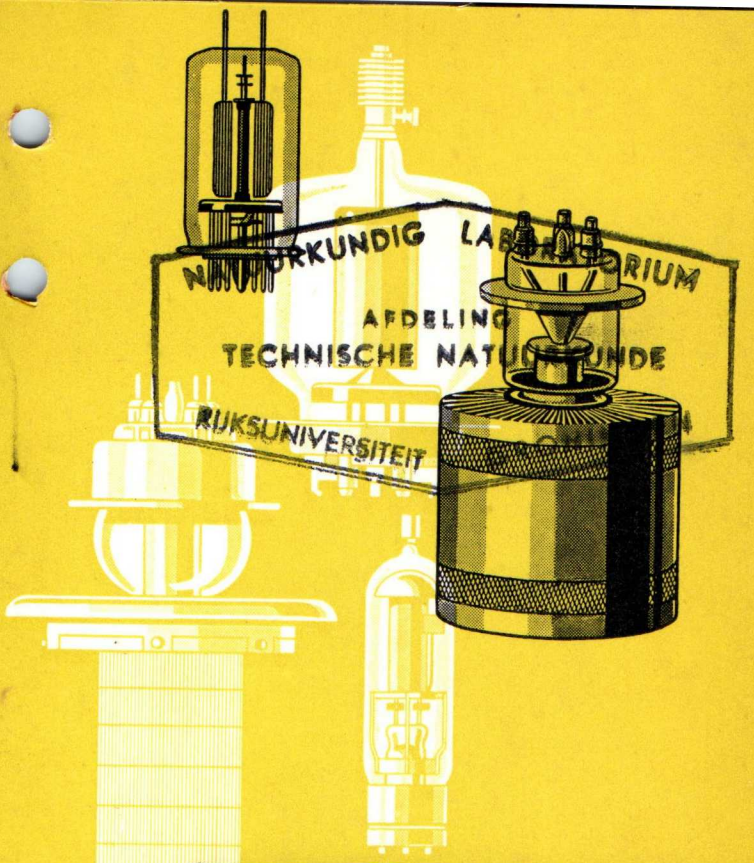
# PHILIPS HANDBOOK

## electron tubes

VOLUME IV




# TRANSMITTING TUBES

PHILIPS ELECTRONIC TUBE DIVISION

# HIGH TENSION RECTIFYING TUBES

| Max. peak inverse voltage | Max. D.C. output current: 0.25 A | 1.25 A | 1.5 A | 2.5 A | 3 A | 15 A |
|---|---|---|---|---|---|---|
| 10 kV | DCG4/1000G (866A)<br>DCX4/1000 (3B28) | DCX4/5000 (4B32) | | | | |
| 13 kV | | | DCG5/5000GB (872A)<br>DCG5/5000GS (8008) | | | |
| 15 kV | | | | | DCG6/18 (6693) | DCG7/100 [1])<br>DCG7/100B [1]) (6786) |
| 21 kV | | | | DCG9/20 (6508)<br>ZT1000 [1]) (8270) | | |
| 27 kV | | | | DCG12/30 [1]) (5870) | | |

[1]) Grid controlled

PREFERRED TYPES

# PREFERRED TYPES

## TRANSMITTING TUBES

| Triodes | |
|---|---|
| TB2.5/400 | TBL7/8000 |
| TB3/750 | TBW7/8000 |
| TBL2/500 | TBL12/40 |
| TBL6/20 | TBL12/100 |
| TBW6/20 | TBW12/100 |
| TBL6/6000 | YD1010 |
| TBW6/6000 | |

| Tetrodes | |
|---|---|
| QB3/200 | QE05/40H |
| QB3/300 | QE08/200 |
| QB3.5/750 | QE08/200H |
| QB4/1100 | QEL2/200 |
| QB5/1750 | QEL2/275 |
| QB5/2000 | YL1000 |
| QBL3.5/2000 | YL1100 |
| QBL4/800 | YL1101 |
| QBL5/3500 | YL1102 |
| QBW5/3500 | YL1103 |
| QC05/35 | YL1110 |
| QE05/40 | YL1120 |
| QE05/40F | YL1150 |
| | YL1200 |

| Double tetrodes | |
|---|---|
| QQC03/14 | YL1020 |
| QQE02/5 | YL1060 |
| QQE03/12 | YL1070 |
| QQE03/20 | YL1071 |
| QQE04/5 | YL1080 |
| QQE06/40 | YL1130 |

| Pentodes |
|---|
| PE1/100 |

## OSCILLATOR TUBES

| | | | |
|---|---|---|---|
| TB2.5/400 | TBL2/400 | TBH7/8000 | TBL12/25 |
| TB3/750 | TBH6/14 | TBL7/8000 | TBW12/25 |
| TB4/1500 | TBL6/14 | TBW7/8000 | TBL12/38 |
| TB5/2500 | TBW6/14 | TBH7/9000 | TBW12/38 |
| TBL2/300 | TBL6/4000 | TBL7/9000 | TBL12/100 |
| | TBH6/6000 | TBW7/9000 | TBW12/100 |
| | | | YD1010 |

TRANSMITTING TUBES
TUBES ÉMETTEURS
SENDERÖHREN

The inclusion of a type number in this list does not necessarily imply its availability

La figuration d'un numéro de type sur cette liste n'implique pas nécessairement que le tube est livrable

Das Vorkommen einer Typennummer in dieser Liste bedeutet nicht dass die Röhre tatsächlich lieferbar ist


| Description<br>Umschreibung | Page<br>Seite | Date<br>Datum |
|---|---|---|
| Preferred type lists<br>Listes de types préférés<br>Vorzugstypenlisten | T21, T22 | 1. 1.1962 |
| Contents<br>Index<br>Inhalt | T1, T2 | 11.11.1961 |
| | T3, T4 | 11.11.1961 |
| | T5, T6 | 11.11.1961 |
| | T7, T8 | 11.11.1961 |
| | T9 | 11.11.1961 |
| Application directions<br>Indications d'application<br>Anwendungsrichtlinien | | |
| Transmitting Tubes<br>A. Tubes Emetteurs<br>Senderöhren | T101, T102 | 3. 3.1956 |
| | T103, T104 | 3. 3.1956 |
| | T105, T106 | 6. 6.1954 |
| | T107, T108 | 6. 6.1954 |
| | T109, T110 | 6. 6.1954 |
| | T111, T112 | 6. 6.1954 |
| | T113 | 6. 6.1954 |
| High voltage rectifiers<br>B. Redresseurs de haute tension<br>Hochspannungsgleichrichter | T131, T132 | 7. 7.1956 |
| | T133, T134 | 7. 7.1956 |
| | T135, T136 | 7. 7.1956 |
| | T137, T138 | 7. 7.1956 |
| Rectifying tube circuits<br>Circuits de tubes redresseurs<br>Schaltungen von Gleichrichterröhren | T150 | 12.12.1955 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| DCG 1/250 | 1,2 | 4. 4.1955 |
| | 3,A | 3. 3.1955 |
| DCG1.5/250 | 1,2 | 4. 4.1955 |
| DCG 4/1000 | 1,2 | 4. 4.1955 |
| | 3,4 | 4. 4.1955 |
| | A | 3. 3.1955 |
| DCG 4/5000 | 1,2 | 4. 4.1955 |
| | 3,4 | 4. 4.1955 |
| | A | 3. 3.1955 |
| DCG 5/30 | 1,2 | 4. 4.1955 |
| DCG5/5000EG<br>DCG5/5000GB | 1 | 3. 3.1956 |
| DCG5/5000GS | 1,2 | 3. 3.1956 |
| | 3,4 | 3. 3.1956 |
| | A | 3. 3.1956 |
| DCG 6/18 | 1,2 | 1. 1.1958 |
| | 3,4 | 1. 1.1958 |
| | 5 | 1. 1.1958 |
| | A,B | 1. 1.1956 |
| DCG 6/6000 | 1,2 | 10.10.1955 |
| | 3,4 | 10.10.1955 |
| | A,B | 4. 4.1951 |
| | C,D | 4. 4.1951 |
| DCG 7/100<br>DCG 7/100B | 1,2 | 12.12.1955 |
| | 3,4 | 12.12.1955 |
| | 5 | 12.12.1955 |
| | A,B | 1. 1.1956 |
| DCG 9/20 | 1,2 | 6. 6.1960 |
| | 3,4 | 3. 3.1955 |
| | A | 3. 3.1955 |
| DCG 12/30 | 1,2 | 3. 3.1955 |
| | 3,4 | 3. 3.1955 |
| | 5 | 6. 6.1954 |
| | A,B | 3. 3.1955 |
| | C,D | 5. 5.1951 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| DCX 4/1000 | 1,2 | 10.10.1955 |
| | 3,4 | 4. 4.1955 |
| DCX 4/5000 | 1,2 | 4. 4.1955 |
| | 3,4 | 4. 4.1955 |
| MA 4/500 | 1,2 | 7. 7.1954 |
| MC 1/60 | 1,2 | 7. 7.1954 |
| PB 2/200 | 1,2 | 7. 7.1954 |
| | 3,4 | 14. 3.1949 |
| | 5,6 | 14. 3.1949 |
| | A,B | 6. 5.1949 |
| | C | 6. 5.1949 |
| PB 2/500 | 1,2 | 7. 7.1954 |
| | 3,4 | 3. 3.1949 |
| | 5 | 3. 3.1949 |
| | A,B | 7. 7.1949 |
| | C,D | 18. 3.1949 |
| PB 3/800 | 1,2 | 7. 7.1954 |
| | 3,4 | 5. 4.1949 |
| | 5,6 | 2. 2.1950 |
| | A,B | 7. 7.1949 |
| | C,D | 7. 7.1949 |
| | E,F | 7. 7.1949 |
| | G,H | 7. 7.1949 |
| | I,J | 7. 7.1949 |
| | K,L | 7. 7.1949 |
| | M,N | 7. 7.1949 |
| PB 3/1000 | 1,2 | 7. 7.1954 |
| PC 05/15 | 1,2 | 7. 7.1954 |
| PE 05/25 | 1,2 | 7. 7.1954 |
| | 3,4 | 3. 3.1950 |
| | 5,A | 7. 7.1954 |

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| Type Typ | Page Seite | Date Datum |
|---|---|---|
| PE 05/25 | B,C | 7. 7.1954 |
| | D,E | 7. 7.1954 |
| | F,G | 7. 7.1954 |
| | H,I | 7. 7.1954 |
| | J,K | 7. 7.1954 |
| PE 06/40 | 1,2 | 7. 7.1954 |
| | 3,4 | 7. 7.1954 |
| | 5,6 | 8. 8.1949 |
| | A,B | 7. 7.1954 |
| | C,D | 9. 9.1949 |
| | E,F | 9. 9.1949 |
| | G | 9. 9.1949 |
| PE 1/80 | 1,2 | 7. 7.1954 |
| PE 1/100 | 1,2 | 2. 2.1959 |
| | 3,4 | 10.10.1955 |
| | 5 | 7. 7.1954 |
| | A,B | 7. 7.1954 |
| | C,D | 7. 7.1954 |
| | E,F | 7. 7.1954 |
| | G,H | 10.10.1955 |
| | I,J | 1. 1.1956 |
| | K | 1. 1.1956 |
| QB 2/250 | 1,2 | 10.10.1956 |
| | 3,4 | 10.10.1956 |
| | 5,6 | 10.10.1956 |
| | 7,8 | 10.10.1956 |
| | 9,10 | 10.10.1956 |
| | 11,12 | 10.10.1956 |
| | A,B | 6. 6.1954 |
| | C,D | 6. 6.1954 |

| Type Typ | Page Seite | Date Datum |
|---|---|---|
| QB2/250 | E,F | 6. 6.1954 |
| QB3/200 | 1,2 | 4. 4.1961 |
| | 3,4 | 4. 4.1961 |
| | 5,6 | 4. 4.1961 |
| | 7 | 4. 4.1961 |
| | A,B | 4. 4.1961 |
| | C,D | 4. 4.1961 |
| QB3/300 | 1,2 | 7. 7.1954 |
| | 3,4 | 9. 9.1960 |
| | 5,6 | 3. 3.1956 |
| | 7,8 | 7. 7.1954 |
| | A,B | 6. 6.1958 |
| | C,D | 6. 6.1958 |
| | E,F | 6. 6.1958 |
| | G,H | 6. 6.1958 |
| | I,J | 7. 7.1954 |
| | K,L | 7. 7.1954 |
| | M,N | 7. 7.1954 |
| | O,P | 7. 7.1954 |
| | Q | 7. 7.1954 |
| QB3/300GA | 1 | 7. 7.1960 |
| QB3.5/750 | 1,2 | 7. 7.1954 |
| | 3,4 | 9. 9.1960 |
| | 5,6 | 7. 7.1954 |
| | 7,8 | 3. 3.1957 |
| | 9 | 1. 1.1956 |
| | A,B | 7. 7.1954 |
| | C,D | 7. 7.1958 |
| | E,F | 7. 7.1958 |
| | G,H | 7. 7.1958 |
| | I,J | 7. 7.1958 |
| | K,L | 7. 7.1958 |
| | M,N | 7. 7.1954 |
| | O,P | 7. 7.1954 |
| | Q,R | 7. 7.1954 |
| | S,T | 7. 7.1954 |
| | U,V | 7. 7.1954 |
| | W | 7. 7.1954 |
| QB 3.5/ /750GA | 1 | 7. 7.1960 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| QB 4/1100 | 1,2 | 5. 5.1959 |
| | 3,4 | 9. 9.1960 |
| | 5,6 | 1. 1.1960 |
| | 7,8 | 5. 5.1959 |
| | 9,10 | 5. 5.1959 |
| | A,B | 3. 3.1960 |
| | C,D | 3. 3.1960 |
| | E,F | 3. 3.1960 |
| | G | 3. 3.1960 |
| QB 4/<br>/1100GA | 1 | 7. 7.1960 |
| QB 5/1750 | 1,2 | 10.10.1955 |
| | 3,4 | 10.10.1955 |
| | 5,6 | 10.10.1955 |
| | 7,8 | 10.10.1955 |
| | 9,10 | 10.10.1955 |
| | A,B | 12.12.1952 |
| | C,D | 7. 7.1954 |
| | E,F | 7. 7.1954 |
| | G,H | 12.12.1952 |
| | I,J | 7. 7.1954 |
| | K,L | 10.10.1955 |
| | M,N | 10.10.1955 |
| QBL4/800 | 1,2 | 9. 9.1957 |
| | 3,4 | 7. 7.1960 |
| | 5,A | 9. 9.1957 |
| QBL5/3500 | 1,2 | 10.10.1955 |
| | 3,4 | 2. 2.1959 |
| | 5,6 | 2. 2.1956 |
| | 7,8 | 5. 5.1959 |
| | 9,10 | 1. 1.1956 |
| | 11,12 | 1. 1.1956 |
| | 13,14 | 1. 1.1956 |
| | A,B | 7. 7.1954 |
| | C,D | 7. 7.1954 |
| | E,F | 7. 7.1954 |
| | G,H | 7. 7.1954 |
| | I,J | 7. 7.1954 |
| | K | 7. 7.1954 |
| QBW5/3500 | 1,2 | 3. 3.1955 |
| | 3,4 | 2. 2.1959 |
| | 5,6 | 2. 2.1956 |
| | 7,8 | 5. 5.1959 |
| | 9,10 | 1. 1.1956 |
| | 11,12 | 1. 1.1956 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| QBW5/3500 | 13,14 | 1. 1.1956 |
| | A,B | 11.11.1952 |
| | C,D | 11.11.1952 |
| | E,F | 11.11.1952 |
| | G,H | 7. 7.1954 |
| | I,J | 12.12.1952 |
| QC05/35 | 1,2 | 10.10.1961 |
| | 3,4 | 10.10.1961 |
| | 5 | 10.10.1961 |
| | A,B | 10.10.1961 |
| | C,D | 10.10.1961 |
| QE04/10 | 1,2 | 3. 3.1957 |
| | 3,4 | 7. 7.1950 |
| | A,B | 7. 7.1950 |
| | C | 7. 7.1950 |
| QE 05/40 | 1,2 | 12.12.1958 |
| | 3,4 | 10.10.1956 |
| | 5,6 | 12.12.1958 |
| | 7,8 | 10.10.1956 |
| | 9,10 | 10.10.1956 |
| | 11 | 10.10.1956 |
| | A,B | 3. 3.1957 |
| | C,D | 3. 3.1957 |
| | E,F | 3. 3.1957 |
| | G,H | 3. 3.1957 |
| | I | 3. 3.1957 |
| QE 05/40F<br>QE 05/40H | 1 | 2. 2.1960 |
| QE 06/50 | 1,2 | 3. 3.1959 |
| | 3,4 | 10.10.1956 |
| | 5,6 | 10.10.1956 |
| | 7,8 | 10.10.1956 |
| | 9,10 | 10.10.1956 |
| | 11,12 | 10.10.1956 |
| | 13,14 | 10.10.1956 |
| | A,B | 3. 3.1957 |
| | C,D | 3. 3.1957 |
| | E,F | 3. 3.1957 |
| | G | 3. 3.1957 |
| QE 08/200 | 1,2 | 9. 9.1960 |
| | 3,4 | 5. 5.1959 |
| | 5,6 | 5. 5.1959 |
| | A,B | 6. 6.1960 |
| | C,D | 6. 6.1960 |
| | E,F | 6. 6.1960 |
| | G,H | 6. 6.1960 |
| | I,J | 6. 6.1960 |
| | K,L | 6. 6.1960 |
| | M | 6. 6.1960 |
| QE08/200H | 1 | 7. 7.1960 |

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| Type<br>Type | Page<br>Seite | Date<br>Datum |
|---|---|---|
| QEL 1/150 | 1,2 | 12.12.1958 |
| | 3,4 | 12.12.1958 |
| | 5,6 | 1. 1.1958 |
| | 7,8 | 1. 1.1958 |
| | 9,10 | 1. 1.1958 |
| | 11 | 1. 1.1958 |
| | A,B | 2. 2.1957 |
| | C,D | 2. 2.1957 |
| QEL 2/250 | 1,2 | 1. 1.1960 |
| | 3,4 | 1. 1.1960 |
| | 5,6 | 1. 1.1960 |
| | 7,8 | 4. 4.1961 |
| | 9,10 | 4. 4.1961 |
| | 11 | 4. 4.1961 |
| | A,B | 7. 7.1960 |
| | C | 7. 7.1960 |
| QQC04/15 | 1,2 | 10.10.1955 |
| | 3,4 | 7. 7.1954 |
| | 5,6 | 3. 3.1955 |
| | 7,8 | 7. 7.1954 |
| | 9,10 | 7. 7.1954 |
| | 11,12 | 7. 7.1954 |
| | 13,14 | 7. 7.1954 |
| | A,B | 7. 7.1954 |
| | C,D | 7. 7.1954 |
| | E,F | 7. 7.1954 |
| | G,H | 7. 7.1954 |
| | I,J | 7. 7.1954 |
| | K,L | 7. 7.1954 |
| | M,N | 7. 7.1954 |
| QQE 02/5 | 1,2 | 9. 9.1957 |
| | 3,4 | 4. 4.1961 |
| | 5,6 | 9. 9.1957 |
| | A,B | 9. 9.1957 |
| | C,D | 9. 9.1957 |
| | E,F | 9. 9.1957 |
| QQE 03/12 | 1,2 | 3. 3.1956 |
| | 3,4 | 3. 3.1956 |
| | 5,6 | 4. 4.1955 |
| | 7,8 | 3. 3.1956 |
| | 9,10 | 2. 2.1956 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| QQE 03/12 | A,B | 3. 3.1955 |
| | C,D | 3. 3.1955 |
| | E,F | 3. 3.1955 |
| | G,H | 3. 3.1955 |
| | I,J | 3. 3.1955 |
| | K,L | 3. 3.1955 |
| | M,N | 3. 3.1955 |
| | O | 3. 3.1955 |
| QQE 03/20 | 1,2 | 3. 3.1957 |
| | 3,4 | 4. 4.1961 |
| | 5,6 | 4. 4.1961 |
| | 7 | 3. 3.1955 |
| | A,B | 7. 7.1954 |
| | C,D | 7. 7.1954 |
| | E,F | 7. 7.1954 |
| | G,H | 7. 7.1954 |
| QQE 04/5 | 1,2 | 9. 9.1960 |
| | 3,4 | 12.12.1958 |
| | A,B | 12.12.1958 |
| | C,D | 12.12.1958 |
| | E,F | 12.12.1958 |
| QQE 04/20 | 1,2 | 7. 7.1954 |
| | 3,4 | 7. 7.1954 |
| | 5,6 | 7. 7.1954 |
| | A,B | 7. 7.1954 |
| QQE 06/40 | 1,2 | 5. 5.1959 |
| | 3,4 | 10.10.1955 |
| | 5,6 | 10.10.1955 |
| | 7,8 | 2. 2.1956 |
| | 9,10 | 2. 2.1956 |
| | 11 | 2. 2.1956 |
| | A,B | 7. 7.1954 |
| | C,D | 7. 7.1954 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| QQE 06/40 | E,F | 7. 7.1954 |
| | G,H | 5. 5.1951 |
| | I,J | 5. 5.1951 |
| | K,L | 5. 5.1951 |
| | M | 6. 6.1953 |
| TAL 12/10 | 1,2 | 6. 6.1951 |
| TAW 12/10 | 3,4 | 4. 4.1950 |
| | 5,6 | 4. 4.1950 |
| | 7,8 | 6. 6.1952 |
| | 9,10 | 4. 4.1950 |
| | A,B | 6. 6.1950 |
| | C,D | 4. 4.1950 |
| | E,F | 4. 4.1950 |
| | G,H | 4. 4.1950 |
| | I,J | 4. 4.1950 |
| | K,L | 4. 4.1950 |
| | M,N | 4. 4.1950 |
| TAL 12/20 | 1,2 | 6. 6.1951 |
| TAW 12/20 | 3,4 | 8. 8.1949 |
| | 5,6 | 4. 4.1950 |
| | 7 | 3. 3.1959 |
| | A,B | 6. 6.1951 |
| | C,D | 4. 4.1950 |
| | E,F | 8. 8.1949 |
| | G,H | 6. 6.1951 |
| | I | 6. 6.1951 |
| TAL 12/35 | 1,2 | 7. 7.1954 |
| | 3,4 | 7. 7.1954 |
| | 5,6 | 3. 3.1951 |
| | 7 | 7. 7.1954 |
| | A,B | 7. 7.1954 |
| | C,D | 7. 7.1954 |
| | E,F | 7. 7.1954 |
| | G,H | 3. 3.1955 |
| | I,J | 7. 7.1954 |
| | K,L | 7. 7.1954 |
| | M,N | 7. 7.1954 |
| | O | 7. 7.1954 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| TAW12/35G | 1,2 | 7. 7.1954 |
| | 3,4 | 7. 7.1954 |
| | 5,6 | 3. 3.1951 |
| | 7 | 3. 3.1951 |
| | A,B | 3. 3.1951 |
| | C,D | 3. 3.1951 |
| | E,F | 3. 3.1951 |
| | G,H | 3. 3.1955 |
| | I,J | 3. 3.1951 |
| | K,L | 3. 3.1951 |
| | M,N | 3. 3.1951 |
| TB 2/200 | 1,2 | 7. 7.1954 |
| TB 2/500 | 1,2 | 7. 7.1954 |
| TB 2.5/300 | 1,2 | 5. 5.1959 |
| | 3,4 | 9. 9.1960 |
| | 5,6 | 4. 4.1950 |
| | 7,8 | 6. 6.1951 |
| | A,B | 7. 7.1949 |
| | C,D | 7. 7.1949 |
| | E,F | 7. 7.1949 |
| | G,H | 28. 8.1949 |
| | I,J | 6. 6.1951 |
| | K,L | 6. 6.1951 |
| TB 2.5/400 | 1,2 | 9. 9.1960 |
| | 3,4 | 2. 2.1959 |
| | 5,6 | 2. 2.1959 |
| | 7,8 | 2. 2.1959 |
| | 9,A | 2. 2.1959 |
| | B,C | 2. 2.1959 |

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| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| TB3/350 | 1,2 | 1. 1.1956 |
| | 3,4 | 1. 1.1956 |
| | 5 | 1. 1.1956 |
| | A,B | 1. 1.1956 |
| TB 3/750 | 1,2 | 6. 6.1959 |
| | 3,4 | 9. 9.1960 |
| | 5,6 | 5. 5.1959 |
| | 7,8 | 5. 5.1959 |
| | 9,10 | 5. 5.1959 |
| | 11,12 | 5. 5.1959 |
| | A,B | 11.11.1950 |
| | C,D | 11.11.1950 |
| | E,F | 11.11.1950 |
| | G,H | 5. 5.1951 |
| | I,J | 5. 5.1951 |
| | K | 5. 5.1951 |
| TB 3/1000 | 1,2 | 7. 7.1954 |
| TB 3/2000 | 1,2 | 7. 7.1954 |
| | 3,4 | 10.10.1949 |
| | A,B | 10.10.1949 |
| | C,D | 10.10.1949 |
| | E | 10.10.1949 |
| TB 4/800 | 1,2 | 1. 1.1956 |
| | 3,4 | 1. 1.1956 |
| | 5 | 1. 1.1956 |
| | A,B | 1. 1.1956 |
| TB 4/1250 | 1,2 | 5. 5.1959 |
| | 3,4 | 12.12.1954 |
| | 5,6 | 7. 7.1954 |
| | 7,8 | 7. 7.1954 |
| | 9 | 3. 3.1955 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| TB 4/1250 | A,B | 7. 7.1954 |
| | C,D | 2. 2.1957 |
| | E,F | 2. 2.1957 |
| | G,H | 2. 2.1957 |
| TB 4/1500 | 1,2 | 10.10.1959 |
| | 3,4 | 10.10.1959 |
| | 5,6 | 10.10.1959 |
| | 7,8 | 10.10.1959 |
| | A,B | 9. 9.1959 |
| TB 5/2500 | 1,2 | 9. 9.1959 |
| | 3,4 | 9. 9.1959 |
| | 5,6 | 9. 9.1959 |
| | 7,8 | 9. 9.1959 |
| | A,B | 9. 9.1959 |
| TBL 2/300 | 1,2 | 6. 6.1958 |
| | 3,4 | 6. 6.1958 |
| | 5,6 | 6. 6.1958 |
| | A,B | 3. 3.1956 |
| | C,D | 3. 3.1956 |
| TBL 2/400 | 1,2 | 5. 5.1959 |
| | 3,4 | 6. 6.1960 |
| | 5,A | 6. 6.1960 |
| | B,C | 5. 5.1959 |
| TBL 2/500 | 1,2 | 10.10.1959 |
| | 3 | 10.10.1959 |
| | A,B | 9. 9.1960 |
| | C | 9. 9.1960 |
| TBL 6/14 | 1,2 | 6. 6.1960 |
| | 3,4 | 6. 6.1960 |
| | A,B | 6. 6.1960 |
| | C,D | 6. 6.1960 |
| | E,F | 6. 6.1960 |
| | G,H | 6. 6.1960 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| TBL 6/20 | 1,2 | 9. 9.1957 |
| | 3,4 | 9. 9.1957 |
| | 5,6 | 9. 9.1957 |
| | A,B | 12.12.1957 |
| | C,D | 12.12.1957 |
| | E,F | 4. 4.1961 |
| | G | 4. 4.1961 |
| TBL6/4000 | 1,2 | 11.11.1960 |
| | 3,4 | 11.11.1960 |
| | 5,6 | 11.11.1960 |
| | A,B | 11.11.1960 |
| TBL6/6000 | 1,2 | 3. 3.1956 |
| | 3,4 | 2. 2.1959 |
| | 5,6 | 7. 7.1954 |
| | 7,8 | 7. 7.1954 |
| | 9,10 | 7. 7.1954 |
| | 11,12 | 7. 7.1954 |
| | 13,14 | 7. 7.1954 |
| | 15 | 7. 7.1954 |
| | A,B | 7. 7.1958 |
| | C,D | 7. 7.1958 |
| | E,F | 7. 7.1954 |
| | G,H | 7. 7.1954 |
| | I,J | 7. 7.1954 |
| | K,L | 7. 7.1954 |
| | M,N | 7. 7.1954 |
| | O | 7. 7.1954 |
| TBL7/8000 | 1,2 | 3. 3.1961 |
| | 3,4 | 3. 3.1961 |
| | 5,6 | 3. 3.1961 |
| | 7 | 3. 3.1961 |
| | A,B | 9. 9.1956 |
| | C,D | 4. 4.1959 |
| | E | 9. 9.1956 |
| TBL7/9000 | 1,2 | 10.10.1961 |
| | 3,4 | 10.10.1961 |
| | A,B | 10.10.1961 |
| TBL 12/25 | 1,2 | 1. 1.1960 |
| | 3,4 | 1. 1.1960 |
| | A,B | 1. 1.1960 |
| TBL 12/38 | 1,2 | 5. 5.1960 |
| | 3,4 | 5. 5.1960 |
| | A,B | 5. 5.1960 |
| | C,D | 5. 5.1960 |
| | E,F | 5. 5.1960 |
| | G | 5. 5.1960 |
| TBL 12/40 | 1,2 | 5. 5.1960 |
| | 3,4 | 6. 6.1958 |
| | 5,6 | 9. 9.1958 |

| Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|
| TBL 12/40 | A,B | 7. 7.1958 |
| | C | 7. 7.1958 |
| TBL 12/100 | 1,2 | 3. 3.1955 |
| | 3,4 | 7. 7.1954 |
| | 5,6 | 7. 7.1954 |
| | 7,8 | 2. 2.1956 |
| | 9 | 7. 7.1954 |
| | A,B | 7. 7.1954 |
| | C,D | 7. 7.1954 |
| | E,F | 4. 4.1955 |
| | G | 4. 4.1955 |
| TBL 15/125 | 1 | 3. 3.1958 |
| TBW 6/14 | 1,2 | 6. 6.1960 |
| | 3,4 | 10.10.1961 |
| | A,B | 6. 6.1960 |
| | C,D | 6. 6.1960 |
| | E | 6. 6.1960 |
| TBW 6/20 | 1,2 | 9. 9.1957 |
| | 3,4 | 9. 9.1957 |
| | 5,6 | 9. 9.1957 |
| | A,B | 12.12.1957 |
| | C,D | 12.12.1957 |
| | E,F | 4. 4.1961 |
| TBW 6/6000 | 1,2 | 7. 7.1954 |
| | 3,4 | 2. 2.1959 |
| | 5,6 | 3. 3.1955 |
| | 7,8 | 7. 7.1954 |
| | 9,10 | 7. 7.1954 |
| | 11,12 | 3. 3.1955 |
| | 13,14 | 7. 7.1954 |
| | 15,16 | 7. 7.1954 |
| | A,B | 7. 7.1958 |
| | C,D | 7. 7.1958 |
| | E,F | 7. 7.1954 |
| | G,H | 7. 7.1954 |
| | I,J | 7. 7.1954 |
| | K,L | 7. 7.1954 |
| | M,N | 7. 7.1954 |

The inclusion of a type number in this list does not necessarily imply its availability
La figuration d'un numéro de type sur cette liste n'implique pas nécessairement qu'il est livrable
Das Vorkommen einer Typennummer in dieser Liste bedeutet nicht dass sie tatsächlich lieferbar ist

| Type<br>Typ | Page<br>Seite | Date<br>Datum | Type<br>Typ | Page<br>Seite | Date<br>Datum |
|---|---|---|---|---|---|
| TBW7/8000 | 1,2 | 3. 3.1961 | | | |
| | 3,4 | 3. 3.1961 | | | |
| | 5,6 | 3. 3.1961 | | | |
| | 7 | 3. 3.1961 | | | |
| | A,B | 9. 9.1956 | | | |
| | C,D | 9. 9.1956 | | | |
| TBW7/9000 | 1,2 | 10.10.1961 | | | |
| | 3,4 | 10.10.1961 | | | |
| | A | 10.10.1961 | | | |
| TBW12/25 | 1,2 | 1. 1.1960 | | | |
| | 3,4 | 7. 7.1960 | | | |
| | A,B | 1. 1.1960 | | | |
| TBW12/38 | 1,2 | 5. 5.1960 | | | |
| | 3,4 | 5. 5.1960 | | | |
| | A,B | 5. 5.1960 | | | |
| | C,D | 5. 5.1960 | | | |
| | E | 5. 5.1960 | | | |
| TBW12/100 | 1,2 | 3. 3.1955 | | | |
| | 3,4 | 7. 7.1954 | | | |
| | 5,6 | 7. 7.1954 | | | |
| | 7,8 | 7. 7.1954 | | | |
| | 9,10 | 2. 2.1956 | | | |
| | A,B | 7. 7.1954 | | | |
| | C,D | 7. 7.1954 | | | |
| | E,F | 4. 4.1955 | | | |
| TBW15/125 | 1 | 3. 3.1958 | | | |
| ZT1000 | 1,2 | 10.10.1961 | | | |
| | 3,4 | 10.10.1961 | | | |
| | 5 | 10.10.1961 | | | |
| | A,B | 10.10.1961 | | | |

# EXPLANATION OF THE TECHNICAL DATA OF PHILIPS TRANSMITTING TUBES.

## I. GENERAL

I-1. In this section of the Electronic Tube Handbook, data and curves are given for transmitting tubes and associated rectifying tubes.

I-2. The tubes of this section may be classified in three groups:

a. preferred types, recommended for use in newly designed equipment.
b. maintenance types, although in production, these tubes are not recommended for newly designed equipment.
c. stock-only types; in general these types can only be delivered from stock. After some time they may no longer be available.

In this Handbook full particulars are given of preferred and maintenance types; data of stock-only types are given only in condensed form, omitting operating conditions. Data on obselete types are not submitted at all.

A list of preferred, maintenance and stock-only types is to be found on a separate sheet following the index. This list will be compiled and published again at regular intervals.

I-3. Classification of the technical data

The technical data of the transmitting tubes may be classified under three headings:

a. characteristic data
b. operating conditions and limiting values
c. characteristic curves

We have tried to word the necessary information concerning the operation of the tubes so as to ensure quick handling of the corresponding data.

## II. CHARACTERISTIC DATA

II-1. The characteristic data on the first pages corresponding to each type comprise various general information independent of any specific kind of operation. These data, e.g. that on filament current, amplification factor, mutual conductance, capacitances, etc. should be regarded as pertaining to an average tube representative of that particular type.

II-2. Filaments, heaters

The published nominal value of the filament (heater) voltage is generally the value to which the voltage should be adjusted.

The published filament current is an average value, consequently deviations from this value may occur in practice.

If series feed of the filaments of transmitting tubes is desired, the user is invited to apply to us for the necessary information.

In the case of D.C. fed cathodes the polarity of the filament voltage must be changed regularly for instance each month. This ensures uniform wear of the filament and consequently longer life. This change-over is necessary especially in the case of tubes with external anode.

II-2a. Pure tungsten cathodes (A-cathodes)

The published filament voltage is the maximum voltage that can be required for a new tube to supply the rated output power. But in most cases a lower filament voltage will suffice and this of course will result in a correspondingly longer life. In order to facilitate the adjustment of the filament voltage, every tube with tungsten cathode is supplied with a list stating the emission of that tube as a function of the filament voltage. Provided the necessary emission current is known, the filament voltage can be simply adjusted to the exact value required in each particular case.

Another method of adjusting the filament voltage of each tube with pure tungsten cathode is to decrease the voltage until the desired output power or the maximum permissible distortion is reached. When modulation is applied the voltage should be adjusted so as to obtain the peak output power.

Adjustment of the filament voltage will have to be repeated regularly, for instance monthly, or as soon as the output has reached too low a value or the distortion becomes inadmissibly high.

The nominal value of the filament voltage should on no account be exceeded, as otherwise the life guarantee will be void. If, however, the emission current becomes too low after the expiry of the guarantee period, the filament voltage can be raised above the nominal value.

The meter for measuring the filament voltage should be connected directly to the filament terminals of the tube and should have an accuracy of ± 1% in the voltage range concerned. In general it will be necessary to check the meter monthly with a precision instrument.

In order to allow for mains voltage fluctuations it will be necessary to apply automatic control or control by hand of the filament voltage when the tube is used with nominal filament voltage at nominal mains voltage. When the tube is used with lower filament voltage without control, this will be permissible only when the mains voltage fluctuations do not cause the nominal filament voltage to be exceeded.

II-2b. Thoriated tungsten cathodes (B-cathodes)

In order to attain the maximum life of these cathodes, the filament voltage should be as near as possible to its nominal

value. Both under and overheating may be harmful. The maximum temporarily permissible deviation is ± 5% and the continuously permissible deviation ± 1%. For measuring the filament voltage see section II-2a.

II-2c. Directly heated oxide coated cathodes (C-cathodes)

For maximum life the filament voltage should be as near as possible to its nominal value. The maximum permissible temporary deviation is ± 10%, for mercury-vapour filled valves ± 5%

II-2d. Indirectly heated oxide coated cathodes (E-cathodes)

For adjustment of the heater voltage see section II-2c. The occurrence of H.F. voltages between heater and cathode may give rise to faulty H.F. insulation and high H.F. losses, necessitating high driving power and increased cathode temperature. These voltages should therefore be avoided by by-passing the heater to cathode insulation and decoupling the heater at V.H.F. and U.H.F. The D.C. voltage between heater and cathode should be as low as possible and definitely below the relevant limiting value.

II-2e. Switching on the filament voltage

If a maximum switching-on value of the filament current is not stated in the publications, switching on at full filament voltage is permissible.

It should be stressed that the published values of the maximum permissible filament current during switching on, refer to the absolute maximum of the instantaneous value under the most unfavourable conditions. In the case of A.C. feed this will exist when switching on is performed at the instantaneous peak voltage of the highest mains voltage that may occur. Calculation of the filament circuit, having regard to the maximum current during switching on, is possible when the cold resistance and the filament current to voltage curve are given. The most use in practice is a filament transformer with high magnetic leakage or a series choke or resistor in the primary of the transformer. This choke or resistor may be short-circuited, or not, by means of a relay after a delay of, say, 15 seconds. Generally one switching stage will suffice.

A simple check as to whether the filament current is not exceeded during switching on can be made with the aid of a calibrated cathode-ray oscilloscope connected directly to the filament terminals, the maximum permissible voltage during switching on being found by the product of the published maximum value of the current during switching on and the cold resistance.

II-2f. By-passing of the filament

Where tubes with directly heated cathodes are concerned provision has to be made for the filament terminals to have the same H.F. potential. In the V.H.F. and U.H.F. range by-passing with capacitors will, therefore, be particularly necessary.

II-2g. Position of the filament

If necessary, the mounting position of the tube is stated under the characteristic data.

II-3. Switching on of the anode voltage

Unless prescribed otherwise, simultaneous switching on of filament and anode, grid and screen-grid voltages is permissible for tubes with internal anode. Where tubes with external anode are concerned the positive voltages should be applied only when the cathode has reached its operating temperature, which can be checked by means of the filament current. For rectifying tubes the necessary minimum delay between the switching on of the filament and of the anode voltage is given under the characteristic data. The actual delay required depends on the ambient temperature during starting and can be read from the curve giving the temperature increase of the condensed mercury against time.

II-4. If the filament is fed with D.C. the anode return lead should be connected to the negative end of the filament. If the filament is fed with A.C. the anode return lead should be connected to the transformer mid-tap or to a tapped resistor shunted over the filament.

II-5. Inter-electrode capacitances

The published values of the various capacitances are average values measured on the cold tube, without operating voltages; individual deviation may, however, occur.

The meaning of the various symbols for capacitances can be found in the appertaining list.

The capacitances of each system, as well as the inter-electrode capacitances across the anode and grid circuits in push-pull connection are published in respect of tubes with double electrode systems intended specially for push-pull operation. These latter capacitances are indicated by $C_o$ and $C_i$ respectively.

II-6. Amplification factor $\mu$ and mutual conductance S

The published values are average values, and individual deviations may occur. Normally the anode current at which the values have been measured, is mentioned.

II-7. Saturation current $I_{sat}$

Each one of the large tubes with pure Tungsten cathode is marked with the value of the filament voltage at which the saturation current has a specific value.

II-8. Accessories

Proper functioning of the transmitting tubes can be guaranteed only if accessories have been supplied by the tube manufacturer or have approved by same. This applies to sockets, cooling clips, etc.

## III. LIMITING VALUES

III-1. By limiting values are meant the maximum permissible values of the various tube data. They are given either for all operating conditions together, or for each particular application. In the former case the limiting values should be considered as general physical maxima, in the latter case the maxima have been fixed with reference to the particular kind of operation. If for instance the limiting value of the anode dissipation for anode modulation is in question then a value that refers to the unmodulated condition is given. This value is, however, lower than the physical maximum, since at 100% modulation the anode dissipation is higher than that in the unmodulated state.

III-2. The limiting values are applicable only up to a maximum frequency mentioned in each case. When operating at higher frequencies the limiting values should be decreased to correspond with the curves published for each type of tube.

III-3. Derating of the limiting values

If no limiting values have been published for a specific application use can be made of the following table, mentioning the derating factors which have to be applied in each case.

The values valid for class C telegraphy have been expressed as unity; the limiting values for other applications have been expressed as the ratio to this unity.

Wo = tungsten filament  Th = thoriated tungsten filament

| | | $V_a$ | $I_a$ | $I_g$ | $W_{ia}$ | $W_a$ | $W_{g2}$ |
|---|---|---|---|---|---|---|---|
| H.F. class C telegraphy | | 1 | 1 | 1 | 1 | 1 | 1 |
| Anode modulation | Th | 0.8 | 0.833 | 1 | 0.67 | 0.67 | 0.67 |
| | Wo | 0.8 | 0.5 | 1 | 0.4 | 0.4 | 0.4 |
| H.F. class B | Th | 1 | 0.833 | 1 | 0.833 *) | 1 | 0.67 |
| | Wo | 1 | 0.5 | 1 | 0.5 | 1 | 0.5 |
| L.F. class B | | 1 | 1 | 1 | 1 | 1 | 1 |
| L.F. class AB | | 1 | 1 | 1 | 1 | 1 | 1 |
| L.F. class A | | 1 | 1 | | $W_a$ | 1 | 1 |
| Self-rectifying oscillator | Th | 1.13 | 0.53 | 0.53 | 0.665 | 1 | |
| | Wo | 1.13 | 0.32 | 0.32 | 0.4 | 1 | |
| Two-phase half-wave without filter | Th | 0.9 | 0.89 | 0.89 | 1 | 1 | |
| | Wo | 0.9 | 0.6 | 0.6 | 1 | 1 | |

*) or 1.5 $W_a$

The voltage supply with the aid of a 3-phase rectifier with or without filter is equivalent to D.C. supply.

The above-mentioned derating factors are determined only by the special conditions appertaining to the physical limits of the tube, and do not therefore contain any safety margins. Where mains voltage fluctuations can be expected the actual derating must go on, until the derated values are not exceeded at maximum mains voltage (see section III-4). The nature of operation, e.g. the industrial application of H.F.heating generators, may also require a further safety derating because of the rough nature of the operation (see section V-5).

III-4. Following common practice the limiting values of transmitting tubes have been given as absolute maxima. This means that the maxima should never on any account be exceeded for instance by mains voltage fluctuations, deviations in the values of the circuit parts, tolerances in the tube properties or meter deviations. Each "limiting value" should be regarded independently of other values, so that under no circumstances it is permitted that any "limiting value" be exceeded. If, for instance, the anode voltage is decreased to a value lower than its "limiting value", it is unpermissible to exceed the "limiting value" of anode current or anode dissipation.

Unless explicitly mentioned otherwise, the "limiting values" are referred to D.C.

III-5. The voltages ($V_a$, $V_g$, $V_{g2}$, etc.) mentioned under "limiting values" should not be exceeded, not even with the cold valve. Special attention should be paid to this point in regard to screen-grid supply with a series resistor.

When designing equipment intended for non-stabilized mains voltages, the maximum mains voltage occurring will determine the nominal operating voltages of the tubes; these have to be lower than the "limiting values".

Should it occur that the transmitting tubes, and thus, too, the voltage supply unit, are temporarily under a lower load, their voltages will increase and these increased values occurring at the highest mains voltage will determine the nominal operating voltages.

The "limiting values" of the voltages are D.C. values. If A.C. voltage supply is used or supply with unsmoothed voltage, the "limiting values" must be decreased in accordance with the derating factors shown in the table in section III-3. The publications re some types of tube contain a special table with "limiting values" for these (industrial) applications.

III-6. The "limiting values" of the anode dissipation should not be exceeded when for instance mains voltage fluctuations occur, or when the grid drive fails. In order to prevent damage to the tube, in the case of the latter, adequate fixed bias or a quick action relay in the anode lead should be provided for instance. When forced-air or water-cooling is applied for an anode dissipation smaller than the absolute maximum, the smaller value should of course be regarded as the "limiting value".

III-7. In some cases the published "limiting values" of the input power $W_{ia}$ are smaller than the product of the "limiting values" of anode voltage and anode current; the latter should not then occur simultaneously.

The input power $W_{ia}$ is not always the product of the D.C. values of $I_a$ and $V_a$. For pulsating supply voltage the form factor should be taken into account.

III-8. For the screen-grid dissipation the product of screen-grid voltage and current can always be taken. When secondary emission occurs, this can be ignored.

III-9. The control grid dissipation $W_g$ or $W_{g1}$ can be calculated by taking the power supplied to the grid bias source ($-V_g \times I_g$) from the driving power ($0.9 \times V_{gp} \times I_g$). When A.C. voltage supply or supply with unsmoothed voltage is used the form factor should be taken into account. Secondary emission of the control grid can be ignored.

III-10. By the maximum permissible grid resistance, $R_g$, is meant the D.C. resistance in the grid circuit. A higher value may cause instability.

## IV. OPERATING CONDITIONS

IV-1. General

Tables of operating conditions for the current applications of transmitting tubes such as for instance class C telegraphy, H.F. class B, L.F. class B, etc., have been published. The values for these tables have been measured or calculated from average tubes under optimum conditions. The values measured from a particular tube may therefore show small deviations from the published data. Some of the voltages or currents have to be adjusted to the published values, while others have to be considered as the outcome of measurements and may therefore show deviations from the published data. The published value of the output power, for instance, will be an average value, which, however, can be approximated in practice by correcting e.g. the H.F. or L.F. input voltage $V_{gp}$ when the published value of the output power is not obtained at the nominal value of $V_{gp}$. In connection with the preceding paragraphs it will be useful when designing a transmitter with several stages to leave a margin in the output power and the input voltages.

The published output power of transmitting tubes is the tube output, which means the anode dissipation $W_a$ taken from the anode input $W_{ia}$; losses in the anode circuit and coupling losses are thus not taken into account.

The quoted driving power is assumed to be 0.9 x the product of the average grid current $I_g$ and the peak value of the grid voltage $V_{gp}$. If present, input losses and losses in the grid circuit and the bleeder are not included.

On short wavelengths, where reduced ratings will have to be applied, the required driving power will often be considerably

higher than the published value, and in some cases it may even be determined almost exclusively by circuit losses.

In the published data for transmitting tubes operating conditions for the various applications have been given. The first column of each table generally gives the maximum performance which may be obtained without exceeding any of the limiting values. Moreover, each column mentions the maximum frequency at which the anode voltage concerned and other data are permitted to be applied. These maximum frequencies and data for each tube appear on a chart which usually companies the publication. For application of a tube at frequencies, higher than those mentioned on this chart, the tube manufacturer should be contacted. Should the above-mentioned chart not have been published, linear interpolation between the data given in the tables can be applied.

IV-2. Rectifying tubes

Under the heading "Operating Conditions" in the publications on rectifying tubes, the operational data have been given for 7 rectifying circuits at transformer-voltages at which the stated inverse peak voltage is reached. It should be observed that the average value of the direct voltage supplied to the smoothing filter ($V_o$) is published without taking the transformer regulation or the voltage drops in the tubes into account. For single-phase full-wave rectification the form factor has not been considered.

## V. APPLICATION OF THE "OPERATING CONDITIONS"

V-1. The published "Operating Conditions" cannot be applied in all circumstances, the nature of some services being such, that deviations from the required values will occur, resulting in an infringement of the limiting values. Depending on the kind of service the following classification can be made:

a. Fixed transmitters for broadcasting and telecommunication service operated by a trained staff.
b. Mobile transmitters.
c. Devices for industrial applications, diathermy, supersonics, etc.
d. Amateur transmitters and special applications.
e. Pulsed operation.

V-2. Fixed transmitters

With fixed transmitters it is in general permissible to use the tube under optimum operating conditions at values of $V_a$, $W_a$, etc. equaling the limiting values. The main reasons applying in most cases for this may be summarized as follows: stabilization of the mains voltage automatically or by hand, only very small deviations in the mains voltage owing to the supply being effected via a special high tension line, transmitter load which is practically constant and optimum, the presence of a well-trained staff for immediate repair of faults which might damage the tube, or the presence of automatically functioning safety devices preventing damage to the tube in any circumstances arising in practice.

V-3. Mobile transmitters are transmitters operating in circumstances affected by this mobility. This category includes ship, portable, motorcycle, car and aircraft transmitters. These transmitters will very often have to function with strongly varying supply voltages and with a load that is neither constant nor optimum. Safety devices will be only very imperfect, especially in the smaller types of mobile transmitters, and therefore use of the tube with the published maximum operating conditions is not at all desirable.

The actual operating conditions chosen will depend upon the performance of the transmitter and upon the specific circumstances such as for instance the safety devices, the voltage constancy, the desired life, duty cycle, etc. Because of the inconstancy and uncontrolled operation of transmitters in mobile devices, it will generally be impossible to guarantee the tubes, except for factory defects unrelated to the nature of operation of the tube.

The smaller transmitting tubes with oxide-cathode have been designed especially for mobile devices. The oxide cathode is rather insensitive to heater voltage variations, and the high specific emission permits of rather low anode voltages. The cathode and the electrode system have been constructed so as to form a rugged unit that can be used in non-resilient apparatus.

The vibrations occurring in normal vehicles are of the order of 1 g, whereas shocks of 2.5 g will very seldom occur. In aircraft and in vehicles used over rough ground it will as a rule be necessary to install the tubes in a resilient fitting.

In general, when installed in vehicles, tubes with thoriated tungsten cathode will require a resilient installation. In some cases such an installation will also be required in ships. In movable apparatus such as H.F. generators when a special clamping device is used for preventing the tube from falling out of the socket, care should be taken that no metal parts touch the bulb and that the maximum permissible temperature is not exceeded in any part of the bulb.

V-4. Intermittent service

When data concerning intermittent service are published on a transmitting tube, it is understood that the on-period of operation does not last longer than 5 minutes and that every on-period is followed by an equally long or longer off-period. The cathode, however, may be heated continuously during this kind of operation. Generally only the published or lower adjustments for intermittent service are permissible.

V-5. Industrial application for diathermy, supersonics, etc.

Industrial electronic apparatus may in many respects be distinguished from fixed broadcast and telecommunication transmitters in so far as the use of the tubes is involved. The differences result from:

1. The personnel servicing the equipment being, as a rule, untrained.
2. The variable and, mostly, adjustable load.

3. The mains voltage fluctuations, which normally are considerable and not compensated.
4. The voltage supply without provision against hum.
5. The relative unimportance of the frequency.
6. The intermittent service.

The design for industrial apparatus will for these reasons differ fundamentally from that of normal transmitting apparatus, and generally demands the application of self-oscillating triodes.

In order to obtain a fool-proof apparatus, that cannot be damaged internally by faulty manipulation, the nominal anode voltage has to be so chosen that the limiting values are not exceeded at the maximum occurring mains voltage.

In the case of voltage supply without rectifier or of two-phase half-wave rectification without filter, the positive voltages will be of a pulsating character and the average values of voltages and currents will therefore have to be chosen lower than in the case of normal D.C. supply.

In general the design of industrial apparatus should be such that the limiting values at the highest occurring mains voltage are not exceeded. Special attention should be paid to the grid dissipation and the grid current, since in most cases these values are critical.

In special cases of intermittent service it will be possible to increase the limiting values. Information concerning these possibilities will be supplied on request by the tube manufacturer.

Preference is given to one tube in each H.F. generator. If one tube does not give sufficient output two tubes in parallel can be used. Push-pull operation is not recommended as equal load of the tubes is barely obtained when load and earth capacitance are variable. When two tubes are operated in parallel the use of separate grid resistors and a common grid fuse is recommended.

V-6. Amateur transmitters and special adjustments

The maximum permissible load of a tube is naturally determined by the physical maxima of the tube, incorporated in the limiting values. No guarantee in respect of the tube life can be given if the limiting values are exceeded. This does not imply that exceeding the limiting values will always result in an immediate breakdown of the tube, and in the case of I.C.A.S. ( Intermittent Commercial and Amateur Service), for instance, higher operating conditions have been given (see section V-4). As a rule no guarantee of tube life is given in these cases.

Information with regard to special circuits, adjustments and operating conditions will willingly be supplied on request.

V-7. Pulsed operation

When a tube is used with pulsed operation the pulse time has to be so short that neither will any part of the tube reach an abnormal temperature nor the contingency of flashing-over

have any opportunity to develop into an actual flashing-over. In general the average load will be considerable lower than the maximum load, according to the limiting values

General information on this kind of operation is not yet available. Information, however, will gladly be given on each specific case.

V-8. H.F. class C telegraphy

A class C amplifier or oscillator is an amplifier in which the grid bias is appreciably greater than the cut-off voltage of the $I_a/V_g$-characteristic concerned, so that plate current flows only for less than one half of each cycle of the alternating grid voltage. In practice, a grid bias of 2 to 2.5 times the cut-off voltage will give good results.

The data published are such as will ensure favourable results as to output power and efficiency.

If a grid resistor is used for obtaining automatic grid bias, care should be taken that the anode current does not become too high when the H.F. driving power fails. A safety device in the anode or screen-grid lead will be desirable for this purpose.

V-9. H.F. class C anode modulation

For H.F. class C anode modulation the anode voltage of an H.F. class C amplifier is modulated with L.F. For 100 % modulation the anode voltage is varied from zero to twice the D.C. value of the voltage. With screen-grid tubes the screen grid should also be modulated to prevent it from being overloaded. The average value of the grid bias and the H.F. driving voltage remain constant during the modulation. With 100 % modulation the average anode dissipation is 1.5 times its value without modulation.

The published limiting value of the anode dissipation refers to the value without modulation. The higher dissipation with modulation is, however, taken into consideration.

In this application automatic grid bias by means of a grid leak can be applied. In order to prevent damage to the tube when the driving voltage fails, partly fixed bias is recommended.

The modulation power published in the data sheets is the power supplied to the modulated H.F. stage. When the modulating stage is being calculated, 5 to 10 % will have to be added for losses in transformer and choke.

V-10. H.F. class B telephony

A class B amplifier is an amplifier in which the grid bias is approximately equal to the cut-off voltage of the relative $I_a/V_g$-characteristic, so that plate current flows for approximately one half of each cycle of the alternating grid voltage. If a telephony amplifier is concerned, a modulated H.F. signal will have to be amplified.

In order to obtain a straight modulation characteristic the published data for H.F. class B telephony have been determined by the method of trial and error.

V-11. L.F. class B amplifier

With this amplifier the anode dissipation is dependent on the input signal voltage, so that maximum anode dissipation is obtained at a signal strength of about 60 % of the value at full drive. When this signal strength of 60 % is not present continuously, as is the case e.g. in broadcast and telephony service, it is permissible for the limiting value of the anode dissipation to be exceeded by 10 % at the point of maximum dissipation. To suppress the occurrence of even harmonics separate controllable grid bias for both tubes can be applied or use can be made of a balancing circuit.

The published data in L.F. class B amplifier service normally give one table for maximum output and other tables for modulating the same type of tube in a published anode-modulation circuit. These published data are rather arbitrary, i.e., the same output can also be obtained with less modulation of the anode current (with smaller load resistance and lower peak grid current), although the efficiency is then smaller. It depends on the circuit of the entire L.F. amplifier which kind of operation is to be preferred.

V-12. Industrial operating conditions

In section V-5 some general remarks have been given concerning the application of transmitting tubes in industrial apparatus (diathermy, inductive and capacitive heating, supersonics, etc.). With single-phase mains connection a hum filter will sometimes be omitted; this omission is usual with three-phase mains connection. Operating conditions have therefore been published giving derating factors for this kind of operation (see chapter III-3).

The operating conditions are divided over two columns, the first giving data which are limited only by the limiting values. Care must be taken that under these operating conditions the limiting values are not exceeded by fluctuations in the mains voltage, or in the load, or by tolerances in the circuit elements.

In the second column the anode voltage and the anode current have been taken at 85 % of the maximum value, and the efficiency has also been reduced to some extent. Under these conditions normal deviations of voltages and load are permissible. The limiting values of the tube should not be exceeded, even under the most unfavourable conditions.

The published value of the output power is the tube output, and where a self-oscillating circuit is in operation, this value should be diminished by the losses in the input circuit, the quoted driving power and, if present, the losses in the input circuit, in order to obtain the actual output in the load.

A favourable load-output characteristic may be obtained by a method of automatic control of the grid voltage and grid current, depending on the matching. Since the grid current is limited in this type of circuit, it may at the same time serve for preventing overloading of the grid. A non-linear element in the grid circuit, e.g. a tungsten lamp or an N.T.C. resistor may help in preventing overloading in the grid.

Moreover, where self-oscillating circuits are concerned, measures may be taken to maintain the frequency within the available frequency band. These measurements may consist of a large circuit capacitance, small stable self-inductance, undercritical inductive coupling with the output circuit, electrostatic screening between generator and output circuit, etc.

If the frequency of industrial generators has to be limited to a small frequency band, crystal-controlled driving stages may be used. Then, however, matching between the tube input and output is rather difficult to obtain. A higher safety margin in the tube load will be necessary with still a high dependence of the output on the load, or special measures such as automatic tuning and/or matching control will have to be taken.

For smaller tubes operating conditions for industrial applications have been given for supply from a two-phase, half-wave rectifier, for supply with raw A.C. voltage and for supply with three-phase half-wave rectifier. The latter case practically coincides with D.C. supply for this purpose.

A.C. supply without rectifier will give about 0.6 times the output obtained with D.C. supply. It should be taken into account that supply without rectifier results in a peak inverse voltage equal to the full anode voltage. This is of special importance when the grid voltage is in counterphase to the anode voltage.

With two-phase, half-wave rectification of the supply voltage, the useful output is about equal to that with D.C. supply. In order to obtain a favourable loading of the mains when using a self-rectifying oscillator, a quasi push-pull circuit can be used, in which two tubes function alternately on each half wave. A favourable loading of the mains for three-phase, self-rectification will be obtained by the use of 6 tubes in a triple push-pull circuit.

**Application directions High-Voltage Rectifiers**

# APPLICATION DIRECTIONS FOR MERCURY-VAPOUR AND GAS-FILLED HIGH-VOLTAGE RECTIFYING TUBES

The following instructions apply in general to all types of high-voltage rectifying tubes. If there are additional instructions for any type of tube it will be indicated on the technical data sheets of the concerning type.

## MOUNTING

The mercury-vapour filled types must be mounted vertically with the base or filament strips at the lower end. The mounting position of the gas-filled types is in general arbitrary.

The tubes must be mounted so that air can circulate freely around them. Therefore the clearance between the tubes and other components of the circuit and between the tubes and the cabinet walls should be at least half the maximum bulb diameter. The minimum clearance between tubes should be 3/4 the maximum bulb diameter.

It should be realised that a minimum clearance is also required for reasons of high voltage insulation.

When a tube is operating and the cooling is only obtained by natural convection the temperature distribution along the bulb will be such that the lowest temperature occurs at the bottom. This distribution is of special importance in the case of mercury-vapour filled types in order to condense the mercury-vapour in the lower part of the tube. Where additional cooling is necessary this cooling should not disturb this normal temperature distribution along the bulb.

Generally if shock or vibration exceeds 0.5 g a shock absorbing device should be used.

The electrode connections, except those of the tube socket, must be flexible. The nuts (e.g. of the anode connections) should be well tightened but care must be taken to ensure that no undue forces are exerted on the tube. The contacts must be checked at regular intervals and their surfaces kept clean in order to avoid excessive heating of the glass-metal seals. The cross section of the conductors should be sufficient not to be heated by the current and to conduct the heat away from the tube. (It should be noted that in rectifier circuits the r.m.s. value of the anode current may reach 2.5 times the average value).

**Application directions High-Voltage Rectifiers**

FILLAMENT SUPPLY

In order to obtain the maximum life of a directly heated cathode, a filament transformer with centre-tap and a phase shift of $90^{o} \pm 30^{o}$ between $V_a$ and $V_f$ is recommended. Series connection of filaments is not allowable.

The filament voltage at nominal mains voltage must be measured at the terminals of the tube. Permanent deviations up to 2.5% from the published value can be accepted. It is therefore recommended that the filament transformer be equipped with suitable tappings. Temporary variations should not exceed 5%.

However to ensure maximum life it is important to keep the filament voltage as near as possible to the nominal value.

In calculating the rating of the filament transformer a spread in the filament current of ± 10% from tube to tube should be taken into account, whilst for directly heated tubes the DC current flowing through the heater winding should also be considered. It is recommended to furnish the filament transformer with several taps on the primary especially in case of HT-insulated high magnetic leakage transformers.

TEMPERATURE

1. Tubes filled with mercury vapour

In the technical data of these tube types temperature limits for the condensed mercury are given. During operation the condensed mercury should only be visible in the neighbourhood of the socket or the lowest part of the bulb. Care should be taken to ensure that the condensed mercury temperature during operation is between the published temperature limits. Too low a temperature gives low gas pressure which results in a low current carrying capability, high arc drop and consequently shortening of life. Too high a temperature gives high gas pressure which results in a reduction of the permissible peak inverse and forward voltage.

Accurate values of the condensed mercury temperature can be measured by means of a thermocouple placed against the envelope, but good technique and instruments are necessary for this measurement. In general temperature values of sufficient accuracy can be obtained by using a normal mercury thermometer the mercury vessel of which is wrapped in staniolstrips and that can be fixed against the bulb by means of a cotton thread.

The temperature measurements should be made at the coldest part of the bulb where the mercury vapour condenses which in general will be just above the base or the lower connections.

In addition to the temperature limits for the condensed mercury sometimes limits for the ambient temperature are given. For each type there is a specific difference between ambient and condensed mercury vapour temperature. High ambient temperature can make it desirable to decrease this difference, which can be obtained by directing a low velocity air flow of ambient temperature or less to the glass just above the base.

The condensed mercury vapour temperature is decisive in all cases.

The ambient temperature can be measured by a thermometer which has been screened against direct heat radiation. The measurement should be carried out at various points around the lower part of the tube.

2. Tubes with inert gas filling

For these tubes only the limits of the ambient temperature are given. These limits are in general minimum -55°C and maximum +75°C.

SWITCHING ON

If switching on of the rectifier takes place twice a day or less the allowable peak anode current when switching on may amount up to twice the maximum published value for $I_{a_p}$

1. Tubes filled with mercury vapour

It is necessary to allow time for the cathode to reach its operating temperature before drawing anode current. Therefore the minimum cathode heating time is given in the published data sheets of each type. After the cathode heating time the high voltage may be switched on provided the temperature of the condensed mercury vapour is not too low and all the condensed mercury is confined to the lower part of the bulb.

Sometimes a heat conserving hood is prescribed for the tube. The purpose of this hood is to avoid condensation of the mercury vapour on the electrodes and upper part of the bulb whilst the tube is cooling.

Switching on (not after transport) may be done at a condensed mercury temperature which lies 5 to 10°C below the published minimum temperature (minimum waiting time re-

quired). However, it is good practice to switch on after the temperature has reached its minimum published value (recommended waiting time).

The waiting times, the minimum required and the recommended one can be read from the curve representing the condensed mercury temperature rise as a function of time with only the filament voltage applied to the tube.

Switching on after transport or after a considerable interruption of operation should be done according to the instructions on the published data sheets.

In order to avoid long preheating times it is recommended to leave the filament supply on during standby periods (e.g. overnight) at 60 to 80% of the nominal value.

Stand by position for mercury vapour filled tubes

In order to have a spare tube always ready for immediate operation it is recommended to have a spare position where a tube stands with continuously a filament voltage of 60-80% of the nominal voltage applied.

When for a certain type a heat conserving hood is prescribed this hood should be fitted on the tube.

2. Tubes with inert gas-filling

It is necessary to allow the cathode to reach operating temperature before drawing anode current. The relevant minimum cathode heating time is given in the technical data sheets of each type. After warming up the anode voltage may be applied provided that the ambient temperature is not below the minimum published value.

No other delays apart from the cathode heating delay are required.

LIMITING VALUES

It should be realised that these values are given as absolute maxima; i.e. maxima which should not be exceeded under any condition (either on account of mains voltage fluctuations, load variations, tolerances on components, overvoltages etc.).

For some ratings of maximum average current a maximum averaging time is quoted. This is to ensure that an anode current greater than the maximum continuously permissible average value is not drawn for such a length of time as would give rise to an excessive temperature within the tube.

The maximum peak anode current is determined by the available safe cathode emission whereas the average current is limited by its heating effects. During normal operation or frequent switching the peak current should not exceed its maximum published value.

For the determination of the actual value of the peak inverse voltage and the peak anode current, the measured values with an oscilloscope or otherwise are decisive.

The $I_{surge}$ is the maximum fault current which should ever be allowed to pass through the tube. (See section "Short circuit protection").

## DESIGN VALUES

1. $V_{arc}$

The value published for $V_{arc}$ applies to average operating conditions.

2. Frequency

Unless otherwise stated the maximum frequency at which the tubes may run under full load is 150 c/s. Under special conditions (derating of voltage and current) higher frequencies may be used; details should be obtained from the manufacturer.

## TYPICAL OPERATING CONDITIONS

Sometimes 2 columms of operating conditions are given viz. one giving theoretical values based on the absolute maxima and one giving more practical values in which mains fluctuations of max. 10% and a voltage drop in tube, transformer, filter etc. of max. 8% are incorporated.

## SHORT CIRCUIT PROTECTION

In order to prevent the tube from being damaged by passing too high a fault current a value for the maximum permissible surge current is given.

The figure given for the maximum surge current is intended as a guide to equipment designers. It indicates the maximum value of a transient current resulting from a sudden overload or short circuit which the rectifier can pass for a period not exceeding 0.1 second without resulting in its immediate destruction. Several overloads of this nature will, however, considerably reduce the life of the tube.

The equipment designer has to take into account this maximum surge current rating when calculating the short-circuit impedance of the equipment. This surge current value is not intended as a peak current that may occur on switching or during operation.

A simple method to limit the surge current to the maximum rating is to put a series resistance in the anode circuit which in most cases will also be necessary because the

relation between the ohmic and the inductive resistance of the short circuit path should be at least 0.3

SCREENING AND INTERFERENCE

In order to prevent unwanted ionisation of the gas filling (and consequent flash over) due to strong R.F. fields, it may be necessary to enclose the rectifier in a separate earthed screening box. Of course R.F. should be prevented from reaching the rectifier by R.F. chokes and condensers.

In circuits with gas filled tubes oscillation in the transformer windings can occur especially in grid controlled circuits. These oscillations should be reduced by suitable circuits as excessive peak inverse voltages may occur, causing arc back. The use of two parallel R.C. circuits is advisable.

An air choke in the order of 100 μH should be connected in series with and close to the anode connection. This choke can advantageously be wound from resistance wire in order to help short circuit protection.

Special attention should be paid to the damping circuits if the primary of the H.T. transformer is connected to a H.T. mains.

SMOOTHING CIRCUITS

In order to limit the peak anode current in a rectifying tube it is necessary to use a choke-input filter.

If switching on of the rectifier takes place twice a day or less the allowable peak anode current when switching on may reach a value of twice the published max. value for $I_{a_p}$

To ensure good voltage regulation on fluctuating loads the inductance value of the choke should be large enough to give uninterrupted current at minimum load. The choke and capacitor must not resonate at the supply or ripple frequency. Damping of this choke will be necessary.

In grid controlled rectifier circuits under "phased back" conditions the harmonic content of the d.c. output will be large unless the inductance is adequate.

PARALLEL OPERATION OF MERCURY-VAPOUR OR GAS FILLED TUBES

As individual gas- or mercury-vapour filled tubes may have slightly different characteristics two or more tubes must not be connected directly in parallel.

Parallel operation is permissible when series resistances are used and the peak voltage drop over this series resistance is at least the ignition voltage. Coupling transformers in the anode leads of parallel connected tubes can serve the same purpose.

GRID CONTROLLED RECTIFIERS

When a thyratron is conducting, a positive ion current of a magnitude proportional to the cathode current is generated. This current will, in general, flow to that electrode which is at the most negative potential during conduction (e.g. the grid). In order to prevent damage to the tube it is necessary to ensure that the voltage of this electrode is more positive than -10 volts during this phase. This precaution will prevent an increase in electrode emission due to excessive electrode dissipation, sputtering of electrode material, changes in the control characteristics caused by shift in contact potential and, in the case of inert gas-filled tubes, a rapid gas clean-up The minimum allowable value of the grid resistor is 0.1 x the recommended one.

In circuits where the anode potential changes from a positive to a negative value and the control grid is at a positive potential, thereby drawing grid current, a small positive ion current flows to the anode. At high negative anode voltages it is therefore essential to limit the magnitude of the positive ion current by severely restricting the current flowing from cathode to grid.

This may be effected by using fixed negative grid bias and narrow positive firing pulses.

However, for bridge circuits the minimum width of these pulses should be sufficiently large to secure safe "take-over" of the discharge.

In those circuits where the anode potential changes very rapidly from a positive to a high negative value, such as with inductive loads fed from polyphase supplies, there will be residual positive ions within the tube which will be drawn towards the anode with considerable energy. In the case of an inert gas-filled tube this would result in excessive gas clean-up and it is therefore necessary to observe the limitations imposed by the commutation factor.

CONTROL CHARACTERISTICS

In most cases the control characteristic given on the data sheets is shown by upper and lower boundary curves within which all tubes may be expected to remain at all

temperatures of the published range and during life.

In multitube circuits where the tubes are operating under the same conditions the spread will in general be smaller.

The published boundaries are therefore to be considered as extreme limits. This should be taken into consideration when designing grid excitation circuits.

GRID EXCITATION CIRCUITS

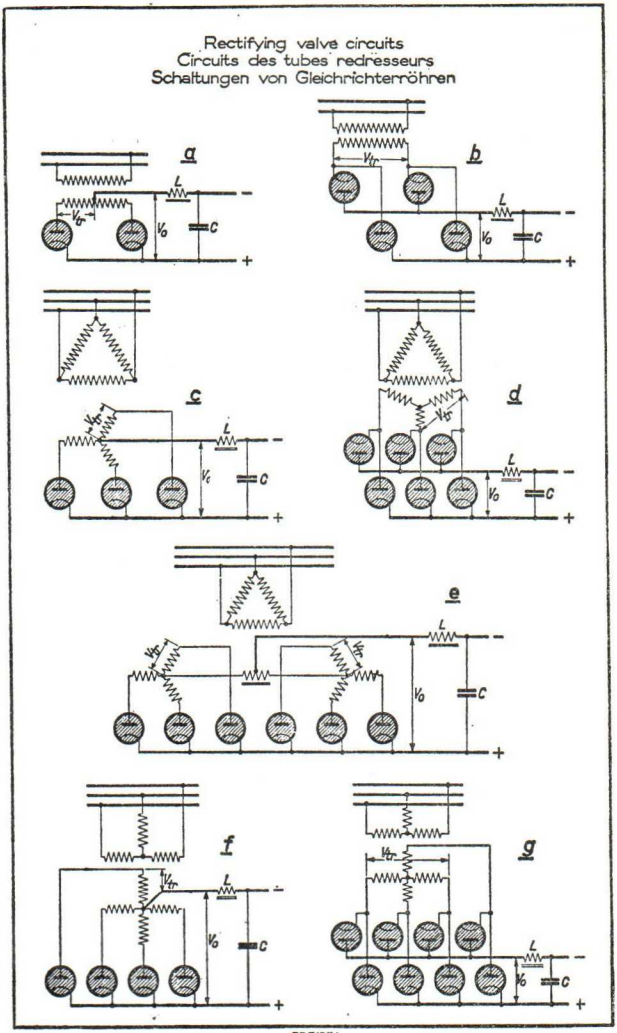
To keep the instant of ignition as constant as possible a large value of excitation voltages is recommended.

The use of a negative grid bias (50 to 120 volts) and a sharp positive grid pulse is recommended. The magnitude of the grid pulse should be 100 to 200 volts with a grid series resistor of 10 kΩ and a maximum impedance of the peaking transformer of 10 kΩ. If a sinusoidal grid voltage is used r.m.s. values of 50 to 120 volts in combination with a negative grid bias of 50 to 120 volts are recommended.

BRIDGE CIRCUITS (diagrams b, e and g)

For output voltages of more than 6 kV bridge circuits are recommended because of the lower peak inverse anode voltage and the larger range of applicable ambient temperatures.

The current angle of the grid should be for 2 phase bridge circuits $> 90^{\circ}$, for 3 phase $> 60^{\circ}$, and for 4 phase $> 45^{\circ}$.


Rectifying valve circuits
Circuits des tubes redresseurs
Schaltungen von Gleichrichterröhren
a
b
c
d
e
f
g
L
C
+
-

7R51054

# PHILIPS

**DCG 1/250**

SINGLE ANODE MERCURY VAPOUR RECTIFYING VALVE
TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE
EINANODIGE GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPF-FÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 4 V [1)2)]
$I_f$ = 2,5 A

Typical characteristics
Caractéristiques types
Kenndaten

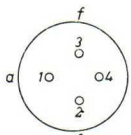
$V_{arc}$ ($I_a$=250mA) = 12 V

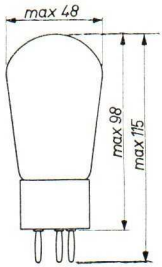
Limiting values
Caractéristiques limites
Grenzdaten

f = max. 500 c/s
$V_{inv_p}$ = max. 3000 V [3)]
$V_{inv_p}$ = max. 2550 V [4)]
$I_o$ = max. 250 mA
$I_{a_p}$ = max. 1250 mA
$t_{amb}$ = 10 - 40 °C

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: A

1) In order to ameliorate the life of the tube a preheating time of the filament of at least 15 sec. is recommended. Pour améliorer la durée de vie du tube il est recommandé de préchauffer le filament pendant 15 sec. au moins. Zur Verbesserung der Lebensdauer der Röhre wird eine Vorheizung der Katode während mindestens 15 Sek. Empfohlen.

2) See page 2; voir page 2; siehe Seite 2

3) f = 150 c/s

4) f = 500 c/s

Socket
Support de tube 40465
Röhrenhalter

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit Sockel unten

Net weight
Poids net 45 g
Nettogewicht

Shipping weight
Poids brut 70 g
Bruttogewicht

Operating conditions
Caractéristiques d'utilisation[5])
Betriebsdaten

| $V_{inv_p}$ = 3 kV | | | | |
|---|---|---|---|---|
| Circuit[6]) Schaltung | $V_{tr}$ ($V_{eff}$) | $V_o$ (V) | $I_o$ (A) | $W_o$ (kW) |
| a | 1060 | 950 | 0,5 | 0,48 |
| b | 2120 | 1910 | 0,5 | 0,95 |
| c | 1220 | 1430 | 0,75 | 1,07 |
| d | 2120 | 2870 | 0,75 | 2,15 |
| e | 1060 | 1240 | 1,5 | 1,86 |
| f | 1060 | 1350 | 1,0 | 1,35 |
| g | 2120 | 2700 | 1,0 | 2,70 |

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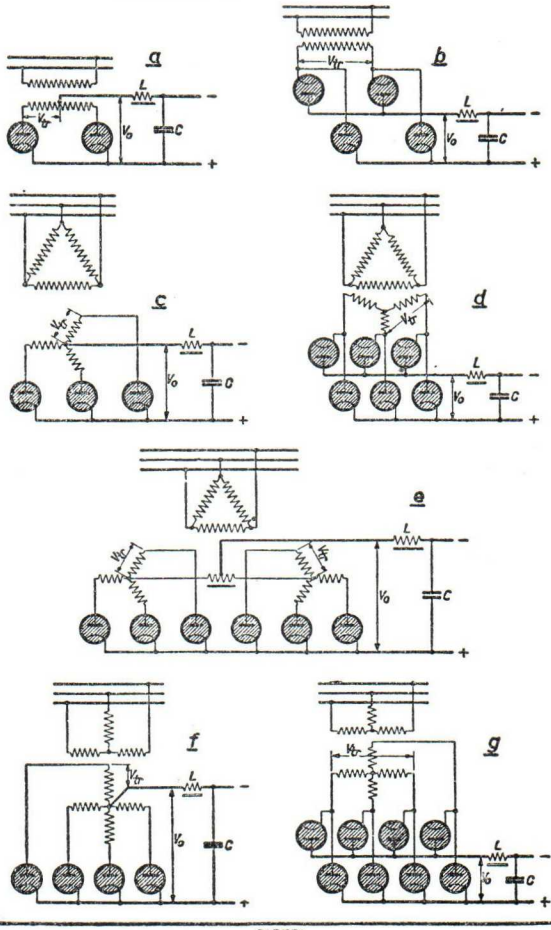
[2]) Phase shift of 90° ± 30° between $V_a$ and $V_f$ and use of a centre-tapped filament transformer is recommended
Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90° ± 30° et d'utiliser un transformateur de chauffage à prise médiane
Eine Phasenverschiebung von 90° ± 30° zwischen $V_a$ und $V_f$ und die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen

[5]) Transformer regulation and voltage drops in the tubes are neglected
Les chutes de tension du transformateur et des tubes ont été négligées
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

[6]) For circuits see page 3
Pour les circuits voir page 3
Für die Schaltungen siehe Seite 3

Rectifying valve circuits
Circuits des tubes redresseurs
Schaltungen von Gleichrichterröhren

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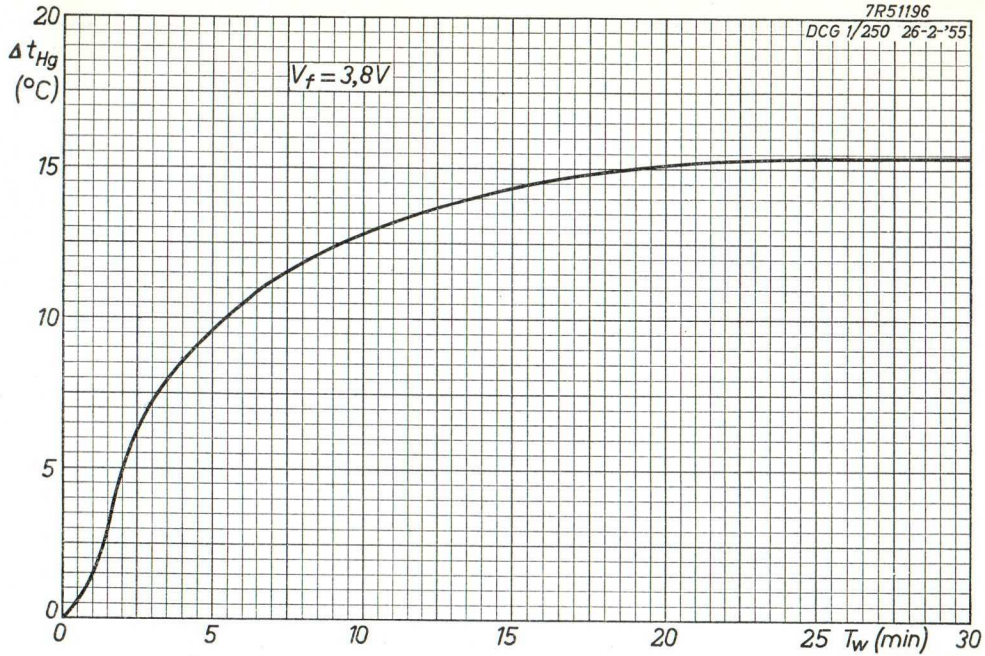



DCG 1/250

PHILIPS

A

# PHILIPS

**DCG 1.5/250**

SINGLE ANODE MERCURY VAPOUR RECTIFYING TUBE
TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE
EINANODIGE GLEICHRICHTERRÖHRE MIT QUECKSILBERFÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 4 V[1])[2])
$I_f$ = 2,5 A

Typical characteristics
Caractéristiques types
Kenndaten

$V_{arc}$ ($I_o$= 250 mA) = 12 V

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| f | = max. | 500 c/s |
| $V_{inv_p}$ | = max. | 4250 V[3]) |
| $V_{inv_p}$ | = max. | 3600 V[4]) |
| $I_{a_p}$ | = max. | 1250 mA |
| $I_o$ | = max. | 250 mA |
| $t_{amb}$ | = max. | 10-40 °C |

---

[1]) In order to ameliorate the life of the tube a preheating time of the filament of at least 15 sec. is recommended. Pour améliorer la durée de vie du tube il est recommandé de préchauffer le filament pendant 15 sec. au moins. Zur Verbesserung der Lebensdauer der Röhre wird eine Vorheizung der Katode während mindestens 15 Sek. Empfohlen.

[2]) Phase shift of 90° ± 30° between $V_a$ and $V_f$ and use of a centre-tapped filament transformer is recommended. Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90° ± 30° et d'utiliser un transformateur de chauffage à prise médiane. Eine Phasenverschiebung von 90° ± 30° zwischen $V_a$ und $V_f$ und die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen.

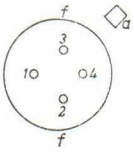
[3]) f = max. 150 c/s

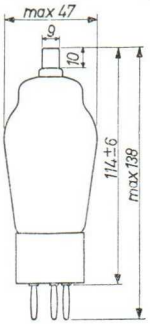
[4]) f = max. 500 c/s

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: A

Socket
Support
Fassung
40465

Cap
Capot
Haube
28 906 022

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit Sockel unten

Net weight
Poids net
Nettogewicht
60 g

Shipping weight
Poids brut
Bruttogewicht
90 g

# PHILIPS

**DCG 4/1000**

SINGLE ANODE MERCURY VAPOUR RECTIFYING VALVE
TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE
EINANODIGE GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPFFÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 2,5 V [1])
$I_f$ = 4,8 A
$T_w$ = min. 30 s [2])

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $I_o$ | = max. 0,25 A | max. 0,5 A |
| $I_{a_p}$ | = max. 1 A | max. 2 A |
| $V_{inv_p}$ (max. 150 c/s) | = max. 10 kV | max. 2 kV |
| $t_{Hg}$ [3]) | = 25 - 60 °C | 25 - 70 °C |
| tamb [4]) | = 15 - 40 °C | 15 - 50 °C |

General characteristics
Caractéristiques générales $V_{arc}$ ($I_o$ =0,25 A) = 12 V ←
Allgemeine Daten

---

[1]) Phase shift of 90° ± 30° between $V_a$ and $V_f$ and use of a centre-tapped filament transformer is recommended ←
Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90° ± 30° et d'utiliser un transformateur de chauffage à prise médiane
Eine Phasenverschiebung von 90° ± 30° zwischen $V_a$ und $V_f$ und die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen

[2]) Waiting time after transport at least 30 minutes
Délai d'attente après le transport au moins 30 minutes
Wartezeit nach Transport mindestens 30 Minuten

[3]) If the equipment is started max. twice daily it is permitted to apply the high tension at a condensed mercury temperature of 20°C ←
Si l'équipement est mis en circuit deux fois au max. par jour, il est permis d'appliquer la haute tension à une température du mercure condensé de 20°C
Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es gestattet die Hochspannung bei einer Temperatur des kondensierten Quecksilbers von 20°C einzuschalten

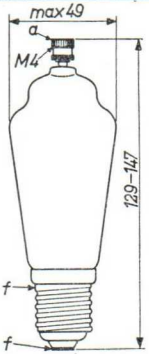
[4]) With convection cooling only
Seulement à refroidissement par convection
Nur mit Kühlung durch Konvektion

Dimensions in mm
Dimensions en mm
Abmessungen in mm

DCG 4/1000 ED

Base, culot, Sockel: Edison
Socket, support, Fassung: E3 000 22




Net weight
Poids net 65 g
Nettogewicht

Shipping weight
Poids brut 155 g
Bruttogewicht

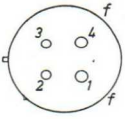
DCG 4/1000 G

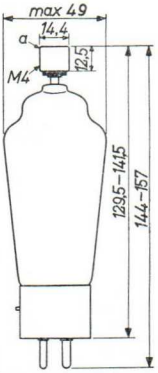
Base : Medium 4p with bayonet
Culot : Medium 4p à baionnette
Sockel: Medium 4p mit Bajonett

Socket :
Support: 40218 - 03 [1])
Fassung:

Cap, capot, Haube: 40619




Net weight
Poids net 80 g
Nettogewicht

Shipping weight
Poids brut 125 g
Bruttogewicht

[1])At voltages above 2 kV the socket must be insulated from the chassis
A des tensions au-dessus de 2 kV le support faut être isolé du châssis
Bei Spannungen über 2 kV muss die Fassung vom Chassis isoliert werden

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit dem Sockel unten

Operating conditions
Caractéristiques d'utilisation [1])
Betriebsdaten

| $V_{inv_p}$ = 10 kV | | | | |
|---|---|---|---|---|
| Circuit[2]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (W) |
| a | 3,5 | 3,2 | 0,5 | 1590 |
| b | 7,1 | 6,4 | 0,5 | 3180 |
| c | 4,1 | 4,8 | 0,75 | 3600 |
| d | 7,1 | 9,6 | 0,75 | 7200 |
| e | 3,5 | 4,1 | 1,5 | 6200 |
| f | 3,5 | 4,5 | 1 | 4500 |
| g | 7,1 | 9,0 | 1 | 9000 |

| $V_{inv_p}$ = 2 kV | | | | |
|---|---|---|---|---|
| Circuit[2]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (W) |
| a | 0,71 | 0,63 | 1 | 630 |
| b | 1,41 | 1,27 | 1 | 1270 |
| c | 0,82 | 0,96 | 1,5 | 1430 |
| d | 1,41 | 1,91 | 1,5 | 2870 |
| e | 0,71 | 0,83 | 3 | 2480 |
| f | 0,71 | 0,90 | 2 | 1800 |
| g | 1,41 | 1,80 | 2 | 3600 |

---

[1]) Transformer regulation and voltage drops in the valves are neglected

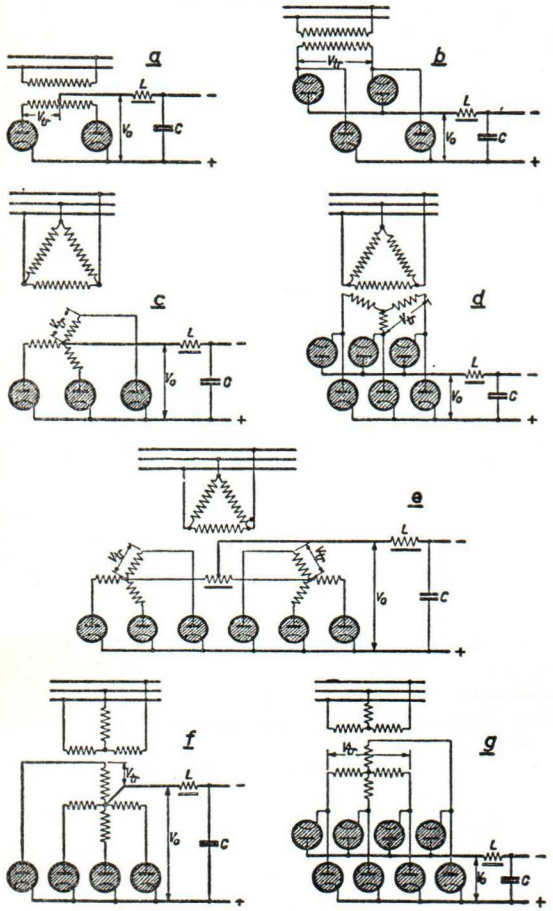
Les chutes de tension du transformateur et des tubes ont été négligées

Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

[2]) For circuits see page 4
Pour les circuits voir page 4
Für die Schaltungen siehe Seite 4

# PHILIPS

Rectifying valve circuits
Circuits des tubes redresseurs
Schaltungen von Gleichrichterröhren

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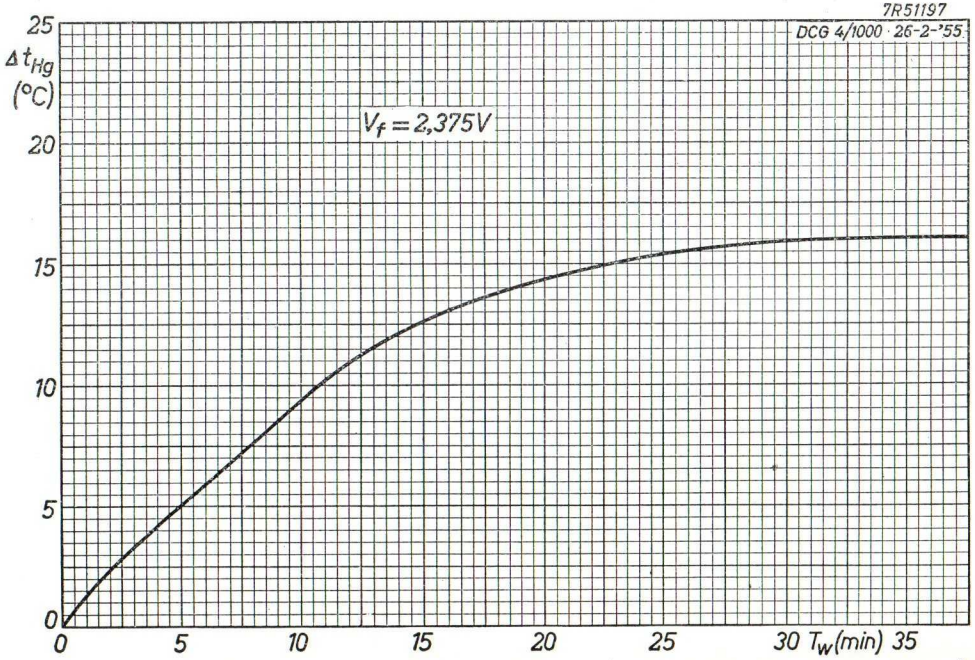



3.3.1955

A

PHILIPS

DCG 4/1000

# PHILIPS

**DCG 4/5000**

SINGLE ANODE MERCURY VAPOUR RECTIFYING VALVE
TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE
EINANODIGE GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPFFÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 4 V [1]
$I_f$ = 7 A
$T_w$ = min. 30 s [2]

Typical characteristics
Caractéristiques types
Kenndaten

$V_{arc}$ ($I_o$ = 1,25 A) = 12 V

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_{a\ inv}$ [3] | = max. 13 | 10 | kV |
| $I_o$ [4] | = max. 1,25 | 1,25 | A |
| $I_{ap}$ | = max. 5 | 5 | A |
| $I_{surge}$ [5] | = max. 40 | 40 | A |
| $t_{Hg}$ [6] | = 25 - 55 | 25 - 60 | °C |
| $t_{amb}$ [7] | = 10 - 35 | 10 - 40 | °C |

[1]) Phase shift of 90° ± 30° between $V_a$ and $V_f$ and/or use of a centre-tapped filament transformer are recommended.
Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90° ± 30° et/ou d'utiliser un transformateur de chauffage à prise médiane.
Eine 90° ± 30° Phasenverschiebung zwischen $V_a$ und $V_f$ und/oder die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen.

[2]) See page 2; voir page 2; siehe Seite 2

[3]) f = max. 150 c/s

[4]) $T_{av}$ = max. 10 s

[5]) During max. 0.1 sec.; pendant 0,1 sec au max.; während max. 0,1 Sek.

[6]) See page 2; voir page 2; siehe Seite 2

[7]) With natural cooling; average values
A refroidissement naturel; valeurs moyennes
Mit natürlicher Kühlung;

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit dem Sockel unten

Net weight
Poids net 200 g
Nettogewicht

Shipping weight
Poids brut 370 g
Bruttogewicht

---

2) Concerning Tw page 1

For average conditions, i.e. temperature within limits and proper distribution of mercury
After transport and also after a long interruption of service a longer waiting time is required before anode voltage is applied to ensure proper distribution of the mercury. In general, a time of 30 minutes will be sufficient

Concernant Tw page 1

Pour les conditions, où les temperatures se trouvent entre leurs limites et où il existe une bonne répartition du mercure
Après le transport et après une longue interruption de service il faut prévoir un délai d'attente plus long avant que la tension d'anode soit appliquée, afin d'obtenir une propre répartition du mercure. En général, un délai de 30 minutes sera suffisant

Betreffs Tw Seite 1

Für normale Betriebsverhältnisse, d.h. zwischen den Grenzen liegende Temperaturen und richtige Quecksilberverteilung
Nach Transport oder nach längerer Unterbrechung des Betriebs ist vor der Anlegung der Anodenspannung eine längere Wartezeit einzuhalten, damit das Quecksilber sich richtig verteilt. Im allgemeinen wird eine Wartezeit von 30 Minuten genügen

6) If the equipment is started max. twice daily it is permitted to apply the high tension at a condensed mercury temperature of 20°C ←
Si l'équipement est mis en circuit deux fois au max. par jour, il est permis d'appliquer la haute tension à une température du mercure condensé de 20°C
Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es gestattet die Hochspannung bei einer Temperatur des kondensierten Quecksilbers von 20°C einzuschalten

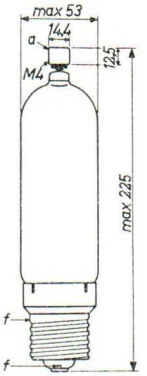
Dimensions in mm
Dimensions en mm
Abmessungen in mm

Base, culot, Sockel: Goliath

Socket
Support
Fassung 65909BG/01

Cap, capot, Haube : 40619




Operating conditions
Caractéristiques d'utilisation [1])
Betriebsdaten

$V_a$ $inv_p$ = 13 kV

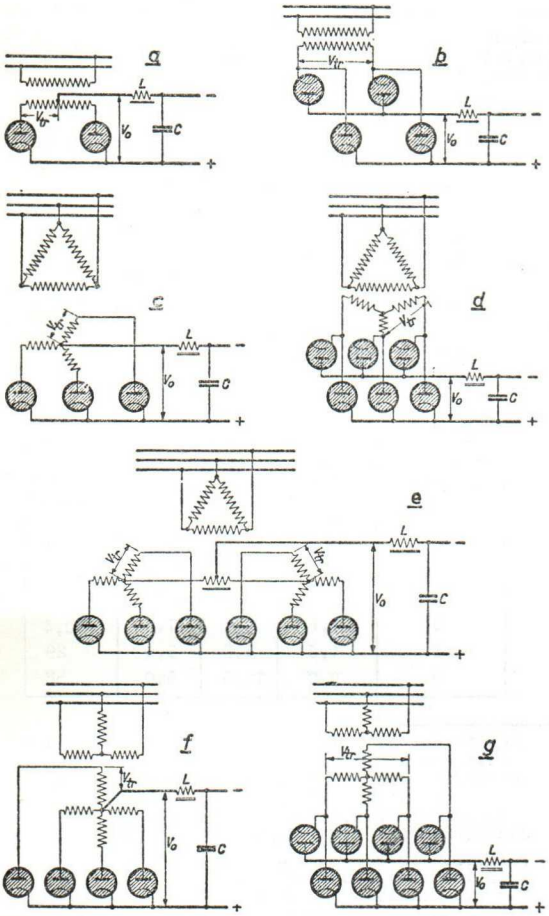
| Circuit[2]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
|---|---|---|---|---|
| a | 4,6 | 4,1 | 2,5 | 10,3 |
| b | 9,2 | 8,3 | 2,5 | 20,7 |
| c | 5,3 | 6,2 | 3,75 | 23,3 |
| d | 9,2 | 12,4 | 3,75 | 46,6 |
| e | 4,6 | 5,4 | 7,5 | 40,4 |
| f | 4,6 | 5,8 | 5,0 | 29 |
| g | 9,2 | 11,6 | 5,0 | 58 |

[1]) Transformer regulation and voltage drops in the valves are neglected
Les chutes de tension du transformateur et dans les tubes ont été négligées
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

[2]) For circuits see page 4
Pour les circuits voir page 4
Für die Schaltungen siehe Seite 4

# PHILIPS

Rectifying valve circuits
Circuits des tubes redresseurs
Schaltungen von Gleichrichterröhren

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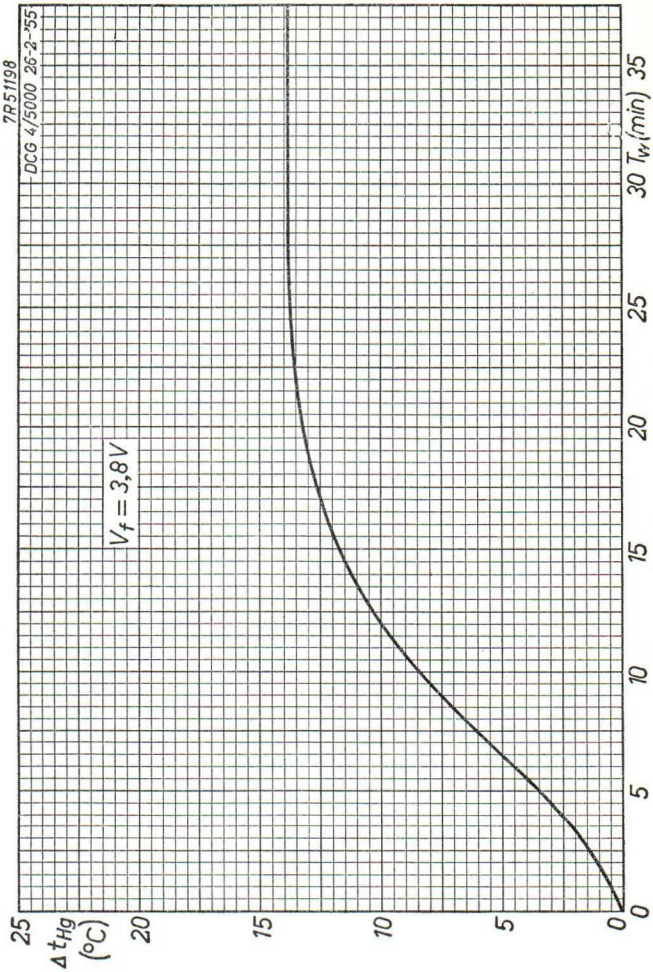

7R51198
DCG 4/5000 26-2-'55
$V_f = 3,8V$
$T_w$ (min)
0
5
10
15
20
25
30
35
$\Delta t_{Hg}$ (°C)
25
20
15
10
5
0

3.3.1955

A

Grid-controlled MERCURY VAPOUR RECTIFYING TUBE
TUBE REDRESSEUR A VAPEUR DE MERCURE à grille
Gittergesteuerte GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPF-FÜLLUNG

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd

| | | |
|---|---|---|
| Heating : indirect, k connected to f | $V_f$ = | 5 V |
| Chauffage: indirect, k connectée à f | $I_f$ = | 30 A |
| Heizung : indirekt, k verbunden mit f | $T_w$ = min. | 10 min |

Capacitances
Capacités
Kapazitäten

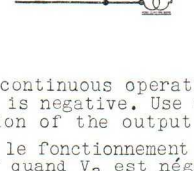
| | | |
|---|---|---|
| $C_{ag}$ = | 4 | pF |
| $C_g$ = | 15 | pF |

Typical characteristics
Caractéristiques types
Kenndaten

| | | | |
|---|---|---|---|
| $V_{arc}$ ($I_o$ = 6 A) = | | 12 | V |
| $T_{ion}$ | < | 50 | µsec |
| $T_{dion}$ | < | 1000 | µsec |

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ inv $_p$ [2]) = | max. | 13 | kV |
| $V_a$ fwd $_p$ [3]) = | max. | 13 | kV |
| $I_o$ = | max. | 6 | A |
| $I_{ap}$ = | max. | 25 | A |
| $I_{surge}$ [4]) = | max. | 250 | A |
| $I_g$ [3]) = | max. | 50 | mA |
| $I_{gp}$ = | max. | 250 | mA |
| $t_{Hg}$ = | 25 - 55 | | °C |
| $t_{amb}$ [5]) = | 20 - 45 | | °C |




During continuous operation $V_g$ must never be positive when $V_a$ is negative. Use of grid control for continuous reduction of the output voltage is not recommended.

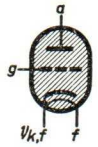
Pendant le fonctionnement continu $V_g$ ne doit jamais être positif quand $V_a$ est négatif. Il n'est pas recommandé d'utiliser la commande de grille pour obtenir une diminution permanente de la tension de sortie.

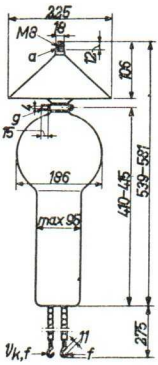
Während Dauerbetrieb soll $V_g$ niemals positiv sein wenn $V_a$ negativ ist. Es wird nicht empfohlen die Gittersteuerung zur Erhaltung einer fortwährenden Verringerung der Ausgangsspannung zu verwenden.

---

[2]),[3]),[4]),[5]) See page 2; voir page 2; siehe Seite 2

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Plug pin for grid connection
Fiche pour connexion de la grille 08 281 72
Steckerstift für Gitteranschluss

Anode cap
Chapeau d'anode 40612
Anodenkappe

Mounting position: vertical with anode terminal up
Montage : vertical avec la borne d'anode en haut
Einbau : senkrecht mit dem Anodenanschluss oben

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 2,3 kg | Poids brut | 10,5 kg |
| Nettogewicht | | Bruttogewicht | |

---

[1] The filament-lead marked red is connected to the cathode
La cathode est connectée au câble perlé, marqué en rouge
Die Katode ist mit der rot gemerkten Perlschnur verbunden

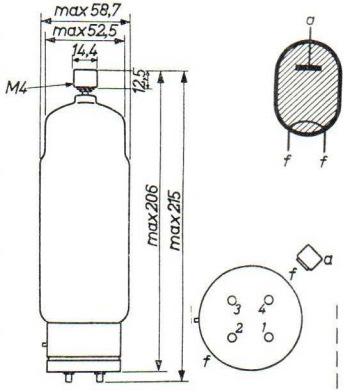
[2] f = max. 150 c/s

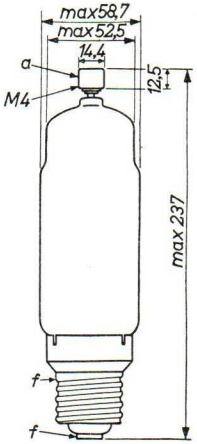
[3] $T_{av}$ = max. 5 sec

[4] T = max. 0,1 sec

[5] With natural cooling; approximate values
A refroidissement naturel; valeurs approchées
Mit natürlicher Kühlung; Näherungswerte

SINGLE ANODE MERCURY VAPOUR RECTIFYING TUBE
TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE
EINANODIGE GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPFFÜLLUNG




DCG 5/5000 GB

Base : Jumbo 4p with bayonet
Culot : Jumbo 4p à baïonnette
Sockel: Jumbo 4p mit Bayonett

Socket
Support 40408
Fassung

Cap
Capot 40619
Haube

DCG 5/5000 EG

Base :
Culot : GOLIATH
Sockel:

Socket
Support 65909 BG/01
Fassung

Cap
Capot 40619
Haube

For further data and curve please refer to type DCG5/5000 GS
Pour les autres caractéristiques et courbe voir type DCG 5/5000 GS
Für die übrigen Daten und Kurve siehe Typ DCG 5/5000 GS

SINGLE ANODE MERCURY VAPOUR RECTIFYING VALVE
TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE
EINANODIGE GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPF-FÜLLUNG

Filament : oxide-coated
Filament:: oxyde
Heizfaden: Oxyd

Heating: : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5 V [1]
$I_f$ = 7 A
$T_w$ = min. 30 s [2]

Typical characteristics
Caractéristiques types
Kenndaten

$V_{arc}$ ($I_o$ = 1,5 A) = 12 V

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | |
|---|---|---|---|---|
| $V_{a\ inv}$ [3] = max. | 13 | 10 | 5 | kV |
| $I_o$ [4] = max. | 1,5 | 1,5 | 1,75 | A |
| $I_{a_p}$ = max. | 6 | 6 | 7 | A |
| $I_{surge}$ [5] = max. | 40 | 40 | 40 | A |
| $t_{Hg}$ [6] = | 25 - 55 | 25 - 60 | 25 - 70 | °C |
| $t_{amb}$ [7] = | 15 - 40 | 15 - 45 | 15 - 55 | °C |

[1]) Phase shift of 90°±30° between $V_a$ and $V_f$ and/or use of a centre-tapped filament transformer are recommended.
Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90°±30° et/ou d'utiliser un transformateur de chauffage à prise médiane.
Eine 90°±30° Phasenverschiebung zwischen $V_a$ und Vf und/oder die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen.

[2]) See page 2; voir page 2; siehe Seite 2

[3]) f = max. 150 c/s

[4]) $T_{av}$ = max. 10 s

[5]) During max. 0.1 sec; pendant 0,1 sec au max.; während max. 0,1 Sek.

[6]) See page 2; voir page 2; siehe Seite 2

[7]) With natural cooling; average values
A refroidissement naturel; valeurs moyennes
Mit natürlicher Kühlung; mittlere Werte

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit dem Sockel unten

Net weight
Poids net 225 g
Nettogewicht

Shipping weight
Poids brut 370 g
Bruttogewicht

---

[2]) Concerning Tw page 1

For average conditions, i.e. temperature within limits and proper distribution of mercury
After transport and also after a long interruption of service a longer waiting time is required before anode voltage is applied to ensure proper distribution of the mercury. In general, a time of 30 minutes will be sufficient

Concernant Tw page 1

Pour les conditions, où les temperatures se trouvent entre leurs limites et où il existe une bonne répartition du mercure
Après le transport et après une longue interruption de service il faut prévoir un délai d'attente plus long avant que la tension d'anode soit appliquée, afin d'obtenir une propre répartition du mercure. En général, un délai de 30 minutes sera suffisant

Betreffs Tw Seite 1

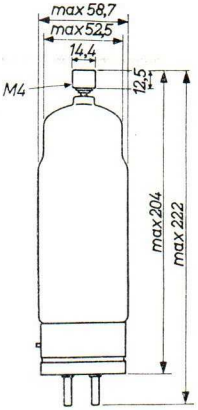
Für normale Betriebsverhältnisse, d.h. zwischen den Grenzen liegende Temperaturen und richtige Quecksilberverteilung
Nach Transport oder nach längerer Unterbrechung des Betriebs ist vor der Anlegung der Anodenspannung eine längere Wartezeit einzuhalten, damit das Quecksilber sich richtig verteilt. Im allgemeinen wird eine Wartezeit von 30 Minuten genügen

[6]) If the equipment is started max. twice daily it is permitted to apply the high tension at a condensed mercury temperature of 20 °C

Si l'équipement est mis en circuit deux fois au max. par jour, il est permis d'appliquer la haute tension à une température du mercure condensé de 20 °C

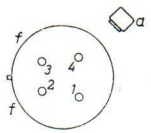
Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es gestattet die Hochspannung bei einer Temperatur des kondensierten Quecksilbers von 20°C einzuschalten

Dimensions in mm
Dimensions en mm
Abmessungen in mm










Base : Super Jumbo with bayonet
Culot : Super Jumbo à baïonnette
Sockel: Super Jumbo mit Bajonett

Socket :
Support: 40403
Fassung:

Cap :
Capot : 40619
Haube :

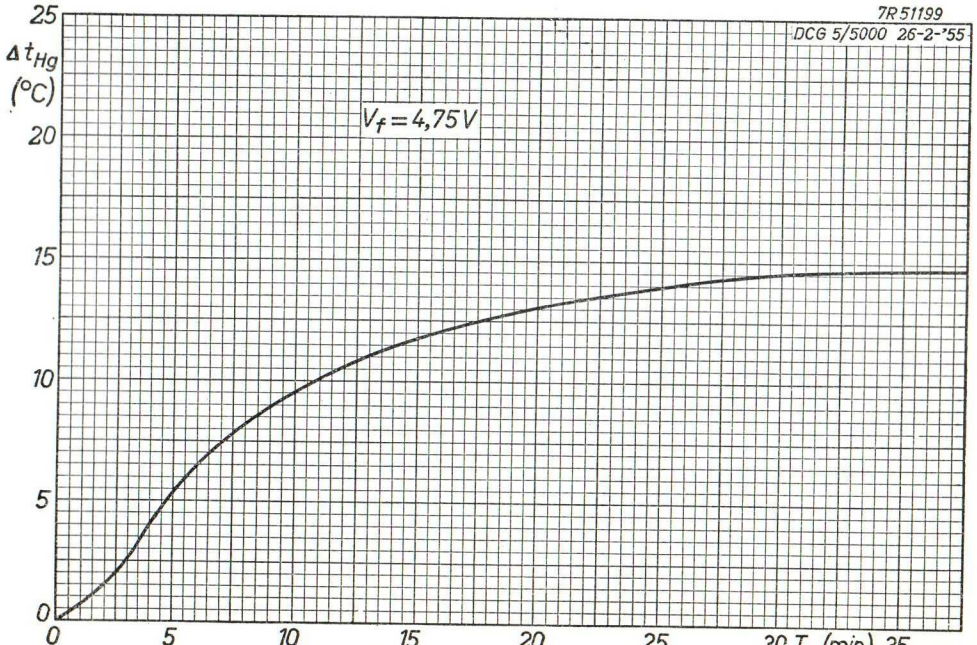
Operating conditions
Caractéristiques d'utilisation [1])
Betriebsdaten

| $V_a$ $inv_p$ = 13 kV | | | | |
|---|---|---|---|---|
| Circuit[2]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 4,6 | 4,1 | 3 | 12,4 |
| b | 9,2 | 8,3 | 3 | 24,8 |
| c | 5,3 | 6,2 | 4,5 | 27,8 |
| d | 9,2 | 12,4 | 4,5 | 55,5 |
| e | 4,6 | 5,4 | 9 | 48,4 |
| f | 4,6 | 5,8 | 6 | 34,8 |
| g | 9,2 | 11,6 | 6 | 69,7 |

| $V_a$ $inv_p$ = 5 kV | | | | |
|---|---|---|---|---|
| Circuit[2]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 1,75 | 1,6 | 3,5 | 5,6 |
| b | 3,5 | 3,2 | 3,5 | 11,1 |
| c | 2,0 | 2,4 | 5,25 | 12,6 |
| d | 3,5 | 4,8 | 5,25 | 25,1 |
| e | 1,75 | 2,1 | 10,5 | 21,7 |
| f | 1,75 | 2,25 | 7 | 15,7 |
| g | 3,5 | 4,5 | 7 | 31,5 |

[1]) Transformer regulation and voltage drops in the valves are neglected
Les chutes de tension du transformateur et des tubes ont été négligées
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

[2]) For circuits see page T150
Pour les circuits voir page T150
Für die Schaltungen siehe Seite T150




PHILIPS

DCG 5/5000 GS

# PHILIPS

**DCG 6/18**

SINGLE ANODE MERCURY VAPOUR RECTIFYING TUBE
TUBE REDRESSEUR MONOPLAQUE A VAPEUR DE MERCURE
EINANODIGE GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPFFÜHLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden : Oxyd

Heating : direct
Chauffage : direct
Heizung : direkt

$V_f$ = 5 V[1])
$I_f$ = 11,5 A
$T_w$ = min. 60 sec[2])

Typical characteristics
Caractéristiques types
Kenndaten

$V_{arc}$ ($I_o$ = 3 A) = 12 V

| | | |
|---|---|---|
| Equilibrium condensed mercury temperature rise over ambient | no load | 19 °C |
| | full load | 21 °C |
| Elévation de la température du mercure condensé au-dessus de la température de l'ambiance en condition d'équilibre | sans charge | 19 °C |
| | à pleine charge | 21 °C |
| Temperaturerhöhung des kondensierten Quecksilbers über der Umgebungstemperatur im Gleichgewichtszustand | bei Leerlauf | 19 °C |
| | bei Vollast | 21 °C |

---

[1])A phase shift of 90° ± 30° between $V_a$ and $V_f$ and the use of a centre-tapped filament transformer are recommended.

Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90° ± 30° et d'utiliser un transformateur de chauffage à prise médiane

Eine 90° ± 30° Phasenverschiebung zwischen $V_a$ und $V_f$ und die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen

[2])For average conditions, i.e. temperatures within limits and proper distribution of mercury

After transport and also after a long interruption of service a longer waiting time is required before anode voltage is applied to ensure proper distribution of the mercury. In general, a time of 30 minutes will be sufficient.

(voir page 2)
(siehe Seite 2)

# PHILIPS

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 150 | 150 c/s |
| $V_{a\ inv_p}$ | = max. | 15 | 2,5 kV |
| $I_o$ | = max. | 3 | 5 A |
| $T_{av}$ | = max. | 10 | 10 sec |
| $I_{a_p}$ | = max. | 12 | 20 A |
| $I_{surge}$ 3) | = max. | 120 | 200 A |

| | | | |
|---|---|---|---|
| $V_{a\ inv_p}$ (kV) | 15 | 10 | 2,5 |
| $t_{Hg}$ (°C) 4) | 25-55 | 25-60 | 25-75 |
| $t_{amb}$ (°C) 5) | 15-35 | 15-40 | 15-55 |

2) Pour les conditions, où les températures se trouvent entre leurs limites et où il existe une bonne répartition du mercure

Après le transport et après une longue interruption de service il faut prévoir un délai d'attente plus long avant que la tension d'anode soit appliquée, afin d'obtenir une propre répartition du mercure. En général, un délai de 30 minutes sera suffisant

Für normale Betriebsverhältnisse, d.h. zwischen den Grenzen liegende Temperaturen und richtige Quecksilberverteilung

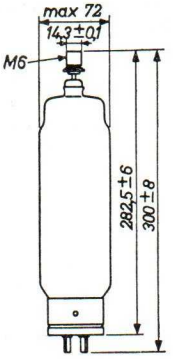
Nach Transport oder nach längerer Unterbrechung des Betriebs ist vor der Anlegung der Anodenspannung eine längere Wartezeit einzuhalten, damit das Quecksilber sich richtig verteilt. Im allgemeinen wird eine Anheizzeit von 30 Minuten genügen.

3) Duration max. 0,1 sec.
Durée 0,1 sec au max.
Zeitdauer max 0,1 Sek.

4) If the equipment is started not more than twice daily, it is permitted to apply high tension at a condensed mercury temperature of 20°C
Si l'équipement n'est mis en circuit que deux fois par jour au max., il est permis d'appliquer la haute tension à une température de 20°C du mercure condensé
Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es erlaubt die Hochspannung bei einer Temperatur von 20°C des kondensierten Quecksilbers einzuschalten

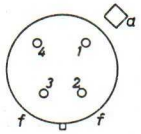
5) With natural cooling; approximate values
A refroidissement naturel; valeurs approchées
Mit natürlicher Kühlung; Näherungswerte

Dimensions in mm
Dimensions en mm
Abmessungen in mm










Base : Super Jumbo with bayonet
Culot : Super Jumbo à baïonnette
Socket: Super Jumbo mit Bajonett

Cap
Capot Medium
Haube

Socket
Support 40403
Fassung

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit Sockel unten

Net weight
Poids net 450 g
Nettogewicht

Shipping weight
Poids brut 1650 g
Bruttogewicht

# PHILIPS

Max. operating conditions
Caractéristiques d'utilisation max.[6])
Max. Betriebsdaten

| $V_a$ $inv_p$ = 15 kV | | | | |
|---|---|---|---|---|
| Circuit[7]) Schaltung | Vtr $kV_{eff}$ | $V_o$ kV | $I_o$ A | $W_o$ kW |
| a | 5,3 | 4,8 | 6 | 28,8 |
| b | 10,6 | 9,6 | 6 | 57,6 |
| c | 6,1 | 7,2 | 9 | 64,8 |
| d | 10,6 | 14,4 | 9 | 130 |
| e | 5,3 | 6,2 | 18 | 112 |
| f | 5,3 | 6,7 | 12 | 80,4 |
| g | 10,6 | 13,5 | 12 | 162 |

| $V_a$ $inv_p$ = 2,5 kV | | | | |
|---|---|---|---|---|
| Circuit[7]) Schaltung | Vtr $kV_{eff}$ | $V_o$ kV | $I_o$ A | $W_o$ kW |
| a | 0,88 | 0,79 | 10 | 7,9 |
| b | 1,76 | 1,58 | 10 | 15,8 |
| c | 1,02 | 1,19 | 15 | 17,9 |
| d | 1,76 | 2,38 | 15 | 35,8 |
| e | 0,88 | 1,03 | 30 | 30,9 |
| f | 0,88 | 1,13 | 20 | 22,6 |
| g | 1,76 | 2,26 | 20 | 45,2 |

[6]) Transformer regulation and voltage drops in the tubes are neglected
Les chutes de tension du transformateur et des tubes ont été négligées
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

[7]) For circuits see page T150
Pour les circuits voir page T150
Für die Schaltungen siehe Seite T150

Typical operating characteristics
Caractéristiques d'utilisation types
Betriebskenndaten

$V_{a\ inv_p}$ = max.15 kV[8])

| Circuit[7]) Schaltung | $V_{tr}$ kV eff | $V_o$[9]) kV | $I_o$ A | $W_o$ kW |
|---|---|---|---|---|
| a | 4,8 | 4,0 | 6 | 24 |
| b | 9,6 | 8,0 | 6 | 48 |
| c | 5,55 | 6,0 | 9 | 54 |
| d | 9,6 | 12,0 | 9 | 108 |
| e | 4,8 | 5,15 | 18 | 93 |
| f | 4,8 | 5,6 | 12 | 67 |
| g | 9,6 | 11,2 | 12 | 134 |

---

7) For circuits see page T150
Pour les circuits voir page T150
Für die Schaltungen siehe Seite T150

8) This value corresponds to a nominal peak inverse anode voltage of 13.6 kV, allowing a mains voltage fluctuation of ± 10%

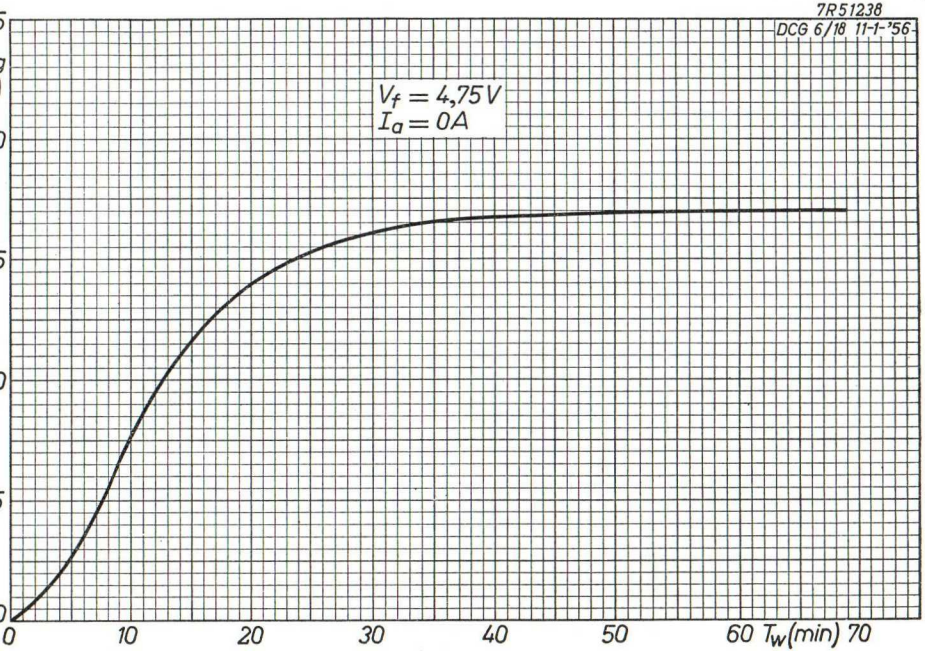
Cette valeur correspond à une tension anodique inverse de crête nominale de 13,6 kV, une fluctuation de la tension du réseau de ± 10% étant permise

Dieser Wert entspricht einem Nennwert der Anodenspitzengegenspannung von 13,6 kV, wenn Netzspannungsschwankungen von ± 10% zugelassen werden

9) Tube voltage drop and losses in transformer, filter, etc., amounting to 8% of the output voltage across the load, have already been deducted

La chute de tension du tube et les pertes dans le transformateur, le filtre, etc., se montant à 8% de la tension sur la charge, sont déjà déduites

Der Spannungsabfall in der Röhre und die Verluste im Transformator, im Filter, usw., im Betrage von 8% der Spannung an der Belastung, sind schon abgezogen worden.

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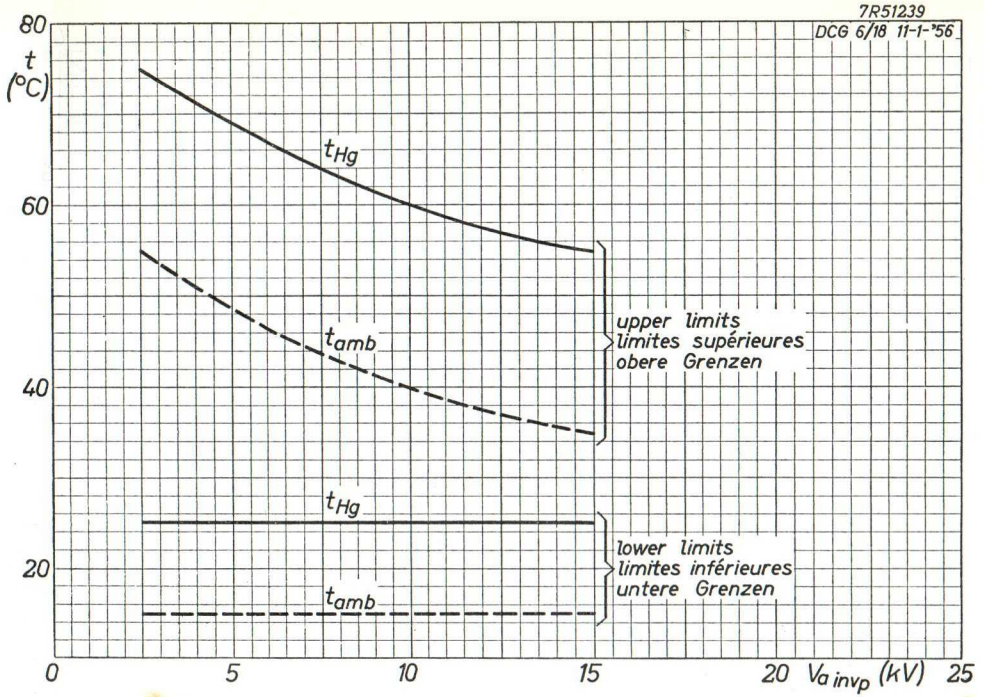
PHILIPS

DCG 6/18

PHILIPS


7R51239
DCG 6/18 11-1-'56
80
t
(°C)
60
40
20
0
5
10
15
20
Va inv p (kV)
25
tHg
tamb
upper limits
limites supérieures
obere Grenzen
tHg
tamb
lower limits
limites inférieures
untere Grenzen

8

# PHILIPS

**DCG 6/6000**

Grid-controlled MERCURY VAPOUR RECTIFYING VALVE
TUBE REDRESSEUR A VAPEUR DE MERCURE à grille
Gittergesteuerte GLEICHRICHTERRÖHRE MIT QUECKSILBER-DAMPFFÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5 V [1)]
$I_f$ = 6,5 A
Tw = min. 60 s [2)]

Capacitances
Capacités
Kapazitäten

$C_{ag}$ = 3 pF
$C_g$ = 8 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_{arc}$ ($I_o$ = 1 A) = 12 V

Ionization time
Temps d'ionisation = 10 µs
Ionisierungszeit

Deionization time
Temps de désionisation = 250 µs
Entionisierungszeit

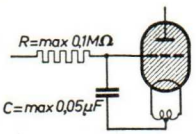
---

1) Phase shift of 90°±30° between $V_a$ and $V_f$ and/or use of a centre-tapped filament transformer are recommended
Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90°±30° et/ou d'utiliser un transformateur de chauffage à prise médiane
Eine 90°±30° Phasenverschiebung zwischen $V_a$ und $V_f$ und/oder die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen

2) For average conditions, i.e. temperatures within limits and proper distribution of mercury.
After transport and also after a long interruption of service a longer waiting time is required before anode voltage is applied to ensure proper distribution of the mercury. In general, a time of 60 minutes will be sufficient.

Voir au verso
Bitte wenden

Limiting values
Caractéristiques limites
Grenzdaten




| | | | |
|---|---|---|---|
| $V_{a\ inv_p}$ | [1] | = max. | 13 kV |
| $V_{a\ fwd_p}$ | | = max. | 13 kV |
| $I_o$ | [2] | = max. | 1 A |
| $I_{ap}$ | | = max. | 4 A |
| $I_{surge}$ | [3] | = max. | 40 A |
| $-V_g$ | [4] | = max. | 300 V |
| $I_g$ | [2] | = max. | 10 mA |
| $I_{gp}$ | | = max. | 50 mA |
| $V_{a\ inv_p} = 13$ kV | $t_{Hg}$ [5] | = | 25 - 55 °C |
| | $t_{amb}$ [6] | = | 15 - 30 °C |
| $V_{a\ inv_p} = 10$ kV | $t_{Hg}$ [5] | = | 25 - 60 °C |
| | $t_{amb}$ [6] | = | 15 - 35 °C |

When the anode voltage $V_a$ is negative, the grid voltage must never be positive
La tension de grille $V_g$ ne doit jamais être positive, quand la tension anodique $V_a$ est négative
Bei negativer Anodenspannung $V_a$ darf die Gitterspannung niemals positiv sein

Concernant Tw, page 1.

Pour les conditions, où les températures se trouvent entre leurs limites et où il existe une bonne répartition du mercure.
Après le transport et après une longue interruption de service il faut prévoir un délai d'attente plus long avant que la tension d'anode soit appliquée, afin d'obtenir une propre répartition du mercure. En général, un délai de 60 minutes sera suffisant.

Betreffs Tw, Seite 1.

Für normale Betriebsverhältnisse, d.h. zwischen den Grenzen liegende Temperaturen und richtige Quecksilberverteilung.
Nach Transport oder nach längerer Unterbrechung ist vor der Anlegung der Anodenspannung eine längere Wartezeit einzuhalten, damit das Quecksilber sich richtig verteilt. Im allgemeinen wird eine Wartezeit von 60 Minuten genügen.

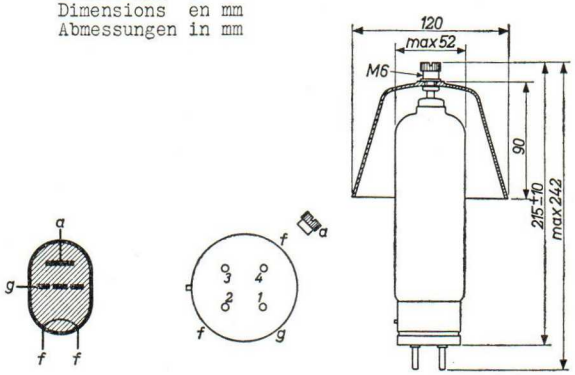
[1] f = max.150 c/s; [2] $T_{av}$ = max.10 s ; [3] T = max. 0,1 s

[4] Before conduction
Avant l'allumage
Gelöschte Röhre

[5] See page 3; voir page 3: siehe Seite 3

[6] With natural cooling
A refroidissement naturel
Mit natürlicher Kühlung

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket, support, Fassung 40408

Anode cap, chapeau d'anode, Anodenkappe: 40616

This cap must always be mounted on the tube, thus also during preheating

Aussi pendant le préchauffage ce chapeau doit être monté sur le tube

Die Anodenkappe muss auch während des Anheizens auf der Röhre montiert sein

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit dem Sockel unten

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 240 g | Poids brut | 400 g |
| Nettogewicht | | Bruttogewicht | |

[4])(page 2).If the equipment is started not more than twice daily it is permitted to apply high tension at a condensed mercury temperature of 20°C

(page 2). Si l'équipement n'est mis en circuit que deux fois par jour au max., il est permis d'appliquer la haute tension à une température de 20°C du mercure condensé

(Seite 2).Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es erlaubt die Hochspannung bei einer Temperatur von 20°C des kondensierten Quecksilbers einzuschalten.

Operating conditions
Caractéristiques d'utilisation [1])
Betriebsdaten

$V_g$ ($V_a$ $inv_p$ = 13 kV) = -100 V
$V_g$ ($V_a$ $inv_p$ = 10 kV) = -50 V
$I_g$ = 1 mA

| $V_a$ $inv_p$ = 13 kV | | | | |
|---|---|---|---|---|
| Circuit [2]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 4,6 | 4,1 | 2 | 8,3 |
| b | 9,2 | 8,3 | 2 | 16,6 |
| c | 5,3 | 6,2 | 3 | 18,6 |
| d | 9,2 | 12,4 | 3 | 37,2 |
| e | 4,6 | 5,4 | 6 | 32,4 |
| f | 4,6 | 5,8 | 4 | 23,4 |
| g | 9,2 | 11,7 | 4 | 46,8 |

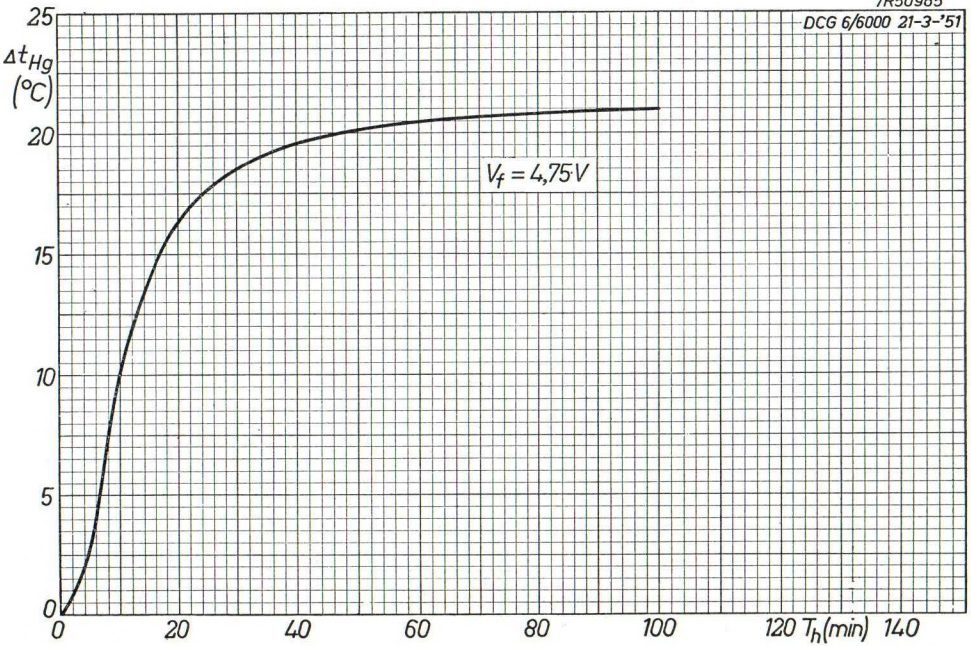
| $V_a$ $inv_p$ = 10 kV | | | | |
|---|---|---|---|---|
| Circuit [2]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 3,5 | 3,2 | 2 | 6,4 |
| b | 7 | 6,4 | 2 | 12,8 |
| c | 4,1 | 4,8 | 3 | 14,4 |
| d | 7 | 9,6 | 3 | 28,8 |
| e | 3,5 | 4,1 | 6 | 24,8 |
| f | 3,5 | 4,5 | 4 | 18 |
| g | 7 | 9 | 4 | 36 |

[1]) Transformer regulation and voltage drops in the valves are neglected
Les chutes de tension du transformateur et dans les tubes ont été négligées
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

[2]) For circuits see page T150
Pour les circuits voir page T150
Für die Schaltungen siehe Seite T150

7R50965

DCG 6/6000 21-3-'51

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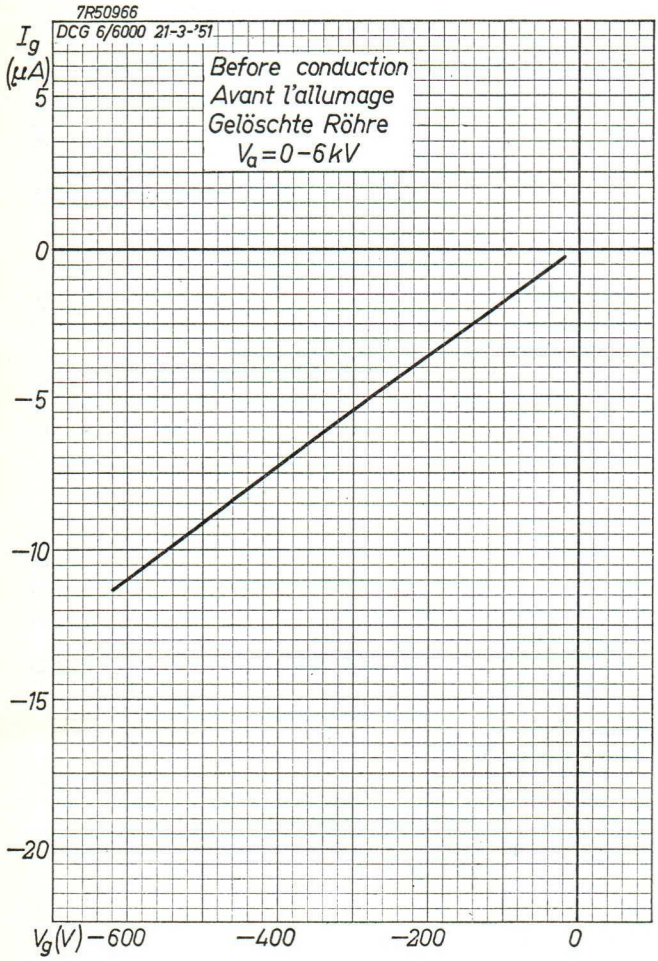
PHILIPS

DCG 6/6000

**DCG 6/6000**

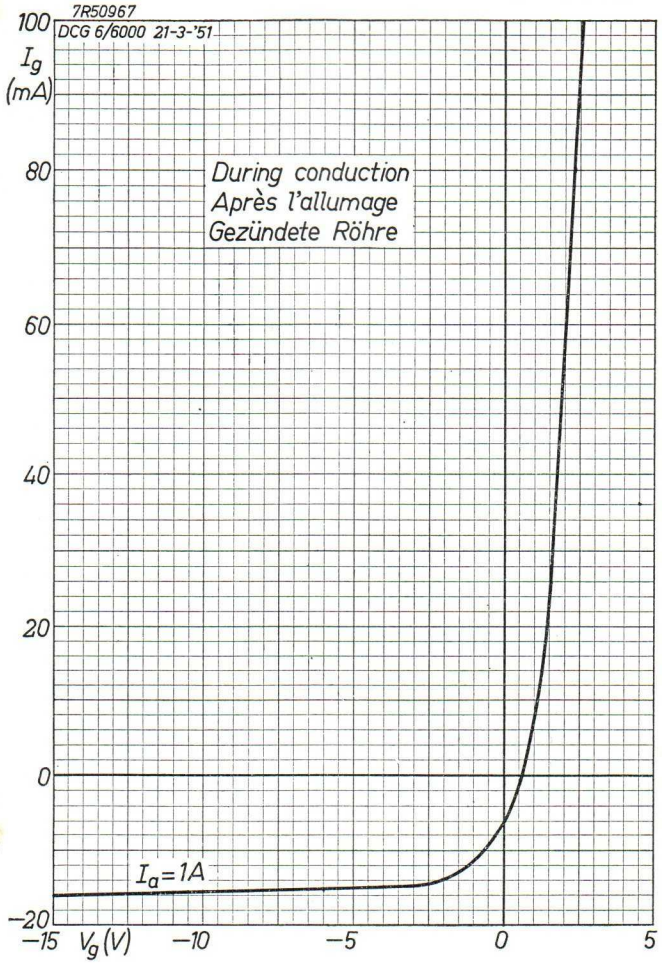
# PHILIPS




B

PHILIPS

DCG 6/6000

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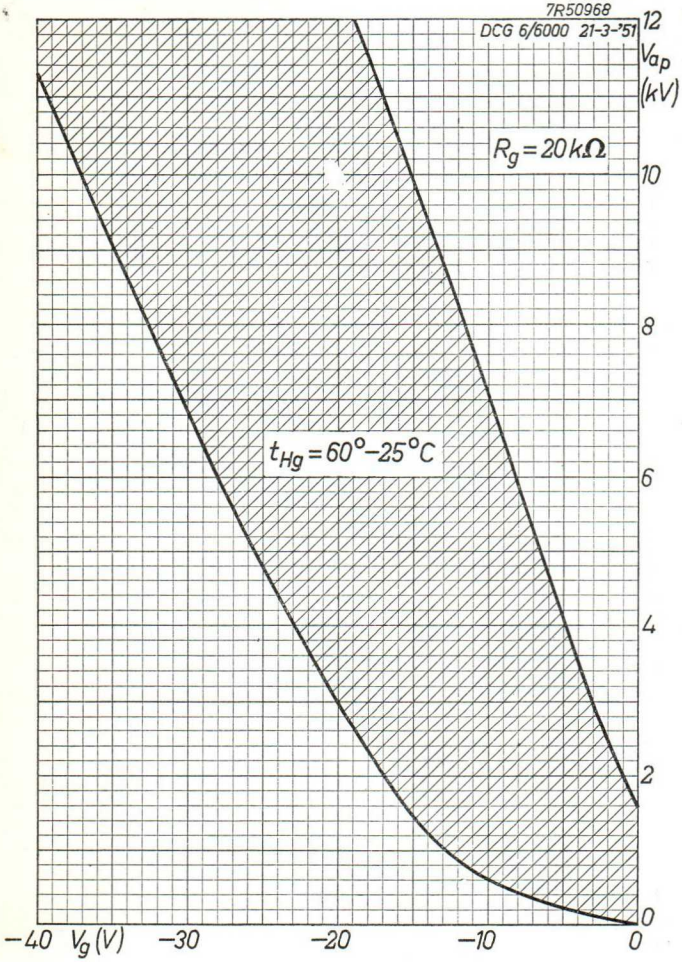
C

DCG 6/6000

# PHILIPS




D

# PHILIPS

**DCG 7/100**
**DCG 7/100B**

Grid-controlled MERCURY VAPOUR RECTIFYING TUBE
TUBE REDRESSEUR A VAPEUR DE MERCURE à grille
Gittergesteuerte GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPF-FÜLLUNG

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd.

Heating : indirect, k connected to f — $V_f$ = 5 V
Chauffage: indirect, k connectée à f — $I_f$ = max. 20 A
Heizung : indirekt, k verbunden mit f — $T_w$ = min. 10 min.[1])

Typical characteristics
Caractéristiques types $V_{arc}$ ($I_o$ = 15 A) = 12 V
Kenndaten

| | | |
|---|---|---|
| Equilibrium condensed mercury temperature rise over ambient | no load | 27 °C |
| | full load | 30 °C |
| Elévation de la température du mercure condensé au-dessus de la température de l'ambiance en condition d'équilibre | sans charge | 27 °C |
| | à pleine charge | 30 °C |
| Temperaturerhöhung des kondensierten Quecksilbers über der Umgebungstemperatur im Gleichgewichtszustand | bei Leerlauf | 27 °C |
| | bei Vollast | 30 °C |

[1])For average conditions, i.e. temperatures within limits and proper distribution of mercury

After transport and also after a long interruption of service a longer waiting time is required before anode voltage is applied to ensure proper distribution of the mercury. In general, a time of 45 minutes will be sufficient. Moreover, 10 minutes after having switched on the heater voltage, preheating of the anode must be started by connecting the anode to a supply voltage $V_b$ = max. 500 V via a resistor limiting the current $I_o$ to 6 A.

(voir page 2)
(siehe Seite 2)

# PHILIPS

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ $inv_p$ [2] | = max. | 15 kV |
| $V_a$ $fwd_p$ | = max. | 15 kV |
| $I_o$ | = max. | 10 A |
| $I_o$ | = max. | 15 A [3] |
| $T_{av}$ | = max. | 10 sec |
| $I_{ap}$ | = max. | 45 A |
| $I_{surge}$ | = max. | 600 A [4] |
| $V_{gp}$ | = max. | 600 V |
| $R_g$ | = max. | 20 kΩ |

| | | | |
|---|---|---|---|
| $V_a$ $inv_p$ | (kV) | 15 | 10 |
| $t_{Hg}$ | (°C) [5] | 25-60 | 25-65 |
| $t_{amb}$ | (°C) [6] | 10-30 | 10-35 |

---

[1] Pour les conditions, où les températures se trouvent entre leurs limites et où il existe une bonne répartition du mercure.

Après le transport et après une longue interruption de service il faut prévoir un délai d'attente plus long avant que la tension d'anode soit appliquée, afin d'obtenir une propre répartition du mercure. En général, un delai de 45 minutes sera suffisant. 10 minutes après que $V_f$ a été appliquée, on doit appliquer, en outre, une tension de 500 V au max. à l'anode par l'intermédiaire d'une résistance limitant le courant à 6 A pour le préchauffage de l'anode.

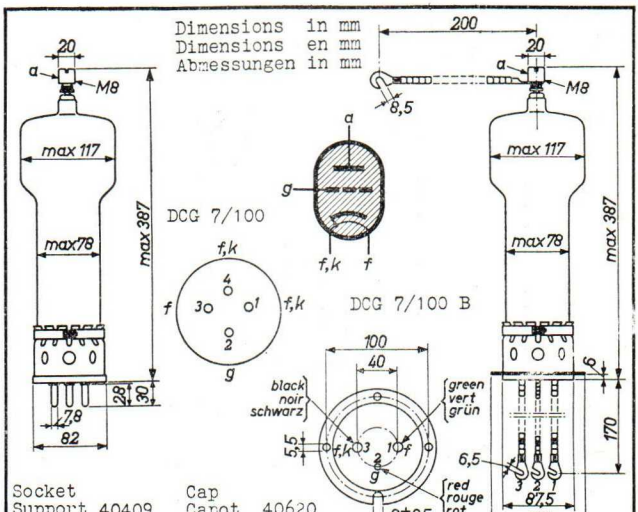
Für normale Betriebsverhältnisse, d.h. zwischen den Grenzen liegende Temperaturen und richtige Quecksilberverteilung

Nach Transport oder nach längerer Unterbrechung des Betriebs ist vor der Anlegung der Anodenspannung eine längere Wartezeit einzuhalten, damit das Quecksilber sich richtig verteilt. Im allgemeinen wird eine Anheizzeit von 45 Minuten genügen. 10 Minuten nach Einschaltung von $V_f$ muss obendrein die Anode an eine Spannung von max. 500 V angeschlossen werden unter Zwischenschaltung eines den Anodenstrom auf 6 A begrenzenden Widerstandes, damit auch die Anode vorgewärmt wird

[2] f = max. 150 c/s

[3] [4] [5] See page 3; voir page 3; siehe Seite 3

[6] See page 4 ; voir page 4 ; siehe Seite 4




Socket — Cap
Support 40409 — Capot 40620
Fassung — Haube

Mounting position: vertical with anode terminal up
Montage : vertical avec la borne d'anode en haut
Einbau : senkrecht mit dem Anodenschluss oben

Net weight
Poids net 1200 g
Nettogewicht

Shipping weight
Poids brut 3760 g
Bruttogewicht

[3]) For intermittent operation
Pour service intermittent
Für aussetzenden Betrieb

[4]) Max. duration 0.1 sec
Durée 0,1 sec au max.
Max. Zeitdauer 0,1 Sek.

[5]) If the equipment is started not more than twice daily, it is permitted to apply high tension at a condensed mercury temperature of 20°C

Si l'équipement n'est mis en circuit que deux fois par jour au max., il est permis d'appliquer la haute tension à une température de 20°C du mercure condensé

Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es erlaubt die Hochspannung bei einer Temperatur von 20°C des kondensierten Quecksilbers einzuschalten

# PHILIPS

Max. operating conditions
Caractéristiques d'utilisation max.[7])
Max. Betriebsdaten

$V_{a\ invp}$ = 15 kV

| Circuit[8]) Schaltung | $V_{tr}$ $kV_{eff}$ | $V_o$ kV | $I_o$ A | $W_o$ kW |
|---|---|---|---|---|
| a | 5,3 | 4,8 | 20 | 96 |
| b | 10,6 | 9,6 | 20 | 192 |
| c | 6,1 | 7,2 | 30 | 216 |
| d | 10,6 | 14,4 | 30 | 432 |
| e | 5,3 | 6,2 | 60 | 372 |
| f | 5,3 | 6,7 | 40 | 268 |
| g | 10,6 | 13,5 | 40 | 540 |

[6])Approximate values; with natural cooling. The tube can be operated at higher ambient temperatures than the stated maxima, when the difference between the ambient and the condensed mercury temperature (30°C with natural cooling) is reduced by an air flow directed at the bulb just above the base. A reduction to less than 10°C can easily be obtained with a simple airjet

Valeurs approchées; à refroidissement naturel. Le tube peut être utilisé à des températures de l'ambiance plus élevées que les maxima mentionnés, si la différence entre les températures de l'ambiance et du mercure condensé (30°C à refroidissement naturel) est diminuée par un courant d'air dirigé vers l'ampoule au dessus du culot. Une diminution jusqu'à moins de 10°C peut être obtenue facilement avec une conduite d'air simple.

Näherungswerte; mit natürlicher Kühlung. Die Röhre kann bei höheren Umgebungstemperaturen als die erwähnten Höchstwerte verwendet werden, wenn die Differenz zwischen der Umgebungstemperatur und der Temperatur des kondensierten Quecksilbers (30°C bei natürlicher Kühlung) mittels eines Luftstromes auf den Kolben gerade oberhalb des Sockels verringert wird. Eine Verringerung bis weniger als 10°C kann leicht mit einer einfachen Luftleitung erhalten werden

[7])Transformer regulation and voltage drops in the tubes are neglected
Les chutes de tension du transformateur et des tubes ont été négligées.
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

[8])For circuits see page T150
Pour les circuits voir page T150
Für die Schaltungen siehe Seite T150

Typical operating conditions
Caractéristiques d'opération types
Betriebskenndaten

$V_{a\ inv_p}$ = max. 15 kV[9])

| Circuit[8]) Schaltung | $V_{tr}$ kVeff | $V_o$[10]) kV | $I_o$ A | $W_o$ kW |
|---|---|---|---|---|
| a | 4,8 | 4 | 20 | 80 |
| b | 9,6 | 8 | 20 | 160 |
| c | 5,55 | 6 | 30 | 180 |
| d | 9,6 | 12 | 30 | 360 |
| e | 4,8 | 5,15 | 60 | 309 |
| f | 4,8 | 5,6 | 40 | 224 |
| g | 9,6 | 11,2 | 40 | 448 |

---

[8]) For circuits see page T150
Pour les circuits voir page T150
Für die Schaltungen siehe Seite T150

[9]) This value corresponds to a nominal peak inverse anode voltage of 13.6 V, allowance being made for a mains voltage fluctuation of ± 10%

Cette valeur correspond à une tension anodique inverse de crête nominale de 13,6 V, une fluctuation de la tension du réseau de ± 10% étant permise

Dieser Wert entspricht einem Nennwert der Anodenspitzengegenspannung von 13,6 V, wenn Netzspannungsschwankungen von ± 10% zugelassen werden

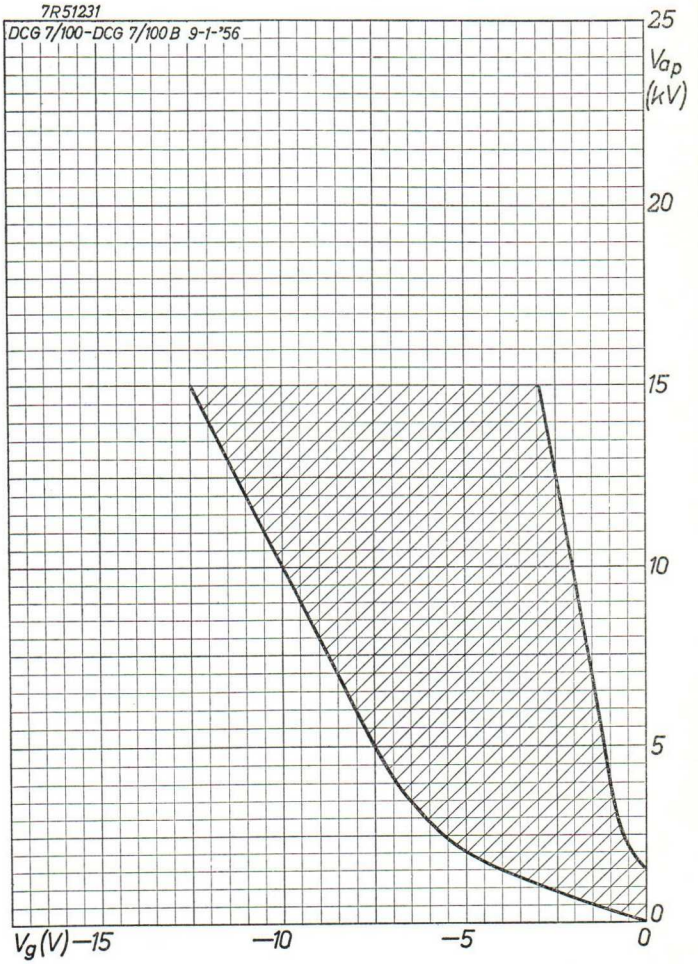
[10]) Tube voltage drop and losses in transformer, filter, etc., amounting to 8% of the output voltage across the load, have already been deducted

La chute de tension du tube et les pertes dans le transformateur, le filtre, etc., se montant à 8% de la tension sur la charge, sont déjà déduites

Der Spannungsabfall in der Röhre und die Verluste im Transformator, im Filter, usw., im Betrage von 8% der Spannung an der Belastung, sind schon abgezogen

# PHILIPS

**DCG 7/100**
**DCG 7/100B**

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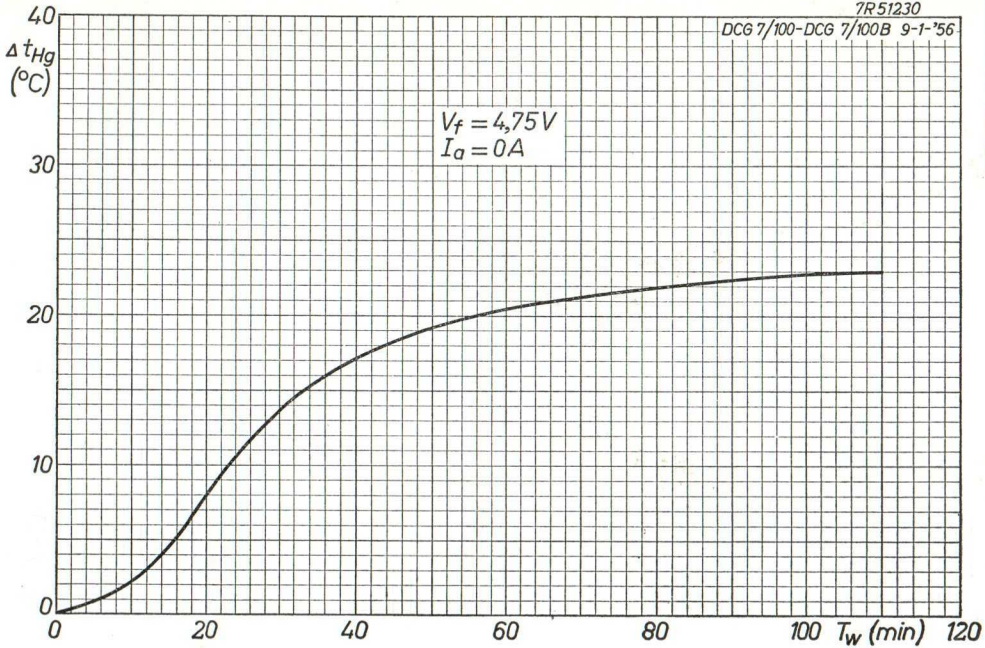
PHILIPS

7R51230
DCG 7/100-DCG 7/100B 9-1-'56




8

# PHILIPS

**DCG 9/20**

SINGLE ANODE MERCURY VAPOUR RECTIFYING TUBE
TUBE REDRESSEUR MONOPLAQUE À VAPEUR DE MERCURE
EINANODIGE GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPFFÜLLUNG

| | | |
|---|---|---|
| Filament : oxide-coated<br>Filament : oxyde<br>Heizfaden: Oxyd | $V_f$ = | 5 V [1] |
| | $I_f$ = | 13,5 A |
| Heating : direct<br>Chauffage: direct<br>Heizung : direkt | $T_w$ = | min. 90 sec [2] |

| | | |
|---|---|---|
| Typical characteristics<br>Caractéristiques types<br>Kenndaten | $T_{dion}$ | < 500 µsec |
| | $T_{ion}$ | < 10 µsec |
| | $V_{arc}$ ($I_o$ = 2,5 A) = | 12 V |

---

[1]) Phase shift of $90^o \pm 30^o$ between $V_a$ and $V_f$ and/or use of a centre-tapped filament transformer are recommended.
Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de $90^o \pm 30^o$ et/ou d'utiliser un transformateur de chauffage à prise médiane.
Eine $90^o \pm 30^o$ Phasenverschiebung zwischen $V_a$ und $V_f$ und/oder die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen.

[2]) For average conditions, i.e. temperature within limits and proper distribution of mercury.
After transport and also after a long interruption of service a longer waiting time is required before anode voltage is applied to ensure proper distribution of the mercury. In general, a time of 60 minutes will be sufficient.

Pour les conditions, où la température se trouve entre ses limites et où il existe une bonne répartition du mercure.
Après le transport et après une longue interruption de service il faut prévoir un délai d'attente plus long avant que la tension d'anode soit appliquée, afin d'obtenir une propre répartition du mercure. En général, un délai de 60 minutes sera suffisant

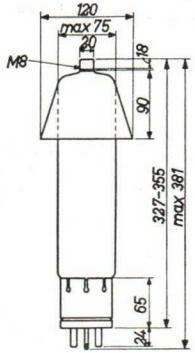
Für normale Betriebsverhältnisse, d.h. zwischen den Grenzen liegende Temperatur und richtige Quecksilberverteilung.
Nach Transport oder nach längerer Unterbrechung des Betriebs ist vor der Anlegung der Anodenspannung eine längere Wartezeit einzuhalten, damit das Quecksilber sich richtig verteilt. Im allgemeinen wird eine Wartezeit von 60 Minuten genügen.

# PHILIPS

Limiting values
Caractéristiques limites
Grenzdaten

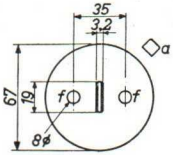
| | | max. | max. | max. | |
|---|---|---|---|---|---|
| $V_{a\ inv_p}$ | 1) = | 21 | 15 | 10 | kV |
| $I_o$ | 2) = | 2,5 | 2,5 | 2,5 | A |
| $I_{a_p}$ | = | 10 | 10 | 10 | A |
| $I_{surge}$ | 3) = | 100 | 100 | 100 | A |
| $t_{Hg}$ | 4) = | 25-45 | 25-50 | 25-60 | °C |
| $t_{amb}$ | 5) = | 15-30 | 15-35 | 15-45 | °C |

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support 40209
Fassung




Top cap
Chapeau de connexion supérieur 40620
Anschlusshaube

Anode cap
Chapeau d'anode 40616
Anodenkappe

This cap must always be mounted on the valve, thus also during preheating
Aussi pendant le préchauffage ce chapeau doit être monté sur le tube
Die Anodenkappe muss auch während der Vorwärmung auf der Röhre montiert sein

1) f = max. 150 c/s 2) $T_{av}$ = max. 30 sec

3) Max. duration 0.1 sec
Durée max. 0,1 sec
Zeitdauer max. 0,1 Sek

4) See page 3; voir page 3; siehe Seite 3

5) With natural cooling; approximate values
A refroidissement naturel; valeurs approchées
Mit natürlicher Kühlung; Näherungswerte

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit dem Sockel unten

Net weight 0,75 kg
Poids net
Nettogewicht

Shipping weight 2,3 kg
Poids brut
Bruttogewicht

Operating conditions
Caractéristiques d'utilisation [1]
Betriebsdaten

| $V_a$ $inv_p$ = 21 kV | | | | |
|---|---|---|---|---|
| Circuit [2] Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 7,4 | 6,7 | 5 | 33,5 |
| b | 14,8 | 13,4 | 5 | 67 |
| c | 8,6 | 10 | 7,5 | 75 |
| d | 14,8 | 20 | 7,5 | 150 |
| → e | 7,4 | 8,7 | 15 | 130 |
| f | 7,4 | 9,5 | 10 | 95 |
| g | 14,8 | 19 | 10 | 190 |

[1]) Transformer regulation and voltage drops in the tubes are neglected.
Les chutes de tension du transformateur et dans les tubes ont été négligées.
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen.

[2]) For circuits see page 4.
Pour les circuits voir page 4.
Für die Schaltungen siehe Seite 4.

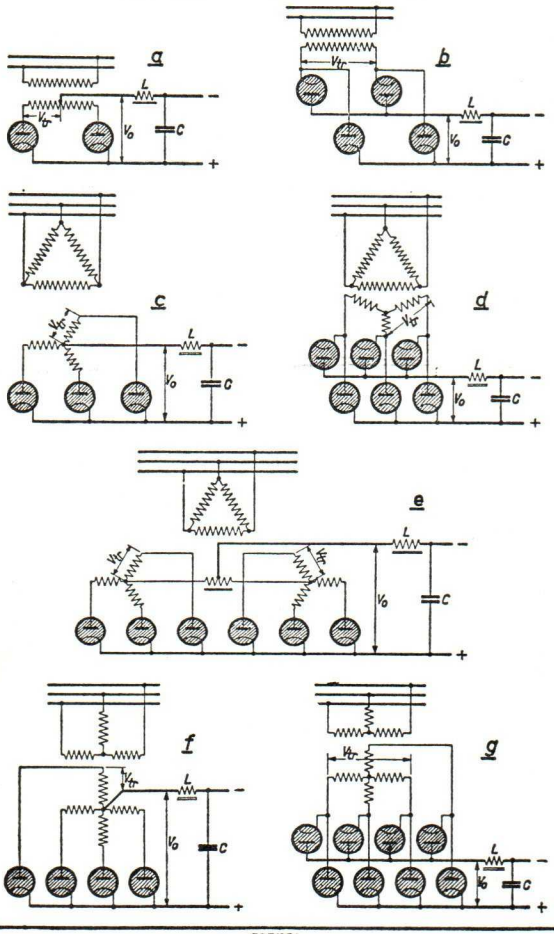
→ [4]) (page 2).If the equipment is started not more than twice daily it is permitted to apply high tension at a condensed mercury temperature of 20 °C.

(page 2).Si l'équipement n'est mis en circuit que deux fois par jour au max., il est permis d'appliquer la haute tension à une température de 20 °C du mercure condensé.

(Seite 2).Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es erlaubt die Hochspannung bei einer Temperatur von 20 °C des kondensierten Quecksilbers einzuschalten.

# PHILIPS

Rectifying valve circuits
Circuits des tubes redresseurs
Schaltungen von Gleichrichterröhren

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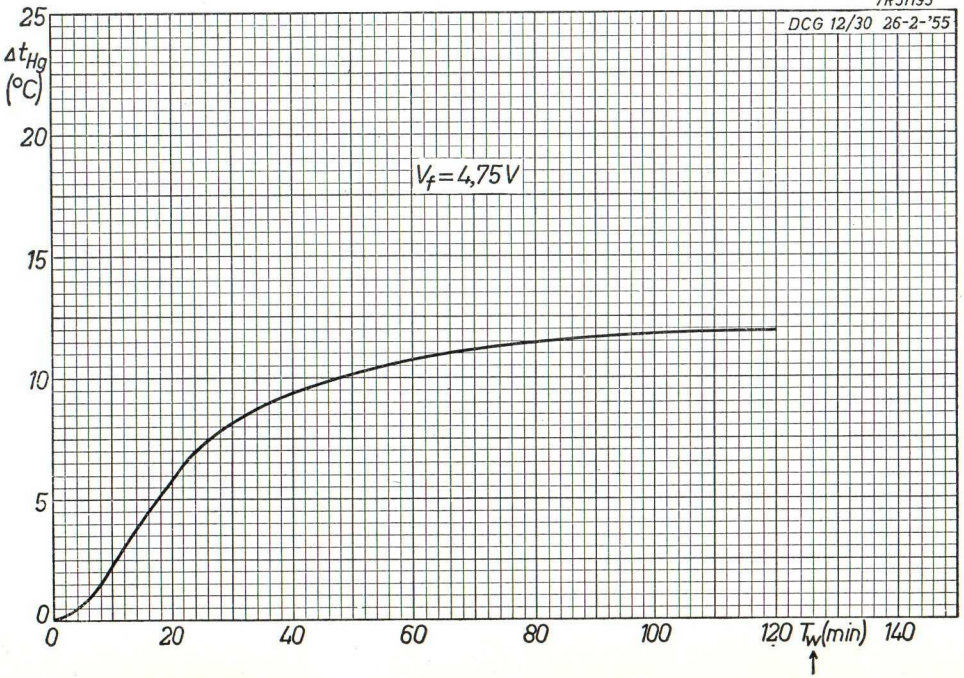
DCG 12/30 26-2-'55

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A

PHILIPS

DCG 9/20

# PHILIPS

**DCG 12/30**

Grid-controlled MERCURY VAPOUR RECTIFYING VALVE
TUBE REDRESSEUR A VAPEUR DE MERCURE à grille
Gittergesteuerte GLEICHRICHTERRÖHRE MIT QUECKSILBER-DAMPFFÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

| | | |
|---|---|---|
| Heating : direct<br>Chauffage: direct<br>Heizung : direkt | $V_f$ = | 5 V [1] |
| | $I_f$ = | 13,5 A |
| | Tw = min. | 90 sec [2] |

| | | |
|---|---|---|
| Capacitances<br>Capacités<br>Kapazitäten | $C_{ag}$ = | 4 pF |
| | $C_g$ = | 13 pF |

| | | |
|---|---|---|
| Typical characteristics<br>Caractéristiques types<br>Kenndaten | $T_{dion}$ | < 500 µsec |
| | $T_{ion}$ | < 10 µsec |
| | $V_{arc}$ ($I_o$=2,5A) = | 12 V ← |

[1]) Phase shift of 90°±30° between $V_a$ and $V_f$ and/or use of a centre-tapped filament transformer are recommended
Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90°±30° et/ou d'utiliser un transformateur de chauffage à prise médiane
Eine 90°±30° Phasenverschiebung zwischen $V_a$ und $V_f$ und/oder die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen

[2]) For average conditions, i.e. temperature within limits and proper distribution of mercury ( see page A).
After transport and also after a long interruption of service a longer waiting time is required before anode voltage is applied to ensure proper distribution of the mercury. In general, a time of 60 minutes will be sufficient.

Pour les conditions, où les températures se trouvent entre leurs limites et où il existe une bonne répartition du mercure (voir page A).
Après le transport et après une longue interruption de service il faut prévoir un délai d'attente plus long avant que la tension d'anode soit appliquée, afin d'obtenir une propre répartition du mercure. En général, un délai de 60 minutes sera suffisant.

(siehe Seite 2)

# PHILIPS

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_{a\ inv_p}$ | = max. | 27 kV | [1] |
| $V_{a_p}$ | = max. | 27 kV | |
| $I_o$ | = max. | 2,5 A | [2] |
| $I_{a_p}$ | = max. | 10 A | |
| $I_{surge}$ | = max. | 100 A | [3] |
| $-V_g$ | = max. | 300 V | [4] |
| $I_g$ | = max. | 25 mA | [2] |
| $I_{g_p}$ | = max. | 125 mA | |

| $V_{a\ inv_p}$ | kV | 27 | 21 | 15 | 13 | 10 |
|---|---|---|---|---|---|---|
| $t_{Hg}$ [5] | °C | 30-40 | 30-45 | 25-50 | 25-55 | 25-60 |
| $t_{amb}$ [6] | °C | 20-25 | 20-30 | 15-35 | 15-40 | 15-45 |

When the anode voltage $V_a$ is negative, the grid voltage must never be positive
La tension de grille $V_g$ ne doit jamais être positive, quand la tension anodique $V_a$ est négative
Bei negativer Anodenspannung $V_a$ darf die Gitterspannung niemals positiv sein

[1]) f = max. 150 c/s [2]) $T_{av}$ = max. 30 sec

[3]) Max. duration 0.1 sec
Durée max. 0,1 sec
Zeitdauer max. 0,1 Sek.

[4]) Direct voltage; before conduction
Tension directe; avant l'allumage
Gleichspannung; gelöschte Röhre

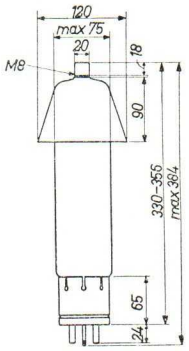
→ [5]) See page 4; voir page 4; siehe Seite 4

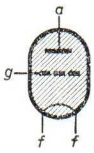
[6]) With natural cooling; approximate values
A refroidissement par convection; valeurs approchées
Mit Kühlung durch Konvektion; Näherungswerte

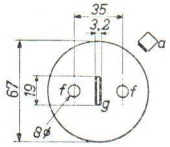
Betreffs $T_w$, Seite 1

Für normale Betriebsverhältnisse, d.h. zwischen den Grenzen liegende Temperaturen und richtige Quecksilberverteilung (siehe Seite A).
Nach Transport oder nach längerer Unterbrechung des Betriebs ist vor der Anlegung der Anodenspannung eine längere Wartezeit einzuhalten, damit das Quecksilber sich richtig verteilt. Im allgemeinen wird eine Anheizzeit von 60 Minuten genügen

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support 40209
Fassung

Top cap
Chapeau de connexion supérieur 40620
Anschlusshaube

Anode cap
Chapeau d'anode 40616
Anodenkappe

This cap must always be mounted on the valve, thus also during preheating
Aussi pendant le préchauffage ce chapeau doit être monté sur le tube
Die Anodenkappe muss auch während der Vorwärmung auf der Röhre montiert sein

Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Einbau : senkrecht mit dem Sockel unten

Net weight
Poids net 0,75 kg
Nettogewicht

Shipping weight
Poids brut 2,3 kg
Bruttogewicht

Operating conditions
Caractéristiques d'utilisation [1])
Betriebsdaten

$V_g$ ($V_a$ $inv_p$ = 27 kV) = -100 V
$V_g$ ($V_a$ $inv_p$ = 10 kV) = -50 V
$I_g$ = 2 mA

| $V_a$ $inv_p$ = 27 kV | | | | |
|---|---|---|---|---|
| Circuit[2]) Schaltung | Vtr ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 9,5 | 8,6 | 5 | 43 |
| b | 19,1 | 17,2 | 5 | 86 |
| c | 11 | 12,9 | 7,5 | 97 |
| d | 19,1 | 25,8 | 7,5 | 194 |
| e | 9,5 | 11,2 | 15 | 168 |
| f | 9,5 | 12,1 | 10 | 121 |
| g | 19,1 | 24,3 | 10 | 243 |

[1]) Transformer regulation and voltage drops in the tubes are neglected
Les chutes de tension du transformateur et dans les tubes ont été négligées
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

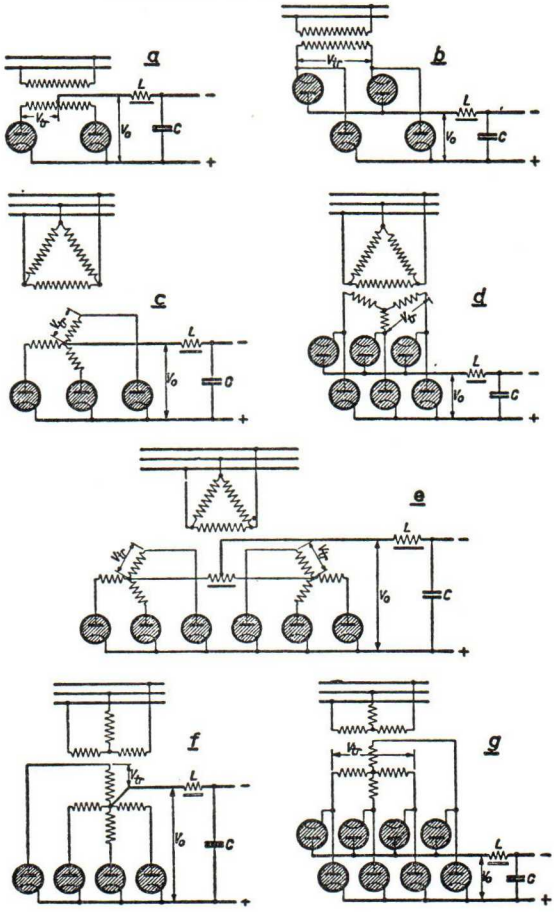
[2]) For circuits see page 5
Pour les circuits voir page 5
Für die Schaltungen siehe Seite 5

[5]) (page 2). If the equipment is started not more than twice daily it is permitted to apply high tension at a condensed mercury temperature which is 5 °C less than the values mentioned in the table.

(page 2). Si l'équipement n'est mis en circuit que deux fois par jour au max., il est permis d'appliquer la haute tension à une température du mercure condensé qui est de 5 °C moins que les valeurs mentionnées dans la table.

(Seite 2). Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es erlaubt die Hochspannung bei einer Temperatur des kondensierten Quecksilbers die um 5 °C niedriger ist als die in der Tabelle erwähnten Werte einzuschalten.

Rectifying valve circuits
Circuits des tubes redresseurs
Schaltungen von Gleichrichterröhren

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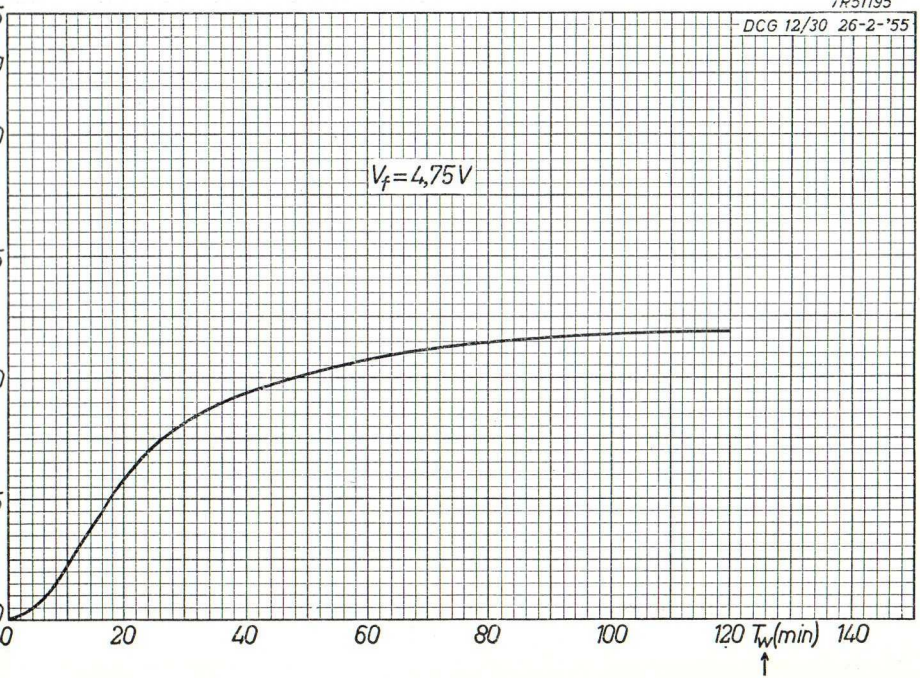
DCG 12/30 26-2-'55

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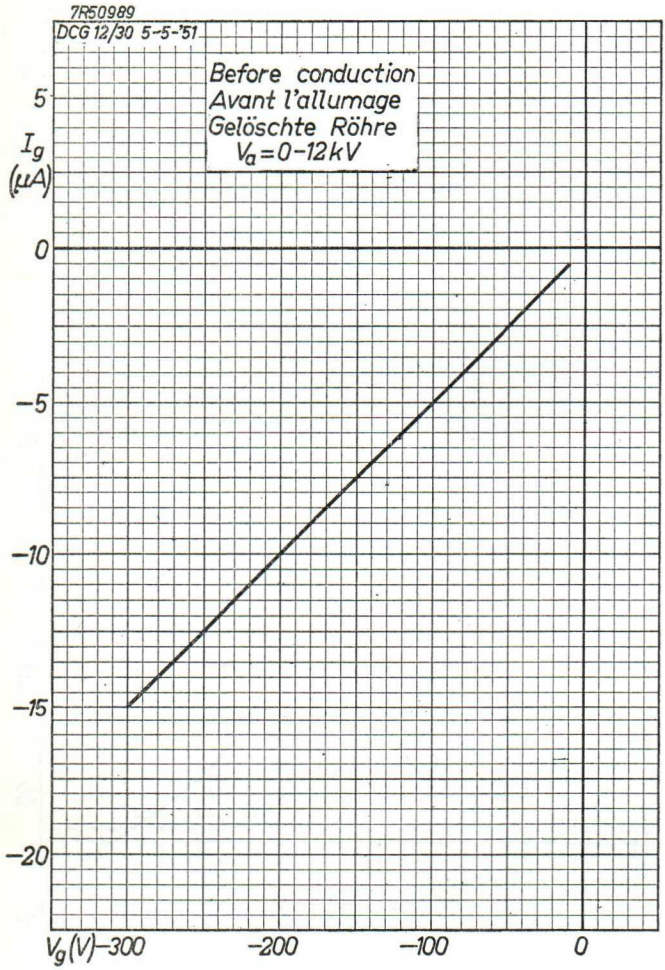
A

PHILIPS

DCG 12/30

DCG 12/30

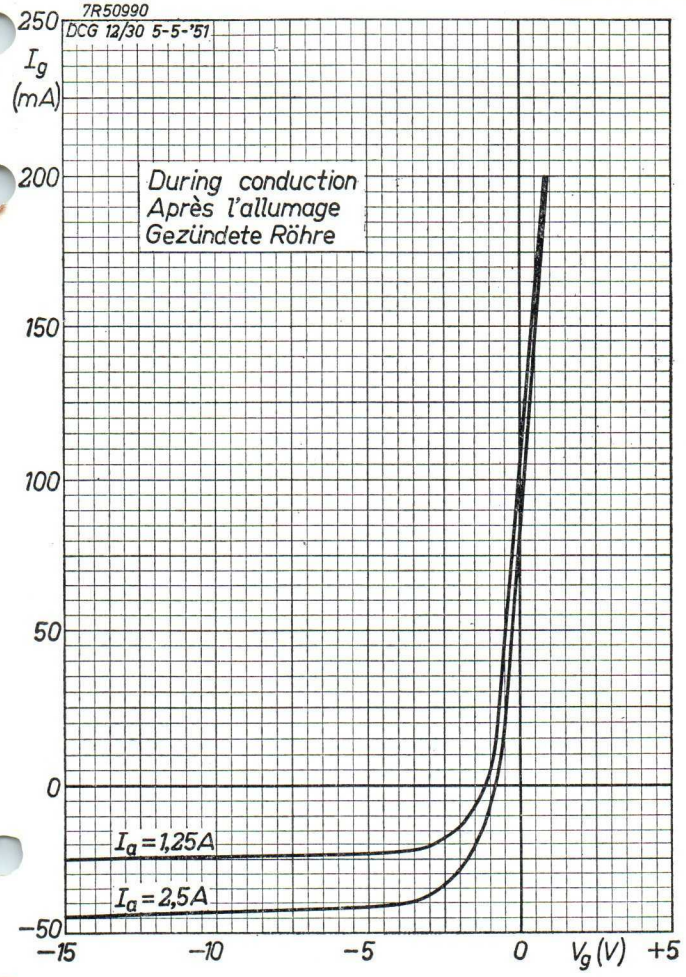
# PHILIPS




B

# PHILIPS

**DCG 12/30**

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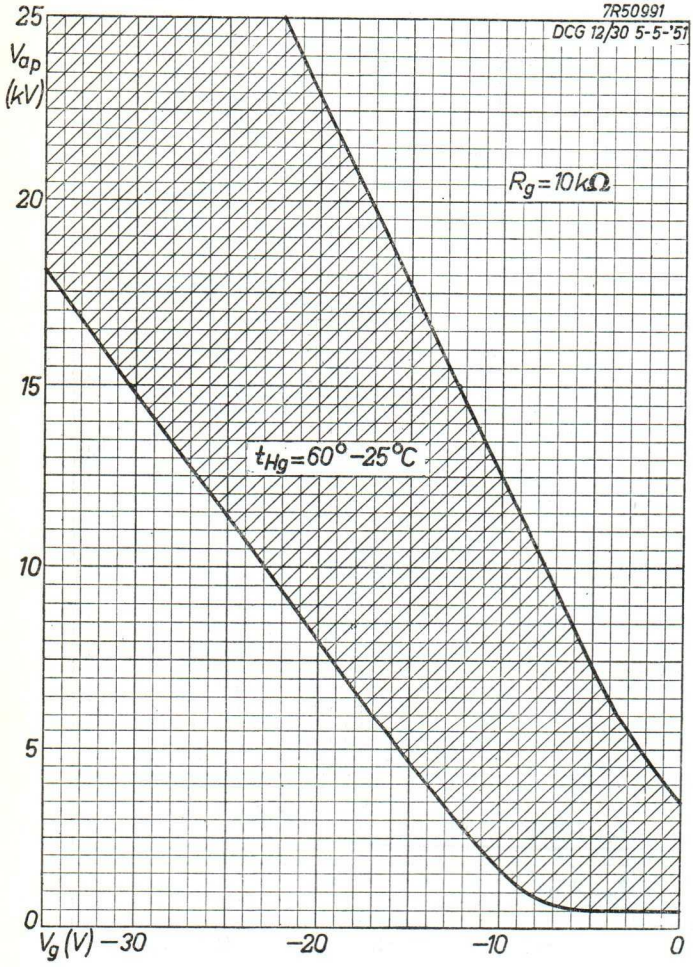
C

DCG 12/30

# PHILIPS




D

# PHILIPS

**DCX 4/1000**

SINGLE ANODE XENON FILLED RECTIFYING VALVE
TUBE REDRESSEUR MONOPLAQUE A REMPLISSAGE DE XENON
EINANODIGE GLEICHRICHTERRÖHRE MIT XENONFÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct — $V_f$ = 2,5 V[1])
Chauffage: direct — $I_f$ = 5 A
Heizung : direkt — $T_w$ = min. 10 sec

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $I_o$ | = max. 0,25 A[2]) | max. 0,5 A[2]) |
| $I_{a_p}$ | = max. 1 A | max. 2 A |
| $V_{inv_p}$ | = max. 10 kV | max. 5 kV |
| f | = max. 150 c/s | max. 500 c/s |
| $t_{amb}$ | = -55°/+75 °C | -55°/+75 °C |
| $I_{surge}$ | = max. 20 A[3]) | max. 20 A[3]) |

General characteristics
Caractéristiques générales
Allgemeine Daten

$V_{arc}$ ($I_o$ = 0,5 A) = 12 V

Net weight
Poids net
Nettogewicht — 100 g

Shipping weight
Poids brut
Bruttogewicht — 165 g

---

[1])See page 2; voir page 2; siehe Seite 2

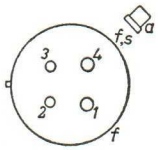
[2])$T_{av}$ = max. 15 sec.

[3])Max. duration 0.1 sec.
Durée 0,1 sec au max.
Zeitdauer max. 0,1 Sek.

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm







| | |
|---|---|
| Base : medium 4-p with bayonet | Socket : |
| Culot : medium 4-p à baïonnette | Support: 40218/03 [2]) |
| Sockel: medium 4-p mit Bajonett | Fassung: |
| Top cap : | Cap : |
| Capot supérieur: medium | Capot : 40619 |
| Kolbenanschluss: | Haube : |

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

---

[1]) Phase shift of 90° ± 30° between $V_a$ and $V_f$ and use of a centre-tapped filament transformer is recommended
In order to obtain a low ignition voltage the voltage of pin 4 (f,s) should be positive with respect to pin 1 at the moment of ignition
Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90° ± 30° et d'utiliser un transformateur de chauffage à prise médiane
Afin d'obtenir une tension d'amorçage basse, la tension de la broche 4 (f,s) sera positive au regard de la broche 1 au moment de l'amorçage
Eine Phasenverschiebung von 90° ± 30° zwischen $V_a$ und $V_f$ und die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen
Zur Erhaltung einer niedrigen Zündspannung soll die Spannung an Stift 4 (f,s) im Augenblick der Zündung positiv in Bezug auf Stift 1 sein.

→ [2]) At voltages above 2 kV the socket must be insulated from the chassis
A des tensions au-dessus de 2 kV le support faut être isolé du châssis
Bei Spannungen über 2 kV muss die Fassung vom Chassis isoliert werden

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| $V_{inv_p}$ = 10 kV | | | | |
|---|---|---|---|---|
| Circuit [2] Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 3,5 | 3,2 | 0,5 | 1,6 |
| b | 7,1 | 6,4 | 0,5 | 3,2 |
| c | 4,1 | 4,8 | 0,75 | 3,6 |
| d | 7,1 | 9,6 | 0,75 | 7,2 |
| e | 3,5 | 4,1 | 1,5 | 6,2 |
| f | 3,5 | 4,5 | 1,0 | 4,5 |
| g | 7,1 | 9,0 | 1,0 | 9,0 |

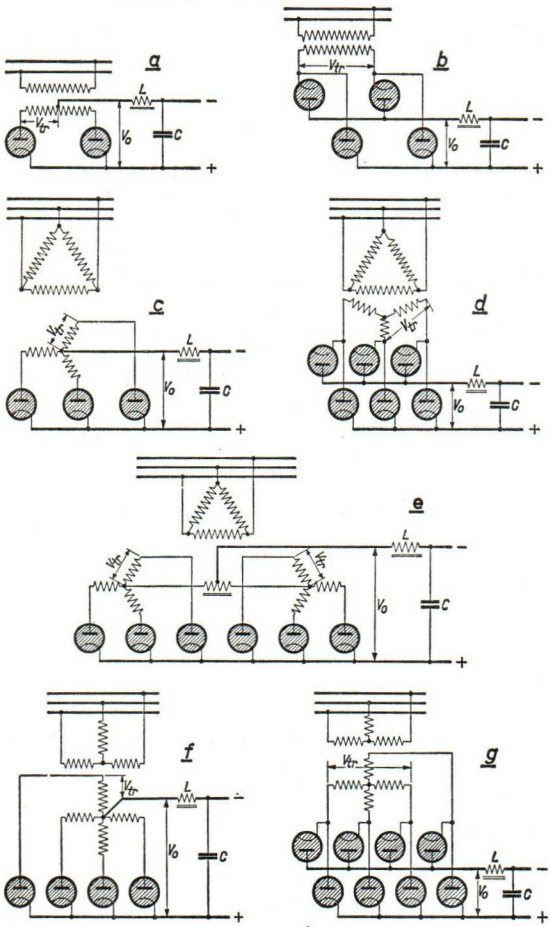
| $V_{inv_p}$ = 5 kV | | | | |
|---|---|---|---|---|
| Circuit [2] Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 1,8 | 1,6 | 1,0 | 1,6 |
| b | 3,5 | 3,2 | 1,0 | 3,2 |
| c | 2,0 | 2,4 | 1,5 | 3,6 |
| d | 3,5 | 4,8 | 1,5 | 7,2 |
| e | 1,8 | 2,1 | 3,0 | 6,2 |
| f | 1,8 | 2,2 | 2,0 | 4,5 |
| g | 3,5 | 4,5 | 2,0 | 9,0 |

[1]) Transformer regulation and voltage drops in the tubes are neglected.
Les chutes de tension du transformateur et dans les tubes ont été négligées.
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen.

[2]) For circuits see page 4
Pour les circuits voir page 4
Für die Schaltungen siehe Seite 4

# PHILIPS

Rectifying valve circuits
Circuits des tubes redresseurs
Schaltungen von Gleichrichterröhren




7R51054

# PHILIPS

**DCX 4/5000**

SINGLE-ANODE XENON-FILLED RECTIFYING VALVE
TUBE REDRESSEUR MONOPLAQUE A REMPLISSAGE DE XENON
EINANODIGE GLEICHRICHTERRÖHRE MIT XENON-FÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

$V_f$ = 5 V[1])
$I_f$ = 7,1 A

Heating : direct
Chauffage: direct
Heizung : direkt

$T_w$ = min. 30 sec

General characteristics
Caractéristiques générales
Allgemeine Daten

$V_{arc}$ ($I_o$=1,25 A) = 12 V

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $I_o$ | = max. | 1,25 A[2]) |
| $I_{ap}$ | = max. | 5 A |
| $V_{invp}$ | = max. | 10 kV |
| f | = max. | 150 c/s |
| $t_{amb}$ | = | -55/+70 °C |
| $I_{surge}$ | = max. | 50 A[3]) |

Net weight
Poids net
Nettogewicht

190 g

Shipping weight
Poids brut
Bruttogewicht

950 g

[1])See page 2; voir page 2; siehe Seite 2

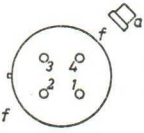
[2])$T_{av}$ = max. 15 sec

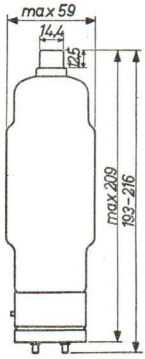
[3])Max. duration 0.1 sec
Durée 0,1 sec au max.
Zeitdauer max. 0,1 Sek

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| | | | |
|---|---|---|---|
| Base : | | Socket : | |
| Culot : | Jumbo 4 p. | Support: | 40408 |
| Sockel: | | Fassung: | |
| Top cap : | | Cap : | |
| Capot supérieur: | medium | Capot : | 40619 |
| Kolbenanschluss: | | Haube : | |

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

---

1) Phase shift of 90° ± 30° between $V_a$ and $V_f$ and use of a centre-tapped filament transformer is recommended. In order to obtain a low ignition voltage the voltage of pin 4 should be positive with respect to pin 2 at the moment of ignition.

Il est recommandé d'opérer le tube avec un décalage de phase entre $V_a$ et $V_f$ de 90° ± 30° et d'utiliser un transformateur de chauffage à prise médiane. Afin d'obtenir une tension d'amorçage basse, la tension de la broche 4 sera positive au regard de la broche 2 au moment de l'amorçage.

Eine Phasenverschiebung von 90° ± 30° zwischen $V_a$ und $V_f$ und die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen. Zur Erhaltung einer niedrigen Zündspannung soll die Spannung an Stift 4 im Augenblick der Zündung positiv in Bezug auf Stift 2 sein.

Operating conditions
Caractéristiques d'utilisation [1])
Betriebsdaten

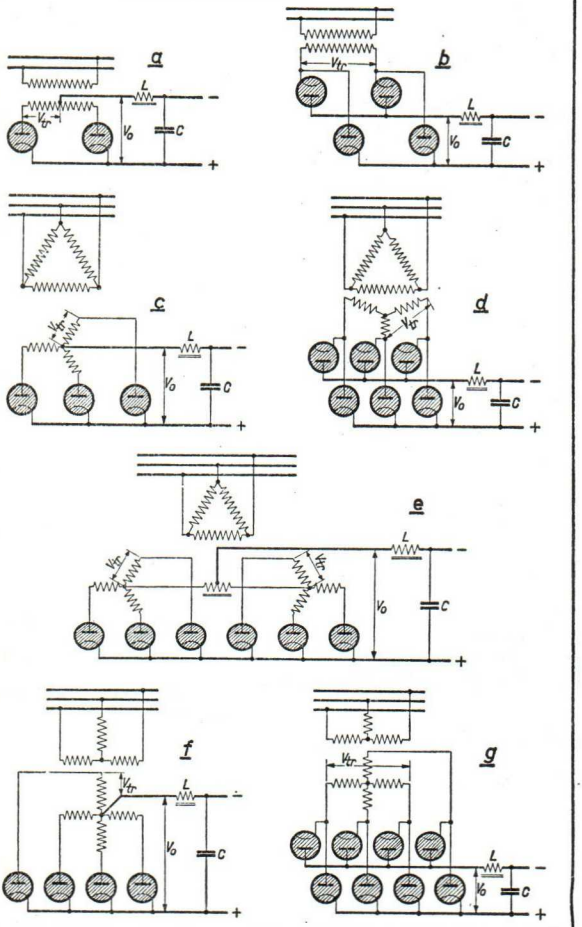
| $V_{a\ inv_p}$ = 10 kV | | | | |
|---|---|---|---|---|
| Circuit[2]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 3,5 | 3,2 | 2,5 | 8 |
| b | 7,1 | 6,4 | 2,5 | 16 |
| c | 4,1 | 4,8 | 3,75 | 18 |
| d | 7,1 | 9,6 | 3,75 | 36 |
| e | 3,5 | 4,1 | 7,5 | 31 |
| f | 3,5 | 4,5 | 5,0 | 22,5 |
| g | 7,1 | 9,0 | 5,0 | 45 |

[1]) Transformer regulation and voltage drops in the valves are neglected
Les chutes de tension du transformateur et dans les tubes ont été négligées
Mit Spannungsverlusten im Transformator und in den Röhren ist keine Rechnung getragen

[2]) For circuits see page 4
Pour les circuits voir page 4
Für die Schaltungen siehe Seite 4

# PHILIPS

Rectifying valve circuits
Circuits des tubes redresseurs
Schaltungen von Gleichrichterröhren




7R51054

# PHILIPS

**MA 4/500**

TRIODE for use as modulator, L.F. amplifier
TRIODE pour utilisation comme modulatrice, amplificatrice B.F.
TRIODE zur Verwendung als Modulator, N.F. Verstärker

Filament : tungsten
Filament : tungstène
Heizfaden: Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 17,0 V
If = 9,6 A

Capacitances
Capacités
Kapazitäten

Ca = 1,2 pF
Cg = 11,3 pF
Cag = 12 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

μ = 7,5
S (Ia=175 mA) = 1,5 mA/V
Isat = 0,6 A

| A mod. | | B mod.[1] | |
|---|---|---|---|
| Va (V) | Wo (W) | Va (V) | Wo (W) |
| 4000 | 152 | 4000 | 950 |

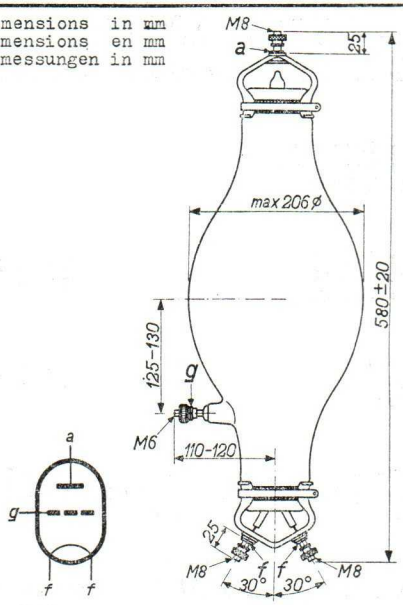
1) two valves
deux tubes
zwei Röhren

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 4000 V
Wa = max. 500 W
Wg = max. 50 W
Rg = max. 50 kΩ

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical
Montage : vertical
Aufstellung : senkrecht

Net weight
Poids net
Nettogewicht 1,8 kg

Shipping weight
Poids brut
Bruttogewicht 7 kg

# PHILIPS

**MC 1/60**

TRIODE for use as modulator, L.F. amplifier
TRIODE pour utilisation comme modulatrice, amplificatrice B.F.
TRIODE zur Verwendung als Modulator, N.F.Verstärker

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 4,0 V
If = 3,3 A

Capacitances
Capacités
Kapazitäten

Ca = 4,3 pF
Cg = 11 pF
Cag = 15,3 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

$\mu$ = 12,5
S (Ia=75 mA) = 6 mA/V

| A mod. | | B mod.[1] | |
|---|---|---|---|
| Va (V) | Wo (W) | Va (V) | Wo (W) |
| 1000 | 22,3 | 1000 | 204 |

1) two valves
deux tubes
zwei Röhren

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 1000 V
Wa = max. 75 W
Wg = max. 5 W
Rg { = max. 20 kΩ [2]
Rg { = max. 50 kΩ [3]
Ik = max. 200 mA
Ikp = max. 800 mA

---

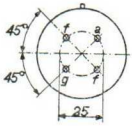
2) With fixed grid bias; à polarisation fixe; mit fester Gittervorspannung

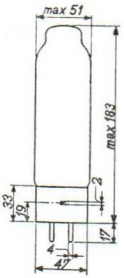
3) With automatic grid bias; à polarisation automatique; mit automatischer Gittervorspannung

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support
Fassung: 40400

Net weight
poids net
Nettogewicht: 180 g

Shipping weight
Poids brut
Bruttogewicht: 390 g

Mounting position: vertical with base up or down horizontal with plane of filament vertical.

Montage : vertical avec culot en haut ou en bas horizontal avec plan du filament vertical

Einbau : senkrecht mit Sockel oben oder unten waagerecht mit der Heizfadenfläche senkrecht

PENTODE for use as H.F. amplifier
PENTHODE pour utilisation en amplificatrice H.F.
PENTODE zur Verwendung als HF-Verstärker

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 12 V
If = 3,35 A

Capacitances
Capacités
Kapazitäten

Ca = 14 pF
Cg1 = 13,7 pF
Cag1 = 0,15 pF

Typical characteristics
Caractéristiques types
Kenndaten

μg2g1 = 5,9
S (Ia=55 mA)= 3,3 mA/V

| λ | Freq. | C telegr. | | B teleph. | | Can.mod. | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >15 | <20 | 2000 | 270 | 2000 | 45 | 1800 | 124 |
| | | 1500 | 175 | 1500 | 37 | 1200 | 60 |
| 5[1]) | 60 [1]) | 1500 | 305 | 1500 | 70 | 1200 | 149 |
| | | Cag2 mod. | | Cg3 mod. | | | |
| >15 | <20 | 1800 | 147 | 2000 | 43 | | |
| | | 1200 | 76 | 1500 | 35 | | |
| 5[1]) | 60 [1]) | 1200 | 155 | 1500 | 65 | | |

[1]) two valves
deux tubes
zwei Röhren

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| Va | = max. 2000 V | Wg1 | = max. 12 W |
| Wa | = max. 110 W | Ik | = max. 285 mA |
| Vg2 | = max. 400 V | Ikp | = max. 1400 mA |
| Wg2 | = max. 25 W | $R_{g3}$ | = max. 80 kΩ |

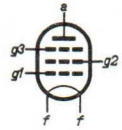
Rg1 { with fixed grid bias / à polarisation fixe / mit fester Gittervorspannung = max. 40 kΩ

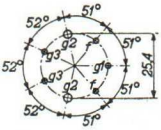
Rg1 { with automatic grid bias / à polarisation automatique / mit autom. Gittervorspannung = max. 80 kΩ

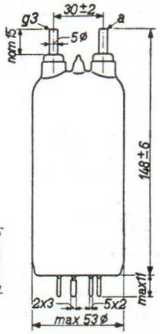
temperature of pins
température des broches
Stiftentemperatur = max. 180 °C

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support
Fassung 40207

Clips
Bornes de connexion
Anschlussklemmen 40600

Mounting position: vertical with base up [1]) or down
Montage : vertical avec pied en haut [1]) ou en bas
Einbau : senkrecht mit Sockel oben [1]) oder unten

Net weight
Poids net
Nettogewicht 150 g

Shipping weight
Poids brut
Bruttogewicht 375 g

[1]) In that case it is recommended to support the tube
Dans ce cas il est recommendé de supporter le tube
In diesem Fall empfiehlt es sich die Röhre zu stützen

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >15 | >15 | 5[1]) | m |
| Va | = | 2000 | 1500 | 1500 | V |
| Vg1 | = | -150 | -150 | -150 | V |
| Vg2 | = | 300 | 400 | 200 | V |
| Vg3 | = | 300 | 0 | 200 | V |
| Ia | = | 190 | 170 | 350 | mA |
| Ig1 | = | 7,5 | 1 | 8 | mA |
| Ig2(+g3) | = | 80 | 60 | 60 | mA |
| Vg1p | = | 260 | 240 | 220 | V |
| Wig1 | = | 2 | 0,24 | 1,7 | W |
| Wg2 | = | 24 | 24 | 12 | W |
| Wia | = | 360 | 255 | 525 | W |
| Wa | = | 110 | 80 | 220 | W |
| Wo | = | 270 | 175 | 305 | W |
| $\eta$ | = | 71 | 68,5 | 58 | % |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >15 | >15 | 5[1]) | m |
| Va | = | 2000 | 1500 | 1500 | V |
| Vg1 | = | -65 | -44 | -45 | V |
| Vg2 | = | 400 | 300 | 300 | V |
| Vg3 | = | 0 | 0 | 0 | V |
| Ia | = | 77,5 | 98 | 190 | mA |
| Ig2 | = | 6,5 | 10 | 12 | mA |
| Vg1p | = | 50 | 65 | 65 | V |
| Wg2 | = | 2,6 | 3 | 3,6 | W |
| Wia | = | 155 | 147 | 285 | W |
| Wa | = | 110 | 110 | 215 | W |
| Wo | = | 45 | 37 | 70 | W |
| $\eta$ | = | 29 | 25 | 25 | % |
| m | = | 100 | 100 | 100 | % |
| Ig1 | = | 2,5 | 4 | 8 | mA |
| Wig1 | = | 0,25 | 0,5 | 1 | W |

[1]) Two valves; deux tubes; zwei Röhren

# PHILIPS

Operating conditions H.F. class C
Caractéristiques d'utilisation H.F. classe C
Betriebsdaten H.F. Klasse C

| | anode modulation<br>modulation d'anode<br>Anodenmodulation | | | anode- and screen grid modulation<br>modulation d'anode et de grille-écran<br>Anoden- und Schirmgitter-modulation | | | |
|---|---|---|---|---|---|---|---|
| $\lambda$ = | >15 | >15 | 5[1]) | >15 | >15 | 5[1]) | m |
| Va = | 1800 | 1200 | 1200 | 1800 | 1200 | 1200 | V |
| Vg1 = | -150 | -150 | -200 | -150 | -150 | -200 | V |
| Vg2 = | 300 | 300 | 300 | 300 | 300 | 400 | V |
| Vg3 = | 0 | 0 | 0 | 0 | 0 | 0 | V |
| Ia = | 100 | 72 | 245 | 114 | 92 | 250 | mA |
| Ig1 = | 7,5 | 7 | 5 | 6 | 5 | 3 | mA |
| Ig2 = | 83 | 83 | 100 | 60 | 55 | 40 | mA |
| Vg1p = | 250 | 240 | 240 | 235 | 230 | 210 | V |
| Wig1 = | 1,9 | 1,7 | 1,2 | 1,4 | 1,2 | 0,6 | W |
| Wg2 = | 25 | 25 | 30 | 18 | 16,5 | 16 | W |
| Wia = | 180 | 87 | 294 | 205 | 110 | 300 | W |
| Wa = | 56 | 27 | 145 | 58 | 34 | 145 | W |
| Wo = | 124 | 60 | 149 | 147 | 76 | 155 | W |
| $\eta$ = | 69 | 69 | 50 | 72 | 69 | 51 | % |
| m = | 100 | 100 | 100 | 100 | 100 | 100 | % |
| Vg2p = | | | | 300 | 300 | 400 | V |
| Wmod = | 90 | 43 | 147 | 115 | 63 | 160 | W |

[1]) Two valves; deux tubes; zwei Röhren

Operating conditions H.F. class C suppressor grid modulation
Caractéristiques d'utilisation H.F. classe C modulation de grille d'arrêt
Betriebsdaten H.F. Klasse C Fanggittermodulation

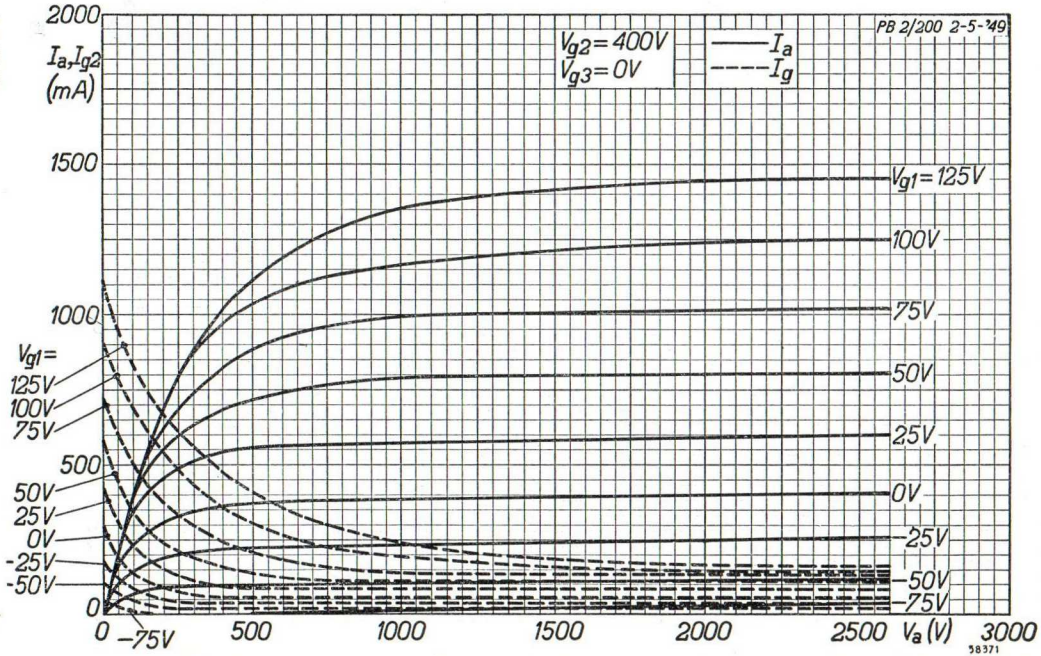
| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >15 | >15 | 5[1]) | m |
| Va | = | 2000 | 1500 | 1500 | V |
| Vg1 | = | -150 | -150 | -150 | V |
| Vg2 | = | 300 | 300 | 400 | V |
| Vg3 | = | -180 | -160 | -185 | V |
| Ia | = | 68 | 60 | 180 | mA |
| Ig1 | = | 8 | 6 | 4 | mA |
| Ig2 | = | 83 | 80 | 125 | mA |
| Vg1p | = | 240 | 250 | 175 | V |
| Wig1 | = | 1,9 | 1,5 | 0,7 | W |
| Wg2 | = | 25 | 24 | 50 | W |
| Wia | = | 135 | 120 | 270 | W |
| Wa | = | 92 | 85 | 205 | W |
| Wo | = | 43 | 35 | 65 | W |
| $\eta$ | = | 32 | 29 | 24 | % |
| m | = | 90 | 90 | 80 | % |
| Vg3p | = | 180 | 160 | 185 | V |
| Wmod | = | 0 | 0 | 0 | W |

[1]) Two valves; deux tubes; zwei Röhren

# PHILIPS

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

| | | | | |
|---|---|---|---|---|
| Va | = | | 2000 | V |
| Vg1 | = | | -75 | V |
| Vg2 | = | | 400 | V |
| Vg3 | = | | 0 | V |
| Raa | = | | 16 | kΩ |
| Vg1g1p | = | 0 | 200 | V |
| Ia | = | 2x20 | 2x142,5 | mA |
| Ig1 | = | 0 | 2x3,5 | mA |
| Ig2 | = | 2x3 | 2x40 | mA |
| Wig1 | = | 0 | 2x0,4 | W |
| Wg2 | = | 2x1,2 | 2x16 | W |
| Wia | = | 2x40 | 2x285 | W |
| Wa | = | 2x40 | 2x85 | W |
| Wo | = | 0 | 400 | W |
| $\eta$ | = | - | 70 | % |




6.5.1949

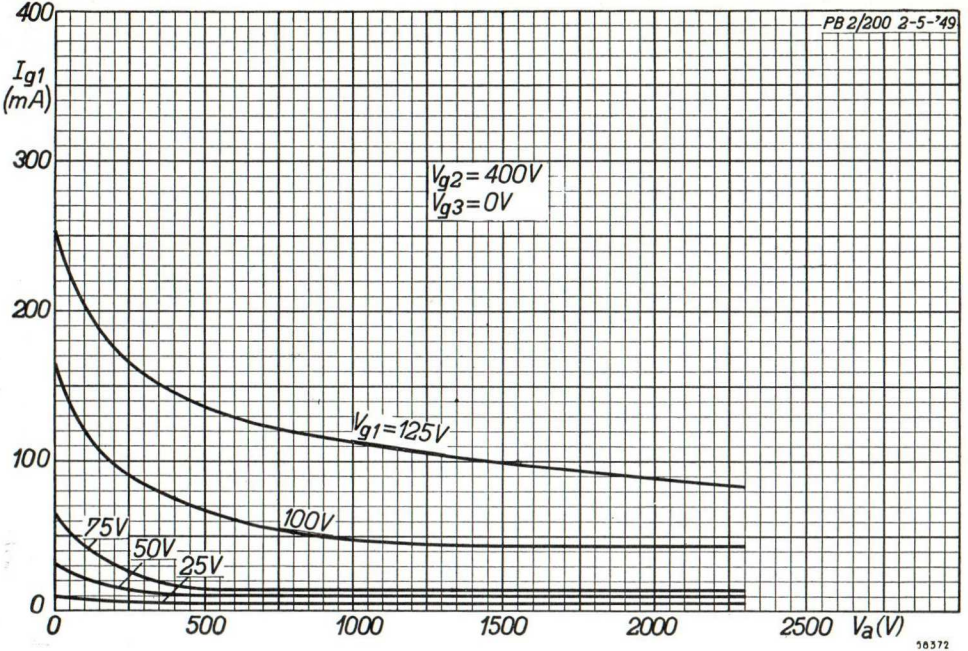
A

PHILIPS

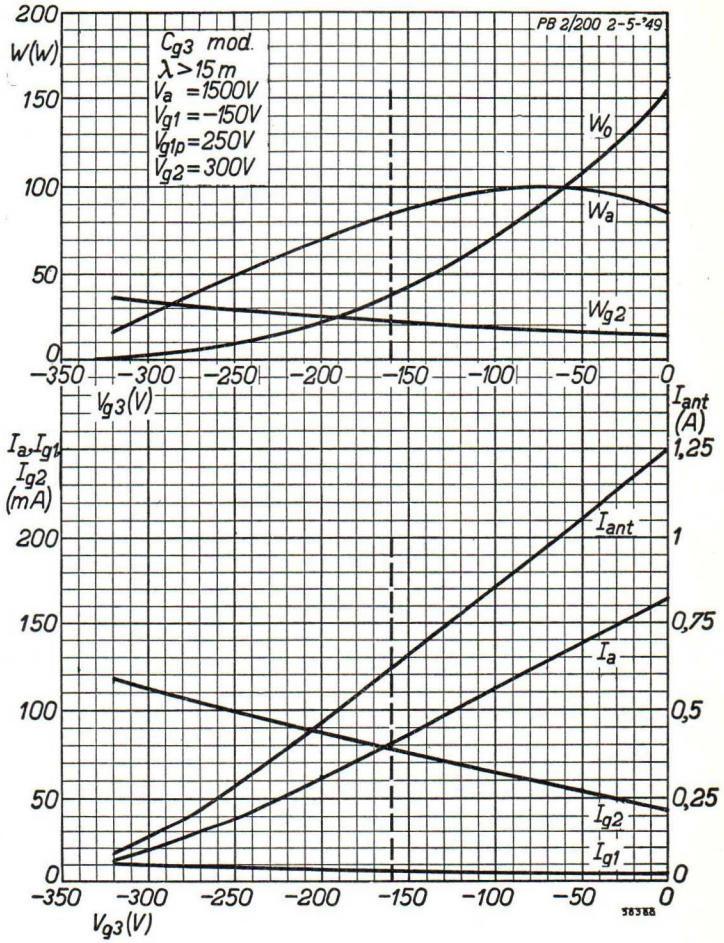
PB 2/200

PB 2/200

PHILIPS




B


PB 2/200 2-5-'49
$C_{g3}$ mod.
$\lambda > 15$ m
$V_a$ = 1500V
$V_{g1}$ = −150V
$V_{g1p}$ = 250V
$V_{g2}$ = 300V
W(W)
200
150
100
50
0
$W_o$
$W_a$
$W_{g2}$
−350 −300 −250 −200 −150 −100 −50 0
$V_{g3}$(V)
$I_a$, $I_{g1}$, $I_{g2}$ (mA)
$I_{ant}$ (A)
1,25
1
0,75
0,5
0,25
0
$I_{ant}$
$I_a$
$I_{g2}$
$I_{g1}$
58388

6.5.1949

C

# PHILIPS

**PB 2/500**

PENTODE for use as H.F. amplifier
PENTHODE pour utilisation comme amplificatrice H.F.
PENTHODE zur Verwendung als H.F. Verstärker

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 12 V
If = 7,3 A

Capacitances
Capacités
Kapazitäten

Ca = 20 pF
Cg1 = 23 pF
Cag1 = 0,2 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

$\mu g2g1$ = 6,2
S (Ia=120 mA)= 6 mA/V

| $\lambda$ | Freq. | C telegr | | B teleph. | | Cag2 mod. | | Cg3 mod. | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >30 | <10 | 2500 | 600 | | | 2000 | 325 | | |
| >15 | <20 | 2000 | 550 | 2000 | 90 | 1800 | 290 | 2000 | 100 |
| 5[1] | 60 [1] | 1500 | 625 | 1500 | 100 | 1200 | 350 | 1500 | 90 |

Limiting values
Caractéristiques limites
Grenzdaten

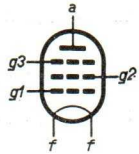
- Va = max. 2500 V
- Wa = max. 250 W
- Vg2 = max. 500 V
- Wg2 = max. 60 W
- temperature of pin seals / température des points de scellement des broches / Temperatur der Stiftenverschlüsse = max. 200 °C

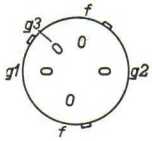
$R_{g3}$ = max. 40 kΩ
Wg1 = max. 20 W
Rg1 = max. 40 kΩ
Ik = max. 600 mA
Ikp = max. 2400 mA

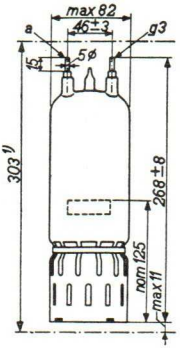
[1]) Two valves; deux tubes; zwei Röhren

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support
Fassung 40200

Clips
Bornes de connexion 40600
Anschlussklemmen

Mounting position : vertical with base up[2]) or down
Montage : vertical avec culot en haut[2]) ou en bas
Einbau : senkrecht mit Sockel oben[2]) oder unten

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 0,63 kg | Poids brut | 2,3 kg |
| Nettogewicht | | Bruttogewicht | |

---

1) Required height in apparatus
Hauteur nécessaire dans l'appareil
Benötigte Höhe im Gerät

2) In that case it is recommended to support the tube
Dans ce cas il est recommandé de supporter le tube
In diesem Fall empfiehlt es sich die Röhre zu stützen

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >30 | >15 | 5[1]) | m |
| Va | = | 2500 | 2000 | 1500 | V |
| Vg1 | = | -150 | -150 | -150 | V |
| Vg2 | = | 400 | 400 | 450 | V |
| Vg3 | = | 0 | 0 | 0 | V |
| Ia | = | 340 | 400 | 750 | mA |
| Ig1 | = | 20 | 20 | 30 | mA |
| Ig2 | = | 150 | 150 | 260 | mA |
| Vg1p | = | 270 | 320 | 420 | V |
| Wig1 | = | 5,4 | 6,4 | 14 | W |
| Wg2 | = | 60 | 60 | 117 | W |
| Wia | = | 850 | 800 | 1125 | W |
| Wa | = | 250 | 250 | 500 | W |
| Wo | = | 600 | 550 | 625 | W |
| $\eta$ | = | 70,5 | 69 | 55 | % |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >15 | 5[1]) | m |
| Va | = | 2000 | 1500 | V |
| Vg1 | = | -50 | -50 | V |
| Vg2 | = | 350 | 260 | V |
| Vg3 | = | 0 | 0 | V |
| Ia | = | 170 | 300 | mA |
| Ig2 | = | 12 | 40 | mA |
| Vg1p | = | 60 | 80 | V |
| Wg2 | = | 4,2 | 11 | W |
| Wia | = | 340 | 450 | W |
| Wa | = | 250 | 350 | W |
| Wo | = | 90 | 100 | W |
| $\eta$ | = | 26,5 | 22 | % |
| m | = | 100 | 100 | % |
| Ig1 | = | 6 | 30 | mA |
| Wig1 | = | 0,7 | 5 | W |

[1]) Two valves; deux tubes; zwei Röhren

# PHILIPS

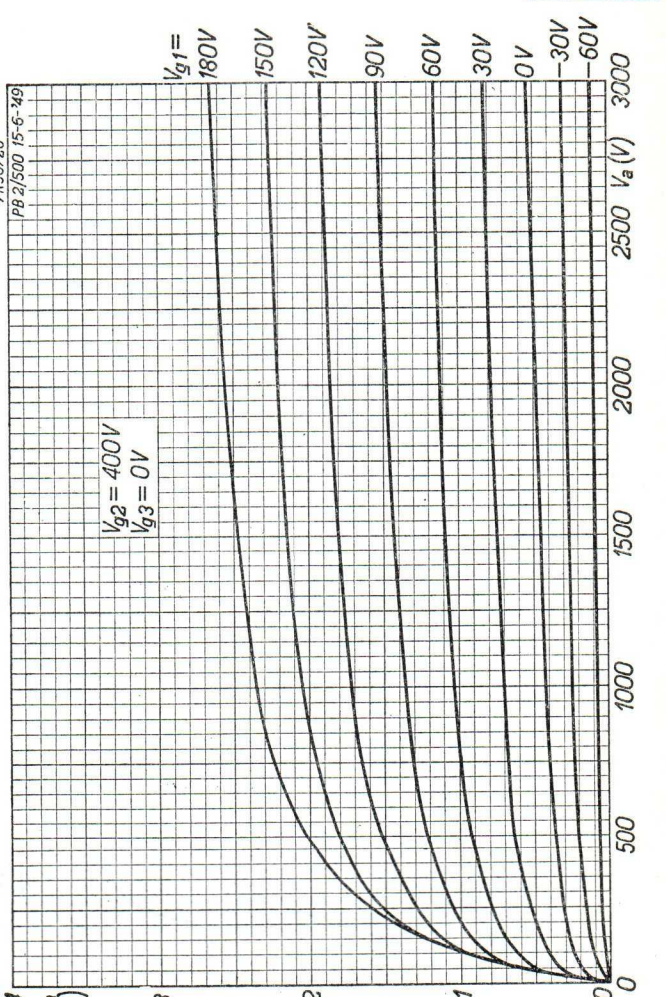
Operating conditions H.F. class C
Caractéristiques d'utilisation H.F. classe C
Betriebsdaten H.F. Klasse C

| | anode- and screen grid modulation<br>modulation d'anode et de grille-écran<br>Anoden- und Schirmgitter-modulation | | | suppressor grid modulation<br>modulation de grille d'arrêt<br>Fanggittermodulation | | |
|---|---|---|---|---|---|---|
| $\lambda$ = | >30 | >15 | 5[1]) | >15 | 5[1]) | m |
| Va = | 2000 | 1800 | 1200 | 2000 | 1500 | V |
| Vg1 = | -150 | -150 | -150 | -150 | -150 | V |
| Vg2 = | 300 | 300 | 400 | 300 | 500 | V |
| Vg3 = | 0 | 0 | 0 | -250 | -260 | V |
| Ia = | 235 | 235 | 570 | 175 | 270 | mA |
| Ig1 = | 25 | 30 | 30 | 24 | 7 | mA |
| Ig2 = | 120 | 133 | 220 | 153 | 240 | mA |
| Vg1p = | 300 | 270 | 325 | 260 | 190 | V |
| Wig1 = | 7,5 | 8,1 | 10 | 6,2 | 2 | W |
| Wg2 = | 36 | 40 | 88 | 46 | 120 | W |
| Wia = | 470 | 423 | 685 | 350 | 405 | W |
| Wa = | 145 | 133 | 335 | 250 | 315 | W |
| Wo = | 325 | 290 | 350 | 100 | 90 | W |
| $\eta$ = | 69 | 68,5 | 51 | 28,5 | 22 | % |
| m = | 100 | 100 | 100 | 100 | 90 | % |
| Vg2p = | 300 | 300 | 400 | | | V |
| Vg3p = | | | | 250 | 260 | V |
| Wmod = | 253 | 235 | 390 | 0 | 0 | W |

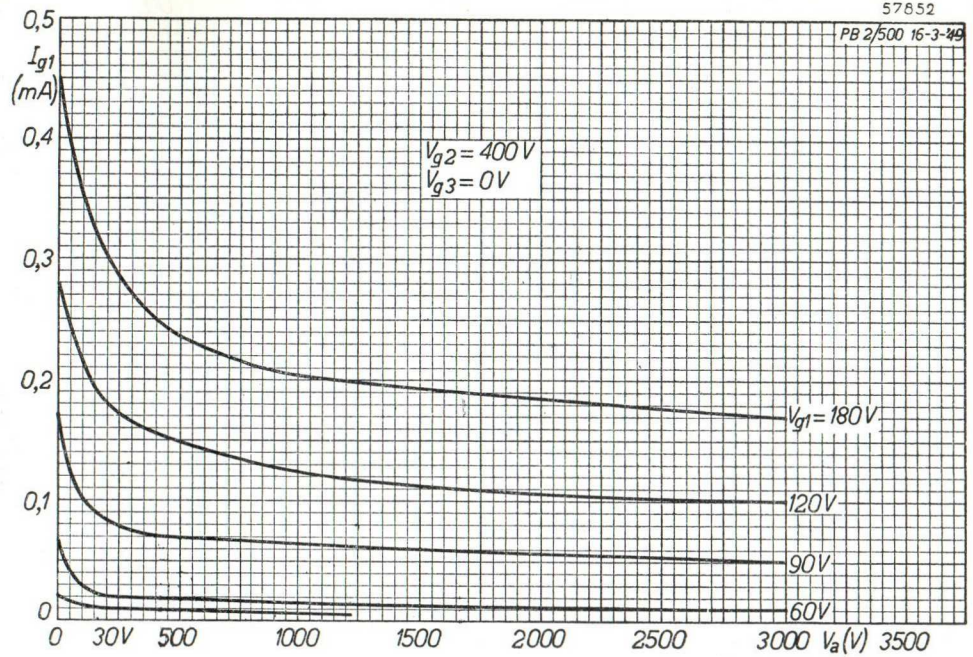
[1]) Two valves; deux tubes; zwei Röhren

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

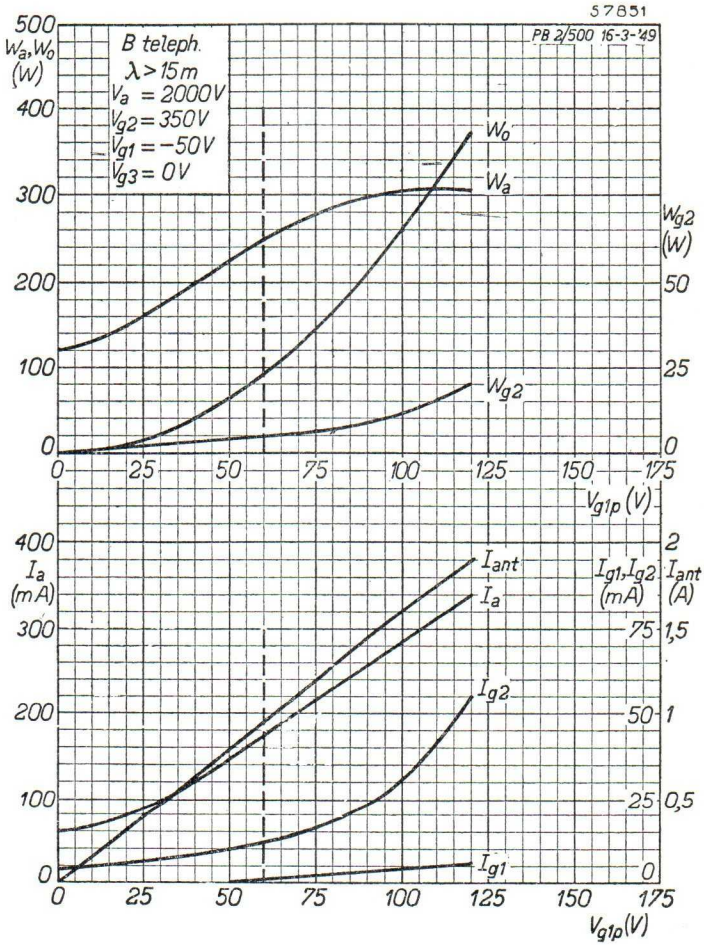
| | | | | |
|---|---|---|---|---|
| Va | = | | 2500 | V |
| Vg1 | = | | -90 | V |
| Vg2 | = | | 500 | V |
| Vg3 | = | | 0 | V |
| Raa | = | | 10 | kΩ |
| Vg1g1p | = | 0 | 290 | V |
| Ia | = | 2x50 | 2x283 | mA |
| Ig1 | = | 0 | 2x7 | mA |
| Ig2 | = | 2x6 | 2x95 | mA |
| Wig1 | = | 0 | 2x1 | W |
| Wg2 | = | 2x3 | 2x47,5 | W |
| Wia | = | 2x125 | 2x708 | W |
| Wa | = | 2x125 | 2x208 | W |
| Wo | = | 0 | 1000 | W |
| $\eta$ | = | - | 70 | % |


7R50720
PB 2/500 15-6-'49
$V_{g1}$ = 180V
150V
120V
90V
60V
30V
0V
-30V
-60V
$V_{g2}$ = 400V
$V_{g3}$ = 0V
$I_a$ (A)
4
3
2
1
0
0
500
1000
1500
2000
2500
3000
$V_a$ (V)

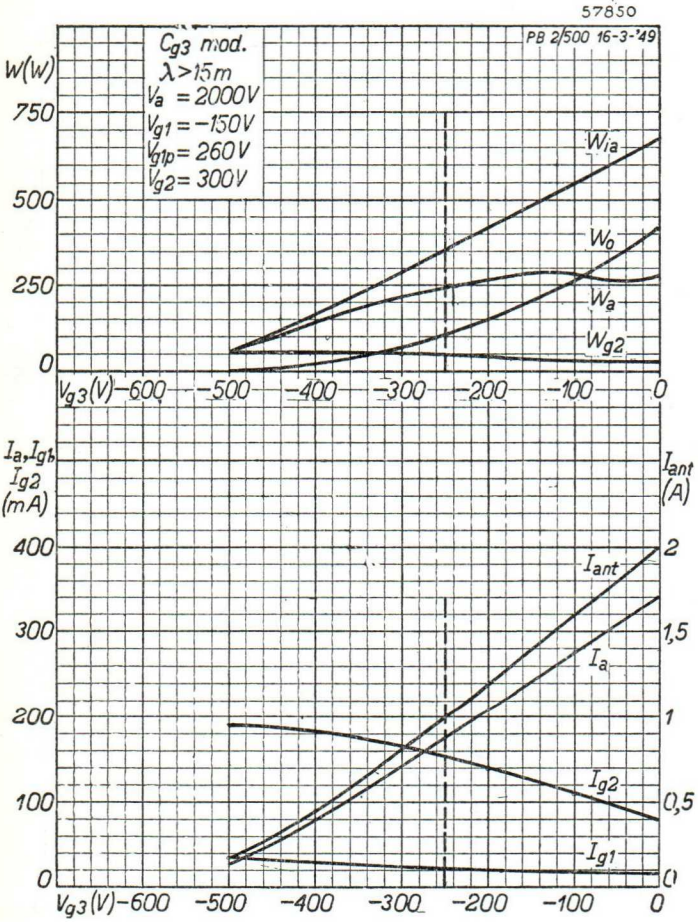
PHILIPS


57852
PB 2/500 16-3-49
0,5
$I_{g1}$ (mA)
0,4
0,3
0,2
0,1
0
$V_{g2} = 400\,V$
$V_{g3} = 0\,V$
$V_{g1} = 180\,V$
120V
90V
60V
0
30V
500
1000
1500
2000
2500
3000
$V_a$(V)
3500

B


57851
PB 2/500 16-3-'49
B teleph.
λ > 15m
Va = 2000V
Vg2 = 350V
Vg1 = −50V
Vg3 = 0V
Wa,Wo (W)
Wo
Wa
Wg2
Wg2 (W)
Vg1p (V)
Ia (mA)
Iant
Ia
Ig2
Ig1
Ig1,Ig2 (mA)
Iant (A)
Vg1p (V)

# PHILIPS


57850
PB 2/500 16-3-'49
Cg3 mod.
λ>15m
Va = 2000V
Vg1 = −150V
Vg1p = 260V
Vg2 = 300V
W(W)
750
500
250
0
Wia
Wo
Wa
Wg2
Vg3(V) −600 −500 −400 −300 −200 −100 0
Ia, Ig1, Ig2 (mA)
400
300
200
100
0
Iant (A)
2
1,5
1
0,5
0
Iant
Ia
Ig2
Ig1
Vg3(V) −600 −500 −400 −300 −200 −100 0

D

PENTODE for use as H.F. amplifier and oscillator
PENTHODE pour utilisation en amplificatrice H.F. et oscillatrice
PENTODE zur Verwendung als H.F. Verstärker und Oszillator

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden : thoriertes Wolfram

Heating : direct
Chauffage : direct
Heizung : direkt

$V_f$ = 12 V
$I_f$ = 8,5 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 21 pF
$C_{g1}$ = 29 pF
$C_{ag1}$ = 0,05 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 3,5
S ($I_a$=225 mA)= 6,5 mA/V

| | Freq. | C telegr. | | B teleph. | |
|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| >30 | <10 | 3000 | 1200 | 3000 | 190 |
| >15 | <20 | 2500 | 950 | 2500 | 130 |
| 5 | 60 | 1800 | 485 | 1800 | 68 |
| | | $C_{ag2}$ mod. | | $C_{g3}$ mod. | |
| >30 | <10 | 2500 | 580 | 3000 | 200 |
| >15 | <20 | 2000 | 425 | 2500 | 150 |

| B mod.[1]) | |
|---|---|
| $V_a$ (V) | $W_o$ (W) |
| 3000 | 1600 |

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. 3000 V | $R_{g3}$ | = max. 30 kΩ |
| $W_a$ | = max. 450 W | $W_{g1}$ | = max. 20 W |
| $V_{g2}$ | = max. 600 V | $R_{g1}$ | = max. 30 kΩ |
| $V_{g2}$(B mod.) | = max. 750 V | $I_k$ | = max. 700 mA |
| $W_{g2}$ | = max. 100 W | $I_{kp}$ | = max. 4500 mA |

temperature of pin seals a and $g_3$)
temp. des points de scellement) = max. 200 °C
des broches a et $g_3$)
Temp. der Verschlüsse a und $g_3$)

[1]) Two tubes, deux tubes, zwei Röhren.

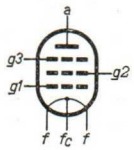
# PHILIPS

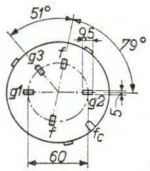
To insure safe seal temperatures a low velocity air flow is required above 60 Mc/s

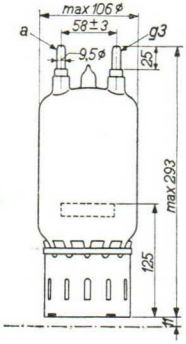
Un courant d'air à vélocité peu élevée est nécessaire aux fréquences dépassant 60 Mc/s pour assurer une température assez basse aux points de scellement

Bei Frequenzen höher als 60 MHz ist ein schwacher Luftstrom notwendig, damit die Temperatur der Stiftenverschlüsse die höchstzulässige Temperatur nicht überschreitet.

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support 40201
Fassung

Clips
Bornes de connexion 40626
Anschlussklemmen

Mounting position: vertical with base up[1]) or down
Montage : vertical avec culot en haut[1]) ou en bas
Einbau : senkrecht mit Sockel oben[1]) oder unten

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 0,78 kg | Poids brut | 2,5 kg |
| Nettogewicht | | Bruttogewicht | |

[1]) In that case it is recommended to support the tube
Dans ce cas il est recommandé de supporter le tube
In diesem Fall empfiehlt es sich die Röhre zu stützen

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | | |
|---|---|---|---|---|---|
| | | | Vg2 = Vg3 | | |
| $\lambda$ | = | >30 | >15 | 5[1]) | m |
| Va | = | 3000 | 2500 | 1800 | V |
| Vg1 | = | −200 | −200 | −150 | V |
| Vg2=Vg3 | = | 300 | 300 | 300 | V |
| Ia | = | 550 | 550 | 985 | mA |
| Ig1 | = | 25 | 20 | 30 | mA |
| Ig2+g3 | = | 100 | 100 | 200 | mA |
| Vg1p | = | 370 | 360 | 300 | V |
| Wig1 | = | 9 | 7 | 9 | W |
| Wg2+g3 | = | 30 | 30 | 60 | W |
| Wia | = | 1650 | 1375 | 1775 | W |
| Wa | = | 450 | 425 | 800 | W |
| Wo | = | 1200 | 950 | 975 | W |
| $\eta$ | = | 72,5 | 69 | 55 | % |
| | | | Vg3 = 0 | | |
| $\lambda$ | = | >30 | >15 | 5[1]) | m |
| Va | = | 3000 | 2500 | 1800 | V |
| Vg1 | = | −300 | −300 | −200 | V |
| Vg2 | = | 500 | 500 | 500 | V |
| Vg3 | = | 0 | 0 | 0 | V |
| Ia | = | 465 | 470 | 945 | mA |
| Ig1 | = | 20 | 20 | 30 | mA |
| Ig2 | = | 200 | 200 | 320 | mA |
| Vg1p | = | 450 | 450 | 350 | V |
| Wig1 | = | 9 | 9 | 11 | W |
| Wg2 | = | 100 | 100 | 160 | W |
| Wia | = | 1400 | 1175 | 1700 | W |
| Wa | = | 450 | 450 | 800 | W |
| Wo | = | 950 | 725 | 900 | W |
| $\eta$ | = | 68 | 61,5 | 53 | % |

[1]) Two valves; deux tubes; zwei Röhren

# PHILIPS

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >30 | >15 | 5[1]) | m |
| Va | = | 3000 | 2500 | 1800 | V |
| Vg1 | = | -120 | -115 | -90 | V |
| Vg2 | = | 500 | 500 | 420 | V |
| Vg3 | = | 0 | 0 | 0 | V |
| Ia | = | 215 | 230 | 350 | mA |
| Ig2 | = | 30 | 30 | 50 | mA |
| Vg1p | = | 80 | 75 | 60 | V |
| Wg2 | = | 15 | 15 | 21 | W |
| Wia | = | 640 | 580 | 630 | W |
| Wa | = | 450 | 450 | 495 | W |
| Wo | = | 190 | 130 | 135 | W |
| $\eta$ | = | 30 | 22 | 21 | % |
| m | = | 100 | 100 | 100 | % |
| Ig1 | = | 4 | 3 | 6 | mA |
| Wig1 | = | 0,7 | 0,5 | 0,8 | W |

[1]) Two valves; deux tubes; zwei Röhren

Operating conditions H.F. class C
Caractéristiques d'utilisation H.F. classe C
Betriebsdaten H.F. Klasse C

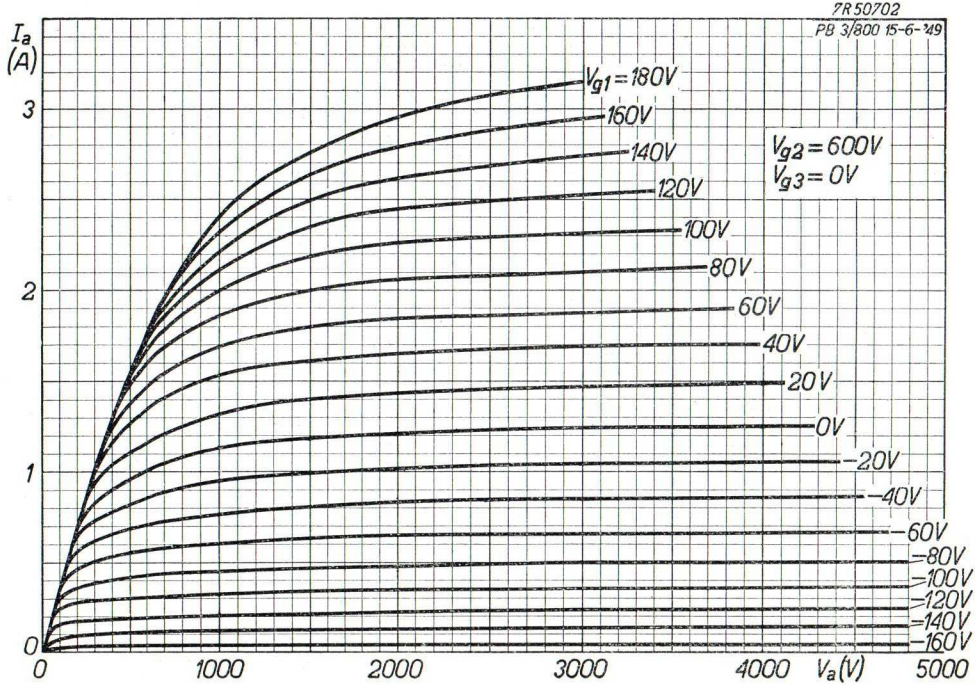
| | anode- and screen grid modulation<br>modulation d'anode et de grille-écran<br>Anoden- und Schirmgittermodulation | | suppressor grid modulation<br>modulation de grille d'arrêt<br>Fanggittermodulation | | | | |
|---|---|---|---|---|---|---|---|
| $\lambda$ = | >30 | >15 | >30 | >15 | >30 | >15 | m |
| Va = | 2500 | 2000 | 3000 | 2500 | 3000 | 2500 | V |
| Vg1 = | −300 | −300 | −300 | −300 | −300 | −300 | V |
| Vg2 = | 500 | 500 | 600 | 600 | 600 | 600 | V |
| Vg3 = | 0 | 0 | −190 | −170 | −210 | −200 | V |
| Ia = | 325 | 315 | 190 | 165 | 175 | 175 | mA |
| Ig1 = | 7 | 7 | 5 | 5 | 5 | 5 | mA |
| Ig2 = | 135 | 135 | 165 | 165 | 165 | 165 | mA |
| Vg1p = | 385 | 385 | 335 | 335 | 335 | 335 | V |
| Wig1 = | 2,7 | 2,7 | 1,7 | 1,7 | 1,7 | 1,7 | W |
| Wg2 = | 67 | 67 | 100 | 100 | 100 | 100 | W |
| Wia = | 815 | 630 | 570 | 415 | 525 | 425 | W |
| Wa = | 235 | 205 | 370 | 265 | 360 | 325 | W |
| Wo = | 580 | 425 | 200 | 150 | 165 | 100 | W |
| $\eta$ = | 71 | 67,5 | 35 | 36 | 31 | 23,5 | % |
| m = | 100 | 100 | 80 | 80 | 100 | 100 | % |
| Vg2p = | 500 | 500 | | | | | V |
| Vg3p = | | | 190 | 170 | 210 | 200 | V |
| Wmod = | 440 | 350 | 0 | 0 | 0 | 0 | W |

PHILIPS

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

| | | | | |
|---|---|---|---|---|
| Va | = | | 3000 | V |
| Vg1 | = | | -160 | V |
| Vg2 | = | | 600 | V |
| Vg3 | = | | 0 | V |
| Raa | = | | 8,8 | kΩ |
| Vg1g1p | = | 0 | 360 | V |
| Ia | = | 2x50 | 2x385 | mA |
| Ig1 | = | 0 | 2x6 | mA |
| Ig2 | = | 2x8 | 2x105 | mA |
| Wig1 | = | 0 | 2x1,1 | W |
| Wg2 | = | 2x4,8 | 2x63 | W |
| Wia | = | 2x150 | 2x1155 | W |
| Wa | = | 2x150 | 2x355 | W |
| Wo | = | 0 | 1600 | W |
| η | = | - | 69 | % |

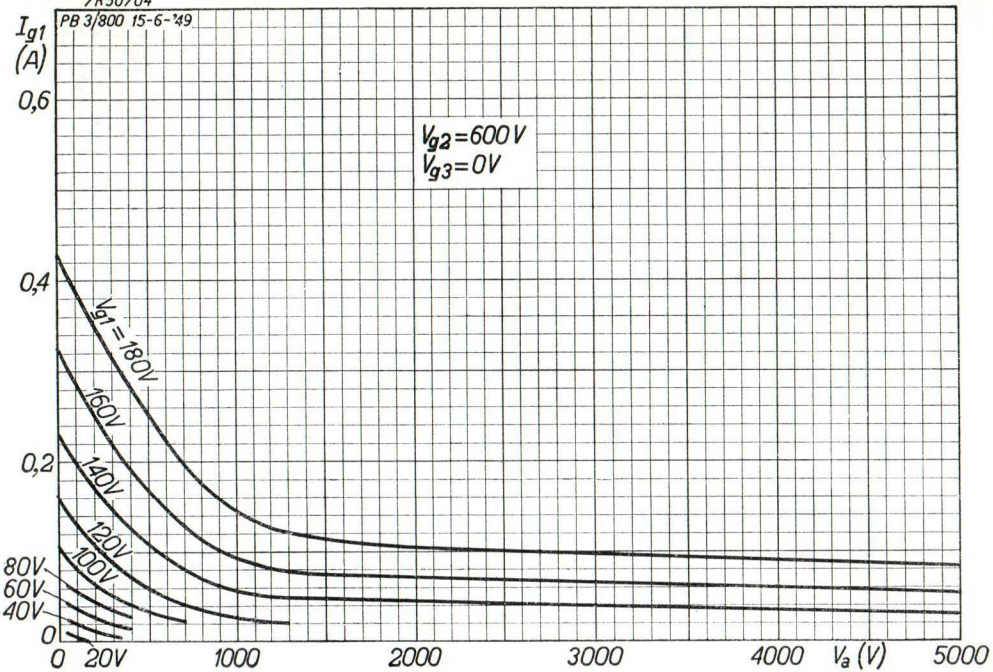
7.7.1949




PHILIPS

PB 3/800

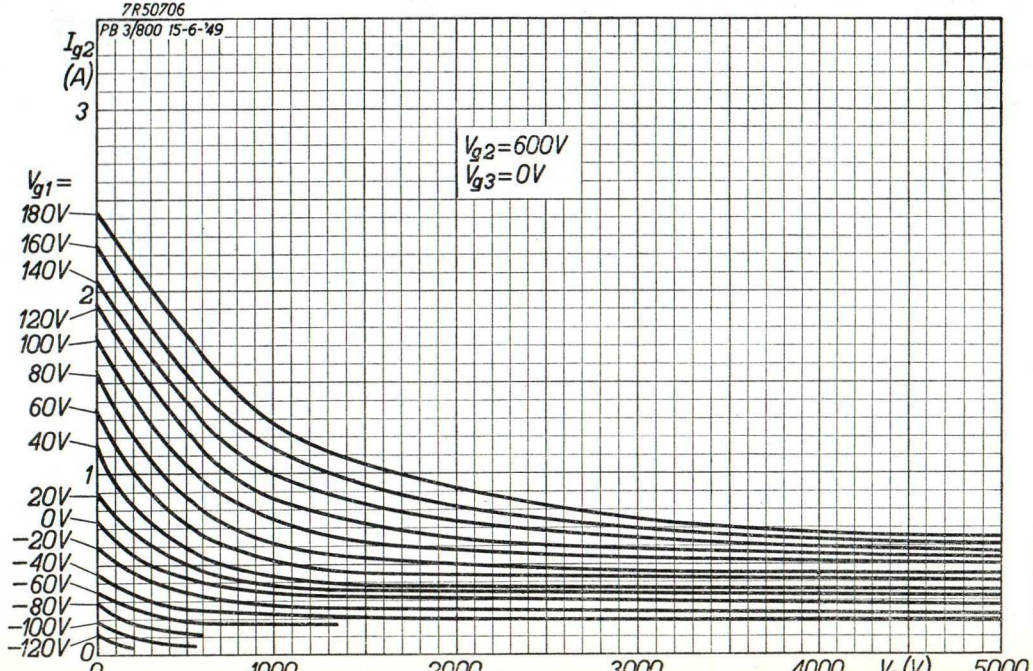
A


7R50704
PB 3/800 15-6-'49
$I_{g1}$ (A)
0,6
0,4
0,2
0
$V_{g2}$=600 V
$V_{g3}$=0V
$V_{g1}$=180V
160V
140V
120V
100V
80V
60V
40V
0
0 20V
1000
2000
3000
4000
$V_a$ (V)
5000

PHILIPS

B

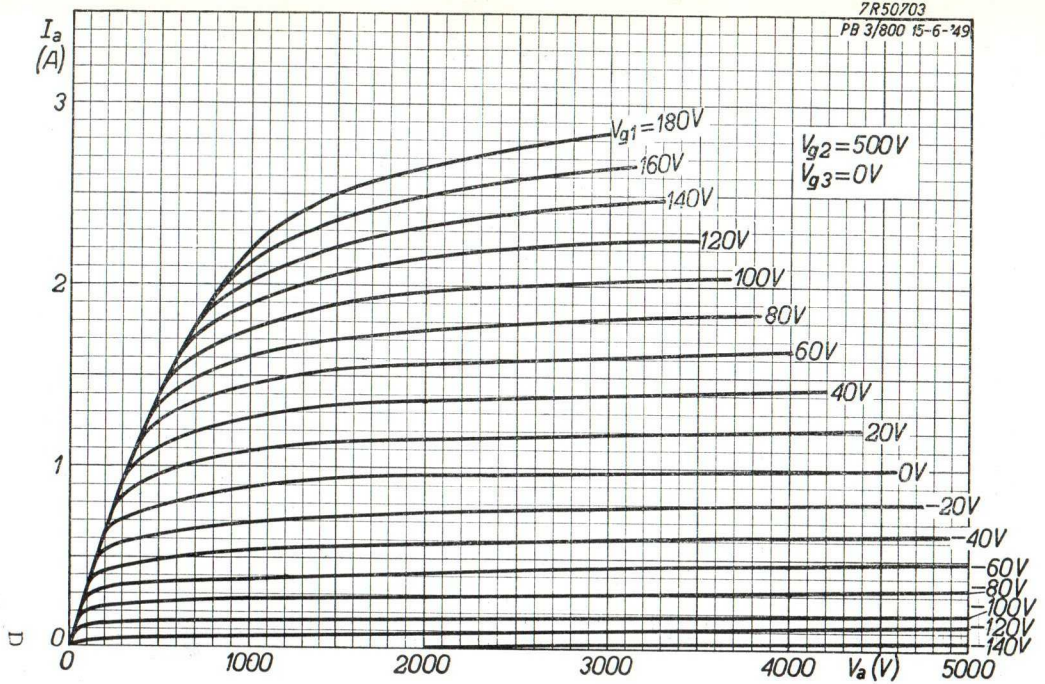
7.7.1949




PHILIPS

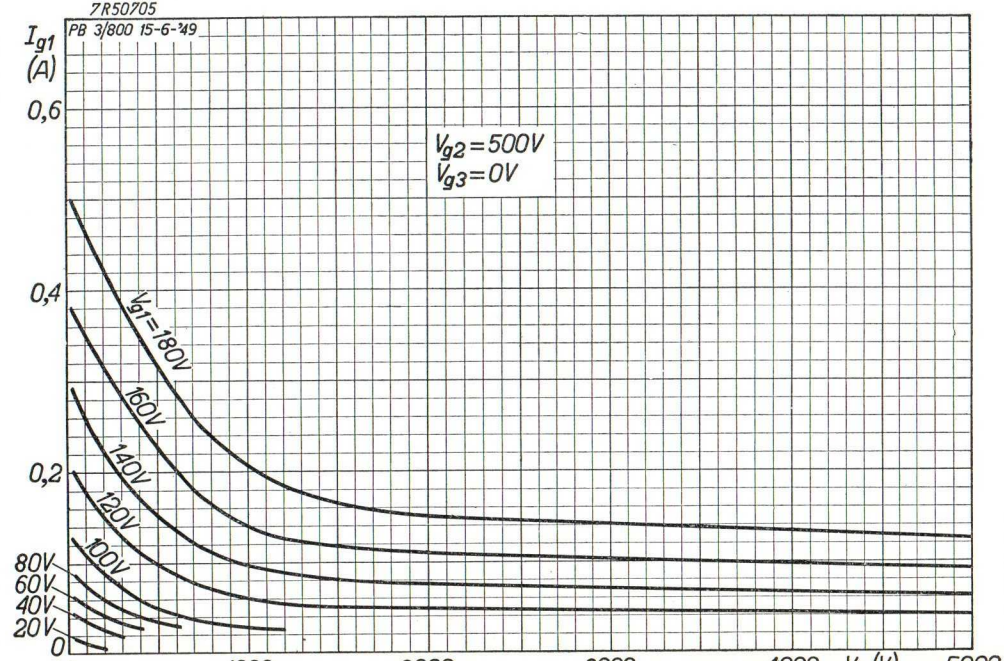
PB 3/800

C


7R50703
PB 3/800 15-6-'49
$I_a$ (A)
3
2
1
0
$V_{g1}$ = 180V
160V
140V
120V
100V
80V
60V
40V
20V
0V
-20V
-40V
-60V
-80V
-100V
-120V
-140V
$V_{g2}$ = 500V
$V_{g3}$ = 0V
0
1000
2000
3000
4000
$V_a$ (V)
5000

PHILIPS

7R50705
PB 3/800 15-6-'49



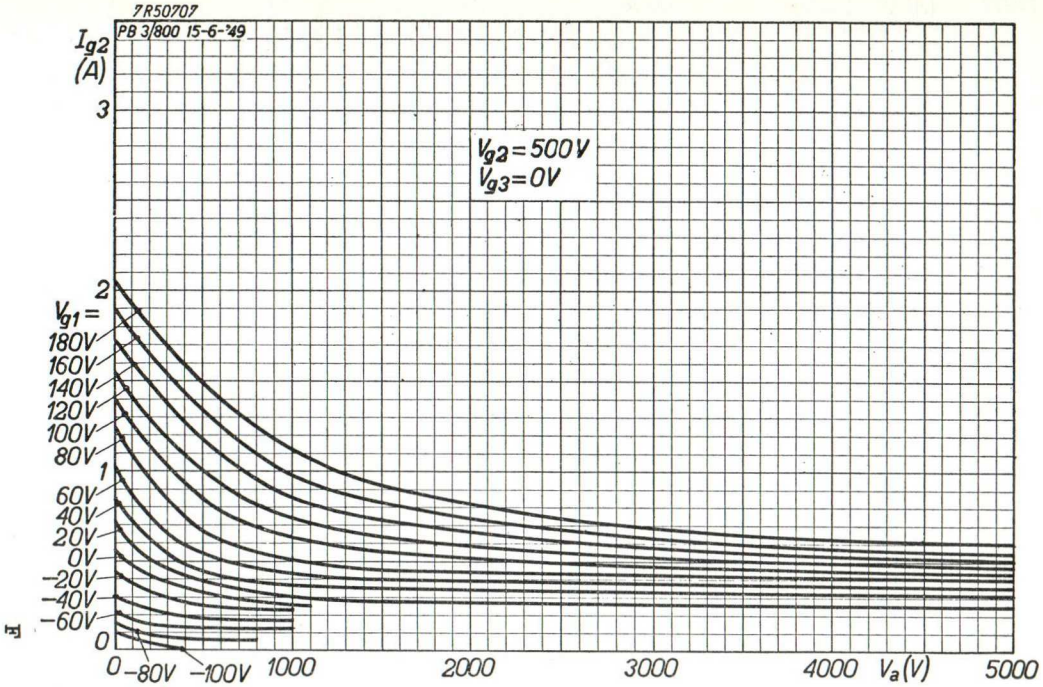

7.7.1949

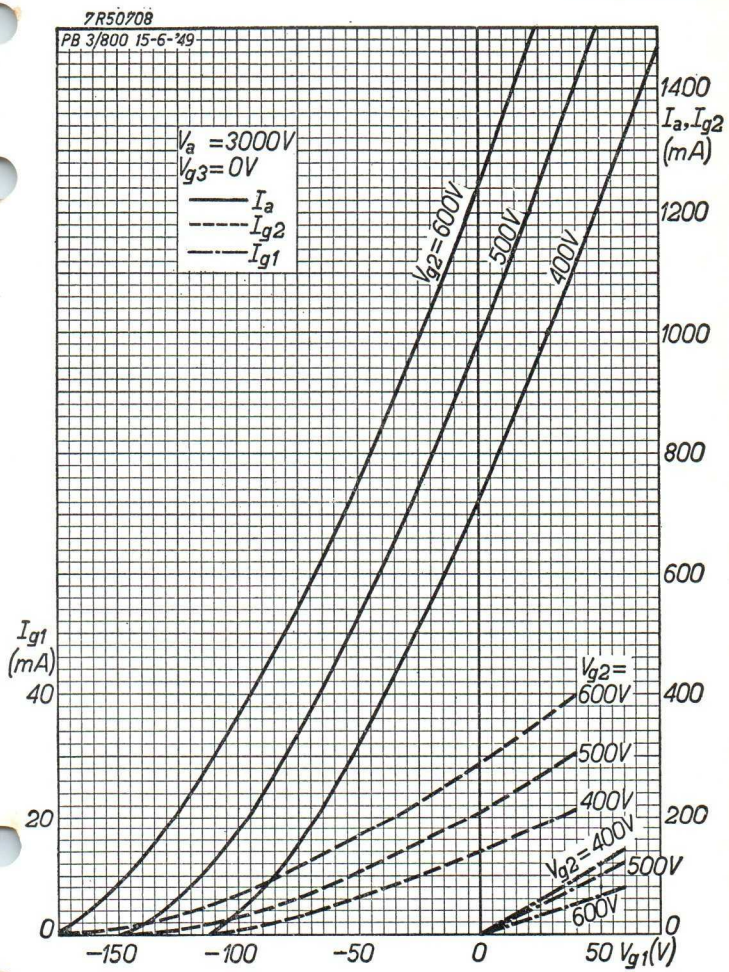
E

PHILIPS

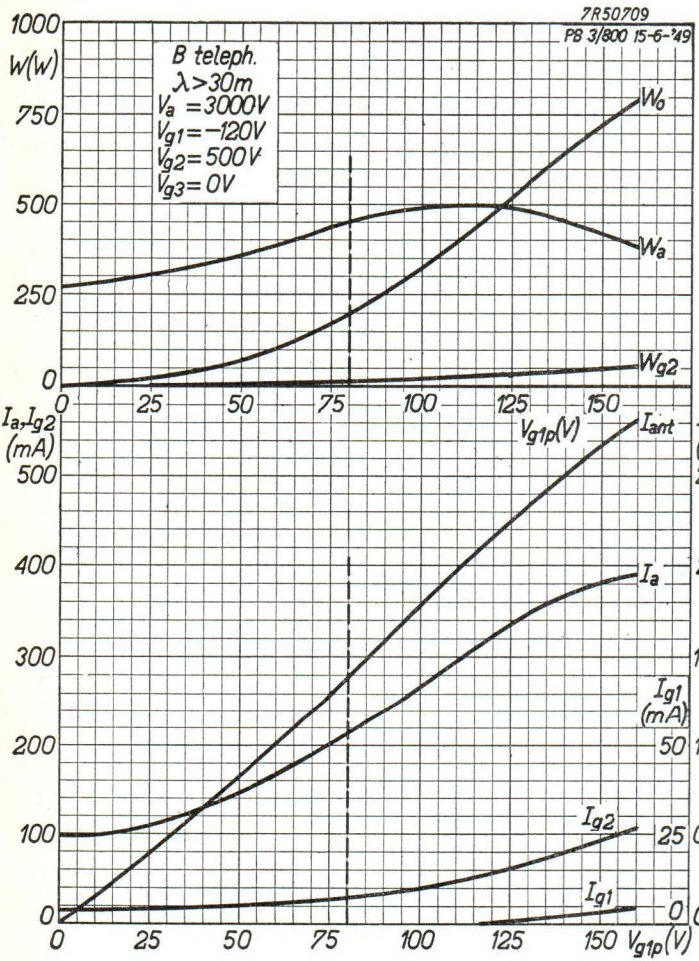
PB 3/800

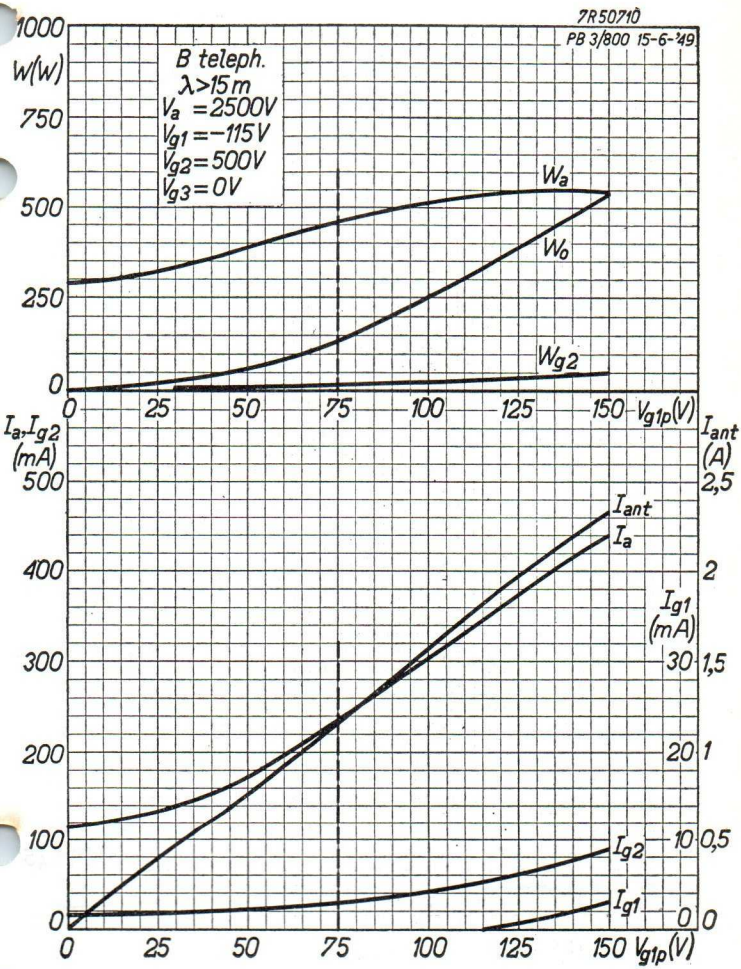
PHILIPS


7R50707
PB 3/800 15-6-'49
$I_{g2}$ (A)
3
2
1
0
$V_{g2}$ = 500 V
$V_{g3}$ = 0 V
$V_{g1}$ =
180V
160V
140V
120V
100V
80V
60V
40V
20V
0V
−20V
−40V
−60V
−80V
−100V
0
1000
2000
3000
4000
$V_a$ (V)
5000

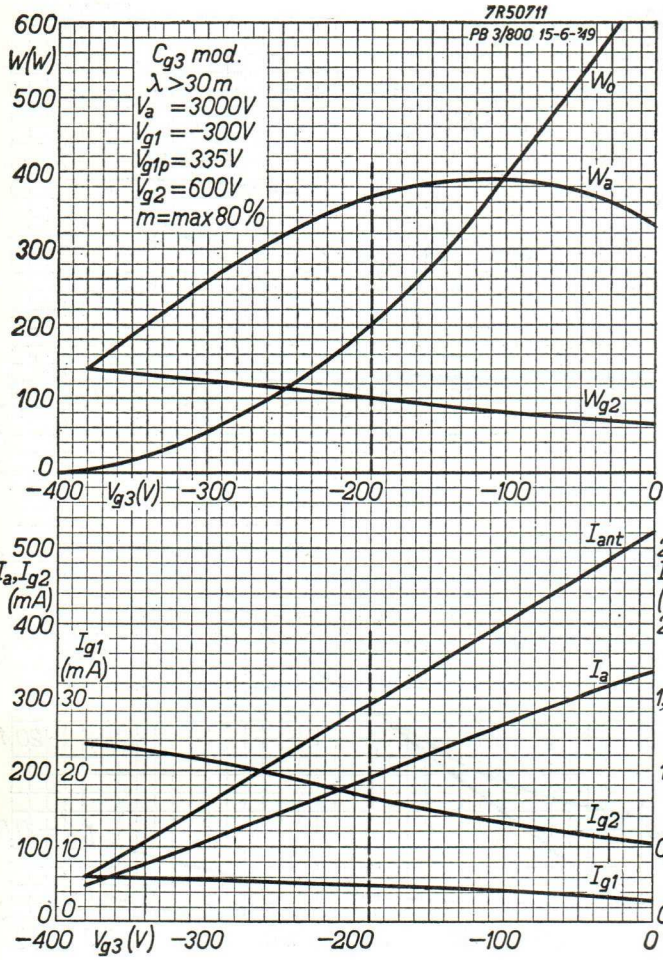

7R50708
PB 3/800 15-6-'49
$V_a$ =3000V
$V_{g3}$= 0V
$I_a$
$I_{g2}$
$I_{g1}$
$V_{g2}$=600V
500V
400V
1400
$I_a$,$I_{g2}$ (mA)
1200
1000
800
600
400
200
0
$I_{g1}$ (mA)
40
20
0
$V_{g2}$= 600V
500V
400V
$V_{g2}$=400V
500V
600V
−150
−100
−50
0
50 $V_{g1}$(V)

# PHILIPS


7R50709
PB 3/800 15-6-'49
B teleph.
λ>30m
Va =3000V
Vg1=−120V
Vg2=500V
Vg3=0V
W(w)
1000
750
500
250
0
Wo
Wa
Wg2
0
25
50
75
100
125
150
Vg1p(V)
Ia,Ig2 (mA)
500
400
300
200
100
0
Iant
Ia
Ig2
Ig1
Iant (A)
2,5
2
1,5
1
0,5
0
Ig1 (mA)
50
25
0
0
25
50
75
100
125
150 Vg1p(V)


7R50710
PB 3/800 15-6-'49
B teleph.
λ>15 m
Va =2500V
Vg1 =−115V
Vg2=500V
Vg3=0V
W(W)
1000
750
500
250
0
Wa
Wo
Wg2
0
25
50
75
100
125
150 Vg1p(V)
Ia,Ig2 (mA)
500
400
300
200
100
0
Iant
Ia
Ig1 (mA)
Iant (A)
2,5
2
1,5
1
0,5
0
30
20
10
Ig2
Ig1
0
25
50
75
100
125
150 Vg1p(V)

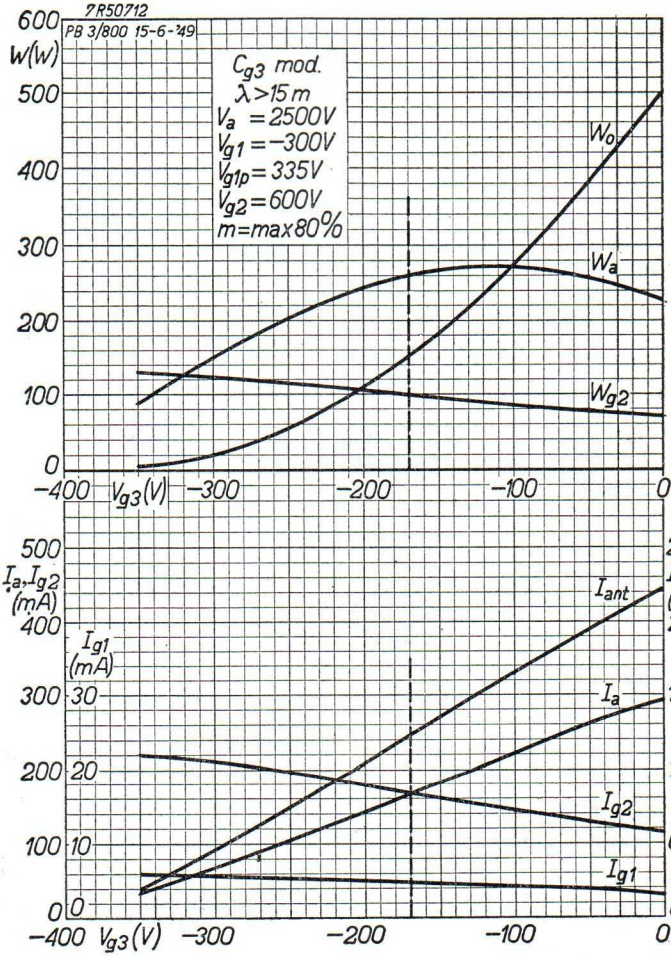
# PHILIPS


7R50711
PB 3/800 15-6-'49
$C_{g3}$ mod.
$\lambda > 30$ m
$V_a = 3000V$
$V_{g1} = -300V$
$V_{g1p} = 335V$
$V_{g2} = 600V$
$m = max\ 80\%$
W(W)
600
500
400
300
200
100
0
$W_o$
$W_a$
$W_{g2}$
−400
$V_{g3}$(V)
−300
−200
−100
0
$I_a, I_{g2}$ (mA)
500
400
300
200
100
0
$I_{g1}$ (mA)
30
20
10
0
$I_{ant}$
$I_a$
$I_{g2}$
$I_{g1}$
$I_{ant}$ (A)
2,5
2
1,5
1
0,5
0

J

# PHILIPS

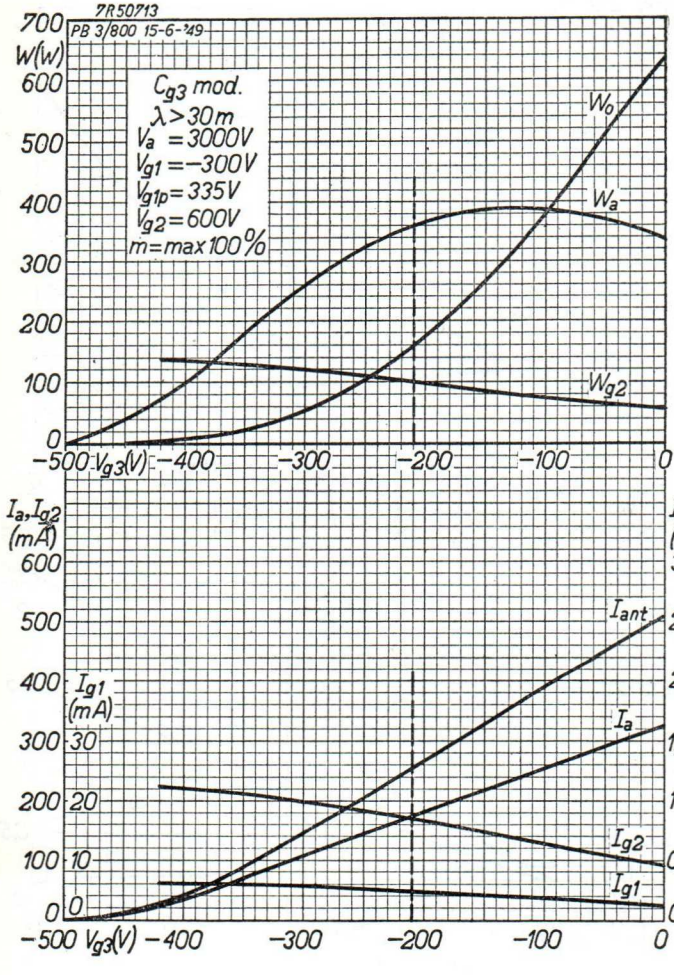
**PB 3/800**

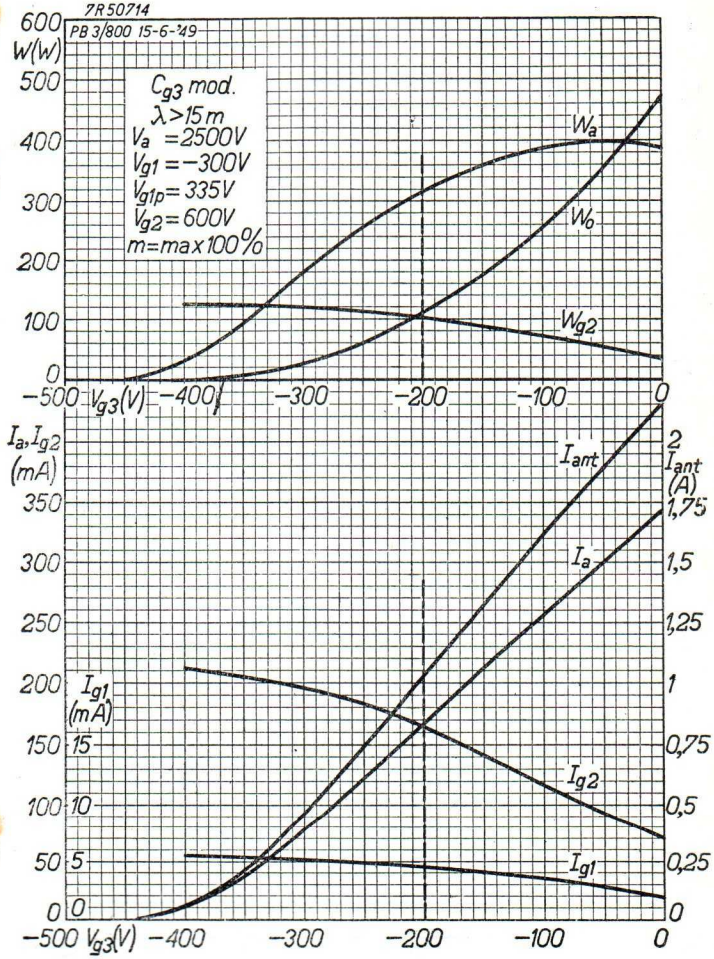



7.7.1949

K

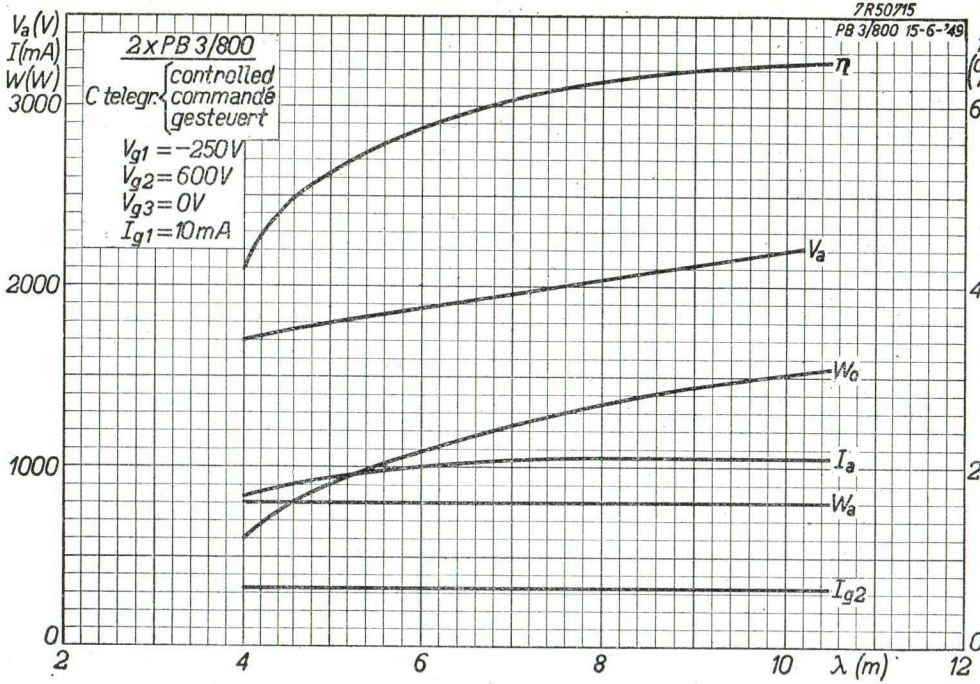
**PHILIPS**


7R50713
PB 3/800 15-6-'49
W(w)
$C_{g3}$ mod.
λ > 30m
$V_a$ = 3000V
$V_{g1}$ = −300V
$V_{g1p}$ = 335V
$V_{g2}$ = 600V
m = max 100%
$W_o$
$W_a$
$W_{g2}$
$V_{g3}$(V)
$I_a$, $I_{g2}$ (mA)
$I_{ant}$ (A)
$I_{g1}$ (mA)
$I_{ant}$
$I_a$
$I_{g2}$
$I_{g1}$


7R50714
PB 3/800 15-6-'49
$C_{g3}$ mod.
λ>15 m
$V_a$ =2500V
$V_{g1}$ =−300V
$V_{g1p}$= 335V
$V_{g2}$= 600V
m=max 100%
W(W)
$W_a$
$W_o$
$W_{g2}$
$V_{g3}$(V)
$I_a$, $I_{g2}$ (mA)
$I_{amt}$
$I_a$
$I_{g2}$
$I_{g1}$
$I_{ant}$ (A)
$I_{g1}$ (mA)

7.7.1949

M




PB 3/800

PHILIPS

# PHILIPS

**PB 3/1000**

PENTODE for use as H.F. amplifier
PENTHODE pour utilisation comme amplificatrice H.F.
PENTHODE zur Verwendung als H.F. Verstärker

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 12 V
If = 7,5 A

Capacitances
Capacités
Kapazitäten

Ca = 20 pF
Cg1 = 45 pF
Cag1 = 0,05 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

μg2g1 = 4
S (Ia=300 mA)= 6,5 mA/V

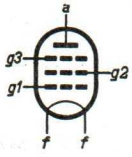
| λ | Freq. | C telegr. | | B teleph. | | Can.mod. | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >60 | < 5 | 3000 | 1250 | 3000 | 275 | 3000 | 450 |
| | | 2500 | 1000 | | | 2500 | 400 |
| | | 2000 | 700 | | | 2000 | 350 |
| 15 | 20 | 2500 | 900 | | | | |
| | | Cag2 mod. | | Cg2 mod. | | Cg3 mod. | |
| >60 | < 5 | 3000 | 750 | 3000 | 250 | 3000 | 210 |
| | | 2500 | 600 | | | | |
| | | 2000 | 425 | | | | |

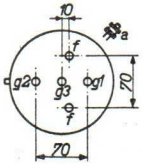
Limiting values
Caractéristiques limites
Grenzdaten

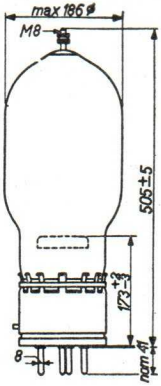
Va = max. 3000 V
Wa = max. 600 W
Vg2 = max. 1000 V
Wg2 = max. 100 W
Wg1 = max. 16 W
Rg1 = max. 10 kΩ
Ik = max. 700 mA
Ikp = max. 2800 mA

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical with base down
Montage : vertical avec le culot en bas
Aufstellung : senkrecht mit Sockel unten

**Net weight**
Poids net 3,9 kg
Nettogewicht

Shipping weight
Poids brut 12 kg
Bruttogewicht

# PHILIPS

**PC 05/15**

PENTODE for use as H.F. amplifier
PENTHODE pour utilisation comme amplificatrice H.F.
PENTHODE zur Verwendung als H.F. Verstärker

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 4 V
If = 1,1 A

Capacitances
Capacités
Kapazitäten

Ca = 10 pF
Cg1 = 11,5 pF
Cag1 = 0,2 pF

Typical characteristics
Caractèristiques typiques
Kenndaten

μg2g1 = 3,5
S (Ia=40 mA) = 1,25 mA/V

| λ | Freq. | C telegr. | | B teleph. | | Cag2 mod. | | Cg3 mod. | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >15 | <20 | 500 | 20 | 500 | 4 | 500 | 16 | 500 | 3 |
| | | 400 | 15 | | | | | | |

Limiting values
Caractéristiques limites
Grenzdaten

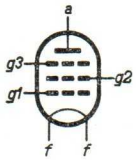
Va = max. 500 V
Wa = max. 15 W
Vg2 = max. 300 V
Wg2 = max. 5 W
Wg1 = max. 1 W
Ik = max. 85 mA
Ikp = max. 340 mA

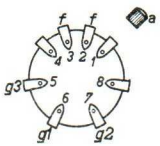
Rg1 { with fixed grid bias / à polarisation fixe / mit fester Gittervorspannung } = max. 50 kΩ

Rg1 { with automatic grid bias / à polarisation automatique / mit autom. Gittervorspannung } = max. 100 kΩ

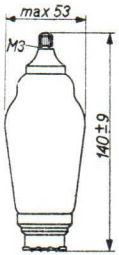
# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base
Culot P
Sockel




Socket
Support
Fassung 5900/02

Mounting position: vertical with base up or down
horizontal with plane of filament vertical

Montage : vertical avec culot en haut ou en bas
horizontal avec plan du filament vertical

Einbau : senkrecht mit Sockel oben oder unten
wagerecht mit der Heizfadenfläche senkrecht

Net weight
Poids net
Nettogewicht 85 g

Shipping weight
Poids brut
Bruttogewicht 150 g

PENTODE for use as H.F. and L.F. amplifier and oscillator
PENTHODE pour utilisation comme amplificatrice H.F. et B.F. et oscillatrice
PENTHODE zur Verwendung als H.F. und N.F. Verstärker und Oszillator

Cathode : oxide-coated
Cathode : oxyde
Kathode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

Vf = 12,6 V
If = 0,7 A

Capacitances
Capacités
Kapazitäten

Ca = 7,8 pF
Cg1 = 14,5 pF
Cag1 = 0,15 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

μg2g1 = 7,6
S (Ia=30 mA)= 3,3 mA/V

| λ | Freq. | C telegr. | | B teleph. | | C ag2 mod. | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >3 | <100 | 500 | 33 | 500 | 6 | 400 | 20 |
| | | 400 | 28 | 400 | 5,4 | 300 | 16 |
| | | 300 | 24 | | | | |

| λ | Freq. | C fr.mult. | |
|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) |
| 5,4/1,8 | 55/165 | 400 | 9 |

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 500 V
Wa = max. 12 W
Vg2 = max. 300 V
Wg2 = max. 5 W
Wg1 = max. 0,5 W

Rg1 = max. 50 kΩ 1)
Rg1 = max. 100 kΩ 2)
Ik = max. 130 mA
Ikp = max. 800 mA
Vfk = max. 75 V

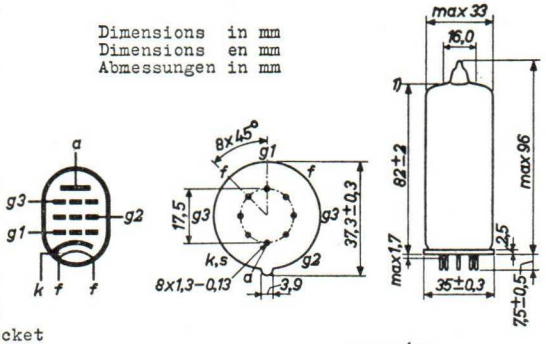
bottomtemperature )
température du fond )
Bodentemperatur )
= max. 180 °C

1) With fixed grid bias; à polarisation fixe; mit fester Gittervorspannung

2) With automatic grid bias; à polarisation automatique; mit automatischer Gittervorspannung

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support
Fassung

40210/02

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

Net weight
Poids net
Nettogewicht

50 g

Shipping weight
Poids brut
Bruttogewicht

65 g

---

1) Reference line
Ligne de référence
Bezugslinie

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >3 | >3 | >3 | m |
| $V_a$ | = | 500 | 400 | 300 | V |
| $V_{g1}$ | = | -80 | -80 | -80 | V |
| $V_{g2}$ | = | 250 | 250 | 250 | V |
| $V_{g3}$ | = | 0 | 0 | 0 | V |
| $I_a$ | = | 90 | 100 | 117 | mA |
| $I_{g1}$ | = | 3 | 3,5 | 4,5 | mA |
| $I_{g2}$ | = | 5 | 5,5 | 8 | mA |
| $V_{g1p}$ | = | 96 | 103 | 110 | V |
| $W_{ig1}$ | = | 0,26 | 0,33 | 0,45 | W |
| $W_{g2}$ | = | 1,25 | 1,4 | 2 | W |
| $W_{ia}$ | = | 45 | 40 | 35,1 | W |
| $W_a$ | = | 12 | 12 | 11,1 | W |
| $W_o$ | = | 33 | 28 | 24 | W |
| $\eta$ | = | 73,5 | 70 | 68 | % |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >3 | >3 | m |
| $V_a$ | = | 500 | 400 | V |
| $V_{g1}$ | = | -28 | -28 | V |
| $V_{g2}$ | = | 250 | 250 | V |
| $V_{g3}$ | = | 0 | 0 | V |
| $I_a$ | = | 36 | 42,5 | mA |
| $I_{g2}$ | = | 3 | 3,5 | mA |
| $V_{g1p}$ | = | 17,5 | 21,25 | V |
| $W_{g2}$ | = | 0,75 | 0,9 | W |
| $W_{ia}$ | = | 18 | 17 | W |
| $W_a$ | = | 12 | 11,6 | W |
| $W_o$ | = | 6 | 5,4 | W |
| $\eta$ | = | 33,5 | 32 | % |
| m | = | 100 | 100 | % |
| $I_{g1}$ | = | 2 | 3,4 | mA |
| $W_{ig1}$ | = | 0,07 | 0,13 | W |

# PHILIPS

Operating conditions H.F. class C anode- and screen grid modulation
Caractéristiques d'utilisation H.F. classe C modulation d'anode et de grille-écran
Betriebsdaten H.F.Klasse C Anoden- und Schirmgittermodulation

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >3 | >3 | m |
| $V_a$ | = | 400 | 300 | V |
| $V_{g1}$ | = | -80 | -80 | V |
| $V_{g2}$ | = | 200 | 200 | V |
| $V_{g3}$ | = | 0 | 0 | V |
| $I_a$ | = | 70 | 77 | mA |
| $I_{g1}$ | = | 2,5 | 3,5 | mA |
| $I_{g2}$ | = | 4,5 | 7 | mA |
| $V_{g1p}$ | = | 100 | 105 | V |
| $W_{ig1}$ | = | 0,25 | 0,35 | W |
| $W_{g2}$ | = | 0,9 | 1,4 | W |
| $W_{ia}$ | = | 28 | 23 | W |
| $W_a$ | = | 8 | 7 | W |
| $W_o$ | = | 20 | 16 | W |
| | = | 71 | 69,5 | % |
| m | = | 100 | 100 | % |
| $V_{g2p}$ | = | 190 | 190 | V |
| $W_{mod}$ | = | 15 | 13 | W |

Operating conditions as class C frequency multiplier
Caractéristiques d'utilisation comme multiplicatrice de fréquence classe C
Betriebsdaten als Klasse C Frequenzvervielfacher

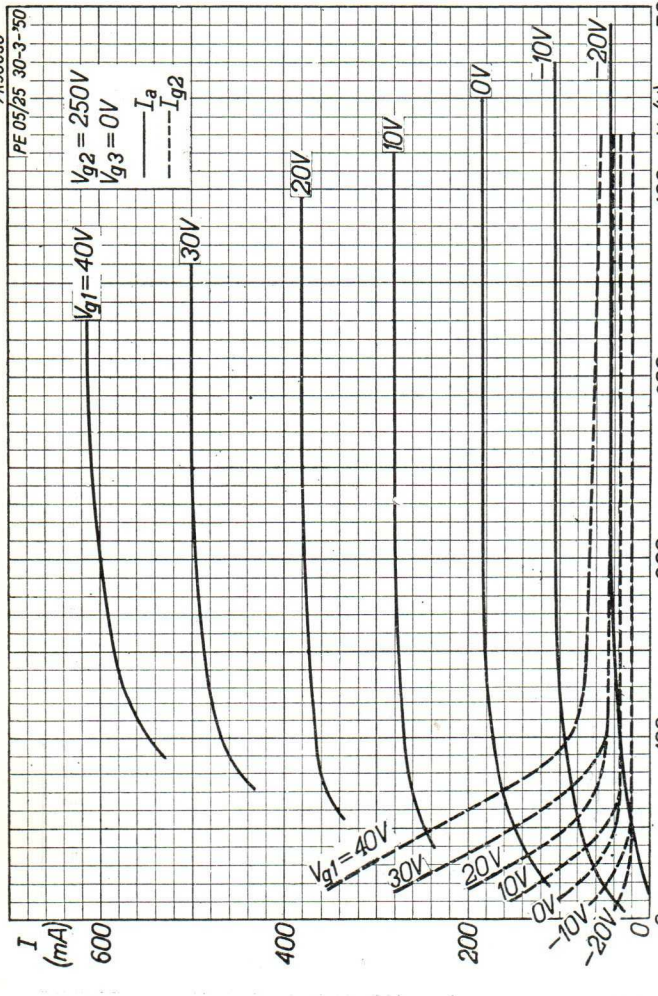
| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | 5,4/1,8 | 5,4/1,8 | 5,4/1,8 | m |
| $V_a$ | = | 400 | 400 | 400 | V |
| $V_{g1}$ | = | -175 | -200 | -250 | V |
| $V_{g2}$ | = | 250 | 250 | 250 | V |
| $V_{g3}$ | = | 0 | 0 | 0 | V |
| $I_a$ | = | 47 | 50 | 52,5 | mA |
| $I_{g1}$ | = | 0,9 | 1 | 1,2 | mA |
| $I_{g2}$ | = | 2 | 2,5 | 3 | mA |
| $V_{g1p}$ | = | 200 | 220 | 270 | V |
| $W_{ig1}$ | = | 0,16 | 0,2 | 0,3 | W |
| $W_{g2}$ | = | 0,5 | 0,65 | 0,75 | W |
| $W_{ia}$ | = | 18,8 | 20 | 21 | W |
| $W_a$ | = | 12 | 12 | 12 | W |
| $W_o$ | = | 6,8 | 8 | 9 | W |
| $\eta$ | = | 36 | 40 | 43 | % |

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als NF - Klasse B Verstärker und Modulator, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 500 | | 400 | | V |
| $V_{g1}$ | = | -24 | | -18,5 | | V |
| $V_{g2}$ | = | 250 | | 200 | | V |
| $V_{g3}$ | = | 0 | | 0 | | V |
| $R_{aa}$ | = | 9 | | 5,5 | | kΩ |
| $V_{g1g1p}$ | = | 0 | 70 | 0 | 82 | V |
| $I_a$ | = | 2x18 | 2x71 | 2x15 | 2x89 | mA |
| $I_{g1}$ | = | 0 | 2x1,8 | 0 | 2x4,4 | mA |
| $I_{g2}$ | = | 2x0,6 | 2x11,2 | 2x0,5 | 2x10,5 | mA |
| $W_{ig1}$ | = | 0 | 2x57 | 0 | 2x165 | mW |
| $W_{g2}$ | = | 2x0,15 | 2x2,8 | 2x0,1 | 2x2,1 | W. |
| $W_{ia}$ | = | 2x9 | 2x35,5 | 2x6 | 2x35,5 | W |
| $W_a$ | = | 2x9 | 2x11 | 2x6 | 2x11 | W |
| $W_o$ | = | 0 | 49 | 0 | 49 | W |
| $d_{tot}$ | = | - | 5 | - | 5 | % |
| $\eta$ | = | - | 69 | - | 69 | % |

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 300 | | V |
| $V_{g1}$ | = | -18 | | V |
| $V_{g2}$ | = | 200 | | V |
| $V_{g3}$ | = | 0 | | V |
| $R_{aa}$ | = | 3 | | kΩ |
| $V_{g1g1p}$ | = | 0 | 100 | V |
| $I_a$ | = | 2x15 | 2x108 | mA |
| $I_{g1}$ | = | 0 | 2x6 | mA |
| $I_{g2}$ | = | 2x0,5 | 2x13 | mA |
| $W_{ig1}$ | = | 0 | 2x270 | mW |
| $W_{g2}$ | = | 2x0,1 | 2x2,6 | W |
| $W_{ia}$ | = | 2x4,5 | 2x32,5 | W |
| $W_a$ | = | 2x4,5 | 2x12,5 | W |
| $W_o$ | = | 0 | 40 | W |
| $d_{tot}$ | = | - | 5 | % |
| $\eta$ | = | - | 62 | % |

# PHILIPS


7R50830
PE 05/25 30-3-'50
$V_{g2}$ = 250V
$V_{g3}$ = 0V
$I_a$
$I_{g2}$
$V_{g1}$ = 40V
30V
20V
10V
0V
−10V
−20V
I (mA)
600
400
200
0
$V_a$ (V)
500
400
300
200
100
0

A

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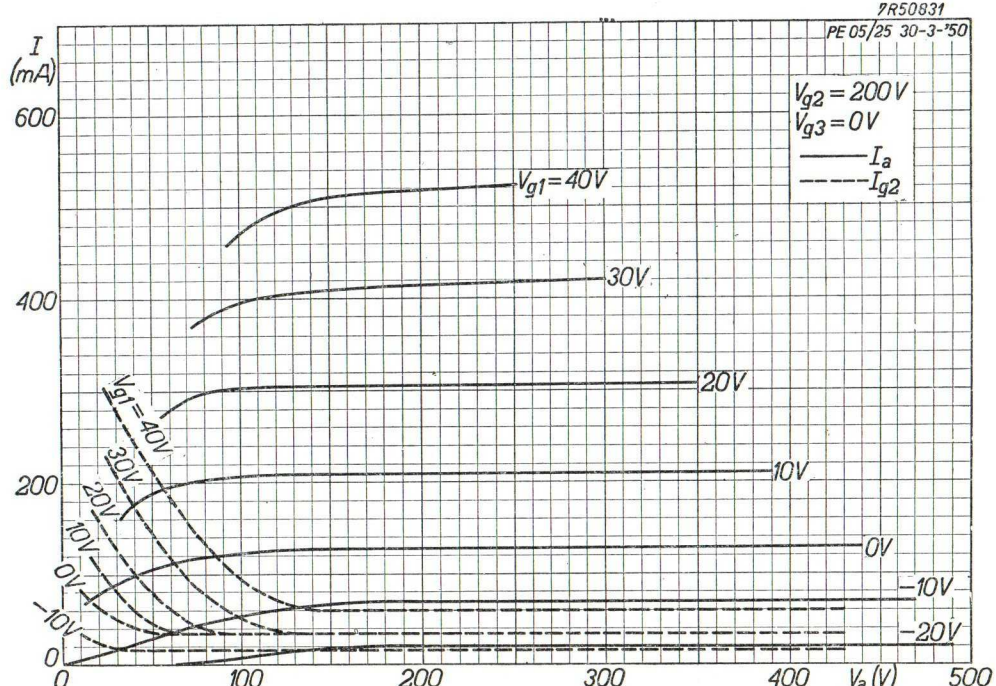
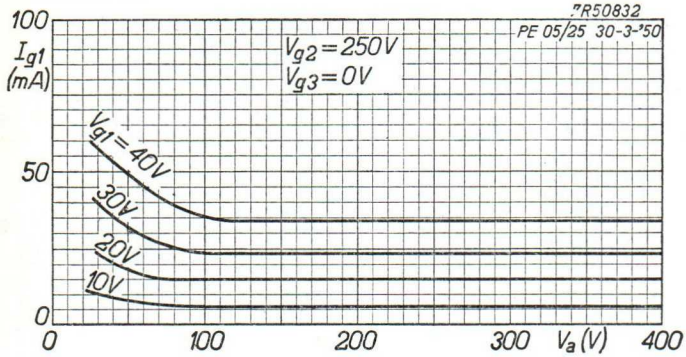
B

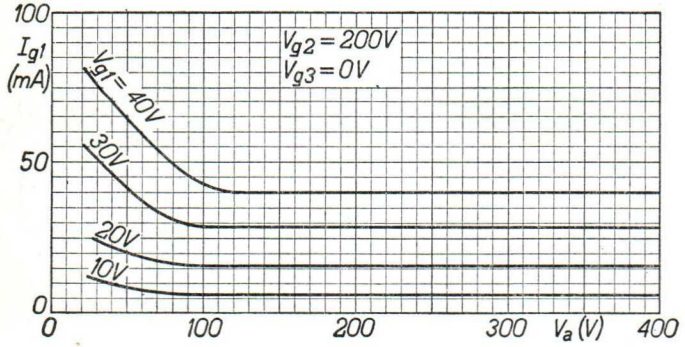
PHILIPS

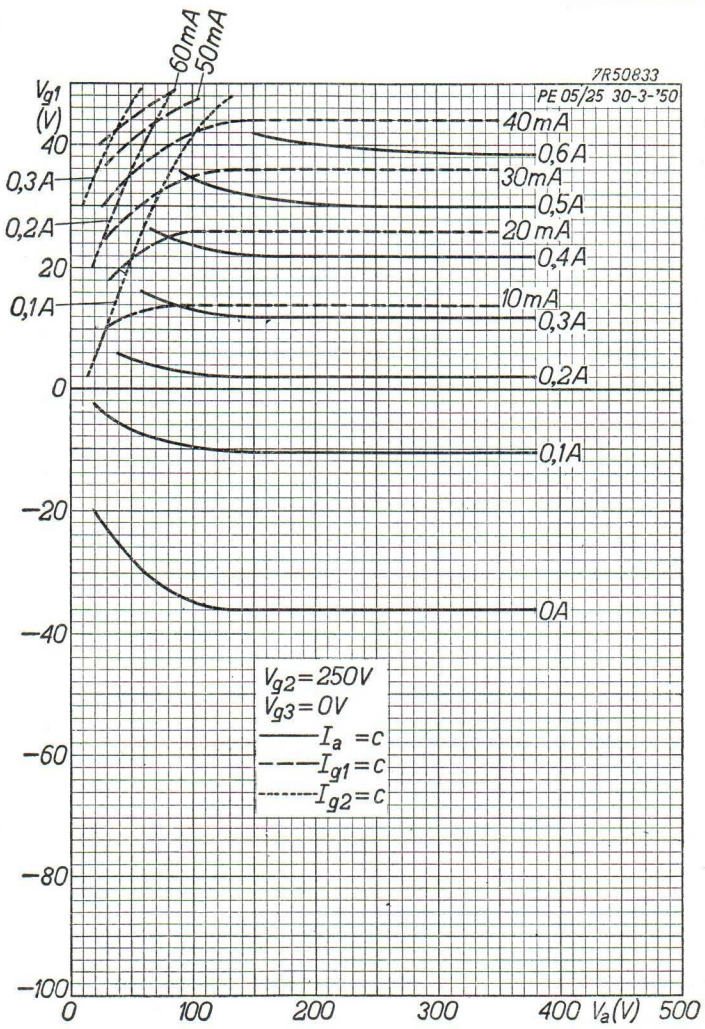
PE 05/25



# PHILIPS

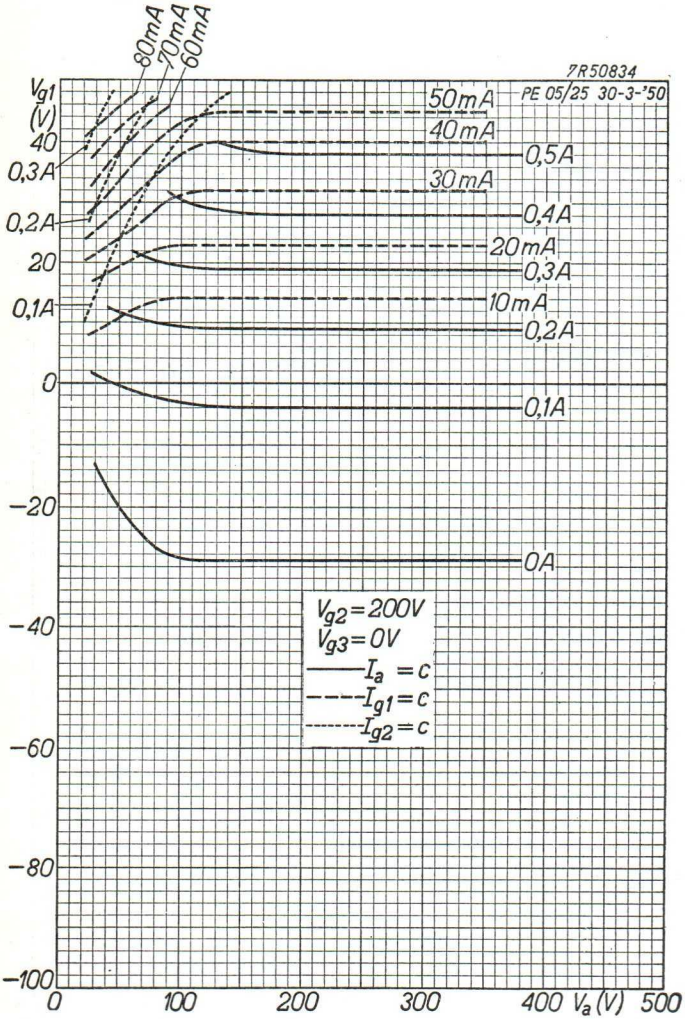

7R50832
PE 05/25 30-3-'50
100
$I_{g1}$ (mA)
50
0
$V_{g2} = 250V$
$V_{g3} = 0V$
$V_{g1} = 40V$
30V
20V
10V
0
100
200
300
$V_a$ (V)
400


100
$I_{g1}$ (mA)
50
0
$V_{g2} = 200V$
$V_{g3} = 0V$
$V_{g1} = 40V$
30V
20V
10V
0
100
200
300
$V_a$ (V)
400

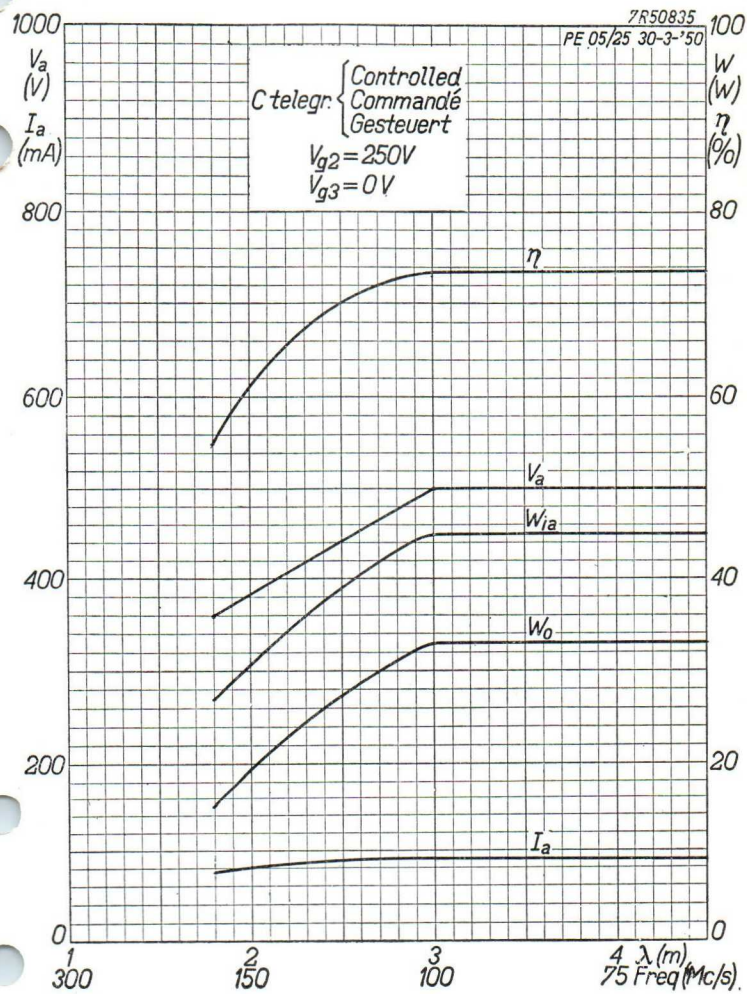

7R50833
PE 05/25 30-3-'50
$V_{g1}$ (V)
60mA
50mA
40mA
0,6A
30mA
0,5A
0,3A
0,2A
20mA
0,4A
40
20
0
−20
−40
−60
−80
−100
0,1A
10mA
0,3A
0,2A
0,1A
0A
$V_{g2}=250V$
$V_{g3}=0V$
$I_a=c$
$I_{g1}=c$
$I_{g2}=c$
0
100
200
300
400
$V_a$(V)
500

PE 05/25

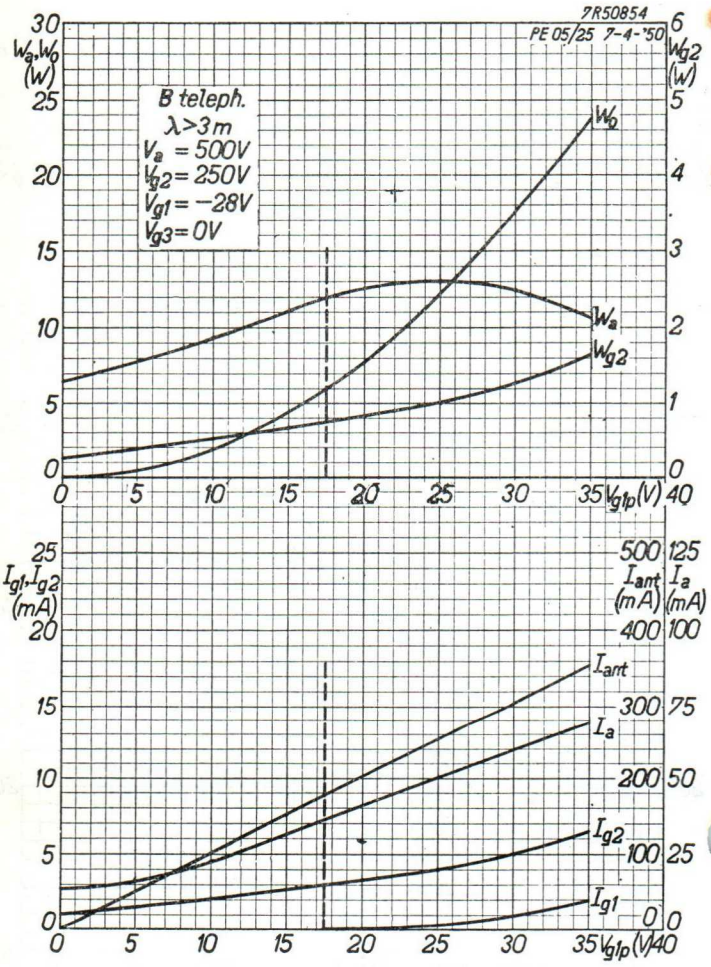
# PHILIPS




E

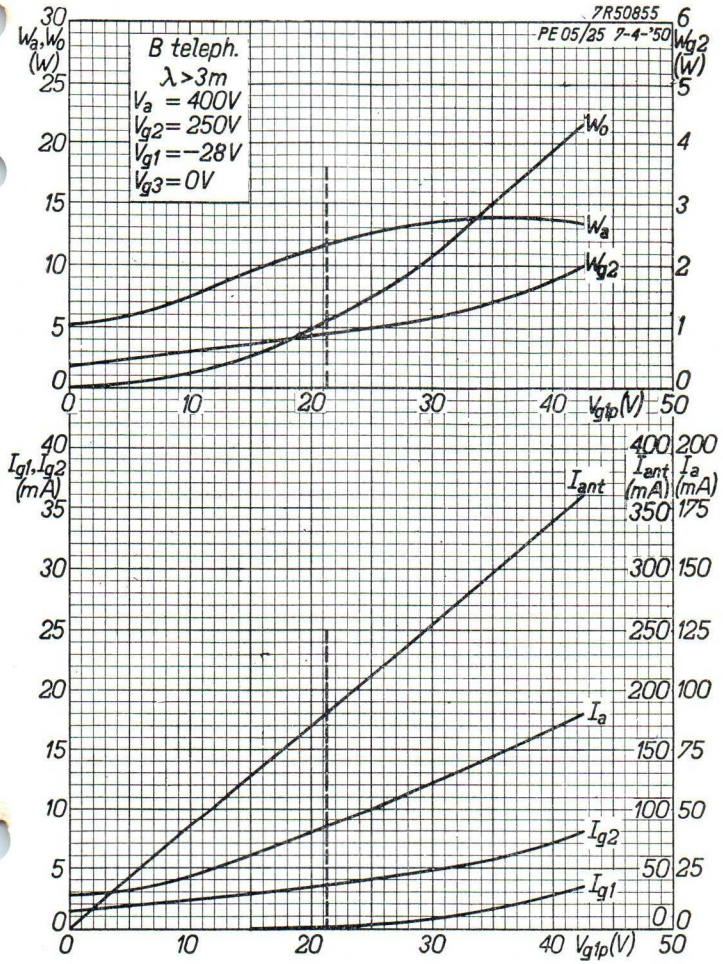

7R50835
PE 05/25 30-3-'50
1000
Va
(V)
Ia
(mA)
800
600
400
200
0
100
W
(W)
η
(%)
80
60
40
20
0
C telegr. { Controlled
Commandé
Gesteuert
Vg2 = 250V
Vg3 = 0V
η
Va
Wia
Wo
Ia
1
300
2
150
3
100
4
75
λ (m)
Freq (Mc/s)

# PHILIPS


7R50854
PE 05/25 7-4-'50
B teleph.
λ>3m
Va = 500V
Vg2 = 250V
Vg1 = −28V
Vg3 = 0V
Wa, Wo (W)
Wg2 (W)
Wo
Wa
Wg2
Vg1p (V)
Ig1, Ig2 (mA)
Iant (mA)
Ia (mA)
Iant
Ia
Ig2
Ig1
Vg1p (V)

# PHILIPS

**PE 05/25**

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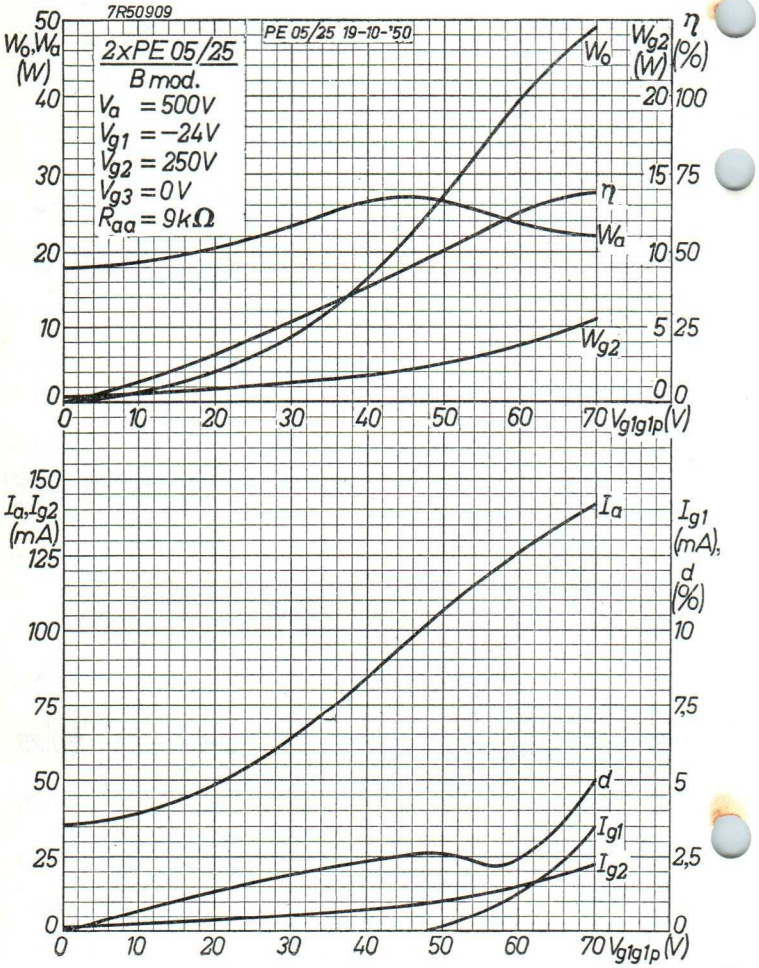
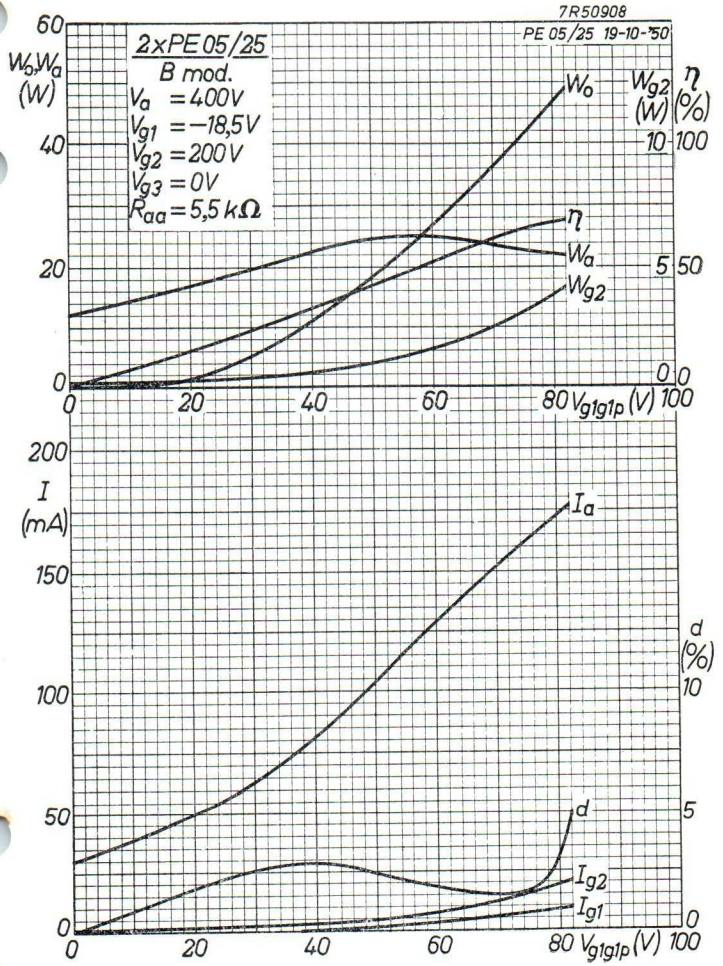
H

# PHILIPS


7R50909
PE 05/25 19-10-'50
2xPE 05/25
B mod.
$V_a$ = 500V
$V_{g1}$ = −24V
$V_{g2}$ = 250V
$V_{g3}$ = 0V
$R_{aa}$ = 9kΩ
$W_o$, $W_a$ (W)
$W_{g2}$ (W)
η (%)
$W_o$
η
$W_a$
$W_{g2}$
$V_{g1g1p}$ (V)
$I_a$, $I_{g2}$ (mA)
$I_{g1}$ (mA), d (%)
$I_a$
d
$I_{g1}$
$I_{g2}$
$V_{g1g1p}$ (V)

# PHILIPS

**PE 05/25**

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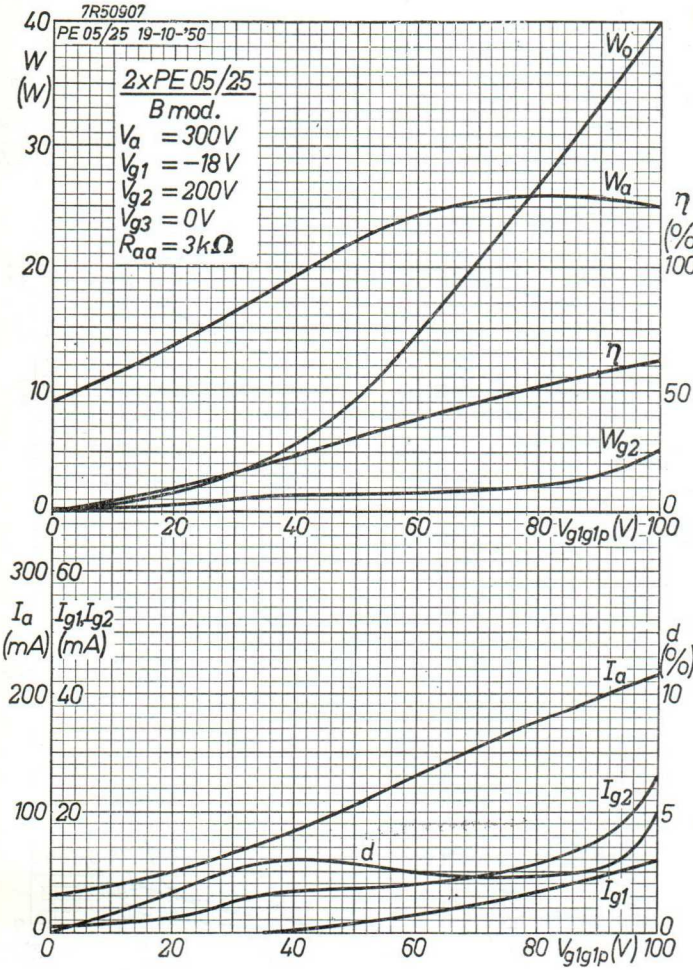
J

# PHILIPS


7R50907
PE 05/25 19-10-'50
2xPE 05/25
B mod.
Va = 300V
Vg1 = −18V
Vg2 = 200V
Vg3 = 0V
Raa = 3kΩ
W (W)
Wo
Wa
η (%)
η
Wg2
Vg1g1p (V)
Ia (mA)
Ig1,Ig2 (mA)
d (%)
Ia
Ig2
d
Ig1

K

# PHILIPS

**PE 06/40**

PENTODE for use as H.F. or L.F. amplifier
PENTHODE pour utilisation en amplificatrice H.F. ou B.F.
PENTODE zur Verwendung als HF- oder NF-Verstärker

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

PE 06/40 P Vf = 6,3 V
PE 06/40 N If = 1,3 A

PE 06/40 E Vf = 12,6 V
If = 0,65 A

Capacitances
Capacités
Kapazitäten

Ca = 8,7 pF
Cg1 = 15 pF
Cag1 = 0,1 pF

Typical characteristics
Caractéristiques types
Kenndaten

μg2g1 = 5,5
S (Ia=40 mA)= 4 mA/V

| λ | Freq. | C telegr. | | B teleph. | | Cag2 mod. | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >15 | <20 | 600 | 45 | 600 | 11 | 500 | 40 |
| 5 | 60 | 600 | 36 | 600 | 6,5 | 500 | 20 |

| λ | Freq. | C fr.mult. | | B mod. [1] | |
|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) |
| 150/75 | 2/4 | 600 | 27 | 600 | 100 |

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 600 V
Wa = max. 25 W
Vg2 = max. 300 V
Wg2 = max. 5 W
Wg1 = max. 1 W

Rg1 = max. 100 kΩ [2]
Rg1 = max. 200 kΩ [3]
Ik = max. 130 mA
Ikp = max. 520 mA
Vfk = max. 75 V

[1]) Two tubes ; deux tubes; zwei Röhren

[2]) With fixed grid bias; à polarisation fixe; mit fester Gittervorspannung

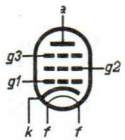
[3]) With automatic grid bias; à polarisation automatique; mit automatischer Gittervorspannung

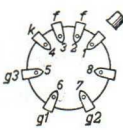
# PHILIPS

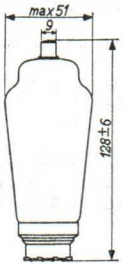
Dimensions in mm
Dimensions en mm
Abmessungen in mm

PE 06/40 P

Base
Culot P
Sockel

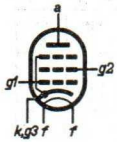


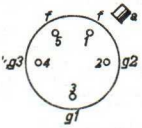



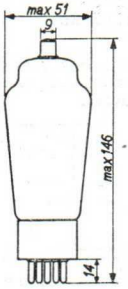




PE 06/40 N

Base
Culot N
Sockel

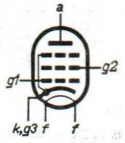


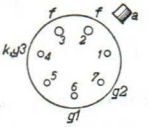



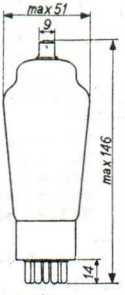




PE 06/40 E

Base
Culot E
Sockel




| | | |
|---|---|---|
| Socket for | PE 06/40 P | 5900/02 |
| Support pour | PE 06/40 N | 40219 |
| Fassung für | PE 06/40 E | 40220 |

Cap; capot; haube 28 906 022

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

Net weight
Poids net 65 g
Nettogewicht

Shipping weight
Poids brut 90 g
Bruttogewicht

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >15 | >15 | 5[1]) | m |
| Va | = | 600 | 600 | 600 | V |
| Vg1 | = | -75 | -40 | -75 | V |
| Vg2 | = | 300 | 300 | 300 | V |
| Vg3 | = | 0 | 0 | 0 | V |
| Ia | = | 109 | 109 | 195 | mA |
| Ig1 | = | 2 | 0 | 0 | mA |
| Ig2 | = | 11,5 | 11 | 20 | mA |
| Vg1p | = | 90 | 40 | 75 | V |
| Wig1 | = | 0,2 | 0 | 0 | W |
| Wg2 | = | 3,5 | 3,3 | 6 | W |
| Wia | = | 65 | 65 | 117 | W |
| Wa | = | 20 | 25 | 45 | W |
| Wo | = | 45 | 40 | 72 | W |
| $\eta$ | = | 69 | 62 | 62 | % |

[1]) Two tubes ; deux tubes; zwei Röhren

# PHILIPS

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphony
Betriebsdaten H.F. Klasse B Telephonie

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >15 | 5[1]) | m |
| Va | = | 600 | 600 | V |
| Vg1 | = | -40 | -38 | V |
| Vg2 | = | 250 | 250 | V |
| Vg3 | = | 0 | 0 | V |
| Ia | = | 60 | 104 | mA |
| Ig2 | = | 3 | 5,5 | mA |
| Vg1p | = | 20 | 17,5 | V |
| Wg2 | = | 0,75 | 1,4 | W |
| Wia | = | 36 | 63 | W |
| Wa | = | 25 | 50 | W |
| Wo | = | 11 | 13 | W |
| $\eta$ | = | 30,5 | 20,5 | % |
| m | = | 100 | 100 | % |
| Ig1 | = | 0 | 0 | mA |
| Wig1 | = | 0 | 0 | W |

Operating conditions as class C frequency multiplier
Caractéristiques d'utilisation comme multiplicatrice de fréquence classe C
Betriebsdaten als Klasse C Frequenzvervielfacher

| | | | |
|---|---|---|---|
| $\lambda$ | = | 150/75 | m |
| Va | = | 600 | V |
| Vg1 | = | -100 | V |
| Vg2 | = | 300 | V |
| Vg3 | = | 0 | V |
| Ia | = | 87 | mA |
| Ig1 | = | 1 | mA |
| Ig2 | = | 11 | mA |
| Vg1p | = | 110 | V |
| Wig1 | = | 0,1 | W |
| Wg2 | = | 3,3 | W |
| Wia | = | 52 | W |
| Wa | = | 25 | W |
| Wo | = | 27 | W |
| $\eta$ | = | 52 | % |

[1]) Two valves; deux tubes; zwei Röhren

Operating conditions H.F. class C anode- and screen grid modulation
Caractéristiques d'utilisation H.F. classe C modulation d'anode et de grille-écran
Betriebsdaten H.F.Klasse C Anoden- und Schirmgittermodulation

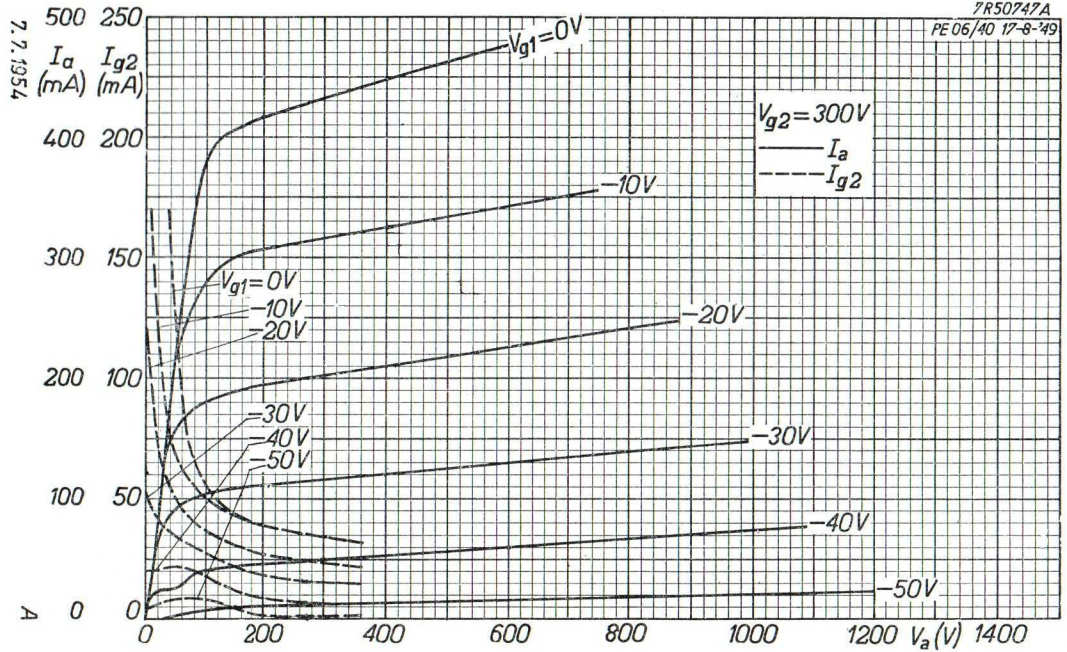
| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >15 | 5[1]) | m |
| Va | = | 500 | 500 | V |
| Vg1 | = | −75 | −55 | V |
| Vg2 | = | 300[2]) | 160[3]) | V |
| Vg3 | = | 0 | 0 | V |
| Ia | = | 114 | 146 | mA |
| Ig1 | = | 1,4 | 2 | mA |
| Ig2 | = | 10 | 10 | mA |
| Vg1p | = | 90 | 75 | V |
| Wig1 | = | 0,1 | 0,15 | W |
| Wg2 | = | 3 | 1,6 | W |
| Wia | = | 57 | 73 | W |
| Wa | = | 17 | 33 | W |
| Wo | = | 40 | 40 | W |
| $\eta$ | = | 70 | 55 | % |
| m | = | 100 | 100 | % |
| Vg2p | = | 300 | 160 | V |
| Wmod | = | 30 | 40 | W |

1) Two valves; deux tubes; zwei Röhren
2) Rg2 = 20 kΩ
3) Rg2 = 34 kΩ

# PHILIPS

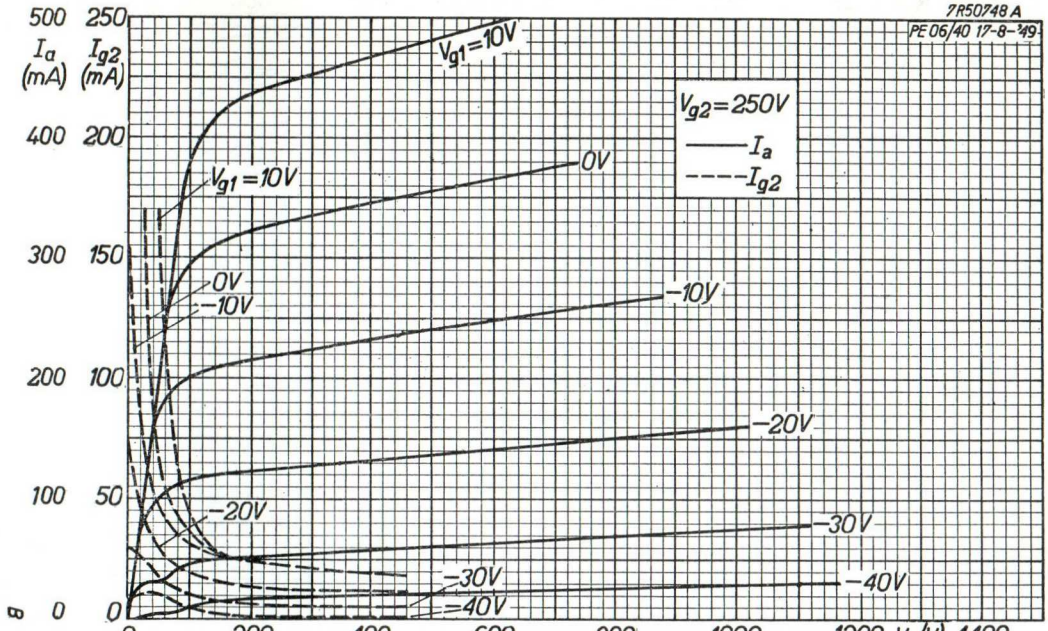
Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

| | | | | |
|---|---|---|---|---|
| Va | = | 600 | | V |
| Vg1 | = | −45 | | V |
| Vg2 | = | 300 | | V |
| Vg3 | = | 0 | | V |
| Raa | = | 6 | | kΩ |
| Vg1g1p | = | 0 | 90 | V |
| Ia | = | 2x34 | 2x115 | mA |
| Ig1 | = | 0 | 0 | mA |
| Ig2 | = | 2x3 | 2x18 | mA |
| Wig1 | = | 0 | 0 | W |
| Wg2 | = | 2x0,9 | 2x5,4 | W |
| Wia | = | 2x20,4 | 2x70 | W |
| Wa | = | 2x20,4 | 2x20 | W |
| Wo | = | 0 | 100 | W |
| $d_{tot}$ | = | - | 4 | % |
| $\eta$ | = | - | 71 | % |




PHILIPS

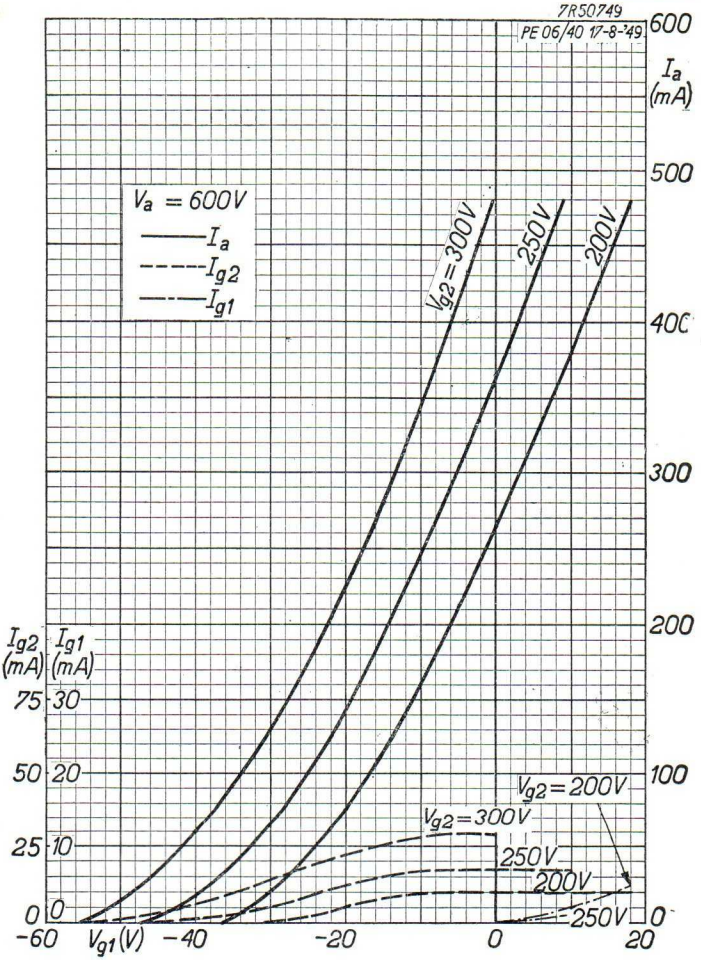
PE 06/40


7R50748 A
PE 06/40 17-8-'49
500
250
$I_a$ (mA)
$I_{g2}$ (mA)
400
200
300
150
200
100
100
50
0
0
$V_{g1}=10V$
$V_{g2}=250V$
$I_a$
$I_{g2}$
0V
−10V
−20V
−30V
−40V
0
200
400
600
800
1000
1200
$V_a$ (V)
1400

PHILIPS

# PHILIPS

**PE 06/40**

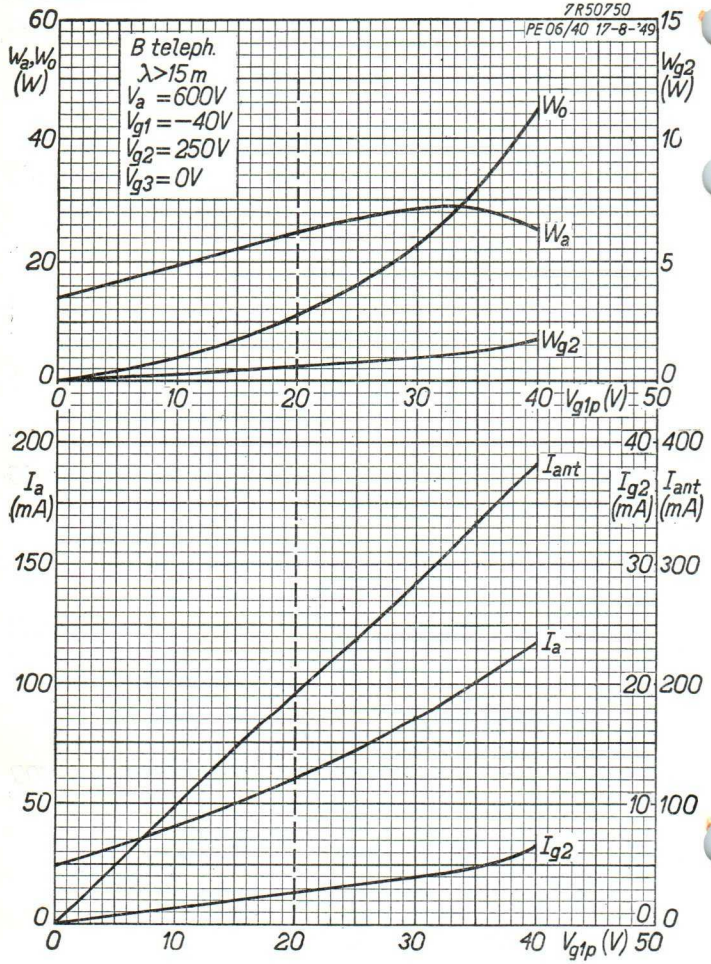



9.9.1949

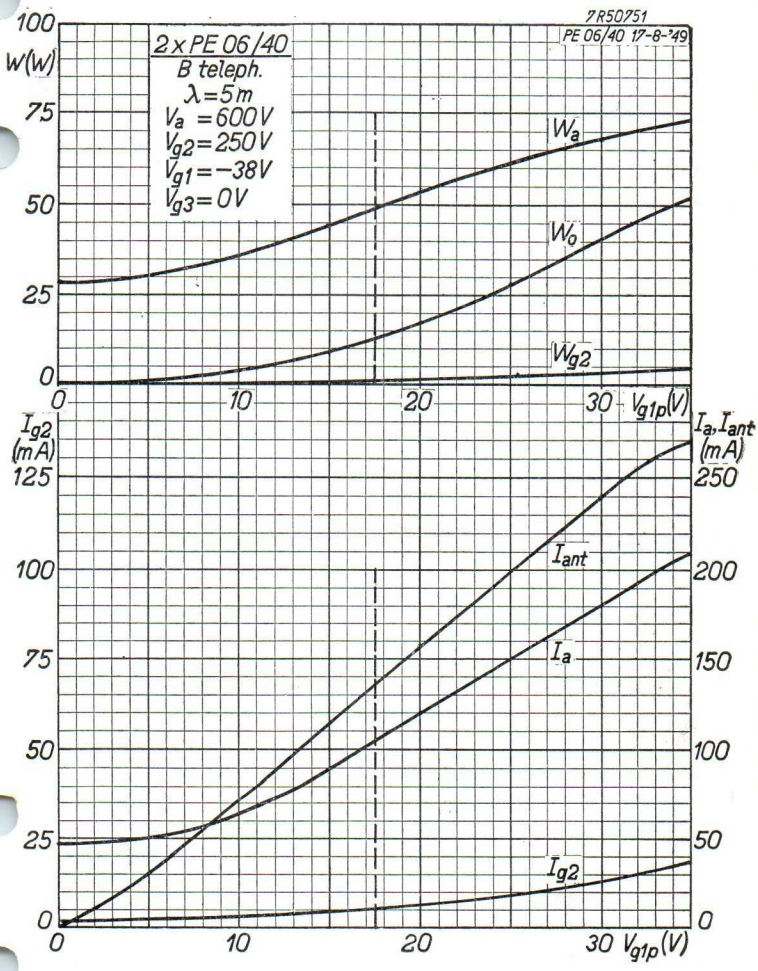
C

**PE 06/40**

# PHILIPS

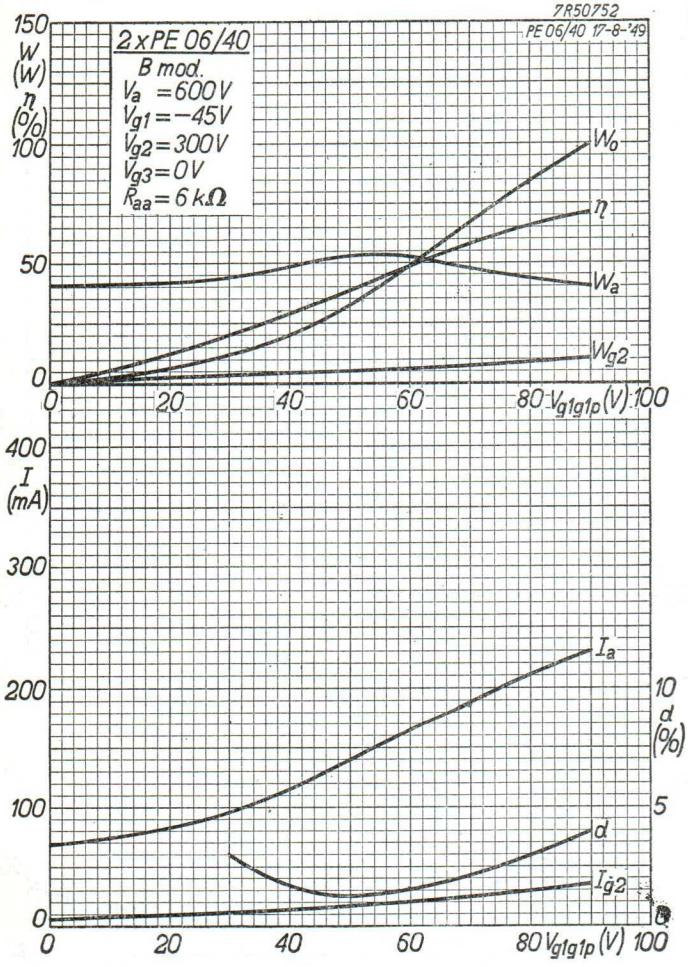



D

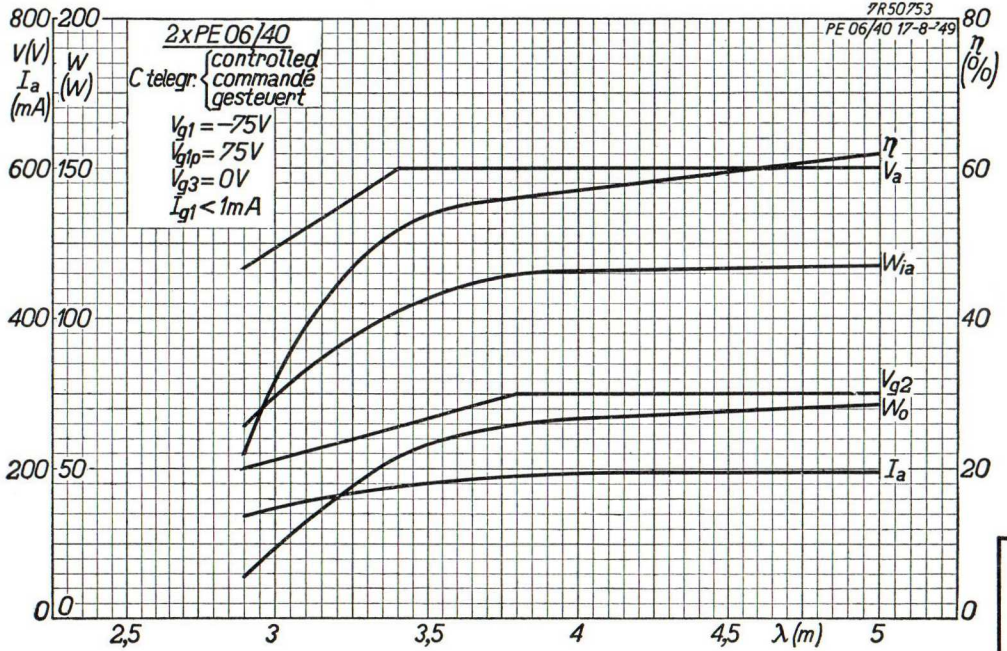

7R50751
PE 06/40 17-8-'49
2 x PE 06/40
B teleph.
λ = 5 m
$V_a$ = 600 V
$V_{g2}$ = 250 V
$V_{g1}$ = −38 V
$V_{g3}$ = 0 V
W(W)
100
75
50
25
0
$W_a$
$W_o$
$W_{g2}$
0
10
20
30
$V_{g1p}$(V)
$I_{g2}$ (mA)
125
100
75
50
25
0
$I_a$, $I_{ant}$ (mA)
250
200
150
100
50
0
$I_{ant}$
$I_a$
$I_{g2}$
0
10
20
30
$V_{g1p}$(V)

**PE 06/40**

# PHILIPS




F




PHILIPS

PE 06/40

PENTODE for use as H.F. amplifier
PENTHODE pour utilisation comme amplificatrice H.F.
PENTHODE zur Verwendung als H.F. Verstärker

Cathode : oxide-coated
Cathode : oxyde
Kathode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

Vf = 12 V
If = 0,9 A

Capacitances
Capacités
Kapazitäten

Ca = 12 pF
Cg1 = 15 pF
Cag1 = 0,1 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

$\mu g2g1$ = 3,9

S (Ia =40 mA)= 2,5 mA/V

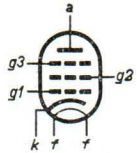
| λ | Freq. | C telegr. | | B teleph. | | Cag2 mod. | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >15 | <20 | 1000 | 85 | 1000 | 13 | 1000 | 60 |
| | | 750 | 60 | | | | |
| 5 | 60 | 625 | 32,5 | 625 | 12 | | |
| | | Cg2 mod. | | Cg3 mod. | | | |
| >15 | <20 | 1000 | 18 | 1000 | 10 | | |
| 5 | 60 | 625 | 11,5 | 625 | 8 | | |

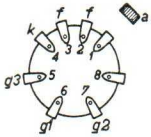
Limiting values
Caractéristiques limites
Grenzdaten

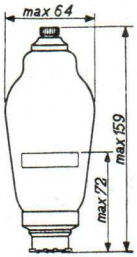
Va = max. 1000 V
Wa = max. 35 W
Vg2 = max. 500 V
Wg2 = max. 6 W
Wg1 = max. 4 W
Rg1 = max. 30 kΩ
Ik = max. 160 mA
Ikp = max. 650 mA
Vfk = max. 170 V

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: P

Socket
Support
Fassung 5900/02

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

Net weight
Poids net 120 g
Nettogewicht

Shipping weight
Poids brut 210 g
Bruttogewicht

PENTODE for use as H.F. and L.F. amplifier
PENTHODE pour utilisation en amplificatrice H.F. et B.F.
PENTODE zur Verwendung als H.F. und N.F. Verstärker

Cathode : oxide-coated
Cathode : oxyde
Kathode : Oxyd

Heating : indirect — $V_f$ = 12,6 V
Chauffage: indirect — $I_f$ = 1,35 A
Heizung : indirekt

Capacitances — $C_a$ = 11 pF; $C_{g1}$ = 20,5 pF; $C_{ag1}$ = 0,1 pF
Capacités
Kapazitäten

Typical characteristics — $\mu_{g2g1}$ = 6,7; S ($I_a$=40 mA) = 6 mA/V
Caractéristiques types
Kenndaten

| λ | Freq. | C telegr. | | B teleph. | |
|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| >5 | <60 | 1000 | 132 | 1000 | 23 |
| | | 800 | 107 | 800 | 23 |
| | | 600 | 78 | 600 | 23 |
| | | $C_{ag2}$ mod. | | $C_{g3}$ mod. | |
| >5 | <60 | 800 | 75 | 1000 | 27 |
| | | 600 | 51 | 800 | 26 |
| | | | | 600 | 22 |

B mod.[1])

| $V_a$ (V) | $W_o$ (W) |
|---|---|
| 1000 | 194 |
| 800 | 110 |
| 600 | 82 |

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. 1000 V | $R_{g3}$ | = max. 50 kΩ |
| $W_a$ | = max. 45 W | $R_{g1}$ | = max. 25 kΩ [2]) |
| $V_{g2}$ | = max. 300 V | $R_{g1}$ | = max. 50 kΩ [3]) |
| $W_{g2}$ | = max. 7 W | $I_k$ | = max. 240 mA |
| $W_{g1}$ | = max. 0,5 W | $I_{kp}$ | = max. 1,5 A |
| | | $V_{kf}$ | = max. 100 V |

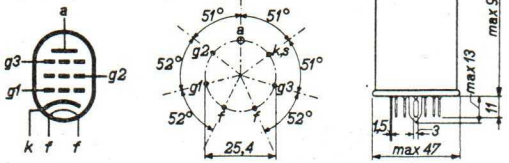
[1]) Two valves; deux tubes; zwei Röhren

[2]) With fixed grid bias; à polarisation fixe; mit fester Gittervorspannung

[3]) With automatic grid bias; à polarisation automatique; mit automatischer Gittervorspannung

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: Septar

Socket
Support 40202
Fassung

Mounting position: arbitrary
Montage : arbitrairement
Aufstellung : willkürlich

Net weight
Poids net 80 g
Nettogewicht

Shipping weight
Poids brut 125 g
Bruttogewicht

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >5 | >5 | >5 | m |
| $V_a$ | = | 1000 | 800 | 600 | V |
| $V_{g1}$ | = | -120 | -110 | -100 | V |
| $V_{g2}$ | = | 250 | 250 | 250 | V |
| $V_{g3}$ | = | 0 | 0 | 0 | V |
| $I_a$ | = | 177 | 190 | 205 | mA |
| $I_{g1}$ | = | 5 | 6 | 7,5 | mA |
| $I_{g2}$ | = | 28 | 28 | 28 | mA |
| $V_{g1p}$ | = | 144 | 134 | 124 | V |
| $W_{ig1}$ | = | 0,65 | 0,73 | 0,84 | W |
| $W_{g2}$ | = | 7 | 7 | 7 | W |
| $W_{ia}$ | = | 177 | 152 | 123 | W |
| $W_a$ | = | 45 | 45 | 45 | W |
| $W_o$ | = | 132 | 107 | 78 | W |
| $\eta$ | = | 74,5 | 70,5 | 63,5 | % |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | >5 | >5 | >5 | m |
| $V_a$ | = | 1000 | 800 | 600 | V |
| $V_{g1}$ | = | -34 | -33 | -30,5 | V |
| $V_{g2}$ | = | 250 | 250 | 250 | V |
| $V_{g3}$ | = | 0 | 0 | 0 | V |
| $I_a$ | = | 68 | 85 | 114 | mA |
| $I_{g2}$ | = | 4,5 | 6 | 7,5 | mA |
| $V_{g1p}$ | = | 20,5 | 22,5 | 26,5 | V |
| $W_{g2}$ | = | 1,15 | 1,5 | 1,9 | W |
| $W_{ia}$ | = | 68 | 68 | 68,4 | W |
| $W_a$ | = | 45 | 45 | 45 | W |
| $W_o$ | = | 23 | 23 | 23,4 | W |
| $\eta$ | = | 34 | 34 | 34 | % |
| m | = | 100 | 100 | 100 | % |
| $I_{g1}$ | = | 2 | 4 | 8 | mA |
| $W_{ig1}$ | = | 0,08 | 0,17 | 0,38 | W |

# PHILIPS

Operating conditions H.F. class C
Caractéristiques d'utilisation H.F. classe C
Betriebsdaten HF- Klasse C

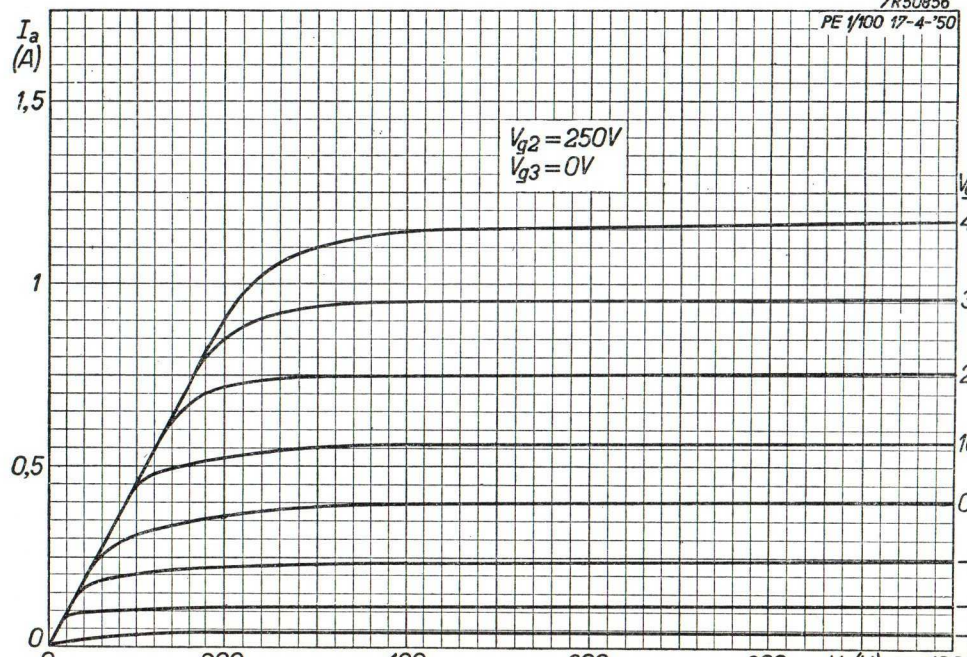
| | anode and screen grid modulation<br>modulation d'anode et de grille-écran<br>Anoden- und Schirmgitter-modulation | | suppressor grid modulation<br>modulation de grille d'arrêt<br>Fanggittermodulation | |
|---|---|---|---|---|
| $\lambda$ = | >5 | >5 | >5 | m |
| $V_a$ = | 800 | 600 | 1000 | V |
| $V_{g1}$ = | -120 | -120 | -100 | V |
| $V_{g2}$ = | 250 | 250 | 150 | V |
| $V_{g3}$ = | 0 | 0 | -100 | V |
| $I_a$ = | 120 | 120 | 72 | mA |
| $I_{g1}$ = | 6,5 | 6,5 | 10 | mA |
| $I_{g2}$ = | 23 | 23 | 24 | mA |
| $V_{g1p}$ = | 150 | 150 | 140 | V |
| $W_{ig1}$ = | 0,9 | 0,9 | 1,3 | W |
| $W_{g2}$ = | 5,8 | 5,8 | 3,6 | W |
| $W_{ia}$ = | 96 | 72 | 72 | W |
| $W_a$ = | 21 | 21 | 45 | W |
| $W_o$ = | 75 | 51 | 27 | W |
| $\eta$ = | 78 | 71 | 37,5 | % |
| m = | 100 | 100 | 100 | % |
| $V_{g2p}$ = | 250 | 250 | - | V |
| $V_{g3p}$ = | - | - | 100 | V |
| $W_{mod}$ = | 48 | 36 | 0 | W |

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 1000 | | 800 | | V |
| $V_{g1}$ | = | -34 | | -33,5 | | V |
| $V_{g2}$ | = | 250 | | 250 | | V |
| $V_{g3}$ | = | 0 | | 0 | | V |
| $R_{aa}$ | = | 8800 | | 7560 | | Ω |
| $V_{g1g1p}$ | = | 0 | 84 | 0 | 68 | V |
| $I_a$ | = | 2x26 | 2x134 | 2x28 | 2x108 | mA |
| $I_{g1}$ | = | 0 | 2x0,8 | 0 | 0 | mA |
| $I_{g2}$ | = | 2x5 | 2x28 | 2x8 | 2x27 | mA |
| $W_{ig1}$ | = | 0 | 2x0,03 | 0 | 0 | W |
| $W_{g2}$ | = | 2x1,3 | 2x7 | 2x2 | 2x6,8 | W |
| $W_{ia}$ | = | 2x26 | 2x134 | 2x22,4 | 2x86,4 | W |
| $W_a$ | = | 2x26 | 2x37 | 2x22,4 | 2x31,4 | W |
| $W_o$ | = | 0 | 194 | 0 | 110 | W |
| $d_{tot}$ | = | - | 5 | - | 4,5 | % |
| $\eta$ | = | - | 72 | - | 63,5 | % |

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 600 | | V |
| $V_{g1}$ | = | -33 | | V |
| $V_{g2}$ | = | 250 | | V |
| $V_{g3}$ | = | 0 | | V |
| $R_{aa}$ | = | 6320 | | Ω |
| $V_{g1g1p}$ | = | 0 | 66 | V |
| $I_a$ | = | 2x28 | 2x102 | mA |
| $I_{g1}$ | = | 0 | 0 | mA |
| $I_{g2}$ | = | 2x11 | 2x28 | mA |
| $W_{ig1}$ | = | 0 | 0 | W |
| $W_{g2}$ | = | 2x2,8 | 2x7 | W |
| $W_{ia}$ | = | 2x16,8 | 2x61,2 | W |
| $W_a$ | = | 2x16,8 | 2x20,2 | W |
| $W_o$ | = | 0 | 82 | W |
| $d_{tot}$ | = | - | 3,3 | % |
| $\eta$ | = | - | 67 | % |

7R50856
PE 1/100 17-4-'50

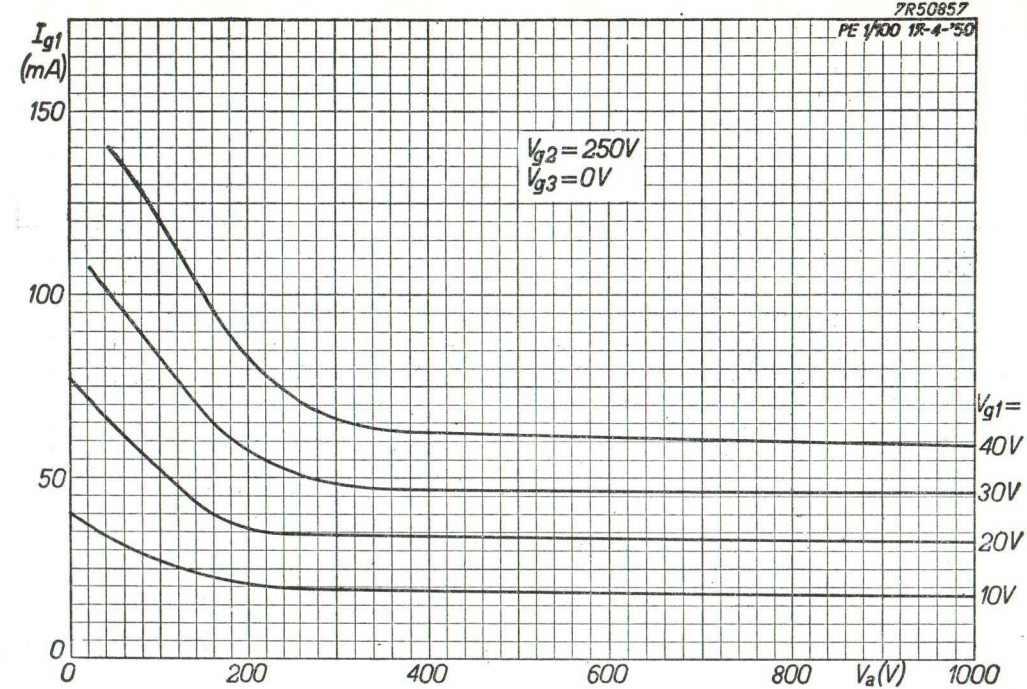



7.7.1954

A

PHILIPS

PE 1/100


7R50857
PE 1/100 1R-4-'50
$I_{g1}$ (mA)
150
100
50
0
$V_{g2}=250V$
$V_{g3}=0V$
$V_{g1}=$
40V
30V
20V
10V
0
200
400
600
800
$V_a$(V)
1000

B

PHILIPS

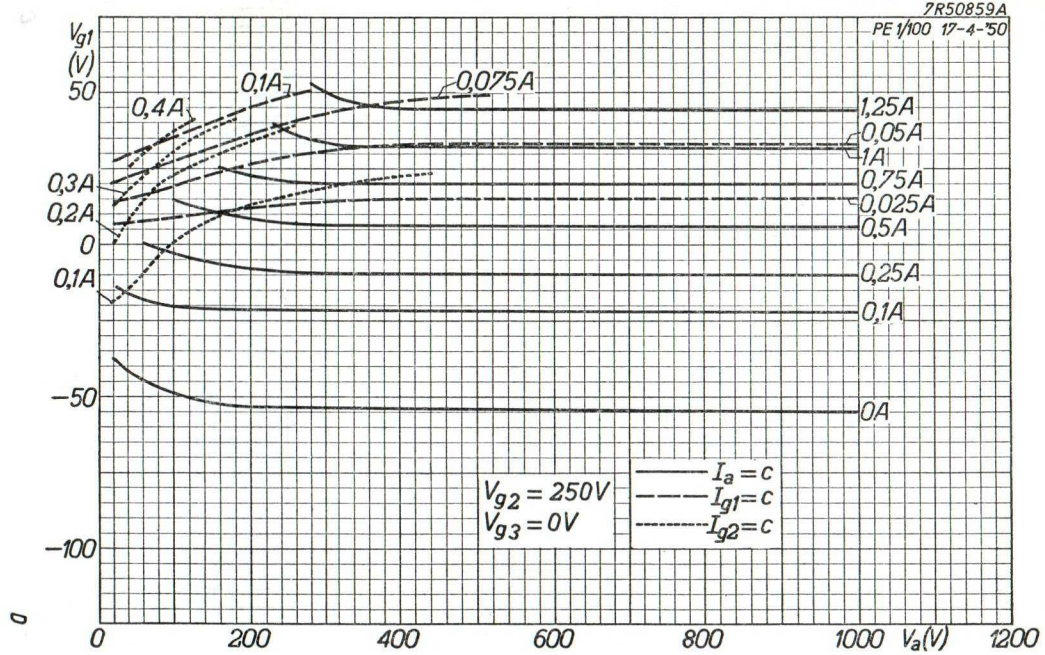
PR50858
PE 1/100 17-4-'50
$V_{g2}$ = 250V
$V_{g3}$ = 0V
$V_{g1}$ = 40V
30V
20V
10V
0V
-10V
-20V
-30V
$I_{g2}$ (mA)
600
400
200
0
$V_a$ (V)
0
200
400
600
800
1000

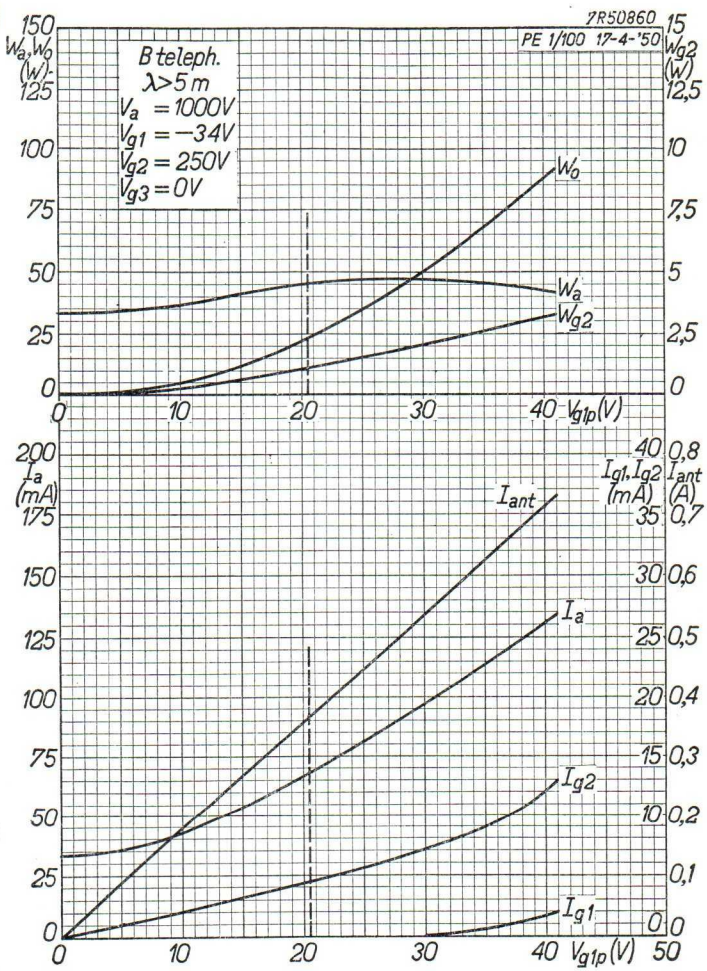
7.7.1954

C

PE 1/100

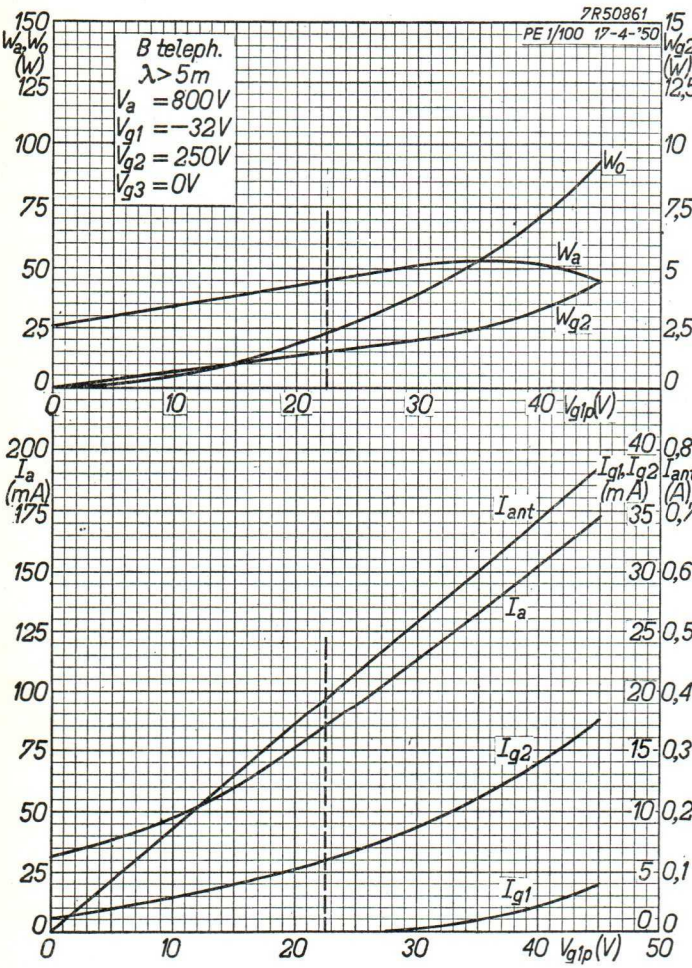
PHILIPS




7R50860
PE 1/100 17-4-'50
B teleph.
λ>5 m
Va = 1000V
Vg1 = −34V
Vg2 = 250V
Vg3 = 0V
Wa, Wo (W)
Wg2 (W)
Wo
Wa
Wg2
Vg1p (V)
Ia (mA)
Igl, Ig2 (mA)
Iant (A)
Iant
Ia
Ig2
Ig1
Vg1p (V)

PE 1/100

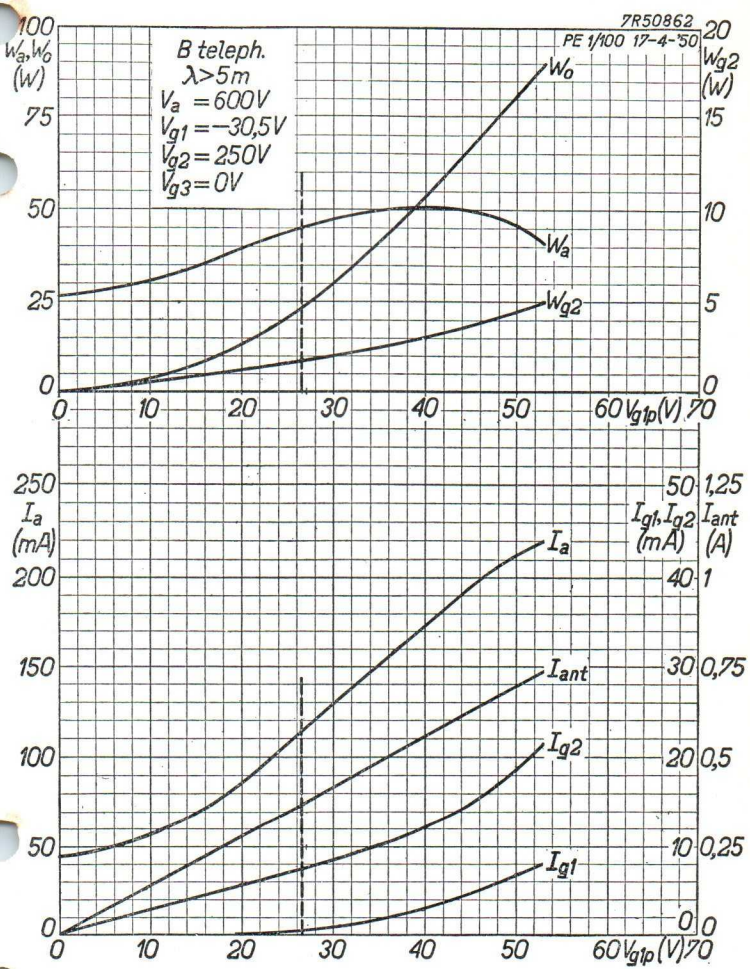
# PHILIPS




F

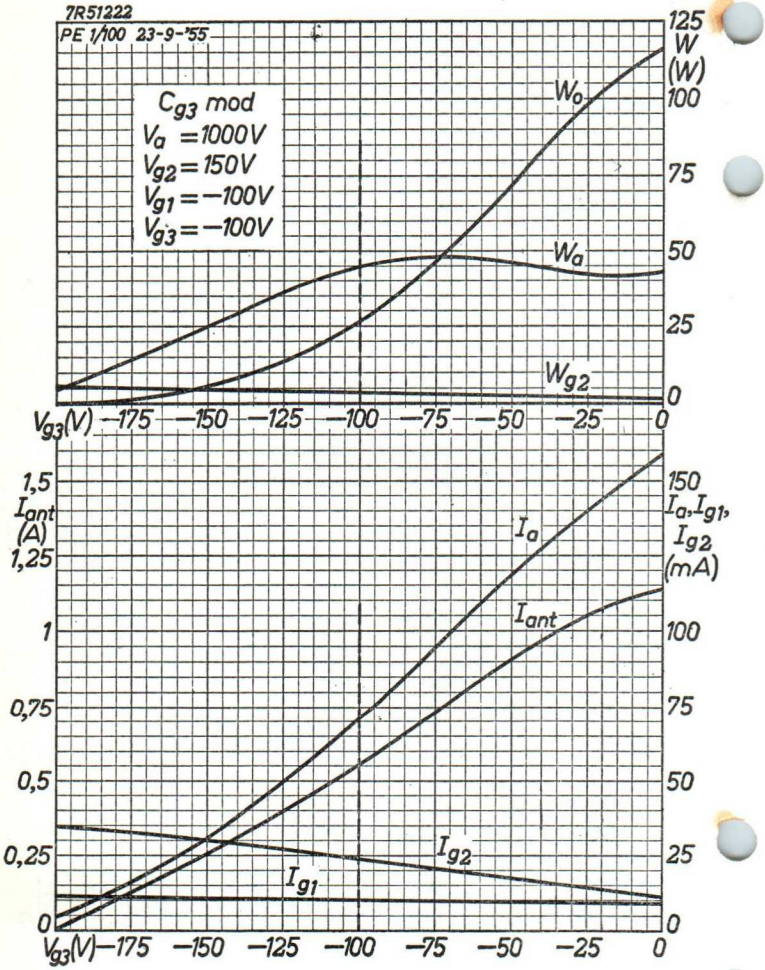
# PHILIPS

**PE 1/100**

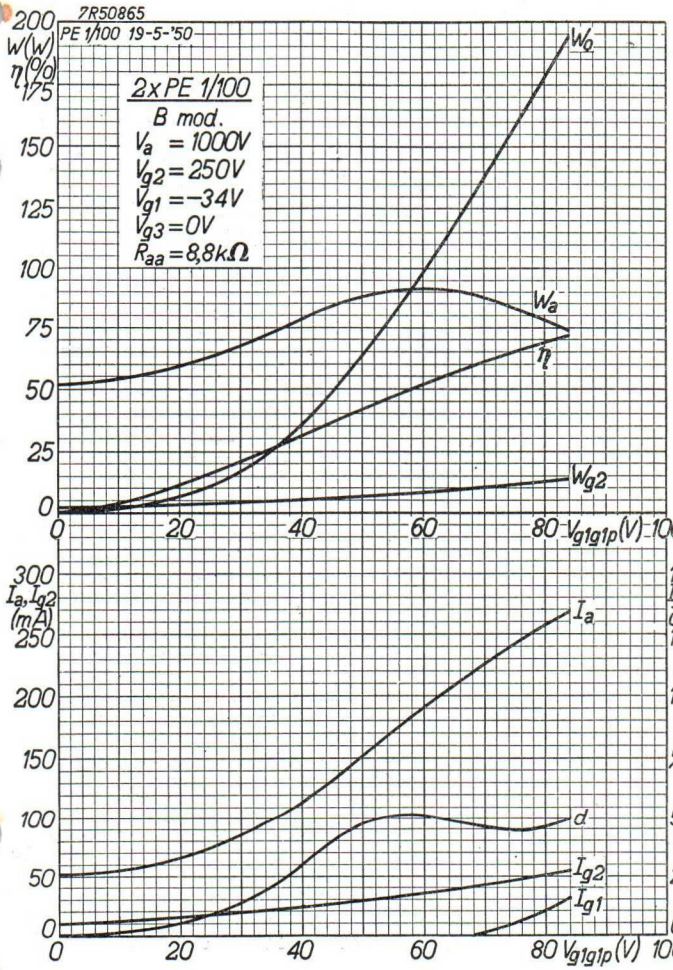


PE 1/100

# PHILIPS

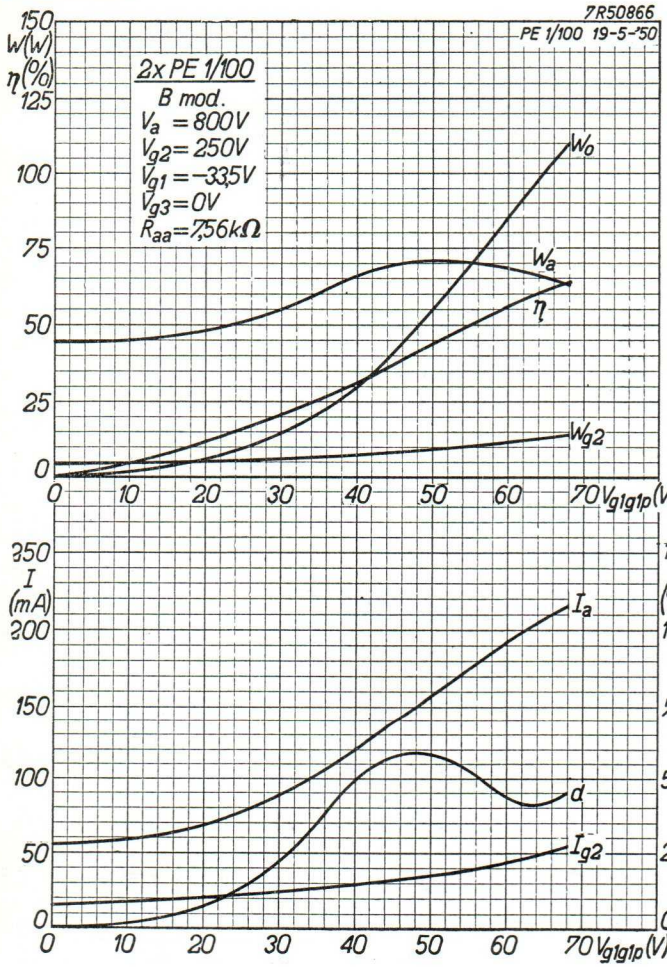



H

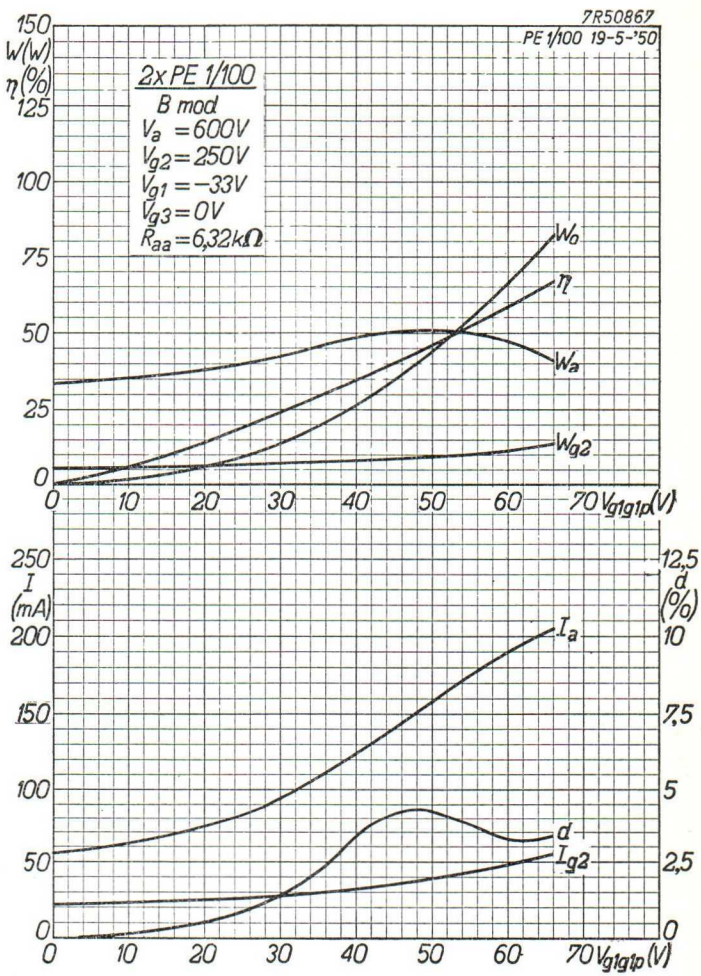

7R50865
PE 1/100 19-5-'50
2x PE 1/100
B mod.
$V_a$ = 1000V
$V_{g2}$ = 250V
$V_{g1}$ = −34V
$V_{g3}$ = 0V
$R_{aa}$ = 8,8kΩ
$W_o$
$W_a$
$\eta$
$W_{g2}$
W(W)
η(%)
$V_{g1g1p}$(V)
$I_a$, $I_{g2}$ (mA)
$I_{g1}$(mA)
d(%)
$I_a$
d
$I_{g2}$
$I_{g1}$

**PE 1/100**

# PHILIPS




J


7R50867
PE 1/100 19-5-'50
2x PE 1/100
B mod
$V_a$ = 600V
$V_{g2}$ = 250V
$V_{g1}$ = −33V
$V_{g3}$ = 0V
$R_{aa}$ = 6,32kΩ
W(w)
η(%)
$W_o$
η
$W_a$
$W_{g2}$
$V_{g1g1p}$(V)
I (mA)
d (%)
$I_a$
d
$I_{g2}$

1.1.1956

K

BEAM POWER TETRODE for use as A.F. or R.F. amplifier or oscillator
TUBE AMPLIFICATEUR A FAISCEAUX pour utilisation en amplificateur B.F. ou H.F. ou oscillateur
BÜNDELRÖHRE zur Verwendung als NF- oder HF-Verstärker oder Oszillator

Cathode: thoriated tungsten
Cathode: tungstène thorié
Katode : thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 10 V
$I_f$ = 5 A

Capacitances
Capacités
Kapazitäten

$C_{g1}$ = 16,3 pF
$C_a$ = 14,0 pF
$C_{ag1}$ < 0,25 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 8,5
$S(I_a = 50\ mA)$ = 3,75 mA/V

| λ | Freq. | C telegr. | | | B teleph | | | $C_{ag2}$ mod | | |
|---|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ | $W_o$ (W) | | $V_a$ | $W_o$ (W) | | $V_a$ | $W_o$ (W) | |
| | | (V) | CCS | ICAS | (V) | CCS | ICAS | (V) | CCS | ICAS |
| 10 | 30 | 2000 | 275 | | 2000 | 50 | | 1600 | 180 | |
| | | 1500 | 210 | | 1500 | 50 | | 1250 | 140 | |
| | | 1250 | 170 | | | | | | | |
| | | 2250 | | 375 | 2250 | | 70 | 2000 | | 300 |

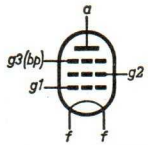
| λ | Freq. | $C_{g1}$ mod | | | AB mod[1]) | | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ | $W_o$ (W) | | $V_a$ | $W_o$ (W) | |
| | | (V) | CCS | ICAS | (V) | CCS | ICAS |
| 10 | 30 | 2000 | 50 | | 2250 | 380 | |
| | | 1500 | 40 | | 2000 | 335 | |
| | | 2250 | | 75 | 1500 | 260 | |
| | | | | | 2500 | | 490 |

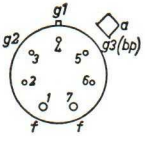
[1]) Without grid current; two tubes
Sans courant de grille; deux tubes
Ohne Gitterstrom; zwei Röhren

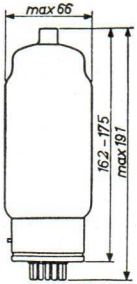
# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm

Cap; capot; Haube 40619




Base, culot, Sockel: Giant 7-pin

Mounting position: Vertical, base up or down
Horizontal, pins 2 and 6 in 1 vertical plane
Montage: Vertical, culot en haut ou en bas
Horizontal, broche 2 et 6 dans un plan vertical
Einbau: Senkrecht, Sockel oben oder unten
Waagerecht, Stifte 2 und 6 in einer senkrechten Fläche

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 230 g | Poids brut | 600 g |
| Nettogewicht | | Bruttogewicht | |

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[2]) from pages 5 and 6; des pages 5 et 6; von Seiten 5 und 6

Obtained preferably from a separate source modulated with the plate supply or from the modulated plate supply through a series resistor of

27 kΩ at $V_a$ = 1250 V
43 kΩ at $V_a$ = 1600 V
41 kΩ at $V_a$ = 2000 V

Obtenu de préférence d'une source séparée modulée avec l'alimentation anodique, ou de l'alimentation anodique modulée à travers une résistance série de

27 kΩ à $V_a$ = 1250 V
43 kΩ à $V_a$ = 1600 V
41 kΩ à $V_a$ = 2000 V

Vorzugsweise erhalten von einer separaten Spannungsquelle, moduliert mit der Anodenspeisung oder von der modulierten Anodenspeisung mittels eines Serienwiderstandes von

27 kΩ bei $V_a$ = 1250 V
43 kΩ bei $V_a$ = 1600 V
41 kΩ bei $V_a$ = 2000 V

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

C.C.S.

Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| f _ _ = max. _ 30 Mc/s | | f _ _ = max. _ 60 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 2000 V | $V_a$ | = max. 1500 V |
| $W_{ia}$ | = max. 360 W | $W_{ia}$ | = max. 270 W |
| $W_a$ | = max. 100 W | | |
| $I_a$ | = max. 180 mA | | |
| $V_{g2}$ | = max. 400 V | f _ _ = max. _ 120 Mc/s | |
| $W_{g2}$ | = max. 22 W | $V_a$ | = max. 1000 V |
| $-V_{g1}$ | = max. 300 V | $W_{ia}$ | = max. 180 W |
| $I_{g1}$ | = max. 25 mA | | |
| $R_{g1}$ | = max. 30 kΩ | | |

C.C.S.

Operating conditions, continuous service
Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 2000 | 1500 | 1250 V |
| $V_{g1}$ | = | -120 | -90 | -75 V[1]) |
| $V_{g2}$ | = | 400 | 300 | 300 V |
| $V_{g3}$ | = | 0 | 0 | 0 V |
| $I_a$ | = | 180 | 180 | 180 mA |
| $I_{g1}$ | = | 10 | 12 | 12 mA |
| $I_{g2}$ | = | 45 | 30 | 35 mA |
| $V_{g1p}$ | = | 205 | 175 | 160 V |
| $W_{ig1}$ | = | 1,9 | 1,9 | 1,7 W |
| $W_{g2}$ | = | 18 | 9,0 | 10,5 W |
| $W_{ia}$ | = | 360 | 270 | 225 W |
| $W_a$ | = | 85 | 60 | 55 W |
| $W_o$ | = | 275 | 210 | 170 W |
| $\eta$ | = | 76,5 | 78 | 75,5 % |

[1])For A.C. filament supply
Pour chauffage du filament par courant alternatif
Für Wechselstromspeisung des Heizfadens

# PHILIPS

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

I.C.A.S.

Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| f = max. 30 Mc/s | | f = max. 60 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 2250 V | $V_a$ | = max. 1700 V |
| $W_{ia}$ | = max. 500 W | $W_{ia}$ | = max. 375 W |
| $W_a$ | = max. 125 W | | |
| $I_a$ | = max. 225 mA | | |
| $V_{g2}$ | = max. 400 V | f = max. 120 Mc/s | |
| $W_{g2}$ | = max. 22 W | $V_a$ | = max. 1125 V |
| $-V_{g1}$ | = max. 300 V | $W_{ia}$ | = max. 250 W |
| $I_{g1}$ | = max. 30 mA | | |
| $R_{g1}$ | = max. 30 kΩ | | |

I.C.A.S.

Operating conditions, intermittent service
Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| $V_a$ | = | 2250 V |
| $V_{g1}$ | = | -155 V[1]) |
| $V_{g2}$ | = | 400 V |
| $V_{g3}$ | = | 0 V |
| $I_a$ | = | 220 mA |
| $I_{g1}$ | = | 15 mA |
| $I_{g2}$ | = | 40 mA |
| $V_{g1p}$ | = | 275 V |
| $W_{ig1}$ | = | 4 W |
| $W_{g2}$ | = | 16 W |
| $W_{ia}$ | = | 495 W |
| $W_a$ | = | 120 W |
| $W_o$ | = | 375 W |
| $\eta$ | = | 76 % |

[1])For A.C. filament supply
Pour chauffage du filament par courant alternatif
Für Wechselstromspeisung des Heizfadens

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF-Klasse C Anoden- und Schirmgittermodulation

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| f | = max. | 30 Mc/s |
|---|---|---|
| $V_a$ | = max. | 1600 V |
| $W_{ia}$ | = max. | 240 W |
| $W_a$ | = max. | 67 W |
| $I_a$ | = max. | 150 mA |
| $V_{g2}$ | = max. | 400 V |
| $W_{g2}$ | = max. | 15 W |
| $-V_{g1}$ | = max. | 300 V |
| $I_{g1}$ | = max. | 25 mA |
| $R_{g1}$ | = max. | 30 kΩ |

| f | = max. | 60 Mc/s |
|---|---|---|
| $V_a$ | = max. | 1200 V |
| $W_{ia}$ | = max. | 180 W |

| f | = max. | 120 Mc/s |
|---|---|---|
| $V_a$ | = max. | 800 V |
| $W_{ia}$ | = max. | 120 W |

Operating characteristics, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = | 1600 | 1250 V |
| $V_{g1}$ | = | -160 | -160 V[1] |
| $V_{g2}$ | = | 300 | 300 V[2] |
| $V_{g3}$ | = | 0 | 0 V |
| $I_a$ | = | 150 | 150 mA |
| $I_{g1}$ | = | 12 | 13 mA |
| $I_{g2}$ | = | 30 | 35 mA |
| $V_{g1_p}$ | = | 250 | 250 V |
| $W_{ig1}$ | = | 2,7 | 2,9 W |
| $W_{g2}$ | = | 9 | 10,5 W |
| $W_{ia}$ | = | 240 | 187,5 W |
| $W_a$ | = | 60 | 47,5 W |
| $W_o$ | = | 180 | 140 W |
| $\eta$ | = | 75 | 74,5 % |
| m | = | 100 | 100 % |
| $W_{mod}$ | = | 120 | 94 W |

[1] See page 4; voir page 4; siehe Seite 4
[2] See page 2; voir page 2; siehe Seite 2

# PHILIPS

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF-Klasse C Anoden- und Schirmgittermodulation

I.C.A.S. Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| f | = max. | 30 Mc/s | |
| $V_a$ | = max. | 2000 V | |
| $W_{ia}$ | = max. | 400 W | |
| $W_a$ | = max. | 100 W | |
| $I_a$ | = max. | 200 mA | |
| $V_{g2}$ | = max. | 400 V | |
| $W_{g2}$ | = max. | 20 W | |
| $-V_{g1}$ | = max. | 300 V | |
| $I_{g1}$ | = max. | 30 mA | |
| $R_{g1}$ | = max. | 30 kΩ | |

| | | |
|---|---|---|
| f | = max. | 60 Mc/s |
| $V_a$ | = max. | 1500 V |
| $W_{ia}$ | = max. | 300 W |

| | | |
|---|---|---|
| f | = max. | 120 Mc/s |
| $V_a$ | = max. | 1000 V |
| $W_{ia}$ | = max. | 200 W |

I.C.A.S. Operating characteristics, intermittent service
Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| $V_a$ | = | 2000 V |
| $V_{g1}$ | = | -175 V[1]) |
| $V_{g2}$ | = | 350 V[2]) |
| $V_{g3}$ | = | 0 V |
| $I_a$ | = | 200 mA |
| $I_{g1}$ | = | 16 mA |
| $I_{g2}$ | = | 40 mA |
| $V_{g1_p}$ | = | 300 V |
| $W_{ig1}$ | = | 4,3 W |
| $W_{g2}$ | = | 14 W |
| $W_{ia}$ | = | 400 W |
| $W_a$ | = | 100 W |
| $W_o$ | = | 300 W |
| $\eta$ | = | 75 % |
| m | = | 100 % |
| $W_{mod}$ | = | 200 W |

[1]) For A.C. filament supply
Pour chauffage du filament par courant alternatif
Für Wechselstromspeisung des Heizfadens

[2]) See page 2; voir page 2; siehe Seite 2

H.F. class C grid modulation
H.F. classe C modulation de grille
HF-Klasse C Gittermodulation

C.C.S.
Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| f = max. 60 Mc/s | | f = max. 30 Mc/s | |
| $V_a$ | = max. 1760 V | $V_a$ | = max. 2000 V |
| $W_{ia}$ | = max. 132 W | $W_{ia}$ | = max. 150 W |
| f = max. 120 Mc/s | | $W_a$ | = max. 100 W |
| $V_a$ | = max. 1520 V | $I_a$ | = max. 100 mA |
| $W_{ia}$ | = max. 114 W | $V_{g2}$ | = max. 400 V |
| | | $W_{g2}$ | = max. 15 W |
| | | $-V_{g1}$ | = max. 200 V |
| | | $R_{g1}$ | = max. 30 kΩ |

C.C.S.
Operating characteristics, continuous service
Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = | 2000 | 1500 V |
| $V_{g1}$ | = | -120 | -140 V [3] |
| $V_{g2}$ | = | 400 | 400 V |
| $V_{g3}$ | = | 0 | 0 V |
| $I_a$ | = | 75 | 70 mA |
| $I_{g1}$ | = | | [4] |
| $I_{g2}$ | = | 3 | 3 mA |
| $V_{g1p}$ (H.F.) | = | 120 | 145 V |
| $V_{g1p}$ (A.F.,B.F.,N.F.) | = | 60 | 60 V |
| $W_{ig1}$ | = | | [5] |
| $W_{g2}$ | = | 1,2 | 1,2 W |
| $W_{ia}$ | = | 150 | 105 W |
| $W_a$ | = | 100 | 65 W |
| $W_o$ | = | 50 | 40 W |
| $\eta$ | = | 33 | 38 % |

[3] Fixed supply or cathode resistor bias, unbypassed for A.F., is recommended
Il est recommandé d'utiliser polarisation fixe ou polarisation par une résistance cathodique, ne pas shuntée pour B.F.
Feste Vorspannung oder Vorspannung mittels eines für NF nicht überbrückten Katodenwiderstandes wird empfohlen

[4] Usually negligible
Ordinairement à négliger
Gewöhnlich zu vernachlässigen

[5] See page 8; voir page 8; siehe Seite 8

# PHILIPS

H.F. class C grid modulation
H.F. classe C modulation de grille
HF-Klasse C Gittermodulation

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| f = max. 60 Mc/s | | f = max. 30 Mc/s | |
|---|---|---|---|
| $V_a$ | max. 1980 V | $V_a$ | max. 2250 V |
| $W_{ia}$ | max. 176 W | $W_{ia}$ | max. 200 W |
| | | $W_a$ | max. 125 W |
| f = max. 120 Mc/s | | $I_a$ | max. 125 mA |
| $V_a$ | max. 1710 V | $V_{g2}$ | max. 400 V |
| $W_{ia}$ | max. 152 W | $W_{g2}$ | max. 20 W |
| | | $-V_{g1}$ | max. 200 V |
| | | $R_{g1}$ | max. 30 kΩ |

Operating characteristics, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| $V_a$ | = | 2250 V |
| $V_{g1}$ | = | -110 V [3] |
| $V_{g2}$ | = | 400 V |
| $V_{g3}$ | = | 0 V |
| $I_a$ | = | 85 mA |
| $I_{g1}$ | = | [4] |
| $I_{g2}$ | = | 2,5 mA |
| $V_{g1p}$ (H.F.) | = | 135 V |
| $V_{g1p}$ (A.F.,B.F.,N.F.) | = | 55 V |
| $W_{ig1}$ | = | [5] |
| $W_{g2}$ | = | 1,0 W |
| $W_{ia}$ | = | 191 W |
| $W_a$ | = | 116 W |
| $W_o$ | = | 75 W |
| $\eta$ | = | 39 % |

[3][4] See page 7; voir page 7; siehe Seite 7

[5] H.F. driving power is never more than 2 W
A.F. driving power is usually not more than 1 W
La puissance de commande H.F. n'est jamais plus de 2 W
Généralement la puissance de commande B.F. n'est plus de 1 W
Die H.F. Steuerleistung ist nie mehr als 2 W
Die NF-Steuerleistung ist gewöhnlich nicht mehr als 1 W

H.F. class B telephony
H.F. classe B téléphonie
HF-Klasse B Telephonie

C.C.S. Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| f = max. 30 Mc/s | | f = max. 60 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 2000 V | $V_a$ | = max. 1760 V |
| $W_{ia}$ | = max. 150 W | $W_{ia}$ | = max. 132 W |
| $W_a$ | = max. 100 W | | |
| $I_a$ | = max. 100 mA | f = max. 120 Mc/s | |
| $V_{g2}$ | = max. 400 V | $V_a$ | = max. 1520 V |
| $W_{g2}$ | = max. 15 W | $W_{ia}$ | = max. 114 W |

C.C.S. Operating characteristics, continuous service
Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = | 2000 | 1500 V |
| $V_{g1}$ | = | -75 | -60 V[1]) |
| $V_{g2}$ | = | 400 | 400 V |
| $V_{g3}$ | = | 0 | 0 V |
| $I_a$ | = | 75 | 100 mA |
| $I_{g2}$ | = | 3 | 4 mA |
| $V_{g1p}$ | = | 80 | 70 V |
| $W_{g2}$ | = | 1,2 | 1,6 W |
| $W_{ia}$ | = | 150 | 150 W |
| $W_a$ | = | 100 | 100 W |
| $W_o$ | = | 50 | 50 W |
| $\eta$ | = | 33 | 33 % |
| m | = | 100 | 100 % |
| $W_{ig1}$ | = | ≤2 | ≤2 W |

[1])For A.C. filament supply
Pour chauffage du filament par courant alternatif
Für Wechselstromspeisung des Heizfadens

# PHILIPS

H.F. class B telephony
H.F. classe B téléphonie
HF-Klasse B Telephonie

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| f = max. 30 Mc/s | | f = max. 60 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 2250 V | $V_a$ | = max. 1980 V |
| $W_{ia}$ | = max. 200 W | $W_{ia}$ | = max. 176 W |
| $W_a$ | = max. 125 W | | |
| $I_a$ | = max. 125 mA | f = max. 120 Mc/s | |
| $V_{g2}$ | = max. 400 V | $V_a$ | = max. 1710 V |
| $W_{g2}$ | = max. 20 W | $W_{ia}$ | = max. 152 W |

Operating characteristics, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| $V_a$ | = | 2250 V |
| $V_{g1}$ | = | -60 V[1]) |
| $V_{g2}$ | = | 400 V |
| $V_{g3}$ | = | 0 V |
| $I_a$ | = | 85 mA |
| $I_{g2}$ | = | 3 mA |
| $V_{g1p}$ | = | 70 V |
| $W_{g2}$ | = | 1,2 W |
| $W_{ia}$ | = | 191 W |
| $W_a$ | = | 121 W |
| $W_o$ | = | 70 W |
| $\eta$ | = | 36,5 % |
| m | = | 100 % |
| $W_{ig1}$ | ≤ | 2 W |

[1])For A.C. filament supply
Pour chauffage du filament par courant alternatif
Für Wechselstromspeisung des Heizfadens

A.F. class AB amplifier and modulator
Amplificatrice et modulatrice B.F. classe AB
NF-Verstärker und Modulator Klasse AB

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. 2250 V | $W_a$ | = max. 100 W |
| $I_a$ | = max. 180 mA | $V_{g2}$ | = max. 1100 V |
| $W_{ia}$ | = max. 360 W | $W_{g2}$ | = max. 22 W |
| | | $R_{g1}$ | = max. 30 kΩ [6]) |

Operating characteristics, continuous service; two tubes
C.C.S. Caractéristiques d'utilisation, service continu; deux tubes
Betriebsdaten, Dauerbetrieb; zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 2250 | | 2000 | | V |
| $V_{g1}$ | = | -95 | | -90 | | V [1]) |
| $V_{g2}$ | = | 750 | | 750 | | V |
| $V_{g3}$ | = | 0 | | 0 | | V |
| $R_{aa}$ | = | 20 | | 16 | | kΩ |
| $V_{g1g1p}$ | = | 0 | 170 | 0 | 160 | V |
| $I_a$ | = | 2x25 | 2x127,5 | 2x25 | 2x132,5 | mA |
| $I_{g2}$ | = | 2x1,0 | 2x26,5 | 2x1,0 | 2x21,5 | mA |
| $W_{ig1}$ | = | 0 | 0 | 0 | 0 | W |
| $W_{g2}$ | = | 2x0,75 | 2x19,9 | 2x0,75 | 2x16,1 | W |
| $W_{ia}$ | = | 2x56 | 2x287 | 2x50 | 2x265 | W |
| $W_a$ | = | 2x56 | 2x97 | 2x50 | 2x97,5 | W |
| $W_o$ | = | 0 | 380 | 0 | 335 | W |
| $\eta$ | = | - | 66 | - | 63 | % |

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 1500 | | V |
| $V_{g1}$ | = | -85 | | V [1]) |
| $V_{g2}$ | = | 750 | | V |
| $V_{g3}$ | = | 0 | | V |
| $R_{aa}$ | = | 9,3 | | kΩ |
| $V_{g1g1p}$ | = | 0 | 160 | V |
| $I_a$ | = | 2x25 | 2x152,5 | mA |
| $I_{g2}$ | = | 2x1,0 | 2x22,5 | mA |
| $W_{ig1}$ | = | 0 | 0 | W |
| $W_{g2}$ | = | 2x0,75 | 2x16,9 | W |
| $W_{ia}$ | = | 2x37,5 | 2x229 | W |
| $W_a$ | = | 2x37,5 | 2x99 | W |
| $W_o$ | = | 0 | 260 | W |
| $\eta$ | = | - | 57 | % |

[1])[6])See page 12; voir page 12; siehe Seite 12

# PHILIPS

A.F. class AB amplifier and modulator
Amplificatrice et modulatrice B.F. classe AB
NF-Verstärker und Modulator Klasse AB

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

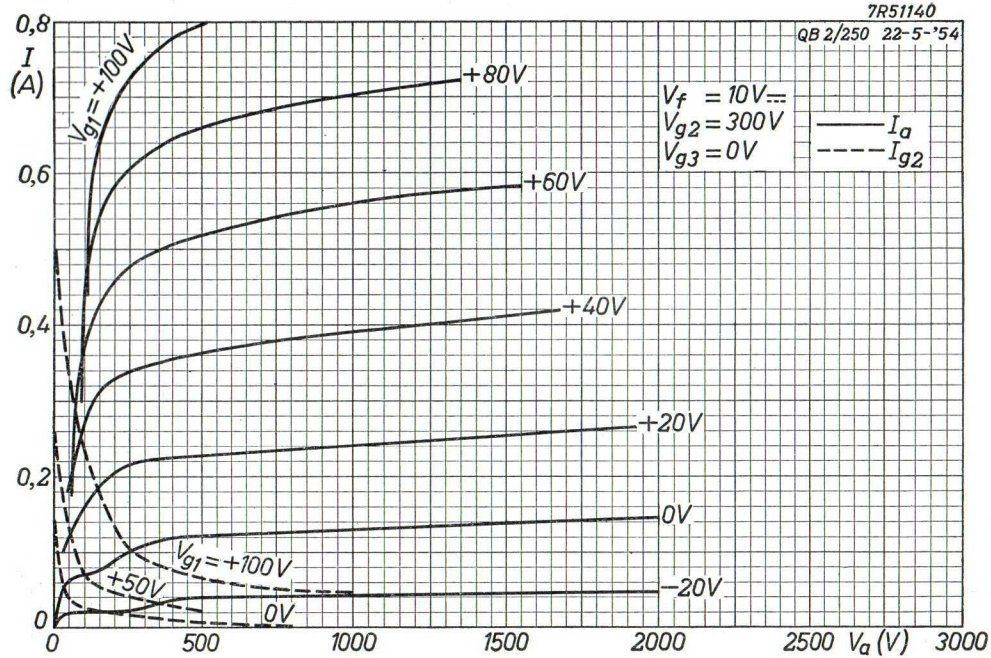
| | | | |
|---|---|---|---|
| $V_a$ | = max. | 2500 | V |
| $I_a$ | = max. | 225 | mA |
| $W_{ia}$ | = max. | 450 | W |
| $W_a$ | = max. | 125 | W |
| $V_{g2}$ | = max. | 1100 | V |
| $W_{g2}$ | = max. | 22 | W |
| $R_{g1}$ | = max. | 30 | kΩ [6] |

Operating characteristics, intermittent service; two tubes
I.C.A.S. Caractéristiques d'utilisation, service intermittent deux tubes
Betriebsdaten, aussetzender Betrieb; zwei Röhren

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 2500 | | V |
| $V_{g1}$ | = | -95 | | V [1] |
| $V_{g2}$ | = | 750 | | V |
| $V_{g3}$ | = | 0 | | V |
| $R_{aa}$ | = | 19 | | kΩ |
| $V_{g1g1p}$ | = | 0 | 180 | V |
| $I_a$ | = | 2x25 | 2x145 | mA |
| $I_{g2}$ | = | 2x1,0 | 2x27 | mA |
| $W_{ig1}$ | = | 0 | 0 | W |
| $W_{g2}$ | = | 2x0,75 | 2x20,3 | W |
| $W_{ia}$ | = | 2x62,5 | 2x362,5 | W |
| $W_a$ | = | 2x62,5 | 2x117,5 | W |
| $W_o$ | = | 0 | 490 | W |
| $\eta$ | = | | 67,5 | % |

[1] For A.C. filament supply
Pour chauffage du filament par courant alternatif
Für Wechselstromspeisung des Heizfadens

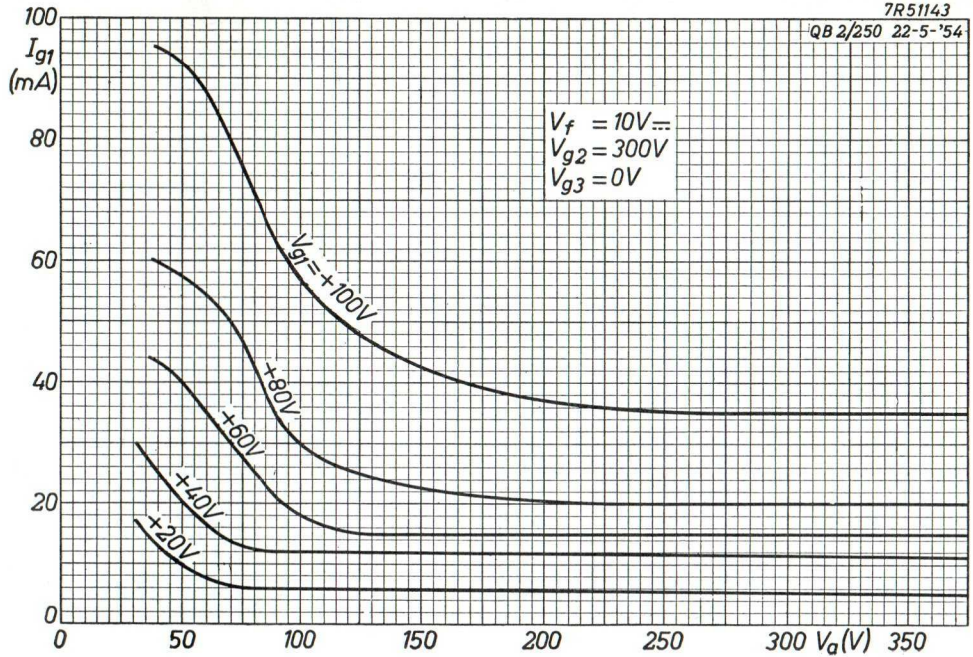
[6] With fixed grid bias. Cathode bias is not recommended
Avec polarisation de grille fixe. Polarisation de cathode n'est pas recommandée
Mit fester Gittervorspannung. Vorspannung mittels eines Katodenwiderstandes wird nicht empfohlen




PHILIPS

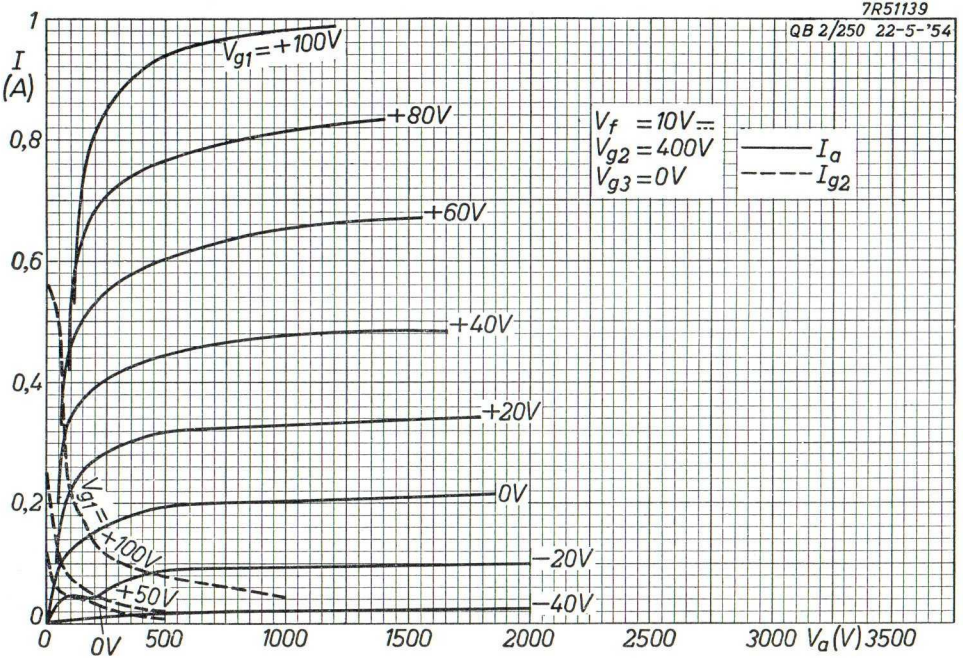
QB 2/250

A


7R51143
QB 2/250 22-5-'54
$I_{g1}$ (mA)
100
80
60
40
20
0
$V_f$ = 10V⎓
$V_{g2}$ = 300V
$V_{g3}$ = 0V
$V_{g1}$ = +100V
+80V
+60V
+40V
+20V
0
50
100
150
200
250
300 $V_a$(V)
350



PHILIPS

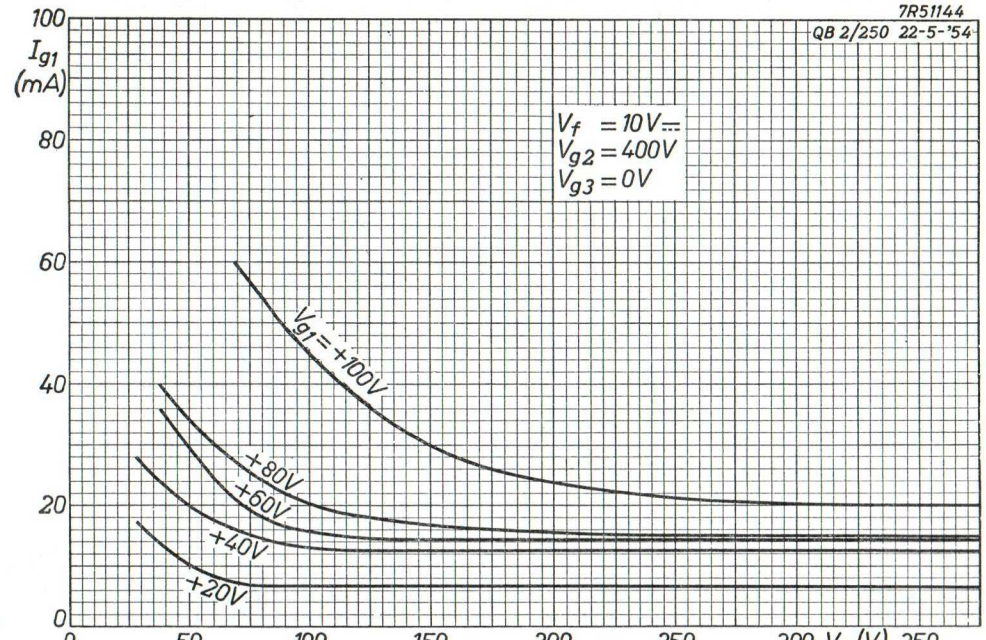



6.6.1954

C

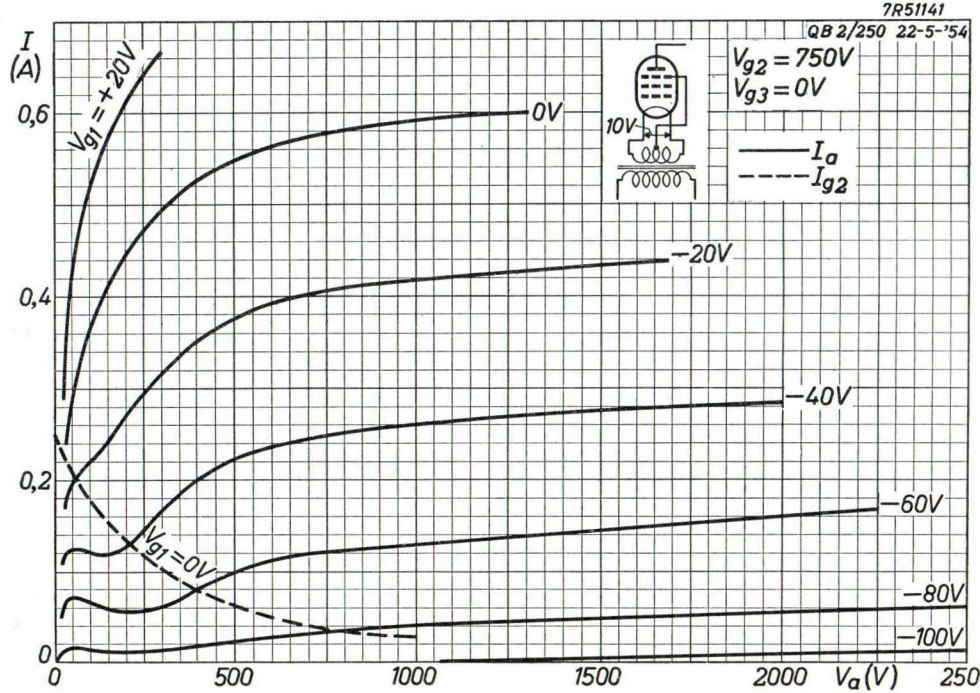
PHILIPS

QB 2/250


7R51144
QB 2/250 22-5-'54
$I_{g1}$ (mA)
100
80
60
40
20
0
$V_f$ = 10 V~
$V_{g2}$ = 400V
$V_{g3}$ = 0V
$V_{g1}$ = +100V
+80V
+60V
+40V
+20V
0
50
100
150
200
250
300
$V_a$ (V)
350



D

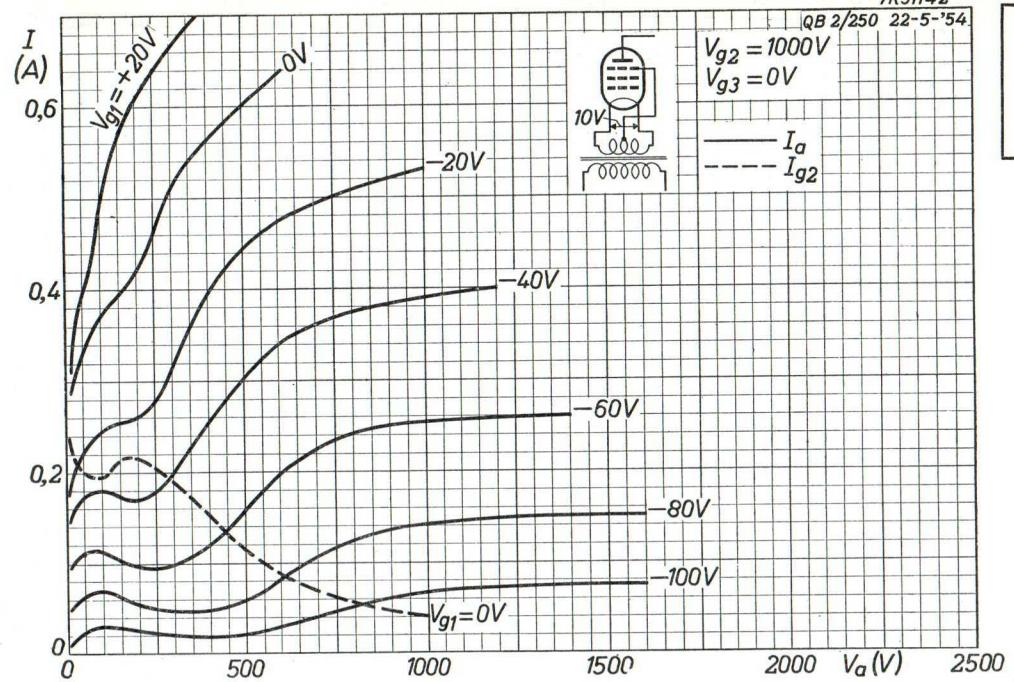



6.6.1954

E

PHILIPS

QB 2/250




QB 2/250

PHILIPS

TETRODE for use as R.F. or A.F. amplifier
TÉTRODE pour utilisation comme amplificatrice H.F. ou B.F.
TETRODE zur Verwendung als HF- oder NF-Verstärker

Cooling : radiation/low velocity air flow
Refroidissement: radiation/léger courant d'air
Kühlung : Strahlung/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 6 V
$I_f$ = 3,5 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 2,1 pF
$C_{g1}$ = 8 pF
$C_{ag1}$ = 0,08 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 500 V
$V_{g2}$ = 250 V
$I_a$ = 125 mA
S = 4 mA/V
$\mu_{g_2g_1}$ = 5

| Freq. | C.telegr. | | Cag2 mod. | | SSB | |
|---|---|---|---|---|---|---|
| (Mc/s) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_\ell$ [1] (W) |
| 50 | 3000 | 280 | 2500 | 230 | | |
| 50 | 1500 | 165 | 1500 | 140 | | |
| 50 | 600 | 45 | 600 | 45 | | |
| 220 | 1500 | 110 | 1500 | 75 | | |
| 30 | | | | | 2500 | 87 |
| 30 | | | | | 2000 | 77 |
| 30 | | | | | 1500 | 58 |

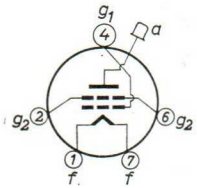
[1]) Useful power in the load
Puissance utile dans la charge
Nutzbare Leistung in der Belastung

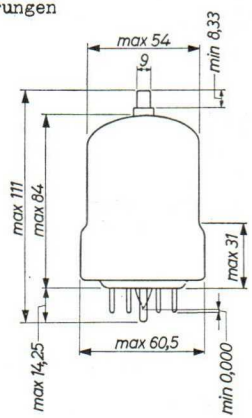
# PHILIPS

Temperatures
Températures
Temperaturen

Temperature of bulb and seals
Température de l'ampoule et des scellements = max. 225°C
Temperatur des Kolbens und der Durchführungen

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: SEPTAR

Socket
Support 40202
Fassung

Anode connector
Connecteur de l'anode 40624
Anodenanschluss

Mounting position: vertical with base up or down
Montage: vertical, avec le culot en haut ou en bas
Einbau: senkrecht mit dem Sockel oben oder unten

Net weight
Poids net 85 g
Nettogewicht

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 150 Mc/s | | f = max. 250 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 3000 V | $V_a$ | = max. 1500 V |
| $I_a$ | = max. 150 mA | | |
| $W_{ia}$ | = max. 450 W | | |
| $W_a$ | = max. 65 W | | |
| $V_{g2}$ | = max. 400 V | | |
| $W_{g2}$ | = max. 10 W | | |
| $-V_{g1}$ | = max. 500 V | | |
| $I_{g1}$ | = max. 30 mA | | |
| $W_{g1}$ | = max. 5 W | | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| f | = | 50 | 50 | 50 | 220 | Mc/s |
| $V_a$ | = | 3000 | 1500 | 600 | 1500 | V |
| $V_{g2}$ | = | 250 | 250 | 250 | 250 | V |
| $V_{g1}$ | = | -100 | -85 | -75 | -85 | V |
| $I_a$ | = | 115 | 150 | 150 | 117 | mA |
| $I_{g2}$ | = | 8 | 24 | 40 | 24 | mA |
| $I_{g1}$ | = | 5 | 12 | 15 | 12 | mA |
| $V_{g1_p}$ | = | 180 | 185 | 170 | 190 | V |
| $W_{ig1}$ | = | 0,8 | 2,0 | 2,3 | 8 | W |
| $W_{g2}$ | = | 2,0 | 6 | 10 | 6 | W |
| $W_{ia}$ | = | 345 | 225 | 90 | 175 | W |
| $W_a$ | = | 65 | 60 | 45 | 65 | W |
| $W_o$ | = | 280 | 165 | 45 | 110 | W |
| $\eta$ | = | 81 | 73 | 50 | 63 | % |

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF-Klasse C Anoden- und Schirmgittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 150 Mc/s | | f = max. 250 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 2500 V | Va | = max. 1500 V |
| $I_a$ | = max. 120 mA | | |
| $W_{ia}$ | = max. 300 W | | |
| Wa | = max. 45 W | | |
| $V_{g2}$ | = max. 400 V | | |
| $W_{g2}$ | = max. 10 W | | |
| $-V_{g1}$ | = max. 500 V | | |
| $I_{g_1}$ | = max. 25 mA | | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f | = 50 | 50 | 50 | 220 | Mc/s |
|---|---|---|---|---|---|
| $V_a$ | = 2500 | 1500 | 600 | 1500 | V |
| $V_{g_2}$ | = 250 | 250 | 250 | 250 | V |
| $V_{g_1}$ | = -135 | -125 | -120 | -85 | V |
| $I_a$ | = 110 | 120 | 120 | 80 | mA |
| $I_{g2}$ | = 10 | 15 | 30 | 27 | mA |
| $I_{g_1}$ | = 6 | 8 | 12 | 12 | mA |
| $V_{g1p}$ | = 215 | 220 | 215 | 185 | V |
| $Wi_{g_1}$ | = 1,2 | 1,6 | 2,3 | 8 | W |
| $W_{g_2}$ | = 2,5 | 3,8 | 7,5 | 6,25 | W |
| $Wi_a$ | = 275 | 180 | 72 | 120 | W |
| Wa | = 45 | 40 | 27 | 45 | W |
| $W_o$ | = 230 | 140 | 45 | 75 | W |
| $\eta$ | = 84 | 78 | 62 | 63 | % |
| m | = 100 | 100 | 100 | 100 | % |
| $V_{g2p}$ | = 250 | 250 | 250 | 250 | V |
| $W_{mod}$ | = 137 | 90 | 36 | 60 | W |

H.F. class B amplifier, single side band
Amplificatrice H.F. classe B à une bande latérale
HF-Klasse B Einseitenbandverstärker

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = max. 3000 V | $V_{g_2}$ | = max. | 600 V |
| $I_a$ | = max. 150 mA | $W_{g_2}$ | = max. | 10 W |
| $W_{ia}$ | = max. 450 W | $R_{g_1}$ | = max. | 250 kΩ |
| $W_a$ | = max. 65 W | | | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| f | = | 30 | | 30 | | 30 | Mc/s |
| $V_a$ | = | 2500 | | 2000 | | 1500 | V |
| $V_{g_2}$ | = | 405 | | 450 | | 480 | V |
| $V_{g_1}$ [1] | = | -88 | | -100 | | -86 | V |
| $V_{g_{1p}}$ | = | 0 | 165 | 0 | 190 | 0 | 150 V |
| $I_a$ | = | 7 | 70 | 22 | 80 | 30 | 90 mA |
| $I_{g_2}$ | = | - | 2 | - | 2 | - | 3 mA |
| $I_{g_1}$ | = | - | 8 | - | 20 | - | 15 mA |
| $W_{g_2}$ | = | - | 22,5 | - | 26 | - | 13,5 W |
| $W_{ig_1}$ | = | - | 1,3 | - | 3,8 | - | 2,3 W |
| $W_{ia}$ | = | 42,5 | 175 | 44 | 160 | 45 | 135 W |
| $W_a$ | = | 42,5 | 60 | 44 | 60 | 45 | 60 W |
| $W_\ell$ [2] | = | 0 | 87 | 0 | 77 | 0 | 58 W |

[1] To be adjusted for the stated zero signal anode current
$V_{g_1}$ doit être réglé pour la valeur donnée pour le courant anodique sans signal d'entrée
$V_{g_1}$ soll so eingestellt werden dass der Anodenstrom ohne Eingangssignal den angegebenen Wert hat

[2] Useful power in the load measured in a circuit having an efficiency of about 75 %
Puissance utile dans la charge, mesurée dans un montage avec un rendement d'environ 75%
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von etwa 75%

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF-Klasse B Verstärker und Modulator

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 3000 | V |
| $I_a$ | = max. | 150 | mA |
| $W_a$ | = max. | 65 | W |
| $V_{g2}$ | = max. | 600 | V |
| $W_{g2}$ | = max. | 20 | W |
| $-V_{g1}$ | = max. | 500 | V |
| $I_{g1}$ | = max. | 20 | mA |
| $R_{g1}$ | = max. | 250 | kΩ |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes $I_{g1} = 0$
Betriebsdaten, zwei Röhren

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 1750 | | 1500 | | 1000 | | | V |
| $V_{g2}$ | = | 500 | | 500 | | 500 | | | V |
| $V_{g1}$ | = | -115 | | -110 | | -100 | | | V |
| $R_{aa\sim}$ | = | 20 | | 15 | | 9 | | | kΩ |
| $V_{g1g1p}$ | = | 0 | 180 | 0 | 170 | 0 | | 170 | V |
| $I_a$ | = | 2x20 | 2x 85 | 2x30 | 2x 90 | 2x30 | 2x | 85 | mA |
| $I_{g2}$ | = | - | 2x11,5 | - | 2x 10 | - | 2x | 15 | mA |
| $W_{g2}$ | = | - | 2x 6 | - | 2x 5 | - | 2x | 7,5 | W |
| $W_{ia}$ | = | 2x35 | 2x 150 | 2x45 | 2x 135 | 2x30 | 2x | 85 | W |
| $W_a$ | = | 2x35 | 2x62,5 | 2x45 | 2x62,5 | 2x30 | 2x | 45 | W |
| $W_o$ | = | 0 | 175 | 0 | 145 | 0 | | 80 | W |
| $\eta$ | = | - | 59 | - | 54 | - | | 47 | % |
| $d_{tot}$ | = | - | 4,5 | - | 3 | - | | 3 | % |

L.F. class B amplifier and modulator (continued)
Amplificatrice et modulatrice B.F. classe B (suite)
NF-Klasse B Verstärker und Modulator (Fortsetzung)

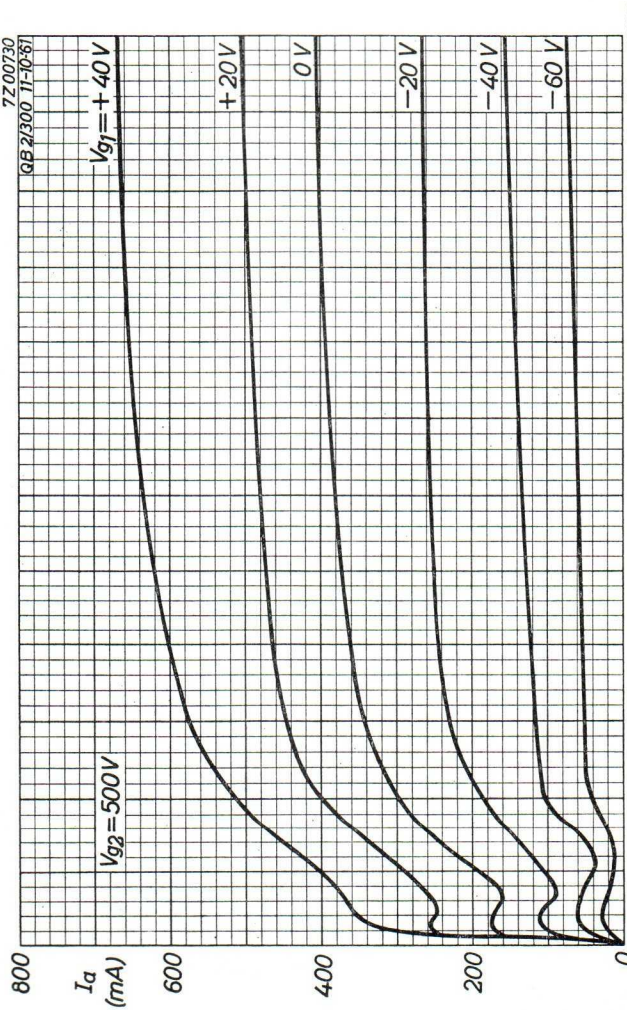
Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes $I_{g1}>0$
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 1800 | | 1500 | | V |
| $V_{g2}$ | = | 250 | | 250 | | V |
| $V_{g1}$ | = | -50 | | -45 | | V |
| $R_{aa\sim}$ | = | 20 | | 14 | | kΩ |
| $V_{g1g1p}$ | = | 0 | 180 | 0 | 200 | V |
| $I_a$ | = | 2x25 | 2x110 | 2x30 | 2x125 | mA |
| $I_{g2}$ | = | - | 2x15 | - | 2x20 | mA |
| $I_{g1}$ | = | 0 | 2x9 | 0 | 2x10 | mA |
| $W_{g2}$ | = | - | 2x4 | - | 2x5 | W |
| $W_{ig1}$ | = | 0 | 2x0,8 | 0 | 2x0,9 | W |
| $W_{ia}$ | = | 2x45 | 2x198 | 2x45 | 2x188 | W |
| $W_a$ | = | 2x45 | 2x63 | 2x45 | 2x63 | W |
| $W_o$ | = | 0 | 270 | 0 | 250 | W |
| $\eta$ | = | - | 68 | - | 67 | % |
| $d_{tot}$ | = | - | 5 | - | 6 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 1000 | | 600 | | V |
| $V_{g2}$ | = | 250 | | 250 | | V |
| $V_{g1}$ | = | -40 | | -40 | | V |
| $R_{aa\sim}$ | = | 6,8 | | 3,6 | | kΩ |
| $V_{g1g1p}$ | = | 0 | 210 | 0 | 240 | V |
| $I_a$ | = | 2x30 | 2x150 | 2x30 | 2x150 | mA |
| $I_{g2}$ | = | - | 2x30 | - | 2x40 | mA |
| $I_{g1}$ | = | 0 | 2x14 | 0 | 2x15 | mA |
| $W_{g2}$ | = | - | 2x7,5 | - | 2x10 | W |
| $W_{ig1}$ | = | 0 | 2x1,3 | 0 | 2x1,6 | W |
| $W_{ia}$ | = | 2x30 | 2x150 | 2x18 | 2x90 | W |
| $W_a$ | = | 2x30 | 2x65 | 2x18 | 2x45 | W |
| $W_o$ | = | 0 | 170 | 0 | 90 | W |
| $\eta$ | = | - | 57 | - | 50 | % |
| $d_{tot}$ | = | - | 6 | - | 10 | % |

# PHILIPS

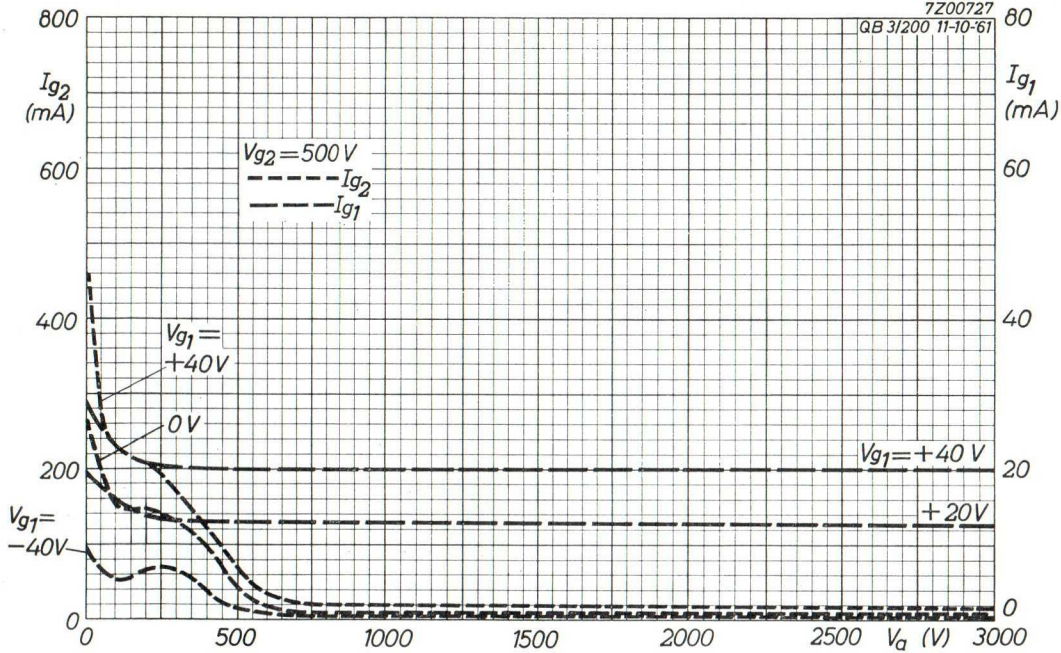
**QB 3/200**



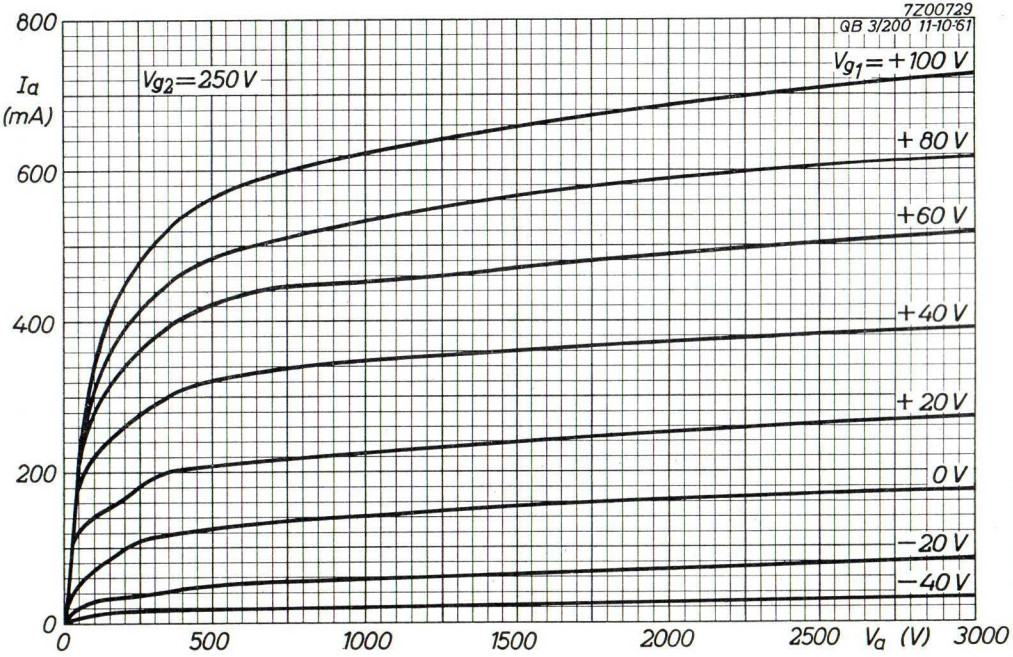

4.4.1961

A

PHILIPS


7Z00727
QB 3/200 11-10-61
800
$I_{g_2}$ (mA)
600
400
200
0
80
$I_{g_1}$ (mA)
60
40
20
0
$V_{g_2}$=500 V
$I_{g_2}$
$I_{g_1}$
$V_{g_1}$= +40V
0 V
$V_{g_1}$= −40V
$V_{g_1}$=+40 V
+20V
0
500
1000
1500
2000
2500
$V_a$ (V)
3000

B




4.4.1961

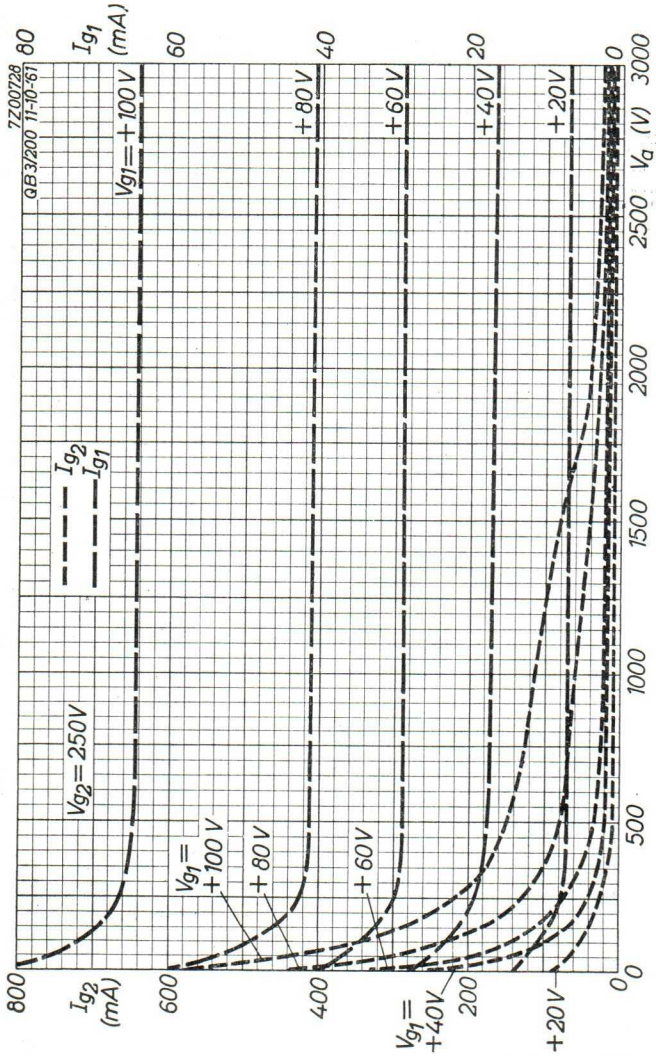
C

PHILIPS

QB3/200

QB3/200

# PHILIPS




D

TETRODE for use as H.F. or L.F. amplifier
TETRODE pour utilisation en amplificatrice H.F. ou B.F.
TETRODE zur Verwendung als HF- oder NF-Verstärker

Cooling : radiation/low velocity air flow
Refroidissement: radiation/léger courant d'air
Kühlung : Strahlung/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5 V
$I_f$ = 6,5 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 3,5 pF
$C_{g1}$ = 10,8 pF
$C_{ag1}$ = 0,05 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 6,2
S ($I_a$=40 mA) = 2,2 mA/V

| λ | Freq. | C telegr. | | B teleph. | | C ag2 mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 2,5 | 120 | 3000 | 375 | 3000 | 58 | 2500 | 300 | 2500 | 550 |
| | | 2500 | 375 | 2500 | 55 | 2000 | 225 | 2000 | 550 |
| | | 2000 | 275 | 2000 | 54 | 1500 | 157 | 1500 | 455 |
| | | 1500 | 110 | | | | | | |
| 2 | 150 | 2500 | 360 | | | | | | |
| 1,5 | 200 | 2000 | 225 | | | | | | |

[1]) Two tubes; deux tubes; zwei Röhren

# PHILIPS

## Temperatures and cooling
## Températures et refroidissement
## Temperaturen und Kühlung

Temperature of anode seal
Température de la sortie de l'anode = max.220 °C
Temperatur der Anodendurchführung

Temperature of pin seals
Température des scellements des broches= max.180 °C
Temperatur der Stiftendurchführungen

Bulb temperature
Température de l'ampoule = max.350 °C
Kolbentemperatur

In general cooling of the tube is not necessary at normal ambient temperature at frequencies below 50 Mc/s. When the tube is used at or near maximum ratings at frequencies above 50 Mc/s, it will be necessary to direct a low velocity air flow on the anode seal and the bottom of the envelope.

In order to prevent overheating of the screen-grid pins by high-frequency current it is recommended to include both screen-grid socket connections in the circuit.

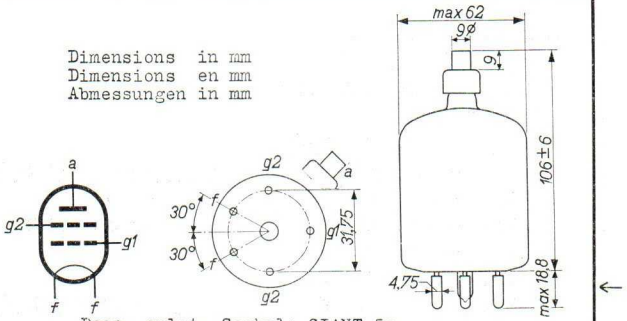
En général il ne faut pas refroidir le tube à la température normale de l'ambiance à des fréquences au-dessous de 50 Mc/s. Si le tube est utilisé à ou près des caractéristiques maximum admissibles au-dessus de 50 Mc/s, il faut diriger un léger courant d'air sur le scellement de la sortie de l'anode et sur le fond du tube.

Il est recommandé d'incorporer les deux bornes de raccordement de la grille-écran dans le circuit pour éviter le surchauffage des broches de la grille-écran par le courant haute fréquence.

Im allgemeinen braucht die Röhre bei normaler Umgebungstemperatur bei Frequenzen unterhalb 50 MHz nicht gekühlt zu werden. Wird die Röhre bei den maximalen Betriebsdaten bei Frequenzen höher als 50 MHz betrieben, so ist ein schwacher Luftstrom auf die Anodendurchführung und den Boden der Röhre notwendig.

Es empfiehlt sich, zur Vermeidung einer Überhitzung der Schirmgitterstifte vom Hochfrequenzstrom, beide Anschlussklemmen des Schirmgitters an der Schaltung zu beteiligen.

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: GIANT 5p.

Socket
Support 40211/01
Fassung

Clip
Borne de connexion 40624
Anschlussklemme

Mounting position: vertical with base up or down
Montage : vertical avec le pied en haut ou en bas
Einbau : senkrecht mit dem Sockel oben oder unten

Net weight
Poids net 120 g
Nettogewicht

Shipping weight
Poids brut 850 g
Bruttogewicht

PHILIPS

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| f ___ = max. 120 Mc/s | | f ___ = max. 170 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 3000 V | $V_a$ | = max. 2500 V |
| $I_a$ | = max. 225 mA | $W_{ia}$ | = max. 560 W |
| $W_{ia}$ | = max. 625 W | | |
| $W_a$ | = max. 125 W[1]) | | |
| $V_{g2}$ | = max. 400 V | | |
| $W_{g2}$ | = max. 20 W | f ___ = max. 200 Mc/s | |
| $-V_{g1}$ | = max. 500 V | $V_a$ | = max. 2200 V |
| $I_{g1}$ | = max. 15 mA | $W_{ia}$ | = max. 435 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = <120 | <120 | <120 | <120 | Mc/s |
| $V_a$ | = 3000 | 2500 | 2000 | 1500 | V |
| $V_{g2}$ | = 350 | 350 | 350 | 350 | V |
| $V_{g1}$ | = -150 | -150 | -100 | -150 | V |
| $I_a$ | = 167 | 200 | 200 | 110 | mA |
| $I_{g2}$ | = 30 | 40 | 50 | 56 | mA |
| $I_{g1}$ | = 6,5 | 9 | 9 | 8 | mA |
| $V_{g1_p}$ | = 300 | 330 | 260 | 225 | V |
| $W_{ig1}$ | = 2 | 3 | 2,4 | 1,7 | W |
| $W_{g2}$ | = 10,5 | 14 | 17,5 | 19,6 | W |
| $W_{ia}$ | = 500 | 500 | 400 | 165 | W |
| $W_a$ | = 125 | 125 | 125 | 55 | W |
| $W_o$ | = 375 | 375 | 275 | 110 | W |
| $\eta$ | = 75 | 75 | 69 | 67 | % |

[1]) Anode red hot, temperature = 850 °C
Anode portée au rouge, température = 850 °C
Anode rotheiss, Temperatur = 850 °C

H.F. class B telephony
H.F. classe B téléphonie
HF - Klasse B Telephonie

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 120 Mc/s | f = max. 170 Mc/s |
|---|---|
| $V_a$ = max. 3000 V | $V_a$ = max. 2500 V |
| $I_a$ = max. 135 mA | $W_{ia}$ = max. 190 W |
| $W_{ia}$ = max. 200 W | |
| $W_a$ = max. 125 W[1]) | f = max. 200 Mc/s |
| $V_{g2}$ = max. 400 V | $V_a$ = max. 2200 V |
| $W_{g2}$ = max. 14 W | $W_{ia}$ = max. 150 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f = | <120 | <120 | <120 Mc/s |
|---|---|---|---|
| $V_a$ = | 3000 | 2500 | 2000 V |
| $V_{g2}$ = | 350 | 350 | 350 V |
| $V_{g1}$ = | -50 | -50 | -50 V |
| $I_a$ = | 60 | 70 | 83 mA |
| $I_{g2}$ = | 1 | 1 | 1,5 mA |
| $V_{g1_p}$ = | 50 | 55 | 65 V |
| $W_{g2}$ = | 0,35 | 0,35 | 0,52 W |
| $W_{ia}$ = | 180 | 175 | 166 W |
| $W_a$ = | 122 | 120 | 112 W |
| $W_o$ = | 58 | 55 | 54 W |
| $\eta$ = | 32 | 31,5 | 32,5 % |
| m = | 100 | 100 | 100 % |
| $I_{g1}$ = | 4,5 | 4 | 4 mA |
| $W_{ig1}$ = | 0,45 | 0,44 | 0,52 W |

[1]) See page 4
Voir page 4
Siehe Seite 4

# PHILIPS

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF - Klasse C Anoden- und Schirmgittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. 120 | Mc/s | |
| $V_a$ | = max. 2500 | V | f = max. 170 Mc/s |
| $I_a$ | = max. 200 | mA | $V_a$ = max. 2100 V |
| $W_{ia}$ | = max. 415 | W | $W_{ia}$ = max. 375 W |
| $W_a$ | = max. 83 | W | |
| $V_{g2}$ | = max. 400 | V | |
| $W_{g2}$ | = max. 20 | W | f = max. 200 Mc/s |
| $-V_{g1}$ | = max. 500 | V | $V_a$ = max. 1800 V |
| $I_{g1}$ | = max. 15 | mA | $W_{ia}$ = max. 290 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = | < 120 | < 120 | < 120 Mc/s |
| $V_a$ | = | 2500 | 2000 | 1500 V |
| $V_{g2}$ | = | 350 | 350 | 300 V |
| $V_{g1}$ | = | -210 | -220 | -150 V |
| $I_a$ | = | 152 | 150 | 160 mA |
| $I_{g2}$ | = | 30 | 33 | 33 mA |
| $I_{g1}$ | = | 4,5 | 5 | 10 mA |
| $V_{g1_p}$ | = | 380 | 390 | 250 V |
| $W_{ig1}$ | = | 1,7 | 2 | 2,5 W |
| $W_{g2}$ | = | 10,5 | 11,5 | 10 W |
| $W_{ia}$ | = | 380 | 300 | 240 W |
| $W_a$ | = | 80 | 75 | 83 W |
| $W_o$ | = | 300 | 225 | 157 W |
| $\eta$ | = | 79 | 75 | 65 % |
| m | = | 100 | 100 | 100 % |
| $V_{g2_p}$ | = | 300 | 300 | 255 V |
| $W_{mod}$ | = | 190 | 150 | 120 W |

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F.classe B
NF - Verstärker und Modulator Klasse B
$I_{g1} = 0$

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 3000 V |
| $I_a$ | = max. | 225 mA |
| $W_a$ | = max. | 125 W [1] |
| $V_{g2}$ | = max. | 600 V |
| $W_{g2}$ | = max. | 20 W |
| $-V_{g1}$ | = max. | 500 V |
| $R_{g1}$ | = max. | 150 kΩ |

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 2500 | | 2000 | | 1500 | | V |
| $V_{g1}$ | = | -97 | | -95,5 | | -94 | | V |
| $V_{g2}$ | = | 600 | | 600 | | 600 | | V |
| $R_{aa}$ | = | 25 | | 17,6 | | 12 | | kΩ |
| $V_{g1g1_p}$ | = | 0 | 190 | 0 | 186 | 0 | 185 | V |
| Ia | = | 2x30 | 2x108 | 2x30 | 2x111 | 2x30 | 2x109 | mA |
| Ig2 | = | 2x0,1 | 2x13 | 2x0,1 | 2x12 | 2x0,15 | 2x13,5 | mA |
| Wg2 | = | 2x0,1 | 2x7,8 | 2x0,1 | 2x7,2 | 2x0,1 | 2x8,1 | W |
| Wia | = | 2x75 | 2x270 | 2x60 | 2x222 | 2x45 | 2x163 | W |
| Wa | = | 2x75 | 2x97,5 | 2x60 | 2x92 | 2x45 | 2x78 | W |
| $W_o$ | = | 0 | 345 | 0 | 260 | 0 | 170 | W |
| $\eta$ | = | - | 64 | - | 58,5 | - | 52 | % |
| dtot | = | - | 4,0 | - | 3,6 | - | 3,5 | % |

[1] Anode red hot, temperature = 850 °C
Anode portée au rouge, température = 850 °C
Anode rotheiss, Temperatur = 850 °C

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF – Verstärker und Modulator Klasse B
} Ig1 > 0

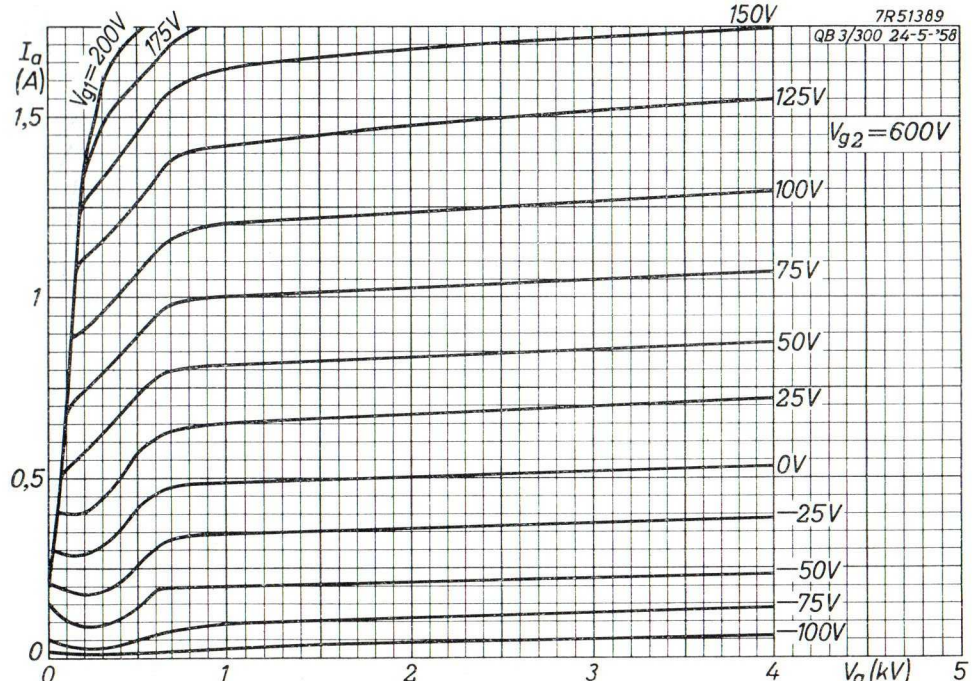
Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 3000 V |
| $I_a$ | = max. | 225 mA |
| $W_a$ | = max. | 125 W [1] |
| $V_{g2}$ | = max. | 400 V |
| $W_{g2}$ | = max. | 20 W |
| $-V_{g1}$ | = max. | 500 V |

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Va | = | 2500 | | 2000 | | 1500 | V |
| Vg1 | = | -51 | | -50 | | -48 | V |
| Vg2 | = | 350 | | 350 | | 350 | V |
| Raa | = | 20 | | 12 | | 7,2 | kΩ |
| $Vg1g1_p$ | = | 0 | 240 | 0 | 296 | 0 | 330 V |
| Ia | = | 2x30 | 2x151 | 2x30 | 2x197,5 | 2x30 | 2x227,5 mA |
| Ig1 | = | 0 | 2x8,5 | 0 | 2x12 | 0 | 2x16 mA |
| Ig2 | = | 2x0,1 | 2x18 | 2x0,15 | 2x32 | 2x0,25 | 2x42 mA |
| Wig1 | = | 0 | 2x0,9 | 0 | 2x1,6 | 0 | 2x2,4 W |
| Wg2 | = | 0 | 2x6,3 | 2x0,1 | 2x11,2 | 2x0,1 | 2x15 W |
| Wia | = | 2x75 | 2x377,5 | 2x60 | 2x395 | 2x45 | 2x341,5 W |
| Wa | = | 2x75 | 2x102,5 | 2x60 | 2x120 | 2x45 | 2x114 W |
| Wo | = | 0 | 550 | 0 | 550 | 0 | 455 W |
| $\eta$ | = | - | 72,5 | - | 69,5 | - | 66,5 % |
| dtot | = | - | 5 | - | 5 | - | 5 % |

[1] Anode red hot, temperature = 850 °C
Anode portée au rouge, température = 850°C
Anode rotheiss, Temperatur = 850 °C

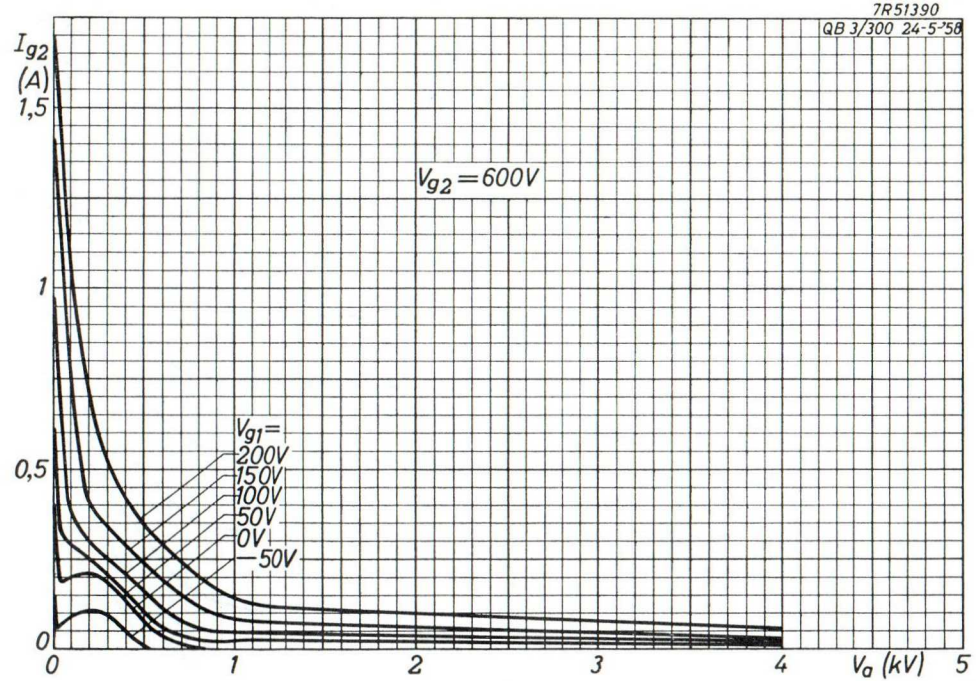



6.6.1958

A

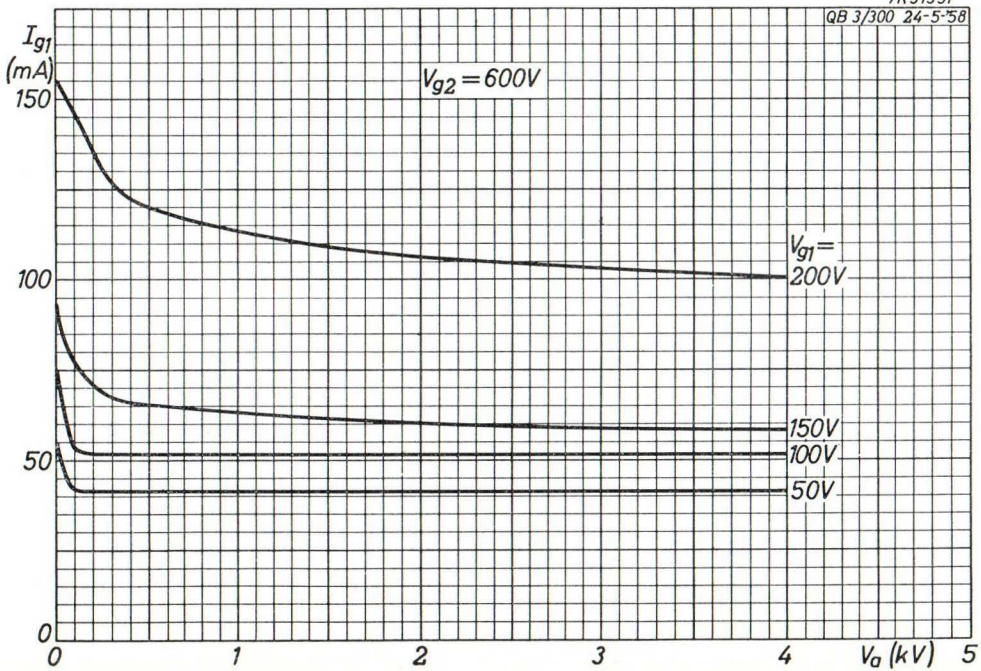
PHILIPS

QB 3/300


7R51390
QB 3/300 24-5-'58
$I_{g2}$ (A)
1,5
1
0,5
0
$V_{g2} = 600V$
$V_{g1}$ =
200V
150V
100V
50V
0V
−50V
0
1
2
3
4
$V_a$ (kV)
5

B

PHILIPS

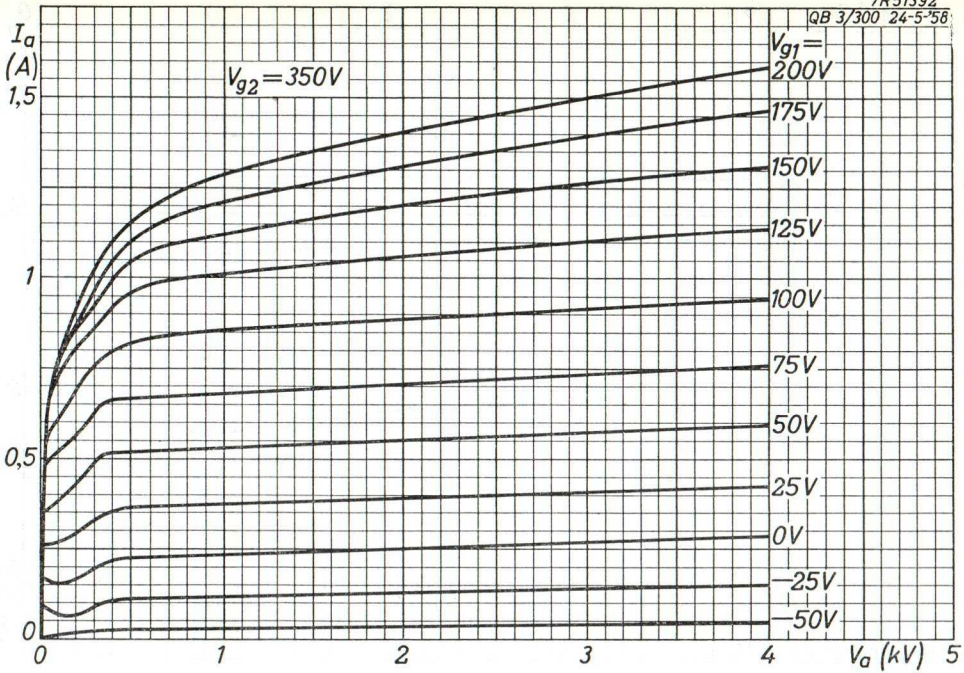



6.6.1958

PHILIPS

QB 3/300

C




QB 3/300

PHILIPS

**PHILIPS**

**QB 3/300**

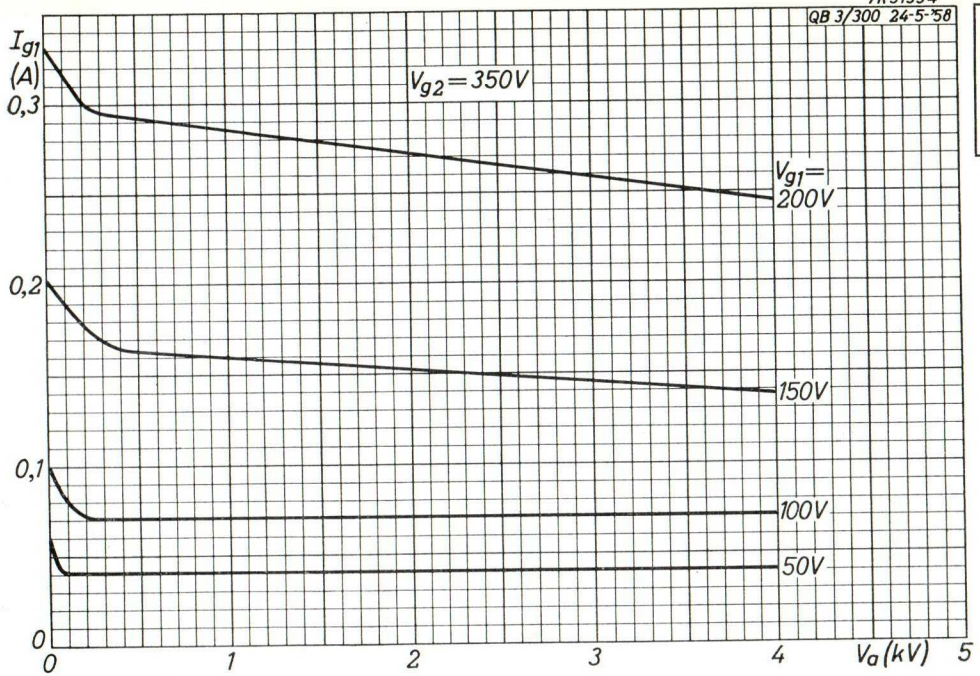



6.6.1958

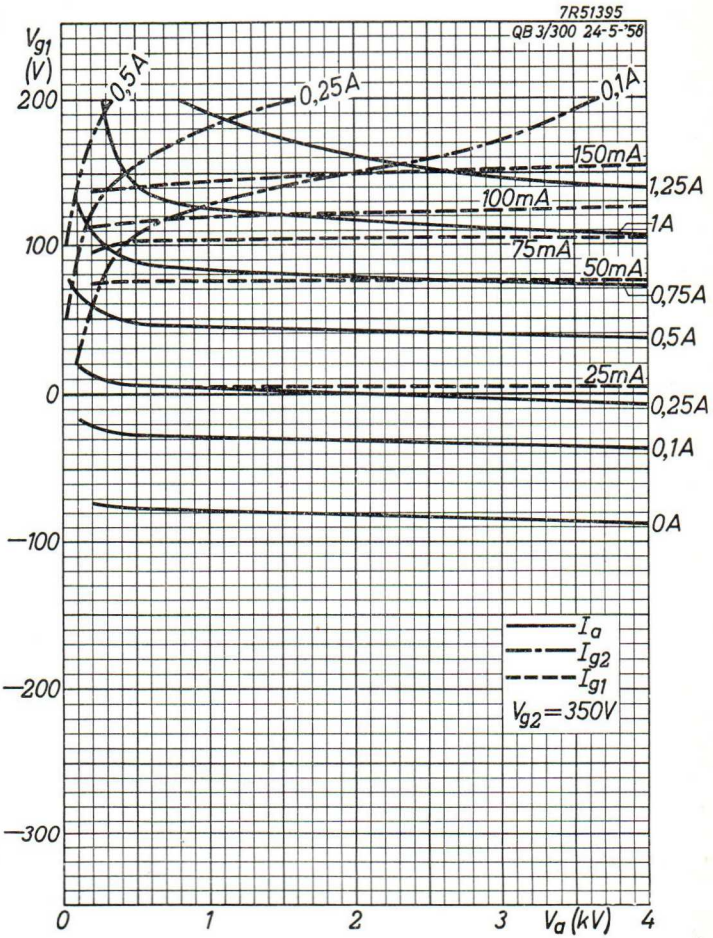
E

QB 3/300

PHILIPS



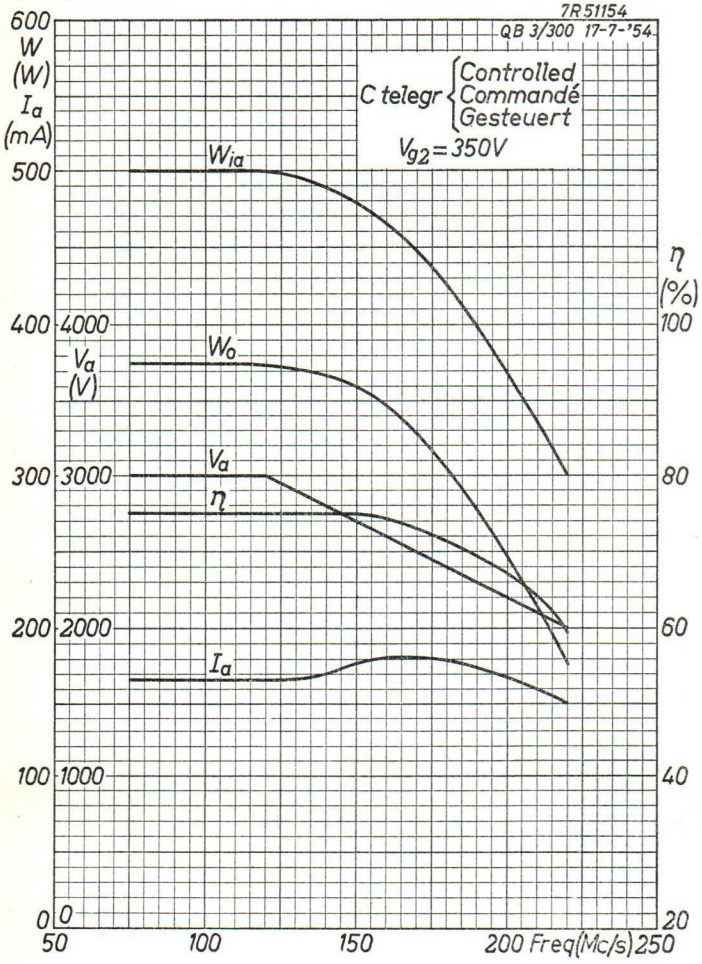

F

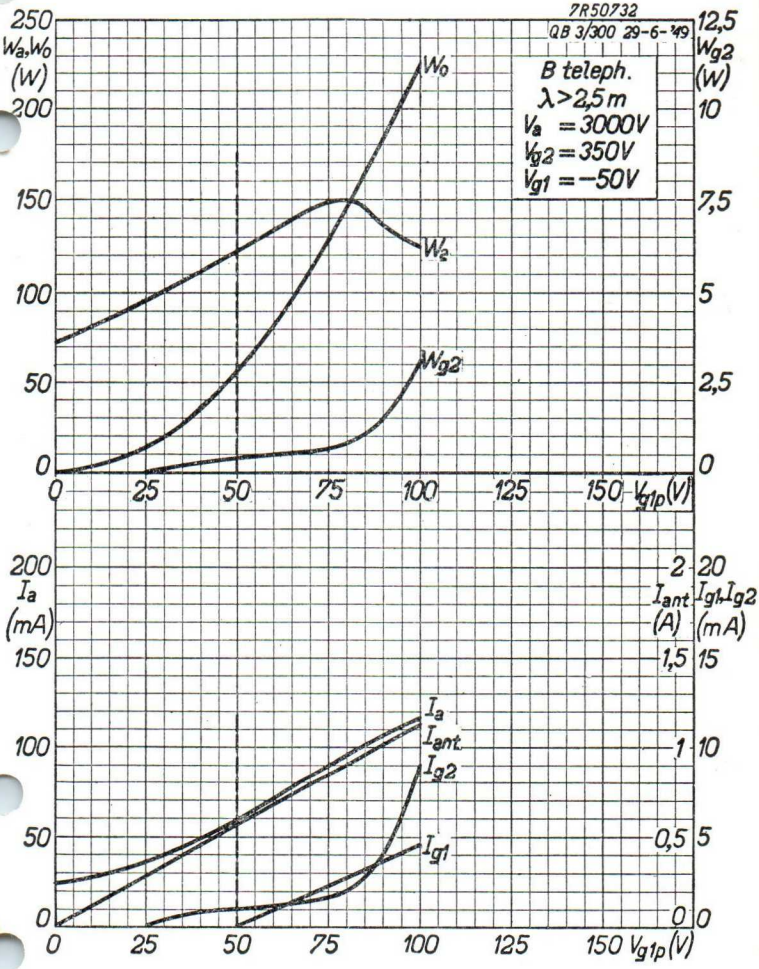

7R51395
QB 3/300 24-5-'58
$V_{g1}$ (V)
200
100
0
−100
−200
−300
0,5A
0,25A
0,1A
150mA
1,25A
100mA
1A
75mA
50mA
0,75A
0,5A
25mA
0,25A
0,1A
0A
$I_a$
$I_{g2}$
$I_{g1}$
$V_{g2}$=350V
0
1
2
3
$V_a$ (kV)
4

6.6.1958 G

QB 3/300

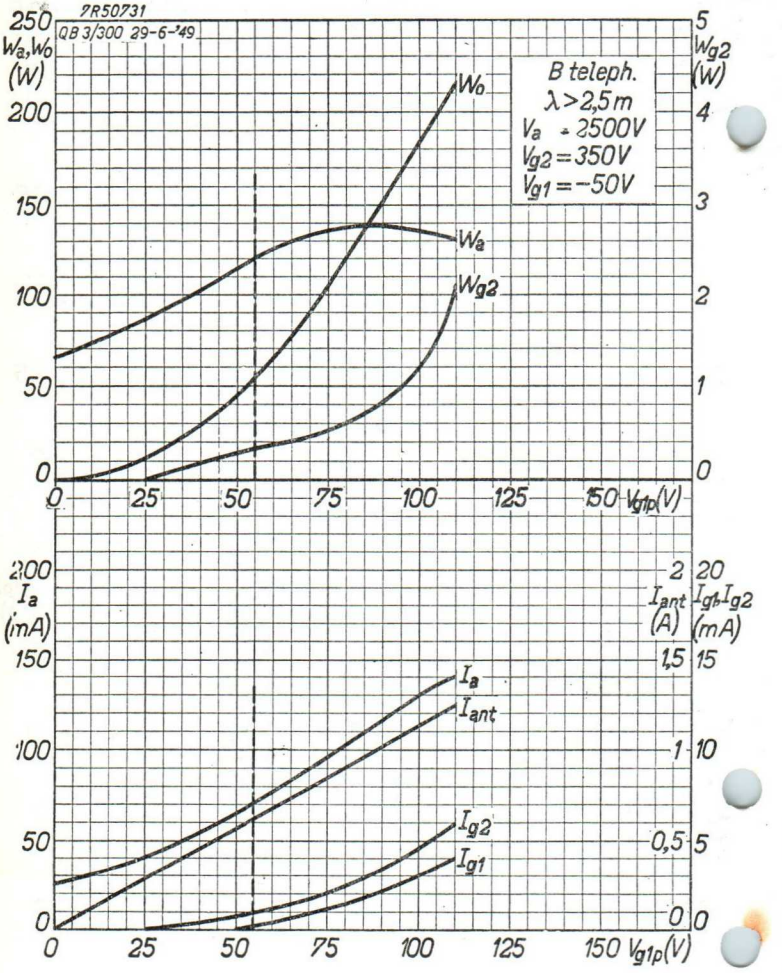
# PHILIPS

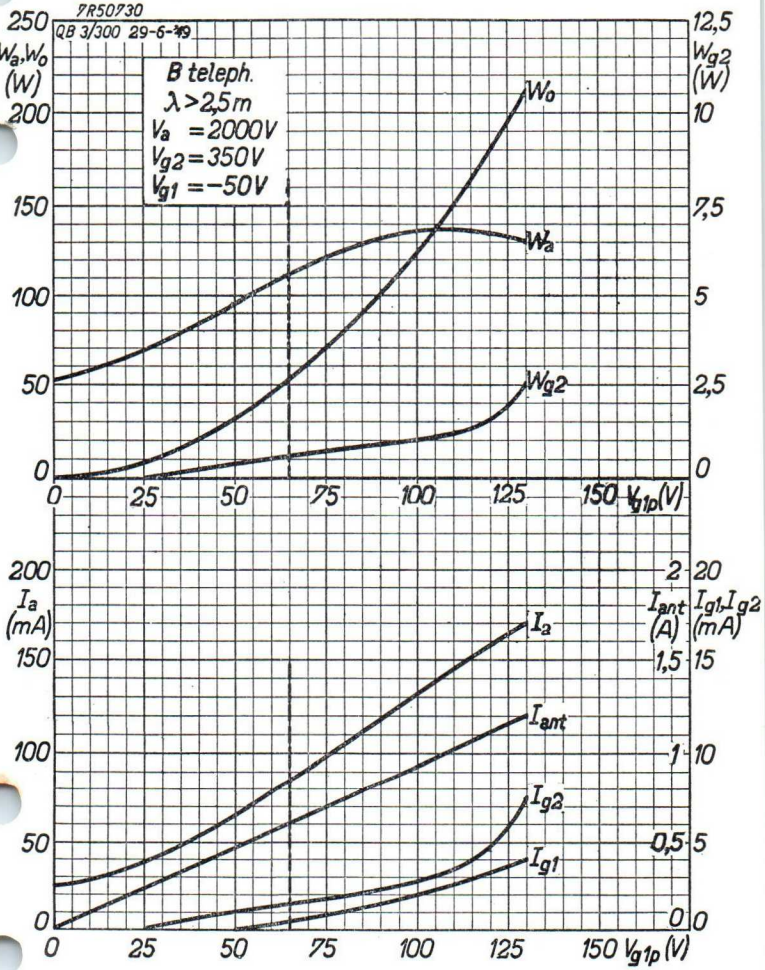



7R50732
QB 3/300 29-6-'49
B teleph.
λ>2,5 m
Va = 3000V
Vg2 = 350V
Vg1 = −50V
Wa,Wo (W)
Wg2 (W)
Wo
Wa
Wg2
Vg1p (V)
Ia (mA)
Iant (A)
Ig1, Ig2 (mA)
Ia
Iant
Ig2
Ig1

QB 3/300

# PHILIPS

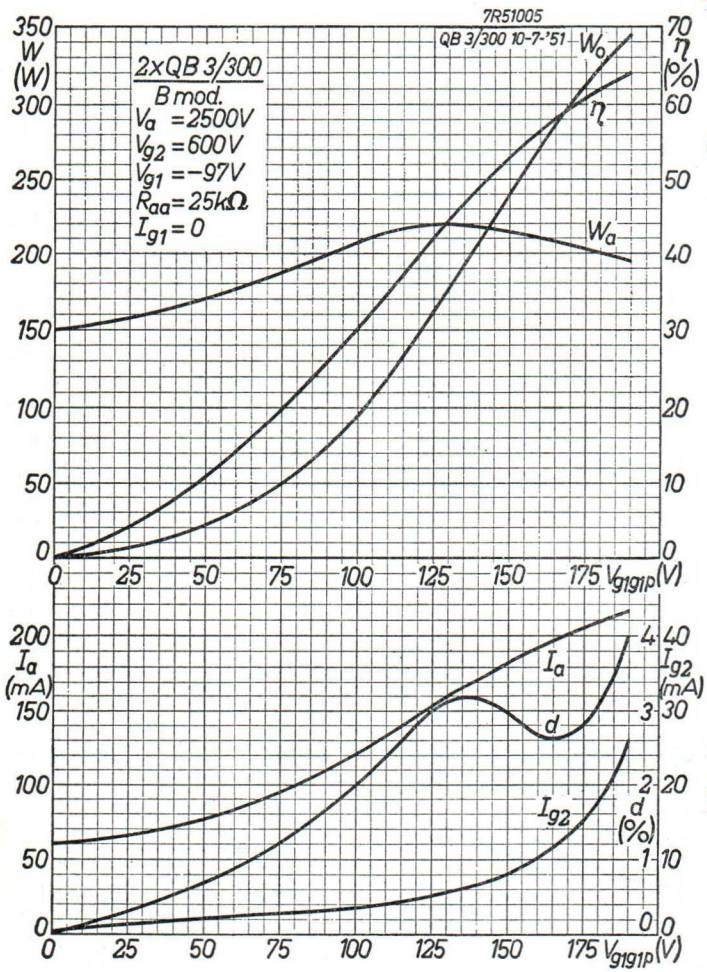



7R50730
QB 3/300 29-6-49
B teleph.
λ>2,5m
Va =2000V
Vg2=350V
Vg1 =−50V
Wa,Wo (W)
Wg2 (W)
Wo
Wa
Wg2
Vg1p (V)
Ia (mA)
Iant (A)
Ig1,Ig2 (mA)
Ia
Iant
Ig2
Ig1
Vg1p (V)

7.7.1954

K

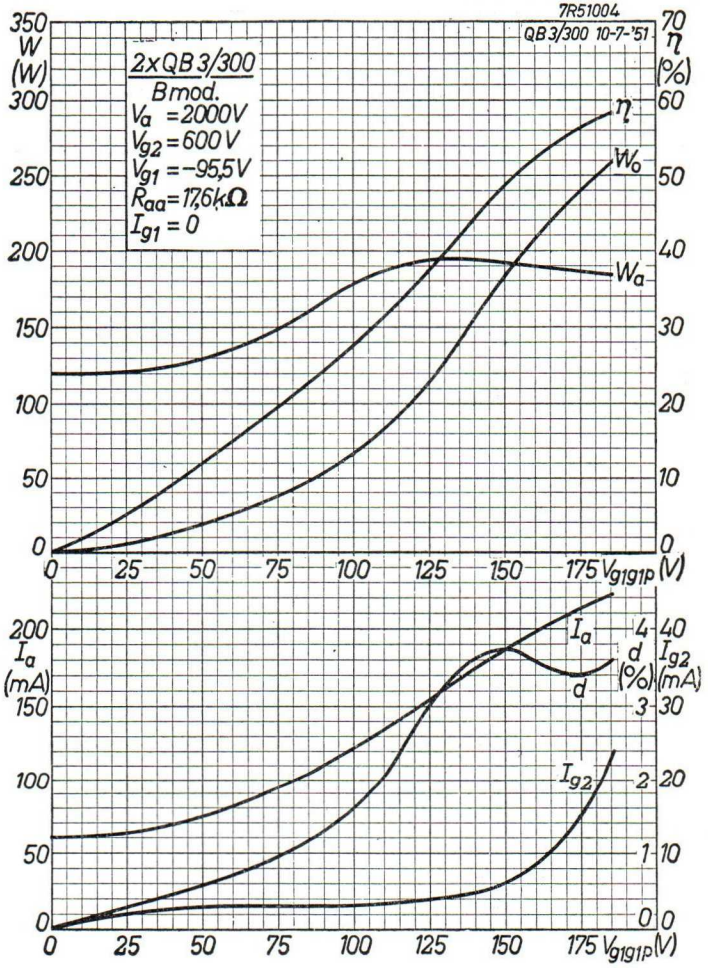
# PHILIPS


7R51005
QB 3/300 10-7-'51
2×QB 3/300
B mod.
$V_a$ = 2500V
$V_{g2}$ = 600V
$V_{g1}$ = −97V
$R_{aa}$ = 25kΩ
$I_{g1}$ = 0
$W_o$
$\eta$
$W_a$
W (W)
$\eta$ (%)
$I_a$ (mA)
$I_{g2}$ (mA)
d (%)
$V_{g1g1p}$ (V)

L

# PHILIPS

**QB 3/300**

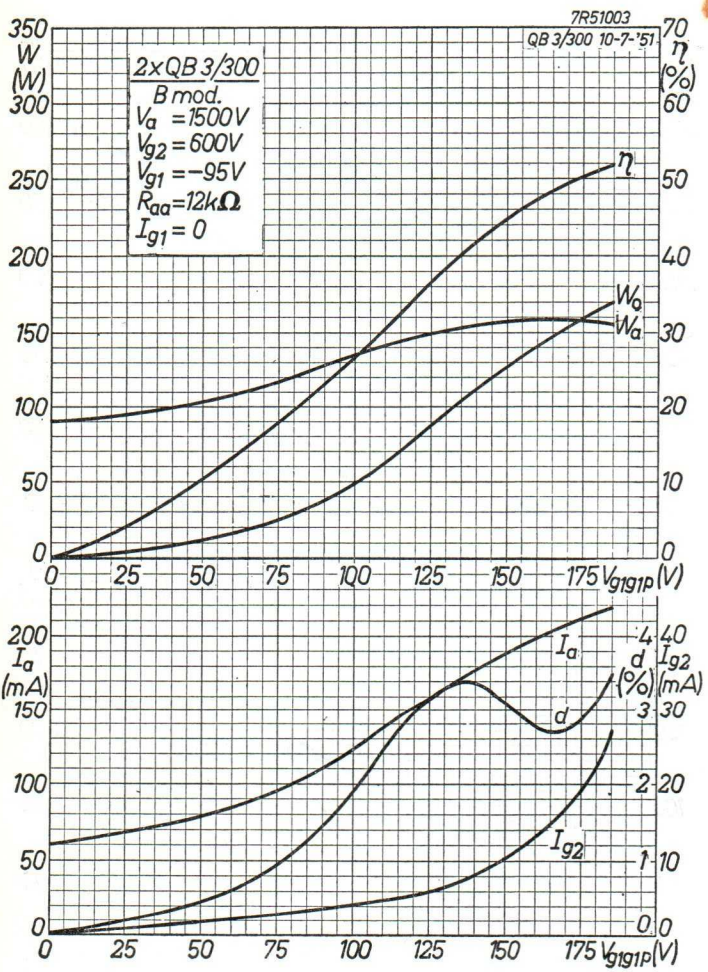



7.7.1954

M

QB 3/300

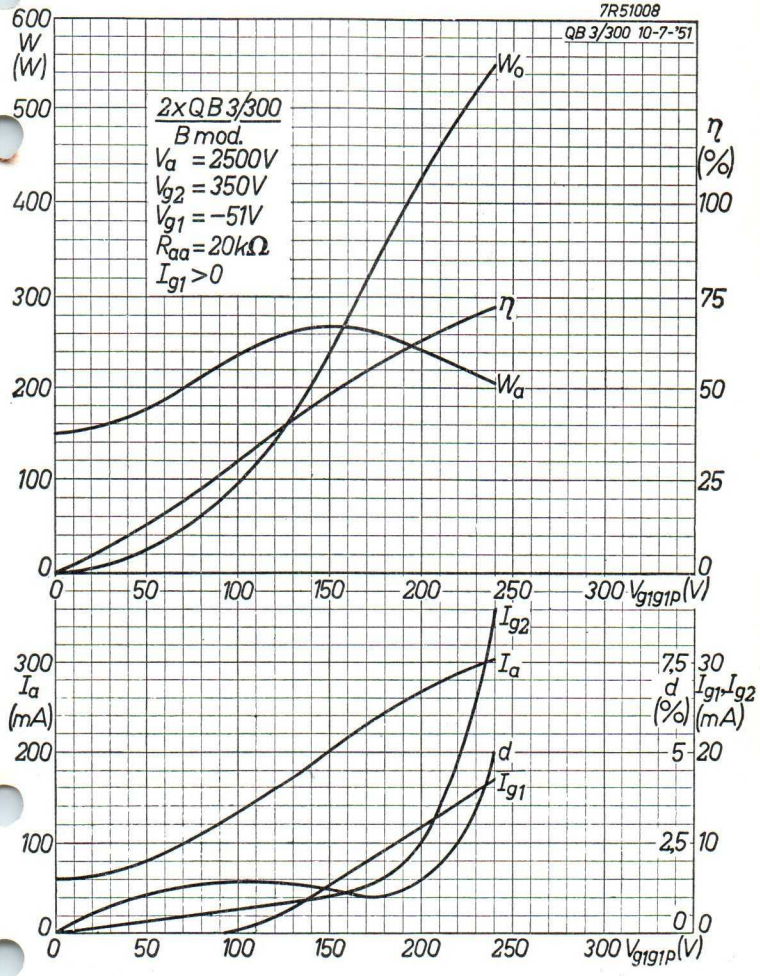
# PHILIPS




N

# PHILIPS

**QB 3/300**

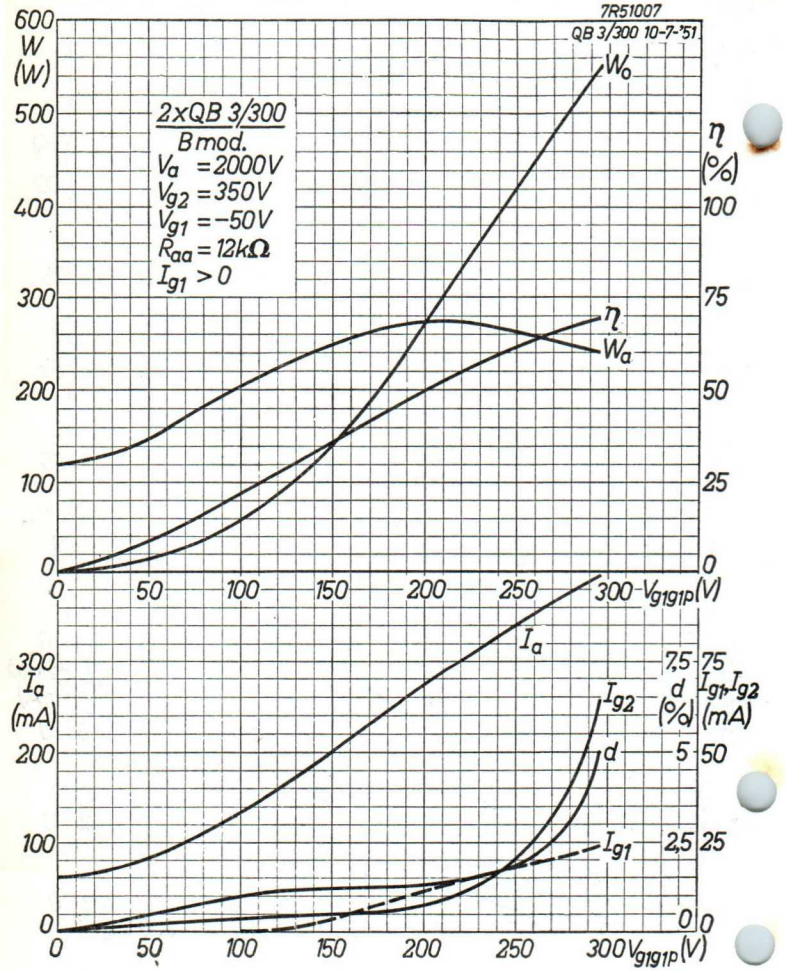



7.7.1954

O

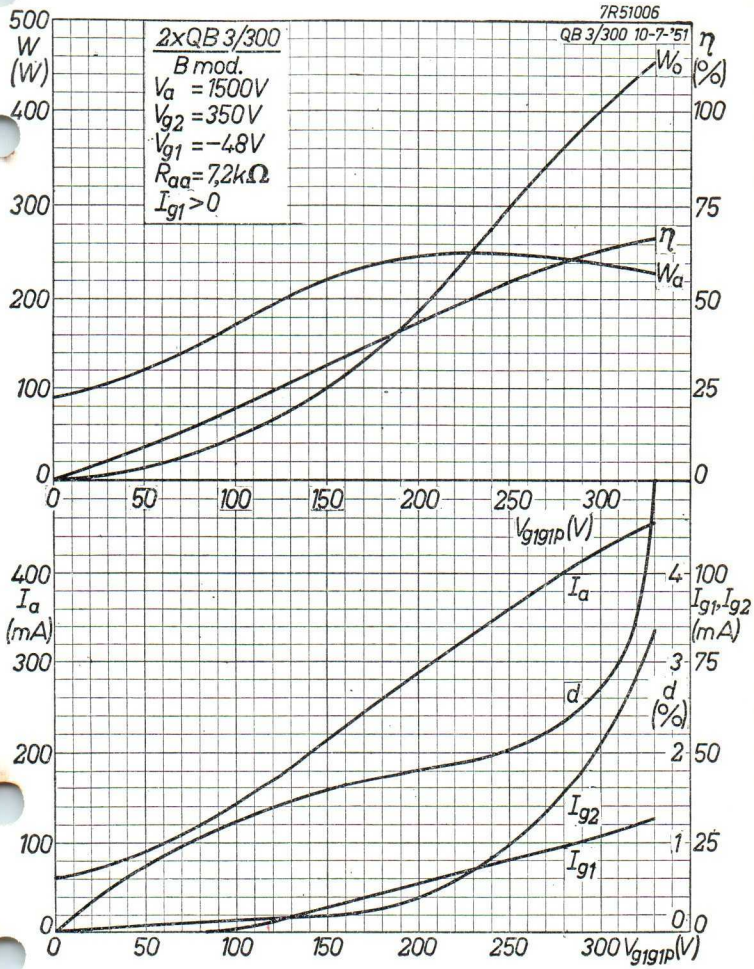
QB 3/300

# PHILIPS



# PHILIPS

**QB 3/300**




7.7.1954

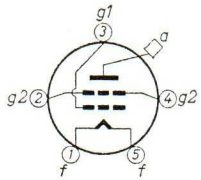
Q

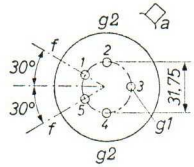
# PHILIPS

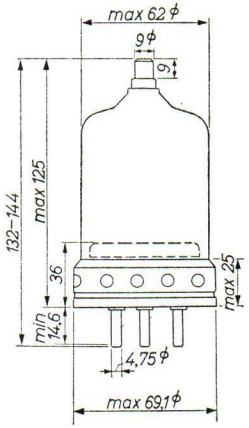
**QB 3/300 GA**

TETRODE for use as H.F. or L.F. amplifier
TETRODE pour utilisation en amplificatrice H.F. ou B.F.
TETRODE zur Verwendung als HF- oder NF-Verstärker

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base : Metal-shell Giant 5p.
Culot : Giant 5p. avec culot métallique
Sockel: Giant 5p. mit Metallring

Socket
Support 40211/01
Fassung

For further data and curves please refer to QB 3/300
Pour les autres données et les courbes voir QB 3/300
Für die übrigen Daten und Kurven siehe QB 3/300

# PHILIPS

**QB 3.5/750**

TETRODE for use as H.F. amplifier and oscillator
TETRODE pour utilisation en amplificatrice H.F. et en oscillatrice
TETRODE zur Verwendung als HF-Verstärker und Oszillator

Cooling : radiation/low velocity air flow
Refroidissement: radiation/léger courant d'air
Kühlung : Strahlung/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5 V
$I_f$ = 14,1 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 4,5 pF
$C_{g1}$ = 12,7 pF
$C_{ag1}$ = 0,12 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 5,1
S ($I_a$=100 mA) = 4 mA/V

| λ | Freq. | C telegr. | | B teleph. | | $C_{ag2}$·mod. | | $B_{mod}$[1]) | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| >4 | <75 | 4000 | 1000 | 4000 | 126 | 3000 | 510 | 3000 | 1240 |
| | | 3000 | 800 | 3000 | 125 | 2500 | 375 | 2500 | 1140 |
| | | 2500 | 575 | 2500 | 125 | | | 2000 | 974 |
| 2,5 | 120 | 2500 | 500 | | | | | 1500 | 660 |

[1]) Two tubes; deux tubes; zwei Röhren

# PHILIPS

Temperatures and cooling
Températures et refroidissement
Temperaturen und Kühlung

Temperature of anode seal
Température du scellement de l'anode = max. 220 °C
Temperatur der Anodeneinschmelzung

Temperature of pin seals
Température des scellements des broches = max. 180 °C
Temperatur der Stifteneinschmelzungen

Bulb temperature
Température de l'ampoule = max. 350 °C
Kolbentemperatur

In order to keep the temperatures below the maximum permitted values a low velocity air flow has to be directed onto the anode seal and the bottom of the envelope.

In order to prevent overheating of the screen-grid pins by high-frequency current it is recommended to include both screen-grid socket connections in the circuit.

Afin de maintenir les températures au-dessous des valeurs maximum admissible, il sera nécessaire de diriger un léger courant d'air vers le scellement de l'anode et vers le fond de l'ampoule.

Il est recommandé d'incorporer les deux bornes de raccordement de la grille-écran dans le circuit pour éviter le surchauffage des broches de la grille-écran par le courant haute fréquence.

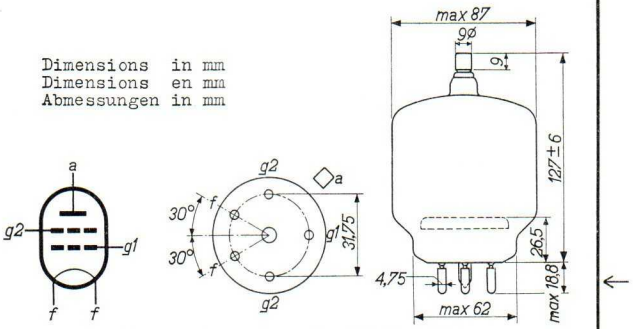
Damit die Temperaturen unterhalb der höchstzulässigen Werte bleiben, soll ein schwacher Luftstrom auf die Anodeneinschmelzung und auf den Boden des Kolbens gerichtet werden.

Es empfiehlt sich, zur Vermeidung einer Überhitzung der Schirmgitterstifte vom Hochfrequenzstrom, beide Anschlussklemmen an der Schaltung zu beteiligen.

Net weight
Poids net 185 g
Nettogewicht

Shipping weight
Poids brut 910 g
Bruttogewicht

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: GIANT 5-PIN.

Socket
Support
Fassung 40211/01

Clip
Borne de connexion
Anschlussklemme 40624

Mounting position: vertical with base up or down
Montage : vertical avec le culot en haut ou en bas
Einbau : senkrecht mit dem Sockel oben oder unten

# PHILIPS

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegraphie

## Limiting values
## Caractéristiques limites
## Grenzdaten

| f | = max. | 75 Mc/s |
|---|---|---|
| $V_a$ | = max. | 4000 V |
| $W_{ia}$ | = max. | 1250 W |
| $W_a$ | = max. | 250 W |
| $I_a$ | = max. | 350 mA |
| $V_{g2}$ | = max. | 600 V |
| $W_{g2}$ | = max. | 35 W |
| $-V_{g1}$ | = max. | 500 V |
| $I_{g1}$ | = max. | 20 mA |

| f | = max. | 100 Mc/s |
|---|---|---|
| $V_a$ | = max. | 3300 V |
| $W_{ia}$ | = max. | 1000 W |

| f | = max. | 120 Mc/s |
|---|---|---|
| $V_a$ | = max. | 2500 V |
| $W_{ia}$ | = max. | 750 W |

## Operating conditions
## Caractéristiques d'utilisation
## Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = | 75 | 75 | 75 Mc/s |
| $V_a$ | = | 4000 | 3000 | 2500 V |
| $V_{g2}$ | = | 500 | 500 | 500 V |
| $V_{g1}$ | = | -225 | -180 | -150 V |
| $I_a$ | = | 312 | 345 | 300 mA |
| $I_{g2}$ | = | 45 | 60 | 60 mA |
| $I_{g1}$ | = | 9 | 10 | 9 mA |
| $V_{g1_p}$ | = | 303 | 265 | 220 V |
| $W_{ig1}$ | = | 2,5 | 2,4 | 1,8 W |
| $W_{g2}$ | = | 22,5 | 30 | 30 W |
| $W_{ia}$ | = | 1248 | 1035 | 750 W |
| $W_a$ | = | 248 | 235 | 175 W |
| $W_o$ | = | 1000 | 800 | 575 W |
| $\eta$ | = | 80 | 77 | 77 % |

H.F. class B telephony
H.F. classe B téléphonie
HF Klasse B Telephonie

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 75 Mc/s | | f = max. 100 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 4000 V | $V_a$ | = max. 3300 V |
| $W_{ia}$ | = max. 400 W | $W_{ia}$ | = max. 320 W |
| $W_a$ | = max. 250 W | | |
| $I_a$ | = max. 250 mA | f = max. 120 Mc/s | |
| $V_{g2}$ | = max. 600 V | $V_a$ | = max. 2500 V |
| $W_{g2}$ | = max. 23 W | $W_{ia}$ | = max. 240 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = 75 | 75 | 75 Mc/s |
| $V_a$ | = 4000 | 3000 | 2500 V |
| $V_{g2}$ | = 500 | 500 | 500 V |
| $V_{g1}$ | = -100 | -90 | -84 V |
| $I_a$ | = 94 | 125 | 150 mA |
| $I_{g2}$ | = 0 | 0 | 0 mA |
| $V_{g1_p}$ | = 55,5 | 61 | 66 V |
| $W_{ia}$ | = 376 | 375 | 375 W |
| $W_a$ | = 250 | 250 | 250 W |
| $W_o$ | = 126 | 125 | 125 W |
| $\eta$ | = 33,5 | 33 | 33 % |
| m | = 100 | 100 | 100 % |
| $I_{g1}$ | = 0,5 | 2 | 5,5 mA |
| $W_{ig1}$ | = 0,06 | 0,25 | 0,75 W |
| $W_{g2}$ | = 4 | 3,8 | 6 W |

# PHILIPS

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF Klasse C Anoden- und Schirmgittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = max. | 75 Mc/s | | | |
| $V_a$ | = max. | 3200 V | f | = max. | 100 Mc/s |
| $W_{ia}$ | = max. | 825 W | $V_a$ | = max. | 2600 V |
| $W_a$ | = max. | 165 W | $W_{ia}$ | = max. | 660 W |
| $I_a$ | = max. | 275 mA | | | |
| $V_{g2}$ | = max. | 600 V | | | |
| $W_{g2}$ | = max. | 35 W | f | = max. | 120 Mc/s |
| $-V_{g1}$ | = max. | 500 V | $V_a$ | = max. | 2000 V |
| $I_{g1}$ | = max. | 20 mA | $W_{ia}$ | = max. | 500 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 75 | 75 Mc/s |
| $V_a$ | = | 3000 | 2500 V |
| $V_{g2}$ | = | 400 | 400 V |
| $V_{g1}$ | = | -310 | -200 V |
| $I_a$ | = | 225 | 200 mA |
| $I_{g2}$ | = | 30 | 30 mA |
| $I_{g1}$ | = | 9 | 9 mA |
| $V_{g1_p}$ | = | 400 | 280 V |
| $W_{ig1}$ | = | 3,3 | 2,3 W |
| $W_{g2}$ | = | 12 | 12 W |
| $W_{ia}$ | = | 675 | 500 W |
| $W_a$ | = | 165 | 125 W |
| $W_o$ | = | 510 | 375 W |
| $\eta$ | = | 75,5 | 75 % |
| m | = | 100 | 100 % |
| $V_{g2_p}$ | = | 350 | 350 V |
| $W_{mod}$ | = | 344 | 256 W |

[1]) $V_{g2}$ = max. 1000 V, when the temperature of the pin seals is max. 120 °C
$V_{g2}$ = max. 1000 V, si la température des scellements des broches est de 120°C aux max.
$V_{g2}$ = max. 1000 V, wenn die Temperatur der Stiftendurchführungen max. 120°C ist.

H.F. class B amplifier, single side band
Amplificatrice H.F. classe B à une bande latérale
HF Einseitenbandverstärker, Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f = max. 30 Mc/s | | $W_{ap}$ | = max. 275 W[1] |
| $V_a$ | = max. 4 kV | $W_a$ | = max. 250 W |
| $I_a$ | = max. 350 mA | $T_{av}$ | = max. 5 sec |
| $W_{ia}$ | = max. 250 W | $V_{g2}$ | = max. 600 V |
| | | $W_{g2}$ | = max. 35 W |
| | | $R_{g1}$ | = max. 250 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = | 30 | | 30 | Mc/s |
| $V_a$ | = | 4 | | 3,5 | kV |
| $V_{g1}$ | = | -105 | | -110 | V |
| $V_{g2}$ | = | 550 | | 600 | V |
| $V_{g1p}$ | = | 0 | 105 | 0 | 110 V |
| $I_a$ | = | 50 | 182 | 50 | 207 mA |
| $I_{g1}$ | = | 0 | 0 | 0 | 0 mA |
| $I_{g2}$ | = | 0 | 9 | 0 | 12 mA |
| $W_{ig1}$ | = | 0 | 0 | 0 | 0 W |
| $W_{g2}$ | = | 0 | 5 | 0 | 7,2 W |
| $W_{ia}$ | = | 200 | 730 | 175 | 725 W |
| $W_a$ | = | 200 | 220 | 175 | 235 W |
| $W_o$ | = | - | 510 | - | 490 W |
| $\eta$ | = | - | 69 | - | 67 % |

| f | = | 30 | | 30 | | 30 | | 30 | Mc/s |
|---|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 4 | | 3,5 | | 3 | | 2,5 | kV |
| $V_{g1}$ | = | -105 | | -98 | | -94 | | -91 | V |
| $V_{g2}$ | = | 500 | | 500 | | 500 | | 500 | V |
| $V_{g1p}$ | = | 0 | 105 | 0 | 98 | 0 | 94 | 0 | 91 V |
| $I_a$ | = | 50 | 164 | 50 | 164 | 50 | 164 | 50 | 164 mA |
| $I_{g1}$ | = | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 mA |
| $I_{g2}$ | = | 0 | 8 | 0 | 9 | 0 | 10 | 0 | 10,5 mA |
| $W_{ig1}$ | = | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 W |
| $W_{g2}$ | = | 0 | 4 | 0 | 4,5 | 0 | 5 | 0 | 5,3 W |
| $W_{ia}$ | = | 200 | 660 | 175 | 575 | 150 | 490 | 125 | 410 W |
| $W_a$ | = | 200 | 200 | 175 | 175 | 150 | 157 | 125 | 140 W |
| $W_o$ | = | - | 460 | - | 400 | - | 333 | - | 270 W |
| $\eta$ | = | - | 70 | - | 69 | - | 68 | - | 66 % |

1) Max. value during a modulation cycle
Valeur max. pendant un cycle de modulation
Max. Wert während eines Modulationszyklus

# PHILIPS

L.F. class B amplifier and modulator. $I_{g1} > 0$
Amplificatrice et modulatrice B.F. classe B. $I_{g1} > 0$
NF-Verstärker und Modulator Klasse B. $I_{g1} > 0$

Limiting values. See page 9
Caractéristiques limites. Voir page 9
Grenzdaten. Siehe Seite 9

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 3000 | | 2500 | | V |
| $V_{g2}$ | = | 300 | | 300 | | V |
| $V_{g1}$ | = | -55 | | -51 | | V |
| $R_{aa}$ | = | 14 | | 9,2 | | kΩ |
| $V_{g1g1_p}$ | = | 0 | 280 | 0 | 306 | V |
| $I_a$ | = | 2x50 | 2x275 | 2x50 | 2x312 | mA |
| $I_{g2}$ | = | 0 | 2x34,5 | 0 | 2x44 | mA |
| $I_{g1}$ | = | 0 | 2x15 | 0 | 2x21 | mA |
| $W_{ig1}$ | = | 0 | 2x1,9 | 0 | 2x2,9 | W |
| $W_{g2}$ | = | 0 | 2x10,5 | 0 | 2x13 | W |
| $W_{ia}$ | = | 2x150 | 2x825 | 2x125 | 2x780 | W |
| $W_a$ | = | 2x150 | 2x205 | 2x125 | 2x210 | W |
| $W_o$ | = | 0 | 1240 | 0 | 1140 | W |
| $d_{tot}$ | = | - | 5 | - | 5 | % |
| $\eta$ | = | - | 75 | - | 73 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 2000 | | 1500 | | V |
| $V_{g2}$ | = | 300 | | 300 | | V |
| $V_{g1}$ | = | -49 | | -45 | | V |
| $R_{aa}$ | = | 6,6 | | 4,55 | | kΩ |
| $V_{g1g1_p}$ | = | 0 | 328 | 0 | 323 | V |
| $I_a$ | = | 2x50 | 2x347 | 2x50 | 2x347 | mA |
| $I_{g2}$ | = | 0 | 2x55 | 0 | 2x58 | mA |
| $I_{g1}$ | = | 0 | 2x27 | 0 | 2x28 | mA |
| $W_{ig1}$ | = | 0 | 2x4 | 0 | 2x4 | W |
| $W_{g2}$ | = | 0 | 2x16,5 | 0 | 2x17,5 | W |
| $W_{ia}$ | = | 2x100 | 2x694 | 2x75 | 2x520 | W |
| $W_a$ | = | 2x100 | 2x207 | 2x75 | 2x190 | W |
| $W_o$ | = | 0 | 974 | 0 | 660 | W |
| $d_{tot}$ | = | - | 5 | - | 5 | % |
| $\eta$ | = | - | 70 | - | 63,5 | % |

L.F. class B amplifier and modulator. $I_{g1} = 0$
Amplificatrice et modulatrice B.F. classe B. $I_{g1} = 0$
NF-Verstärker und Modulator Klasse B. $I_{g1} = 0$

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. 4000 V | $I_a$ | = max. 350 mA |
| $W_a$ | = max. 250 W | $V_{g2}$ | = max. 600 V [1] |
| | | $W_{g2}$ | = max. 35 W |
| | | $-V_{g1}$ | = max. 500 V |
| | | $I_{g1}$ | = max. 30 mA |
| | | $R_{g1}$ | = max. 250 kΩ |

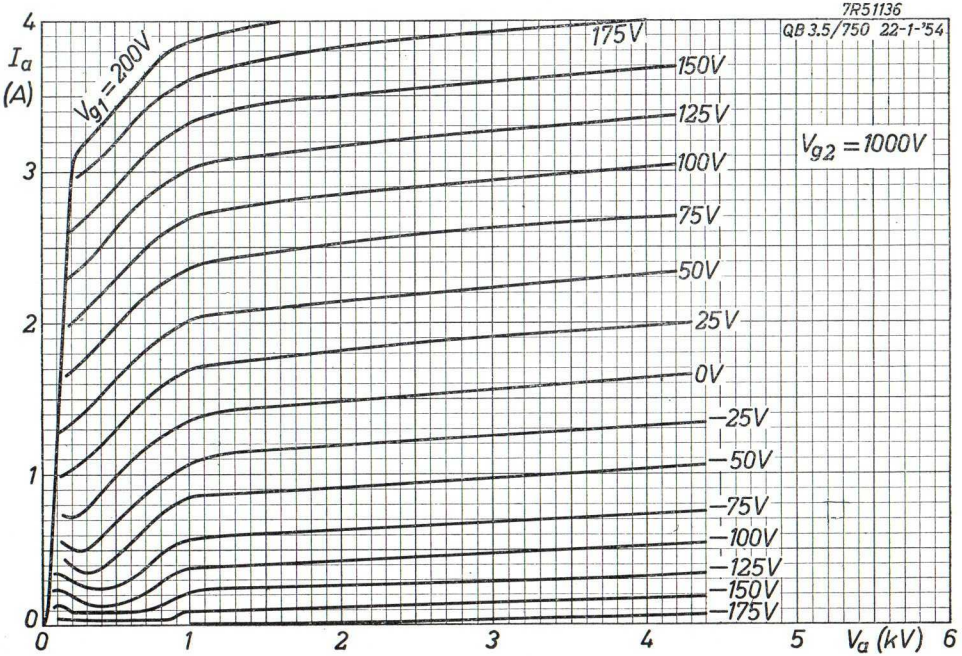
Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 3000 | | 2500 | | V |
| $V_{g2}$ | = | 500 | | 500 | | V |
| $V_{g1}$ | = | -94 | | -91 | | V |
| $R_{aa}$ | = | 22 | | 18 | | kΩ |
| $V_{g1g1_p}$ | = | 0 | 184 | 0 | 178 | V |
| $I_a$ | = | 2x50 | 2x155 | 2x50 | 2x155 | mA |
| $I_{g2}$ | = | 0 | 2x10 | 0 | 2x10,5 | mA |
| $W_{g2}$ | = | 0 | 2x5 | 0 | 2x5,3 | W |
| $W_{ia}$ | = | 2x150 | 2x465 | 2x125 | 2x387 | W |
| $W_a$ | = | 2x150 | 2x147 | 2x125 | 2x132 | W |
| $W_o$ | = | 0 | 635 | 0 | 510 | W |
| dtot | = | - | 2,8 | - | 2,6 | % |
| $\eta$ | = | - | 68 | - | 66 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 2000 | | 1500 | | V |
| $V_{g2}$ | = | 500 | | 500 | | V |
| $V_{g1}$ | = | -88 | | -85 | | V |
| $R_{aa}$ | = | 14,5 | | 10 | | kΩ |
| $V_{g1g1_p}$ | = | 0 | 173 | 0 | 167 | V |
| $I_a$ | = | 2x50 | 2x150 | 2x50 | 2x150 | mA |
| $I_{g2}$ | = | 0 | 2x14,5 | 0 | 2x15,5 | mA |
| $W_{g2}$ | = | 0 | 2x7,3 | 0 | 2x7,8 | W |
| $W_{ia}$ | = | 2x100 | 2x300 | 2x75 | 2x225 | W |
| $W_a$ | = | 2x100 | 2x105 | 2x75 | 2x91 | W |
| $W_o$ | = | 0 | 390 | 0 | 268 | W |
| dtot | = | - | 3,2 | - | 3 | % |
| $\eta$ | = | - | 65 | - | 60 | % |

[1]) See page 6; voir page 6; siehe Seite 6

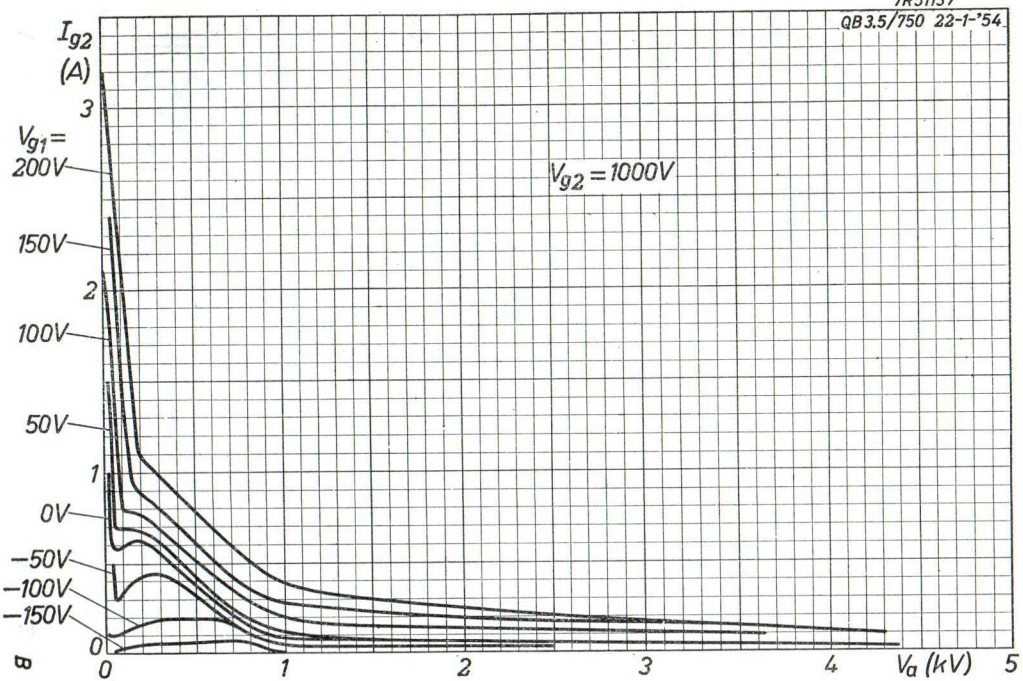
7.7.1954




PHILIPS

QB 3.5/750

A

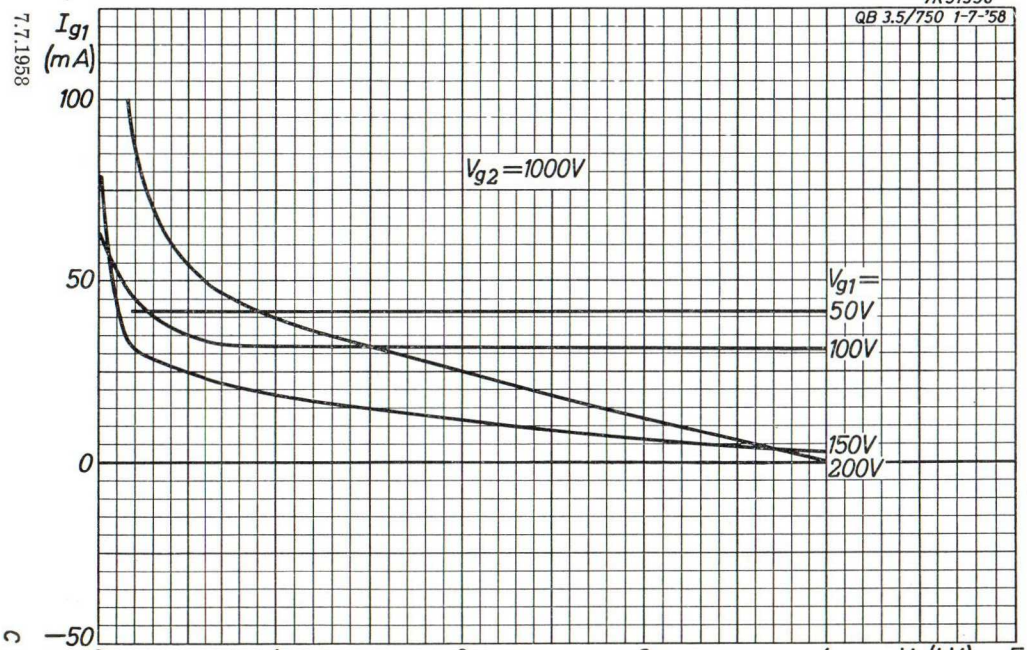



QB 3.5/750

PHILIPS

7R51396

QB 3.5/750 1-7-'58

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C

PHILIPS

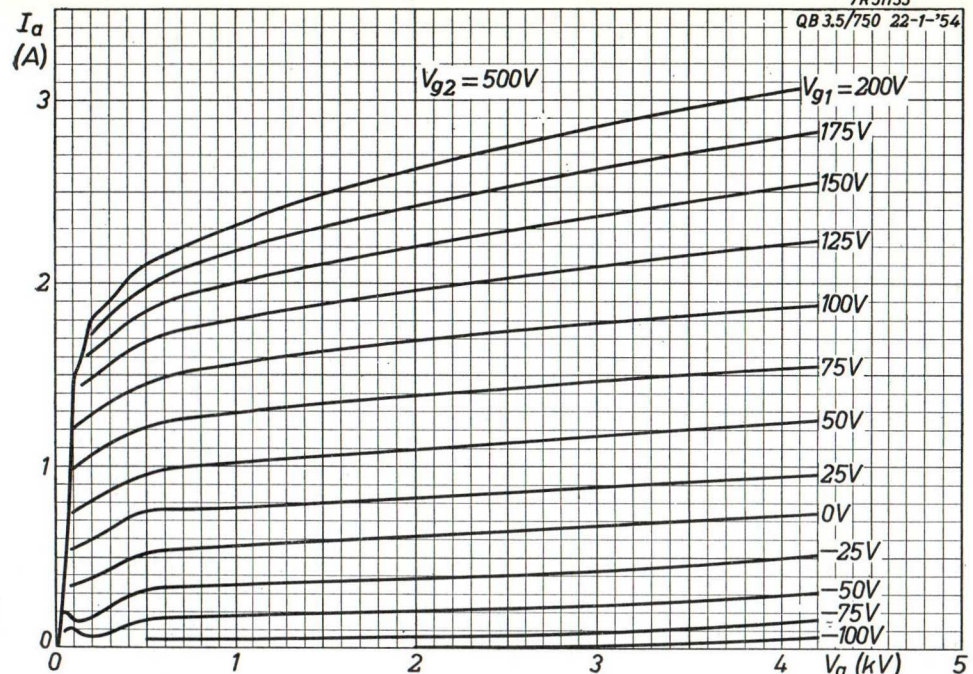
QB 3.5/750

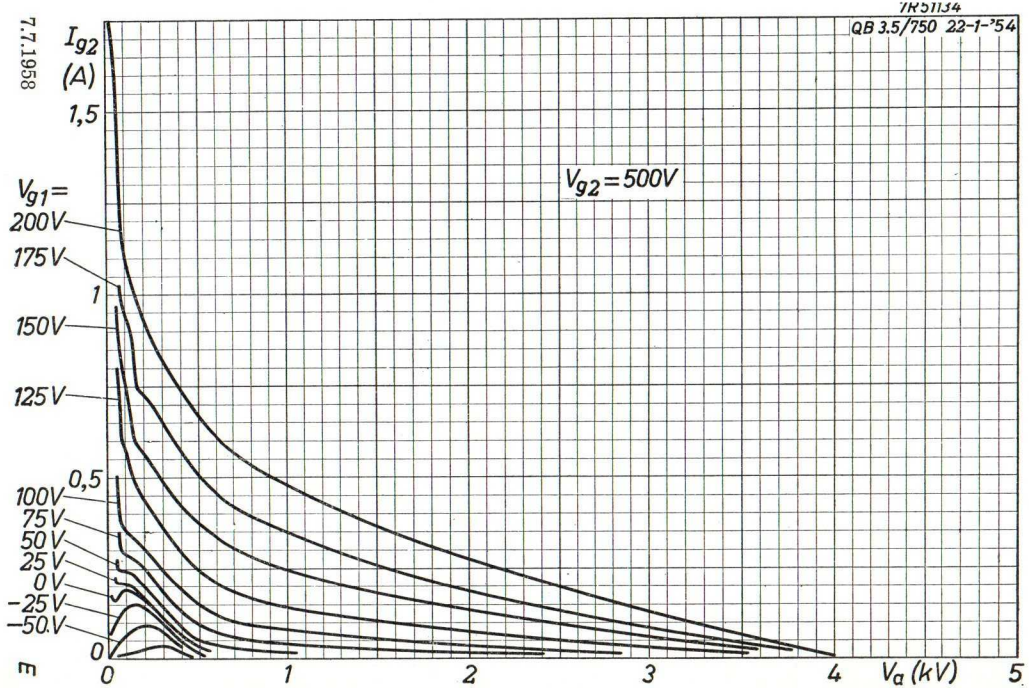
7R51133

QB 3.5/750 22-1-'54

QB 3.5/750

PHILIPS



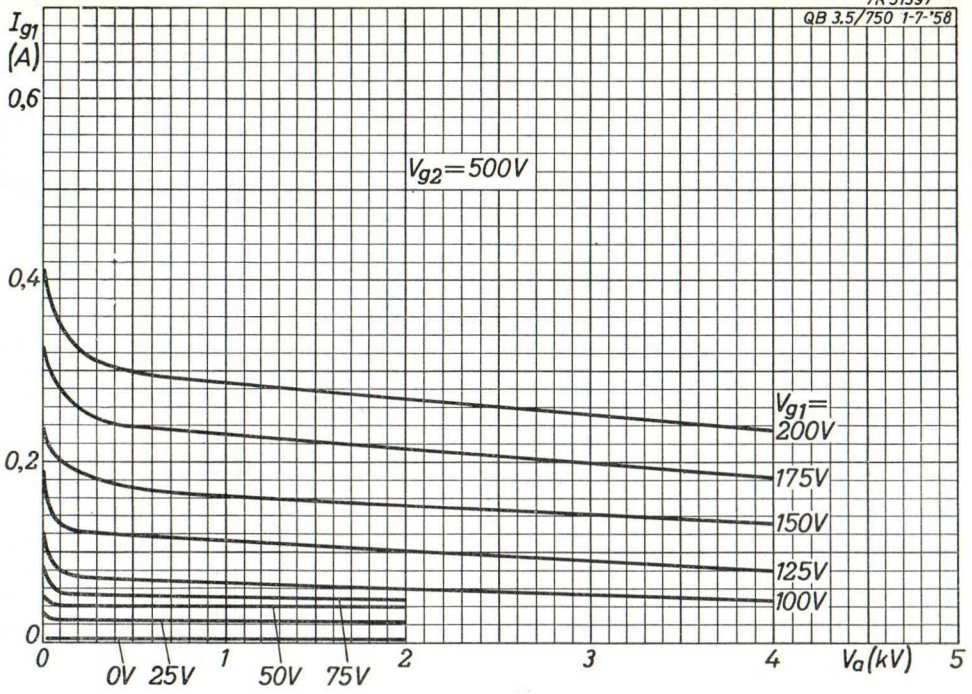


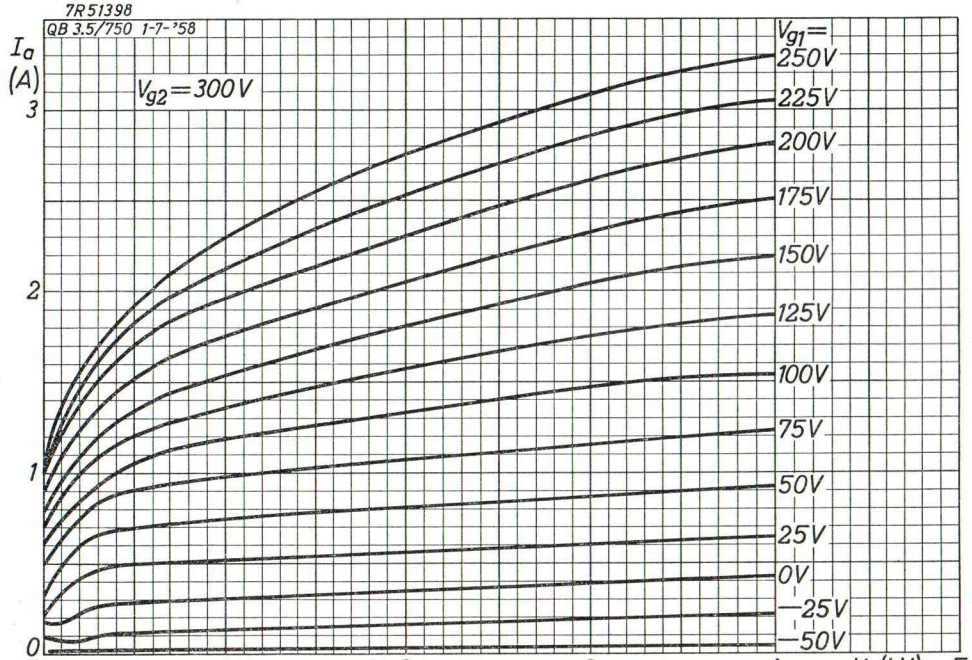

PHILIPS

QB 3.5/750

QB 3.5/750

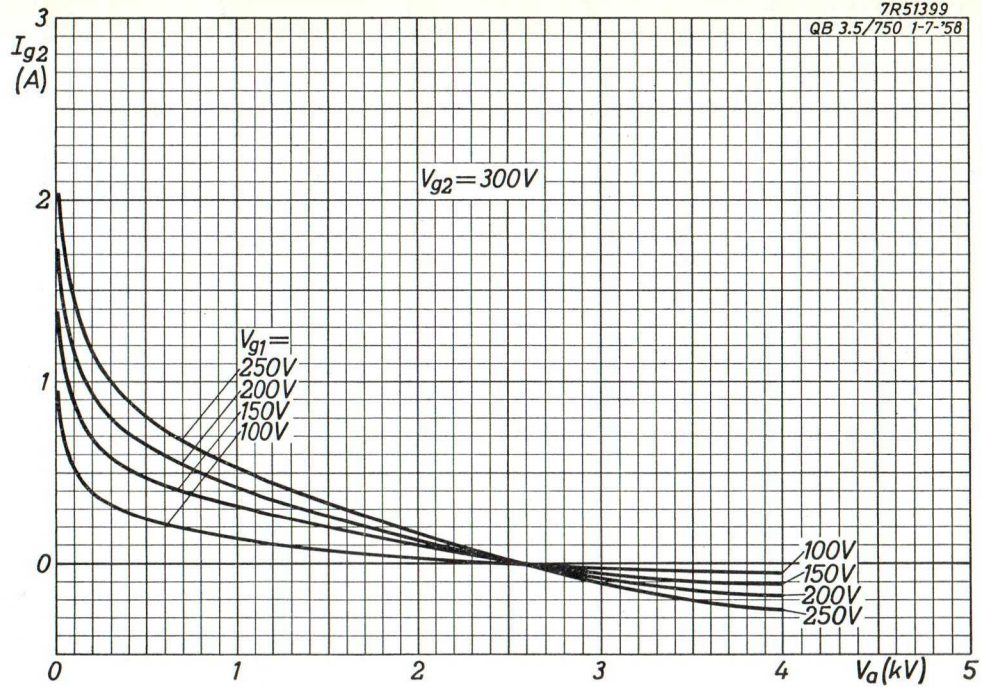
PHILIPS






PHILIPS

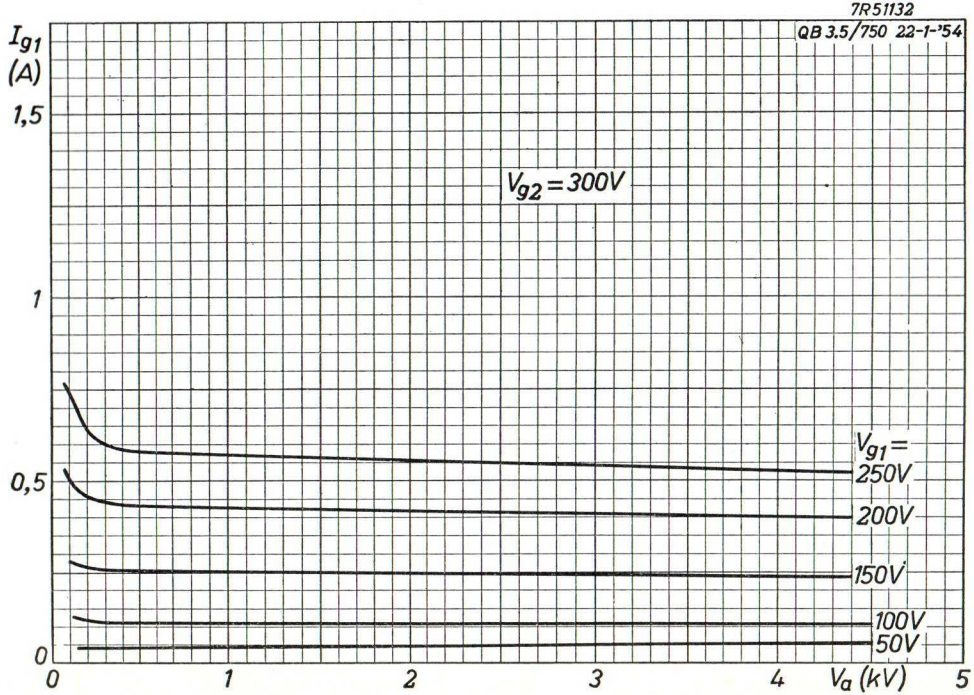
QB 3.5/750




QB 3.5/750

PHILIPS

H

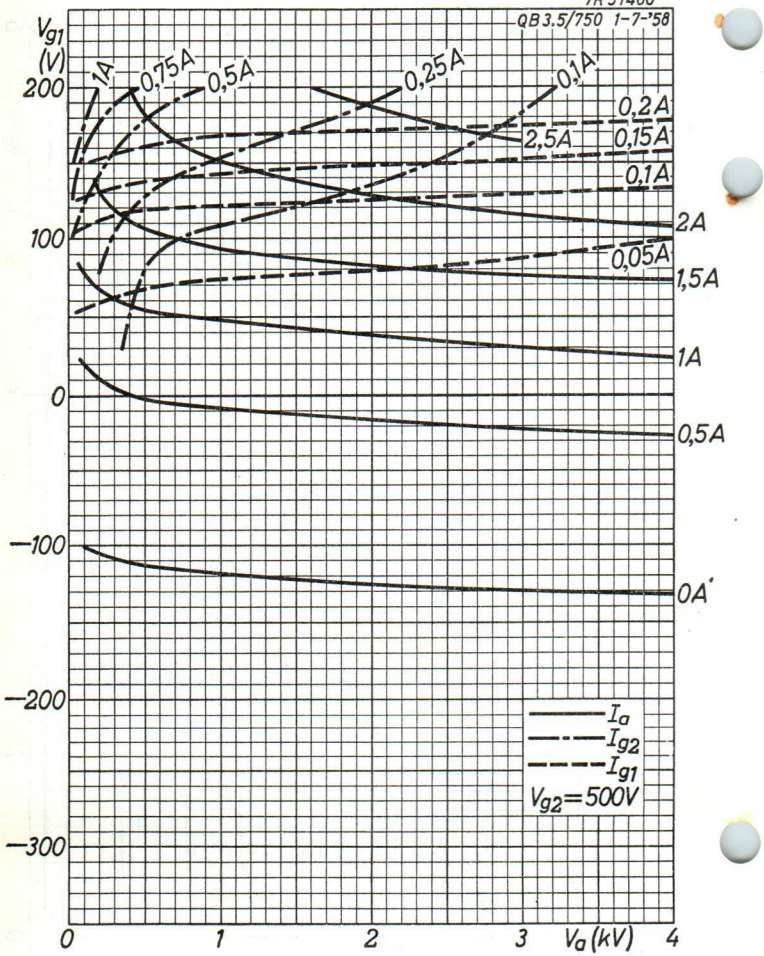



PHILIPS

QB 3.5/750

**QB 3.5/750**

# PHILIPS

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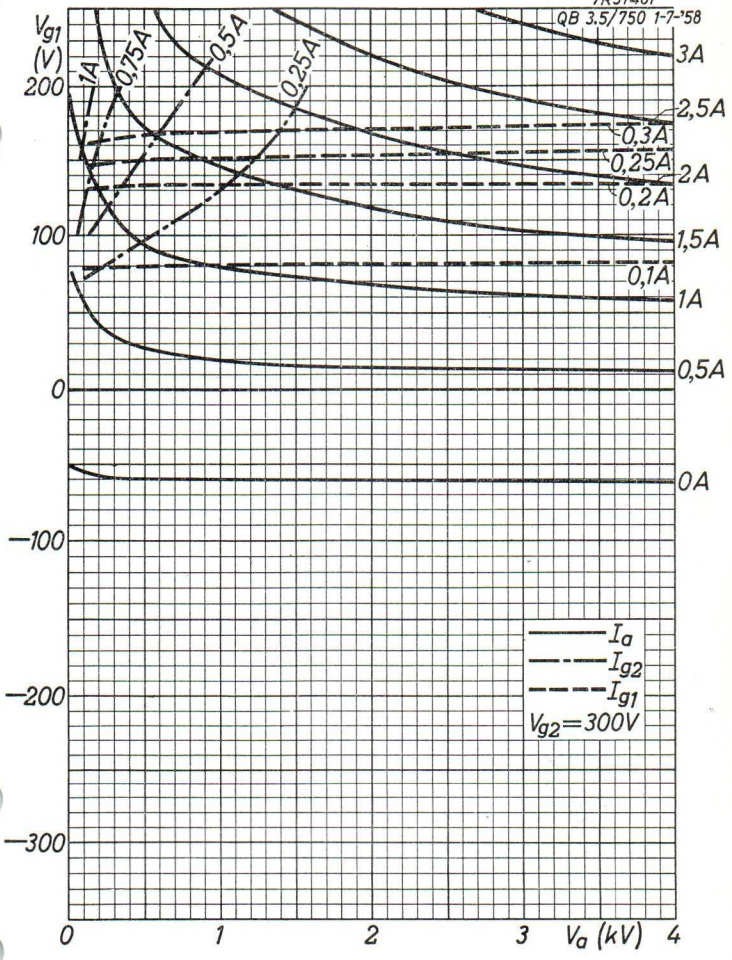
**PHILIPS**

**QB 3.5/750**

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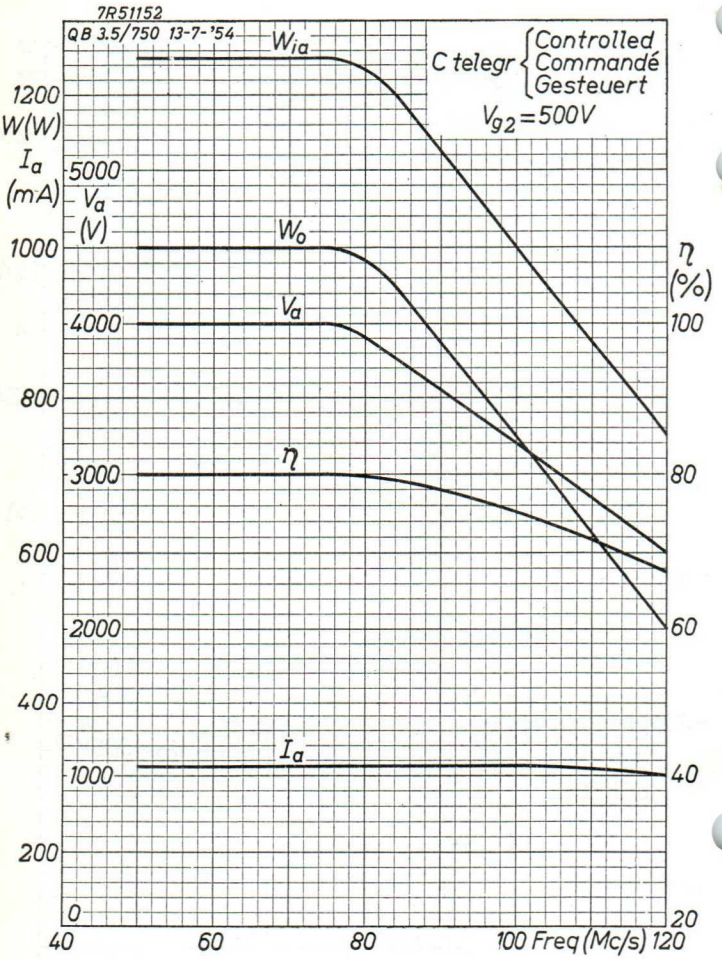
**QB 3.5/750**

# PHILIPS

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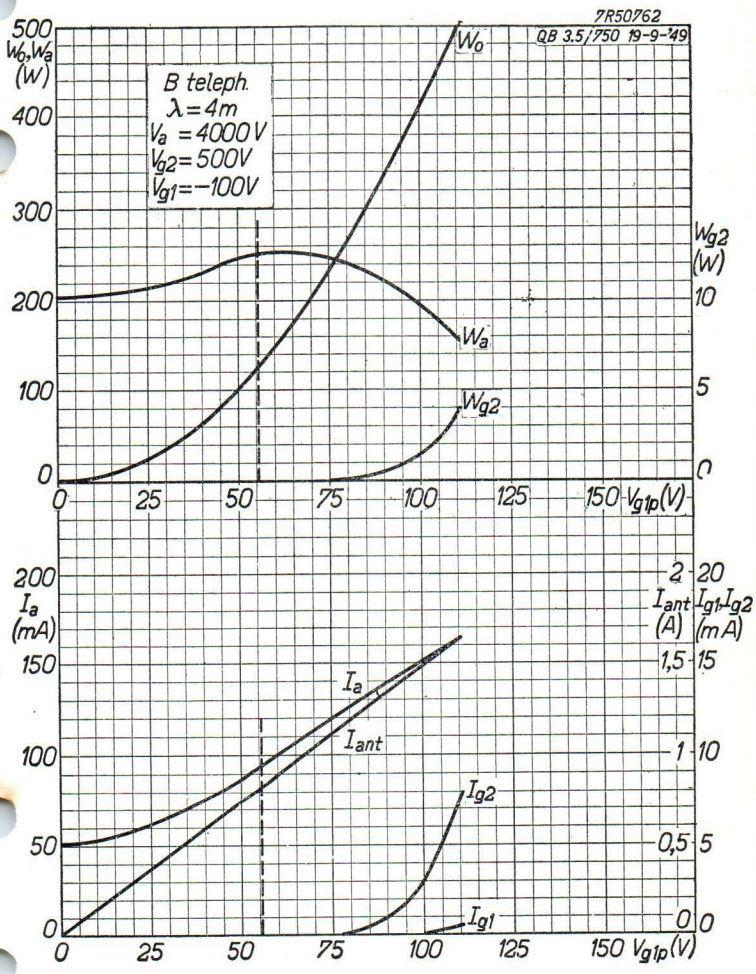
# PHILIPS

**QB 3.5/750**

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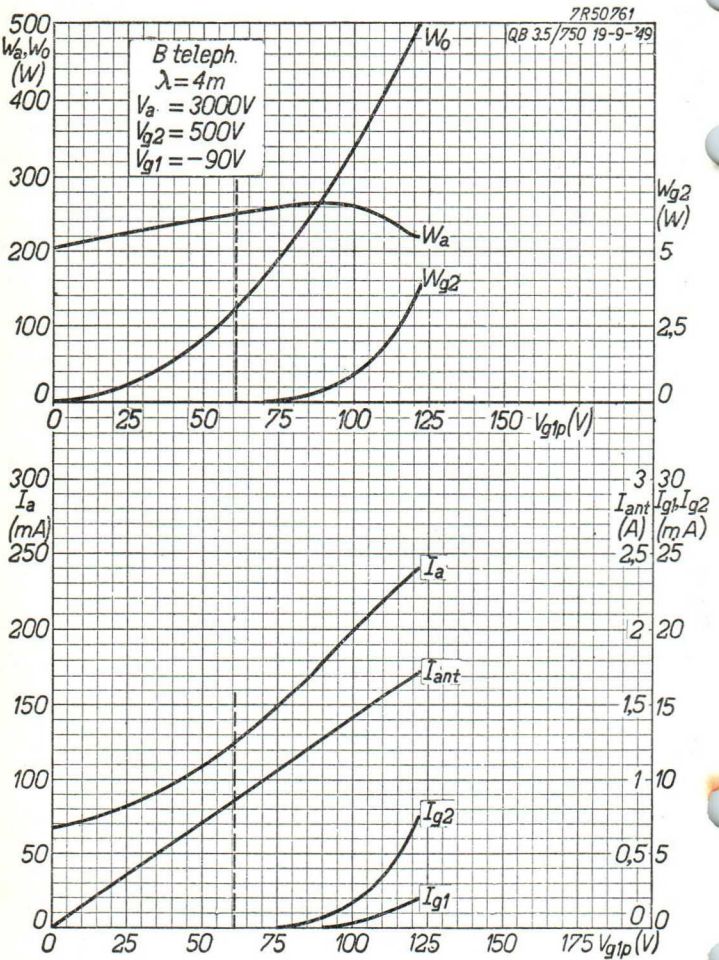
M

QB 3.5/750

# PHILIPS

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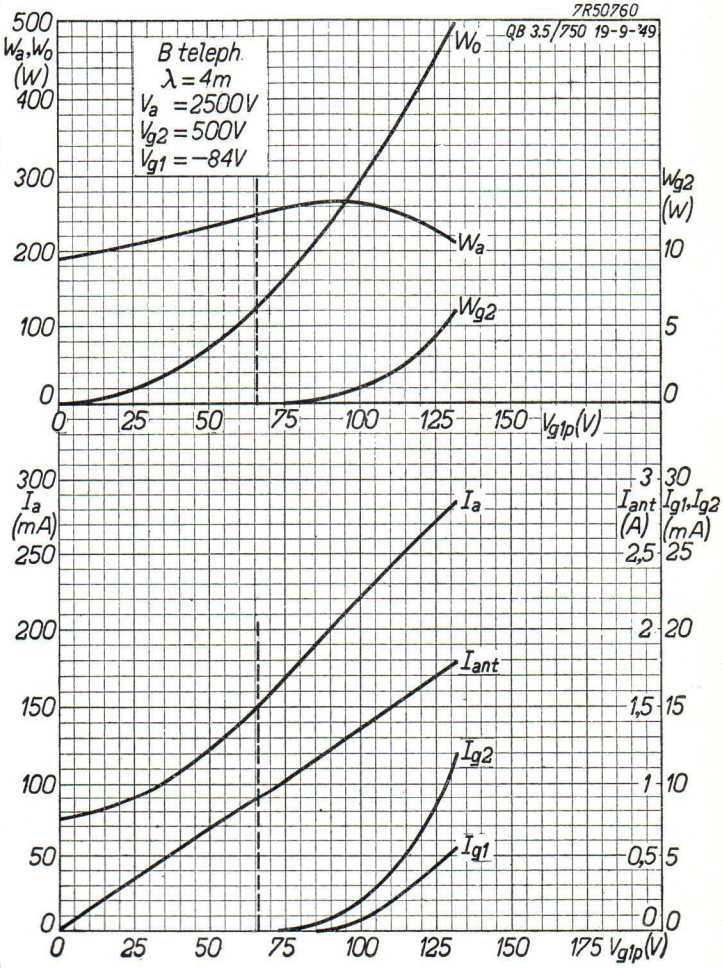
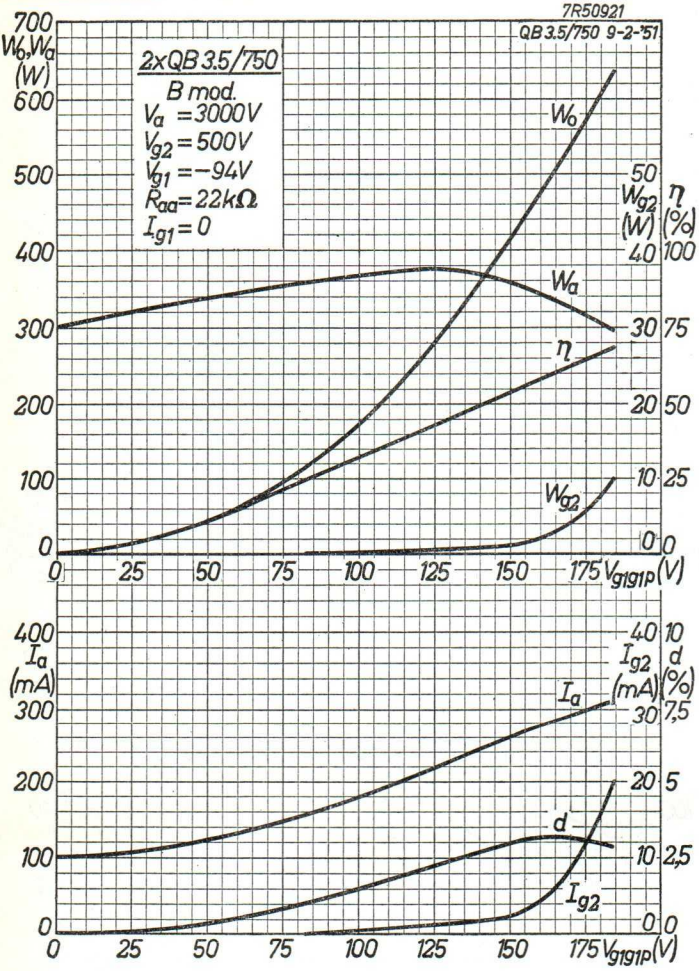

7R50760
QB 3.5/750 19-9-'49
B teleph
λ = 4m
Va = 2500V
Vg2 = 500V
Vg1 = −84V
Wa, Wo (W)
Wo
Wa
Wg2
Wg2 (W)
Vg1p (V)
Ia (mA)
Ia
Iant
Ig2
Ig1
Iant (A)
Ig1, Ig2 (mA)
Vg1p (V)

7.7.1954

O

**QB 3.5/750**

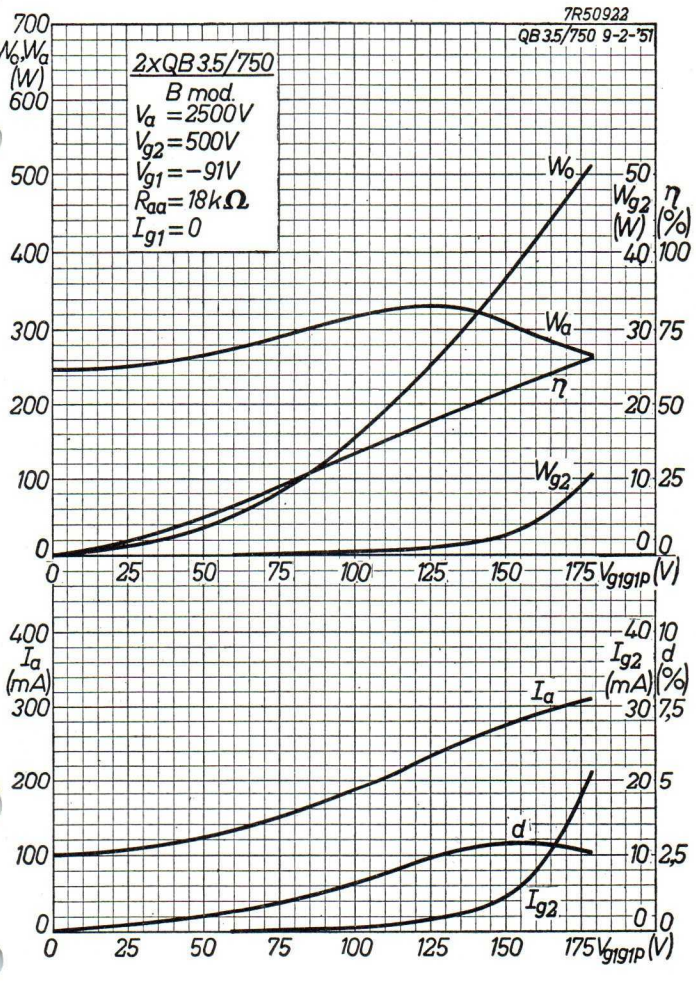
# PHILIPS




P

# PHILIPS

**QB 3.5/750**

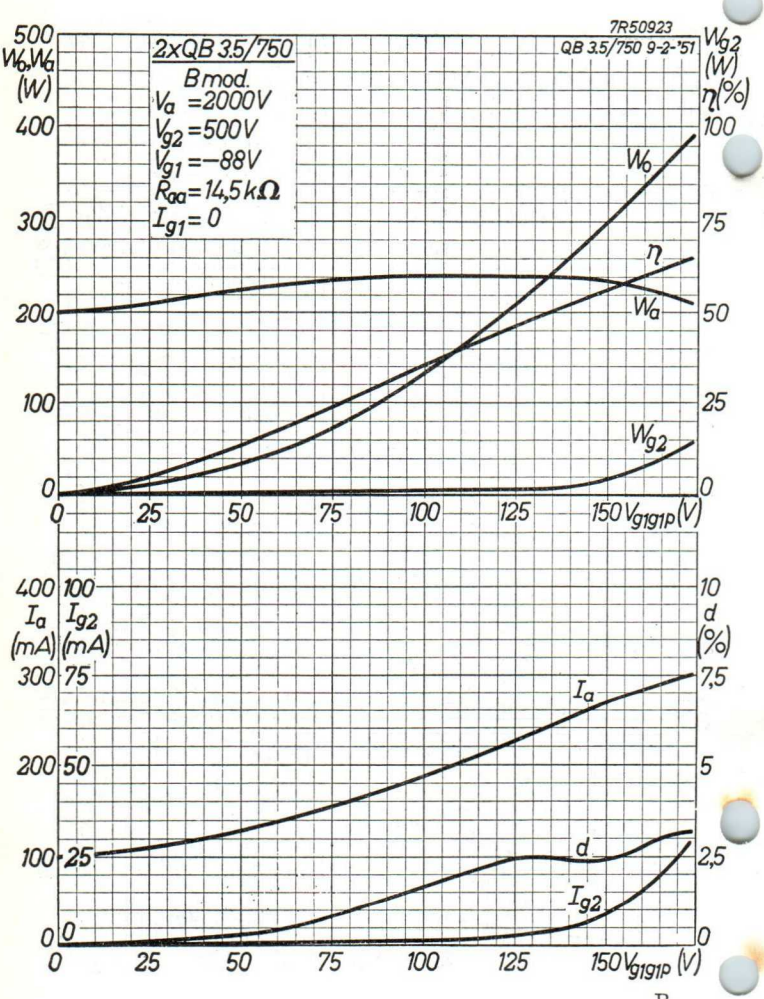



7.7.1954

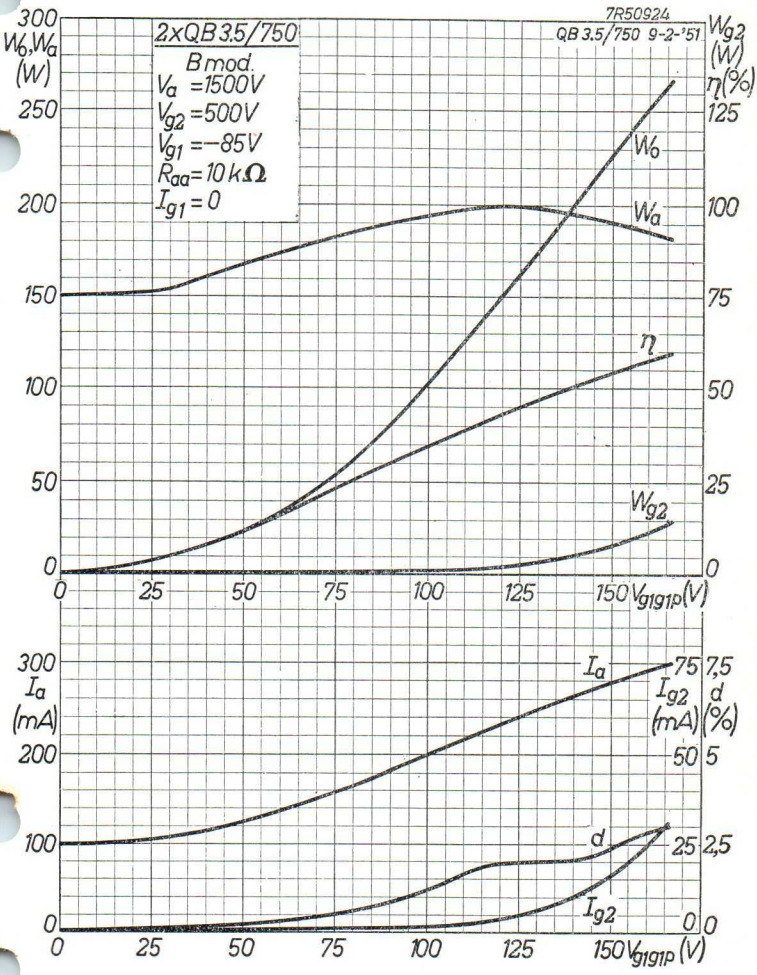
Q

QB 3.5/750

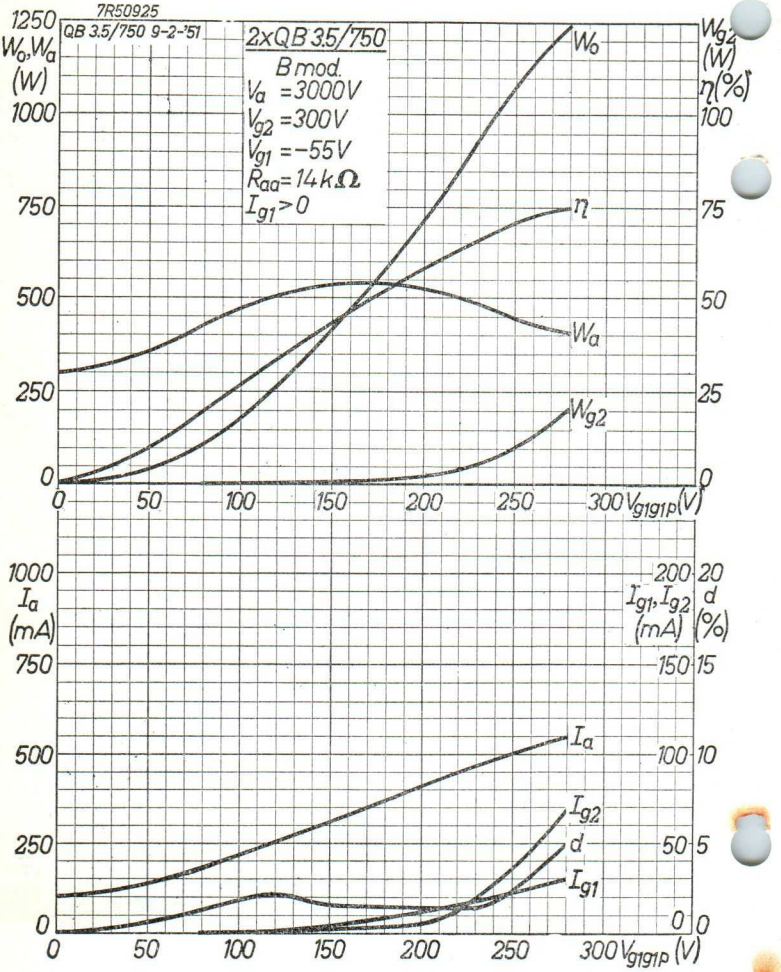
# PHILIPS



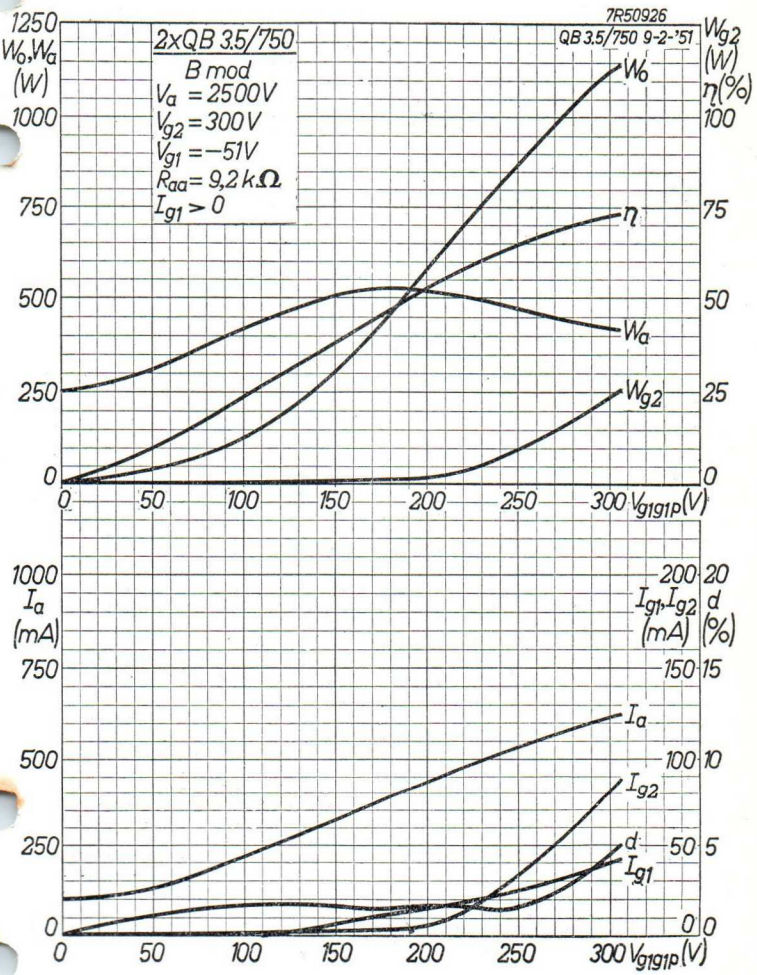

R


7R50924
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod.
$V_a$ = 1500V
$V_{g2}$ = 500V
$V_{g1}$ = −85V
$R_{aa}$ = 10 kΩ
$I_{g1}$ = 0
$W_o$, $W_a$ (W)
$W_{g2}$ (W)
η (%)
$W_o$
$W_a$
η
$W_{g2}$
$V_{g1g1p}$ (V)
$I_a$ (mA)
$I_{g2}$ (mA)
d (%)
$I_a$
$I_{g2}$
d

# PHILIPS


7R50925
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod.
Va =3000V
Vg2 =300V
Vg1 =−55V
Raa=14kΩ
Ig1>0
Wo,Wa (W)
Wg2 (W)
η(%)
Wo
η
Wa
Wg2
Vg1g1p(V)
Ia (mA)
Ig1,Ig2 (mA)
d (%)
Ia
Ig2
d
Ig1

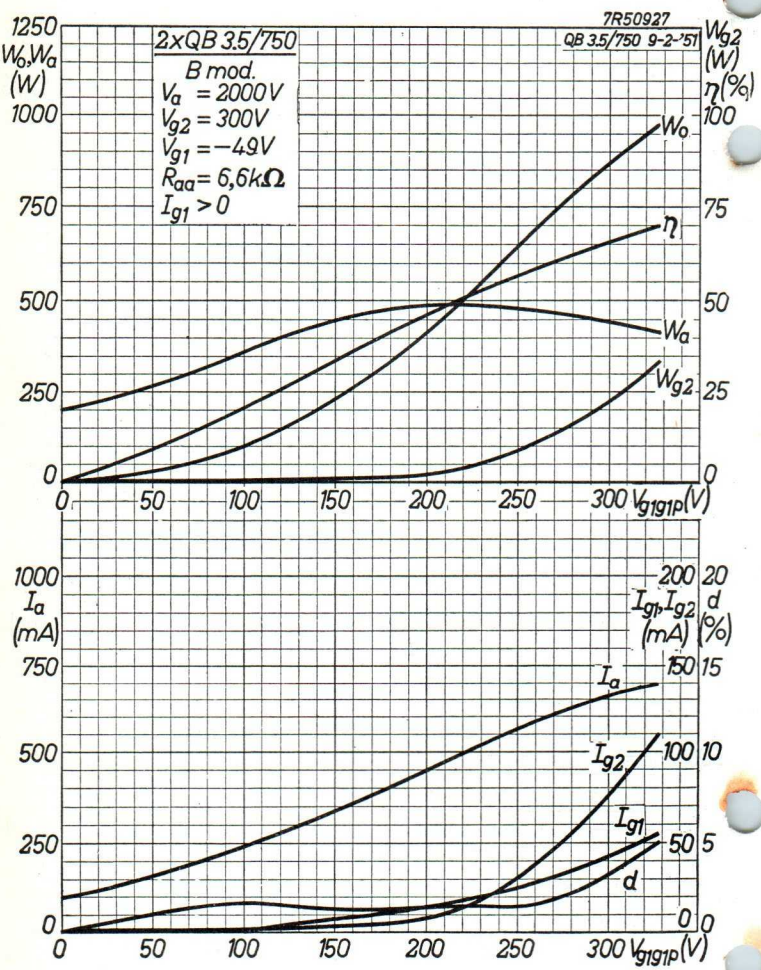
T

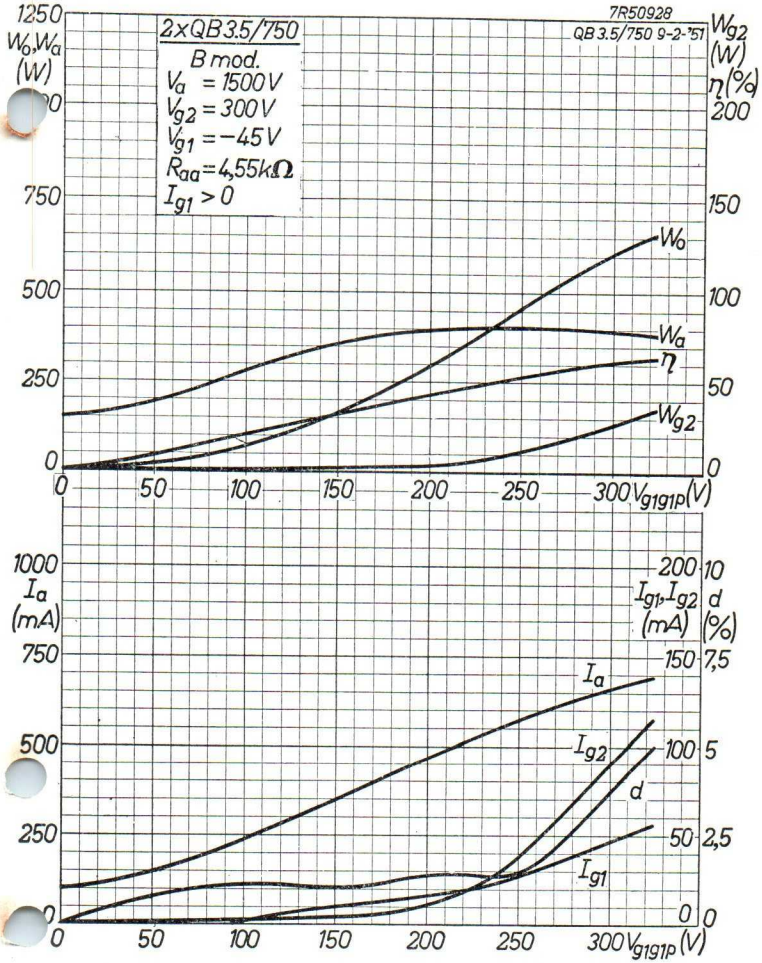

7R50926
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod
Va = 2500V
Vg2 = 300V
Vg1 = −51V
Raa = 9,2 kΩ
Ig1 > 0
Wo,Wa (W)
Wg2 (W)
η (%)
Wo
η
Wa
Wg2
Vg1g1p (V)
Ia (mA)
Ig1,Ig2 (mA)
d (%)
Ia
Ig2
d
Ig1

7.7.1954

U

# PHILIPS


7R50927
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod.
$V_a$ = 2000V
$V_{g2}$ = 300V
$V_{g1}$ = −49V
$R_{aa}$ = 6,6kΩ
$I_{g1}$ > 0
$W_o$, $W_a$ (W)
$W_{g2}$ (W)
η (%)
$W_o$
η
$W_a$
$W_{g2}$
$V_{g1g1P}$ (V)
$I_a$ (mA)
$I_{g1}$, $I_{g2}$ (mA)
d (%)
$I_a$
$I_{g2}$
$I_{g1}$
d

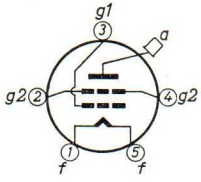

7R50928
QB 3.5/750 9-2-'51
2×QB 3.5/750
B mod.
$V_a$ = 1500 V
$V_{g2}$ = 300 V
$V_{g1}$ = −45 V
$R_{aa}$ = 4,55 kΩ
$I_{g1}$ > 0
$W_o$, $W_a$ (W)
$W_{g2}$ (W)
η (%)
$W_o$
$W_a$
η
$W_{g2}$
$V_{g1g1p}$ (V)
$I_a$ (mA)
$I_{g1}$, $I_{g2}$ (mA)
d (%)
$I_a$
$I_{g2}$
d
$I_{g1}$

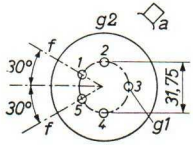
# PHILIPS

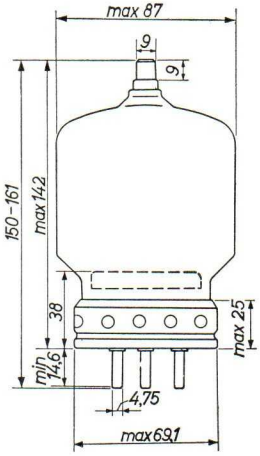
**QB 3.5/750 GA**

TETRODE for use as H.F. amplifier and oscillator
TETRODE pour utilisation en amplificatrice H.F. et en oscillatrice
TETRODE zur Verwendung als HF-Verstärker und Oszillator

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base : Metal-shell Giant 5p.
Culot : Giant 5p. avec culot métallique
Sockel: Giant 5p. mit Metallring

Socket
Support 40211/01
Fassung

For further data and curves please refer to QB 3.5/750
Pour les autres données et les courbes voir QB 3.5/750
Für die übrigen Daten und Kurven siehe QB 3.5/750

Tetrode for use in A.M. and F.M. transmitters
Tétrode pour utilisation dans des émetteurs A.M. et F.M.
Tetrode zur Verwendung in AM- und FM-Sendern

Cooling : radiation and forced air
Refroidissement: radiation et ventilation forcée
Kühlung : Strahlung und Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5 V
$I_f$ = 14,1 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 4,9 pF
$C_{g_1}$ = 12,7 pF
$C_{ag_1}$ = 0,12 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 2500 V
$V_{g_2}$ = 500 V
$I_a$ = 100 mA
S = 4,0 mA/V
$\mu_{g_2g_1}$ = 5,1

| Freq | C telegr. | | $C_{ag_2}$ mod. | | B S.S.B. | |
|---|---|---|---|---|---|---|
| Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| 30 | | | 3650 | 765[1] | | |
| 75 | 4000 | 1100 | 3000 | 630 | | |
| | 3000 | 800 | 2500 | 510 | | |
| | 2500 | 640 | 2000 | 380 | | |
| 100 | 4000 | 800 | | | | |
| | 3500 | 650 | | | | |
| 110 | | | | | 4000 | 650 |
| | | | | | 3500 | 600 |
| | | | | | 3000 | 500 |

| B AF;BF;NF | | |
|---|---|---|
| Va (V) | $W_o(W)$[2] | |
| | $I_{g_1}>0$ | $I_{g_1}=0$ |
| 4000 | 1750 | 1540 |
| 3500 | 1650 | 1330 |
| 3000 | 1375 | 1110 |
| 2500 | 1110 | 850 |

[1]) Intermittent service, ICAS
Service intermittent, ICAS
Aussetzender Betrieb, ICAS

[2]) Two tubes; deux tubes, zwei Röhren

Cooling. At $W_a$ < 250 W a low velocity air flow directed on the anode seal and the base will be sufficient. At $W_a$ > 250 W the glass chimney should be used for circulating forced air along the bulb. At $W_a$ = 400 W at least 0.4 $m^3$/min. air will be necessary, which is obtained by a static pressure of min. 5 mm water below the chassis (see drawing page 3)

Refroidissement. À $W_a$ < 250 W un léger courant d'air dirigé vers le scellement de l'anode et le fond suffira. À $W_a$ > 250 W la cheminée de verre doit être utilisée pour faire circuler l'air forcé le long de l'ampoule. À $W_a$ = 400 W 0,4 $m^3$/min. d'air sera nécessaire au moins, cequi est obtenu par une pression de 5 mm d'eau au moins au-dessous du châssis (voir le croquis page 3)

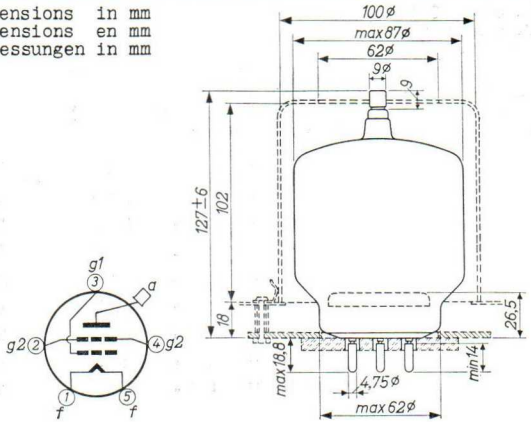
Kühlung. Bei $W_a$ < 250 W genügt ein schwacher auf die Anodeneinschmelzung und den Boden gerichteter Luftstrom. Bei $W_a$ > 250 W soll der gläserne Luftführungszylinder zur Führung von Pressluft entlang des Kolbens verwendet werden. Bei $W_a$ = 400 W ist mindestens 0,4 $m^3$/min erforderlich, was durch einen Druck von mindestens 5 mm Wasser unter dem Chassis erhalten werden kann (siehe Skizze Seite 3)

Temperatures
Températures
Temperaturen

| | |
|---|---|
| Anode seal temperature<br>Température du scellement de l'anode<br>Anodeneinschmelzungstemperatur | max. 220 °C |
| Temperature of pin seals<br>Température des scellements des broches<br>Temperatur der Einschmelzungen der Stifte | max. 180 °C |
| Bulb temperature<br>Température de l'ampoule<br>Kolbentemperatur | max. 350 °C |

| | |
|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 190 g |
| Shipping weight (9 tubes)<br>Poids brut (9 tubes)<br>Bruttogewicht (9 Röhren) | 6,5 kg |

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| | | | |
|---|---|---|---|
| Base<br>Culot<br>Sockel | Giant 5p | Socket<br>Support<br>Fassung | 40211/01 |
| Top cap<br>Capot supérieur<br>Kolbenanschluss | Small | Cap<br>Capot<br>Haube | 40624 |
| Chimney<br>Cheminée<br>Luftführungsring | 40666 | | |

Mounting position: Vertical with base up or down
Montage : Vertical avec le pied en haut ou en bas
Einbau : Senkrecht mit dem Sockel oben oder unten

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | = | | 110 | Mc/s |
|---|---|---|---|---|
| $V_a$ | = | max. | 4000 | V |
| $W_{ia}$ | = | max. | 1400 | W |
| $W_a$ | = | max. | 400 | W |
| $I_a$ | = | max. | 350 | mA |
| $V_{g2}$ | = | max. | 600 | V |
| $W_{g2}$ | = | max. | 35 | W |
| $-V_{g1}$ | = | max. | 500 | V |
| $I_{g1}$ | = | max. | 25 | mA |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f | = | 75 | 75 | 75 | 100 | 100 | Mc/s |
|---|---|---|---|---|---|---|---|
| $V_a$ | = | 4000 | 3000 | 2500 | 4000 | 3500 | V |
| $V_{g2}$ | = | 500 | 500 | 500 | 500 | 500 | V |
| $V_{g1}$ | = | -220 | -220 | -200 | -170 | -170 | V |
| $I_a$ | = | 350 | 350 | 350 | 270 | 250 | mA |
| $I_{g2}$ | = | 25 | 30 | 35 | 16 | 17 | mA |
| $I_{g1}$ | = | 6 | 6 | 6,5 | 9,5 | 9 | mA |
| $V_{g1p}$ | = | 305 | 305 | 290 | 240 | 235 | V |
| $W_{ig1}$ | = | 1,8 | 1,8 | 1,8 | 2 | 1,8 | W |
| $W_{g2}$ | = | 12,5 | 15 | 17,5 | 8 | 8,5 | W |
| $W_{ia}$ | = | 1400 | 1050 | 875 | 1080 | 875 | W |
| $W_a$ | = | 300 | 250 | 235 | 280 | 225 | W |
| $W_o$ | = | 1100 | 800 | 640 | 800 | 650 | W |
| $\eta$ | = | 78,5 | 76 | 73 | 74 | 74 | % |

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF-Klasse C Anoden- und Schirmgittermodulation

Limiting values (Absolute limits; carrier conditions with m = max. 100 %)
Caractéristiques limites (Limites absolues; caractéristiques de l'onde porteuse à m = max. 100 %)
Grenzdaten (Absolute Grenzwerte; Trägerdaten mit m = max. 100 %)

CCS = continuous service / service continu / Dauerbetrieb
ICAS = intermittent service / service intermittent / aussetzender Betrieb

| | | CCS | ICAS | |
|---|---|---|---|---|
| f | = | 75 | 30 | Mc/s |
| $V_a$ | = max. | 3200 | 4000 | V |
| $W_{ia}$ | = max. | 880 | 1100 | W |
| $W_a$ | = max. | 270 | 270 | W |
| $I_a$ | = max. | 275 | 275 | mA |
| $V_{g2}$ | = max. | 600 | 600 | V |
| $W_{g2}$ | = max. | 35 | 35 | W |
| $-V_{g1}$ | = max. | 500 | 500 | V |
| $I_{g1}$ | = max. | 25 | 25 | mA |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | CCS | | | ICAS | |
|---|---|---|---|---|---|---|
| f | = | 75 | 75 | 75 | 30 | Mc/s |
| $V_a$ | = | 3000 | 2500 | 2000 | 3650 | V |
| $V_{g2}$ | = | 500 | 500 | 500 | 500 | V |
| $V_{g1}$ | = | -220 | -220 | -220 | -225 | V |
| $I_a$ | = | 275 | 275 | 275 | 275 | mA |
| $I_{g2}$ | = | 36 | 38 | 40 | 30 | mA |
| $I_{g1}$ | = | 6 | 6 | 6 | 6 | mA |
| $V_{g1p}$ | = | 305 | 308 | 305 | 308 | V |
| $W_{ig1}$ | = | 1,6 | 1,7 | 1,6 | 1,7 | W |
| $W_{g2}$ | = | 18 | 19 | 20 | 15 | W |
| $W_{ia}$ | = | 825 | 688 | 550 | 1000 | W |
| $W_a$ | = | 195 | 178 | 170 | 235 | W |
| $W_o$ | = | 630 | 510 | 380 | 765 | W |
| $\eta$ | = | 76 | 74 | 69 | 76,5 | % |
| m | = | 100 | 100 | 100 | 100 | % |
| $V_{g2p}$ | = | 400 | 400 | 400 | 400 | V [1] |
| $W_{mod}$ | = | 413 | 344 | 275 | 500 | W |

[1]) $g_2$ modulated with transformer; $g_2$ modulée par transformateur; $g_2$ moduliert mittels Transformators

# PHILIPS

H.F. class B amplifier, single side band
Amplificatrice H.F. classe B à une bande latérale $I_{g_1} = 0$
HF-Einseitenbandverstärker Klasse B

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

f = 110 Mc/s
$V_a$ = max. 4000 V
$W_{ia}$ = max. 1400 W
$W_a$ = max. 400 W
$I_a$ = max. 350 mA
$V_{g_2}$ = max. 850 V
$W_{g_2}$ = max. 35 W

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| f | = | | 110 | | | 110 | | Mc/s |
| $V_a$ | = | | 4000 | | | 3500 | | V |
| $V_{g_1}$ | = | | -130 | | | -135 | | V |
| $V_{g_2}$ | = | | 705 | | | 750 | | V |
| | | | [1] | [2] | | [1] | [2] | |
| $V_{g_1p}$ | = | 0 | 130 | | 0 | 135 | | V |
| $I_a$ | = | 65 | 250 | 175 | 75 | 280 | 200 | mA |
| $I_{g_2}$ | = | | 10 | 7 | | 12 | 8,4 | mA |
| $W_{g_2}$ | = | | 7,05 | 4,95 | | 9 | 6,3 | W |
| $W_{ia}$ | = | 260 | 1000 | 700 | 263 | 980 | 700 | W |
| $W_a$ | = | 260 | 350 | 375 | 263 | 380 | 400 | W |
| $W_o$ | = | | 650 | 325 | | 600 | 300 | W |
| $\eta$ | = | | 65 | 46,5 | | 61,2 | 43 | % |

[1]) Single tone
Signal monofréquence
Einzelton

[2]) Double tone
Signal difréquence
Doppelton

H.F. class B amplifier, single side band (continued)
Amplificatrice H.F. classe B a une bande latérale (suite)
HF-Einseitenbandverstärker Klasse B (Fortsetzung)

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

| | | | | | |
|---|---|---|---|---|---|
| $f$ | = | | 110 | | Mc/s |
| $V_a$ | = | | 3000 | | V |
| $V_{g1}$ | = | | -140 | | V |
| $V_{g2}$ | = | | 810 | | V |
| | | | [1] | [2] | |
| $V_{g1p}$ | = | 0 | 140 | | V |
| $I_a$ | = | 90 | 300 | 215 | mA |
| $I_{g2}$ | = | | 15 | 10,5 | mA |
| $W_{g2}$ | = | | 12,2 | 8,5 | W |
| $W_{ia}$ | = | 270 | 900 | 645 | W |
| $W_a$ | = | 270 | 400 | 395 | W |
| $W_o$ | = | | 500 | 250 | W |
| $\eta$ | = | | 55,5 | 38,8 | % |

A.F. class B amplifier
Amplificatrice B.F. classe B $I_{g1} > 0$
NF-Klasse B-Verstärker

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | max. | 4000 | V |
| $W_a$ | = | max. | 400 | W |
| $I_a$ | = | max. | 350 | mA |
| $V_{g2}$ | = | max. | 800 | V [3] |
| $W_{g2}$ | = | max. | 35 | W |
| $-I_{g1}$ | = | max. | 25 | mA |

[1][2]) See page 6; voir page 6; siehe Seite 6

[3]) $V_{g2}$ = max. 1000 V if the temperature of the pin seals is kept below 120 °C
$V_{g2}$ = max. 1000 V si la température des scellements des broches est au-dessous de 120 °C
$V_{g2}$ = max. 1000 V wenn die Temperatur der Einschmelzungen der Stifte unterhalb 120 °C ist

A.F. class B amplifier (continued)
Amplificatrice B.F. classe B (suite)
NF-Klasse B-Verstärker (Fortsetzung)

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 4000 | | 3500 | | V |
| $V_{g2}$ | = | 500 | | 500 | | V |
| $V_{g1}$ | = | -90 | | -85 | | V |
| $R_{aa\sim}$ | = | 15000 | | 11300 | | Ω |
| $V_{g1g1p}$ | = | 0 | 290 | 0 | 305 | V |
| $I_a$ | = | 2x80 | 2x319 | 2x80 | 2x350 | mA |
| $I_{g2}$ | = | | 2x20 | | 2x20 | mA |
| $I_{g1}$ | = | | 2x6 | | 2x6,5 | mA |
| $W_{g2}$ | = | | 2x10 | | 2x10 | W |
| $W_{ig1}$ | = | | 2x0,8 | | 2x0,9 | W |
| $W_{ia}$ | = | 2x320 | 2x1275 | 2x280 | 2x1225 | W |
| $W_a$ | = | 2x320 | 2x400 | 2x280 | 2x400 | W |
| $W_o$ | = | | 1750 | | 1650 | W |
| $\eta$ | = | | 68,5 | | 67,5 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 3000 | | 2500 | | V |
| $V_{g2}$ | = | 500 | | 500 | | V |
| $V_{g1}$ | = | -80 | | -75 | | V |
| $R_{aa\sim}$ | = | 10000 | | 8000 | | Ω |
| $V_{g1g1p}$ | = | 0 | 292 | 0 | 290 | V |
| $I_a$ | = | 2x90 | 2x350 | 2x95 | 2x350 | mA |
| $I_{g2}$ | = | | 2x20 | | 2x30 | mA |
| $I_{g1}$ | = | | 2x6,5 | | 2x7 | mA |
| $W_{g2}$ | = | | 2x10 | | 2x15 | W |
| $W_{ig1}$ | = | | 2x0,85 | | 2x0,91 | W |
| $W_{ia}$ | = | 2x270 | 2x1050 | 2x238 | 2x875 | W |
| $W_a$ | = | 2x270 | 2x362 | 2x238 | 2x320 | W |
| $W_o$ | = | | 1375 | | 1110 | W |
| $\eta$ | = | | 65,5 | | 63,5 | % |

A.F. class B amplifier
Amplificatrice B.F. classe B
NF-Klasse B-Verstärker

$I_{g1} = 0$

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 4000 | V |
| $W_a$ | = max. | 400 | W |
| $I_a$ | = max. | 350 | mA |
| $V_{g2}$ | = max. | 800 | V [3]) |
| $W_{g2}$ | = max. | 35 | W |
| $I_{g1}$ | = max. | 25 | mA |

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 4000 | | 3500 | | V |
| $V_{g2}$ | = | 750 | | 750 | | V |
| $V_{g1}$ | = | -150 | | -145 | | V |
| $R_{aa\sim}$ | = | 14500 | | 11500 | | Ω |
| $V_{g1g1p}$ | = | 0 | 300 | 0 | 290 | V |
| $I_a$ | = | 2x60 | 2x293 | 2x70 | 2x305 | mA |
| $I_{g2}$ | = | | 2x15 | | 2x13,5 | mA |
| $W_{g2}$ | = | | 2x11,2 | | 2x10,4 | W |
| $W_{ia}$ | = | 2x240 | 2x1170 | 2x245 | 2x1065 | W |
| $W_a$ | = | 2x240 | 2x400 | 2x245 | 2x400 | W |
| $W_o$ | = | | 1540 | | 1330 | W |
| $\eta$ | = | | 66 | | 62,5 | % |

---

[1]) $V_{g2}$ = max. 1000 V if the temperature of the pin seals is kept below 120 °C
$V_{g2}$ = max. 1000 V si la température des scellements des broches est au-dessous de 120 °C
$V_{g2}$ = max. 1000 V wenn die Temperatur der Einschmelzungen der Stifte unterhalb 120 °C ist

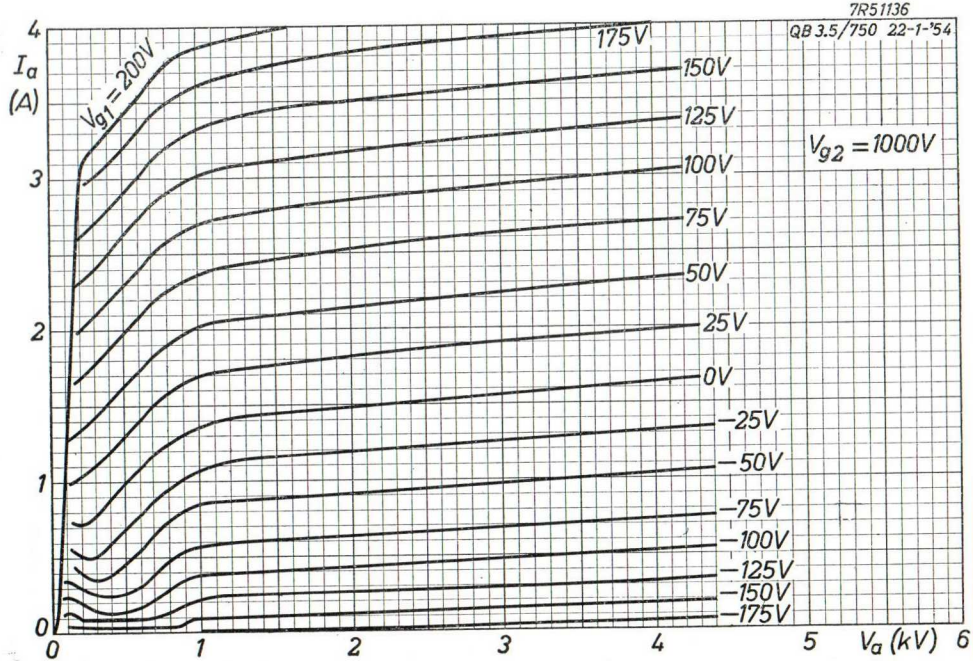
# PHILIPS

A.F. class B amplifier (continued)
Amplificatrice B.F. classe B (suite)
NF-Klasse B-Verstärker (Fortsetzung)

$I_{g1} = 0$

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

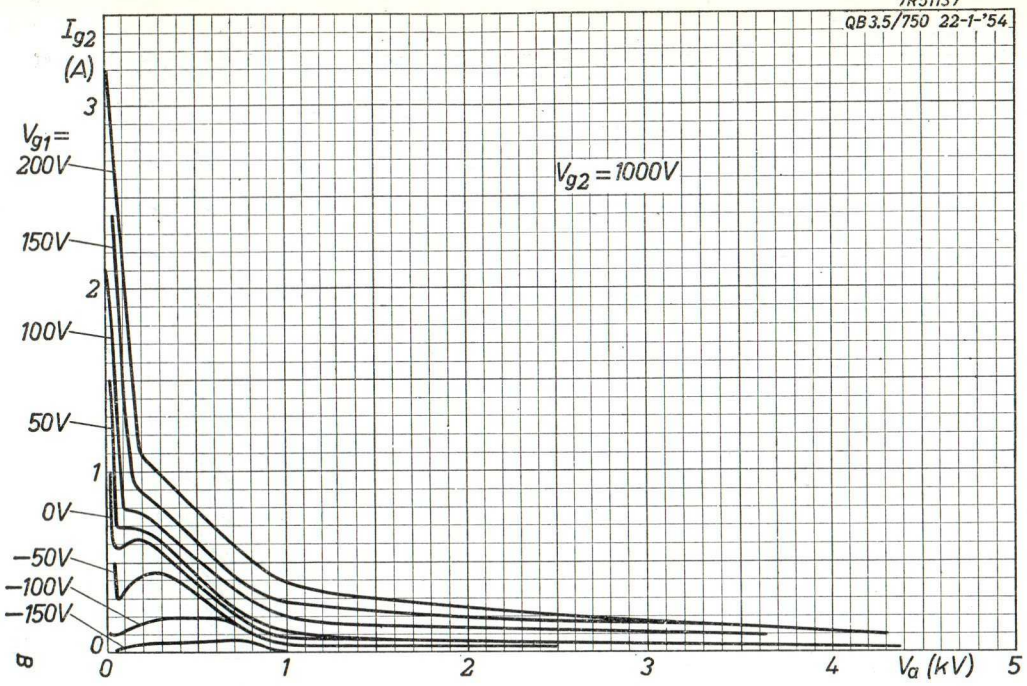
| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 3000 | | 2500 | | V |
| $V_{g2}$ | = | 750 | | 750 | | V |
| $V_{g1}$ | = | -137 | | -130 | | V |
| $R_{aa\sim}$ | = | 8900 | | 6800 | | Ω |
| $V_{g1g1p}$ | = | 0 | 274 | 0 | 260 | V |
| $I_a$ | = | 2x80 | 2x318 | 2x95 | 2x318 | mA |
| $I_{g2}$ | = | | 2x11 | | 2x11,6 | mA |
| $W_{g2}$ | = | | 2x10,3 | | 2x8,7 | W |
| $W_{ia}$ | = | 2x240 | 2x955 | 2x238 | 2x795 | W |
| $W_a$ | = | 2x240 | 2x400 | 2x238 | 2x370 | W |
| $W_o$ | = | | 1110 | | 850 | W |
| $\eta$ | = | | 58 | | 53,5 | % |



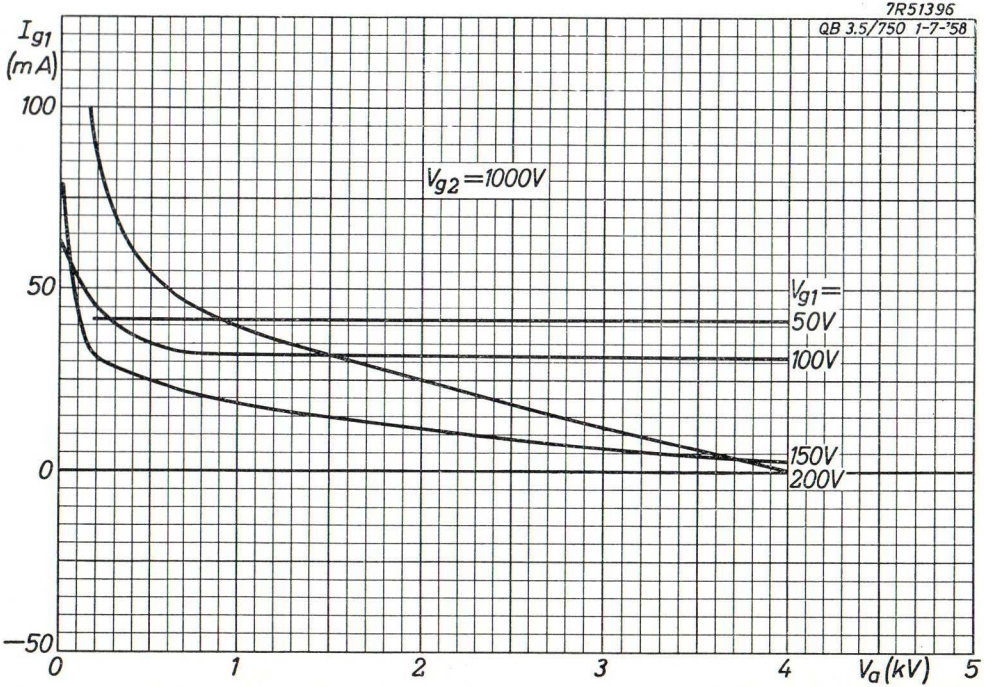

PHILIPS

QB 4/1100

A


7R51137
QB 3,5/750 22-1-'54
$I_{g2}$ (A)
3
2
1
0
$V_{g1}$ =
200V
150V
100V
50V
0V
−50V
−100V
−150V
$V_{g2}$ = 1000V
0
1
2
3
4
5
$V_a$ (kV)
B

PHILIPS

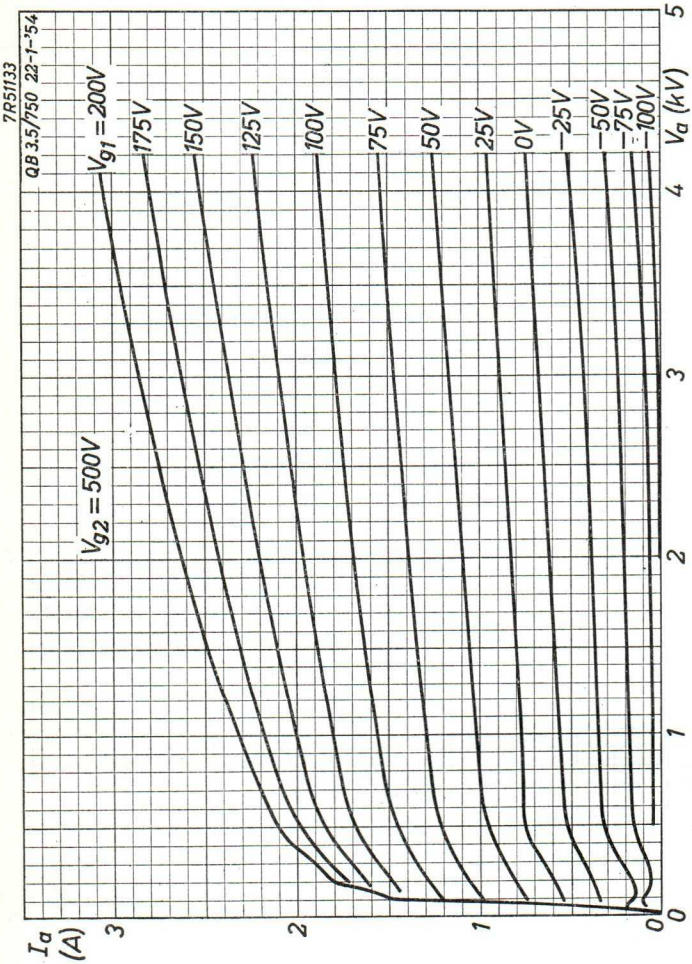



PHILIPS

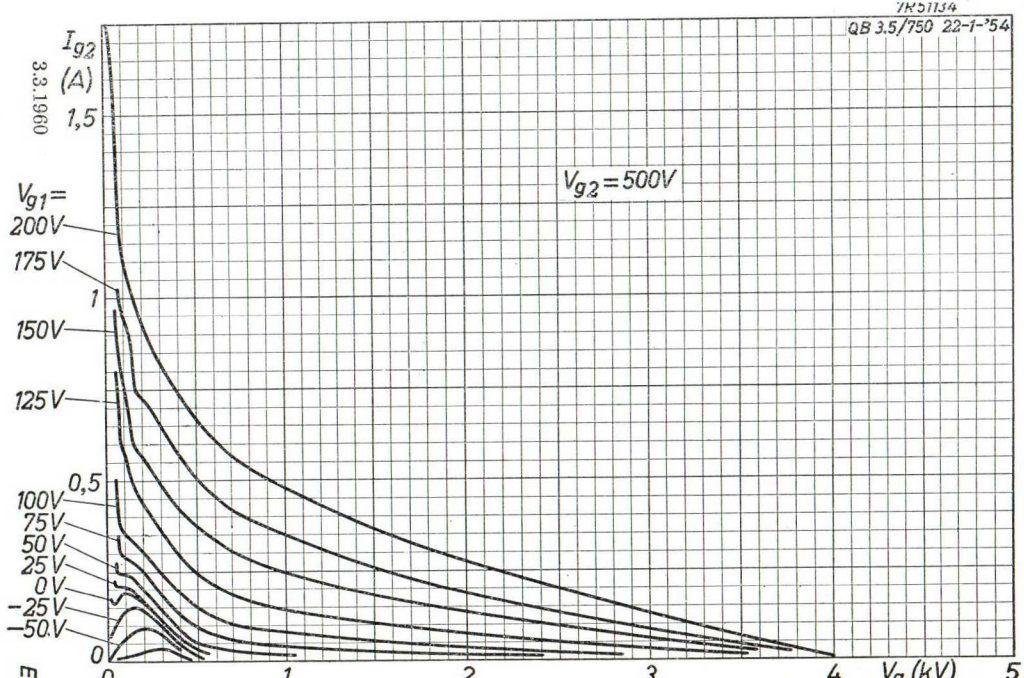
QB 4/1100

QB 4/1100

# PHILIPS




D




3.3.1960

PHILIPS

QB 4/1100

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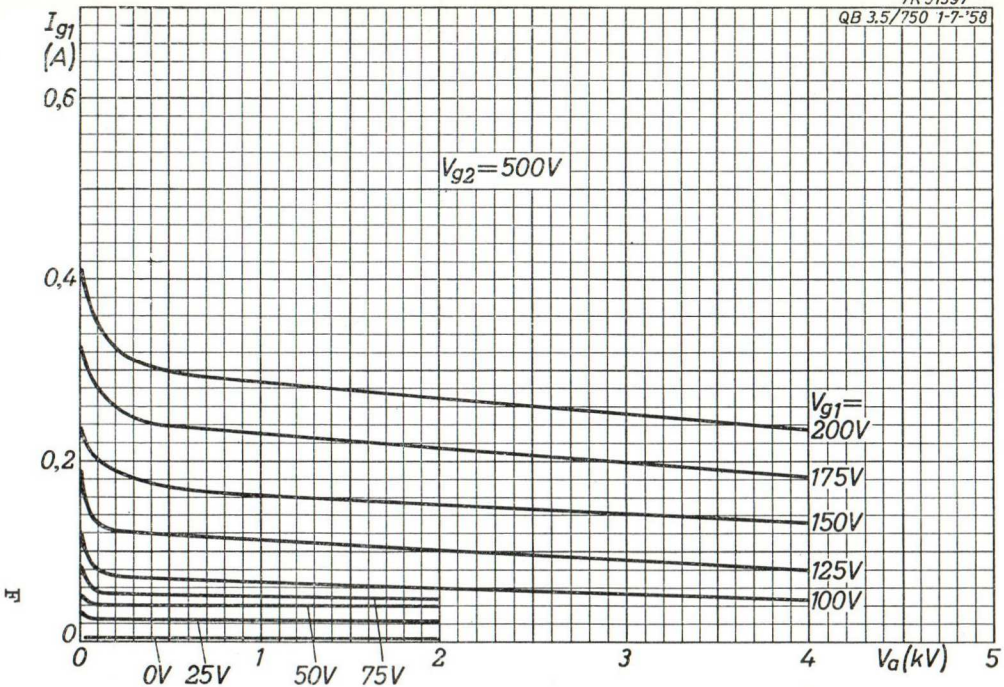
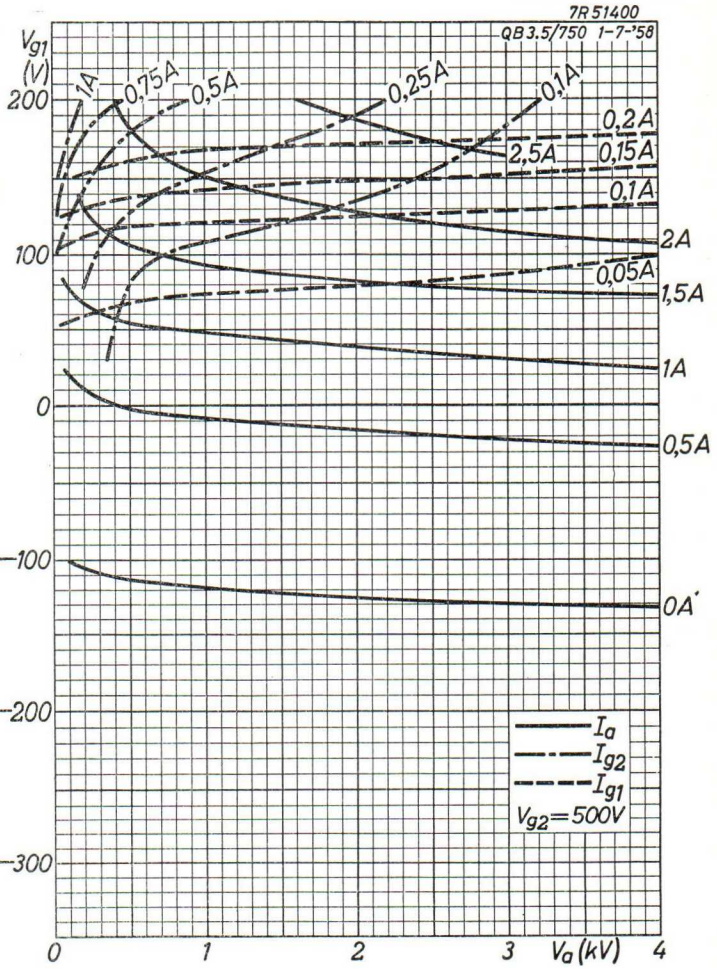


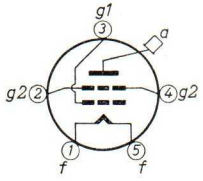

7R 51400
QB 3.5/750 1-7-'58
$V_{g1}$ (V)
200
100
0
−100
−200
−300
1A
0,75A
0,5A
0,25A
0,1A
0,2A
2,5A
0,15A
0,1A
2A
0,05A
1,5A
1A
0,5A
0A
$I_a$
$I_{g2}$
$I_{g1}$
$V_{g2}$=500V
0
1
2
3
$V_a$(kV)
4

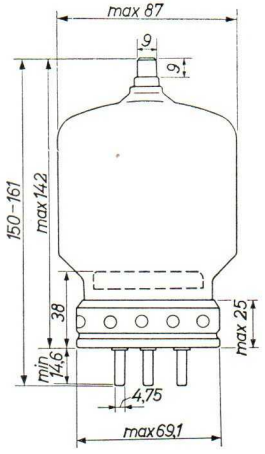
# PHILIPS

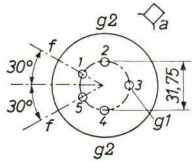
**QB 4/1100 GA**

TETRODE for use in A.M. and F.M. transmitters
TETRODE pour utilisation dans des émetteurs A.M. et F.M.
TETRODE zur Verwendung in AM- und FM-Sendern

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base : Metal-shell Giant 5p.
Culot : Giant 5p. avec culot métallique
Sockel: Giant 5p. mit Metallring

Socket
Support 40211/01
Fassung

For further data and curves please refer to QB 4/1100
Pour les autres données et les courbes voir QB 4/1100
Für die übrigen Daten und Kurven siehe QB 4/1100

TETRODE for use as H.F.amplifier,frequency multiplier or modulator
TETRODE pour utilisation en amplificatrice H.F., multiplicatrice de fréquence ou modulatrice
TETRODE zur Verwendung als HF-Verstärker, Frequenzvervielfacher oder Modulator

Cooling : radiation/low velocity air flow
Refroidissement: radiation/léger courant d'air
Kühlung : Strahlung/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 10 V
$I_f$ = 9,9 A

Capacitances
Capacités
Kapazitäten

$C_{g1}$ = 24 pF
$C_a$ = 8,3 pF
$C_{ag1}$ = 0,25 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ ($I_a$ = 120 mA)= 9,5
S ($I_a$ = 120 mA)= 7 mA/V

| λ | Freq. | C telegr. | | $C_{ag2}$ mod | | $C_{g1}$ mod | |
|---|---|---|---|---|---|---|---|
| (m) | ( Mc/s) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 5 | 60 | 5000 | 1760 | 4000 | 1200 | 4500 | 400 |
| | | 4000 | 1410 | | | 4000 | 330 |

| λ | Freq. | Single side band B Une bande latérale Ein Seitenband | | $B_{mod}$ [1]) | |
|---|---|---|---|---|---|
| (m) | ( Mc/s) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 5 | 60 | 5000 | 900 | 5000 | 2220 |
| | | | | 4000 | 2250 |

Industrial application, H.F. class C
Application industrielle, H.F. classe C
Industrielle Anwendung, HF-Klasse C

| λ | Freq. | ∿ 2) | | ⎓ 3) | |
|---|---|---|---|---|---|
| (m) | ( Mc/s) | $V_{tr}$ ($V_{eff}$) | $W_o$ (W) | $V_{tr}$ ($V_{eff}$) 4) | $W_o$ (W) |
| 5 | 60 | 4800 | 750 | 4250 | 1110 |

1)2)3)4) See page 3; voir page 3; siehe Seite 3

Cooling
Refroidissement
Kühlung

In order to keep the temperatures below the maximum permitted values it may be necessary to direct an air flow to the seals

Afin de maintenir les températures au-dessous des valeurs maximum admissible il peut être nécessaire de diriger un courant d'air vers les scellements

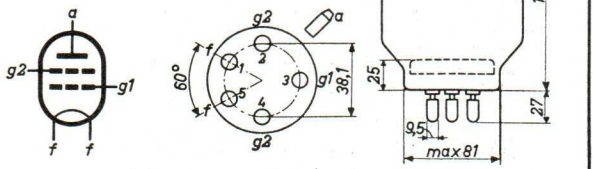
Damit die Temperaturen unterhalb der höchstzulässigen Werte bleiben, kann ein Luftstrom auf die Einschmelzungen notwendig sein

Bulb temperature
Température de l'ampoule = max. 250 °C
Kolbentemperatur

Temperature of anode seal
Température du scellement de l'anode = max. 220 °C
Temperatur der Anodeneinschmelzung

Temperature of pin seals
Température des scellements des broches = max. 180 °C
Temperatur der Stifteneinschmelzungen

Dimensions in mm
Dimensions en mm
Abmessungen in mm



| | | |
|---|---|---|
| Mounting position: vertical with base up or down<br>Montage : verticale avec le culot en haut ou en bas<br>Einbau : senkrecht mit dem Sockel oben oder unten | | |
| Accessories<br>Accessoires<br>Zubehörteile | Socket<br>Support<br>Fassung | 40216 |
| | Clip for ande connection<br>Borne de connexion de l'anode<br>Anodenanschlussklemme | 40626 |
| Net weight<br>Poids net<br>Nettogewicht | 375 g | |
| Shipping weight<br>Poids brut<br>Bruttogewicht | 1,35 kg | |

---

[1]) Two tubes
Deux tubes
Zwei Röhren

→ [2]) ∿ = selfrectification
∿ = auto-redressement
∿ = Selbstgleichrichtung

→ [3]) ⌒ = two phase half wave rectification without filter
⌒ = redressement biphasé à une alternance sans filtre
⌒ = Zweiphasen-Einweggleichrichtung ohne Filter

[4]) Each phase
Chaque phase
Jede Phase

# PHILIPS

H.F. class C telegraphy
H.F. classe C télégraphie
HF- Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 75 | Mc/s |
| $V_a$ | = max. | 5 | kV |
| $W_{ia}$ | = max. | 2250 | W |
| $W_a$ | = max. | 500 | W |
| $I_a$ | = max. | 450 | mA |
| $V_{g2}$ | = max. | 700 | V |
| $W_{g2}$ | = max. | 65 | W |
| $-V_{g1}$ | = max. | 500 | V |
| $W_{g1}$ | = max. | 25 | W |

| | | | |
|---|---|---|---|
| f | = max. | 110 | Mc/s[1]) |
| $V_a$ | = max. | 4,5 | kV |
| $W_{ia}$ | = max. | 1800 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| f | ≤ | 60 | 60 | 60 | 60 | Mc/s |
| $V_a$ | = | 5 | 5 | 4 | 4 | kV |
| $V_{g2}$ | = | 600 | 700 | 600 | 700 | V |
| $V_{g1}$ | = | -200 | -200 | -200 | -200 | V |
| $I_a$ | = | 440 | 440 | 450 | 450 | mA |
| $I_{g2}$ | = | 80 | 75 | 90 | 85 | mA |
| $I_{g1}$ | = | 35 | 25 | 39 | 27 | mA |
| $V_{g1p}$ | = | 350 | 340 | 350 | 340 | V |
| $W_{ia}$ | = | 2200 | 2200 | 1800 | 1800 | W |
| $W_{ig1}$ | = | 12 | 8 | 14 | 8,5 | W |
| $W_{ig2}$ | = | 48 | 52,5 | 54 | 59,5 | W |
| $W_a$ | = | 440 | 440 | 390 | 390 | W |
| $W_o$ | = | 1760 | 1760 | 1410 | 1410 | W |
| $\eta$ | = | 80 | 80 | 78 | 78 | % |

[1])See page N; voir page N; siehe Seite N

H.F.class C anode and screen grid modulation
H.F.classe C modulation d'anode et de grille écran
HF- Klasse C Anoden- und Schirmgittermodulation

Screen grid modulated via a choke of 2 H
La grille-écran modulée à travers une bobine de 2 H
Schirmgitter moduliert über eine Drosselspule von 2 H

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 75 | Mc/s |
| $V_a$ | = max. | 4 | kV |
| $W_{ia}$ | = max. | 1600 | W |
| $W_a$ | = max. | 330 | W |
| $I_a$ | = max. | 400 | mA |
| $V_{g2}$ | = max. | 700 | V |
| $W_{g2}$ | = max. | 50 | W |
| $-V_{g1}$ | = max. | 500 | V |
| $W_{g1}$ | = max. | 25 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | ≤ | 60 | Mc/s |
| $V_a$ | = | 4 | kV |
| $V_{g2}$ | = | 600 | V |
| $V_{g1}$ | = | -240 | V |
| $V_{g2p}$ | = | 340 | V |
| $V_{g1p}$ | = | 415 | V |
| $I_a$ | = | 380 | mA |
| $I_{g2}$ | = | 80 | mA |
| $I_{g1}$ | = | 20 | mA |
| $W_{ia}$ | = | 1520 | W |
| $W_{ig1}$ | = | 7,5 | W |
| $W_{ig2}$ | = | 48 | W |
| $W_a$ | = | 320 | W |
| $W_o$ | = | 1200 | W |
| $\eta$ | = | 79 | % |
| m | = | 100 | % |
| $W_{mod}$ | = | 760 | W |

# PHILIPS

H.F. class C control grid modulation
H.F. classe C modulation de grille de commande
HF-Klasse C Steuergittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

| f | = max. | 75 Mc/s |
|---|---|---|
| $V_a$ | = max. | 5000 V |
| $W_{ia}$ | = max. | 1000 W |
| $W_a$ | = max. | 500 W |
| $I_a$ | = max. | 225 mA |
| $V_{g2}$ | = max. | 700 V |
| $W_{g2}$ | = max. | 50 W |
| $-V_{g1}$ | = max. | 500 V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | ≤ | 60 | 60 Mc/s |
| $V_a$ | = | 4500 | 4000 V |
| $V_{g2}$ | = | 600 | 600 V |
| $V_{g1}$ | = | -180 [1]) | -180 [1])V |
| $R_{g1}$ | = | 1400 | 1400 Ω |
| $V_{g1\,p}$ | = | 220 | 210 V |
| $I_a$ | = | 200 | 200 mA |
| $I_{g2}$ | = | 5 | 5 mA |
| $I_{g1}$ | = | 6,5 | 6,5 mA |
| $W_{ig1}$ | = | 1,3 | 1,2 W |
| $W_{ia}$ | = | 900 | 800 W |
| $W_a$ | = | 500 | 470 W |
| $W_{g2}$ | = | 3 | 3 W |
| $W_o$ | = | 400 | 330 W |
| $\eta$ | = | 44,5 | 41 % |
| m | = | 100 | 100 % |
| $V_{g1\,mod\,p}$ | = | 100 | 100 V |
| $I_{g1}$ [2]) | = | 5 | 27 mA |
| $W_{ig1}$ [2]) | = | 5 | 5 W |

[1])[2])See page 7; voir page 7; siehe Seite 7

H.F. class B amplifier single side band
H.F. classe B amplificateur à une bande latérale
HF-Klasse B Einseitenbandverstärker

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 75 | Mc/s |
| $V_a$ | = max. | 5000 | V |
| $W_{1a}$ | = max. | 2250 | W |
| $W_a$ | = max. | 500 | W |
| $I_a$ | = max. | 450 | mA |
| $V_{g2}$ | = max. | 700 | V |
| $W_{g2}$ | = max. | 65 | W |
| $R_{g1}$ | = max. | 50 | kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = | 60 | | Mc/s |
| $V_a$ | = | 5000 | | V |
| $V_{g2}$ | = | 700 | | V |
| $V_{g1}$ | = | -90 | | V |
| $V_{g1p}$ | = | 0 | 130 | V |
| $I_a$ | = | 56 | 280 | mA |
| $I_{g2}$ | = | 0 | 25 | mA |
| $I_{g1}$ | = | 0 | 1 | mA |
| $W_{1g1}$ | = | 0 | 1 | W |
| $W_{1a}$ | = | 280 | 1400 | W |
| $W_a$ | = | 280 | 500 | W |
| $W_{g2}$ | = | 0 | 18 | W |
| $W_o$ | = | 0 | 900 | W |
| $\eta$ | = | | 64,5 | % |

[1] With -170 V from fixed bias supply included
Y compris une tension de polarisation fixe de -170 V
Einschliesslich einer festen Vorspannung von -170 V

[2] At crest of modulation
A la crête de modulation
Beim Scheitel der Modulation

# PHILIPS

Operating conditions as H.F. class C amplifier for industrial use with self rectification
Caractéristiques d'utilisation en amplificatrice H.F. classe C pour des applications industrielles à auto redressement
Betriebsdaten als HF-Klasse C Verstärker für industrielle Anwendungen mit Selbstgleichrichtung

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f = max. 75 Mc/s | | $V_{tr\,g2}$ [1]) = max. | 780 Veff |
| $V_{tr\,a}$ [1]) = max. | 5600 Veff | $W_{g2}$ = max. | 65 W |
| $W_{ia}$ = max. | 1460 W | $-V_{g1}$ = max. | 500 V |
| $W_a$ = max. | 500 W | $I_{g1}$ = max. | 25 mA |
| $I_a$ = max. | 240 mA | $R_{g1}$ = max. | 50 kΩ |

Operating conditions
Caractéristiques d'utilisation [2])
Betriebsdaten

| | | |
|---|---|---|
| f | ≤ | 60 Mc/s |
| $V_{tr\,a}$ [1]) | = | 4800 Veff |
| $V_{tr\,g2}$ [1]) | = | 670 Veff |
| $R_{g1}$ | = | 16 kΩ |
| $V_{g1_p}$ | = | 350 V |
| $I_a$ | = | 200 mA |
| $I_{g2}$ | = | 32 mA |
| $I_{g1}$ | = | 11 mA |
| $W_{ig1}$ | = | 3,5 W |
| $W_{ia}$ | = | 1060 W |
| $W_a$ | = | 310 W |
| $W_{g2}$ | = | 24 W |
| $W_o$ | = | 750 W |
| $\eta$ | = | 71 % |

[1]) See page 9; voir page 9; siehe Seite 9

[2]) Under these conditions normal deviations of voltages and load are permissible. The absolute limiting values of the tube must, however, not be exceeded
Dans cettes conditions des déviations normales des tensions et de la charge sont permises. Il ne faut cependant pas dépasser les caractéristiques limites absolues
Unter diesen Bedingungen sind normale Abweichungen der Spannungen und der Belastung gestattet. Die absoluten Grenzwerte dürfen jedoch nicht überschritten werden

Operating conditions as H.F. class C amplifier for industrial use with anode voltage from two-phase half-wave rectifier without filter
Caractéristiques d'utilisation en amplificatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur biphasé à une alternance sans filtre
Betriebsdaten als HF-Klasse C Verstärker für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Zweiphasen-Einweggleichrichter ohne Filter

Limiting values (absolute limits)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| $f$ | = max. 75 Mc/s | $V_{tr\ g2}$ [1] | = max. 700 $V_{eff}$ |
| $V_{tr\ a}$ [1] | = max. 5000 $V_{eff}$ | $W_{g2}$ | = max. 65 W |
| $W_{ia}$ | = max. 2250 W | $-V_{g1}$ | = max. 500 V |
| $W_a$ | = max. 500 W | $W_{g1}$ | = max. 25 W |
| $I_a$ | = max. 400 $V_{eff}$ | $I_{g1}$ | = max. 45 mA |
| | | $R_{g1}$ | = max. 50 kΩ |

Operating conditions
Caractéristiques d'utilisation [2]
Betriebsdaten

| | | |
|---|---|---|
| $f$ | ≤ | 60 Mc/s |
| $V_{tr\ a}$ [1] | = | 4250 $V_{eff}$ |
| $V_a$ [3] | = | 3825 V |
| $V_{tr\ g2}$ [1] | = | 600 V |
| $V_{g2}$ [3] | = | 540 V |
| $R_{g1}$ | = | 14 kΩ |
| $V_{g1p}$ | = | 300 V |
| $I_a$ | = | 325 mA |
| $I_{g2}$ | = | 20 mA |
| $I_{g1}$ | = | 15 mA |
| $W_{ig1}$ | = | 4 W |
| $W_{ia}$ | = | 1535 W |
| $W_a$ | = | 425 W |
| $W_{g2}$ | = | 13,3 W |
| $W_o$ | = | 1110 W |
| $\eta$ | = | 72 % |

[1] $V_{tr\ a}$ und $V_{tr\ g2}$ are the anode transformer secondary voltage per phase and the screen grid transformer secondary voltage per phase respectively
$V_{tr\ a}$ et $V_{tr\ g2}$ sont les tensions secondaires par phase des transformateurs d'anode respectivement de la grille-écran
$V_{tr\ a}$ und $V_{tr\ g2}$ sind die Sekundärspannungen pro Phase des Anoden-bzw. Schirmgittertransformators.

[2] See page 8; voir page 8; siehe Seite 8

[3] D.C. value; valeur moyenne; mittlerer Wert

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF-Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

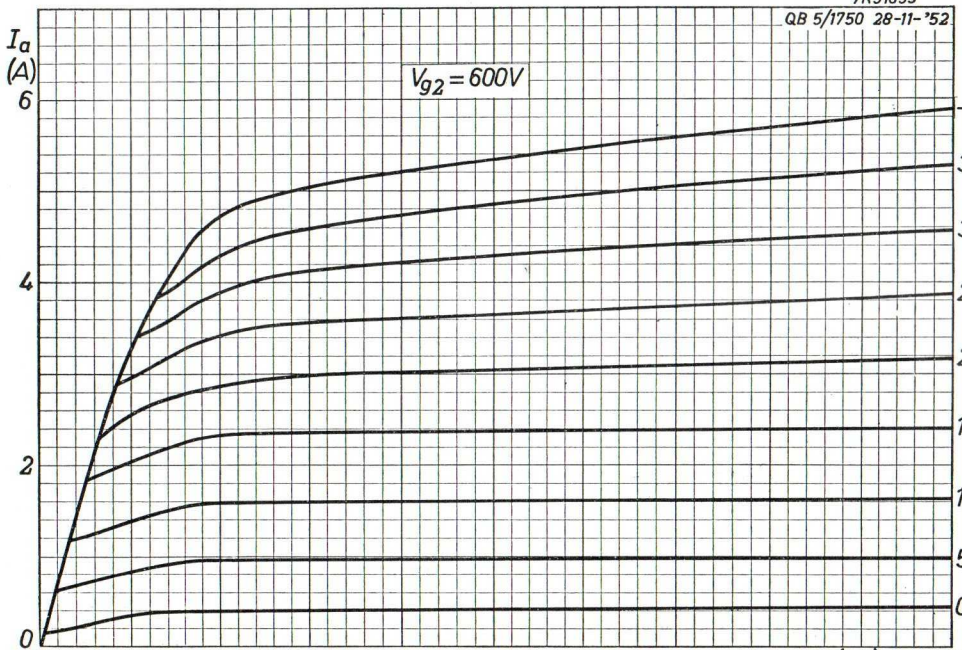
| | | | |
|---|---|---|---|
| $V_a$ | = max. | 5000 | V |
| $W_{ia}$ | = max. | 2250 | W |
| $W_a$ | = max. | 500 | W |
| $I_a$ | = max. | 450 | mA |
| $V_{g2}$ | = max. | 700 | V |
| $W_{g2}$ | = max. | 65 | W |
| $-V_{g1}$ | = max. | 500 | V |
| $I_{g1}$ | = max. | 45 | mA |
| $R_{g1}$ | = max. | 50 | kΩ |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $V_a$ | = | 5000 | | 4000 | | 4000 | V |
| $V_{g2}$ | = | 600 | | 600 | | 600 | V |
| $V_{g1}$ | = | -62,5 | | -62,5 | | -60 | V |
| $R_{aa\sim}$ | = | 26 | | 20 | | 16 | kΩ |
| $V_{g1g1_p}$ | = | 0 | 260 | 0 | 254 | 0 | 305 V |
| $I_a$ | = | 2x50 | 2x290 | 2x45 | 2x285 | 2x55 | 2x366 mA |
| $I_{g2}$ | = | 0 | 2x43 | 0 | 2x40 | 0 | 2x60 mA |
| $I_{g1}$ | = | 0 | 2x13 | 0 | 2x13,5 | 0 | 2x18 mA |
| $W_{ig1}$ | = | 0 | 2x1,5 | 0 | 2x1,5 | 0 | 2x2,5 W |
| $W_{ia}$ | = | 2x250 | 2x1450 | 2x180 | 2x1140 | 2x220 | 2x1465 W |
| $W_a$ | = | 2x250 | 2x340 | 2x180 | 2x300 | 2x220 | 2x340 W |
| $W_{g2}$ | = | 0 | 2x26 | 0 | 2x24 | 0 | 2x36 W |
| $W_o$ | = | 0 | 2220 | 0 | 1680 | 0 | 2250 W |
| $d_{tot}$ | = | - | 5 | - | 4,7 | - | 5 % |
| $\eta$ | = | - | 76,5 | - | 74 | - | 76,5 % |

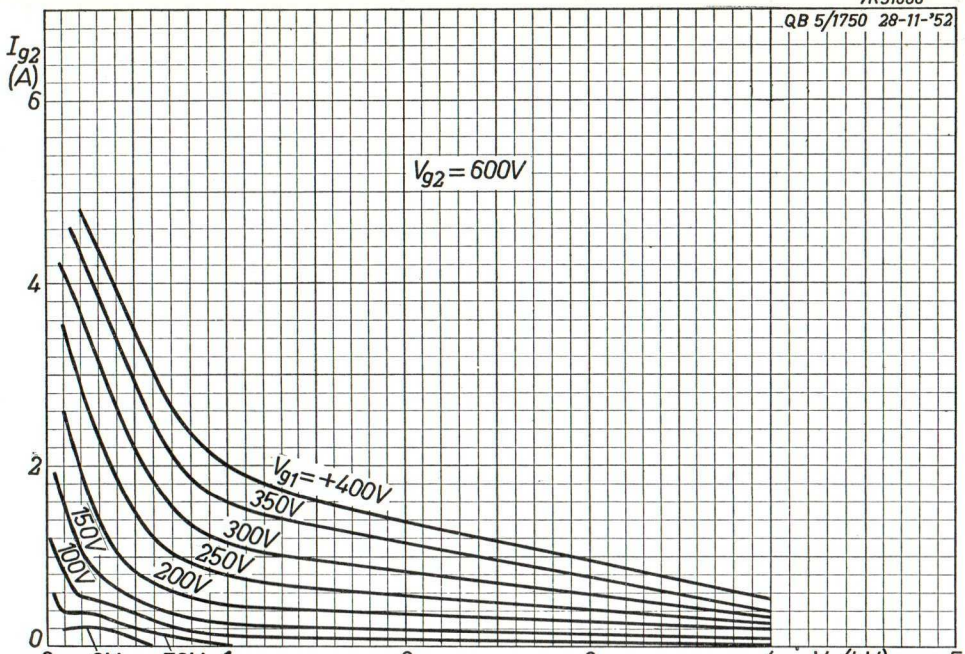
7R51059

QB 5/1750 28-11-'52




PHILIPS

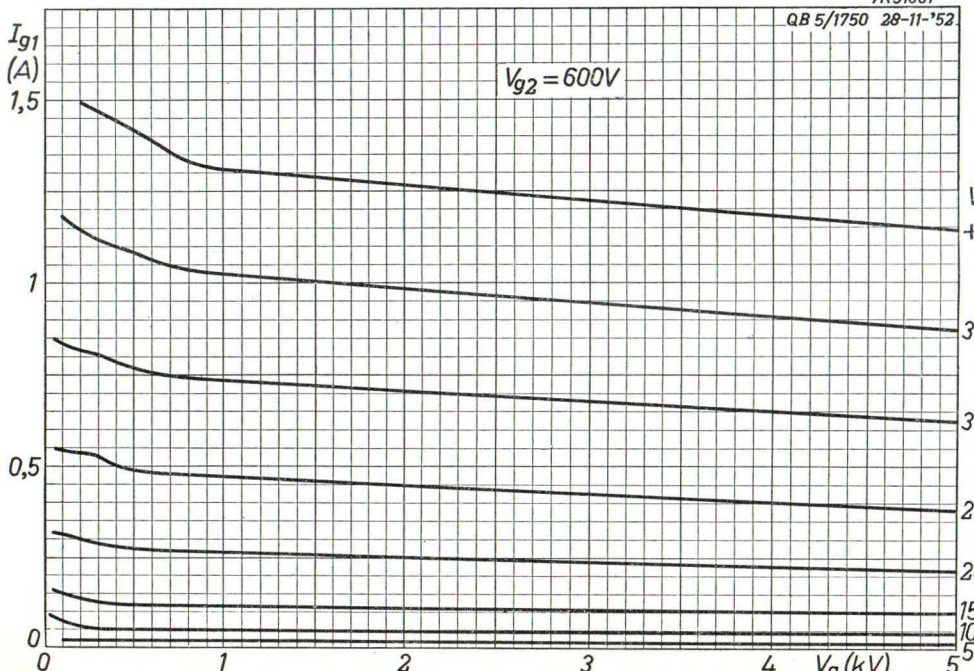
QB 5/1750




B

QB 5/1750

PHILIPS




7.7.1954

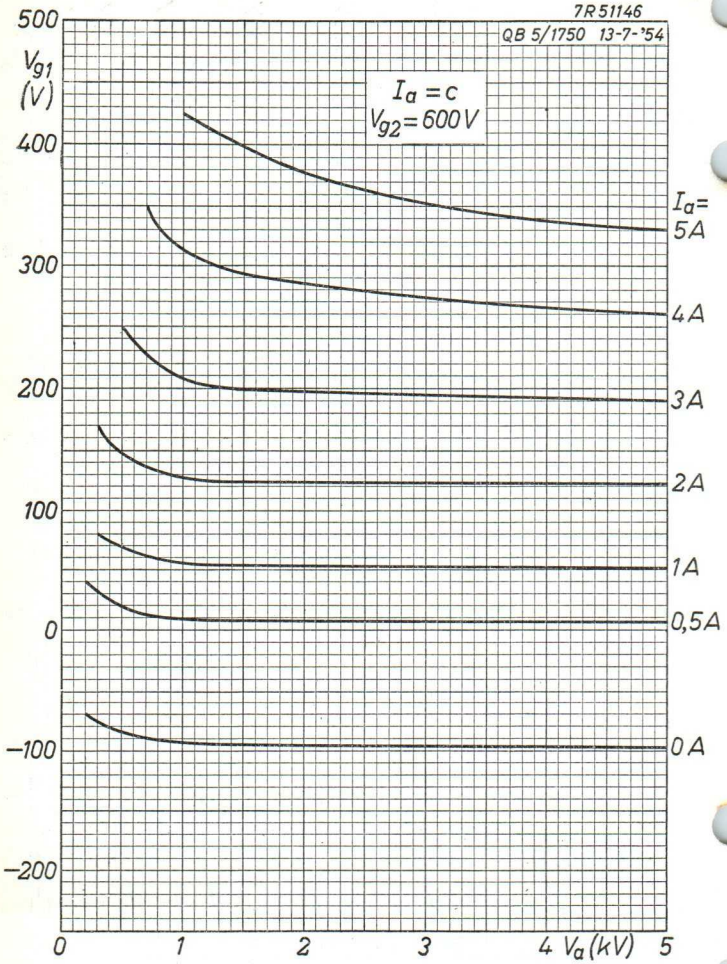
C

PHILIPS

QB 5/1750

QB 5/1750

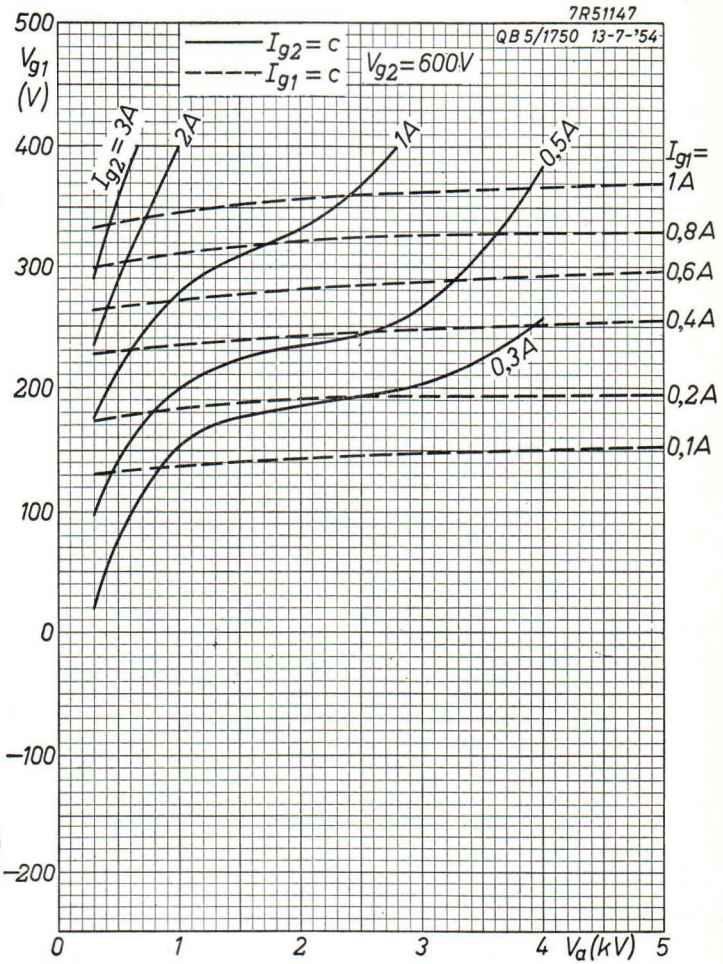
# PHILIPS




D

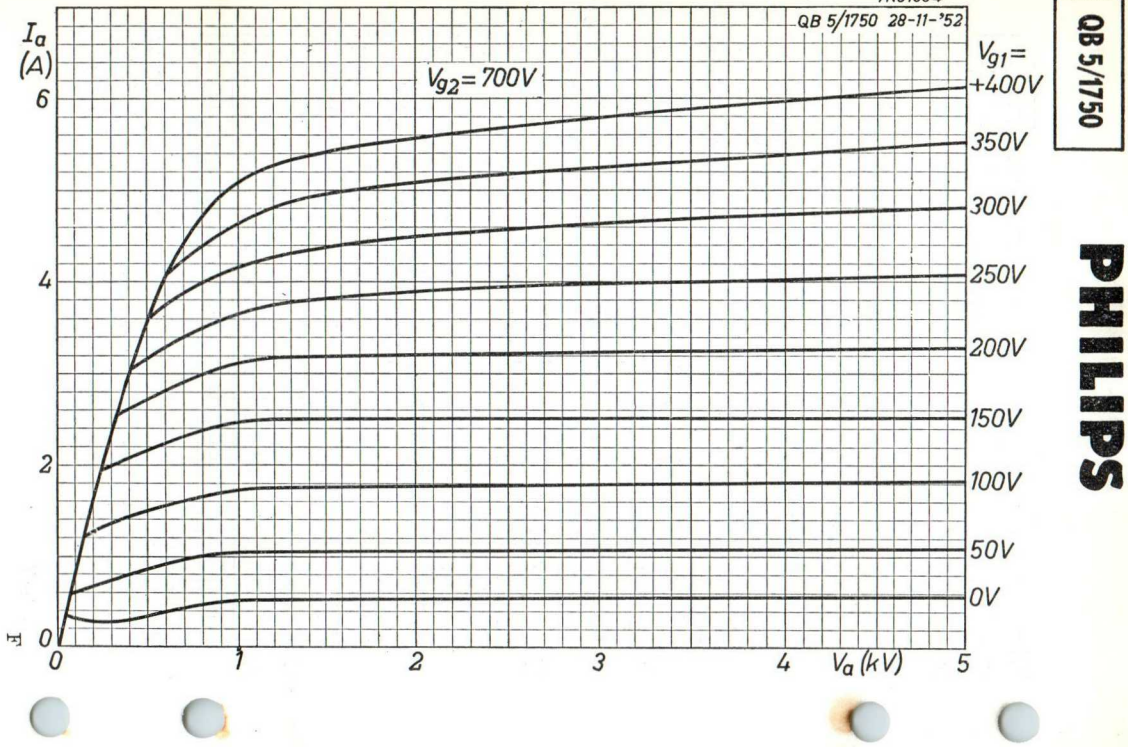
# PHILIPS

**QB 5/1750**




7. 7. 1954

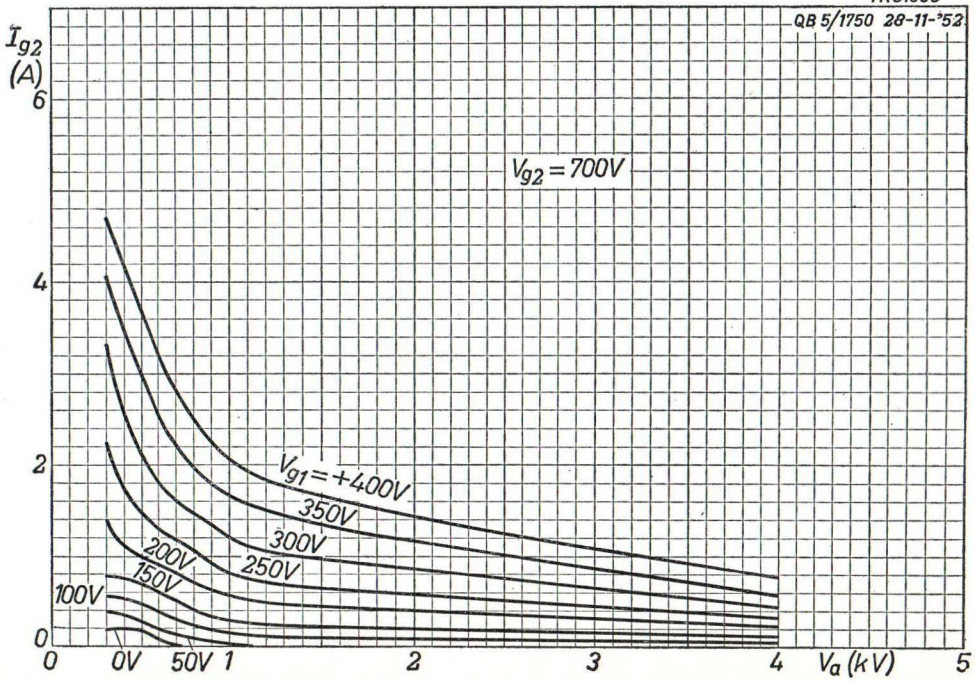
E




QB 5/1750

PHILIPS

7R51065
QB 5/1750 28-11-'52




PHILIPS

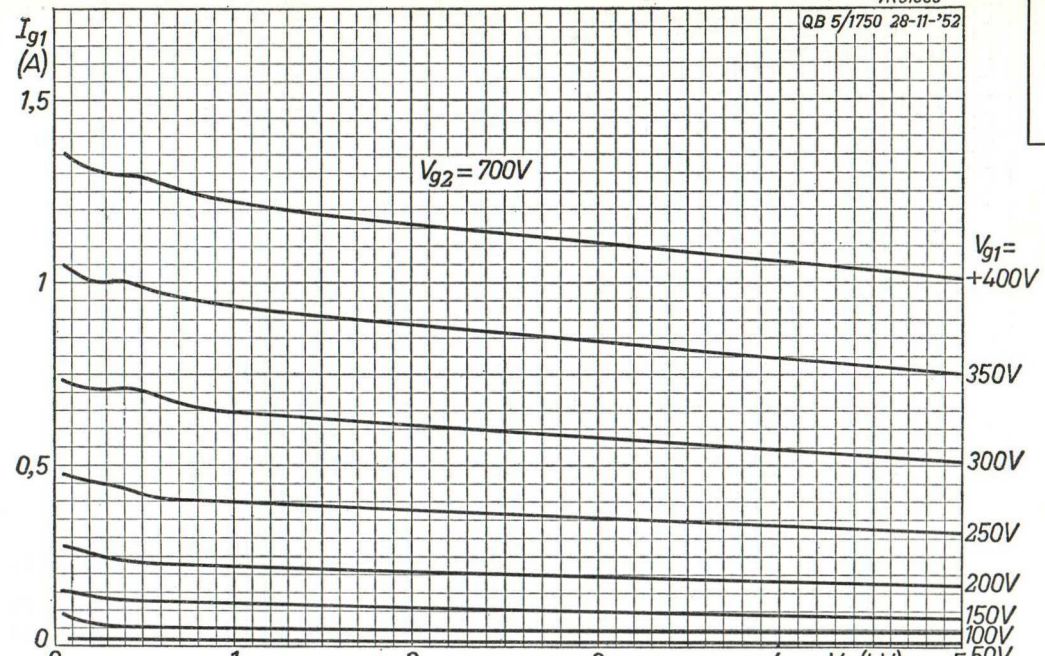
QB 5/1750

7R51066

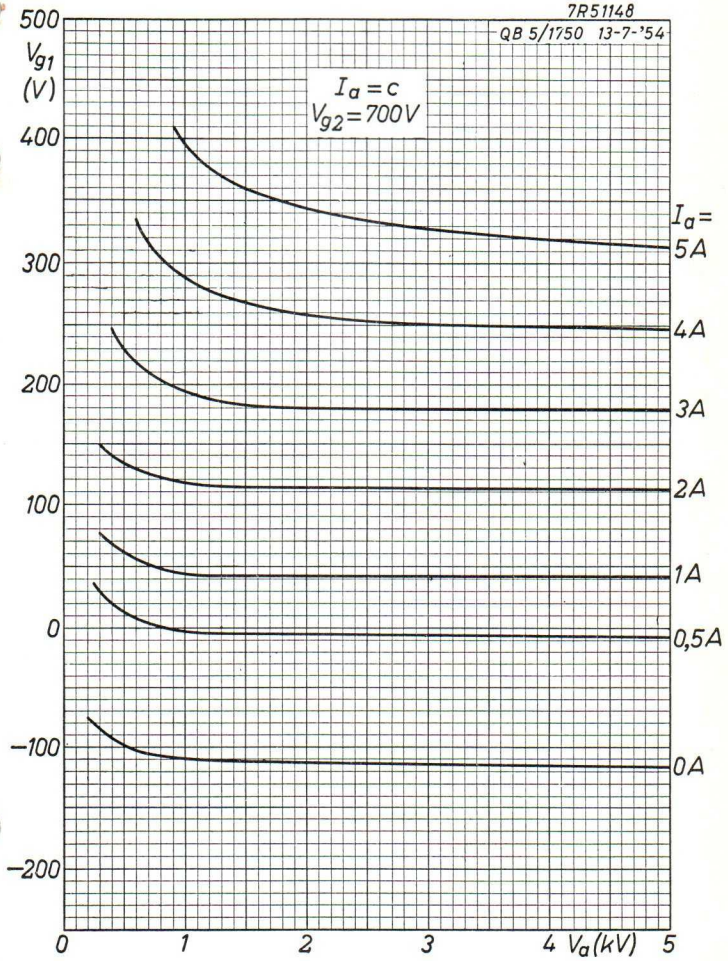
QB 5/1750 28-11-'52

QB 5/1750

PHILIPS




H

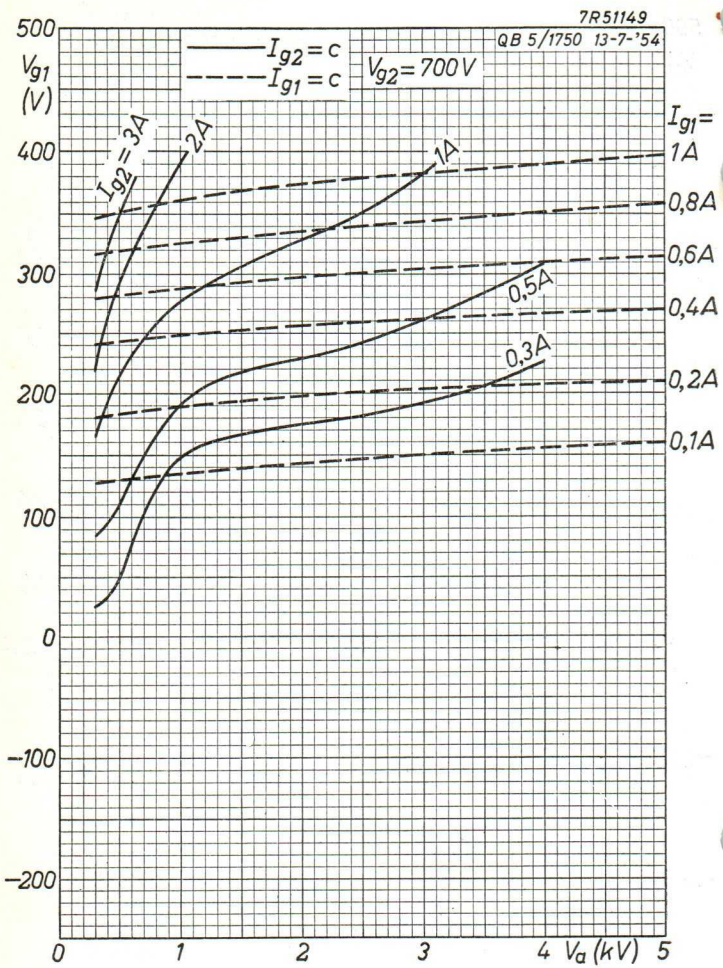

7R51148
QB 5/1750 13-7-'54
$I_a = c$
$V_{g2} = 700V$
$V_{g1}$ (V)
500
400
300
200
100
0
−100
−200
$I_a$ =
5A
4A
3A
2A
1A
0,5A
0A
0
1
2
3
4
$V_a$(kV)
5

I

7.7.1954

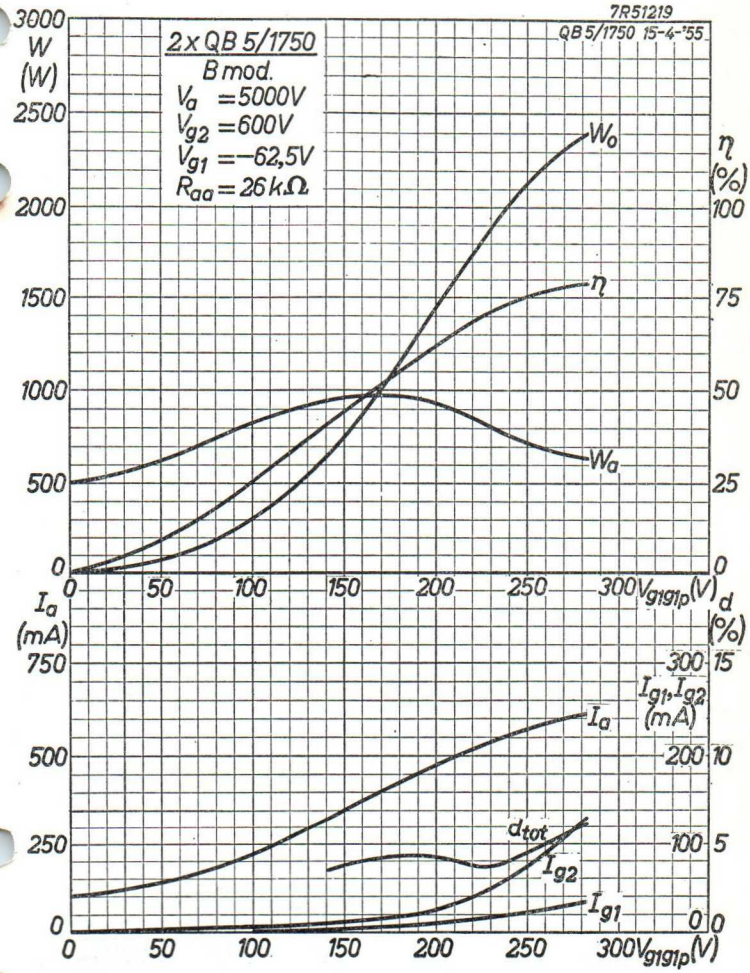
QB 5/1750

# PHILIPS




J

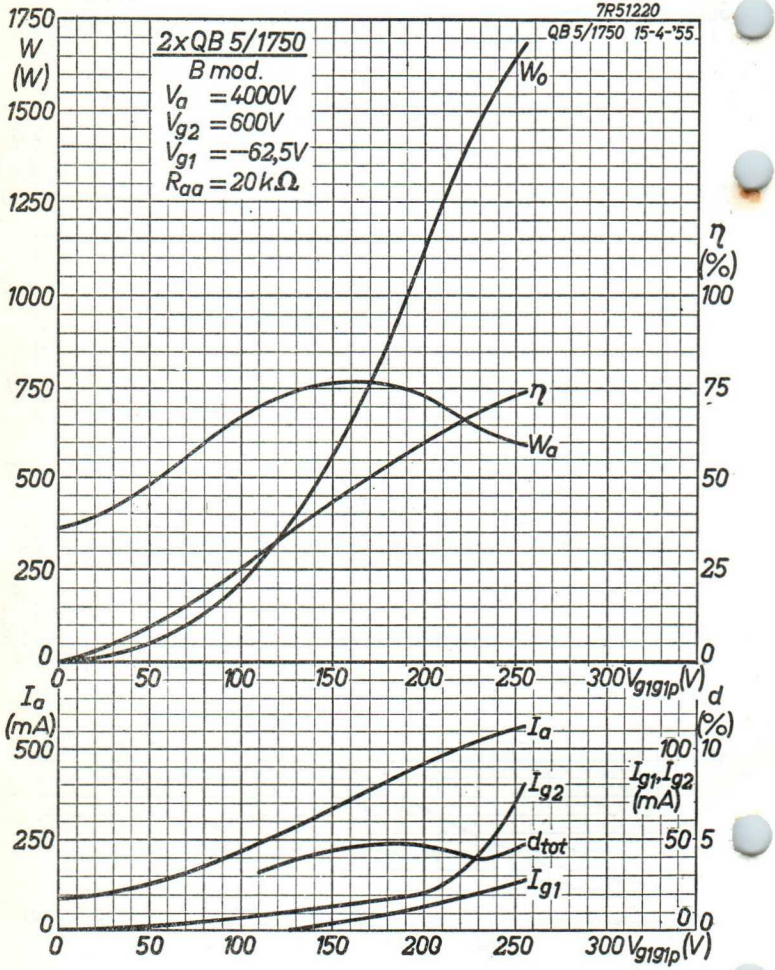
**PHILIPS** QB 5/1750



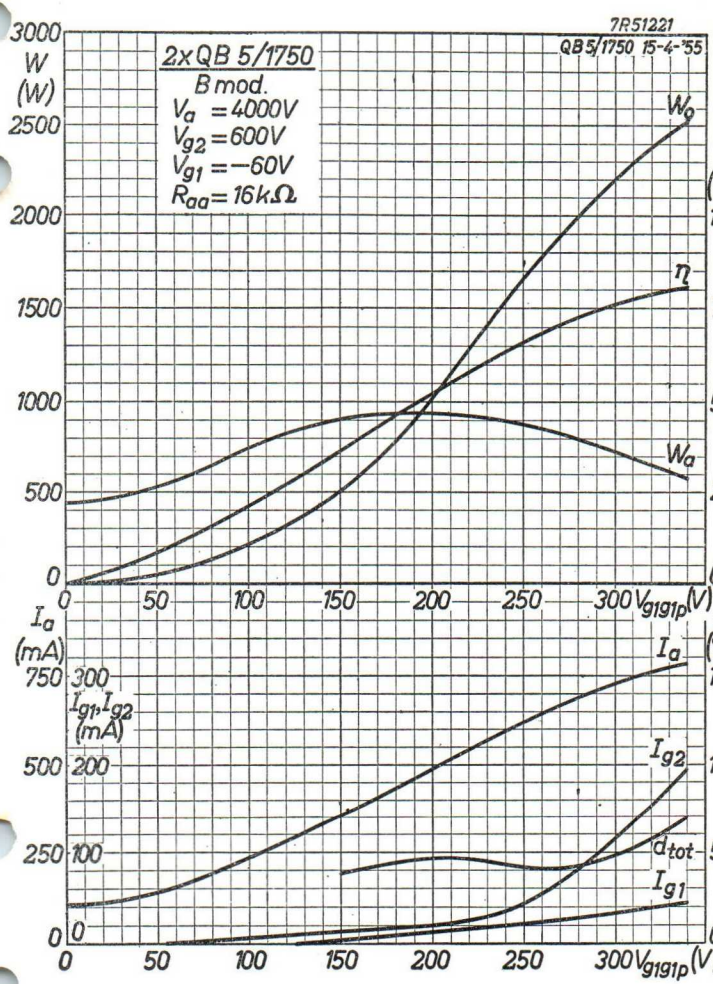

10.10.1955 K

QB 5/1750

# PHILIPS



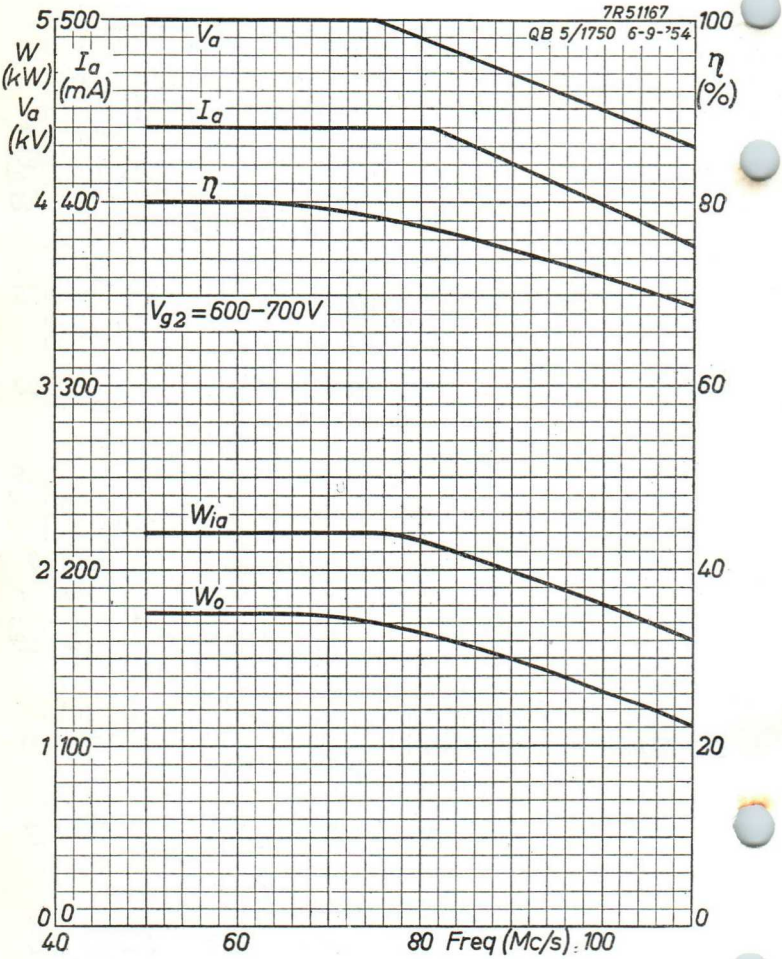

L


7R51221
QB5/1750 15-4-'55
2x QB 5/1750
B mod.
$V_a$ = 4000V
$V_{g2}$ = 600V
$V_{g1}$ = −60V
$R_{aa}$ = 16kΩ
W (W)
η (%)
$W_o$
η
$W_a$
$V_{g1g1p}$ (V)
$I_a$ (mA)
d (%)
$I_a$
$I_{g1}, I_{g2}$ (mA)
$I_{g2}$
$d_{tot}$
$I_{g1}$

10.10.1955 M

QB 5/1750

# PHILIPS




N

TETRODE for use as H.F. amplifier, modulator or frequency multiplier
TETRODE pour utilisation en amplificatrice H.F., modulatrice ou multiplicatrice de fréquence
TETRODE zur Verwendung als HF-Verstärker, Modulator oder Frequenzvervielfacher

Cooling : forced air
Refroidissement : ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden : thoriertes Wolfram

Heating : direct
Chauffage : direct
Heizung : direkt

$V_f$ = 5 V
$I_f$ = 13,5 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 5,6 pF
$C_{g1}$ = 12,8 pF
$C_{ag1}$ = 0,05 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 6,2
$S(I_a=200\ mA)$ = 5,2 mA/V

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegraphie

| Freq. (Mc/s) | Va (V) | Wo (W) |
|---|---|---|
| 110 | 4000 | 930 |
| | 3000 | 670 |
| | 2500 | 530 |

Television service
Service de télévision
Fernsehbetrieb

Neg.mod. Pos.synchr.

| Freq. (Mc/s) | Va (V) | Wo (W) | |
|---|---|---|---|
| | | sync. | black noir schwarz |
| 220 | 2400 | 600 | 340 |
| | 1850 | 300 | 170 |

Temperatures
Températures
Temperaturen

Temperature of seals
Température des scellements = max. 150 °C
Temperatur der Einschmelzungen

Anode temperature
Température de l'anode = max. 150 °C
Anodentemperatur

In order to keep the temperatures of the seals below the maximum permissible value it is necessary to direct an air flow on to the seals. Cooling air must be applied to the seals and the anode cooler prior to the application of filament power and the cooling must be continued for three minutes after the power has been removed from the filament.

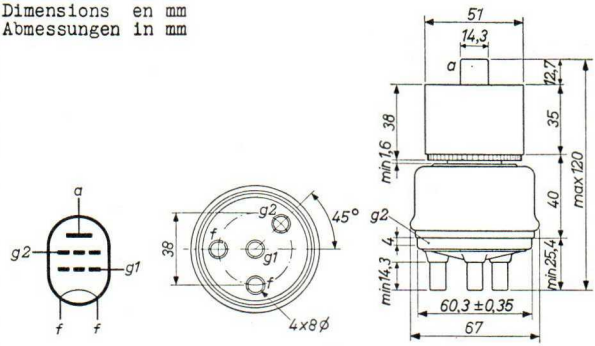
Afin de maintenir la température des scellements au-dessous de la valeur admissible au max. il est nécessaire de diriger un courant d'air vers les scellements. Il faut appliquer l'air de refroidissement vers les scellements et le refroidisseur de l'anode avant l'application de la puissance du filament et continuer le refroidissement pendant trois minutes après que la puissance a été éloignée du filament

Damit die Temperatur der Einschmelzungen unterhalb des höchstzulässigen Wertes bleibt, ist ein Luftstrom auf die Einschmelzungen notwendig. Kühlluft soll den Einschmelzungen und dem Anodenkühler vor der Anlegung der Heizspannung zugeführt werden und die Kühlung soll bis drei Minuten nach der Entfernung der Heizspannung fortgesetzt werden

Cooling characteristics
Caractéristiques de refroidissement
Kühlungsdaten

| $W_a$ (W) | h (m) | $t_{i\,max.}$ (°C) | $q_{min.}$ ($m^3$/min.) | Pi (mm $H_2O$) |
|---|---|---|---|---|
| 300 | 0 | 35 | 0,50 | 9,8 |
| | 0 | 45 | 0,59 | 12,9 |
| | 1500 | 35 | 0,60 | 12,0 |
| | 3000 | 25 | 0,63 | 11,5 |
| 400 | 0 | 35 | 0,77 | 17,5 |
| | 0 | 45 | 0,90 | 23,0 |
| | 1500 | 35 | 0,93 | 21,3 |
| | 3000 | 25 | 0,97 | 20,5 |
| 500 | 0 | 35 | 1,13 | 35,5 |
| | 0 | 45 | 1,32 | 46,9 |
| | 1500 | 35 | 1,36 | 43,3 |
| | 3000 | 25 | 1,42 | 41,5 |

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical with anode up or down
Montage : vertical avec l'anode en haut ou en bas
Einbau : senkrecht mit der Anode oben oder unten

Net weight
Poids net 530 g
Nettogewicht

# PHILIPS

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegraphie

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f | = | max. | 120 Mc/s |
| $V_a$ | = | max. | 4000 V |
| $W_{ia}$ | = | max. | 1400 W |
| $W_a$ | = | max. | 500 W |
| $I_a$ | = | max. | 350 mA |
| $V_{g2}$ | = | max. | 500 V |
| $W_{g2}$ | = | max. | 30 W |
| $-V_{g1}$ | = | max. | 500 V |
| $I_{g1}$ | = | max. | 30 mA |
| $R_{g1}$ | = | max. | 30 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = | 110 | 110 | 110 Mc/s |
| $V_a$ | = | 4000 | 3000 | 2500 V |
| $V_{g2}$ | = | 500 | 500 | 500 V |
| $V_{g1}$ | = | -150 | -150 | -150 V |
| $I_a$ | = | 315 | 310 | 310 mA |
| $I_{g2}$ | = | 22 | 24 | 26 mA |
| $I_{g1}$ | = | 16 | 16 | 15 mA |
| $V_{g1p}$ | = | 230 | 230 | 230 V |
| $W_{ig1}$ | = | 5 | 5 | 5 W |
| $W_{g2}$ | = | 11 | 12 | 13 W |
| $W_{ia}$ | = | 1260 | 930 | 775 W |
| $W_a$ | = | 330 | 260 | 245 W |
| $W_o$ | = | 930 | 670 | 530 W |
| $\eta$ | = | 73,5 | 72 | 68,5 % |
| $W_\ell$[1]) | = | 835 | 600 | 475 W |

[1]) Useful power in the load
Puissance utile dans la charge
Nützliche Leistung in der Belastung

H.F. class B amplifier for television service; negative modulation, positive synchronisation
Amplificatrice H.F. classe B pour télévision; modulation négative, synchronisation positive
HF-Klasse B Verstärker für Fernsehsender; negative Modulation, positive Synchronisierung

Limiting values (black level; absolute values)
Caractéristiques limites(niveau de noir; valeurs absolues)
Grenzdaten (Schwarzpegel; absolute Werte)

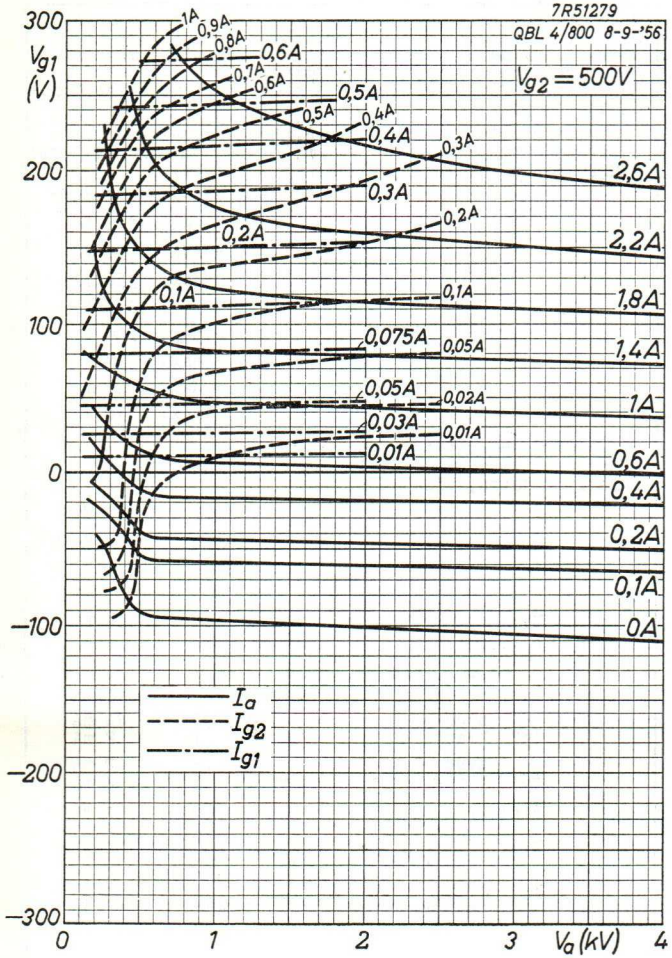
| | | | |
|---|---|---|---|
| f | = max. | 220 | Mc/s |
| $V_a$ | = max. | 3000 | V |
| $V_{g2}$ | = max. | 500 | V |
| $I_a$ | = max. | 350 | mA |
| $W_{ia}$ | = max. | 1050 | W |
| $W_a$ | = max. | 500 | W |
| $W_{g2}$ | = max. | 30 | W |
| $I_{g1}$ | = max. | 30 | mA |
| $R_{g1}$ | = max. | 30 | kΩ |

Operating conditions, one tube
Caractéristiques d'utilisation, une tube
Betriebsdaten, eine Röhre

| | | | | |
|---|---|---|---|---|
| f | | = | 220 | 220 Mc/s |
| B | | = | 6 | 6 Mc/s |
| $V_a$ | | = | 2400 | 1850 V |
| $V_{g2}$ | | = | 500 | 500 V |
| $V_{g1}$ | | = | -100 | -100 V |
| $V_{g1p}$ | sync | = | 185 | 140 V |
| $I_a$ | sync | = | 400 | 285 mA |
| | black, noir, schwarz | = | 300 | 215 mA |
| $I_{g2}$ | sync | = | 35 | 20 mA |
| | black, noir, schwarz | = | 3 | 2 mA |
| $I_{g1}$ | sync | = | 15 | 10 mA |
| | black, noir, schwarz | = | 5 | 2 mA |
| $W_{ig1}$ | sync | = | 25 | 15 W |
| $W_{ia}$ | sync | = | 960 | 525 W |
| | black, noir, schwarz | = | 720 | 400 W |
| $W_o$ | sync | = | 600 | 300 W |
| | black, noir, schwarz | = | 340 | 170 W |

QBL 4/800

# PHILIPS




A

# PHILIPS

**QBL 5/3500**

TETRODE for use as H.F. amplifier, modulator or frequency multiplier
TETRODE pour utilisation en amplificatrice H.F., modulatrice ou multiplicatrice de fréquence
TETRODE zur Verwendung als HF-Verstärker, Modulator oder Frequenzvervielfacher

| | |
|---|---|
| Cooling<br>Refroidissement<br>Kühlung | forced air<br>ventilation forcée<br>Pressluftkühlung |

Filament : Thoriated tungsten
Filament : Tungstène thorié
Heizfaden: Thoriertes Wolfram

| | | |
|---|---|---|
| Heating : direct<br>Chauffage: direct<br>Heizung : direkt | $V_f$ | = 6,3 V |
| | $I_f$ | = 32,5 A |
| Capacitances<br>Capacités<br>Kapazitäten | $C_a$ | = 8,4 pF |
| | $C_{g1}$ | = 23,5 pF |
| | $C_{ag1}$ | < 0,35 pF |
| Typical characteristics<br>Caractéristiques types<br>Kenndaten | $\mu_{g2g1}$ | = 8,5 |
| | $S(I_a=2A)$ | = 19 mA/V |

| λ | Freq. | C telegr. | | $C_{ag2}$ mod. | |
|---|---|---|---|---|---|
| m | (Mc/s) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) |
| 4 | 75 | 5 | 4,1 | | |
| | | 4 | 3,15 | | |
| 2,7 | 110 | 5 | 3,9 | 4 | 2,7 |
| 1,36 | 220 | 4 | 2,9 | | |

Television, télévision, Fernsehen

| | Freq. (Mc/s) | Neg. mod. pos. synchr. $V_a$ (kV) | $W_o$ sync (kW) | $W_o$ (kW) black noir schwarz | Pos. mod. neg. synchr. $V_a$ kV | $W_o$ (kW) white blanc weiss |
|---|---|---|---|---|---|---|
| Narrow band<br>Bande étroite<br>Schmaler Band | 170-220 | 4 | 5,9 | 3,3 | 4 | 4,0 |
| Broad band | 54-88 | 5 | 8,0 | 4,5 | | |
| Bande large<br>Breiter Band | 170-220 | 4 | 5,0 | 2,8 | 4 | 2,8 |

Temperatures and cooling
Températures et refroidissement
Temperaturen und Kühlung

Temperature of seals
Température des scellements = max. 180 °C
Temperatur der Einschmelzungen

Bulb temperature
Température de l'ampoule = max. 250 °C
Kolbentemperatur

Cooling characteristics
Caractéristiques de refroidissement
Kühlungsdaten

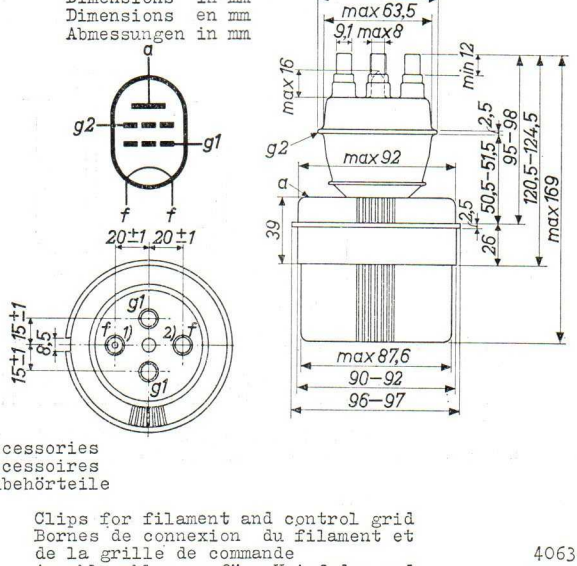
| $W_a$ (kW) | h (m) | $t_i$ (°C) | q ($m^3$/min) | $P_i$ ($mmH_2O$) |
|---|---|---|---|---|
| 1 | 0 | 35 | 1,8 | 10 |
| 1 | 0 | 45 | 2,2 | 15 |
| 1 | 1500 | 35 | 2,2 | 13 |
| 1 | 3000 | 25 | 2,3 | 13 |
| 2,5 | 0 | 35 | 4,5 | 60 |
| 2,5 | 0 | 45 | 5,4 | 85 |
| 2,5 | 1500 | 35 | 5,4 | 73 |
| 2,5 | 3000 | 25 | 5,8 | 75 |
| 3 | 0 | 35 | 5,7 | 95 |

In order to keep the temperature of the seals below the maximum permissible value, it may be necessary to direct an airflow to the seals

Afin de maintenir la température des scellements au-dessous de la valeur maximum admissible il peut être nécessaire de diriger un courant d'air vers les scellements

Damit die Temperatur der Einschmelzungen unterhalb des höchstzulässigen Wertes bleibt, kann ein Luftstrom auf die Einschmelzungen notwendig sein

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Accessories
Accessoires
Zubehörteile

Clips for filament and control grid
Bornes de connexion du filament et de la grille de commande 40634
Anschlussklemmen für Heizfaden und Steuergitter

Screen grid connector
Connecteur pour la grille-écran 40622
Schirmgitteranschlussring

Insulating pedestal (see page 4)
Socle isolant (voir page 4) 40635
Isolierender Sockel (siehe Seite 4)

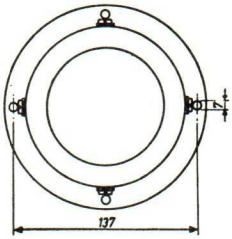
---

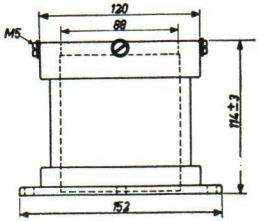
1) This pin is marked "0"
Cette broche est marquée "0"
Dieser Stift ist mit "0" gekennzeichnet

2) This pin should be used for connecting the anode return lead
Cette broche sera utilisée pour connecter le conducteur de retour du circuit anodique
Dieser Stift soll zum Anschliessen der Anodenrückleitung verwendet werden

# PHILIPS

Mounting position: vertical with anode up or down
Montage : vertical avec l'anode en haut ou en bas
Einbau : senkrecht mit der Anode oben oder unten




40635

At frequencies above 30 Mc/s both connecting pins must be used when connecting the control grid
Aux fréquences au-dessus de 30 Mc/s il faut utiliser les deux broches de connexion pour la connexion de la grille de commande
Bei Frequenzen über 30 MHz müssen die beiden Anschlussstifte zum Anschliessen des Steuergitters verwendet werden

| | | |
|---|---|---|
| Tube<br>Tube<br>Röhre | Net weight<br>Poids net<br>Nettogewicht | 2,25 kg |
| | Shipping weight<br>Poids brut<br>Bruttogewicht | 5,7 kg |

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| | |
|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 1,6 kg |
| Shipping weight<br>Poids brut<br>Bruttogewicht | 2,7 kg |

H.F. class C telegraphy
H.F. classe C télégraphie
H.F. Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| f | = max. | 30 Mc/s |
| $V_a$ | = max. | 5,5 kV |
| $W_{ia}$ | = max. | 5,5 kW |
| $W_a$ | = max. | 3 kW |
| $I_a$ | = max. | 1,1 A |
| $V_{g2}$ | = max. | 800 V |
| $W_{g2}$ | = max. | 100 W |
| $-V_{g1}$ | = max. | 500 V |
| $W_{g1}$ | = max. | 30 W |

| | | |
|---|---|---|
| f | = max. | 110 Mc/s |
| $V_a$ | = max. | 5 kV |

| | | |
|---|---|---|
| f | = max. | 220 Mc/s |
| $V_a$ | = max. | 4 kV |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = | 75 | 110 | 75 | 220 Mc/s |
| $V_a$ | = | 5 | 5 | 4 | 4 kV |
| $V_{g2}$ | = | 800 | 800 | 800 | 800 V |
| $V_{g1}$ | = | -250 | -250 | -250 | -250 V |
| $I_a$ | = | 1,1 | 1,1 | 1,1 | 1,1 A |
| $I_{g2}$ | = | 100 | 100 | 120 | 120 mA |
| $I_{g1}$ | = | 70 | 70 | 80 | 80 mA |
| $V_{g1p}$ | = | 480 | 480 | 500 | 500 V |
| $W_{ig1}$ | = | 30 | 30 | 36 | 36 W |
| $W_{g2}$ | = | 80 | 80 | 96 | 96 W |
| $W_{ia}$ | = | 5,5 | 5,5 | 4,4 | 4,4 kW |
| $W_a$ | = | 1,4 | 1,6 | 1,25 | 1,5 kW |
| $W_o$ | = | 4,1 | 3,9 | 3,15 | 2,9 kW |
| $\eta$ | = | 74,5 | 71 | 72 | 66 % |

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF Klasse C Anoden- und Schirmgittermodulation

Screen grid modulated via a choke of 60 H
La grille-écran modulée à travers une bobine de 60 H
Schirmgitter moduliert über eine Drosselspule von 60 H

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = max. | 30 Mc/s | f | = max. | 110 Mc/s |
| $V_a$ | = max. | 4,5 kV | $V_a$ | = max. | 4 kV |
| $W_{ia}$ | = max. | 3,6 kW | | | |
| $W_a$ | = max. | 2 kW | | | |
| $I_a$ | = max. | 0,9 A | | | |
| $V_{g2}$ | = max. | 800 V | | | |
| $W_{g2}$ | = max. | 100 W[1]) | | | |
| $-V_{g1}$ | = max. | 500 V | f | = max. | 220 Mc/s |
| $W_{g1}$ | = max. | 30 W | $V_a$ | = max. | 3,2 kV |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| f | = | 110 Mc/s |
| $V_a$ | = | 4 kV |
| $V_{g2}$ | = | 800 V |
| $V_{g1}$ | = | -375 V |
| $V_{g1_p}$ | = | 625 V |
| $I_a$ | = | 0,9 A |
| $I_{g2}$ | = | 120 mA |
| $I_{g1}$ | = | 85 mA |
| $W_{ia}$ | = | 3,6 kW |
| $W_a$ | = | 0,9 kW |
| $W_o$ | = | 2,7 kW |
| $W_{g2}$ | = | 96 W |
| $W_{ig1}$ | = | 48 W |
| $\eta$ | = | 75 % |
| m | = | 100 % |
| $W_{mod}$ | = | 1,8 kW |

[1])For all other modulation methods $W_{g2}$ = max. 65 W
Pour toutes les autres méthodes de modulation $W_{g2}$ = max. 65 W
Für alle andere Modulationsverfahren ist $W_{g2}$ = max. 65 W

H.F. class B amplifier, single side band
Amplificatrice H.F. classe B à une bande latérale
HF Einseitenbandverstärker, Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

f = max. 110 Mc/s

| | | |
|---|---|---|
| $V_a$ | = max. | 5 kV |
| $I_a$ | = max. | 1,3 A |
| $W_{ia}$ | = max. | 6,5 kW |
| $W_a$ | = max. | 3 kW |
| $V_{g2}$ | = max. | 800 V |
| $W_{g2}$ | = max. | 100 W |
| $I_{g1}$ | = max. | 80 mA |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $V_a$ | = | 5 | | 4,5 | | 4 | kV |
| $V_{g2}$ | = | 800 | | 800 | | 800 | V |
| $V_{g1}$ | = | -107 | | -105 | | -104 | V |
| $V_{g1p}$ | = | 0 | 277 | 0 | 275 | 0 | 274 V |
| $I_a$ | = | 0,08 | 1,3 | 0,08 | 1,29 | 0,07 | 1,28 A |
| $I_{g2}$ | = | 0 | 75 | 0 | 75 | 0 | 78 mA |
| $I_{g1}$ | = | 0 | 55 | 0 | 55 | 0 | 54 mA |
| $W_{ig1}$ | = | 0 | 15 | 0 | 15 | 0 | 15 W |
| $W_{g2}$ | = | 0 | 60 | 0 | 60 | 0 | 62,5 W |
| $W_{ia}$ | = | 0,40 | 6,5 | 0,36 | 5,8 | 0,28 | 5,1 kW |
| $W_a$ | = | 0,40 | 2,1 | 0,36 | 1,95 | 0,28 | 1,8 kW |
| $W_o$ | = | - | 4,4 | - | 3,85 | - | 3,3 kW |
| $\eta$ | = | - | 68 | - | 66,5 | - | 65 % |

[1]) Page 8; Seite 8

At 100 % modulation with single tone sine wave $I_a$ = max. 1.5 A.
A modulation de 100 % par onde sinusoïdale monofréquence $I_a$ = 1,5 A au max.
Bei 100 % Modulation mit sinusförmigem Signal einer einzigen Frequenz ist $I_a$ = max. 1,5 A

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF Klasse B Verstärker und Modulator

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = max. | 5 kV | $I_a$ | = max. | 1,1 A[1]) |
| $W_{ia}$ | = max. | 5,5 kW | $V_{g2}$ | = max. | 800 V |
| $W_a$ | = max. | 3 kW | $W_{g2}$ | = max. | 100 W |
| | | | $-V_{g1}$ | = max. | 500 V |
| | | | $W_{g1}$ | = max. | 30 W |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 5 | | 5 | | kV |
| $V_{g2}$ | = | 800 | | 800 | | V |
| $V_{g1}$ | = | -107 | | -107 | | V |
| $R_{aa'}$ | = | 3700 | | 5000 | | Ω |
| $V_{g1g1_p}$ | = | 0 | 714 | 0 | 594 | V |
| $I_a$ | = | 2x0,1 | 2x1,46 | 2x0,1 | 2x1,1 | A |
| $I_{g2}$ | = | 0 | 2x120 | 0 | 2x50 | mA |
| $I_{g1}$ | = | 0 | 2x150 | 0 | 2x40 | mA |
| $I_{g1_p}$ | = | 0 | 2x750 | 0 | 2x460 | mA |
| $W_{ig1}$ | = | 0 | 2x50 | 0 | 2x11 | W |
| $W_{g2}$ | = | 0 | 2x96 | 0 | 2x40 | W |
| $W_{ia}$ | = | 2x0,5 | 2x7,3 | 2x0,5 | 2x5,5 | kW |
| $W_a$ | = | 2x0,5 | 2x2,55 | 2x0,5 | 2x1,9 | kW |
| $W_o$ | = | 0 | 9,5 | 0 | 7,2 | kW |
| $\eta$ | = | - | 65 | - | 65 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 5 | | 4 | | kV |
| $V_{g2}$ | = | 800 | | 800 | | V |
| $V_{g1}$ | = | -107 | | -103 | | V |
| $R_{aa'}$ | = | 17600 | | 7000 | | Ω |
| $V_{g1g1_p}$ | = | 0 | 214 | 0 | 366 | V |
| $I_a$ | = | 2x0,1 | 2x0,32 | 2x0,1 | 2x0,6 | A |
| $I_{g2}$ | = | 0 | 2x10 | 0 | 2x60 | mA |
| $I_{g1}$ | = | 0 | 0 | 0 | 2x11 | mA |
| $I_{g1_p}$ | = | 0 | 0 | 0 | 2x70 | mA |
| $W_{ig1}$ | = | 0 | 0 | 0 | 2x2 | W |
| $W_{g2}$ | = | 0 | 2x8 | 0 | 2x48 | W |
| $W_{ia}$ | = | 2x0,5 | 2x1,6 | 2x0,4 | 2x2,4 | kW |
| $W_a$ | = | 2x0,5 | 2x0,55 | 2x0,4 | 2x0,9 | kW |
| $W_o$ | = | 0 | 2,1 | 0 | 3,0 | kW |
| $\eta$ | = | - | 65 | - | 62 | % |

[1])See page 7; voir page 7; siehe Seite 7

Grid modulated H.F.class C amplifier for television service, negative modulation, positive synchronisation
Amplificatrice H.F. classe C pour télévision, modulation de grille, modulation négative, synchronisation positive
HF Klasse C Verstärker für Fernsehsender, Gittermodulation, negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 110 Mc/s | | f = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 5 kV | $V_a$ = max. | 4 kV |
| $I_a$ sync = max. | 1,5 A | $W_{ia}$ sync = max. | 6 kW |
| $W_{ia}$ sync = max. | 7 kW | | |
| $W_a$ sync = max. | 3 kW | | |
| $V_{g2}$ = max. | 800 V | | |
| $W_{g2}$ sync = max. | 100 W | | |
| $-V_{g1}$ = max. | 500 V | | |
| $I_{g1}$ sync = max. | 80 mA | | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| f | 54-88 [1] | 170-220 [1] | 170-220 | Mc/s |
|---|---|---|---|---|
| B (-1,5 db) | 6,5 | 6,5 | - | Mc/s [2] |
| B (-3 db) | 12 | 12 | 7,5 | Mc/s [2] |
| $V_a$ | 5 | 4 | 4 | kV |
| $V_{g2}$ | 800 | 800 | 800 | V |
| $V_{g1}$ sync | -175 | -150 | -150 | V |
| $V_{g1}$ black, noir, schwarz | -260 | -230 | -260 | V |
| $V_{g1}$ white, blanc, weiss | -450 | -450 | -450 | V |
| $V_{g1g1p}$ | 900 | 850 | 850 | V [3] |
| $I_a$ sync | 2,7 | 2,75 | 2,75 | A |
| $I_a$ black, noir, schwarz | 1,75 | 2,1 | 1,5 | A |
| $I_{g2}$ sync | 145 | 110 | 250 | mA |
| $I_{g2}$ black, noir, schwarz | 40 | 50 | 65 | mA |
| $I_{g1}$ sync | 82 | 100 | 80 | mA |
| $I_{g1}$ black, noir, schwarz | 35 | 50 | 20 | mA |
| $W_{ig1}$ sync | 200-300 | 300-400 | 200-300 | W [4] |
| $W_o$ sync | 8,0 | 5,0 | 5,9 | kW |
| $W_o$ black, noir, schwarz | 4,5 | 2,8 | 3,3 | kW |

[1], [2], [3], [4]) See page 14 ; voir page 14 ; siehe Seite 14

# PHILIPS

H.F. class B amplifier for television service, negative modulation, positive synchronisation.
Amplificatrice H.F. classe B pour télévision, modulation négative, synchronisation positive
HF Klasse B Verstärker für Fernsehsender, negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 110 Mc/s | | f = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 5 kV | $V_a$ = max. | 4 kV |
| $V_{g2}$ = max. | 800 V | $W_{ia\ sync}$ = max. | 6 kW |
| $I_{a\ sync}$ = max. | 1,5 A | | |
| $W_{ia\ sync}$ = max. | 7 kW | | |
| $W_{a\ sync}$ = max. | 3 kW | | |
| $W_{g2\ sync}$ = max. | 100 W | | |
| $I_{g1\ sync}$ = max. | 80 mA | | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | | |
|---|---|---|---|---|
| f | | 54-88 | 170- 220 | Mc/s [1] |
| B (-1,5 db) | | 6,5 | 6,5 | Mc/s [2] |
| B (-3 db) | | 12 | 12 | Mc/s [2] |
| $V_a$ | | 5 | 4 | kV |
| $V_{g2}$ | | 800 | 800 | V |
| $V_{g1}$ | | -175 | -150 | V |
| $V_{g1g1_p}$ | sync | 900 | 850 | V [3] |
| | black, noir, schwarz | 730 | 700 | V [3] |
| $I_a$ | sync | 2,7 | 2,75 | A |
| | black, noir, schwarz | 1,75 | 2,1 | A |
| $I_{g2}$ | sync | 145 | 110 | mA |
| | black, noir, schwarz | 40 | 50 | mA |
| $I_{g1}$ | sync | 82 | 100 | mA |
| | black, noir, schwarz | 35 | 50 | mA |
| $W_{ig1}$ | sync | 200-300 | 300-400 | W [4] |
| $W_o$ | sync | 8,0 | 5,0 | kW |
| | black, noir, schwarz | 4,5 | 2,8 | kW |

[1], [2], [3], [4] See page 14; voir page 14; siehe Seite 14

Grid modulated H.F.class C amplifier for television service, positive modulation, negative synchronisation
Amplificatrice H.F. classe C pour télévision, modulation de grille, modulation positive, synchronisation négative
HF Klasse C Verstärker für Fernsehsender, Gittermodulation, positive Modulation, negative Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f | = max. 110 Mc/s | f | = max. 220 Mc/s |
|---|---|---|---|
| $V_a$ | = max. 5 kV | $V_a$ | = max. 4 kV |
| $V_{g2}$ | = max. 800 V | | |
| $-V_{g1}$ | = max. 500 V | $W_{ia}$ white, blanc, weiss | = max. 4,4 kW |
| $I_a$ | = max. 1,1 A | | |
| $W_{ia}$ white, blanc, weiss | = max. 5,5 kW | | |
| $W_a$ white, blanc, weiss | = max. 3 kW | | |
| $W_{g2}$ white, blanc, weiss | = max. 100 W | | |
| $I_{g1}$ white, blanc, weiss | = max. 80 mA | | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | |
|---|---|---|---|
| f | | 170-220[1] | 170-220 Mc/s |
| B (-1,5 db) | | 6,5 | - Mc/s$^2$[2] |
| B (-3 db) | | 12 | 7,5 Mc/s$^2$[2] |
| $V_a$ | | 4 | 4 kV |
| $V_{g2}$ | | 800 | 800 V |
| $V_{g1}$ | white, blanc, weiss | -230 | -230 V |
| | black, noir, schwarz | -380 | -380 V |
| $V_{g1g1_p}$ | | 850 | 850 V[3] |
| $I_a$ | white, blanc, weiss | 2,1 | 1,7 A |
| | black, noir, schwarz | 0,6 | 0,5 A |
| $I_{g2}$ | white, blanc, weiss | 50 | 80 mA |
| | black, noir, schwarz | 10 | 10 mA |
| $I_{g1}$ | white, blanc, weiss | 50 | 25 mA |
| | black, noir, schwarz | 0 | 0 mA |
| $W_{ig1}$ | | 300-400 | 200-300 W[4] |
| $W_o$ | white, blanc, weiss | 2,8[5] | 4,0 kW |
| | black, noir, schwarz | 0,25 | 0,36 kW |

[1], [2], [3], [4], [5] See page 14; voir page 14; siehe Seite 14

H.F. class B amplifier for television service, positive modulation, negative synchronisation
Amplificatrice H.F.classe B pour télévision, modulation positive, synchronisation négative
HF Klasse B Verstärker für Fernsehsender, positive Modulation, negative Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 110 Mc/s | f = max. 220 Mc/s |
|---|---|
| $V_a$ = max. 5 kV | $V_a$ = max. 4 kV |
| $V_{g2}$ = max. 800 V | $W_{ia}$ (white, blanc, weiss) = max. 4,4 kW |
| white, blanc, weiss: $I_a$ = max. 1,1 A | |
| white, blanc, weiss: $W_{ia}$ = max. 5,5 kW | |
| white, blanc, weiss: $W_a$ = max. 3 kW | |
| white, blanc, weiss: $W_{g2}$ = max. 100 W | |
| white, blanc, weiss: $I_{g1}$ = max. 80 mA | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | |
|---|---|---|---|
| f | | = | 170 - 220 Mc/s [1] |
| B (-1,5 db) | | = | 6,5 Mc/s [2] |
| B (-3 db) | | = | 12 Mc/s [2] |
| $V_a$ | | = | 4 kV |
| $V_{g2}$ | | = | 800 V |
| $V_{g1}$ | | = | -150 V |
| $V_{g1g1_p}$ | white, blanc, weiss | = | 700 V [3] |
| | black, noir, schwarz | = | 350 V [3] |
| $I_a$ | white, blanc, weiss | = | 2,1 A |
| | black, noir, schwarz | = | 0,6 A |
| $I_{g2}$ | white, blanc, weiss | = | 50 mA |
| | black, noir, schwarz | = | 10 mA |
| $I_{g1}$ | white, blanc, weiss | = | 50 mA |
| | black, noir, schwarz | = | 0 mA |
| $W_{ig1}$ | white, blanc, weiss | = | 200-300 W [4] |
| $W_o$ | white, blanc, weiss | = | 2,8 kW [5] |
| | black, noir, schwarz | = | 0,25 kW |

[1], [2], [3], [4], [5] See page 14 ; voir page 14 ; siehe Seite 14

Grid modulated H.F. class C amplifier for colour-television service, negative modulation, positive synchronisation
Amplificatrice H.F. classe C pour télévision en couleurs, modulation de grille; modulation négative, synchronisation positive
HF Klasse C Verstärker für Farbfernsehsender, Gittermodulation; negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 110 Mc/s | | f = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 5 kV | $V_a$ | = max. 4 kV |
| $I_a$ sync | = max. 1,5 A | $W_{ia}$ sync | = max. 6 kW |
| $W_{ia}$ sync | = max. 7 kW | | |
| $W_a$ sync | = max. 3 kW | | |
| $V_{g2}$ | = max. 800 V | | |
| $W_{g2}$ sync | = max. 100 W | | |
| $-V_{g1}$ | = max. 500 V | | |
| $I_{g1}$ sync | = max. 80 mA | | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | |
|---|---|---|---|
| f | | = | 170 - 220 Mc/s [1] |
| B (-1,5 db) | | = | 4 Mc/s [2] |
| B (- 3 db) | | = | 8,5 Mc/s [2] |
| $V_a$ | | = | 3,5 kV |
| $V_{g2}$ | | = | 700 V |
| $V_{g1}$ | sync | = | -120 V |
| | black, noir, schwarz | = | -170 V |
| | white, blanc, weiss | = | -320 V |
| $V_{g1g1p}$ | | = | 640 V [3] |
| $I_a$ | sync | = | 2 A |
| | black, noir, schwarz | = | 1,5 A |
| $I_{g2}$ | sync | = | 82 mA |
| | black, noir, schwarz | = | 38 mA |
| $I_{g1}$ | sync | = | 100 mA |
| | black, noir, schwarz | = | 50 mA |
| $W_{ig1}$ | sync | = | 100 - 200 W [4] |
| $W_o$ | sync | = | 3 kW |
| | black, noir, schwarz | = | 1,7 kW |

[1][2][3][4]) See page 14; voir page 14; siehe Seite 14

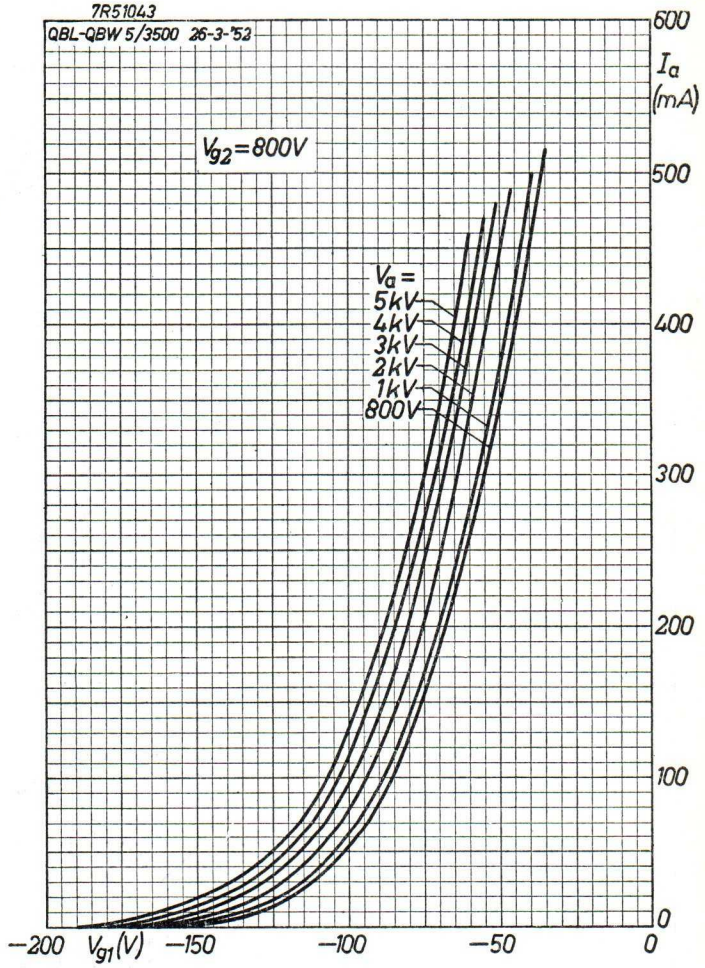
1) The operating conditions are given at a frequency slightly below the peak of the resonance curve
Les caractéristiques d'utilisation sont données à une fréquence un peu au-dessous de la crête de la courbe de résonance
Die Betriebsdaten gelten bei einer Frequenz ein wenig unterhalb des Scheitels der Abstimmkurve.

2) This value of bandwidth is based on measurements on a circuit with a single LC section
Cette valeur de la largeur de bande se rapporte à des mesures à un montage avec un seul circuit LC.
Dieser Wert der Bandbreite bezieht sich auf Messungen an einer Schaltung mit einem einzigen LC-Kreis.

3) Measured by the slide back method
Mesuré par la méthode de glissement de la tension de polarisation
Gemessen mittels Verschiebung der Gittervorspannung

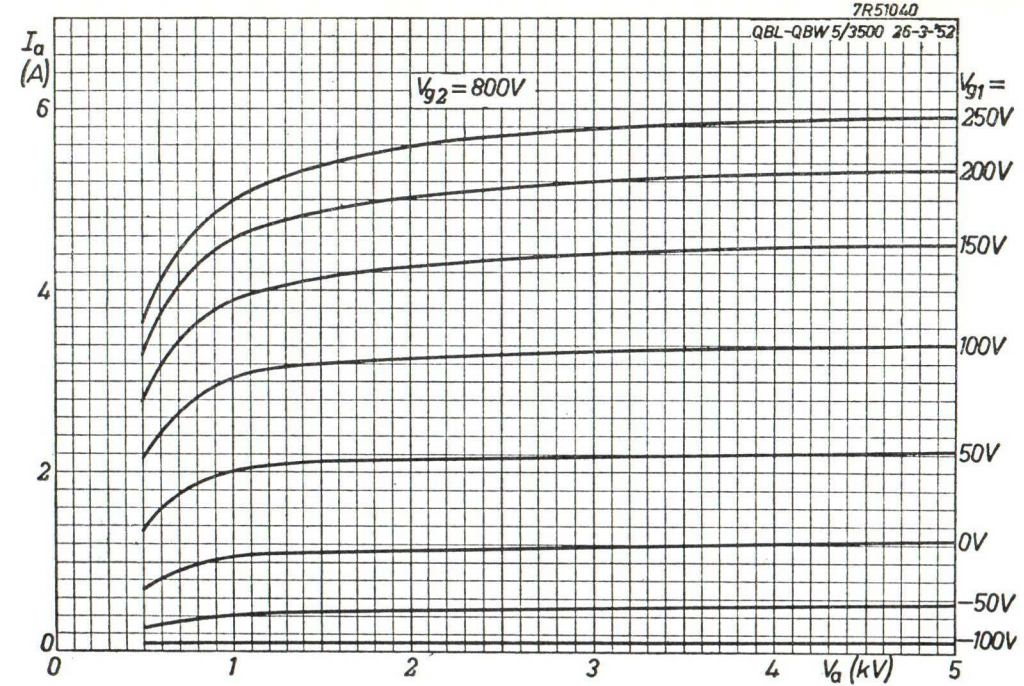
4) Driving power is accounted for largely by circuit losses. The indicated driving power is required to take care of losses in damping resistors, circuit losses and tube driving power
La puissance d'entrée est nécessaire pour la plupart pour les pertes dans le circuit. La puissance mentionnée est nécessaire pour les pertes dans les résistances d'amortissement, dans le circuit et pour la puissance d'entrée du tube
Die Eingangsleistung ist grossenteils nötig für die Verluste in der Schaltung. Die genannte Leistung ist nötig für die Verluste in Dämpfungswiderständen, in Kreisen und für die Eingangsleistung der Röhre

5) In the peak of the resonance curve $W_o$(white)=3,3 kW
A la crete de la courbe de résonance $W_o$ ( blanc) = 3,3 kW
Im Scheitel der Abstimmkurve ist $W_o$(weiss)=3,3 kW


7R51043
QBL-QBW 5/3500 26-3-'52
$V_{g2}$=800V
$V_a$ =
5kV
4kV
3kV
2kV
1kV
800V
600
$I_a$
(mA)
500
400
300
200
100
0
−200
$V_{g1}$(V)
−150
−100
−50
0

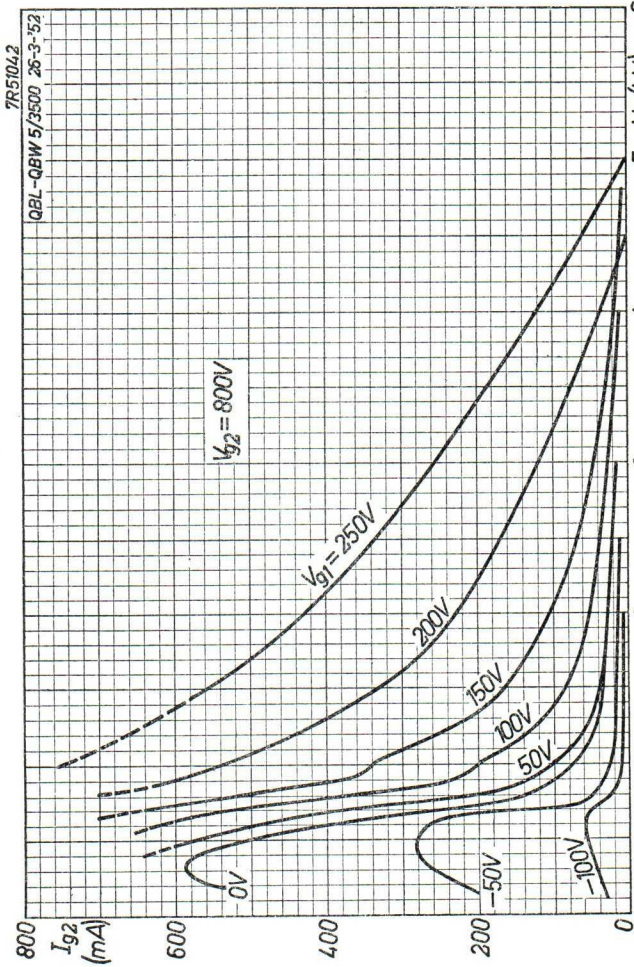
7.7.1954

A


7R51040
QBL-QBW 5/3500 26-3-'52
$I_a$ (A)
$V_{g2}$ = 800V
$V_{g1}$ =
250V
200V
150V
100V
50V
0V
−50V
−100V
6
4
2
0
0
1
2
3
4
5
$V_a$ (kV)

# PHILIPS

**QBL 5/3500**

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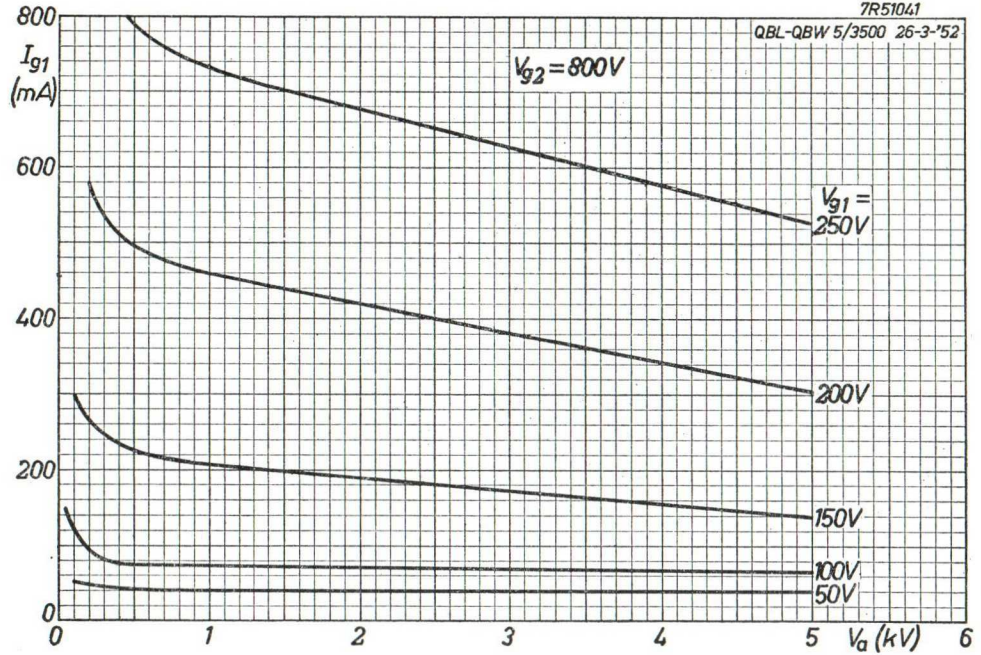
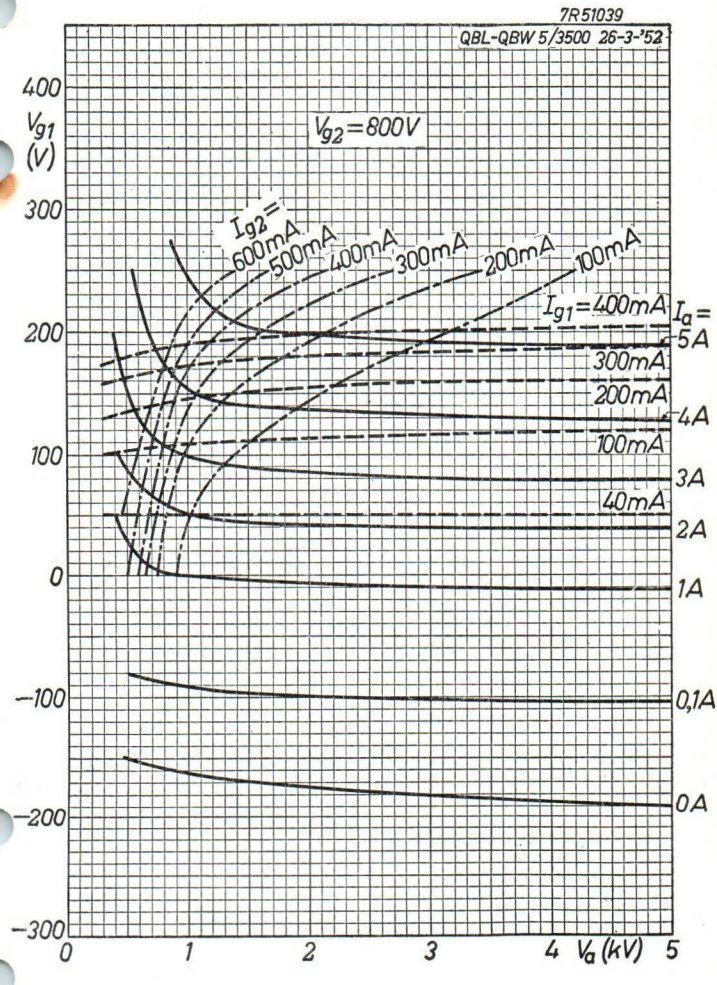
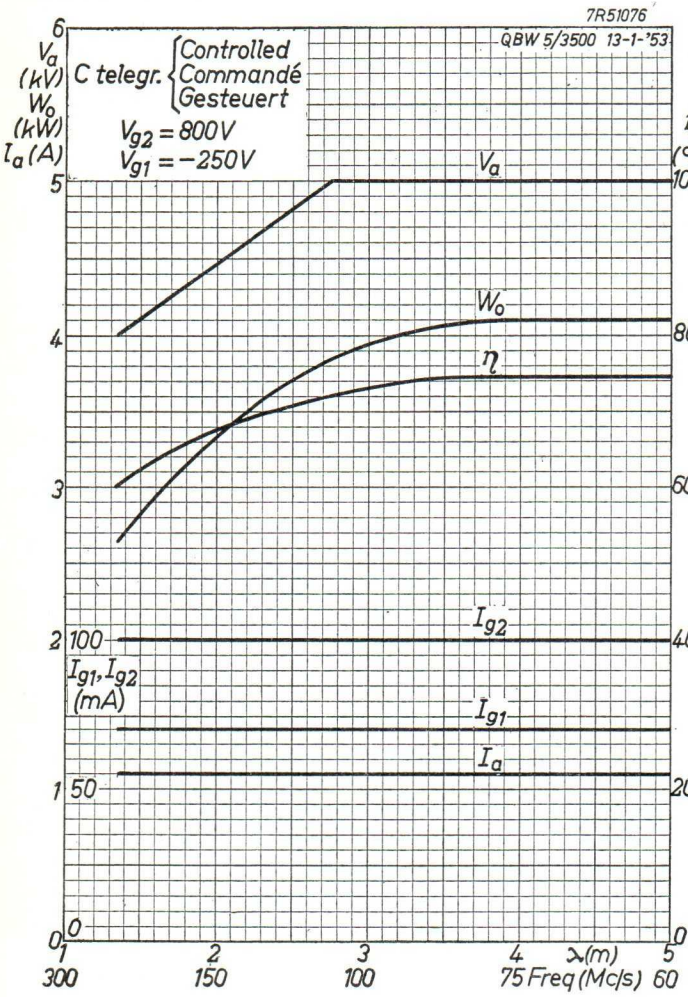
C


7R51041
QBL-QBW 5/3500 26-3-'52
$V_{g2}$ = 800V
$I_{g1}$ (mA)
800
600
400
200
0
$V_{g1}$ = 250V
200V
150V
100V
50V
0
1
2
3
4
5
6
$V_a$ (kV)


7R51039
QBL-QBW 5/3500 26-3-'52
$V_{g2}$=800V
$I_{g2}$=
600mA
500mA
400mA
300mA
200mA
100mA
$I_{g1}$=400mA
300mA
200mA
100mA
40mA
$I_a$=
5A
4A
3A
2A
1A
0,1A
0A
400
$V_{g1}$ (V)
300
200
100
0
−100
−200
−300
0
1
2
3
4
$V_a$ (kV)
5

QBL 5/3500

# PHILIPS

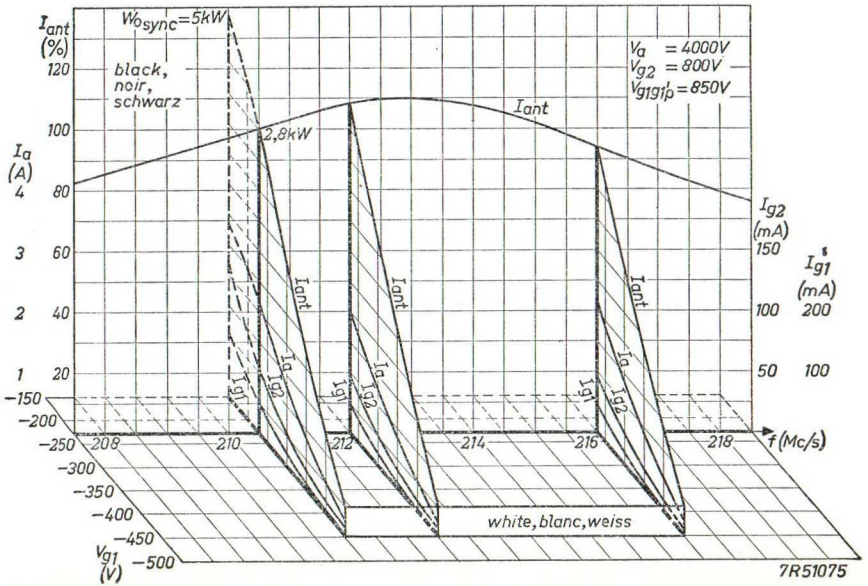



F

7.7.1954

G

*Grid-modulated H.F. class C amplifier for television service (2 valves in push-pull)*
*Amplificateur H.F. classe C modulé par la grille pour la télévision (2 tubes en montage push-pull)*
*H.F. Klasse C Verstärker mit Gittermodulation für Fernsehbetrieb (2 Röhren in Gegentaktschaltung)*



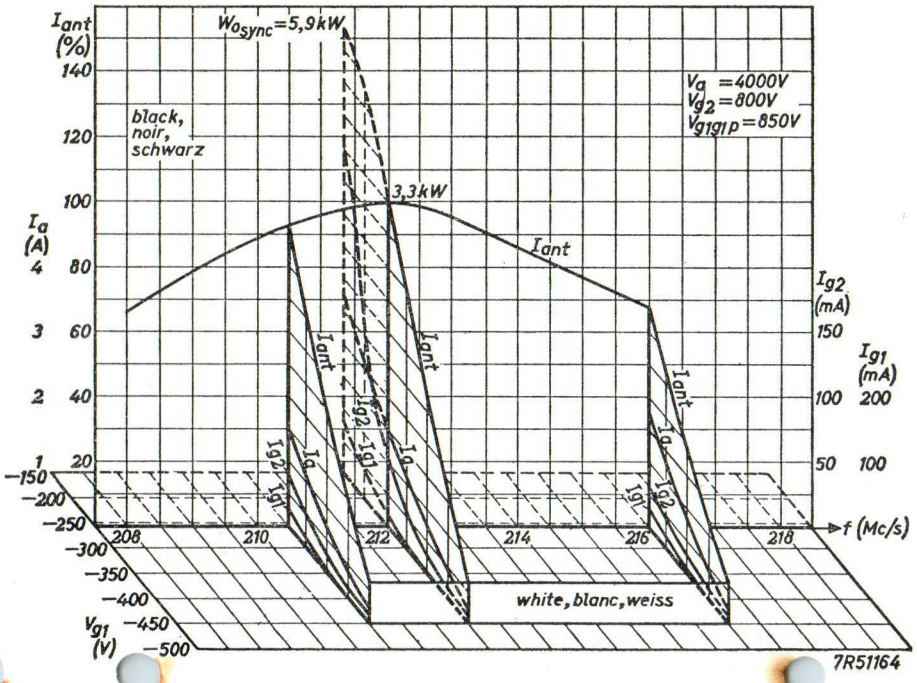

PHILIPS

QBL 5/3500

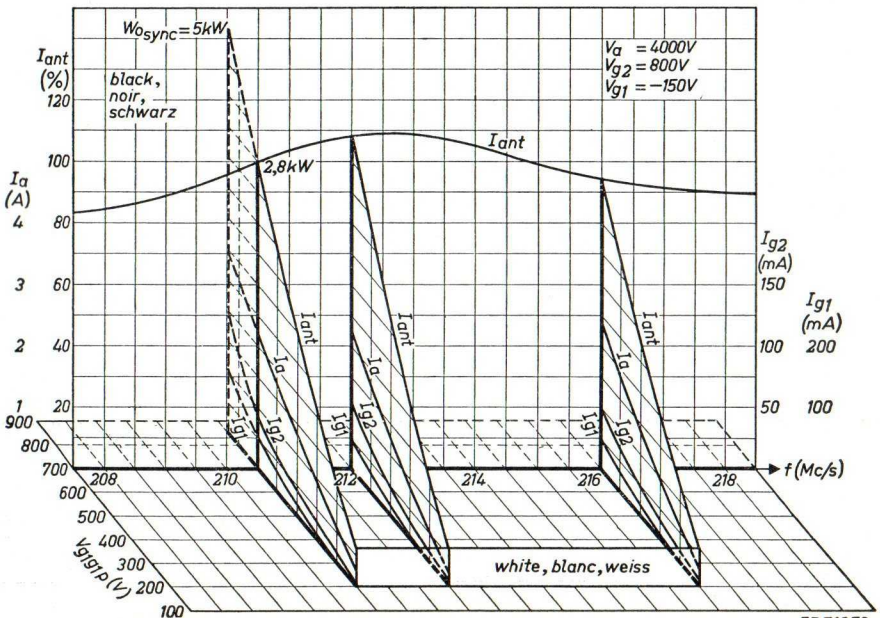
Grid-modulated H.F. class C amplifier for television service (2 valves in push-pull)
Amplificateur H.F. class C modulé par la grille pour la télévision (2 tubes en montage push-pull)
H.F. Klasse C Verstärker mit Gittermodulation für Fernsehbetrieb (2 Röhren in Gegentaktschaltung)

QBL 5/3500

PHILIPS



Grid-modulated H.F. class B amplifier for television service (2 valves in push-pull)
Amplificateur H.F. classe B modulé par la grille pour la télévision (2 tubes en montage push-pull)
H.F. Klasse B Verstärker mit Gittermodulation für Fernsehbetrieb (2 Röhren in Gegentaktschaltung)

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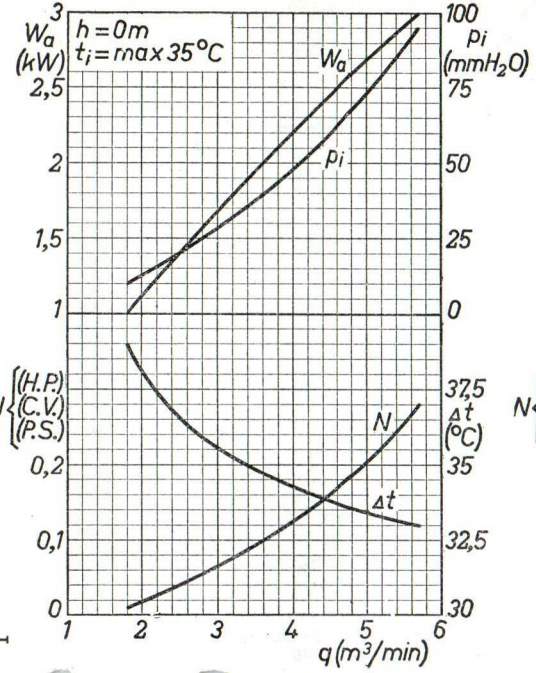
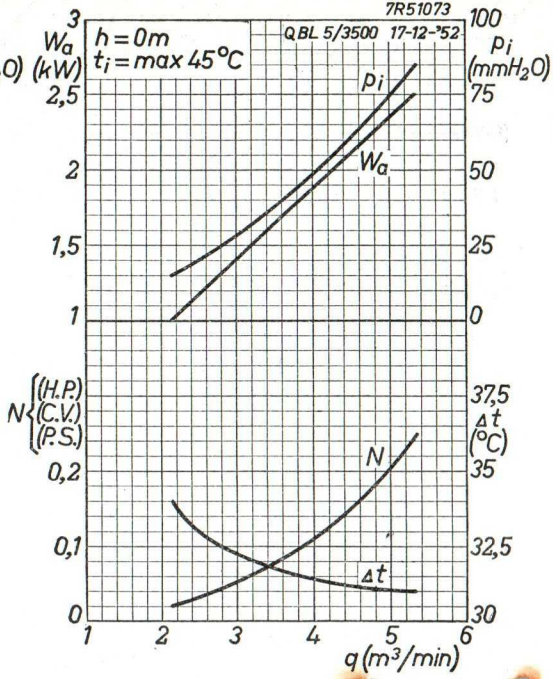
I

PHILIPS

QBL 5/3500


h = 0m
$t_i$ = max 35°C
$W_a$ (kW)
$p_i$ (mmH$_2$O)
N {(H.P.) (C.V.) (P.S.)}
$\Delta t$ (°C)
q (m$^3$/min)


7R51073
QBL 5/3500 17-12-'52
h = 0m
$t_i$ = max 45°C
$W_a$ (kW)
$p_i$ (mmH$_2$O)
N {(H.P.) (C.V.) (P.S.)}
$\Delta t$ (°C)
q (m$^3$/min)

PHILIPS

PHILIPS

QBL 5/3500




7.7.1954

K

# PHILIPS

**QBW 5/3500**

TETRODE for use as H.F. amplifier, modulator or frequency multiplier
TÉTRODE pour utilisation en amplificatrice H.F., modulatrice ou multiplicatrice de fréquence
TETRODE zur Verwendung als HF-Verstärker, Modulator oder Frequenzvervielfacher

Cooling : water/air flow to seals
Refroidissement: circulation d'eau/air aux scellements
Kühlung : Wasser/Luftstrom auf Einschmelzungen

Filament : Thoriated tungsten
Filament : Tungstène thorié
Heizfaden: Thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 6,3 V
$I_f$ = 32,5 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 8,4 pF
$C_{g1}$ = 23,5 pF
$C_{ag1}$ < 0,35 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 8,5
$S(I_a=2A)$ = 19 mA/V

| λ | Freq. | C telegr. | | Cag2 mod. | |
|---|---|---|---|---|---|
| m | (Mc/s) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) |
| 4 | 75 | 5 | 4,1 | | |
| | | 4 | 3,15 | | |
| 2,7 | 110 | 5 | 3,9 | 4 | 2,7 |
| 1,36 | 220 | 4 | 2,9 | | |

Television, télévision, Fernsehen

| | Freq. (Mc/s) | Neg. mod. pos. synchr. $V_a$ (kV) | $W_o$ sync (kW) | $W_o$ black noir schwarz (kW) | Pos.mod neg.synchr. $V_a$ kV | $W_o$ White blanc weiss (kW) |
|---|---|---|---|---|---|---|
| Narrow band<br>Bande étroite<br>Schmaler Band | 170-220 | 4 | 5,9 | 3,3 | 4 | 4,0 |
| Broad band<br>Bande large<br>Breiter Band | 54-88<br>170-220 | 5<br>4 | 8,0<br>5,0 | 4,5<br>2,8 | 4 | 2,8 |

# PHILIPS

Cooling characteristics
Caractéristiques de refroidissement
Kühlungsdaten

| $W_a$ (kW) | $t_i$ (°C) | q (l/min) | $p_i$ (atm) |
|---|---|---|---|
| 1 | 20 | 2,5 | 0,073 |
| | 50 | 3,0 | 0,1 |
| 2 | 20 | 2,5 | 0,073 |
| | 50 | 4,8 | 0,25 |
| 3 | 20 | 3,0 | 0,105 |
| | 50 | 6,9 | 0,55 |

See cooling characteristics
Voir les courbes de refroidissement
Siehe die Kühlungskurven

$t_i$ = max. 50 °C

Temperature of seals
Température des scellements = max. 180 °C
Temperatur der Einschmelzungen

Bulb temperature
Température de l'ampoule = max. 250 °C
Kolbentemperatur

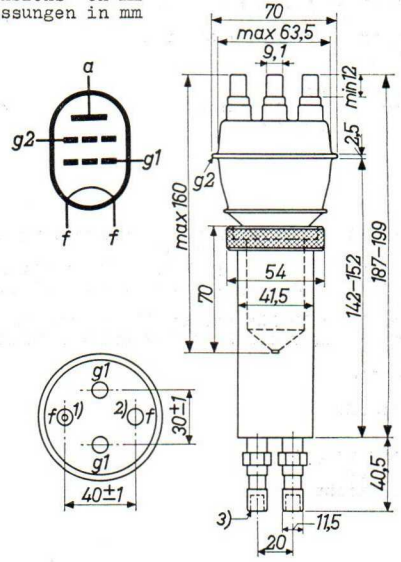
To keep the seal temperature below 180 °C it may be necessary to direct an air flow of sufficient velocity to the seals. At frequencies below 75 Mc/s this air cooling will in general not be necessary at $V_a \leq 4$ kV ($V_a \leq 3.2$ kV in the case of class C anode and screen grid modulation). At $V_a \leq 5$ kV ($V_a \leq 4$ kV in the case of class C a and $g_2$ modulation) air cooling will generally be necessary at each frequency.

Dans bien des cas un courant d'air à vitesse suffisante sera nécessaire, afin que la température des scellements ne depasse pas 180°C. En général, le refroidissement par air ne sera pas nécessaire au dessous de 75 Mc/s à $V_a \leq 4$ kV (à $V_a \leq 3,2$ kV en cas de modulation d'anode et de grille écran classe C). Généralement le refroidissement par air sera nécessaire à chaque fréquence à $V_a \leq 5$ kV (à $V_a \leq 4$ kV en cas de modulation d'anode et de grille écran classe C).

In vielen Fällen ist ein auf die Einschmelzungen gerichteter genügend starker Luftstrom notwendig, damit die Temperatur von 180°C der Einschmelzungen nicht überschritten wird. Im allgemeinen brauchen die Einschmelzungen bei Frequenzen bis zu 75 MHz und $V_a \leq 4$ kV nicht gekühlt zu werden ( bei Klasse C Anoden- und Schirmgittermodulation nicht bei $V_a \leq 3,2$ kV). Bei $V_a \leq 5$ kV (4 kV bei Klasse C Anoden- und Schirmgittermodulation) wird im allgemeinen die Luftkühlung bei jeder Frequenz erforderlich sein.

Tube mounted in water-jacket type K 713
Tube monté dans le refroidisseur type K 713
Röhre in Kühltopf Typ K 713 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm




1) This pin is marked "O"
Cette broche est marquée "O"
Dieser Stift ist mit "O" gekennzeichnet

2) This pin should be used for connecting the anode return lead
Cette broche sera utilisée pour connecter le conducteur de retour du circuit anodique
Dieser Stift soll zum Anschliessen der Anodenrückleitung verwendet werden

3) 1/8"pipe thread; 1/8" pas à gaz; 1/8"Gasrohrgewinde

# PHILIPS

Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

Clips for filament and control grid
Bornes de connexion pour le filament et la grille de commande 40634
Anschlussklemmen für Heizfaden und Steuergitter

Screen grid connector
Connecteur pour la grille écran 40622
Schirmgitteranschlussring

At frequencies above 30 Mc/s both connecting pins must be used when connecting the control grid
Aux fréquences au-dessus de 30 Mc/s il faut utiliser les deux broches de connexion pour la connexion de la grille de commande
Bei Frequenzen über 30 MHz müssen die beiden Anschlussstifte zum Anschliessen des Steuergitters verwendet werden

Tube : Net weight
Tube : Poids net 0,35 kg
Röhre: Nettogewicht

Tube : Shipping weight
Tube : Poids brut 1,1 kg
Röhre: Bruttogewicht

K 713

Net weight
Poids net 0,52 kg
Nettogewicht

Shipping weight
Poids brut 0,75 kg
Bruttogewicht

H.F. class C telegraphy
H.F. classe C télégraphie
H.F. Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 30 Mc/s | | f = max. 110 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 5,5 kV | $V_a$ = max. | 5 kV |
| $W_{ia}$ = max. | 5,5 kW | | |
| $W_a$ = max. | 3 kW | f = max. 220 Mc/s | |
| $I_a$ = max. | 1,1 A | $V_a$ = max. | 4 kV |
| $V_{g2}$ = max. | 800 V | | |
| $W_{g2}$ = max. | 100 W | | |
| $-V_{g1}$ = max. | 500 V | | |
| $W_{g1}$ = max. | 30 W | | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = | 75 | 110 | 75 | 220 Mc/s |
| $V_a$ | = | 5 | 5 | 4 | 4 kV |
| $V_{g2}$ | = | 800 | 800 | 800 | 800 V |
| $V_{g1}$ | = | -250 | -250 | -250 | -250 V |
| $I_a$ | = | 1,1 | 1,1 | 1,1 | 1,1 A |
| $I_{g2}$ | = | 100 | 100 | 120 | 120 mA |
| $I_{g1}$ | = | 70 | 70 | 80 | 80 mA |
| $V_{g1p}$ | = | 480 | 480 | 500 | 500 V |
| $W_{ig1}$ | = | 30 | 30 | 36 | 36 W |
| $W_{g2}$ | = | 80 | 80 | 96 | 96 W |
| $W_{ia}$ | = | 5,5 | 5,5 | 4,4 | 4,4 kW |
| $W_a$ | = | 1,4 | 1,6 | 1,25 | 1,5 kW |
| $W_o$ | = | 4,1 | 3,9 | 3,15 | 2,9 kW |
| $\eta$ | = | 74,5 | 71 | 72 | 66 % |

# PHILIPS

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF Klasse C Anoden- und Schirmgittermodulation

Screen grid modulated via a choke of 60 H
La grille-écran modulée à travers une bobine de 60 H
Schirmgitter moduliert über eine Drosselspule von 60 H

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = max. | 30 Mc/s | f | = max. | 110 Mc/s |
| $V_a$ | = max. | 4,5 kV | $V_a$ | = max. | 4 kV |
| $W_{ia}$ | = max. | 3,6 kW | | | |
| $W_a$ | = max. | 2 kW | | | |
| $I_a$ | = max. | 0,9 A | | | |
| $V_{g2}$ | = max. | 800 V | | | |
| $W_{g2}$ | = max. | 100 W[1]) | | | |
| $-V_{g1}$ | = max. | 500 V | f | = max. | 220 Mc/s |
| $W_{g1}$ | = max. | 30 W | $V_a$ | = max. | 3,2 kV |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| f | = | 110 Mc/s |
| $V_a$ | = | 4 kV |
| $V_{g2}$ | = | 800 V |
| $V_{g1}$ | = | -375 V |
| $V_{g1p}$ | = | 625 V |
| $I_a$ | = | 0,9 A |
| $I_{g2}$ | = | 120 mA |
| $I_{g1}$ | = | 85 mA |
| $W_{ia}$ | = | 3,6 kW |
| $W_a$ | = | 0,9 kW |
| $W_o$ | = | 2,7 kW |
| $W_{g2}$ | = | 96 W |
| $W_{ig1}$ | = | 48 W |
| $\eta$ | = | 75 % |
| m | = | 100 % |
| $W_{mod}$ | = | 1,8 kW |

[1]) For all other modulation methods $W_{g2}$ = max. 65 W
Pour toutes les autres méthodes de modulation $W_{g2}$ = max. 65 W
Für alle andere Modulationsverfahren ist $W_{g2}$ = max. 65 W

H.F. class B amplifier, single side band
Amplificatrice H.F. classe B à une bande latérale
HF Einseitenbandverstärker, Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

f = max. 110 Mc/s

| | | |
|---|---|---|
| $V_a$ | = max. | 5 kV |
| $I_a$ | = max. | 1,3 A |
| $W_{ia}$ | = max. | 6,5 kW |
| $W_a$ | = max. | 3 kW |
| $V_{g2}$ | = max. | 800 V |
| $W_{g2}$ | = max. | 100 W |
| $I_{g1}$ | = max. | 80 mA |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $V_a$ | = | 5 | | 4,5 | | 4 | kV |
| $V_{g2}$ | = | 800 | | 800 | | 800 | V |
| $V_{g1}$ | = | -107 | | -105 | | -104 | V |
| $V_{g1_p}$ | = | 0 | 277 | 0 | 275 | 0 | 274 V |
| $I_a$ | = | 0,08 | 1,3 | 0,08 | 1,29 | 0,07 | 1,28 A |
| $I_{g2}$ | = | 0 | 75 | 0 | 75 | 0 | 78 mA |
| $I_{g1}$ | = | 0 | 55 | 0 | 55 | 0 | 54 mA |
| $W_{ig1}$ | = | 0 | 15 | 0 | 15 | 0 | 15 W |
| $W_{g2}$ | = | 0 | 60 | 0 | 60 | 0 | 62,5 W |
| $W_{ia}$ | = | 0,40 | 6,5 | 0,36 | 5,8 | 0,26 | 5,1 kW |
| $W_a$ | = | 0,40 | 2,1 | 0,36 | 1,95 | 0,28 | 1,8 kW |
| $W_o$ | = | - | 4,4 | - | 3,85 | - | 3,3 kW |
| $\eta$ | = | - | 68 | - | 66,5 | - | 65 % |

[1]) Page 8; Seite 8

At 100 % modulation with single tone sine wave $I_a$ = max. 1.5 A
A modulation de 100 % par onde sinusoïdale monofréquence $I_a$ = 1,5 A au max.
Bei 100 % Modulation mit sinusförmigem Signal einer einzigen Frequenz ist $I_a$ = max. 1,5 A

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF Klasse B Verstärker und Modulator

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = max. | 5 kV | $I_a$ | = max. | 1,1 A[1] |
| $W_{ia}$ | = max. | 5,5 kW | $V_{g2}$ | = max. | 800 V |
| $W_a$ | = max. | 3 kW | $W_{g2}$ | = max. | 100 W |
| | | | $-V_{g1}$ | = max. | 500 V |
| | | | $W_{g1}$ | = max. | 30 W |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 5 | | 5 | kV |
| $V_{g2}$ | = | 800 | | 800 | V |
| $V_{g1}$ | = | -107 | | -107 | V |
| $R_{aa'}$ | = | 3700 | | 5000 | Ω |
| $V_{g1g1_p}$ | = | 0 | 714 | 0 | 594 V |
| $I_a$ | = | 2x0,1 | 2x1,46 | 2x0,1 | 2x1,1 A |
| $I_{g2}$ | = | 0 | 2x120 | 0 | 2x50 mA |
| $I_{g1}$ | = | 0 | 2x150 | 0 | 2x40 mA |
| $I_{g1_p}$ | = | 0 | 2x750 | 0 | 2x460 mA |
| $W_{ig1}$ | = | 0 | 2x50 | 0 | 2x11 W |
| $W_{g2}$ | = | 0 | 2x96 | 0 | 2x40 W |
| $W_{ia}$ | = | 2x0,5 | 2x7,3 | 2x0,5 | 2x5,5 kW |
| $W_a$ | = | 2x0,5 | 2x2,55 | 2x0,5 | 2x1,9 kW |
| $W_o$ | = | 0 | 9,5 | 0 | 7,2 kW |
| $\eta$ | = | - | 65 | - | 65 % |

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 5 | | 4 | kV |
| $V_{g2}$ | = | 800 | | 800 | V |
| $V_{g1}$ | = | -107 | | -103 | V |
| $R_{aa'}$ | = | 17600 | | 7000 | Ω |
| $V_{g1g1_p}$ | = | 0 | 214 | 0 | 366 V |
| $I_a$ | = | 2x0,1 | 2x0,32 | 2x0,1 | 2x0,6 A |
| $I_{g2}$ | = | 0 | 2x10 | 0 | 2x60 mA |
| $I_{g1}$ | = | 0 | 0 | 0 | 2x11 mA |
| $I_{g1_p}$ | = | 0 | 0 | 0 | 2x70 mA |
| $W_{ig1}$ | = | 0 | 0 | 0 | 2x2 W |
| $W_{g2}$ | = | 0 | 2x8 | 0 | 2x48 W |
| $W_{ia}$ | = | 2x0,5 | 2x1,6 | 2x0,4 | 2x2,4 kW |
| $W_a$ | = | 2x0,5 | 2x0,55 | 2x0,4 | 2x0,9 kW |
| $W_o$ | = | 0 | 2,1 | 0 | 3,0 kW |
| $\eta$ | = | - | 65 | - | 62 % |

[1])See page 7; voir page 7; siehe Seite 7

Grid modulated H.F.class C amplifier for television service, negative modulation, positive synchronisation
Amplificatrice H.F. classe C pour télévision, modulation de grille, modulation négative, synchronisation positive
HF Klasse C Verstärker für Fernsehsender, Gittermodulation, negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 110 Mc/s | | f = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 5 kV | $V_a$ = max. | 4 kV |
| $I_a$ sync = max. | 1,5 A | $W_{ia}$ sync = max. | 6 kW |
| $W_{ia}$ sync = max. | 7 kW | | |
| $W_a$ sync = max. | 3 kW | | |
| $V_{g2}$ = max. | 800 V | | |
| $W_{g2}$ sync = max. | 100 W | | |
| $-V_{g1}$ = max. | 500 V | | |
| $I_{g1}$ sync = max. | 80 mA | | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| f | 54-88 [1] | 170-220 [1] | 170-220 | Mc/s |
|---|---|---|---|---|
| B (-1,5 db) | 6,5 | 6,5 | - | Mc/s [2] |
| B (-3 db) | 12 | 12 | 7,5 | Mc/s [2] |
| $V_a$ | 5 | 4 | 4 | kV |
| $V_{g2}$ | 800 | 800 | 800 | V |
| $V_{g1}$ sync | -175 | -150 | -150 | V |
| $V_{g1}$ black, noir, schwarz | -260 | -230 | -260 | V |
| $V_{g1}$ white, blanc, weiss | -450 | -450 | -450 | V |
| $V_{g1g1_p}$ | 900 | 850 | 850 | V [3] |
| $I_a$ sync | 2,7 | 2,75 | 2,75 | A |
| $I_a$ black, noir, schwarz | 1,75 | 2,1 | 1,5 | A |
| $I_{g2}$ sync | 145 | 110 | 250 | mA |
| $I_{g2}$ black, noir, schwarz | 40 | 50 | 65 | mA |
| $I_{g1}$ sync | 82 | 100 | 80 | mA |
| $I_{g1}$ black, noir, schwarz | 35 | 50 | 20 | mA |
| $W_{ig1}$ sync | 200-300 | 300-400 | 200-300 | W [4] |
| $W_o$ sync | 8,0 | 5,0 | 5,9 | kW |
| $W_o$ black, noir, schwarz | 4,5 | 2,8 | 3,3 | kW |

[1], [2], [3], [4]) See page 14 ; voir page 14 ; siehe Seite 14

# PHILIPS

H.F. class B amplifier for television service, negative modulation, positive synchronisation.
Amplificatrice H.F. classe B pour télévision, modulation négative, synchronisation positive
HF Klasse B Verstärker für Fernsehsender, negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. | 110 Mc/s | f = max. | 220 Mc/s |
|---|---|---|---|
| $V_a$ = max. | 5 kV | $V_a$ = max. | 4 kV |
| $V_{g2}$ = max. | 800 V | $W_{ia}$ sync = max. | 6 kW |
| $I_a$ sync = max. | 1,5 A | | |
| $W_{ia}$ sync = max. | 7 kW | | |
| $W_a$ sync = max. | 3 kW | | |
| $W_{g2}$ sync = max. | 100 W | | |
| $I_{g1}$ sync = max. | 80 mA | | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | |
|---|---|---|---|
| f | | 54-88 | 170- 220 Mc/s[1] |
| B (-1,5 db) | | 6,5 | 6,5 Mc/s[2] |
| B (-3 db) | | 12 | 12 Mc/s[2] |
| $V_a$ | | 5 | 4 kV |
| $V_{g2}$ | | 800 | 800 V |
| $V_{g1}$ | | -175 | -150 V |
| $V_{g1g1_p}$ | sync | 900 | 850 V[3] |
| | black, noir, schwarz | 730 | 700 V[3] |
| $I_a$ | sync | 2,7 | 2,75 A |
| | black, noir, schwarz | 1,75 | 2,1 A |
| $I_{g2}$ | sync | 145 | 110 mA |
| | black, noir, schwarz | 40 | 50 mA |
| $I_{g1}$ | sync | 82 | 100 mA |
| | black, noir, schwarz | 35 | 50 mA |
| $W_{ig1}$ | sync | 200-300 | 300-400 W[4] |
| $W_o$ | sync | 8,0 | 5,0 kW |
| | black, noir, schwarz | 4,5 | 2,8 kW |

[1], [2], [3], [4] See page 14; voir page 14; siehe Seite 14

Grid modulated H.F.class C amplifier for television service, positive modulation, negative synchronisation
Amplificatrice H.F. classe C pour télévision, modulation de grille, modulation positive, synchronisation négative
HF Klasse C Verstärker für Fernsehsender, Gittermodulation, positive Modulation, negative Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f | = max. 110 Mc/s | f | = max. 220 Mc/s |
|---|---|---|---|
| $V_a$ | = max. 5 kV | $V_a$ | = max. 4 kV |
| $V_{g2}$ | = max. 800 V | $W_{ia}$ white, blanc, weiss | = max. 4,4 kW |
| $-V_{g1}$ | = max. 500 V | | |
| $I_a$ | = max. 1,1 A | | |
| $W_{ia}$ white, blanc, weiss | = max. 5,5 kW | | |
| $W_a$ white, blanc, weiss | = max. 3 kW | | |
| $W_{g2}$ white, blanc, weiss | = max. 100 W | | |
| $I_{g1}$ white, blanc, weiss | = max. 80 mA | | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | |
|---|---|---|---|
| f | | 170-220 [1] | 170-220 Mc/s |
| B (-1,5 db) | | 6,5 | - Mc/s$^2$) |
| B (-3 db) | | 12 | 7,5 Mc/s$^2$) |
| $V_a$ | | 4 | 4 kV |
| $V_{g2}$ | | 800 | 800 V |
| $V_{g1}$ | white, blanc, weiss | -230 | -230 V |
| | black, noir, schwarz | -380 | -380 V |
| $V_{g1g1_p}$ | | 850 | 850 V [3] |
| $I_a$ | white, blanc, weiss | 2,1 | 1,7 A |
| | black, noir, schwarz | 0,6 | 0,5 A |
| $I_{g2}$ | white, blanc, weiss | 50 | 80 mA |
| | black, noir, schwarz | 10 | 10 mA |
| $I_{g1}$ | white, blanc, weiss | 50 | 25 mA |
| | black, noir, schwarz | 0 | 0 mA |
| $W_{ig1}$ | | 300-400 | 200-300 W [4] |
| $W_o$ | white, blanc, weiss | 2,8 [5]) | 4,0 kW |
| | black, noir, schwarz | 0,25 | 0,36 kW |

[1], [2], [3], [4], [5] See page 14; voir page 14; siehe Seite 14 ←

H.F. class B amplifier for television service, positive modulation, negative synchronisation
Amplificatrice H.F.classe B pour télévision, modulation positive, synchronisation négative
HF Klasse B Verstärker für Fernsehsender, positive Modulation, negative Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| | f | = max. 110 Mc/s | |
| | $V_a$ | = max. 5 kV | |
| | $V_{g2}$ | = max. 800 V | |
| white / blanc / weiss | $I_a$ | = max. 1,1 A | |
| | $W_{ia}$ | = max. 5,5 kW | |
| | $W_a$ | = max. 3 kW | |
| | $W_{g2}$ | = max. 100 W | |
| | $I_{g1}$ | = max. 80 mA | |

| | | |
|---|---|---|
| f | = max. 220 Mc/s | |
| $V_a$ | = max. 4 kV | |
| $W_{ia}$ (white / blanc / weiss) | = max. 4,4 kW | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | |
|---|---|---|---|
| f | | = | 170 - 220 Mc/s [1] |
| B (-1,5 db) | | = | 6,5 Mc/s [2] |
| B (-3 db) | | = | 12 Mc/s [2] |
| $V_a$ | | = | 4 kV |
| $V_{g2}$ | | = | 800 V |
| $V_{g1}$ | | = | -150 V |
| $V_{g1g1p}$ | white, blanc, weiss | = | 700 V [3] |
| | black, noir, schwarz | = | 350 V [3] |
| $I_a$ | white, blanc, weiss | = | 2,1 A |
| | black, noir, schwarz | = | 0,6 A |
| $I_{g2}$ | white, blanc, weiss | = | 50 mA |
| | black, noir, schwarz | = | 10 mA |
| $I_{g1}$ | white, blanc, weiss | = | 50 mA |
| | black, noir, schwarz | = | 0 mA |
| $W_{ig1}$ | white, blanc, weiss | = | 200-300 W [4] |
| $W_o$ | white, blanc, weiss | = | 2,8 kW [5] |
| | black, noir, schwarz | = | 0,25 kW |

[1], [2], [3], [4], [5] See page 14 ; voir page 14 ; siehe Seite 14 ←

Grid modulated H.F. class C amplifier for colour-television service, negative modulation, positive synchronisation
Amplificatrice H.F. classe C pour télévision en couleurs, modulation de grille; modulation négative, synchronisation positive
HF Klasse C Verstärker für Farbfernsehsender, Gittermodulation; negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f _ _ _ _ = max. 110 Mc/s | | f _ _ _ _ = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 5 kV | $V_a$ | = max. 4 kV |
| $I_a$ sync | = max. 1,5 A | $W_{ia}$ sync | = max. 6 kW |
| $W_{ia}$ sync | = max. 7 kW | | |
| $W_a$ sync | = max. 3 kW | | |
| $V_{g2}$ | = max. 800 V | | |
| $W_{g2}$ sync | = max. 100 W | | |
| $-V_{g1}$ | = max. 500 V | | |
| $I_{g1}$ sync | = max. 80 mA | | |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | |
|---|---|---|
| f | | = 170 - 220 Mc/s [1] |
| B (-1,5 db) | | = 4 Mc/s [2] |
| B (- 3 db) | | = 8,5 Mc/s [2] |
| $V_a$ | | = 3,5 kV |
| $V_{g2}$ | | = 700 V |
| $V_{g1}$ | sync | = -120 V |
| | black, noir, schwarz | = -170 V |
| | white, blanc, weiss | = -320 V |
| $V_{g1g1p}$ | | = 640 V [3] |
| $I_a$ | sync | = 2 A |
| | black, noir, schwarz | = 1,5 A |
| $I_{g2}$ | sync | = 82 mA |
| | black, noir, schwarz | = 38 mA |
| $I_{g1}$ | sync | = 100 mA |
| | black, noir, schwarz | = 50 mA |
| $W_{ig1}$ | sync | = 100 - 200 W [4] |
| $W_o$ | sync | = 3 kW |
| | black, noir, schwarz | = 1,7 kW |

[1][2][3][4]) See page 14; voir page 14; siehe Seite 14

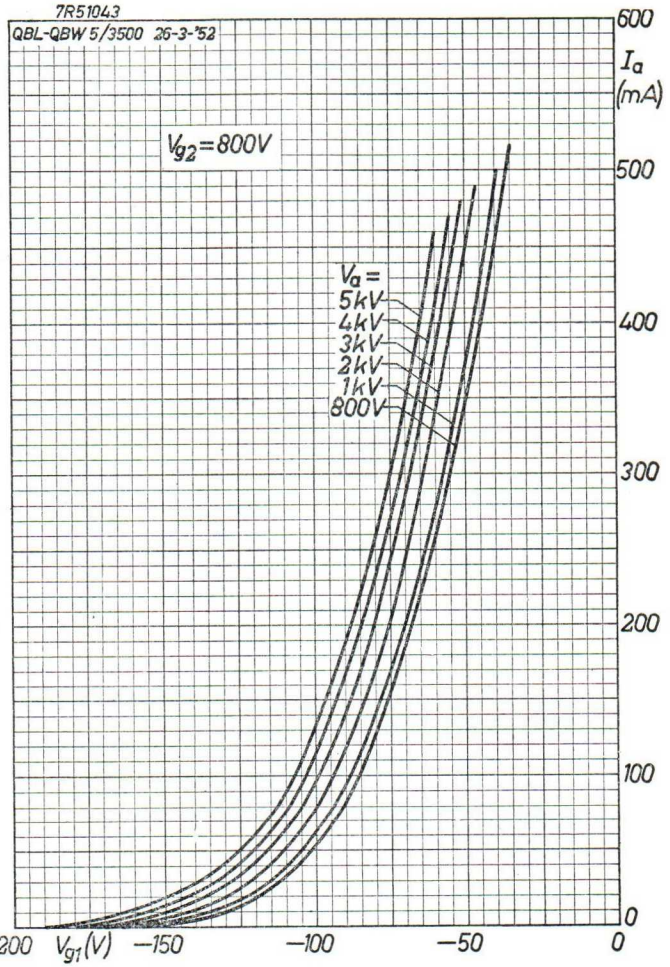
1) The operating conditions are given at a frequency slightly below the peak of the resonance curve
Les caractéristiques d'utilisation sont données à une fréquence un peu au-dessous de la crête de la courbe de résonance
Die Betriebsdaten gelten bei einer Frequenz ein wenig unterhalb des Scheitels der Abstimmkurve.

2) This value of bandwidth is based on measurements on a circuit with a single LC section
Cette valeur de la largeur de bande se rapporte à des mesures à un montage avec un seul circuit LC.
Dieser Wert der Bandbreite bezieht sich auf Messungen an einer Schaltung mit einem einzigen LC-Kreis.

3) Measured by the slide back method
Mesuré par la méthode de glissement de la tension de polarisation
Gemessen mittels Verschiebung der Gittervorspannung

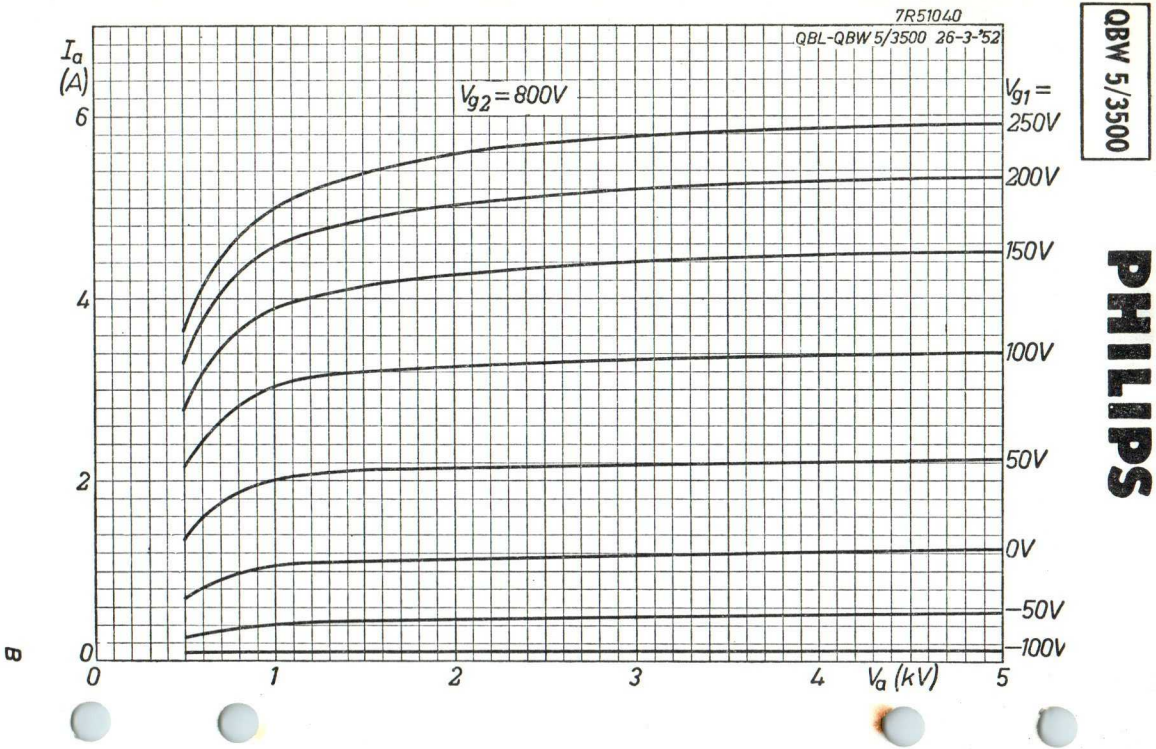
4) Driving power is accounted for largely by circuit losses. The indicated driving power is required to take care of losses in damping resistors, circuit losses and tube driving power
La puissance d'entrée est nécessaire pour la plupart pour les pertes dans le circuit. La puissance mentionnée est nécessaire pour les pertes dans les résistances d'amortissement, dans le circuit et pour la puissance d'entrée du tube
Die Eingangsleistung ist grossenteils nötig für die Verluste in der Schaltung. Die genannte Leistung ist nötig für die Verluste in Dämpfungswiderständen, in Kreisen und für die Eingangsleistung der Röhre

5) In the peak of the resonance curve $W_o$(white)=3,3 kW
A la crete de la courbe de résonance $W_o$ ( blanc) = 3,3 kW
Im Scheitel der Abstimmkurve ist $W_o$(weiss)=3,3 kW


7R51043
QBL-QBW 5/3500 26-3-'52
$V_{g2}$=800V
$V_a$ =
5kV
4kV
3kV
2kV
1kV
800V
600
$I_a$
(mA)
500
400
300
200
100
0
−200
$V_{g1}$(V)
−150
−100
−50
0

A

11.11.1952



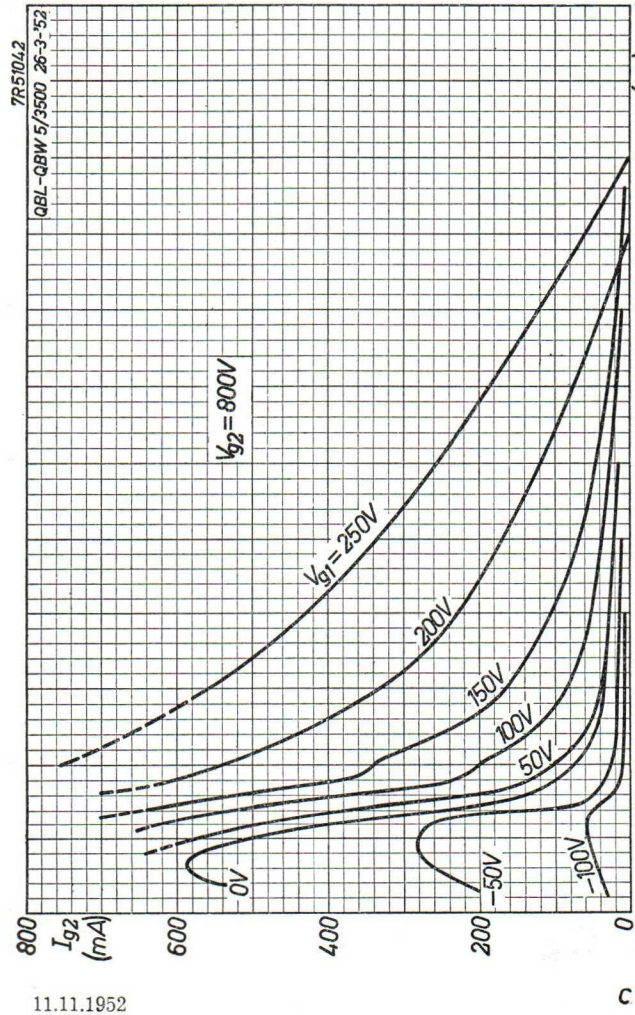

QBW 5/3500

PHILIPS

B

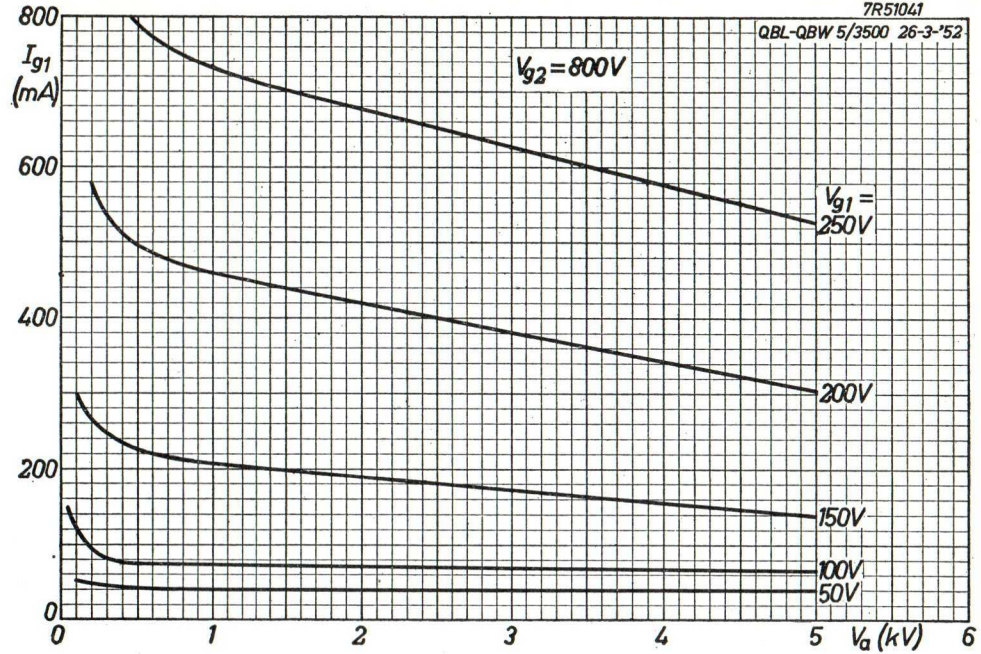
# PHILIPS

**QBW 5/3500**



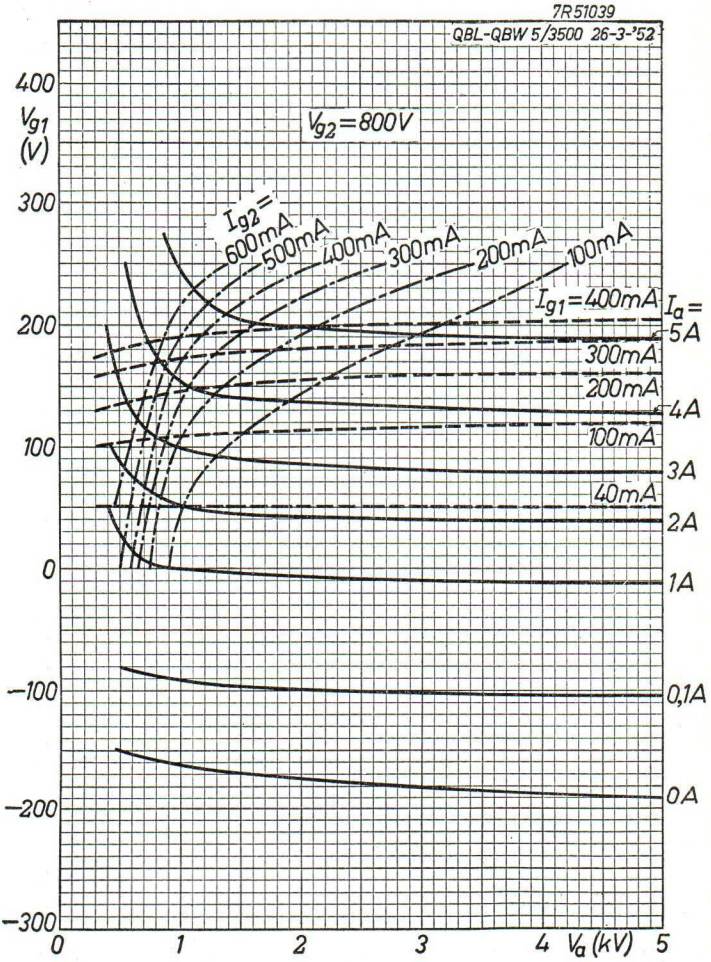

11.11.1952

C


7R51041
QBL-QBW 5/3500 26-3-'52
$V_{g2}$ = 800V
$I_{g1}$ (mA)
800
600
400
200
0
$V_{g1}$ = 250V
200V
150V
100V
50V
0
1
2
3
4
5
6
$V_a$ (kV)

# PHILIPS

**QBW 5/3500**

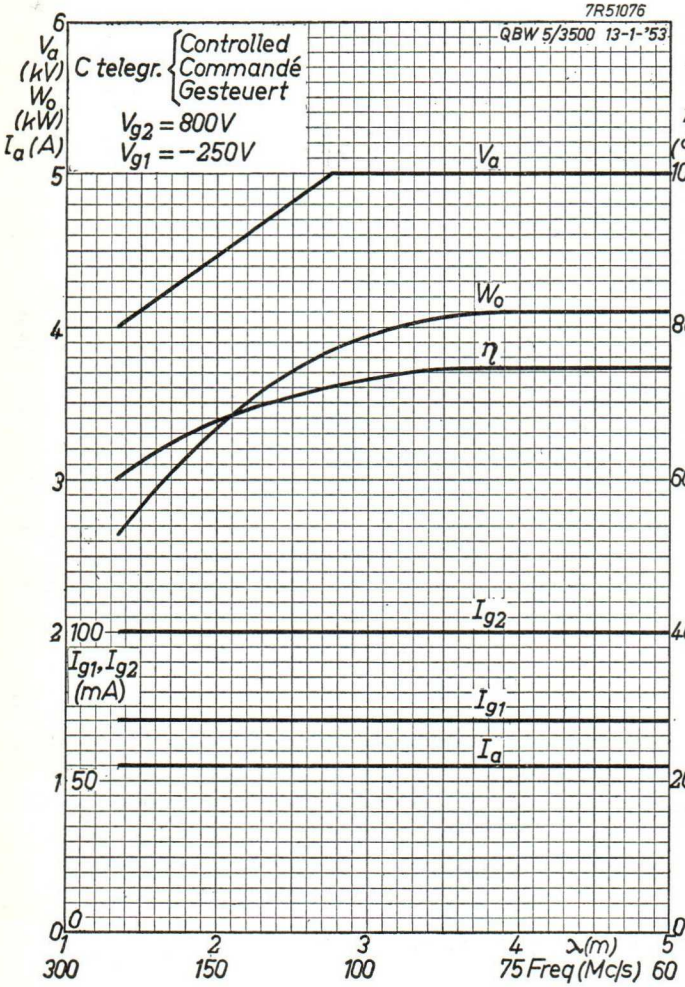



11.11.1952

E

**QBW 5/3500**

# PHILIPS




F

# PHILIPS

**QBW 5/3500**

*Grid-modulated H.F. class C amplifier for television service (2 valves in push-pull)*
*Amplificateur HF. classe C modulé par la grille pour la télévision (2 tubes en montage push-pull)*
*H.F. Klasse C Verstärker mit Gittermodulation für Fernsehbetrieb (2 Röhren in Gegentaktschaltung)*



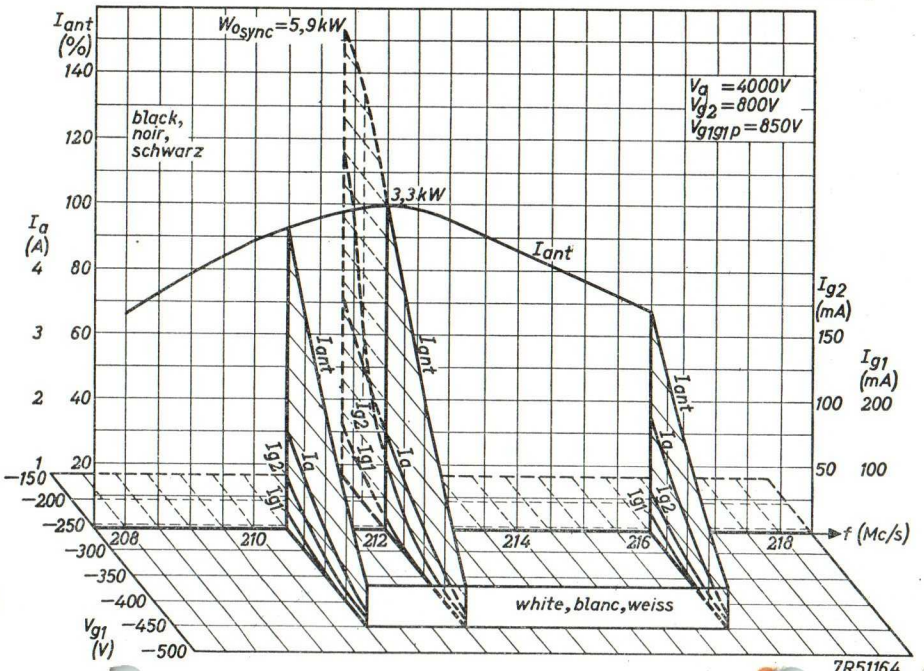

7.7.1954

G

Grid-modulated H.F. class C amplifier for television service (2 valves in push-pull)
Amplificateur H.F. class C modulé par la grille pour la télévision (2 tubes en montage push-pull)
H.F. Klasse C Verstärker mit Gittermodulation für Fernsehbetrieb (2 Röhren in Gegentaktschaltung)

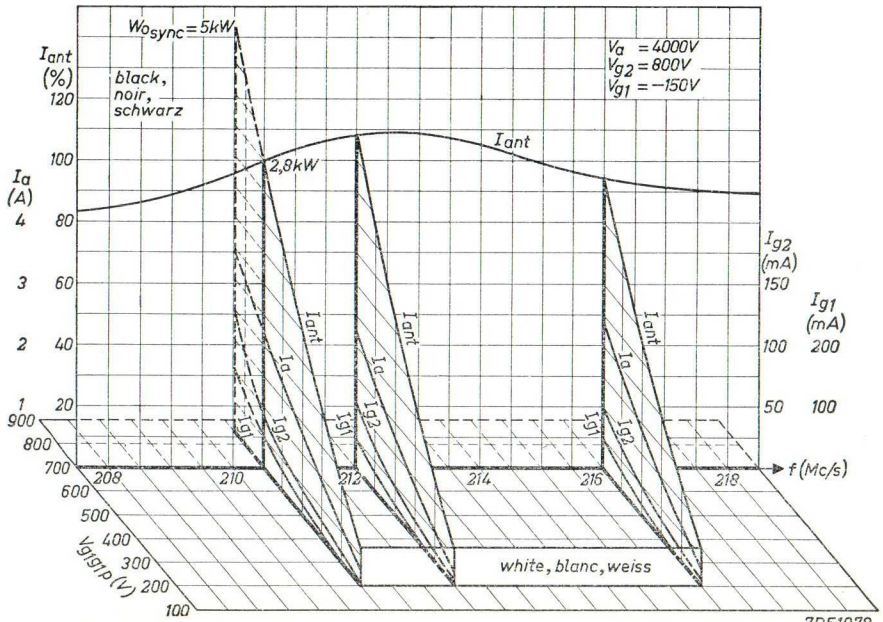
QBW 5/3500

PHILIPS



12.12.1952

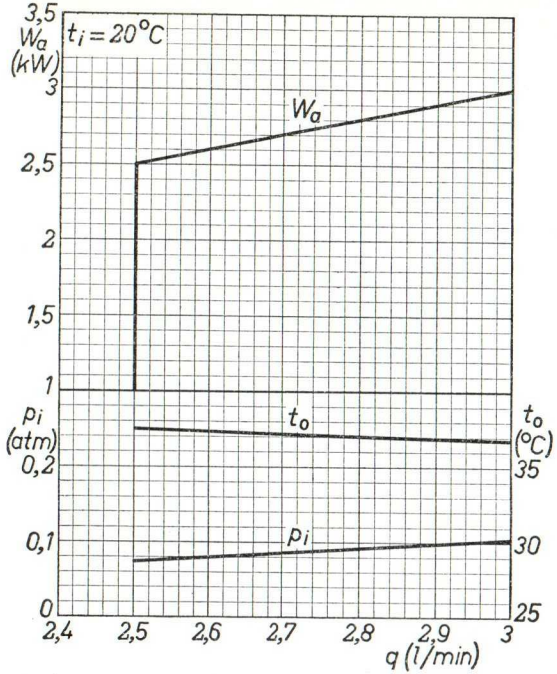
*Grid-modulated H.F. class B amplifier for television service (2 valves in push-pull)*
*Amplificateur H.F. classe B modulé par la grille pour la télévision (2 tubes en montage push-pull)*
*H.F. Klasse B Verstärker mit Gittermodulation für Fernsehbetrieb (2 Röhren in Gegentaktschaltung)*

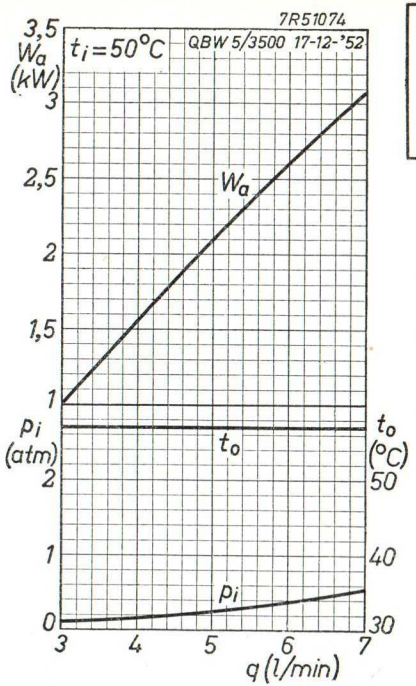



PHILIPS

OBW 5/3500

I




QBW 5/3500

PHILIPS

QUICK HEATING BEAM POWER TETRODE for use as R.F. amplifier, oscillator and frequency multiplier in mobile and fixed equipment

TÉTRODE À FAISCEAUX À CHAUFFAGE RAPIDE pour utilisation en amplificatrice, oscillatrice et multiplicatrice de fréquence H.F. pour installations mobiles et fixes

SCHNELLHEIZENDE BÜNDELTETRODE zur Verwendung als HF-Verstärker, Oszillator und Frequenzvervielfacher in mobilen und festen Anlagen

Filament : oxide-coated
Filament : oxyde
Heizfaden : Oxyd

$V_f$ = 1,6 V ± 15%

Heating : direct
Chauffage : direct
Heizung : direkt

If = 3,2 A

The cathode heating time for $W_o$ > 70% of $W_o$ max is 0.4 sec.

Le temps de chauffage de la cathode pour $W_o$ > 70% de $W_o$ max est de 0,4 sec.

Die Anheizzeit der Katode für $W_o$ > 70% von $W_o$ max ist 0,4 Sek.

Capacitances
Capacités
Kapazitäten

$C_a$ = 8,5 pF
$C_{g1}$ = 13,5 pF
$C_{ag1}$ < 0,24 pF

Typical characteristics
Caractéristiques types
Kenndaten

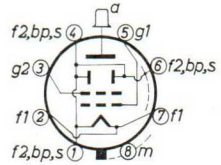
$V_a$ = 200 V
$V_{g2}$ = 200 V
$I_a$ = 100 mA
S = 7 mA/V
$\mu_{g2g1}$ = 4,5

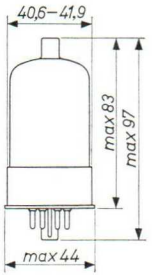
| Freq | C telegr. FM teleph. | | $C_{ag_2}$ mod. | |
|---|---|---|---|---|
| (Mc/s) | $V_a$ (V) | $W_o$ (W) IMS [1]) | $V_a$ (V) | $W_o$ (W) IMS [1]) |
| 60 | 600 | 65 | 475 | 34 |
| | | | 400 | 32 |
| 175 | 400 | 35 | | |

[1]) Intermittent mobile service
Service intermittent mobile
Aussetzender mobiler Betrieb

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel : OCTAL 8 p.

Socket, support, Fassung: 5903/13
Cap, capot, Haube : 28 906 022

Mounting position: When the tube is mounted with its main axis deviating from the vertical it is recommended that the pins 3 and 7 be placed in a vertical plane
Montage: Si le tube est monté de telle manière que l'axe principal n'est pas vertical, il est conseillé de placer les broches 3 et 7 dans un plan vertical
Einbau: When die Röhre derart eingebaut wird dass die Hauptachse nicht senkrecht ist, wird empfohlen die Stifte 3 und 7 in einer senkrechten Ebene liegen zu lassen

| Net weight<br>Poids net<br>Nettogewicht | 57 g | Shipping weight<br>Poids brut<br>Bruttogewicht | 85 g |
|---|---|---|---|

Bulb temperature
Température de l'ampoule max. 220 °C
Kolbentemperatur

Derating table of the limiting values of $V_a$ and $W_{ia}$ as a function of the operating frequency
Tableau d'abaissement des caractéristiques limites de $V_a$ et $W_{ia}$ en fonction de la fréquence de fonctionnement
Reduktionstabelle für die Grenzwerte von $V_a$ und $W_{ia}$ als Funktion der Betriebsfrequenz

| Freq. (Mc/s) | $V_a$ (%) | $W_{ia}$ (%) |
|---|---|---|
| 60 | 100 | 100 |
| 80 | 84 | 92 |
| 125 | 65 | 78 |
| 150 | 58 | 72 |
| 160 | 56 | 70 |
| 175 | 53 | 67 |

H.F. class C telegraphy and F.M. telephony. Intermittent mobile service
H.F. classe C télégraphie et F.M. téléphonie. Service intermittent mobile
HF-Klasse C Telegraphie und FM Telephonie. Aussetzender mobiler Betrieb

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

See also page 2 for Derating table
Voir aussi page 2 pour Tableau d'abaissement
Siehe auch Seite 2 für Reduktionstabelle

| | | | |
|---|---|---|---|
| f = | max. 60 Mc/s | $V_{g_2}$ = | max. 200 V |
| $V_a$ = | max. 650 V | $W_{g_2}$ = | max. 5 W |
| $W_{i_a}$ = | max. 90 W | $-V_{g_1}$ = | max. 150 V |
| $W_a$ = | max. 25 W | $I_{g_1}$ = | max. 5 mA |
| $I_a$ = | max. 160 mA | $R_{g_1}$ = | max. 30 kΩ [1] |

Operating characteristics
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 60 | 175 Mc/s |
| $V_a$ | = | 600 | 400 V |
| $V_{g_2}$ | = | 180 | 190 V [2] |
| $V_{g_1}$ | = | -71 | -54 V [3] |
| $V_{g_{1p}}$ | = | 91 | 68 V |
| $I_a$ | = | 150 | 150 mA |
| $I_{g_2}$ | = | 15 | 15 mA |
| $I_{g_1}$ | = | 2,8 | 2,2 mA |
| $W_{i_{g_1}}$ | = | 0,3 | 3 W |
| $W_{i_a}$ | = | 90 | 60 W |
| $W_a$ | = | 25 | 25 W |
| $W_o$ | = | 65 | 35 W |
| $\eta$ | = | 73,5 | 58 % |

[1])[2])[3]) See page 5; voir page 5; Siehe Seite 5.

# PHILIPS

H.F. class C anode and screen grid modulation. Intermittent mobile service
H.F. classe C modulation d'anode et de grille-écran. Service intermittent mobile
HF-Klasse C Anoden- und Schirmgittermodulation. Aussetzender mobiler Betrieb

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

See also page 2 for Derating table
Voir aussi page 2 pour Tableau d'abaissement
Siehe auch Seite 2 für Reduktionstabelle

| | | | |
|---|---|---|---|
| f | = max. 60 Mc/s | $V_{g_2}$ | = max. 250 V |
| $V_a$ | = max. 480 V | $W_{g_2}$ | = max. 2 W |
| $W_{i_a}$ | = max. 45 W | $-V_{g_1}$ | = max. 150 V |
| $W_a$ | = max. 14 W | $I_{g_1}$ | = max. 3,5 mA |
| $I_a$ | = max. 120 mA | $R_{g_1}$ | = max. 30 kΩ [1] |

Operating characteristics
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 60 | 60 Mc/s |
| $V_a$ | = | 475 | 400 V |
| $V_{g_2}$ | = | 135 | 150 V [4] |
| $V_{g_1}$ | = | -77 | -87 V [3] |
| $V_{g_{1p}}$ | = | 95 | 107 V |
| $I_a$ | = | 94 | 112 mA |
| $I_{g_2}$ | = | 9 | 12 mA |
| $I_{g_1}$ | = | 2,8 | 3,4 mA |
| $W_{ig_1}$ | = | 0,3 | 0,4 W |
| $W_{i_a}$ | = | 45 | 45 W |
| $W_a$ | = | 11 | 13 W |
| $W_o$ | = | 34 | 32 W |
| $\eta$ | = | 75 | 71 % |
| m | = | 100 | 100 % |
| $W_{mod}$ | = | 23 | 23 W |

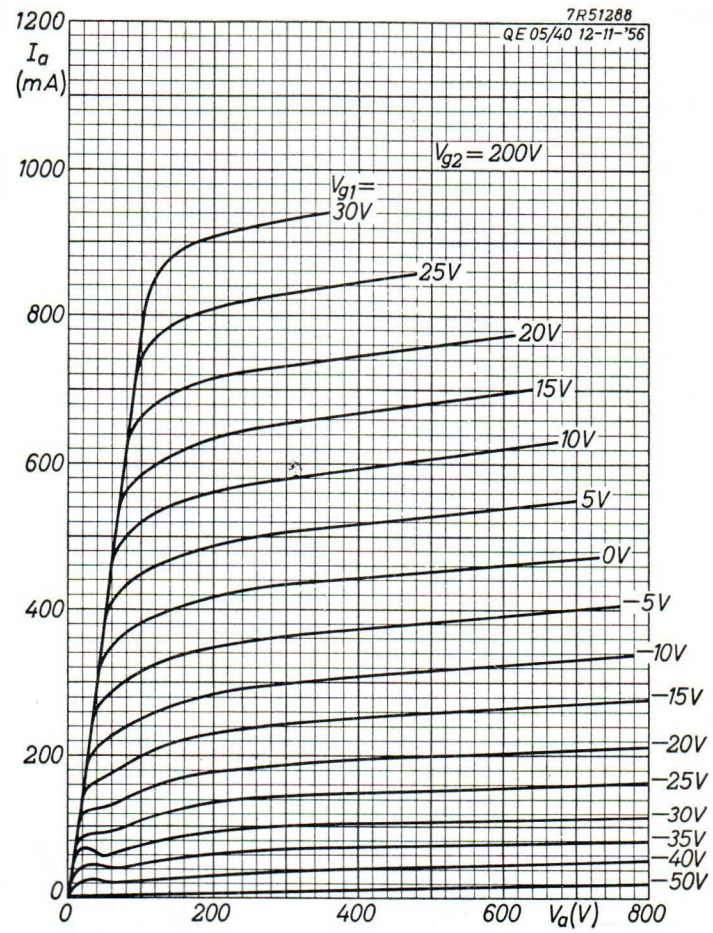
[1])[2])[3]) See page 5; voir page 5; siehe Seite 5.

[1]) For operation at maximum ratings
Pour le fonctionnement aux caractéristiques limites
Für Betrieb bei den Grenzdaten

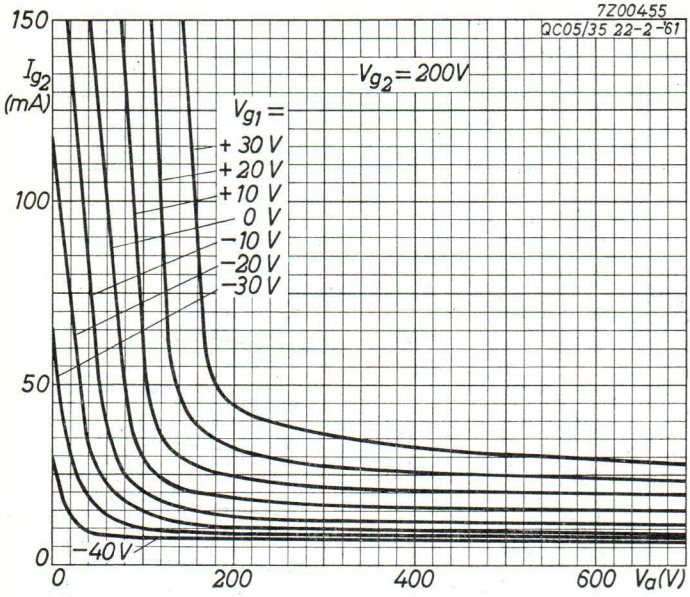
[2]) Obtained preferably from the anode supply through a series resistor
Obtenue de préférence de l'alimentation anodique à travers une résistance série
Vorzugsweise über einen Serienwiderstand von der Anodenspeisung erhalten

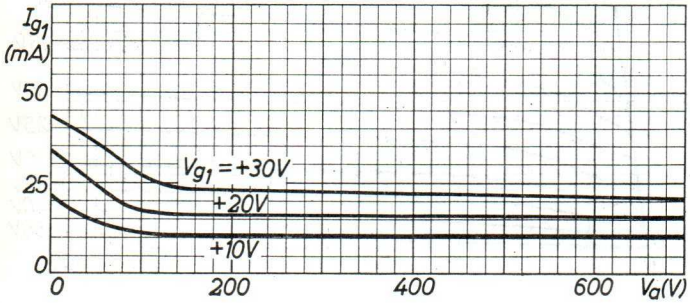
[3]) $V_{g_1}$ may be obtained by means of a grid resistor or from a combination of grid resistor and fixed supply
$V_{g_1}$ peut être obtenue par moyen d'une résistance de grille ou de la combinaison d'une résistance de grille et une polarisation fixe
$V_{g_1}$ kann mittels eines Gitterwiderstandes oder von der Kombination eines Gitterwiderstandes und einer festen Vorspannung erhalten werden

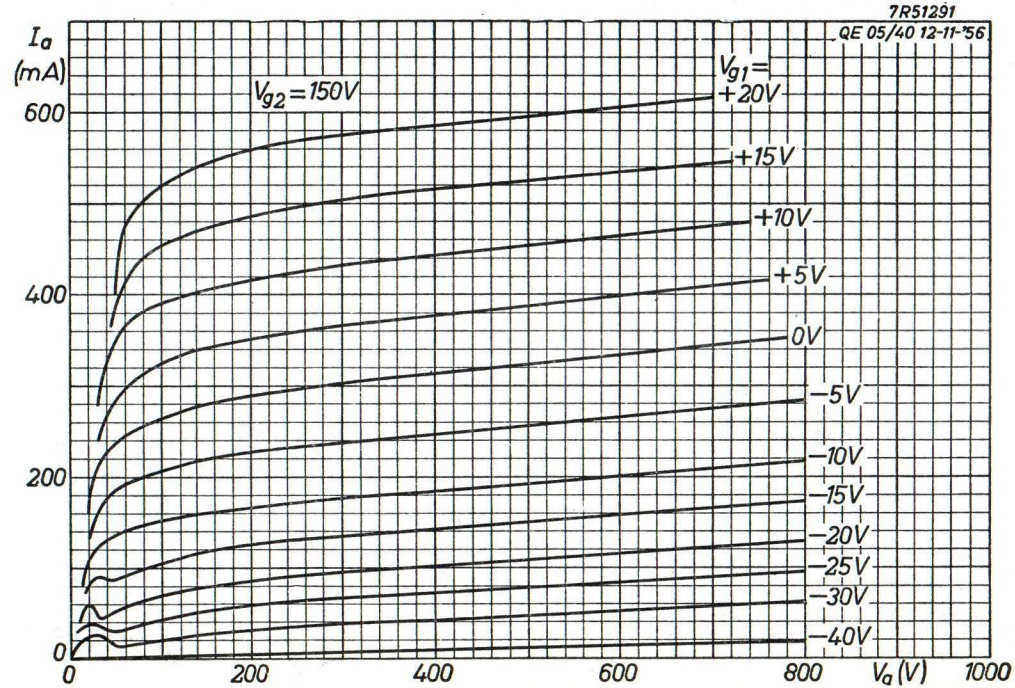
[4]) Obtained preferably from a separate source modulated from the anode supply or from the modulated anode supply through a series resistance
Obtenue de préférence d'une source séparée modulée par l'alimentation anodique ou bien de l'alimentation anodique modulée à travers une résistance série
Vorzugsweise von einer eigenen von der Anodenspeisung modulierten Spannungsquelle oder über einen Serienwiderstand von der modulierten Anodenspeisung erhalten


7R51288
QE 05/40 12-11-'56
1200
$I_a$
(mA)
1000
800
600
400
200
0
$V_{g2}$ = 200V
$V_{g1}$ =
30V
25V
20V
15V
10V
5V
0V
−5V
−10V
−15V
−20V
−25V
−30V
−35V
−40V
−50V
0
200
400
600
$V_a$(V)
800

# PHILIPS


7Z00455
QC05/35 22-2-61
150
$I_{g_2}$ (mA)
100
50
0
$V_{g_2}$ = 200V
$V_{g_1}$ =
+ 30 V
+ 20 V
+ 10 V
0 V
−10 V
−20 V
−30 V
−40 V
0
200
400
600
$V_a$(V)


$I_{g_1}$ (mA)
50
25
0
$V_{g_1}$ = +30V
+20V
+10V
0
200
400
600
$V_a$(V)



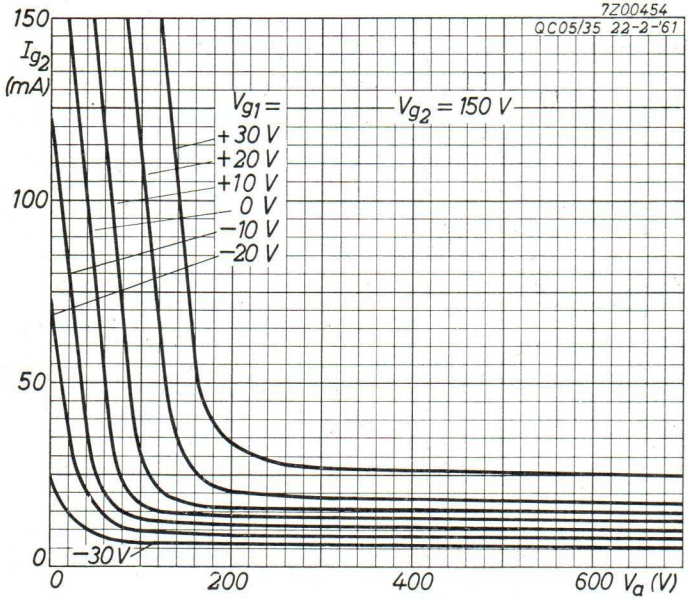

10.10.1961

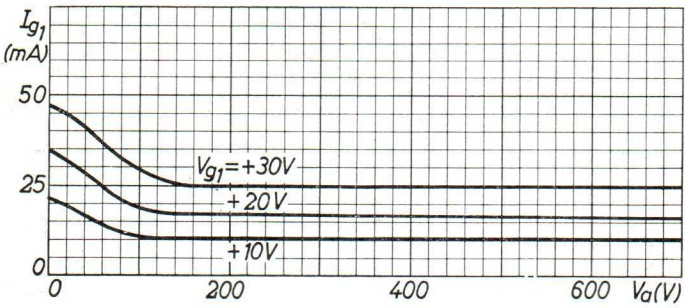
C

PHILIPS

QC05/35

# PHILIPS


7Z00454
QC05/35 22-2-'61
150
$I_{g_2}$ (mA)
100
50
0
$V_{g_1}$ =
+30 V
+20 V
+10 V
0 V
−10 V
−20 V
−30 V
$V_{g_2}$ = 150 V
0
200
400
600
$V_a$ (V)


$I_{g_1}$ (mA)
50
25
0
$V_{g_1}$=+30V
+20V
+10V
0
200
400
600
$V_a$(V)

# PHILIPS

**QE 04/10**

TETRODE for use as H.F. amplifier, oscillator or frequency multiplier
TETRODE pour utilisation comme amplificatrice ou oscillatrice H.F. ou multiplicatrice de fréquence
TETRODE zur Verwendung als HF-Verstärker oder Oszillator oder Frequenzvervielfacher

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

$V_f$ = 6,3 V
$I_f$ = 0,6 A
$T_{hk}$ = 22 s

Capacitances
Capacités
Kapazitäten

$C_a$ = 5,4 pF
$C_{g1}$ = 8 pF
$C_{ag1}$ < 0,1 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 5,6
S ($I_a$=25 mA) = 1,9 mA/V
$R_i$ = 67 kΩ

| λ | Freq. | C telegr. | |
|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) |
| >5 | <60 | 300 | 8 |
| 3 | 100 | 300 | 7,4 |
| 2 | 150 | 300 | 6,3 |
| 1,7 | 175 | 280 | 5,4 |
| | | C ag2 mod. | |
| >5 | <60 | 250 | 5,8 |

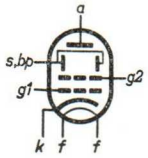
| λ | Freq. | C fr.mult. | |
|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) |
| 8/4 | 37,5/75 | 300 | 5,6 |
| 6/3 | 50/100 | 300 | 4,4 |
| 4/2 | 75/150 | 250 | 2,3 |
| 12/4 | 25/75 | 300 | 3,2 |
| 9/3 | 33,3/100 | 275 | 2,8 |
| 6/2 | 50/150 | 225 | 1,5 |

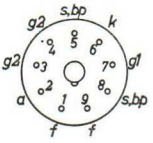
Limiting values
Caractéristiques limites
Grenzdaten

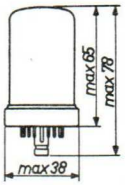
$V_a$ = max. 400 V
$W_a$ = max. 7,5 W
$V_{g2}$ = max. 250 V
$W_{g2}$ = max. 2 W
$W_{g1}$ = max. 0,25 W
$R_{g1}$ = max. 0,1 MΩ
$I_{g1}$ = max. 6 mA
$I_k$ = max. 50 mA
$V_{kf}$ = max. 100 V

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: B9G

Socket
Support
Fassung
40212

Mounting position: arbitrary
Montage : arbitrairement
Einbau : beliebig

Net weight
Poids net
Nettogewicht
40 g

Shipping weight
Poids brut
Bruttogewicht
55 g

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten HF - Klasse C Telegrafie

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\lambda$ | = | >5 | >5 | 3 | 2 | 2 | 1,7[1]) | m |
| $V_a$ | = | 300 | 300 | 300 | 300 | 300 | 280 | V |
| $V_{g1}$ | = | -60 | -35 | -60 | -50 | -30 | -50 | V |
| $V_{g2}$ | = | 250 | 150 | 250 | 250 | 150 | 250 | V |
| $I_a$ | = | 43 | 40 | 44,5 | 46 | 44 | 2x46 | mA |
| $I_{g1}$ | = | 0,5 | 2,8 | 0,4 | 0,4 | 1,5 | 2x0,3 | mA |
| $I_{g2}$ | = | 6,7 | 7,2 | 5,3 | 4 | 4,5 | 2x3,5 | mA |
| $V_{g1p}$ | = | 68 | 58 | 68 | 57 | 52 | 55 | V |
| $W_{ig1}$ | = | 31 | 150 | 25 | 21 | 70 | 2x15 | mW |
| $W_{g2}$ | = | 1,7 | 1,1 | 1,4 | 1 | 0,7 | 2x0,9 | W |
| $W_{ia}$ | = | 12,9 | 12 | 13,4 | 13,8 | 13,2 | 2x12,9 | W |
| $W_a$ | = | 4,9 | 4,9 | 6 | 7,5 | 6,9 | 2x7,5 | W |
| $W_o$ | = | 8 | 7,1 | 7,4 | 6,3 | 6,3 | 10,8 | W |
| $\eta$ | = | 62 | 59 | 55 | 46 | 48 | 42 | % |

Operating conditions H.F. class C anode- and screen grid modulation
Caractéristiques d'utilisation H.F. classe C modulation d'anode et de grille-écran
Betriebsdaten HF - Klasse C Anoden- und Schirmgittermodulation

| | | | |
|---|---|---|---|
| $\lambda$ | = | >5 | m |
| $V_a$ | = | 250 | V |
| $V_{g1}$ | = | -50 | V |
| $V_{g2}$ | = | 200 | V |
| $I_a$ | = | 38,5 | mA |
| $I_{g1}$ | = | 1,5 | mA |
| $I_{g2}$ | = | 10 | mA |
| $V_{g1p}$ | = | 72 | V |
| $W_{ig1}$ | = | 0,1 | W |
| $W_{g2}$ | = | 2 | W |
| $W_{ia}$ | = | 9,6 | W |
| $W_a$ | = | 3,8 | W |
| $W_o$ | = | 5,8 | W |
| $\eta$ | = | 60 | % |
| m | = | 100 | % |
| $V_{g2p}$ | = | 176 | V |
| $W_{mod}$ | = | 5 | W |

[1]) Two valves in push-pull; deux tubes en push-pull; zwei Röhren in Gegentakt

# PHILIPS

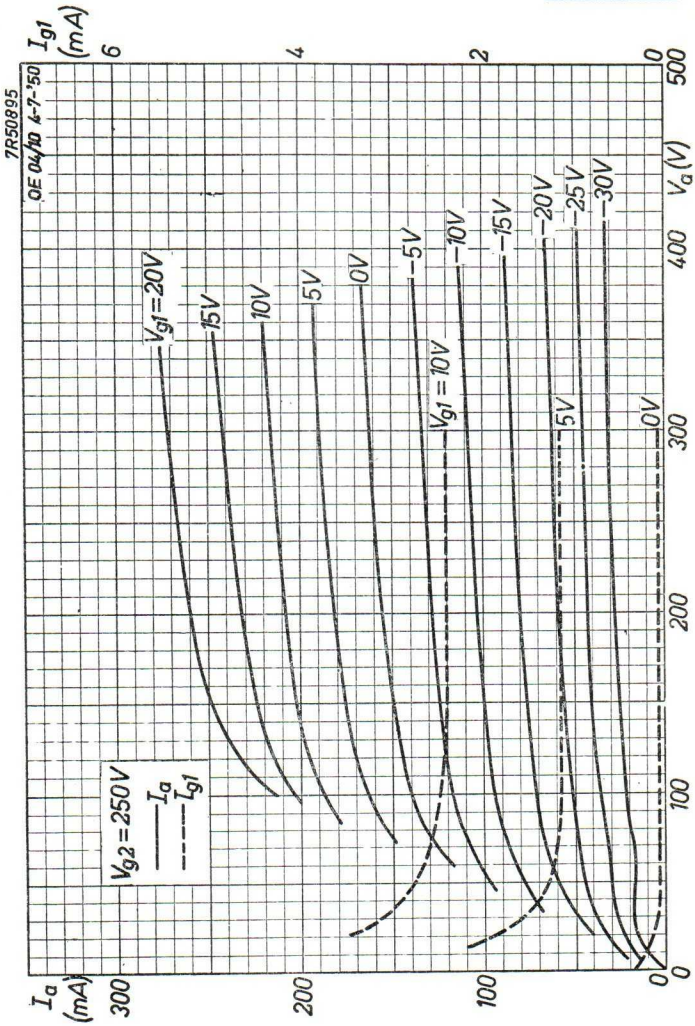
Operating conditions as class C frequency doubler
Caractéristiques d'utilisation comme doubleur de fréquence classe C
Betriebsdaten als Frequenzverdoppler Klasse C

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 8/4 | 6/3 | 4/2 | m |
| $V_a$ | = | 300 | 300 | 250 | V |
| $V_{g1}$ | = | -120 | -120 | -120 | V |
| $V_{g2}$ | = | 250 | 200 | 200 | V |
| $I_a$ | = | 43,3 | 38,4 | 36,8 | mA |
| $I_{g1}$ | = | 1,2 | 1,5 | 1,1 | mA |
| $I_{g2}$ | = | 5,5 | 2,6 | 2,1 | mA |
| $V_{g1p}$ | = | 124 | 120 | 144 | V |
| $W_{ig1}$ | = | 134 | 162 | 143 | mW |
| $W_{g2}$ | = | 1,4 | 0,52 | 0,42 | W |
| $W_{ia}$ | = | 13 | 11,5 | 9,2 | W |
| $W_a$ | = | 7,4 | 7,1 | 6,9 | W |
| $W_o$ | = | 5,6 | 4,4 | 2,3 | W |
| $\eta$ | = | 43 | 38 | 25 | % |

Operating conditions as class C frequency tripler
Caractéristiques d'utilisation comme tripleur de fréquence classe C
Betriebsdaten als Frequenzverdreifacher Klasse C

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 12/4 | 9/3 | 6/2[1]) | m |
| $V_a$ | = | 300 | 275 | 225 | V |
| $V_{g1}$ | = | -140 | -140 | -140 | V |
| $V_{g2}$ | = | 250 | 200 | 200 | V |
| $I_a$ | = | 34,3 | 36 | 2x36 | mA |
| $I_{g1}$ | = | 0 | 1,5 | 2x1,3 | mA |
| $I_{g2}$ | = | 2,8 | 2,5 | 2x2,5 | mA |
| $V_{g1p}$ | = | 130 | 142 | 152 | V |
| $W_{ig1}$ | = | 0 | 192 | 2x180 | mW |
| $W_{g2}$ | = | 0,7 | 0,5 | 2x0,5 | W |
| $W_{ia}$ | = | 10,3 | 9,9 | 2x8,1 | W |
| $W_a$ | = | 7,1 | 7,1 | 2x6,6 | W |
| $W_o$ | = | 3,2 | 2,8 | 3 | W |
| $\eta$ | = | 31 | 28,5 | 18,5 | % |

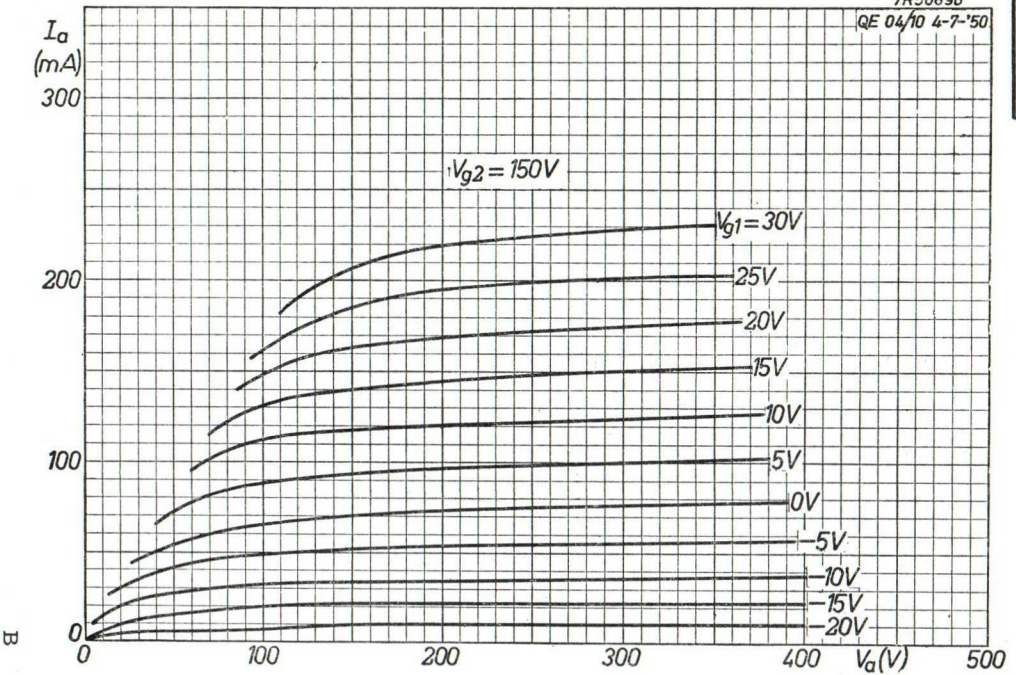
[1]) Two valves in push-pull; deux tubes en push-pull; zwei Röhren in Gegentakt


7R50895
QE 04/10 4-7-'50
$I_{g1}$ (mA)
6
4
2
0
$V_a$ (V)
500
400
300
200
100
0
$I_a$ (mA)
300
200
100
0
$V_{g2}$ = 250 V
$I_a$
$I_{g1}$
$V_{g1}$ = 20V
15V
10V
5V
0V
−5V
−10V
−15V
−20V
−25V
−30V
$V_{g1}$ = 10V
5V
0V

7R50896

QE 04/10 4-7-'50

QE 04/10

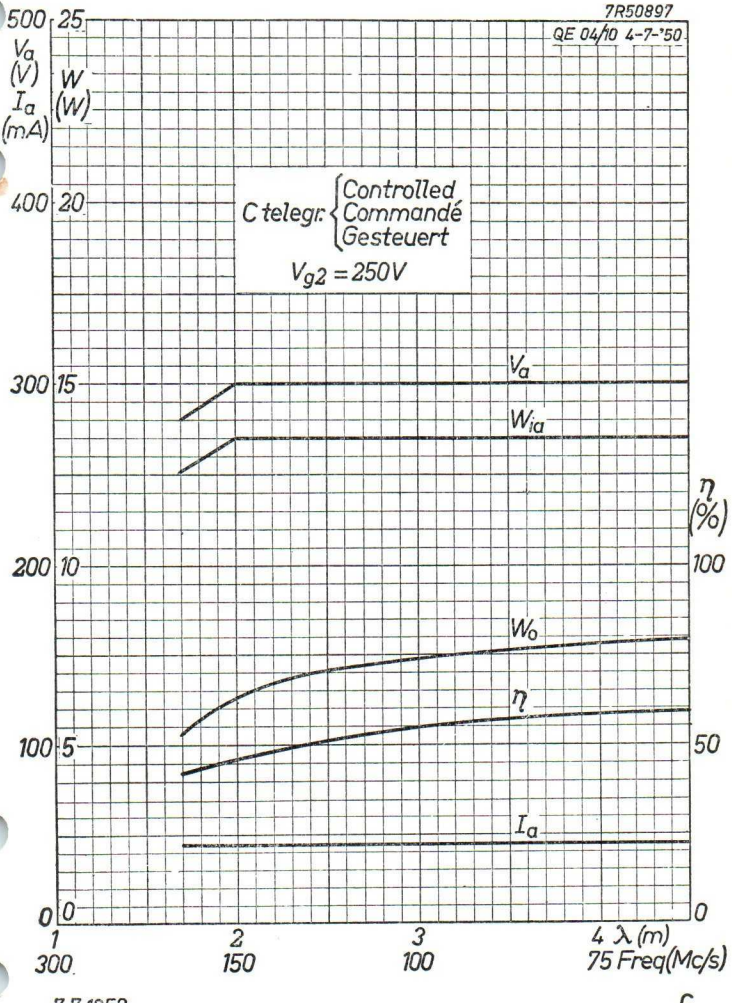



PHILIPS

B

# PHILIPS

**QE 04/10**




7.7.1950

C

# PHILIPS

**QE 05/40**

BEAM POWER TETRODE for use as R.F. amplifier, oscillator and frequency multiplier and as A.F. amplifier and modulator in mobile and fixed equipment
TETRODE A FAISCEAU pour utilisation en amplificatrice, oscillatrice et multiplicatrice de fréquence H.F. et en amplificatrice et modulatrice B.F. dans installations mobiles et fixes
BÜNDELTETRODE zur Verwendung als HF-Verstärker, Oszillator und Frequenzvervielfacher und als NF-Verstärker und Modulator in beweglichen und festen Geräten

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

$V_f$ = 6,3 V
$I_f$ = 1,25 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 8,5 pF
$C_{g1}$ = 13,5 pF
$C_{ag1}$ < 0,24 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ ($V_a$ = 200 V, $V_{g2}$ = 200 V) = 4,5
S ($I_a$ = 100 mA) = 7 mA/V

| λ | Freq. | C telegr. | | | Cag2 mod. | | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) CCS | $W_o$ (W) ICAS | $V_a$ (V) | $W_o$ (W) CCS | $W_o$ (W) ICAS |
| 5 | 60 | 750 | | 70 | 600 | | 52 |
| | | 600 | 52 | 66 | 475 | 34 | |
| | | 500 | 48 | | 400 | 32 | |
| 1,7 | 175 | 400 | | 35 | | | |
| | | 320 | 25 | | | | |

| AB mod.[1][2] | | | AB mod.[1][3] | | | AB mod.[1][4] | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ (V) | $W_o$ (W) CCS | $W_o$ (W) ICAS | $V_a$ (V) | $W_o$ (W) CCS | $W_o$ (W) ICAS | $V_a$ (V) | $W_o$ (W) CCS | $W_o$ (W) ICAS |
| 750 | | 120 | 750 | | 131 | 400 | 22 | 22 |
| 600 | 82 | 95 | 600 | 90 | 113 | 250 | 10 | |
| 500 | 70 | | 500 | 83 | | | | |
| 400 | 55 | | 400 | 62 | | | | |

[1] Two tubes
Deux tubes
Zwei Röhren

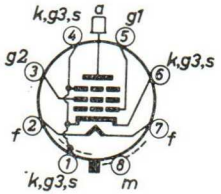
[2] Without grid current
Sans courant de grille.
Ohne Gitterstrom

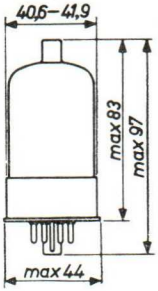
[3] With grid current
Avec courant de grille
Mit Gitterstrom

[4] In triode connection
En montage triode
In Triodenschaltung

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: Octal 8-pin

Socket, support, Fassung: 5903/13
Cap , capot , Haube : 28 906 022

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 57 g | Poids brut | 85 g |
| Nettogewicht | | Bruttogewicht | |

Bulb temperature
Température de l'ampoule max. 220 °C
Kolbentemperatur

---

1) For operation at maximum ratings
Pour opération aux caractéristiques limites
Für Betrieb bei den Grenzwerten

3) $V_{g1}$ may be obtained from a separate supply, or from $R_{g1}$ or $R_k$, or by combination methods
$V_{g1}$ peut être obtenue d'une source séparée, ou par moyen de $R_{g1}$ ou $R_k$, ou par une combinaison de ces méthodes
$V_{g1}$ kann von einer eigenen Quelle, oder mittels $R_{g1}$ oder $R_k$, oder mittels einer Kombination dieser Methoden erhalten werden

9) For values of $R_{g1}$ exceeding 100 kΩ, cathode bias is required
Pour des valeurs de $R_{g1}$ dépassant 100 kΩ il faut utiliser polarisation de cathode
Für Werte von $R_{g1}$ oberhalb 100 kΩ ist Gittervorspannung mittels Katodenwiderstand erforderlich

[4]) Obtained preferably from a separate source, or from the anode supply with a voltage divider or through a series resistor
When the tube is keyed, a series screen resistor should not be used. $V_{g2}$ must not exceed 400 V under key-up conditions
Obtenu de préférence d'une source séparée, ou de l'alimentation anodique par moyen d'un potentiomètre ou à travers une résistance série
Si le tube est manié, une résistance série de grille-écran ne sera pas utilisée. $V_{g2}$ ne dépassera pas une valeur de 400 V dans le cas de manipulateur levé.
Vorzugsweise von einer eigenen Quelle oder mittels eines Spannungsteilers oder über einen Serienwiderstand von der Anodenspeisung erhalten
Wenn die Röhre mit Tastung betrieben wird, soll kein Schirmgitterserienwiderstand verwendet werden. $V_{g2}$ soll im Falle gehobener Taste einen Wert von 400 V nicht überschreiten

[5]) $V_{g1}$ may be obtained by means of a grid resistor or from a combination of grid resistor with either fixed supply or cathode resistor
$V_{g1}$ peut être obtenu par moyen d'une résistance de grille ou d'une combinaison d'une résistance de grille et ou bien une polarisation fixe ou bien une résistance cathodique
$V_{g1}$ kann mittels eines Gitterwiderstandes oder von einer Kombination eines Gitterwiderstandes und entweder einer festen Vorspannung oder eines Katodenwiderstandes erhalten werden

[6]) Obtained preferably from a separate source modulated with the anode supply or from the modulated anode supply through a series resistor
Obtenu de préférence d'une source séparée modulée par l'alimentation anodique ou bien de l'alimentation anodique modulée à travers une résistance série
Vorzugsweise von einer eigenen mit der Anodenspeisung modulierten Spannungsquelle oder von der Anodenspeisung über einen Serienwiderstand erhalten

[7]) Under these conditions only fixed bias is recommended
Dans ces conditions seulement une polarisation fixe est recommandée
Unter diesen Umständen wird nur eine feste Vorspannung empfohlen

[8]) Obtained preferably from a separate source or from the anode supply using a voltage divider
Obtenu de préférence d'une source séparée ou bien de l'alimentation anodique en utilisant un potentiomètre
Vorzugsweise von einer eigenen Quelle oder von der Anodenspeisung mit Verwendung eines Spannungsteilers erhalten

H.F. class C telegraphy and H.F. class C anode and screen grid modulation
H.F. classe C télégraphie et H.F. classe C modulation d'anode et de grille-écran
HF-Klasse C Telegraphie und HF-Klasse C Anoden- und Schirmgittermodulation

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DERATING TABLE of the limiting values of $V_a$ and $W_{ia}$ (in %) as a function of the operating frequency

TABLEAU D'ABAISSEMENT des caractéristiques limites de $V_a$ et $W_{ia}$ (en %) en fonction de la fréquence d'opération.

REDUKTIONSTABELLE der Grenzwerte von $V_a$ und $W_{ia}$ (in %) als Funktion der Betriebsfrequenz

| Freq. (Mc/s) | $V_a$ (%) | $W_{ia}$ (%) |
|---|---|---|
| 60 | 100 | 100 |
| 80 | 84 | 92 |
| 125 | 65 | 78 |
| 150 | 58 | 72 |
| 160 | 56 | 70 |
| 175 | 53 | 67 |

H.F. class C telegraphy
H.F. classe C télégraphie
H.F. Klasse C Telegrafie

Limiting values
Caractéristiques limites
Grenzdaten

| | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|
| f | = max. | 60 | 60 | Mc/s |
| $V_a$ | = max. | 600 | 750 | V |
| $W_{ia}$ | = max. | 67,5 | 90 | W |
| $W_a$ | = max. | 20 | 25 | W |
| $I_a$ | = max. | 140 | 150 | mA |
| $V_{g2}$ | = max. | 250 | 250 | V |
| $W_{g2}$ | = max. | 3 | 3 | W |
| $-V_{g1}$ | = max. | 150 | 150 | V |
| $I_{g1}$ | = max. | 3,5 | 4 | mA |
| $V_{kf\,p}$ | = max. | 135 | 135 | V |
| $R_{g1}$ [1] | = max. | 30 | 30 | kΩ |

See page 4 for Derating table
Voir page 4 pour Tableau d'abaissement
Für Reduktionstabelle siehe Seite 4

C.C.S. = Continuous service / Service continu / Dauerbetrieb
I.C.A.S. = Intermittent service / Service intermittent / Aussetzender Betrieb

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | C.C.S. | | | I.C.A.S. | | | |
|---|---|---|---|---|---|---|---|---|
| f | = | 60 | 60 | 175 | 60 | 60 | 175 | Mc/s |
| $V_a$ | = | 600 | 500 | 320 | 750 | 600 | 400 | V |
| $V_{g1}$ [3] | = | -58 | -66 | -51 | -62 | -71 | -54 | V |
| $V_{g2}$ [4] | = | 150 | 170 | 180 | 160 | 180 | 190 | V |
| $I_a$ | = | 112 | 135 | 140 | 120 | 150 | 150 | mA |
| $I_{g1}$ | = | 2,8 | 2,5 | 2,0 | 3,1 | 2,8 | 2,2 | mA |
| $I_{g2}$ | = | 9 | 9 | 10 | 11 | 10 | 10,4 | mA |
| $V_{g1\,p}$ | = | 73 | 84 | 64 | 79 | 91 | 68 | V |
| $W_{ig1}$ | = | 0,2 | 0,2 | 3 | 0,2 | 0,3 | 3 | W |
| $W_{g2}$ | = | 1,4 | 1,6 | 1,8 | 1,8 | 1,8 | 2,0 | W |
| $W_{ia}$ | = | 67,5 | 67,5 | 45 | 90 | 90 | 60 | W |
| $W_a$ | = | 15,5 | 19,5 | 20 | 20 | 24 | 25 | W |
| $W_o$ | = | 52 | 48 | 25 | 70 | 66 | 35 | W |
| $\eta$ | = | 77 | 71 | 55,5 | 78 | 73,5 | 58 | % |

[1)3)4)] See page 2 and 3; voir page 2 et 3; siehe Seite 2 und 3

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF-Klasse C Anoden- und Schirmgittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|---|
| | $f$ | = max. | 60 | 60 | Mc/s |
| | $V_a$ | = max. | 480 | 600 | V |
| See page 4 for Derating table | $W_{ia}$ | = max. | 45 | 67,5 | W |
| Voir page 4 pour Tableau d'abaissement | $W_a$ | = max. | 13,3 | 16,7 | W |
| | $I_a$ | = max. | 117 | 125 | mA |
| Für Reduktionstabelle siehe Seite 4 | $V_{g2}$ | = max. | 250 | 250 | V |
| | $W_{g2}$ | = max. | 2 | 2 | W |
| | $-V_{g1}$ | = max. | 150 | 150 | V |
| | $I_{g1}$ | = max. | 3,5 | 4 | mA |
| | $V_{kfp}$ | = max. | 135 | 135 | V |
| | $R_{g1}$ [1] | = max. | 30 | 30 | kΩ |

C.C.S. = Continuous service / Service continu / Dauerbetrieb
I.C.A.S. = Intermittent service / Service intermittent / Aussetzender Betrieb

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | C.C.S. | | I.C.A.S. | |
|---|---|---|---|---|---|
| $f$ | = | 60 | 60 | 60 | Mc/s |
| $V_a$ | = | 475 | 400 | 600 | V |
| $V_{g1}$ [5] | = | -77 | -87 | -87 | V |
| $V_{g2}$ [6] | = | 135 | 150 | 150 | V |
| $I_a$ | = | 94 | 112 | 112 | mA |
| $I_{g1}$ | = | 2,8 | 3,4 | 3,4 | mA |
| $I_{g2}$ | = | 6,4 | 7,8 | 7,8 | mA |
| $V_{g1p}$ | = | 95 | 107 | 107 | V |
| $W_{ig1}$ | = | 0,3 | 0,4 | 0,4 | W |
| $W_{g2}$ | = | 1,0 | 1,2 | 1,2 | W |
| $W_{ia}$ | = | 45 | 45 | 67,5 | W |
| $W_a$ | = | 11 | 13 | 15,5 | W |
| $W_o$ | = | 34 | 32 | 52 | W |
| $\eta$ | = | 75,5 | 71 | 77 | % |
| m | = | 100 | 100 | 100 | % |
| $W_{mod}$ | = | 23 | 23 | 34 | W |

[1][5][6] See page 2 and 3; voir page 2 et 3; siehe Seite 2 und 3

A.F. class AB amplifier and modulator (Ig1 = 0)
Amplificatrice et modulatrice B.F. classe AB (Ig1 = 0)
NF-Klasse AB Verstärker und Modulator (Ig1 = 0)

Limiting values; continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. 600 V | $V_{g2}$ | = max. 250 V |
| $W_{ia}$ | = max. 60 W | $W_{g2}$ | = max. 3 W |
| $W_a$ | = max. 20 W | $V_{kf_p}$ | = max. 135 V |
| $I_a$ | = max. 125 mA | $R_{g1}$ | = max. 100 kΩ |

Operating conditions, continuous service; two tubes
C.C.S. Caractéristiques d'utilisation, service continu; deux tubes
Betriebsdaten, Dauerbetrieb; zwei Röhren

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 600 | | 500 | V |
| $V_{g2}$ [8] | = | 180 | | 185 | V |
| $V_{g1}$ [7] | = | -45 | | -40 | V |
| $R_{aa}$ | = | 7000 | | 5500 | Ω |
| $V_{g1g1_p}$ | = | 0 | 90 | 0 | 80 V |
| $I_a$ | = | 2x13 | 2x100 | 2x29 | 2x108 mA |
| $I_{g2}$ | = | 2x0,5 | 2x12 | 2x1 | 2x13 mA |
| $W_{ig1}$ | = | 0 | 0 | 0 | 0 W |
| $W_{g2}$ | = | 2x0,1 | 2x2 | 2x0,2 | 2x2,4 W |
| $W_{ia}$ | = | 2x7,8 | 2x60 | 2x14,5 | 2x54 W |
| $W_a$ | = | 2x7,8 | 2x19 | 2x14,5 | 2x19 W |
| $W_o$ | = | 0 | 82 | 0 | 70 W |
| $\eta$ | = | - | 68 | | 65 % |

| | | | |
|---|---|---|---|
| $V_a$ | = | 400 | V |
| $V_{g2}$ [8] | = | 190 | V |
| $V_{g1}$ [7] | = | -40 | V |
| $R_{aa}$ | = | 4000 | Ω |
| $V_{g1g1_p}$ | = | 0 80 | V |
| $I_a$ | = | 2x32 2x114 | mA |
| $I_{g2}$ | = | 2x1,3 2x13 | mA |
| $W_{ig1}$ | = | 0 0 | W |
| $W_{g2}$ | = | 2x0,25 2x2,5 | W |
| $W_{ia}$ | = | 2x12,8 2x45,5 | W |
| $W_a$ | = | 2x12,8 2x18 | W |
| $W_o$ | = | 0 55 | W |
| $\eta$ | = | - 60 | % |

[7][8] See page 8; voir page 8; siehe Seite 8

A.F. class AB amplifier and modulator ($I_{g1}$ = 0)
Amplificatrice et modulatrice B.F. classe AB ($I_{g1}$ = 0)
NF-Klasse AB Verstärker und Modulator ($I_{g1}$ =0)

I.C.A.S. Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. 750 V | $V_{g2}$ | = max. 250 V |
| $W_{ia}$ | = max. 85 W | $W_{g2}$ | = max. 3 W |
| $W_a$ | = max. 25 W | $V_{kfp}$ | = max. 135 V |
| $I_a$ | = max. 135 mA | $R_{g1}$ [7] | = max. 100 kΩ |

I.C.A.S. Operating conditions, intermittent service; two tubes
Caractéristiques d'utilisation, service intermittent; deux tubes
Betriebsdaten, aussetzender Betrieb; zwei Röhren

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 750 | | 600 | V |
| $V_{g2}$ [8] | = | 195 | | 200 | V |
| $V_{g1}$ [7] | = | -50 | | -50 | V |
| $R_{aa}$ | = | 8000 | | 6000 | Ω |
| $V_{g1g1_p}$ | = | 0 | 100 | 0 | 100 V |
| $I_a$ | = | 2x12 | 2x110 | 2x14 | 2x115 mA |
| $I_{g2}$ | = | 2x0,5 | 2x13 | 2x0,5 | 2x13,5 mA |
| $W_{ig1}$ | = | 0 | 0 | 0 | 0 W |
| $W_{g2}$ | = | 2x0,1 | 2x2,5 | 2x0,1 | 2x2,7 W |
| $W_{ia}$ | = | 2x8,7 | 2x82,5 | 2x8,4 | 2x69 W |
| $W_a$ | = | 2x8,7 | 2x22,5 | 2x8,4 | 2x21,5 W |
| $W_o$ | = | 0 | 120 | 0 | 95 W |
| $\eta$ | = | - | 72,5 | - | 69 % |

[7] Under these conditions only fixed bias is recommended
Dans ces conditions seulement une polarisation fixe est recommandée
Unter diesen Umständen wird nur eine feste Vorspannung empfohlen

[8] Obtained preferably from a separate source or from the anode supply using a voltage divider
Obtenu de préférence d'une source séparée ou bien de l'alimentation anodique en utilisant un potentiomètre
Vorzugsweise von einer eigenen Quelle oder von der Anodenspeisung mit Verwendung eines Spannungsteilers erhalten

A.F. class AB amplifier and modulator (Ig1 > 0)
Amplificatrice et modulatrice B.F. classe AB (Ig1 > 0)
NF-Klasse AB Verstärker und Modulator (Ig1 > 0)

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. 600 V | $V_{g2}$ | = max. 250 V |
| $W_{ia}$ | = max. 62,5 W | $W_{g2}$ | = max. 3 W |
| $W_a$ | = max. 20 W | $V_{kfp}$ | = max. 135 V |
| $I_a$ | = max. 125 mA | $R_{g1}$ [7] | = max. 30 kΩ |

Operating conditions, continuous service; two tubes
C.C.S. Caractéristiques d'utilisation, service continu; deux tubes
Betriebsdaten, Dauerbetrieb; zwei Röhren

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 600 | | 500 | V |
| $V_{g2}$ [8] | = | 165 | | 175 | V |
| $V_{g1}$ [7] | = | -44 | | -44 | V |
| $R_{aa}$ | = | 6800 | | 4600 | Ω |
| $V_{g1g1p}$ | = | 0 | 97 | 0 | 102 V |
| $I_a$ | = | 2x11 | 2x103 | 2x13 | 2x121 mA |
| $I_{g2}$ | = | 2x0,3 | 2x8,5 | 2x0,3 | 2x9 mA |
| $I_{g1}$ | = | 0 | 2x0,5 | 0 | 2x1,0 mA |
| $W_{ig1}$ | = | 0 | 2x0,1 | 0 | 2x0,15 W |
| $W_{g2}$ | = | 2x0,05 | 2x1,4 | 2x0,06 | 2x1,6 W |
| $W_{ia}$ | = | 2x6,6 | 2x62 | 2x6,5 | 2x60,5 W |
| $W_a$ | = | 2x6,6 | 2x17 | 2x6,5 | 2x19 W |
| $W_o$ | = | 0 | 90 | 0 | 83 W |
| $\eta$ | = | - | 72,5 | | 68,5 % |

| | | | |
|---|---|---|---|
| $V_a$ | = | 400 | V |
| $V_{g2}$ [8] | = | 175 | V |
| $V_{g1}$ [7] | = | -41 | V |
| $R_{aa}$ | = | 3700 | Ω |
| $V_{g1g1p}$ | = | 0 | 95 V |
| $I_a$ | = | 2x16 | 2x116 mA |
| $I_{g2}$ | = | 2x0,5 | 2x9 mA |
| $I_{g1}$ | = | 0 | 2x0,8 mA |
| $W_{ig1}$ | = | 0 | 2x0,1 W |
| $W_{g2}$ | = | 2x0,1 | 2x1,6 W |
| $W_{ia}$ | = | 2x6,4 | 2x46,5 W |
| $W_a$ | = | 2x6,4 | 2x15,5 W |
| $W_o$ | = | 0 | 62 W |
| $\eta$ | = | | 66,5 % |

[7)8)] See page 8; voir page 8; siehe Seite 8

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A.F. class AB amplifier and modulator (Ig1 > 0)
Amplificatrice et modulatrice B.F. classe AB (Ig1 > 0)
NF-Klasse AB Verstärker und Modulator (Ig1 > 0)

I.C.A.S.

Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. 750 V | $V_{g2}$ | = max. 250 V |
| $W_{ia}$ | = max. 90 W | $W_{g2}$ | = max. 3 W |
| $W_a$ | = max. 25 W | $V_{kf_p}$ | = max. 135 V |
| $I_a$ | = max. 135 mA | $R_{g1}$ [7] | = max. 30 kΩ |

I.C.A.S.

Operating conditions, intermittent service; two tubes
Caractéristiques d'utilisation, service intermittent; deux tubes
Betriebsdaten, aussetzender Betrieb; zwei Röhren

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 750 | | 600 | V |
| $V_{g2}$ [8] | = | 165 | | 190 | V |
| $V_{g1}$ [7] | = | -46 | | -48 | V |
| $R_{aa}$ | = | 7400 | | 5000 | Ω |
| $V_{g1g1_p}$ | = | 0 | 108 | 0 | 109 V |
| $I_a$ | = | 2x11 | 2x120 | 2x14 | 2x135 mA |
| $I_{g2}$ | = | 2x0,15 | 2x10 | 2x0,6 | 2x10 mA |
| $I_{g1}$ | = | 0 | 2x1,3 | 0 | 2x1,0 mA |
| $W_{ig1}$ | = | 0 | 2x0,2 | 0 | 2x0,15 W |
| $W_{g2}$ | = | 2x0,03 | 2x1,7 | 2x0,1 | 2x1,9 W |
| $W_{ia}$ | = | 2x8,3 | 2x90 | 2x8,4 | 2x81 W |
| $W_a$ | = | 2x8,3 | 2x24,5 | 2x8,4 | 2x24,5 W |
| $W_o$ | = | 0 | 131 | 0 | 113 W |
| $\eta$ | = | - | 73 | - | 70 % |

7) Under these conditions only fixed bias is recommended
Dans ces conditions seulement une polarisation fixe est recommandée
Unter diesen Umständen wird nur eine feste Vorspannung empfohlen

8) Obtained preferably from a separate source or from the anode supply using a voltage divider
Obtenu de préférence d'une source séparée ou bien de l'alimentation anodique en utilisant un potentiomètre
Vorzugsweise von einer eigenen Quelle oder von der Anodenspeisung mit Verwendung eines Spannungsteilers erhalten

A.F. class AB amplifier and modulator in triode connection (g2 connected to anode; Ig1= 0)
Amplificatrice et modulatrice B.F. classe AB en montage triode (g2 connecté à a; Ig1 = 0)
NF-Klasse AB Verstärker und Modulator in Triodenschaltung (g2 verbunden mit a; Ig1 = 0)

Limiting values
Caractéristiques limites
Grenzdaten

| | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|
| $V_a$ | = max. | 400 | 400 | V |
| $I_a$ | = max. | 90 | 90 | mA |
| $W_{ia}$ | = max. | 35 | 35 | W |
| $W_a$ | = max. | 20 | 25 | W |
| $V_{kf_p}$ | = max. | 135 | 135 | V |
| $R_{g1}$ [9] | = max. | 100 | 100 | kΩ |
| $R_{g1}$ [9] | = max. | 500 | 500 | kΩ |

C.C.S. = continuous service / service continu / Dauerbetrieb
I.C.A.S. = intermittent service / service intermittent / aussetzender Betrieb

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

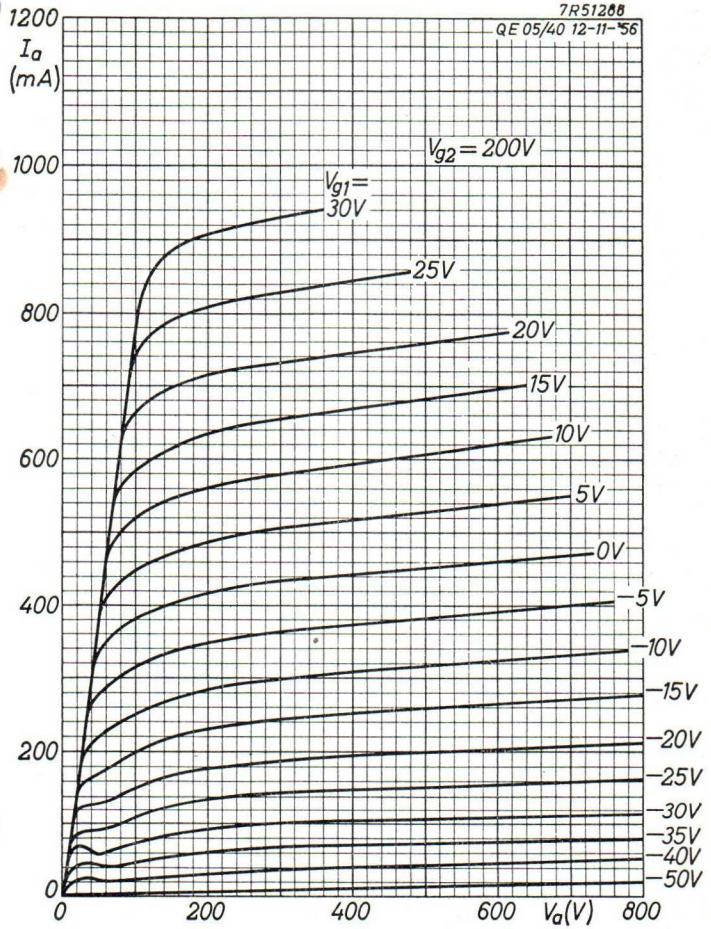
C.C.S.

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 400 | | 250 | V |
| $V_{g1}$ [9] | = | -100 | | -50 | V |
| $R_{aa}$ | = | 8000 | | 5000 | Ω |
| $V_{gg_p}$ | = | 0 | 200 | 0 | 100 V |
| $I_a$ | = | 2x20 | 2x50 | 2x60 | 2x62 mA |
| $W_{ia}$ | = | 2x8 | 2x20 | 2x15 | 2x15,5 W |
| $W_a$ | = | 2x8 | 2x9 | 2x15 | 2x10,5 W |
| $W_o$ | = | 0 | 22 | 0 | 10 W |
| $\eta$ | = | - | 55 | - | 32 % |

I.C.A.S.

| | | | |
|---|---|---|---|
| $V_a$ | = | 400 | V |
| $V_{g1}$ [9] | = | -100 | V |
| $R_{aa}$ | = | 8000 | Ω |
| $V_{gg_p}$ | = | 0 | 200 V |
| $I_a$ | = | 2x20 | 2x50 mA |
| $W_{ia}$ | = | 2x8 | 2x20 W |
| $W_a$ | = | 2x8 | 2x9 W |
| $W_o$ | = | 0 | 22 W |
| $\eta$ | = | - | 55 % |

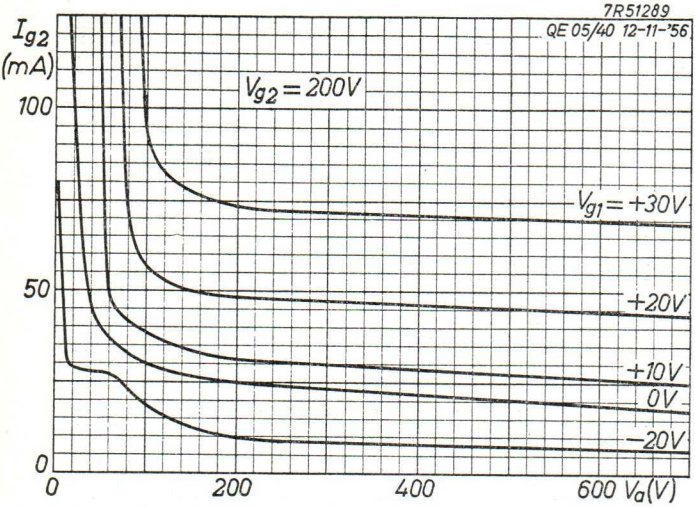
[9] See page 2; voir page 2; siehe Seite 2

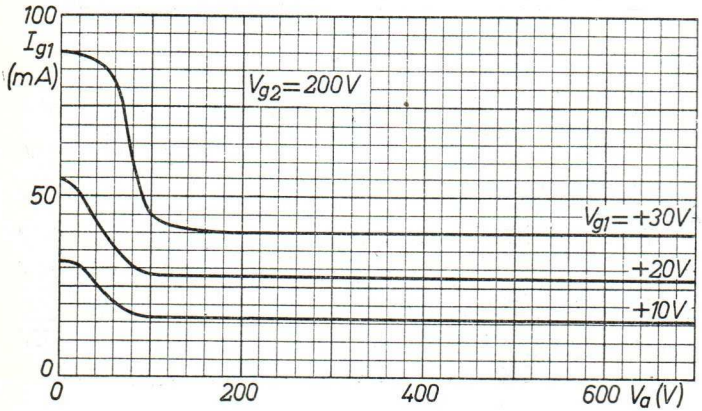

7R51288
QE 05/40 12-11-56
1200
$I_a$
(mA)
1000
800
600
400
200
0
$V_{g2}$ = 200V
$V_{g1}$ =
30V
25V
20V
15V
10V
5V
0V
−5V
−10V
−15V
−20V
−25V
−30V
−35V
−40V
−50V
0
200
400
600
$V_a$(V)
800

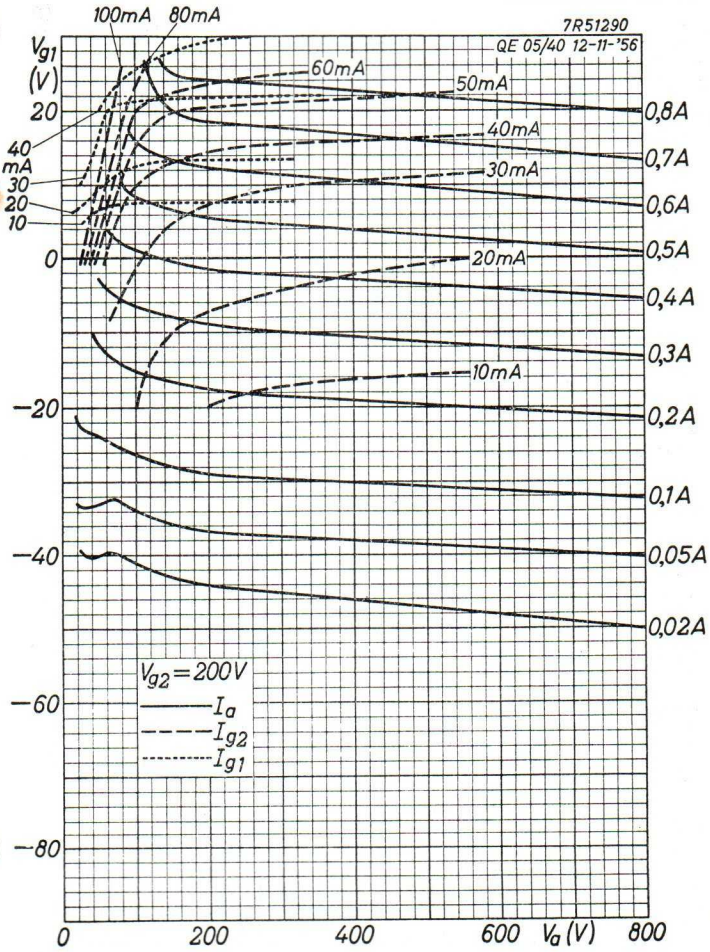
3.3.1957

A

# PHILIPS

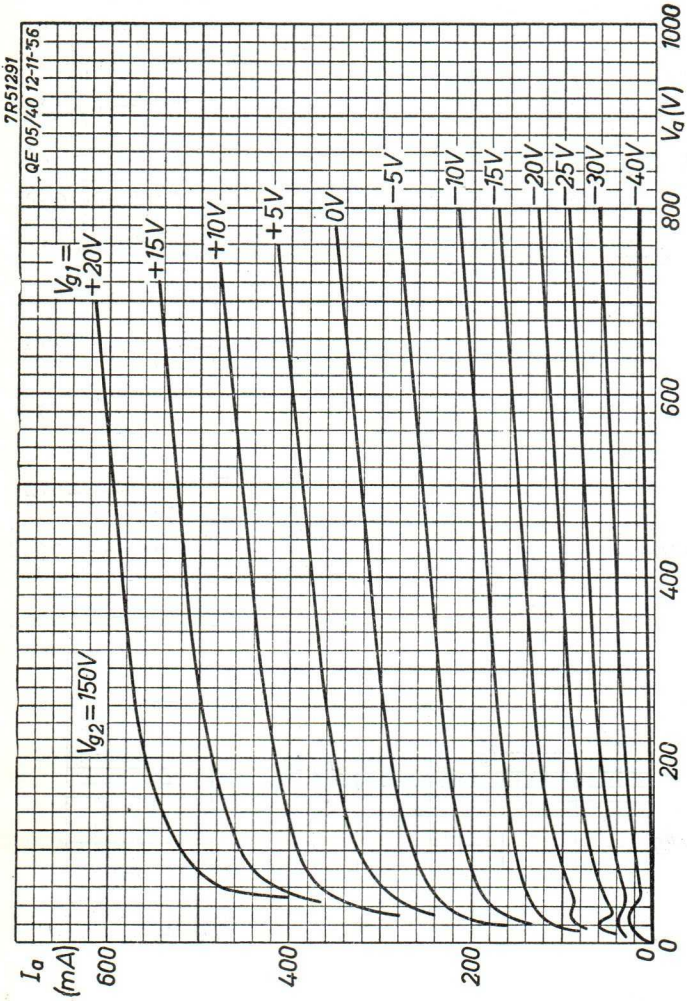

7R51289
QE 05/40 12-11-'56
$I_{g2}$ (mA)
100
50
0
$V_{g2} = 200V$
$V_{g1} = +30V$
+20V
+10V
0V
−20V
0
200
400
600 $V_a$(V)


100
$I_{g1}$ (mA)
50
0
$V_{g2} = 200V$
$V_{g1} = +30V$
+20V
+10V
0
200
400
600 $V_a$(V)

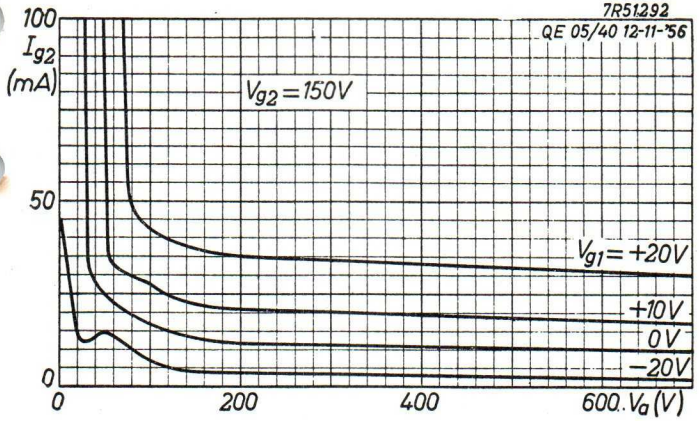

7R51290
QE 05/40 12-11-'56
100mA
80mA
60mA
50mA
40mA
30mA
20mA
10mA
$V_{g1}$ (V)
20
40 mA
30
20
10
0
−20
−40
−60
−80
0,8A
0,7A
0,6A
0,5A
0,4A
0,3A
0,2A
0,1A
0,05A
0,02A
$V_{g2}=200V$
$I_a$
$I_{g2}$
$I_{g1}$
0
200
400
600
$V_a$ (V)
800

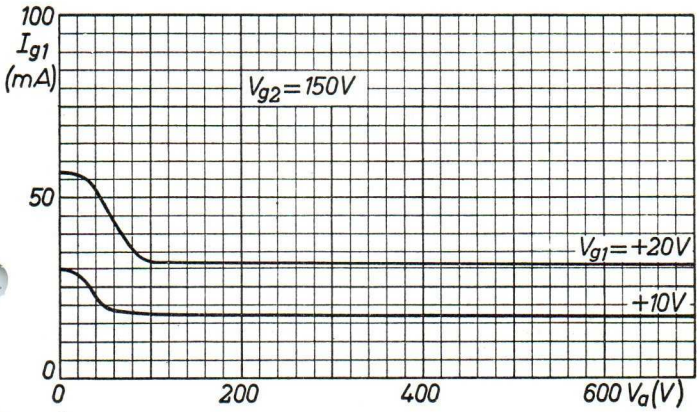
QE 05/40

# PHILIPS

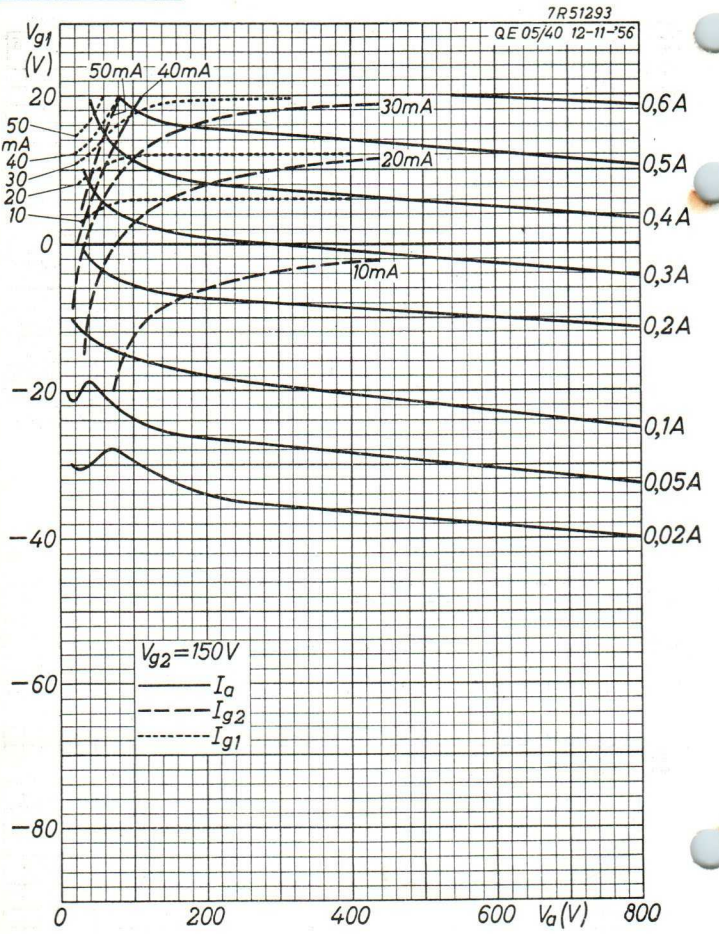



D


7R51292
QE 05/40 12-11-'56
100
$I_{g2}$
(mA)
$V_{g2}=150V$
50
$V_{g1}=+20V$
+10V
0V
−20V
0
0
200
400
600 $V_a$(V)


100
$I_{g1}$
(mA)
$V_{g2}=150V$
50
$V_{g1}=+20V$
+10V
0
0
200
400
600 $V_a$(V)

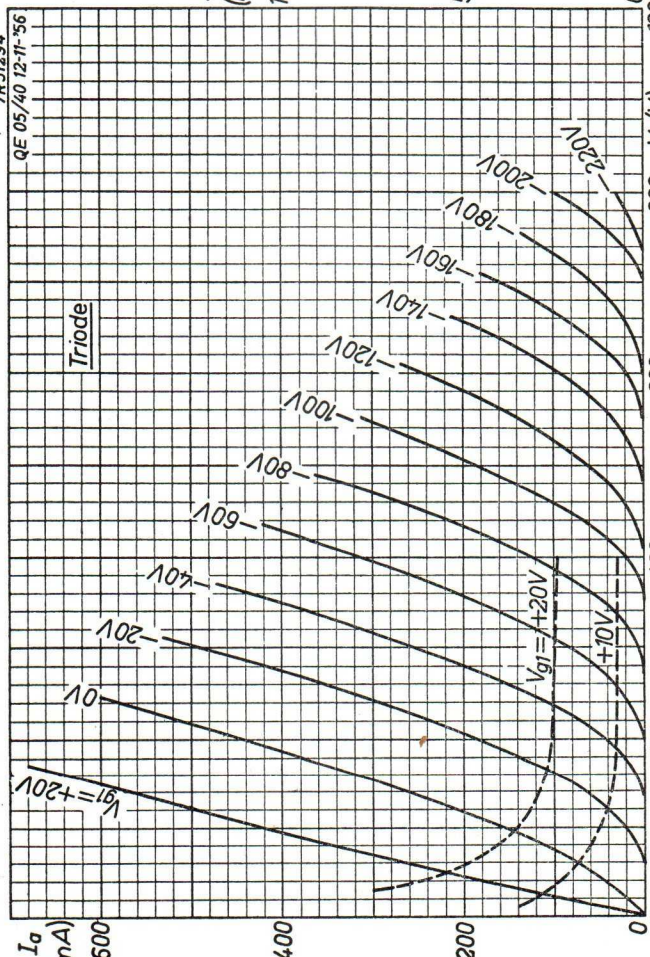
# PHILIPS


7.R.51293
QE 05/40 12-11-'56
$V_{g1}$ (V)
50mA
40mA
30mA
20mA
10mA
50 mA
40
30
20
10
0
−20
−40
−60
−80
0,6A
0,5A
0,4A
0,3A
0,2A
0,1A
0,05A
0,02A
$V_{g2}$=150V
$I_a$
$I_{g2}$
$I_{g1}$
0
200
400
600
$V_a$(V)
800

F

# PHILIPS

**QE 05/40**

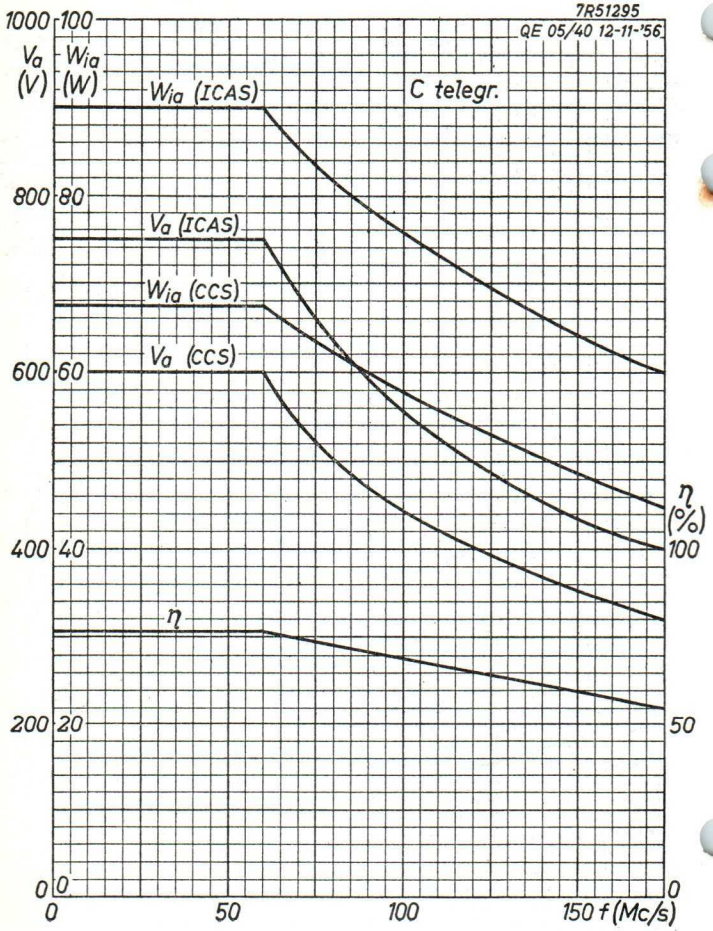



3.3.1957

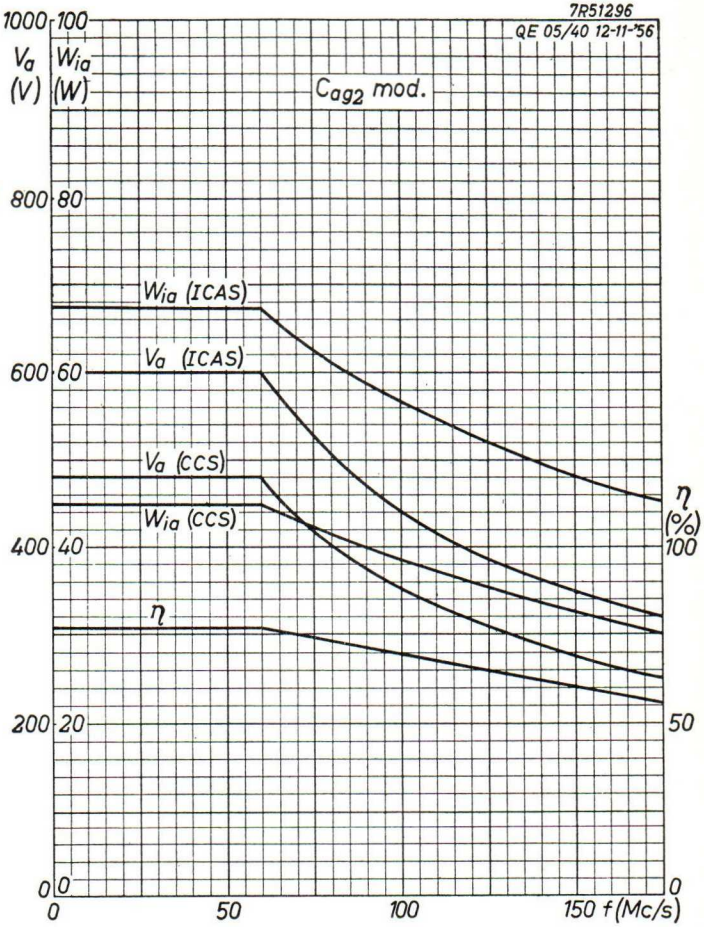
G

QE 05/40

# PHILIPS

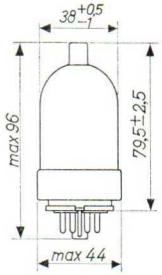



H


7R51296
QE 05/40 12-11-'56
1000
100
$V_a$ (V)
$W_{ia}$ (W)
$C_{ag_2}$ mod.
800
80
$W_{ia}$ (ICAS)
600
60
$V_a$ (ICAS)
$V_a$ (CCS)
$W_{ia}$ (CCS)
400
40
$\eta$
200
20
0
0
0
50
100
150 f (Mc/s)
$\eta$ (%)
100
50
0

## QE05/40F

$V_f$ = 12,6 V
$I_f$ = 0,625 A




Base, culot, Sockel: Octal 8-p

For further data and curves please refer to QE 05/40
Pour les autres données et courbes voir QE 05/40
Für die übrigen Daten und Kennlinien siehe QE 05/40

## QE05/40H

$V_f$ = 26,5 V
$I_f$ = 0,3 A

For further data and curves please refer to QE 05/40
Pour les autres données et courbes voir QE 05/40
Für die übrigen Daten und Kennlinien siehe QE 05/40

BEAM POWER TETRODE for use as A.F. and R.F. amplifier and oscillator
TETRODE A FAISCEAU pour utilisation en amplificatrice B.F. et H.F. et oscillatrice
BÜNDELTETRODE zur Verwendung als NF- und HF-Verstärker und Oszillator

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

$V_f$ = 6,3 V
$I_f$ = 0,9 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 7 pF
$C_{g1}$ = 12 pF
$C_{ag1}$ < 0,2 pF[1])

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 8
S ($I_a$ = 72 mA) = 6 mA/V

| λ | Freq. | C telegr. | | | B teleph. | | | $C_{ag2}$ mod. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $V_a$ | $W_o$ (W) | | $V_a$ | $W_o$ (W) | | $V_a$ | $W_o$ (W) | |
| m | Mc/s | (V) | CCS | ICAS | (V) | CCS | ICAS | (V) | CCS | ICAS |
| 5 | 60 | 600 | 40 | | 600 | 12,5 | | 475 | 28 | |
| | | 500 | 32 | | 500 | 11 | | 400 | 22 | |
| | | 400 | 25 | | 400 | 9 | | 325 | 17 | |
| | | 750 | | 54 | 750 | | 15 | 600 | | 44 |

| AB mod[2])[3]) | | | AB mod[2])[4]) | | |
|---|---|---|---|---|---|
| $V_a$ | $W_o$ (W) | | $V_a$ | $W_o$ (W) | |
| (V) | CCS | ICAS | (V) | CCS | ICAS |
| 600 | 56 | | 600 | 80 | |
| 500 | 46 | | 500 | 75 | |
| 400 | 36 | | 400 | 55 | |
| 750 | | 72 | 750 | | 120 |
| 400 | 15[5]) | 15[5]) | | | |

[1]) With external shield connected to cathode
Avec blindage extérieur connecté à la cathode
Mit äusserer Abschirmung verbunden mit Katode

[2]) Two tubes; deux tubes; zwei Röhren

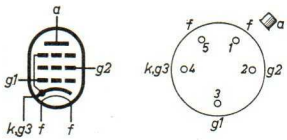
[3]) Without grid current
Sans courant de grille
Ohne Gitterstrom

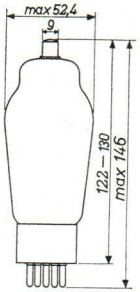
[4]) With grid current
Avec courant de grille
Mit Gitterstrom

[5]) Two tubes in triode connection
Deux tubes en montage triode
Zwei Röhren in Triodenschaltung

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: Medium 5-pin

Socket, support, Fassung: 40219
Cap , capot , Haube : 28 906 022

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 60 g | Poids brut | 85 g |
| Nettogewicht | | Bruttogewicht | |

1.) Page 5 and 6; page 5 et 6; Seite 5 und 6
Obtained preferably from a separate source modulated with the plate supply or from the modulated plate supply through a series resistor of

12.5 kΩ at $V_a$ = 325 V
25 kΩ at $V_a$ = 400 V
28 kΩ at $V_a$ = 475 V
37.5 kΩ at $V_a$ = 600 V

Obtenu de préférence d'une source séparée modulée avec l'alimentation anodique, ou de l'alimentation anodique modulée à travers une résistance série de

12,5 kΩ à $V_a$ = 325 V
25 kΩ à $V_a$ = 400 V
28 kΩ à $V_a$ = 475 V
37,5 kΩ à $V_a$ = 600 V

Vorzugsweise erhalten von einer separaten Spannungsquelle, moduliert mit der Anodenspeisung oder von der modulierten Anodenspeisung mittels eines Serienwiderstandes von

12,5 kΩ bei $V_a$ = 325 V
25 kΩ bei $V_a$ = 400 V
28 kΩ bei $V_a$ = 475 V
37,5 kΩ bei $V_a$ = 600 V

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| f | = max. | 60 | Mc/s |
| $V_a$ | = max. | 600 | V |
| $W_{ia}$ | = max. | 60 | W |
| $W_a$ | = max. | 25 | W |
| $I_a$ | = max. | 100 | mA |
| $V_{g2}$ | = max. | 300 | V |
| $W_{g2}$ | = max. | 3,5 | W |
| $-V_{g1}$ | = max. | 200 | V |
| $I_{g1}$ | = max. | 5 | mA |
| $V_{kf}$ | = max. | 135 | V |
| $R_{g1}$ | = max. | 30 | kΩ |

| | | | |
|---|---|---|---|
| f | = max. | 80 | Mc/s |
| $V_a$ | = max. | 480 | V |
| $W_{ia}$ | = max. | 48 | W |

| | | | |
|---|---|---|---|
| f | = max. | 125 | Mc/s |
| $V_a$ | = max. | 330 | V |
| $W_{ia}$ | = max. | 33 | W |

Operating conditions, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 600 | 500 | 400 V |
| $V_{g1}$ | = | -45 | -45 | -45 V |
| $V_{g2}$ | = | 250 | 250 | 250 V |
| $I_a$ | = | 100 | 100 | 100 mA |
| $I_{g1}$ | = | 4 | 4 | 4 mA |
| $I_{g2}$ | = | 8 | 8 | 8 mA |
| $V_{g1_p}$ | = | 65 | 65 | 65 V |
| $W_{ig1}$ | = | 0,3 | 0,3 | 0,3 W |
| $W_{g2}$ | = | 2 | 2 | 2 W |
| $W_{ia}$ | = | 60 | 50 | 40 W |
| $W_a$ | = | 20 | 18 | 15 W |
| $W_o$ | = | 40 | 32 | 25 W |
| $\eta$ | = | 66,5 | 64 | 62,5 % |

# PHILIPS

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| f = max. | 60 Mc/s | | |
| $V_a$ = max. | 750 V | f = max. | 80 Mc/s |
| $W_{ia}$ = max. | 75 W | $V_a$ = max. | 600 V |
| $W_a$ = max. | 30 W | $W_{ia}$ = max. | 60 W |
| $I_a$ = max. | 100 mA | | |
| $V_{g2}$ = max. | 300 V | | |
| $W_{g2}$ = max. | 3,5 W | | |
| $-V_{g1}$ = max. | 200 V | f = max. | 125 Mc/s |
| $I_{g1}$ = max. | 5 mA | $V_a$ = max. | 415 V |
| $V_{kf}$ = max. | 135 V | $W_{ia}$ = max. | 41,5 W |
| $R_{g1}$ = max. | 30 kΩ | | |

Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Grenzdaten, aussetzender Betrieb

| | | |
|---|---|---|
| $V_a$ | = | 750 V |
| $V_{g1}$ | = | -45 V |
| $V_{g2}$ | = | 250 V |
| $I_a$ | = | 100 mA |
| $I_{g1}$ | = | 4 mA |
| $I_{g2}$ | = | 8 mA |
| $V_{g1_p}$ | = | 65 V |
| $W_{ig1}$ | = | 0,3 W |
| $W_{g2}$ | = | 2 W |
| $W_{ia}$ | = | 75 W |
| $W_a$ | = | 21 W |
| $W_o$ | = | 54 W |
| $\eta$ | = | 72 % |

H.F. classe C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille écran
HF-Klasse C Anoden- und Schirmgittermodulation

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| f | = max. | 60 | Mc/s |
| $V_a$ | = max. | 475 | V |
| $W_{ia}$ | = max. | 40 | W |
| $W_a$ | = max. | 16,5 | W |
| $I_a$ | = max. | 83 | mA |
| $V_{g2}$ | = max. | 300 | V |
| $W_{g2}$ | = max. | 2,5 | W |
| $-V_{g1}$ | = max. | 200 | V |
| $I_{g1}$ | = max. | 5 | mA |
| $V_{kf}$ | = max. | 135 | V |
| $R_{g1}$ | = max. | 30 | kΩ |

| | | | |
|---|---|---|---|
| f | = max. | 80 | Mc/s |
| $V_a$ | = max. | 380 | V |
| $W_{ia}$ | = max. | 32 | W |

| | | | |
|---|---|---|---|
| f | = max. | 125 | Mc/s |
| $V_a$ | = max. | 260 | V |
| $W_{ia}$ | = max. | 22 | W |

Operating conditions, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 475 | 400 | 325 V |
| $V_{g1}$ | = | -85 | -75 | -75 V |
| $V_{g2}$ [1]) | = | 250 | 250 | 250 V |
| $I_a$ | = | 83 | 80 | 80 mA |
| $I_{g1}$ | = | 4 | 3,5 | 3,5 mA |
| $I_{g2}$ | = | 8 | 6 | 6 mA |
| $V_{g1p}$ | = | 108 | 95 | 95 V |
| $W_{ig1}$ | = | 0,4 | 0,3 | 0,3 W |
| $W_{g2}$ | = | 2 | 1,5 | 1,5 W |
| $W_{ia}$ | = | 39,5 | 32 | 26 W |
| $W_a$ | = | 11,5 | 10 | 9 W |
| $W_o$ | = | 28 | 22 | 17 W |
| $\eta$ | = | 71 | 69 | 65,5 % |
| m | = | 100 | 100 | 100 % |
| $W_{mod}$ | = | 20 | 16 | 13 W |

1) See page 2; voir page 2; siehe Seite 2

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille écran
HF-Klasse C Anoden- und Schirmgittermodulation

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

f = max. 60 Mc/s
$V_a$ = max. 600 V
$W_{ia}$ = max. 60 W
$W_a$ = max. 25 W
$I_a$ = max. 100 mA
$V_{g2}$ = max. 300 V
$W_{g2}$ = max. 2,5 W
$V_{g1}$ = max. 200 V
$I_{g1}$ = max. 5 mA
$V_{kf}$ = max. 135 V
$R_{g1}$ = max. 30 kΩ

f = max. 80 Mc/s
$V_a$ = max. 480 V
$W_{ia}$ = max. 48 W

f = max. 125 Mc/s
$V_a$ = max. 330 V
$W_{ia}$ = max. 33 W

Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| $V_a$ | = | 600 V |
| $V_{g1}$ | = | -85 V |
| $V_{g2}$ [1]) | = | 300 V |
| $I_a$ | = | 100 mA |
| $I_{g1}$ | = | 4 mA |
| $I_{g2}$ | = | 8 mA |
| $V_{g1_p}$ | = | 107 V |
| $W_{ig1}$ | = | 0,4 W |
| $W_{g2}$ | = | 2,4 W |
| $W_{ia}$ | = | 60 W |
| $W_a$ | = | 16 W |
| $W_o$ | = | 44 W |
| $\eta$ | = | 73 % |
| m | = | 100 % |
| $W_{mod}$ | = | 30 W |

[1])See page 2; voir page 2; siehe Seite 2

H.F. class B telephony
H.F. classe B téléphonie
HF-Klasse B Telefonie

Limiting values, continuous service
C.C.S. Caractéristiques limites; service continu
Grenzdaten, Dauerbetrieb

f = max. 60 Mc/s

$V_a$ = max. 600 V
$W_{ia}$ = max. 37,5 W
$W_a$ = max. 25 W
$I_a$ = max. 80 mA
$V_{g2}$ = max. 300 V
$W_{g2}$ = max. 2,5 W
$V_{kf}$ = max. 135 V
$R_{g1}$ = max. 30 kΩ

f = max. 80 Mc/s

$V_a$ = max. 540 V
$W_{ia}$ = max. 34 W

f = max. 125 Mc/s

$V_a$ = max. 450 V
$W_{ia}$ = max. 28 W

Operating conditions, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 600 | 500 | 400 | V |
| $V_{g1}$ | = | -40 | -40 | -40 | V |
| $V_{g2}$ | = | 300 | 300 | 300 | V |
| $I_a$ | = | 62,5 | 70 | 75 | mA |
| $I_{g2}$ | = | 4 | 4 | 5 | mA |
| $V_{g1_p}$ | = | 36 | 38 | 40 | V |
| $W_{g2}$ | = | 1,2 | 1,2 | 1,5 | W |
| $W_{ia}$ | = | 37,5 | 35 | 30 | W |
| $W_a$ | = | 25 | 24 | 21 | W |
| $W_o$ | = | 12,5 | 11 | 9 | W |
| $\eta$ | = | 33 | 31,5 | 30 | % |
| m | = | 100 | 100 | 100 | % |
| $W_{ig1}$ | = | 0,2 | 0,3 | 0,4 | W |

# PHILIPS

H.F. class B telephony
H.F. classe B téléphonie
HF-Klasse B Telefonie

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| f = max. 60 Mc/s | | f = max. 80 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 750 V | $V_a$ | = max. 675 V |
| $W_{ia}$ | = max. 45 W | $W_{ia}$ | = max. 40,5 W |
| $W_a$ | = max. 30 W | | |
| $I_a$ | = max. 90 mA | | |
| $V_{g2}$ | = max. 300 V | f = max. 125 Mc/s | |
| $W_{g2}$ | = max. 2,5 W | $V_a$ | = max. 562 V |
| $V_{kf}$ | = max. 135 V | $W_{ia}$ | = max. 34 W |
| $R_{g1}$ | = max. 30 kΩ | | |

Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| $V_a$ | = | 750 V |
| $V_{g1}$ | = | -40 V |
| $V_{g2}$ | = | 300 V |
| $I_a$ | = | 60 mA |
| $I_{g2}$ | = | 3 mA |
| $V_{g1p}$ | = | 35 V |
| $W_{g2}$ | = | 0,9 W |
| $W_{ia}$ | = | 45 W |
| $W_a$ | = | 30 W |
| $W_o$ | = | 15 W |
| $\eta$ | = | 33 % |
| m | = | 100 % |
| $W_{ig1}$ | = | 0,2 W |

A.F. class AB amplifier and modulator (Ig1 > 0)
Amplificatrice et modulatrice B.F. classe AB (Ig1 > 0)
NF-Klasse AB Verstärker und Modulator (Ig1 > 0)

---

C.C.S. Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. 600 V | $V_{g2}$ | = max. 300 V |
| $W_{ia}$ | = max. 60 W | $W_{g2}$ | = max. 3,5 W |
| $W_a$ | = max. 25 W | $V_{kf}$ | = max. 135 V |
| $I_a$ | = max. 120 mA | $R_{g1}$ | = max. 30 kΩ [1] |

C.C.S. Operating conditions, continuous service; two tubes
Caractéristiques d'utilisation, service continu; deux tubes
Betriebsdaten, Dauerbetrieb; zwei Röhren

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 600 | | 500 | V |
| $V_{g2}$ | = | 300 | | 300 | V |
| $V_{g1}$ | = | -32 | | -30 | V |
| $R_{aa}$ | = | 6900 | | 4600 | Ω |
| $V_{g1g1p}$ | = | 0 | 90 | 0 | 86 V |
| $I_a$ | = | 2x24 | 2x100 | 2x30 | 2x120 mA |
| $I_{g2}$ | = | 2x0,35 | 2x9 | 2x0,45 | 2x10 mA |
| $W_{ig1}$ | = | 0 | 0,1 | 0 | 0,2 W |
| $W_{g2}$ | = | 2x0,11 | 2x2,7 | 2x0,14 | 2x3 W |
| $W_{ia}$ | = | 2x14,4 | 2x60 | 2x15 | 2x60 W |
| $W_a$ | = | 2x14,4 | 2x20 | 2x15 | 2x22,5 W |
| $W_o$ | = | 0 | 80 | 0 | 75 W |
| $\eta$ | = | - | 66,5 | - | 62,5 % |
| d | = | - | 2 | - | 2 % [2] |

| | | | |
|---|---|---|---|
| $V_a$ | = | 400 | V |
| $V_{g2}$ | = | 300 | V |
| $V_{g1}$ | = | -28 | V |
| $R_{aa}$ | = | 3700 | Ω |
| $V_{g1g1p}$ | = | 0 | 80 V |
| $I_a$ | = | 2x36 | 2x120 mA |
| $I_{g2}$ | = | 2x1 | 2x10 mA |
| $W_{ig1}$ | = | 0 | 0,2 W |
| $W_{g2}$ | = | 2x0,3 | 2x3 W |
| $W_{ia}$ | = | 2x14,4 | 2x48 W |
| $W_a$ | = | 2x14,4 | 2x20,5 W |
| $W_o$ | = | 0 | 55 W |
| $\eta$ | = | - | 57 % |
| d | = | - | 2 % [2] |

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[1] [2] See page 10, voir page 10, siehe Seite 10

# PHILIPS

A.F. class AB amplifier and modulator ($I_{g1} > 0$)
Amplificatrice et modulatrice B.F. classe AB ($I_{g1} > 0$)
NF-Klasse AB Verstärker und modulator ($I_{g1} > 0$)

I.C.A.S. Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. 750 V | $V_{g2}$ | = max. 300 V |
| $W_{ia}$ | = max. 90 W | $W_{g2}$ | = max. 3,5 W |
| $W_a$ | = max. 30 W | $V_{kf}$ | = max. 135 V |
| $I_a$ | = max. 120 mA | $R_{g1}$ | = max. 30 kΩ [1] |

I.C.A.S. Operating conditions, intermittent service; two tubes
Caractéristiques d'utilisation, service intermittent; deux tubes
Betriebsdaten, aussetzender Betrieb; zwei Röhren

| | | | |
|---|---|---|---|
| $V_a$ | = | 750 | V |
| $V_{g2}$ | = | 300 | V |
| $V_{g1}$ | = | -35 | V |
| $R_{aa}$ | = | 7300 | Ω |
| $V_{g1g1_p}$ | = | 0 | 96 V |
| $I_a$ | = | 2x15 | 2x120 mA |
| $I_{g2}$ | = | 2x0,25 | 2x10 mA |
| $W_{ig1}$ | = | 0 | 0,2 W |
| $W_{g2}$ | = | 2x0,08 | 2x3 W |
| $W_{ia}$ | = | 2x11,25 | 2x90 W |
| $W_a$ | = | 2x11,25 | 2x30 W |
| $W_o$ | = | 0 | 120 W |
| $\eta$ | = | - | 66,5 % |
| d | = | - | 2 % [2] |

[1] With fixed bias. Cathode bias is not recommended
Avec polarisation fixe. Polarisation de cathode n'est pas recommandée
Mit fester Vorspannung. Vorspannung mittels Katodenwiderstand wird nicht empfohlen

[2] Distortion with zero-impedance driver
Distorsion avec un pré-amplificateur sans résistance interne
Verzerrung bei Verwendung eines Vorverstärkers ohne inneren Widerstand

A.F. class AB amplifier and modulator (Ig1 = 0)
Amplificatrice et modulatrice B.F. classe AB (Ig1 = 0)
NF-Klasse AB Verstärker und Modulator (Ig1 = 0)

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. 600 V | $V_{g2}$ | = max. 300 V |
| $W_{ia}$ | = max. 60 W | $W_{g2}$ | = max. 3,5 W |
| $W_a$ | = max. 25 W | $V_{kf}$ | = max. 135 V |
| $I_a$ | = max. 120 mA | $R_{g1}$ | = max. 100 kΩ[1]) |

Operating conditions, continuous service; two tubes
C.C.S. Caractéristiques d'utilisation, service continu; deux tubes
Betriebsdaten, Dauerbetrieb; zwei Röhren

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 600 | | 500 | V |
| $V_{g2}$ | = | 300 | | 300 | V |
| $V_{g1}$ | = | -34 | | -32 | V |
| $R_{aa}$ | = | 10000 | | 8200 | Ω |
| $V_{g1g1p}$ | = | 0 | 68 | 0 | 64 V |
| $I_a$ | = | 2x18 | 2x69,5 | 2x22 | 2x70,5 mA |
| $I_{g2}$ | = | 2x0,3 | 2x7,5 | 2x0,5 | 2x7,5 mA |
| $W_{ig1}$ | = | 0 | 0 | 0 | 0 W |
| $W_{g2}$ | = | 2x0,09 | 2x2,25 | 2x0,15 | 2x2,25 W |
| $W_{ia}$ | = | 2x10,8 | 2x41,7 | 2x11 | 2x35,3 W |
| $W_a$ | = | 2x10,8 | 2x13,7 | 2x11 | 2x12,3 W |
| $W_o$ | = | 0 | 56 | 0 | 46 W |
| $\eta$ | = | - | 67 | - | 65 % |

| | | | |
|---|---|---|---|
| $V_a$ | = | 400 | V |
| $V_{g2}$ | = | 300 | V |
| $V_{g1}$ | = | -30 | V |
| $R_{aa}$ | = | 6800 | Ω |
| $V_{g1g1p}$ | = | 0 | 60 V |
| $I_a$ | = | 2x28 | 2x71,5 mA |
| $I_{g2}$ | = | 2x1 | 2x8 mA |
| $W_{ig1}$ | = | 0 | 0 W |
| $W_{g2}$ | = | 2x0,3 | 2x2,4 W |
| $W_{ia}$ | = | 2x11,2 | 2x28,6 W |
| $W_a$ | = | 2x11,2 | 2x10,6 W |
| $W_o$ | = | 0 | 36 W |
| $\eta$ | = | - | 63 % |

[1])See page 10; voir page 10; siehe Seite 10

# PHILIPS

A.F. class AB amplifier and modulator (Ig1 = 0)
Amplificatrice et modulatrice B.F. classe AB ( Ig1 = 0)
NF-Klasse AB Verstärker und Modulator (Ig1 = 0)

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = max. 750 V | | $V_{g2}$ | = max. 300 V | |
| $W_{ia}$ | = max. 90 W | | $W_{g2}$ | = max. 3,5 W | |
| $W_a$ | = max. 30 W | | $V_{kf}$ | = max. 135 V | |
| $I_a$ | = max. 120 mA | | $R_{g1}$ | = max. 100 kΩ | [1] |

Operating conditions, intermittent service; two tubes
I.C.A.S. Caractéristiques d'utilisation, service intermittent; deux tubes
Betriebsdaten, aussetzender Betrieb; zwei Röhren

| | | | |
|---|---|---|---|
| $V_a$ | = | 750 | V |
| $V_{g2}$ | = | 300 | V |
| $V_{g1}$ | = | -35 | V |
| $R_{aa}$ | = | 12000 | Ω |
| $V_{g1g1_p}$ | = | 0 ; 70 | V |
| $I_a$ | = | 2x15 ; 2x69,5 | mA |
| $I_{g2}$ | = | 2x0,25 ; 2x8 | mA |
| $W_{ig1}$ | = | 0 ; 0 | W |
| $W_{g2}$ | = | 2x0,075 ; 2x2,4 | W |
| $W_{ia}$ | = | 2x11,25 ; 2x52 | W |
| $W_a$ | = | 2x11,25 ; 2x16 | W |
| $W_o$ | = | 0 ; 72 | W |
| $\eta$ | = | - ; 69 | % |

[1] With fixed bias. Cathode bias is not recommended
Avec polarisation fixe. Polarisation de cathode n'est pas recommandée
Mit fester Vorspannung. Vorspannung mittels Katodenwiderstand wird nicht empfohlen

A.F. class AB amplifier and modulator in triode connection (g2 connected to a; $I_{g1}$ = 0)
Amplificatrice et modulatrice B.F. classe AB en montage triode (g2 connecté à a; $I_{g1}$ = 0)
NF-Klasse AB Verstärker und Modulator in Triodenschaltung (g2 verbunden mit a; $I_{g1}$ = 0)

---

C.C.S. Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 400 | V |
| $I_a$ | = max. | 125 | mA |
| $W_{ia}$ | = max. | 50 | W |
| $W_a$ | = max. | 25 | W |
| $V_{kf}$ | = max. | 135 | V |
| $R_{g1}$ | = max. | 0,1 | MΩ [1] |
| $R_{g1}$ | = max. | 0,5 | MΩ [2] |

C.C.S. Operating conditions, continuous service; two tubes
Caractéristiques d'utilisation, service continu; deux tubes
Betriebsdaten, Dauerbetrieb; zwei Röhren

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 400 | | V |
| $V_{g1}$ | = | -45 | | V |
| $R_{aa}$ | = | 3 | | kΩ |
| $V_{gg_p}$ | = | 0 | 90 | V |
| $I_a$ | = | 2x32 | 2x70 | mA |
| $W_{ia}$ | = | 2x12,8 | 2x28 | W |
| $W_a$ | = | 2x12,8 | 2x20,5 | W |
| $W_o$ | = | 0 | 15 | W |
| $\eta$ | = | - | 27 | % |

---

[1] With fixed bias
Avec polarisation fixe
Mit fester Gittervorspannung

[2] With cathode bias
Avec polarisation de cathode
Mit Vorspannung mittels Katodenwiderstand

# PHILIPS

A.F. class AB amplifier and modulator in triode connection (g2 connected to a; Ig1 = 0)
Amplificatrice et modulatrice B.F. classe AB en montage triode (g2 connecté à a; Ig1 = 0)
NF-Klasse AB Verstärker und Modulator in Triodenschaltung (g2 verbunden mit a; Ig1 = 0)

---

I.C.A.S. Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 400 | V |
| $I_a$ | = max. | 125 | mA |
| $W_{ia}$ | = max. | 50 | W |
| $W_a$ | = max. | 30 | W |
| $V_{kf}$ | = max. | 135 | V |
| $R_{g1}$ | = max. | 0,1 | MΩ [1] |
| $R_{g1}$ | = max. | 0,5 | MΩ [2] |

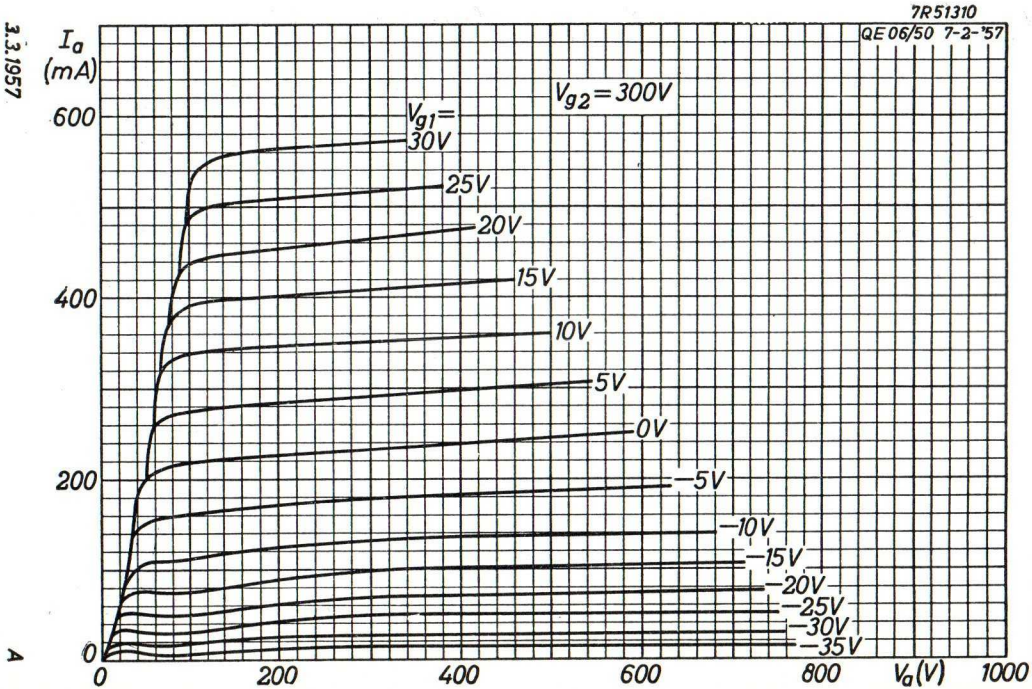
I.C.A.S. Operating conditions, intermittent service; two tubes
Caractéristiques d'utilisation, service intermittent; deux tubes
Betriebsdaten, aussetzender Betrieb; zwei Röhren

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 400 | | V |
| $V_{g1}$ | = | -45 | | V |
| $R_{aa}$ | = | 3 | | kΩ |
| $V_{gg_p}$ | = | 0 | 90 | V |
| $I_a$ | = | 2x32 | 2x70 | mA |
| $W_{ia}$ | = | 2x12,8 | 2x28 | W |
| $W_a$ | = | 2x12,8 | 2x20,5 | W |
| $W_o$ | = | 0 | 15 | W |
| $\eta$ | = | - | 27 | % |

---

[1] With fixed bias
Avec polarisation fixe
Mit fester Vorspannung

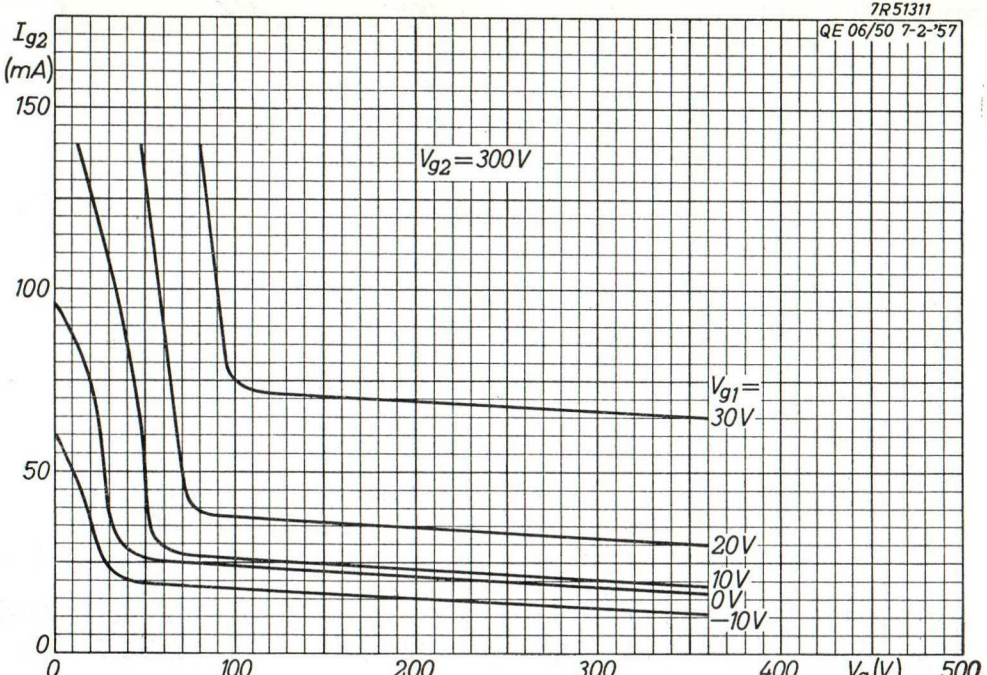
[2] With cathode bias
Avec polarisation de cathode
Mit Vorspannung mittels Katodenwiderstand

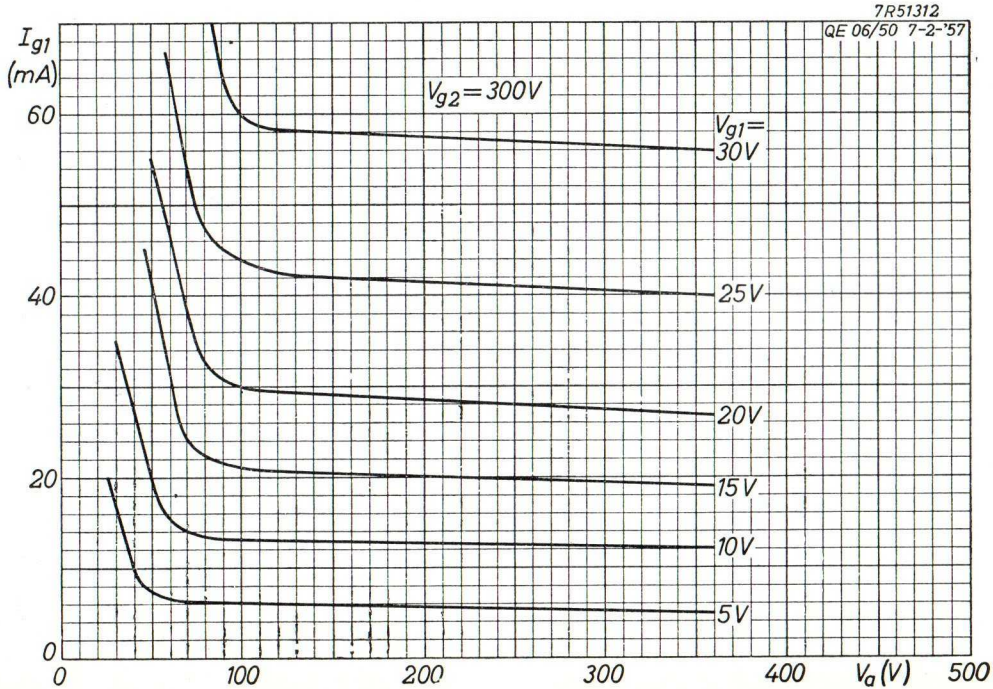



PHILIPS

QE 06/50

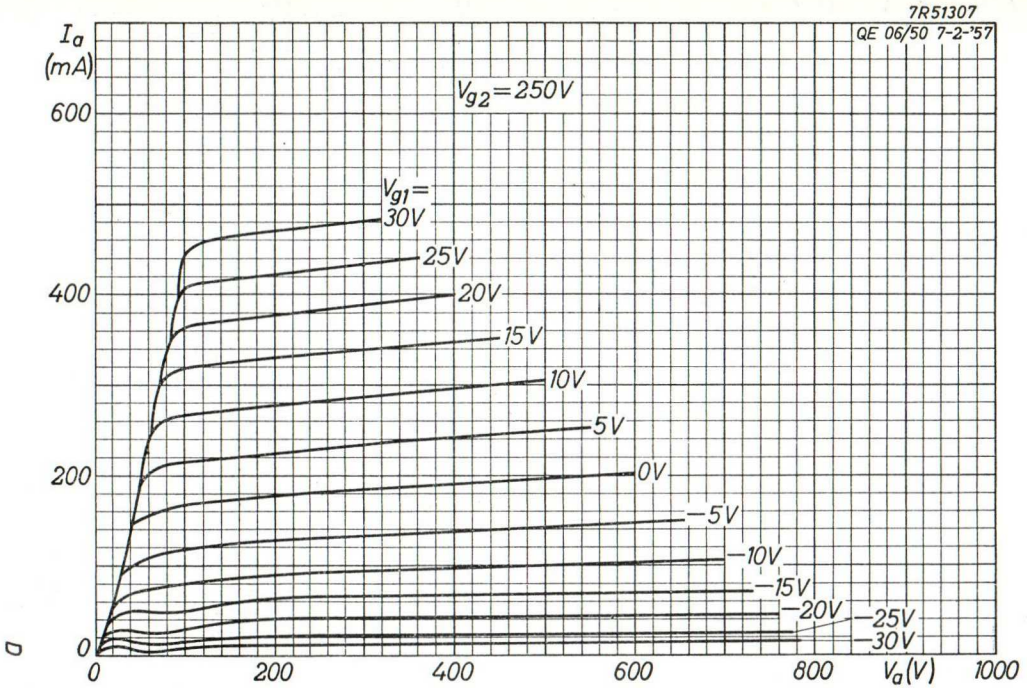
PHILIPS

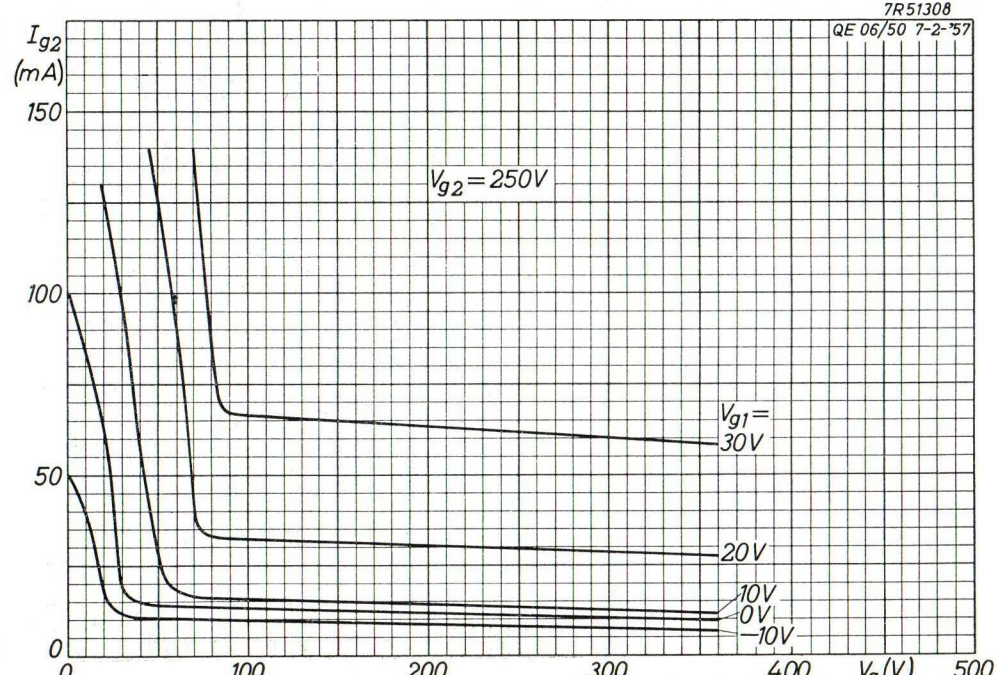

7R51311
QE 06/50 7-2-'57
$I_{g2}$ (mA)
150
100
50
0
$V_{g2}=300V$
$V_{g1}=$
30V
20V
10V
0V
−10V
0
100
200
300
400
$V_a$(V)
500




PHILIPS

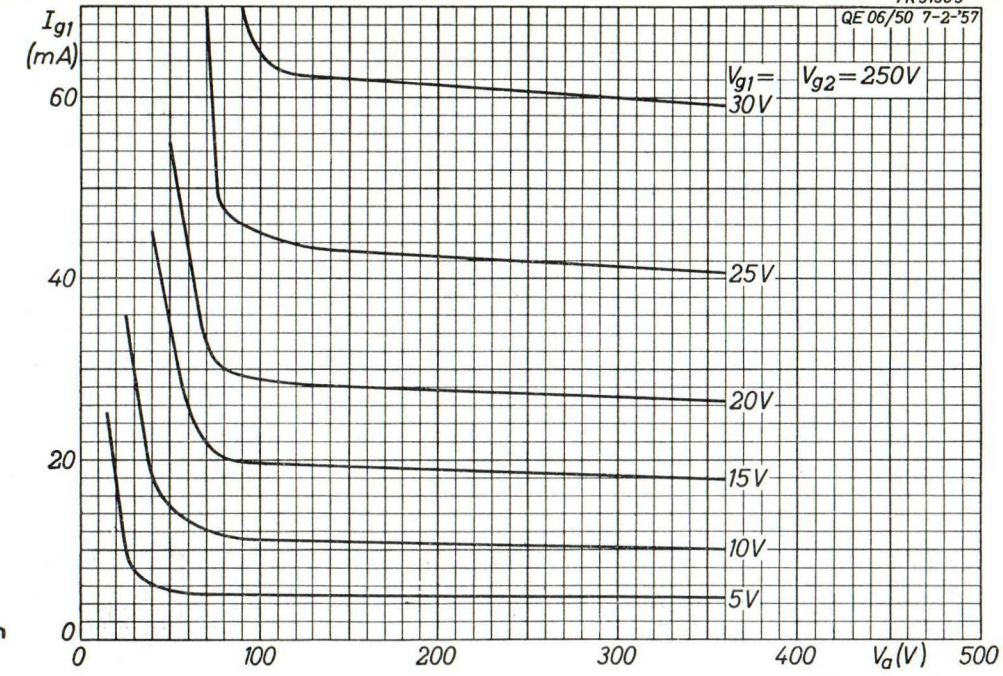
QE 06/50


7R51307
QE 06/50 7-2-'57
$I_a$ (mA)
$V_{g2}$ = 250V
$V_{g1}$ =
30V
25V
20V
15V
10V
5V
0V
−5V
−10V
−15V
−20V
−25V
−30V
600
400
200
0
0
200
400
600
800
$V_a$ (V)
1000




PHILIPS

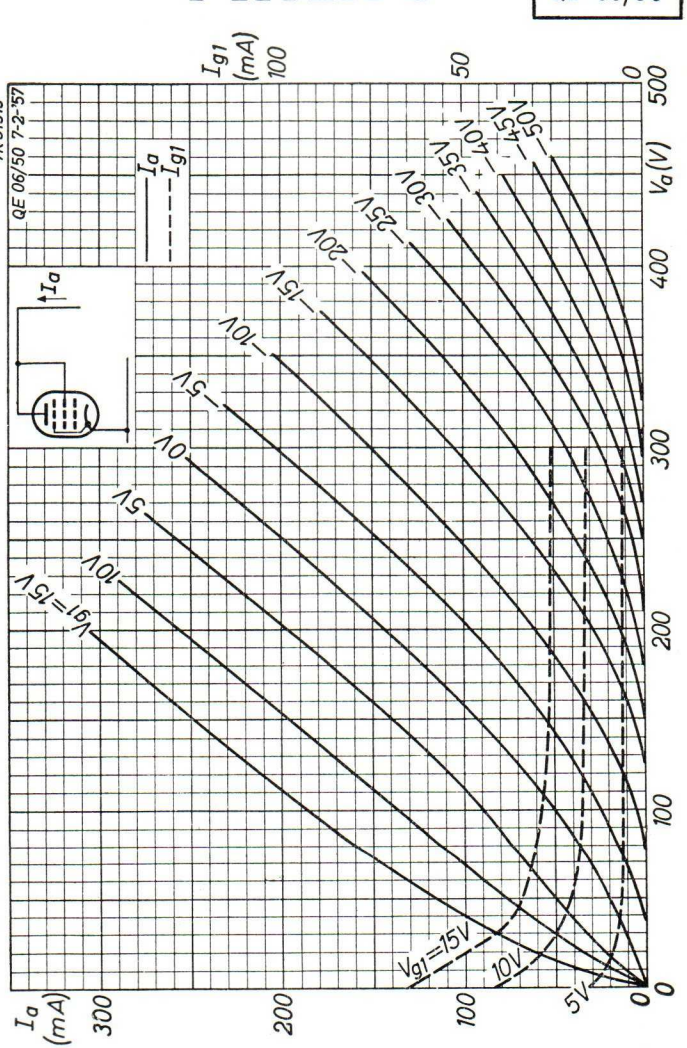
QE 06/50


7R51309
QE 06/50 7-2-'57
$I_{g1}$ (mA)
60
40
20
0
$V_{g1}$= $V_{g2}$=250V
30V
25V
20V
15V
10V
5V
0
100
200
300
400
$V_a$(V)
500

PHILIPS

# PHILIPS

**QE 06/50**




3.3.1957

G

BEAMPOWER TETRODE for use as amplifier, oscillator, frequency multiplier or modulator in A.M., S.S.B. and F.M. transmitters
TÉTRODE À FAISCEAUX pour utilisation comme amplificatrice, oscillatrice, multiplicatrice de fréquence ou modulatrice dans des émetteurs A.M., à une bande latérale ou F.M.
BÜNDELTETRODE zur Verwendung als Verstärker, Oszillator, Frequenzvervielfacher oder Modulator in AM-, Einseitenband- oder FM-Sendern

Cathode : oxide coated
Cathode : oxyde
Katode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

$V_f$ = 6,3 V
$I_f$ = 3,9 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 12,7 pF
$C_{g1}$ = 30 pF
$C_{ag1}$ < 0,9 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 750 V
$V_{g2}$ = 250 V
$I_a$ = 100 mA
S = 9 mA/V
$\mu_{g2g1}$ = 5,7

| Freq. | C telegr. | | $C_{ag2}$ mod. | | B S.S.B. | | B mod.[2] | |
|---|---|---|---|---|---|---|---|---|
| Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ [1] (W) | $V_a$ (V) | $W_o$ (W) |
| 30 | 750 | 200 | 600 | 130 | 750 | 220 | 750<br>600 | 300<br>200 |

Net weight
Poids net 220 g
Nettogewicht

Shipping weight
Poids brut 400 g
Bruttogewicht

[1]) Peak envelope power with double tone
Puissance à la crête de l'enveloppe avec signal d'entrée difréquence
Leistung beim Scheitelwert der Hüllkurve mit Doppeltonverfahren

[2]) Two tubes
Deux tubes
Zwei Röhren

# PHILIPS

Cooling : Radiation and convection
Refroidissement: Rayonnement et convection
Kühlung : Strahlung und Konvektion

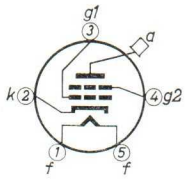
Temperatures
Températures
Temperaturen

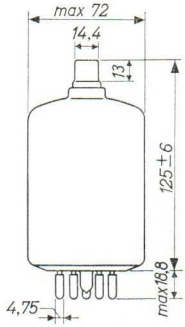
Anode seal temperature
Température du scellement de l'anode max. 220 °C
Anodeneinschmelzungstemperatur

Pin temperature
Température des broches max. 180 °C
Stiftentemperatur

Bulb temperature
Température de l'ampoule max. 300 °C
Kolbentemperatur

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base
Culot Giant 5p.
Sockel

Socket
Support 40 211/01
Fassung

Top cap
Capot supérieur Medium
Kolbenanschluss

Cap
Capot 40 619
Haube

Mounting position: Vertical, or horizontal with plane of anodes vertical
Montage : Vertical, ou horizontal avec le plan des anodes vertical
Einbau : Senkrecht, oder waagerecht mit der Fläche der Anoden senkrecht

R.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| f | = | | 30 | Mc/s |
|---|---|---|---|---|
| $V_a$ | = | max. | 825 | V |
| $W_{ia}$ | = | max. | 300 | W |
| $W_a$ | = | max. | 100 | W |
| $I_a$ | = | max. | 400 | mA |
| $V_{g2}$ | = | max. | 300 | V |
| $W_{g2}$ | = | max. | 12 | W |
| $-V_{g1}$ | = | max. | 150 | V |
| $I_{g1}$ | = | max. | 30 | mA |
| $R_{g1}$ | = | max. | 25 | kΩ |
| $V_{kf}$ | = | max. | 125 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f | = | 30 | Mc/s |
|---|---|---|---|
| $V_a$ | = | 750 | V |
| $V_{g2}$ | = | 250 | V |
| $V_{g1}$ | = | -90 | V |
| $I_a$ | = | 385 | mA |
| $I_{g2}$ | = | 20 | mA |
| $I_{g1}$ | = | 7 | mA |
| $V_{g1p}$ | = | 120 | V |
| $W_{ia}$ | = | 285 | W |
| $W_{ig1}$ | = | 1,0 | W |
| $W_{g2}$ | = | 5 | W |
| $W_a$ | = | 85 | W |
| $W_o$ | = | 200 | W |
| $\eta$ | = | 70 | % |

# PHILIPS

R.F. class C anode and screen-grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF-Klasse C Anoden- und Schirmgittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = 30 Mc/s | $V_{g2}$ | = max. 300 V |
| $V_a$ | = max. 650 V | $W_{g2}$ | = max. 10 W |
| $W_{ia}$ | = max. 200 W | $-V_{g1}$ | = max. 150 V |
| $W_a$ | = max. 67 W | $I_{g1}$ | = max. 30 mA |
| $I_a$ | = max. 350 mA | $R_{g1}$ | = max. 25 kΩ |
| | | $V_{kf}$ | = max. 125 V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| f | = | 30 Mc/s |
| $V_a$ | = | 600 V |
| $V_{g2}$ | = | 250 V |
| $V_{g1}$ | = | -100 V |
| $I_a$ | = | 300 mA |
| $I_{g2}$ | = | 20 mA |
| $I_{g1}$ | = | 4 mA |
| $V_{g1p}$ | = | 110 V |
| $W_{ia}$ | = | 180 W |
| $W_{ig1}$ | = | 0,4 W |
| $W_{g2}$ | = | 5 W |
| $W_a$ | = | 50 W |
| $W_o$ | = | 130 W |
| $\eta$ | = | 72 % |
| m | = | 100 % |
| $V_{g2p}$ | = | 220 V [1] |
| $W_{mod}$ | = | 90 W |

[1]) Obtained from a separate winding on the modulation transformer
Obtenu d'un enroulement séparé du transformateur de modulation
Von einer getrennten Wicklung des Modulationstransformators erhalten

R.F. class B single sideband amplifier
Amplificateur H.F. classe B à une bande latérale
HF-Klasse B Einseitenbandverstärker

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f = | 30 Mc/s | $I_a$ = | max. 400 mA |
| $V_a$ = | max. 825 V | $V_{g2}$ = | max. 350 V |
| $W_{ia}$ = | max. 250 W | $W_{g2}$ = | max. 12 W |
| $W_a$ = | max. 100 W | $R_{g1}$ = | max. 25 kΩ |
| | | $V_{kf}$ = | max. 125 V |

Operating conditions with double-tone modulation
Caractéristiques d'utilisation avec modulation difréquence
Betriebsdaten mit Doppeltonmodulation

The R.F. voltage is modulated with two sinusoidal A.F. signals of equal strength but different frequency
La tension H.F. est modulée avec deux signaux B.F. sinusoïdaux d'intensité égale mais de fréquence différente
Die HF-Spannung ist mittels zweier sinusförmigen NF-Signale gleicher Stärke aber verschiedener Frequenz moduliert

| | | | |
|---|---|---|---|
| f | = | 30 | Mc/s |
| $V_a$ | = | 750 | V |
| $V_{g2}$ | = | 310 | V |
| $V_{g1}$ | = | -45 | V [1] |
| $V_{g1p}$ | = | 0 | 45 [2] V |
| $I_a$ | = | 130 | 270 mA |
| $I_{g2}$ | = | <5 | 26 mA |
| $I_{g1}$ | = | 0 | 0 mA |
| $W_{ia}$ | = | 98 | 200 W |
| $W_{g1}$ | = | 0 | 0 W |
| $W_{g2}$ | = | 1,5 | 8 W |
| $W_a$ | = | 98 | 90 W |
| $W_o$ | = | 0 | 220 W [3] |
| $\eta$ | = | - | 55 % |

[1]) To be adjusted so that $I_a$ = 130 mA at $V_{g1p}$ = 0
A régler jusqu'à ce que $I_a$ = 130 mA à $V_{g1p}$ = 0
Einzustellen bis $I_a$ = 130 mA wenn $V_{g1p}$ = 0

[2]) To be adjusted so that $I_{g1}$ = 0
A régler jusqu'à ce que $I_{g1}$ = 0
Einzustellen bis $I_{g1}$ = 0

[3]) Peak envelop power; puissance à la crête de l'enveloppe; Leistung beim Scheitelwert der Hüllkurve

# PHILIPS

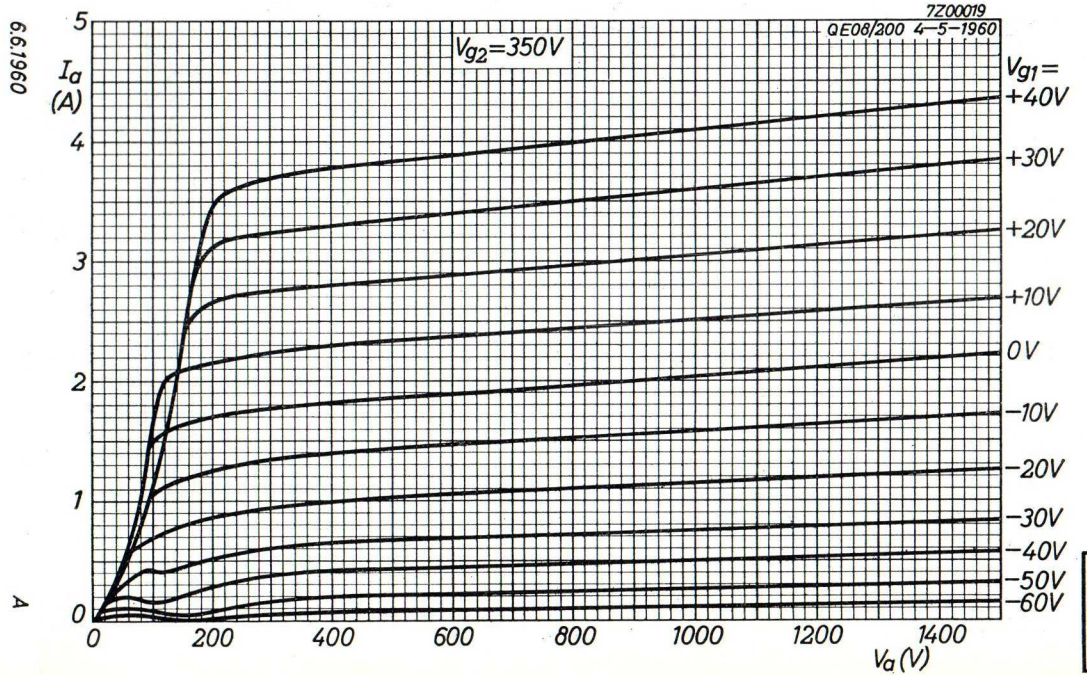
A.F. class B amplifier
Amplificatrice B.F. classe B
NF-Klasse B Verstärker

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 825 | V |
| $W_a$ | = max. | 100 | W |
| $I_a$ | = max. | 400 | mA |
| $V_{g2}$ | = max. | 300 | V |
| $W_{g2}$ | = max. | 12 | W |
| $-V_{g1}$ | = max. | 150 | V |
| $I_{g1}$ | = max. | 30 | mA |
| $R_{g1}$ | = max. | 15 | kΩ |
| $V_{kf}$ | = max. | 125 | V |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 750 | | 600 | | V |
| $V_{g2}$ | = | 250 | | 250 | | V |
| $V_{g1}$ | = | -45 | | -45 | | V |
| $R_{aa\sim}$ | = | 3600 | | 3500 | | Ω |
| $V_{g1g1p}$ | | 0 | 110 | 0 | 105 | V |
| $I_a$ | = | 2x45 | 2x280 | 2x25 | 2x235 | mA |
| $I_{g2}$ | = | 0 | 2x40 | 2x0,5 | 2x24 | mA |
| $I_{g1}$ | = | 0 | 2x1 | 0 | 2x0,5 | mA |
| $W_{ia}$ | = | 2x34 | 2x210 | 2x15 | 2x140 | W |
| $W_{g2}$ | = | 0 | 2x10 | 0 | 2x6 | W |
| $W_a$ | = | 2x34 | 2x60 | 2x15 | 2x40 | W |
| $W_o$ | = | 0 | 300 | 0 | 200 | W |
| $d_{tot}$ | = | - | 6,5 | - | 5 | % |
| $\eta$ | = | - | 71,5 | - | 71,5 | % |

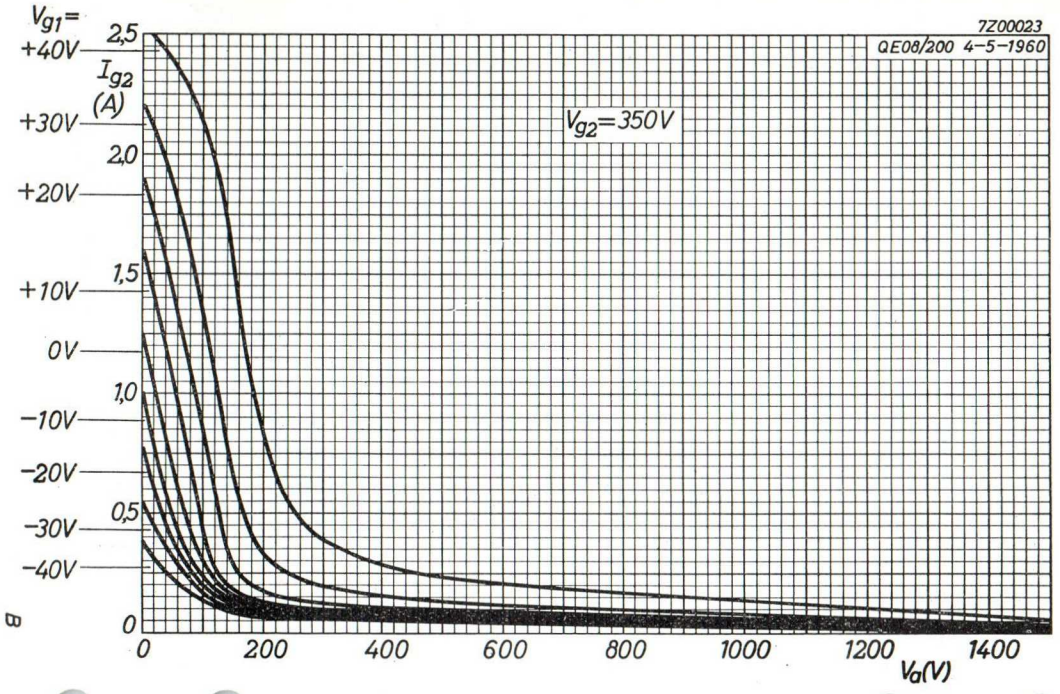



6.6.1960

A

PHILIPS

QE08/200

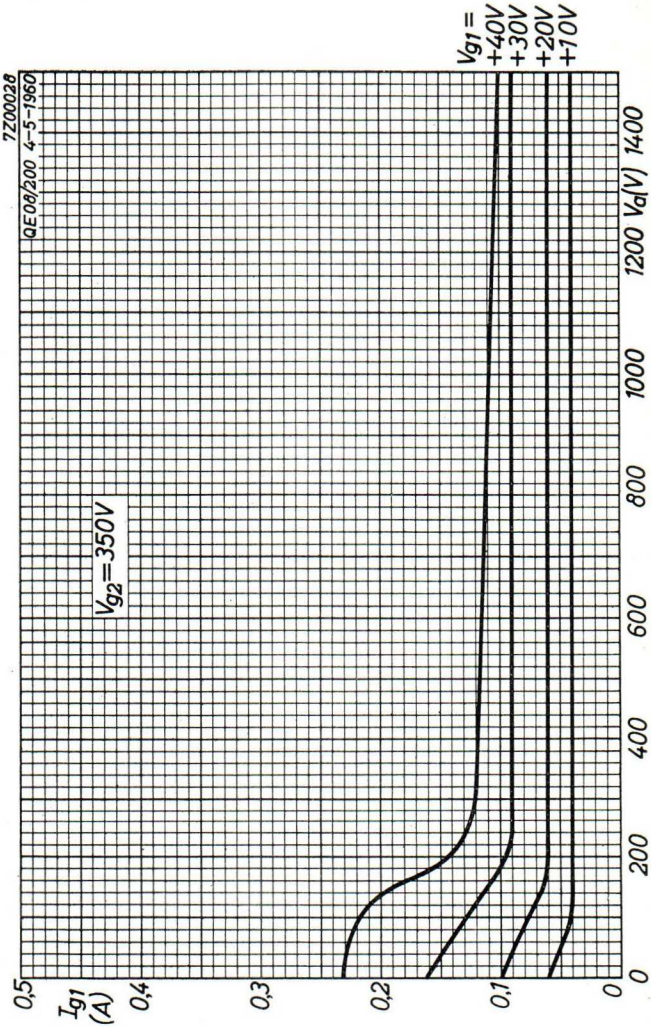



QE08/200

PHILIPS

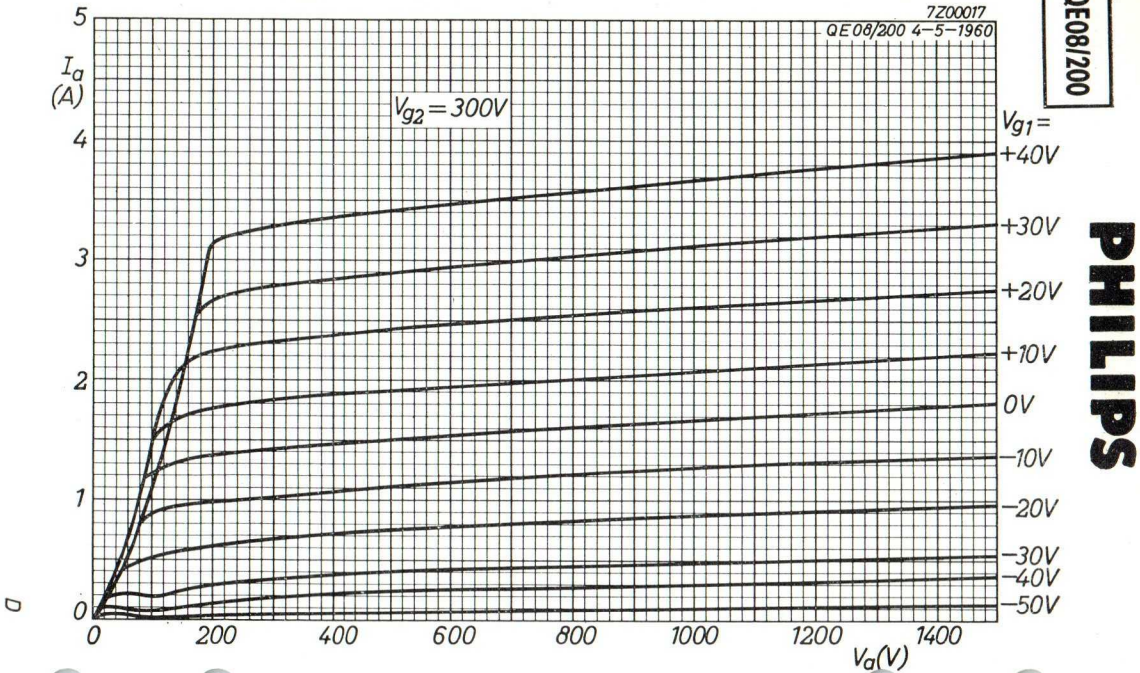
PHILIPS

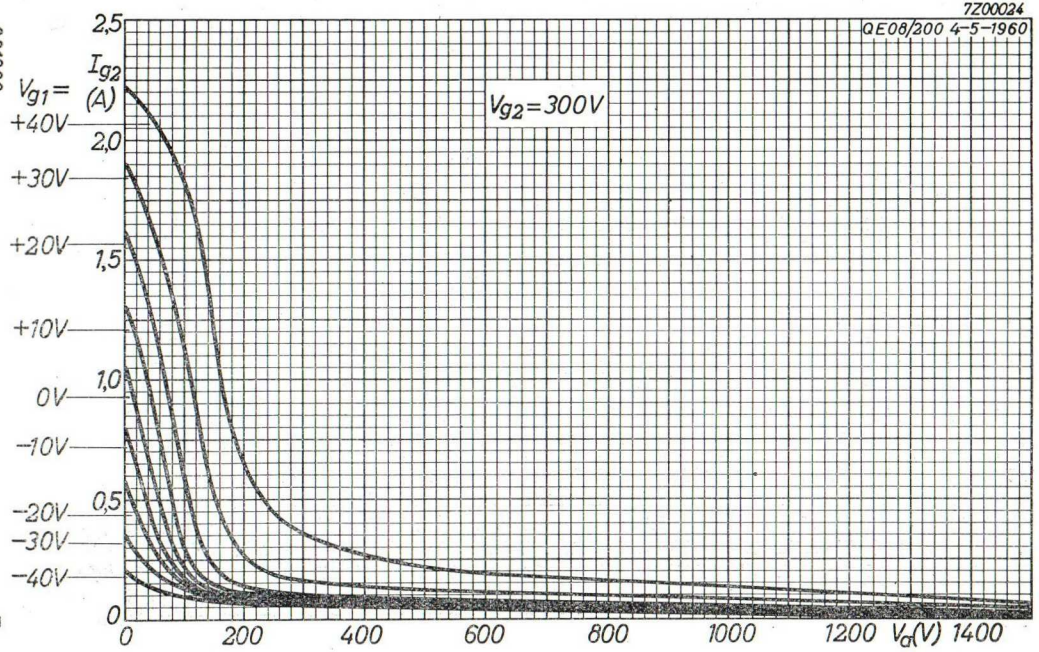
QE08/200




6.6.1960

C


7Z00017
QE08/200 4-5-1960
QE08/200
PHILIPS
$I_a$ (A)
$V_{g2} = 300V$
$V_{g1}$ =
+40V
+30V
+20V
+10V
0V
−10V
−20V
−30V
−40V
−50V
$V_a$(V)
0
200
400
600
800
1000
1200
1400
1
2
3
4
5

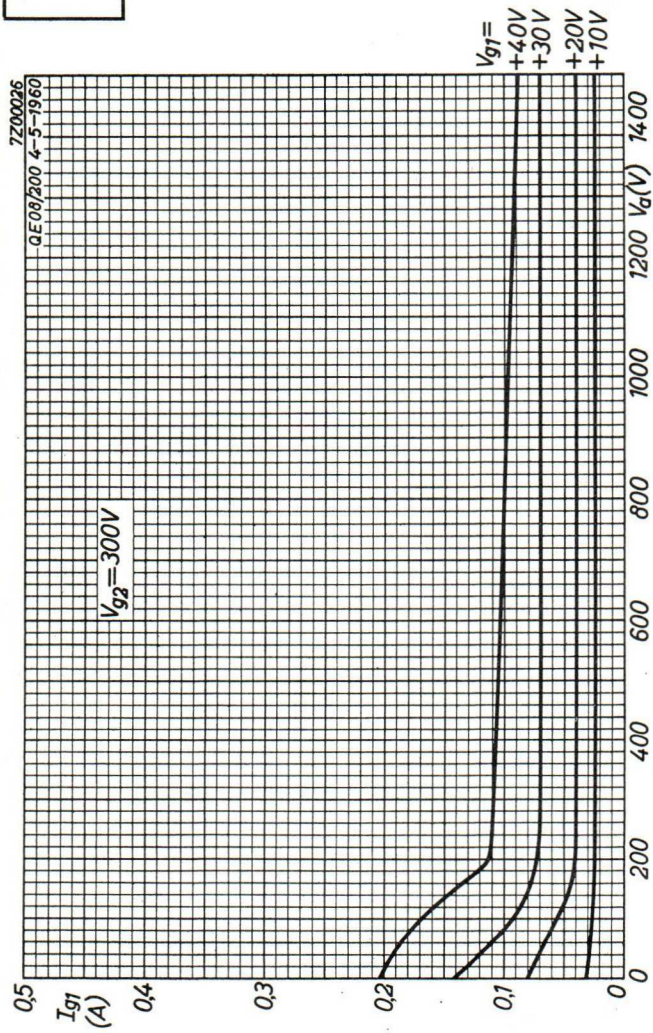



PHILIPS

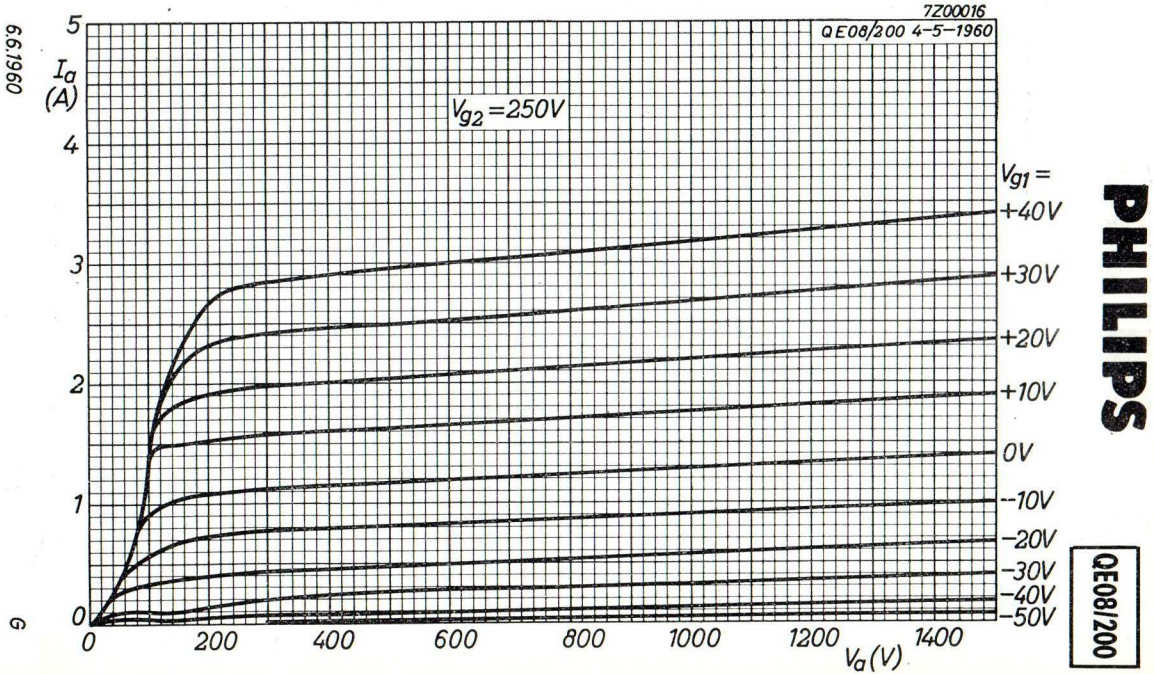
QE08/200

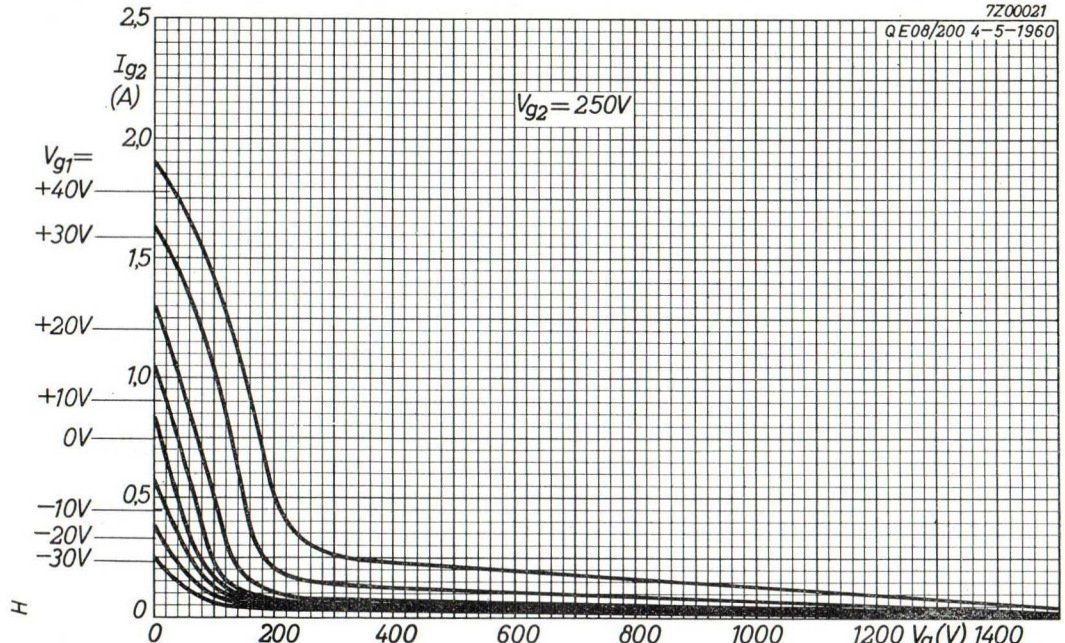
QE08/200

# PHILIPS



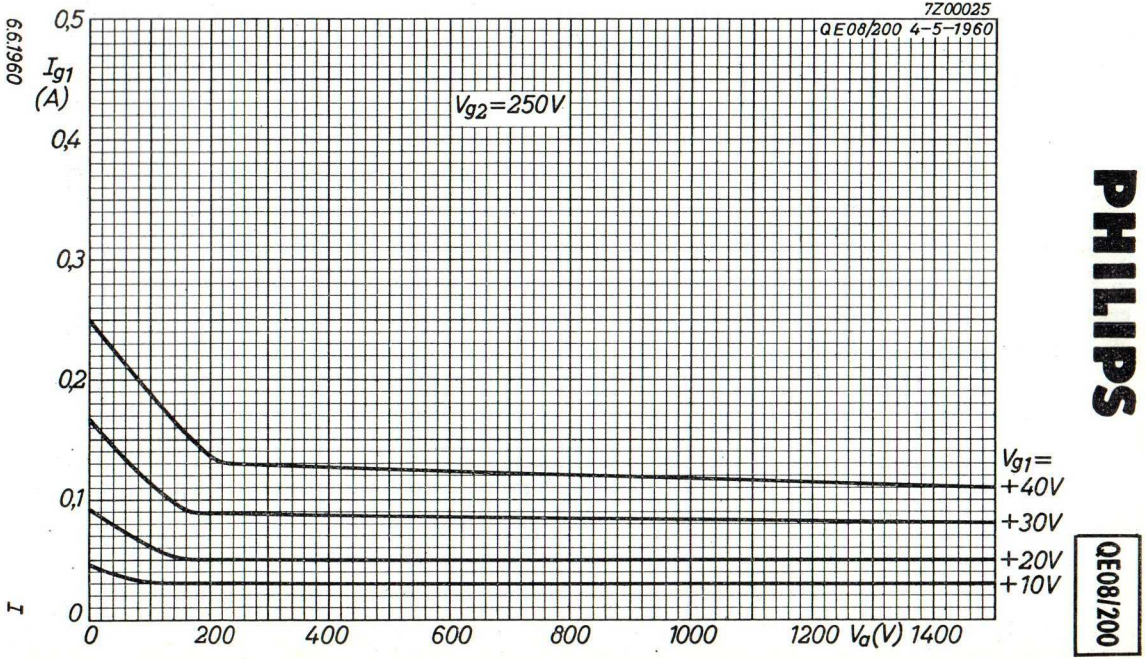

F


7Z00016
QE08/200 4-5-1960
$I_a$ (A)
$V_{g2}$ = 250V
$V_{g1}$ =
+40V
+30V
+20V
+10V
0V
−10V
−20V
−30V
−40V
−50V
$V_a$ (V)
0
200
400
600
800
1000
1200
1400
1
2
3
4
5
PHILIPS
QE08/200
6.6.1960
G



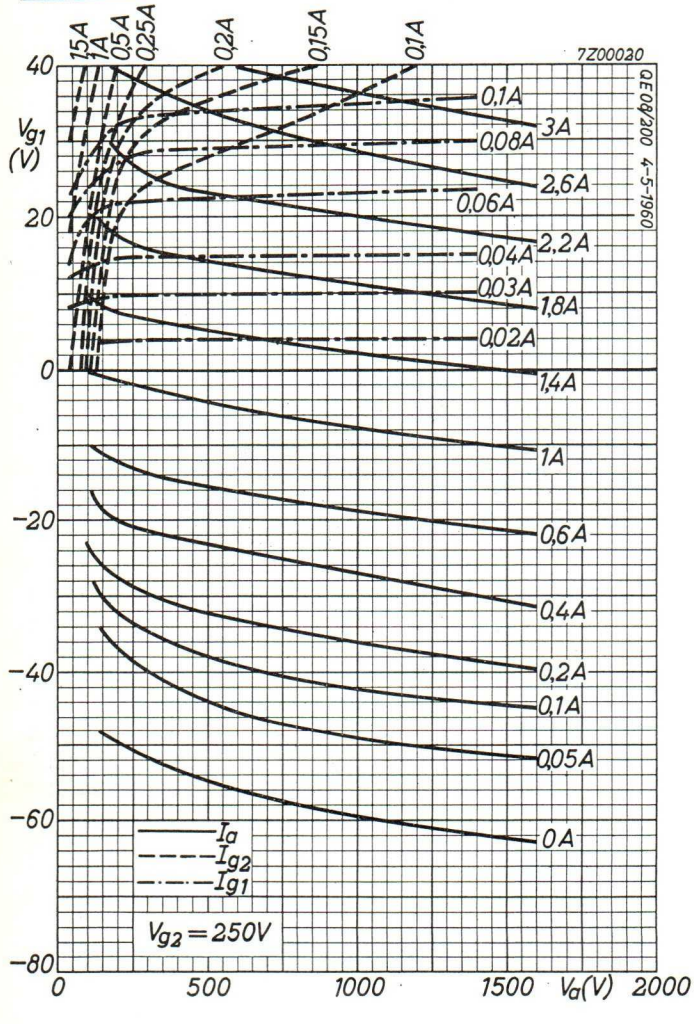

QE08/200

PHILIPS

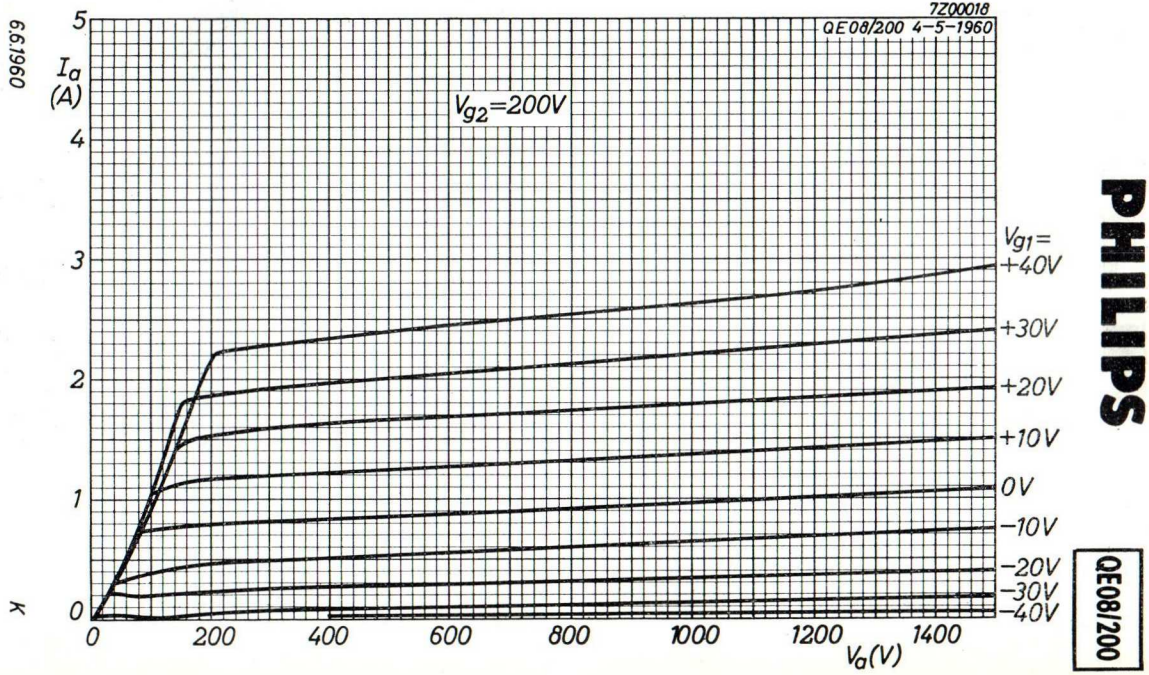

7Z00025
QE08/200 4-5-1960
6.6.1960
$I_{g1}$ (A)
$V_{g2}$=250V
0,5
0,4
0,3
0,2
0,1
0
I
0
200
400
600
800
1000
1200
$V_a$(V) 1400
$V_{g1}$=
+40V
+30V
+20V
+10V
PHILIPS
QE08/200

QE08/200

# PHILIPS




J

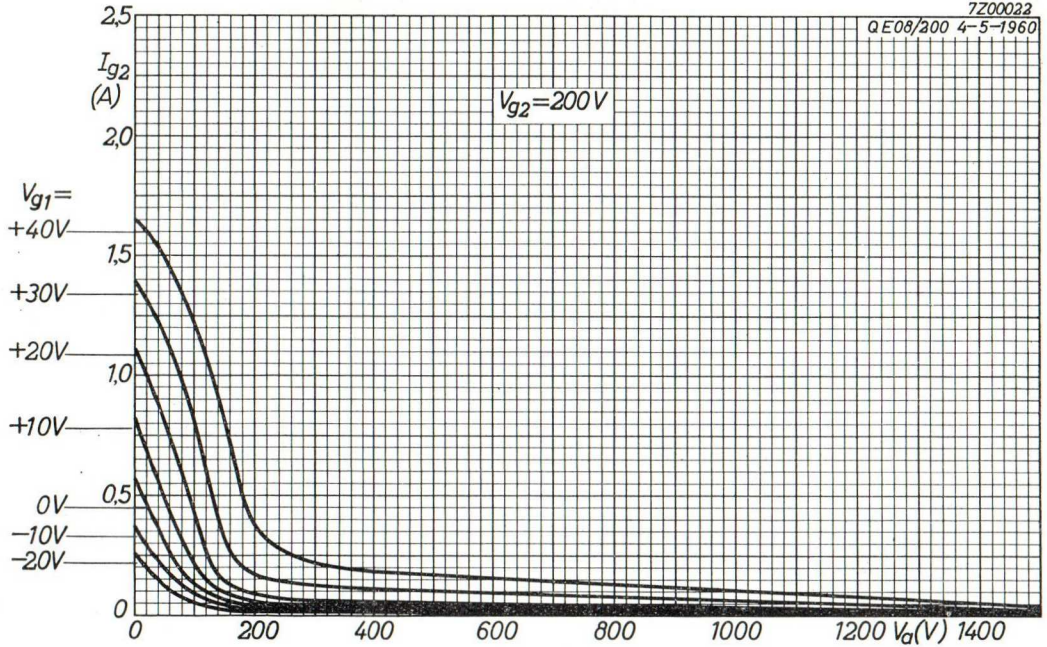



6.6.1960

K

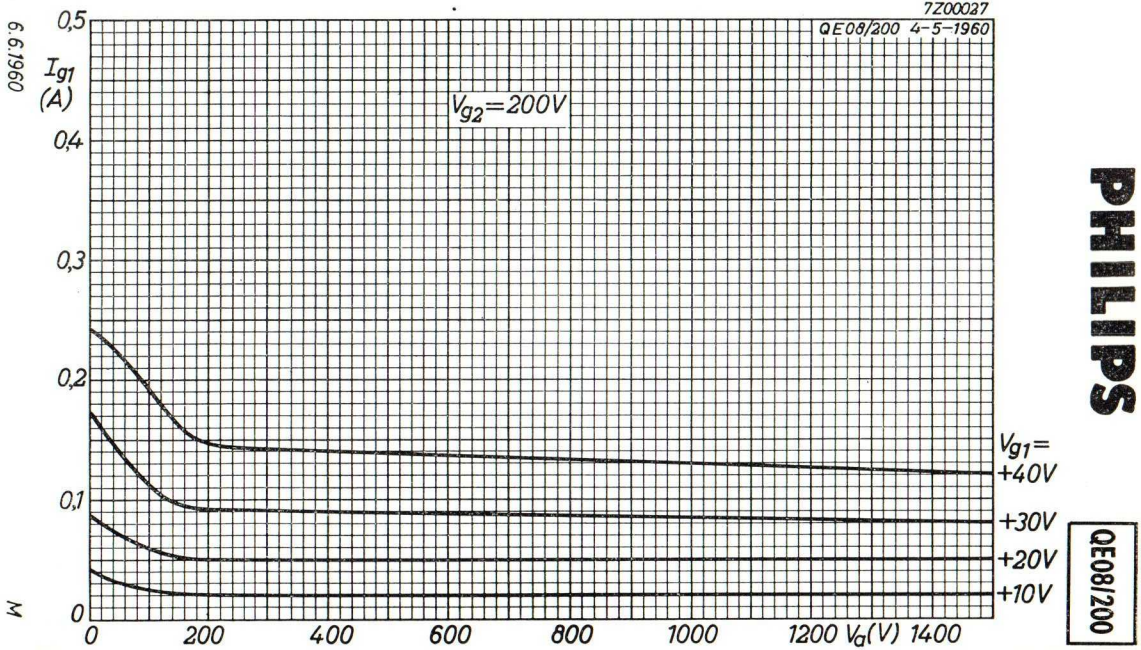
PHILIPS

QE08/200


7Z00022
QE08/200 4-5-1960
$I_{g2}$ (A)
$V_{g2}$=200V
$V_{g1}$=
+40V
+30V
+20V
+10V
0V
−10V
−20V
2,5
2,0
1,5
1,0
0,5
0
0
200
400
600
800
1000
1200
$V_a$(V)
1400



PHILIPS




6.9.1960

PHILIPS

QE08/200

M

# PHILIPS

**QE 08/200 H**

BEAMPOWER TETRODE for use as amplifier, oscillator, frequency multiplier or modulator in A.M., S.S.B. and F.M. transmitters

TETRODE À FAISCEAUX pour utilisation comme amplificatrice, oscillatrice, multiplicatrice de fréquence ou modulatrice dans des émetteurs A.M., à une bande latérale ou F.M.

BÜNDELTETRODE zur Verwendung als Verstärker, Oszillator, Frequenzverfielfacher oder Modulator in AM-, Einseitenband- oder FM-Sendern

| | |
|---|---|
| Heating : indirect | $V_f$ = 26,5 V |
| Chauffage: indirect | $I_f$ = 0,7 A |
| Heizung : indirekt | |

For further data and curves please refer to QE 08/200
Pour les autres données et les courbes voir QE 08/200
Für die übrigen Daten und Kurven siehe QE 08/200

V.H.F./U.H.F. TETRODE for use as H.F. amplifier, oscillator, frequency-multiplier and modulator at frequencies up to 500 Mc/s
TETRODE V.H.F./U.H.F. pour utilisation en amplificatrice et oscillatrice H.F., multiplicatrice de fréquence et modulatrice à des fréquences jusqu'à 500 MHz
VHF/UHF-TETRODE zur Verwendung als HF-Verstärker und Oszillator, Frequenzvervielfacher und Modulator bei Frequenzen bis zu 500 MHz

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

$V_f$ = 6,0 V
$I_f$ = 2,6 A
$T_h$ = min. 30 sec

Capacitances
Capacités
Kapazitäten

$C_a$ = 4,5 pF
$C_{g1}$ = 15,5 pF
$C_{ag1}$ = 0,03 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 5

$S \begin{cases} V_a = 500\ V \\ V_{g2} = 250\ V \\ I_a = 200\ mA \end{cases}$ = 12 mA/V

| λ | Freq. | C telegr. | | $C_{ag2}$ mod. | | AB mod | | |
|---|---|---|---|---|---|---|---|---|
| (cm) | (Mc/s) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ [3] (W) | $W_o$ [4] (W) |
| 182 | 165 | 1250 | 195 | 1000 | 140 | 1250 | 310 | 425 |
| | | 1000 | 150 | 800 | 100 | 1000 | 240 | 315 |
| | | 750 | 110 | 600 | 80 | 800 | 195 | 240 |
| | | 600 | 85 | 400 | 55 | 600 | 140 | 170 |
| 60 | 500 | 1250 | 140 [1] | | | | | |
| | | 1000 | 110 [1] | | | | | |
| | | 800 | 90 [1] | | | | | |
| | | 600 | 65 [1] | | | | | |
| | | | | Telev. class B | | | | |
| 140 | 216 | | | 1250 | 250 [2] | | | |
| | | | | 1000 | 200 [2] | | | |
| | | | | 750 | 135 [2] | | | |

[1] Useful output power in load
Puissance de sortie dans la charge
Nützliche Ausgangsleistung in der Belastung

[2][3][4] See page 3; voir page 3; siehe Seite 3

# PHILIPS

Cooling

Forced air through the radiator and in general to the base end of the tube. Air flow and heater voltage must be applied simultaneously.

| | |
|---|---|
| Seal temperature | max. 150°C |
| Air-system socket (air-system chimney included) | 40222[5]) |
| Air-system chimney (See page 4) | 56 590 81/40 |

The use of this air-system socket with chimney is recommended, since a standard Loctal socket does not ensure an adequate cooling of the base.
All four cathode connections should be used.

[5]) Socket type 40222 is intended for circuits where the cathode is at chassis potential.

Refroidissement

Air forcé par le radiateur et en général à la partie inférieure du tube. Le courant d'air et la tension de chauffage seront appliqués simultanément.

| | |
|---|---|
| Température des scellements | max. 150°C |
| Support de tube pour le système de ventilation (y incluse la cheminée) | 40222[5]) |
| Cheminée pour le système de ventilation (voir page 4) | 56 590 81/40 |

L'usage du support de tube 40222 avec la cheminée 56 590 81/40 est recommandé, un support Loctal normal n'assurant pas un refroidissement adéquat du culot du tube.
Il faut utiliser toutes les quatre connexions de cathode

[5]) Le support de tube 40222 est destiné pour des circuits dont la cathode a le potentiel du châssis.

Kühlung

Pressluft durch den Kühler und im allgemeinen auf die Unterseite der Röhre. Luftströmung und Heizspannung müssen gleichzeitig eingeschaltet werden.

| | |
|---|---|
| Temperatur der Einschmelzungen | max. 150°C |
| Röhrenfassung für die Ventilationsanlage (Lüftführungsring einbegriffen) | 40222[5]) |
| Luftführungsring für die Ventilationsanlage (siehe Seite 4) | 56 590 81/40 |

Da eine richtige Kühlung des Röhrenbodens von einem normalen Loctalfassung nicht gesichert ist, wird die Verwendung der Röhrenfassung 40222 mit dem Führungsring 56 590 81/40 empfohlen.
Alle vier Katodenanschlüsse müssen verwendet werden.

[5]) Die Fassung 40222 ist bestimmt für Schaltungen in denen die Katode das Chassispotential hat.

Cooling characteristics
Caractéristiques de refroidissement
Kühlungsdaten

The figures in this table apply to the simultaneous cooling of the radiator and the base, making use of the socket 40222 with chimney 56 590 81/40

Les nombres de cette liste s'appliquent au refroidissement simultané du radiateur et de la côté inférieure du tube, en utilisant le support 40222 avec la cheminée 56 590 81/40

Die Zahlen dieser Tafel gelten bei gleichzeitiger Kühlung des Kühlers und des Röhrenbodens, mit Verwendung der Fassung 40222 mit dem Schornstein 56 590 81/40

| Wa (W) | h (m) | ti (°C) | q ($m^3$/min) | pi (mm $H_2O$) |
|---|---|---|---|---|
| 150 | 0 | 35 | 0,220 | 15,0 |
| | 0 | 45 | 0,258 | 19,8 |
| | 1500 | 35 | 0,264 | 18,3 |
| | 3000 | 25 | 0,278 | 17,5 |

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

Net weight
Poids net 130 g
Nettogewicht

Shipping weight
Poids brut 300 g
Bruttogewicht

---

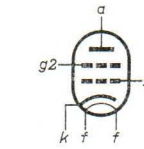
[2] During sync-pulse peak
Pendant la crête de l'impulsion de synchronisation
Während des Scheitels des Synchronisierungsimpulses

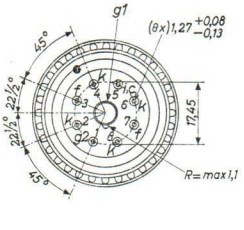
[3] Two tubes. Without grid current
Deux tubes. Sans courant de grille
Zwei Röhren. Ohne Gitterstrom

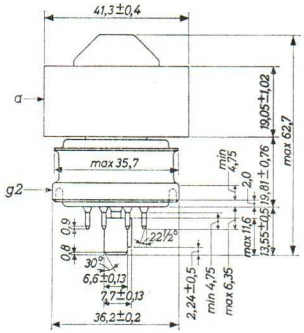
[4] Two tubes. With grid current
Deux tubes. Avec courant de grille
Zwei Röhren. Mit Gitterstrom

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm



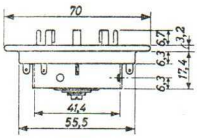



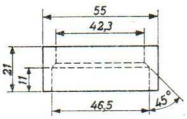




At higher frequencies the ring-surface terminal should be used for connecting the screen grid

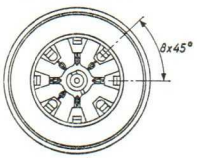
A des fréquences élevées la connexion superficielle annulaire sera utilisée pour connecter la grille-écran

Bei höheren Frequenzen muss zum Anschliessen des Schirmgitters der Oberflächenkontaktring benutzt werden




Chimney, cheminée, Luftführungsring
56 590 81/40




Socket, support, Fassung
40222

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

f = max. 500 Mc/s

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = max. | 1250 V | $V_{g2}$ | = max. | 300 V |
| $W_{ia}$ | = max. | 300 W | $W_{g2}$ | = max. | 12 W |
| $W_a$ | = max. | 150 W | $-V_{g1}$ | = max. | 250 V |
| $I_a$ | = max. | 250 mA | $W_{g1}$ | = max. | 2 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | $\geq$ | 180 | 180 | 180 | 180 cm |
| f | $\leq$ | 165 | 165 | 165 | 165 Mc/s |
| $V_a$ | = | 1250 | 1000 | 750 | 600 V |
| $V_{g2}$ | = | 250 | 250 | 250 | 250 V |
| $V_{g1}$ | = | -90 | -80 | -80 | -75 V |
| $V_{g1_p}$ | = | 105 | 95 | 95 | 90 V |
| $I_a$ | = | 200 | 200 | 200 | 200 mA |
| $I_{g2}$ | = | 20 | 30 | 37 | 37 mA |
| $I_{g1}$ | = | 10 | 10 | 10 | 10 mA |
| $W_{ig1}$[1]) | = | 0,8 | 0,7 | 0,7 | 0,7 W |
| $W_{g2}$ | = | 5 | 7,5 | 9,3 | 9,3 W |
| $W_{ia}$ | = | 250 | 200 | 150 | 120 W |
| $W_a$ | = | 55 | 50 | 40 | 35 W |
| $W_o$ | = | 195 | 150 | 110 | 85 W |
| $\eta$ | = | 78 | 75 | 73,5 | 71 % |

[1]) Driver output, circuit losses not included
Puissance de l'excitateur, ne pas y compris les pertes du circuit
Leistung der Steuerstufe, Kringverluste nicht einbegriffen

# PHILIPS

H.F. class C telegraphy (continued)
H.F. classe C télégraphie (continuation)
HF-Klasse C Telegraphie (Fortsetzung)

Operating conditions, single tube, coaxial cavity
Caractéristiques d'utilisation, tube simple, cavité coaxiale
Betriebsdaten, eine Röhre, koaxialer Hohlraum

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | $\geq$ | 60 | 60 | 60 | 60 cm |
| f | $\leq$ | 500 | 500 | 500 | 500 Mc/s |
| $V_a$ | = | 1250 | 1000 | 800 | 600 V |
| $V_{g2}$ | = | 250 | 250 | 250 | 250 V |
| $V_{g1}$ | = | -80 | -80 | -80 | -80 V |
| $I_a$ | = | 200 | 200 | 200 | 200 mA |
| $I_{g2}$ | = | 7 | 7 | 7 | 7 mA |
| $I_{g1}$ | = | 10 | 10 | 10 | 10 mA |
| $W_{ig1}$ | = | 10 | 10 | 10 | 10 W |
| $W_{g2}$ | = | 1,8 | 1,8 | 1,8 | 1,8 W |
| $W_{ia}$ | = | 250 | 200 | 160 | 120 W |
| $W_o$ | = | 140 | 110 | 90 | 65 W |
| $\eta$ | = | 56 | 55 | 56 | 54 % |

H.F. class C anode and screen-grid modulation
H.F. classe C modulation de l'anode et de la grille écran
HF-Klasse C Anoden- und Schirmgittermodulation

Screen-grid modulation 55% at 100% anode modulation. Self-modulation of the screen-grid by means of a series resistor or choke should not be applied

Modulation de la grille écran 55% à 100% modulation de l'anode. Auto-modulation de la grille écran au moyen d'une résistance ou d'une bobine n'est pas recommandée

Schirmgittermodulation 55% bei einer Anodenmodulation von 100%. Selbstmodulation des Schirmgitters mittels eines Reihenwiderstandes oder einer Reihendrossel wird nicht empfohlen



→

H.F. class C anode and screen-grid modulation (continued)
H.F. classe C modulation de l'anode et de grille écran (continuation)
HF-Klasse C Anoden- und Schirmgittermodulation (Fortsetzung)

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = max. | 1000 V | $V_{g2}$ | = max. | 300 V |
| $W_{ia}$ | = max. | 200 W | $W_{g2}$ | = max. | 12 W |
| $W_a$ | = max. | 100 W | $-V_{g1}$ | = max. | 250 V |
| $I_a$ | = max. | 200 mA | $W_{g1}$ | = max. | 2 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | $\geq$ | 180 | 180 | 180 | 180 | cm |
| f | $\leq$ | 165 | 165 | 165 | 165 | Mc/s |
| $V_a$ | = | 1000 | 800 | 600 | 400 | V |
| $V_{g2}$ | = | 250 | 250 | 250 | 250 | V |
| $V_{g1}$ | = | -105 | -100 | -95 | -90 | V |
| $V_{g1p}$ | = | 125 | 120 | 120 | 110 | V |
| $I_a$ | = | 200 | 200 | 200 | 200 | mA |
| $I_{g2}$ | = | 20 | 25 | 35 | 40 | mA |
| $I_{g1}$ | = | 15 | 10 | 8 | 7 | mA |
| $W_{ig1}$ | = | 2 | 1,5 | 1 | 1 | W |
| $W_{g2}$ | = | 5 | 6,3 | 8,8 | 10 | W |
| $W_{ia}$ | = | 200 | 160 | 120 | 80 | W |
| $W_a$ | = | 60 | 60 | 40 | 25 | W |
| $W_o$ | = | 140 | 100 | 80 | 55 | W |
| $\eta$ | = | 70 | 63 | 66 | 69 | % |
| m | = | 100 | 100 | 100 | 100 | % |
| $V_{g2_p}$ | = | 170 | 160 | 150 | 140 | V |
| $W_{mod}$ | = | 100 | 80 | 60 | 40 | W |

# PHILIPS

H.F. class B amplifier for television service, negative modulation, positive synchronisation
Amplificatrice H.F. classe B pour télévision, modulation négative, synchronisation positive
HF-Klasse B Verstärker für Fernsehsender, negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f = max. 220 Mc/s | | $I_a$ = max. | 250 mA |
| $V_a$ = max. | 1250 V | $W_a$ = max. | 150 W |
| $V_{g2}$ = max. | 400 V | $W_{g2}$ = max. | 12 W |
| $-V_{g1}$ = max. | 250 V | $W_{g1}$ = max. | 2 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | | = | 216 | 216 | 216 Mc/s |
| B | | = | 5 | 5 | 5 Mc/s |
| $V_a$ | | = | 1250 | 1000 | 750 V |
| $V_{g2}$ | | = | 300 | 300 | 300 V |
| $V_{g1}$ | | = | -70 | -65 | -60 V |
| $V_{g1p}$ | sync | = | 100 | 95 | 85 V |
| | black, noir, schwarz | = | 75 | 70 | 65 V |
| $I_a$ | sync | = | 305 | 330 | 335 mA |
| | black, noir, schwarz | = | 230 | 240 | 245 mA |
| $I_{g2}$ | sync | = | 45 | 45 | 50 mA |
| | black, noir, schwarz | = | 10 | 15 | 20 mA |
| $I_{g1}$ | sync | = | 25 | 20 | 15 mA |
| | black, noir, schwarz | = | 4 | 4 | 4 mA |
| $W_{ig1}$ | sync | = | 9 | 8 | 7 W |
| | black, noir, schwarz | = | 5,5 | 4,7 | 4,25 W |
| $W_{ia}$ | black, noir, schwarz | = | 290 | 240 | 185 W |
| $W_o$ | sync | = | 250 | 200 | 135 W |
| | black, noir, schwarz | = | 140 | 110 | 75 W |



→

L.F.class AB amplifier and modulator
Amplificatrice et modulatrice B.F. classe AB
NF-Verstärker und Modulator Klasse AB

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = max. | 1250 V | $W_{g2}$ | = max. | 12 | W |
| $W_{ia}$ | = max. | 300 W | $W_{g1}$ | = max. | 2 | W |
| $W_a$ | = max. | 150 W | $R_{g1}$ | = max. | 100 | kΩ[1]) |
| $I_a$ | = max. | 250 mA | | | | |
| $V_{g2}$ | = max. | 400 V | | | | |

Operating conditions, two tubes without grid current
Caractéristiques d'utilisation, deux tubes sans courant de grille
Betriebsdaten, zwei Röhren ohne Gitterstrom

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 1250 | 1000 | V |
| $V_{g2}$ | = | 300 | 300 | V |
| $V_{g1}$ | = | -48 | -47 | V |
| $R_{aa}$ | = | 7200 | 5850 | Ω |
| $V_{g1g1_p}$ | = | 0 96 | 0 94 | V |
| $I_a$ | = | 2x57,5 2x195 | 2x60 2x190 | mA |
| $I_{g2}$ | = | 0 2x20 | 0 2x30 | mA |
| $W_{g2}$ | = | 0 2x6 | 0 2x9 | W |
| $W_{ia}$ | = | 2x72 2x244 | 2x60 2x190 | W |
| $W_a$ | = | 2x72 2x89 | 2x60 2x70 | W |
| $W_o$ | = | 0 310 | 0 240 | W |
| $\eta$ | = | - 63,5 | - 63 | % |

[1]) Each tube
Chaque tube
Jede Röhre

L.F.class AB amplifier and modulator (continued)
Amplificatrice et modulatrice B.F. classe AB(continuation)
NF-Verstärker und Modulator Klasse AB(Fortsetzung)

Operating conditions, two tubes without grid current
Caractéristiques d'utilisation, deux tubes sans courant de grille
Betriebsdaten, zwei Röhren ohne Gitterstrom

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 800 | | 600 | | V |
| $V_{g2}$ | = | 300 | | 300 | | V |
| $V_{g1}$ | = | -47 | | -44 | | V |
| $R_{aa}$ | = | 4625 | | 3550 | | Ω |
| $V_{g1g1_p}$ | = | 0 | 94 | 0 | 88 | V |
| $I_a$ | = | 2x60 | 2x190 | 2x80 | 2x190 | mA |
| $I_{g2}$ | = | 0 | 2x32,5 | 0 | 2x32,5 | mA |
| $W_{g2}$ | = | 0 | 2x9,8 | 0 | 2x9,8 | W |
| $W_{ia}$ | = | 2x48 | 2x152 | 2x48 | 2x114 | W |
| $W_a$ | = | 2x48 | 2x55 | 2x48 | 2x44 | W |
| $W_o$ | = | 0 | 195 | 0 | 140 | W |
| $\eta$ | = | - | 64 | - | 61 | % |

Operating conditions, two tubes with grid current
Caractéristiques d'utilisation deux tubes à courant de grille
Betriebsdaten, zwei Röhren mit Gitterstrom

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 1250 | | 1000 | | V |
| $V_{g2}$ | = | 300 | | 300 | | V |
| $V_{g1}$ | = | -44 | | -43 | | V |
| $R_{aa}$ | = | 5600 | | 4600 | | Ω |
| $V_{g1g1_p}$ | = | 0 | 100 | 0 | 98 | V |
| $I_a$ | = | 2x90 | 2x238 | 2x82,5 | 2x247 | mA |
| $I_{g2}$ | = | 0 | 2x32,5 | 0 | 2x35 | mA |
| $I_{g1_p}$ | = | 0 | 10 | 0 | 10 | mA |
| $W_{ig1}$ | = | 0 | 2x0,037 | 0 | 2x0,037 | W |
| $W_{g2}$ | = | 0 | 2x10 | 0 | 2x10 | W |
| $W_{ia}$ | = | 2x112 | 2x297 | 2x82,5 | 2x247 | W |
| $W_a$ | = | 2x112 | 2x85 | 2x82,5 | 2x90 | W |
| $W_o$ | = | 0 | 425 | 0 | 315 | W |
| $\eta$ | = | - | 72 | - | 64 | % |

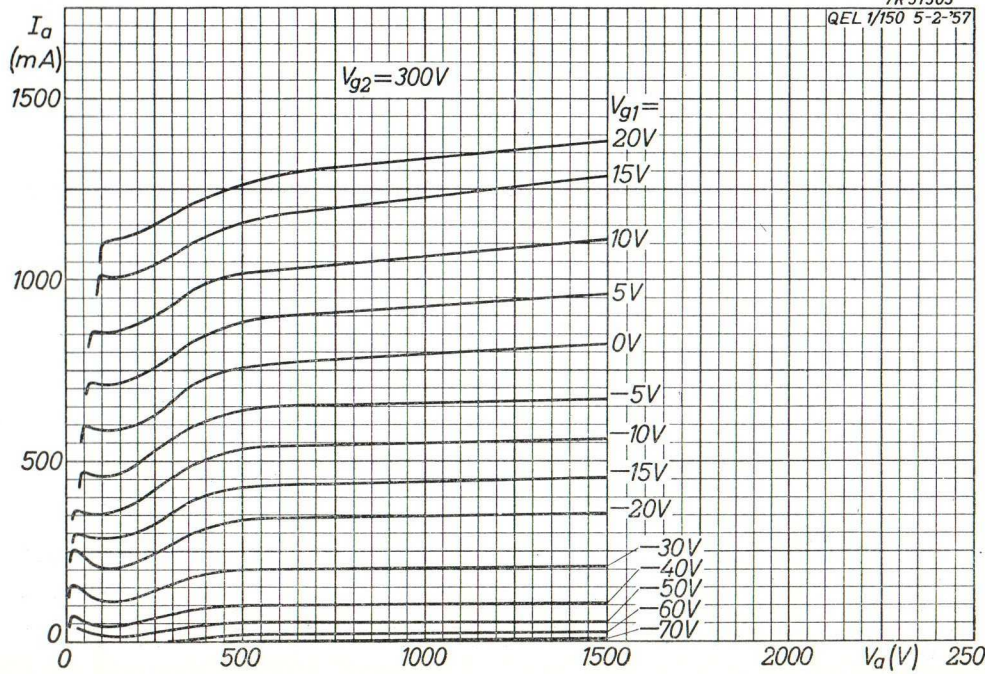


→

L.F.class AB amplifier and modulator (continued)
Amplificatrice et modulatrice B.F. classe AB(cont.)
NF-Verstärker und Modulator Klasse AB(Fortsetzung)

Operating conditions, two tubes with grid current
Caractéristiques d'utilisation, deux tubes à courant de grille
Betriebsdaten, zwei Röhren mit Gitterstrom

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 800 | | 600 | | V |
| $V_{g2}$ | = | 300 | | 300 | | V |
| $V_{g1}$ | = | -43 | | -41 | | V |
| $R_{aa}$ | = | 3500 | | 2600 | | Ω |
| $V_{g1g1_p}$ | = | 0 | 96 | 0 | 94 | V |
| $I_a$ | = | 2x80 | 2x245 | 2x92,5 | 2x243 | mA |
| $I_{g2}$ | = | 0 | 2x37,5 | 0 | 2x42,5 | mA |
| $I_{g1_p}$ | = | 0 | 10 | 0 | 10 | mA |
| $W_{ig1}$ | = | 0 | 2x0,037 | 0 | 2x0,037 | W |
| $W_{g2}$ | = | 0 | 2x11 | 0 | 2x12,7 | W |
| $W_{ia}$ | = | 2x64 | 2x196 | 2x55,5 | 2x146 | W |
| $W_a$ | = | 2x64 | 2x76 | 2x55,5 | 2x61 | W |
| $W_o$ | = | 0 | 240 | 0 | 170 | W |
| $\eta$ | = | - | 61 | - | 58 | % |



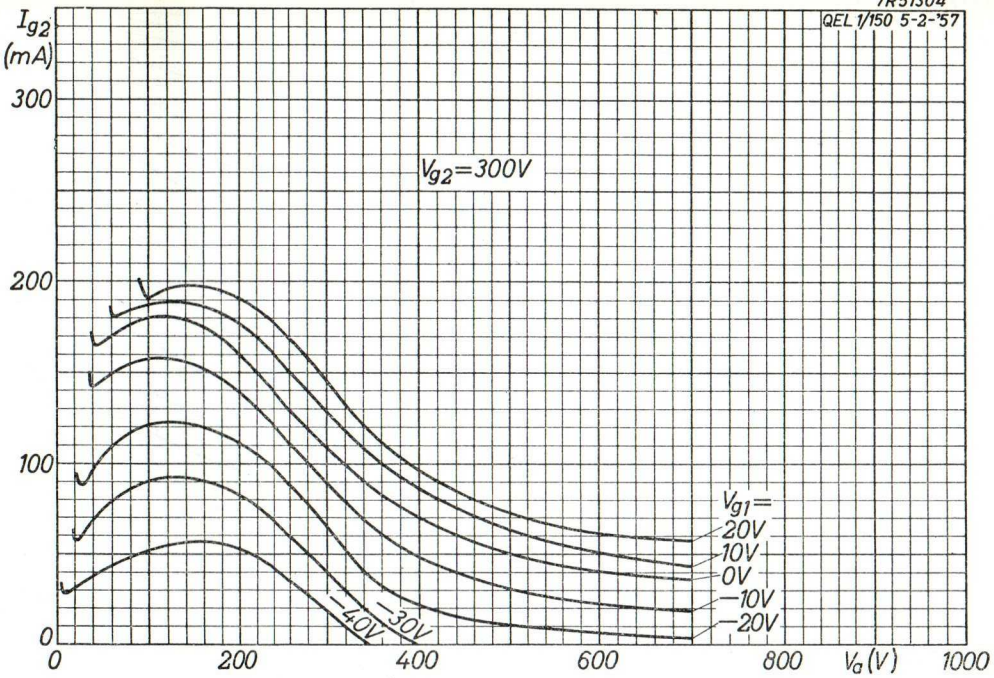

PHILIPS

QEL 1/150

2.2.1957

A

PHILIPS

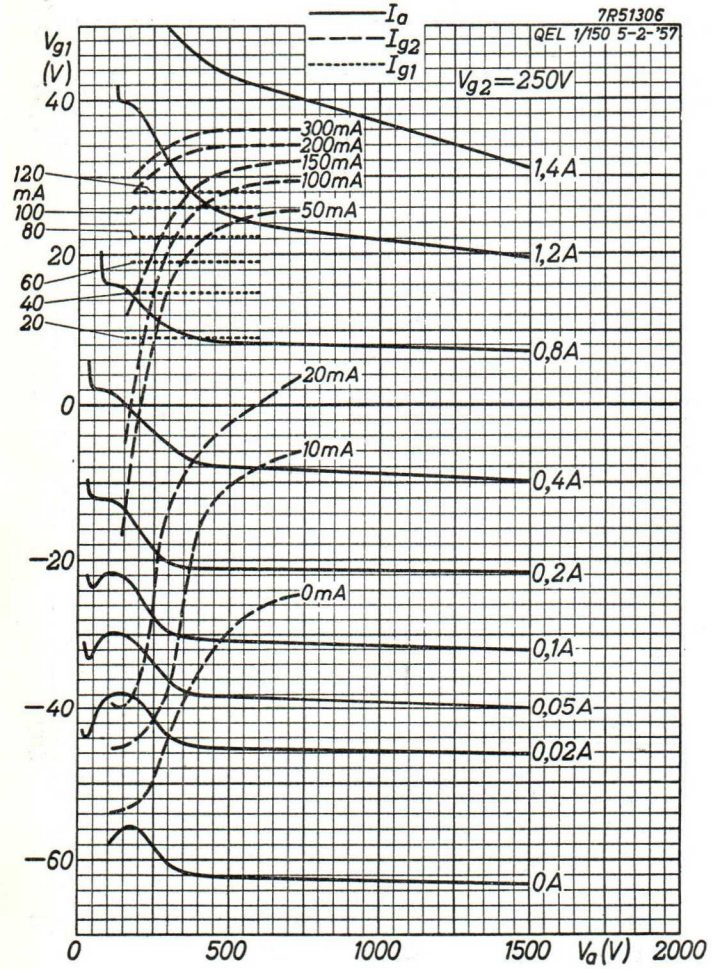

7R51304
QEL 1/150 5-2-'57
$I_{g2}$ (mA)
300
200
100
0
$V_{g2}$=300V
$V_{g1}$=
20V
10V
0V
−10V
−20V
−40V
−30V
0
200
400
600
800
$V_a$ (V)
1000

B

7R51305
QEL 1/150 5-2-57
$I_{g1}$ (mA)
150
100
50
0
0
200
400
600
800
1000
$V_a$(V)
$V_{g2}$=300V
$V_{g1}$=
20V
15V
10V
5V

QEL 1/150

# PHILIPS




D

V.H.F./U.H.F. TETRODE for use as H.F. amplifier, oscillator, frequency-multiplier and modulator at frequencies up to 500 Mc/s

TETRODE V.H.F./U.H.F. pour utilisation en amplificatrice et oscillatrice H.F., multiplicatrice de fréquence et modulatrice à des fréquences jusqu'à 500 MHz

VHF/UHF-TETRODE zur Verwendung als HF-Verstärker und Oszillator, Frequenzvervielfacher und Modulator bei Frequenzen bis zu 500 MHz

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd

Heating : indirect
Chauffage: indirect
Heizung : indirekt

Capacitances
Capacités
Kapazitäten

Typical characteristics
Caractéristiques types
Kenndaten

| | | |
|---|---|---|
| $V_f$ | = | 6,0 V[1]) |
| $I_f$ | = | 2,6 A |
| $T_w$ | = | min. 30 sec |
| $C_a$ | = | 4,5 pF |
| $C_{g_1}$ | = | 15,7 pF |
| $C_{ag_1}$ | < | 0,06 pF |
| $V_a$ | = | 500 V |
| $V_{g_2}$ | = | 250 V |
| $I_a$ | = | 200 mA |
| S | = | 12 mA/V |
| $\mu_{g_2g_1}$ | = | 5,2 |

| Freq | C telegr | | $C_{ag_2}$ mod | | B teleph | | B teleph SSB | |
|---|---|---|---|---|---|---|---|---|
| (Mc/s) | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| 175 | 2000 | 390 | 1500 | 235 | 2000 | 65 | 2000 | 300 |
| | 1500 | 280 | 1000 | 145 | 1500 | 50 | 1500 | 215 |
| | 1000 | 190 | 500 | 60 | 1000 | 30 | 1000 | 120 |
| | 500 | 70 | | | | | | |
| 500 | 2000 | 225[2]) | | | | | | |

| AB mod | |
|---|---|
| Va (V) | Wo[3]) (W) |
| 2000 | 600 |
| 1500 | 430 |
| 1000 | 240 |

[1]) See page 3; voir page 3; siehe Seite 3

[2]) Useful output power in the load
Puissance de sortie utile dans la charge
Nützliche Ausgangsleistung in der Belastung

[3]) Two tubes
Deux tubes
Zwei Röhren

# PHILIPS

Temperatures; températures; Temperaturen

Temperature of ceramic to metal seals
Température des joints céramique-métal max. 250 °C
Temperatur des Keramik zu Metalleinschmelzungen

Temperature of glass to metal seals
Température des joints verre-métal max. 175 °C
Temperatur der Glas zu Metalleinschmelzungen

Temperature of anode core
Température du noyau anodique max. 250 °C
Temperatur des Anodenkerns

Socket; support; Fassung

Air system socket
(Air system chimney included)
Support de tube pour le système de ventilation (y incluse la cheminée) 40222 [1])
Röhrenfassung für die Ventilationsanlage
(Luftführungsring einbegriffen)

Air system chimney (see page 4)
Cheminée pour le système de ventilation (voir page 4) 56 590 81/40
Luftführungsring (siehe Seite 4)

Cooling; refroidissement; Kühlung

Forced air through the radiator and in general to the base end of the tube.
The use of the socket 40222 with chimney is recommended since a standard loctal socket does not ensure an adequate cooling of the base.
Air flow and heater voltage must be applied simultaneously.
All four cathode connections should be used

Air forcé par le radiateur et, en général, à la partie inférieure du tube.
L'utilisation du support 40222 avec la cheminée est recommandée, un support loctal normal n'assurant pas un refroidissement adéquat du culot.
Le courant d'air et la tension de chauffage seront appliqués simultanément.
Il faut utiliser toutes les quatre connexions de cathode

Pressluft durch den Kühler und im allgemeinen auf die Unterseite der Röhre. Da eine richtige Kühlung des Röhrenbodens von einem normalen Loctalfassung nicht gesichert ist, wird die Verwendung der Fassung 40222 mit Luftführungsring empfohlen.
Luftkühlung und Heizspannung müssen gleichzeitig eingeschaltet werden.
Alle vier Katodenanschlüsse müssen verwendet werden

[1]) Intended for circuits where the cathode is at chassis potential
Destiné pour des circuits dont la cathode a le potentiel du châssis
Bestimmt für Schaltungen in denen die Katode das Chassispotential hat

Cooling characteristics
Caractéristiques de refroidissement
Kühlungsdaten

The figures apply to the simultaneous cooling of the radiator and the base, making use of the socket 40222 with chimney
Les nombres s'appliquent au refroidissement simultané du radiateur et le culot du tube en utilisant le support 40222 avec la cheminée
Die Zahlen gelten bei gleichzeitiger Kühlung des Kühlers und des Röhrenbodens, mit Verwendung der Fassung 40222 mit dem Luftführungsring

| $W_a$ (W) | h (m) | $t_i$ ($^oC$) | q ($m^3$/min) | $p_i$ (mm $H_2O$) |
|---|---|---|---|---|
| 250 | 0 | 20 | 0,11 | 6,4 |

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

Net weight
Poids net 120 g
Nettogewicht

Shipping weight
Poids brut 300 g
Bruttogewicht

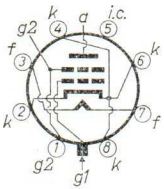


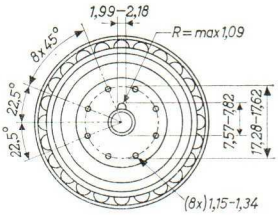
[1]) When the tube is driven to max. input as a class C amplifier, but not as a frequency multiplier, the heater voltage should be reduced according to the table below
Lorsque le tube est utilisé en amplificateur classe C (mais ne pas en multiplicateur de fréquence) avec puissance d'entrée max., la tension de chauffage doit être dimenuée selon la table sous-mentionnée
Wenn die Röhre als Klasse C Verstärker (aber nicht als Frequenzvervielfacher) mit max. Eingangsleistung verwendet wird, muss die Heizspannung nach untenstehender Tabelle verringert werden

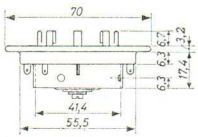
| f | ≦ 300 Mc/s | 300-400 Mc/s | 400-500 Mc/s |
|---|---|---|---|
| $V_f$ | 6 V | 5,75 V | 5,5 V |

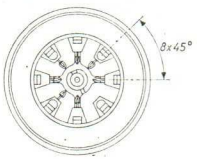
# PHILIPS

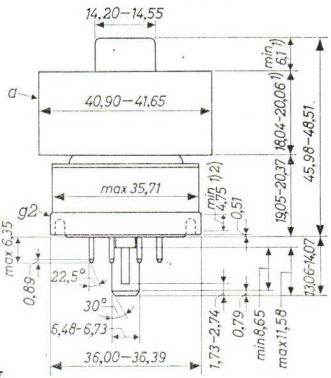
Dimensions in mm
Dimensions en mm
Abmessungen in mm



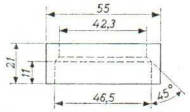




Socket, support, Fassung
40222




Chimney
Cheminée 56 590 81/40
Luftführungsring

1) Contact surface
Surface de contact
Kontaktfläche

2) Screen grid contact at the outer cylindrical surface only
Contact de la grille écran seulement à la surface cylindrique extérieure
Schirmgitterkontaktfläche nur an der Aussenseite

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

f = max. 500 Mc/s

| | | | |
|---|---|---|---|
| $V_a$ | = max. 2000 V | $V_{g_2}$ | = max. 300 V |
| $W_{ia}$ | = max. 500 W | $W_{g_2}$ | = max. 12 W |
| $W_a$ | = max. 250 W | $-V_{g_1}$ | = max. 250 V |
| $I_a$ | = max. 250 mA | $W_{g_1}$ | = max. 2 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| f | = | 175 | 175 | 175 | 175 | 500 | Mc/s |
| $V_a$ | = | 2000 | 1500 | 1000 | 500 | 2000 | V |
| $V_{g_2}$ | = | 250 | 250 | 250 | 250 | 300 | V |
| $V_{g_1}$ | = | -90 | -90 | -90 | -90 | -90 | V |
| $V_{g_1p}$ | = | 112 | 112 | 114 | 114 | - | V |
| $I_a$ | = | 250 | 250 | 250 | 250 | 250 | mA |
| $I_{g_2}$ | = | 19 | 21 | 38 | 45 | 10 [1] | mA |
| $I_{g_1}$ | = | 26 | 28 | 31 | 35 | 25 [1] | mA |
| $W_{ig_1}$ | = | 2,9 | 3,2 | 3,5 | 4 | - | W |
| $W_{g_2}$ | = | 4,75 | 5,25 | 9,5 | 8,75 | 3 | W |
| $W_{ia}$ | = | 500 | 375 | 250 | 125 | 500 | W |
| $W_a$ | = | 110 | 95 | 60 | 55 | - | W |
| $W_o$ | = | 390 | 280 | 190 | 70 | 225 [1] | W |
| $\eta$ | = | 78 | 75 | 76 | 56 | - | % |

[1]) Measured values for a typical circuit having an efficiency of about 75 %
Valeurs mesurées dans un circuit avec un rendement d'environ 75 %
Werte gemessen in einer Schaltung mit einem Wirkungsgrad von etwa 75 %

# PHILIPS

H.F. class C anode and screen-grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF-Klasse C Anoden-und Schirmgittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. 1500 V | $V_{g_2}$ | = max. 300 V |
| $W_{ia}$ | = max. 300 W | $W_{g_2}$ | = max. 12 W |
| $W_a$ | = max. 165 W | $-V_{g_1}$ | = max. 250 V |
| $I_a$ | = max. 200 mA | $W_{g_1}$ | = max. 2 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = | 175 | 175 | 175 Mc/s |
| $V_a$ | = | 1500 | 1000 | 500 V |
| $V_{g_2}$ | = | 250 | 250 | 250 V |
| $V_{g_1}$ | = | -100 | -100 | -100 V |
| $V_{g_{1p}}$ | = | 117 | 117 | 118 V |
| $I_a$ | = | 200 | 200 | 200 mA |
| $I_{g_2}$ | = | 20 | 22 | 31 mA |
| $I_{g_1}$ | = | 14 | 14 | 15 mA |
| $W_{ig_1}$ | = | 1,7 | 1,7 | 1,8 W |
| $W_{g_2}$ | = | 5 | 5,5 | 7,75 W |
| $W_{ia}$ | = | 300 | 200 | 100 W |
| $W_a$ | = | 65 | 55 | 40 W |
| $W_o$ | = | 235 | 145 | 60 W |
| $\eta$ | = | 78 | 72,5 | 60 % |
| m | = | 100 | 100 | 100 % |
| $W_{mod}$ | = | 150 | 100 | 50 W |

H.F. class B telephony
H.F. classe B téléphonie
HF-Klasse B Telephonie

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = max. | 2000 V | $V_{g_2}$ | = max. | 400 V |
| $W_{ia}$ | = max. | 500 W | $W_{g_2}$ | = max. | 12 W |
| $W_a$ | = max. | 250 W | $W_{g_1}$ | = max. | 2 W |
| $I_a$ | = max. | 250 mA | | | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = | 175 | 175 | 175 | Mc/s |
| $V_a$ | = | 2000 | 1500 | 1000 | V |
| $V_{g_2}$ | = | 350 | 350 | 350 | V |
| $V_{g_1}$ | = | -55 | -55 | -55 | mA |
| $V_{g_1p}$ | = | 25 | 25 | 25 | V |
| $I_a$ | = | 100 | 100 | 100 | mA |
| $I_{g_2}$ | = | -4 | -3 | -3 | mA |
| $W_{g_2}$ | = | 1,4 | 1 | 1 | W |
| $W_{i_a}$ | = | 200 | 150 | 100 | W |
| $W_a$ | = | 135 | 100 | 70 | W |
| $W_o$ | = | 65 | 50 | 30 | W |
| $\eta$ | = | 32,5 | 33 | 30 | % |

# PHILIPS

H.F. class B telephony, single side band
H.F. classe B téléphonie à une bande latérale
HF-Klasse B Einseitenband

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| f | = max. | 500 Mc/s |
| $V_a$ | = max. | 2000 V |
| $W_{ia}$ | = max. | 500 W |
| $W_a$ | = max. | 250 W |
| $I_a$ | = max. | 250 mA |
| $V_{g_2}$ | = max. | 400 V |
| $W_{g_2}$ | = max. | 12 W |
| $-V_{g_1}$ | = max. | 250 V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| f | = | 175 | | | 175 | | | Mc/s |
| $V_a$ | = | 2000 | | | 1500 | | | V |
| $V_{g2}$ | = | 300 | | | 300 | | | V |
| $V_{g_1}$ | = | -47 | | | -45 | | | V |
| $R_{a\sim}$ | = | 4200 | | | 2900 | | | Ω |
| $V_{g_{1p}}$ | = | 0 | 47[1] | 47[2] | 0 | 45[1] | 45[2] | V |
| $I_a$ | = | 75 | 250 | 160 | 75 | 250 | 165 | mA |
| $I_{g_2}$ | = | -1 | -7 | -5 | -2 | -4 | -5 | mA |
| $I_{g_1}$ | = | 0 | 0 | 0 | 0 | 0 | 0 | mA |
| $W_{ia}$ | = | 150 | 500 | 320 | 115 | 375 | 250 | W |
| $W_{ig1}$ | = | 0 | 0 | 0 | 0 | 0 | 0 | W |
| $W_a$ | = | 150 | 200 | 170 | 115 | 155 | 140 | W |
| $W_o$ | = | 0 | 300 | 150 | 0 | 220 | 110 | W |
| $W_o$ pep[3] | = | — | — | 300 | — | — | 220 | W |
| $d_3$ [4] | = | — | — | -32 | — | — | -31 | dB |

[1]) Single tone modulation
Modulation à une fréquence
Eintonmodulation

[2]) Two tone modulation
Modulation à deux fréquences
Zweitonmodulation

[3])[4]) See page 9, voir page 9, siehe Seite 9.

H.F. class B telephony, single side band (continued)
H.F. classe B téléphonie à une bande latérale (suite)
HF-Klasse B Einseitenband (Fortsetzung)

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| $f$ | = | | 175 | | Mc/s |
| $V_a$ | = | | 1000 | | V |
| $V_{g2}$ | = | | 315 | | V |
| $V_{g1}$ | = | | -44,5 | | V |
| $R_{a\sim}$ | = | | 1850 | | Ω |
| $V_{g1p}$ | = | 0 | 44,5[1]) | 44,5[2]) | V |
| $I_a$ | = | 100 | 250 | 180 | mA |
| $I_{g2}$ | = | -4 | 20 | 0 | mA |
| $I_{g1}$ | = | 0 | 0 | 0 | mA |
| $W_{ia}$ | = | 100 | 250 | 180 | W |
| $W_{ig1}$ | = | 0 | 0 | 0 | W |
| $W_a$ | = | 100 | 120 | 115 | W |
| $W_o$ | = | 0 | 130 | 65 | W |
| $W_{o\ pep}$[3]) | = | — | — | 130 | W |
| $d_3$ [4]) | = | — | — | -30 | dB |

[3]) Peak envelope power
Puissance à la crête de l'enveloppe
Leistung beim Scheitel der Umhüllungskurve

[4]) Third harmonic distortion
Distorsion par la troisième harmonique
Verzerrung vom dritten Harmonischen

# PHILIPS

L.F. class AB amplifier and modulator
Amplificatrice et modulatrice B.F. classe AB
NF-Verstärker und Modulator Klasse AB

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = max. 2000 V | $V_{g_2}$ | = max. | 400 | V |
| $W_{i_a}$ | = max. 500 W | $W_{g_2}$ | = max. | 12 | W |
| $W_a$ | = max. 250 W | $W_{g_1}$ | = max. | 2 | W |
| $I_a$ | = max. 250 mA | $R_{g_1}$ | = max. | 100 | kΩ [1] |

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

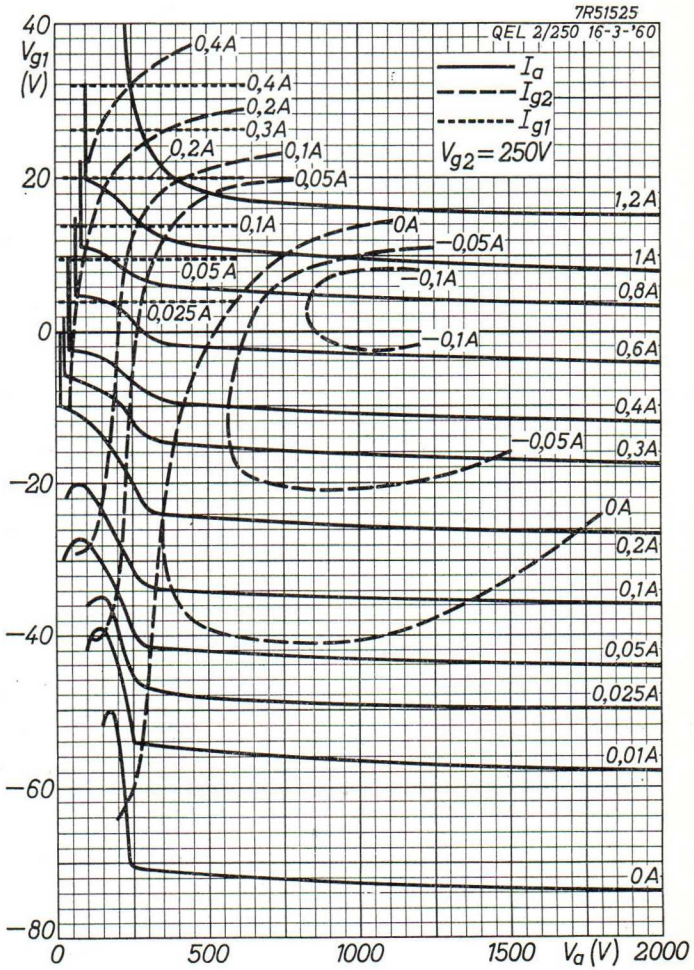
| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 2000 | | 1500 | | V |
| $V_{g_2}$ | = | 350 | | 350 | | V |
| $V_{g_1}$ | = | -55 | | -55 | | V |
| $R_{aa_\sim}$ | = | 9500 | | 6200 | | Ω |
| $V_{g_1g_{1p}}$ | = | 0 | 100 | 0 | 100 | V |
| $I_a$ | = | 2x100 | 2x250 | 2x100 | 2x250 | mA |
| $I_{g_2}$ | = | 0 | 2x5 | 0 | 2x8 | mA |
| $W_{g_2}$ | = | 0 | 2x1,75 | 0 | 2x2,8 | W |
| $W_{i_a}$ | = | 2x200 | 2x500 | 2x150 | 2x375 | W |
| $W_a$ | = | 2x200 | 2x200 | 2x150 | 2x160 | W |
| $W_o$ | = | 0 | 600 | 0 | 430 | W |
| $\eta$ | = | - | 60 | - | 57 | % |

[1]) Each tube
Chaque tube
Jede Röhre

L.F. class AB amplifier and modulator (continued)
Amplificatrice et modulatrice B.F. classe AB (suite)
NF-Verstärker und Modulator Klasse AB (Fortsetzung)

Operating conditions (continued)
Caractéristiques d'utilisation (suite)
Betriebsdaten (Fortsetzung)

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | 1000 | | V |
| $V_{g_2}$ | = | 350 | | V |
| $V_{g_1}$ | = | -55 | | V |
| $R_{aa\sim}$ | | 3500 | | Ω |
| $V_{g_1g_{1p}}$ | = | 0 | 100 | V |
| $I_a$ | = | 2x100 | 2x250 | mA |
| $I_{g_2}$ | = | 0 | 2x10 | mA |
| $W_{g_2}$ | = | 0 | 2x3,5 | W |
| $W_{i_a}$ | = | 2x100 | 2x250 | W |
| $W_a$ | = | 2x100 | 2x130 | W |
| $W_o$ | = | 0 | 240 | W |
| $\eta$ | = | - | 48 | % |

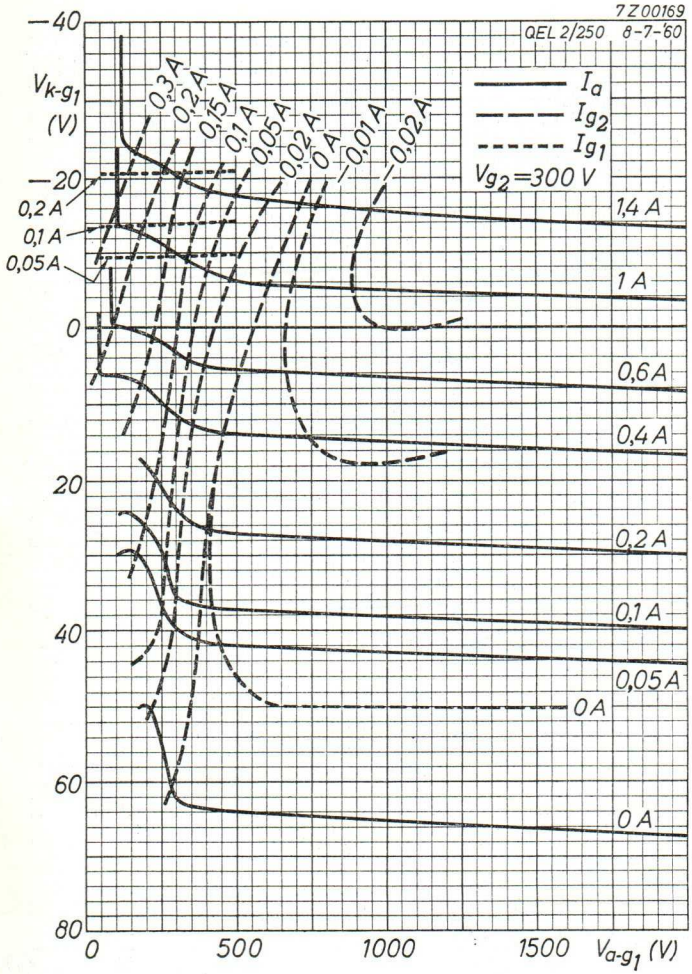

7R51525
QEL 2/250 16-3-'60
$I_a$
$I_{g2}$
$I_{g1}$
$V_{g2} = 250V$
$V_{g1}$ (V)
40
20
0
−20
−40
−60
−80
0
500
1000
1500
$V_a$ (V)
2000
0,4A
0,4A
0,2A
0,3A
0,2A
0,1A
0,05A
0,1A
0A
−0,05A
0,05A
−0,1A
0,025A
−0,1A
−0,05A
0A
1,2A
1A
0,8A
0,6A
0,4A
0,3A
0,2A
0,1A
0,05A
0,025A
0,01A
0A

7.7.1960

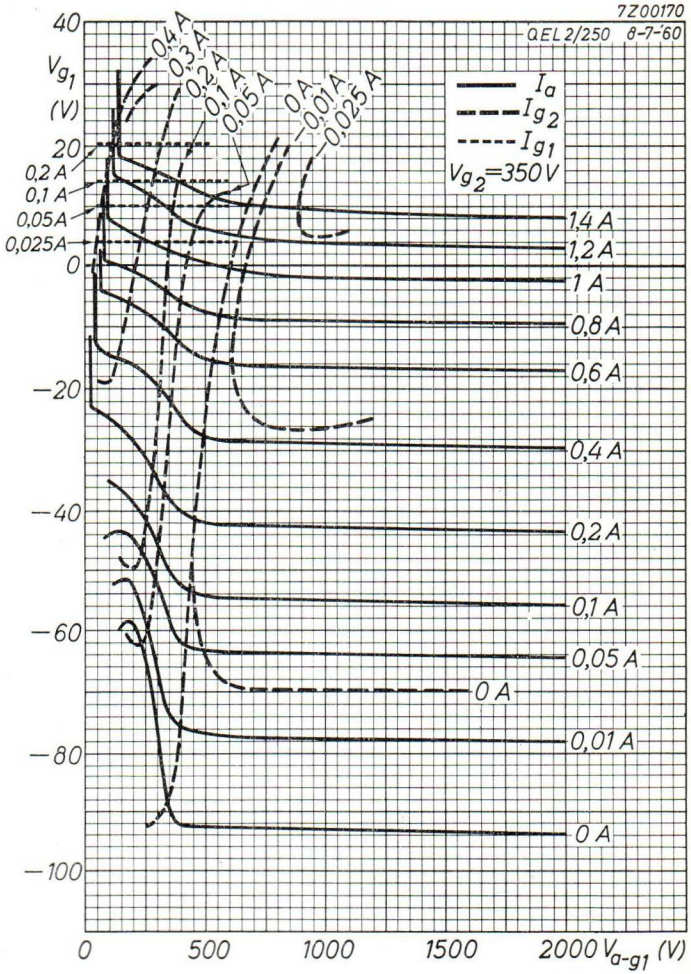
A

QEL 2/250

# PHILIPS




B


7Z00170
QEL 2/250 8-7-60
$V_{g_1}$ (V)
40
20
0
−20
−40
−60
−80
−100
0,4 A
0,3 A
0,2 A
0,1 A
0,05 A
0 A
0,01 A
0,025 A
$I_a$
$I_{g_2}$
$I_{g_1}$
$V_{g_2}$=350 V
0,2 A
0,1 A
0,05 A
0,025 A
1,4 A
1,2 A
1 A
0,8 A
0,6 A
0,4 A
0,2 A
0,1 A
0,05 A
0 A
0,01 A
0 A
0
500
1000
1500
2000 $V_{a-g1}$ (V)

# PHILIPS

**QQC 04/15**

DOUBLE TETRODE for use as H.F. amplifier or oscillator, frequency multiplier or modulator
DOUBLE TETRODE pour utilisation en amplificatrice ou oscillatrice H.F., multiplicatrice de fréquence ou modulatrice
DOPPELTETRODE zur Verwendung als HF-Verstärker oder Oszillator, Frequenzvervielfacher oder Modulator

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

| | | |
|---|---|---|
| $V_f$ = | 3-3,15[1]) | 6-6,3 V[1]) |
| $I_f$ = | 1,36 | 0,68 A |

Heating : direct
Chauffage: direct
Heizung : direkt

Pins
Broches 3-(1+5) 1-5
Stifte

Capacitances
Capacités
Kapazitäten

per system
par système
pro System

in push-pull
en push-pull
in Gegentakt

$C_a$ = 3,3 pF $C_o$ = 1,7 pF
$C_{g1}$ = 8,5 pF $C_i$ = 5,7 pF
$C_{ag1}$ = 0,05 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ = 7,5
$S$[3]) ($I_a$= 20 mA) = 2 mA/V

| λ | Freq. | C telegr. | | | Cag2 mod. | | | B mod | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$[2]) (W) | | $V_a$ (V) | $W_o$[2]) (W) | | $V_a$ (V) | $W_o$ (W) |
| | | | CCS | ICAS | | CCS | ICAS | C.C.S | |
| 5 | 60 | 600 | 26,6 | 35 | 450 | 17,5 | | 450 | 18 |
| | | 400 | 17,6 | 23,2 | 400 | 15,4 | | 400 | 17 |
| | | 250 | 10,6 | 14,0 | 250 | 6,2 | 8,2 | 350 | 16 |
| 1,6 | 186 | 600 | 25,6 | 33,6 | 250 | 6,0 | 7,8 | 250 | 9 |
| | | 400 | 16,8 | 22,0 | | | | I.C.A.S | |
| | | 250 | 10,2 | 13,2 | | | | 600 | 28,2 |
| | | C fr.mult. | | | | | | | |
| 4,8/1,6 | 62/186 | 400 | 7,2 | 10 | tripler | | | | |
| | | 250 | 4,6 | 6,2 | tripleur | | | | |
| | | | | | Verdreifacher | | | | |
| 3,2/1,6 | 93/186 | 400 | 6,5 | 8,0 | doubler | | | | |
| | | 250 | 4,0 | 4,9 | doubleur 3) | | | | |
| | | | | | Verdoppler | | | | |

[1]) Nominal values; valeurs nominales; Nennwerte

[2]) CCS = continous service; service continu; Dauerbetrieb

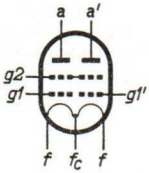
ICAS = intermittent service; service intermittent; aussetzender Betrieb

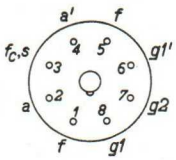
[3]) One system; un système; ein System

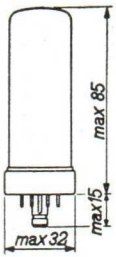
# PHILIPS

| | | |
|---|---|---|
| Pin temperature<br>Temp. des broches<br>Stiftentemperatur | = max. | 100 °C |
| Bulb temperature<br>Temp. de l'ampoule<br>Kolbentemperatur | = max. | 200 °C |

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: Loctal

Socket
Support 40213
Fassung

Mounting position: vertical with base up or down
Horizontal with pins 1 and 5 in one horizontal plane

Montage : vertical avec le culot en haut ou en bas
Horizontal avec les broches 1 et 5 situées dans le même plan horizontal

Einbau : senkrecht mit Sockel oben oder unten
Waagerecht mit den Stiften 1 und 5 in einer waagerechten Ebene

Net weight
Poids net 40 g
Nettogewicht

Shipping weight
Poids brut 55 g
Bruttogewicht

H.F. class C telegraphy, two systems in push-pull
H.F. classe C télégraphie, deux systèmes en push-pull
HF Klasse C Telegraphie, zwei Systeme in Gegentakt

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| f = max. 186 Mc/s | | f = max. 300 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 600 V | $V_a$ | = max. 450 V |
| $W_{ia}$ | = max. 2x18 W | $W_{ia}$ | = max. 2x9 W |
| $W_a$ | = max. 2x6 W | | |
| $I_a$ | = max. 2x30 mA | | |
| $V_{g2}$ | = max. 250 V | | |
| $W_{g2}$ | = max. 7 W | | |
| $-V_{g1}$ | = max. 200 V | | |
| $I_{g1}$ | = max. 2x5 mA | | |

Operating conditions; continuous service
C.C.S. Caractéristiques d'utilisation; service continu
Betriebsdaten; Dauerbetrieb

| | | | | |
|---|---|---|---|---|
| f | = | 60 | 60 | 60 Mc/s |
| $V_a$ | = | 600 | 400 | 250 V |
| $V_{g2}$ | = | 200 | 200 | 175 V |
| $V_{g1}$ | = | -80 | -80 | -70 V |
| $I_a$ | = | 2x30 | 2x30 | 2x30 mA |
| $I_{g2}$ | = | 6 | 6 | 6,5 mA |
| $I_{g1}$ | = | 2x1,0 | 2x1,2 | 2x1,8 mA |
| $V_{g1g1'p}$ | = | 210 | 210 | 210 V |
| $W_{ig1}$ | = | 2x0,1 | 2x0,11 | 2x0,17 W |
| $W_{g2}$ | = | 1,2 | 1,2 | 1,1 W |
| $W_{ia}$ | = | 2x18 | 2x12 | 2x7,5 W |
| $W_a$ | = | 2x4,7 | 2x3,2 | 2x2,2 W |
| $W_o$ | = | 26,6 | 17,6 | 10,6 W |
| $\eta$ | = | 74 | 73 | 71 % |

H.F. class C telegraphy, two systems in push-pull; continued
H.F. classe C télégraphie, deux systèmes en push-pull; continuation
HF Klasse C Telegraphie, zwei Systeme in Gegentakt; Fortsetzung

C.C.S. Operating conditions; continuous service
Caractéristiques d'utilisation; service continu
Betriebsdaten; Dauerbetrieb

| | | | | |
|---|---|---|---|---|
| $f$ | = | 186 | 186 | 186 Mc/s |
| $V_a$ | = | 600 | 400 | 250 V |
| $V_{g1}$ | = | -80 | -80 | -70 V |
| $V_{g2}$ | = | 200 | 200 | 175 V |
| $I_a$ | = | 2x30 | 2x30 | 2x30 mA |
| $I_{g1}$ | = | 2x1,0 | 2x1,0 | 2x1,5 mA |
| $I_{g2}$ | = | 3,0 | 3,5 | 4,5 mA |
| $V_{g1g1'p}$ | = | 210 | 210 | 220 V |
| $W_{ig1}$ | = | 2x0,1 | 2x0,1 | 2x0,15 W |
| $W_{g2}$ | = | 0,6 | 0,7 | 0,8 W |
| $W_{ia}$ | = | 2x18 | 2x12 | 2x7,5 W |
| $W_a$ | = | 2x5,2 | 2x3,6 | 2x2,4 W |
| $W_o$ | = | 25,6 | 16,8 | 10,2 W |
| $\eta$ | = | 71[1]) | 70 | 68 % |

I.C.A.S. Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| $f$ = max. 186 Mc/s | | $f$ = max. 300 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 600 V | $V_a$ = max. | 450 V |
| $W_{ia}$ = max. | 2x24 W | $W_{ia}$ = max. | 2x12 W |
| $W_a$ = max. | 2x8 W | | |
| $I_a$ = max. | 2x40 mA | | |
| $V_{g2}$ = max. | 250 V | | |
| $W_{g2}$ = max. | 7 W | | |
| $-V_{g1}$ = max. | 200 V | | |
| $I_{g1}$ = max. | 2x5 mA | | |

1) In order to prevent overheating a low velocity air flow should be directed on the bulb and the base
Afin de prévenir le surchauffage il faut diriger un léger courant d'air sur l'ampoule et le culot
Zur Vermeidung einer Überhitzung ist ein schwacher Lufstrom auf den Kolben und den Sockel notwendig

H.F. class C telegraphy, two systems in push-pull; continued
H.F. classe C télégraphie, deux systèmes en push-pull; continuation
HF Klasse C Telegraphie, zwei Systeme in Gegentakt; Fortsetzung

Operating conditions; intermittent service
I.C.A.S. Caractéristiques d'utilisation; service intermittent
Betriebsdaten; aussetzender Betrieb

| | | | | | |
|---|---|---|---|---|---|
| $f$ | = | 60 | 60 | 60 | Mc/s |
| $V_a$ | = | 600 | 400 | 250 | V |
| $V_{g2}$ | = | 200 | 200 | 175 | V |
| $V_{g1}$ | = | -80 | -80 | -70 | V |
| $I_a$ | = | 2x40 | 2x40 | 2x40 | mA |
| $I_{g2}$ | = | 5,5 | 6,0 | 7,5 | mA |
| $I_{g1}$ | = | 2x1,2 | 2x2,0 | 2x2,5 | mA |
| $V_{g1g1'p}$ | = | 220 | 220 | 230 | V |
| $W_{ig1}$ | = | 2x0,12 | 2x0,22 | 2x0,26 | W |
| $W_{g2}$ | = | 1,1 | 1,2 | 1,3 | W |
| $W_{ia}$ | = | 2x24 | 2x16 | 2x10 | W |
| $W_a$ | = | 2x6,5 | 2x4,4 | 2x3,0 | W |
| $W_o$ | = | 35 | 23,2 | 14,0 | W |
| $\eta$ | = | 73 | 72,5 | 70 | % |
| $f$ | = | 186 | 186 | 186 | Mc/s |
| $V_a$ | = | 600 | 400 | 250 | V |
| $V_{g2}$ | = | 200 | 200 | 175 | V |
| $V_{g1}$ | = | -80 | -80 | -70 | V |
| $I_a$ | = | 2x40 | 2x40 | 2x40 | mA |
| $I_{g2}$ | = | 4,5 | 5,0 | 7,5 | mA |
| $I_{g1}$ | = | 2x1,3 | 2x1,5 | 2x2,0 | mA |
| $V_{g1g1'p}$ | = | 220 | 220 | 230 | V |
| $W_{ig1}$ | = | 2x0,13 | 2x0,15 | 2x0,26 | W |
| $W_{g2}$ | = | 0,9 | 1,0 | 1,3 | W |
| $W_{ia}$ | = | 2x24 | 2x16 | 2x10 | W |
| $W_a$ | = | 2x7,2 | 2x5 | 2x3,4 | W |
| $W_o$ | = | 33,6 | 22 | 13,2 | W |
| $\eta$ | = | 70[1]) | 69 | 66 | % |

[1])See page 4; voir page 4; siehe Seite 4

# PHILIPS

H.F. class C anode and screen grid modulation, two systems in push-pull
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull
HF Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | f = max. 186 Mc/s | | f = max. 300 Mc/s | |
|---|---|---|---|---|
| $V_a$ | = max. 480 | V | $V_a$ = max. 360 | V |
| $W_{ia}$ | = max. 2x11,5 | W | $W_{ia}$ = max. 2x5,25 | W |
| $W_a$ | = max. 2x4 | W | | |
| $I_a$ | = max. 2x25 | mA | | |
| $V_{g2}$ | = max. 250 | V | | |
| $W_{g2}$ | = max. 4,5 | W | | |
| $-V_{g1}$ | = max. 200 | V | | |
| $I_{g1}$ | = max. 2x5 | mA | | |

Operating conditions, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | | |
|---|---|---|---|---|---|
| f | = | 60 | 60 | 60 | 186 Mc/s |
| $V_a$ | = | 450 | 400 | 250 | 250 V |
| $R_{g2}$ | = | 18 | 18 | 10 | 10 kΩ |
| $V_{g1}$ | = | -80 | -80 | -70 | -70 V |
| $I_a$ | = | 2x25 | 2x25 | 2x19,5 | 2x19,5 mA |
| $I_{g2}$ | = | 14 | 11 | 11 | 11 mA |
| $I_{g1}$ | = | 2x1,0 | 2x0,8 | 2x1,5 | 2x1,5 mA |
| $V_{g1_p}$ | = | 83 | 83 | 110 | 110 V |
| $W_{ig1}$ | = | 2x0,08 | 2x0,06 | 2x0,15 | 2x0,15 W |
| $W_{g2}$ | = | 2,8 | 2,2 | 1,6 | 1,6 W |
| $W_{ia}$ | = | 2x11,25 | 2x10 | 2x4,9 | 2x4,9 W |
| $W_a$ | = | 2x2,5 | 2x2,3 | 2x1,8 | 2x1,9 W |
| $W_o$ | = | 17,5 | 15,4 | 6,2 | 6,0 W |
| $\eta$ | = | 77,5 | 77 | 63 | 61 % |
| m | = | 100 | 100 | 100 | 100 % |
| $W_{mod}$ | = | 11,5 | 10 | 5 | 5 W |

H.F. class C anode and screen grid modulation, two systems in push-pull; continued
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull; continuation
HF Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt; Forsetzung

I.C.A.S. Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | f = max. 186 Mc/s | f = max. 300 Mc/s |
|---|---|---|
| $V_a$ = max. | 480 V | $V_a$ = max. 360 V |
| $W_{ia}$ = max. | 2x15,5 W | $W_{ia}$ = max. 2x7 W |
| $W_a$ = max. | 2x5 W | |
| $I_a$ = max. | 2x32 mA | |
| $V_{g2}$ = max. | 250 V | |
| $W_{g2}$ = max. | 4,5 W | |
| $-V_{g1}$ = max. | 200 V | |
| $I_{g1}$ = max. | 2x5 mA | |

I.C.A.S. Operating conditions, intermittent service
Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| f | = | 60 | 186 Mc/s |
| $V_a$ | = | 250 | 250 V |
| $R_{g2}$ | = | 10 | 10 kΩ |
| $V_{g1}$ | = | -70 | -70 V |
| $I_a$ | = | 2x26,5 | 2x26,5 mA |
| $I_{g2}$ | = | 9 | 9 mA |
| $I_{g1}$ | = | 2x1,8 | 2x1,5 mA |
| $V_{g1_p}$ | = | 110 | 110 V |
| $W_{ig1}$ | = | 2x0,18 | 2x0,15 W |
| $W_{g2}$ | = | 1,5 | 1,5 W |
| $W_{ia}$ | = | 2x6,6 | 2x6,6 W |
| $W_a$ | = | 2x2,5 | 2x2,7 W |
| $W_o$ | = | 8,2 | 7,8 W |
| $\eta$ | = | 62 | 59 % |
| m | = | 100 | 100 % |
| $W_{mod}$ | = | 7 | 7 W |

# PHILIPS

Class C frequency tripler, two systems in push-pull
Classe C tripleur de fréquence, deux systèmes en push-pull
Klasse C Frequenzverdreifacher, zwei Systeme in Gegentakt

C.C.S. Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| f = max. 186 Mc/s | | f = max. 300 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 600 V | $V_a$ = max. | 450 V |
| $W_{ia}$ = max. | 2x12 W | $W_{ia}$ = max. | 2x9 W |
| $W_a$ = max. | 2x6 W | | |
| $I_a$ = max. | 2x30 mA | | |
| $V_{g2}$ = max. | 250 V | | |
| $W_{g2}$ = max. | 7 W | | |
| $-V_{g1}$ = max. | 200 V | | |
| $I_{g1}$ = max. | 2x5 mA | | |

C.C.S. Operating conditions, continuous service
Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| f | = | 62/186 | 62/186 Mc/s |
| $V_a$ | = | 400 | 250 V |
| $V_{g2}$ | = | 200 | 200 V |
| $V_{g1}$ | = | -175 | -175 V |
| $I_a$ | = | 2x24 | 2x30 mA |
| $I_{g2}$ | = | 3 | 6 mA |
| $I_{g1}$ | = | 2x0,6 | 2x1,1 mA |
| $V_{g1g1'p}$ | = | 430 | 430 V |
| $W_{ig1}$ | = | 2x0,12 | 2x0,22 W |
| $W_{g2}$ | = | 0,6 | 1,2 W |
| $W_{ia}$ | = | 2x9,6 | 2x7,5 W |
| $W_a$ | = | 2x6 | 2x5,2 W |
| $W_o$ | = | 7,2 | 4,6 W |
| $\eta$ | = | 37,5 | 31 % |

Class C frequency tripler, two systems in push-pull; continued
Classe C tripleur de fréquence, deux systèmes en push-pull; continuation
Klasse C Frequenzverdreifacher, zwei Systeme in Gegentakt; Fortsetzung

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| f = max. 186 Mc/s | | f = max. 300 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 600 V | $V_a$ = max. | 450 V |
| $W_{ia}$ = max. | 2x16 W | $W_{ia}$ = max. | 2x12 W |
| $W_a$ = max. | 2x8 W | | |
| $I_a$ = max. | 2x40 mA | | |
| $V_{g2}$ = max. | 250 V | | |
| $W_{g2}$ = max. | 7 W | | |
| $-V_{g1}$ = max. | 200 V | | |
| $I_{g1}$ = max. | 2x5 mA | | |

Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| f | = | 62/186 | 62/186 Mc/s |
| $V_a$ | = | 400 | 250 V |
| $V_{g2}$ | = | 200 | 200 V |
| $V_{g1}$ | = | -175 | -175 V |
| $I_a$ | = | 2x32,5 | 2x40 mA |
| $I_{g2}$ | = | 4 | 6,5 mA |
| $I_{g1}$ | = | 2x1,1 | 2x1,5 mA |
| $V_{g1g1'p}$ | = | 430 | 430 V |
| $W_{ig1}$ | = | 2x0,22 | 2x0,3 W |
| $W_{g2}$ | = | 0,8 | 1,3 W |
| $W_{ia}$ | = | 2x13 | 2x10 W |
| $W_a$ | = | 2x8 | 2x6,9 W |
| $W_o$ | = | 10 | 6,2 W |
| $\eta$ | = | 38,5 | 31 % |

# PHILIPS

Class C frequency doubler
Classe C doubleur de fréquence
Klasse C Frequenzverdoppler

Limiting values, per tube
C.C.S. Caractéristiques limites, par tube
Grenzdaten, pro Röhre

| f = max. 186 Mc/s | | f = max. 300 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 600 V | $V_a$ = max. | 450 V |
| $W_{ia}$ = max. | 2x12 W | $W_{ia}$ = max. | 2x9 W |
| $W_a$ = max. | 2x6 W | | |
| $I_a$ = max. | 2x30 mA | | |
| $V_{g2}$ = max. | 250 V | | |
| $W_{g2}$ = max. | 7 W | | |
| $-V_{g1}$ = max. | 200 V | | |
| $I_{g1}$ = max. | 2x5 mA | | |

Operating conditions, one system, continuous service
C.C.S. Caractéristiques d'utilisation, un système, service continu
Betriebsdaten, ein System, Dauerbetrieb

| f | = | 93/186 | 93/186 Mc/s |
|---|---|---|---|
| $V_a$ | = | 400 | 250 V |
| $V_{g1}$ | = | -175 | -175 V |
| $V_{g2}$ | = | 200 | 200 V |
| $I_a$ | = | 30 | 30 mA |
| $I_{g1}$ | = | 1,2 | 1,5 mA |
| $I_{g2}$ | = | 1,5 | 2 mA |
| $V_{g1_p}$ | = | 210 | 220 V |
| $W_{ig1}$ | = | 0,23 | 0,3 W |
| $W_{g2}$ | = | 0,3 | 0,4 W |
| $W_{ia}$ | = | 12 | 7,5 W |
| $W_a$ | = | 5,5 | 3,5 W |
| $W_o$ | = | 6,5 | 4 W |
| $\eta$ | = | 54 | 53 % |

Class C frequency doubler
Classe C doubleur de fréquence
Klasse C Frequenzverdoppler

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Limiting values, per tube
I.C.A.S. Caractéristiques limites, par tube
Grenzdaten, pro Röhre

| f = max. 186 Mc/s | | f = max. 300 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 600 V | $V_a$ = max. | 450 V |
| $W_{ia}$ = max. | 2x16 W | $W_{ia}$ = max. | 2x12 W |
| $W_a$ = max. | 2x8 W | | |
| $I_a$ = max. | 2x40 mA | | |
| $V_{g2}$ = max. | 250 V | | |
| $W_{g2}$ = max. | 7 W | | |
| $-V_{g1}$ = max. | 200 V | | |
| $I_{g1}$ = max. | 2x5 mA | | |

Operating conditions, one system, intermittent service
I.C.A.S. Caractéristiques d'utilisation, un système, service intermittent
Betriebsdaten, ein System, aussetzender Betrieb

| | | | |
|---|---|---|---|
| f | = | 93/186 | 93/186 Mc/s |
| $V_a$ | = | 400 | 250 V |
| $V_{g2}$ | = | 200 | 200 V |
| $V_{g1}$ | = | -175 | -175 V |
| $I_a$ | = | 40 | 40 mA |
| $I_{g2}$ | = | 2,5 | 3 mA |
| $I_{g1}$ | = | 1,5 | 2 mA |
| $V_{g1_p}$ | = | 220 | 230 V |
| $W_{ig1}$ | = | 0,3 | 0,42 W |
| $W_{g2}$ | = | 0,5 | 0,6 W |
| $W_{ia}$ | = | 16 | 10 W |
| $W_a$ | = | 8 | 5,1 W |
| $W_o$ | = | 8 | 4,9 W |
| $\eta$ | = | 50 | 49 % |

# PHILIPS

L.F. class B amplifier and modulator, two systems in push-pull
Amplificatrice et modulatrice B.F. classe B, deux systèmes en push-pull
NF-Verstärker und Modulator Klasse B, zwei Systeme in Gegentakt

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 600 | V |
| $W_{ia}$ | = max. | 2x18 | W |
| $W_a$ | = max. | 2x6 | W |
| $I_a$ | = max. | 2x30 | mA |
| $V_{g2}$ | = max. | 250 | V |
| $W_{g2}$ | = max. | 7 | W |
| $-V_{g1}$ | = max. | 200 | V |

Operating conditions, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_f$ | = | 6,3[1]) | | 6,3[1]) | | V |
| $V_a$ | = | 450 | | 400 | | V |
| $V_{g2}$ | = | 200 | | 200 | | V |
| $V_{g1}$ | = | -24 | | -24 | | V |
| $R_{aa'}$ | = | 20 | | 16 | | kΩ |
| $V_{g1g1'p}$ | = | 0 | 94 | 0 | 94 | V |
| $I_a$ | = | 2x2,8 | 2x32,5 | 2x2,7 | 2x35 | mA |
| $I_{g2}$ | = | 2x0,16 | 2x5 | 2x0,15 | 2x5,3 | mA |
| $I_{g1}$ | = | 0 | 2x1,1 | 0 | 2x1,3 | mA |
| $W_{ia}$ | = | 2x1,3 | 2x14,6 | 2x1,1 | 2x14 | W |
| $W_a$ | = | 2x1,3 | 2x5,6 | 2x1,1 | 2x5,5 | W |
| $W_o$ | = | - | 18 | - | 17 | W |
| $d_{tot}$ | = | - | 5 | - | 5 | % |
| $\eta$ | = | - | 61,5 | - | 60,5 | % |

[1]) D.C. voltage
Tension directe
Gleichspannung

L.F. class B amplifier and modulator, two systems in push-pull; continued
Amplificatrice et modulatrice B.F. classe B, deux systèmes en push-pull; continuation
NF-Verstärker und Modulator Klasse B, zwei Systeme in Gegentakt; Fortsetzung

C.C.S. Operating conditions, continuous service
Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_f$ | = | 6,3[1]) | | 6,3[1]) | | V |
| $V_a$ | = | 350 | | 250 | | V |
| $V_{g2}$ | = | 200 | | 175 | | V |
| $V_{g1}$ | = | -24 | | -20 | | V |
| $R_{aa}$ | = | 12 | | 8 | | kΩ |
| $V_{g1g1'p}$ | = | 0 | 104 | 0 | 100 | V |
| $I_a$ | = | 2x2,5 | 2x37,5 | 2x2,9 | 2x36 | mA |
| $I_{g2}$ | = | 2x0,14 | 2x5,5 | 2x0,2 | 2x5 | mA |
| $I_{g1}$ | = | 0 | 2x1,4 | 0 | 2x1,5 | mA |
| $W_{ia}$ | = | 2x0,88 | 2x13,1 | 2x0,71 | 2x9 | W |
| $W_a$ | = | 2x0,88 | 2x5,1 | 2x0,71 | 2x4,5 | W |
| $W_o$ | = | - | 16 | - | 9 | W |
| dtot | = | - | 5 | - | 5 | % |
| $\eta$ | = | - | 61 | - | 50 | % |

[1]) Direct voltage
Tension directe
Gleichspannung

L.F. class B amplifier and modulator, two systems in push-pull; continued
Amplificatrice et modulatrice B.F. classe B, deux systèmes en push-pull; continuation
NF-Verstärker und Modulator Klasse B, zwei Systeme in Gegentakt; Fortsetzung

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Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 600 | V |
| $W_{ia}$ | = max. | 2x24 | W |
| $W_a$ | = max. | 2x8 | W |
| $I_a$ | = max. | 2x40 | mA |
| $V_{g2}$ | = max. | 250 | V |
| $W_{g2}$ | = max. | 7 | W |
| $-V_{g1}$ | = max. | 200 | V |

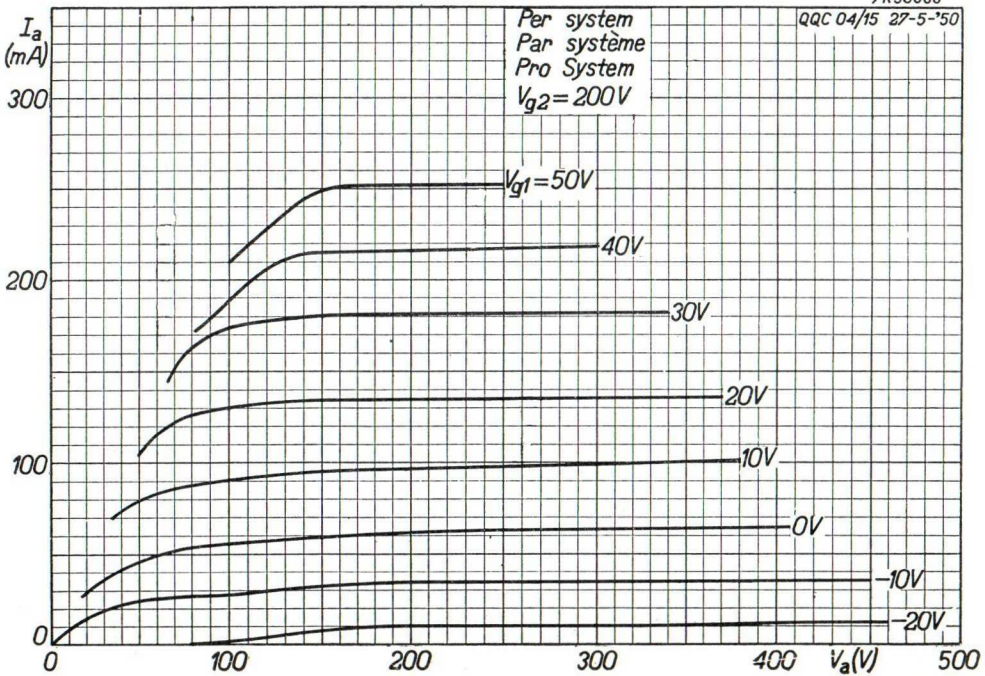
Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | | | |
|---|---|---|---|---|
| $V_f$ | = | 6,3[1] | | V |
| $V_a$ | = | 600 | | V |
| $V_{g2}$ | = | 200 | | V |
| $V_{g1}$ | = | -24 | | V |
| $R_{aa'}$ | = | 25 | | kΩ |
| $V_{g1g1'p}$ | = | 0 | 85 | V |
| $I_a$ | = | 2x3,0 | 2x33,5 | mA |
| $I_{g2}$ | = | 2x0,18 | 2x4,5 | mA |
| $I_{g1}$ | = | 0 | 2x1,2 | mA |
| $W_{ia}$ | = | 2x1,8 | 2x20,1 | W |
| $W_a$ | = | 2x1,8 | 2x6 | W |
| $W_o$ | = | 0 | 28,2 | W |
| $d_{tot}$ | = | - | 5 | % |
| $\eta$ | = | 0 | 70 | % |

7.7. 1954

7R50868

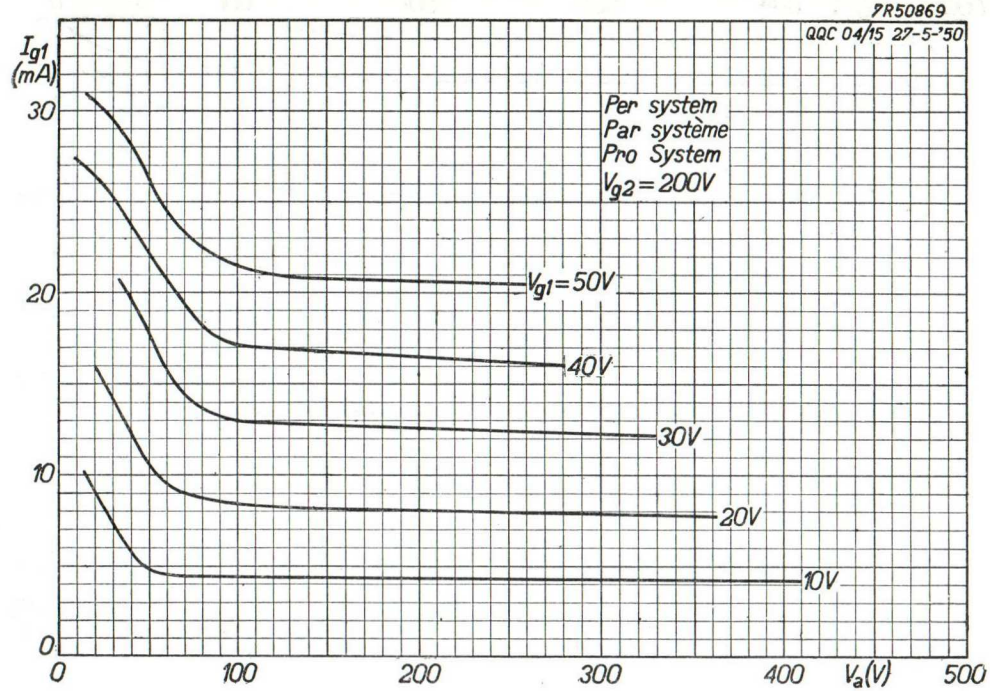
QQC 04/15 27-5-'50




PHILIPS

QQC 04/15

A

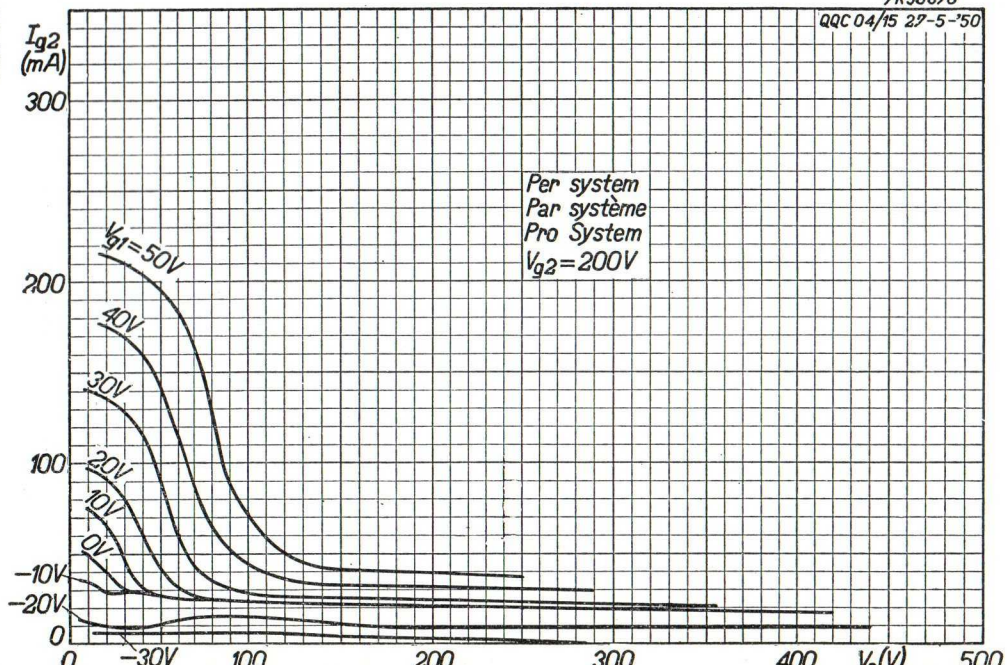

7R50869
QQC 04/15 27-5-'50
$I_{g1}$ (mA)
30
20
10
0
Per system
Par système
Pro System
$V_{g2}$ = 200V
$V_{g1}$ = 50V
40V
30V
20V
10V
0
100
200
300
400
$V_a$(V)
500



PHILIPS

7R50870

QQC 04/15 27-5-'50



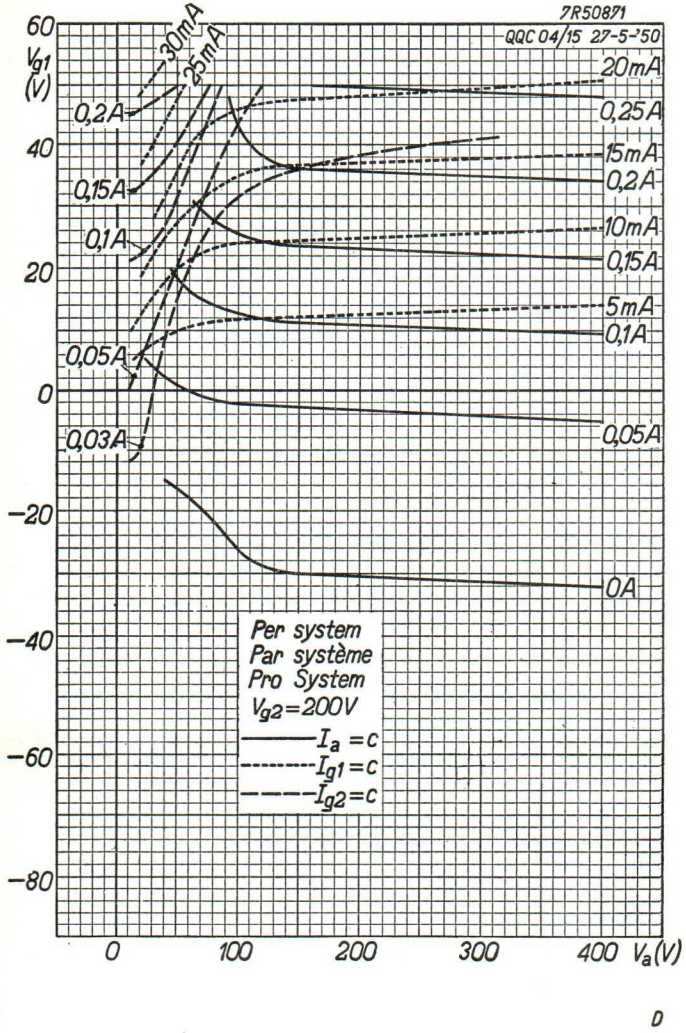

PHILIPS

QQC 04/15

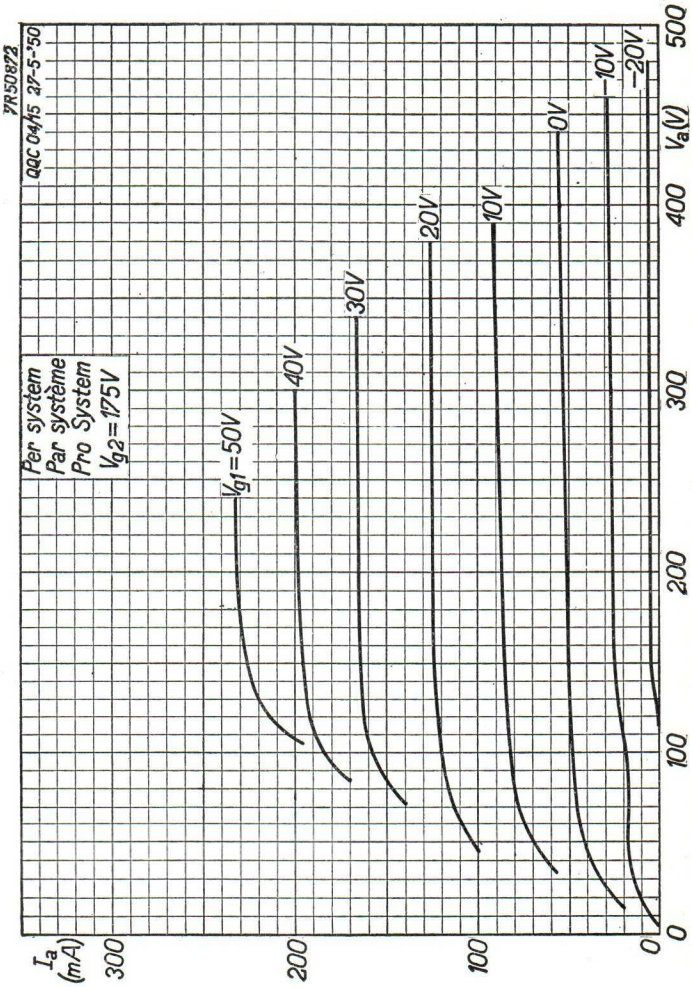
C

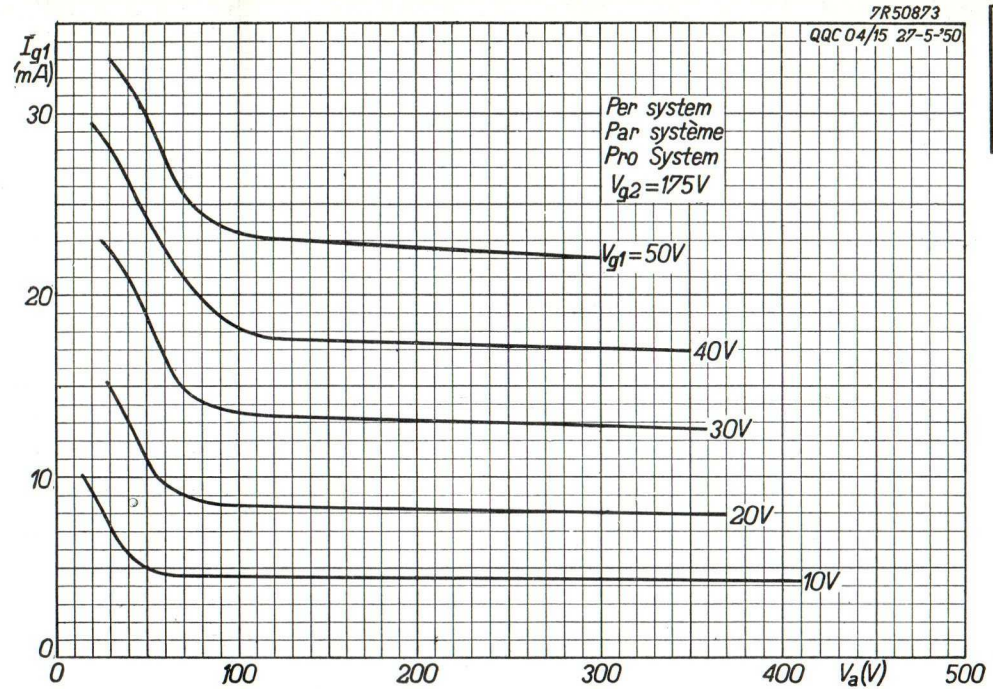
QQC 04/15

# PHILIPS



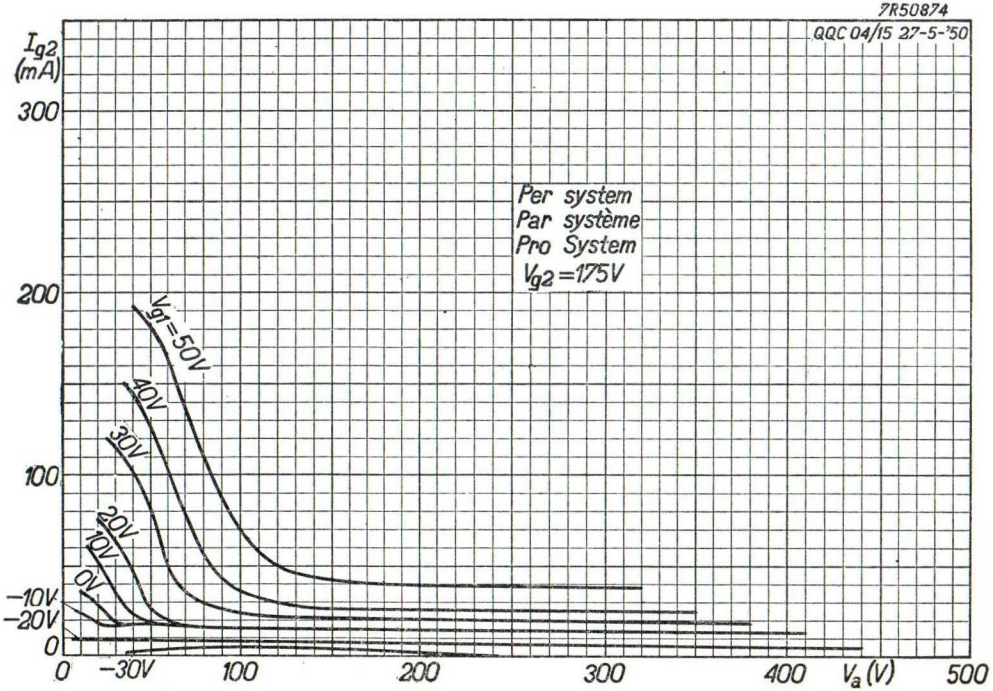

D


7R50872
QQC 04/15 27-5-'50
Per system
Par système
Pro System
$V_{g2}$=175V
$V_{g1}$=50V
40V
30V
20V
10V
0V
-10V
-20V
$I_a$ (mA)
300
200
100
0
$V_a$(V)
0
100
200
300
400
500


7R50873
QQC 04/15 27-5-'50
$I_{g1}$ (mA)
30
20
10
0
Per system
Par système
Pro System
$V_{g2}$ = 175V
$V_{g1}$ = 50V
40V
30V
20V
10V
0
100
200
300
400
$V_a$(V)
500

F

PHILIPS

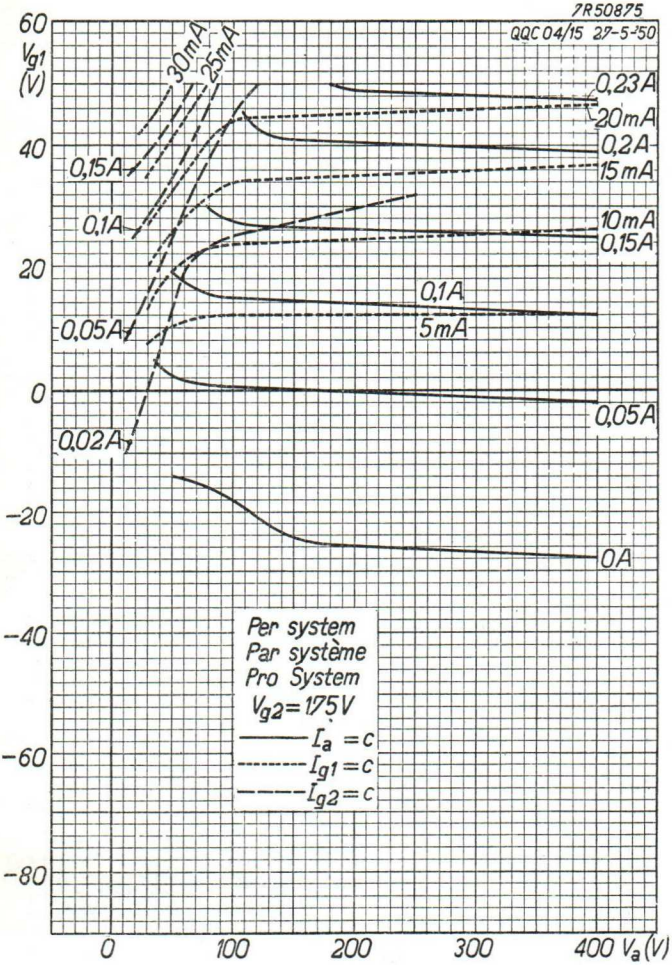



PHILIPS

QQC 04/15

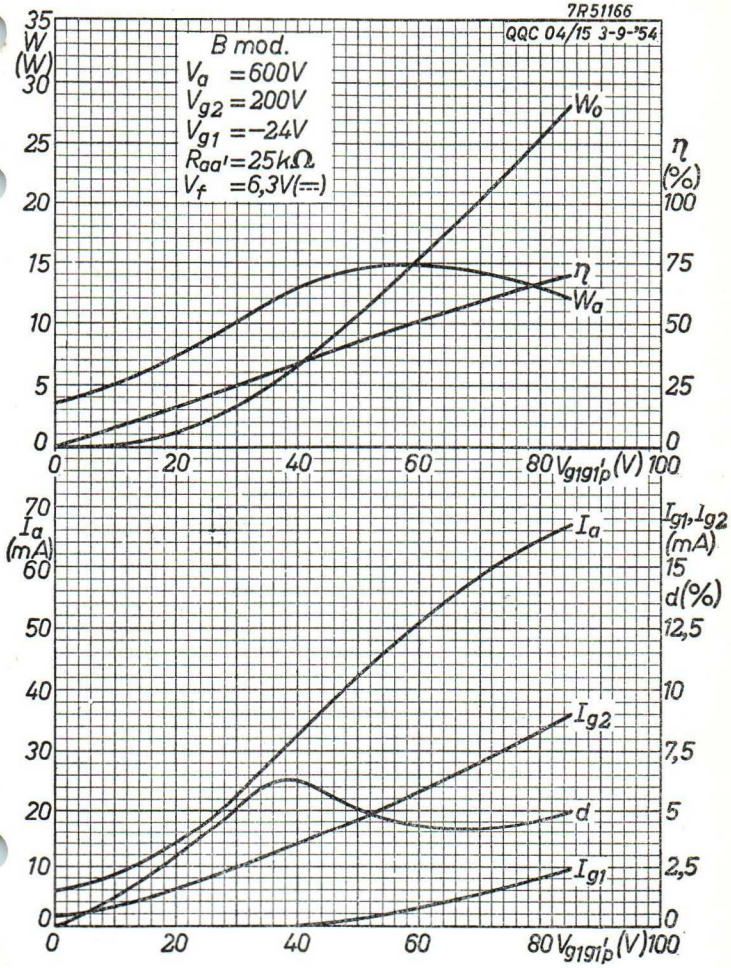
QQC 04/15

# PHILIPS



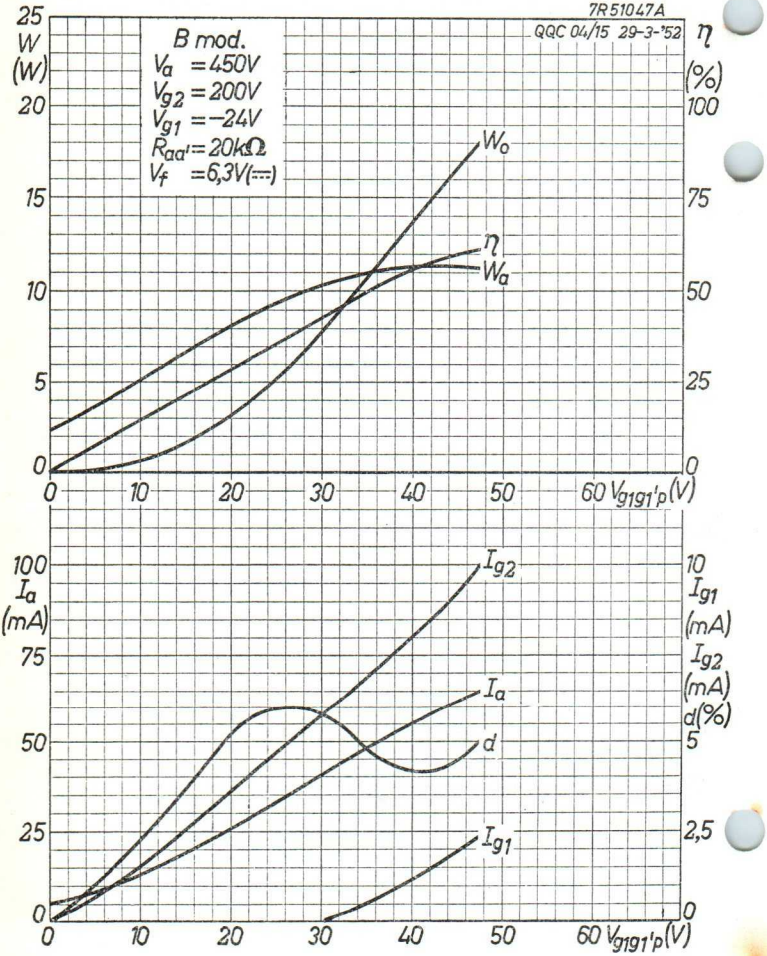

H

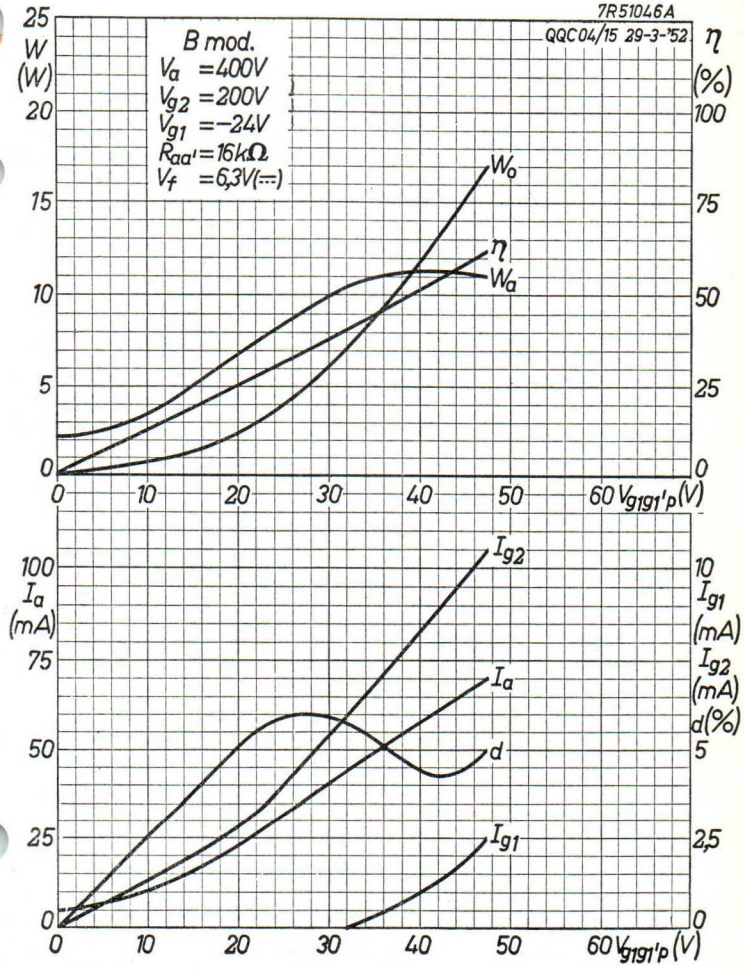
7R51166
QQC 04/15 3-9-'54



QQC 04/15

# PHILIPS



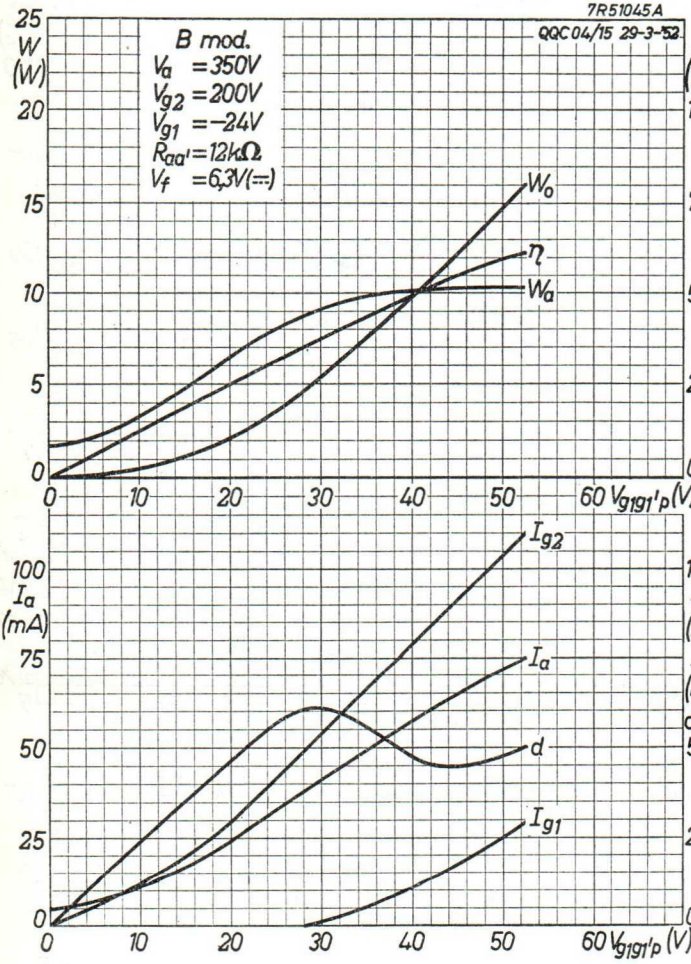

7R51046A
QQC04/15 29-3-'52
B mod.
$V_a$ =400V
$V_{g2}$ =200V
$V_{g1}$ =−24V
$R_{aa'}$=16kΩ
$V_f$ =6,3V(=)
W (W)
η (%)
$W_o$
η
$W_a$
$V_{g1g1'p}$ (V)
$I_a$ (mA)
$I_{g2}$
$I_a$
d
$I_{g1}$
$I_{g1}$ (mA)
$I_{g2}$ (mA)
d(%)

7.7.1954

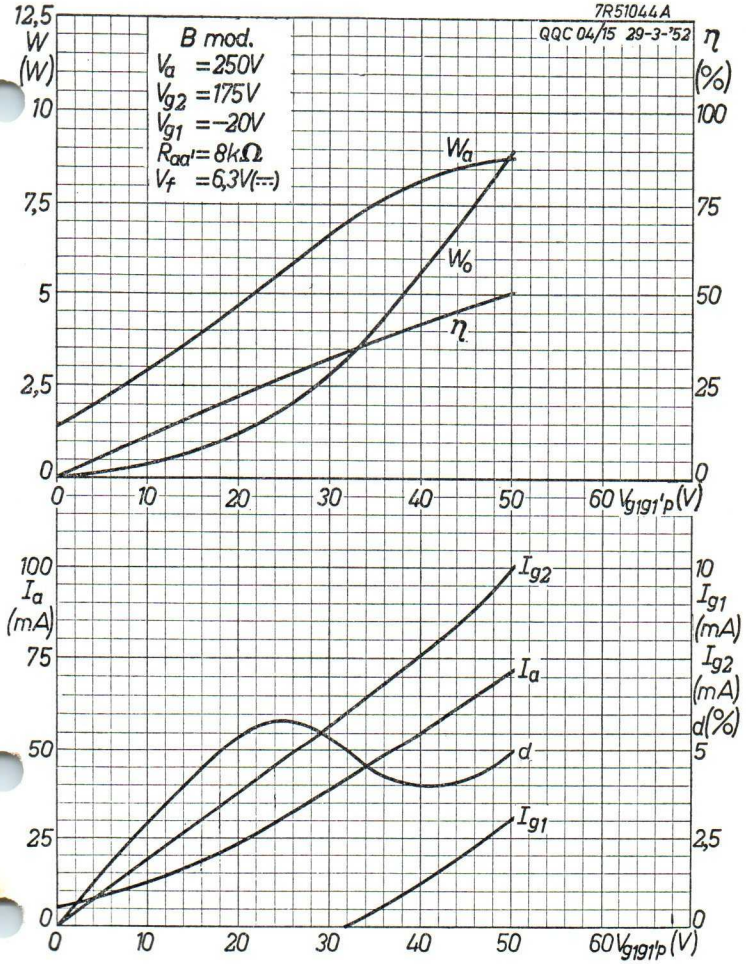
K

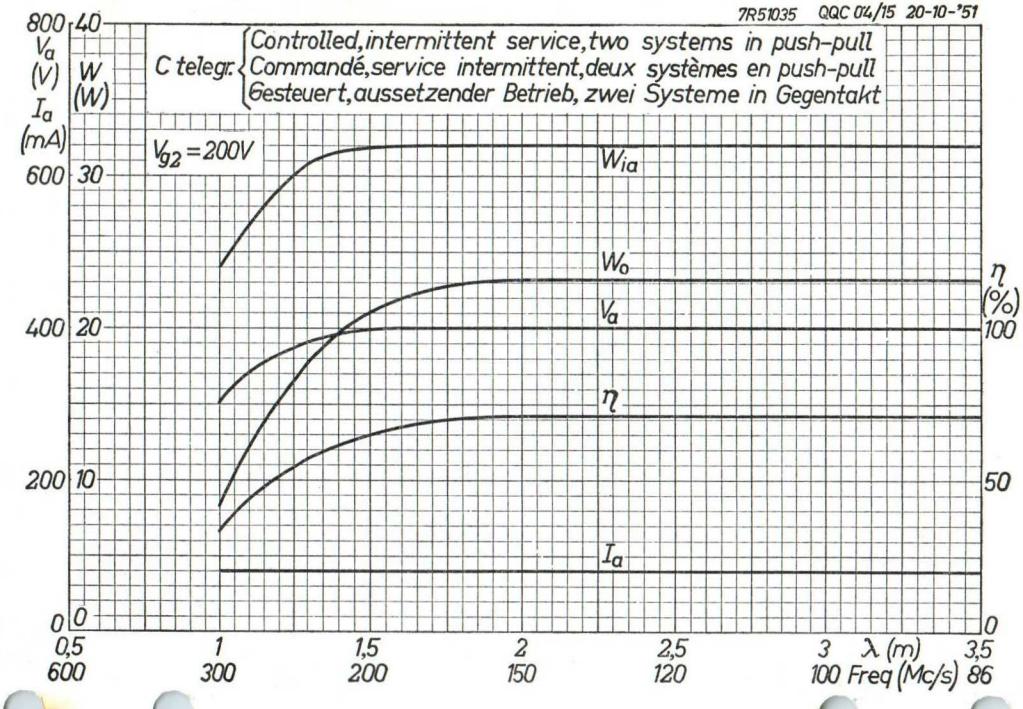
QQC 04/15

# PHILIPS




L


7R51044A
QQC 04/15 29-3-'52
B mod.
$V_a$ = 250V
$V_{g2}$ = 175V
$V_{g1}$ = −20V
$R_{aa'}$ = 8kΩ
$V_f$ = 6,3V(~)
12,5 W (W)
10
7,5
5
2,5
0
$W_a$
$W_o$
$\eta$
$\eta$ (%)
100
75
50
25
0
0 10 20 30 40 50 60 $V_{g1g1'p}$ (V)
100 $I_a$ (mA)
75
50
25
0
$I_{g2}$
$I_a$
d
$I_{g1}$
10 $I_{g1}$ (mA) $I_{g2}$ (mA) d(%)
5
2,5
0
0 10 20 30 40 50 60 $V_{g1g1'p}$ (V)


C telegr.
Controlled, intermittent service, two systems in push-pull
Commandé, service intermittent, deux systèmes en push-pull
Gesteuert, aussetzender Betrieb, zwei Systeme in Gegentakt
$V_{g2}$ = 200V
$W_{ia}$
$W_o$
$V_a$
$\eta$
$I_a$
$V_a$ (V)
$I_a$ (mA)
W (W)
$\eta$ (%)
800
600
400
200
0
40
30
20
10
0
100
50
0
0,5
1
1,5
2
2,5
3
3,5
$\lambda$ (m)
600
300
200
150
120
100
86
Freq (Mc/s)

PHILIPS

# PHILIPS

**QQE 02/5**

DOUBLE TETRODE for use as H.F. amplifier, oscillator and frequency multiplier
DOUBLE TETRODE pour utilisation en amplificatrice, oscillatrice et multiplicatrice de fréquence H.F.
DOPPELTETRODE zur Verwendung als HF-Verstärker, Oszillator und Frequenzvervielfacher

| | | |
|---|---|---|
| Cathode: oxide-coated<br>Cathode: oxyde<br>Katode : Oxyd | $V_f$ = | 6,3 12,6 V [1]<br>0,6 0,3 A |
| Heating : indirect<br>Chauffage: indirect<br>Heizung : indirekt | Pins<br>Broches<br>Stifte | 9-(4+5) 4-5 |
| Capacitances<br>Capacités<br>Kapazitäten | per system<br>par système<br>pro System | in push-pull<br>en push-pull<br>in Gegentakt |
| | $C_a$ = 1,6 pF | $C_o$ = 0,95 pF |
| | $C_{g1}$ = 6,4 pF | $C_i$ = 3,8 pF |
| | $C_{ag1}$ = 0,16 pF | |

The tube is internally neutralized
Le tube est neutrodyné internement
Die Röhre ist innerlich neutrodynisiert

Typical characteristics per system
Caractéristiques types par système
Kenndaten pro System

| | | |
|---|---|---|
| $V_a$ | = | 150 V |
| $V_{g2}$ | = | 150 V |
| $I_a$ | = | 25 mA |
| $\mu_{g2g1}$ | = | 31 |
| S | = | 10,5 mA/V |

| λ | Freq | C telegr. | | | Cag2 mod. | | |
|---|---|---|---|---|---|---|---|
| | | $V_a$ | $W_o$ (W) [2] | | $V_a$ | $W_o$ (W) [2] | |
| (m) | (Mc/s) | (V) | CCS | ICAS | (V) | CCS | ICAS |
| 0,6 | 500 | 180 | 5,8 | | 180 | 4,2 | 5,8 |
| | | 200 | | 7,2 | | | |

| λ | Freq | C fr.mult. | | |
|---|---|---|---|---|
| | | $V_a$ | $W_o$ (W) [2] | |
| (m) | (Mc/s) | (V) | CCS | ICAS |
| 1,8/0,6 | 167/500 | 180 | 2,35 | |
| | | 200 | | 2,95 |

[1]) See page 2; voir page 2; siehe Seite 2
[2]) Two systems; deux systèmes; zwei Systeme

# PHILIPS

Cooling: Radiation and convection. The use of a closed can is not allowed
Refroidissement: Rayonnement et convection. Il n'est pas permis d'utiliser un écran fermé
Kühlung: Strahlung und Konvektion. Die Verwendung einer geschlossenen Buchse ist nicht gestattet

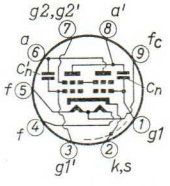
Bulb temperature (at hottest point)
Température de l'ampoule (au point le plus chaud) max. 225 °C
Kolbentemperatur (an der wärmsten Stelle)

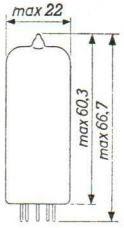
Pin seal temperature
Température des scellements des broches max. 120 °C
Temperatur der Stifteneinschmelzungen

Mounting position: arbitrary
Montage: arbitrairement
Einbau : willkürlich

Base :
Culot : Noval
Sockel:

Socket :
Support: B8 700 19
Fassung:




Dimensions in mm
Dimensions en mm
Abmessungen in mm

Low loss socket without collar is recommended. At high frequencies use of a metal retaining device is not recommended due to loss of output power

Un support à faibles pertes sans manchon est recommandé A hautes fréquences l'utilisation d'un dispositif métallique pour retenir le tube n'est pas recommandée à cause de la perte de puissance de sortie

Eine verlustarme Fassung ohne Metallring wird empfohlen. Bei hohen Frequenzen wird eine metallene Vorrichtung zum festhalten der Röhre der Ausgangsleistungsverluste wegen nicht empfohlen

---

[1]) A temporary deviation of 10 % of $V_f$ is permissible; e.g. when the tube is fed from an accumulator, the actual $V_f$ should not exceed 7 V or 14 V and the accumulator may be used until its voltage has decreased to such an extent that $V_f$ is 5.7 V or 11.4 V

Une déviation temporaire de $V_f$ de 10% est admissible; par exemple si le tube est alimenté d'un accumulateur, le $V_f$ actuel ne surpassera pas 7 V ou 14 V et l'accumulateur peut être utilisé jusqu'à sa tension est diminuée de telle manière que $V_f$ = 5,7 V ou 11,4 V

Eine vorübergehende Abweichung von $V_f$ von 10 % ist zulässig; wenn z.B. die Röhre von einem Akkumulator gespeist wird, so soll die an der Röhre gemessene Heizspannung 7 V oder 14 V nicht überschreiten und kann der Akkumulator verwendet werden bis die Spannung so weit verringert ist dass $V_f$ = 5,7 V oder 11,4 V

H.F. class C telegraphy; two systems in push-pull
H.F. classe C télégraphie; deux systèmes en push-pull
HF-Klasse C Telegraphie; zwei Systeme in Gegentakt

Limiting values (absolute values)
Caractéristiques limites( valeurs absolues)
Grenzdaten (absolute Werte)

| | C.C.S. | | I.C.A.S. | |
|---|---|---|---|---|
| $f$ | = max. | 500 | max. 500 | Mc/s |
| $V_a$ | = max. | 250 | max. 250 | V |
| $W_{ia}$ | = max. | 2x6 | max. 2x7 | W |
| $W_a$ | = max. | 2x3 | max. 2x3,75 | W |
| $I_a$ | = max. | 2x45 | max. 2x50 | mA |
| $V_{g2}$ | = max. | 200 | max. 200 | V |
| $W_{g2}$ | = max. | 2x1,5 | max. 2x1,75 | W |
| $-V_{g1}$ | = max. | 100 | max. 100 | V |
| $I_{g1}$ | = max. | 2x3 | max. 2x4 | mA |
| $V_{kf}$ | = max. | 100 | max. 100 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | C.C.S. | I.C.A.S. | |
|---|---|---|---|
| $f$ | = 500 | 500 | Mc/s |
| $V_a$ | = 180 | 200 | V |
| $V_{g2}$ | = 180 | 200 | V |
| $V_{g1}$ | = -20 | -20 | V |
| $R_{g1}$ | = 27 | 27 | kΩ [1] |
| $V_{g1g1'p}$ | = 50 | 50 | V |
| $I_a$ | = 2x27,5 | 2x31 | mA |
| $I_{g2}$ | = 12,5 | 14 | mA |
| $I_{g1}$ | = 2x0,75 | 2x0,75 | mA |
| $W_{ia}$ | = 2x5 | 2x6,2 | W |
| $W_a$ | = 2x2,1 | 2x2,6 | W |
| $W_{g2}$ | = 2,25 | 2,8 | W |
| $W_{ig1}$ [2] | = 1,2 | 1,2 | W |
| $W_o$ | = 5,8 | 7,2 | W |
| $\eta$ | = 58 | 58 | % |
| $W_\ell$ [3] | = 5 | 6 | W |

[1])...[3]) See page 6; voir page 6; siehe Seite 6

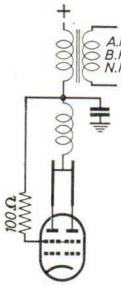
# PHILIPS

H.F. Class C anode and screen grid modulation, two systems in push-pull
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull
HF-Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|
| f | = | max. 500 | max. 500 | Mc/s |
| $V_a$ | = | max. 200 | max. 200 | V |
| $W_{ia}$ | = | max. 2x4 | max. 2x5 | W |
| $W_a$ | = | max. 2x2 | max. 2x2,5 | W |
| $I_a$ | = | max. 2x32 | max. 2x40 | mA |
| $V_{g2}$ | = | max. 200 | max. 200 | V |
| $W_{g2}$ | = | max. 2x1,0 | max. 2x1,15 | W |
| $-V_{g1}$ | = | max. 100 | max. 100 | V |
| $I_{g1}$ | = | max. 2x3 | max. 2x4 | mA |
| $V_{kf}$ | = | max. 100 | max. 100 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten




| | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|
| f | = | 500 | 500 | Mc/s |
| $V_a$ | = | 180 | 180 | V |
| $V_{g2}$ | = | | | 4) |
| $V_{g1}$ | = | -20 | -20 | V |
| $R_{g1}$ | = | 68 | 27 | kΩ 1) |
| $V_{g1g1'p}$ | = | 45 | 50 | V |
| $I_a$ | = | 2x20 | 2x27,5 | mA |
| $I_{g2}$ | = | 9,5 | 12,5 | mA |
| $I_{g1}$ | = | 2x0,3 | 2x0,75 | mA |
| $W_{ia}$ | = | 2x3,6 | 2x5,0 | W |
| $W_a$ | = | 2x1,5 | 2x2,1 | W |
| $W_{g2}$ | = | 1,7 | 2,25 | W |
| $W_{ig1}$ | = | 1,0 | 1,2 | W 2) |
| $W_o$ | = | 4,2 | 5,8 | W |
| $\eta$ | = | 58 | 58 | % |
| $W_\ell$ | = | 3,5 | 5,0 | W 3) |
| m | = | 100 | 100 | % |
| $W_{mod}$ | = | 4,5 | 6,1 | W |

4) See circuit diagram
Voir le schéma
Siehe Schaltbild

1)...3) See page 6; voir page 6; siehe Seite 6

H.F. class C frequency tripler, two systems in push-pull
H.F. classe C tripleur de fréquence, deux systemes en push-pull
HF-Klasse C Frequenzverdreifacher, zwei Systeme in Gegentakt

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | C.C.S. | | I.C.A.S. | |
|---|---|---|---|---|---|
| f | = max. | 500 | max. | 500 | Mc/s |
| $V_a$ | = max. | 250 | max. | 250 | V |
| $W_{ia}$ | = max. | 2x4 | max. | 2x5 | W |
| $W_a$ | = max. | 2x3 | max. | 2x3,75 | W |
| $I_a$ | = max. | 2x30 | max. | 2x40 | mA |
| $V_{g2}$ | = max. | 200 | max. | 200 | V |
| $W_{g2}$ | = max. | 2x1,5 | max. | 2x1,75 | W |
| $-V_{g1}$ | = max. | 100 | max. | 100 | V |
| $I_{g1}$ | = max. | 2x3 | max. | 2x4 | mA |
| $V_{kf}$ | = max. | 100 | max. | 100 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|
| f | = | 167/500 | 167/500 | Mc/s |
| $V_a$ | = | 180 | 200 | V |
| $V_{bg2}$ | = | 180 | 200 | V |
| $R_{g2}$ | = | 1200 | 1200 | Ω |
| $R_{g1}$ | = | 82 | 82 | kΩ[1)][5)] |
| $V_{g1g1'p}$ | = | 165 | 165 | V |
| $I_a$ | = | 2x20 | 2x22,5 | mA |
| $I_{g2}$ | = | 9,7 | 11,0 | mA |
| $I_{g1}$ | = | 2x0,9 | 2x0,9 | mA |
| $W_{ia}$ | = | 2x3,6 | 2x4,5 | W |
| $W_a$ | = | 2x2,45 | 2x3,05 | W |
| $W_{g2}$ | = | 1,65 | 2,05 | W |
| $W_{ig1}$ [2)] | = | 1,1 | 1,1 | W |
| $W_o$ | = | 2,35 | 2,95 | W |
| $\eta$ | = | 33 | 33 | % |
| $W_\ell$ [3)] | = | 1,8 | 2,2 | W |

[1)]...[5)] See page 6; voir page 6; siehe Seite 6

# PHILIPS

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[1]) Each system; chaque système; jedes System

[2]) Driver output power
Puissance de sortie du préamplificateur
Ausgangsleistung der Treiberstufe

[3]) Output power in load
Puissance dans la charge
Leistung in der Belastung

[4]) See circuit diagram
Voir le schéma
Siehe das Schaltbild

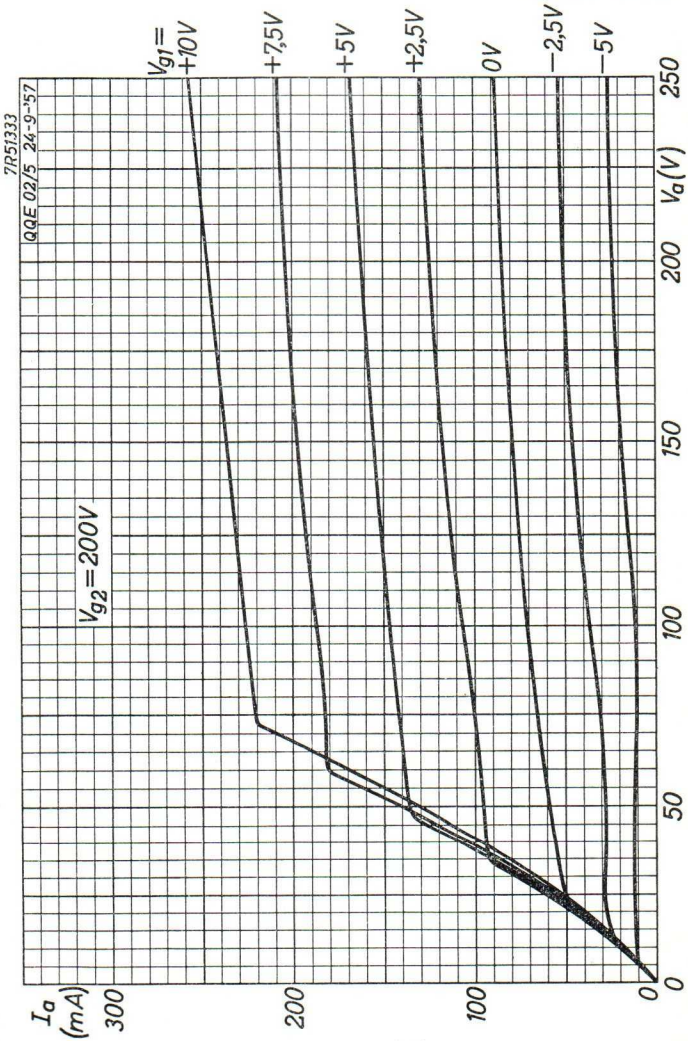
[5]) Fixed bias or a combination of fixed bias and grid current biasing is not recommended

Polarisation fixe ou une combinaison de polarisation fixe et polarisation par courant de grille n'est pas recommandée

Feste Gittervorspannung oder eine Kombination von fester Gittervorspannung und Gittervorspannung mittels Gitterstromes wird nicht empfohlen

PHILIPS

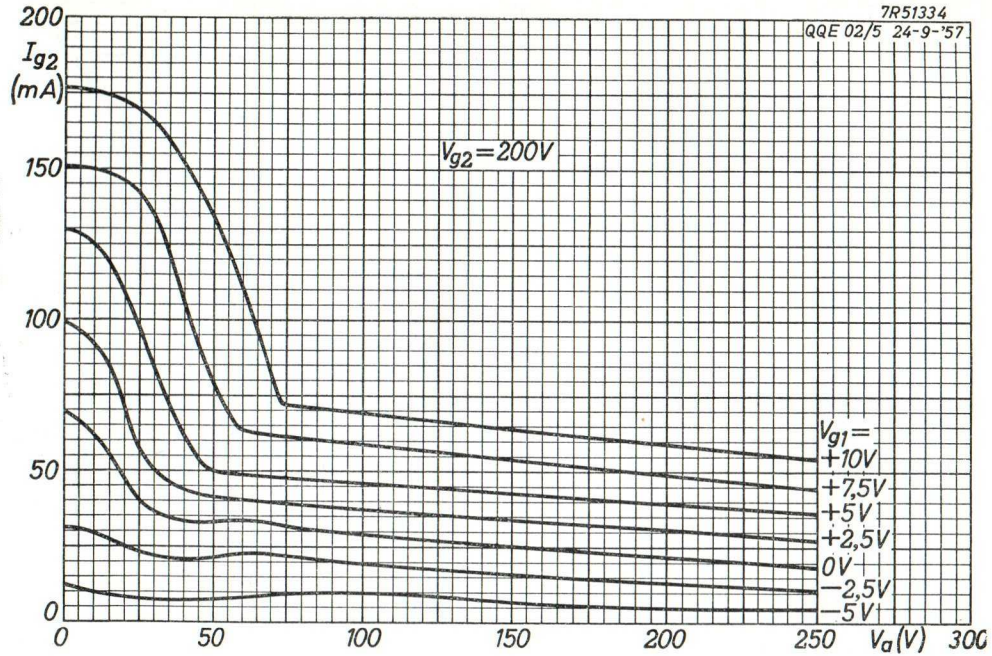
QQE 02/5

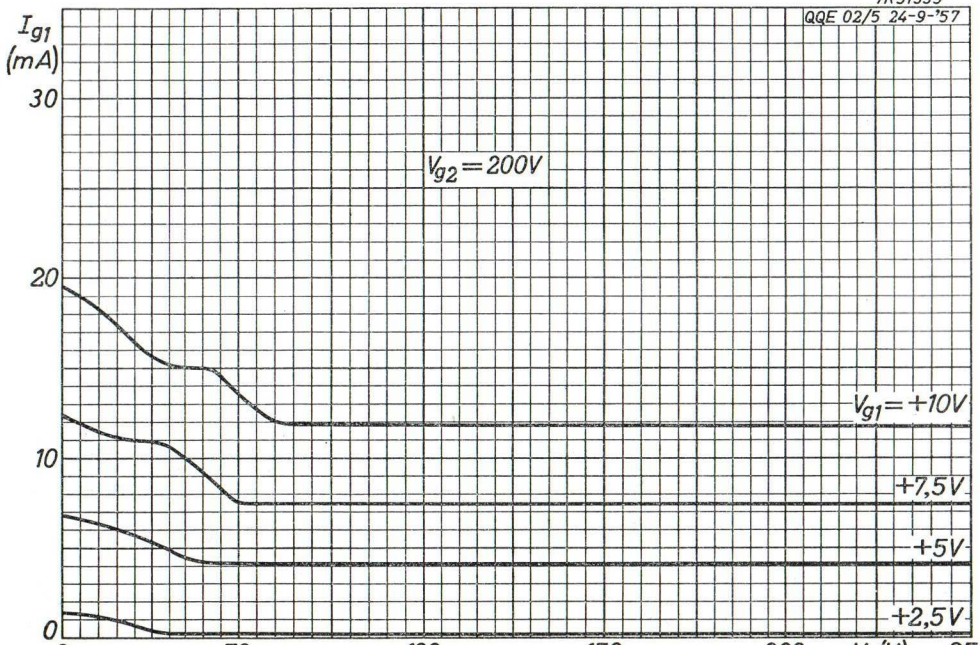



9.9.1957

A

PHILIPS


7R51334
QQE 02/5 24-9-'57
$I_{g2}$ (mA)
200
150
100
50
0
$V_{g2}$ = 200V
$V_{g1}$ =
+10V
+7,5V
+5V
+2,5V
0V
−2,5V
−5V
0
50
100
150
200
250
$V_a$ (V)
300




9.9.1957

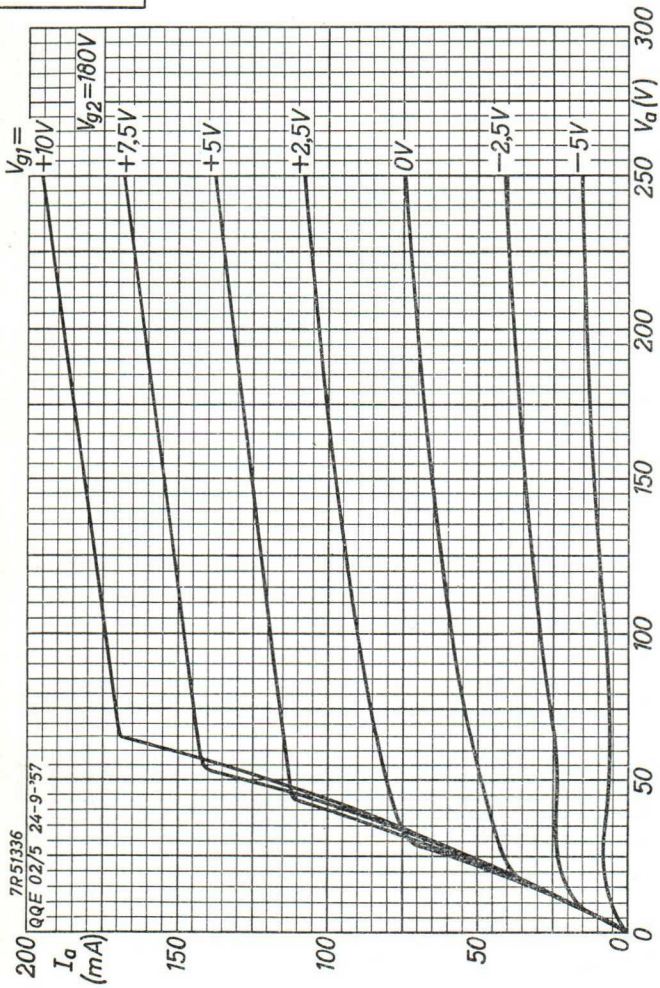
C

PHILIPS

QQE 02/5

QQE 02/5

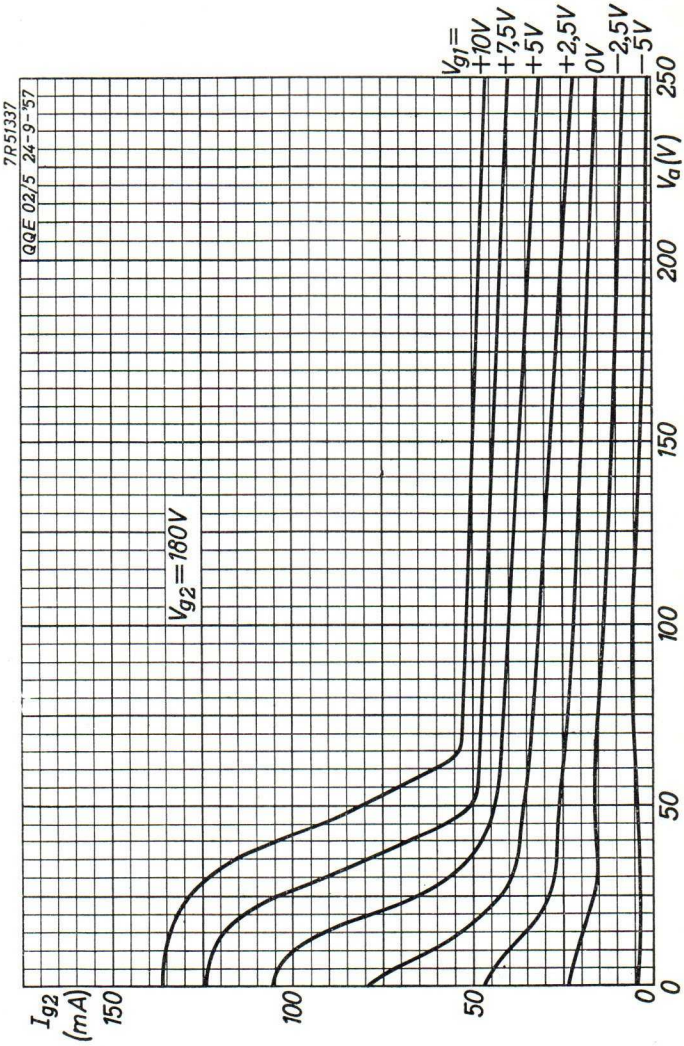
# PHILIPS




D

# PHILIPS

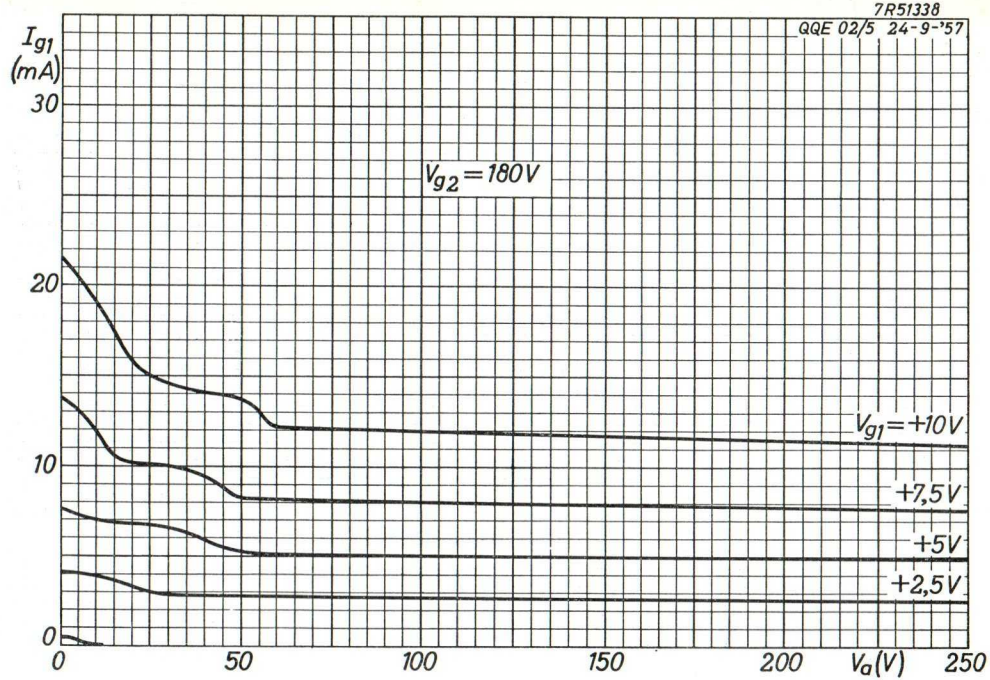
**QQE 02/5**




9.9.1957

E

PHILIPS


7R51338
QQE 02/5 24-9-'57
$I_{g1}$ (mA)
30
20
10
0
$V_{g2} = 180V$
$V_{g1} = +10V$
+7,5V
+5V
+2,5V
0
50
100
150
200
$V_a$(V)
250

# PHILIPS

**QQE 03/12**

DOUBLE TETRODE for use as H.F. amplifier and oscillator, frequency multiplier and modulator
DOUBLE TÉTRODE pour utilisation en amplificatrice et oscillatrice H.F., multiplicatrice de fréquence et modulatrice
DOPPELTETRODE zur Verwendung als HF-Verstärker und Oszillator, Frequenzvervielfacher und Modulator

| | | | |
|---|---|---|---|
| Cathode: oxide-coated<br>Cathode: oxyde<br>Katode : Oxyd | $V_f$ | = 6,3 | 12,6 V [1] |
| | $I_f$ | = 0,82 | 0,41 A |
| Heating : indirect<br>Chauffage: indirect<br>Heizung : indirekt | Pins<br>Broches 9-(4+5)<br>Stifte | | 4-5 |

| | per system<br>par système<br>pro System | in push-pull<br>en push-pull<br>in Gegentakt |
|---|---|---|
| The tube is internally neutralized<br>Le tube est neutrodyné internement<br>Die Röhre ist innerlich neutrodynisiert | $C_a$ = 2,6 pF | $C_o$ = 1,4 pF |
| | $C_{g_1}$ = 6,2 pF | $C_i$ = 5,1 pF |
| | $C_{ag_1}$ < 0,1 pF | |

Typical characteristics per system
Caractéristiques types par système
Kenndaten pro System

$\mu_{g_2 g_1}$ ($I_a$ = 30 mA ) = 7,5

S ($I_a$ = 30 mA ) = 3,3 mA/V

| λ | Freq | C telegr | | | $C_{ag_2}$ mod | | |
|---|---|---|---|---|---|---|---|
| | | $V_a$ | $W_o$(W)[2] | | $V_a$ | $W_o$(W)[2] | |
| (m) | (Mc/s) | (V) | CCS | ICAS | (V) | CCS | ICAS |
| 1,5 | 200 | 300 | 12 | 16 | 200 | 7,1 | 8,8 |
| | | 250 | 9,0 | 11,2 | | | |
| | | 200 | 7,4 | 9,0 | | | |

| λ | Freq | C fr.mult. | | | B mod | |
|---|---|---|---|---|---|---|
| | | $V_a$ | $W_o$(W)[2] | | $V_a$ | $W_o$[2] |
| (m) | (Mc/s) | (V) | CCS | ICAS | (V) | (W) |
| 4,5/1,5 | 67/200 | 300 | 3,5 | 4,8 | 300 | 17,5 |
| | | 250 | 3,0 | 4,2 | 250 | 14 |
| | | 200 | 2,8 | 3,5 | 200 | 8,7 |

[1] See page 2; voir page 2; siehe Seite 2
[2] Two systems in push-pull, useful power output in load
Deux systèmes en push-pull, puissance de sortie utile dans la charge
Zwei Systeme in Gegentakt, nützliche Ausgangsleistung in der Belastung

# PHILIPS

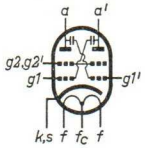
Cooling: Radiation and convection. The use of a closed can is not allowed
Refroidissement: Rayonnement et convection. Il n'est pas permis d'utiliser un écran fermé
Kühlung: Strahlung und Konvektion. Die Verwendung einer geschlossenen Buchse ist nicht gestattet

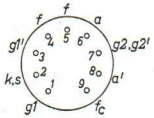
Bulb temperature
Temp. d'ampoule max. 225°C
Kolbentemperatur

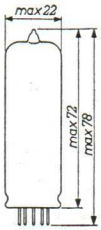
Pin temperature
Temp. des broches max. 120°C
Stiftentemperatur

Dimensions in mm
Dimensions en mm
Abmessungen in mm

Base
Culot NOVAL
Sockel




Socket
Support 5908/36
Röhrenhalter

Tube retainer
Ressort pour retenir le tube 40647
Feder zum Festhalten der Röhre

Mounting position: arbitrary; if the tube is mounted horizontally, it is recommanded that pins 2 and 7 are placed in a vertical plane
Montage: arbitrairement; si le tube est monté horizontalement, il est recommandé que les broches 2 et 7 sont montées dans un plan vertical
Einbau : willkürlich; wenn die Röhre waagerecht aufgestellt ist, wird empfohlen die Stifte 2 und 7 in einer senkrechten Ebene aufzustellen

Net weight, poids net, Nettogewicht : 16 g
Shipping weight, poids brut, Bruttogewicht: 23 g

1) Occasional operation at 5.3 V or 7.8 V (resp. 10.6 V or 15.6 V) is acceptable. The tube may be used with only half the heater energized during the stand-by period of a transmitter in order to reduce heater current consumption during this time.
Opération occassionelle à 5,3 V ou 7,8 V (10,6 ou 15,6 resp.) est acceptable. Afin de réduire la consommation de courant de chauffage pendant le temps d'attente d'un émetteur, le tube peut être utilisé avec la moitié du filament seulement chauffée pendant ce temps.
Gelegentliche Wirkung bei 5,3 V oder 7,8 V (bzw. 10,6 V oder 15,6 V) ist akzeptabel. Zur Verringerung des Heizstromverbrauches während der Ruhezeit eines Senders darf die Röhre während dieser Zeit mit nur der Hälfte des Heizfadens geheizt gebraucht werden.

H.F. class C telegraphy; two systems in push-pull
H.F. classe C télégraphie; deux systèmes en push-pull
HF- Klasse C Telegraphie; zwei Systeme in Gegentakt

C.C.S. Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| f | = max. | 200 | Mc/s |
| $V_a$ | = max. | 300 | V |
| $W_a$ | = max. | 2x5 | W |
| $W_{ia}$ | = max. | 2x11,25 | W |
| $I_a$ | = max. | 2x45 | mA |
| $V_{g_2}$ | = max. | 200 | V |
| $W_{g_2}$ | = max. | 2x1 | W |
| $-V_{g_1}$ | = max. | 150 | V |
| $W_{g_1}$ | = max. | 2x0,2 | W |
| $I_{g_1}$ | = max. | 2x3 | mA |
| $I_k$ | = max. | 2x50 | mA |
| $I_{k_p}$ | = max. | 225 | mA |
| $V_{kf}$ | = max. | 100 | V |

C.C.S. Operating characteristics, continuous service
Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | | |
|---|---|---|---|---|---|
| f | = | 200 | 200 | 200 | Mc/s |
| $V_a = V_b$ | = | 300 | 250 | 200 | V |
| $V_{g_2}$ | = | 175 | - | - | V |
| $R_{g_2}$ | = | - | 47 | 22 | kΩ |
| $V_{g_1}$ | = | -40 | - | - | V |
| $R_{g_1}$ [1] | = | - | 18 | 15 | kΩ |
| $V_{g_1 g_1'p}$ | = | 110 | 110 | 115 | V |
| $I_a$ | = | 2x37,5 | 2x33,5 | 2x35 | mA |
| $I_{g_2}$ | = | 2,3 | 1,8 | 2,2 | mA |
| $I_{g_1}$ | = | 2x0,9 | 2,2 | 2,7 | mA |
| $W_{ia}$ | = | 2x11,25 | 2x8,4 | 2x7 | W |
| $W_a$ | = | 2x4 | 2x2,9 | 2x2,8 | W |
| $W_{g_2}$ | = | 0.4 | 0,3 | 0,33 | W |
| $W_{ig_1}$ | = | 2x0,05 | 0,12 | 0,14 | W |
| $W_o$ | = | 14;5 | 11 | 8,4 | W |
| $\eta$ | = | 65 | 65 | 60 | % |
| $W_o$ [2] | = | 12 | 9 | 7,4 | W |

[1] [2] See page 4; voir page 4, siehe Seite 4

# PHILIPS

H.F.class C telegraphy, two systems in push-pull; continued
H.F.classe C télégraphie, deux systèmes en push-pull; continuation
HF-Klasse C Telegraphie, zwei Systeme in Gegentakt: Fortsetzung

I.C.A.S. Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| f | = max. | 200 | Mc/s |
| $V_a$ | = max. | 300 | V |
| $W_a$ | = max. | 2x7 | W |
| $W_{ia}$ | = max. | 2x15 | W |
| $I_a$ | = max. | 2x55 | mA |
| $V_{g_2}$ | = max. | 200 | V |
| $W_{g_2}$ | = max. | 2x1 | W |
| $-V_{g_1}$ | = max. | 150 | V |
| $W_{g_1}$ | = max. | 2x0,2 | W |
| $I_{g_1}$ | = max. | 2x4 | mA |
| $I_k$ | = max. | 2x65 | mA |
| $I_{k_p}$ | = max. | 2x300 | mA |
| $V_{kf}$ | = max. | 100 | V |

I.C.A.S. Operating conditions, intermittent service
Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | | | | |
|---|---|---|---|---|---|
| f | = | 200 | 200 | 200 | Mc/s |
| $V_a = V_b$ | = | 300 | 250 | 200 | V |
| $V_{g_2}$ | = | 200 | - | - | V |
| $R_{g_2}$ | = | - | 27 | 8,2 | kΩ |
| $V_{g_1}$ | = | -45 | | | V |
| $R_{g_1}$ [1] | = | - | 18 | 15 | kΩ |
| $V_{g_1 g_1 p}$ | = | 130 | 120 | 130 | V |
| $I_a$ | = | 2x50 | 2x40 | 2x42 | mA |
| $I_{g_2}$ | = | 3,0 | 2,4 | 3,1 | mA |
| $I_{g_1}$ | = | 2x1,5 | 2,5 | 3,0 | mA |
| $W_{ia}$ | = | 2x15 | 2x10 | 2x8,4 | W |
| $W_a$ | = | 2x6 | 2x3,5 | 2x3,4 | W |
| $W_{g_2}$ | = | 0,6 | 0,45 | 0,55 | W |
| $W_{ig_1}$ | = | 2x0,1 | 0,15 | 0,18 | W |
| $W_o$ | = | 18,5 | 13 | 10 | W |
| $\eta$ | = | 62 | 65 | 60 | % |
| $W_o$ [2] | = | 16 | 11,2 | 9 | W |

[1] Common resistor for both systems
Résistance commune pour les deux systèmes
Gemeinsamer Widerstand für beide Systeme

[2] Useful power output in load
Puissance utile dans la charge
Nützliche Leistung in der Belastung

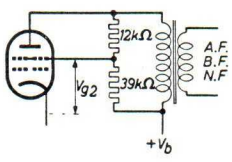
H.F. class C anode and screen grid modulation, two systems in push-pull
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull
HF- Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | |
|---|---|---|
| f | = max. | 200 Mc/s |
| $V_a$ | = max. | 240 V |
| $W_a$ | = max. | 2x3,3 W |
| $W_{ia}$ | = max. | 2x7,5 W |
| $I_a$ | = max. | 2x37,5 mA |
| $V_{g2}$ | = max. | 200 V |
| $W_{g2}$ | = max. | 1,3 W |
| $-V_{g1}$ | = max. | 150 V |
| $W_{g1}$ | = max. | 2x0,2 W |
| $I_{g1}$ | = max. | 2x3 mA |
| $I_k$ | = max. | 2x40 mA |
| $I_{kp}$ | = max. | 2x180 mA |
| $V_{kf}$ | = max. | 100 V |

Operating conditions, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | |
|---|---|---|
| f | = | 200 Mc/s |
| $V_a=V_b$ | = | 200 V |
| $V_{g2}$ [3] | = | |
| $R_{g1}$ [1] | = | 33 kΩ |
| $V_{g1,g1'p}$ | = | 130 V |
| $I_a$ | = | 2x33,5 mA |
| $I_{g2}$ | = | 2,6 mA |
| $I_{g1}$ | = | 1,5 mA |
| $W_{ia}$ | = | 2x6,7 W |
| $W_a$ | = | 2x2,65 W |
| $W_{g2}$ | = | 0,46 W |
| $W_{ig1}$ | = | 0,1 W |
| $W_o$ | = | 8,1 W |
| $\eta$ | = | 60 % |
| $W_o$ [2] | = | 7,1 W |
| m | = | 100 % |
| $W_{mod}$ | = | 6,7 W |




[1] [2] See page 4, voir page 4; siehe Seite 4
[3] See diagram; voir le schéma; siehe das Schaltbild

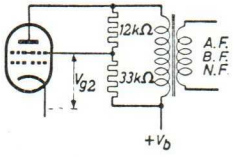
H.F. class C anode and screen grid modulation, two systems in push-pull; continued
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull; continuation
HF-Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt; Fortsetzung

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | |
|---|---|---|
| f | = max. | 200 Mc/s |
| $V_a$ | = max. | 240 V |
| $W_a$ | = max. | 2x4,6 W |
| $W_{ia}$ | = max. | 2x10 W |
| $I_a$ | = max. | 2x46 mA |
| $V_{g2}$ | = max. | 200 V |
| $W_{g2}$ | = max. | 1,3 W |
| $-V_{g1}$ | = max. | 150 V |
| $W_{g1}$ | = max. | 2x0,2 W |
| $I_{g1}$ | = max. | 2x4 mA |
| $I_k$ | = max. | 2x52 mA |
| $I_{kp}$ | = max. | 2x240 mA |
| $V_{kf}$ | = max. | 100 V |

Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| f | = | 200 Mc/s |
| $V_a = V_b$ | = | 200 V |
| $V_{g2}$ [3] | | |
| $R_{g1}$ [1] | = | 15 kΩ |
| $V_{g1\,g1'p}$ | = | 130 V |
| $I_a$ | = | 2x43 mA |
| $I_{g2}$ | = | 3,1 mA |
| $I_{g1}$ | = | 3,3 mA |
| $W_{ia}$ | = | 2x8,6 W |
| $W_a$ | = | 2x3,7 W |
| $W_{g2}$ | = | 0,54 W |
| $W_{ig1}$ | = | 0,2 W |
| $W_o$ | = | 9,8 W |
| $\eta$ | = | 57 % |
| $W_o$ [2] | = | 8,8 W |
| m | = | 100 % |
| $W_{mod}$ | = | 8,6 W |




[1] [2] See page 4; voir page 4; siehe Seite 4
[3] See diagram; voir le schéma; siehe das Schaltbild

H.F. class C frequency tripler, two systems in push-pull
H.F. classe C tripleur de fréquence, deux systèmes en push-pull
HF-Klasse C Frequenzverdreifacher, zwei Systeme in Gegentakt

C.C.S. Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | |
|---|---|---|
| f | = max. | 200 Mc/s |
| $V_a$ | = max. | 300 V |
| $W_a$ | = max. | 2x5 W |
| $W_{ia}$ | = max. | 2x7,5 W |
| $I_a$ | = max. | 2x30 mA |
| $V_{g_2}$ | = max. | 200 V |
| $W_{g_2}$ | = max. | 2 W |
| $-V_{g_1}$ | = max. | 150 V |
| $W_{g_1}$ | = max. | 2x0,2 W |
| $I_{g_1}$ | = max. | 2x2 mA |
| $I_k$ | = max. | 2x35 mA |
| $I_{kp}$ | = max. | 2x225 mA |
| $V_{kf}$ | = max. | 100 V |

C.C.S. Operating conditions, continuous service
Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | | |
|---|---|---|---|---|---|
| f | = | 67/200 | 67/200 | 67/200 | Mc/s |
| $V_a = V_b$ | = | 300 | 250 | 200 | V |
| $V_{g_2}$ | = | 150 | 161 | 155 | V |
| $R_{g_2}$ | = | - | 47 | 15 | kΩ |
| $V_{g_1}$ | = | -100 | - | - | V |
| $R_{g_1}$ [1] | = | - | 47 | 33 | kΩ |
| $V_{g_1 g_1 p}$ | = | 230 | 230 | 230 | V |
| $I_a$ | = | 2x24 | 2x25 | 2x28,5 | mA |
| $I_{g_2}$ | = | 2,0 | 1,9 | 3,0 | mA |
| $I_{g_1}$ | = | 2x1,0 | 2x1,0 | 2x1,6 | mA |
| $W_{ia}$ | = | 2x7,2 | 2x6,25 | 2x5,7 | W |
| $W_a$ | = | 2x4,0 | 2x3,75 | 2x3,8 | W |
| $W_{g_2}$ | = | 0,30 | 0,31 | 0,46 | W |
| $W_{ig_1}$ | = | 0,23 | 0,23 | 0,35 | W |
| $W_o$ | = | 6,5 | 5,0 | 3,8 | W |
| $\eta$ | = | 45 | 40 | 33,5 | % |
| $W_o$ [2] | = | 3,5 | 3,0 | 2,8 | W |

1) 2) See page 4; voir page 4; siehe Seite 4

H.F. class C frequency tripler, two systems in push-pull; continued
H.F. classe C tripleur de fréquence, deux systèmes en push-pull; continuation
HF-Klasse C Frequenzverdreifacher, zwei Systeme in Gegentakt; Fortsetzung

Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| f | = max. | 200 | Mc/s |
| $V_a$ | = max. | 300 | V |
| $W_a$ | = max. | 2x7 | W |
| $W_{ia}$ | = max. | 2x10 | W |
| $I_a$ | = max. | 2x42 | mA |
| $V_{g_2}$ | = max. | 200 | V |
| $W_{g_2}$ | = max. | 2 | W |
| $-V_{g_1}$ | = max. | 150 | V |
| $W_{g_1}$ | = max. | 2x0,2 | W |
| $I_{g_1}$ | = max. | 2x3 | mA |
| $I_k$ | = max. | 2x45 | mA |
| $I_{kp}$ | = max. | 2x300 | mA |
| $V_{kf}$ | = max. | 100 | V |

Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | | | | |
|---|---|---|---|---|---|
| f | =67/200 | 67/200 | 67/200 | 67/200 | Mc/s |
| $V_a = V_b$ | = 300 | 300 | 250 | 200 | V |
| $V_{g_2}$ | = 150 | 175 | 176 | 175 | V |
| $R_{g_2}$ | = - | - | 18 | 4,7 | kΩ |
| $V_{g_1}$ | = -100 | -100 | - | - | V |
| $R_{g_1}$ [1] | = - | - | 27 | 22 | kΩ |
| $V_{g_1 g_1 p}$ | = 240 | 230 | 230 | 230 | V |
| $I_a$ | =2x32,5 | 2x32,5 | 2x36 | 2x39 | mA |
| $I_{g_2}$ | = 3,5 | 2,7 | 4,1 | 5,2 | mA |
| $I_{g_1}$ | = 2x1,9 | 2x1,2 | 2x1,9 | 2x2,3 | mA |
| $W_{ia}$ | = 2x9,7 | 2x9,7 | 2x9 | 2x7,8 | W |
| $W_a$ | = 2x5,8 | 2x6,1 | 2x5,9 | 2x5,55 | W |
| $W_{g_2}$ | = 0,53 | 0,47 | 0,72 | 0,91 | W |
| $W_{ig_1}$ | = 0,45 | 0,28 | 0,43 | 0,52 | W |
| $W_o$ | = 7,8 | 7,2 | 6,2 | 4,5 | W |
| $\eta$ | = 40 | 37 | 34,5 | 29 | % |
| $W_o$ [2] | = 4,8 | 4,2 | 4,2 | 3,5 | W |

[1] [2] See page 4; voir page 4; siehe Seite 4

L.F. class AB amplifier and modulator without grid current
Amplificatrice et modulatrice B.F. classe AB sans courant de grille
NF-Verstärker und Modulator Klasse AB ohne Gitterstrom

Limiting values; only for speech and music
Caractéristiques limites;seulement pour parole et musique
Grenzdaten; nur für Sprache und Musik

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 300 | V |
| $W_a$ | = max. | 2x7 | W |
| $W_{ia}$ | = max. | 2x15 | W |
| $I_a$ | = max. | 2x50 | mA |
| $V_{g2}$ | = max. | 200 | V |
| $W_{g2}$ | = max. | 2x1 | W ← |
| $W_{g2p}$ | = max. | 2x2 | W ← |
| $-V_{g1}$ | = max. | 150 | V |
| $W_{g1}$ | = max. | 2x0,2 | W |
| $I_{g1}$ | = max. | 2x4 | mA |
| $I_k$ | = max. | 2x60 | mA |
| $I_{kp}$ | = max. | 2x300 | mA |
| $V_{kf}$ | = max. | 100 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $V_a$ | = | 300 | | 250 | | 200 | V |
| $V_{g2}$ | = | 200 | | 200 | | 200 | V |
| $V_{g1}$ [1] | = | -21,5 | | -21,5 | | -21,5 | V |
| $R_{aa'}$ | = | 10 | | 8 | | 6,5 | kΩ |
| $V_{g1g1'p}$ | = | 0 | 43,5 | 0 | 44,5 | 0 | 43,5 V |
| $I_a$ | = | 2x15 | 2x36 | 2x15 | 2x34,5 | 2x15 | 2x33 mA |
| $I_{g2}$ | = | 1,2 | 12,6 | 1,4 | 12,4 | 2,4 | 14 mA |
| $W_{g2}$ | = | 0,24 | 2,5 | 0,28 | 2,5 | 0,48 | 2,8 W |
| $W_{ia}$ | = | 2x4,5 | 2x10,8 | 2x3,75 | 2x8,65 | 2x3,0 | 2x6,6 W |
| $W_a$ | = | 2x4,5 | 2x4,8 | 2x3,75 | 2x4,0 | 2x3,0 | 2x3,1 W |
| $W_o$ | = | 0 | 12 | 0 | 9,3 | 0 | 7,0 W |
| $\eta$ | = | - | 56 | - | 54 | - | 53 % |
| $d_{tot}$ | = | - | 2,5 | - | 2,7 | - | 3,2 % |

→ [1]) Individual adjustment of the grid bias of each system is recommended
Il est recommandé de régler la polarisation négative de chaque système individuellement
Es wird empfohlen die Gittervorspannung jedes Systems einzeln zu regeln

# PHILIPS

L.F. class AB amplifier and modulator with grid current
Amplificatrice et modulatrice B.F. classe AB avec courant de grille
NF-Verstärker und Modulator Klasse AB mit Gitterstrom

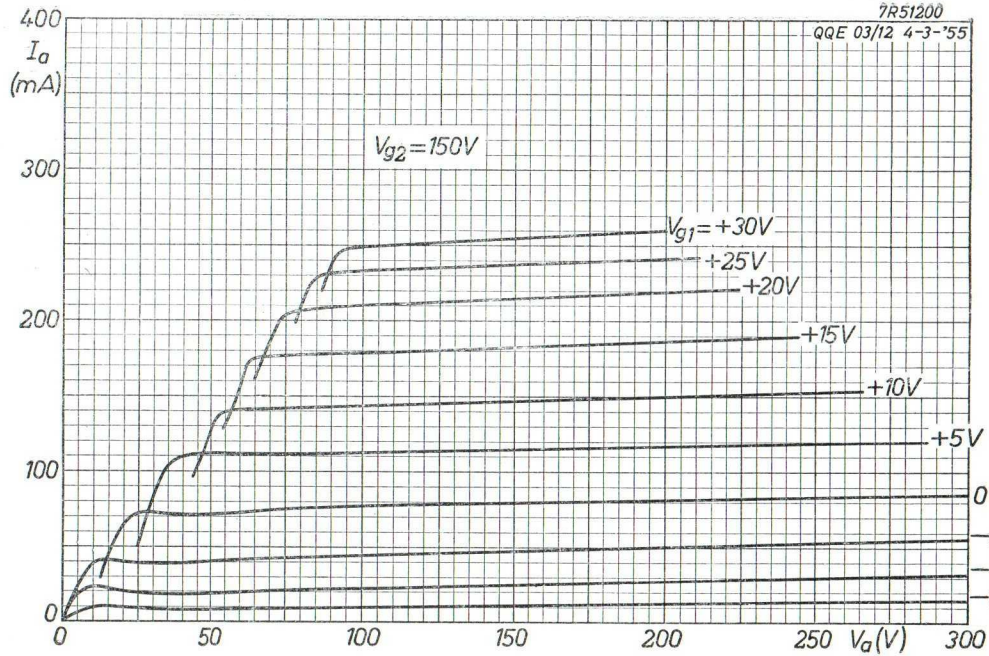
Limiting values; only for speech and music
Caractéristiques limites; seulement pour parole et musique
Grenzdaten; nur für Sprache und Musik

| | | |
|---|---|---|
| $V_a$ | = max. | 300 V |
| $W_a$ | = max. | 2x7 W |
| $W_{ia}$ | = max. | 2x15 W |
| $I_a$ | = max. | 2x50 mA |
| $V_{g2}$ | = max. | 200 V |
| $W_{g2}$ | = max. | 2x1 W |
| $W_{g2p}$ | = max. | 2x2 W |
| $-V_{g1}$ | = max. | 150 V |
| $W_{g1}$ | = max. | 2x0,2 W |
| $I_{g1}$ | = max. | 2x4 mA |
| $I_k$ | = max. | 2x60 mA |
| $I_{kp}$ | = max. | 2x300 mA |
| $V_{kf}$ | = max. | 100 V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $V_a$ | = | 300 | | 250 | | 200 | V |
| $V_{g2}$ | = | 200 | | 200 | | 200 | V |
| $V_{g1}$ [1] | = | -21,5 | | -21,5 | | -21,5 | V |
| $R_{aa'}$ | = | 6,5 | | 5,0 | | 5,0 | kΩ |
| $V_{g,g1,'p}$ | = | 0 | 64 | 0 | 67 | 0 | 54 V |
| $I_a$ | = | 2x15 | 2x50 | 2x15 | 2x50 | 2x15 | 2x41,1 mA |
| $I_{g2}$ | = | 1,2 | 11,4 | 1,4 | 13 | 2,4 | 19 mA |
| $I_{g1}$ | = | 0 | 2x0,56 | 0 | 2x0,62 | 0 | 2x0,22 mA |
| $W_{g2}$ | = | 0,24 | 2,3 | 0,28 | 2,6 | 0,48 | 3,8 W |
| $W_{ig1}$ | = | 0 | 2x0,02 | 0 | 2x0,02 | 0 | 2x0,01 W |
| $W_{ia}$ | = | 2x4,5 | 2x15 | 2x3,75 | 2x12,5 | 2x3,0 | 2x8,22 W |
| $W_a$ | = | 2x4,5 | 2x6,25 | 2x3,75 | 2x5,5 | 2x3,0 | 2x3,87 W |
| $W_o$ | = | 0 | 17,5 | 0 | 14 | 0 | 8,7 W |
| $\eta$ | = | - | 58 | - | 56 | - | 53 % |
| $d_{tot}$ | = | - | 5,0 | - | 5,5 | - | 6,0 % |

[1] See page 9; voir page 9; siehe Seite 9




3.3.1955

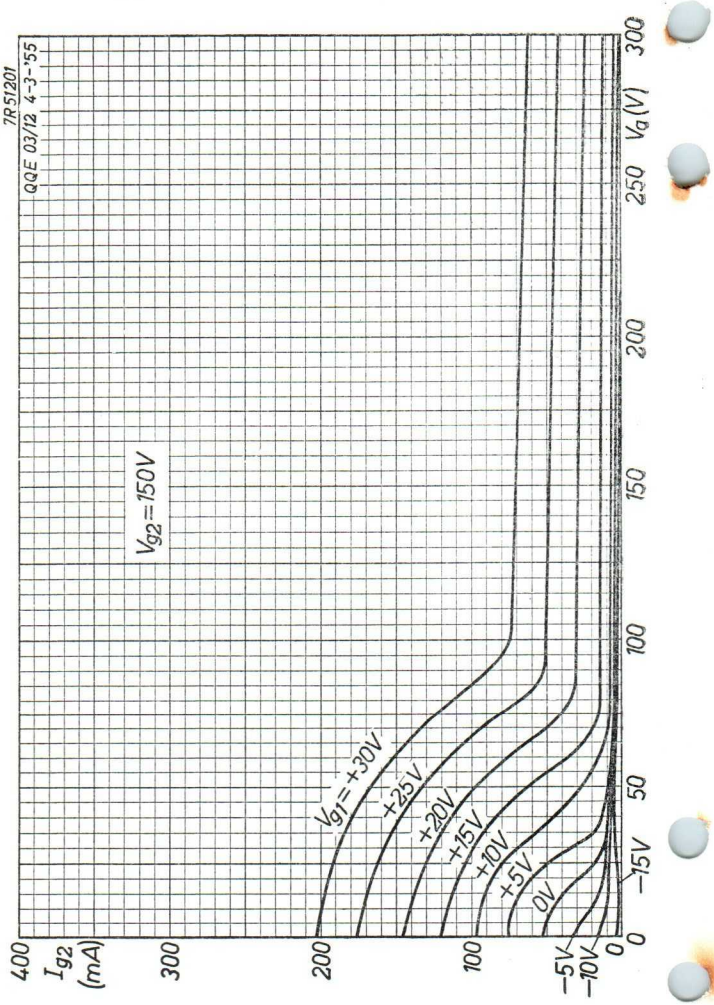
PHILIPS

QQE03/12

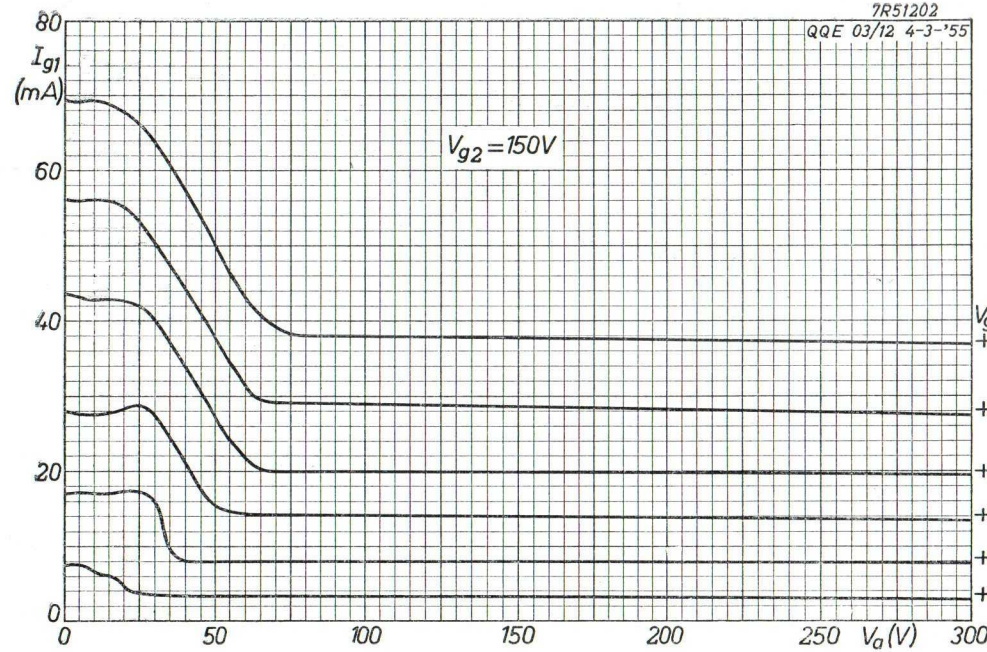
A

**QQE03/12**

# PHILIPS



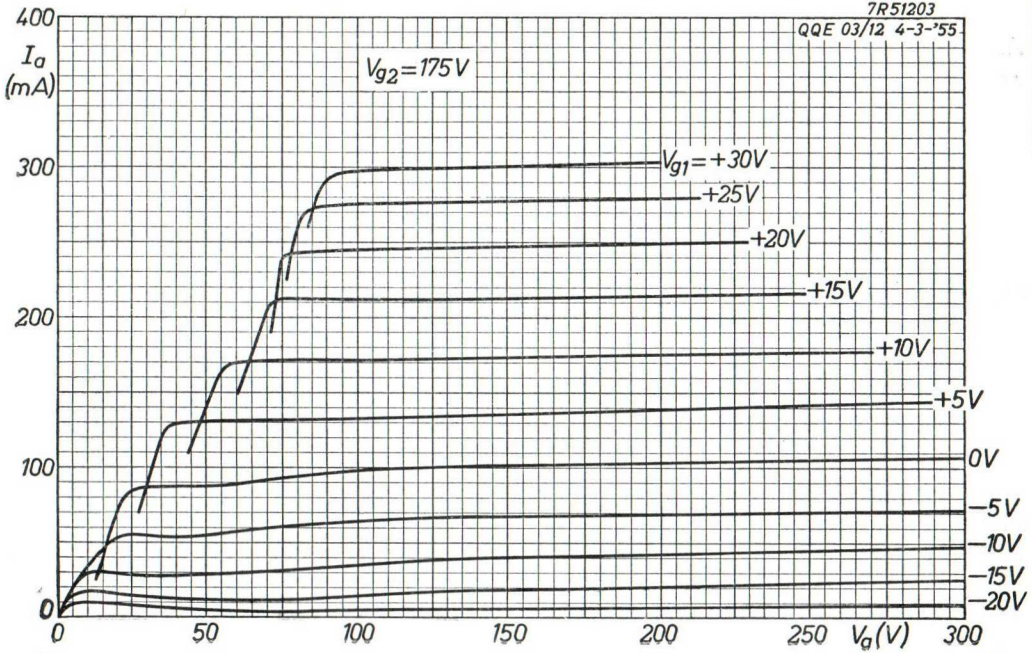

B



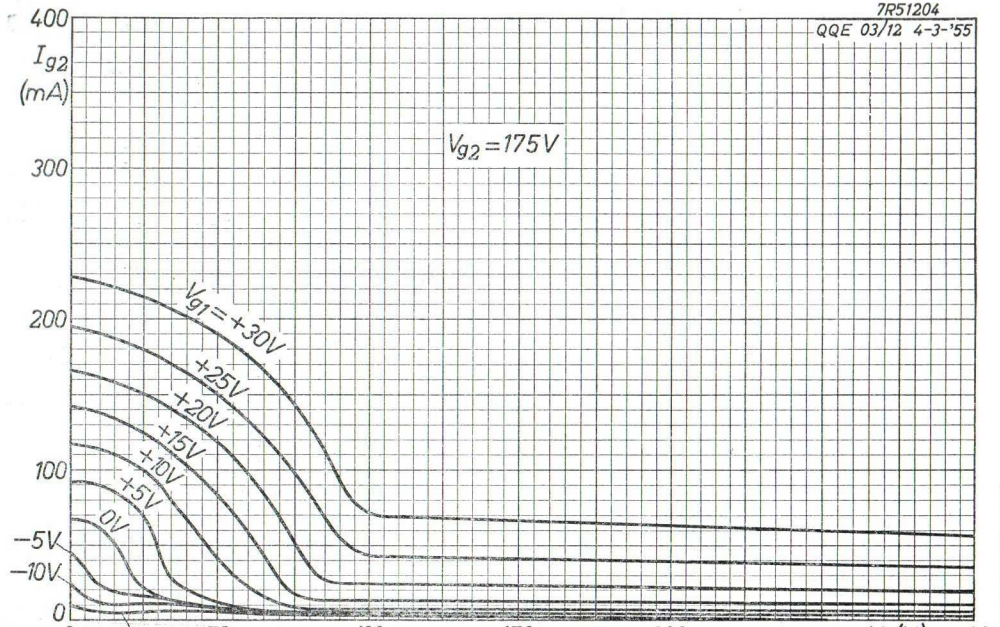

PHILIPS

QQE03/12

C

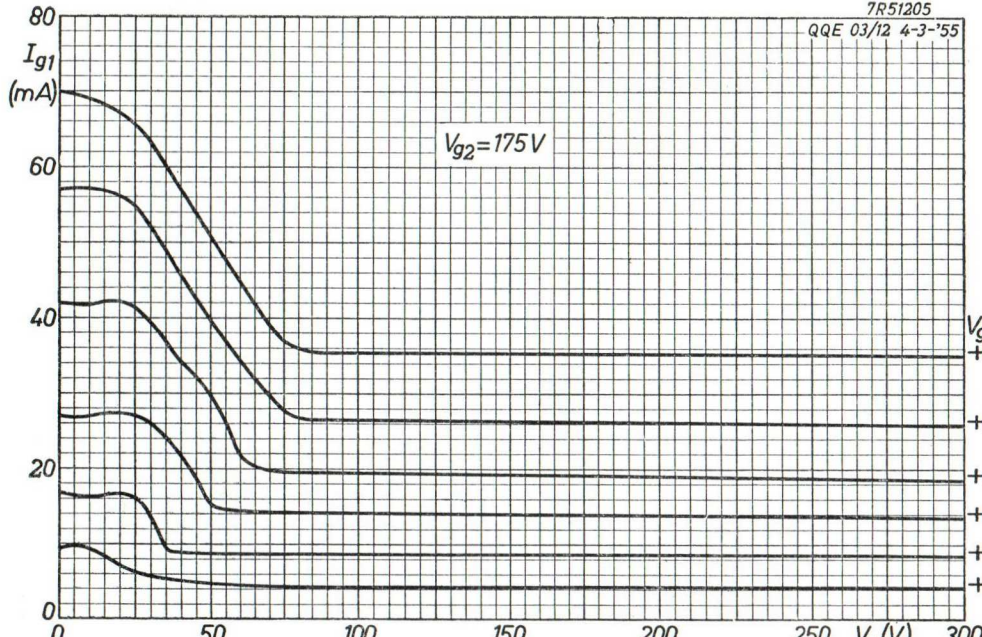

7R51203
QQE 03/12 4-3-'55
$V_{g2}$=175V
$I_a$ (mA)
400
300
200
100
0
$V_{g1}$=+30V
+25V
+20V
+15V
+10V
+5V
0V
−5V
−10V
−15V
−20V
0
50
100
150
200
250
$V_a$(V)
300

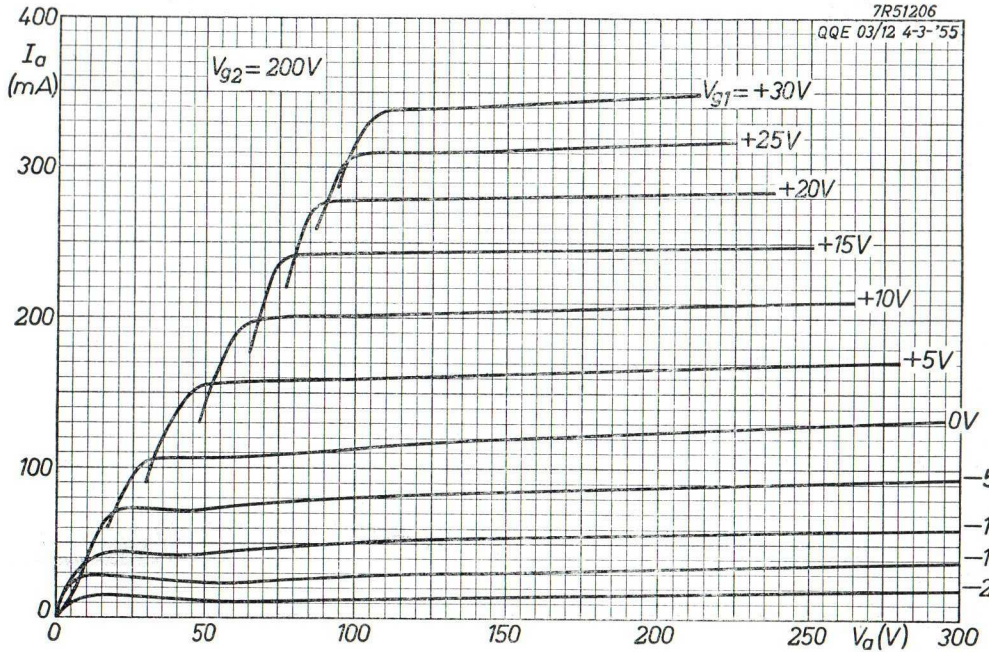
D




PHILIPS

QQE03/12

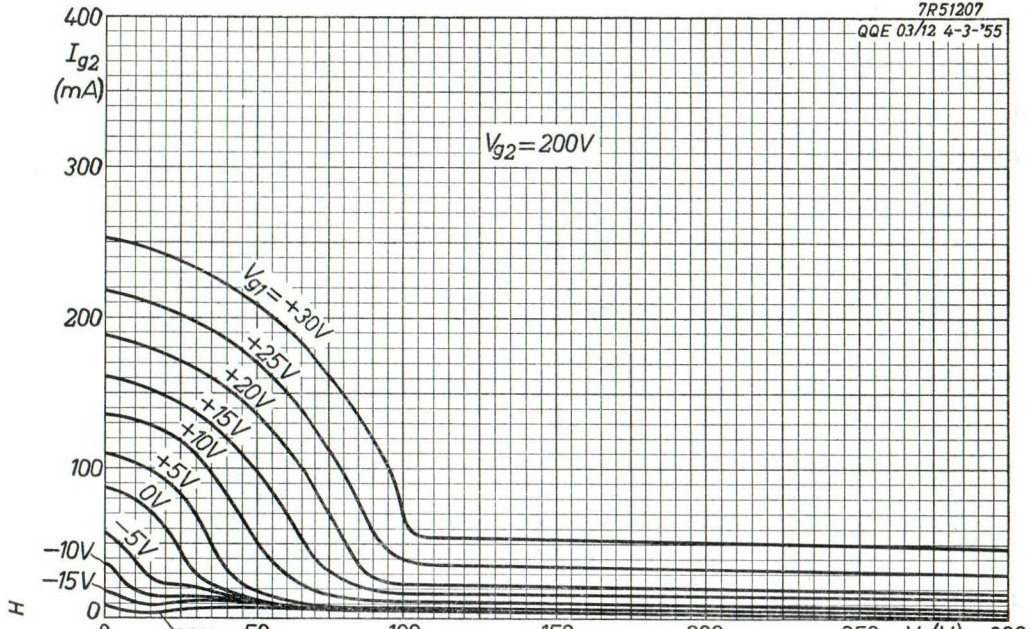

7R51205
QQE 03/12 4-3-'55
$I_{g1}$ (mA)
$V_{g2}$=175 V
$V_{g1}$=
+30V
+25V
+20V
+15V
+10V
+5V
$V_a$ (V)
0
20
40
60
80
0
50
100
150
200
250
300

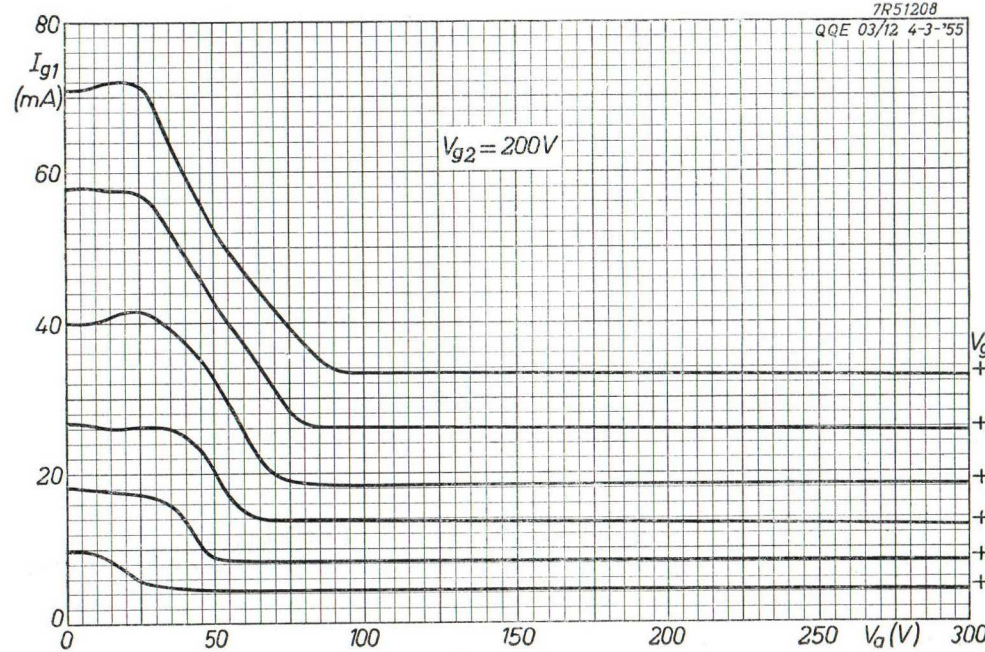



PHILIPS

QQE03/12

PHILIPS

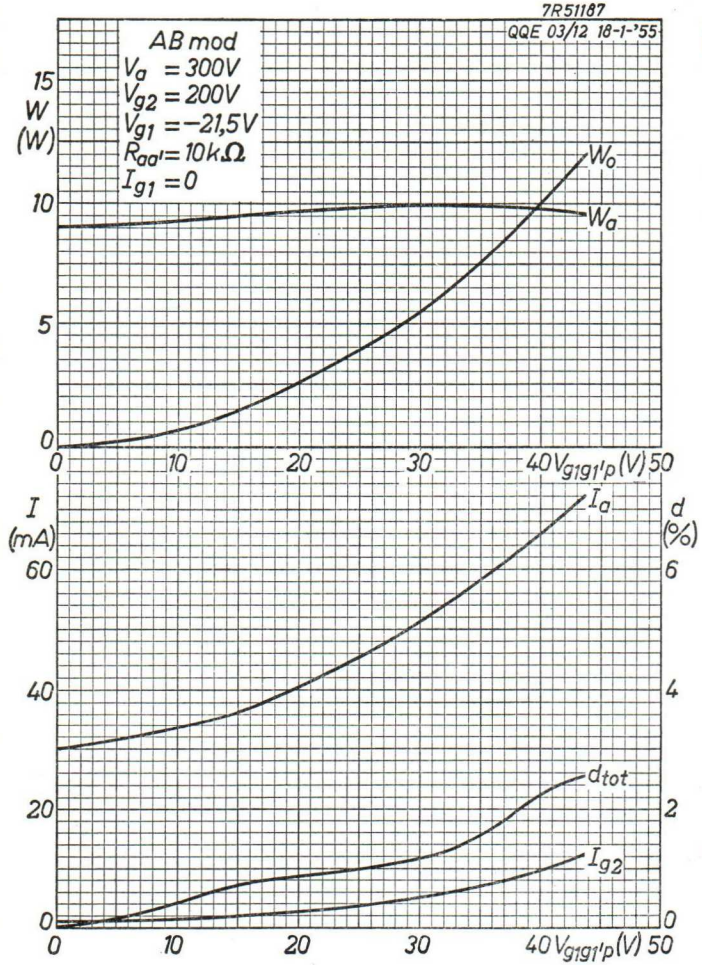

7R51207
QQE 03/12 4-3-'55
$I_{g2}$ (mA)
$V_{g2}=200V$
$V_{g1}=+30V$
+25V
+20V
+15V
+10V
+5V
0V
−5V
−10V
−15V
−20V
H
400
300
200
100
0
0
50
100
150
200
250
300
$V_a$ (V)



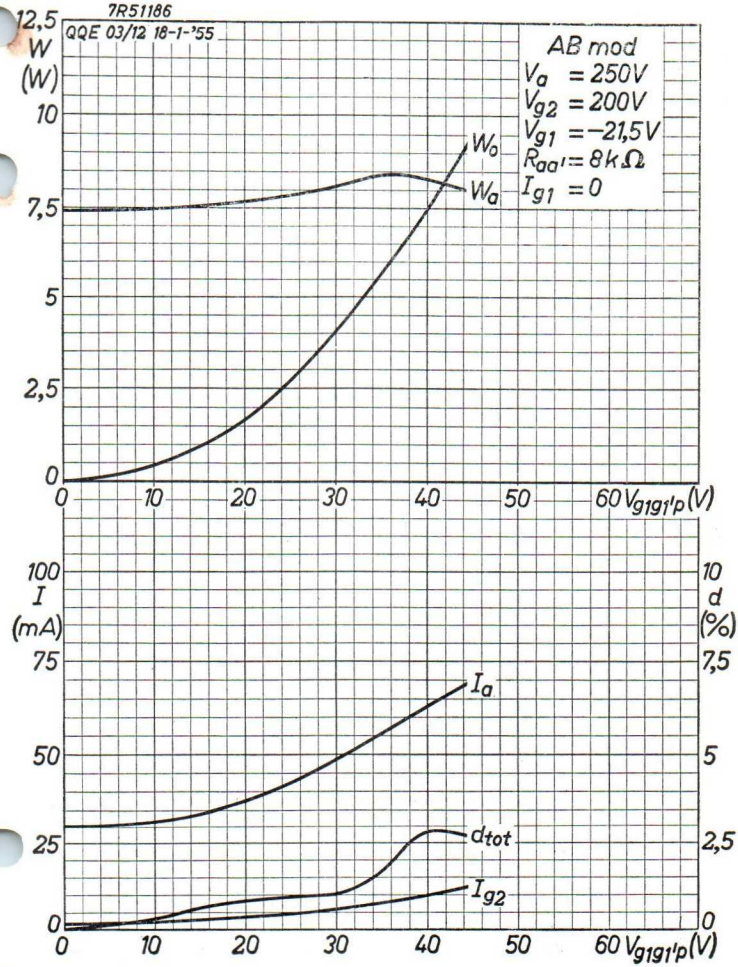

PHILIPS

QQE03/12

# PHILIPS

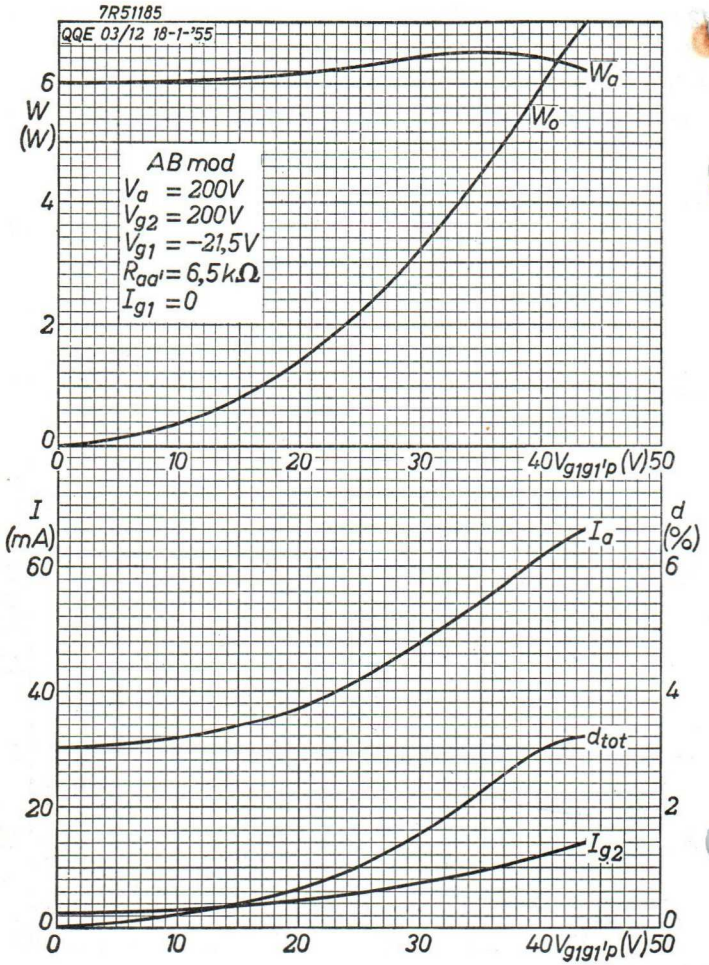

7R51187
QQE 03/12 18-1-'55
AB mod
$V_a$ = 300V
$V_{g2}$ = 200V
$V_{g1}$ = −21,5V
$R_{aa'}$ = 10kΩ
$I_{g1}$ = 0
W (W)
15
10
5
0
$W_o$
$W_a$
0
10
20
30
40
$V_{g1g1'p}$ (V)
50
I (mA)
60
40
20
0
$I_a$
$d_{tot}$
$I_{g2}$
d (%)
6
4
2
0

J


7R51186
QQE 03/12 18-1-'55
AB mod
$V_a$ = 250V
$V_{g2}$ = 200V
$V_{g1}$ = −21,5V
$R_{aa'}$ = 8kΩ
$I_{g1}$ = 0
$W_o$
$W_a$
12,5
W
(W)
10
7,5
5
2,5
0
0
10
20
30
40
50
60 $V_{g1g1'p}$(V)
100
I
(mA)
75
50
25
0
10
d
(%)
7,5
5
2,5
0
$I_a$
$d_{tot}$
$I_{g2}$

3.3.1955 K

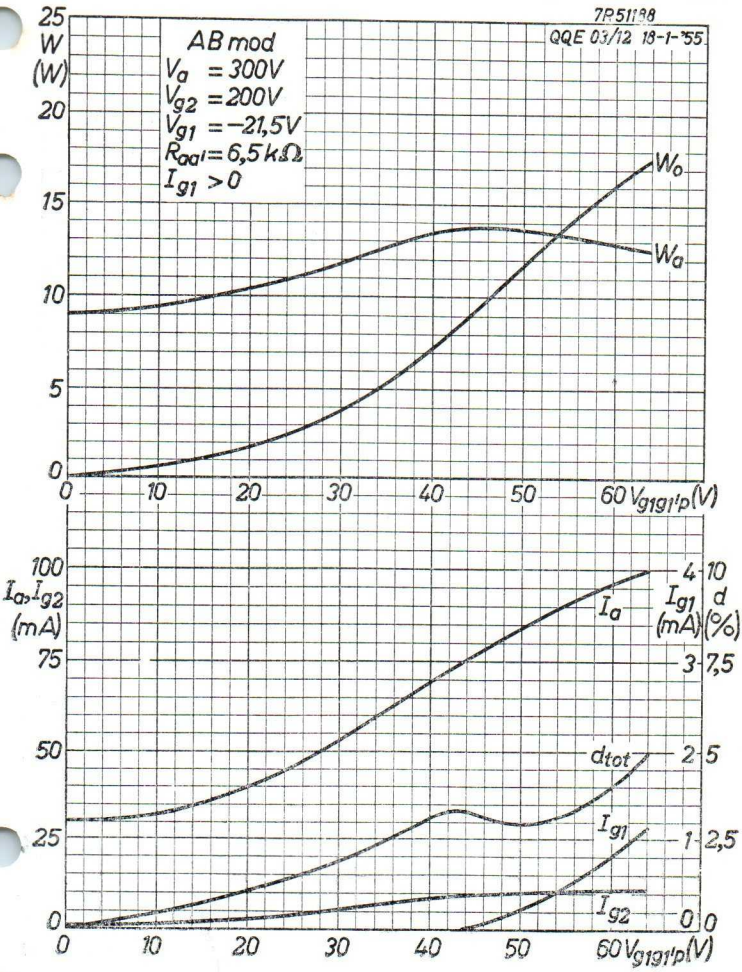
**QQE03/12** **PHILIPS**




L

# PHILIPS

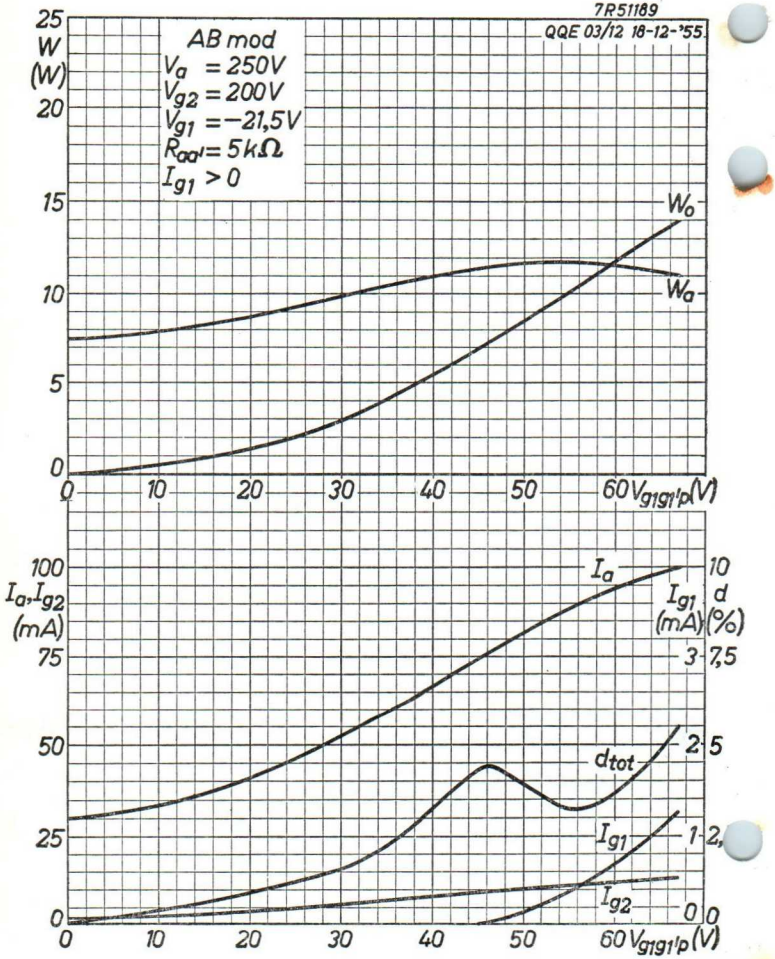
**QQE03/12**



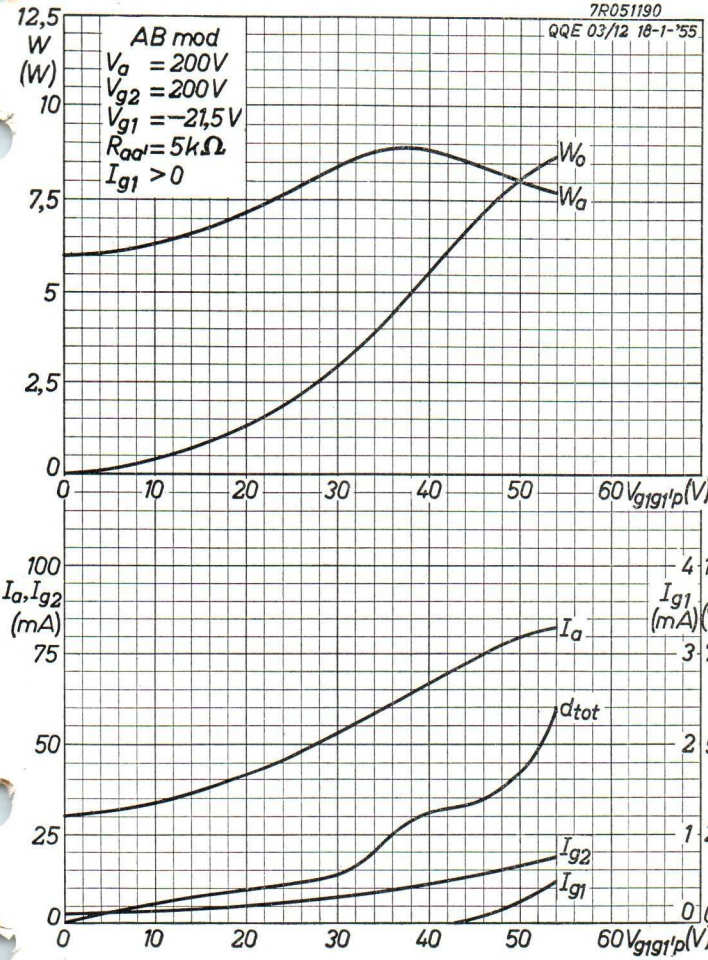

3.3.1955

M

**QQE03/12** **PHILIPS**




N


7R051190
QQE 03/12 18-1-'55
AB mod
$V_a$ = 200V
$V_{g2}$ = 200V
$V_{g1}$ = −21,5V
$R_{aa'}$ = 5kΩ
$I_{g1}$ > 0
12,5
W
(W)
10
7,5
5
2,5
0
$W_o$
$W_a$
0
10
20
30
40
50
60 $V_{g1g1'p}$(V)
100
$I_a$, $I_{g2}$
(mA)
75
50
25
0
$I_a$
$d_{tot}$
$I_{g2}$
$I_{g1}$
4
3
2
1
0
$I_{g1}$
(mA)
10
7,5
5
2,5
0
d
(%)

DOUBLE TETRODE for use as R.F. class C amplifier at frequencies up to 600 Mc/s or as L.F. amplifier
DOUBLE TETRODE pour utilisation en amplificatrice H.F. classe C à des fréquences jusqu'à 600 Mc/s ou en amplificatrice B.F.
DOPPELTETRODE zur Verwendung als H.F. Klasse C Verstärker bei Frequenzen bis 600 MHz oder als NF-Verstärker

Cathode: oxide coated
Cathode: oxyde
Katode : Oxyd

$V_f$ = 6,3 12,6 V
$I_f$ = 1,3 0,65 A

Pins
Broches 5-(1+7) 1-7
Stifte

Heating : indirect, series or parallel supply
Chauffage: indirect, alimentation en série ou en parallèle
Heizung : indirekt, Serien- oder Parallelspeisung

| Capacitances<br>Capacités<br>Kapazitäten | per system<br>par système<br>pro System | in push-pull<br>en push-pull<br>in Gegentakt |
|---|---|---|
| See page 2 for internal neutralisation ($C_n$, $C_n'$)<br>Voir page 2 pour neutralisation interne ($C_n$, $C_n'$)<br>Für Neutrodynisierung siehe Seite 2 ($C_n$, $C_n'$) | $C_a$ = 2,6 pF | $C_o$ = 1,6 pF |
| | $C_{g1}$ = 7,0 pF | $C_i$ = 4,4 pF |
| | $C_{ag1}$ < 0,08 pF | |
| | $C_{ag1}$-$C_n$ < 0,035 pF | |

Typical characteristics
Caractéristiques types
Kenndaten

$\mu_{g2g1}$ ($I_a$=20 mA) = 8
S ($I_a$=20 mA) = 2,5 mA/V

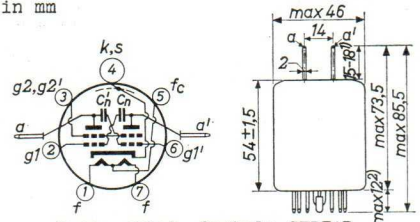
Two systems; deux systèmes; zwei Systeme

| λ | Freq. | C telegr. | | $C_{ag2}$ mod | | λ | Freq. | Cfr.mult | |
|---|---|---|---|---|---|---|---|---|---|
| | | $V_a$ | $W_o$ | $V_a$ | $W_o$ | | | $V_a$ | $W_o$ |
| m | Mc/s | (V) | (W) | (V) | (W) | m | Mc/s | (V) | (W) |
| 1,5 | 200 | 600 | 48 | 500 | 31 | 4,5/1,5 | 67/200 | 300 | 10 |
| | | 400 | 30 | 300 | 17 | 2,25/0,75 | 133/400 | 300 | 8 |
| | | 300 | 21 | | | | | | |
| | | 200 | 13 | | | | | | |
| 0,75 | 400 | 400 | 24 | 300 | 13 | | | | |
| | | 300 | 17 | | | | | | |
| | | 200 | 11 | | | | | | |
| 0,5 | 600 | 400 | 20 | | | | | | |

| B mod. | |
|---|---|
| $V_a$ | $W_o$ |
| (V) | (W) |
| 500 | 23,5 |
| 400 | 13,2 |

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: SEPTAR

| | | | |
|---|---|---|---|
| Socket | | Clips | |
| Support | 40202 | Bornes de connexion | 40623 |
| Fassung | | Anschlussklemmen | |

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

→ Cooling Temperature of anode seals and bulb max. 220 °C
Temperature of bottom seals max. 180 °C

Generally natural cooling is sufficient with:
$V_a$ = 600 V up to 150 Mc/s
$V_a$ = 500 V up to 200 Mc/s
$V_a$ = 300 V up to 430 Mc/s

Above these limits or with high ambient temperatures it may be necessary to direct an air flow of about 15 l/min. on top of the bulb to keep the seal temperatures within the stated limits

→ Refroidissement Température des scellements anodiques et de l'ampoule max. 220 °C
Température des scellements du fond max. 180 °C

En général refroidissement naturel est suffisant à:
$V_a$ = 600 V jusqu'à 150 MHz
$V_a$ = 500 V jusqu'à 200 MHz
$V_a$ = 300 V jusqu'à 430 MHz

A des fréquences plus élevées ou à des températures élevées il peut être nécessaire de diriger un courant d'air d'environ 15 l/min. sur la partie supérieure de l'ampoule afin de ne pas dépasser les limites de température mentionnées

1) Max. 3 mm glass included
Y inclus 3 mm de verre au max.
Einschliesslich max. 3 mm Glas

2) Max. 2.5 mm glas included
Y inclus 2,5 mm de verre au max.
Einschliesslich max. 2,5 mm Glas

Kühlung Temperatur der Anodeneinschmelzungen und des Kolbens max. 220 °C
Temperatur der Bodeneinschmelzungen max. 180 °C

Im allgemeinen wird natürliche Kühlung genügen wenn:

$V_a$ = 600 V bis 150 MHz
$V_a$ = 500 V bis 200 MHz
$V_a$ = 300 V bis 430 MHz

Oberhalb dieser Grenzen oder bei hohen Umgebungstemperaturen kann ein Luftstrom von etwa 15 l/Min. auf die Obenseite des Kolbens nötig sein, damit die genannte Temperaturgrenzen der Einschmelzungen nicht überschritten werden.

Net weight
Poids net
Nettogewicht 55 g

Shipping weight
Poids brut
Bruttogewicht 140 g

H.F. class C telegraphy
H.F. classe C télégraphie
H.F. Klasse C Telegrafie

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 600 | V |
| $W_a$ | = max. | 2x10 | W |
| $V_{g_2}$ | = max. | 250 | V |
| $W_{g_2}$ | = max. | 2x1,5 | W |
| $-V_{g_1}$ | = max. | 75 | V |
| $I_k$ | = max. | 2x55 | mA |
| $R_{g_1}$ [1]) | = max. | 50 | kΩ |
| $R_{g_1}$ [2]) | = max. | 100 | kΩ |
| $I_{g_1}$ | = max. | 2x2,5 | mA |
| $V_{kf}$ | = max. | 100 | V |

[1]) Fixed bias
Polarisation de grille fixe
Feste Gittervorspannung

[2]) Automatic bias
Polarisation de grille automatique
Automatische Gittervorspannung

# PHILIPS

H.F. class C telegraphy (continued)
H.F. classe C télégraphie (continuation)
HF Klasse C Telegraphie (Fortsetzung)

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 1,5 | 1,5 | 1,5 | 1,5 m |
| f | = | 200 | 200 | 200 | 200 Mc/s |
| $V_a$ | = | 600 | 400 | 300 | 200 V |
| $V_{g2}$ | = | 250 | 250 | 250 | 200 V |
| $V_{g1}$ | = | -60 | -50 | -40 | -30 V |
| $I_a$ | = | 2x50 | 2x50 | 2x50 | 2x50 mA |
| $I_{g2}$ | = | 2x4 | 2x4 | 2x4,5 | 2x4 mA |
| $I_{g1}$ | = | 2x0,7 | 2x0,7 | 2x0,7 | 2x1 mA |
| $W_{ia}$ | = | 2x30 | 2x20 | 2x15 | 2x10 W |
| $W_a$ | = | 2x6 | 2x5 | 2x4,5 | 2x3,5 W |
| $W_{g2}$ | = | 2x1,0 | 2x1,0 | 2x1,1 | 2x0,8 W |
| $W_{ig1}$ | = | 1,5 | 1 | < 1 | < 1 W |
| $W_o$ | = | 48 | 30 | 21 | 13 W |
| $\eta$ | = | 80 | 75 | 70 | 65 % |

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 0,75 | 0,75 | 0,75 | 0,5 m |
| f | = | 400 | 400 | 400 | 600 Mc/s |
| $V_a$ | = | 400 | 300 | 200 | 400 V |
| $V_{g2}$ | = | 250 | 250 | 200 | 250 V |
| $V_{g1}$ | = | -50 | -40 | -30 | -50 V |
| $I_a$ | = | 2x50 | 2x50 | 2x50 | 2x50 mA |
| $I_{g2}$ | = | 2x2,5 | 2x2,5 | 2x3,0 | 2x2,5 mA |
| $I_{g1}$ | = | 2x0,7 | 2x0,6 | 2x0,5 | 2x0,7 mA |
| $W_{ia}$ | = | 2x20 | 2x15 | 2x10 | 2x20 W |
| $W_a$ | = | 2x8 | 2x6,5 | 2x4,5 | 2x10 W |
| $W_{g2}$ | = | 2x0,6 | 2x0,6 | 2x0,6 | 2x0,63 W |
| $W_{ig1}$ | = | 2 | 1,5 | 1 | W |
| $W_o$ | = | 24 | 17 | 11 | 20 W |
| $\eta$ | = | 60 | 57 | 55 | 50 % |

H.F. class C anode and screen-grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF Klasse C Anoden- und Schirmgittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 500 | V |
| $W_a$ | = max. | 2x10 | W |
| $V_{g2}$ | = max. | 250 | V |
| $W_{g2}$ | = max. | 2x1,5 | W |
| $-V_{g1}$ | = max. | 100 | V |
| $I_k$ | = max. | 2x50 | mA |
| $I_{g1}$ | = max. | 2x2,5 | mA |
| $V_{kf}$ | = max. | 100 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | 1,5 | 1,5 | 0,75 m |
| f | = | 200 | 200 | 400 Mc/s |
| $V_a$ | = | 500 | 300 | 300 V |
| $V_{g2}$ | = | 250 | 250 | 250 V |
| $V_{g1}$ | = | -80 | -50 | -50 V |
| $I_a$ | = | 2x40 | 2x40 | 2x40 mA |
| $I_{g2}$ | = | 2x4 | 2x4 | 2x3 mA |
| $I_{g1}$ | = | 2x1,0 | 2x1,0 | 2x1,0 mA |
| $W_{ia}$ | = | 2x20 | 2x12 | 2x12 W |
| $W_a$ | = | 2x4,5 | 2x3,5 | 2x5,5 W |
| $W_{g2}$ | = | 2x1 | 2x1 | 2x0,75 W |
| $W_{ig1}$ | = | 2x5 | 2x2,5 | W |
| $W_o$ | = | 31 | 17 | 13 W |
| $\eta$ | = | 77,5 | 71 | 54 % |
| m | = | 100 | 100 | 100 % |
| Wmod | = | 20 | 12 | 12 W |

# PHILIPS

H.F. class C frequency trebler
H.F. classe C tripleur de fréquence
HF Klasse C Frequenzverdreifacher

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 600 | V |
| $W_a$ | = max. | 2x10 | W |
| $V_{g2}$ | = max. | 250 | V |
| $W_{g2}$ | = max. | 2x1,5 | W |
| $-V_{g1}$ | = max. | 200 | V |
| $I_k$ | = max. | 2x50 | mA |
| $R_{g1}$ [1]) | = max. | 50 | kΩ |
| $R_{g1}$ [2]) | = max. | 100 | kΩ |
| $I_{g1}$ | = max. | 2x2,5 | mA |
| $V_{kf}$ | = max. | 100 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| $\lambda$ | = | 4,5/1,5 | 2,25/0,75 m |
| f | = | 66,7/200 | 133/400 Mc/s |
| $V_a$ | = | 300 | 300 V |
| $V_{g2}$ | = | 250 | 250 V |
| $V_{g1}$ | = | -175 | -175 V |
| $I_a$ | = | 2x45 | 2x45 mA |
| $I_{g2}$ | = | 2x3,0 | 2x2,8 mA |
| $I_{g1}$ | = | 2x1,5 | 2x1,2 mA |
| $W_{ia}$ | = | 2x13,5 | 2x13,5 W |
| $W_a$ | = | 2x8,5 | 2x9,5 W |
| $W_{g2}$ | = | 2x0,75 | 2x0,7 W |
| $W_{ig1}$ | = | 2x1 | 2x2 W |
| $W_o$ | = | 10 | 8,0 W |
| $\eta$ | = | 37 | 29,5 % |

[1]) Fixed bias
Polarisation de grille fixe
Feste Gittervorspannung

[2]) Automatic bias
Polarisation de grille automatique
Automatische Gittervorspannung

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF Klasse B Verstärker und Modulator

Limiting values
Caractéristiques limites
Grenzdaten

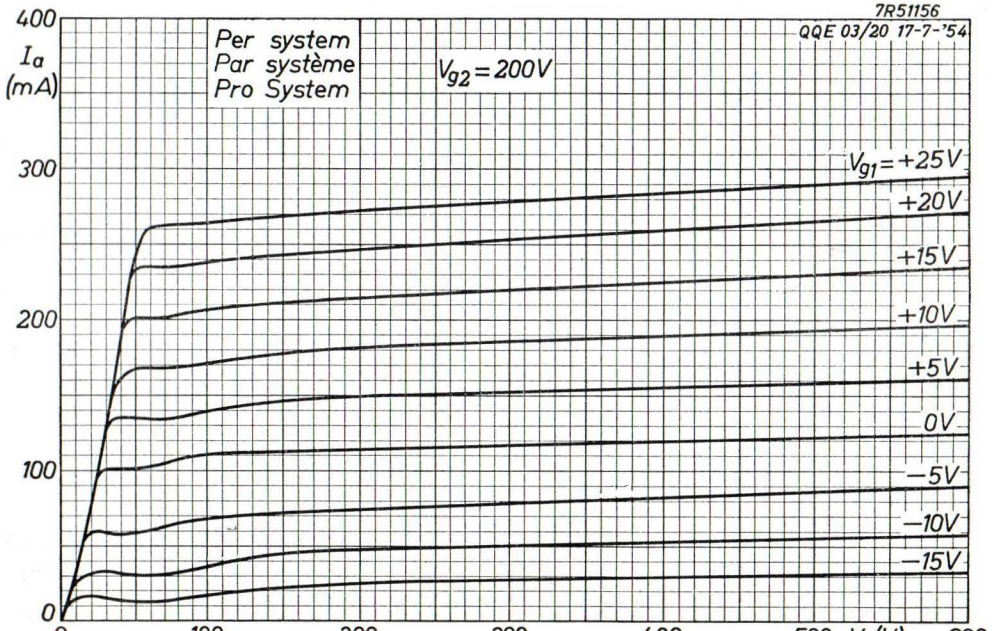
| | | | |
|---|---|---|---|
| $V_a$ | = max. | 600 | V |
| $W_a$ | = max. | 2x10 | W |
| $V_{g2}$ | = max. | 250 | V |
| $W_{g2}$ | = max. | 2x1,5 | W |
| $-V_{g1}$ | = max. | 75 | V |
| $I_k$ | = max. | 2x55 | mA |
| $R_{g1}$ | = max. | 50 | kΩ [1] |
| $R_{g1}$ | = max. | 100 | kΩ [2] |
| $V_{kf}$ | = max. | 100 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 500 | | 300 | | V |
| $V_{g2}$ | = | 250 | | 250 | | V |
| $V_{g1}$ | = | -26 | | -25 | | V |
| $R_{aa'}$ | = | 20 | | 11 | | kΩ |
| $V_{g1g1'}{}_p$ | = | 0 | 52 | 0 | 50 | V |
| $I_a$ | = | 2x12,5 | 2x36,5 | 2x12,5 | 2x35 | mA |
| $I_{g2}$ | = | 2x0,35 | 2x8,1 | 2x0,6 | 2x9,5 | mA |
| $W_{g2}$ | = | 0,18 | 4,05 | 0,3 | 4,75 | W |
| $W_{ia}$ | = | 2x6,25 | 2x18,25 | 2x3,75 | 2x10,5 | W |
| $W_a$ | = | 2x6,25 | 2x6,5 | 2x3,75 | 2x3,9 | W |
| $W_o$ | = | 0 | 23,5 | 0 | 13,2 | W |
| $d_{tot}$ | = | - | 3,5 | - | 3,5 | % |
| $\eta$ | = | - | 63,5 | - | 63 | % |

[1] Fixed bias
Polarisation de grille fixe
Feste Gittervorspannung

[2] Automatic bias
Polarisation de grille automatique
Automatische Gittervorspannung

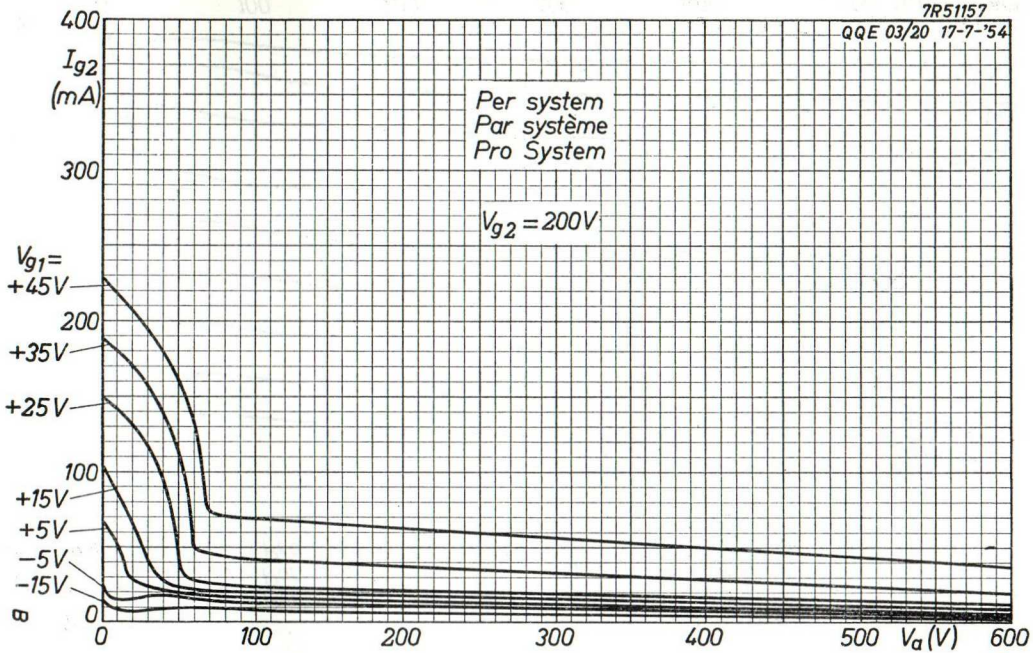



7.7.1954

A

PHILIPS

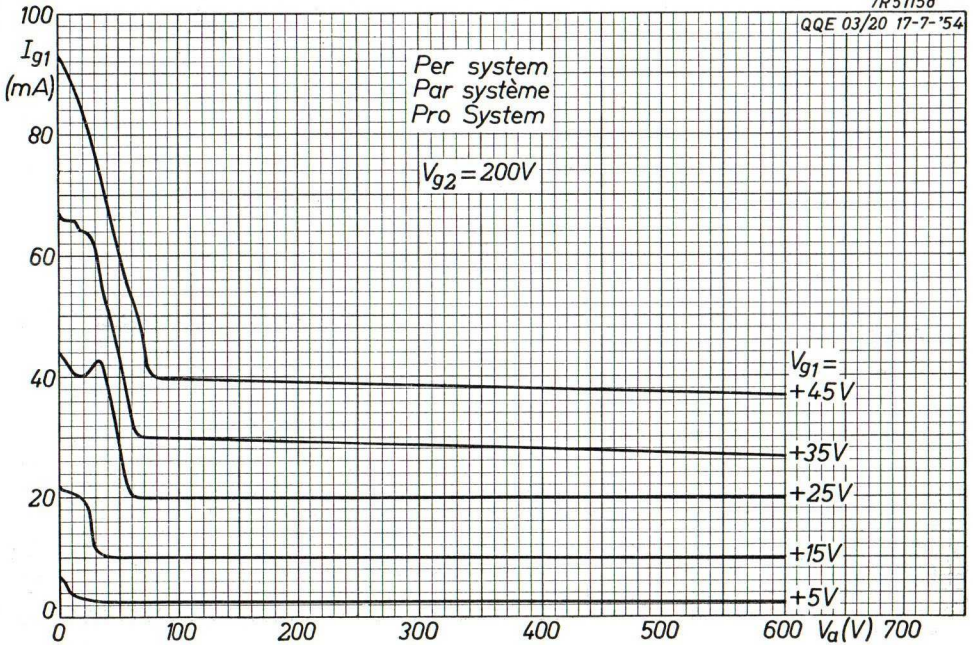
QQE 03/20


7R51157
QQE 03/20 17-7-'54
Per system
Par système
Pro System
$V_{g2} = 200V$
$I_{g2}$ (mA)
400
300
200
100
0
$V_{g1}$=
+45V
+35V
+25V
+15V
+5V
−5V
−15V
B
0
100
200
300
400
500
600
$V_a$ (V)

PHILIPS

7R51158

QQE 03/20 17-7-'54

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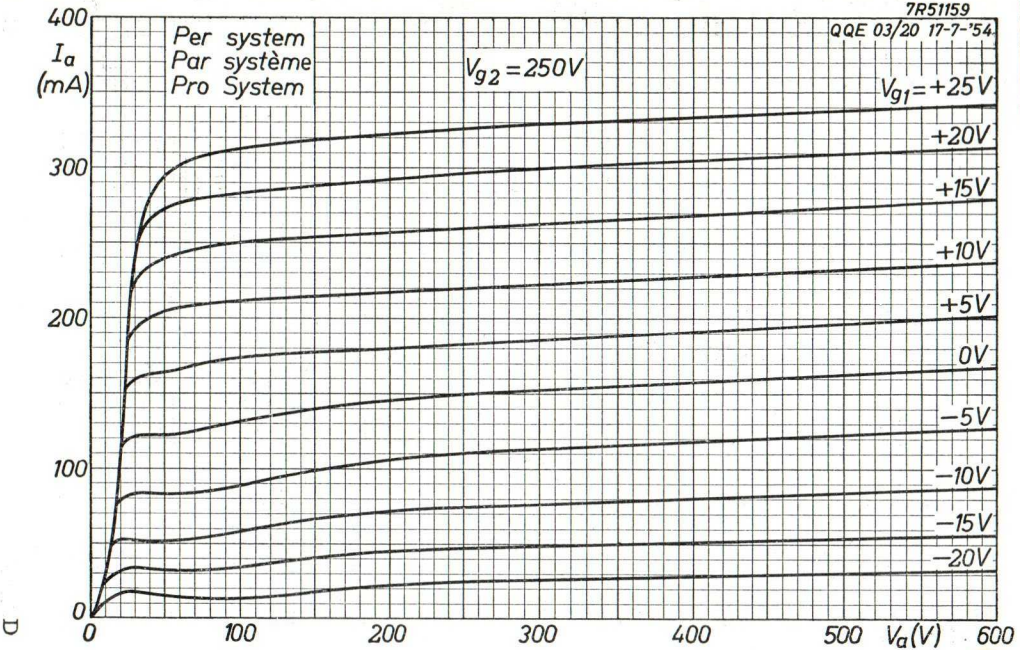
C

PHILIPS

QQE 03/20




QQE 03/20

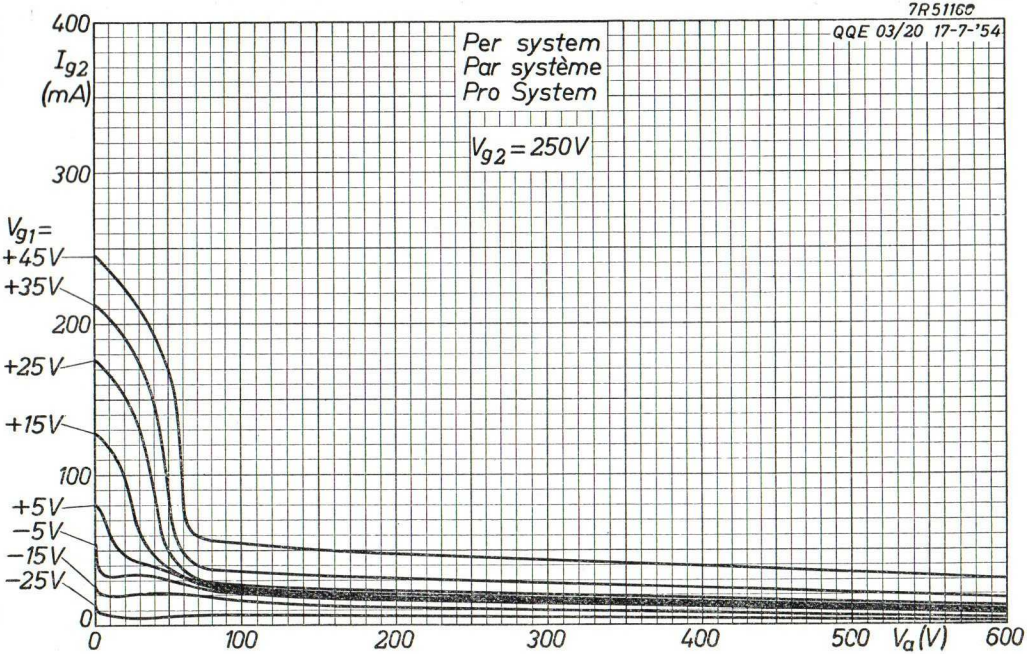
PHILIPS

D

7.7.1954

7R51166

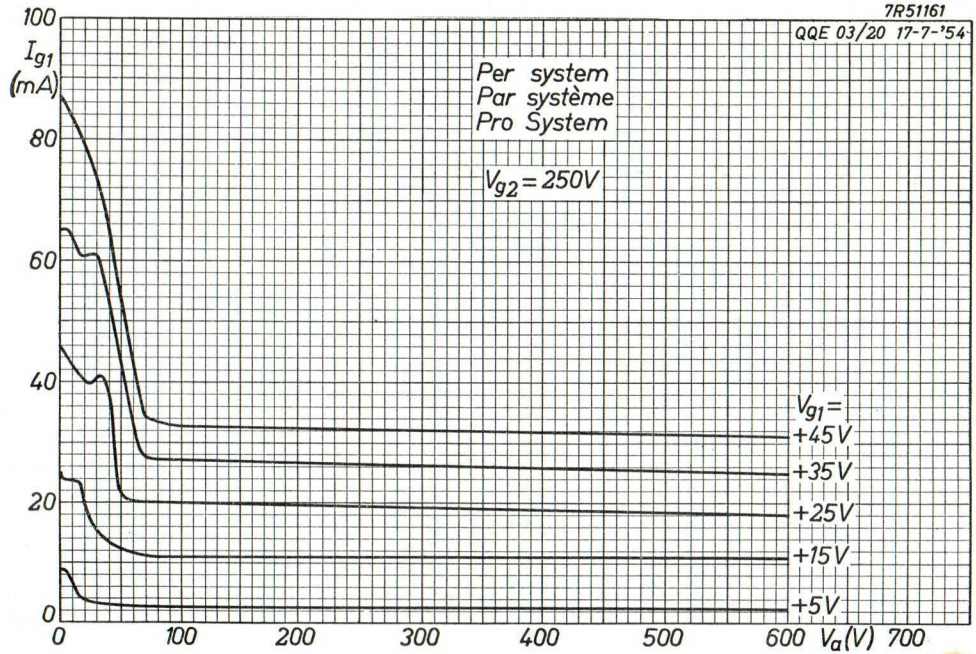
QQE 03/20 17-7-'54




E

PHILIPS

QQE 03/20

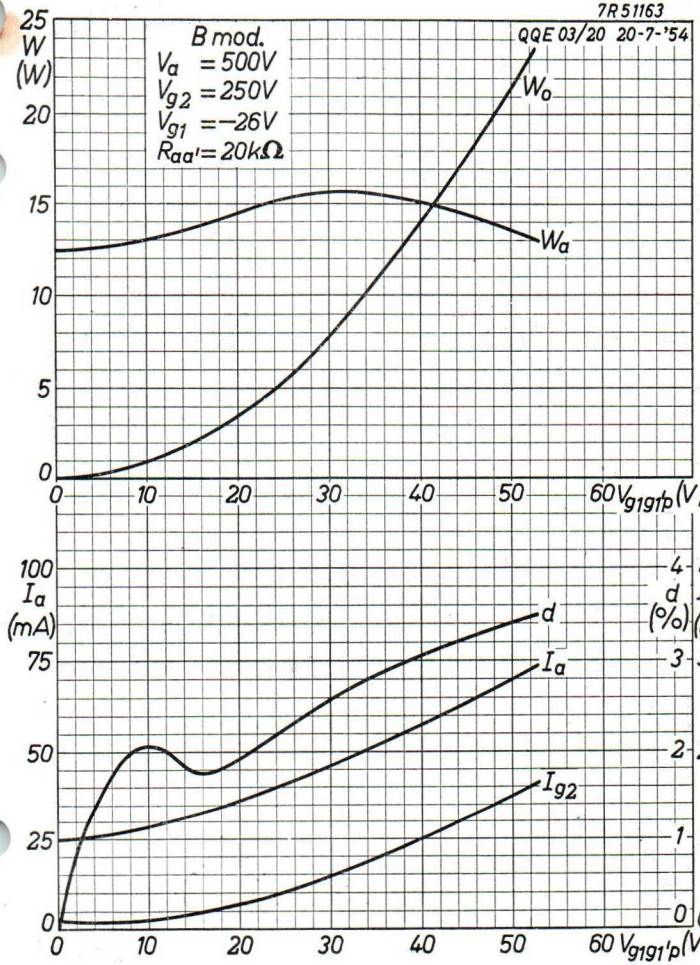

7R51161
QQE 03/20 17-7-'54
Per system
Par système
Pro System
$V_{g2}$ = 250V
$I_{g1}$ (mA)
100
80
60
40
20
0
$V_{g1}$ =
+45V
+35V
+25V
+15V
+5V
0
100
200
300
400
500
600
$V_a$(V)
700

# PHILIPS

**QQE 03/20**

7R 51163

QQE 03/20 20-7-'54

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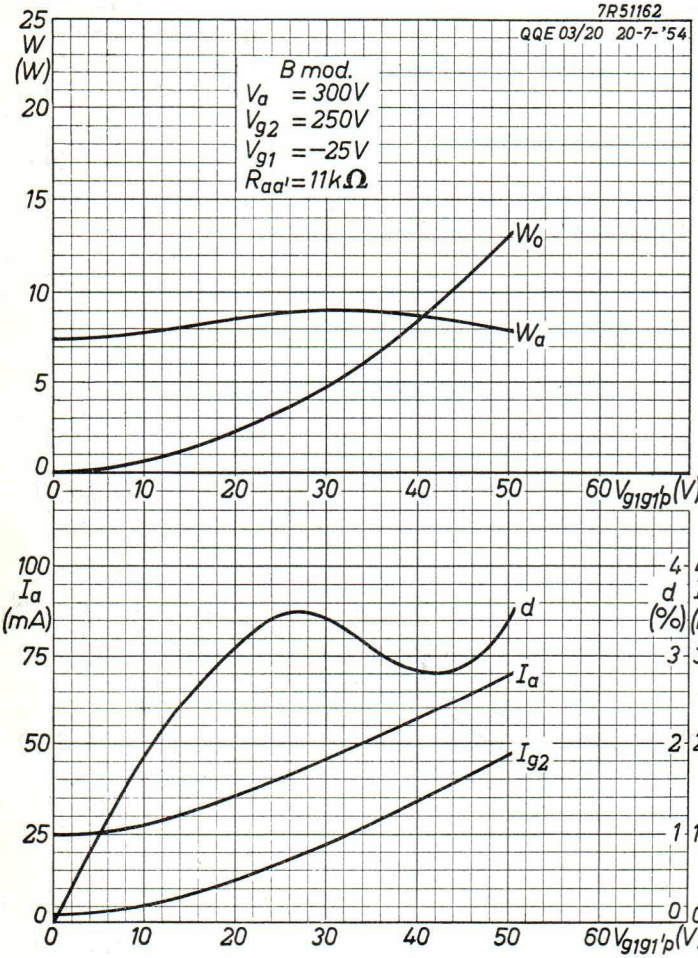
G

# PHILIPS


7R51162
QQE 03/20 20-7-'54
B mod.
$V_a$ = 300V
$V_{g2}$ = 250V
$V_{g1}$ = −25V
$R_{aa'}$ = 11kΩ
W (W)
$W_o$
$W_a$
$V_{g1g1'p}$ (V)
$I_a$ (mA)
d
$I_a$
$I_{g2}$
d (%)
$I_{g2}$ (mA)
$V_{g1g1'p}$ (V)

# PHILIPS

**QQE 04/5**

DOUBLE TETRODE with internal neutralisation for use as oscillator, frequency tripler and amplifier
TETRODE DOUBLE avec neutralisation interne pour utilisation en oscillatrice, tripleuse de fréquence et amplificatrice
DOPPELTETRODE mit Innenneutrodynisierung zur Verwendung als Oszillator, Frequenzverdreifacher und Verstärker

| | | | |
|---|---|---|---|
| Cathode: oxide coated | $V_f$ | = 6,3 V ± 10 % | 12,6 V ± 10 % |
| Cathode: oxyde | $I_f$ | = 0,6 A | 0,3 A |
| Katode : Oxyd | | | |
| | Pins | | |
| | Broches | 7-(1+8) | 1-8 |
| | Stifte | | |

Heating : indirect
Chauffage: indirect
Heizung : indirekt

Capacitances (each system)
Capacités (chaque système)
Kapazitäten (jedes System)

| | | |
|---|---|---|
| $C_a$ | = | 1,35 pF |
| $C_{g_1}$ | = | 4,5 pF |
| $C_{ag_1}$ | = | 0,145 pF |

Typical characteristics
Caractéristiques types
Kenndaten

| | | |
|---|---|---|
| $V_a$ | = | 350 V |
| $V_{g_2}$ | = | 200 V |
| $I_a$ | = | 25 mA |
| S | = | 10,5 mA/V |
| $\mu_{g_2g_1}$ | = | 26 |

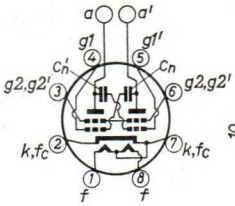
| Freq. | C telegr. | | | | C freq. tripler | | | |
|---|---|---|---|---|---|---|---|---|
| | C.C.S. | | I.C.A.S. | | C.C.S. | | I.C.A.S. | |
| Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 960 | 250 | 7 | 250 | 8 | | | | |
| 320/960 | | | | | 250 | 2,75 | 250 | 3 |

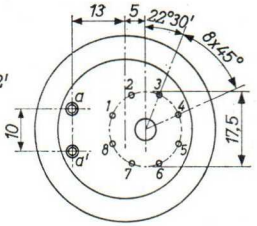
Temperatures
Températures
Temperaturen

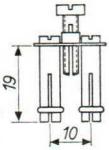
Pin seals
Scellements des broches max.220°C
Stifteneinschmelzungen

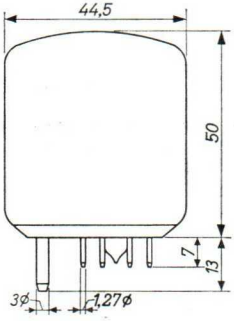
Bulb, ampoule, Kolben max.220°C

# PHILIPS




Example of anode-tank circuit connector at 960 Mc/s
Exemple d'un connecteur anode-circuit accordé à 960 MHz
Beispiel einer Verbindung Anode-abgestimmter Kreis bei 960 MHz

Dimensions in mm
Dimensions en mm
Abmessungen in mm

Socket assembly
Assemblage du support B8 700 71
Zusammenstellung Fassung

Mounting position: arbitrary
Montage : arbitrairement
Einbau : beliebig

Net weight
Poids net 35 g
Nettogewicht

Shipping weight
Poids brut 55 g
Bruttogewicht

H.F. class C telegraphy; two systems in push-pull
H.F. classe C télégraphie; deux systèmes en push-pull
HF-Klasse C Telegraphie; zwei Systeme in Gegentakt

Limiting values
Caractéristiques limites
Grenzdaten

| | | C.C.S. | | I.C.A.S. | |
|---|---|---|---|---|---|
| $f$ | = max. | 960 | max. | 960 | Mc/s |
| $V_a$ | = max. | 400 | max. | 400 | V |
| $I_a$ | = max. | 2 x 45 | max. | 2 x 50 | mA |
| $W_a$ | = max. | 2 x 8 | max. | 2 x 10 | W |
| $W_{ia}$ | = max. | 2 x 10 | max. | 2 x 12 | W |
| $V_{g2}$ | = max. | 225 | max. | 225 | V |
| $W_{g2}$ | = max. | 2 x 1,5 | max. | 2 x 1,75 | W |
| $-V_{g1}$ | = max. | 100 | max. | 100 | V |
| $I_{g1}$ | = max. | 2 x 4 | max. | 2 x 5 | mA |

Operating characteristics
Caractéristiques d'utilisation
Betriebsdaten

| | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|
| $f$ | = | 960 | 960 | Mc/s |
| $V_a$ | = | 250 | 250 | V |
| $V_{g2}$ | = | 160 [1] | 170 [2] | V |
| $V_{g1}$ | = | -15 | -15 | V |
| $R_{g1}$ | = | 20 | 20 | kΩ |
| $I_a$ | = | 2 x 35 | 2 x 40 | mA |
| $I_{g2}$ | = | 15 | 15 | mA |
| $I_{g1}$ | = | 2 x 0,75 | 2 x 0,75 | mA |
| $W_{ia}$ | = | 2 x 8,8 | 2 x 10 | W |
| $W_a$ | = | 2 x 5,4 | 2 x 5,4 | W |
| $W_{g2}$ | = | 2,5 | 2,9 | W |
| $W_{dr}$ [3] | = | 1,4 | 1,4 | W |
| $W_o$ | = | 7 | 8 | W |
| $W_\ell$ [4] | = | 4 | 5 | W |
| $\eta$ | = | 40 | 40 | % |

[1]) Adjust $V_{g2}$ until $I_a$ = 2x35 mA at $W_o$ max.
Régler $V_{g2}$ jusqu'à ce que $I_a$ = 2x35 mA à $W_o$ max.
$V_{g2}$ einstellen bis $I_a$ = 2x35 mA wenn $W_o$ max. ist.

[2]) Adjust $V_{g2}$ until $I_a$ = 2x40 mA at $W_o$ max.
Régler $V_{g2}$ jusqu'à ce que $I_a$ = 2x40 mA à $W_o$ max.
$V_{g2}$ einstellen bis $I_a$ = 2x40 mA wenn $W_o$ max. ist

[3]) See page 4; voir page 4; siehe Seite 4

# PHILIPS

H.F. class C frequency tripler (two systems in push-pull)
H.F. classe C tripleur de fréquence (deux systèmes en push-pull)
HF-Klasse C Frequenzverdreifacher (zwei Systeme in Gegentakt)

Limiting values
Caractéristiques limites
Grenzdaten

| | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|
| $f$ | = max. | 960 | max. 960 | Mc/s |
| $V_a$ | = max. | 400 | max. 400 | V |
| $I_a$ | = max. | 2 x 40 | max. 2 x 40 | mA |
| $W_a$ | = max. | 2 x 8 | max. 2 x 10 | W |
| $W_{ia}$ | = max. | 2 x 10 | max. 2 x 12 | W |
| $V_{g2}$ | = max. | 225 | max. 250 | V |
| $W_{g2}$ | = max. | 2 x 1,5 | max. 2 x 1,75 | W |
| $-V_{g1}$ | = max. | 100 | max. 100 | V |
| $I_{g1}$ | = max. | 2 x 4 | max. 2 x 5 | mA |

Operating characteristics
Caractéristiques d'utilisation
Betriebsdaten

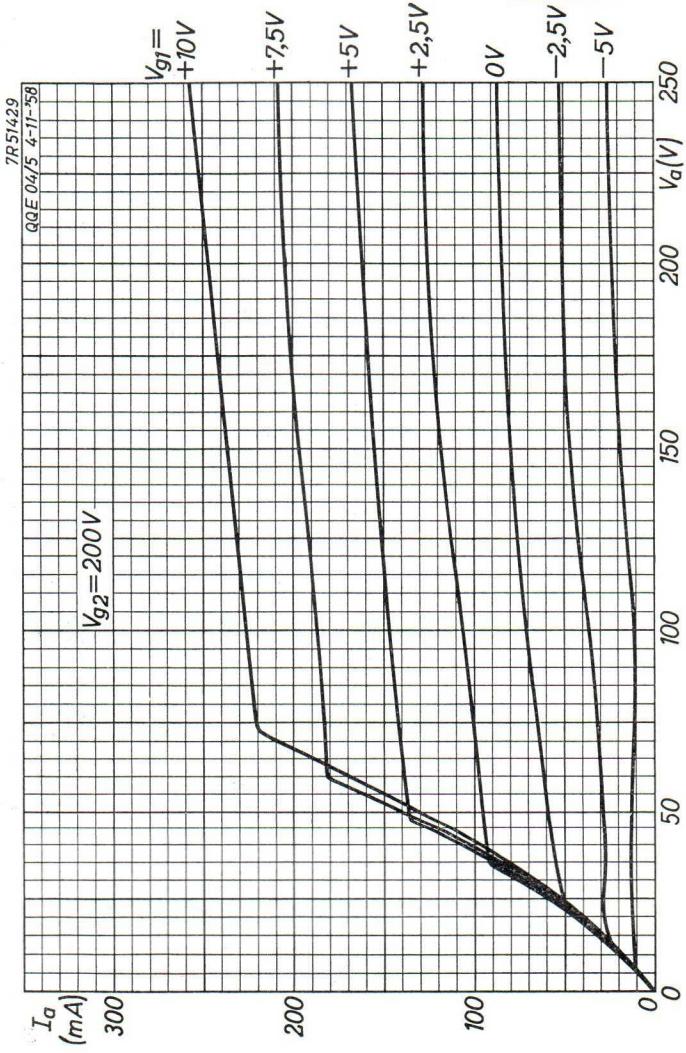
| | | C.C.S. | I.C.A.S. | |
|---|---|---|---|---|
| $f$ | = | 320/960 | 320/960 | Mc/s |
| $V_a$ | = | 250 | 250 | V |
| $V_{g2}$ | = | 150 | 170 | V |
| $R_{g1}$ | = | 20 | 20 | kΩ |
| $I_a$ | = | 2 x 37,5 | 2 x 40 | mA |
| $I_{g2}$ | = | 15 | 16 | mA |
| $I_{g1}$ | = | 2 x 2,25 | 2 x 2,25 | mA |
| $W_{ia}$ | = | 2 x 9,5 | 2 x 10 | W |
| $W_a$ | = | 2 x 8 | 2 x 8,5 | W |
| $W_{g2}$ | = | 2,25 | 2,8 | W |
| $W_{dr}$ [3]) | = | 3 | 3 | W |
| $W_o$ | = | 2,75 | 3 | W |
| $W_\ell$ [4]) | = | 1,5 | 1,8 | W |
| $\eta$ | = | 14,7 | 15 | % |

[3]) Driver output power
Puissance de sortie du tube d'attaque
Ausgangsleistung der Treiberstufe

[4]) Useful power in the load
Puissance utile dans la charge
Nutzleistung in der Belastung

# PHILIPS

**QQE 04/5**

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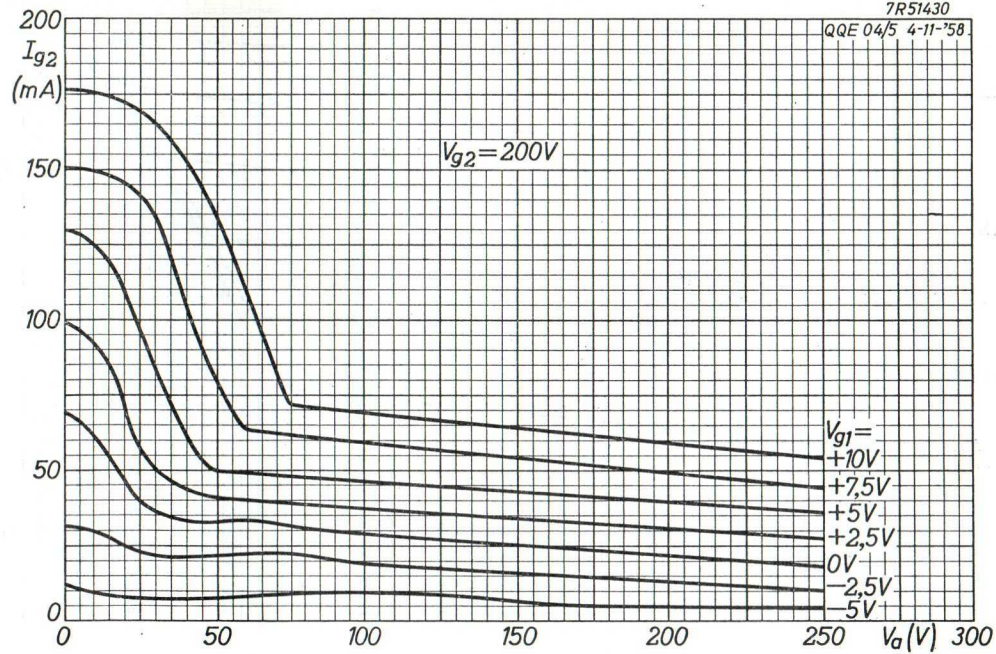
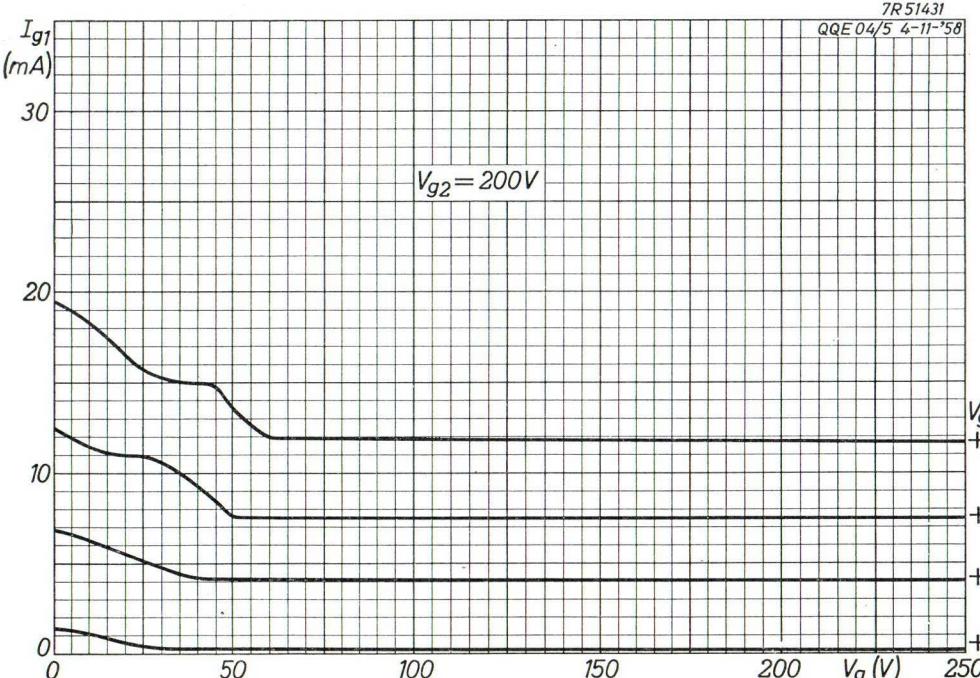
A

PHILIPS

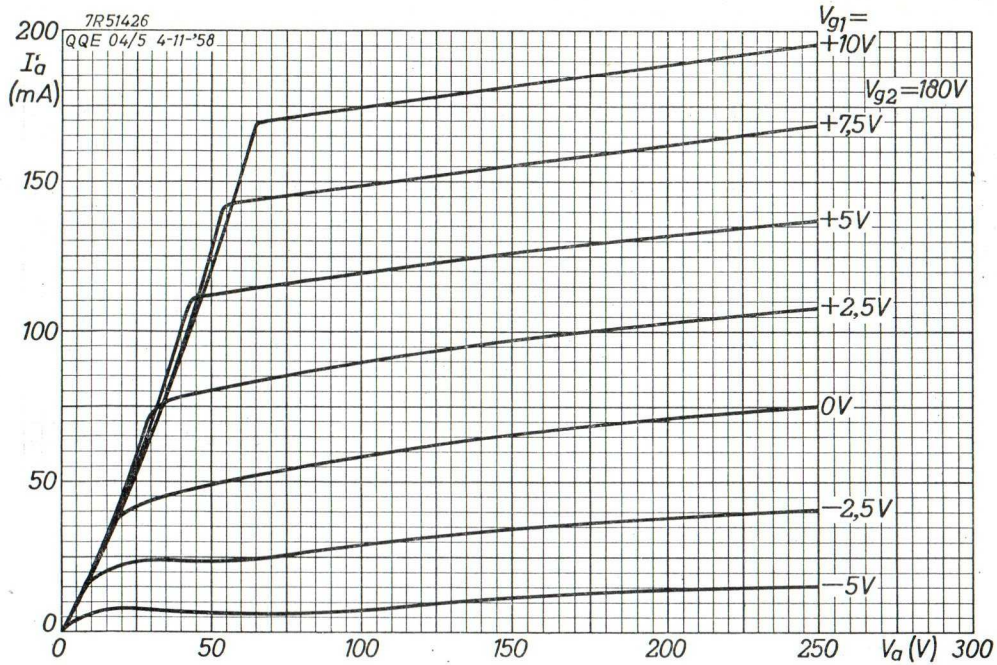

7R51430
QQE 04/5 4-11-'58
$I_{g2}$ (mA)
200
150
100
50
0
$V_{g2}=200V$
$V_{g1}=$
+10V
+7,5V
+5V
+2,5V
0V
−2,5V
−5V
0
50
100
150
200
250
$V_a$ (V)
300

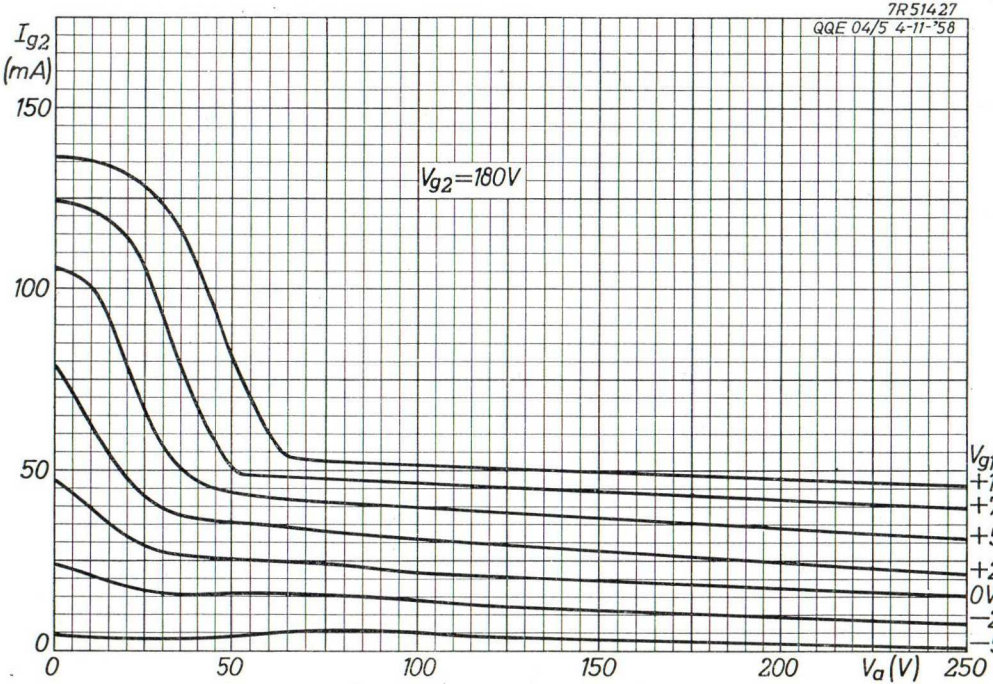
B




PHILIPS

QQE 04/5


7R51426
QQE 04/5 4-11-'58
$I_a$ (mA)
200
150
100
50
0
0
50
100
150
200
250
300
$V_a$ (V)
$V_{g1}$ =
+10V
$V_{g2}$ =180V
+7,5V
+5V
+2,5V
0V
−2,5V
−5V

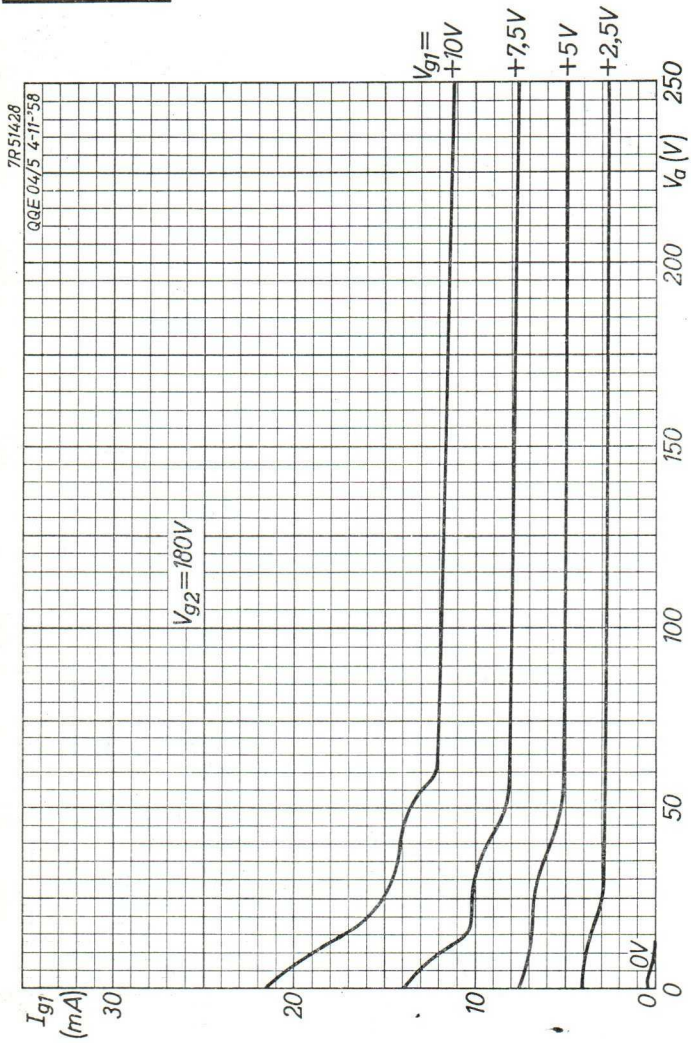



PHILIPS

QQE 04/5

QQE 04/5

# PHILIPS




F

DOUBLE TETRODE for use as H.F. amplifier and oscillator
DOUBLE TETRODE pour utilisation en amplificatrice et oscillatrice H.F.
DOPPELTETRODE zur Verwendung als HF-Verstärker und Oszillator

| | | | |
|---|---|---|---|
| Cathode : oxide coated<br>Cathode : oxyde<br>Katode : Oxyd | $V_f$ = | 6,3 | 12,6 V |
| | $I_f$ = | 1,6 | 0,8 A |
| Heating : indirect<br>Chauffage: indirect<br>Heizung : indirekt | Pins<br>Broches<br>Stifte | 5-(1+7) | 1-7 |
| Capacitances<br>Capacités<br>Kapazitäten | per system<br>par système<br>pro System | $C_a$ = 3,8 pF<br>$C_{g1}$ = 8 pF<br>$C_{ag1}$ < 0,07 pF<br>$C_{g2k}$ = 65 pF[1]) | |
| Typical characteristics<br>Caractéristiques types<br>Kenndaten | $\mu_{g2g1}$ =<br>$S(I_a=30mA)$[2])= | 6,5<br>3 mA/V | |

| λ | Freq. | C telegr.[3]) | | | Cag2 mod.[3]) | | |
|---|---|---|---|---|---|---|---|
| (m) | (Mc/s) | Va (V) | Wo (W) | | Va (V) | Wo (W) | |
| | | | CCS | ICAS | | CCS | ICAS |
| 1,5 | 200 | 750 | 26 | 35 | 600 | 17 | 26 |
| | | 500 | 26 | | 425 | 16 | |
| 1,2 | 250 | 500 | 23 | | | | |

Temperature of anode and pin seals
Température des scellements de l'anode et des broches max.180 °C
Temperatur der Anoden- und Stiftenein-schmelzungen

bulb temperature
Température de l'ampoule max.220 °C
Kolbentemperatur

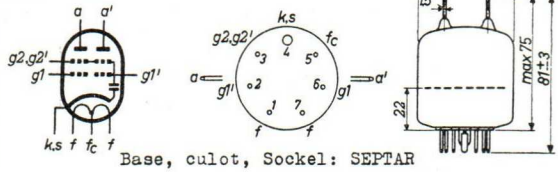
[1]) Including internal capacitor between grid No.2 and cathode
Y compris le condensateur interne entre grille No.2 et la cathode
Einschliesslich des inneren Kondensators zwischen Gitter 2 und Katode

[2]) Per system; par système; pro System

[3]) Two systems in push-pull; deux systèmes en push-pull; zwei Systeme in Gegentakt

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: SEPTAR

Socket
Support
Fassung 40202

Anode clips
Bornes de connexion de l'anode 40615
Anodenanschlussklemmen

Mounting position: arbitrary
Montage : arbitrairement
Aufstellung : willkürlich

Net weight
Poids net 60 g
Nettogewicht

Shipping weight
Poids brut 150 g
Bruttogewicht

H.F. class C telegraphy, two systems in push-pull
H.F. classe C télégraphie, deux systèmes en push-pull
HF Klasse C Telegraphie, zwei Systeme in Gegentakt

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | f = max. 200 Mc/s | f = max. 250 Mc/s |
|---|---|---|
| $V_a$ | = max. 750 V | = max. 670 V |
| $W_{ia}$ | = max. 2x18 W | = max. 2x16 W |
| $W_a$ | = max. 2x7,5 W | |
| $I_a$ | = max. 2x45 mA | |
| $V_{g2}$ | = max. 250 V | |
| $W_{g2}$ | = max. 5 W | |
| $-V_{g1}$ | = max. 175 V | |
| $I_{g1}$ | = max. 2x5 mA | |
| $R_{g1}$ | = max. 50 kΩ[1]) | |
| $R_{g1}$ | = max. 25 kΩ[2]) | |
| $V_{kf}$ | = max. 100 V | |

Operating conditions, continuous service.
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | | | | |
|---|---|---|---|---|---|---|
| f | = | 200 | 200 | 200 | 250 | 250 Mc/s |
| $V_a$ | = | 750 | 500 | 400 | 500 | 400 V |
| $V_{g2}$ | = | 200 | 200 | 200 | 200 | 200 V |
| $V_{g1}$ | = | -65 | -65 | -65 | -65 | -65 V |
| $I_a$ | = | 2x24 | 2x36 | 2x45 | 2x32 | 2x40 mA |
| $I_{g2}$ | = | 15 | 14 | 14 | 12 | 14 mA |
| $I_{g1}$ | = | 2x1,4 | 2x1,3 | 2x1,4 | 2x0,9 | 2x1,0 mA |
| $V_{g1g1'p}$ | = | 150 | 150 | 150 | 140 | 140 V |
| $W_{ig1}$ | = | 2x0,10 | 2x0,09 | 2x0,10 | 2x0,06 | 2x0,07 W |
| $W_{g2}$ | = | 3,0 | 2,8 | 2,8 | 2,4 | 2,8 W |
| $W_{ia}$ | = | 2x18 | 2x18 | 2x18 | 2x16 | 2x16 W |
| $W_a$ | = | 2x5 | 2x5 | 2x5,25 | 2x7,0 | 2x7,5 W |
| $W_o$ | = | 26 | 26 | 25,5 | 18 | 17 W |
| η | = | 72 | 72 | 71 | 56 | 53 % |

[1])Per system; par système; pro System
[2])Per tube; par tube; pro Röhre

H.F. class C telegraphy, two systems in push-pull; continued
H.F. classe C télégraphie, deux systèmes en push-pull; continuation
HF Klasse C Telegraphie, zwei Systeme in Gegentakt; Fortsetzung

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Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | f = max. 200 Mc/s | f = max. 250 Mc/s |
|---|---|---|
| $V_a$ | = max. 750 V | $V_a$ = max. 670 V |
| $W_{ia}$ | = max. 2x25 W | $W_{ia}$ = max. 2x22 W |
| $W_a$ | = max. 2x10 W | |
| $I_a$ | = max. 2x57,5 mA | |
| $V_{g2}$ | = max. 250 V | |
| $W_{g2}$ | = max. 5 W | |
| $-V_{g1}$ | = max. 175 V | |
| $I_{g1}$ | = max. 2x5 mA | |
| $R_{g1}$ | = max. 50 kΩ[1]) | |
| $R_{g1}$ | = max. 25 kΩ[2]) | |
| $V_{kf}$ | = max. 100 V | |

Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| f | = | 200 Mc/s |
| $V_a$ | = | 750 V |
| $V_{g2}$ | = | 200 V |
| $V_{g1}$ | = | -50 V |
| $I_a$ | = | 2x32,5 mA |
| $I_{g2}$ | = | 22 mA |
| $I_{g1}$ | = | 2x2,0 mA |
| $V_{g1g1'p}$ | = | 130 V |
| $W_{ig1}$ | = | 2x0,12 W |
| $W_{g2}$ | = | 4,4 W |
| $W_{ia}$ | = | 2x24,4 W |
| $W_a$ | = | 2x6,9 W |
| $W_o$ | = | 35 W |
| $\eta$ | = | 72 % |

1)Per system; par système; pro System
2)Per tube; par tube; pro Röhre

H.F. class C anode and screen grid modulation, two systems in push-pull
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull
HF Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt

Limiting values, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Grenzdaten, Dauerbetrieb

| | f = max. 200 Mc/s | f = max. 250 Mc/s |
|---|---|---|
| $V_a$ | = max. 600 V | $V_a$ = max. 530 V |
| $W_{ia}$ | = max. 2x11 W | $W_{ia}$ = max. 2x10 W |
| $W_a$ | = max. 2x5 W | |
| $I_a$ | = max. 2x37,5 mA | |
| $V_{g2}$ | = max. 250 V | |
| $W_{g2}$ | = max. 3,4 W | |
| $-V_{g1}$ | = max. 175 V | |
| $I_{g1}$ | = max. 2x5 mA | |
| $R_{g1}$ | = max. 50 kΩ[1]) | |
| $R_{g1}$ | = max. 25 kΩ[2]) | |
| $V_{kf}$ | = max. 100 V | |

Operating conditions, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| f | = | 200 | 200 Mc/s |
| $V_a$ | = | 600 | 425 V |
| $V_{g2}$ | = | 200 | 200 V |
| $V_{g1}$ | = | -65 | -60 V |
| $I_a$ | = | 2x18 | 2x26 mA |
| $I_{g2}$ | = | 16 | 16 mA |
| $I_{g1}$ | = | 2x1,3 | 2x1,2 mA |
| $V_{g1g1'p}$ | = | 150 | 140 V |
| $W_{ig1}$ | = | 2x0,09 | 2x0,075 W |
| $W_{g2}$ | = | 3,2 | 3,2 W |
| $W_{ia}$ | = | 2x10,8 | 2x11 W |
| $W_a$ | = | 2x2,3 | 2x3 W |
| $W_o$ | = | 17 | 16 W |
| η | = | 79 | 72 % |
| m | = | 100 | 100 % |
| $W_{mod}$ | = | 13,5 | 13,5 W |

[1]) Per system; par système; pro System
[2]) Per tube; par tube; pro Röhre

H.F. class C anode and screen grid modulation, two systems in push-pull; continued
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull; continuation
HF Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt; Fortsetzung

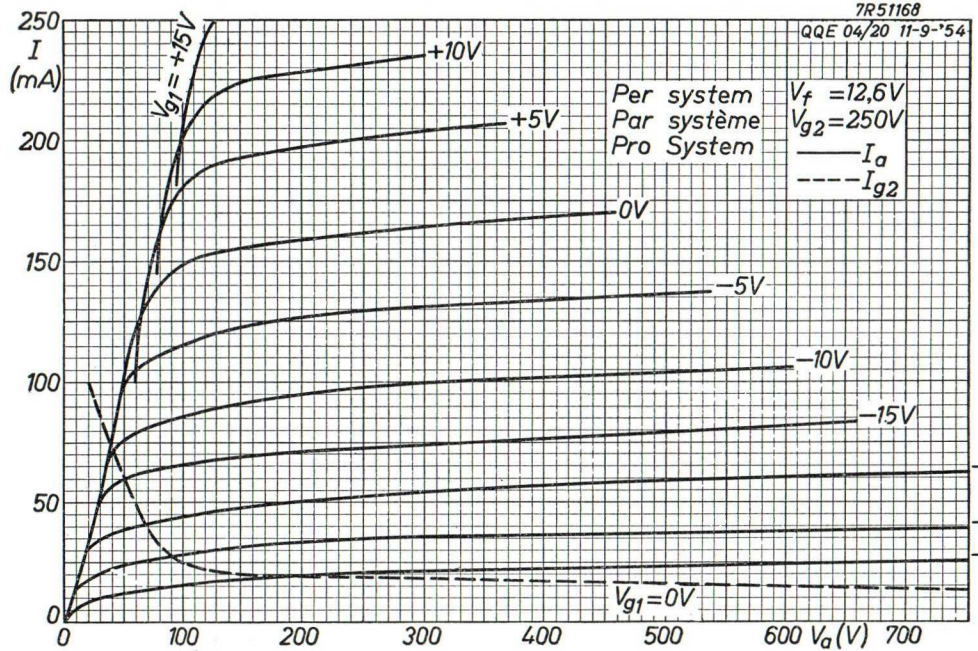
Limiting values, intermittent service
I.C.A.S. Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | |
|---|---|---|
| f | = max. | 200 Mc/s |
| $V_a$ | = max. | 600 V |
| $W_{ia}$ | = max. | 2x18 W |
| $W_a$ | = max. | 2x7,5 W |
| $I_a$ | = max. | 2x47,5 mA |
| $V_{g2}$ | = max. | 250 V |
| $W_{g2}$ | = max. | 5 W |
| $-V_{g1}$ | = max. | 175 V |
| $I_{g1}$ | = max. | 2x5 mA |
| $R_{g1}$ | = max. | 50 kΩ[1]) |
| $R_{g1}$ | = max. | 25 kΩ[2]) |
| $V_{kf}$ | = max. | 100 V |

Operating conditions, intermittent service
I.C.A.S. Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| f | = | 200 Mc/s |
| $V_a$ | = | 600 V |
| $V_{g2}$ | = | 200 V |
| $V_{g1}$ | = | -70 V |
| $I_a$ | = | 2x30 mA |
| $I_{g2}$ | = | 20 mA |
| $I_{g1}$ | = | 2x1,5 mA |
| $V_{g1g1'p}$ | = | 160 V |
| $W_{ig1}$ | = | 2x0,105 W |
| $W_{g2}$ | = | 4,0 W |
| $W_{ia}$ | = | 2x18 W |
| $W_a$ | = | 2x5 W |
| $W_o$ | = | 26 W |
| $\eta$ | = | 72 % |
| m | = | 100 % |
| $W_{mod}$ | = | 20 W |

[1])Per system; par système; pro System
[2])Per tube; par tube; pro Röhre

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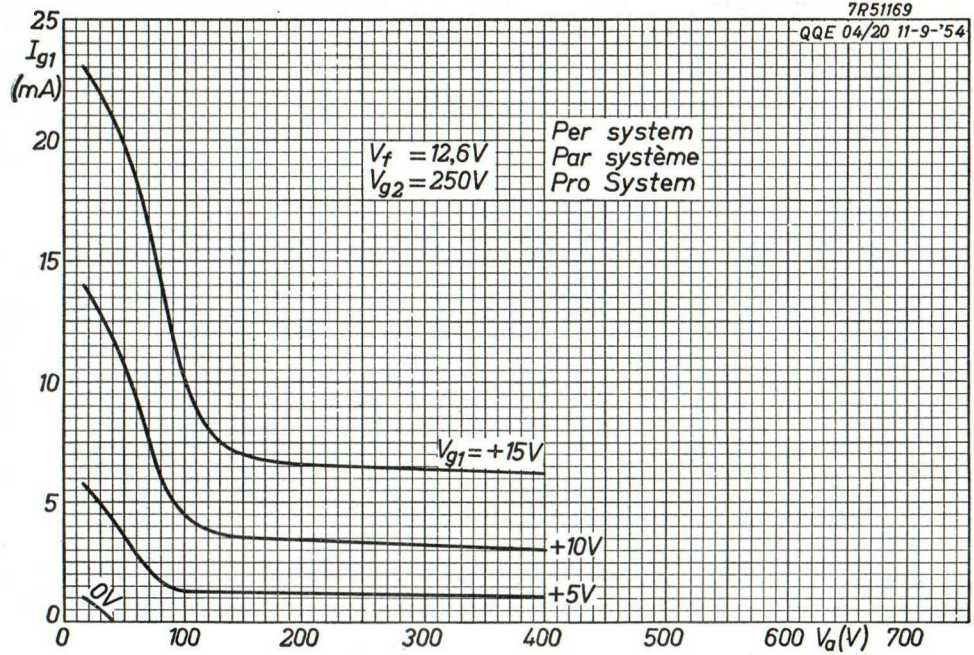
PHILIPS

QQE 04/20


7R51169
QQE 04/20 11-9-'54
$I_{g1}$ (mA)
25
20
15
10
5
0
$V_f$ = 12,6V
$V_{g2}$ = 250V
Per system
Par système
Pro System
$V_{g1}$ = +15V
+10V
+5V
0V
0
100
200
300
400
500
600
$V_a$ (V)
700

# PHILIPS

**QQE 06/40**

DOUBLE TETRODE for use as H.F. amplifier and oscillator, frequency multiplier and modulator (internally neutralised)
DOUBLE TETRODE pour utilisation en amplificatrice et oscillatrice H.F., multiplicatrice de fréquence et modulatrice (avec neutralisation interne)
DOPPELTETRODE zur Verwendung als HF-Verstärker und Oszillator, Frequenzvervielfacher und Modulator (mit innerer Neutralisation)

Cathode : oxide-coated
Cathode : oxyde
Katode : Oxyd

| | | |
|---|---|---|
| $V_f$ | 6,3 | 12,6 V |
| $I_f$ | 1,8 | 0,9 A |

Heating : indirect
Chauffage: indirect
Heizung : indirekt

pins
broches 5-(1+7) 1-7
Stifte

| Capacitances<br>Capacités<br>Kapazitäten | per system<br>par système<br>pro System | in push-pull<br>en push-pull<br>in Gegentakt |
|---|---|---|
| See page 2 for internal neutralisation ($C_n$, $C_n'$)<br>Voir page 2 pour neutralisation interne ($C_n$,$C_n'$)<br>Für Neutrodynisierung siehe Seite 2 ($C_n$, $C_n'$) | $C_a$ = 3,2 pF | $C_o$ = 2,1 pF |
| | $C_{g1}$ = 10,5 pF | $C_i$ = 6,7 pF |
| | $C_{ag1}$ < 0,09 pF | |
| | $C_{ag1}$-$C_n$ < 0,035 pF | |

| Typical characteristics<br>Caractéristiques types<br>Kenndaten | | |
|---|---|---|
| | $\mu_{g2g1}$ | = 8,2 |
| | $S^{1)}$ ($I_a$= 30 mA) | = 4,5 mA/V |

| λ | Freq. | C telegr. | | | | Cag2 mod. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | C.C.S. | | I.C.A.S. | | C.C.S. | | I.C.A.S. | |
| (m) | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| 5 | 60 | | | | | 600 | 71 | 600 | 79 |
| 1,5 | 200 | 600 | 90 | | | | | | |
| 1,2 | 250 | 750 | 85 | 750 | 96 | 600 | 64 | 600 | 71 |
| 0,7 | 430 | 520 | 66 | | | | | | |
| 0,6 | 500 | 500 | 60 | | | | | | |

| λ | Freq. | Cfr.mult. | | B mod. | |
|---|---|---|---|---|---|
| (m) | (Mc/s) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| 6/2 | 50/150 | 500 | 20 | 600 | 86 |
| | | 400 | 18 | 450 | 60 |
| 4/1,3 | 75/225 | 400 | 12 | 300 | 37 |

1)Per system; par système; pro System

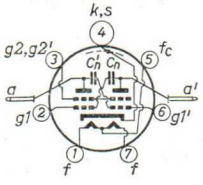
# PHILIPS

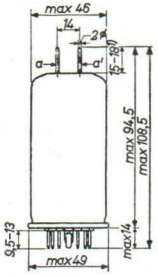
Cooling: radiation. When the tube is used at frequencies above 150 Mc/s it may be necessary to direct a low velocity air flow on the bulb and the anode seals.
Temperature of bulb and anode seals max. 250 °C
Temperature of bottom pin seals max. 180 °C

Refroidissement: radiation. Si le tube est utilisé aux fréquences supérieures à 150 Mc/s, il peut être nécessaire de diriger un léger courant d'air sur l'ampoule et sur les scellements des sorties d'anode.
Température de l'ampoule et des scellements des sorties d'anode max. 250 °C
Température des scellements des broches du fond max. 180 °C

Kühlung: Strahlung. Wenn die Röhre bei Frequenzen höher als 150 MHz benutzt wird, kann ein Luftstrom auf den Kolben und die Anodenverschlüsse notwendig sein.
Temperatur des Kolben und der Anodenverschlüsse max. 250 °C
Temperatur der Bodenstiftverschlüsse max. 180 °C

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| | | |
|---|---|---|
| Base, culot, Sockel | : | Septar |
| Socket, support, Fassung | : | 40202 |
| Clips, bornes de connexion, Anschlussklemmen | : | 40623 |

Mounting position: vertical with base up or down.
horizontal with anode pins in one horizontal plane
Montage : vertical avec le pied en haut ou en bas.
horizontal avec les broches des anodes situées dans le même plan horizontal.
Aufstellung: senkrecht mit Sockel oben oder unten
waagerecht mit der Fläche durch beide Anodenstifte waagerecht.

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 60 g | Poids brut | 155 g |
| Nettogewicht | | Bruttogewicht | |

1) Max. 3 mm glass included
3 mm de verre au max. y inclus
Einschliesslich max. 3 mm Glas

H.F. class C telegraphy, two systems in push-pull
H.F. classe C télégraphie, deux systèmes en push-pull
HF Klasse C Telegraphie, zwei Systeme in Gegentakt

Limiting values, continuous service
C.C.S. Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| f | = max. | 250 Mc/s | f | = max. | 500 Mc/s |
|---|---|---|---|---|---|
| $V_a$ | = max. | 750 V | $V_a$ | = max. | 600 V |
| $W_{ia}$ | = max. | 2x60 W | $W_{ia}$ | = max. | 2x50 W |
| $W_a$ | = max. | 2x20 W | | | |
| $I_a$ | = max. | 2x110 mA | | | |
| $V_{g2}$ | = max. | 300 V | | | |
| $W_{g2}$ | = max. | 2x3,5 W | | | |
| $-V_{g1}$ | = max. | 175 V | | | |
| $I_{g1}$ | = max. | 2x5 mA | | | |
| $R_{g1}$ | = max. | 50 kΩ | | | |
| $V_{kf}$ | = max. | 100 V | | | |

Operating conditions, continuous service
C.C.S. Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| f | = | 200 | 250 | 430 | 500 Mc/s |
|---|---|---|---|---|---|
| $V_a$ | = | 600 | 750 | 520 | 500 V |
| $V_{g1}$ | = | -80 | -80 | -80 | - V |
| $R_{g1}$ | = | - | - | - | 20 kΩ |
| $V_{g2}$ | = | 250 | 250 | 250 | 250 V |
| $I_a$ | = | 2x100 | 2x80 | 2x100 | 2x100 mA |
| $I_{g1}$ | = | 2x2,5 | 2x1,5 | 2x2,8 | 2x3 mA |
| $I_{g2}$ | = | 16 | 17 | 18 | 20 mA |
| $V_{g1g1'p}$ | = | 200 | 250 | - | - V |
| $W_{g2}$ | = | 4 | 4,25 | 4,5 | 5 W |
| $W_{ia}$ | = | 2x60 | 2x60 | 2x52 | 2x50 W |
| $W_a$ | = | 2x15 | 2x17,5 | 2x19 | 2x20 W |
| $W_o$ | = | 90 | 85 | 66 | 60 W |
| $\eta$ | = | 75 | 71 | 64 | 60 % |

# PHILIPS

H.F. class C telegraphy, two systems in push-pull; continued
H.F. classe C télégraphie, deux systèmes en push-pull; continuation
HF - Klasse C Telegraphie, zwei Systeme in Gegentakt; Fortsetzung

I.C.A.S Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| f = max. 250 Mc/s | | f = max. 500 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 750 V | $V_a$ | = max. 600 V |
| $W_{ia}$ | = max. 2x75 W | $W_{ia}$ | = max. 2x60 W |
| $W_a$ | = max. 2x22,5 W | | |
| $I_a$ | = max. 2x120 mA | | |
| $V_{g2}$ | = max. 300 V | | |
| $W_{g2}$ | = max. 2x4 W | | |
| $-V_{g1}$ | = max. 175 V | | |
| $I_{g1}$ | = max. 2x5 mA | | |
| $R_{g1}$ | = max. 50 kΩ | | |
| $V_{kf}$ | = max. 100 V | | |

I.C.A.S Operating conditions, intermittent service
Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | |
|---|---|---|
| f | = | 250 Mc/s |
| $V_a$ | = | 750 V |
| $V_{g1}$ | = | -80 V |
| $V_{g2}$ | = | 250 V |
| $I_a$ | = | 2x90 mA |
| $I_{g1}$ | = | 2x1,7 mA |
| $I_{g2}$ | = | 14 mA |
| $V_{g1g1'_p}$ | = | 260 V |
| $W_{g2}$ | = | 3,5 W |
| $W_{ia}$ | = | 2x67,5 W |
| $W_a$ | = | 2x19,5 W |
| $W_o$ | = | 96 W |
| $\eta$ | = | 71 % |

H.F. class C anode and screen grid modulation, two systems in push-pull
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull
HF Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt

C.C.S. Limiting values, continuous service
Caractéristiques limites, service continu
Grenzdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| f | = max. | 250 | Mc/s |
| $V_a$ | = max. | 600 | V |
| $W_{ia}$ | = max. | 2x45 | W |
| $W_a$ | = max. | 2x14 | W |
| $I_a$ | = max. | 2x92 | mA |
| $V_{g2}$ | = max. | 300 | V |
| $W_{g2}$ | = max. | 2x3,5 | W [1] |
| $W_{g2}$ | = max. | 2x2,3 | W [2] |
| $-V_{g1}$ | = max. | 175 | V |
| $I_{g1}$ | = max. | 2x5 | mA |
| $R_{g1}$ | = max. | 50 | kΩ [3] |
| $R_{g1}$ | = max. | 25 | kΩ [4] |
| $V_{kf}$ | = max. | 100 | V |
| f | = max. | 500 | Mc/s |
| $V_a$ | = max. | 480 | V |
| $W_{ia}$ | = max. | 2x33,5 | W |

C.C.S. Operating conditions, continuous service
Caractéristiques d'utilisation, service continu
Betriebsdaten, Dauerbetrieb

| | | | |
|---|---|---|---|
| f | = | 60 | 250 Mc/s |
| $V_a$ | = | 600 | 600 V |
| $V_{g2}$ | = | 250 | 250 V |
| $V_{g1}$ | = | -80 | -80 V |
| $I_a$ | = | 2x75 | 2x75 mA |
| $I_{g2}$ | = | 20 | 18 mA |
| $I_{g1}$ | = | 2x3,8 | 2x1,6 mA |
| $V_{g1_p}$ | = | 105 | 130 V |
| $W_{g2}$ | = | 5 | 4,5 W |
| $W_{ia}$ | = | 2x45 | 2x45 W |
| $W_a$ | = | 2x9,5 | 2x13 W |
| $W_o$ | = | 71 | 64 W |
| η | = | 79 | 71 % |
| m | = | 100 | 100 % |
| $V_{g2_p}$ | = | 90 | 90 V |
| $W_{mod}$ | = | 45 | 45 W |

[1]) Screen grid modulated via a choke
La grille-écran modulée à travers une bobine de choc
Schirmgitter moduliert über eine Drosselspule
2),3),4) See page 6; voir page 6; siehe Seite 6

# PHILIPS

H.F. class C anode and screen grid modulation, two systems in push-pull
H.F. classe C modulation d'anode et de grille-écran, deux systèmes en push-pull
HF Klasse C Anoden- und Schirmgittermodulation, zwei Systeme in Gegentakt

I.C.A.S. Limiting values, intermittent service
Caractéristiques limites, service intermittent
Grenzdaten, aussetzender Betrieb

| | | | | | |
|---|---|---|---|---|---|
| f | = max. | 250 Mc/s | | | |
| $V_a$ | = max. | 600 V | $R_{g1}$ | = max. | 50 kΩ [3] |
| $W_{ia}$ | = max. | 2x50 W | $R_{g1}$ | = max. | 25 kΩ [4] |
| $W_a$ | = max. | 2x15 W | $V_{kf}$ | = max. | 100 V |
| $I_a$ | = max. | 2x100 mA | | | |
| $V_{g2}$ | = max. | 300 V | | | |
| $W_{g2}$ | = max. | 2x4 W [1] | | | |
| $W_{g2}$ | = max. | 2x2,6 W [2] | | | |
| $-V_{g1}$ | = max. | 175 V | f | = max. | 500 Mc/s |
| $I_{g1}$ | = max. | 2x5 mA | $V_a$ | = max. | 480 V |
| | | | $W_{ia}$ | = max. | 2x40 W |

I.C.A.S. Operating conditions, intermittent service
Caractéristiques d'utilisation, service intermittent
Betriebsdaten, aussetzender Betrieb

| | | | |
|---|---|---|---|
| f | = | 60 | 250 Mc/s |
| $V_a$ | = | 600 | 600 V |
| $V_{g2}$ | = | 250 | 250 V |
| $V_{g1}$ | = | -80 | -80 V |
| $I_a$ | = | 2x83 | 2x83 mA |
| $I_{g2}$ | = | 16 | 16 mA |
| $I_{g1}$ | = | 2x4 | 2x1,7 mA |
| $V_{g1_p}$ | = | 105 | 130 V |
| $W_{g2}$ | = | 4 | 4 W |
| $W_{ia}$ | = | 2x50 | 2x50 W |
| $W_a$ | = | 2x10,5 | 2x14,5 W |
| $W_o$ | = | 79 | 71 W |
| η | = | 79 | 71 % |
| m | = | 100 | 100 % |
| $V_{g2_p}$ | = | 90 | 90 V |
| $W_{mod}$ | = | 50 | 50 W |

1) See page 5, voir page 5; siehe Seite 5
2) For all other modulation methods
Pour toutes les autres méthodes de modulation
Für alle andere Modulationsarten
3) Per system; par système; pro System
4) Per tube; par tube; pro Röhre

H.F. class C frequency tripler, two systems in push-pull
H.F. classe C tripleur de fréquence, deux systèmes en push-pull
HF - Klasse C Frequenzverdreifacher, zwei Systeme in Gegentakt

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 250 | Mc/s |
| $V_a$ | = max. | 750 | V |
| $W_{ia}$ | = max. | 2x60 | W |
| $W_a$ | = max. | 2x20 | W |
| $I_a$ | = max. | 2x110 | mA |
| $V_{g2}$ | = max. | 300 | V |
| $W_{g2}$ | = max. | 2x3,5 | W |
| $-V_{g1}$ | = max. | 175 | V |
| $I_{g1}$ | = max. | 2x5 | mA |
| $R_{g1}$ | = max. | 50 | kΩ |
| $V_{kf}$ | = max. | 100 | V |

| | | | |
|---|---|---|---|
| f | = max. | 500 | Mc/s |
| $V_a$ | = max. | 600 | V |
| $W_{ia}$ | = max. | 2x 50 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| λ | = | 6/2 | 6/2 | 4/1,3 | m |
| $V_a$ | = | 500 | 400 | 400 | V |
| $V_{g1}$ | = | -150 | -150 | -150 | V |
| $V_{g2}$ | = | 250 | 250 | 250 | V |
| $I_a$ | = | 2x60 | 2x73 | 2x65 | mA |
| $I_{g1}$ | = | 2x 3 | 2x2,5 | 2x 1,5 | mA |
| $I_{g2}$ | = | 10 | 16 | 20 | mA |
| $V_{g1g1'p}$ | = | 360 | 360 | 360 | V |
| $W_{ig1}$ | = | 2x0,6 | 2x0,5 | 2x 0,3 | W |
| $W_{g2}$ | = | 2,5 | 4 | 5 | W |
| $W_{ia}$ | = | 2x30 | 2x29 | 2x26 | W |
| $W_a$ | = | 2x20 | 2x20 | 2x20 | W |
| $W_o$ | = | 20 | 18 | 12 | W |
| η | = | 33 | 31 | 23 | % |

Pulse modulator
Modulateur par impulsion
Impulsmodulator

---

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ [1] | = max. 7 kV | $I_{g_2p}$ | = max. 2x1 A |
| $V_{a_p}$ [2] | = max. 8 kV | $W_{g_2}$ | = max. 2x1,5 W |
| $W_a$ | = max. 2x7,5 W | $-V_{g_1}$ [1] | = max. 200 V |
| $W_{1a}$ | = max. 2x30 W | $V_{g_1p}$ | = max. 450 V |
| $V_{g_2}$ [1] | = max. 850 V | $I_{g_1p}$ | = max. 2x1 A |
| | | $W_{g_1}$ | = max. 2x0,5 W |
| | | $V_{kf}$ | = max. 100 V |
| | | $T_{imp}$ | = max. 1,2 µsec |

$I_{a_p}$ ($T_{imp}$ = max. 1,2 µsec) = max. 5 A
$I_{a_p}$ ($T_{imp}$ = max. 0,2 µsec) = max. 6 A

Pulse repetition rate
Fréquence des impulsions = max. 1250 c/s
Impulsfrequenz

Duty cycle
Cycle d'opération = max. 0,0015
Arbeitsperiode

Operating conditions
Caractéristiques d'opération
Kenndaten

| | | | |
|---|---|---|---|
| $V_a$ | = | 7 | 7 kV |
| $V_{g_2}$ | = | 850 | 650 V |
| $V_{g_1}$ | = | -200 | -200 V |
| $V_{g_1p}$ | = | 450 | 450 V |
| $R_a$ | = | 400 | 1000 Ω |
| $I_{a_p}$ | = | 5 | 6 A |
| $T_{imp}$ | = | 1,2 | 0,13 µsec |
| Pulse repetition rate<br>Fréquence des impulsions<br>Impulsfrequenz | = | 1250 | 500 c/s |
| Duty cycle<br>Cycle d'opération<br>Arbeitsperiode | = | 0,0015 | 0,000 065 |
| Time of rise<br>Temps de montée<br>Ansteigzeit | = | | 0,01 µsec |

1) See page 9; voir page 9; siehe Seite 9
2) Due to transients
Pour des tensions transitoires
Für Ausgleichsspannungen

[1]) The tube should be protected by sufficient DC resistance in the supply circuit of the anode, the screen grid and the control grid, so that in case of short-circuit the current is limited to 0.5 A in each circuit

Le tube doit être protégé par des résistances ohmiques de valeur suffisante dans les circuits de l'anode, de la grille-écran et de la grille de commande, de sorte qu'en cas de court-circuit le courant soit limité dans chaque circuit à 0,5 A

Die Röhre soll mittels ohmscher Widerstände genügender Grösse in den Anoden-, Schirmgitter- und Steuergitterleitungen geschützt werden, so dass bei Kurzschluss der Strom in jeder Leitung auf 0,5 A begrenzt wird

L.F. class B amplifier and modulator without grid current
Amplificatrice et modulatrice B.F. classe B sans courant de grille
NF-Verstärker und Modulator Klasse B ohne Gitterstrom

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 600 | V |
| $W_{ia}$ | = max. | 2x60 | W |
| $W_a$ | = max. | 2x20 | W |
| $I_a$ | = max. | 2x110 | mA |
| $V_{g2}$ | = max. | 300 | V |
| $W_{g2}$ | = max. | 2x3,5 | W |
| $R_{g1}$ | = max. | 50 | kΩ |
| $V_{kf}$ | = max. | 100 | V |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 600 | | 450 | | 300 | | V |
| $V_{g1}$ [1] | = | -27,5 | | -27,5 | | -26 | | V |
| $V_{g2}$ | = | 250 | | 250 | | 250 | | V |
| $R_{aa'}$ | = | 12,5 | | 10 | | 6,5 | | kΩ |
| $V_{g1g1'p}$ | = | 0 | 55 | 0 | 55 | 0 | 52 | V |
| $I_a$ | = | 2x20 | 2x62 | 2x20 | 2x58 | 2x20 | 2x56 | mA |
| $I_{g2}$ | = | 0,9 | 23 | 1,4 | 27 | 2,2 | 28 | mA |
| $W_{g2}$ | = | 0,2 | 5,8 | 0,4 | 6,7 | 0,6 | 7,0 | W |
| $W_{ia}$ | = | 2x12 | 2x37 | 2x9,0 | 2x26 | 2x6,0 | 2x16,8 | W |
| $W_a$ | = | 2x12 | 2x12 | 2x9,0 | 2x8,5 | 2x6,0 | 2x5,6 | W |
| $W_o$ | = | 0 | 50 | 0 | 35 | 0 | 22,5 | W |
| $d_{tot}$ | = | - | 2,4 | - | 3.1 | - | 2,9 | % |
| $\eta$ | = | - | 67,5 | - | 67,5 | - | 67 | % |

[1] Individual adjustment of the grid bias of each system is recommended
Il est recommandé de régler la polarisation négative de chaque système individuellement
Es wird empfohlen die Gittervorspannung jedes Systems einzeln zu regeln.

L.F. class B amplifier and modulator with grid current
Amplificatrice et modulatrice B.F. classe B avec courant de grille
NF-Verstärker und Modulator Klasse B mit Gitterstrom

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 600 | V |
| $W_{ia}$ | = max. | 2x60 | W |
| $W_a$ | = max. | 2x20 | W |
| $I_a$ | = max. | 2x110 | mA |
| $V_{g2}$ | = max. | 300 | V |
| $W_{g2}$ | = max. | 2x3,5 | W |
| $I_{g1}$ | = max. | 2x5 | mA |
| $R_{g1}$ | = max. | 50 | kΩ |
| $V_{kf}$ | = max. | 100 | V |

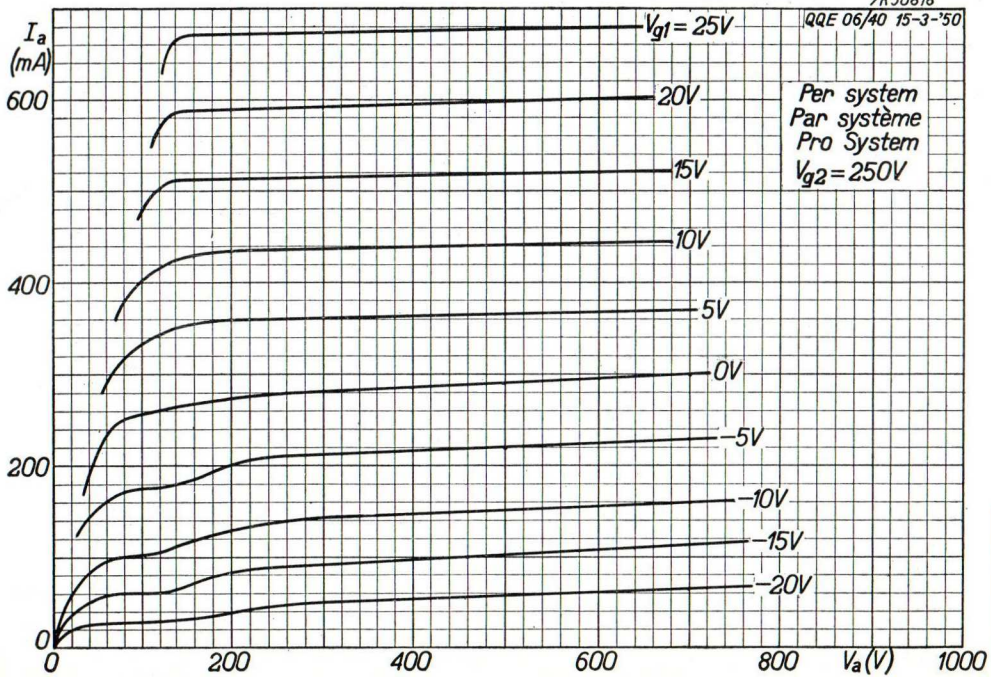
Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 600 | | 450 | | 300 | | V |
| $V_{g1}$ [1] | = | -25 | | -25 | | -25 | | V |
| $V_{g2}$ | = | 250 | | 250 | | 250 | | V |
| $R_{aa'}$ | = | 8,0 | | 6,0 | | 4,0 | | kΩ |
| $V_{g1g1'p}$ | = | 0 | 78 | 0 | 76 | 0 | 75 | V |
| $I_a$ | = | 2x25 | 2x100 | 2x25 | 2x97 | 2x25 | 2x94 | mA |
| $I_{g1}$ | = | 0 | 2x2,6 | 0 | 2x2,6 | 0 | 2x2,6 | mA |
| $I_{g2}$ | = | 1,2 | 26 | 1,9 | 28 | 2,8 | 28 | mA |
| $W_{ig1}$ | = | 0 | 2x0,1 | 0 | 2x0,1 | 0 | 2x0,1 | W |
| $W_{g2}$ | = | 0,3 | 6,5 | 0,5 | 7,0 | 0,7 | 7,0 | W |
| $W_{ia}$ | = | 2x15 | 2x60 | 2x11,2 | 2x43,5 | 2x7,5 | 2x28,2 | W |
| $W_a$ | = | 2x15 | 2x17 | 2x11,2 | 2x13,5 | 2x7,5 | 2x9,7 | W |
| $W_o$ | = | 0 | 86 | 0 | 60 | 0 | 37 | W |
| $d_{tot}$ | = | - | 5 | - | 5 | - | 5 | % |
| $\eta$ | = | - | 71,5 | - | 69 | - | 65,5 | % |

[1] Individual adjustment of the grid bias of each system is recommended
Il est recommandé de régler la polarisation négative de chaque système individuellement
Es wird empfohlen die Gittervorspannung jedes Systems einzeln zu regeln

7R50818

QQE 06/40 15-3-'50

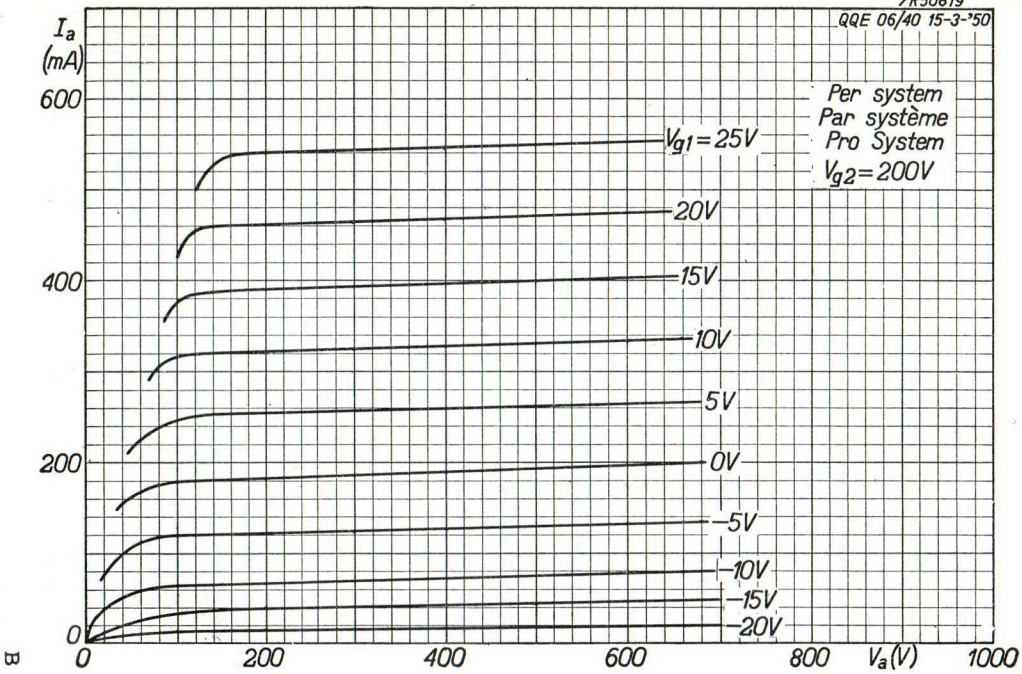



PHILIPS

QQE 06/40

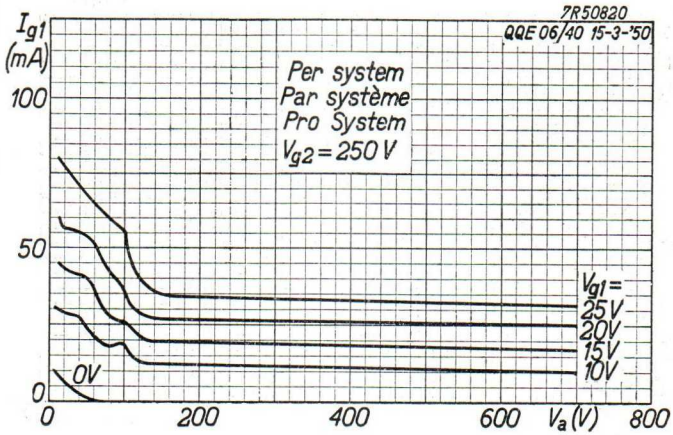
7.7.1954

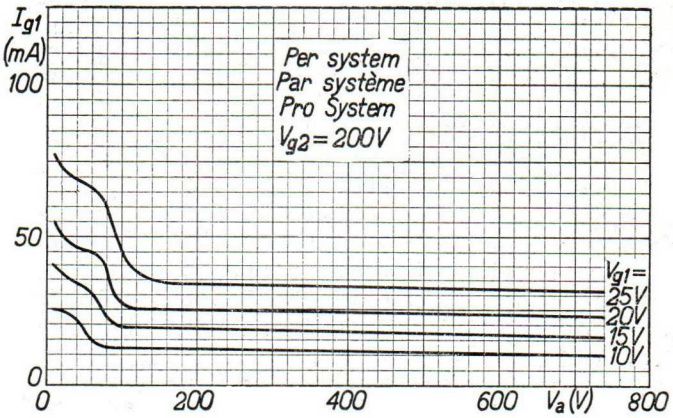
A


7R50819
QQE 06/40 15-3-'50
$I_a$ (mA)
600
400
200
0
Per system
Par système
Pro System
$V_{g2}$ = 200V
$V_{g1}$ = 25V
20V
15V
10V
5V
0V
−5V
−10V
−15V
−20V
0
200
400
600
800
$V_a$(V)
1000

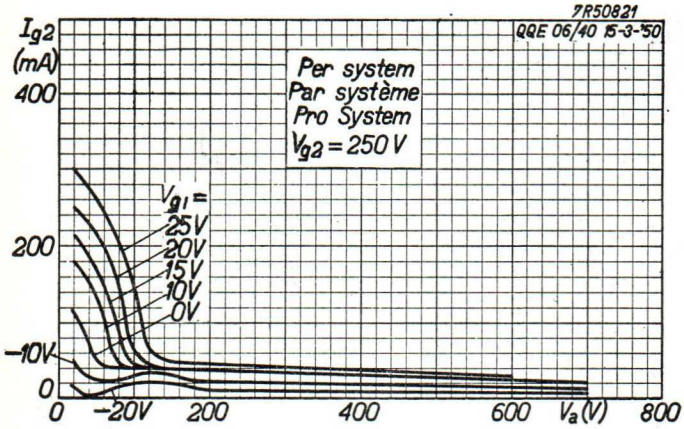
B

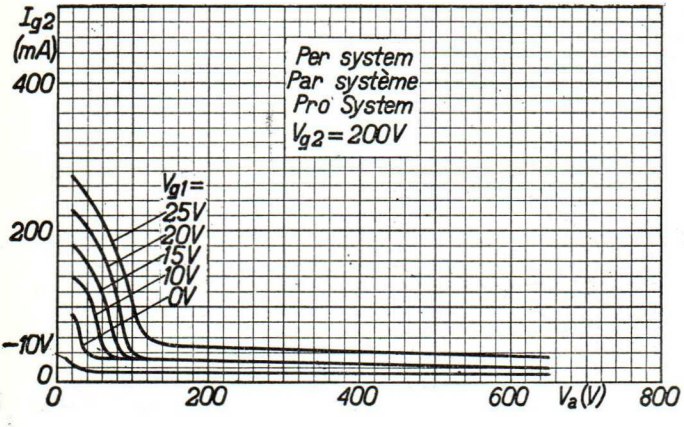
PHILIPS


7R50820
QQE 06/40 15-3-'50
$I_{g1}$ (mA)
100
50
0
Per system
Par système
Pro System
$V_{g2}$ = 250 V
$V_{g1}$ =
25 V
20V
15V
10V
0V
0
200
400
600
$V_a$ (V)
800


$I_{g1}$ (mA)
100
50
0
Per system
Par système
Pro System
$V_{g2}$ = 200V
$V_{g1}$ =
25V
20V
15V
10V
0
200
400
600
$V_a$ (V)
800

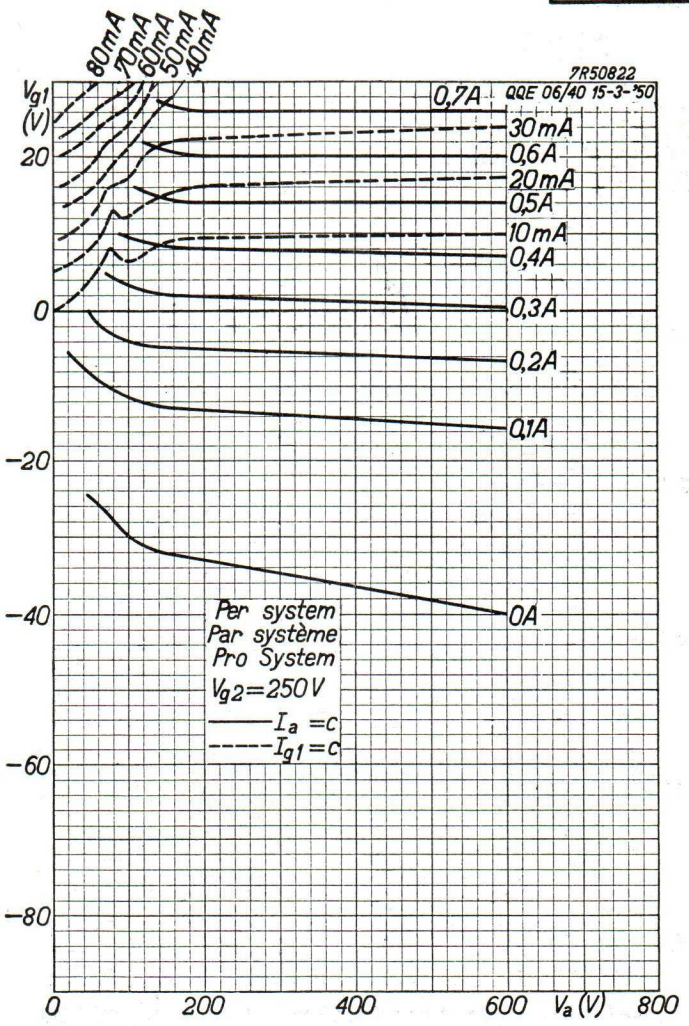
# PHILIPS


7R50821
QQE 06/40 15-3-50
$I_{g2}$ (mA)
400
200
−10V
0
Per system
Par système
Pro System
$V_{g2} = 250\,V$
$V_{g1}$ =
25V
20V
15V
10V
0V
0
−20V
200
400
600
$V_a$(V)
800


$I_{g2}$ (mA)
400
200
−10V
0
Per system
Par système
Pro System
$V_{g2} = 200V$
$V_{g1}$ =
25V
20V
15V
10V
0V
0
200
400
600
$V_a$(V)
800

# PHILIPS

**QQE 06/40**

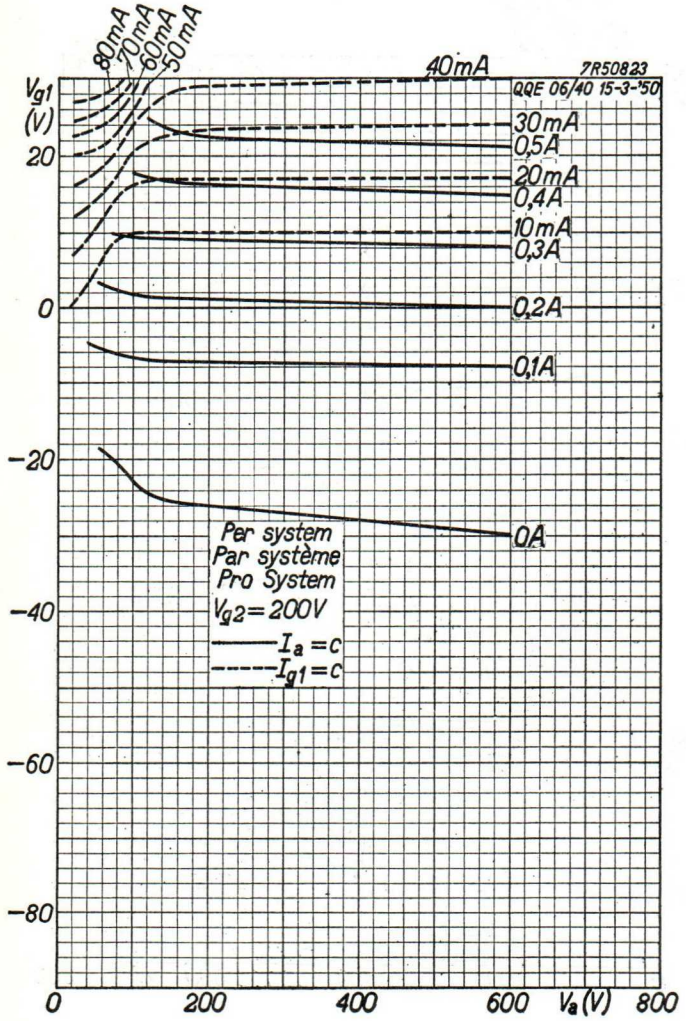



7.7.1954

E

QQE 06/40

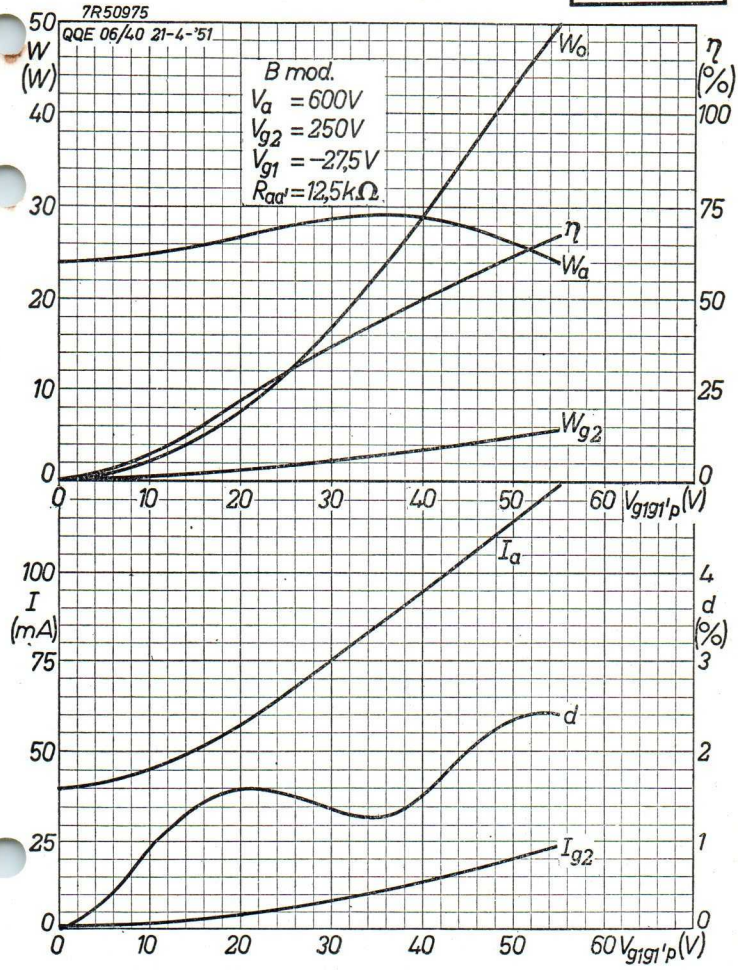
# PHILIPS




F

# PHILIPS

**QQE 06/40**

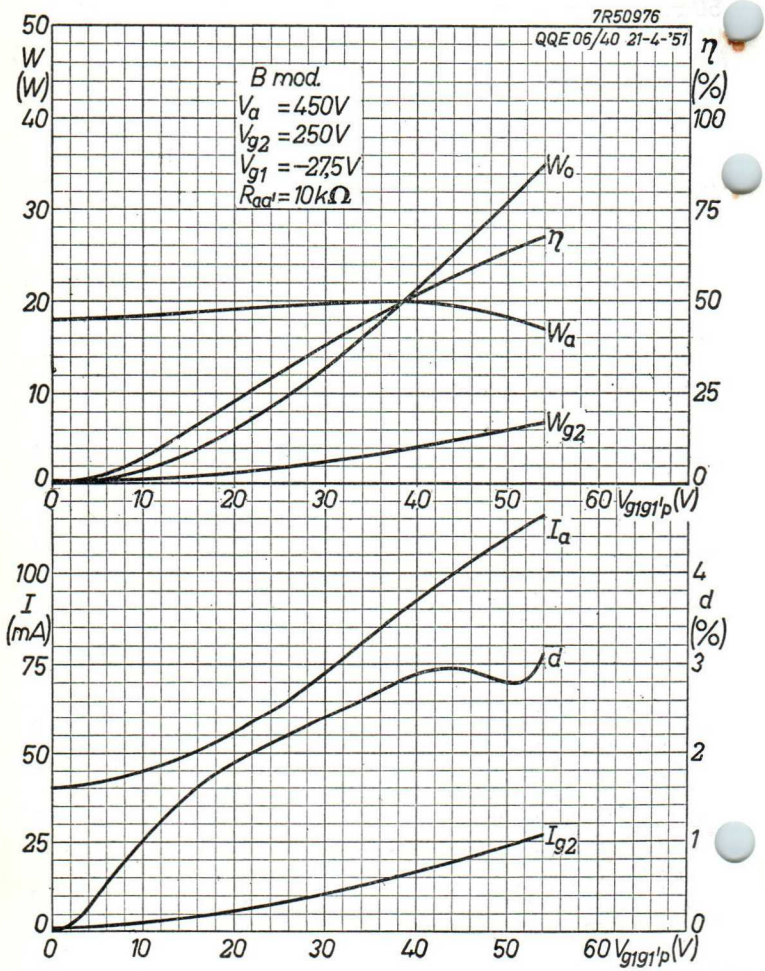



5.5.1951

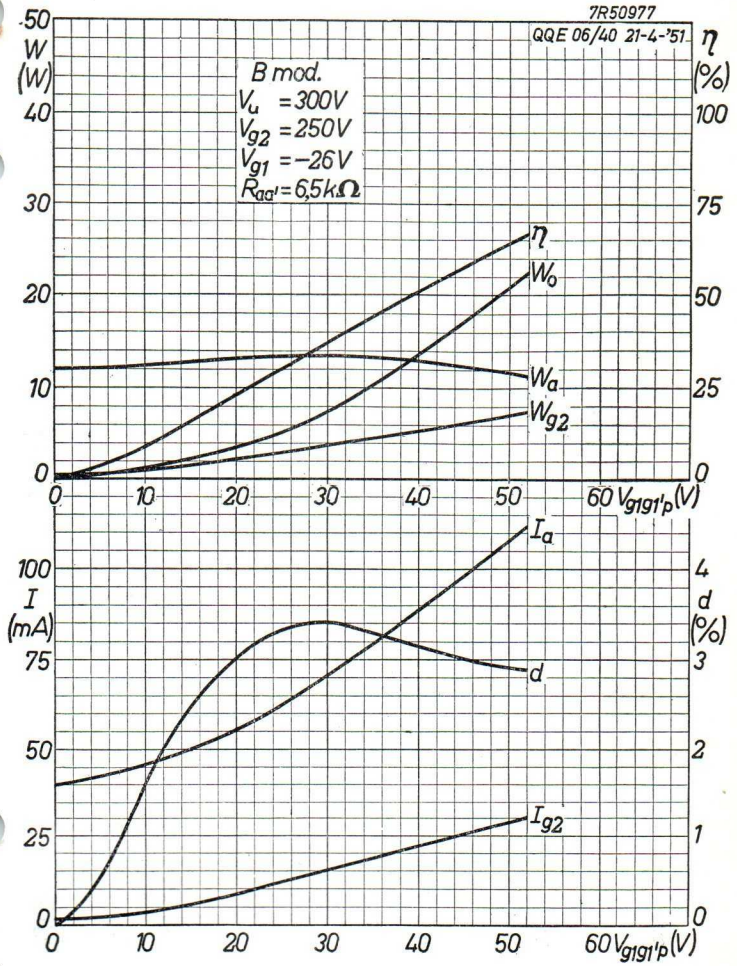
G

**QQE 06/40**

# PHILIPS

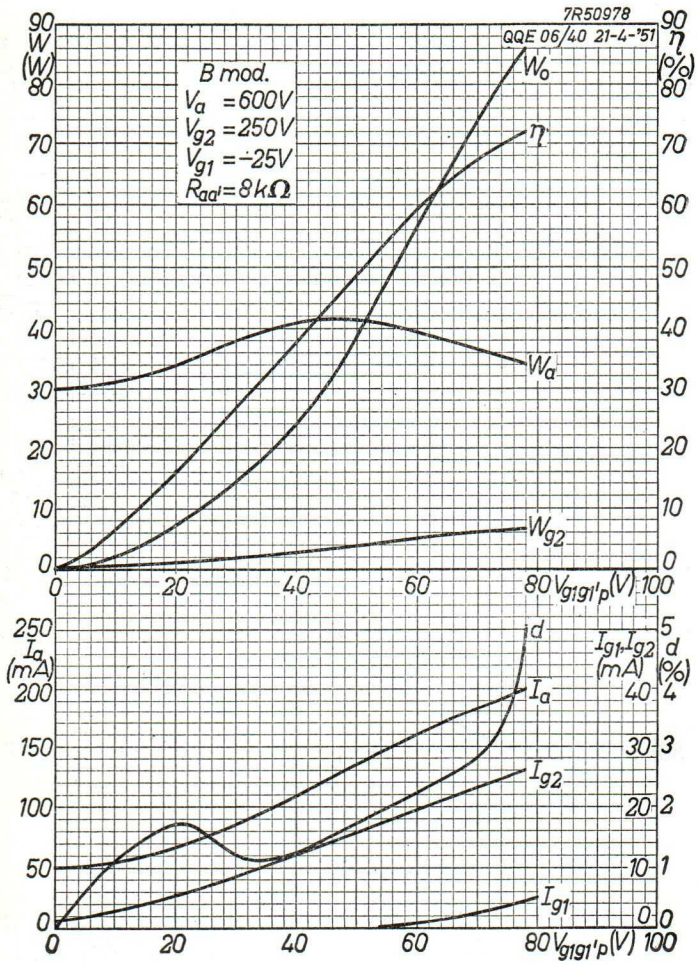



H


7R50977
QQE 06/40 21-4-'51
B mod.
$V_u$ = 300V
$V_{g2}$ = 250V
$V_{g1}$ = −26V
$R_{aa'}$ = 6,5 kΩ
W (W)
η (%)
$W_o$
$W_a$
$W_{g2}$
$V_{g1g1'p}$ (V)
I (mA)
d (%)
$I_a$
$I_{g2}$
d

**QQE 06/40**

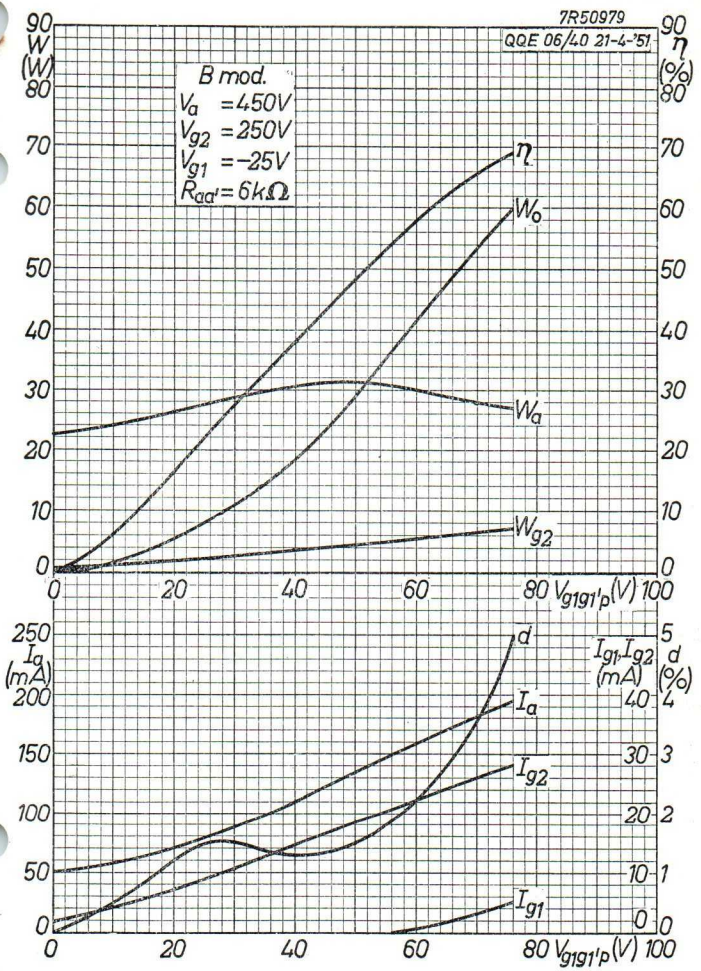
# PHILIPS




J

# PHILIPS

**QQE 06/40**

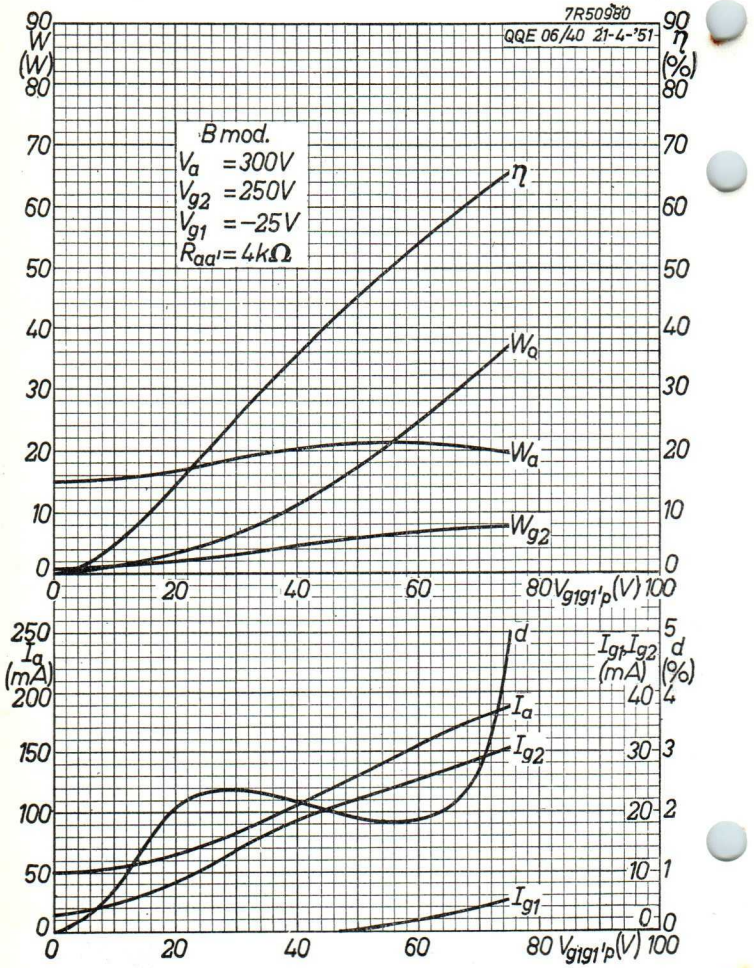



5.5.1951

K

**QQE 06/40**

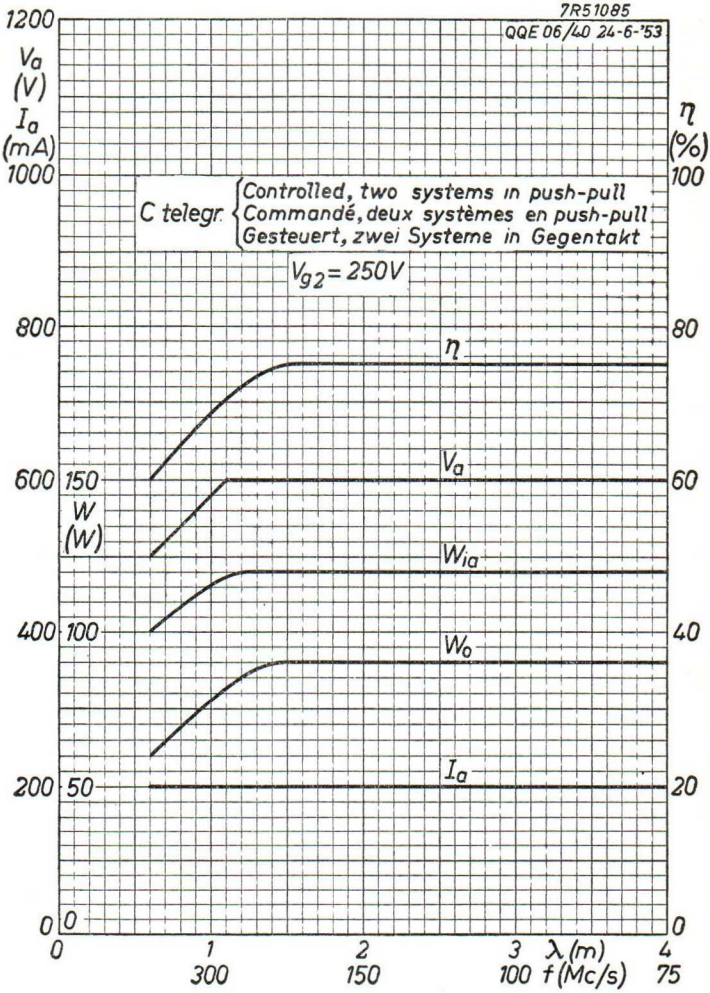
# PHILIPS




L

# PHILIPS

**QQE 06/40**




6.6.1953

M

# PHILIPS

**TAL 12/10**
**TAW 12/10**

TRIODE for use as H.F. and L.F. amplifier and oscillator
TRIODE pour utilisation comme amplificatrice H.F. et B.F. et oscillatrice
TRIODE zur Verwendung als H.F. und N.F. Verstärker und Oszillator

| | TAL 12/10 | TAW 12/10 |
|---|---|---|
| Cooling | : forced air | water |
| Refroidissement: | à air forcée | eau |
| Kühlung | : erzwungene Luftkühlung | Wasser |

Filament : tungsten, two-phase
Filament : tungstène, biphasé
Heizfaden: Wolfram, zwei Phasen

| | | | |
|---|---|---|---|
| Heating | : direct | per phase | $V_f$ = 22 V [1] |
| Chauffage: | direct | par phase | $I_f$ = 39 A |
| Heizung | : direkt | pro Phase | |

Starting current must never exceed 78 A per phase
Le courant de démarrage ne doit jamais excéder 78 A par phase
Der Anlaufstrom darf unter keinen Umständen höher sein als 78 A pro Phase

| | |
|---|---|
| Capacitances | $C_a$ = 4 pF |
| Capacités | $C_g$ = 24,8 pF |
| Kapazitäten | $C_{ag}$ = 22 pF |

| | | |
|---|---|---|
| Typical characteristics | $\mu$ | = 22 |
| Caractéristiques typiques | S ($I_a$=0,5 A) | = 7 mA/V |
| Kenndaten | Isat | = 8 A |

---

[1]) Each tube is marked with the value of the filament voltage at which the saturation current has a value of 8 A
La valeur de tension du filament correspondante à un courant de saturation de 8 A est indiquée à chaque tube
Auf jede Röhre ist der Wert der Heizspannung angegeben wobei der Sättigungsstrom einen Wert von 8 A erhält

# PHILIPS

| λ | Freq. | C telegr. | | B teleph. | | C an.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) |
| >60 | < 5 | 12 | 10,5 | | | 10 | 7,7 | 12 | 17 |
| >15 | <20 | 10 | 10,5 | 8 | 2 | 8 | 6 | 10 | 16,6 |
| | | | | 6 | 2 | | | 8 | 16,2 |

Limiting values
Caractéristiques limites
Grenzdaten

$V_a$ = max. 12 kV
$W_a$ = max. 4 kW
$W_g$ = max. 300 W
$R_g$ = max. 10 kΩ

$q$ ($t_i$=20 °C, $W_a$= 4 kW) = min. 5,4 m³/min

$t_i$ = max. 45 °C

$t_{anode}$ = max. 150 °C

temperature of bulb and seals)
température de l'ampoule et des points de scellement) = max. 150 °C
Temperatur des Kolbens und der Verschlüsse)

Pressure loss
Perte de pression
Druckverlust

$p_i$ ($q$ =5,4 m³/min, $t_i$= 20 °C) = 117 mm $H_2O$

Mounting position: exactly vertical with anode down
Montage : exactement vertical avec l'anode en bas
Aufstellung : genau senkrecht mit der Anode unten

Filament bracket
Etriers des filaments 40604
Heizfadenbügel

Protective cap for grid seals
Chapeau de protection pour les sorties de la grille 40632
Schutzkappe für Gitterverschlüsse

[1]) Two valves; deux tubes; zwei Röhren

| λ | Freq. | C telegr. | | B teleph. | | C an.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) |
| >60 | < 5 | 12 | 15 | 12 | 3,7 | 10 | 7,7 | 12 | 30 |
| >15 | <20 | 10 | 12 | 10 | 3,3 | 8 | 6 | 10 | 25 |
| 6 | 50 | 6,5 | 6,5 | | | | | 8 | 19,5 |
| 4 | 75 | 4 | 3,5 | | | | | | |

Limiting values
Caractéristiques limites
Grenzdaten

$V_a$ = max. 12 kV — $t_o$ = max. 50 °C
$W_a$ = max. 7,5 kW — $t_o - t_i$ = max. 11 °C
$W_g$ = max. 300 W — q ($W_a$=7,5 kW)= min. 12 l/min
$R_g$ = max. 10 kΩ

temperature of bulb and seals)
température de l'ampoule et des) = max. 150 °C
points de scellement)
Temperatur des Kolbens und der) = max. 150 °C
Verschlüsse)

Pressure loss
Perte de pression — $p_i$ (q=12 l/min)= 0,3 atm
Druckverlust

Mounting position: exactly vertical with anode down
Montage : exactement vertical avec l'anode en bas
Aufstellung : genau senkrecht mit der Anode unten

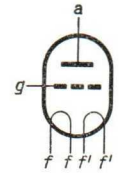
Filament bracket
Etriers des filaments — 40604
Heizfadenbügel

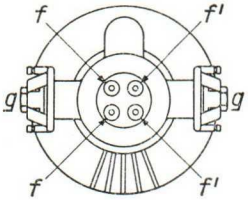
Protective cap for grid seals
Chapeau de protection pour les sorties de la grille — 40632
Schutzkappe für Gitterverschlüsse

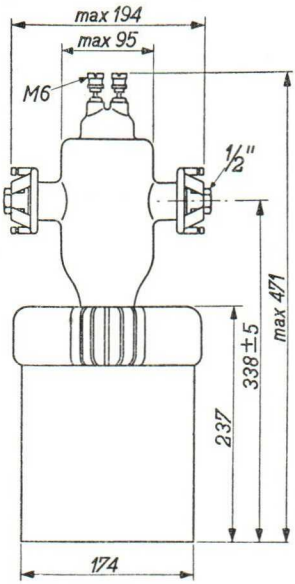
[1]) Two valves; deux tubes; zwei Röhren

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm



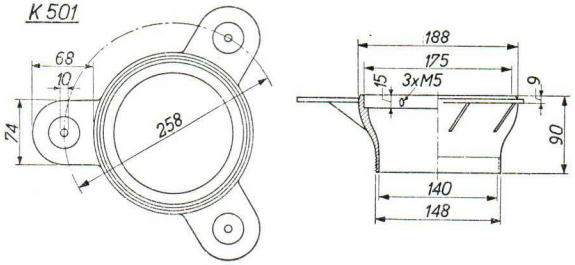



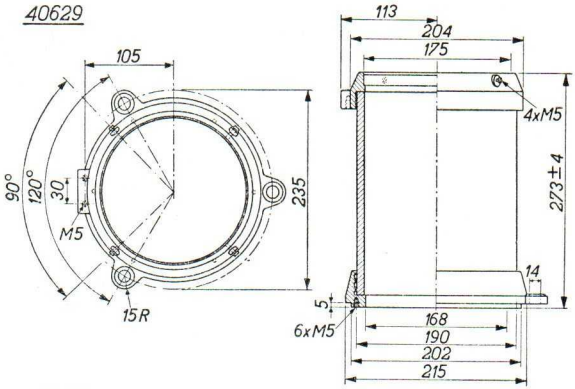

| | | | |
|---|---|---|---|
| Supporting ring<br>Poignée<br>Tragring | | | 40603 |
| Foot<br>Pied<br>Fuss | K 501 | or<br>ou<br>oder | Insulating collar<br>Support isolant<br>Isolierhalter 40629 |
| Net weight<br>Poids net<br>Nettogewicht | | | 13,5 kg |
| Shipping weight<br>Poids brut<br>Bruttogewicht | | | 33 kg |

*Dimensions in mm ; Dimensions en mm ; Abmessungen in mm* 59696

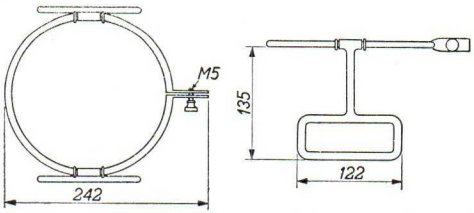
K 501




40629



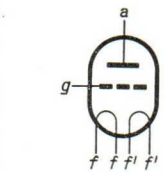

40603

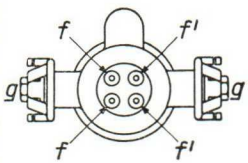


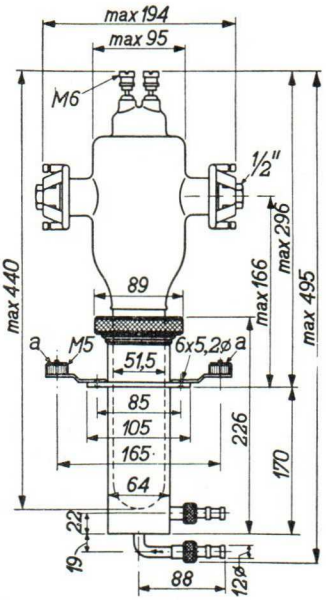
# PHILIPS

Valve mounted in water-jacket type K 700
Tube monté dans le réfrigérant type K 700
Röhre in Kühltopf Typ K 700 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| | |
|---|---|
| Net weight of the valve<br>Poids net du tube<br>Netto Röhrengewicht | 2 kg |
| Shipping weight of the valve<br>Poids brut du tube<br>Brutto Röhrengewicht | 8 kg |
| Net weight of the water-jacket<br>Poids net du réfrigérant<br>Nettogewicht des Kühltopfes | 2,1 kg |

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >60 | >15 | m |
| $V_a$ | = | 12 | 10 | kV |
| $V_g$ | = | -700 | -600 | V |
| $I_a$ | = | 1,21 | 1,45 | A |
| $I_g$ | = | 0,28 | 0,26 | A |
| $V_{gp}$ | = | 1100 | 1050 | V |
| $W_{ig}$ | = | 280 | 250 | W |
| $W_{ia}$ | = | 14,5 | 14,5 | kW |
| $W_a$ | = | 4 | 4 | kW |
| $W_o$ | = | 10,5 | 10,5 | kW |
| $\eta$ | = | 72,5 | 72,5 | % |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | > 60 | >15 | m |
| $V_a$ | = | 8 | 6 | kV |
| $V_g$ | = | -300 | -190 | V |
| $I_a$ | = | 0,75 | 1 | A |
| $V_{gp}$ | = | 325 | 315 | V |
| $W_{ia}$ | = | 6 | 6 | kW |
| $W_a$ | = | 4 | 4 | kW |
| $W_o$ | = | 2 | 2 | kW |
| $\eta$ | = | 33 | 33 | % |
| m | = | 100 | 100 | % |
| $I_g$ | = | 0,26 | 0,35 | A |
| $W_{ig}$ | = | 155 | 200 | W |

# PHILIPS

Operating conditions H.F. class C anode modulation
Caractéristiques d'utilisation H.F. classe C modulation d'anode
Betriebsdaten H.F. Klasse C Anodenmodulation

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >60 | >15 | m |
| $V_a$ | = | 10 | 8 | kV |
| $V_g$ | = | -800 | -700 | V |
| $I_a$ | = | 1 | 1 | A |
| $I_g$ | = | 0,44 | 0,33 | A |
| $V_{gp}$ | = | 1200 | 1150 | V |
| $W_{ig}$ | = | 475 | 345 | W |
| $W_{ia}$ | = | 10 | 8 | kW |
| $W_a$ | = | 2,3 | 2 | kW |
| $W_o$ | = | 7,7 | 6 | kW |
| $\eta$ | = | 77 | 75 | % |
| m | = | 100 | 100 | % |
| $W_{mod}$ | = | 5 | 4 | kW |

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 12 | | 10 | | 8 | | kV |
| $V_g$ | = | -450 | | -350 | | -265 | | V |
| $R_{aa}$ | = | 16 | | 10 | | 7,12 | | kΩ |
| $V_{ggp}$ | = | 0 | 1520 | 0 | 1350 | 0 | 1300 | V |
| $I_a$ | = | 2x0,32 | 2x0,94 | 2x0,38 | 2x1,14 | 2x0,4 | 2x1,42 | A |
| $I_g$ | = | 0 | 2x0,14 | 0 | 2x0,14 | 0 | 2x0,27 | A |
| $W_{ig}$ | = | 0 | 2x96 | 0 | 2x86 | 0 | 2x158 | W |
| $W_{ia}$ | = | 2x3,84 | 2x11,3 | 2x3,8 | 2x11,4 | 2x3,2 | 2x11,4 | kW |
| $W_a$ | = | 2x3,84 | 2x2,8 | 2x3,8 | 2x3,1 | 2x3,2 | 2x3,3 | kW |
| $W_o$ | = | 0 | 17 | 0 | 16,6 | 0 | 16,2 | kW |
| dtot | = | - | 5 | - | 5 | - | 5 | % |
| $\eta$ | = | - | 75 | - | 73 | - | 71 | % |

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = | >60 | >15 | 6 | 4 | m |
| $V_a$ | = | 12 | 10 | 6,5 | 4 | kV |
| $V_g$ | = | -700 | -600 | -460 | -350 | V |
| $I_a$ | = | 1,7 | 1,7 | 1,7 | 1,7 | A |
| $I_g$ | = | 0,35 | 0,28 | 0,19 | 0,16 | A |
| $V_{gp}$ | = | 1100 | 1070 | 885 | 775 | V |
| $W_{ig}$ | = | 350 | 270 | 150 | 115 | W |
| $W_{ia}$ | = | 20,4 | 17 | 11 | 6,8 | kW |
| $W_a$ | = | 5,4 | 5 | 4,5 | 3,3 | kW |
| $W_o$ | = | 15 | 12 | 6,5 | 3,5 | kW |
| $\eta$ | = | 73,5 | 70,5 | 59 | 51,5 | % |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >60 | >15 | m |
| $V_a$ | = | 12 | 10 | kV |
| $V_g$ | = | -435 | -360 | V |
| $I_a$ | = | 0,93 | 1 | A |
| $V_{gp}$ | = | 285 | 245 | V |
| $W_{ia}$ | = | 11,2 | 10 | kW |
| $W_a$ | = | 7,5 | 6,7 | kW |
| $W_o$ | = | 3,7 | 3,3 | kW |
| $\eta$ | = | 33 | 33 | % |
| m | = | 100 | 100 | % |
| $I_g$ | = | 0,35 | 0,35 | A |
| $W_{ig}$ | = | 180 | 155 | W |

# PHILIPS

Operating conditions H.F. class C anode modulation
Caractéristiques d'utilisation H.F. classe C modulation d'anode
Betriebsdaten H.F. Klasse C Anodenmodulation

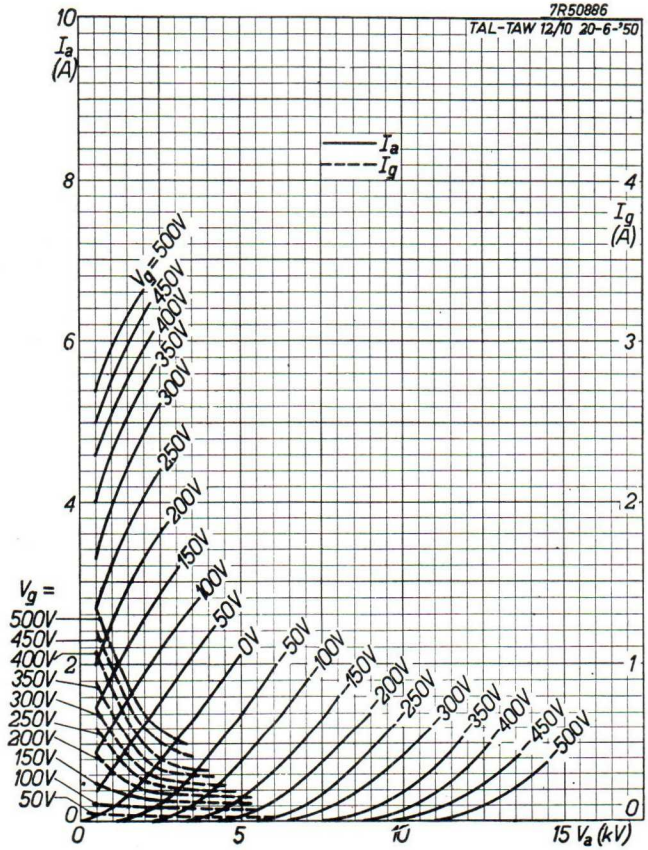
| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >60 | >15 | m |
| $V_a$ | = | 10 | 8 | kV |
| $V_g$ | = | -800 | -700 | V |
| $I_a$ | = | 1 | 1 | A |
| $I_g$ | = | 0,44 | 0,33 | A |
| $V_{gp}$ | = | 1200 | 1150 | V |
| $W_{ig}$ | = | 475 | 345 | W |
| $W_{ia}$ | = | 10 | 8 | kW |
| $W_a$ | = | 2,3 | 2 | kW |
| $W_o$ | = | 7,7 | 6 | kW |
| $\eta$ | = | 77 | 75 | % |
| m | = | 100 | 100 | % |
| $W_{mod}$ | = | 5 | 4 | kW |

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 12 | | 10 | | 8 | | kV |
| $V_g$ | = | -415 | | -350 | | -260 | | V |
| $R_{aa}$ | = | 8,32 | | 5,6 | | 5,4 | | kΩ |
| $V_{ggp}$ | = | 0 | 1720 | 0 | 1560 | 0 | 1400 | V |
| $I_a$ | = | 2x0,55 | 2x1,7 | 2x0,35 | 2x1,9 | 2x0,45 | 2x1,75 | A |
| $I_g$ | = | 0 | 2x0,32 | 0 | 2x0,18 | 0 | 2x0,38 | A |
| $W_{ig}$ | = | 0 | 2x250 | 0 | 2x130 | 0 | 2x120 | W |
| $W_{ia}$ | = | 2x6,6 | 2x20,4 | 2x3,5 | 2x19 | 2x3,6 | 2x14 | kW |
| $W_a$ | = | 2x6,6 | 2x5,4 | 2x3,5 | 2x6,5 | 2x3,6 | 2x4,25 | kW |
| $W_o$ | = | 0 | 30 | 0 | 25 | 0 | 19,5 | kW |
| $d_{tot}$ | = | - | 5 | - | 5 | - | 5 | % |
| $\eta$ | = | - | 73,5 | - | 66 | - | 69,5 | % |

# PHILIPS

**TAL 12/10**
**TAW 12/10**

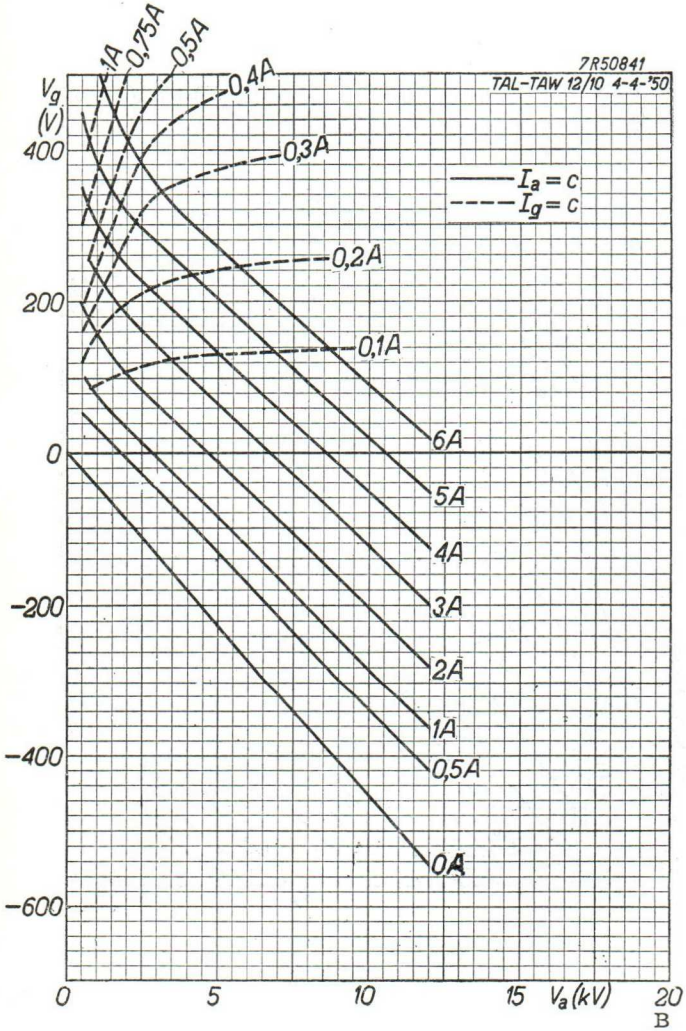



6.6.1950

A

**TAL 12/10**
**TAW 12/10**

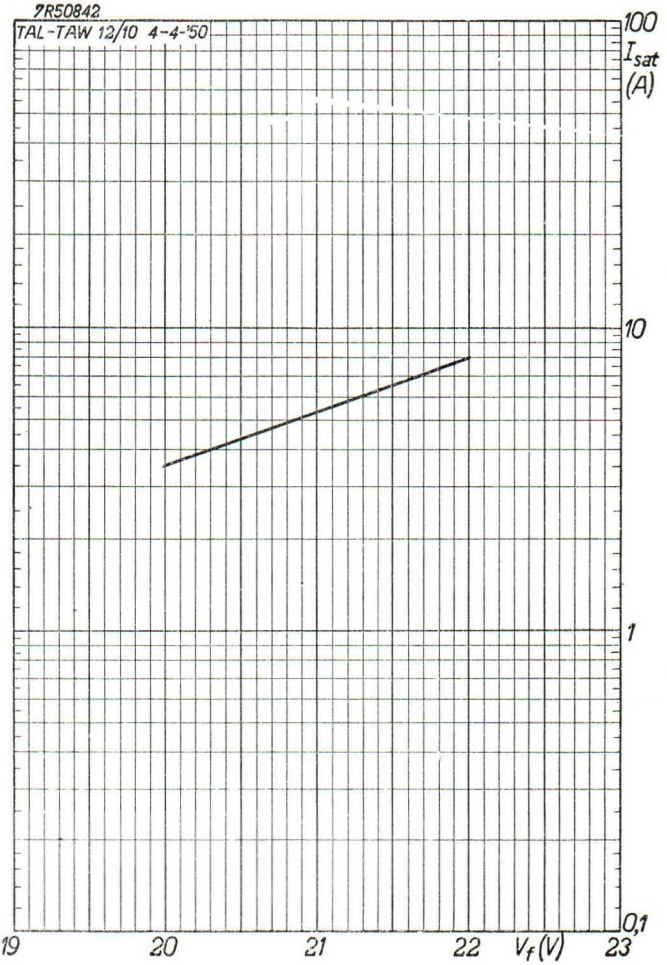
# PHILIPS




B

# PHILIPS

**TAL 12/10**
**TAW 12/10**

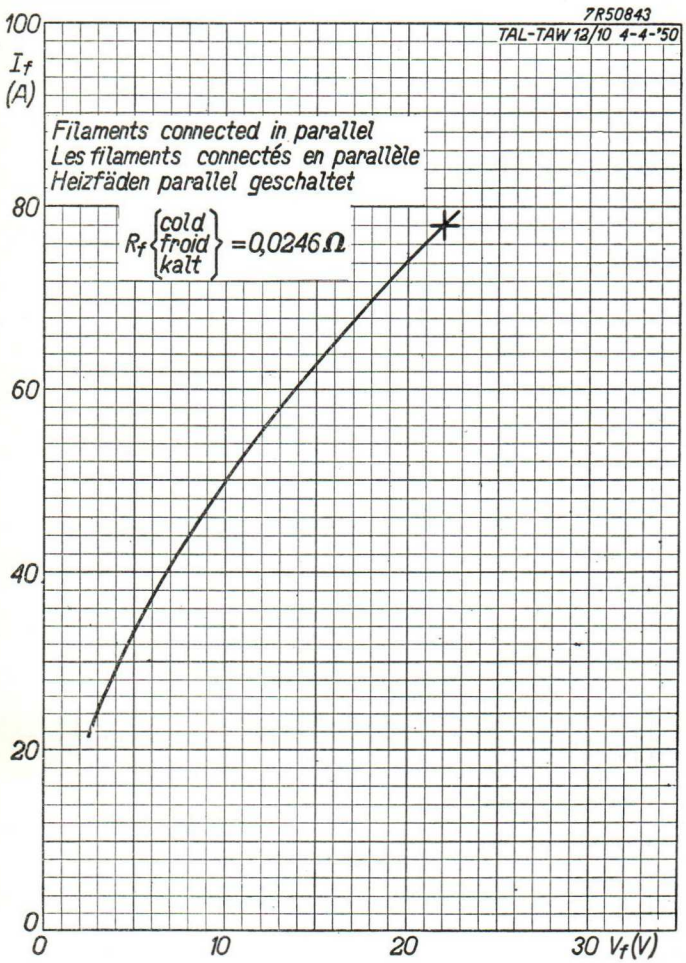



4.4.1950

C

**TAL 12/20**
**TAW 12/20**

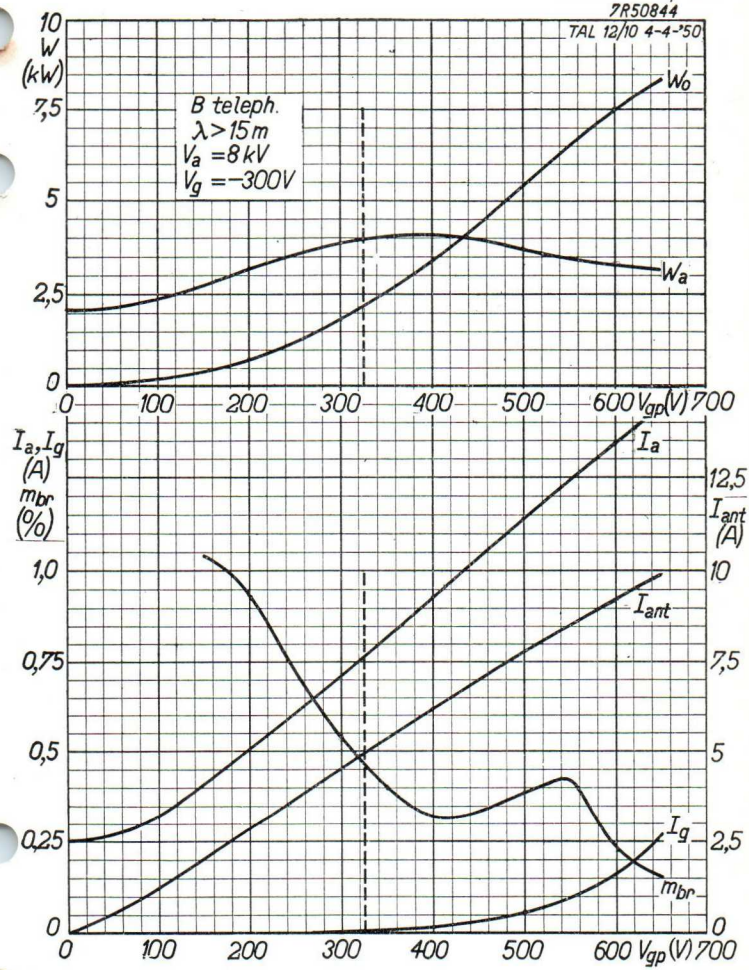
# PHILIPS




D

# PHILIPS

**TAL 12/10**

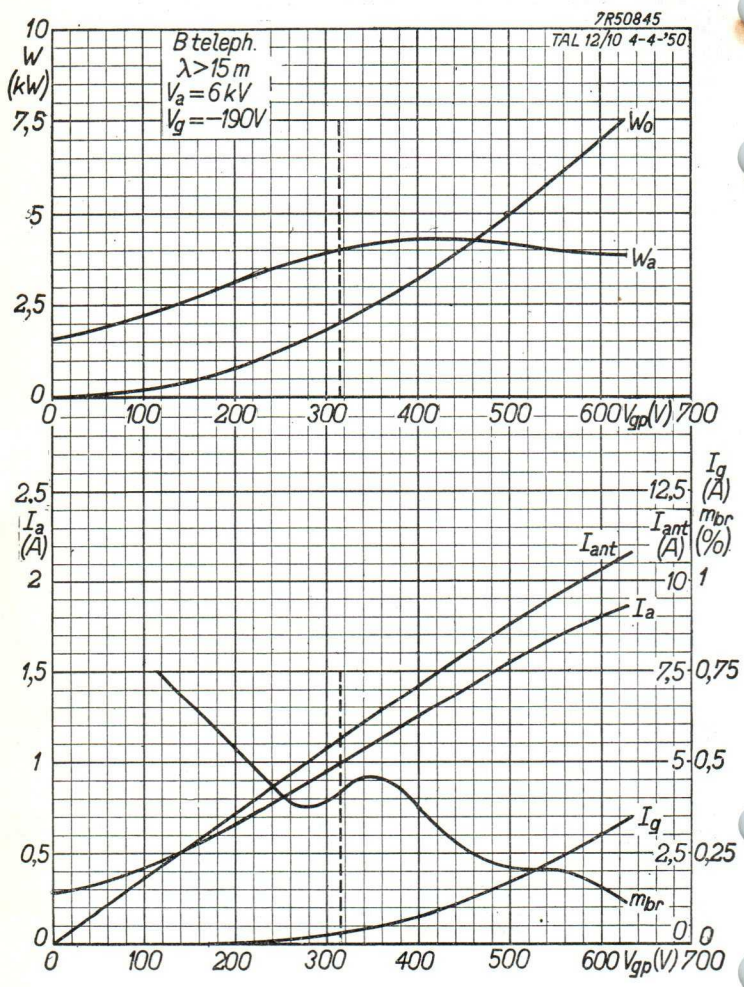



4.4.1950

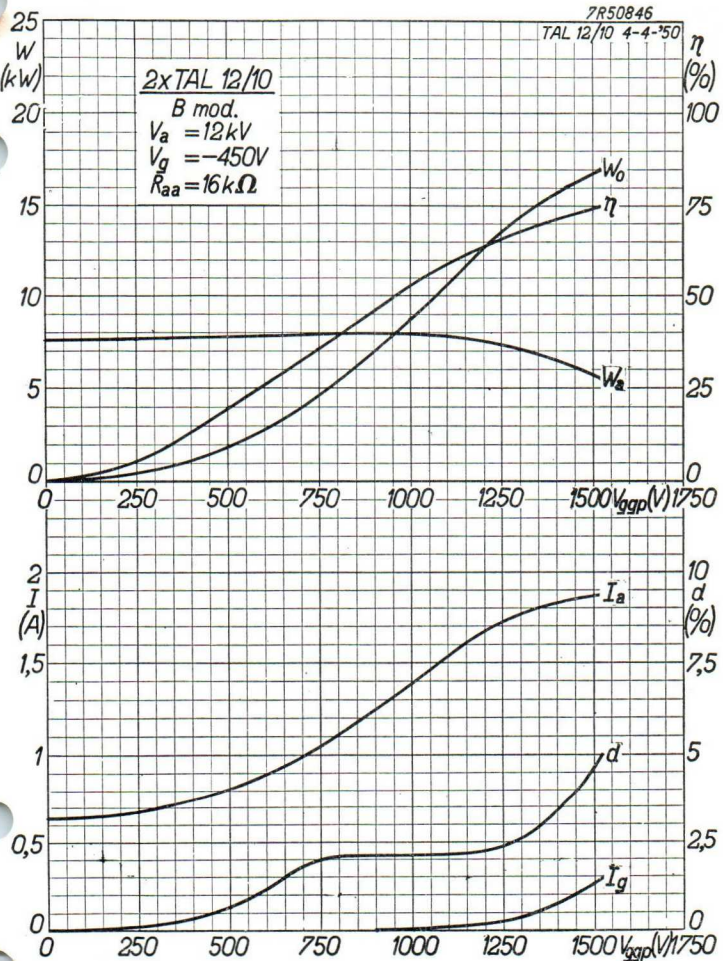
E

TAL 12/10

# PHILIPS

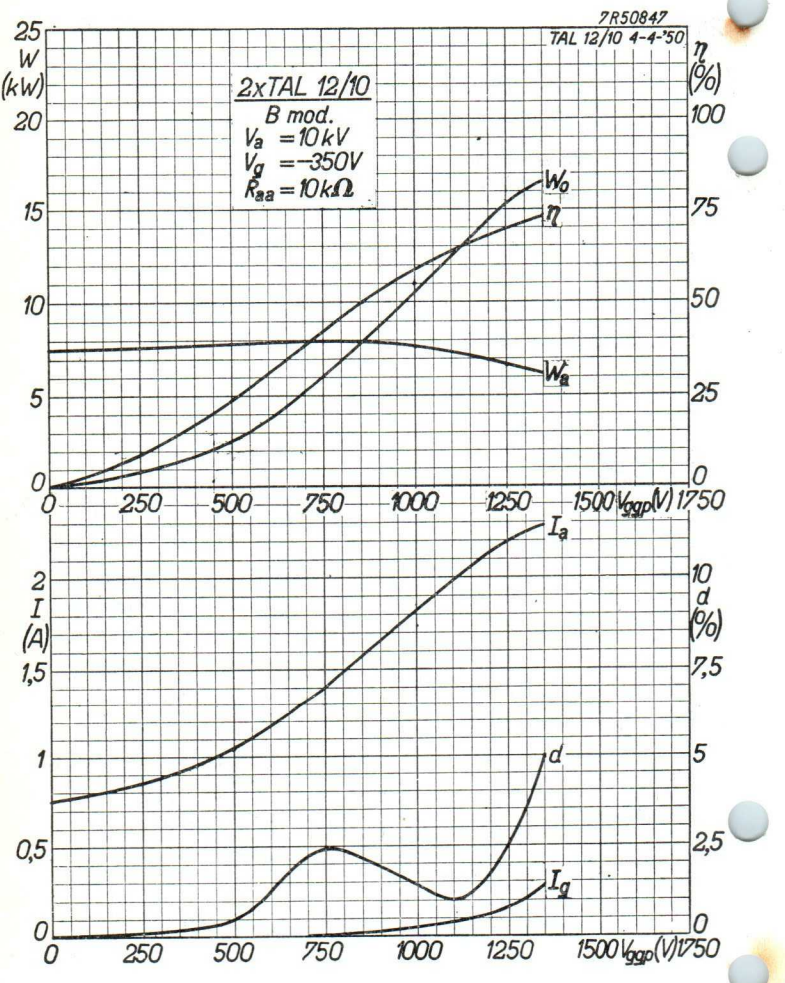



F

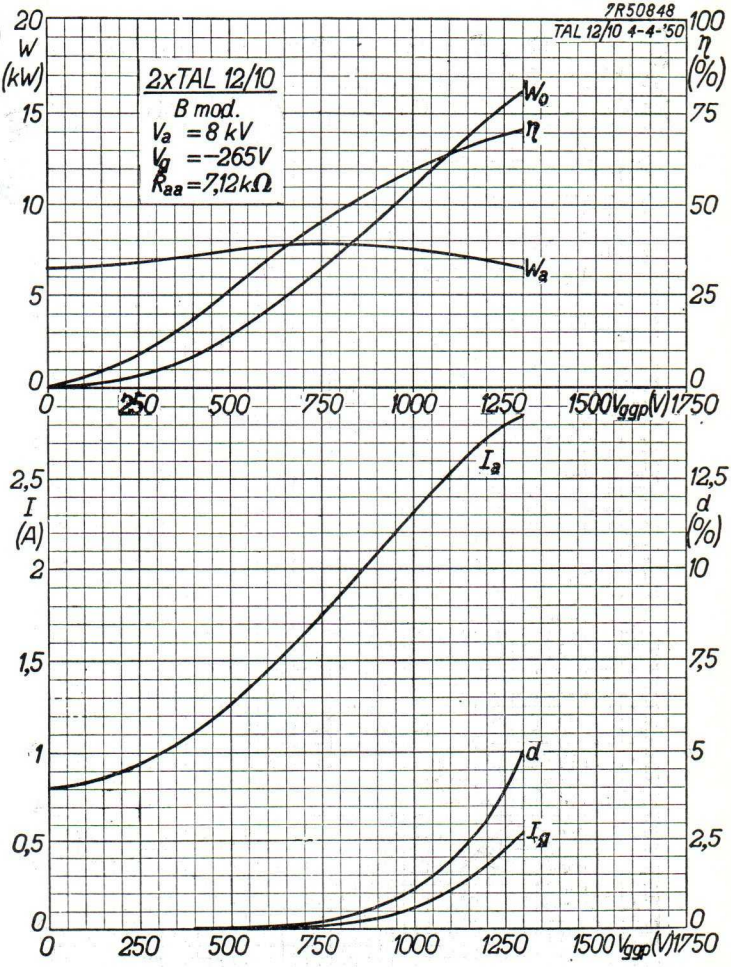

7R50846
TAL 12/10 4-4-'50
2xTAL 12/10
B mod.
$V_a$ = 12kV
$V_g$ = −450V
$R_{aa}$ = 16kΩ
W (kW)
η (%)
$W_o$
η
$W_a$
$V_{ggp}$ (V)
I (A)
d (%)
$I_a$
d
$I_g$

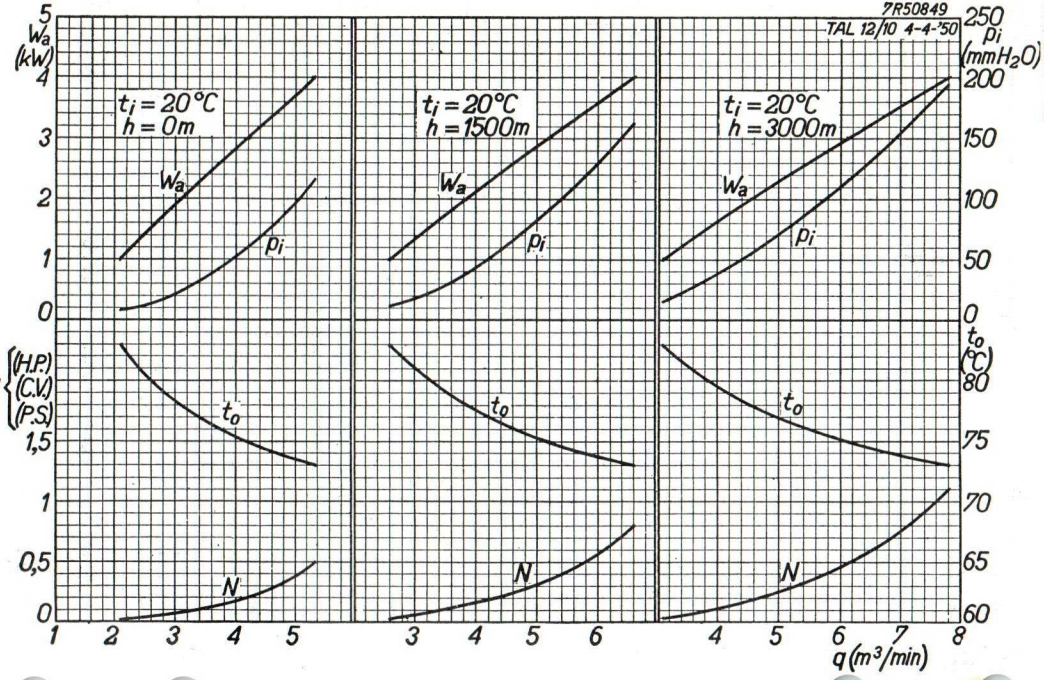
**TAL 12/10**

# PHILIPS



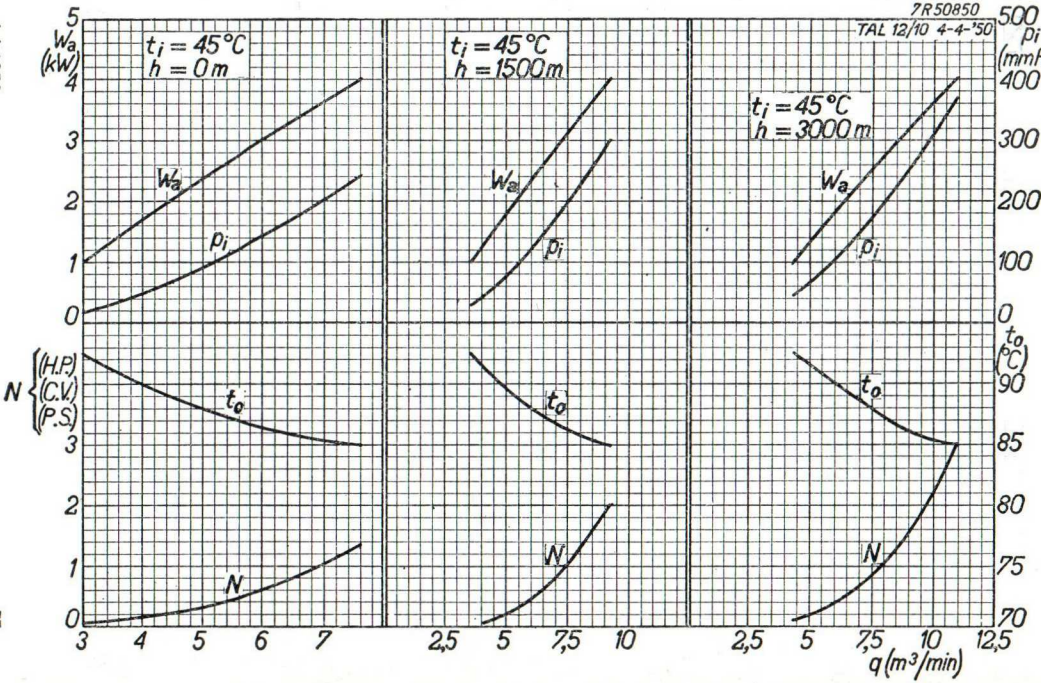

H


7R50848
TAL 12/10 4-4-'50
2xTAL 12/10
B mod.
$V_a$ = 8 kV
$V_g$ = −265V
$R_{aa}$ = 7,12kΩ
W (kW)
η (%)
$W_o$
η
$W_a$
$I_a$
I (A)
d (%)
d
$I_g$
$V_{ggp}$ (V)




TAL 12/10

PHILIPS

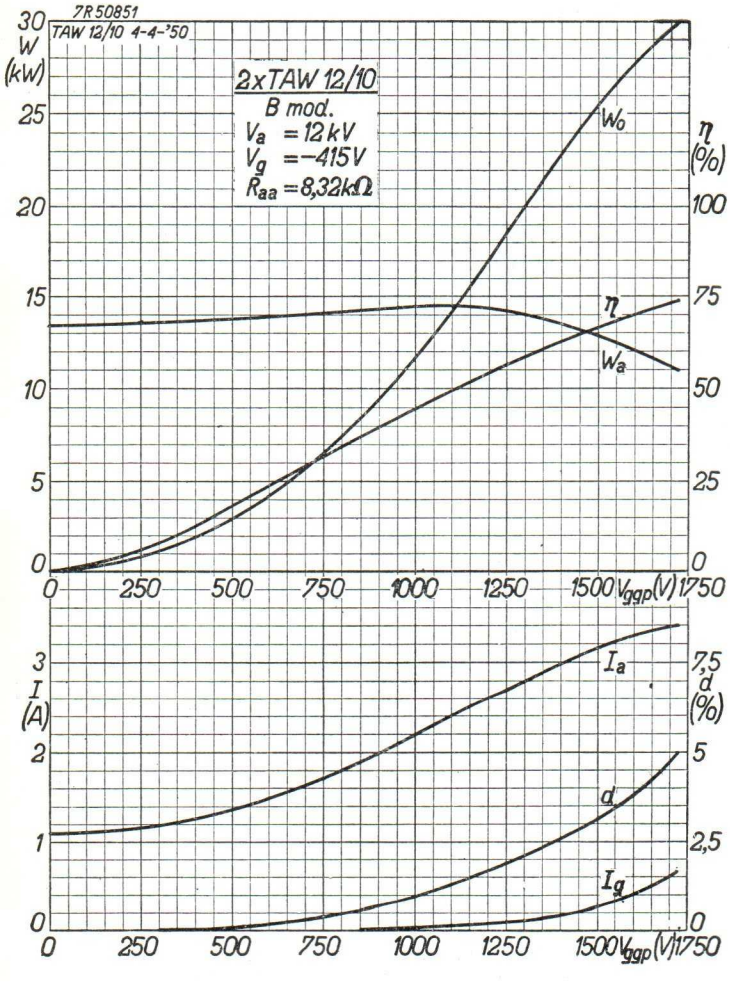


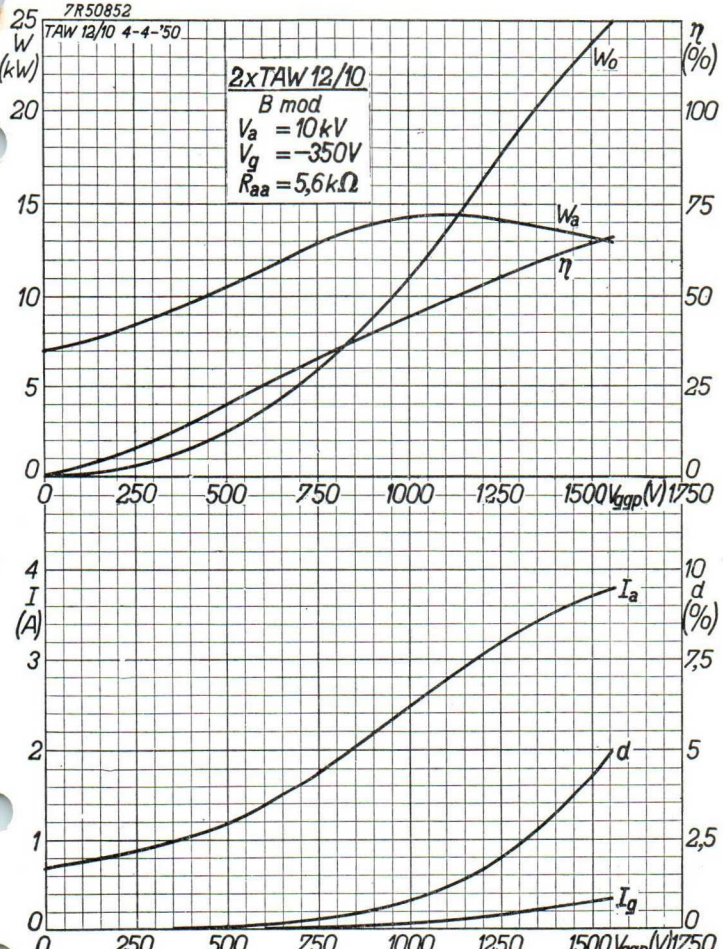

PHILIPS

TAL 12/10

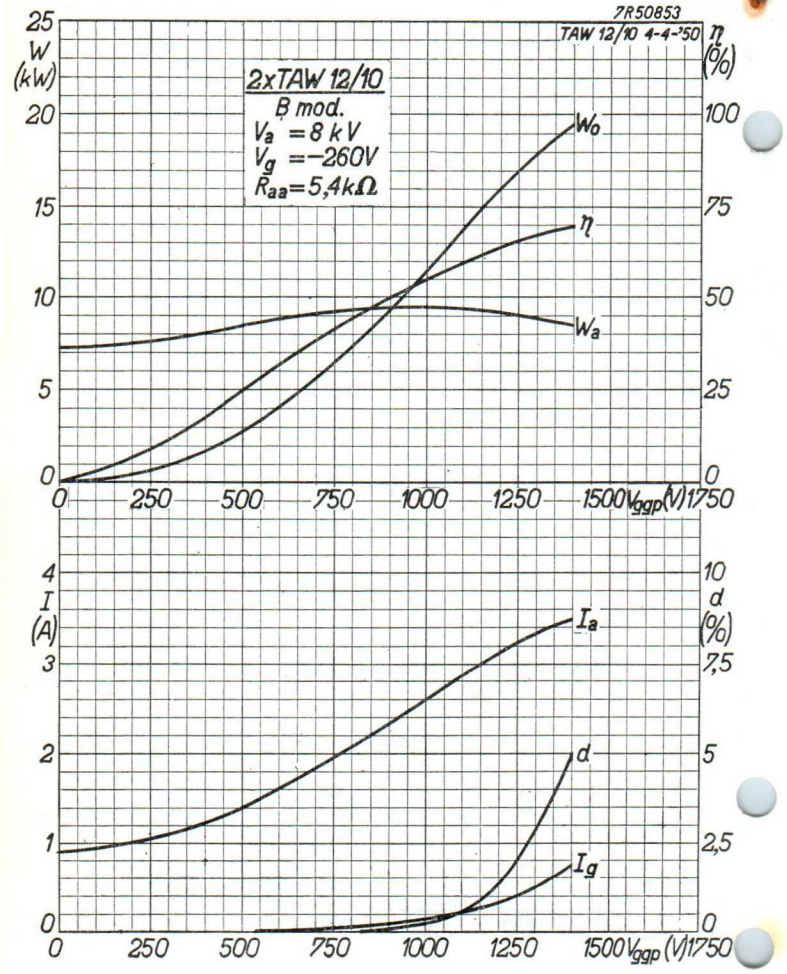
TAW 12/10

# PHILIPS




7R50852
TAW 12/10 4-4-'50
2xTAW 12/10
B mod
$V_a$ = 10kV
$V_g$ = −350V
$R_{aa}$ = 5,6kΩ
W (kW)
η (%)
$W_o$
$W_a$
η
$V_{ggp}$ (V)
I (A)
d (%)
$I_a$
d
$I_g$

# PHILIPS


7R50853
TAW 12/10 4-4-'50
2xTAW 12/10
B mod.
$V_a$ = 8 kV
$V_g$ = −260V
$R_{aa}$ = 5,4kΩ
$W_o$
$\eta$
$W_a$
W (kW)
η (%)
$V_{ggp}$ (V)
$I_a$
$I_g$
d
I (A)
d (%)

N

# PHILIPS

**TAL 12/20**
**TAW 12/20**

TRIODE for use as H.F. amplifier and oscillator
TRIODE pour utilisation comme amplificatrice H.F. et oscillatrice
TRIODE zur Verwendung als H.F. Verstärker und Oszillator

| | TAL 12/20 | TAW 12/20 |
|---|---|---|
| Cooling | : forced air | water |
| Refroidissement | : à air forcée | eau |
| Kühlung | : erzwungene Luftkühlung | Wasser |

Filament : tungsten
Filament : tungstène
Heizfaden: Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 21,5 V [2]
If = 78 A [2]

Starting current must never exceed 160 A
Le courant de démarrage ne doit jamais excéder 160 A
Der Anlaufstrom darf unter keinen Umständen höher sein als 160 A

Typical characteristics
Caractéristiques typiques
Kenndaten

$\mu$ = 38
S (Ia = 1 A) = 10 mA/V
Isat = 11 A

| λ | Freq. | C telegr. | | B teleph. | | Can.mod. | | B mod.[1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) |
| >11 | <28 | 12<br>10 | 22<br>18 | 12 | 5 | 10 | 9,5 | 12<br>10 | 42<br>16 |

[1]) Two valves; deux tubes; zwei Röhren

[2]) Each tube is marked with the value of the filament voltage at which the saturation current has a value of 11 A
A chaque tube est indiqué la valeur de tension du filament correspondante à un courant de saturation de 11 A
Auf jede Röhre ist der Wert der Heizspannung angegeben wobei der Sättigungsstrom einen Wert von 11 A erhält

Capacitances
Capacités
Kapazitäten

Caf = 1,9 pF
Cgf = 23,5 pF
Cag = 25 pF

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 12 kV
Wa = max. 18 kW
q (ti=20 °C, Wa=18 kW) = min. 21,2 $m^3$/min

Wg = max. 500 W
Rg = max. 10 kΩ
$t_{anode}$ = max. 180 °C

temperature of bulb and seals)
température de l'ampoule et des points de scellement) = max. 150 °C
Temperatur des Kolbens und der Verschlüsse)

Pressure loss
Perte de pression
Druckverlust
pi (q = 21,2 $m^3$/min, ti = 20 °C) = 130 mm $H_2O$

It is necessary to direct a low velocity air flow on the grid seals at frequencies higher than 20 Mc/s
Il faut diriger un courant d'air à vélocité peu élevée sur les points de scellement de la grille aux fréquences dépassant 20 Mc/s
Bei Frequenzen höher als 20 MHz ist ein schwacher Luftstrom auf die Gitterverschlüsse notwendig

Mounting position: exactly vertical with anode down
Montage : exactement vertical avec l'anode en bas
Aufstellung : genau senkrecht mit der Anode unten

Grid bracket
Etrier de la grille
Gitterbügel
40614

Protective cap for grid seals
Chapeau de protection pour les sorties de la grille
Schutzkappe für Gitterverschlüsse
40632

Capacitances
Capacités
Kapazitäten

Caf = 1,4 pF
Cgf = 23,5 pF
Cag = 25 pF

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 12 kV
Wa = max. 18 kW
Wg = max. 500 W
Rg = max. 20 kΩ

to = max. 60 °C
to-ti = max. 14 °C
q (Wa=18 kW)= min. 20 l/min

temperature of bulb and seals)
température de l'ampoule et des) = max. 150 °C
points de scellement)
Temperatur des Kolbens und der)
Verschlüsse)

Pressure loss
Perte de pression
Druckverlust

pi (q=20 l/min)= 0,5 atm

It is necessary to direct a low velocity air flow on the grid seals at frequencies higher than 20 Mc/s
Il faut diriger un courant d'air à vélocité peu élevée sur les points de scellement de la grille aux fréquences dépassant 20 Mc/s
Bei Frequenzen höher als 20 MHz ist ein schwacher Luftstrom auf die Gitterverschlüsse notwendig

Mounting position: exactly vertical with anode down
Montage : exactement vertical avec l'anode en bas
Aufstellung : genau senkrecht mit der Anode unten

Grid bracket
Etrier de la grille
Gitterbügel

40614

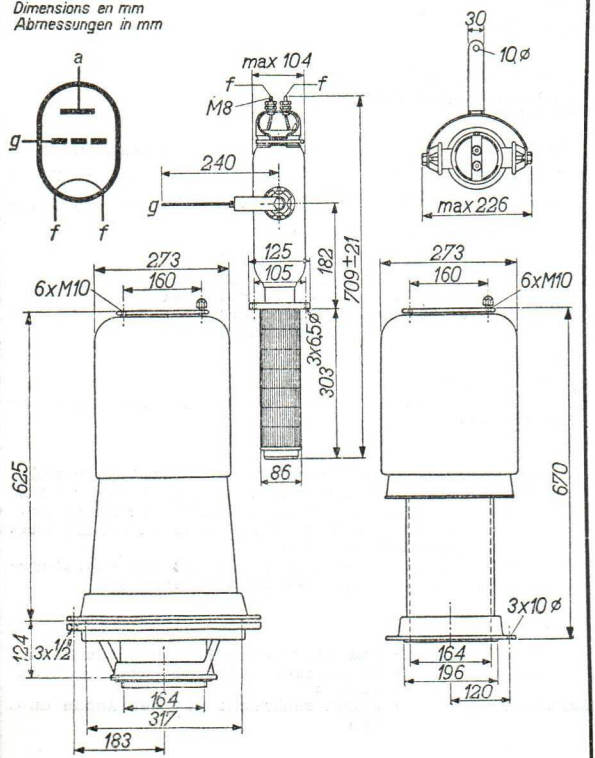
Protective cap for grid seals
Chapeau de protection pour les sorties de la grille
Schutzkappe für Gitterverschlüsse

40632

# PHILIPS

*Dimensions in mm*
*Dimensions en mm*
*Abmessungen in mm*

59695




K 503/01

Housing with canalized outlet of the air
Carter avec sortie d'air canalisée
Gehäuse mit kanalisiertem Luftausgang

Valve: net weight
Tube : poids net 7,5 kg
Röhre: Nettogewicht

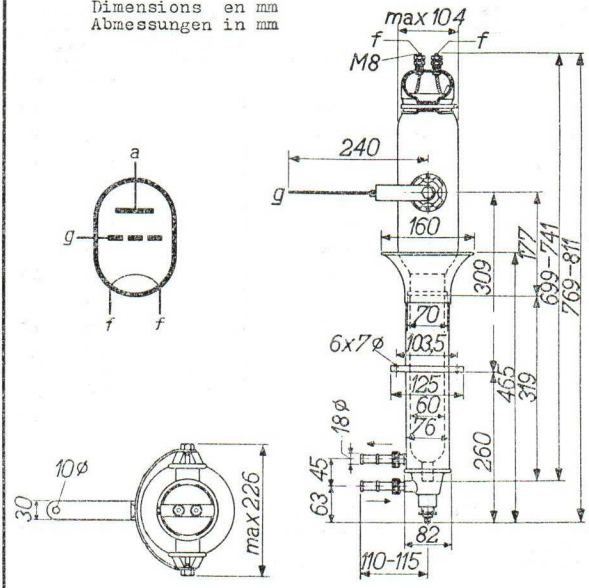
K 504/01

Housing with free outlet of the air
Carter avec sortie d'air libre
Gehäuse mit freiem Luftausgang

shipping weight
poids brut 16 kg
Bruttogewicht

Valve mounted in water-jacket type K 707
Tube monté dans le réfrigérant type K 707
Röhre in Kühltopf Typ K 707 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| | | | |
|---|---|---|---|
| Valve: net weight | | shipping weight | |
| Tube : poids net | 3,6 kg | poids brut | 10,3 kg |
| Röhre: Nettogewicht | | Bruttogewicht | |

| | | |
|---|---|---|
| Water-jacket Réfrigérant Kühltopf | net weight<br>poids net<br>Nettogewicht | 4,3 kg |
| | shipping weight<br>poids brut<br>Bruttogewicht | 5,8 kg |

# PHILIPS

Operating conditions H.F. class C
Caractéristiques d'utilisation H.F. classe C
Betriebsdaten H.F. Klasse C

| | telegraphy<br>télégraphie<br>Telegraphie | | anode modulation<br>modulation d'anode<br>Anodenmodulation | |
|---|---|---|---|---|
| $\lambda$ = | >11 | >11 | >11 | m |
| Va = | 12 | 10 | 10 | kV |
| Vg = | -600 | -500 | -900 | V |
| Ia = | 2,7 | 2,7 | 1,4 | A |
| Ig = | 0,4 | 0,42 | 0,5 | A |
| Vgp = | 1800 | 1600 | 2100 | V |
| Wig = | 720 | 670 | 1050 | W |
| Wia = | 32,4 | 27 | 14 | kW |
| Wa = | 10,4 | 9 | 4,5 | kW |
| Wo = | 22 | 18 | 9,5 | kW |
| $\eta$ = | 68 | 67 | 68 | % |
| m = | | | 100 | % |
| Wmod = | | | 7 | kW |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

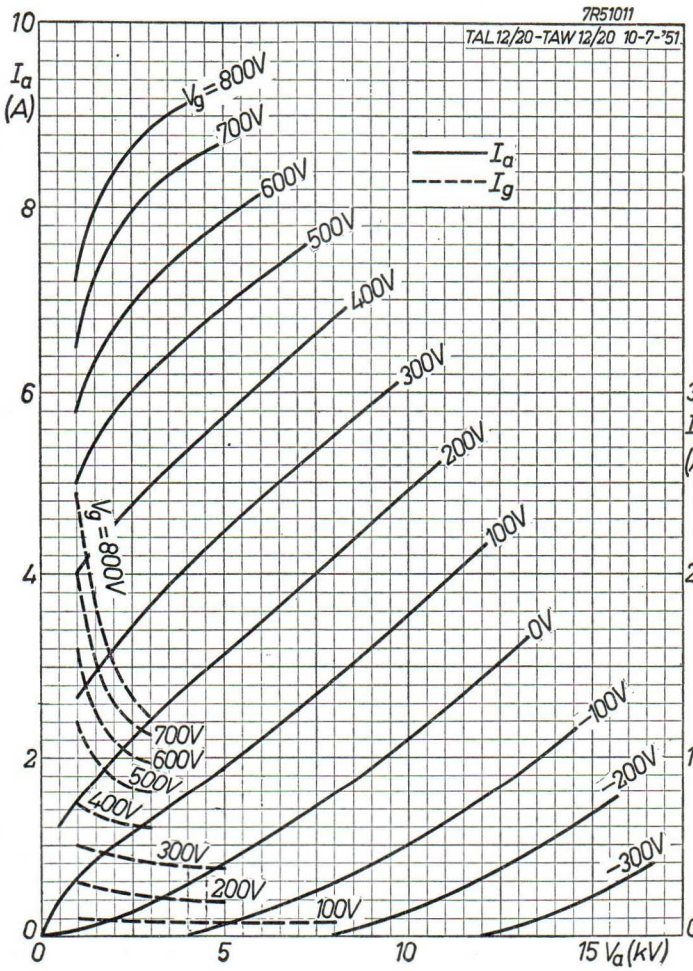
| | | |
|---|---|---|
| $\lambda$ = | >11 | m |
| Va = | 12 | kV |
| Vg = | -200 | V |
| Ia = | 1,54 | A |
| Vgp = | 435 | V |
| Wia = | 18,5 | kW |
| Wa = | 13,5 | kW |
| Wo = | 5 | kW |
| $\eta$ = | 27 | % |
| m = | 100 | % |
| Ig = | 0,24 | A |
| Wig = | 210 | W |

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation en amplificatrice et modulatrice B.F., classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 12 | | 10 | | kV |
| $V_g$ | = | -250 | | -200 | | V |
| $R_{aa\sim}$ | = | 5,6 | | 10,5 | | kΩ |
| $V_{gg_p}$ | = | 0 | 1900 | 0 | 1100 | V |
| $I_a$ | = | 2x0,32 | 2x2,45 | 2x0,25 | 2x1,1 | A |
| $I_g$ | = | 0 | 2x0,33 | 0 | 2x0,17 | A |
| $W_{ig}$ | = | 0 | 2x280 | 0 | 2x85 | W |
| $W_{ia}$ | = | 2x3,8 | 2x29 | 2x2,5 | 2x11 | kW |
| $W_a$ | = | 2x3,8 | 2x8 | 2x2,5 | 2x3 | kW |
| $W_o$ | = | 0 | 42 | 0 | 16 | kW |
| $\eta$ | = | - | 72,5 | - | 73 | % |
| $d_{tot}$ | = | - | 3,1 | - | 1,7 | % |

# PHILIPS

**TAL 12/20**
**TAW 12/20**

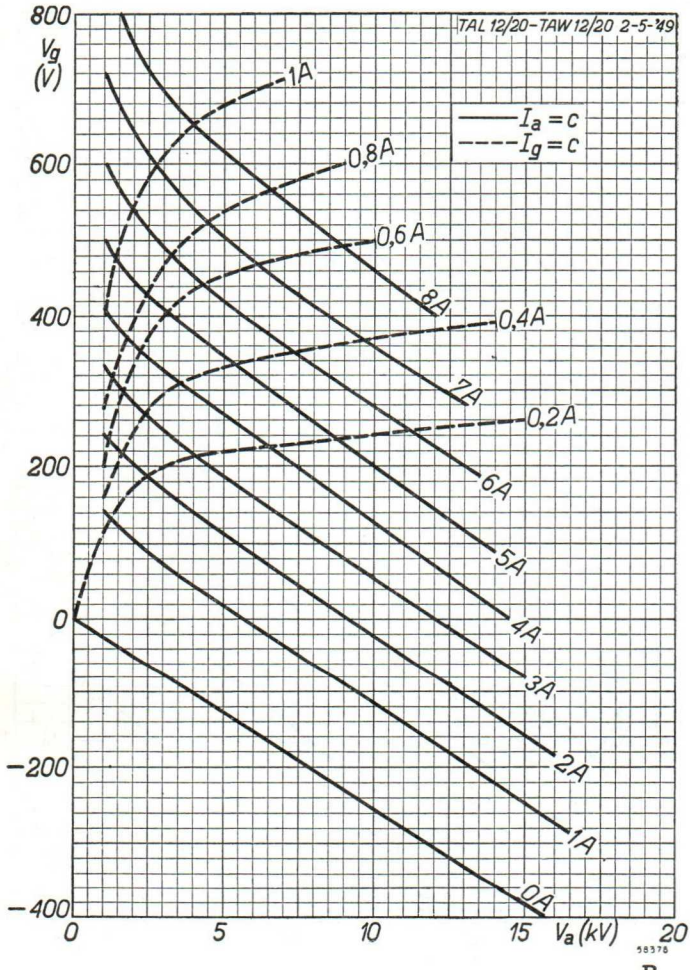



6.6.1951

A

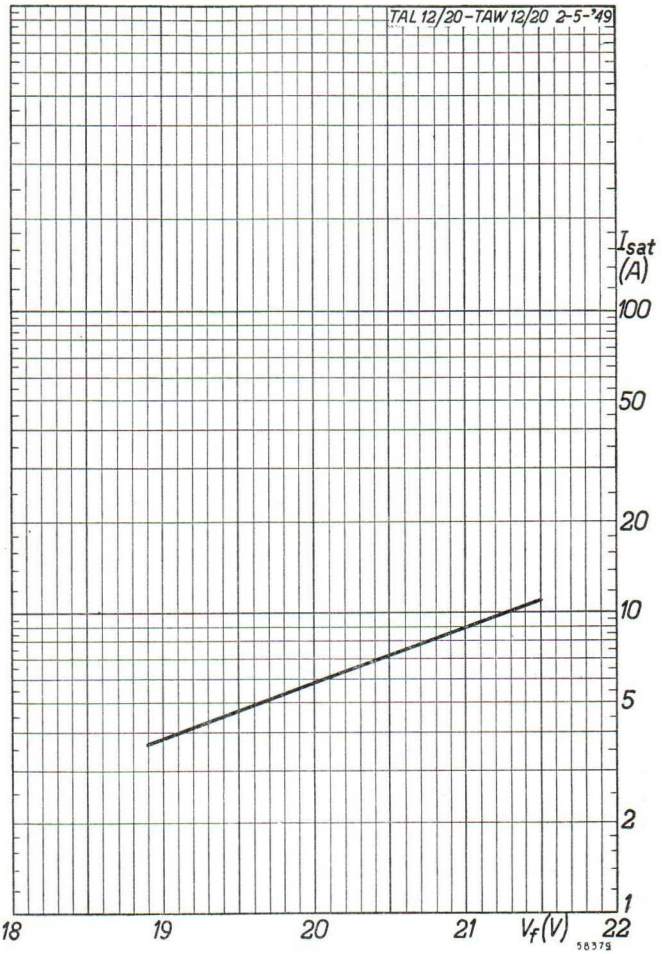
TAL 12/20
TAW 12/20

# PHILIPS



# PHILIPS

**TAL 12/20**
**TAW 12/20**

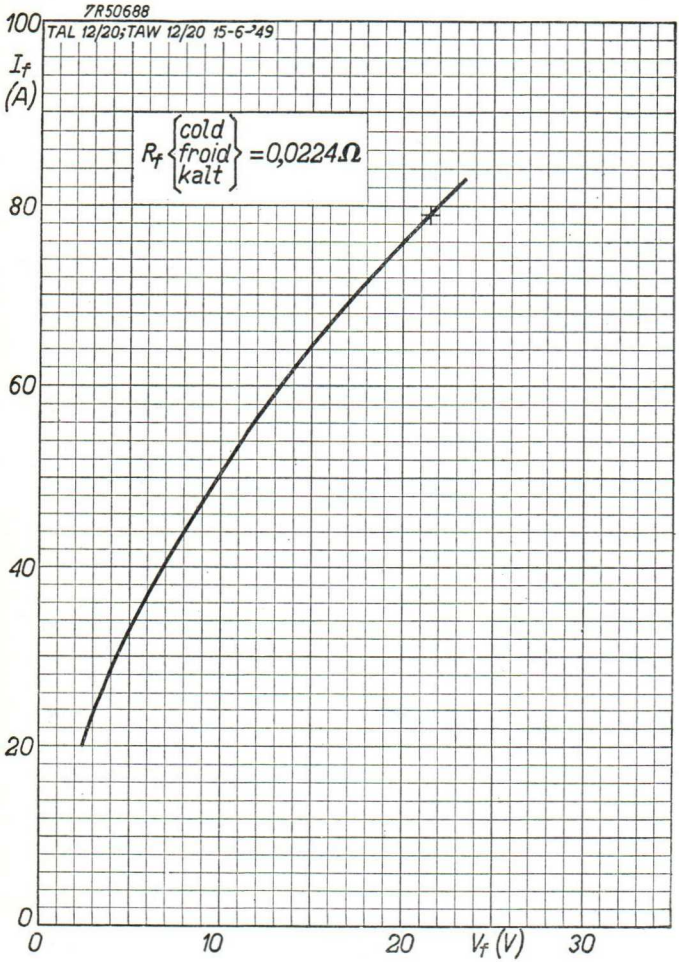



4.4.1950

C

**TAL 12/20**
**TAW 12/20**

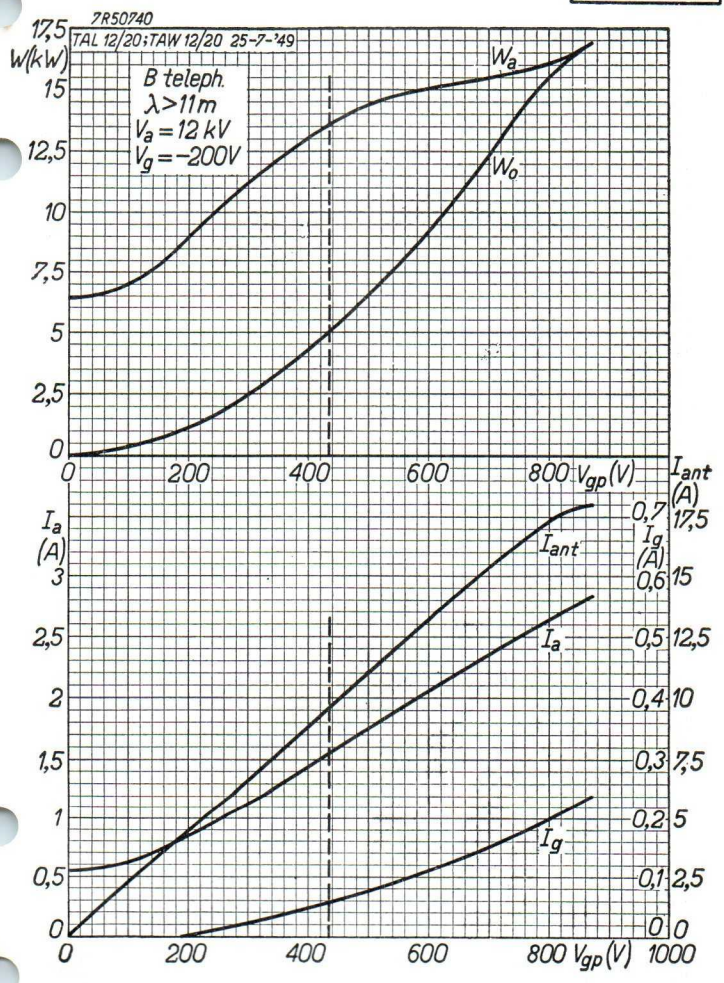
# PHILIPS




D

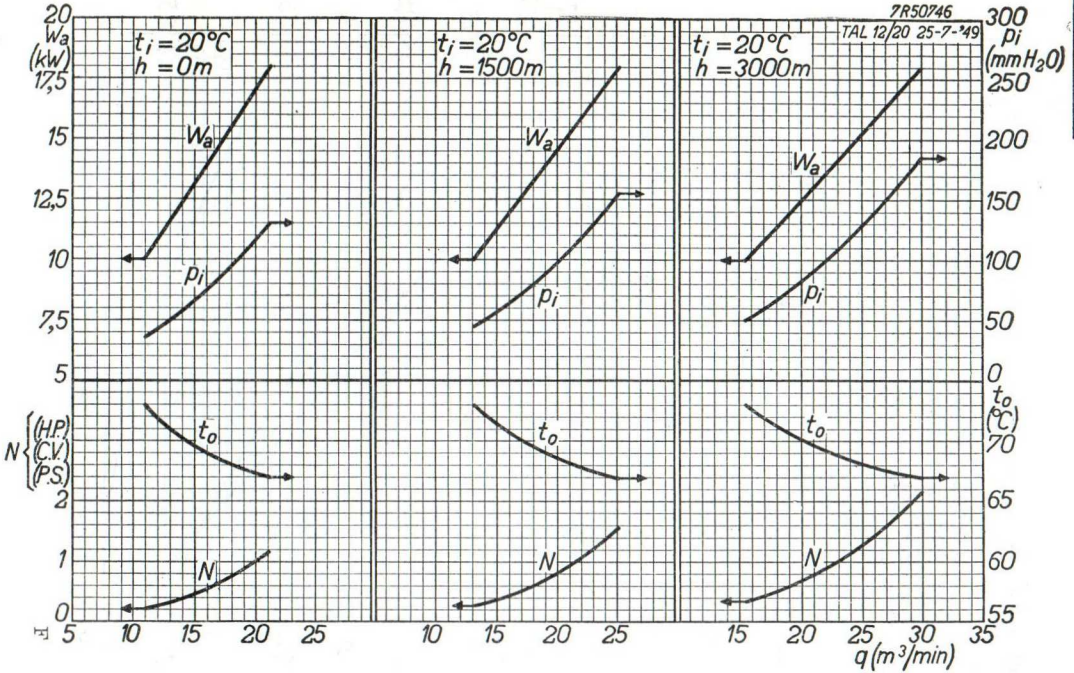
# PHILIPS

**TAL 12/20**
**TAW 12/20**

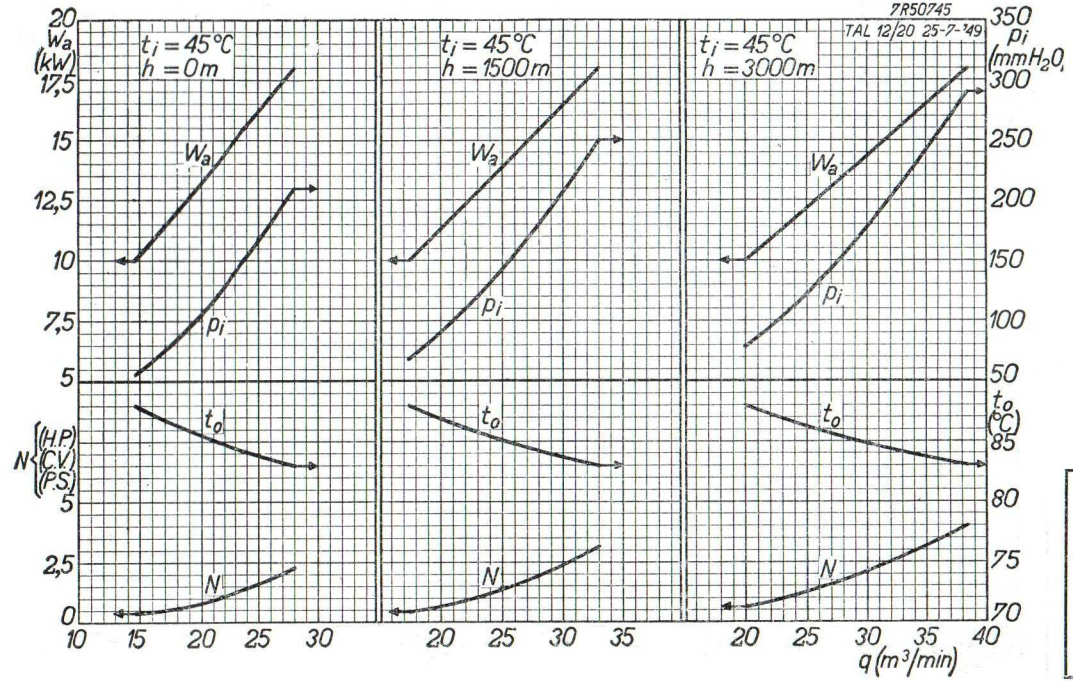



8.8.1949

E


7R50746
TAL 12/20 25-7-'49
TAL 12/20
PHILIPS
$t_i = 20°C$ $h = 0m$
$t_i = 20°C$ $h = 1500m$
$t_i = 20°C$ $h = 3000m$
$W_a$ (kW)
$p_i$ (mm $H_2O$)
$t_o$ (°C)
N (H.P.) (C.V.) (P.S.)
$q$ ($m^3$/min)
20
17,5
15
12,5
10
7,5
5
300
250
200
150
100
50
0
70
65
60
55
2
1
0
5
10
15
20
25
30
35

6.6.1951



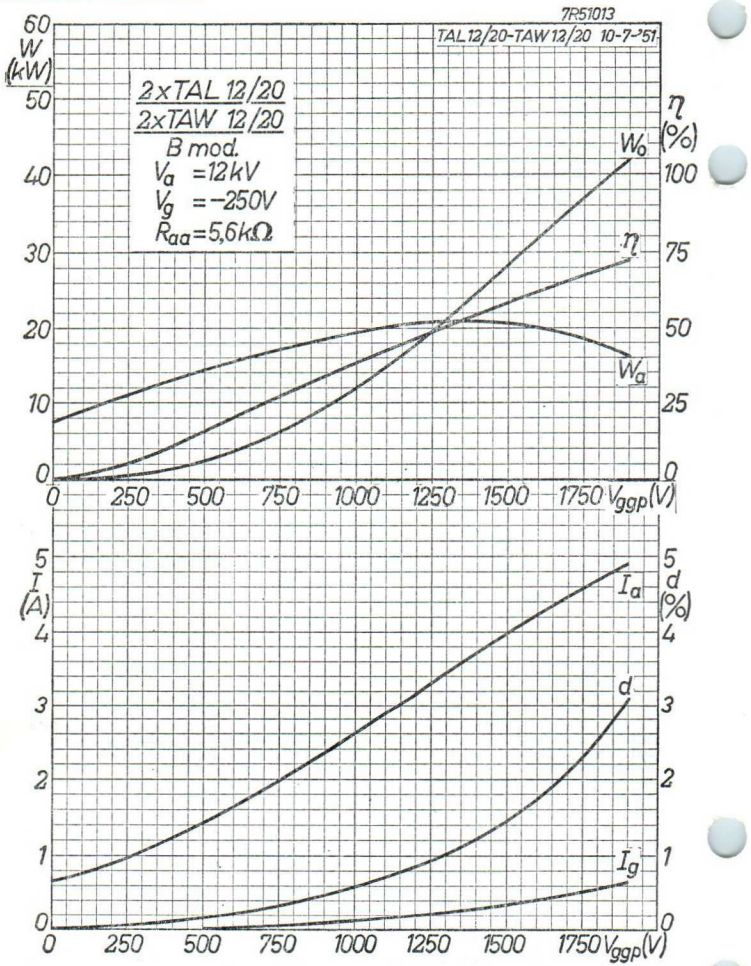

PHILIPS

TAL 12/20

G

**TAL12/20**
**TAW12/20**

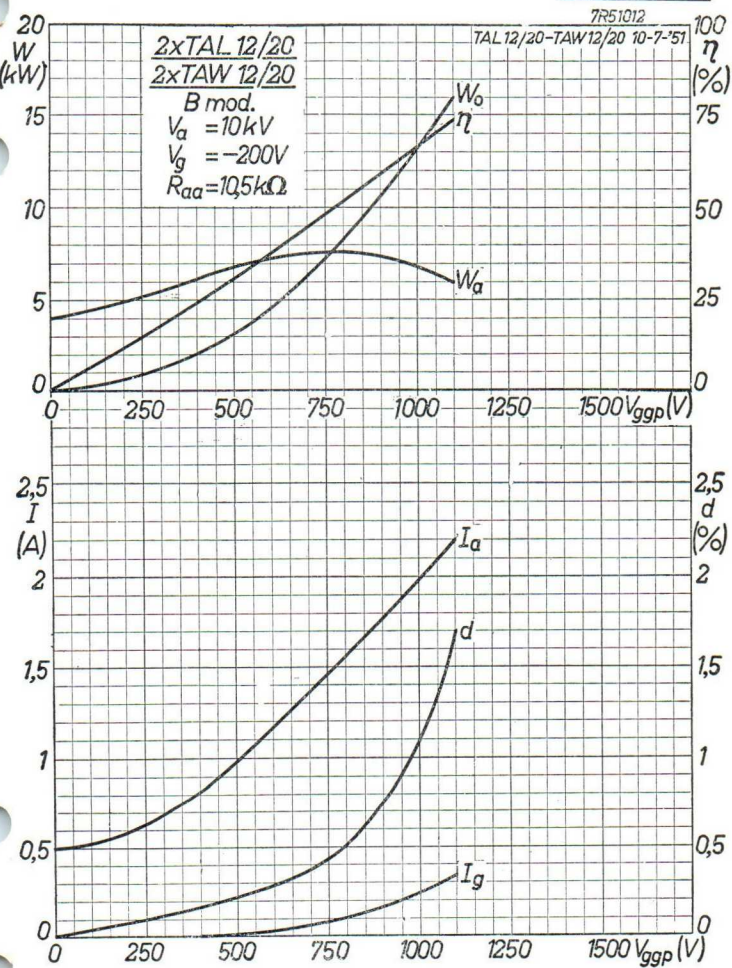
# PHILIPS




H

# PHILIPS

**TAL 12/20**
**TAW 12/20**




6.6.1951

TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour utilisation en amplificatrice H.F. ou B.F. ou en oscillatrice
TRIODE zur Verwendung als HF- oder NF-Verstärker oder Oszillator

Cooling : forced air
Refroidissement: par ventilation forcée
Kühlung : Pressluftkühlung

Filament : tungsten, three-phase
Filament : tungstène, triphasé
Heizfaden: Wolfram, drei Phasen

Heating : direct per phase $V_f$ = max.28,3 V[1])
Chauffage: direct par phase $I_f$ = 48,5 A
Heizung : direkt pro Phase

Filament current must never exceed a peak value of 100 A per phase at any time during initial energising schedule.
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 100 A par phase.
Der Anlaufstrom darf niemals einen Scheitelwert von 100 A pro Phase überschreiten.

Capacitances
Capacités
Kapazitäten

$C_a$ = 2,6 pF
$C_g$ = 72 pF
$C_{ag_1}$ = 31 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ($I_a$=1,25 A ; $V_a$= 12 kV) = 25
S ($I_a$=1,25 A ; $V_a$= 12 kV) = 16,5 mA/V

$I_{sat}$ = 23 A

[1]) Each valve is marked with the value of the filament voltage at which the saturation current has a value of 23 A.
La valeur de tension du filament correspondante à un courant de saturation de 23 A est indiquée à chaque tube
Auf jeder Röhre ist der Wert der Heizspannung angegeben wobei der Sättigungsstrom einen Wert von 23 A erhält.

# PHILIPS

| λ | Freq. | C telegr. | | B teleph. | | C an.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) |
| | | | | | | | | 12 | 80 |
| >15 | <20 | 15 | 48,5 | 15 | 9 | 12 | 27 | 12 | 38,5 |
| | | 12 | 38 | 12 | 8,5 | | | 10 | 77 |
| | | 10 | 31 | 10 | 8 | 10 | 21,5 | 10 | 32 |
| 11 | 27 | 15 | 45 | | | 12 | 26 | | |
| | | | | | | 10 | 20,5 | | |
| 8 | 37,5 | 10 | 26 | | | | | | |

Air cooling characteristics
Caractéristiques de refroidissement par air
Luftkühlungsdaten

| $W_a$ (kW) | h (m) | $t_i$ max. (°C) | q min. ($m^3$/min) | pi (mm $H_2O$) | |
|---|---|---|---|---|---|
| 18 | 0 | 35 | 25,5 | 130 | See also cooling curves<br>Voir aussi les courbes de refroidissement<br>Siehe auch die Kühlungskurven. |
| | 0 | 45 | 29,5 | 170 | |
| | 1500 | 35 | 30,5 | 155 | |
| | 3000 | 25 | 32,5 | 155 | |
| 12 | 0 | 35 | 17,5 | 65 | |
| | 0 | 45 | 20 | 80 | |
| | 1500 | 35 | 20,5 | 75 | |
| | 3000 | 25 | 22 | 75 | |

temperature of seals
temp. des scellements
Temp. der Einschmelzungen
= max. 180 °C

When the valve is used at frequencies above 10 Mc/s, special attention must be given to the anode- and grid-seal temperatures.
Cooling of the grid-seals can be effected by means of the caps 40632.
Cooling of the anode-seal is effected by air flowing through the slots provided at the top of the cooler housing. In certain cases, e.g. at low anode dissipation and with cooling by the minimum quantity of air (according to the cooling curves), the air flow to the seal may not be sufficient to maintain the seal temperature below the maximum permissible value at frequencies above 10 Mc/s.
Consequently, in these cases, a larger quantity of air must be supplied.

[1]) Two tubes; deux tubes; zwei Röhren

Il faut faire attention aux températures des scellements de l'anode et de la grille lorsqu'on utilise le tube aux fréquences supérieures à 10 Mc/s.
Le refroidissement des scellements de la grille peut être réalisé au moyen des chapeaux 40632.
Le refroidissement du scellement d'anode s'effectue par air traversant les fentes prévues du côté supérieur du refroidisseur. Dans certains cas, p.ex. aux basses valeurs de la dissipation anodique et au débit d'air minimum prescrit aux feuilles avec les courbes de refroidissement, il y a le risque que le courant d'air ne suffise pas pour un refroidissement effectif du scellement aux fréquences supérieures à 10 Mc/s et que, par conséquent, la température maximum admissible soit dépassée.
Dans ces cas, il est nécessaire d'élever le débit d'air.

Insbesondere sind die Temperaturen der Anoden- und Gitterverschmelzung zu beachten, wenn die Röhre bei höheren Frequenzen als 10 MHz benutzt wird.
Die Gittereinschmelzungen können mit Hilfe der Schutzkappen 40632 gekühlt werden.
Die Anodenverschmelzung wird von dem Luftstrom gekühlt, der durch die am oberen Teil des Luftkühlgehäuses vorgesehenen Spalte hindurchfliesst. Jedoch, bei Frequenzen höher als 10 MHz dürfte in gewissen Fällen, z.B. bei einer niedrigen Anodenverlustleistung, bei dem erforderlichen Mindestluftstrom (siehe die Kühlungskurven) eine zweckmässige Kühlung der Anodenverschmelzung nicht erreicht werden.
Folglich muss in diesen Fällen der Luftstrom in dem Masse den Mindestwert übersteigen, dass die Temperatur der Verschmelzung den höchstzulässigen Wert nicht überschreitet.

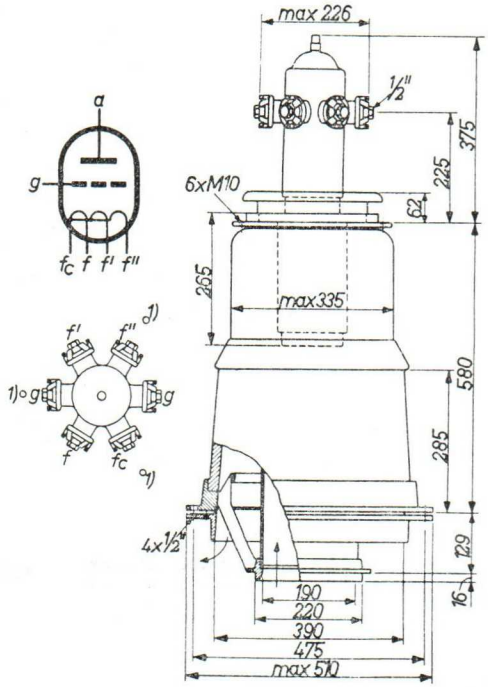
| | |
|---|---|
| Protective caps for grid- and filament seals<br>Chapeaux de protection pour les sorties de la grille et du filament<br>Schutzkappen für Gitter- und Heizfaden-anschlüsse | 40632 |
| Filament bracket (for D.C. supply)<br>Etrier du filament (pour alimentation par C.C.)<br>Heizfadenbügel (für Gleichstromspeisung) | 40606 |

| | | | |
|---|---|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 20 kg | Shipping weight<br>Poids brut<br>Bruttogewicht | 87 kg |

# PHILIPS

Tube mounted in cooler housing type K 505
Tube monté dans le refroidisseur type K 505
Röhre im Luftkühlgehäuse Typ K 505 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anoden unten

1) Holes for locating pins
Trous pour chevilles de localisation
Löcher für Sucherstifte

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegrafie

| | | | | max. | max. | |
|---|---|---|---|---|---|---|
| Limiting values<br>Caractéristiques limites<br>Grenzdaten | | | | $V_a$ = 15 kV<br>$-V_g$=1000 V<br>$I_a$ = 5 A | $I_g$ =0,6 A<br>$W_{ia}$= 75 kW<br>$W_a$ = 18 kW | |
| Operating conditions<br>Caractéristiques d'utilisation<br>Betriebsdaten | | | | | | |
| $\lambda$ | = | >15 | >15 | >15 | 11 | 8 m |
| f | = | <20 | <20 | <20 | 27 | 37,5 Mc/s |
| $V_a$ | = | 15 | 12 | 10 | 15 | 10 kV |
| $V_g$ | = | -900 | -700 | -600 | -900 | -600 V |
| $I_a$ | = | 4,2 | 4,2 | 4,2 | 4,2 | 4,2 A |
| $I_g$ | = | 0,42 | 0,5 | 0,53 | 0,42 | 0,6 A |
| $V_{gp}$ | = | 1470 | 1350 | 1160 | 1470 | 1200 V |
| $W_{ig}$ | = | 560 | 610 | 560 | 560 | 650 W |
| $W_{ia}$ | = | 63 | 50,4 | 42 | 63 | 42 kW |
| $W_a$ | = | 14,5 | 12,4 | 11 | 18 | 16 kW |
| $W_o$ | = | 48,5 | 38 | 31 | 45 | 26 kW |
| $\eta$ | = | 77 | 75,5 | 74 | 71,5 | 62 % |

H.F. class B telephony
H.F. classe B téléphonie
HF - Klasse B Telefonie

| | | | max. |
|---|---|---|---|
| Limiting values<br>Caractéristiques limites<br>Grenzdaten | | | $V_a$ = 15 kV<br>$I_a$ = 2,5 A<br>$W_{ia}$ = 37,5 kW<br>$W_a$ = 18 kW |
| Operating conditions<br>Caractéristiques d'utilisation<br>Betriebsdaten | | | |
| $\lambda$ | = | >15 >15 >15 | m |
| f | = | <20 <20 <20 | Mc/s |
| $V_a$ | = | 15 12 10 | kV |
| $V_g$ | = | -500 -400 -315 | V |
| $I_a$ | = | 1,8 2,2 2,5 | A |
| $V_{gp}$ | = | 500 470 440 | V |
| $W_{ia}$ | = | 27 26,5 25 | kW |
| $W_a$ | = | 18 18 17 | kW |
| $W_o$ | = | 9 8,5 8 | kW |
| $\eta$ | = | 33 32 32 | % |
| m | = | 100 100 100 | % |
| $I_g$ | = | 0,3 0,36 0,4 | A |
| $W_{ig}$ | = | 270 305 317 | W |

# PHILIPS

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF - Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 12 kV |
| $-V_g$ | = max. | 1000 V |
| $I_a$ | = max. | 2,9 A |
| $I_g$ | = max. | 0,6 A |
| $W_{ia}$ | = max. | 35 kW |
| $W_a$ | = max. | 12 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = | >15 | >15 | 11 | 11 | m |
| f | = | <20 | <20 | 27 | 27 | Mc/s |
| $V_a$ | = | 12 | 10 | 12 | 10 | kV |
| $V_g$ [1] | = | -1000 | -900 | -1000 | -900 | V |
| $I_a$ | = | 2,9 | 2,9 | 2,9 | 2,9 | A |
| $I_g$ | = | 0,4 | 0,45 | 0,45 | 0,5 | A |
| $V_{gp}$ | = | 1600 | 1550 | 1650 | 1600 | V |
| $W_{ig}$ | = | 580 | 630 | 670 | 700 | W |
| $W_{ia}$ | = | 35 | 29 | 35 | 29 | kW |
| $W_a$ | = | 8 | 7,5 | 9 | 8,5 | kW |
| $W_o$ | = | 27 | 21,5 | 26 | 20,5 | kW |
| $\eta$ | = | 77 | 74 | 74 | 70,5 | % |
| m | = | 100 | 100 | 100 | 100 | % |
| $W_{mod}$ | = | 17,5 | 14,5 | 17,5 | 14,5 | kW |

[1]) Grid bias partially obtained by the grid resistor
Polarisation de grille obtenue partiellement par la résistance de grille
Gittervorspannung, teilweise durch den Gitterwiderstand erzeugt

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF - Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

$V_a$ = max. 15 kV
$I_a$ = max. 6 A
$W_{ia}$ = max. 90 kW
$W_a$ = max. 18 kW

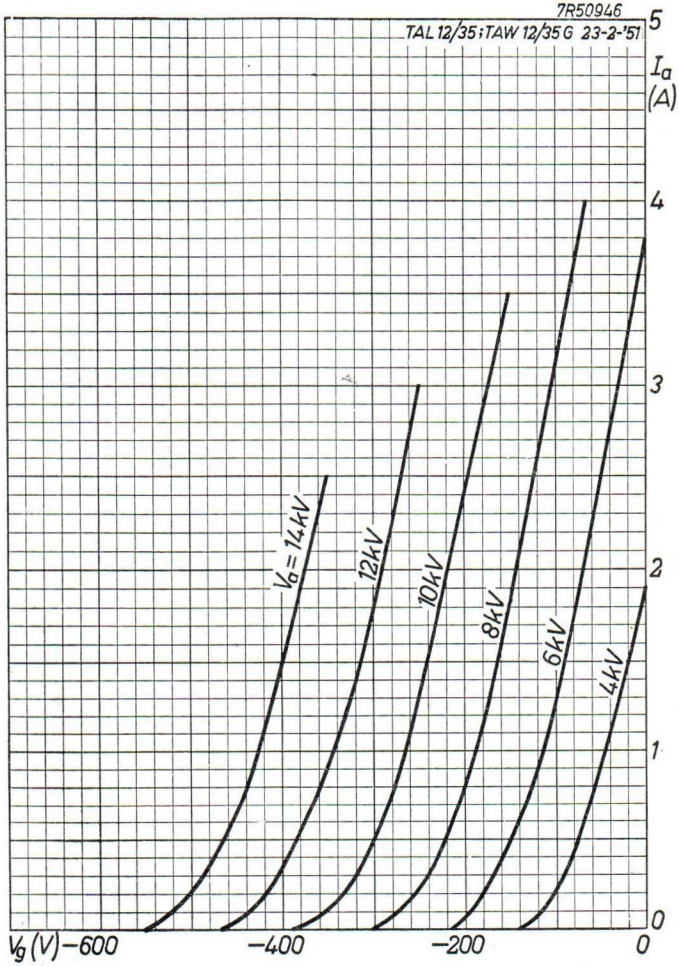
Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 12 | | 12 | | kV |
| $V_g$ | = | -400 | | -425 | | V |
| $R_{aa}$ | = | 3,2 | | 5,8 | | kΩ |
| $V_{ggp}$ | = | 0 | 2000 | 0 | 1480 | V |
| $I_a$ | = | 2x0,35 | 2x4,5 | 2x0,15 | 2x2,25 | A |
| $I_g$ | = | 0 | 2x0,55 | 0 | 2x0,19 | A |
| $I_{gp}$ | = | 0 | 2x3 | 0 | 2x1,25 | A |
| $W_{ig}$ | = | 0 | 2x500 | 0 | 2x127 | W |
| $W_{ia}$ | = | 2x4,2 | 2x54 | 2x1,8 | 2x27 | kW |
| $W_a$ | = | 2x4,2 | 2x14 | 2x1,8 | 2x7,7 | kW |
| $W_o$ | = | 0 | 80 | 0 | 38,5 | kW |
| $d_{tot}$ | = | - | 3,5 | - | 3,7 | % |
| $\eta$ | = | - | 74 | - | 71,5 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 10 | | 10 | | kV |
| $V_g$ | = | -325 | | -345 | | V |
| $R_{aa}$ | = | 2,1 | | 5 | | kΩ |
| $V_{ggp}$ | = | 0 | 2050 | 0 | 1330 | V |
| $I_a$ | = | 2x0,3 | 2x5,4 | 2x0,14 | 2x2,25 | A |
| $I_g$ | = | 0 | 2x0,6 | 0 | 2x0,2 | A |
| $I_{gp}$ | = | 0 | 2x3 | 0 | 2x1,35 | A |
| $W_{ig}$ | = | 0 | 2x555 | 0 | 2x120 | W |
| $W_{ia}$ | = | 2x3 | 2x54 | 2x1,4 | 2x22,5 | kW |
| $W_a$ | = | 2x3 | 2x15,5 | 2x1,4 | 2x6,5 | kW |
| $W_o$ | = | 0 | 77 | 0 | 32 | kW |
| $d_{tot}$ | = | - | 3,5 | - | 4 | % |
| | = | - | 71,5 | - | 71 | % |

# PHILIPS

**TAL 12/35**

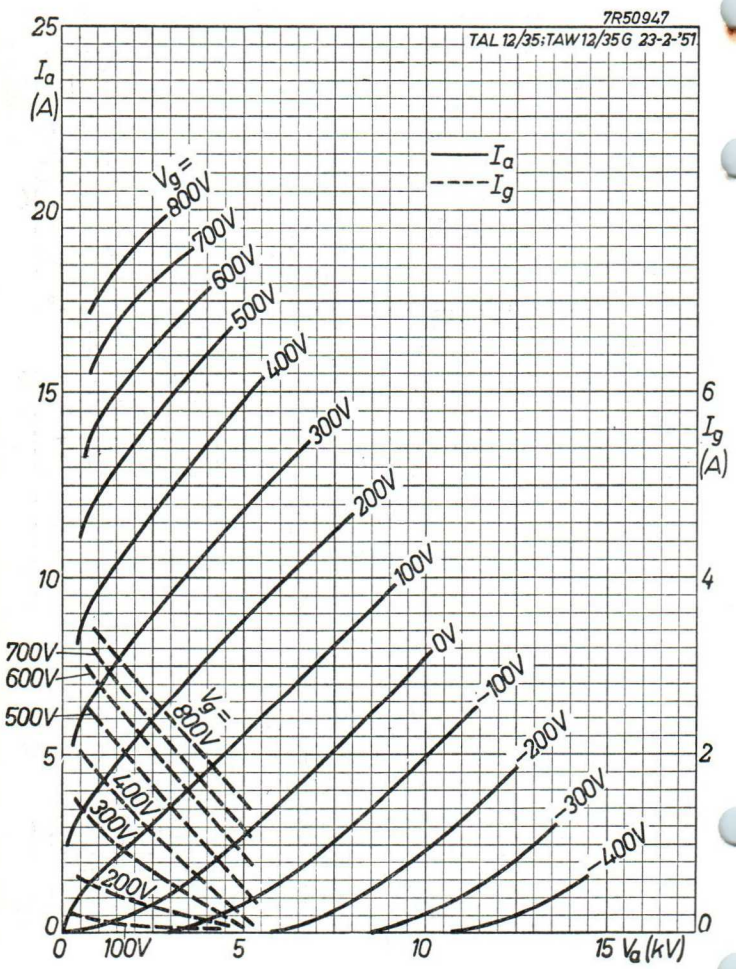



7.7.1954

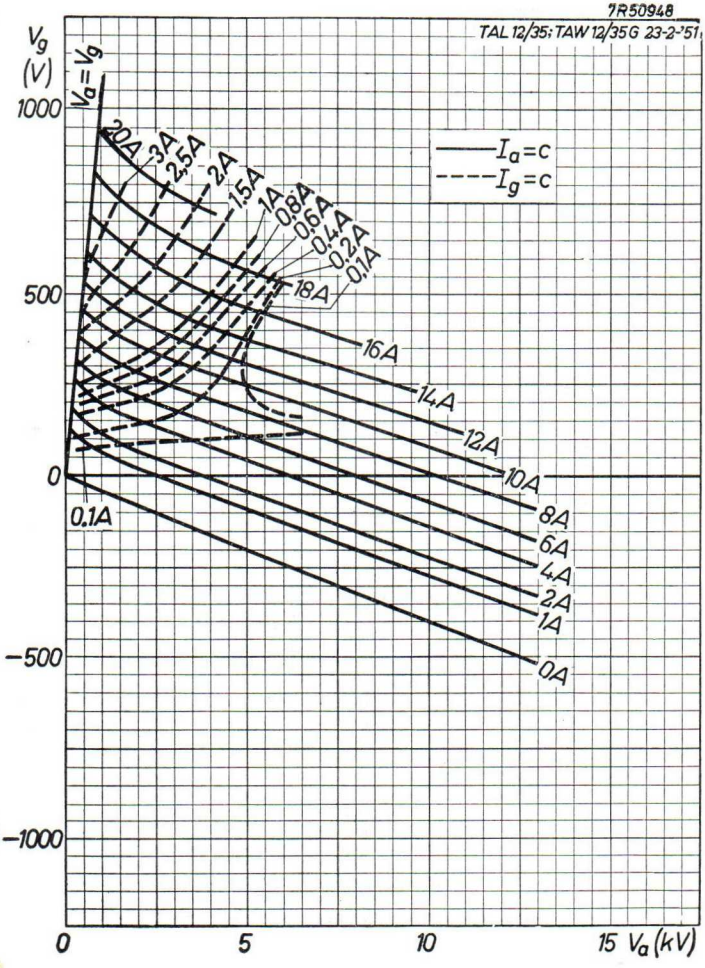
A

TAL 12/35

# PHILIPS



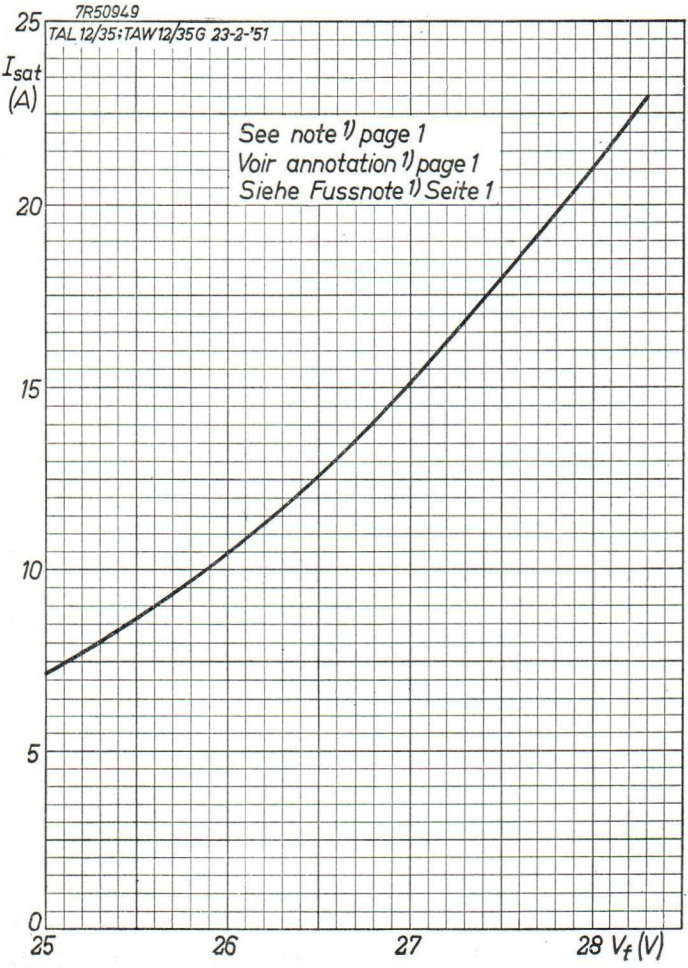

B


7R50948
TAL 12/35; TAW 12/35G 23-2-'51
$V_g$ (V)
$V_a = V_g$
1000
500
0
−500
−1000
20A
3A
2,5A
2A
1,5A
1A
0,8A
0,6A
0,4A
0,2A
0,1A
18A
16A
14A
12A
10A
8A
6A
4A
2A
1A
0A
0,1A
$I_a = c$
$I_g = c$
0
5
10
15 $V_a$ (kV)

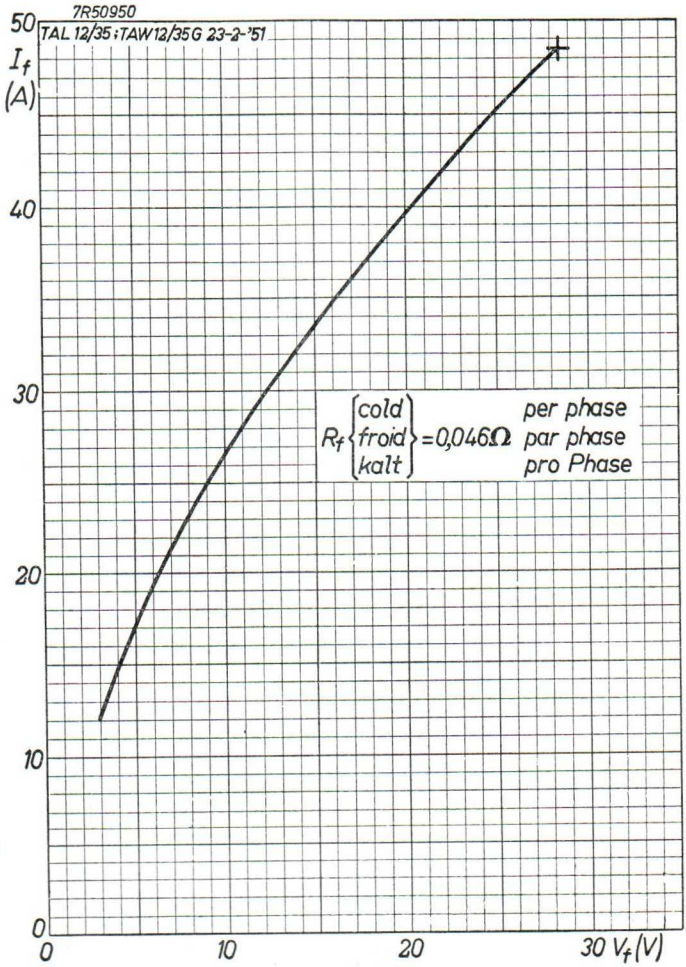
7.7.1954

C

# PHILIPS

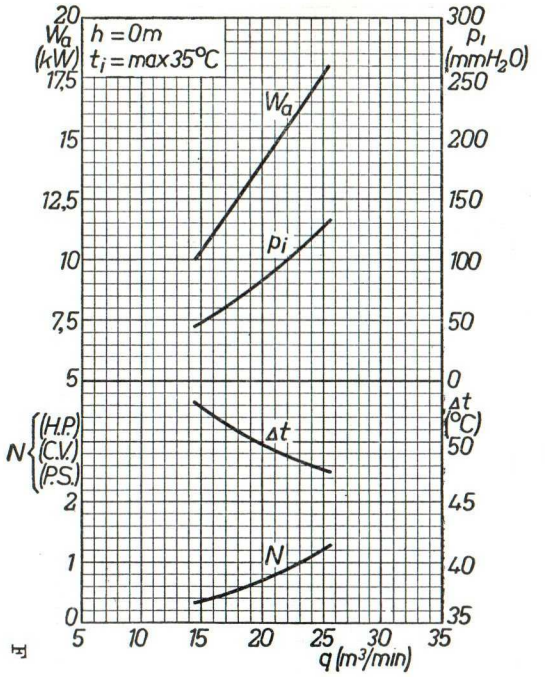

7R50949
TAL 12/35: TAW 12/35G 23-2-'51
$I_{sat}$ (A)
25
20
15
10
5
0
See note 1) page 1
Voir annotation 1) page 1
Siehe Fussnote 1) Seite 1
25
26
27
28 $V_f$ (V)

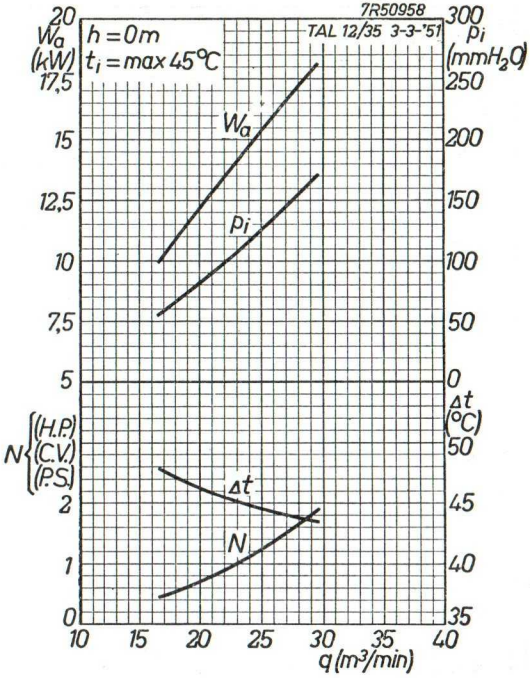
D


7R50950
TAL 12/35 ; TAW 12/35 G 23-2-'51
$I_f$ (A)
50
40
30
20
10
0
0
10
20
30 $V_f$ (V)
$R_f \begin{cases} \text{cold} \\ \text{froid} \\ \text{kalt} \end{cases} = 0{,}046\,\Omega$ per phase par phase pro Phase

7.7.1954

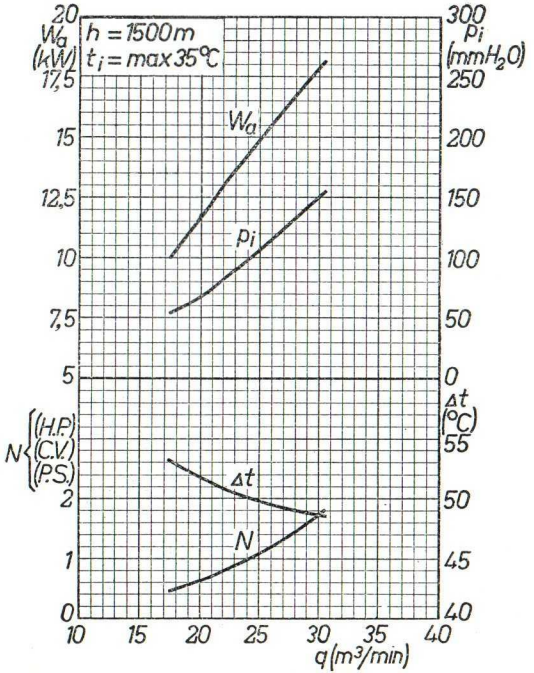
E

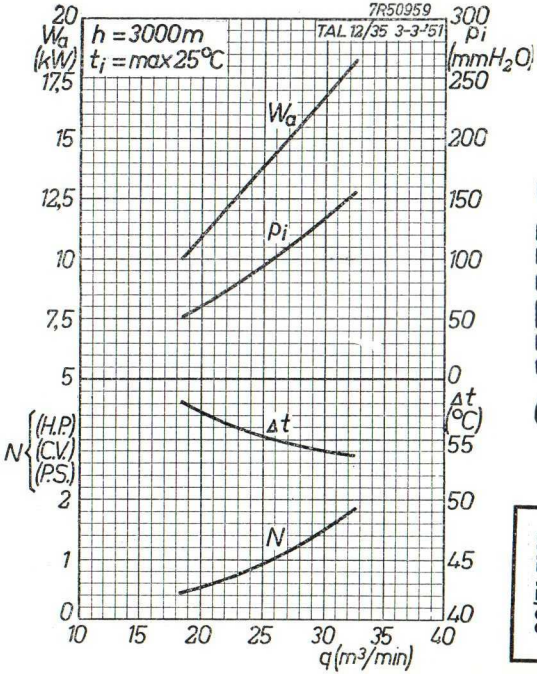



TAL 12/35

PHILIPS



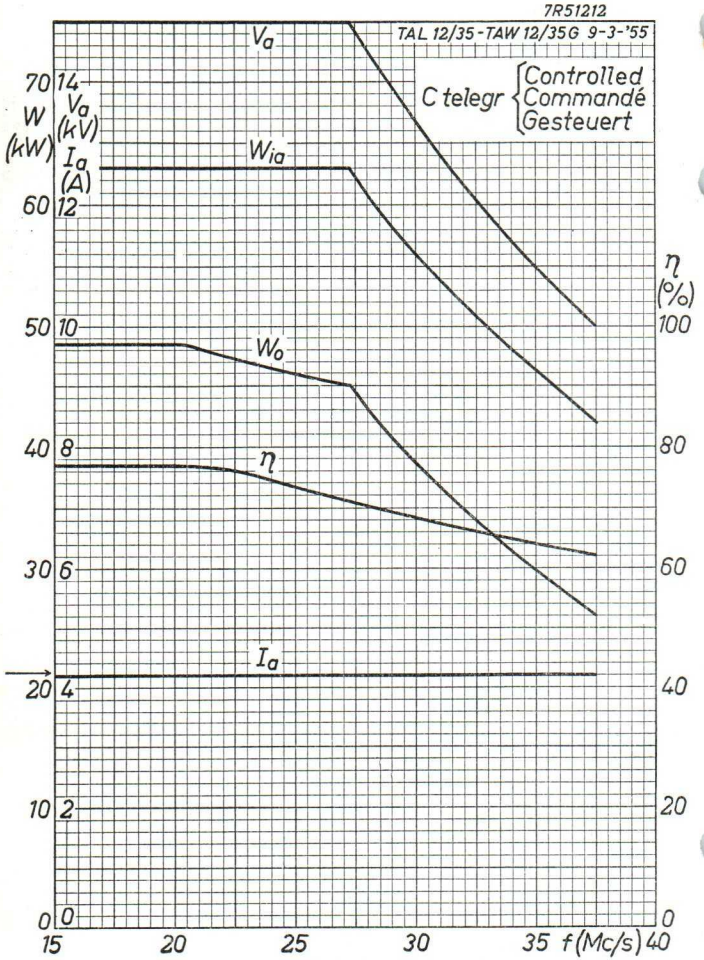

PHILIPS

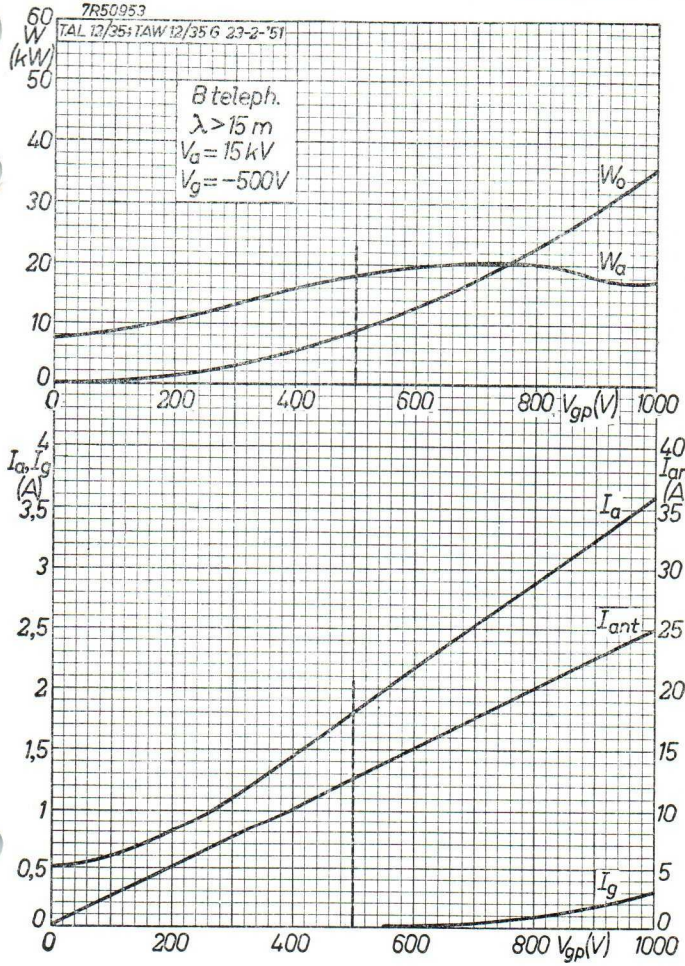
TAL 12/35

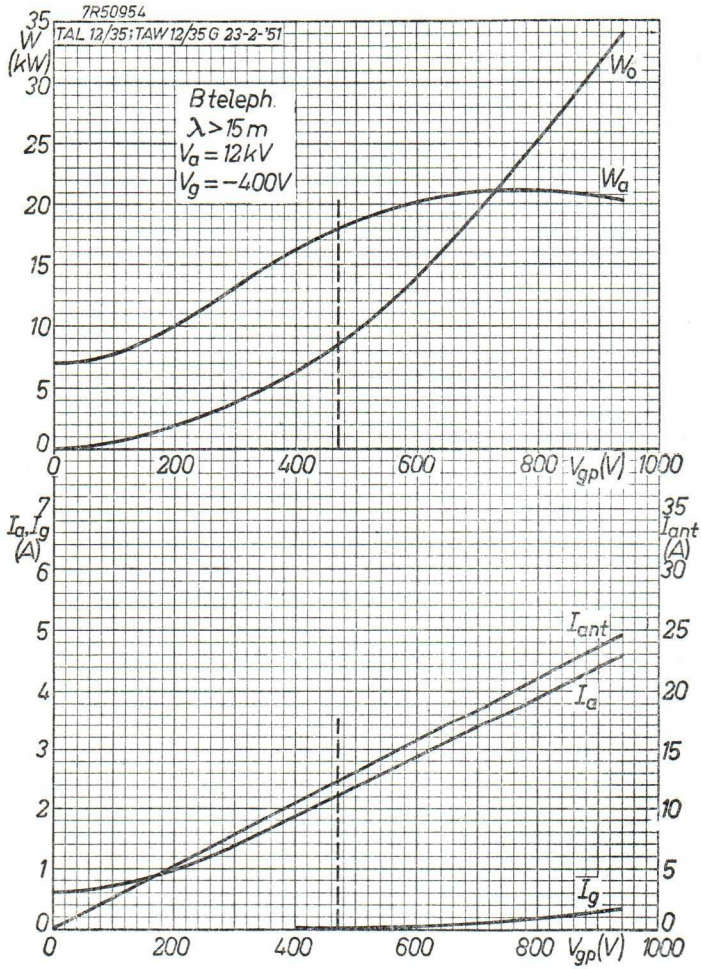
G

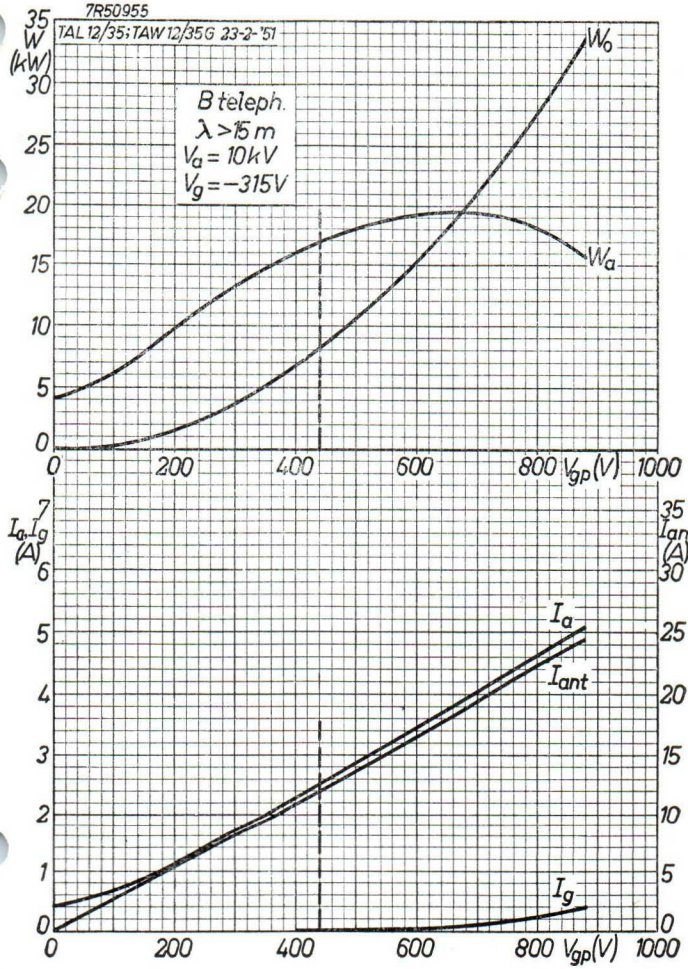
TAL 12/35

# PHILIPS




7R50953
TAL 12/35; TAW 12/35 G 23-2-'51
B teleph.
λ > 15 m
$V_a$ = 15 kV
$V_g$ = −500 V
W (kW)
$W_o$
$W_a$
$V_{gp}$ (V)
$I_a$, $I_g$ (A)
$I_{ant}$ (A)
$I_a$
$I_{ant}$
$I_g$

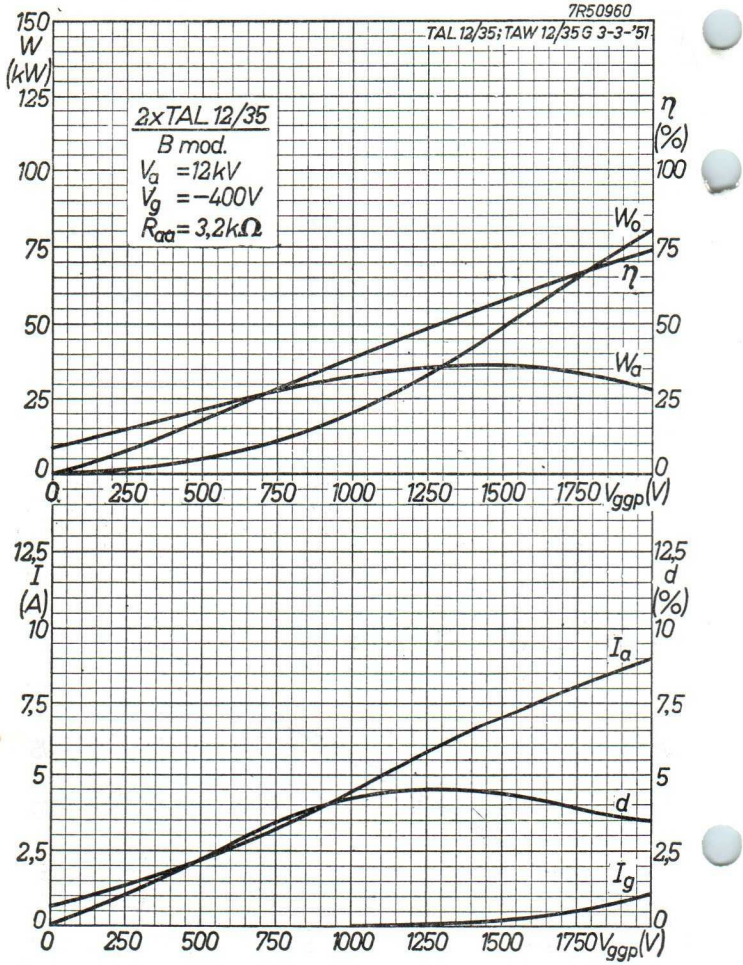

7R50954
TAL 12/35; TAW 12/35 G 23-2-'51
W (kW)
B teleph.
λ > 15 m
$V_a$ = 12 kV
$V_g$ = −400 V
$W_o$
$W_a$
$V_{gp}$(V)
$I_a$, $I_g$ (A)
$I_{ant}$ (A)
$I_{ant}$
$I_a$
$I_g$

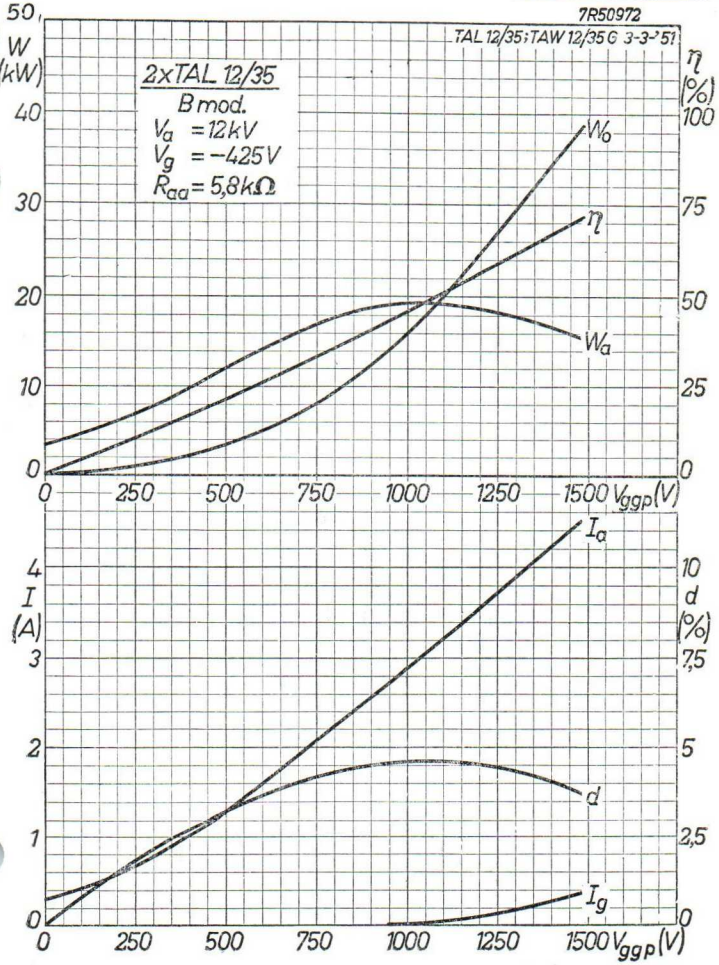

7R50955
TAL 12/35; TAW 12/35G 23-2-'51
B teleph.
λ > 15 m
$V_a$ = 10kV
$V_g$ = −315V
W (kW)
$W_o$
$W_a$
$I_a$, $I_g$ (A)
$I_{ant}$ (A)
$I_a$
$I_{ant}$
$I_g$
$V_{gp}$(V)

7.7.1954

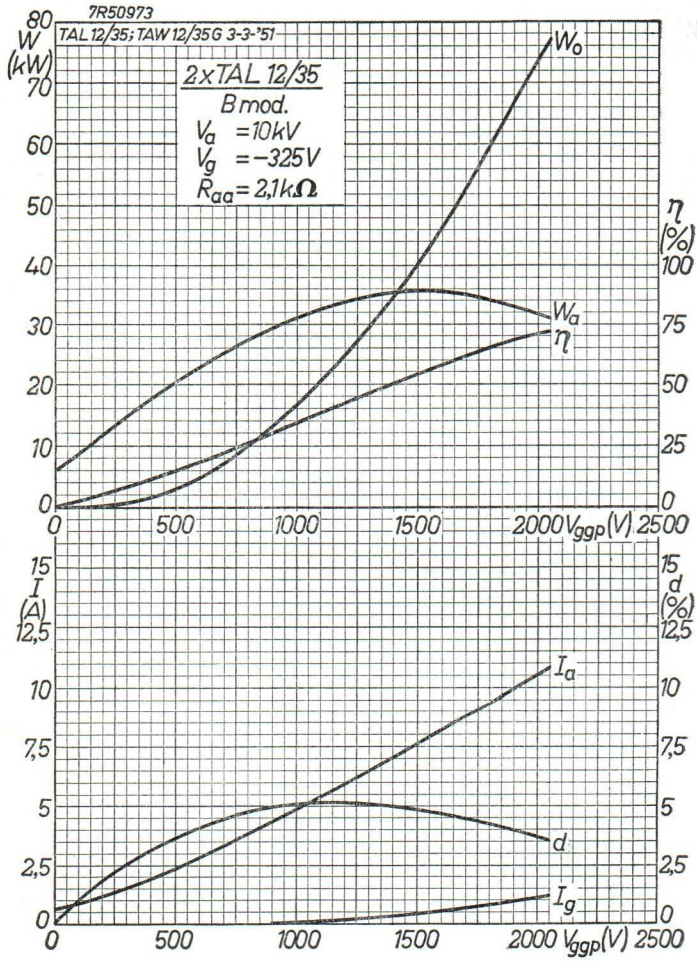
K

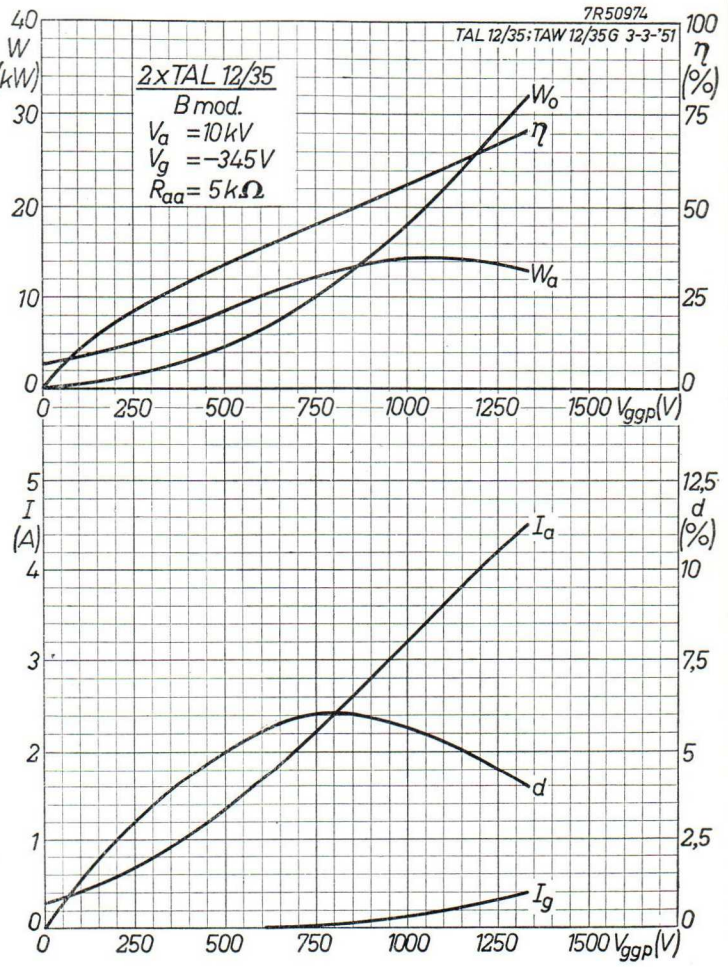
# PHILIPS


7R50960
TAL 12/35; TAW 12/35 G 3-3-'51
2x TAL 12/35
B mod.
$V_a$ = 12 kV
$V_g$ = −400 V
$R_{aa}$ = 3,2 kΩ
W (kW)
η (%)
$W_o$
η
$W_a$
$V_{ggp}$ (V)
I (A)
d (%)
$I_a$
d
$I_g$
$V_{ggp}$ (V)


7R50972
TAL 12/35; TAW 12/35 G 3-3-'51
2xTAL 12/35
B mod.
$V_a$ = 12 kV
$V_g$ = −425 V
$R_{aa}$ = 5,8 kΩ
W (kW)
η (%)
$W_o$
η
$W_a$
$V_{ggp}$ (V)
I (A)
d (%)
$I_a$
d
$I_g$

**PHILIPS**


7R50973
TAL 12/35; TAW 12/35G 3-3-'51
2xTAL 12/35
B mod.
$V_a$ = 10kV
$V_g$ = −325V
$R_{aa}$ = 2,1kΩ
W (kW)
$W_o$
$W_a$
η
η (%)
$V_{ggp}$ (V)
I (A)
$I_a$
$I_g$
d
d (%)


7R50974
TAL 12/35; TAW 12/35 G 3-3-'51
2 x TAL 12/35
B mod.
$V_a$ = 10 kV
$V_g$ = −345 V
$R_{aa}$ = 5 kΩ
W (kW)
η (%)
$W_o$
η
$W_a$
$V_{ggp}$ (V)
I (A)
d (%)
$I_a$
d
$I_g$

TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour utilisation en amplificatrice H.F.ou B.F. ou en oscillatrice
TRIODE zur Verwendung als HF-oder NF-Verstärker oder Oszillator

Cooling : water/air flow to seals
Refroidissement: circulation d'eau/air aux scellements
Kühlung : Wasser/Luftstrom auf Einschmelzungen

Filament : tungsten, three-phase
Filament : tungstène, triphasé
Heizfaden: Wolfram, drei Phasen

| | | | |
|---|---|---|---|
| Heating : direct | per phase | $V_f$ = max.28,3 V[1]) |
| Chauffage: direct | par phase | $I_f$ = 48,5 A |
| Heizung : direkt | pro Phase | |

Filament current must never exceed a peak value of 100 A per phase at any time during initial energising schedule.
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 100 A par phase.
Der Anlaufstrom darf niemals einen Scheitelwert von 100 A pro Phase überschreiten.

| | |
|---|---|
| Capacitances | $C_a$ = 2,6 pF |
| Capacités | $C_g$ = 72 pF |
| Kapazitäten | $C_{ag}$ = 31 pF |

| | | |
|---|---|---|
| Typical characteristics | $\mu$ ($I_a$=1,25 A / $V_a$= 12 kV) | = 25 |
| Caractéristiques types | S ($I_a$=1,25 A / $V_a$= 12 kV) | = 16,5 mA/V |
| Kenndaten | $I_{sat}$ | = 23 A |

[1]) Each valve is marked with the value of the filament voltage at which the saturation current has a value of 23 A.
La valeur de tension du filament correspondante à un courant de saturation de 23 A est indiquée à chaque tube.
Auf jeder Röhre ist der Wert der Heizspannung angegeben wobei der Sättigungsstrom einen Wert von 23 A erhält.

# PHILIPS

| λ | Freq. | C telegr. | | B teleph. | | C an.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) |
| | | | | | | | | 12 | 107 |
| >15 | < 20 | 15 | 48,5 | 15 | 9 | 12 | 27 | 12 | 38,5 |
| | | 12 | 38 | 12 | 8,5 | | | 10 | 77 |
| | | 10 | 31 | 10 | 8 | 10 | 21,5 | 10 | 32 |
| 11 | 27 | 15 | 45 | | | 12 | 26 | | |
| | | | | | | 10 | 20,5 | | |
| 8 | 37,5 | 10 | 26 | | | | | | |

Cooling characteristics
Caractéristiques de refroidissement
Kühlungsdaten

| $W_a$ (kW) | $t_i$ (°C) | $q_{min}$ [2] (l/min) | $p_i$ (atm) | |
|---|---|---|---|---|
| 10 | 20 | 10 | 0,03 | See also the cooling curves<br>Voir aussi les courbes de refroidissement.<br>Siehe auch die Kühlungskurven |
| | 50 | 22 | 0,15 | |
| 20 | 20 | 18 | 0,09 | |
| | 50 | 40 | 0,4 | |
| 30 | 20 | 27 | 0,21 | |
| | 50 | 59 | 1 | |

$t_i$ = max. 50 °C

Temperature of seals
Temp. des scellements
Temp. der Einschmelzungen
= max. 180 °C

[1]) Two tubes; deux tubes; zwei Röhren

[2]) At temperatures $t_i$ between 20 and 50 °C the required quantity of water can be found by proportional interpolation.

Le débit d'eau aux températures $t_i$ entre 20 et 50°C peut être calculé par interpolation linéaire.

Die benötigte Wassermenge für Temperaturwerte ti zwischen 20 und 50 °C kann durch Proportionalinterpolation berechnet werden.

It is necessary to direct a low velocity air flow to the anode- and grid seals at frequencies above 10 Mc/s

Il faut diriger un léger courant d'air sur les scellements de l'anode et de la grille aux fréquences supérieures à 10 Mc/s

Ein schwacher Luftstrom auf die Anoden- und Gittereinschmelzungen ist notwendig, wenn die Röhre bei Frequenzen höher als 10 MHz betrieben wird

Water-jacket
Refroidisseur K 715
Kühltopf

Protective caps for grid- and filament seals
Chapeaux de protection pour les sorties de la grille et du filament 40632
Schutzkappen für Gitter- und Heizfadenanschlüsse

Cooling of the grid seals can be effected by means of these caps
Le refroidissement des scellements de la grille peut être réalisé au moyen de ces chapeaux
Die Gittereinschmelzungen können mit Hilfe dieser Schutzkappen gekühlt werden

Filament bracket (for D.C. supply)
Etrier du filament (pour alimentation par C.C.) 40606
Heizfadenbügel (für Gleichstromspeisung)

Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

Tube : net weight
Tube : poids net 6,8 kg
Röhre: Nettogewicht

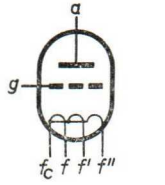
Shipping weight
Poids brut 75 kg
Bruttogewicht

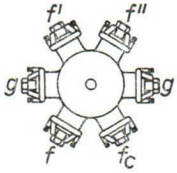
Net weight
K 715 Poids net 16,7 kg
Nettogewicht

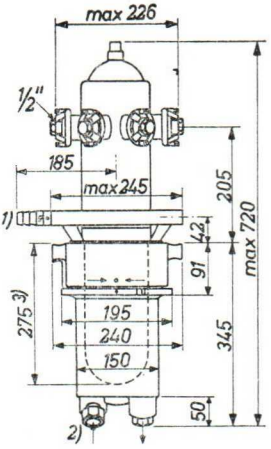
# PHILIPS

Valve mounted in water-jacket type K 715
Tube monté dans le refroidisseur type K 715
Röhre in Kühltopf Typ K 715 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm

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1) Use connecting hose with an inner diameter of 1"
Pour un tuyau flexible d'un diamètre intérieur de 1 pouce
Für Schlauch von 1 Zoll Innendurchmesser

2) Coupling for metal tubing with an outer diameter of 28 mm
Raccord pour un tuyau d'un diamètre extérieur de 28 mm
Anschluss für Rohr mit Aussendurchmesser von 28 mm

3) For removing the valve from its water-jacket the free height above the valve must be at least 275 mm
Pour enlever le tube la hauteur libre au dessus du tube doit être 275 mm au moins
Zum Herausnehmen der Röhre ist eine freie Höhe von mindestens 275 mm oberhalb der Röhre erforderlich

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegrafie

| | | max. | | max. |
|---|---|---|---|---|
| Limiting values<br>Caractéristiques limites<br>Grenzdaten | | $V_a$ = 15 kV<br>$-V_g$=1000 V<br>$I_a$ = 5 A | | $I_g$ =0,6 A<br>$W_{ia}$= 75 kW<br>$W_a$ = 30 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ = | >15 | >15 | >15 | 11 | 8 | m |
| f = | <20 | <20 | <20 | 27 | 37,5 | Mc/s |
| $V_a$ = | 15 | 12 | 10 | 15 | 10 | kV |
| $V_g$ = | -900 | -700 | -600 | -900 | -600 | V |
| $I_a$ = | 4,2 | 4,2 | 4,2 | 4,2 | 4,2 | A |
| $I_g$ = | 0,42 | 0,5 | 0,53 | 0,42 | 0,6 | A |
| $V_{gp}$ = | 1470 | 1350 | 1160 | 1470 | 1200 | V |
| $W_{ig}$ = | 560 | 610 | 560 | 560 | 650 | W |
| $W_{ia}$ = | 63 | 50,4 | 42 | 63 | 42 | kW |
| $W_a$ = | 14,5 | 12,4 | 11 | 18 | 16 | kW |
| $W_o$ = | 48,5 | 38 | 31 | 45 | 26 | kW |
| $\eta$ = | 77 | 75,5 | 74 | 71,5 | 62 | % |

H.F. class B telephony
H.F. classe B téléphonie
HF - Klasse B Telefonie

| | max. |
|---|---|
| Limiting values<br>Caractéristiques limites<br>Grenzdaten | $V_a$ = 15 kV<br>$I_a$ = 2,5 A<br>$W_{ia}$ = 37,5 kW<br>$W_a$ = 30 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $\lambda$ = | >15 | >15 | >15 | m |
| f = | <20 | <20 | <20 | Mc/s |
| $V_a$ = | 15 | 12 | 10 | kV |
| $V_g$ = | -500 | -400 | -315 | V |
| $I_a$ = | 1,8 | 2,2 | 2,5 | A |
| $V_{gp}$ = | 500 | 470 | 440 | V |
| $W_{ia}$ = | 27 | 26,5 | 25 | kW |
| $W_a$ = | 18 | 18 | 17 | kW |
| $W_o$ = | 9 | 8,5 | 8 | kW |
| $\eta$ = | 33 | 32 | 32 | % |
| m = | 100 | 100 | 100 | % |
| $I_g$ = | 0,3 | 0,36 | 0,4 | A |
| $W_{ig}$ = | 270 | 305 | 317 | W |

# PHILIPS

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF - Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 12 kV |
| $-V_g$ | = max. | 1000 V |
| $I_a$ | = max. | 2,9 A |
| $I_g$ | = max. | 0,6 A |
| $W_{ia}$ | = max. | 35 kW |
| $W_a$ | = max. | 20 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = | >15 | >15 | 11 | 11 | m |
| f | = | <20 | <20 | 27 | 27 | Mc/s |
| $V_a$ | = | 12 | 10 | 12 | 10 | kV |
| $V_g$ [1] | = | -1000 | -900 | -1000 | -900 | V |
| $I_a$ | = | 2,9 | 2,9 | 2,9 | 2,9 | A |
| $I_g$ | = | 0,4 | 0,45 | 0,45 | 0,5 | A |
| $V_{gp}$ | = | 1600 | 1550 | 1650 | 1600 | V |
| $W_{ig}$ | = | 580 | 630 | 670 | 700 | W |
| $W_{ia}$ | = | 35 | 29 | 35 | 29 | kW |
| $W_a$ | = | 8 | 7,5 | 9 | 8,5 | kW |
| $W_o$ | = | 27 | 21,5 | 26 | 20,5 | kW |
| $\eta$ | = | 77 | 74 | 74 | 70,5 | % |
| m | = | 100 | 100 | 100 | 100 | % |
| $W_{mod}$ | = | 17,5 | 14,5 | 17,5 | 14.5 | kW |

[1]) Grid bias partially obtained by the grid resistor
Polarisation de grille obtenue partiellement par la résistance de grille
Gittervorspannung, teilweise durch den Gitterwiderstand erzeugt

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF - Verstärker und Modulator Klasse B

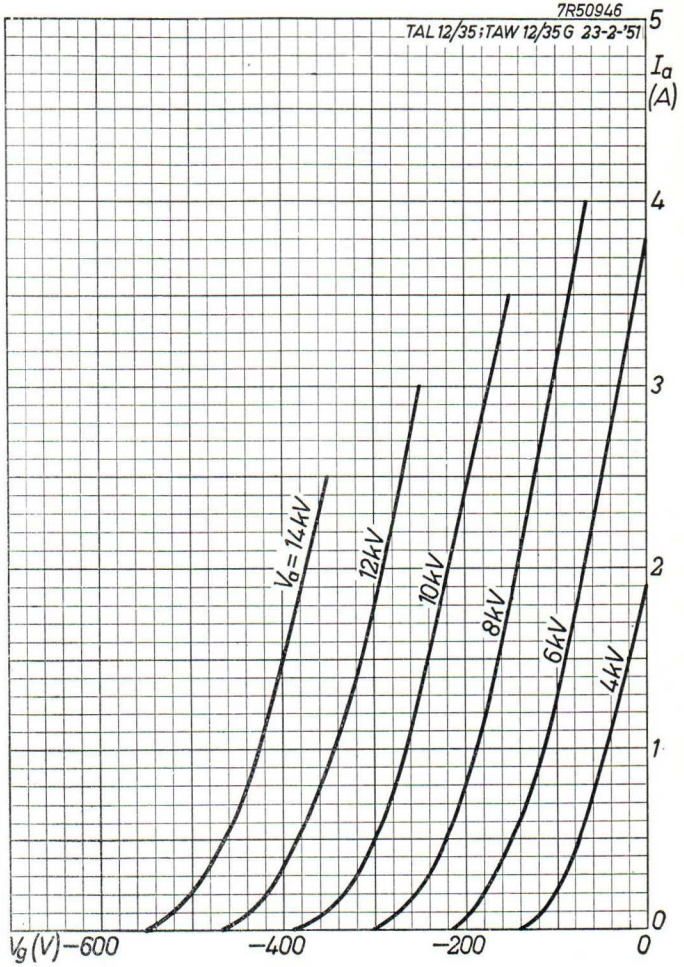
Limiting values
Caractéristiques limites
Grenzdaten

$V_a$ = max. 15 kV
$I_a$ = max. 6 A
$W_{ia}$ = max. 90 kW
$W_a$ = max. 30 kW

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

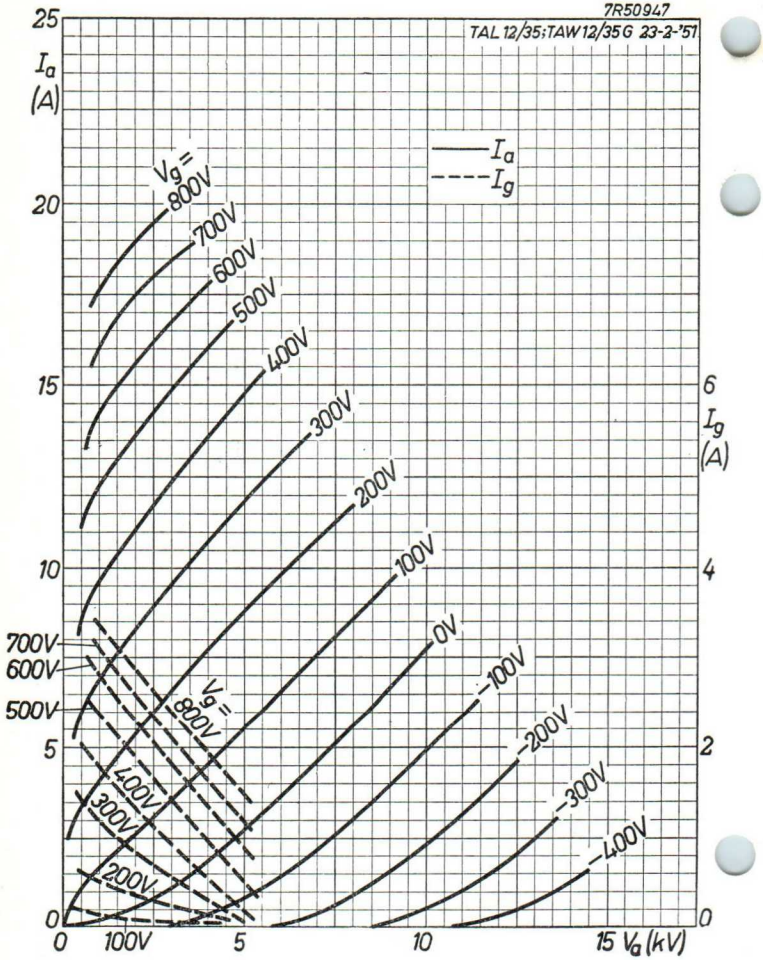
| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 12 | | 12 | | kV |
| $V_g$ | = | -400 | | -425 | | V |
| $R_{aa}$ | = | 2,4 | | 5,8 | | kΩ |
| $V_{ggp}$ | = | 0 | 2400 | 0 | 1480 | V |
| $I_a$ | = | 2x0,35 | 2x6 | 2x0,15 | 2x2,25 | A |
| $I_g$ | = | 0 | 2x0,6 | 0 | 2x0,19 | A |
| $I_{gp}$ | = | 0 | 2x3,3 | 0 | 2x1,25 | A |
| $W_{ig}$ | = | 0 | 2x650 | 0 | 2x127 | W |
| $W_{ia}$ | = | 2x4,2 | 2x72 | 2x1,8 | 2x27 | kW |
| $W_a$ | = | 2x4,2 | 2x18,5 | 2x1,8 | 2x7,7 | kW |
| $W_o$ | = | 0 | 107 | 0 | 38,5 | kW |
| $d_{tot}$ | = | - | 4 | - | 3,7 | % |
| $\eta$ | = | - | 74,5 | - | 71,5 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 10 | | 10 | | kV |
| $V_g$ | = | -325 | | -345 | | V |
| $R_{aa}$ | = | 2,1 | | 5 | | kΩ |
| $V_{ggp}$ | = | 0 | 2050 | 0 | 1330 | V |
| $I_a$ | = | 2x0,3 | 2x5,4 | 2x0,14 | 2x2,25 | A |
| $I_g$ | = | 0 | 2x0,6 | 0 | 2x0,2 | A |
| $I_{gp}$ | = | 0 | 2x3 | 0 | 2x1,35 | A |
| $W_{ig}$ | = | 0 | 2x555 | 0 | 2x120 | W |
| $W_{ia}$ | = | 2x3 | 2x54 | 2x1,4 | 2x22,5 | kW |
| $W_a$ | = | 2x3 | 2x15,5 | 2x1,4 | 2x6,5 | kW |
| $W_o$ | = | 0 | 77 | 0 | 32 | kW |
| $d_{tot}$ | = | - | 3,5 | - | 4 | % |
| $\eta$ | = | - | 71,5 | - | 71 | % |

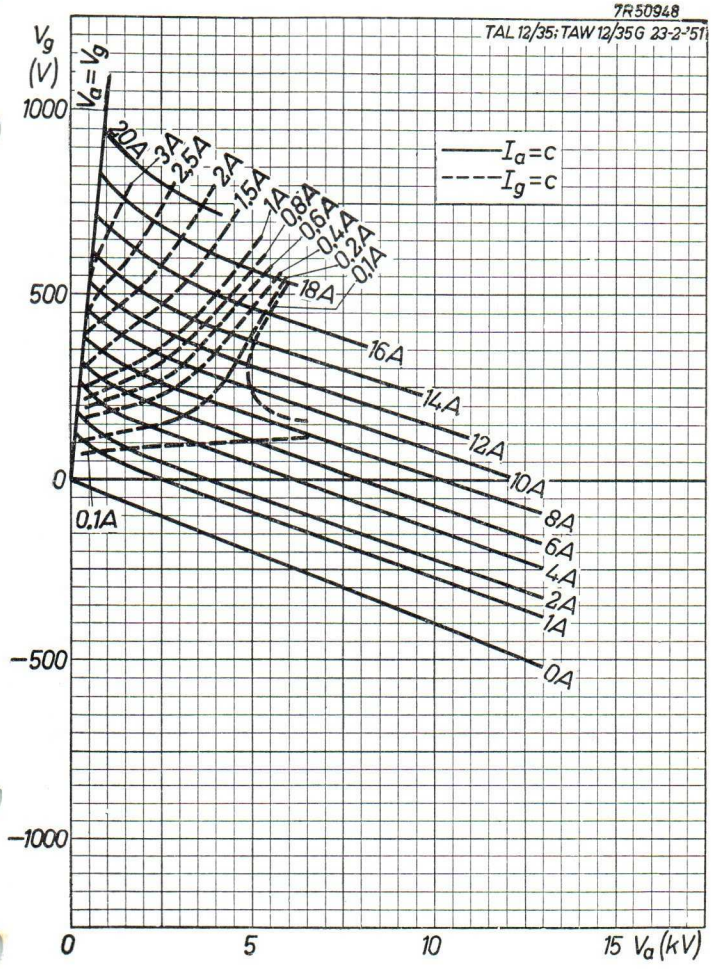

7R50946
TAL 12/35 ; TAW 12/35 G 23-2-'51
$I_a$ (A)
5
4
3
2
1
0
$V_o$ = 14kV
12kV
10kV
8kV
6kV
4kV
$V_g$ (V) −600
−400
−200
0

TAW 12/35 G

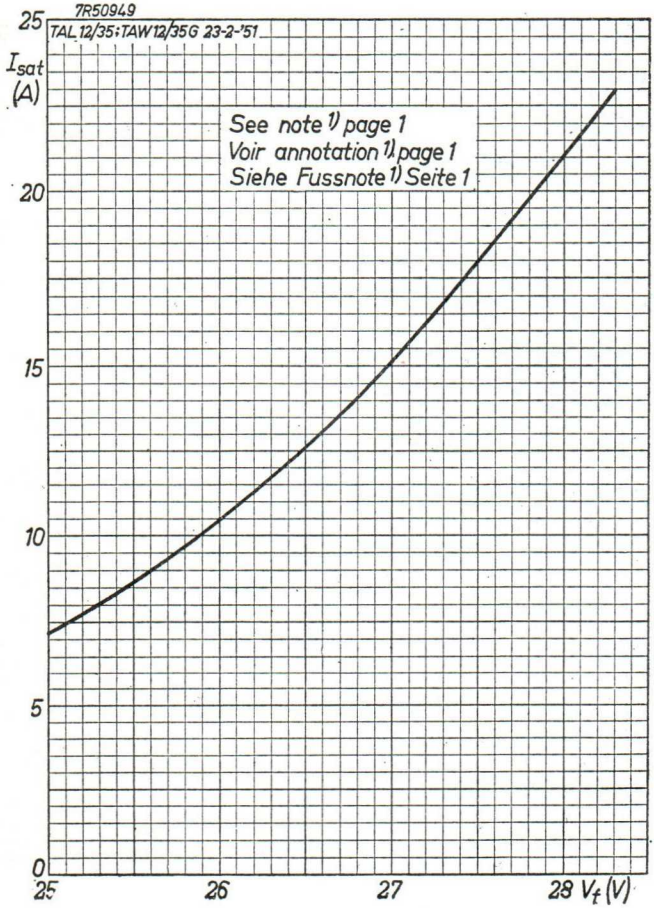
# PHILIPS




B


7R50948
TAL 12/35; TAW 12/35G 23-2-'51
$V_g$ (V)
$V_a = V_g$
1000
500
0
−500
−1000
$I_a$=c
$I_g$=c
20A
3A
2,5A
2A
1,5A
1A
0,8A
0,6A
0,4A
0,2A
0,1A
18A
16A
14A
12A
10A
8A
6A
4A
2A
1A
0A
0,1A
0
5
10
15 $V_a$ (kV)

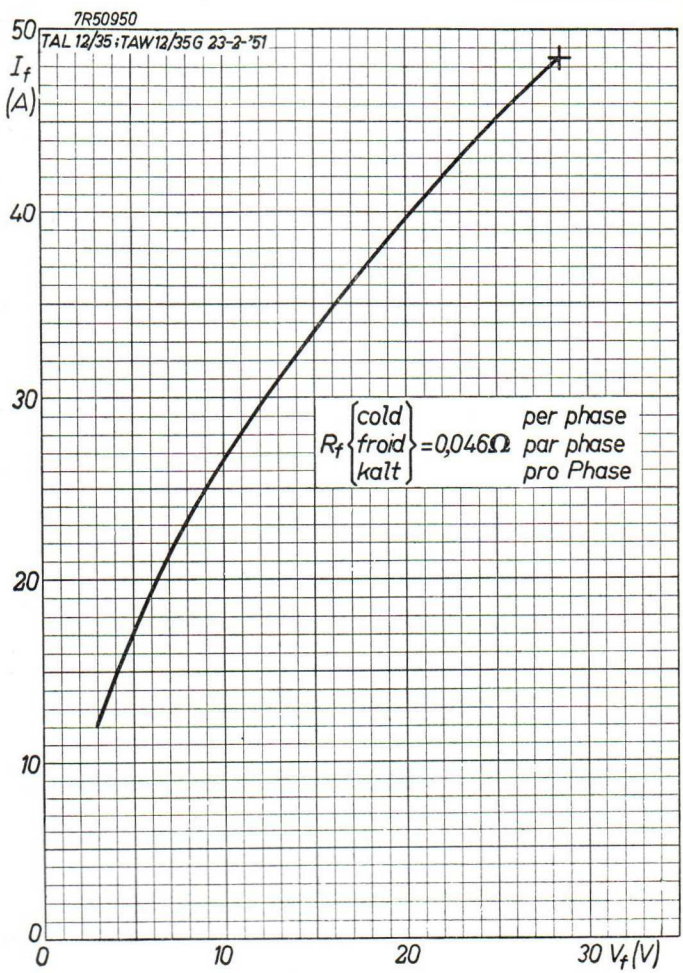
# PHILIPS


7R50949
TAL 12/35; TAW 12/35 G 23-2-'51
$I_{sat}$ (A)
25
20
15
10
5
0
See note 1) page 1
Voir annotation 1) page 1
Siehe Fussnote 1) Seite 1
25
26
27
28 $V_t$ (V)

D

# PHILIPS

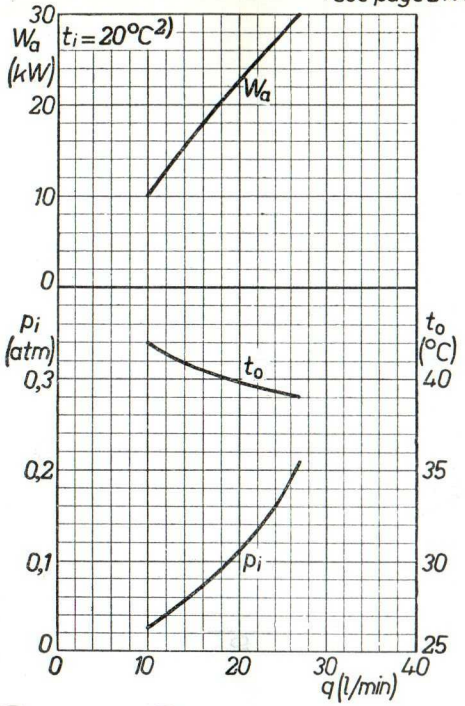
**TAW 12/35 G**

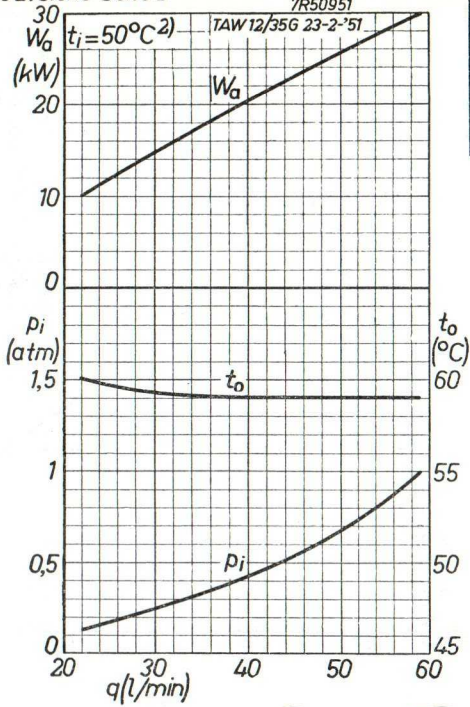



3.3.1951

E

2) see page 2 ; voir page 2 ; siehe Seite 2




TAW 12/35 G

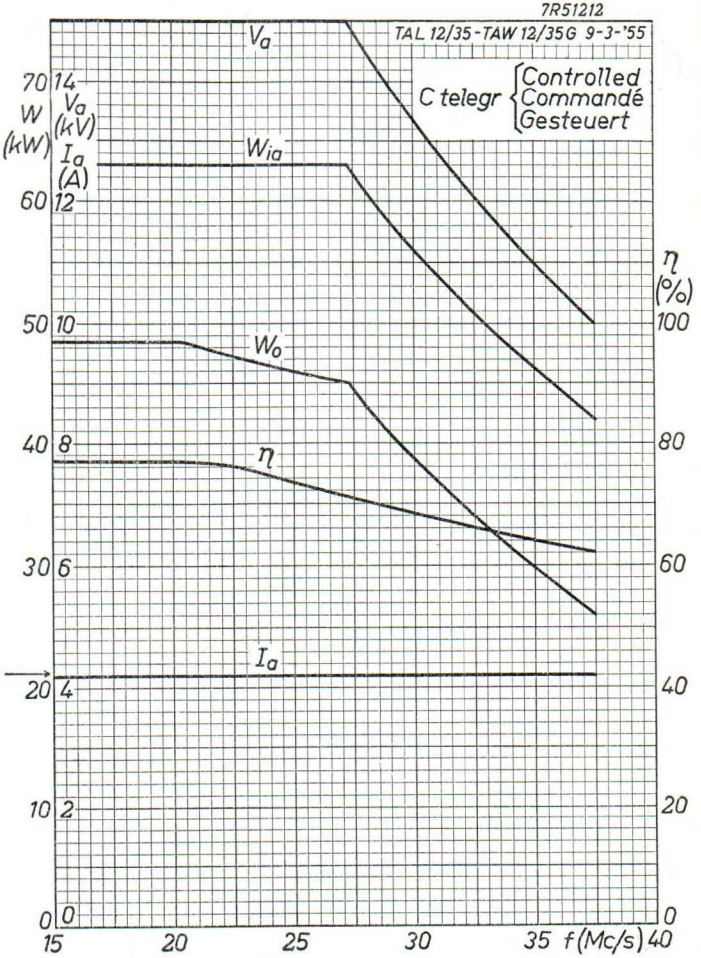
PHILIPS

F

# PHILIPS

**TAW 12/35 G**

7R51212

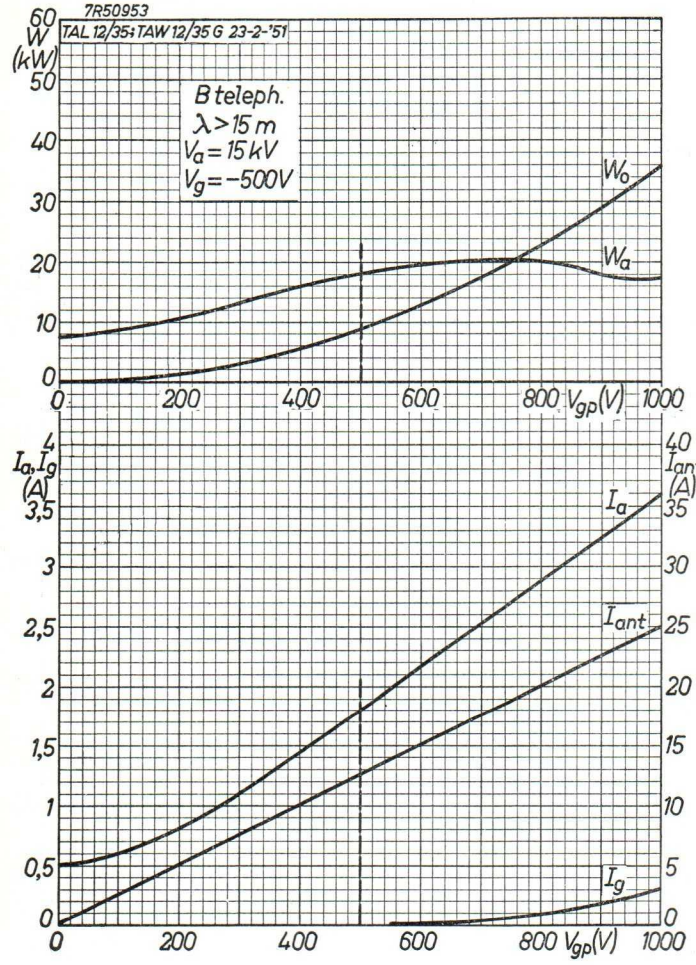



3.3.1955

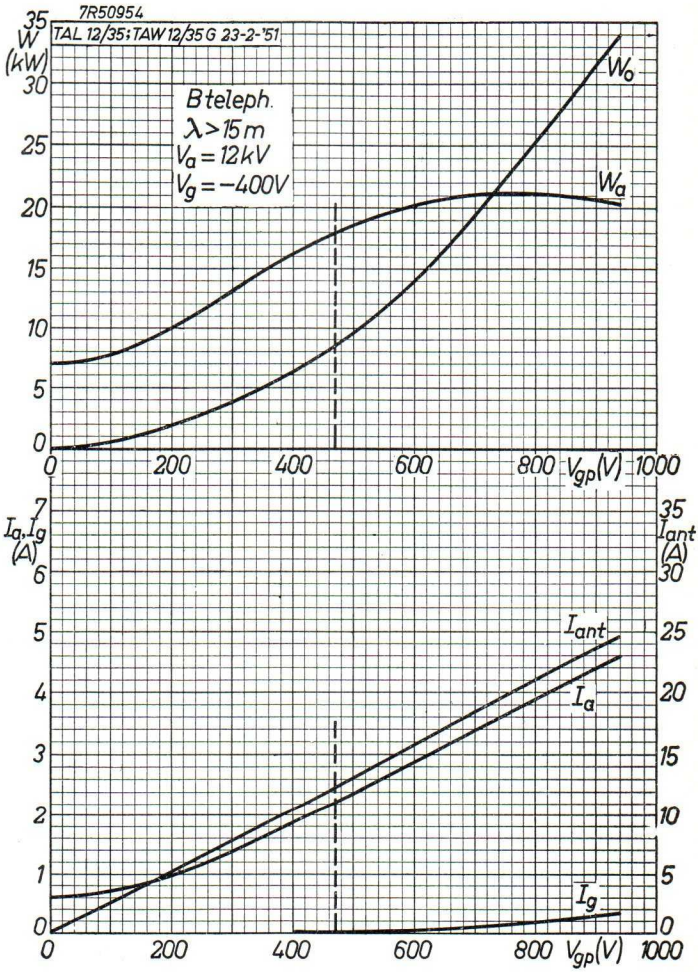
G

**TAW 12/35 G**

# PHILIPS

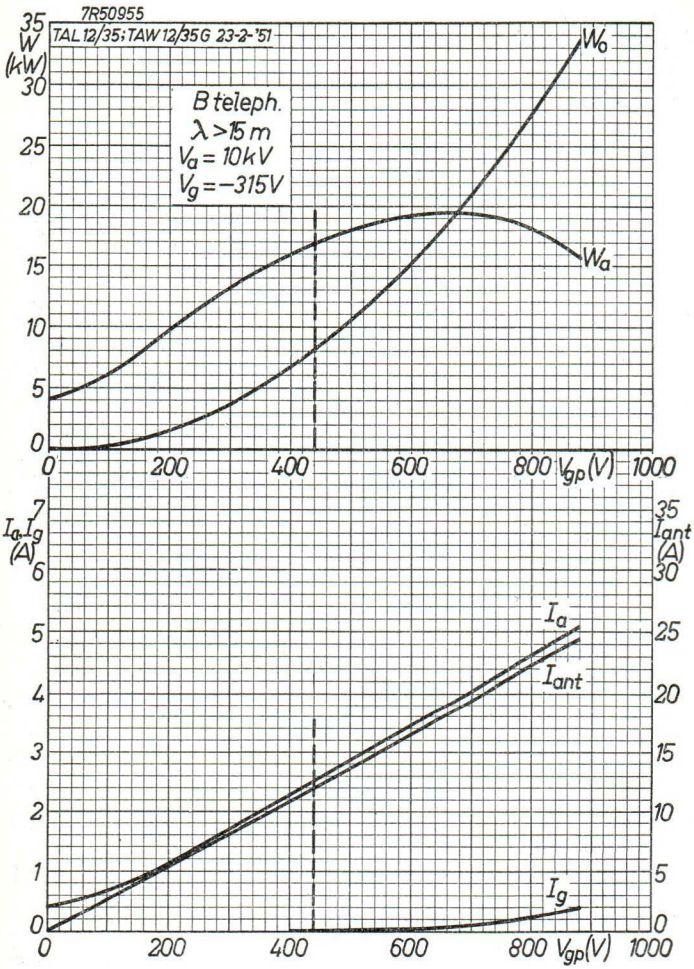



H

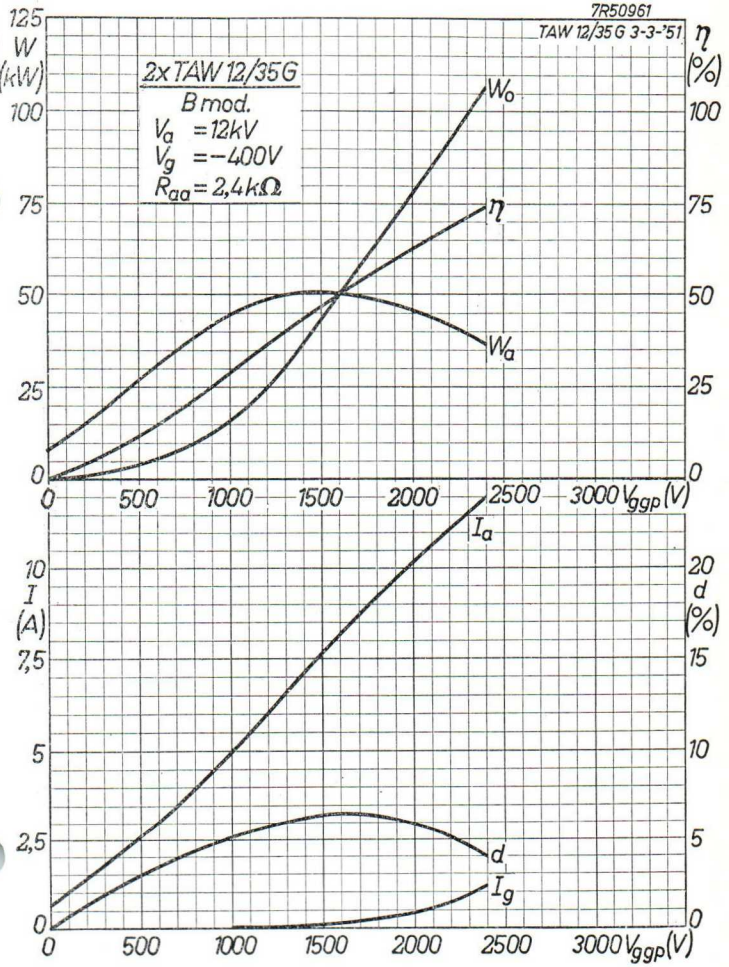

7R50954
TAL 12/35; TAW 12/35 G 23-2-'51
B teleph.
λ > 15 m
Va = 12 kV
Vg = −400V
W (kW)
Wo
Wa
Vgp (V)
Ia, Ig (A)
Iant (A)
Iant
Ia
Ig

**TAW 12/35 G**

# PHILIPS




J

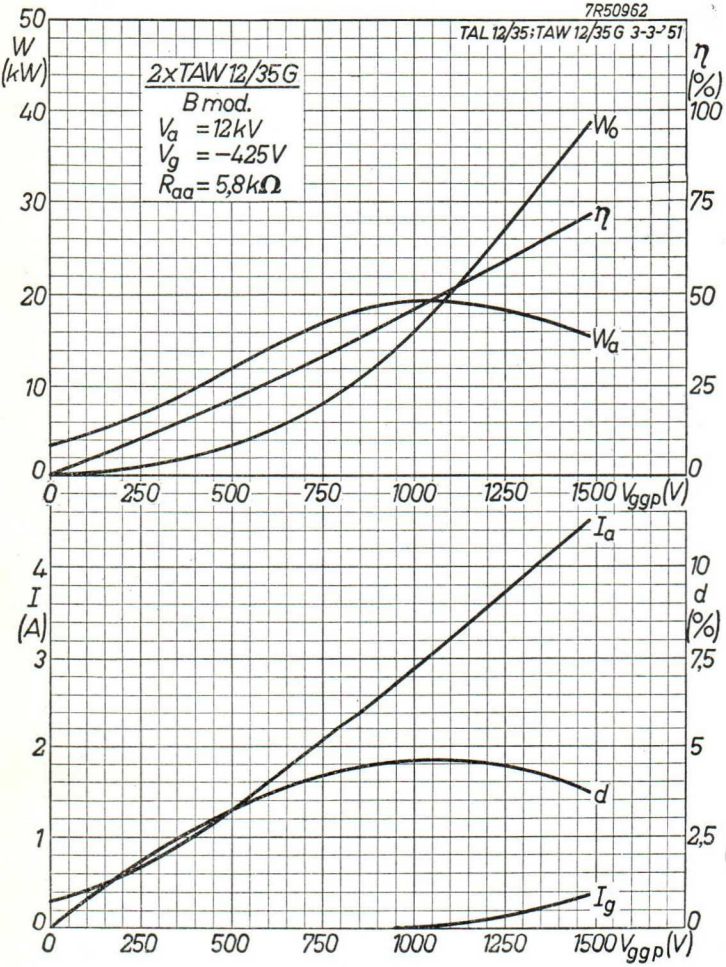

7R50961
TAW 12/35 G 3-3-'51
2x TAW 12/35G
B mod.
$V_a$ = 12kV
$V_g$ = −400V
$R_{aa}$ = 2,4kΩ
W (kW)
η (%)
$W_o$
$W_a$
η
$I_a$
$I_g$
d
I (A)
d (%)
$V_{ggp}$ (V)
0
500
1000
1500
2000
2500
3000
125
100
75
50
25
10
7,5
5
2,5
20
15
10
5

TAW 12/35 G

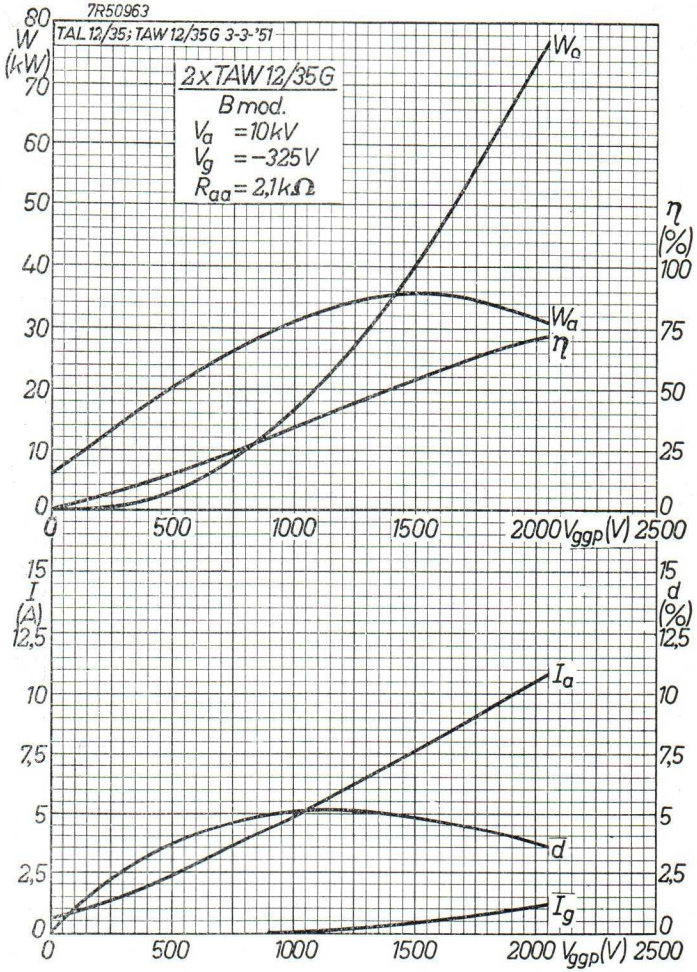
# PHILIPS

7R50962

TAL 12/35:TAW 12/35 G 3-3-'51

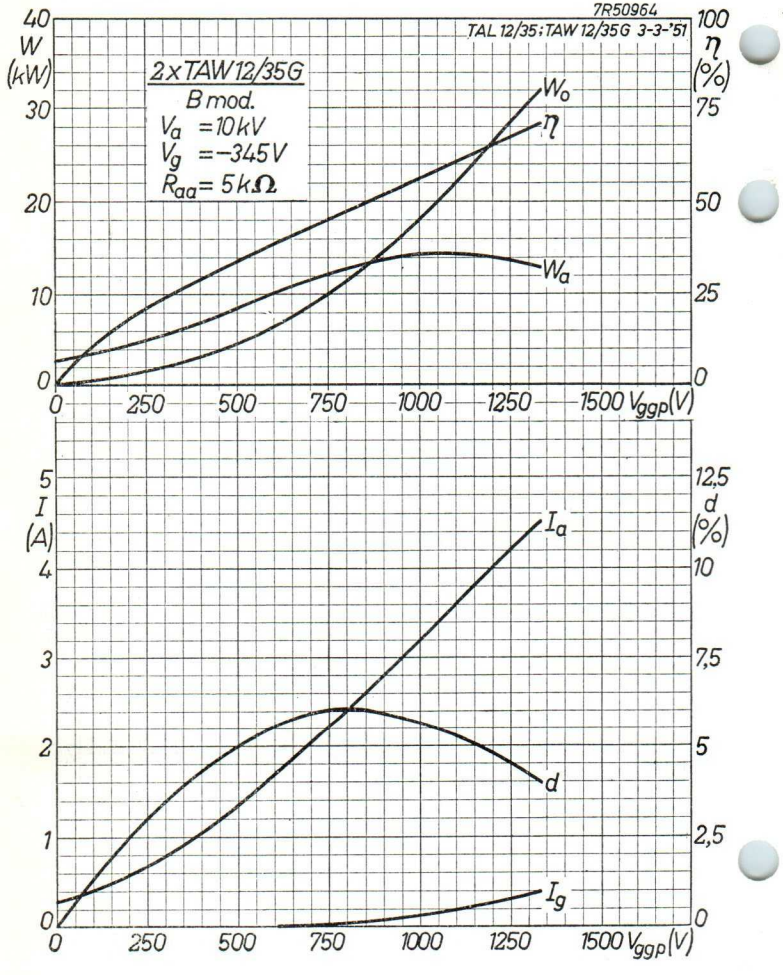



L


7R50963
TAL 12/35; TAW 12/35G 3-3-'51
2 x TAW 12/35G
B mod.
$V_a$ = 10kV
$V_g$ = −325V
$R_{aa}$ = 2,1kΩ
W (kW)
80
70
60
50
40
30
20
10
0
$W_a$
$W_a$
η
η (%)
100
75
50
25
0
0
500
1000
1500
2000
$V_{ggp}$(V)
2500
I (A)
15
12,5
10
7,5
5
2,5
0
$I_a$
d
$I_g$
d (%)
15
12,5
10
7,5
5
2,5
0
0
500
1000
1500
2000
$V_{ggp}$(V)
2500

TAW 12/35 G

# PHILIPS




N

TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour utilisation comme amplificatrice H.F. ou B.F. ou oscillatrice
TRIODE zur Verwendung als HF- oder NF-Verstärker oder Oszillator

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 12 V
$I_f$ = 2,7 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 5,4 pF
$C_g$ = 8,2 pF
$C_{ag}$ = 5,5 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ = 27
S ($I_a$=50 mA)= 4,2 mA/V

| λ | Freq. | C telegr. | | B teleph. | | Can. mod. | | B mod [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| >6,5 | <46 | 2000 | 275 | 2000 | 60 | 1600 | 160 | 2000 | 540 |
| | | 1500 | 200 | 1500 | 57 | 1200 | 100 | 1600 | 240 |
| 5 | 60 | 1500 | 200 | 1500 | 48 | 1200 | 85 | 1200 | 168 |
| 3 | 100 | 1050 | 120 | | | | | | |

Limiting values
Caractéristiques limites
Grenzdaten

$V_a$ = max. 2000 V
$W_a$ = max. 130 W
$W_g$ = max. 18 W
$R_g$ = max. 25 kΩ
$I_k$ = max. 230 mA

[1]) Two tubes; deux tubes; zwei Röhren

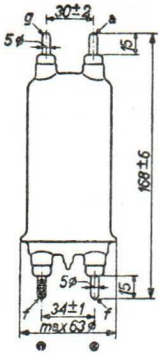
# PHILIPS

Temperature of pin seals
Température des scellements des broches = max. 220 °C
Temperatur der Stiftendurchführungen

Bulb temperature
Température de l'ampoule = max. 250 °C
Kolbentemperatur

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| Socket | | Clips | |
|---|---|---|---|
| Support | 40206 | Bornes de connexion | 40600 |
| Fassung | | Anschlussklemmen | |

Key
Clé 40608
Schlüssel

Mounting position: vertical with base up[1]) or down
Montage : vertical avec pied en haut[1]) ou en bas
Einbau : senkrecht mit Sockel oben[1])oder unten

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 160 g | Poids brut | 400 g |
| Nettogewicht | | Bruttogewicht | |

---

[1]) In that case the tube should be supported
Dans ce cas le tube doit être supporté
In diesem Fall ist die Röhre zu stützen

# PHILIPS

**TB 2/500**

TRIODE for use as H.F. and L.F. amplifier and oscillator
TRIODE pour utilisation comme amplificatrice H.F. et B.F. et oscillatrice
TRIODE zur Verwendung als H.F. und N.F. Verstärker und Oszillator

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 12 V
If = 7,3 A

Capacitances
Capacités
Kapazitäten

Ca = 6 pF
Cg = 12,5 pF
Cag = 6 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

$\mu$ = 32
S (Ia=125 mA) = 7,5 mA/V

| $\lambda$ | Freq. | C telegr. | | B teleph. | | Can.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >15 | <20 | 2000 | 635 | 2000 | 124 | 1800 | 430 | 2000 | 900 |
| 3 | 100 | 1700 | 400 | | | | | | |

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 2000 V
Wa = max. 300 W
Wg = max. 20 W

Ik = max. 600 mA
Ikp = max. 2400 mA

Rg { with fixed grid bias / à polarisation fixe / mit fester Gittervorspannung = max. 10 kΩ

Rg { with automatic grid bias / à polarisation automatique / mit autom. Gittervorspannung = max. 20 kΩ

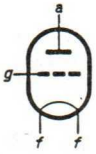
[1]) Two valves; deux tubes; zwei Röhren

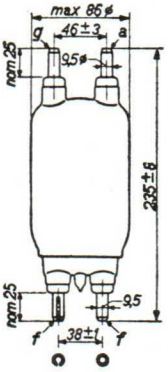
# PHILIPS

Temperature of pin seals
Température des scellements des broches = max. 220 °C
Temperatur der Stiftendurchführungen

Bulb temperature
Température de l'ampoule = max. 250 °C
Kolbentemperatur

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| Socket | | Clips |
|---|---|---|
| Support | 40204 | Bornes de connexion 40626 |
| Fassung | | Anschlussklemmen |

| Key | |
|---|---|
| Clé | 40608 |
| Schlüssel | |

Mounting position: vertical with base up[1]) or down
Montage : vertical avec pied en haut[1])ou en bas
Einbau : senkrecht mit Fuss oben[1]) oder unten

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 0,34 kg | Poids brut | 1,2 kg |
| Nettogewicht | | Bruttogewicht | |

---

[1]) In that case the tube should be supported
Dans ce cas le tube doit être supporté
In diesem Fall ist die Röhre zu stützen

TRIODE for use as H.F. and L.F. amplifier and oscillator, suitable for grounded-grid circuits
TRIODE pour utilisation comme amplificatrice H.F. et B.F. et oscillatrice, propre aux circuits "grounded-grid"
TRIODE zur Verwendung als H.F. und N.F. Verstärker und Oszillator, geeignet für Gitterbasisschaltungen

Cooling : radiation/low velocity air flow
Refroidissement: radiation/léger courant d'air
Kühlung : Strahlung/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 6,3 V
$I_f$ = 5,4 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,1 pF
$C_g$ = 4,3 pF
$C_{ag}$ = 5,2 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

$\mu$ = 25
S ($I_a$ = 44 mA) = 2,8 mA/V

| λ | Freq. | C. telegr. | | C osc. | | B teleph. | | Can. mod. | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| 4 | 75 | 2500 | 390 | | | 2500 | 65 | 2000 | 204 |
| | | 2000 | 295 | | | 2000 | 64 | 1500 | 153 |
| | | 1500 | 210 | | | 1500 | 59 | 1000 | 95 |
| | | 1000 | 126 | | | | | | |
| 2 | 150 | | | 2500 | 376 | | | | |
| | | | | 2000 | 282 | | | | |
| 1,5 | 200 | | | 2000 | 198 | | | | |

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| Va | = max. 2500 V | |
| Wa | = max. 135 W | 1) |
| Wg | = max. 16 W | |
| Rg | = max. 0,1 MΩ | 2) |
| Rg | = max. 0,2 MΩ | 3) |
| Ik | = max. 250 mA | |
| Ikp | = max. 1,6 A | |

temperature of anode seal
temp. de la sortie supérieure
Temp. des Anodenverschlusses
= max. 220 °C

bottomtemperature
température du fond
Bodentemperatur
= max. 180 °C

It is necessary to direct a low velocity air flow on bottom and top seal if the valve is used at or near maximum ratings at frequencies above 50 Mc/s

Il faut diriger un léger courant d'air sur le fond et la partie supérieure du tube, lorsqu'il est utilisé à ou près de ses caractéristiques limites aux fréquences supérieures à 50 Mc/s

Ein schwacher Luftstrom auf den Boden und den Anodenverschluss ist notwendig, wenn die Röhre bei oder nahe den Grenzdaten bei Frequenzen höher als 50 MHz benutzt wird

Mounting position: vertical with base up or down
Montage : vertical avec le pied en haut ou en bas
Aufstellung : senkrecht mit Fuss oben oder unten

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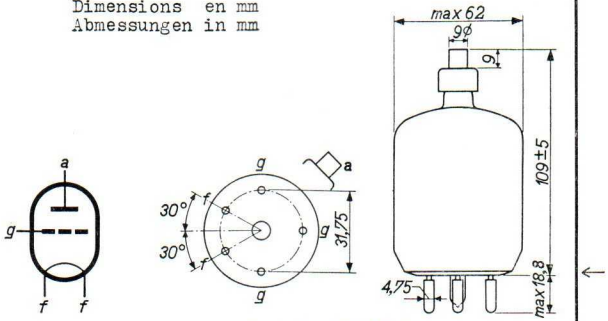
1) Anode red hot, temperature = 850 °C
Anode portée au rouge, température = 850 °C
Anode rot glühend, Temperatur = 850 °C

2) With fixed grid bias; à polarisation fixe; mit fester Gittervorspannung

3) With automatic grid bias; à polarisation automatique; mit automatischer Gittervorspannung

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base, culot, Sockel: GIANT 5p.

| | |
|---|---|
| Clip<br>Borne de connexion<br>Anschlussklemme | 40624 |
| Socket<br>Support<br>Fassung | 40211/01 |
| Socket with grid connections grounded<br>Support avec les connexions de la grille mise à la terre<br>Fassung mit geerdeten Gitteranschlüssen | 40215/01 |
| Net weight<br>Poids net<br>Nettogewicht | 110 g |
| Shipping weight (5 valves)<br>Poids brut (5 tubes)<br>Bruttogewicht (5 Röhren) | 3,5 kg |

# PHILIPS

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = | 4 | 4 | 4 | 4 | m |
| Va | = | 2500 | 2000 | 1500 | 1000 | V |
| Vg | = | -200 | -150 | -110 | -80 | V |
| Ia | = | 205 | 205 | 205 | 205 | mA |
| Ig | = | 40 | 40 | 40 | 40 | mA |
| Vgp | = | 390 | 340 | 300 | 260 | V |
| Wig | = | 14 | 13 | 11 | 10 | W |
| Wia | = | 512 | 410 | 308 | 205 | W |
| Wa | = | 122 | 115 | 98 | 79 | W |
| Wo | = | 390 | 295 | 210 | 126 | W |
| $\eta$ | = | 76 | 72 | 68 | 61,5 | % |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 4 | 4 | 4 | m |
| Va | = | 2500 | 2000 | 1500 | V |
| Vg | = | -87 | -67 | -45 | V |
| Ia | = | 77 | 97 | 120 | mA |
| Vgp | = | 100 | 100 | 100 | V |
| Wia | = | 193 | 194 | 180 | W |
| Wa | = | 128 | 130 | 121 | W |
| Wo | = | 65 | 64 | 59 | W |
| $\eta$ | = | 34 | 33 | 33 | % |
| m | = | 100 | 100 | 100 | % |
| Ig | = | 20 | 28 | 52 | mA |
| Wig | = | 3,6 | 5,1 | 9,4 | W |

Operating conditions H.F. class C anode modulation
Caractéristiques d'utilisation H.F. classe C modulation d'anode
Betriebsdaten H.F. Klasse C Anodenmodulation

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 4[1]) | 4[1]) | 4[1]) | m |
| Va | = | 2000 | 1500 | 1000 | V |
| Vg | = | -225 | -180 | -130 | V |
| Ia | = | 255 | 255 | 255 | mA |
| Ig | = | 80 | 80 | 80 | mA |
| Vgp | = | 415 | 370 | 320 | V |
| Wig | = | 30 | 27 | 23 | W |
| Wia | = | 510 | 382 | 255 | W |
| Wa | = | 102 | 76 | 65 | W |
| Wo | = | 408 | 306 | 190 | W |
| $\eta$ | = | 80 | 80 | 74,5 | % |
| m | = | 100 | 100 | 100 | % |
| Wmod | = | 255 | 191 | 126 | W |

Operating conditions as H.F. class C oscillator
Caractéristiques d'utilisation comme oscillatrice H.F. classe C
Betriebsdaten als H.F. Klasse C Oszillator

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 2[1]) | 2[1]) | 1,5[1]) | m |
| Va | = | 2500 | 2000 | 2000 | V |
| Ia | = | 410 | 410 | 346 | mA |
| Ig | = | 80 | 80 | 80 | mA |
| Rg | = | 2500 | 1875 | 1875 | Ω |
| Wia | = | 1025 | 820 | 692 | W |
| Wa | = | 245 | 230 | 270 | W |
| Wig | = | 28 | 26 | 26 | W |
| Wo | = | 752 | 564 | 396 | W |
| $\eta$ | = | 73 | 69 | 57 | % |

[1]) Two valves; deux tubes; zwei Röhren

Operating conditions as H.F. class C òscillator for high frequency heating and diathermy generators
Caractéristiques d'utilisation comme oscillatrice H.F. classe C pour chauffage à haute fréquence et générateurs H.F. pour diathermie
Betriebsdaten als H.F. Klasse C Oszillator für Hochfrequenzheizung und Diathermiegeneratoren

A. With anode voltage from single phase full wave rectifier without filter
Avec tension anodique de redresseur monophasé deux tubes sans filtre
Mit Anodenspannung von Einphasen-Vollweggleichrichter ohne Filter

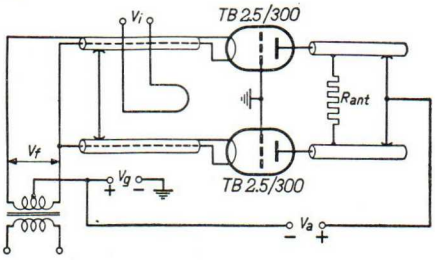
| | | | |
|---|---|---|---|
| $\lambda$ | = | 7,3 | m |
| Va | = | 2000 | V [1] |
| Ia | = | 170 | mA |
| Ig | = | 34 | mA |
| Rg | = | 3750 | Ω |
| Wia | = | 420 | W |
| Wa | = | 120 | W |
| Wig | = | 10 | W |
| Wo | = | 290 | W |
| $\eta$ | = | 69 | % |

B. With anode and grid alternating voltage. Phase-shift 180° between Va and Vg
Avec tension alternative de l'anode et de la grille. Décalage de phase entre Va et Vg = 180°
Mit Anoden- und Gitterwechselspannung: Phasenverschiebung zwischen Va und Vg = 180°

| | | | |
|---|---|---|---|
| $\lambda$ | = | 7,3 | m |
| Va | = | 2500 | Veff |
| Ia | = | 90 | mA |
| Ig | = | 20 | mA |
| Rg | = | 1700 | Ω |
| Vg | = | 85 | Veff |
| Wia | = | 255 | W |
| Wa | = | 85 | W |
| Wo | = | 170 | W |
| $\eta$ | = | 67 | % |

[1]) Mean value; valeur moyenne; Mittelwert

Operating conditions H.F.class C telegraphy, grounded grid
Caractéristiques d'utilisation H.F. classe C télégraphie, circuit "grounded-grid"
Betriebsdaten H.F. Klasse C Telegraphie, Gitterbasisschaltung




| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = | 3[1]) | 3[1]) | 3[1]) | 3[1]) | m |
| Va | = | 2500 | 2000 | 1500 | 1000 | V |
| Vg | = | -200 | -150 | -110 | -80 | V |
| Ia | = | 410 | 410 | 410 | 410 | mA |
| Ig | = | 80 | 80 | 80 | 80 | mA |
| Vgp | = | 390 | 340 | 300 | 260 | V |
| Wig | = | 158 | 136 | 118 | 100 | W |
| Wia | = | 1025 | 820 | 615 | 410 | W |
| Wa | = | 245 | 230 | 195 | 158 | W |
| Wo [2]) | = | 780+130 | 590+110 | 420+96 | 252+80 | W |
| $\eta$ [3]) | = | 76 | 72 | 68 | 61,5 | % |

[1]) Two valves; deux tubes; zwei Röhren

[2]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage préamplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[3]) Pure valve efficiency; rendement net du tube; reiner Röhrenwirkungsgrad

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
N.F.-Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 2500 | V |
| $W_a$ | = max. | 135 | W |
| $W_g$ | = max. | 16 | W |
| $I_k$ | = max. | 250 | mA |
| $I_{kp}$ | = max. | 1,6 | A |

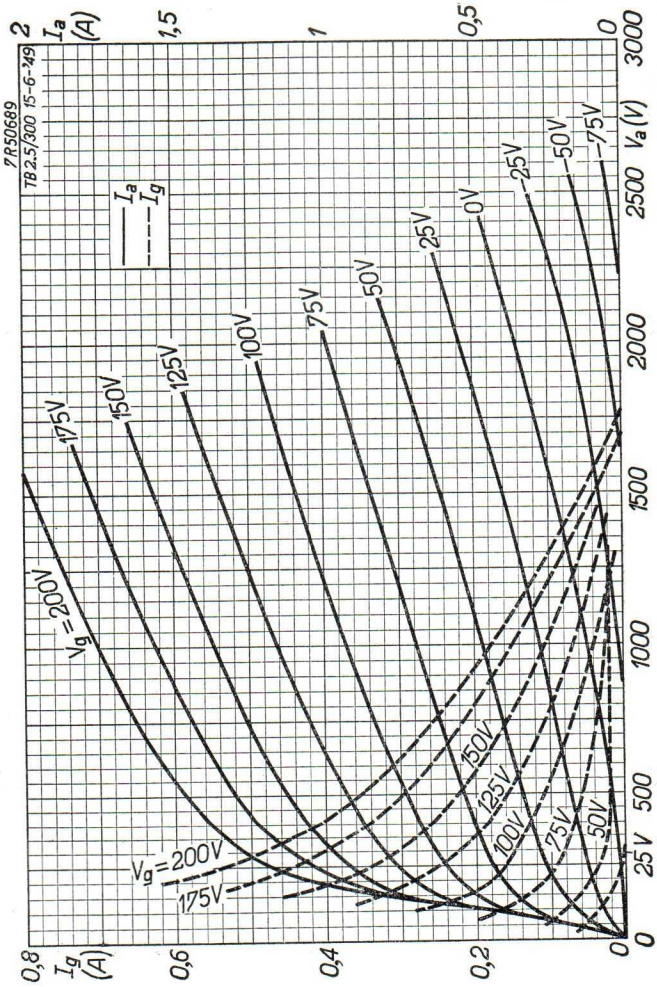
Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 2500 | | 2000 | | V |
| $V_g$ | = | -86 | | -65 | | V |
| $R_{aa}$ | = | 18,2 | | 12,0 | | kΩ |
| $V_{ggp}$ | = | 0 | 412 | 0 | 394 | V |
| $I_a$ | = | 2x30 | 2x178 | 2x30 | 2x208 | mA |
| $I_g$ | = | 0 | 2x42 | 0 | 2x42 | mA |
| $W_{ig}$ | = | 0 | 2x7,8 | 0 | 2x7,3 | W |
| $W_{ia}$ | = | 2x75 | 2x445 | 2x60 | 2x416 | W |
| $W_a$ | = | 2x75 | 2x95 | 2x60 | 2x101 | W |
| $W_o$ | = | 0 | 700 | 0 | 630 | W |
| dtot | = | - | 5,0 | - | 3,7 | % |
| $\eta$ | = | - | 78,5 | - | 76 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 1500 | | 1000 | | V |
| $V_g$ | = | -46 | | -23 | | V |
| $R_{aa}$ | = | 8,5 | | 5,0 | | kΩ |
| $V_{ggp}$ | = | 0 | 340 | 0 | 295 | V |
| $I_a$ | = | 2x30 | 2x210 | 2x30 | 2x210 | mA |
| $I_g$ | = | 0 | 2x40 | 0 | 2x40 | mA |
| $W_{ig}$ | = | 0 | 2x6,1 | 0 | 2x5,4 | W |
| $W_{ia}$ | = | 2x45 | 2x315 | 2x30 | 2x210 | W |
| $W_a$ | = | 2x45 | 2x90 | 2x30 | 2x73 | W |
| $W_o$ | = | 0 | 450 | 0 | 274 | W |
| $d_{tot}$ | = | - | 2,9 | - | 2,2 | % |
| $\eta$ | = | - | 71,5 | - | 65 | % |

# PHILIPS

**TB 2.5/300**

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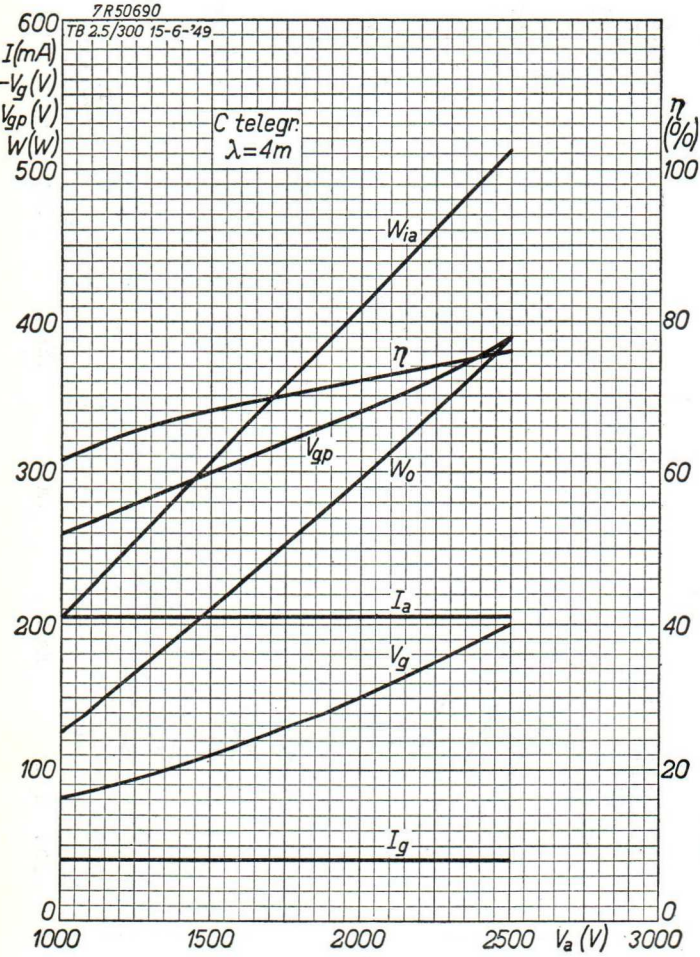
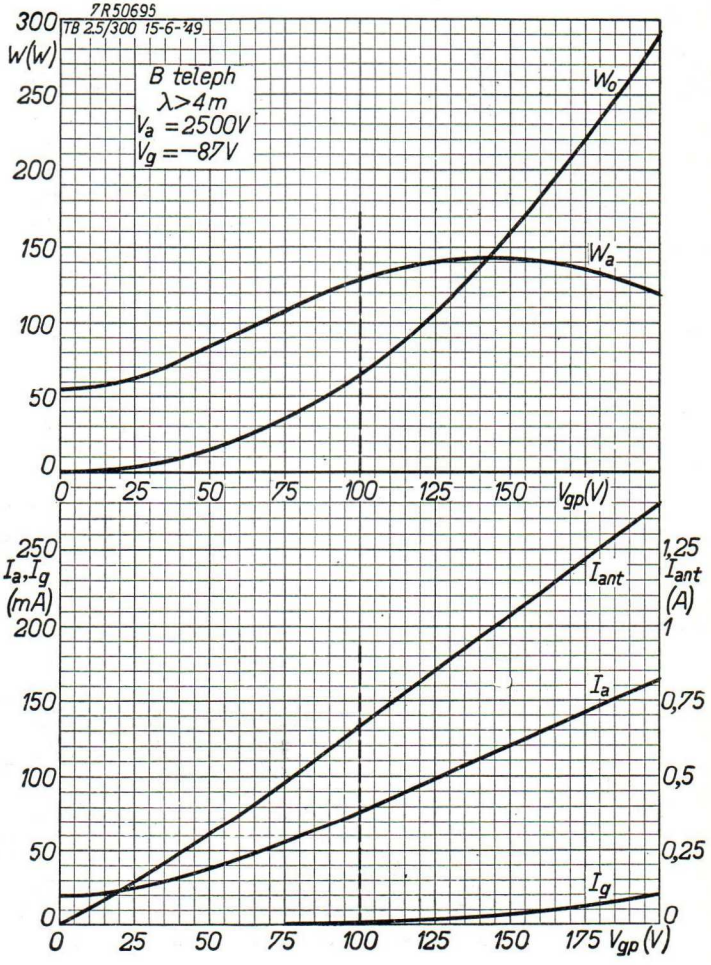
A

**TB 2.5/300**

# PHILIPS



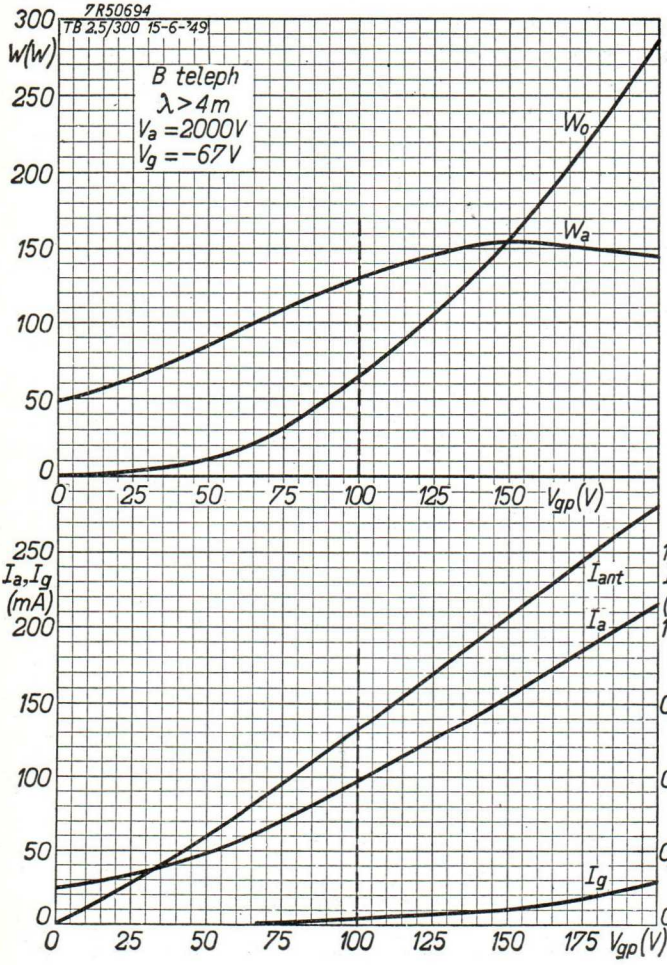

7R50695
TB 2.5/300 15-6-'49
B teleph
λ>4m
Va =2500V
Vg =−87V
W(w)
Wo
Wa
Vgp(V)
Ia,Ig (mA)
Iant
Ia
Ig
Iant (A)

7.7.1949

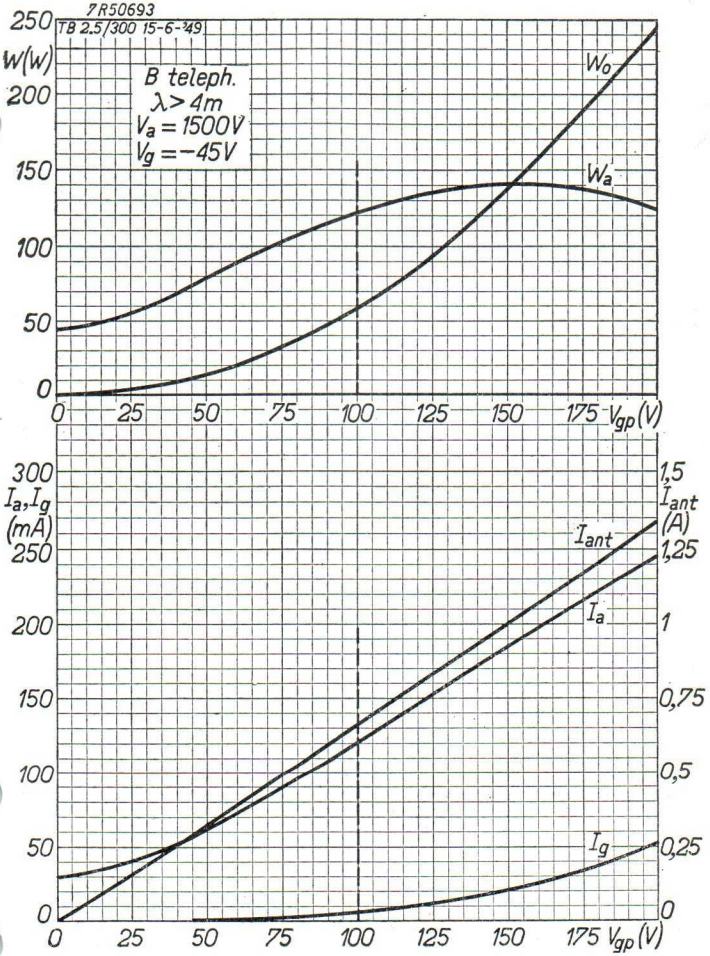
C

**TB 2.5/300**

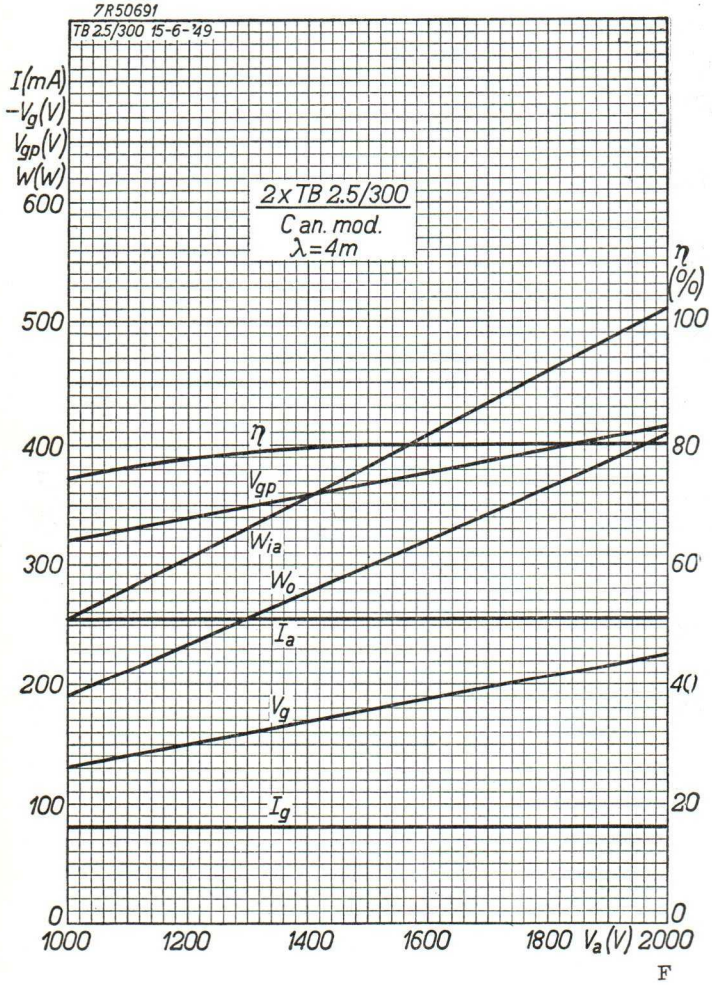
# PHILIPS



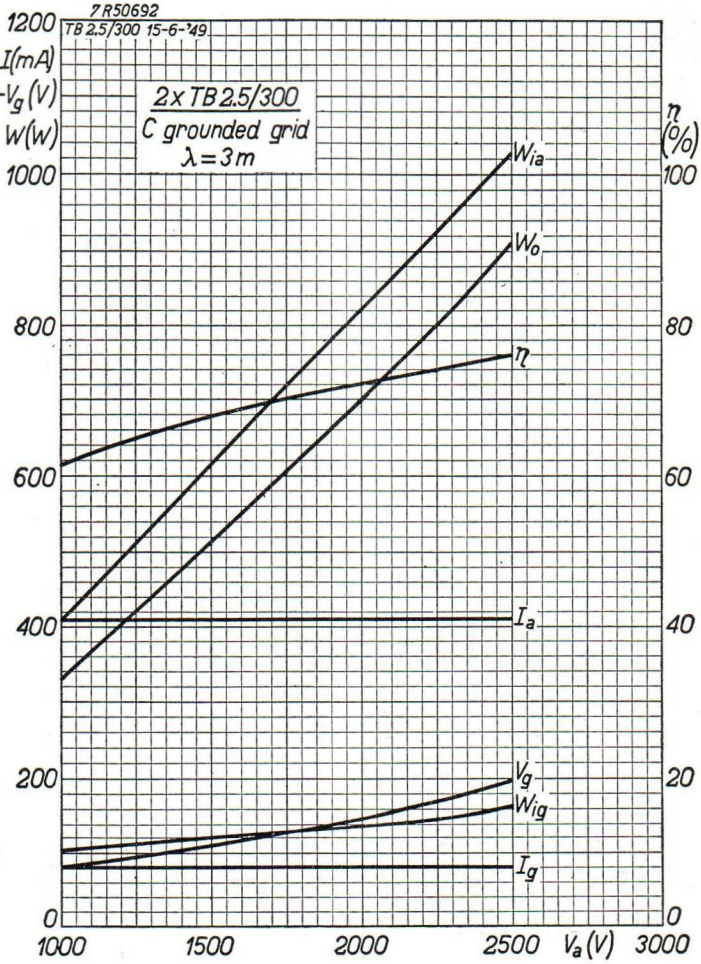

D


7R50693
TB 2.5/300 15-6-49
B teleph.
λ > 4m
Va = 1500V
Vg = −45V
W(w)
Wo
Wa
Vgp (V)
Ia, Ig (mA)
Iant (A)
Iant
Ia
Ig

# PHILIPS

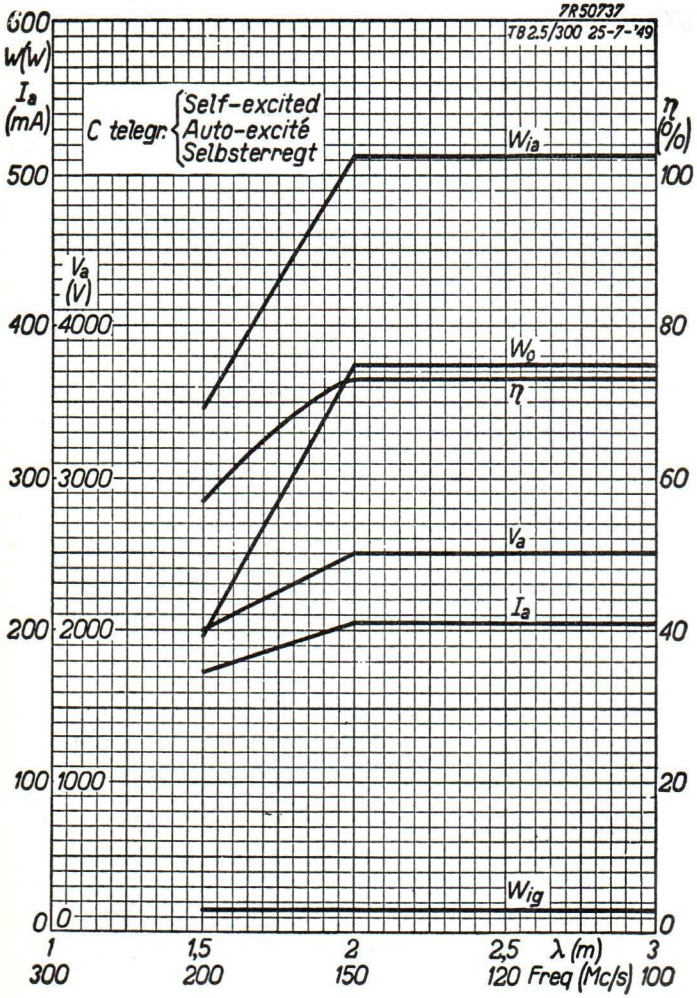

7R50691
TB 2.5/300 15-6-49
I(mA)
−Vg(V)
Vgp(V)
W(w)
2 x TB 2.5/300
C an. mod.
λ=4m
η (%)
600
500
400
300
200
100
0
100
80
60
40
20
0
η
Vgp
Wia
Wo
Ia
Vg
Ig
1000
1200
1400
1600
1800
Va(V)
2000

F

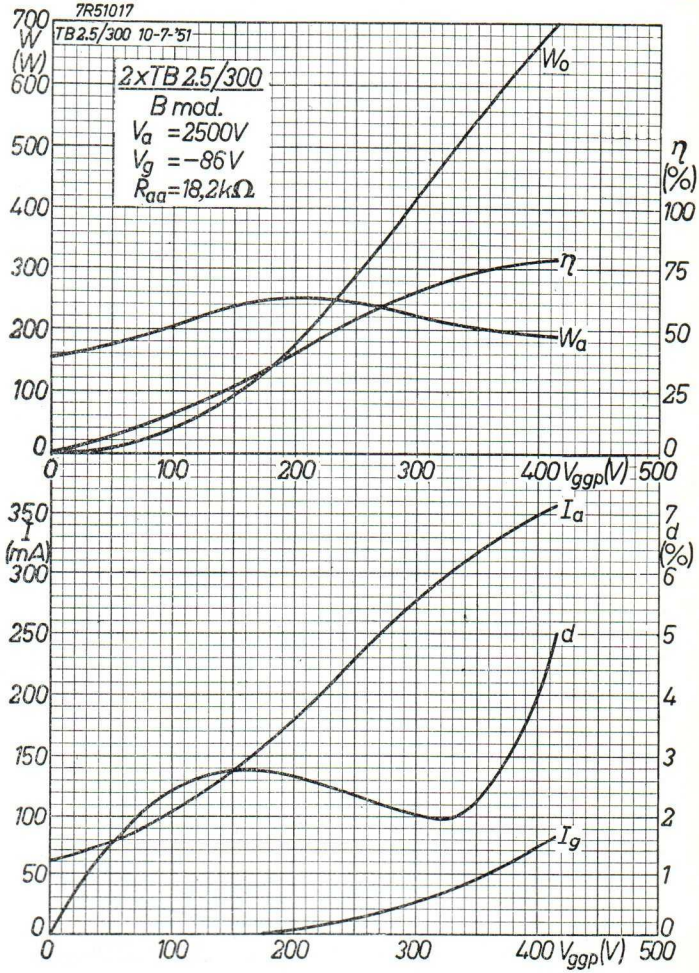

7R50692
TB 2.5/300 15-6-'49
2x TB 2.5/300
C grounded grid
λ = 3 m
I(mA)
−Vg(V)
W(W)
η
(%)
Wia
Wo
η
Ia
Vg
Wig
Ig
1200
1000
800
600
400
200
0
100
80
60
40
20
0
1000
1500
2000
2500
Va(V)
3000

TB 2.5/300

# PHILIPS

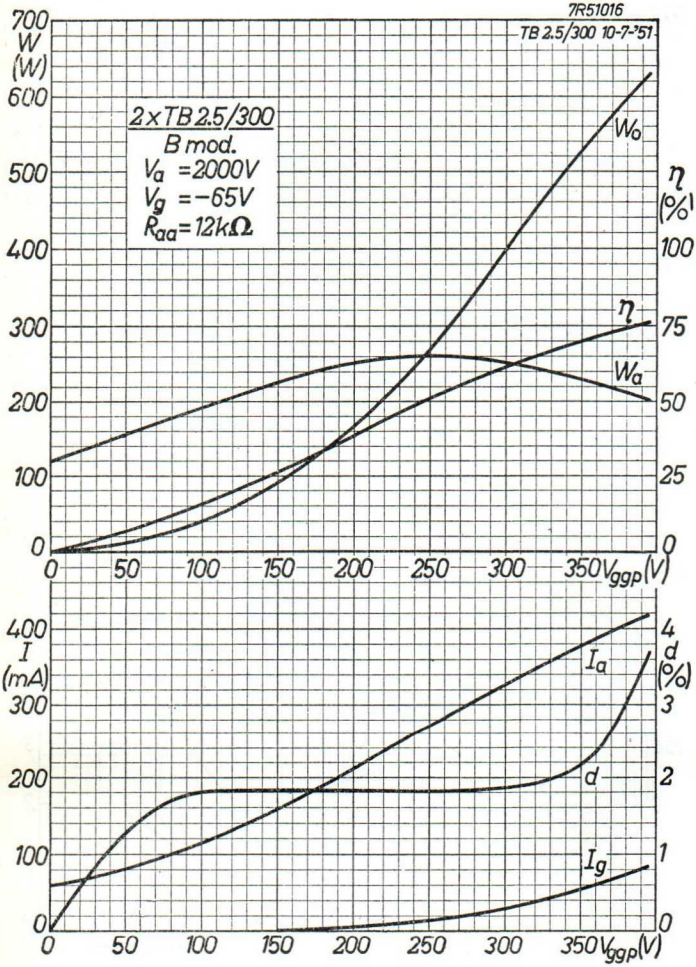



H

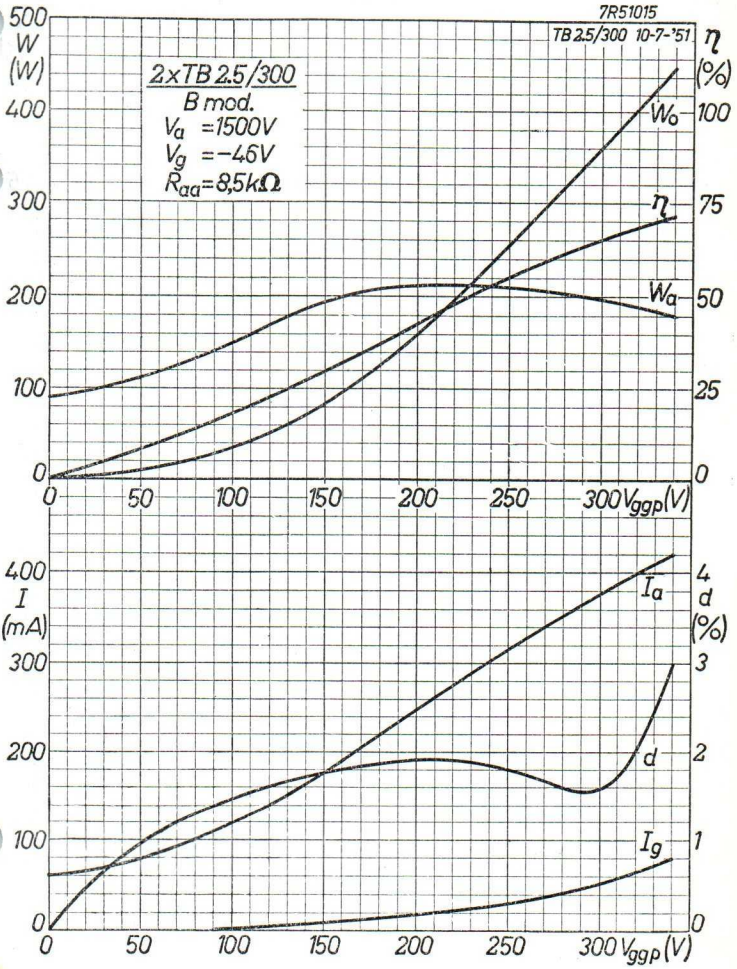

7R51017
TB2.5/300 10-7-'51
2xTB 2.5/300
B mod.
$V_a$ = 2500V
$V_g$ = −86V
$R_{aa}$ = 18,2kΩ
W (W)
η (%)
$W_o$
η
$W_a$
$V_{ggp}$(V)
I (mA)
d (%)
$I_a$
d
$I_g$

TB 2.5/300

# PHILIPS

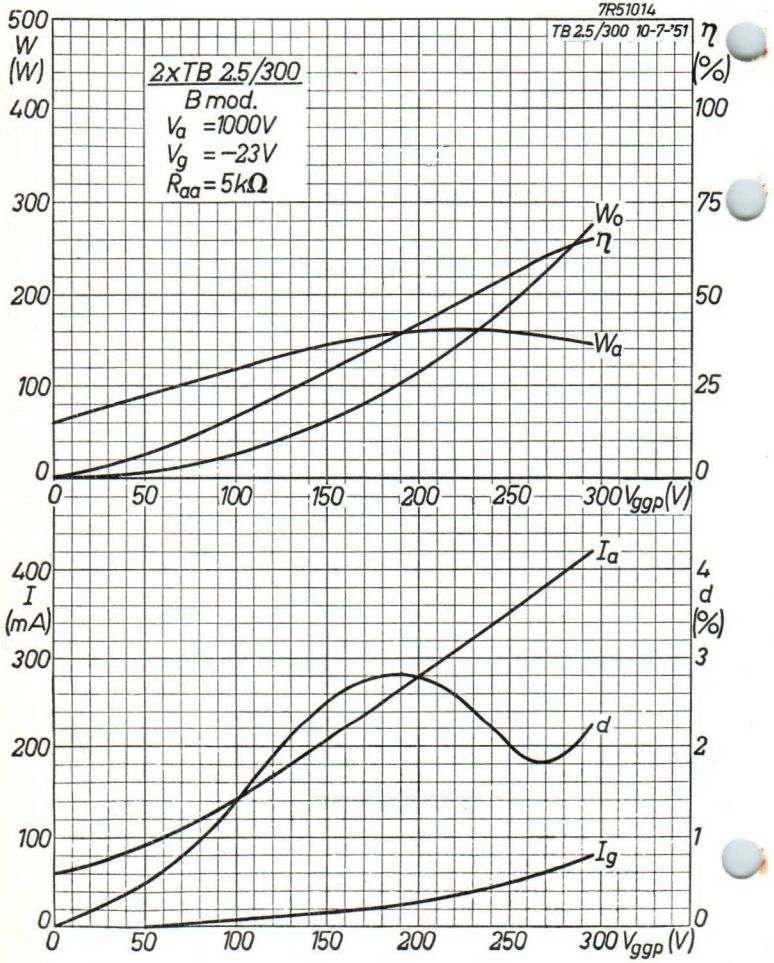



J


7R51015
TB 2.5/300 10-7-'51
2xTB 2.5/300
B mod.
Va =1500V
Vg =-46V
Raa=8,5kΩ
W (W)
η (%)
Wo
η
Wa
I (mA)
d (%)
Ia
d
Ig
Vggp (V)

**TB 2.5/300**

# PHILIPS




L

TRIODE for use as H.F. and L.F. amplifier and oscillator, suitable for grounded-grid circuits
TRIODE pour utilisation comme amplificatrice H.F. et B.F. et oscillatrice, propre aux circuits "grounded-grid"
TRIODE zur Verwendung als H.F. und N.F. Verstärker und Oszillator, geeignet für Gitterbasisschaltungen

Cooling : radiation/low velocity air flow
Refroidissement: radiation/léger courant d'air
Kühlung : Strahlung/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 6,3 V
$I_f$ = 5,8 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,1 pF
$C_g$ = 4,9 pF
$C_{ag}$ = 5,0 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 2500 V
$I_a$ = 60 mA
$\mu$ = 25
S = 2,8 mA/V

| λ | Freq. | C telegr. | | C osc. | | B teleph. | | Can.mod. | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 4 | 75 | 2500 | 390 | | | 2500 | 65 | 2000 | 204 |
| | | 2000 | 295 | | | 2000 | 64 | 1500 | 153 |
| | | 1500 | 210 | | | 1500 | 59 | 1000 | 95 |
| | | 1000 | 126 | | | | | | |
| 2 | 150 | | | 2500 | 376 | | | | |
| | | | | 2000 | 282 | | | | |
| 1,5 | 200 | | | 2000 | 198 | | | | |

Temperatures
Températures
Temperaturen

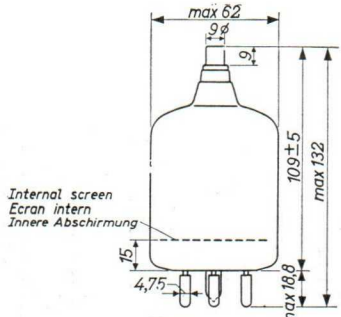
temperature of anode seal
temp. de la sortie supérieure = max. 220 °C
Temp. des Anodenverschlusses

bottomtemperature
température du fond = max. 180 °C
Bodentemperatur

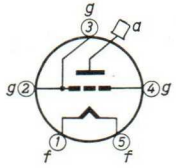
It is recommended to direct a low velocity air flow on bottom and top seal if the tube is used at or near maximum ratings at frequencies above 50 Mc/s
Il est recommandé de diriger un léger courant d'air sur le fond et la partie supérieure du tube, lorsqu'il est utilisé à ou près de ses caractéristiques limites aux fréquences supérieures à 50 MHz
Ein schwacher Luftstrom auf den Boden und den Anodenverschluss wird empfohlen, wenn die Röhre bei oder nahe den Grenzdaten bei Frequenzen höher als 50 MHz benutzt wird

Mounting position: vertical with base up or down
Montage : vertical avec le pied en haut ou en bas
Aufstellung : senkrecht mit Fuss oben oder unten

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base
Culot Giant 5 p.
Sockel




Socket
Support 40211/01
Fassung

Clip
Borne de connexion 40624
Anschlussklemme

Net weight
Poids net 125 g
Nettogewicht

Shipping weight, 5 tubes
Poids brut, 5 tubes 3,6 kg
Bruttogewicht, 5 Röhren

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 150 | Mc/s |
| $V_a$ | = max. | 3000 | V |
| $I_a$ | = max. | 255 | mA |
| $W_a$ | = max. | 150 | W |
| $W_{ia}$ | = max. | 512 | W |
| $-V_g$ | = max. | 300 | V |
| $I_g$ | = max. | 45 | mA |
| $R_g$ | = max. | 0,1 | MΩ [1] |
| $R_g$ | = max. | 0,2 | MΩ [2] |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| f | = | 150 | 150 | 150 | 150 | Mc/s |
| $V_a$ | = | 2500 | 2000 | 1500 | 1000 | V |
| $V_g$ | = | -200 | -150 | -110 | -80 | V |
| $I_a$ | = | 205 | 205 | 205 | 205 | mA |
| $I_g$ | = | 40 | 40 | 40 | 40 | mA |
| $V_{gp}$ | = | 390 | 340 | 300 | 260 | V |
| $W_{ig}$ | = | 14 | 13 | 11 | 10 | W |
| $W_{ia}$ | = | 512 | 410 | 308 | 205 | W |
| $W_a$ | = | 122 | 115 | 98 | 79 | W |
| $W_o$ | = | 390 | 295 | 210 | 126 | W |
| $\eta$ | = | 76 | 72 | 68 | 61,5 | % |

[1] Fixed grid bias
Polarisation de grille fixe
Feste Gittervorspannung

[2] Automatic grid bias
Polarisation de grille automatique
Automatische Gittervorspannung

# PHILIPS

H.F. class B telephony
H.F. classe B téléphonie
HF-Klasse B Telephonie

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 150 | Mc/s |
| $V_a$ | = max. | 3000 | V |
| $I_a$ | = max. | 170 | mA |
| $W_a$ | = max. | 150 | W |
| $W_{ia}$ | = max. | 200 | W |
| $I_g$ | = max. | 55 | mA |
| $R_g$ | = max. | 0,1 | MΩ [1] |
| $R_g$ | = max. | 0,2 | MΩ [2] |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f = | 150 | 150 | 150 | Mc/s |
| $V_a$ = | 2500 | 2000 | 1500 | V |
| $V_g$ = | -87 | -67 | -45 | V |
| $I_a$ = | 77 | 97 | 120 | mA |
| $V_{gp}$ = | 100 | 100 | 100 | V |
| $W_{ia}$ = | 193 | 194 | 180 | W |
| $W_a$ = | 128 | 130 | 121 | W |
| $W_o$ = | 65 | 64 | 59 | W |
| $\eta$ = | 34 | 33 | 33 | % |
| m = | 100 | 100 | 100 | % |
| $I_g$ = | 20 | 28 | 52 | mA |
| $W_{ig}$ = | 3,6 | 5,1 | 9,4 | W |

[1]) Fixed grid bias
Polarisation de grille fixe
Fester Gittervorspannung

[2]) Automatic grid bias
Polarisation de grille automatique
Automatische Gittervorspannung

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF-Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | |
|---|---|---|---|---|
| f | = | max. | 150 | Mc/s |
| $V_a$ | = | max. | 2400 | V |
| $I_a$ | = | max. | 170 | mA |
| $W_a$ | = | max. | 100 | W |
| $W_{ia}$ | = | max. | 340 | W |
| $-V_g$ | = | max. | 300 | V |
| $I_g$ | = | max. | 45 | mA |
| $R_g$ | = | max. | 0,1 | MΩ[1]) |
| $R_g$ | = | max. | 0,2 | MΩ[2]) |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f = | 150 | 150 | 150 | Mc/s |
| $V_a$ = | 2000 | 1500 | 1000 | V |
| $V_g$ = | -225 | -180 | -130 | V |
| $I_a$ = | 128 | 128 | 128 | mA |
| $I_g$ = | 40 | 40 | 40 | mA |
| $V_{gp}$ = | 415 | 370 | 320 | V |
| $W_{ig}$ = | 15 | 14 | 12 | W |
| $W_{ia}$ = | 256 | 192 | 128 | W |
| $W_a$ = | 51 | 38 | 32 | W |
| $W_o$ = | 205 | 154 | 96 | W |
| $\eta$ = | 80 | 80 | 75 | % |
| m = | 100 | 100 | 100 | % |
| $W_{mod}$ = | 128 | 96 | 64 | W |

[1]) Fixed grid bias
Polarisation de grille fixe
. Fester Gitervorspannung

[2]) Automatic grid bias
Polarisation de grille automatique
Automatische Gittervorspannung

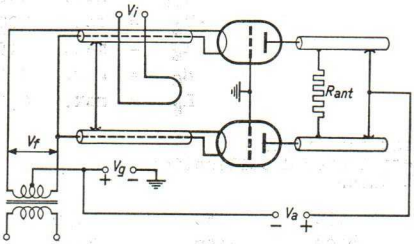
# PHILIPS

H.F. class C telegraphy, grounded grid
H.F. classe C télégraphie, grille mise à la terre
HF-Klasse C Telegraphie, Gitterbasisschaltung

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $f$ | = max. | 150 | Mc/s | $W_{ia}$ | = max. | 512 W |
| $V_a$ | = max. | 3000 | V | $-V_g$ | = max. | 300 V |
| $I_a$ | = max. | 205 | mA | $I_g$ | = max. | 45 mA |
| $W_a$ | = max. | 150 | W | $R_g$ | = max. | 0,1 MΩ[1] |
| | | | | $R_g$ | = max. | 0,2 MΩ[2] |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren




| | | | | | |
|---|---|---|---|---|---|
| $f$ = | 100 | 100 | 100 | 100 | Mc/s |
| $V_a$ = | 2500 | 2000 | 1500 | 1000 | V |
| $V_g$ = | -200 | -150 | -110 | -80 | V |
| $I_a$ = | 410 | 410 | 410 | 410 | mA |
| $I_g$ = | 80 | 80 | 80 | 80 | mA |
| $V_{gp}$ = | 390 | 340 | 300 | 260 | V |
| $W_{ig}$ = | 158 | 136 | 118 | 100 | W |
| $W_{ia}$ = | 1025 | 820 | 615 | 410 | W |
| $W_a$ = | 245 | 230 | 195 | 158 | W |
| $W_o$[3] = | 780+130 | 590+110 | 420+96 | 252+80 | W |
| $\eta$[4] = | 76 | 72 | 68 | 61,5 | % |

[1]) Fixed grid bias
Polarisation de grille fixe
Fester Gittervorspannung

[2]) Automatic grid bias
Polarisation de grille automatique
Automatische Gittervorspannung

[3])[4]) See page 7; voir page 7; siehe Seite 7

H.F. class C oscillator for high-frequency heating and diathermy generators, with anode voltage from single-phase full-wave rectifier without filter.

Oscillatrice H.F. classe C pour chauffage à haute fréquence et pour générateurs H.F. de diathermie, avec tension anodique d'un redresseur monophasé à deux alternances sans filtre.

HF-Klasse C Oszillator für Hochfrequenzheizung und Diathermiegeneratoren, mit Anodenspannung von einem Einphasen-Vollweggleichrichter ohne Filter.

Limiting values
Caractéristiques limites
Grenzdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| f | = | max. | 150 | Mc/s | | | |
| $V_a$ | = | max. | 2700 | V [5] | $-V_g$ | = max. | 300 V |
| $I_a$ | = | max. | 180 | mA | $I_g$ | = max. | 40 mA |
| $W_a$ | = | max. | 150 | W | $R_g$ | = max. | 0,1 MΩ [1] |
| | | | | | $R_g$ | = max. | 0,2 MΩ [2] |
| | | | | | $W_{ia}$ | = max. | 512 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 50 | Mc/s |
| $V_a$ | = | 2000 | V [5] |
| $I_a$ | = | 170 | mA |
| $I_g$ | = | 34 | mA |
| $R_g$ | = | 3750 | Ω |
| $W_{ia}$ | = | 420 | W |
| $W_a$ | = | 120 | W |
| $W_{ig}$ | = | 10 | W |
| $W_o$ | = | 290 | W |
| $\eta$ | = | 69 | % |

[1][2]) See page 6; voir page 6; Siehe Seite 6.

[3]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage préamplificateur

[4]) Pure valve efficiency; rendement net du tube; reiner Röhrenwirkungsgrad

[5]) Mean value; valeur moyenne; Mittelwert

# PHILIPS

H.F. class C oscillator for industrial use with self-rectification. Phase shift of 180° between $V_a$ and $V_g$.
Oscillatrice H.F. classe C pour applications industrielles à autoredressement. Décalage de phase entre $V_a$ et $V_g$ de 180°.
HF-Klasse C Oszillator für industrielle Anwendungen mit Selbstgleichrichtung. Zwischen $V_a$ und $V_g$ eine Fasenverschiebung von 180°.

Limiting values
Caractéristiques limites
Grenzdaten

| f | = | max. | 150 | Mc/s |
|---|---|---|---|---|
| $V_a$ | = | max. | 2825 | $V_{eff}$ |
| $I_a$ | = | max. | 110 | mA |
| $W_a$ | = | max. | 150 | W |
| $W_{ia}$ | = | max. | 340 | W |
| $-V_g$ | = | max. | 300 | V |
| $I_g$ | = | max. | 35 | mA |
| $R_g$ | = | max. | 0,1 | MΩ [1] |
| $R_g$ | = | max. | 0,2 | MΩ [2] |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 50 | Mc/s |
| $V_a$ | = | 2500 | $V_{eff}$ |
| $I_a$ | = | 90 | mA |
| $I_g$ | = | 20 | mA |
| $R_g$ | = | 1700 | Ω |
| $V_g$ | = | 85 | $V_{eff}$ |
| $W_{ia}$ | = | 255 | W |
| $W_a$ | = | 85 | W |
| $W_o$ | = | 170 | W |
| $\eta$ | = | 67 | % |

[1]) Fixed grid bias
Polarisation de grille fixe
Fester Gittervorspannung

[2]) Automatic grid bias
Polarisation de grille automatique
Automatische Gittervorspannung

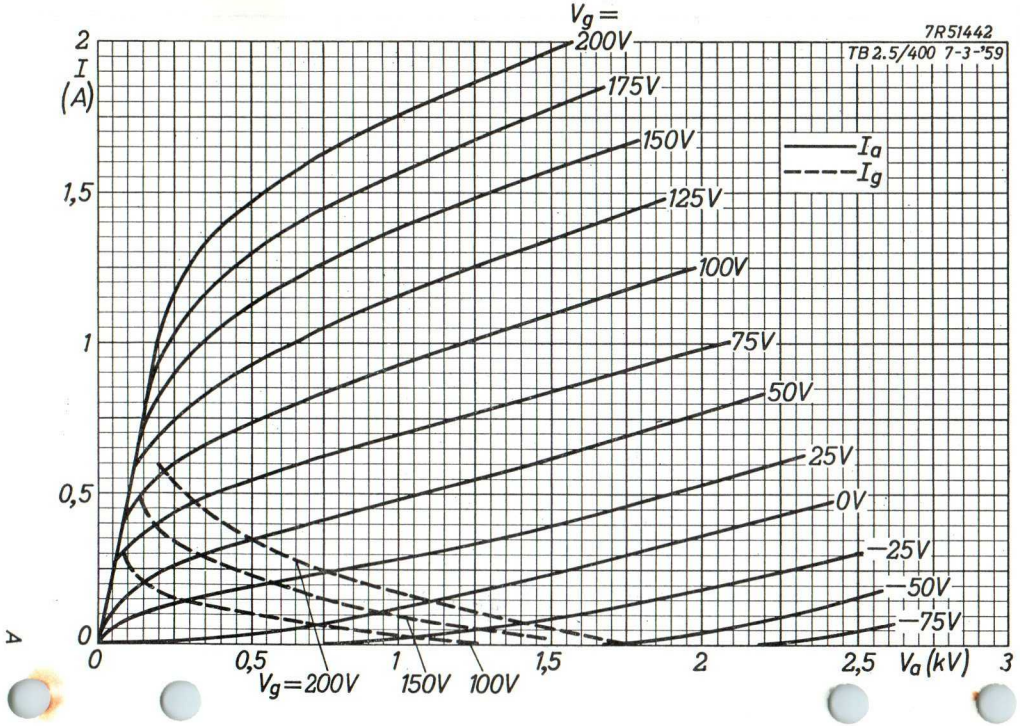
L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF-Verstärker und Modulator Klasse B

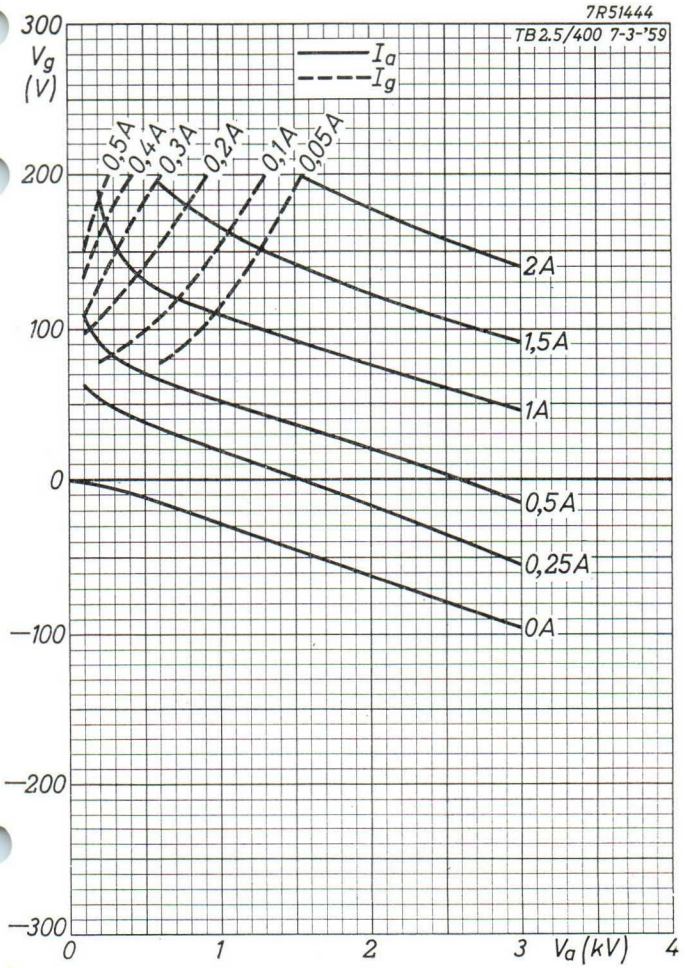
Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 3000 | V |
| $I_a$ | = max. | 210 | mA |
| $W_a$ | = max. | 150 | W |
| $W_{ia}$ | = max. | 512 | W |
| $I_g$ | = max. | 45 | mA |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 2500 | | 1000 | | V |
| $V_g$ | = | -86 | | -23 | | V |
| $R_{aa\sim}$ | = | 18,2 | | 5,0 | | kΩ |
| $V_{ggp}$ | = | 0 | 412 | 0 | 295 | V |
| $I_a$ | = | 2x30 | 2x178 | 2x30 | 2x210 | mA |
| $I_g$ | = | 0 | 2x42 | 0 | 2x40 | mA |
| $W_{ig}$ | = | 0 | 2x7,8 | 0 | 2x5,4 | W |
| $W_{ia}$ | = | 2x75 | 2x445 | 2x30 | 2x210 | W |
| $W_a$ | = | 2x75 | 2x95 | 2x30 | 2x73 | W |
| $W_o$ | = | 0 | 700 | 0 | 274 | W |
| $d_{tot}$ | = | - | 5,0 | - | 2,2 | % |
| $\eta$ | = | - | 78,5 | - | 65 | % |


7R51442
TB 2.5/400 7-3-'59
$V_g =$
200V
175V
150V
125V
100V
75V
50V
25V
0V
−25V
−50V
−75V
$I_a$
$I_g$
I (A)
2
1,5
1
0,5
0
0,5
1
1,5
2
2,5
3
$V_a$ (kV)
$V_g$=200V
150V
100V

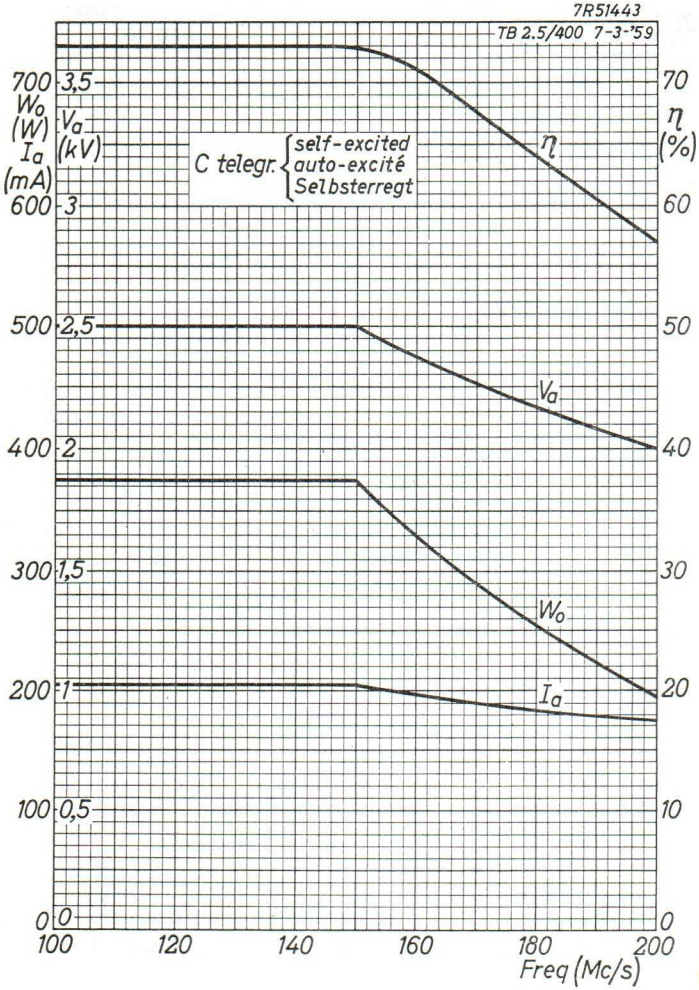

7R51444
TB 2.5/400 7-3-'59
$I_a$
$I_g$
0,5A
0,4A
0,3A
0,2A
0,1A
0,05A
2A
1,5A
1A
0,5A
0,25A
0A
$V_g$ (V)
300
200
100
0
−100
−200
−300
0
1
2
3
$V_a$ (kV)
4

2. 2. 1959

B

**TB 2.5/400**

# PHILIPS



TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour utilisation en amplificatrice H.F. ou B.F.ou oscillatrice
TRIODE zur Verwendung als HF- oder NF-Verstärker oder Oszillator

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5 V
$I_f$ = 6,3 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,3 pF
$C_g$ = 2,9 pF
$C_{ag}$ = 2,0 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ = 38

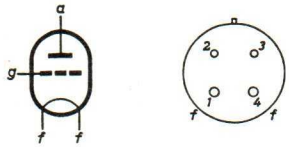
S $\left\{\begin{matrix} V_a = 3000 \text{ V} \\ I_a = 200 \text{ mA} \end{matrix}\right\}$ = 4,5 mA/V

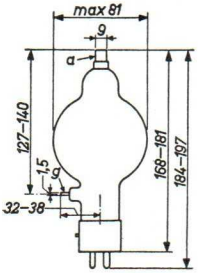
| λ | Freq. | C telegr. | | C an.mod. | | B mod[1]) | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 7,5 | 40 | 3000 | 400 | 2500 | 285 | 2500 | 425 |
| | | 2000 | 235 | 2000 | 235 | 2000 | 360 |
| | | 1500 | 185 | 1500 | 175 | 1500 | 280 |

[1]) Two tubes
Deux tubes
Zwei Röhren

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base : Medium 4-p with bayonet
Culot : Medium 4-p à baïonnette
Sockel: Medium 4-p mit Bajonett

Socket
Support 40218-03
Fassung

Mounting position: vertical with base up or down
Montage : vertical avec le culot en haut ou en bas
Einbau : senkrecht mit Sockel oben oder unten

Net weight
Poids net 115 g
Nettogewicht

H.F. class C telegraphy
H.F. classe C télégraphie
HF- Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 40 | Mc/s |
| $V_a$ | = max. | 3000 | V |
| $I_a$ | = max. | 225 | mA |
| $W_a$ | = max. | 100 | W |
| $W_g$ | = max. | 20 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = | 40 | 40 | 40 | Mc/s |
| $V_a$ | = | 3000 | 2000 | 1500 | V |
| $V_g$ | = | -200 | -80 | -65 | V |
| $I_a$ | = | 167 | 167 | 190 | mA |
| $I_g$ | = | 51 | 39 | 48 | mA |
| $V_{gp}$ | = | 385 | 230 | 230 | V |
| $W_{ig}$ | = | 18 | 8 | 10 | W |
| $W_{ia}$ | = | 500 | 335 | 285 | W |
| $W_a$ | = | 100 | 100 | 100 | W |
| $W_o$ | = | 400 | 235 | 185 | W |
| $\eta$ | = | 80 | 70 | 65 | % |

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF- Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 40 | Mc/s |
| $V_a$ | = max. | 2500 | V |
| $I_a$ | = max. | 180 | mA |
| $W_a$ | = max. | 65 | W |
| $W_g$ | = max. | 20 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = | 40 | 40 | 40 | Mc/s |
| $V_a$ | = | 2500 | 2000 | 1500 | V |
| $V_g$ | = | -250 | -200 | -150 | V |
| $I_a$ | = | 140 | 150 | 160 | mA |
| $I_g$ | = | 40 | 41 | 46 | mA |
| $V_{gp}$ | = | 425 | 375 | 325 | V |
| $W_{ig}$ | = | 15,5 | 14 | 14 | W |
| $W_{ia}$ | = | 350 | 300 | 240 | W |
| $W_a$ | = | 65 | 65 | 65 | W |
| $W_o$ | = | 285 | 235 | 175 | W |
| $\eta$ | = | 81,5 | 78 | 73 | % |
| m | = | 100 | 100 | 100 | % |
| $W_{mod}$ | = | 175 | 150 | 120 | W |

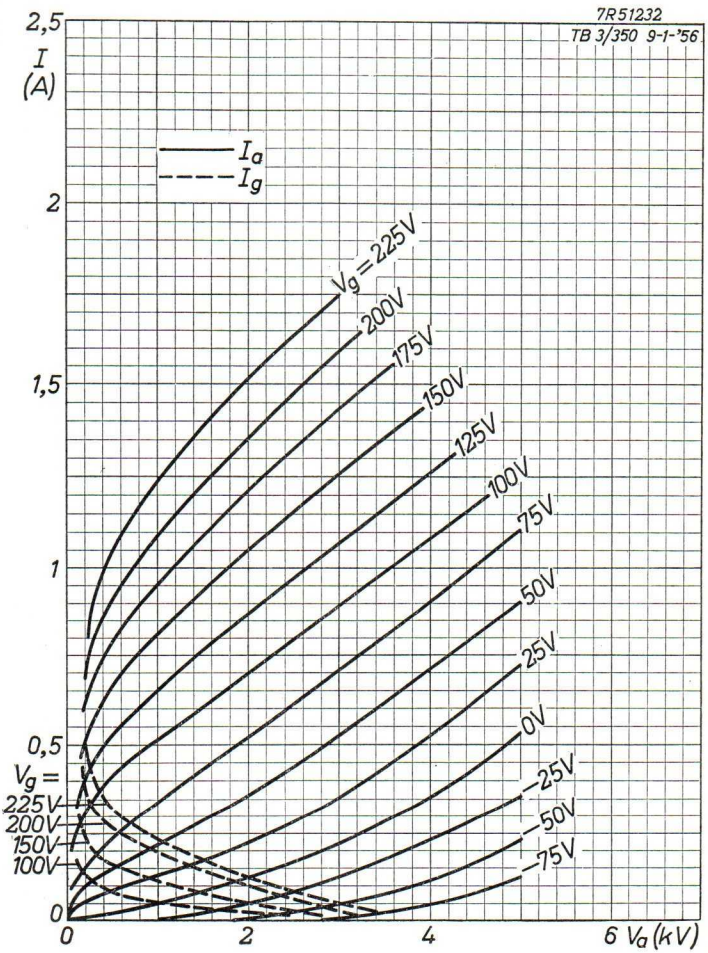
L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF- Klasse B Verstärker und Modulator

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 3000 | V |
| $I_a$ | = max. | 225 | mA |
| $W_a$ | = max. | 100 | W |
| $W_g$ | = max. | 20 | W |

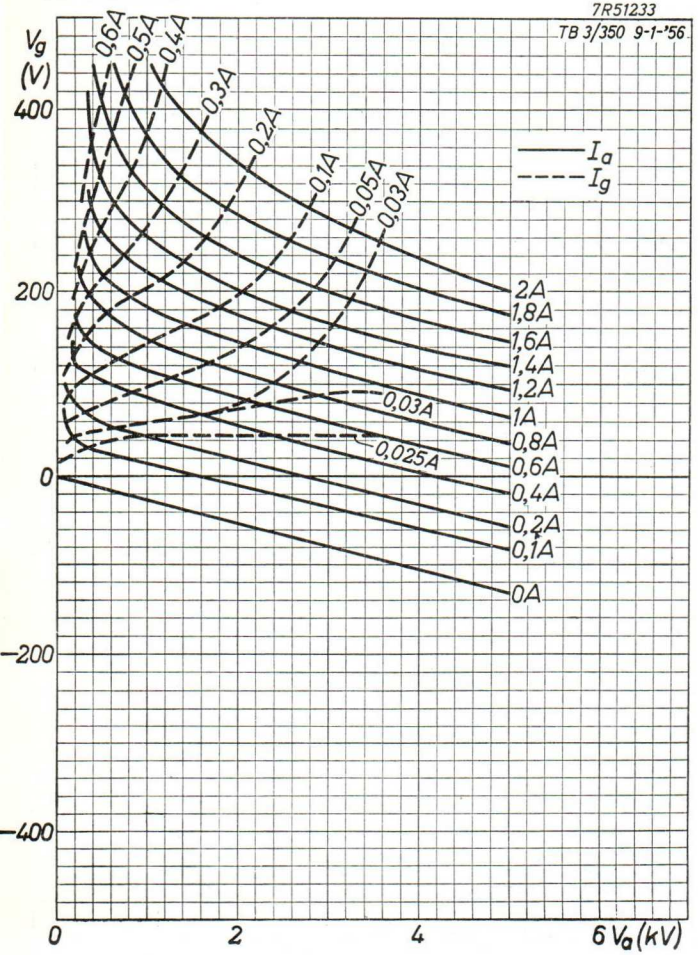
Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | 2500 | | 2000 | | 1500 | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 2500 | | 2000 | | 1500 | | V |
| $V_g$ | = | -50 | | -35 | | -20 | | V |
| $R_{aa\sim}$ | = | 22 | | 15 | | 8,8 | | kΩ |
| $V_{gg_p}$ | = | 0 | 310 | 0 | 300 | 0 | 290 | V |
| $I_a$ | = | 2x24 | 2x125 | 2x30 | 2x140 | 2x40 | 2x160 | mA |
| $I_g$ | = | 0 | 2x25 | 0 | 2x33 | 0 | 2x38 | mA |
| $I_{g_p}$ | = | 0 | 2x90 | 0 | 2x110 | 0 | 2x160 | mA |
| $W_{1g}$ | = | 0 | 2x3,5 | 0 | 2x4,5 | 0 | 2x5 | W |
| $W_{1a}$ | = | 2x60 | 2x312 | 2x60 | 2x280 | 2x60 | 2x240 | W |
| $W_a$ | = | 2x60 | 2x100 | 2x60 | 2x100 | 2x60 | 2x100 | W |
| $W_o$ | = | 0 | 425 | 0 | 360 | 0 | 280 | W |
| $\eta$ | = | - | 68 | - | 64 | - | 58,5 | % |


7R51232
TB 3/350 9-1-'56
2,5
I
(A)
2
1,5
1
0,5
0
$I_a$
$I_g$
$V_g$ = 225V
200V
175V
150V
125V
100V
75V
50V
25V
0V
25V
50V
75V
$V_g$ =
225V
200V
150V
100V
0
2
4
6 $V_a$ (kV)

TB 3/350

# PHILIPS



TRIODE for use as H.F. and L.F. amplifier and oscillator suitable for grounded grid circuits
TRIODE pour utilisation en amplificatrice H F. et B.F. et oscillatrice, propre aux circuits "grounded-grid"
TRIODE zur Verwendung als HF- und NF-Verstärker und Oszillator, geeignet für Gitterbasisschaltungen

Cooling : radiation/low velocity air flow
Refroidissement: radiation/léger courant d'air
Kühlung : Strahlung/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

| | | | |
|---|---|---|---|
| Heating : direct<br>Chauffage: direct<br>Heizung : direkt | $V_f$ | = | 5 V |
| | $I_f$ | = | 14,1 A |
| Capacitances<br>Capacités<br>Kapazitäten | $C_a$ | = | 0,16 pF |
| | $C_g$ | = | 6,3 pF |
| | $C_{ag}$ | = | 5,0 pF |
| Typical characteristics<br>Caractéristiques types<br>Kenndaten | $\mu$ ($V_a$ = 3000 V, $I_a$ = 90 mA) | = | 25 |
| | S ($V_a$ = 3000 V, $I_a$ = 90 mA) | = | 5 mA/V |

| Freq | C telegr | | C an:mod. | | C grounded grid | | B teleph | |
|---|---|---|---|---|---|---|---|---|
| Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ [1] (W) | $V_a$ (V) | $W_o$ (W) |
| 100 | 3000 | 840 | 2500 | 482 | 3000 | 968 | 3000 | 140 |
| | 2500 | 750 | 2000 | 375 | 2500 | 874 | 2500 | 133 |
| | 2000 | 585 | | | 2000 | 687 | 2000 | 126 |
| | 1500 | 425 | | | 1500 | 520 | | |

| | C osc | | C osc indust | | | B mod [2] | |
|---|---|---|---|---|---|---|---|
| | $V_a$ (V) | $W_o$ (W) | $V_a$ ⩘ ($V_{eff}$) | $V_a$ ⩛ ($V_{eff}$) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 100 | 3000 | 813 | | | | 3000 | 1280 |
| 150 | 2000 | 425 | | | | 2500 | 1290 |
| 41 | | | 2500 | | 665 | 2000 | 1170 |
| 41 | | | | 3000 | 415 | 1500 | 860 |

[1]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pré-amplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[2]) Two tubes ; deux tubes; zwei Röhren

Temperatures and cooling
Températures et refroidissement
Temperaturen und Kühlung

Temperature of anode seal
Temp. de la sortie de l'anode = max. 220 °C
Temp. der Anodendurchführung

Temperature of pins
Température des broches = max. 180 °C
Stiftentemperatur

In cases where the maximum permissible temperatures are likely to be exceeded, as would normally be the case at frequencies above 30 Mc/s with full ratings, a low velocity air flow has to be directed onto the anode seal and the bottom of the envelope

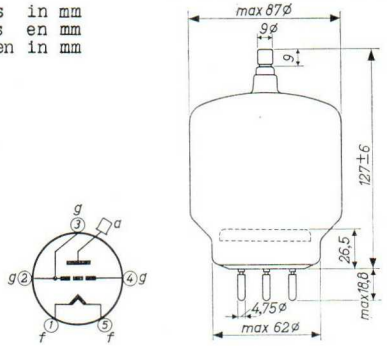
Il existe des cas, où les températures maxima admissibles sont susceptibles d'être dépassées, comme dans le cas où le tube est utilisé à ses données maxima admissibles au-dessus de 30 Mc/s. Il faut alors diriger un léger courant d'air sur le scellement de la sortie d'anode et sur la partie inférieure du tube

In den Fällen, wo die Temperatur der Anodendurchführung und des Presstellers den höchstzulässigen Wert wahrscheinlich überschreiten wird, ist ein schwacher auf diese Röhrenteile gerichteter Luftstrom notwendig. Dies wird im allgemeinen der Fall sein,wenn die Röhre bei den maximalen Betriebsdaten bei höheren Frequenzen als 30 MHz betrieben wird

Net weight
Poids net 190 g
Nettogewicht

Shipping weight
Poids brut 915 g
Bruttogewicht

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| | | | |
|---|---|---|---|
| Base<br>Culot<br>Sockel | Giant 5p | Socket<br>Support<br>Fassung | 40211/01 |
| Top cap<br>Capot supérieur<br>Kolbenanschluss | Small | Cap<br>Capot<br>Haube | 40624 |

Mounting position: vertical with base up or down
Montage : vertical avec le pied en haut ou en bas
Einbau : senkrecht mit dem Sockel oben oder unten

In order to prevent overheating of the grid pins by high-frequency current it is recommended to include the three grid socket connections in the circuit
Il est recommandé d'incorporer toutes les bornes de raccordement de la grille dans le circuit pour éviter le surchauffage des broches de la grille par le courant haute fréquence
Es empfiehlt sich, zur Vermeidung einer Überhitzung der Gitterstifte vom Hochfrequenzstrom, alle drei Stifte des Gitters an der Schaltung zu beteiligen

# PHILIPS

H.F. class C telegraphy or F.M. telephony
H.F. classe C télégraphie ou F.M. téléphonie
HF-Klasse C Telegraphie oder FM-Telephonie

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | = | | 100 | 150 | | Mc/s |
|---|---|---|---|---|---|---|
| Va | = | max. | 3000 | 2000 | | V |
| Wia | = | max. | 1100 | 750 | | W |
| Wa | = | max. | 250 | 250 | | W |
| Ia | = | max. | 400 | 400 | | mA |
| -Vg | = | max. | 500 | 500 | | V |
| Ig | = | max. | 95 | 95 | | mA |
| Rg | = | max. | 0,1 | 0,1 | | MΩ |

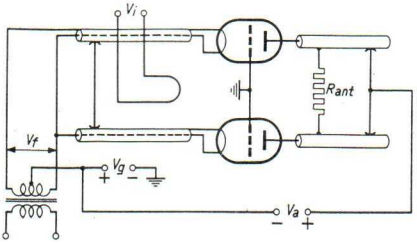
Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f | = | 100 | 100 | 100 | 100 | Mc/s |
|---|---|---|---|---|---|---|
| Va | = | 3000 | 2500 | 2000 | 1500 | V |
| Vg | = | -250 | -200 | -150 | -120 | V |
| Ia | = | 363 | 400 | 400 | 400 | mA |
| Ig | = | 69 | 69 | 80 | 80 | mA |
| Vgp | = | 430 | 380 | 320 | 295 | V |
| Wig | = | 27 | 23,5 | 23 | 21,5 | W |
| Wia | = | 1090 | 1000 | 800 | 600 | W |
| Wa | = | 250 | 250 | 215 | 175 | W |
| Wo | = | 840 | 750 | 585 | 425 | W |
| $\eta$ | = | 77 | 75 | 73 | 71 | % |

H.F. class C telegraphy of F.M. telephony, grounded grid
H.F. classe C télégraphie ou F.M. téléphonie, grille mise à la terre
HF-Klasse C Telegraphie oder FM-Telephonie, Gitterbasisschaltung

For limiting values see page 4
Pour les caractéristiques limites voir page 4
Für die Grenzdaten siehe Seite 4

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)




| | | | | | | |
|---|---|---|---|---|---|---|
| f | = | 100 | 100 | 100 | 100 | Mc/s |
| Va | = | 3000 | 2500 | 2000 | 1500 | V |
| Vg | = | -250 | -200 | -150 | -120 | V |
| Ia | = | 726 | 800 | 800 | 800 | mA |
| Ig | = | 138 | 138 | 160 | 160 | mA |
| Vgp | = | 430 | 380 | 320 | 295 | V |
| Wig | = | 310 | 294 | 250 | 233 | W |
| Wia | = | 2180 | 2000 | 1600 | 1200 | W |
| Wa | = | 500 | 500 | 430 | 350 | W |
| Wo[1]) | = | 1680+256 | 1500+247 | 1170+204 | 850+190 | W |
| $\eta$ | = | 77 | 75 | 73 | 71 | % |

[1]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pré-amplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

# PHILIPS

H.F. class C oscillator
H.F. classe C oscillateur
HF-Klasse C Oszillator

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | = | | 100 | 150 | Mc/s |
|---|---|---|---|---|---|
| $V_a$ | = | max. | 3000 | 2000 | V |
| $W_{ia}$ | = | max. | 1100 | 750 | W |
| $W_a$ | = | max. | 250 | 250 | W |
| $I_a$ | = | max. | 400 | 400 | mA |
| $-V_g$ | = | max. | 500 | 500 | V |
| $I_g$ | = | max. | 95 | 95 | mA |
| $R_g$ | = | max. | 0,1 | 0,1 | MΩ |

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

| f | = | 100 | 150 | Mc/s |
|---|---|---|---|---|
| $V_a$ | = | 3000 | 2000 | V |
| $I_a$ | = | 726 | 700 | mA |
| $I_g$ | = | 138 | 160 | mA |
| $R_g$ | = | 1800 | 1000 | Ω |
| $W_{ia}$ | = | 2180 | 1400 | W |
| $W_a$ | = | 500 | 500 | W |
| $W_{ig}$ | = | 54 | 50 | W |
| $W_o$ | = | 1626 | 850 | W |
| $\eta$ | = | 75 | 61 | % |

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF-Klasse C Anodenmodulation

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | = | | 100 | 150 | Mc/s |
|---|---|---|---|---|---|
| Va | = | max. | 2500 | 1600 | V |
| Wia | = | max. | 740 | 500 | W |
| Wa | = | max. | 170 | 170 | W |
| Ia | = | max. | 330 | 330 | mA |
| -Vg | = | max. | 500 | 500 | V |
| Ig | = | max. | 95 | 95 | mA |
| Rg | = | max. | 0,1 | 0,1 | MΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f | = | 100 | 100 | Mc/s |
|---|---|---|---|---|
| Va | = | 2500 | 2000 | V |
| Vg | = | -300 | -225 | V |
| Ia | = | 250 | 250 | mA |
| Ig | = | 70 | 70 | mA |
| Vgp | = | 440 | 370 | V |
| Wig | = | 28 | 23,5 | W |
| Wia | = | 625 | 500 | W |
| Wa | = | 143 | 125 | W |
| Wo | = | 482 | 375 | W |
| $\eta$ | = | 77 | 75 | % |
| m | = | 100 | 100 | % |
| Wmod | = | 312 | 250 | W |

# PHILIPS

H.F. class B telephony
H.F. classe B téléphonie
HF-Klasse B Telephonie

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | = | | 100 | 150 | Mc/s |
|---|---|---|---|---|---|
| Va | = | max. | 3000 | 2000 | V |
| Wia | = | max. | 400 | 400 | W |
| Wa | = | max. | 250 | 250 | W |
| Ia | = | max. | 330 | 330 | mA |
| -Vg | = | max. | 500 | 500 | V |
| Ig | = | max. | 95 | 95 | mA |
| Rg | = | max. | 0,1 | 0,1 | MΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f | = | 100 | 100 | 100 | Mc/s |
|---|---|---|---|---|---|
| Va | = | 3000 | 2500 | 2000 | V |
| Vg | = | -110 | -90 | -70 | V |
| Ia | = | 130 | 153 | 188 | mA |
| Vgp | = | 91 | 89 | 86 | V |
| Wia | = | 390 | 383 | 376 | W |
| Wa | = | 250 | 250 | 250 | W |
| Wo | = | 140 | 133 | 126 | W |
| $\eta$ | = | 36 | 35 | 33,5 | % |
| m | = | 100 | 100 | 100 | % |
| Ig | = | 62 | 70 | 85 | mA |
| Wig | = | 10,2 | 11,3 | 13,2 | W |

H.F. class C oscillator for industrial use with anode voltage from single-phase full-wave rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur monophasé à deux alternances sans filtre
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Einphasen-Vollweggleichrichter ohne Filter

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | = | | 100 | 150 | Mc/s |
|---|---|---|---|---|---|
| Va | = | max. | 2700 | 1800 | V |
| Wia | = | max. | 975 | 650 | W |
| Wa | = | max. | 250 | 250 | W |
| Ia | = | max. | 360 | 360 | mA |
| -Vg | = | max. | 500 | 500 | V |
| Ig | = | max. | 85 | 85 | mA |
| Rg | = | max. | 0,1 | 0,1 | MΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 41 | Mc/s |
| Va | = | 2500 | Veff |
| Ia | = | 340 | mA |
| Ig | = | 60 | mA |
| Rg | = | 3330 | Ω |
| Wia | = | 935 | W |
| Wa | = | 250 | W |
| Wig | = | 20 | W |
| Wo | = | 665 | W |
| $\eta$ | = | 71 | % |

# PHILIPS

H.F. class C oscillator for industrial use with self rectification. Phase shift between Va and Vg 180°
Oscillatrice H.F. classe C pour des applications industrielles à auto-redressement. Déphasage de 180° entre Va et Vg
HF-Klasse C Oszillator für industrielle Anwendungen mit Selbstgleichrichtung. Phasenverschiebung zwischen Va und Vg 180°

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | = | | 100 | 150 | Mc/s |
|---|---|---|---|---|---|
| $V_{tr}$ | = | max. | 3400 | 2250 | Veff |
| $W_{ia}$ | = | max. | 730 | 500 | W |
| $W_a$ | = | max. | 250 | 250 | W |
| $I_a$ | = | max. | 210 | 210 | mA |
| $-V_{g1}$ | = | max. | 500 | 500 | V |
| $I_g$ | = | max. | 50 | 50 | mA |
| $R_g$ | = | max. | 0,1 | 0,1 | MΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 41 | Mc/s |
| $V_{tr}$ | = | 3000 | Veff |
| $I_a$ | = | 180 | mA |
| $I_g$ | = | 32 | mA |
| $R_g$ | = | 3000 | Ω |
| $V_g$ | = | 110 | Veff |
| $W_{ia}$ | = | 600 | W |
| $W_a$ | = | 185 | W |
| $W_o$ | = | 415 | W |
| $\eta$ | = | 69 | % |

A.F. class B amplifier and modulator
Amplificatrice B.F. classe B ou modulatrice
NF-Klasse B-Verstärker oder Modulator

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| | | | | |
|---|---|---|---|---|
| $V_a$ | = | max. | 3000 | V |
| $W_{ia}$ | = | max. | 1100 | W |
| $W_a$ | = | max. | 250 | W |
| $I_a$ | = | max. | 400 | mA |
| $-V_g$ | = | max. | 500 | V |
| $I_g$ | = | max. | 95 | mA |
| $R_g$ | = | max. | 0,1 | MΩ |

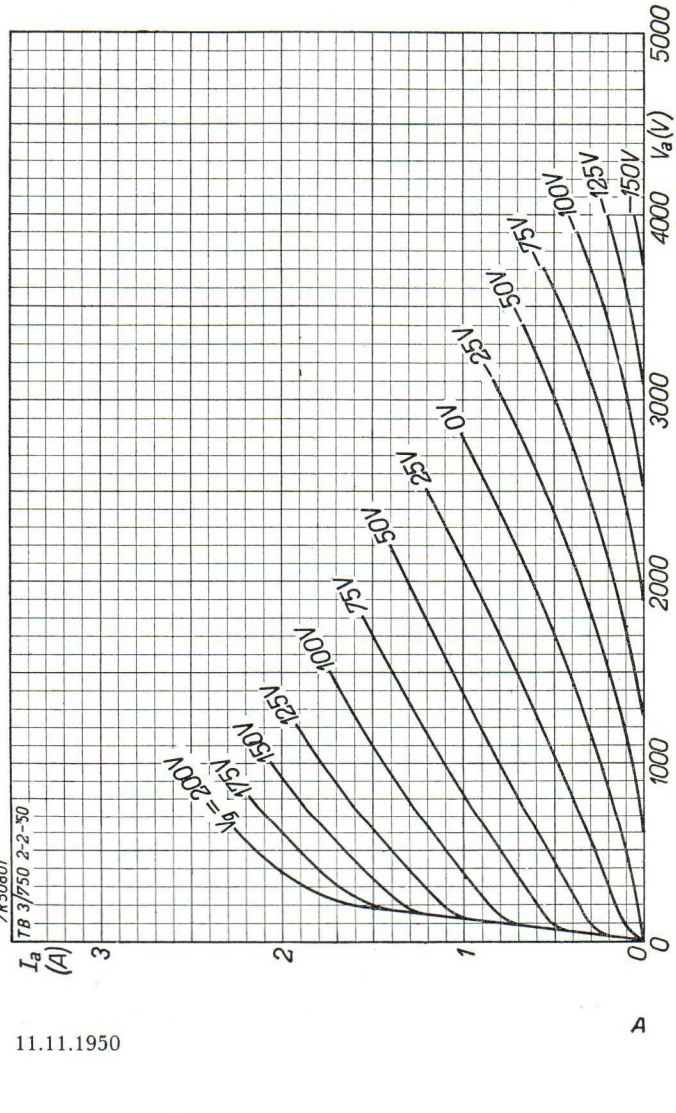
Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 3000 | | 2500 | | V |
| $V_g$ | = | -110 | | -90 | | V |
| $R_{aa\sim}$ | = | 14,2 | | 9,65 | | kΩ |
| $V_{ggp}$ | = | 0 | 465 | 0 | 460 | V |
| $I_a$ | = | 2x50 | 2x285 | 2x50 | 2x345 | mA |
| $I_g$ | = | 0 | 2x75 | 0 | 2x90 | mA |
| $W_{ig}$ | = | 0 | 2x16 | 0 | 2x19 | W |
| $W_{ia}$ | = | 2x150 | 2x855 | 2x125 | 2x860 | W |
| $W_a$ | = | 2x150 | 2x125 | 2x125 | 2x215 | W |
| $W_o$ | = | 0 | 1280 | 0 | 1290 | W |
| $d_{tot}$ | = | - | 5,0 | - | 5,0 | % |
| $\eta$ | = | - | 75 | - | 75 | % |

A.F. class B amplifier and modulator (continued)
Amplificatrice B.F. classe B ou modulatrice (suite)
NF-Klasse B-Verstärker oder Modulator (Fortsetzung)

Operating conditions (two tubes)
Caractéristiques d'utilisation (deux tubes)
Betriebsdaten (zwei Röhren)

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 2000 | | 1500 | | V |
| $V_g$ | = | -68,5 | | -47,5 | | V |
| $R_{aa\sim}$ | = | 6,45 | | 4,65 | | kΩ |
| $V_{ggp}$ | = | 0 | 425 | 0 | 375 | V |
| $I_a$ | = | 2x50 | 2x390 | 2x50 | 2x390 | mA |
| $I_g$ | = | 0 | 2x90 | 0 | 2x90 | mA |
| $W_{ig}$ | = | 0 | 2x17 | 0 | 2x15 | W |
| $W_{ia}$ | = | 2x100 | 2x780 | 2x75 | 2x585 | W |
| $W_a$ | = | 2x100 | 2x195 | 2x75 | 2x155 | W |
| $W_o$ | = | 0 | 1170 | 0 | 860 | W |
| $d_{tot}$ | = | - | 3,2 | - | 3,0 | % |
| $\eta$ | = | - | 75 | - | 73,5 | % |

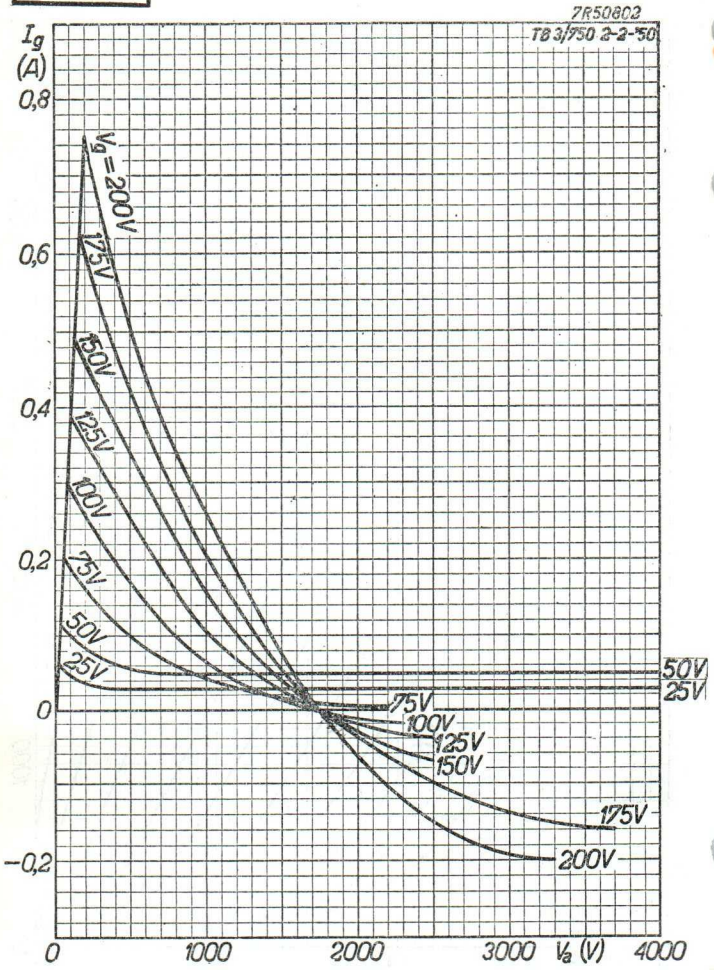

7R50801
TB 3/750 2-2-50
$I_a$ (A)
3
2
1
0
0
1000
2000
3000
4000
5000
$V_a$(V)
$V_g$ = 200V
175V
150V
125V
100V
75V
50V
25V
0V
-25V
-50V
-75V
-100V
-125V
-150V

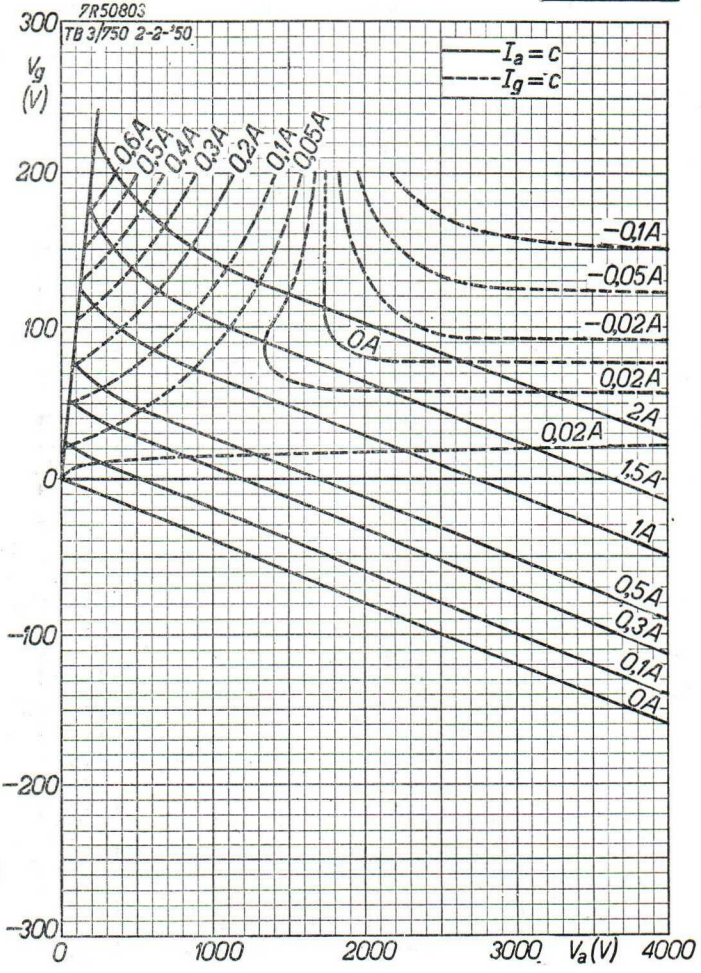
11.11.1950

A

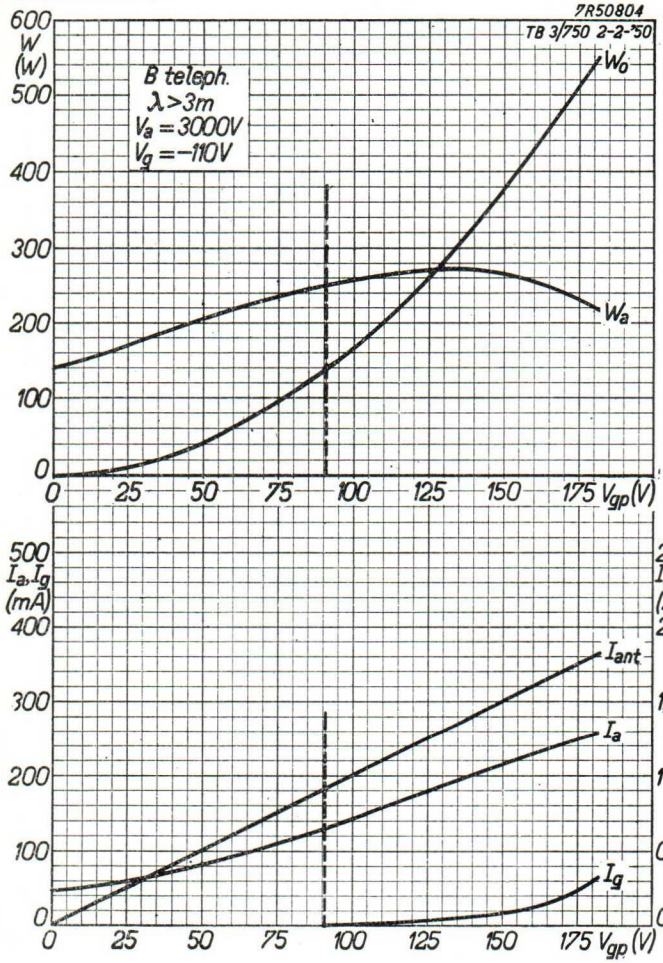
TB 3/750

# PHILIPS



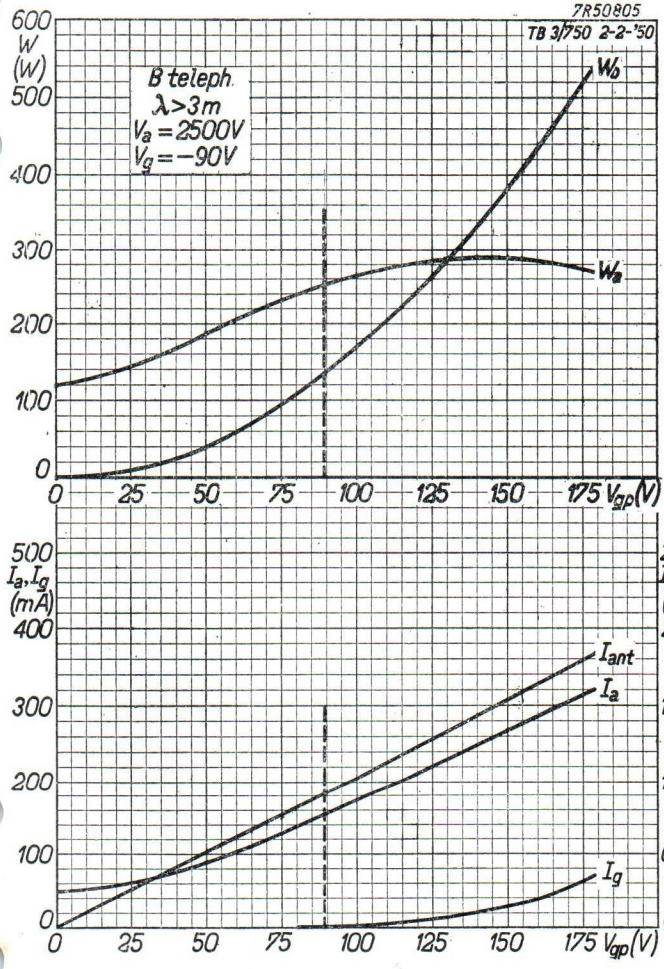

7R50803
TB 3/750 2-2-3-50
$I_a = c$
$I_g = c$
$V_g$ (V)
300
200
100
0
−100
−200
−300
0,6A
0,5A
0,4A
0,3A
0,2A
0,1A
0,05A
0A
−0,1A
−0,05A
−0,02A
0,02A
0,02A
2A
1,5A
1A
0,5A
0,3A
0,1A
0A
0
1000
2000
3000
$V_a$(V)
4000

# PHILIPS


7R50804
TB 3/750 2-2-'50
B teleph.
λ>3m
Va = 3000V
Vg = −110V
W (W)
Wo
Wa
Ia, Ig (mA)
Iant (A)
Iant
Ia
Ig
Vgp (V)
0
25
50
75
100
125
150
175
200
300
400
500
600
100
0,5
1
1,5
2
2,5

# PHILIPS

**TB 3/750**

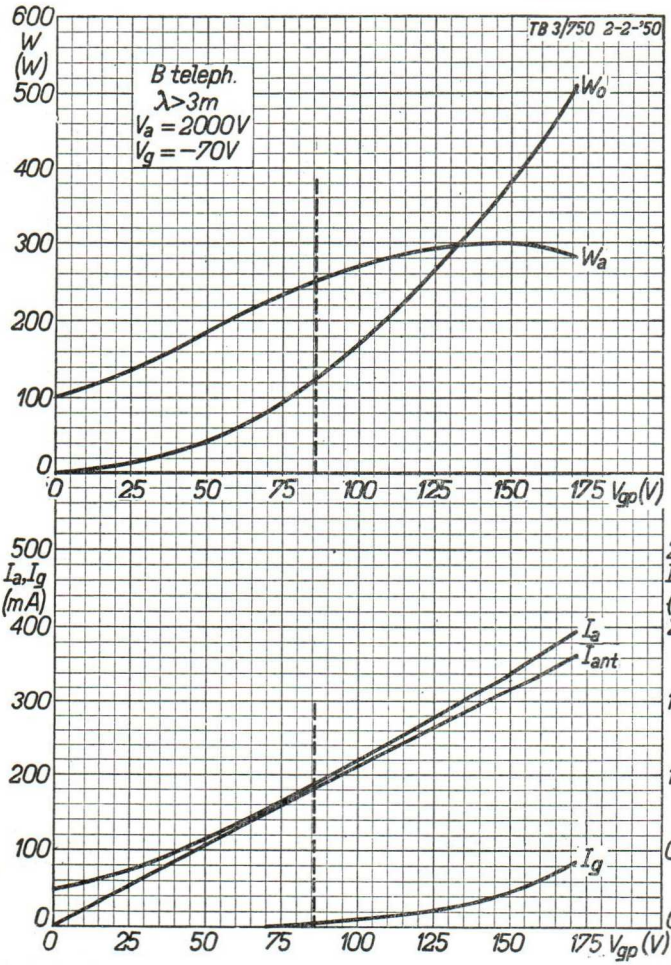



11.11.1950

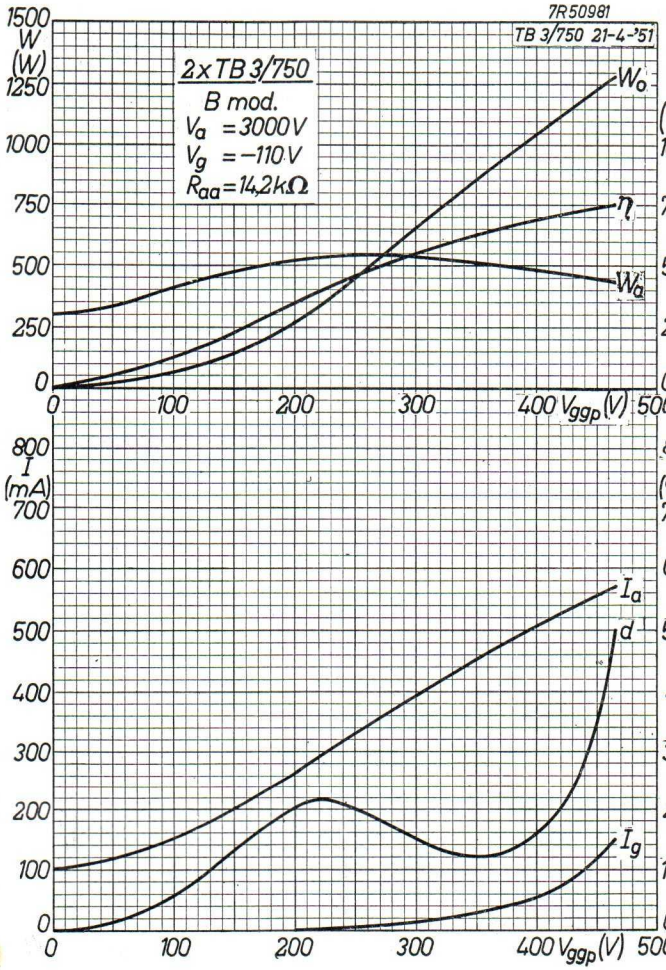
E

# PHILIPS

7R 50806



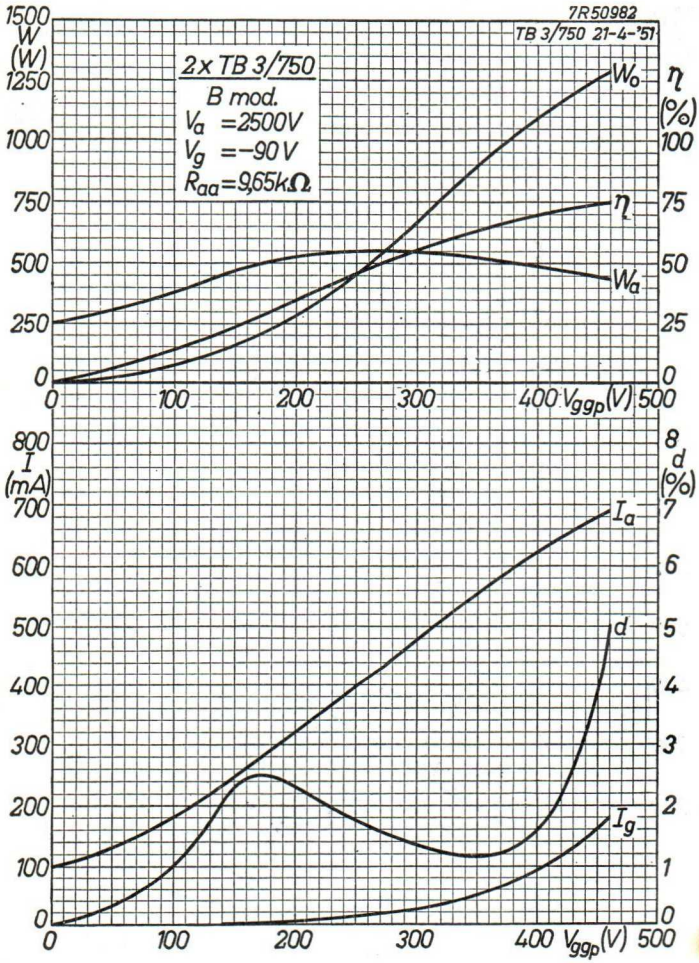

F


7R50981
TB 3/750 21-4-'51
2x TB 3/750
B mod.
$V_a$ = 3000 V
$V_g$ = −110 V
$R_{aa}$ = 14,2 kΩ
W (W)
η (%)
$W_o$
η
$W_a$
$V_{ggp}$ (V)
I (mA)
d (%)
$I_a$
d
$I_g$

5.5.1951

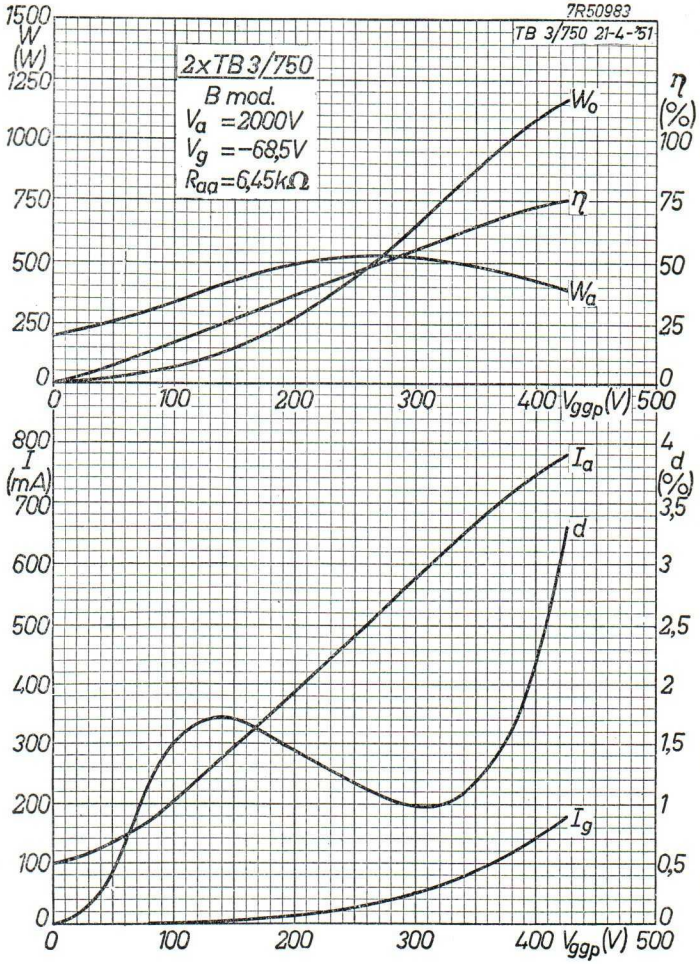
G

# PHILIPS


7R50982
TB 3/750 21-4-'51
2 x TB 3/750
B mod.
$V_a$ = 2500 V
$V_g$ = −90 V
$R_{aa}$ = 9,65 kΩ
W (W)
η (%)
$W_o$
η
$W_a$
$I_a$
d
$I_g$
I (mA)
d (%)
$V_{ggp}$ (V)

# PHILIPS

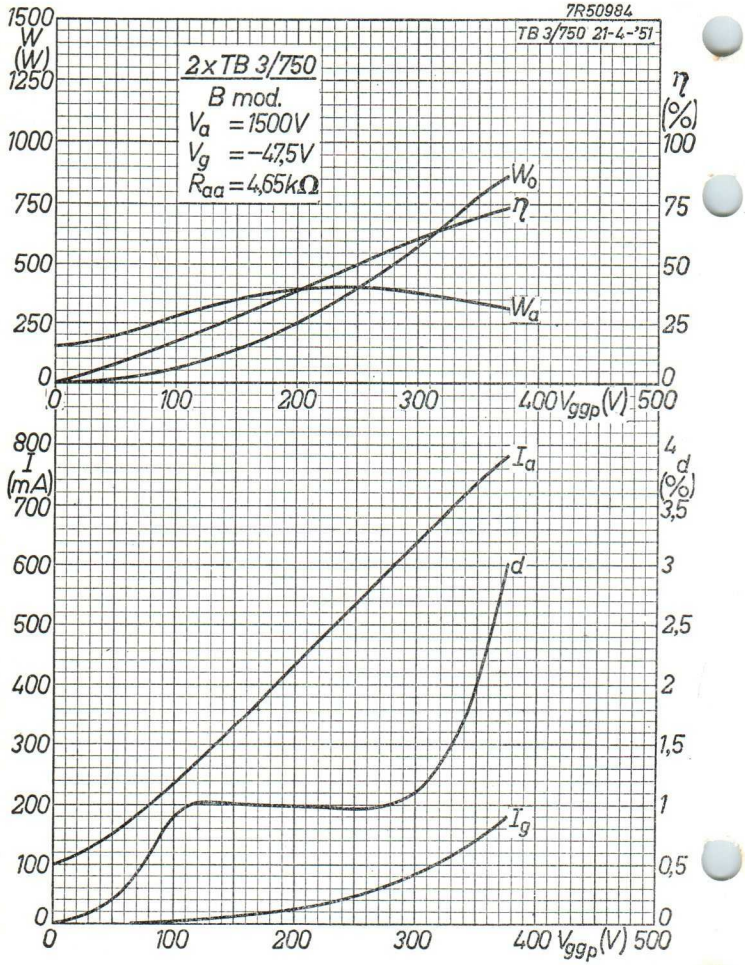
**TB 3/750**




5.5.1951

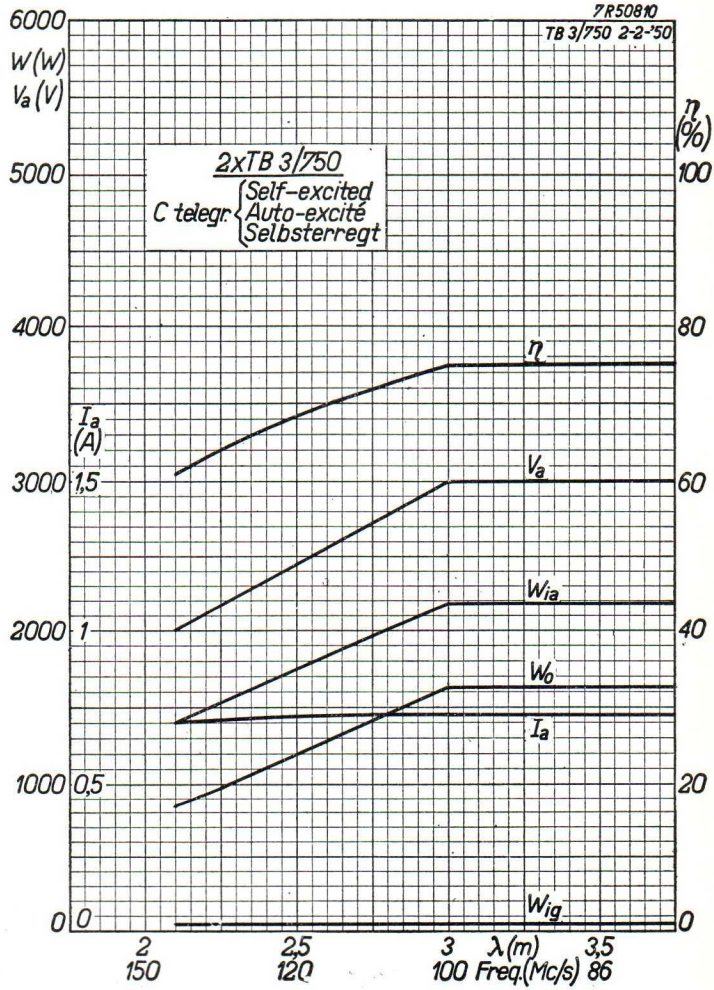
TB 3/750

# PHILIPS



# PHILIPS

**TB 3/750**




5.5.1951

K

# PHILIPS

**TB 3/1000**

TRIODE for use as H.F. and L.F. amplifier and oscillator
TRIODE pour utilisation comme amplificatrice H.F. et B.F. et oscillatrice
TRIODE zur Verwendung als H.F. und N.F. Verstärker und Oszillator

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 12 V
If = 8,5 A

Capacitances
Capacités
Kapazitäten

Ca = 7 pF
Cg = 15 pF
Cag = 8 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

$\mu$ = 31
S (Ia=150 mA) = 8 mA/V

| $\lambda$ | Freq. | C telegr. | | B teleph. | | Can.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) | Va (V) | Wo (W) |
| >15 | <20 | 3000 | 1200 | 3000 | 200 | 2500 | 720 | 3000 | 1750 |
| 5 | 60 | 2600 | 975 | | | 2100 | 568 | 2500<br>2000 | 1400<br>1000 |

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 3000 V
Wa ($\lambda$ >15 m) = max. 500 W
Wa ($\lambda$ <15 m) = max. 450 W
Wg = max. 40 W
Rg = max. 10 kΩ
Ik = max. 700 mA
Ikp = max. 2800 mA

---

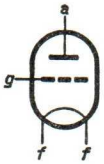
[1]) Two valves; deux tubes; zwei Röhren

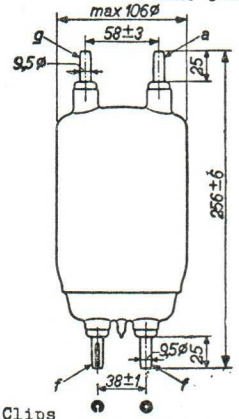
# PHILIPS

Temperature of pin seals
Température des scellements des broches = max. 220 °C
Temperatur der Stifteneinschmelzungen

Bulb temperature
Température de l'ampoule = max. 300 °C
Kolbentemperatur

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support 40204
Fassung

Clips
Bornes de connexion 40626
Anschlussklemmen

Key
Clé 40608
Schlüssel

Mounting position: vertical with base up[1]) or down
Montage : vertical avec pied en haut[1])ou en bas
Einbau : senkrecht mit Fuss oben[1]) oder unten

Net weight
Poids net 0,5 kg
Nettogewicht

Shipping weight
Poids brut 1,5 kg
Bruttogewicht

[1]) In that case the tube should be supported
Dans ce cas le tube doit être supporté
In diesem Fall ist die Röhre zu stützen

TRIODE for use as H.F. and L.F. amplifier and oscillator
TRIODE pour utilisation comme amplificatrice H.F. et B.F. et oscillatrice
TRIODE zur Verwendung als H.F. und N.F. Verstärker und Oszillator

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

Vf = 12 V
If = 17 A

Capacitances
Capacités
Kapazitäten

Ca = 10,5 pF
Cg = 26 pF
Cag = 13 pF

Typical characteristics
Caractéristiques typiques
Kenndaten

$\mu$ = 34
S (Ia=300 mA) = 18 mA/V

| $\sqrt{\lambda}$ | Freq. | C telegr. | | B teleph. | | Can.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) |
| >150 | < 2 | 3,5 | 2,9 | 3,5 | 0,6 | 3 | 1,63 | 3 | 3,3 |
| > 15 | <20 | 3 | 2,6 | 3 | 0,52 | 2,5 | 1,3 | 2,5 | 2,5 |

Limiting values
Caractéristiques limites
Grenzdaten

Va = max. 3,5 kV
Wa = max. 1,1 kW
Wg = max. 60 W
Rg = max. 5 kΩ
Ik = max. 1,4 A
Ikp = max. 5,6 A

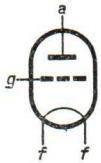
[1]) Two valves; deux tubes; zwei Röhren

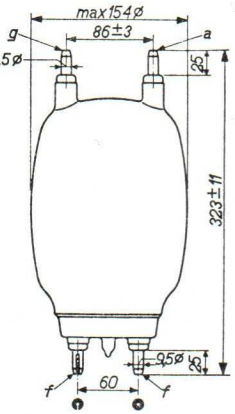
# PHILIPS

Temperature of pin seals
Température des scellements des broches = max. 220 °C
Temperatur der Stifteneinschmelzungen

Bulb temperature
Température de l'ampoule = max. 300 °C
Kolbentemperatur

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support 40205
Fassung

Clips
Bornes de connexion 40626
Anschlussklemmen

Key
Clé 40608
Schlüssel

Mounting position: arbitrary with plane of anode vertical[1])
Montage : arbitrairement avec plan de l'anode vertical[1])
Einbau : willkürlich mit der Anodenfläche senkrecht[1])

Net weight
Poids net 0,9 kg
Nettogewicht

Shipping weight
Poids brut 4,4 kg
Bruttogewicht

[1]) The tube should be supported if it is mounted with base up
Le tube doit être supporté pour le cas où il est monté avec le pied en haut
Die Röhre ist zu stützen wenn sie mit dem Fuss nach oben aufgestellt ist.

Operating conditions H.F. class C telegraphy
Caractéristiques d'utilisation H.F. classe C télégraphie
Betriebsdaten H.F. Klasse C Telegraphie

| | | | |
|---|---|---|---|
| $\lambda$ = | >150 | >15 | m |
| Va = | 3500 | 3000 | V |
| Vg = | -200 | -200 | V |
| Ia = | 1140 | 1230 | mA |
| Ig = | 100 | 120 | mA |
| Vgp = | 400 | 450 | V |
| Wig = | 40 | 54 | W |
| Wia = | 4000 | 3700 | W |
| Wa = | 1100 | 1100 | W |
| Wo = | 2900 | 2600 | W |
| $\eta$ = | 72,5 | 70 | % |

Operating conditions H.F. class B telephony
Caractéristiques d'utilisation H.F. classe B téléphonie
Betriebsdaten H.F. Klasse B Telephonie

| | | | |
|---|---|---|---|
| $\lambda$ = | >150 | >15 | m |
| Va = | 3500 | 3000 | V |
| Vg = | -95 | -70 | V |
| Ia = | 485 | 540 | mA |
| Vgp = | 125 | 110 | V |
| Wia = | 1700 | 1620 | W |
| Wa = | 1100 | 1100 | W |
| Wo = | 600 | 520 | W |
| $\eta$ = | 35 | 32 | % |
| m = | 100 | 100 | % |
| Ig = | 100 | 160 | mA |
| Wig = | 25 | 35 | W |

# PHILIPS

Operating conditions H.F. class C anode modulation
Caractéristiques d'utilisation H.F. classe C modulation d'anode
Betriebsdaten H.F. Klasse C Anodenmodulation

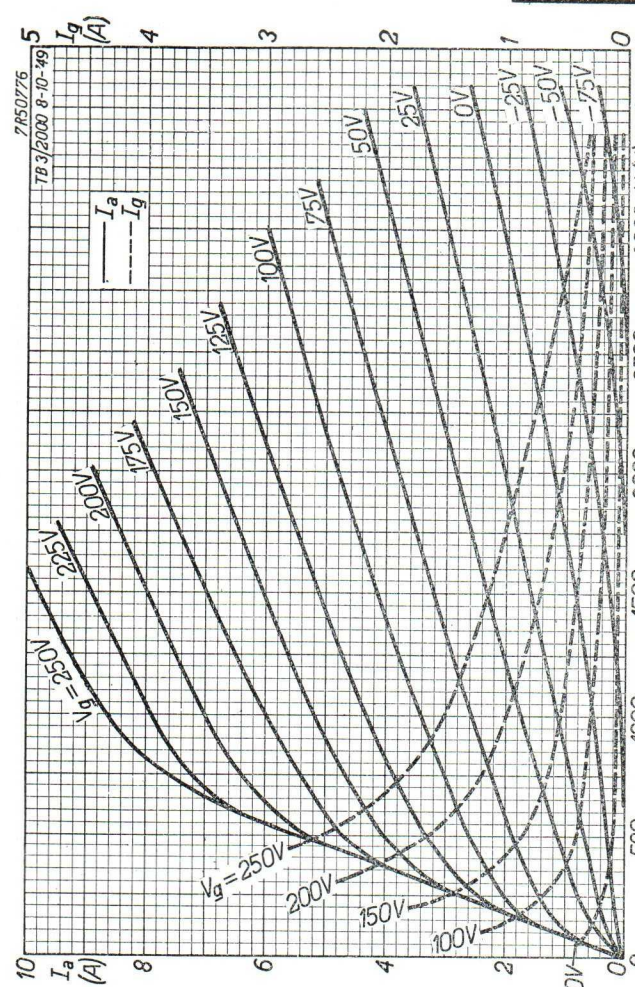
| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | >150 | >15 | m |
| Va | = | 3000 | 2500 | V |
| Vg | = | -300 | -250 | V |
| Ia | = | 725 | 700 | mA |
| Ig | = | 165 | 160 | mA |
| Vgp | = | 550 | 480 | V |
| Wig | = | 90 | 77 | W |
| Wia | = | 2175 | 1750 | W |
| Wa | = | 550 | 450 | W |
| Wo | = | 1625 | 1300 | W |
| $\eta$ | = | 75 | 74 | % |
| m | = | 100 | 100 | % |
| Wmod | = | 1087 | 875 | W |

Operating conditions as L.F. class B amplifier and modulator, two valves
Caractéristiques d'utilisation comme amplificatrice et modulatrice B.F. classe B, deux tubes
Betriebsdaten als N.F. Verstärker und Modulator Klasse B, zwei Röhren

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Va | = | 3000 | | 3000 | | 2500 | V |
| Vg | = | -70 | | -70 | | -70 | V |
| Raa | = | 4 | | 5,08 | | 4 | kΩ |
| Vggp | = | 0 | 340 | 0 | 300 | 0 | 340 V |
| Ia | = | 2x135 | 2x833 | 2x135 | 2x650 | 2x100 | 2x750 mA |
| Ig | = | 0 | 2x38 | 0 | 2x23 | 0 | 2x88 mA |
| Wig | = | 0 | 2x6,5 | 0 | 2x3,5 | 0 | 2x15 W |
| Wia | = | 2x405 | 2x2500 | 2x405 | 2x1950 | 2x250 | 2x1875 W |
| Wa | = | 2x405 | 2x850 | 2x405 | 2x650 | 2x250 | 2x625 W |
| Wo | = | 0 | 3300 | 0 | 2600 | 0 | 2500 W |
| $d_{tot}$ | = | - | 1,5 | - | 1,3 | - | 1,5 % |
| $\eta$ | = | - | 66 | - | 67 | - | 66,5 % |

PHILIPS

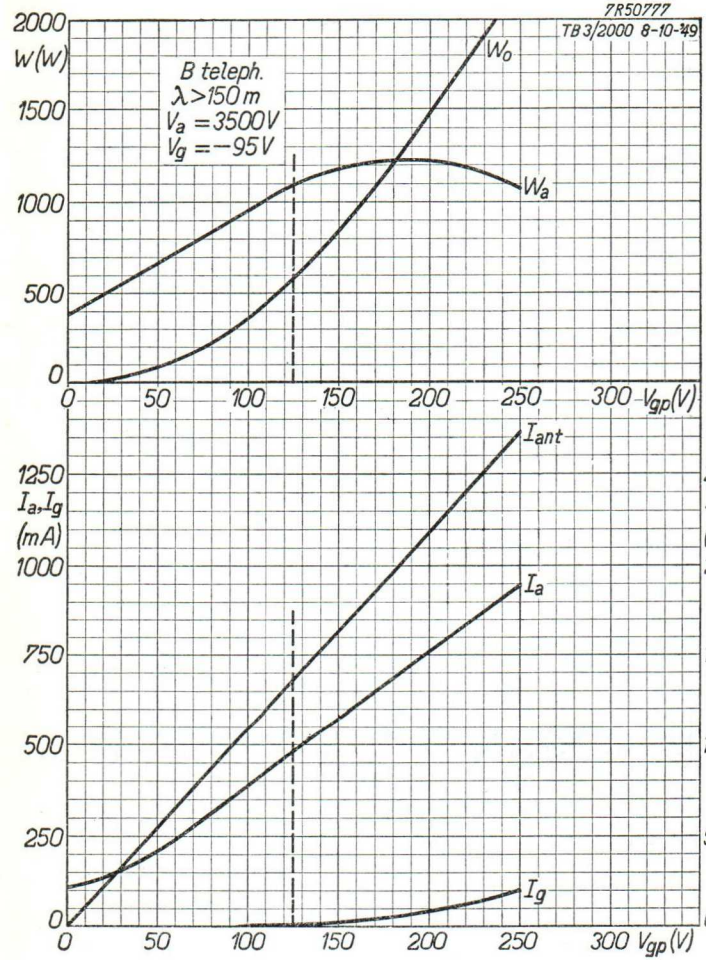
TB 3/2000

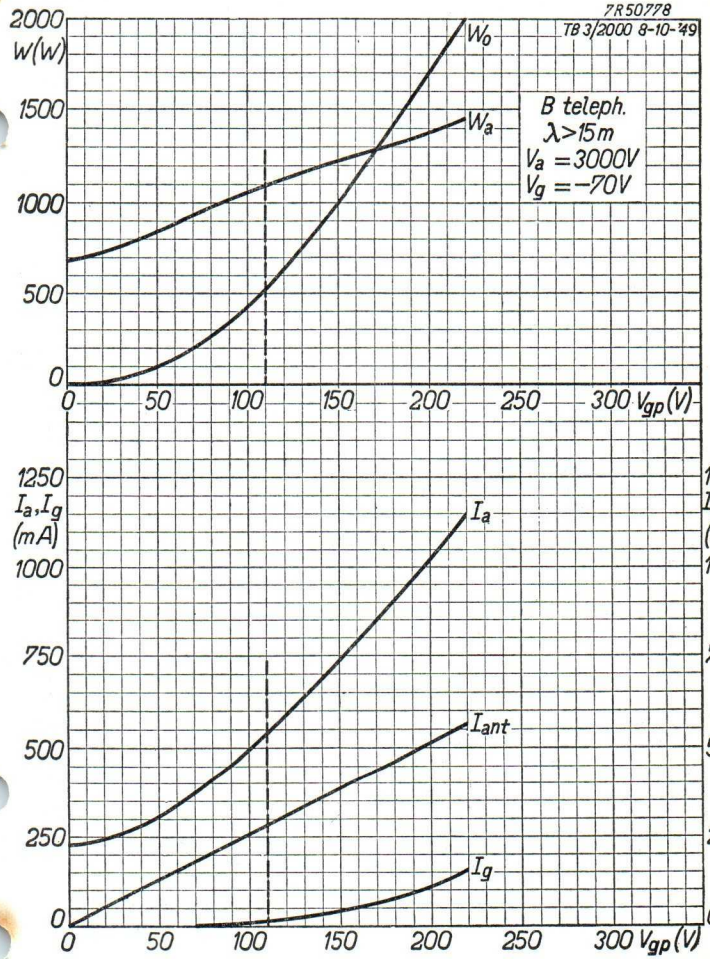



10.10.1949

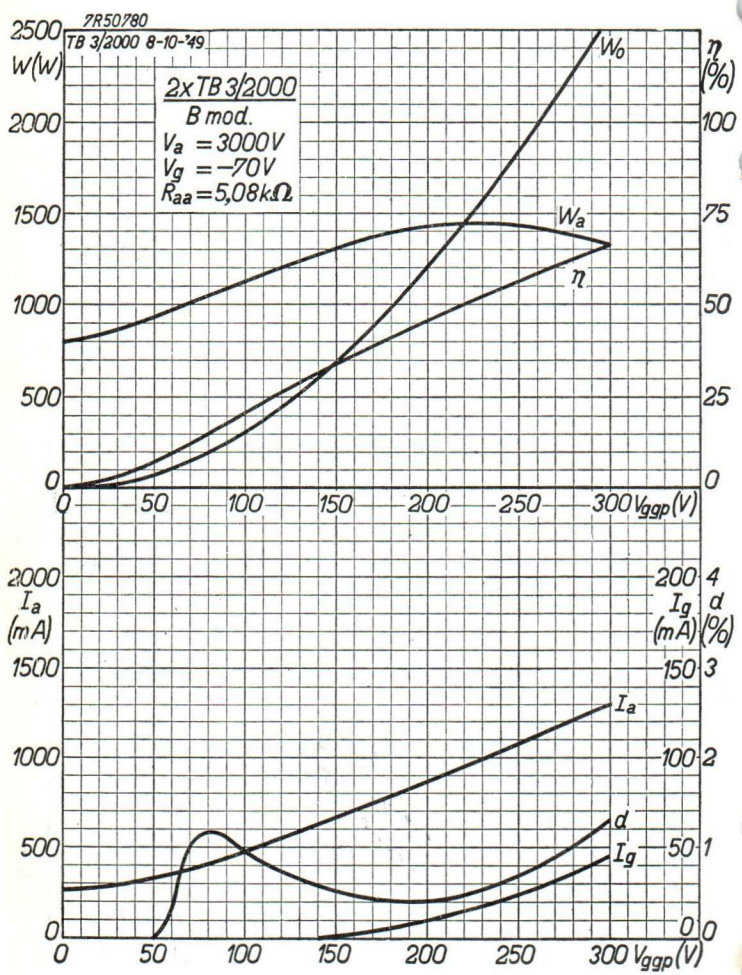
A

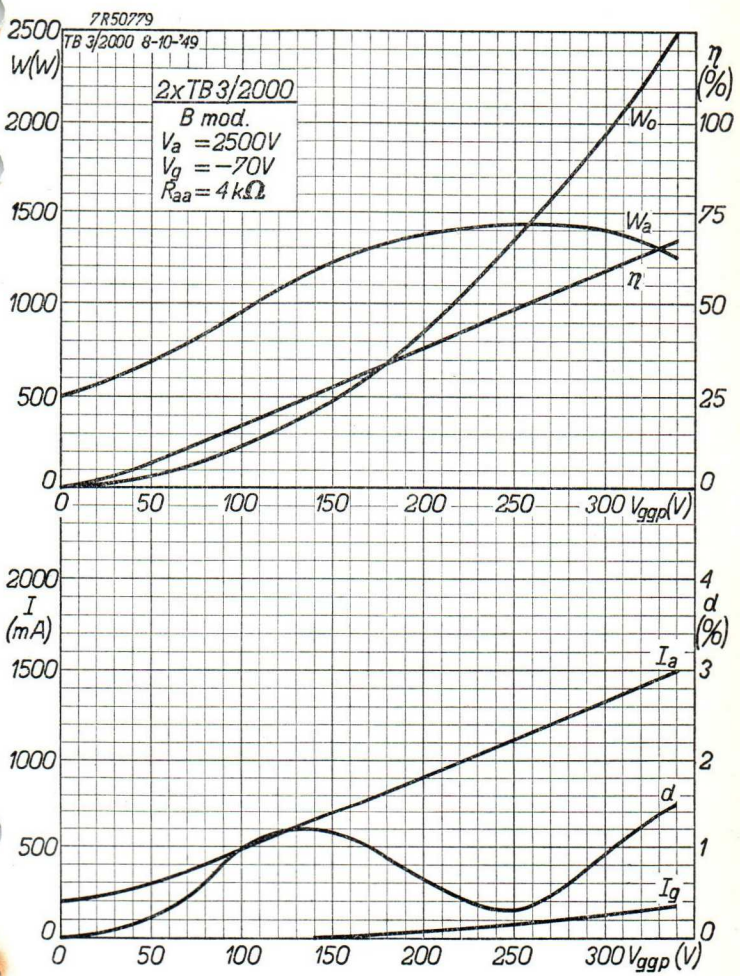
# PHILIPS


7R50777
TB 3/2000 8-10-'49
B teleph.
λ>150 m
Va = 3500 V
Vg = −95 V
W(W)
2000
1500
1000
500
0
Wo
Wa
0
50
100
150
200
250
300
Vgp(V)
Ia, Ig (mA)
1250
1000
750
500
250
0
Iant
Ia
Ig
Iant (mA)
2500
2000
1500
1000
500
0


7R50778
TB 3/2000 8-10-'49
2000
W(W)
1500
1000
500
0
$W_o$
$W_a$
B teleph.
λ>15m
$V_a$ =3000V
$V_g$ =−70V
0
50
100
150
200
250
300 $V_{gp}$(V)
1250
$I_a$,$I_g$
(mA)
1000
750
500
250
0
$I_a$
$I_{ant}$
$I_g$
12,5
$I_{ant}$
(A)
10
7,5
5
2,5
0

# PHILIPS


7R50780
TB 3/2000 8-10-'49
2x TB 3/2000
B mod.
Va = 3000V
Vg = −70V
Raa = 5,08kΩ
W(W)
η (%)
Wo
Wa
η
Vggp (V)
Ia (mA)
Ig (mA)
d (%)
Ia
d
Ig


7R50779
TB 3/2000 8-10-'49
2xTB3/2000
B mod.
Va =2500V
Vg =−70V
Raa=4kΩ
W(w)
η (%)
Wo
Wa
η
I (mA)
d (%)
Ia
d
Ig
0
50
100
150
200
250
300 Vggp(V)

TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour utilisation en amplificatrice H.F. ou B.F. ou oscillatrice
TRIODE zur Verwendung als HF- oder NF-Verstärker oder Oszillator

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5 V
$I_f$ = 10,5 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,5 pF
$C_g$ = 4,6 pF
$C_{ag}$ = 2,9 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ = 37

$S$ $\left\{\begin{matrix} V_a = 3000\ V \\ I_a = 300\ mA \end{matrix}\right\}$ = 5,6 mA/V

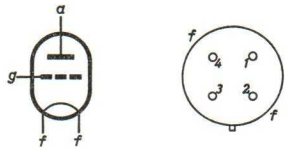
| λ | Freq. | C telegr. | | C an.mod. | | B mod [1]) | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 7,5 | 40 | 4000 | 1000 | 3000 | 435 | 3000 | 1180 |
| | | 3000 | 750 | 2500 | 400 | 2000 | 900 |
| | | 2000 | 464 | 2000 | 335 | 1500 | 630 |

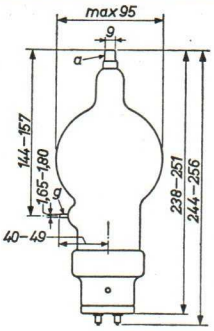
Temperatures
Températures
Temperaturen

Temperature of anode and grid seals
Température des scellements d'anode et de grille = max. 225 °C
Temperatur der Anoden- und Gittereinschmelzungen

[1])Two tubes, deux tubes, zwei Röhren

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base : Jumbo with bayonet
Culot : Jumbo à baïonnette
Sockel: Jumbo mit Bajonett

Socket
Support 40408
Fassung

Mounting position: vertical with base up or down
Montage : vertical avec le culot en haut ou en bas
Einbau : senkrecht mit Sockel oben oder unten

Net weight
Poids net 285 g
Nettogewicht

Shipping weight
Poids brut 1500 g
Bruttogewicht

H.F. class C telegraphy
H.F. classe C télégraphie
HF- Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 40 | Mc/s |
| $V_a$ | = max. | 4000 | V |
| $I_a$ | = max. | 350 | mA |
| $W_a$ | = max. | 250 | W |
| $W_g$ | = max. | 40 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = | 40 | 40 | 40 Mc/s |
| $V_a$ | = | 4000 | 3000 | 2000 V |
| $V_g$ | = | -220 | -150 | -100 V |
| $I_a$ | = | 313 | 333 | 357 mA |
| $I_g$ | = | 93 | 90 | 94 mA |
| $V_{gp}$ | = | 470 | 395 | 345 V |
| $W_{ig}$ | = | 39 | 32 | 29 W |
| $W_{ia}$ | = | 1250 | 1000 | 714 W |
| $W_a$ | = | 250 | 250 | 250 W |
| $W_o$ | = | 1000 | 750 | 464 W |
| $\eta$ | = | 80 | 75 | 65 % |

# PHILIPS

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF- Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 40 | Mc/s |
| $V_a$ | = max. | 3200 | V |
| $I_a$ | = max. | 280 | mA |
| $W_a$ | = max. | 165 | W |
| $W_g$ | = max. | 40 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = | 40 | 40 | 40 Mc/s |
| $V_a$ | = | 3000 | 2500 | 2000 V |
| $V_g$ | = | -200 | -180 | -160 V |
| $I_a$ | = | 200 | 225 | 250 mA |
| $I_g$ | = | 38 | 45 | 60 mA |
| $V_{g_p}$ | = | 375 | 365 | 365 V |
| $W_{ig}$ | = | 14 | 17 | 22 W |
| $W_{ia}$ | = | 600 | 565 | 500 W |
| $W_a$ | = | 165 | 165 | 165 W |
| $W_o$ | = | 435 | 400 | 335 W |
| $\eta$ | = | 72,5 | 71 | 67 % |
| m | = | 100 | 100 | 100 % |
| $W_{mod}$ | = | 300 | 282 | 250 W |

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF- Klasse B Verstärker und modulator

Limiting values
Caractéristiques limites
Grenzdaten

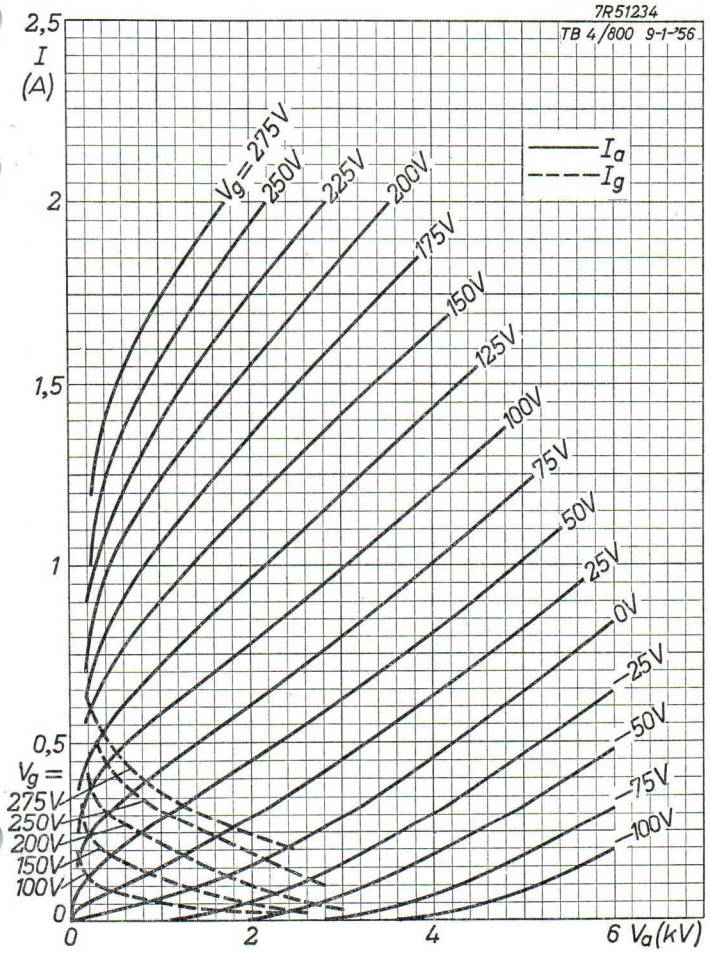
| | | |
|---|---|---|
| $V_a$ | = max. | 4000 V |
| $I_a$ | = max. | 350 mA |
| $W_a$ | = max. | 250 W |
| $W_g$ | = max. | 40 W |

Operating characteristics
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $V_a$ | = | 3000 | | 2000 | | 1500 | V |
| $V_g$ | = | -65 | | -30 | | 0 | V |
| $R_{aa\sim}$ | = | 12,2 | | 6,0 | | 4,2 | kΩ |
| $V_{gg_p}$ | = | 0 | 520 | 0 | 520 | 0 | 460 V |
| $I_a$ | = | 2x50 | 2x280 | 2x70 | 2x350 | 2x110 | 2x350 mA |
| $I_g$ | = | 0 | 2x90 | 0 | 2x110 | 0 | 2x110 mA |
| $I_{g_p}$ | = | 0 | 2x340 | 0 | 2x400 | 0 | 2x400 mA |
| $W_{ig}$ | = | 0 | 2x21 | 0 | 2x26 | 0 | 2x23 W |
| $W_{ia}$ | = | 2x150 | 2x840 | 2x140 | 2x700 | 2x165 | 2x525 W |
| $W_a$ | = | 2x150 | 2x250 | 2x140 | 2x250 | 2x165 | 2x210 W |
| $W_o$ | = | 0 | 1180 | 0 | 900 | 0 | 630 W |
| $\eta$ | = | - | 70 | - | 64 | - | 60 % |

# PHILIPS

**TB 4/800**

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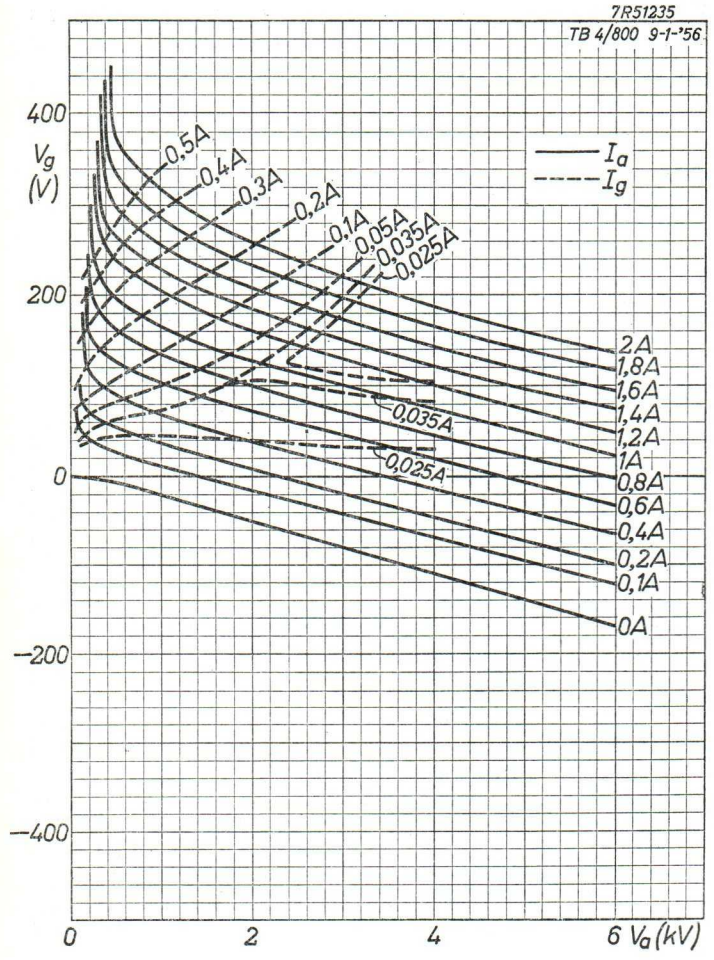
A

TB 4/800

# PHILIPS




B

TRIODE for use as H.F. or L.F. amplifier or oscillator, suitable for grounded grid circuits
TRIODE pour utilisation en amplificatrice H.F.ou B.F.ou oscillatrice, propre aux circuits "grounded-grid"
TRIODE zur Verwendung als HF- oder NF-Verstärker oder Oszillator, geeignet für Gitterbasisschaltungen

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 10 V
$I_f$ = 9,9 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,17 pF
$C_g$ = 8,0 pF
$C_{ag}$ = 7,0 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ = 28
S ($I_a$=125 mA)= 4,5 mA/V

| λ | Freq. | C telegr. | | C grounded grid | | C an.mod. | | B mod.[2] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$[1] (W) | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 3 | 100 | 4000 | 1690 | 4000 | 1950 | 3000 | 1050 | 4000 | 2290 |
| | | 3500 | 1430 | 3500 | 1650 | | | 3500 | 2440 |
| | | 3000 | 1175 | 3000 | 1375 | | | 3000 | 2310 |
| | | 2500 | 950 | 2500 | 1120 | | | 2500 | 2000 |

Temperatures and cooling
Températures et refroidissement
Temperaturen und Kühlung

Temperature of anode seal
Température du scellement de l'anode = max. 220 °C
Temperatur der Anodeneinschmelzung

Temperature of bottom pin seals
Température des scellements de broches du fond = max. 180 °C
Temperatur der Bodenstiften-einschmelzungen

Bulb temperature
Température de l'ampoule = max. 250 °C
Kolbentemperatur

[1], [2]) See page 2; voir page 2; siehe Seite 2

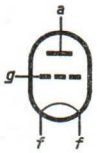
# PHILIPS

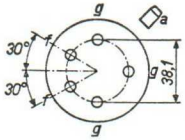
In general cooling of the tube is not necessary at normal ambient temperature at frequencies below 50 Mc/s.
When the tube is used at or near maximum ratings at frequencies above 50 Mc/s, it will be necessary to direct a low velocity air flow on the anode seal and the bottom of the envelope

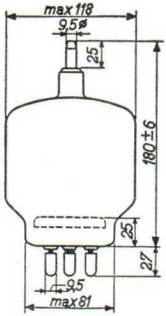
En général il ne faut pas refroidir le tube à la température normale de l'ambiance à des fréquences au-dessous de 50 Mc/s.
Si le tube est utilisé à ou près des caractéristiques maximum admissibles au-dessus de 50 Mc/s, il faut diriger un léger courant d'air sur le scellement de la sortie de l'anode et sur le fond du tube

Im allgemeinen braucht die Röhre bei normaler Umgebungstemperatur bei Frequenzen unterhalb 50 MHz nicht gekühlt zu werden
Wird die Röhre bei den maximalen Betriebsdaten bei Frequenzen höher als 50 MHz betrieben, so ist ein schwacher Luftstrom auf die Anodendurchführung und den Boden der Röhre notwendig

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket
Support 40216
Fassung

Anode clip
Borne de connexion de l'anode 40626
Anodenanschlussklemme

Mounting position: vertical with base up or down
Montage : Vertical avec le culot en haut ou en bas
Einbau : senkrecht mit Sockel oben oder unten

Net weight
Poids net 420 g
Nettogewicht

Shipping weight
Poids brut 1,4 kg
Bruttogewicht

1) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage préamplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

2) Two tubes; deux tubes; zwei Röhren

H.F. class C telegraphy
H.F. classe C télégraphie
HF- Klasse C Telegrafie

Limiting values
Caractéristiques limites
Grenzdaten

| f | = max. | 100 | Mc/s |
|---|---|---|---|
| $V_a$ | = max. | 4000 | V |
| $W_a$ | = max. | 450 | W |
| $W_g$ | = max. | 50 | W |
| $I_g$ | = max. | 115 | mA |
| $I_k$ | = max. | 650 | mA |

Operating conditions (controlled)
Caractéristiques d'utilisation (commandé)
Betriebsdaten (gesteuert)

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 3 | 3 | 3 | 3 m |
| $V_a$ | = | 4000 | 3500 | 3000 | 2500 V |
| $V_g$ | = | -350 | -300 | -250 | -200 V |
| $I_a$ | = | 535 | 535 | 535 | 535 mA |
| $I_g$ | = | 115 | 115 | 115 | 115 mA |
| $V_{gp}$ | = | 580 | 520 | 460 | 405 V |
| $W_{ig}$ | = | 60 | 54 | 48 | 42 W |
| $W_{ia}$ | = | 2140 | 1880 | 1600 | 1340 W |
| $W_a$ | = | 450 | 450 | 425 | 390 W |
| $W_o$ | = | 1690 | 1430 | 1175 | 950 W |
| $\eta$ | = | 79 | 76 | 73,5 | 71 % |

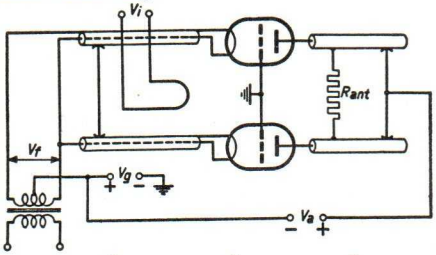
Operating conditions (self excited)
Caractéristiques d'utilisation (auto excitateur)
Betriebsdaten (selbsterregt)

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 3 | 3 | 3 | 3 m |
| $V_a$ | = | 4000 | 3500 | 3000 | 2500 V |
| $R_g$ | = | 3000 | 2600 | 2200 | 1800 Ω |
| $I_a$ | = | 535 | 535 | 535 | 535 mA |
| $I_g$ | = | 115 | 115 | 115 | 115 mA |
| $V_{gp}$ | = | 580 | 520 | 460 | 405 V |
| $W_{ig}$ | = | 60 | 54 | 48 | 42 W |
| $W_{ia}$ | = | 2140 | 1880 | 1600 | 1340 W |
| $W_a$ | = | 450 | 450 | 425 | 390 W |
| $W_o$ | = | 1630 | 1376 | 1127 | 908 W |
| $\eta$ | = | 76,5 | 73 | 70,5 | 67,5 % |

# PHILIPS

Operating conditions H.F. class C telegraphy (continued)
Caractéristiques d'utilisation H.F. classe C télégraphie, (continué)
Betriebsdaten H.F. Klasse C Telegraphie,(Fortsetzung)

Grounded grid circuit. Circuit "grounded grid". Gitterbasisschaltung.




| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = | 3[1]) | 3[1]) | 3[1]) | 3[1]) | m |
| $V_a$ | = | 4000 | 3500 | 3000 | 2500 | V |
| $V_g$ | = | -350 | -300 | -250 | -200 | V |
| $I_a$ | = | 2x535 | 2x535 | 2x535 | 2x535 | mA |
| $I_g$ | = | 2x115 | 2x115 | 2x115 | 2x115 | mA |
| $V_{gp}$ | = | 580 | 520 | 460 | 405 | V |
| $W_{ig}$ | = | 2x320 | 2x274 | 2x248 | 2x212 | W |
| $W_{ia}$ | = | 2x2140 | 2x1880 | 2x1600 | 2x1340 | W |
| $W_a$ | = | 2x450 | 2x450 | 2x425 | 2x390 | W |
| $W_o$ [2]) | = | 3380+520 | 2860+440 | 2350+400 | 1900+340 | W |
| $\eta$ [3]) | = | 79 | 76 | 73,5 | 71 | % |

[1]) Two valves; deux tubes; zwei Röhren

[2]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage préamplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[3]) Pure valve efficiency; rendement net du tube;reiner Röhrenwirkungsgrad

H.F.class C anode modulation
H.F.classe C modulation d'anode
HF- Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| f | = max. | 100 Mc/s |
| $V_a$ | = max. | 3000 V |
| $W_a$ | = max. | 300 W |
| $W_g$ | = max. | 50 W |
| $I_g$ | = max. | 115 mA |
| $I_k$ | = max. | 550 mA |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| $\lambda$ | = | 3 m |
| $V_a$ | = | 3000 V |
| $V_g$ | = | -375 V |
| $I_a$ | = | 450 mA |
| $I_g$ | = | 85 mA |
| $V_{gp}$ | = | 580 V |
| $W_{ig}$ | = | 42 W |
| $W_{ia}$ | = | 1350 W |
| $W_a$ | = | 300 W |
| $W_o$ | = | 1050 W |
| $\eta$ | = | 78 % |
| m | = | 100 % |
| $W_{mod}$ | = | 675 W |

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF Klasse B-Verstärker und Modulator

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 4000 | V |
| $W_a$ | = max. | 450 | W |
| $W_g$ | = max. | 50 | W |
| $I_k$ | = max. | 700 | mA |
| $I_g$ | = max. | 130 | mA |
| $R_g$ | = max. | 50 | kΩ |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 4000 | | 3500 | V |
| $V_g$ | = | -135 | | -114 | V |
| $R_{aa}$ | = | 14,5 | | 10,2 | kΩ |
| $V_{ggp}$ | = | 0 | 566 | 0 | 563 V |
| $I_a$ | = | 2x70 | 2x368 | 2x70 | 2x442 mA |
| $I_g$ | = | 0 | 2x93 | 0 | 2x115 mA |
| $W_{ig}$ | = | 0 | 2x24 | 0 | 2x29 W |
| $W_{ia}$ | = | 2x280 | 2x1474 | 2x245 | 2x1550 W |
| $W_a$ | = | 2x280 | 2x329 | 2x245 | 2x330 W |
| $W_o$ | = | 0 | 2290 | 0 | 2440 W |
| $d_{tot}$ | = | - | 5 | - | 5 % |
| $\eta$ | = | - | 77,7 | - | 78,8 % |

| | | | | | |
|---|---|---|---|---|---|
| $V_a$ | = | 3000 | | 2500 | V |
| $V_g$ | = | -94 | | -75 | V |
| $R_{aa}$ | = | 7,5 | | 5,2 | kΩ |
| $V_{ggp}$ | = | 0 | 560 | 0 | 530 V |
| $I_a$ | = | 2x70 | 2x500 | 2x70 | 2x555 mA |
| $I_g$ | = | 0 | 2x130 | 0 | 2x126 mA |
| $W_{ig}$ | = | 0 | 2x33 | 0 | 2x30 W |
| $W_{ia}$ | = | 2x210 | 2x1500 | 2x175 | 2x1387 W |
| $W_a$ | = | 2x210 | 2x345 | 2x175 | 2x387 W |
| $W_o$ | = | 0 | 2310 | 0 | 2000 W |
| $d_{tot}$ | = | - | 5 | - | 3,5 % |
| $\eta$ | = | - | 77 | - | 72 % |

Operating conditions as H.F. classe C oscillator for industrial use with anode voltage from two-phase half-wave rectifier without filter
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur biphasé à une alternance sans filtre
Betriebsdaten als HF- Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Zweiphasen-Einweggleichrichter ohne Filter.

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f = max. 100 Mc/s | | $I_g$ = max. 100 mA | |
| $V_a$ = max. 3600 V | | $W_{ia}$ = max. 2200 W | |
| $-V_g$ = max. 320 V | | $W_a$ = max. 450 W | |
| $I_a$ = max. 475 mA | | $W_g$ = max. 50 W | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| $V_{tr}$ | = | 4000[1] | 3350[2] $V_{eff}$ |
| $V_a$ | = | 3600 | 3000 V [3] |
| $I_a$ | = | 450 | 400 mA |
| $I_g$ | = | 100 | 85 mA |
| $R_g$ | = | 3,0 | 3,0 kΩ |
| $W_{ia}$ | = | 2000 | 1480 W |
| $W_a$ | = | 450 | 400 W |
| $W_o$ | = | 1500 | 1040 W |
| $\eta$ | = | 75 | 70 % |

[1]) Care must be taken that under these operating conditions the absolute limiting values are not exceeded by variation of the supply voltage or the load or by tolerances in the circuit elements.
Il faut prendre garde de ne pas dépasser les caractéristiques limites absolues par suite de variation de la tension d'alimentation ou de la charge ou par suite des tolérances des éléments du circuit.
Es musz darauf geachtet werden dass die absoluten Grenzwerte nicht überschritten werden infolge Schwankungen der Speisespannung oder der Belastung oder infolge Abweichungen der Schaltteile.

[2],[3]) see page 8; voir page 8; siehe Seite 8.

# PHILIPS

Operating conditions as H.F. class C oscillator for industrial use with anode voltage from three-phase half-wave rectifier without filter
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé à une seule alternance sans filtre
Betriebsdaten als H.F. Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasen-Einweggleichrichter ohne Filter.

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f = max. 100 Mc/s | | $I_g$ = max. 115 mA | |
| $V_a$ = max. 4000 V | | $W_{ia}$ = max. 2200 W | |
| $-V_g$ = max. 500 V | | $W_a$ = max. 450 W | |
| $I_a$ = max. 535 mA | | $W_g$ = max. 50 W | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| $V_{tr}$ | = | 3400[1]) | 2900[2]) $V_{eff}$ |
| $V_a$ | = | 4000 | 3400 V[3]) |
| $I_a$ | = | 535 | 450 mA |
| $I_g$ | = | 115 | 100 mA |
| $R_g$ | = | 3,0 | 3,0 kΩ |
| $W_{ia}$ | = | 2140 | 1530 W |
| $W_a$ | = | 450 | 390 W |
| $W_o$ | = | 1630 | 1090 W |
| $\eta$ | = | 76,5 | 71 % |

1) See page 7; voir page 7; siehe Seite 7.

2) Under these conditions normal deviations of voltages and load are permissible. The absolute limiting values of the valve must, however, not be exceeded.
Dans cettes conditions des déviations normales des tensions et de la charge sont permises. Il ne faut cependant pas dépasser les caractéristiques limites absolues.
Unter diesen Bedingungen sind normale Abweichungen der Spannungen und der Belastung gestattet. Die absoluten Grenzwerte dürfen jedoch nicht überschritten werden.

3) D.C value; valeur moyenne; mittlerer Wert.

Operating conditions as H.F. class C oscillator for industrial use with self rectification
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles à auto-redressement
Betriebsdaten als H.F.Klasse C Oszillator für industrielle Anwendungen mit Selbstgleichrichtung

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

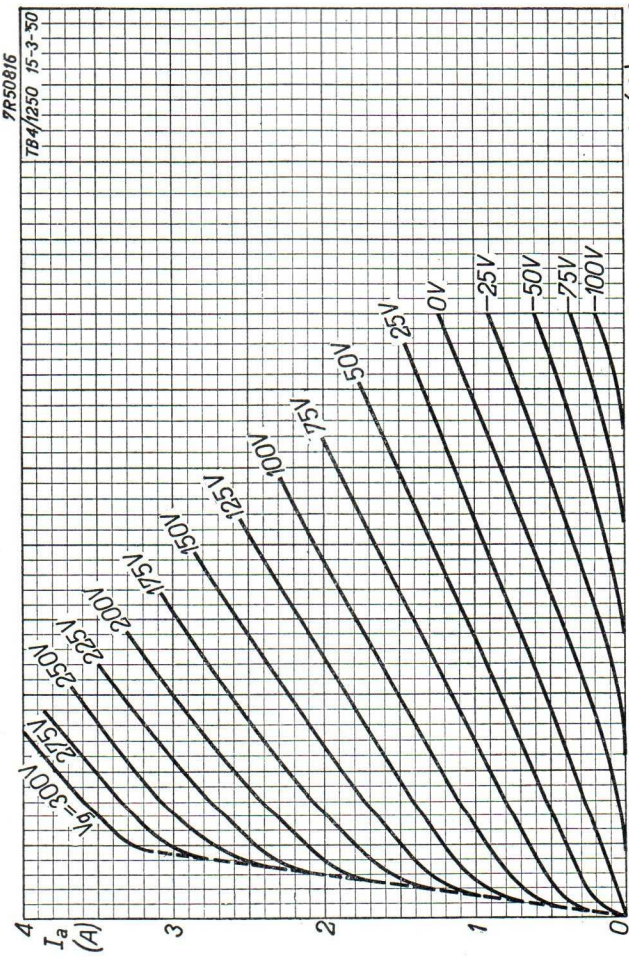
| | | | | | |
|---|---|---|---|---|---|
| $f$ | = max. 100 | Mc/s | $I_g$ | = max. 55 | mA |
| $V_{tr}$ | = max. 4500 | $V_{eff}$ | $W_{ia}$ | = max. 1450 | W |
| $-V_g$ | = max. 500 | V | $W_a$ | = max. 450 | W |
| $I_a$ | = max. 280 | mA | $W_g$ | = max. 50 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $V_{tr}$ | = | 4500[1]) | 3800[2]) | $V_{eff}$ |
| $I_a$ | = | 280 | 240 | mA |
| $I_g$ | = | 55 | 47 | mA |
| $R_g$ | = | 3,4 | 3,4 | kΩ |
| $W_{ia}$ | = | 1400 | 1010 | W |
| $W_a$ | = | 350 | 295 | W |
| $W_o$ | = | 1000 | 670 | W |
| $\eta$ | = | 71,5 | 66 | % |

[1]) See note [1]) page 7.
Voir la note [1]) page 7.
Siehe Fussnote [1]) Seite 7.

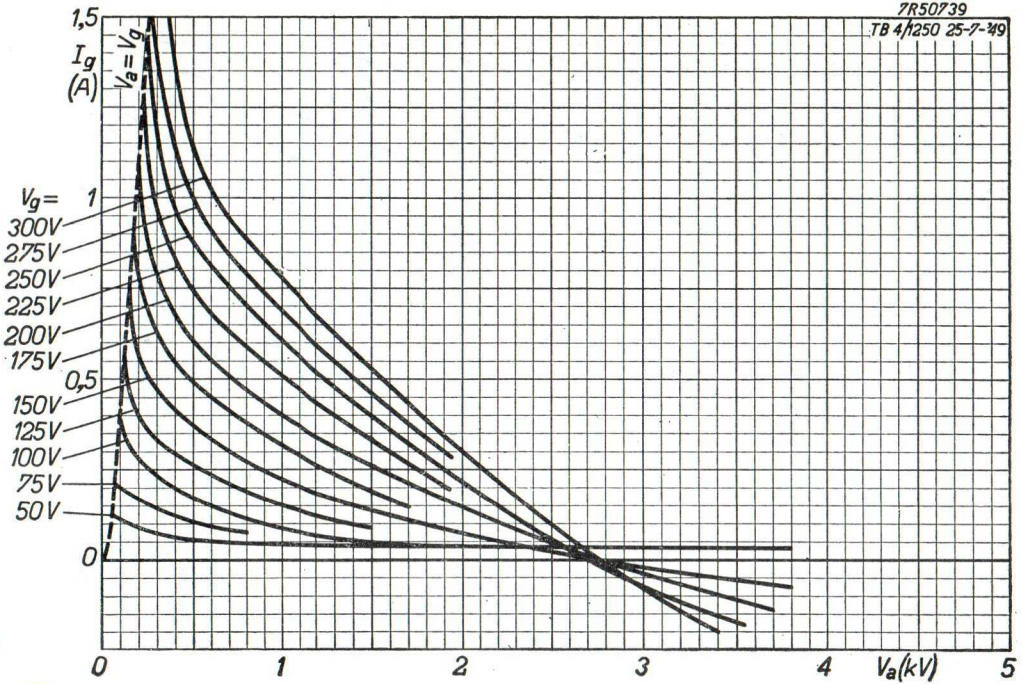
[2]) See note [2]) page 8.
Voir la note [2]) page 8.
Siehe Fussnote [2]) Seite 8.


7R50816
TB4/1250 15-3-50
$V_a$ (kV)
$I_a$ (A)
0
1
2
3
4
5
6
0V
-25V
-50V
-75V
-100V
25V
50V
75V
100V
125V
150V
175V
200V
225V
250V
275V
$V_g$=300V

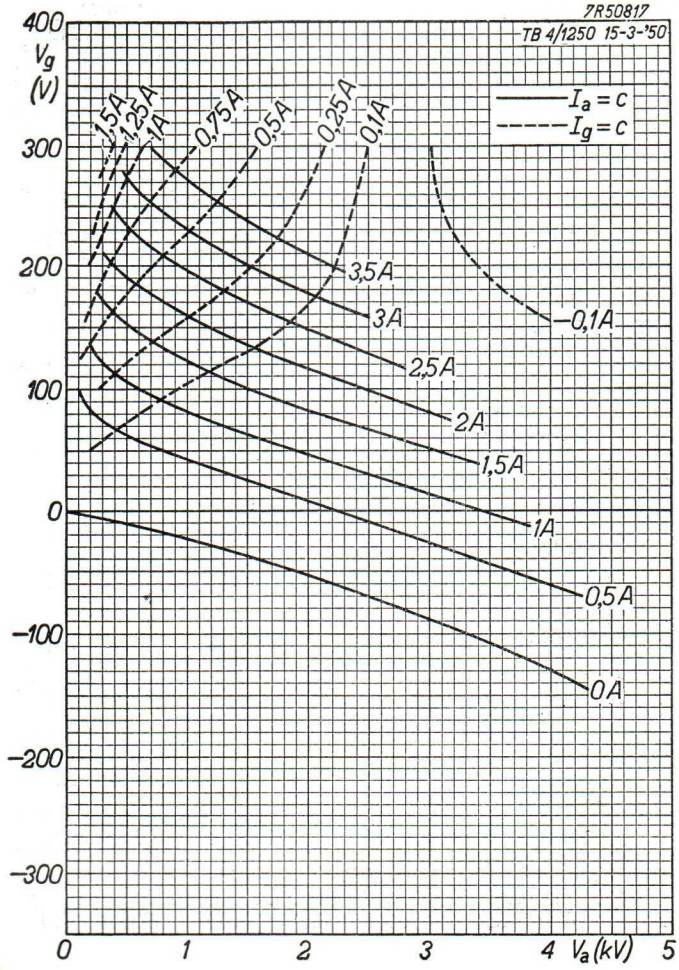
7.7.1954

A

7R50739
TB 4/1250 25-7-'49

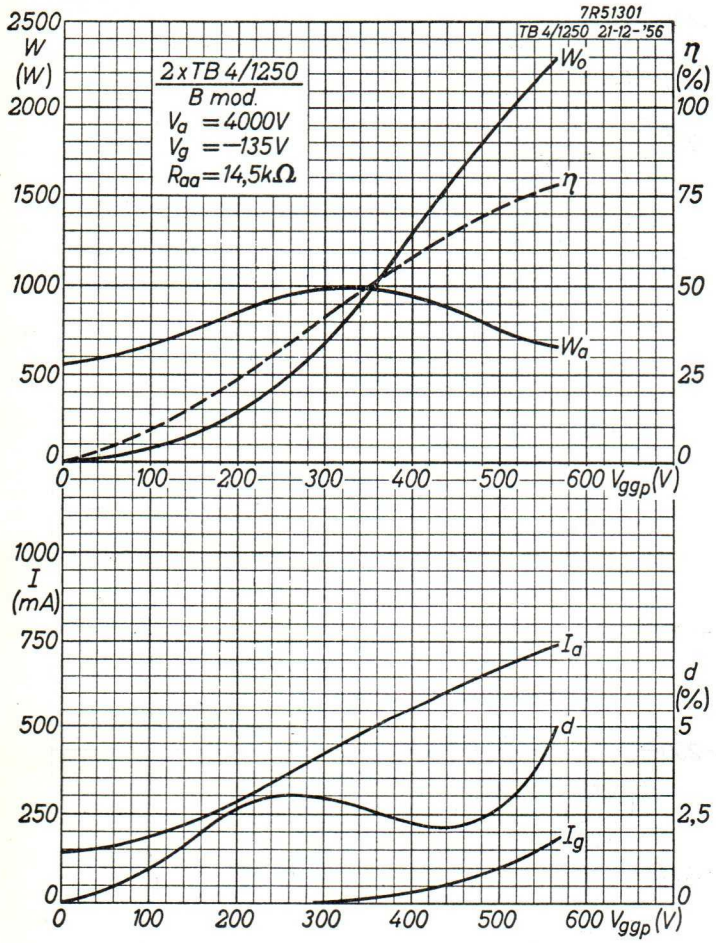



PHILIPS

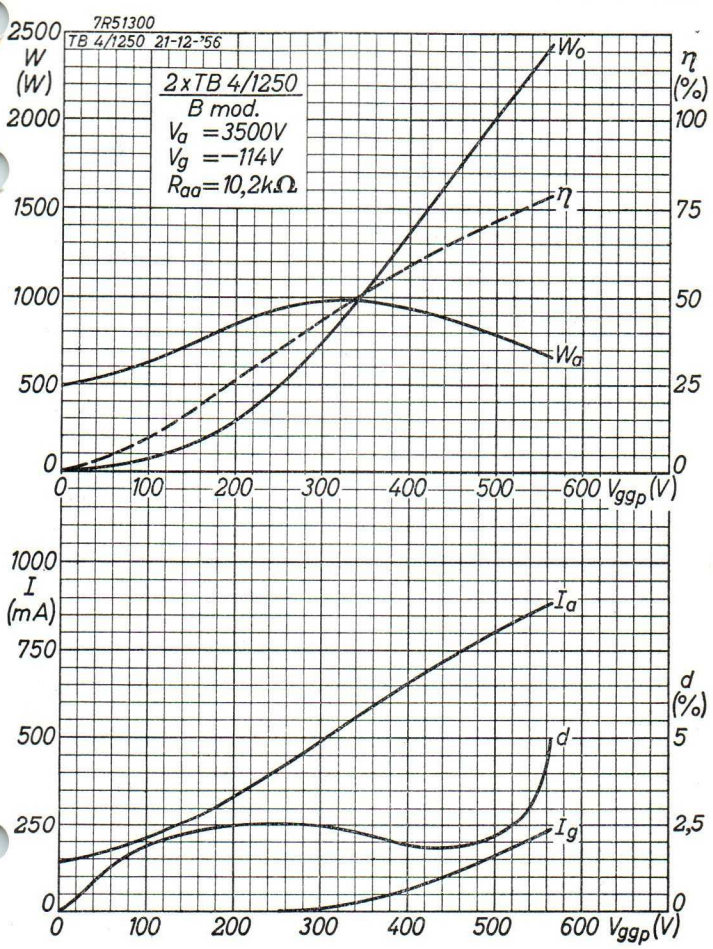

7R50817
TB 4/1250 15-3-'50
$V_g$ (V)
400
300
200
100
0
−100
−200
−300
$I_a = c$
$I_g = c$
1,5A
1,25A
1A
0,75A
0,5A
0,25A
0,1A
3,5A
3A
2,5A
2A
1,5A
1A
0,5A
0A
−0,1A
0
1
2
3
4
$V_a$ (kV)
5

TB 4/1250

# PHILIPS

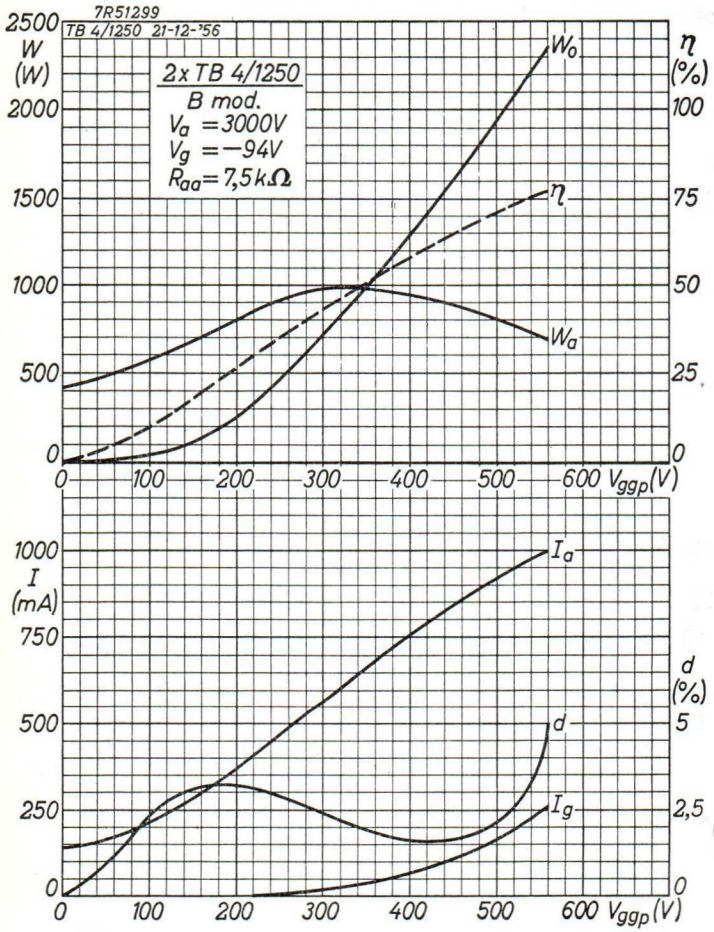



D

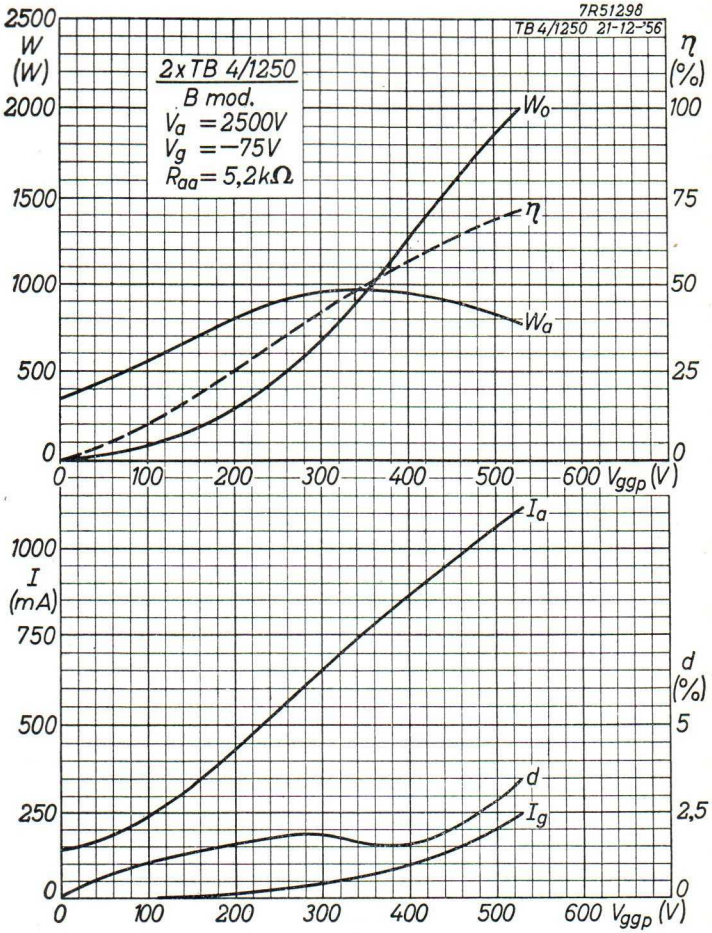

7R51300
TB 4/1250 21-12-'56
2 x TB 4/1250
B mod.
$V_a$ = 3500V
$V_g$ = −114V
$R_{aa}$ = 10,2kΩ
W (W)
η (%)
$W_o$
η
$W_a$
$V_{ggp}$ (V)
I (mA)
$I_a$
d (%)
d
$I_g$

**TB 4/1250**

# PHILIPS

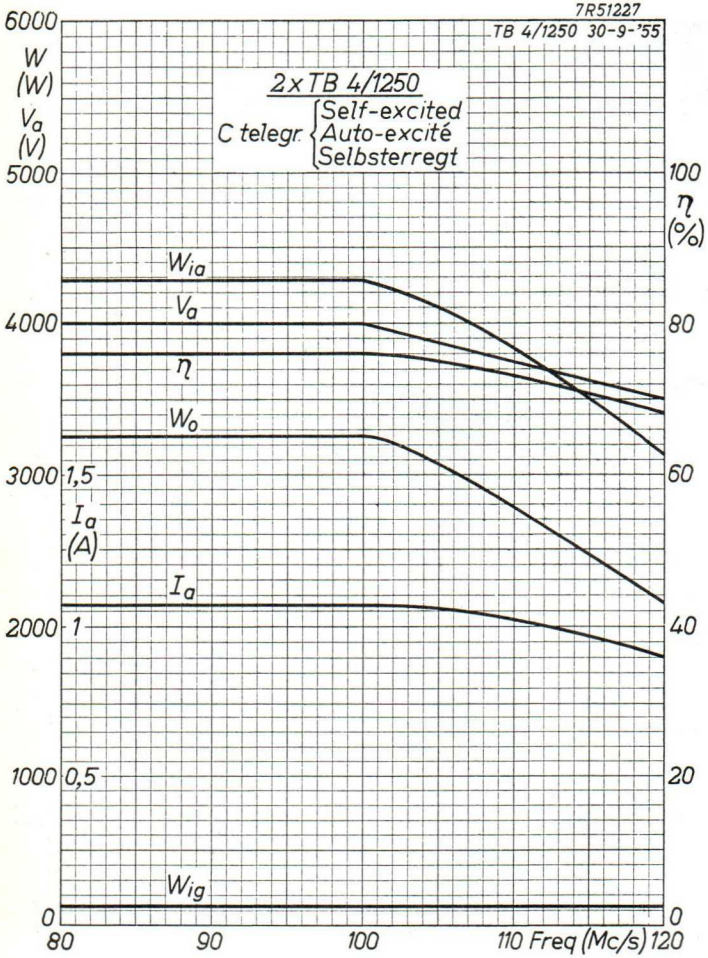



F


7R51298
TB 4/1250 21-12-56
2 x TB 4/1250
B mod.
$V_a$ = 2500V
$V_g$ = −75V
$R_{aa}$ = 5,2kΩ
W (W)
η (%)
$W_o$
$W_a$
η
$I_a$
$I_g$
d
I (mA)
d (%)
$V_{ggp}$ (V)

**TB 4/1250**

# PHILIPS




H

TRIODE for use in industrial R.F. generators
TRIODE pour utilisation en générateurs H.F. industriels
TRIODE zur Verwendung in industriellen HF-Generatoren

Filament : thoriated tungsten
Filament : tungstène thorié
Glühfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5,0 V $\pm$ 5 %
$I_f$ = 32,5 A $\pm$ 10 %

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,2 pF
$C_g$ = 9,2 pF
$C_{ag}$ = 5,1 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ( $V_a$ = 4000 V ) = 21
S ( $I_a$ = 120 mA ) = 3,3 mA/V

Industrial oscillator class C
Oscillatrice industrielle classe C
Industrieller Oszillator Klasse C

| Freq | three phase triphasé dreiphasig | | | single phase monophasé einphasig | | A.C. operation à courant alternatif Wechselstromspeisung | |
|---|---|---|---|---|---|---|---|
| Mc/s | $V_a$ (V) | $W_o$(W) CCS | $W_o$(W) ICAS | $V_a$ (V) | $W_o$(W) CCS | $V_a$ ($V_{eff}$) | $W_o$(W) CCS |
| 50 | 6000 | 1640 | 3200 | 5400 | 1635 | 4500 | 1020 |
| | 5000 | 1670 | 2400 | 4500 | 1600 | | |
| | 4000 | 1650 | | | | | |

Temperatures
Températures
Temperaturen

Temperature of all seals
Température de tous les scellements = max. 220 °C
Temperatur aller Einschmelzungen

Bulb temperature
Température de l'ampoule = max. 350 °C
Kolbentemperatur

Cooling

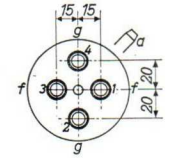
In general cooling of the tube working at the published operating conditions with matched load is not necessary. When the tube is mounted in a small cabinet adequate ventilation must be provided.
At non-matched load, combined with the highest operating frequencies a low-velocity air flow on the tube is necessary. A small fan will suffice; it is recommended to mount the fan underneath the tube socket.

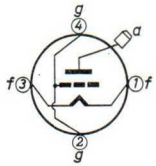
Refroidissement

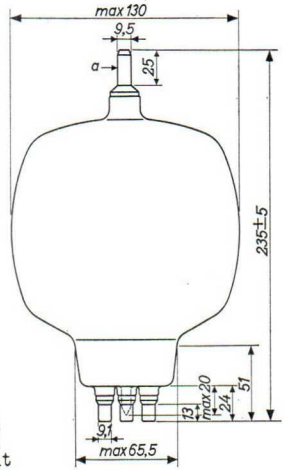
En général refroidissement du tube fonctionnant aux caractéristiques d'utilisation publiées à charge adaptée n'est pas nécessaire. Si le tube est monté dans une boîte, il faut appliquer une ventilation propre.
Dans le cas de charge non-adaptée, combiné avec les fréquences les plus hautes, un leger courant d'air dirigé vers le tube est nécessaire. Un petit ventilateur suffira; il est recommandé de monter le ventilateur au-dessous du support de tube

Kühlung

Wird die Röhre bei den veröffentlichten Betriebsdaten mit angepasster Belastung verwendet, so wird im allgemeinen keine Kühlung der Röhre notwendig sein. Wenn die Röhre in einem Gehäuse eingebaut ist, so ist eine geeignete Ventilation notwendig.
Bei nicht-angepasster Belastung und den höchsten Frequenzen ist ein schwacher Luftstrom auf die Röhre notwendig. Ein kleiner Ventilator wird hierzu genügen; es wird empfohlen dieser Ventilator unterhalb der Röhrenfassung zu montieren.




Dimensions in mm
Dimensions en mm
Abmessungen in mm

Mounting position: vertical
Montage : vertical
Einbau : senkrecht

Accessories
Accessoires
Zubehör

Socket
Support B8 700 51
Fassung

Anode clip
Borne de connexion de l'anode 40665
Anodenanschlussklemme

Net weight
Poids net 450 g
Nettogewicht

Shipping weight
Poids brut 1400 g
Bruttogewicht

# PHILIPS

H.F. CLASS C OSCILLATOR for industrial use with anode voltage from three-phase rectifier. Continuous service.
OSCILLATEUR H.F. CLASSE C pour applications industrielles avec tension anodique dérivée d'un redresseur triphasé. Service continu.
HF-KLASSE C OSZILLATOR für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasengleichrichter. Dauerbetrieb.

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues) C.C.S.
Grenzdaten (absolute Werte)

f = max. 50 Mc/s

| | | | |
|---|---|---|---|
| $V_a$ | = max. 7000 V | $-V_g$ | = max. 1250 V |
| $I_a$ | = max. 560 mA | $I_g$ | = max. 210 mA [1] |
| $Wi_a$ | = max. 2500 W | $I_g$ | = max. 280 mA [2] |
| $W_a$ | = max. 500 W | $R_g$ | = max. 15 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = | 50 | 50 | 50 Mc/s |
| $V_a$ | = | 6000 | 5000 | 4000 V |
| $I_a$ [1] | = | 350 | 430 | 535 mA |
| $I_a$ [2] | = | 90 | 100 | 150 mA |
| $I_g$ [1] | = | 120 | 130 | 150 mA |
| C.C.S. $I_g$ [2] | = | 180 | 200 | 225 mA |
| $R_g$ | = | 4200 | 3500 | 2700 Ω |
| $Wi_a$ | = | 2100 | 2150 | 2140 W |
| $W_a$ | = | 460 | 480 | 490 W |
| $W_o$ | = | 1640 | 1670 | 1650 W |
| $\eta$ | = | 78 | 77,5 | 77 % |
| $W_\ell$ [3] | = | 1300 | 1350 | 1325 W |
| $Ra_\sim$ | = | 9000 | 6400 | 3800 Ω |
| $Vg_\sim/Va_\sim$ [4] | = | 15 | 15,5 | 20 % |

[1])....[4]) See page 8; voir page 8; siehe Seite 8

H.F. CLASS C OSCILLATOR for industrial use with anode voltage from three-phase rectifier. Intermittent service.
OSCILLATEUR H.F. CLASSE C pour applications industrielles avec tension anodique dérivée d'un redresseur triphasé Service intermittent.
HF-KLASSE C OSZILLATOR für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasengleichrichter. Aussetzender Betrieb.

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| $f$ | = max. 50 Mc/s | | |
| $V_a$ | = max. 7000 V | $-V_g$ | = max. 1250 V |
| $I_a$ | = max. 750 mA | $I_g$ | = max. 185 mA [1] |
| $W_{ia}$ | = max. 5000 W | $I_g$ | = max. 300 mA [2] |
| $W_a$ | See page B / Voir page B / Siehe Seite B | $R_g$ | = max. 15 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| $f$ | = | 50 | 50 Mc/s |
| $V_a$ | = | 6000 | 5000 V |
| $I_a$ [1] | = | 700 | 630 mA |
| $I_a$ [2] | = | 130 | 150 mA |
| $I_g$ [1] | = | 170 | 160 mA |
| $I_g$ [2] | = | 290 | 280 mA |
| $R_g$ | = | 3300 | 2700 Ω |
| $W_{ia}$ | = | 4200 | 3150 W |
| $W_a$ | = | 1000 | 750 W |
| $W_o$ | = | 3200 | 2400 W |
| $\eta$ | = | 76 | 76 % |
| $W_\ell$ [3] | = | 2650 | 1950 W |
| $R_{a\sim}$ | = | 6500 | 4500 Ω |
| $V_{g\sim}/V_{a\sim}$ [4] | = | 16 | 17 % |

[1])....[4]) See page 8; voir page 8; siehe Seite 8

# PHILIPS

H.F. CLASS C OSCILLATOR for industrial use with anode voltage from single-phase rectifier without filter. Continuous service.

OSCILLATEUR H.F. CLASSE C pour applications industrielles avec tension anodique dérivée d'un redresseur monophasé sans filtre. Service continu.

HF-KLASSE C OSZILLATOR für industrielle Anwendungen mit der Anodenspannung von einem Einphasengleichrichter onhe Filter abgenommen. Dauerbetrieb.

Limiting values (absolute limits)
Caractéristiques limites (limites absolues) C.C.S.
Grenzdaten (absolute Grenzwerte)

| | | | | | |
|---|---|---|---|---|---|
| f | = max. 50 Mc/s | | | | |
| $V_a$ | = max. 6300 V | $-V_g$ | = | max. 1250 V | |
| $I_a$ | = max. 500 mA | $I_g$ | = | max. 185 mA | 1) |
| $W_{i_a}$ | = max. 2500 W | $I_g$ | = | max. 280 mA | 2) |
| $W_a$ | = max. 500 W | $R_g$ | = | max. 15 kΩ | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| | f | = | 50 | 50 Mc/s |
| | $V_a$ | = | 5400 | 4500 V |
| | $I_a$ | = | 320 | 380 mA 1) |
| | $I_a$ | = | 80 | 90 mA 2) |
| C.C.S. | $I_g$ | = | 110 | 120 mA 1) |
| | $I_g$ | = | 170 | 190 mA 2) |
| | $R_g$ | = | 4,2 | 3,5 kΩ |
| | $W_{i_a}$ | = | 2125 | 2100 W |
| | $W_a$ | = | 490 | 500 W |
| | $W_o$ | = | 1635 | 1600 W |
| | $\eta$ | = | 77 | 76 % |
| | $W_\ell$ 3) | = | 1350 | 1300 W |
| | $R_{a_\sim}$ | = | 9 | 6,4 kΩ |
| | $V_{g_\sim}/V_{a_\sim}$ 4) | = | 13 | 15,5 % |

1)....4) See page 8; voir page 8; siehe Seite 8

H.F. CLASS C OSCILLATOR for industrial use with self-rectification. Continuous service.
OSCILLATEUR H.F. CLASSE C pour applications industrielles à autoredressement. Service continu.
HF-KLASSE C OSZILLATOR für industrielle Anwendungen mit Selbstgleichrichtung. Dauerbetrieb.

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues) C.C.S.
Grenzdaten (absolute Werte)

$f$ = max. 50 Mc/s

| | | | |
|---|---|---|---|
| $V_{tr}$ | = max. 5000 $V_{eff}$ | $-V_g$ | = max. 1350 V [5] |
| $I_a$ | = max. 320 mA [6] | $I_g$ | = max. 110 mA [1] [6] |
| $W_{i_a}$ | = max. 1600 W | $I_g$ | = max. 150 mA [2] [6] |
| $W_a$ | = max. 500 W | $R_g$ | = max. 15 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

C.C.S.

| | | |
|---|---|---|
| $f$ | = | 50 Mc/s |
| $V_{tr}$ | = | 4500 $V_{eff}$ |
| $I_a$ [1] | = | 280 mA [1] [6] |
| $I_a$ [2] | = | 70 mA [2] [6] |
| $I_g$ [1] | = | 80 mA [1] [6] |
| $I_g$ [2] | = | 125 mA [2] [6] |
| $R_g$ | = | 2700 Ω |
| $W_{i_a}$ | = | 1400 W |
| $W_a$ | = | 380 W |
| $W_o$ | = | 1020 W |
| $\eta$ | = | 73 % |
| $W_\ell$ [3] | = | 820 W |
| $R_{a_\sim}$ | = | 3300 Ω |
| $V_{g_\sim}/V_{a_\sim}$ [4] | = | 18 % |

[1])...[6]) See page 8; voir page 8; siehe Seite 8

1) Loaded, chargé, belastet

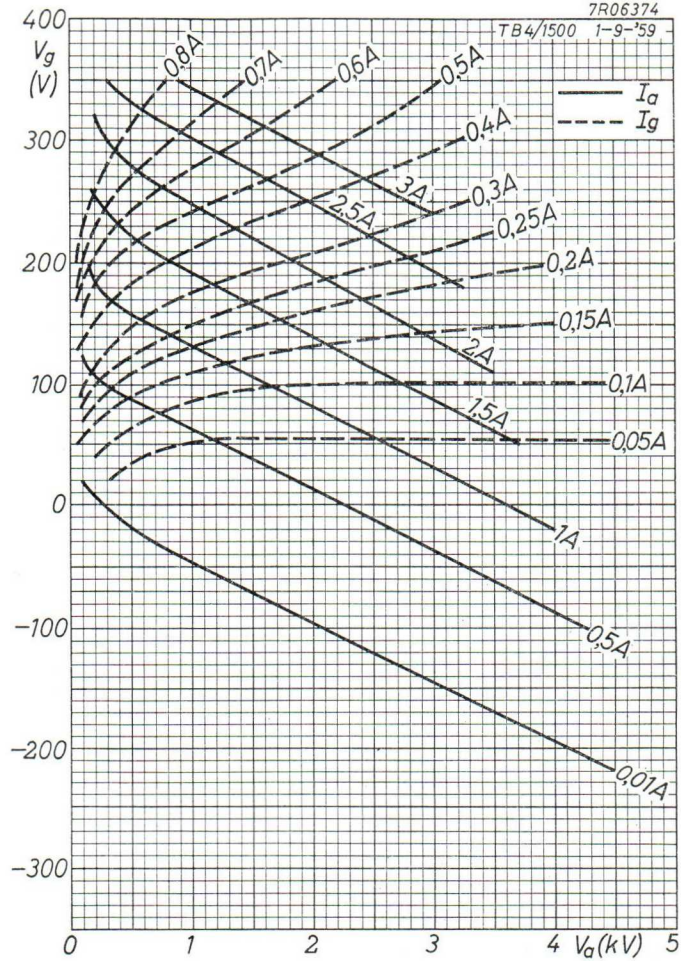
2) Unloaded, non-chargé, nicht belastet

3) $W_\ell$ = useful power in the load measured in a circuit having an efficiency of 85 %
$W_\ell$ = puissance utile dans la charge, mesurée dans un circuit avec un rendement de 85 %
$W_\ell$ = Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von 85 %

4) feedback ratio under loaded conditions
rapport de réaction en condition chargée
Rückkopplungsverhältnis in belastetem Zustand

5) At peak of mains frequency sine-wave
A la crête de l'onde sinusoïdale de la fréquence du réseau
Beim Scheitelwert der Sinuswelle der Netzfrequenz

6) Averaged over any mains frequency cycle
Intégré sur chaque cycle de la fréquence du réseau
Integriert über jede Periode der Netzfrequenz

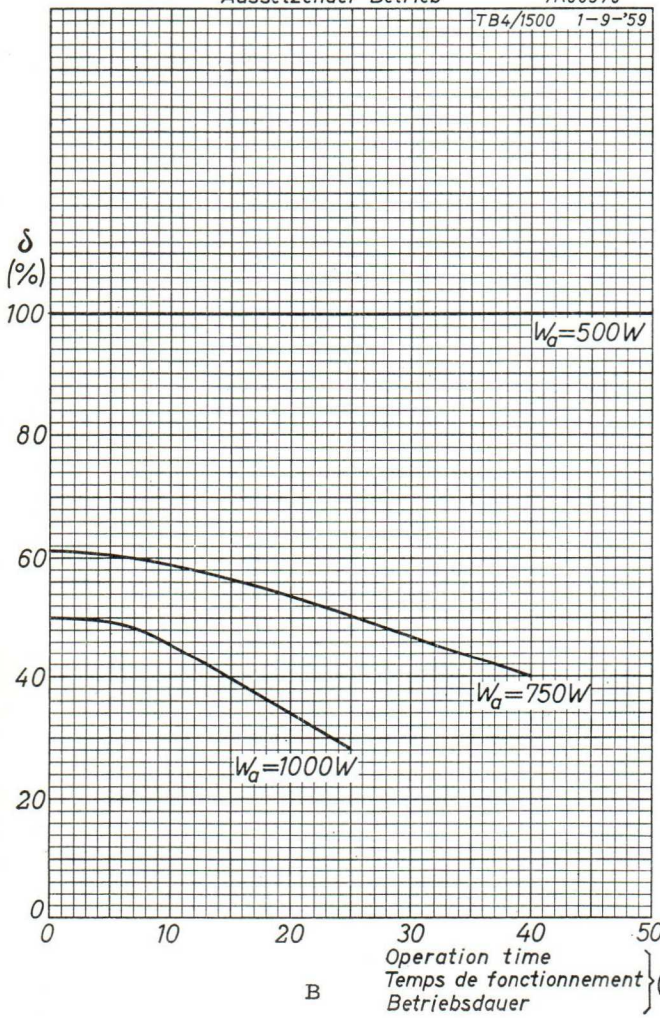

7R06374
TB4/1500 1-9-'59
$V_g$ (V)
400
300
200
100
0
−100
−200
−300
0,8A
0,7A
0,6A
0,5A
0,4A
0,3A
0,25A
0,2A
0,15A
0,1A
0,05A
3A
2,5A
2A
1,5A
1A
0,5A
0,01A
$I_a$
$I_g$
0
1
2
3
4
$V_a$(kV)
5

TB 4/1500

# PHILIPS

*Intermittent service*
*Service intermittent*
*Aussetzender Betrieb*

7R06370



TRIODE for use as oscillator in industrial R.F. generators
TRIODE pour utilisation comme oscillatrice dans des générateurs H.F. industriels
TRIODE zur Verwendung als Oszillator in industriellen HF-Generatoren

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden : thoriertes Wolfram

Heating : direct
Chauffage : direct
Heizung : direkt

$V_f$ = 6,3 V $\pm$ 5 %
$I_f$ = 32,5 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,25 pF
$C_g$ = 10,5 pF
$C_{ag}$ = 6,2 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ($V_a$ = 4 kV) = 22
S ($I_a$ = 190 mA) = 5,1 mA/V

Industrial oscillator class C
Oscillatrice industrielle classe C
Industrieller Oszillator Klasse C

| Freq | Three-phase triphasé dreiphasig | | | Single phase monophasé einphasig | | A.C. operation à courant alternatif Wechselstromspeisung | |
|---|---|---|---|---|---|---|---|
| Mc/s | $V_a$ (V) | $W_o$ (W) CCS | $W_o$ (W) ICAS | $V_a$ (V) | $W_o$ (W) CCS | $V_a$ ($V_{eff}$) | $W_o$ (W) CCS |
| 50 | 6000 | 2840 | 4400 | 5400 | 2750 | 5200 | 1560 |
| | 5000 | 2720 | 3375 | 4500 | 2550 | | |
| | 4000 | 2160 | | | | | |
| | 3000 | 1560 | | | | | |

Temperatures
Températures
Temperaturen

Temperature of seals
Température des scellements = max. 220 °C
Temperatur der Einschmelzungen

Bulb temperature
Température de l'ampoule = max. 350 °C
Kolbentemperatur

Cooling

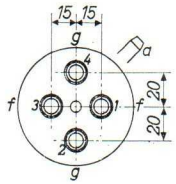
In general cooling of the tube is not necessary at matched load. When the tube is mounted in a small cabinet adequate ventilation must be provided
At non-matched load or at high anode voltages, combined with the highest operating frequencies a low-velocity air flow directed on the tube is necessary. A small fan will suffice; it is recommended to mount the fan underneath the tube socket

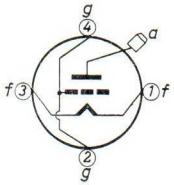
Refroidissement

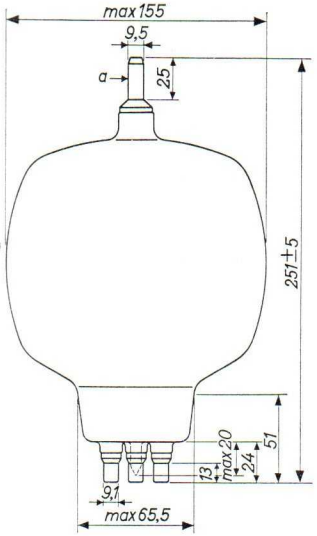
En général refroidissement du tube n'est pas nécessaire dans le cas de charge adaptée
Si le tube est monté dans une boîte, il faut appliquer une ventilation propre
Dans le cas de charge non-adaptée ou à des tensions hautes, combinées avec des fréquences hautes, un léger courant d'air dirigé vers le tube est nécessaire
Un petit ventilateur suffira; il est recommandé de monter le ventilateur au-dessous du support de tube

Kühlung

Im allgemeinen wird Kühlung der Röhre bei angepasster Belastung nicht notwendig sein
Wenn die Röhre in einem Gehäuse eingebaut ist, so ist eine geeignete Ventilation des Gehäuses notwendig
Bei nicht-angepasster Belastung und bei höheren Anodenspannungen, zusammen mit den höchsten Betriebsfrequenzen, ist ein schwacher Luftstrom auf die Röhre notwendig. Ein kleiner Ventilator wird hierzu genügen; es wird empfohlen dieser Ventilator unterhalb der Röhrenfassung zu montieren




Dimensions in mm
Dimensions en mm
Abmessungen in mm

Mounting position: vertical
Montage : vertical
Einbau : senkrecht

Accessories
Accessoires
Zubehör

Socket
Support B8 700 51
Fassung

Anode clip
Borne de connexion de l'anode 40665
Anodenanschlussklemme

Net weight
Poids net 600 g
Nettogewicht

Shipping weight
Poids brut 1750 g
Bruttogewicht

# PHILIPS

H.F. CLASS C OSCILLATOR for industrial use with anode voltage from three-phase rectifier. Continuous service.
OSCILLATEUR H.F. CLASSE C pour applications industrielles avec tension anodique dérivée d'un redresseur triphasé. Service continu
HF-KLASSE C OSZILLATOR für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasengleichrichter. Dauerbetrieb

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues) C.C.S.
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f = max. 50 Mc/s | | $-V_g$ | = max. 1250 V |
| $V_a$ | = max. 7000 V | $I_g$ | = max. 300 mA [1] |
| $I_a$ | = max. 750 mA | $I_g$ | = max. 400 mA [2] |
| $W_{i_a}$ | = max. 4000 W | $R_g$ | = max. 10 kΩ |
| $W_a$ | = max. 800 W | | |

Operating conditions. Recommended grid blocking capacitor:
at high frequencies about 100 pF
at about 1 Mc/s about 1000 pF

Caractéristiques d'utilisation. Valeur recommandée du condensateur d'arrêt de la grille:
au fréquences élevées environ 100 pF
à environ 1 MHz environ 1000 pF

Betriebsdaten. Empfohlener Gitterblockierungskondensator:
bei den höchsten Frequenzen etwa 100 pF
bei etwa 1 MHz etwa 1000 pF

| | | | | | | |
|---|---|---|---|---|---|---|
| | f | = | 50 | 50 | 50 | 50 Mc/s |
| | $V_a$ | = | 6000 | 5000 | 4000 | 3000 V |
| | $I_a$ [1] | = | 600 | 700 | 700 | 700 mA |
| C.C.S. | $I_a$ [2] | = | 120 | 150 | 170 | 200 mA |
| | $I_g$ [1] | = | 150 | 160 | 180 | 200 mA |
| | $I_g$ [2] | = | 260 | 280 | 300 | 340 mA |
| | $R_g$ | = | 3 | 2,5 | 2 | 1,5 kΩ |
| | $W_{ia}$ | = | 3600 | 3500 | 2800 | 2100 W |
| | $W_a$ | = | 760 | 780 | 640 | 540 W |
| | $W_o$ | = | 2840 | 2720 | 2160 | 1560 W |
| | $\eta$ | = | 79 | 78 | 77 | 74 % |
| | $W_{\ell}$ [3] | = | 2350 | 2250 | 1750 | 1250 W |
| | $R_{a\sim}$ | = | 5,4 | 3,8 | 3 | 2,25 kΩ |
| | $V_{g\sim}/V_{a\sim}$ [4] | = | 13 | 17 | 20 | 25 % |

[1]... [4]) See page 8; voir page 8; siehe Seite 8

H.F. CLASS C OSCILLATOR for industrial use with anode voltage from three-phase rectifier. Intermittent service.
OSCILLATEUR H.F. CLASSE C pour applications industrielles avec tension anodique dérivée d'un redresseur triphasé Service intermittent
HF-KLASSE C OSCILLATOR für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasen-gleichrichter. Aussetzender Betrieb

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | | | |
|---|---|---|---|---|---|
| f | = max. 50 Mc/s | | | | |
| $V_a$ | = max. 7000 V | $-V_g$ | = max. | 1250 | V |
| $I_a$ | = max. 1000 mA | $I_g$ | = max. | 300 | mA [1] |
| $W_{i_a}$ | = max. 7000 W | $I_g$ | = max. | 400 | mA [2] |
| $W_a$ | See page B / Voir page B / Siehe Seite B | $R_g$ | = max. | 10 | kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 50 | 50 Mc/s |
| $V_a$ | = | 6000 | 5000 V |
| $I_a$ | = | 950 | 900 mA [1] |
| $I_a$ | = | 180 | 200 mA [2] |
| $I_g$ | = | 190 | 190 mA [1] |
| $I_g$ | = | 390 | 390 mA [2] |
| $R_g$ | = | 2500 | 2000 Ω |
| $W_{i_a}$ | = | 5700 | 4500 W |
| $W_a$ | = | 1300 | 1125 W |
| $W_o$ | = | 4400 | 3375 W |
| $\eta$ | = | 77 | 75 % |
| $W_\ell$ [3] | = | 3600 | 2800 W |
| $R_{a\sim}$ | = | 3200 | 2700 Ω |
| $V_{g\sim}/V_{a\sim}$ [4] | = | 17 | 20 % |

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[1]... [4]) See page 8; voir page 8; siehe Seite 8

# PHILIPS

H.F. CLASS C OSCILLATOR for industrial use with anode voltage from single-phase rectifier without filter. Continuous service

OSCILLATEUR H.F. CLASSE C pour applications industrielles avec tension anodique dérivée d'un redresseur monophasé sans filtre. Service continu

HF-KLASSE C OSZILLATOR für industrielle Anwendungen mit der Anodenspannung von einem Einphasengleichrichter ohne Filter abgenommen. Dauerbetrieb

Limiting values (absolute limits)
Caractéristiques limites (limites absolues) C.C.S.
Grenzdaten (absolute Grenzwerte)

| f = max. 50 Mc/s | | | |
|---|---|---|---|
| $V_a$ = max. 6300 V | | $-V_g$ = max. 1250 V | |
| $I_a$ = max. 670 mA | | $I_g$ = max. 270 mA | [1] |
| $W_{ia}$ = max. 4000 W | | $I_g$ = max. 400 mA | [2] |
| $W_a$ = max. 800 W | | $R_g$ = max. 10 kΩ | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| C.C.S. | f = | 50 | 50 Mc/s |
| | $V_a$ = | 5400 | 4500 V |
| | $I_a$ = | 530 | 600 mA [1] |
| | $I_a$ = | 100 | 120 mA [2] |
| | $I_g$ = | 140 | 150 mA [1] |
| | $I_g$ = | 240 | 260 mA [2] |
| | $R_g$ = | 3 | 2,5 kΩ |
| | $W_{ia}$ = | 3520 | 3320 W |
| | $W_a$ = | 770 | 770 W |
| | $W_o$ = | 2750 | 2550 W |
| | $\eta$ = | 78 | 77 % |
| | $W_\ell$ [3] = | 2250 | 2100 W |
| | $R_{a\sim}$ = | 5,4 | 3,8 kΩ |
| | $V_{g\sim}/V_{a\sim}$ [4] = | 13 | 15,5 % |

[1]....[4]) See page 8; voir page 8; siehe Seite 8

H.F. CLASS C OSCILLATOR for industrial use with self-rectification. Continuous service
OSCILLATEUR H.F. CLASSE C pour applications industrielles à autoredressement. Service continu
HF-KLASSE C OSZILLATOR für industrielle Anwendungen mit Selbstgleichrichtung. Dauerbetrieb

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues) C.C.S.
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| $f$ | = max. 50 Mc/s | $-V_g$ | = max. 1250 V [5] |
| $V_{tr}$ | = max. 5600 $V_{eff}$ | $I_g$ | = max. 160 mA [1][6] |
| $I_a$ | = max. 400 mA [6] | $I_g$ | = max. 210 mA [2][6] |
| $W_{ia}$ | = max. 2250 W | $R_g$ | = max. 10 kΩ |
| $W_a$ | = max. 800 W | | |

Operating conditions. Recommended grid blocking capacitor:
at high frequencies about 100 pF
at about 1 Mc/s about 1000 pF

Caractéristiques d'utilisation. Valeur recommandée du condensateur d'arrêt de la grille:
au fréquences élevées environ 100 pF
à environ 1 MHz environ 1000 pF

Betriebsdaten. Empfohlener Gitterblockierungskondensator:
bei den höchsten Frequenzen etwa 100 pF
bei etwa 1 MHz etwa 1000 pF

C.C.S.

| | | |
|---|---|---|
| $f$ | = | 50 Mc/s |
| $V_{tr}$ | = | 5200 $V_{eff}$ |
| $I_a$ | = | 360 mA [1][6] |
| $I_a$ | = | 90 mA [2][6] |
| $I_g$ | = | 100 mA [1][6] |
| $I_g$ | = | 140 mA [2][6] |
| $R_g$ | = | 1,8 kΩ |
| $W_{ia}$ | = | 2080 W |
| $W_a$ | = | 520 W |
| $W_o$ | = | 1560 W |
| $\eta$ | = | 75 % |
| $W_\ell$ [3] | = | 1300 W |
| $R_{a\sim}$ | = | 3,2 kΩ |
| $V_{g\sim}/V_{a\sim}$ [4] | = | 17 % |

[1]...[6]) See page 8; voir page 8; siehe Seite 8

[1]) Loaded, chargé, belastet

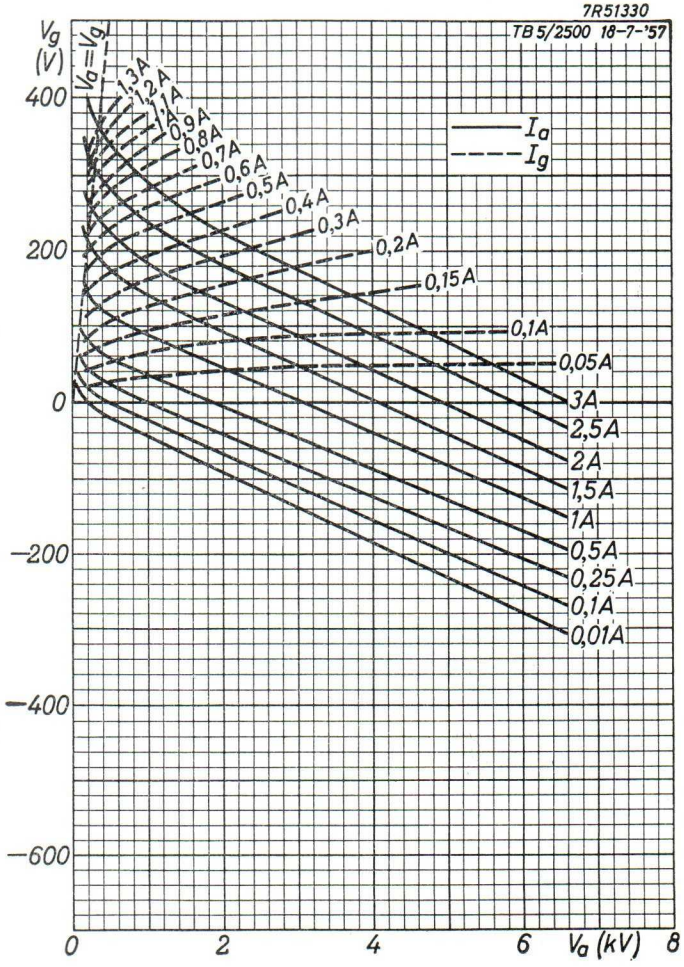
[2]) Unloaded, non-chargé, nicht belastet

[3]) $W_\ell$ = useful power in the load measured in a circuit having an efficiency of 85 %
$W_\ell$ = puissance utile dans la charge, mesurée dans un circuit avec un rendement de 85 %
$W_\ell$ = Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von 85 %

[4]) feedback ratio under loaded conditions
rapport de réaction en condition chargée
Rückkopplungsverhältnis in belastetem Zustand

[5]) At peak of mains frequency sine-wave
A la crête de l'onde sinusoïdale de la fréquence du réseau
Beim Scheitelwert der Sinuswelle der Netzfrequenz

[6]) Averaged over any mains frequency cycle
Intégré sur chaque cycle de la fréquence du réseau
Integriert über jede Periode der Netzfrequenz

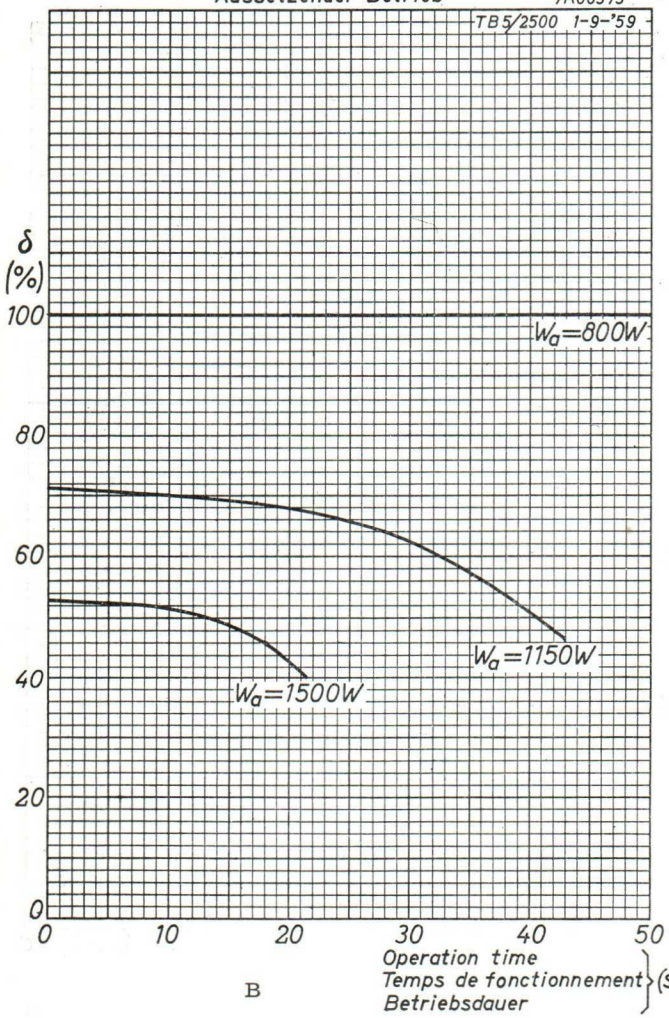

7R51330
TB 5/2500 18-7-'57
$V_g$ (V)
$V_g = V_a$
1,3A
1,2A
1,1A
1A
0,9A
0,8A
0,7A
0,6A
0,5A
0,4A
0,3A
0,2A
0,15A
0,1A
0,05A
$I_a$
$I_g$
3A
2,5A
2A
1,5A
1A
0,5A
0,25A
0,1A
0,01A
400
200
0
−200
−400
−600
0
2
4
6
8
$V_a$ (kV)

TB 5/2500

# PHILIPS

*Intermittent service*
*Service intermittent*
*Aussetzender Betrieb*

7R06373




B

TRIODE with coaxial arrangement of the terminals for use as H.F. amplifier, oscillator or frequency multiplier at frequencies up to 900 Mc/s
TRIODE avec arrangement coaxial des connexions des électrodes pour utilisation en amplificatrice ou oscillatrice H.F., ou en multiplicatrice de fréquence jusqu'à 900 MHz
TRIODE mit koaxialer Anordnung der Elektrodenanschlüsse zur Verwendung als HF-Verstärker, Oszillator oder Frequenzvervielfacher bis zu 900 MHz

Cooling : forced air
Refroidissement : par ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden : thoriertes Wolfram

| | | | | | |
|---|---|---|---|---|---|
| Heating | : direct | f < 600 | 600-750 | 750-900 | MHz |
| Chauffage | : direct | $V_f$ = 3,4 | 3,3 | 3,2 | V |
| Heizung | : direkt | $I_f$ = 19 | - | - | A |

| | | | |
|---|---|---|---|
| Capacitances | $C_a$ < | 0,12 | pF |
| Capacités | $C_g$ = | 9 | pF |
| Kapazitäten | $C_{ag}$ = | 4 | pF |

Typical characteristics / Caractéristiques types / Kenndaten: $\mu$ ($V_a$ = 2000 V, $I_a$ = 150 mA) = ~ 32; S = 10 mA/V

| λ | f | C telegr. | | C an. mod. | |
|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 1,70 | 175 | 2500 | 475 | 2000 | 505 |
| 1,00 | 300 | 2000 | 460 | 1600 | 370 |
| 0,64 | 470 | 1750 | 405 | 1400 | 275 |
| 0,50 | 600 | 1600 | 350 | 1280 | 225 |
| 0,33 | 900 | 1300 | 155 | 1040 | 107 |

Industrial oscillator class C
Oscillatrice industrielle classe C
Industrieller Oszillator Klasse C

| λ | freq. | A.C. operation à courant alternatif Wechselstromspeisung | | single-phase full-wave [1] monophasé à deux alternances einphasig vollweg | |
|---|---|---|---|---|---|
| (m) | (Mc/s) | Vtr (V) | $W_o$ (W) | $V_a$ (V) | $W_o$ (W) |
| 0,64 | 470 | 1750 | 235 | 1750 | 385 |

[1]) With filter; avec filtre; mit Filter

# PHILIPS

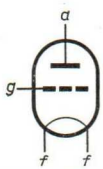
Air cooling characteristics
Caractéristiques du refroidissement par air
Luftkühlungsdaten

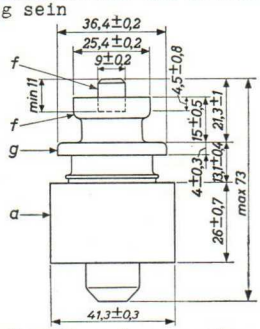
| Wa (W) | h (m) | ti max. (°C) | q min ($m^3$/min) | pi (mm $H_2O$) |
|---|---|---|---|---|
| | 0 | 45 | 0,45 | 24,0 |
| ≦ 300 | 1500 | 35 | 0,46 | 22,5 |
| | 3000 | 25 | 0,49 | 21,5 |

Temperature of envelope
Température de l'enveloppe = max. 200 °C
Temperatur der Hülle

Generally it will be necessary to direct an air flow to the centre filament seal
En général il sera nécessaire de diriger un courant d'air sur le scellement central du filament
Im allgemeinen wird ein Luftstrom auf die mittlere Heizfadeneinschmelzung nötig sein

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical with anode up or down
Montage : vertical avec l'anode en haut ou en bas
Einbau : senkrecht mit der Anode oben oder unten

Net weight
Poids net 143 g
Nettogewicht

Shipping weight
Poids brut 225 g
Bruttogewicht

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| f | | 175 | 300 | 470 | 600 | 900 Mc/s |
|---|---|---|---|---|---|---|
| $V_a$ | = max. | 2500 | 2000 | 1750 | 1600 | 1300 V |
| $I_a$ | = max. | 400 | 400 | 400 | 400 | 400 mA |
| $-V_g$ | = max. | 300 | 300 | 300 | 300 | 300 V |
| $I_g$ | = max. | 120 | 120 | 120 | 120 | 120 mA |
| $W_{ia}$ | = max. | 1000 | 800 | 700 | 640 | 520 W |
| $W_a$ | = max. | 300 | 300 | 300 | 300 | 300 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

Data for grounded grid circuit except for the data at 175 Mc/s which refer to a grounded cathode circuit

Données pour un circuit avec grille mise à la terre, à l'exception des données à 175 MHz, qui se rapportent à un circuit avec cathode mise à la terre

Daten für Gitterbasisschaltung mit Ausnahme der Daten bei 175 MHz, die sich auf eine Katodenbasisschaltung beziehen

| f | = | 175 | 300 | 470 | 600 | 900 Mc/s |
|---|---|---|---|---|---|---|
| $V_a$ | = | 2500 | 2000 | 1750 | 1600 | 1300 V |
| $I_a$ | = | 260 | 335 | 380 | 400 | 350 mA |
| $V_g$ | = | -200 | -120 | -105 | -90 | -60 V |
| $I_g$ | = | 100 | 100 | 100 | 100 | 100 mA |
| $V_{gp}$ | = | 275 | - | - | - | - V |
| $W_{ig}$ | = | 25 | - | - | - | - W |
| $W_{ia}$ | = | 650 | 670 | 665 | 640 | 455 W |
| $W_a$ | = | 175 | 210 | 260 | 290 | 300 W |
| $W_o$ | = | 475 | 460 | 405 | 350 | 155 W |
| $\eta$ | = | 73 | 69 | 61 | 55 | 34 % |

[1] With respect to cathode
Par rapport à la cathode
In Bezug auf die Katode

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF-Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| f | | 175 | 300 | 470 | 600 | 900 | Mc/s |
|---|---|---|---|---|---|---|---|
| $V_a$ | = max. | 2000 | 1600 | 1400 | 1280 | 1040 | V |
| $I_a$ | = max. | 335 | 335 | 335 | 335 | 335 | mA |
| $-V_g$ | = max. | 300 | 300 | 300 | 300 | 300 | V |
| $I_g$ | = max. | 120 | 120 | 120 | 120 | 120 | mA |
| $W_{ia}$ | = max. | 670 | 536 | 465 | 429 | 348 | W |
| $W_a$ | = max. | 200 | 200 | 200 | 200 | 200 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

Data for grounded grid circuit except for the data at 175 Mc/s which refer to a grounded cathode circuit

Données pour un circuit avec grille mise à la terre, à l'exception des données à 175 MHz, qui se rapportent à un circuit avec cathode mise à la terre

Daten für Gitterbasisschaltung mit Ausnahme der Daten bei 175 MHz, die sich auf eine Katodenbasisschaltung beziehen

| f | = | 175 | 300 | 470 | 600 | 900 | Mc/s |
|---|---|---|---|---|---|---|---|
| $V_a$ [1] | = | 2000 | 1600 | 1400 | 1280 | 1040 | V |
| $I_a$ | = | 335 | 335 | 332 | 332 | 290 | mA |
| $V_g$ | = | -200 [3] | -140 [3] | -120 | -100 | -80 | V |
| $I_g$ | = | 120 | 120 | 110 | 100 | 80 | mA |
| $V_{gp}$ | = | 275 | - | - | - | - | V |
| $W_{ig}$ | = | 30 | - | - | - | - | W |
| $W_{ia}$ | = | 670 | 536 | 465 | 425 | 302 | W |
| $W_a$ | = | 165 | 166 | 190 | 200 | 200 | W |
| $W_o$ | = | 505 | 370 | 275 | 225 | 102 | W |
| $\eta$ | = | 75,5 | 69 | 59 | 53 | 34 | % |
| m | = | 100 | 100 | 100 | 100 | 100 | % |
| $W_{mod}$ | = | 335 | 268 | 233 | 213 | 151 | W |

1) See page 3; voir page 3; siehe Seite 3
3) Partially fixed bias
Polarisation de grille partiellement fixe
Gittervorspannung zum Teil fest

Operating conditions as H.F. class C oscillator for industrial use with self rectification
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles à autoredressement
Betriebsdaten als H.F. Klasse C Oszillator für industrielle Anwendungen mit Selbstgleichrichtung

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = | 470 | Mc/s |
| $V_{tr}$ | = max. | 1800 | Veff |
| $I_a$ | = max. | 210 | mA |
| $I_g$ [1] | = max. | 85 | mA |
| $I_g$ [2] | = max. | 120 | mA |
| $-V_g$ | = max. | 500 | V |
| $W_a$ | = max. | 170 | W |
| $W_{ia}$ | = max. | 400 | W |
| $R_g$ | = max. | 5 | kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 470 | Mc/s |
| $V_{tr}$ | = | 1750 | Veff |
| $I_a$ [1] | = | 185 | mA |
| $I_a$ [2] | = | 105 | mA |
| $I_g$ [1] | = | 75 | mA |
| $I_g$ [2][3] | = | 80 | mA |
| $R_g$ [4] | = | 400 | Ω |
| $W_{ia}$ | = | 365 | W |
| $W_a$ | = | 130 | W |
| $W_o$ | = | 235 | W |
| $\eta$ | = | 64 | % |
| $W_\ell$ [5] | = | 165 | W |

[1]) Loaded, chargé, belastet

[2]) Unloaded, non-chargé, nicht belastet

[3]) The grid resistance is obtained by a current stabilising device
La résistance de grille est obtenue par moyen d'un dispositif de stabilisation de courant
Der Gitterwiderstand wird von einer Stromstabilisierungsvorrichtung gebildet

[4])[5]) See page 6; siehe Seite 6; voir page 6

# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from single-phase full-wave rectifier with filter
Oscillateur H.F. classe C pour des appliquations industrielles avec tension anodique dérivée d'un redresseur monophasé à deux alternances avec filtre
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Einphasen-Vollweggleichrichter mit Filter

Limiting values
Caractéristiques limites
Grenzdaten

| f | = | 470 Mc/s |
|---|---|---|
| $V_a$ | = max. | 1800 V |
| $I_a$ | = max. | 400 mA |
| $I_g$ [1] | = max. | 110 mA |
| $I_g$ [2] | = max. | 120 mA |
| $-V_g$ | = max. | 300 V |
| $W_a$ | = max. | 300 W |
| $W_{ia}$ | = max. | 700 W |
| $R_g$ | = max. | 5 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f | = | 470 Mc/s |
|---|---|---|
| $V_a$ | = | 1750 V |
| $I_a$ [1] | = | 340 mA |
| $I_a$ [2] | = | 170 mA |
| $I_g$ [1] | = | 95 mA |
| $I_g$ [2][3] | = | 100 mA |
| $R_g$ [4] | = | 1000 Ω |
| $W_{ia}$ | = | 595 W |
| $W_a$ | = | 210 W |
| $W_o$ | = | 385 W |
| $\eta$ | = | 65 % |
| $W_\ell$ | = | 270 W |

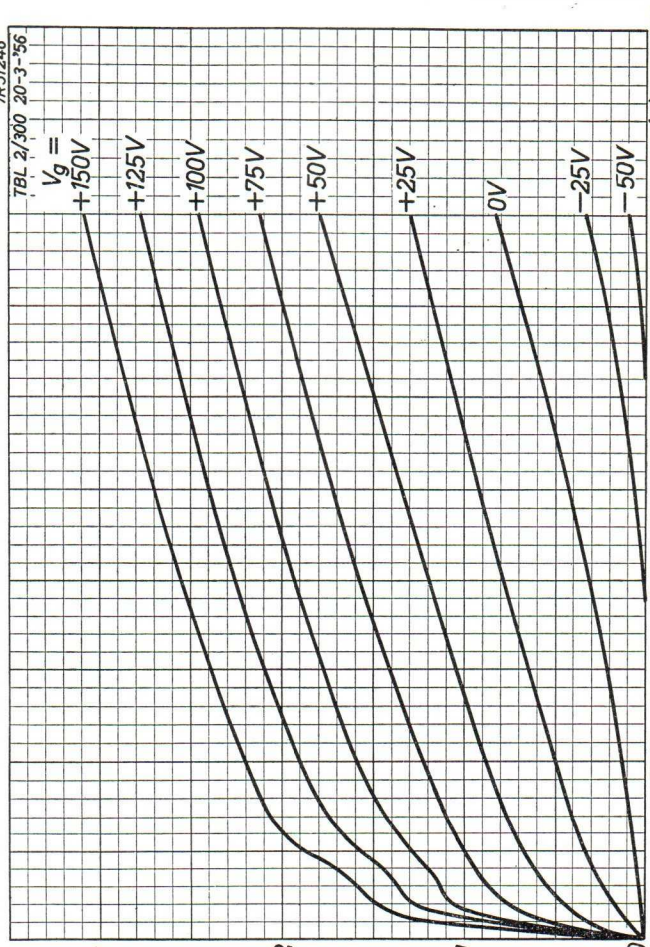
[1][2][3] See page 5; voir page 5; siehe Seite 5

[4] Under matched conditions
Dans la condition d'adaptation
In angepasstem Zustand

[5] Useful power in the load measured by a calorimetric method
Puissance utile dans la charge, mesurée par une méthode calorimétrique
Nutzleistung in der Belastung, gemessen nach einem kalorimetrischen Verfahren

# PHILIPS

**TBL 2/300**



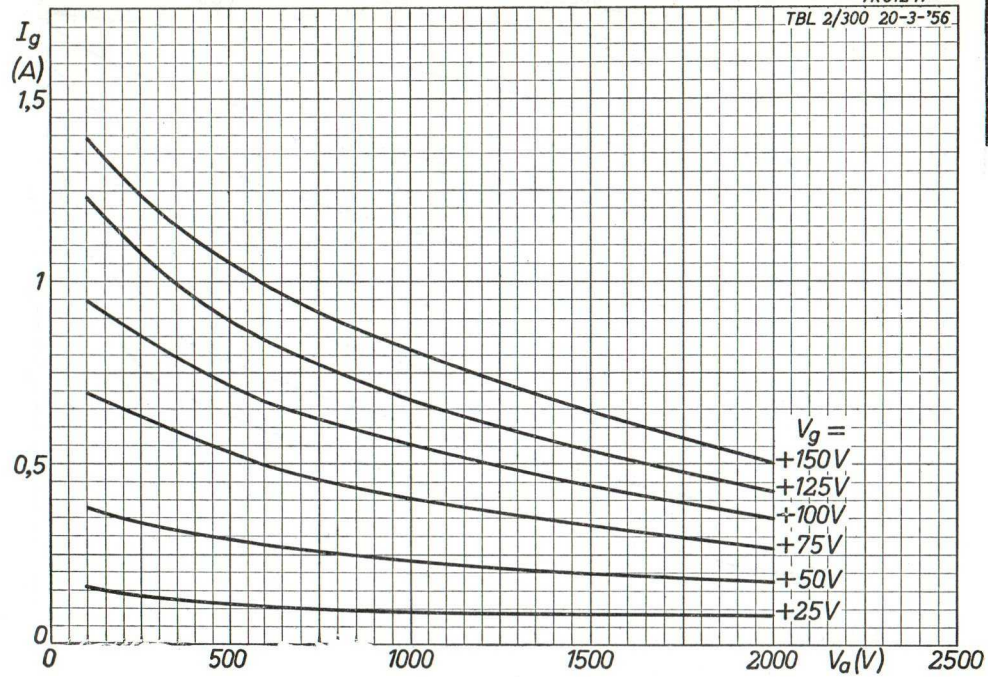

3.3.1956

7R51247

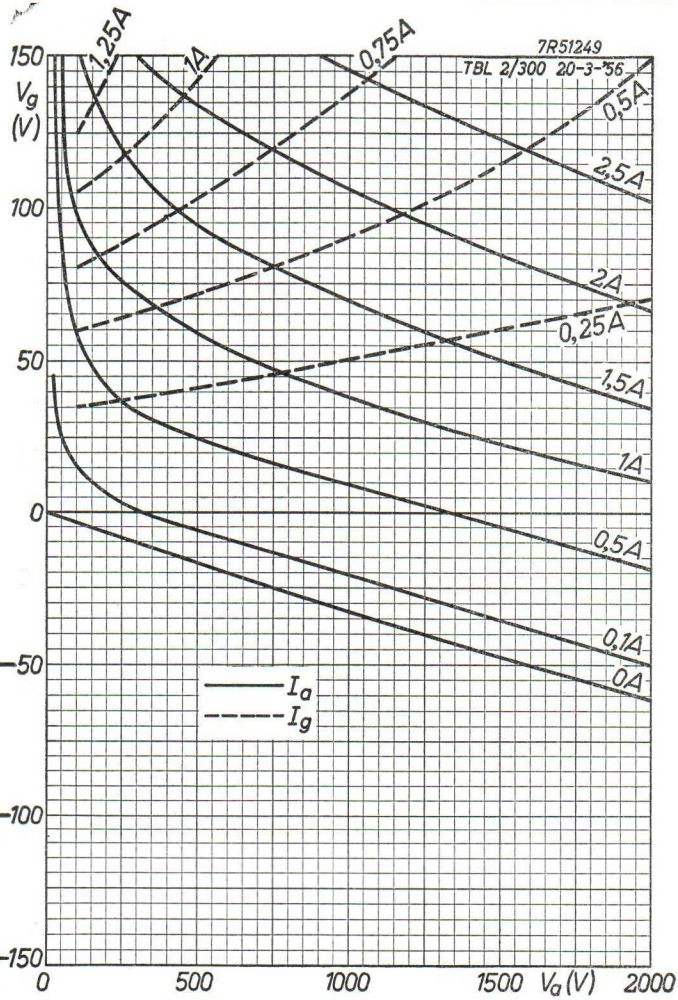
TBL 2/300 20-3-'56

TBL 2/300

PHILIPS

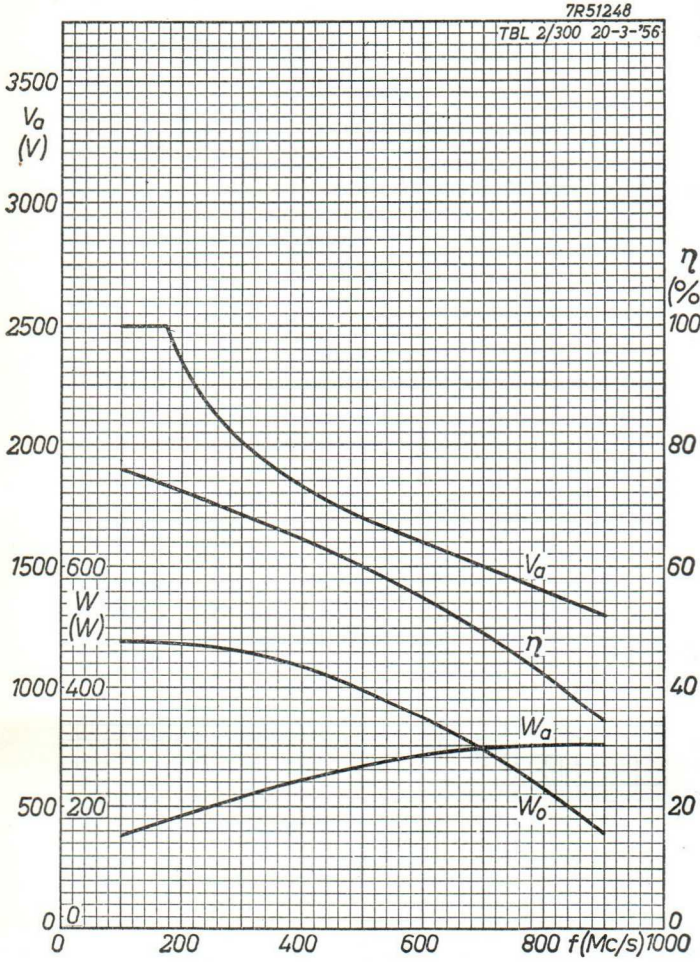



B


7R51249
TBL 2/300 20-3-'56
1,25A
1A
0,75A
0,5A
2,5A
2A
0,25A
1,5A
1A
0,5A
0,1A
0A
$I_a$
$I_g$
150
$V_g$ (V)
100
50
0
−50
−100
−150
0
500
1000
1500
$V_a$ (V)
2000

TBL 2/300

# PHILIPS




D

FORCED AIR COOLED TRIODE WITH CERAMIC ENVELOPE and coaxial arrangement of the terminals for use as R.F. amplifier, oscillator or frequency multiplier at frequencies up to 900 Mc/s

TRIODE A REFROIDISSEMENT PAR VENTILATION FORCEE AVEC ENVELOPPE CERAMIQUE et arrangement coaxial des connexions des électrodes pour utilisation en amplificatrice, oscillatrice ou multiplicatrice de fréquence jusqu'à 900 MHz

PRESSLUFTGEKÜHLTE TRIODE MIT KERAMISCHER UMHÜLLUNG und koaxialer Anordnung der Elektrodenanschlüsse zur Verwendung als HF-Verstärker, Oszillator oder Frequenzvervielfacher bis zu 900 MHz

Filament : thoriated tungsten
Filament : tungstène thorié
Glühfaden: thoriertes Wolfram

| | | | | |
|---|---|---|---|---|
| Heating : direct | f = | <600 | 600-750 | 750-900 Mc/s |
| Chauffage: direct | $V_f$ = | 3,4 | 3,3 | 3,2 V |
| Heizung : direkt | $I_f$ = | 19 | | A |

| | | | |
|---|---|---|---|
| Capacitances | Ca | < | 0,12 pF |
| Capacités | Cg | = | 11,5 pF |
| Kapazitäten | Cag | = | 6,5 pF |

| | | | | |
|---|---|---|---|---|
| Typical characteristics | $\mu$ { $V_a$ = 2000 V } | = | 33 | |
| Caractéristiques types | $S$ { $I_a$ = 200 mA } | = | 10 | mA/V |
| Kenndaten | | | | |

Temperatures
Températures
Temperaturen

Temperature of seal between filament terminals
Température du scellement entre les connexions du filament = max. 200 °C
Temperatur der Einschmelzung zwischen den Glühfadenanschlüssen

Temperature of other seals
Température des autres scellements = max. 250 °C
Temperatur der übrigen Einschmelzungen

Net weight
Poids net 157 g
Nettogewicht

Shipping weight
Poids brut 250 g
Bruttogewicht

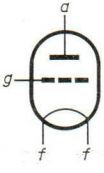
# PHILIPS

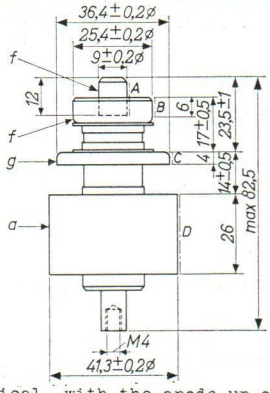
Cooling characteristics
Caractéristiques de refroidissement
Kühldaten

| $W_a$ (W) | h (m) | $t_i$ max. (°C) | q min ($m^3$/min) | $p_i$ (mm $H_2O$) |
|---|---|---|---|---|
| 400 | 0 | 45 | 0,65 | 12 |
| | 1500 | 35 | 0,65 | 12 |
| | 3000 | 25 | 0,65 | 12 |

The required quantity of air is independent of $W_a$ and frequency
La quantité d'air requise est indépendante de $W_a$ et de la fréquence
Die erforderliche Luftmenge ist unabhängig von Wa und der Frequenz

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical, with the anode up or down
Montage : vertical, avec l'anode en haut ou en bas
Einbau : Senkrecht, mit der Anode oben oder unten

Eccentricity of the electrode connections: The electrode connections A, B and C are within cylindrical surfaces having a diameter of 9.5, 25.9 and 36.9 mm respectively and being concentric with the cylindrical surface D
Excentricité des connexions des électrodes: Les connexions des électrodes A, B et C sont situées au-dedans de surfaces cylindriquesd'un diamètre de 9,5; 25,9 et 36,9 mm successivement et concentriques avec la surface cylindrique D
Exzentrizität der Elektrodenanschlüsse: Die Elektrodenanschlüsse A,B und C befinden sich innerhalb zylindrischer Flächen mit Durchmesser von beziehungsweise 9,5; 25,9 und 36,9 mm und konzentrisch mit der Zylinderfläche D

R.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | | 470 | 600 | 900 | Mc/s |
|---|---|---|---|---|---|
| Va | = max. | 2200 | 2100 | 2000 | V |
| Wia | = max. | 880 | 840 | 800 | W |
| Wa | = max. | 400 | 400 | 400 | W |
| Ia | = max. | 400 | 400 | 400 | mA |
| -Vg | = max. | 300 | 300 | 300 | V |
| Ig | = max. | 120 | 120 | 120 | mA |

Operating conditions, grounded grid
Caractéristiques d'utilisation, grille mise à la terre
Betriebsdaten, Gitterbasisschaltung

| f | = | 470 | 640 | 730 | 810 | Mc/s |
|---|---|---|---|---|---|---|
| Va[1]) | = | 2000 | 1800 | 1800 | 1800 | V |
| Ia | = | 400 | 400 | 400 | 400 | mA |
| -Vg | = | 140 | 120 | 120 | 120 | V |
| Ig | = | 120 | 100 | 100 | 100 | mA |
| Wig | = | 120 | 105 | 105 | 105 | W |
| Wia | = | 800 | 720 | 720 | 720 | W |
| Wa | = | 290 | 310 | 340 | 392 | W |
| Wo[2]) | = | 510+85 | 410+80 | 380+80 | 328+80 | W |
| $\eta$ [3]) | = | 63,5 | 57 | 53 | 45,5 | % |

---

[1]) With respect to cathode
Par rapport à la cathode
In Bezug auf die Katode

[2]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pré-amplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[3]) Pure valve efficiency
Rendement net du tube
Reiner Röhrenwirkungsgrad

# PHILIPS

R.F. class C oscillator for industrial use
Oscillateur H.F. classe C pour utilisation industrielle
HF-Klasse C Oszillator für industrielle Anwendungen

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f | = | 470 Mc/s | 900 Mc/s |
|---|---|---|---|
| $V_a$ | = max. | 2200 | 2000 V |
| $W_{ia}$ | = max. | 880 | 800 W |
| $W_a$ | = max. | 400 | 400 W |
| $I_a$ | = max. | 400 | 400 mA |
| $-V_g$ | = max. | 300 | 300 V |
| $I_g$ | = max. | 120 | 120 mA [1] |
| $I_g$ | = max. | 130 | 130 mA [2] |
| $R_g$ | = max. | 10 | 10 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f | = | 470 | 810 Mc/s |
|---|---|---|---|
| $V_a$ | = | 2000 | 1800 V |
| $I_a$ | = | 380 | 380 mA [1] |
| $I_a$ | = | 170 | - mA [2] |
| $R_g$ | = | 1000 | 1000 Ω [3] |
| $I_g$ | = | 110 | 110 mA [1] |
| $I_g$ | = | 120 | 120 mA [2] |
| $W_{ia}$ | = | 760 | 684 W |
| $W_a$ | = | 280 | 400 W |
| $W_o$ | = | 480 | 284 W |
| $\eta$ | = | 63 | 41 % |
| $W_\ell$ | = | 340 | 200 W [4] |

[1][2][4]) See page 5; voir page 5; siehe Seite 5.

[3]) Grid resistance obtained by current stabilizing device; value under loaded conditions
La résistance de grille est obtenue par un dispositif de stabilisation de courant; valeur dans la condition chargée.
Der Gitterwiderstand wird erhalten mittels einer Stromstabilisierungsvorrichtung; der angegebene Wert gilt in belastetem Zustand.

R.F. class C oscillator with self-rectification for industrial use (grounded grid)
Oscillateur H.F. classe C à auto-redressement pour utilisation industrielle(grille mise à la terre)
HF-Klasse C Oszillator mit Selbstgleichrichtung für industrielle Anwendungen (Gitterbasisschaltung)

Limiting values (Absolute limits)
Caracteristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

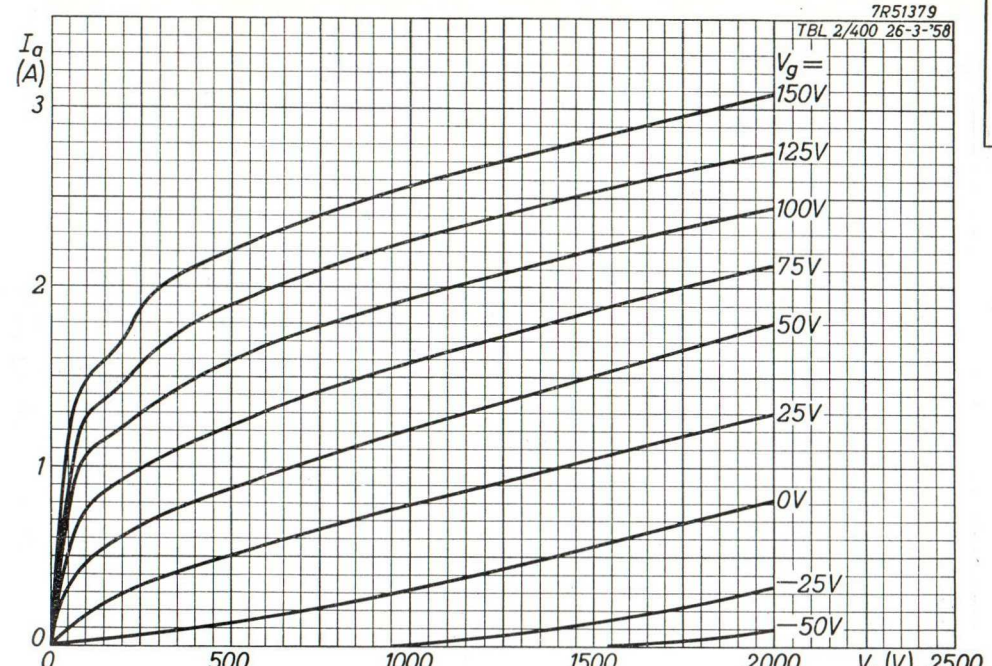
| | | | |
|---|---|---|---|
| | f | = | 470 Mc/s |
| | $V_{tr}$ | = max. | 2000 $V_{eff}$ |
| Voltages with respect to the cathode | $W_{ia}$ | = max. | 450 W |
| | $W_a$ | = max. | 170 W |
| Tensions par rapport à la cathode | $I_a$ | = max. | 210 mA |
| | $-V_g$ | = max. | 300 V |
| Spannungen in bezug auf die Katode | $I_g$ | = max. | 85 mA [1] |
| | $I_g$ | = max. | 120 mA [2] |
| | $R_g$ | = max. | 5 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| | f | = | 470 Mc/s |
| | $V_{tr}$ | = | 1800 Veff |
| Voltages with respect to the cathode | $I_a$ | = | 190 mA [1] |
| | $I_a$ | = | 110 mA [2] |
| Tensions par rapport à la cathode | $I_g$ | = | 70 mA [1] |
| | $I_g$ | = | 100 mA [2] |
| Spannungen in bezug auf die Katode | $R_g$ | = | 400 Ω |
| | $W_{ia}$ | = | 380 W |
| | $W_a$ | = | 150 W |
| | $W_o$ | = | 230 W |
| | $\eta$ | = | 60 % |
| | $W_\ell$ | = | 160 w [4] |

[1]) Loaded; chargé; belastet
[2]) Unloaded; sans charge; unbelastet
[4]) Useful power in the load
Puissance utile dans la charge
Nutzleistung in der Belastung

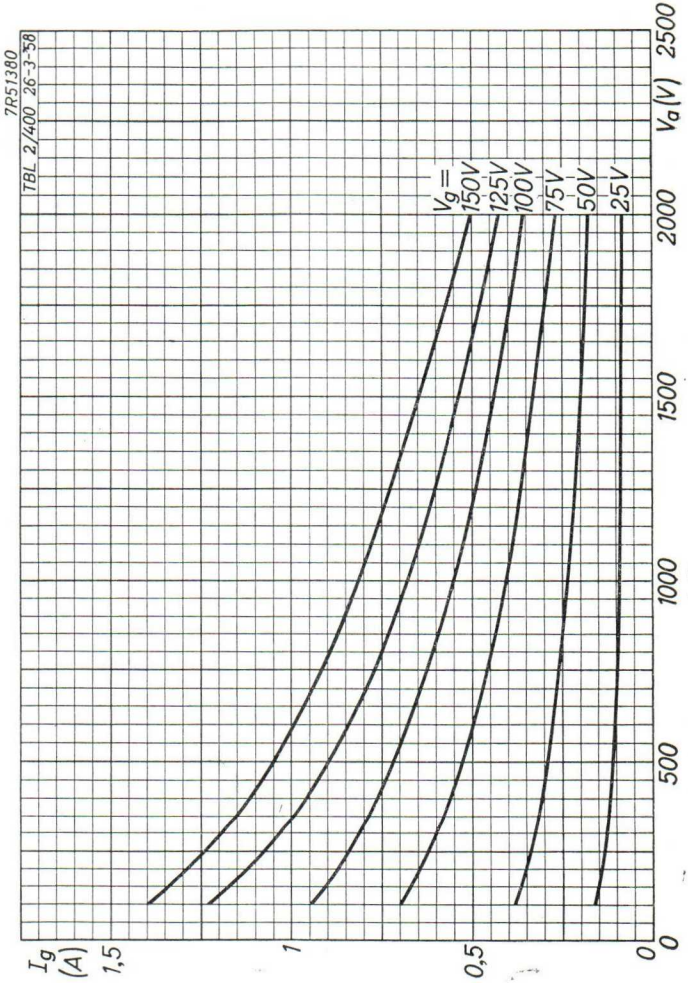
PHILIPS


7R51379
TBL 2/400 26-3-'58
$I_a$ (A)
3
2
1
0
$V_g$ =
150V
125V
100V
75V
50V
25V
0V
−25V
−50V
0
500
1000
1500
2000
$V_a$ (V) 2500

A

# PHILIPS

**TBL 2/400**

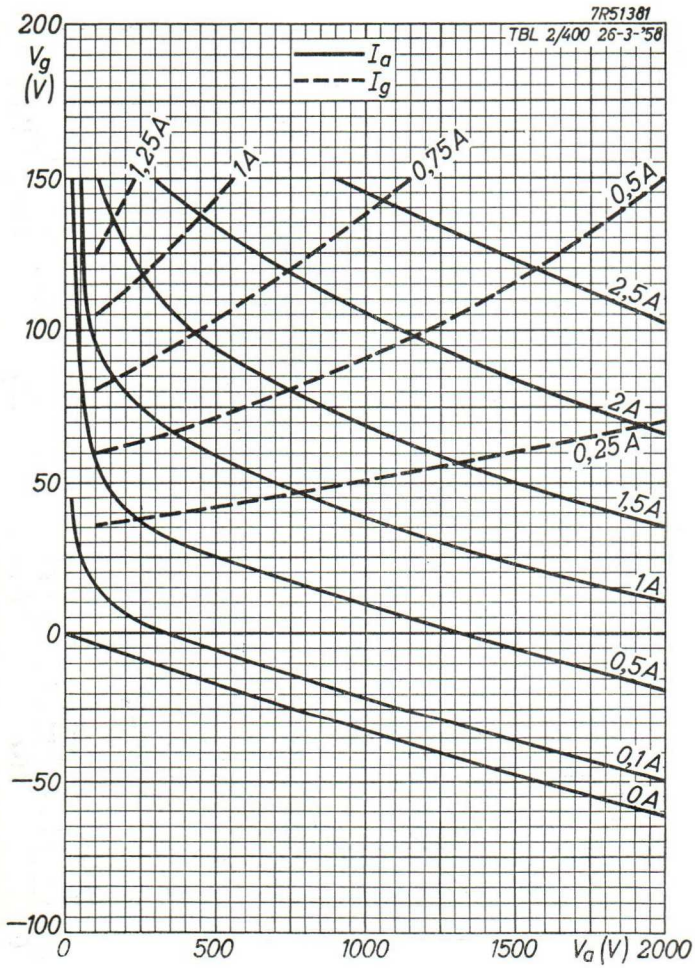



5.5.1959

B

**TBL 2/400**

# PHILIPS




C

# PHILIPS

**TBL 2/500**

FORCED AIR COOLED TRIODE WITH CERAMIC ENVELOPE and coaxial arrangement of the terminals for use as U.H.F. amplifier
TRIODE A REFROIDISSEMENT PAR VENTILATION FORCEE AVEC ENVELOPPE CERAMIQUE et arrangement coaxial des connexions des électrodes pour utilisation en amplificatrice U.H.F.
PRESSLUFTGEKÜHLTE TRIODE MIT KERAMISCHER UMHULLUNG und koaxialer Anordnung der Elektrodenanschlüsse zur Verwendung als UHF-Verstärker

Filament : thoriated tungsten
Filament : tungstène thorié
Glühfaden: thoriertes Wolfram

| Heating : direct<br>Chauffage: direct<br>Heizung : direkt | f | < 600 | 600-750 | > 750 | Mc/s |
|---|---|---|---|---|---|
| | $V_f$ = | 3,4 | 3,3 | 3,2 | V |
| | $I_f$ = | 19 | | | A |

| Capacitances<br>Capacités<br>Kapazitäten | | |
|---|---|---|
| | $C_a$ = | 0,05 pF |
| | $C_g$ = | 11 pF |
| | $C_{ag}$ = | 3,8 pF |

| Typical characteristics<br>Caractéristiques types<br>Kenndaten | | |
|---|---|---|
| | $V_a$ = | 2400 V |
| | $I_a$ = | 240 mA |
| | $\mu$ = | 70 |
| | S = | 14 mA/V |

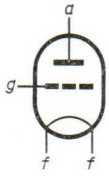
Temperatures and cooling
Températures et refroidissement
Temperaturen und Kühlung

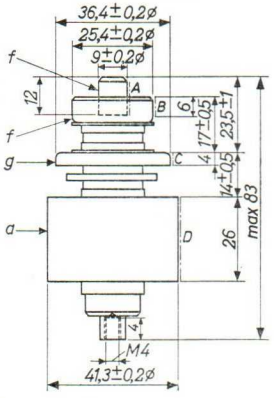
Temperature of envelope
Température de l'enveloppe
Temperatur der Umhüllung = max. 200 °C

| $W_a$ (W) | h (m) | ti max. (°C) | q min. ($m^3$/min.) | pi (mm $H_2O$) |
|---|---|---|---|---|
| 500 | 0 | 45 | 0,9 | 24 |
| | 1500 | 35 | 0,9 | 20 |
| | 3000 | 25 | 1,0 | 21 |

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical, with the anode up or down
Montage : vertical, avec l'anode en haut ou en bas
Einbau : senkrecht, mit der Anode oben oder unten

Eccentricity of the electrode connections: The electrode connections A, B and C are within cylindrical surfaces having a diameter of 9.5, 25.9 and 36.9 mm respectively and being concentric with the cylindrical surface D
Excentricité des connexions des électrodes: Les connexions des électrodes A, B et C sont situées au-dedans de surfaces cylindriques d'un diamètre de 9,5; 25,9 et 36,9 mm successivement et concentriques avec la surface cylindrique D
Exzentrizität der Elektrodenanschlüsse: Die Elektrodenanschlüsse A, B und C befinden sich innerhalb zylindrischer Flächen mit Durchmesser von beziehungsweise 9,5; 25,9 und 36,9 mm und konzentrisch mit der Zylinderfläche D

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 157 g | Poids brut | 250 g |
| Nettogewicht | | Bruttogewicht | |

H.F. class C telegraphy or F.M. telephony
H.F. classe C télégraphie ou F.M. téléphonie
HF-KLASSE C Telegraphie oder FM-Telephonie

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| f = max. | 400 | 625 | 940 | Mc/s |
|---|---|---|---|---|
| $V_a$ = max. | 2700 | 2500 | 2000 | V |
| $W_{ia}$ = max. | 1000 | 880 | 800 | W |
| $W_a$ = max. | 500 | 500 | 500 | W |
| $I_a$ = max. | 400 | 400 | 400 | mA |
| $-V_g$ = max. | 300 | 300 | 300 | V |
| $I_g$ = max. | 175 | 175 | 160 | mA |

Operating conditions (grounded grid)
Caractéristiques d'utilisation (grille mise à la terre)
Betriebsdaten (Gitterbasisschaltung)

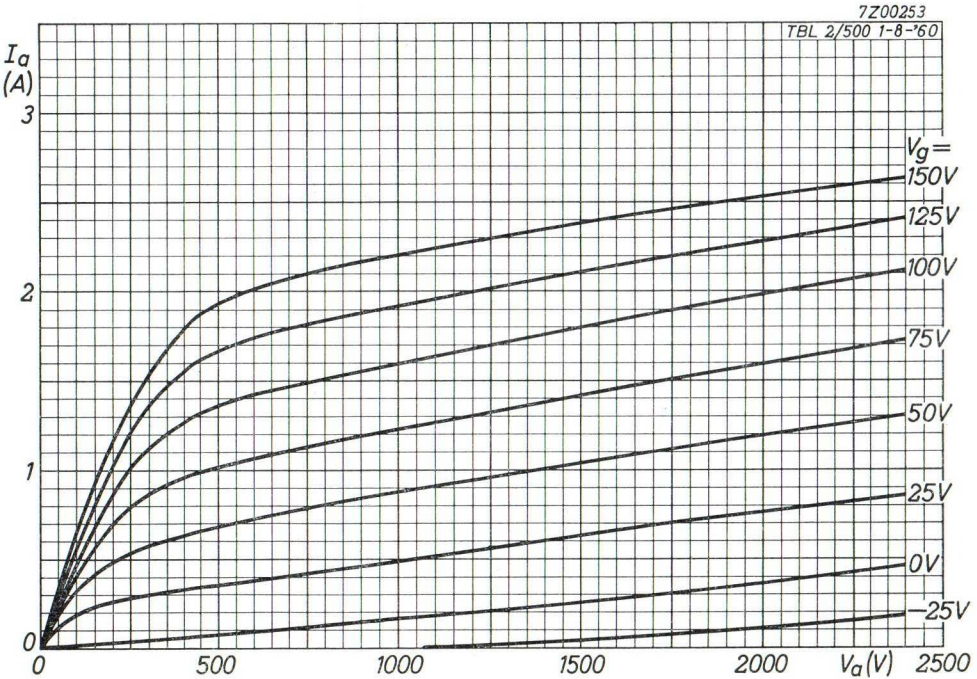
| f = | 400 | 625 | Mc/s |
|---|---|---|---|
| $V_a$ = | 2500 | 2200 | V |
| $-V_g$ = | 70 | 60 | V |
| $I_a$ = | 380 | 380 | mA |
| $I_g$ = | 160 | 170 | mA |
| $W_{ia}$ = | 950 | 835 | W |
| $W_{ig}$ = | 70 | 65 | W |
| $W_a$ = | 330 | 302 | W |
| $W_o$ = | 620+50 | 533+47 | W [1] |
| $\eta$ = | 65 | 64 | % [2] |
| $W_\ell$ = | 470 | 405 | W [3] |
| $W_o/W_i$ = | 9,6 | 8,9 | |

[1] Power transferred from driving stage included
Y compris la puissance transmise de l'étage préamplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[2] Pure tube efficiency
Rendement net du tube
Reiner Röhrenwirkungsgrad

[3] Useful power in the load measured in a circuit having an efficiency of 70 %
Puissance utile dans la charge, mesurée dans un circuit avec un rendement de 70 %
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von 70 %

9.9.1960



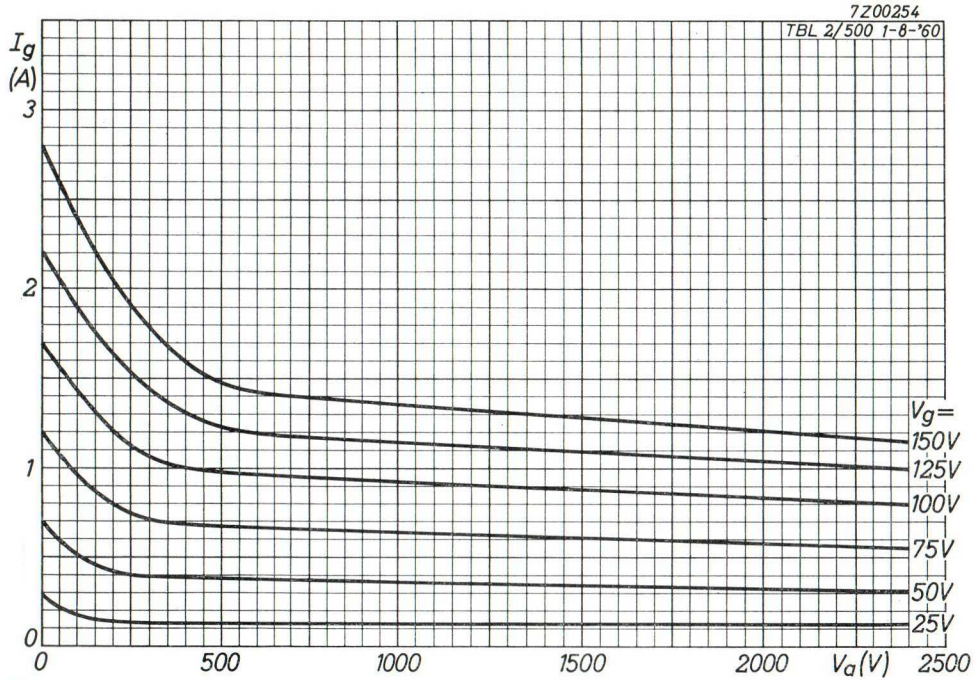

PHILIPS

TBL 2/500

A

TBL 2/500

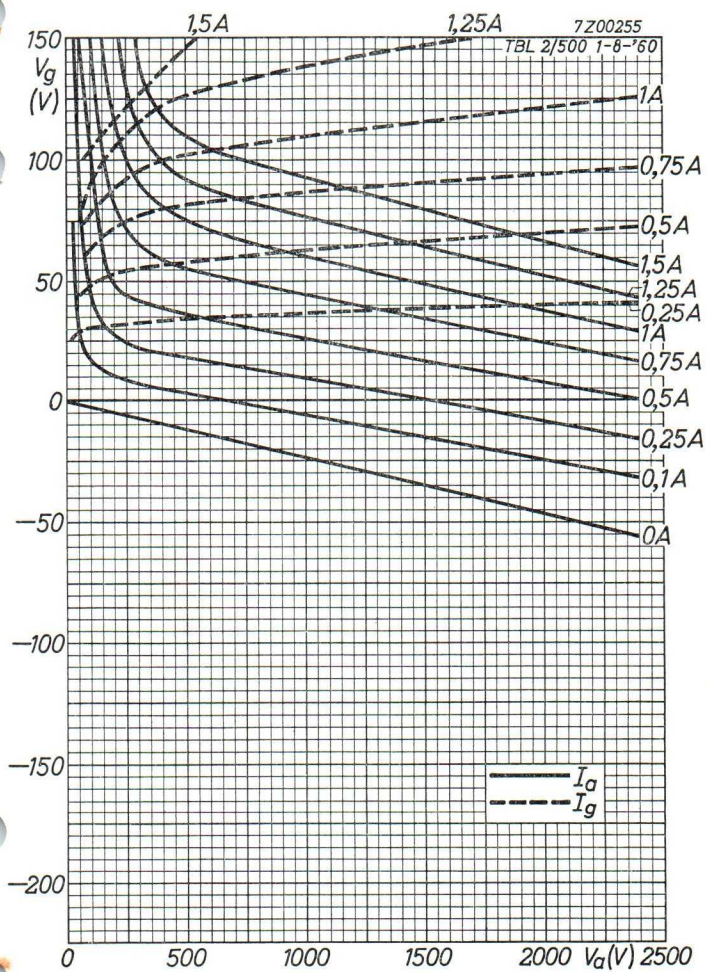
PHILIPS




B

# PHILIPS

**TBL 2/500**




9.9.1960

C

TRIODE for use in industrial R.F. generators
TRIODE pour utilisation dans les générateurs H.F. industriels
TRIODE zur Verwendung in industriellen HF-Generatoren

Cooling : forced air
Refroidissement: par ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f = 6{,}3\ V\ ^{+5\%}_{-10\%}$
$I_f = 130\ A$

The filament current must never exceed a peak value of 280 A at any time during the initial energizing schedule
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 280 A
Der Anlaufstrom darf niemals einen Scheitelwert von 280 A überschreiten

Capacitances
Capacités
Kapazitäten

$C_a = 1{,}2\ pF$
$C_g = 44{,}5\ pF$ ←
$C_{ag} = 33{,}5\ pF$

Typical characteristics
Caractéristiques types
Kenndaten

$V_a = 6\ kV$
$I_a = 2{,}5\ A$
$S = 23\ mA/V$
$\mu = 17{,}5$

Temperatures; températures; Temperaturen

Temperature of all seals
Température de tous les scellements = max. 220 °C
Temperatur aller Einschmelzungen

Net weight
Poids net 3,8 kg
Nettogewicht

Shipping weight
Poids brut 9,2 kg
Bruttogewicht

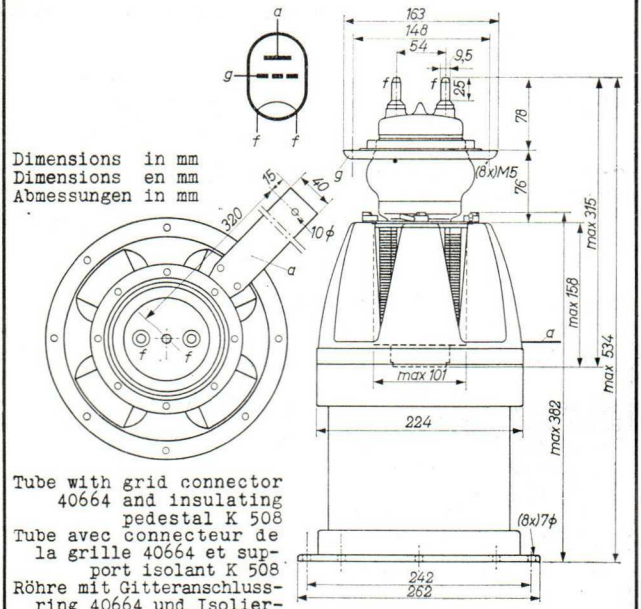
Net weight insulating pedestal K 508
Poids net du support isolant K 508 7,4 kg
Nettogewicht des Isoliersockels ←

Shipping weight insulating pedestal
Poids brut du support isolant 9,1 kg
Bruttogewicht des Isoliersockels

# PHILIPS

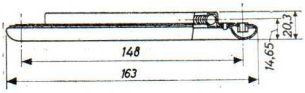
Air cooling characteristics
Caractéristiques du refroidissement par air
Luftkühlungsdaten

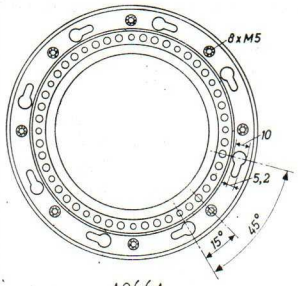
| Wa (kW) | h (m) | ti (°C) | qmin (m³/min) | pi (mm $H_2O$) |
|---|---|---|---|---|
| 5 | 0 | 45 | 5,9 | 15 |
| | 0 | 35 | 5,2 | 12 |
| | 1500 | 35 | 6,2 | 14 |
| | 3000 | 25 | 6,6 | 15 |
| 7,5 | 0 | 45 | 9,0 | 34 |
| | 0 | 35 | 8,0 | 27 |
| | 1500 | 35 | 9,5 | 32 |
| | 3000 | 25 | 10,2 | 34 |
| 10 | 0 | 45 | 12,3 | 63 |
| | 0 | 35 | 11 | 50 |
| | 1500 | 35 | 13 | 59 |
| | 3000 | 25 | 14 | 64 |




Dimensions in mm
Dimensions en mm
Abmessungen in mm

Tube with grid connector 40664 and insulating pedestal K 508
Tube avec connecteur de la grille 40664 et support isolant K 508
Röhre mit Gitteranschlussring 40664 und Isoliersockel K 508




40664
Grid connector
Connecteur de la grille
Gitteranschlussring

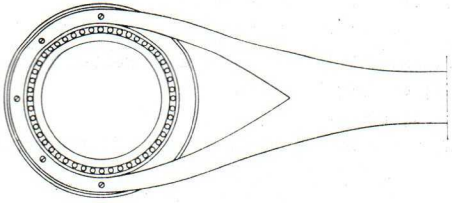
Mounting position: vertical with anode down
Montage: vertical avec l'anode en bas
Einbau: senkrecht mit der Anode unten

Filament clip
Borne de filament 40662
Heizfadenklemme

The rounded side of the grid connector should face the anode. To ensure a uniform R.F. current distribution in the grid seal at frequencies higher than 4 Mc/s, the grid lead should be connected as shown below.

Le côté arrondi du connecteur de la grille sera tourné vers l'anode. Afin d'assurer une distribution uniforme du courant H.F. dans le scellement de la grille à des fréquences supérieures à 4 MHz, le conducteur de la grille sera relié selon la figure ci-dessous.

Die abgerundete Seite des Gitteranschlussringes soll der Anode zugekehrt sein. Zur Gewährleistung einer gleichmässigen HF-Stromverteilung in der Gittereinschmelzung bei Frequenzen höher als 4 MHz, soll der Gitterleitung nach untenstehender Figur verbunden werden.



# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from three-phase rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec la tension anodique dérivée d'un redresseur triphasé sans filtre
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasengleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| f = 30 Mc/s | | | |
|---|---|---|---|
| Va = max. 8 kV | | -Vg = max. 1600 V | |
| Wia = max. 30 kW | | Ig = max. 1,5 A | 3) |
| Wa = max. 10 kW | 1) | Ig = max. 2,0 A | 4) |
| Wa = max. 15 kW | 2) | Rg = max. 10 kΩ | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 30 | 30 Mc/s |
| Va | = | 7 | 6 kV |
| Ia | = | 3,5 | 3,3 A 3) |
| Ia | = | 0,7 | 0,51 A 4) |
| Ig | = | 0,95 | 0,8 A 3) |
| Ig | = | 1,35 | 1,1 A 4) |
| Rg | = | 950 | 1000 Ω |
| $Ra_{\sim}$ | = | 1000 | 870 Ω |
| $Vg_{\sim}/Va_{\sim}$ | = | 25 | 26 % |
| Wia | = | 24,5 | 19,8 kW |
| Wa | = | 6,8 | 5,5 kW |
| Wo | = | 17,7 | 14,3 kW |
| $\eta$ | = | 72 | 72 % |
| $W_{\ell}$ 5) | = | 14 | 11 kW |

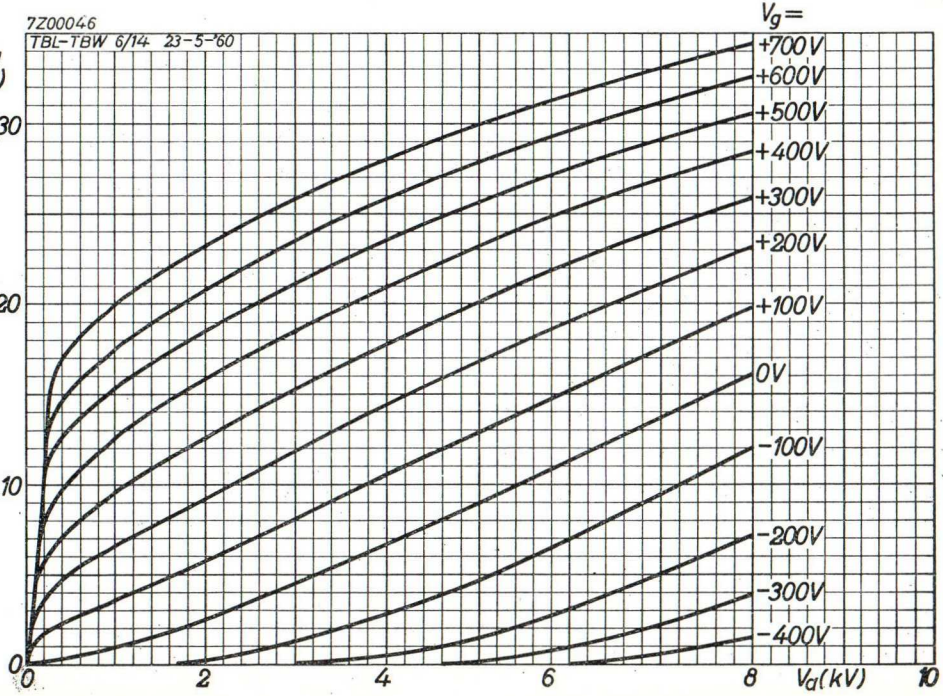
1) Continuous service with adequate cooling
Service continu avec refroidissement adéquat
Dauerbetrieb mit angemessener Kühlung

2) Intermittent service. See also pages E and F
Service intermittent. Voir aussi pages E et F
Aussetzender Betrieb. Siehe auch Seiten E und F

3) Loaded; chargé; belastet

4) Unloaded; sans charge; unbelastet

5) Useful power in the load, measured in a circuit having an efficiency of about 85 %
Puissance utile dans la charge, mesurée dans un circuit avec un rendement d'environ 85 %
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von etwa 85 %




6.6.1960

A

PHILIPS

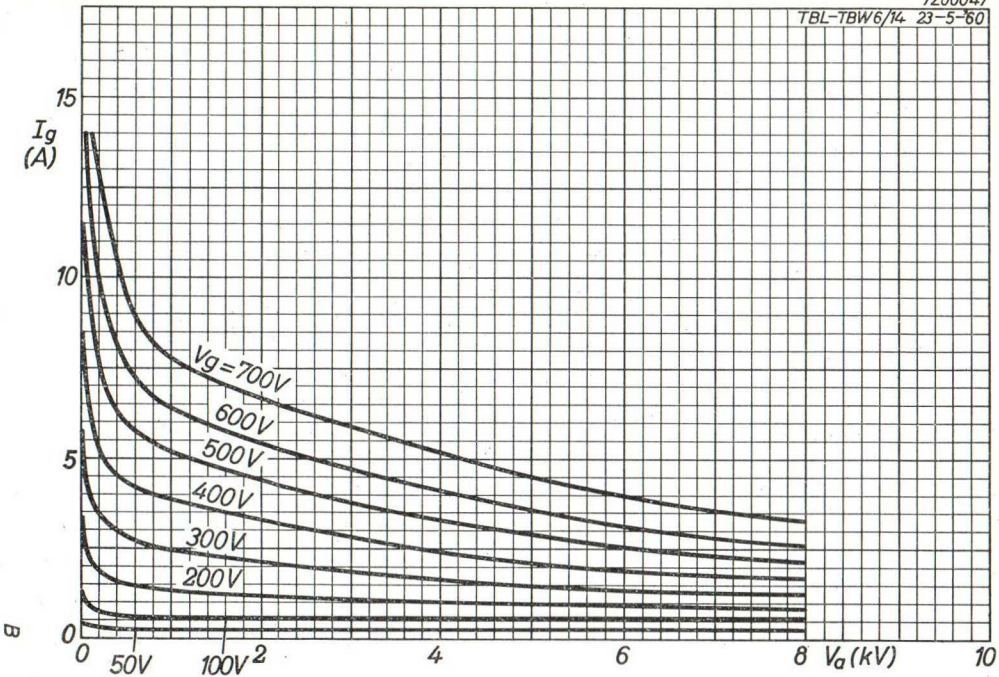
TBL 6/14

7Z00047

TBL-TBW6/14 23-5-60

TBL 6/14

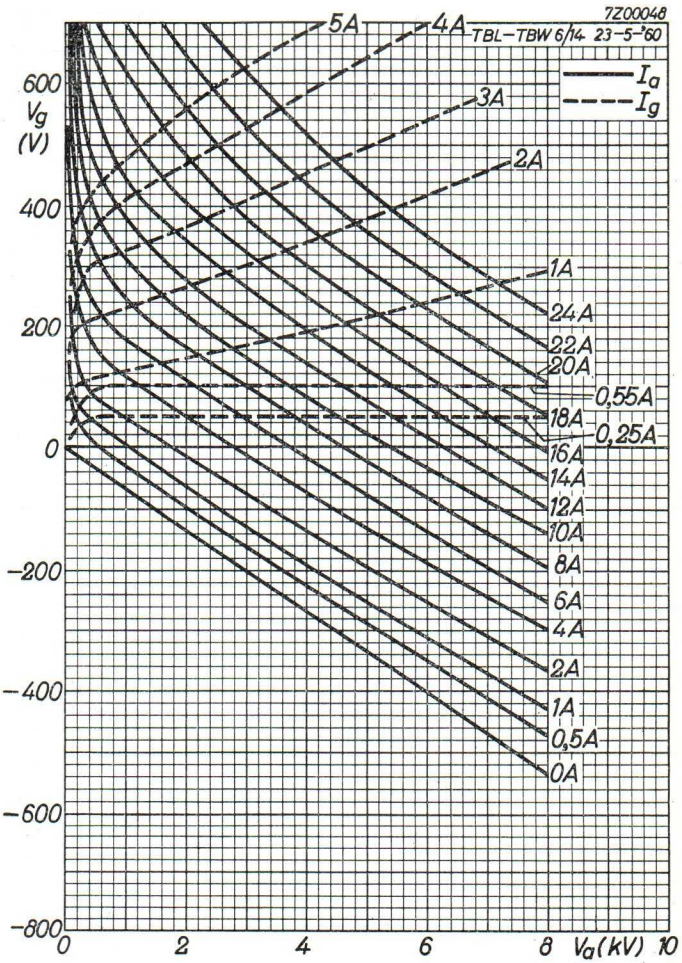
PHILIPS




B

# PHILIPS

**TBL 6/14**




6.6.1960

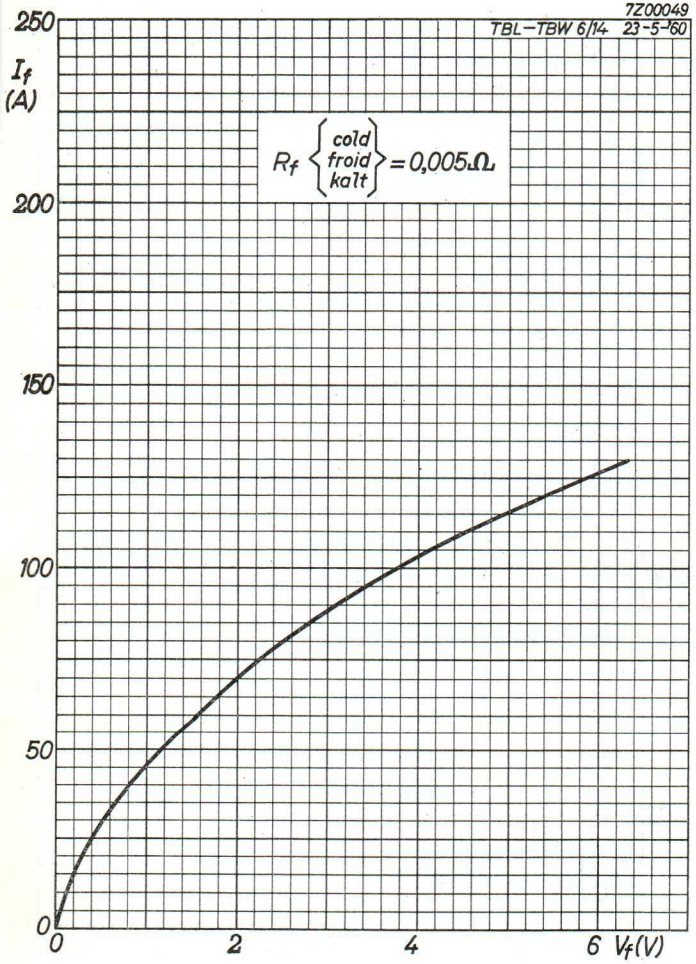
C

TBL 6/14

# PHILIPS

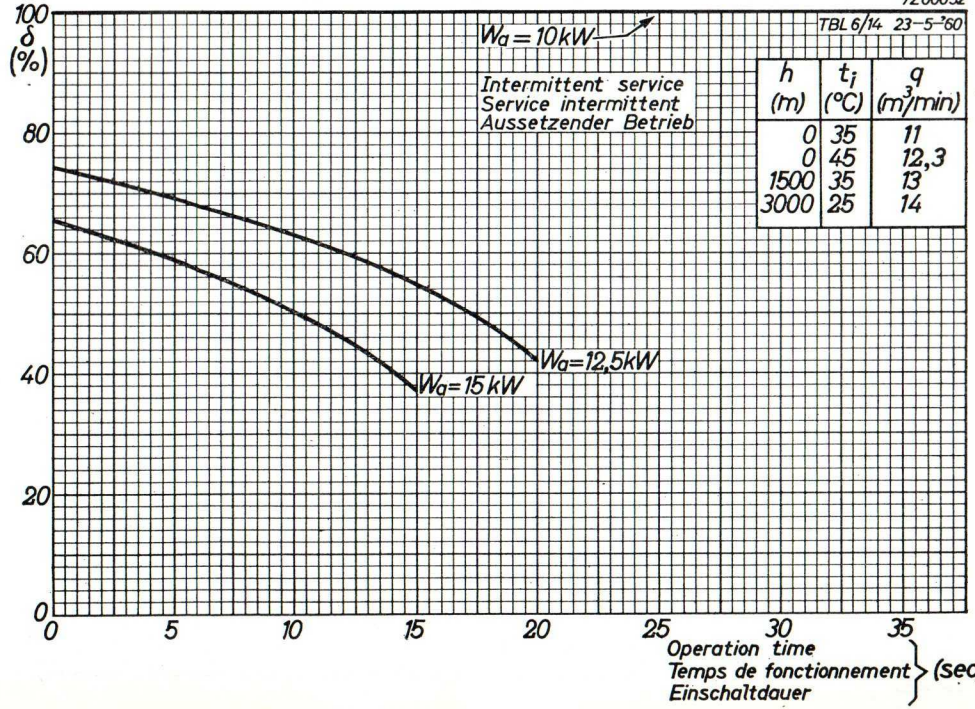
7Z00049

TBL–TBW 6/14 23-5-'60




D

7Z00052

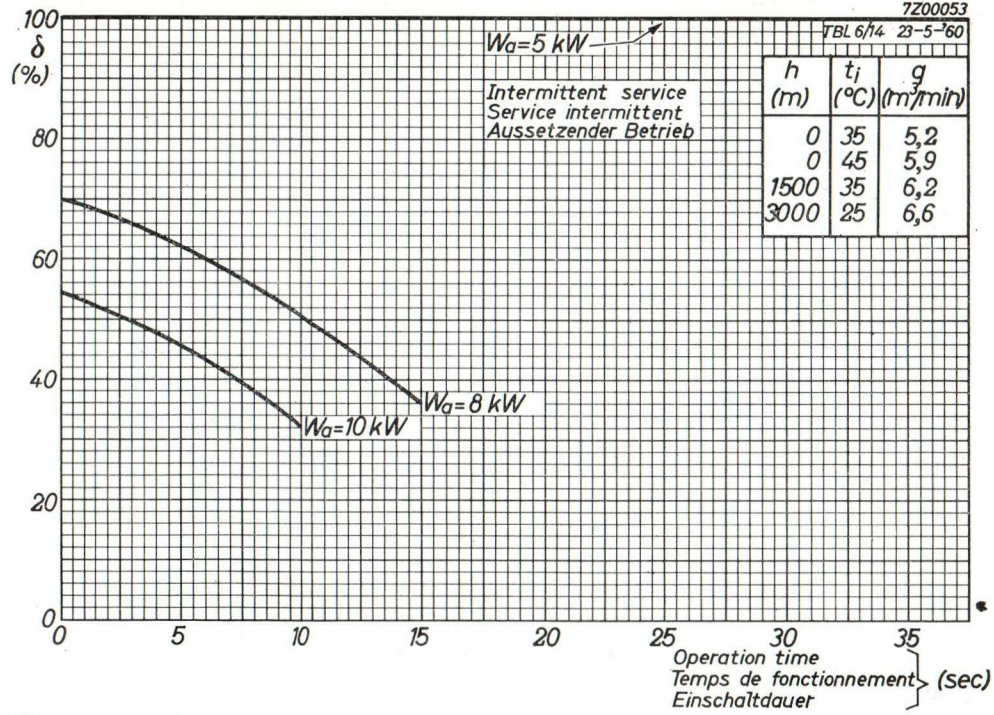



6.6.1960

E

PHILIPS

TBL 6/14

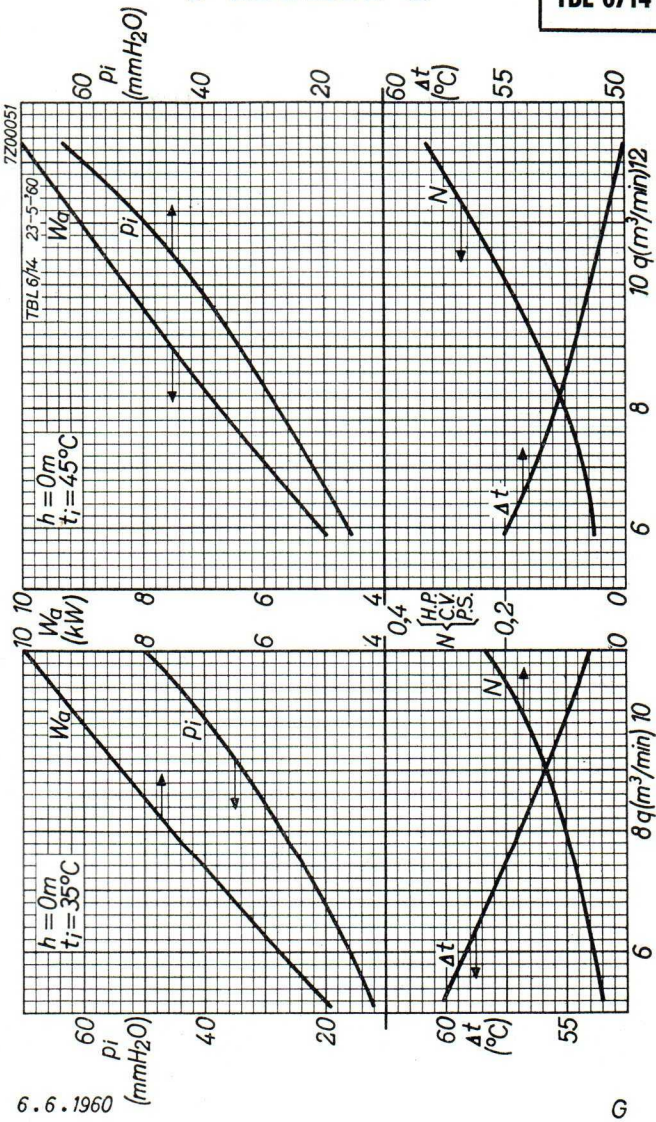



| h (m) | $t_i$ (°C) | g ($m^3$/min) |
|---|---|---|
| 0 | 35 | 5,2 |
| 0 | 45 | 5,9 |
| 1500 | 35 | 6,2 |
| 3000 | 25 | 6,6 |

PHILIPS

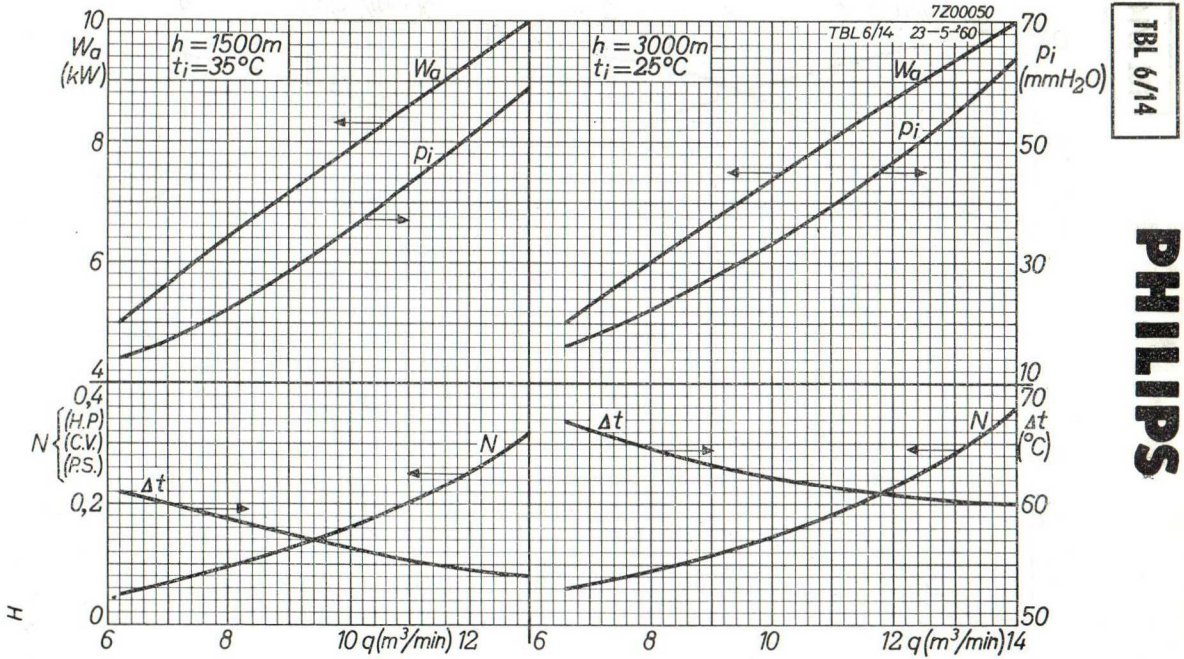
# PHILIPS

**TBL 6/14**




6.6.1960

G




TBL 6/14

PHILIPS

H

COAXIAL TRIODE for use in A.M., F.M. and television transmitters
TRIODE COAXIALE pour utilisation dans émetteurs A.M., F.M. et de télévision
KOAXIALE TRIODE zur Verwendung in AM-,FM- und Fernsehsendern

Cooling : forced air
Refroidissement: par ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 6,3 V
$I_f$ = 154 A

The filament current must never exceed a peak value of 500 A at any time during the initial energizing schedule
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 500 A
Der Anlauf-Heizstrom darf niemals einen Scheitelwert von 500 A überschreiten

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,6 pF [1]
$C_g$ = 65 pF
$C_{ag}$ = 29 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ($I_a$ = 1 A, $V_a$ = 4 kV) = 60
S ($I_a$ = 1 A, $V_a$ = 4 kV) = 60 mA/V

Air cooling characteristics (For recommended direction of air flow see page 2)
Caractéristiques de refroidissement par air (Pour la direction recommandée du courant d'air voir page 2)
Luftkühlungsdaten (Für die empfohlene Richtung des Luftstromes, siehe Seite 2)

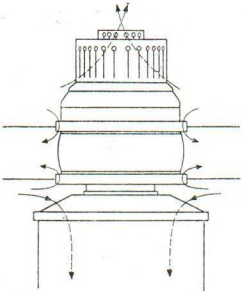
| $W_a$ (kW) | h (m) | $t_{i\,max}$ (°C) | $q_{min}$ ($m^3$/min) | $p_i$ (mm $H_2O$) |
|---|---|---|---|---|
| 5,5 | 0 | 35 | 5,0 | 16 |
| | 1500 | 35 | 5,9 | 16 |
| | 3000 | 25 | 5,7 | 16 |
| 8 | 0 | 35 | 7,7 | 35 |
| | 1500 | 35 | 9 | 40 |
| | 3000 | 25 | 9 | 36 |
| 10 | 0 | 35 | 11 | 65 |
| | 1500 | 35 | 13 | 75 |
| | 3000 | 25 | 13 | 66 |

See also the cooling curves (pages E, F )
Voir aussi les courbes de refroidissement (pages E, F )
Siehe auch die Kühlungskurven (Seite E, F )

[1])See page 4; voir page 4; siehe Seite 4

# PHILIPS

Recommended direction of air flow
Direction recommandée du courant d'air
Empfohlene Richtung des Luftstromes



Temperature of seals
Température des scellements = max. 180 °C
Temperatur der Einschmelzungen

Generally it is necessary to direct an air flow on the grid, anode and filament seals. E.g. at 220 Mc/s an air flow of 0.6 m³/min on each of these seals is necessary

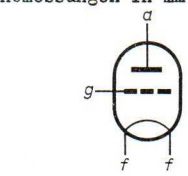
En général il faut diriger un courant d'air sur les scellements de l'anode, de la grille et du filament. Par exemple à 220 MHz un courant d'air de 0,6 m³/min sur chaque de ces scellements est nécessaire

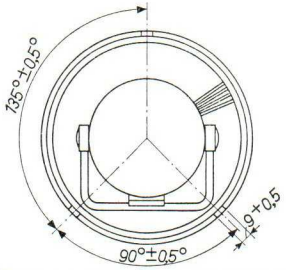
Im allgemeinen ist ein Luftstrom auf die Anoden-, Gitter- und Heizfadeneinschmelzungen erforderlich. Bei 220 MHz zum Beispiel ist ein Luftstrom von 0,6 m³/min auf jede dieser Einschmelzungen notwendig

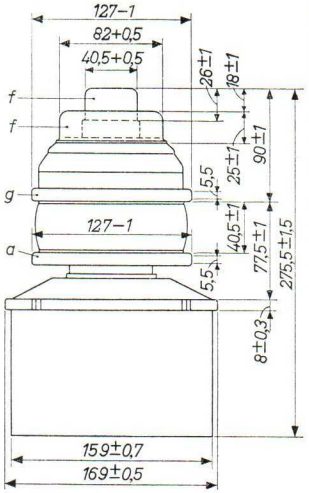
Accessories
Accessoires
Zubehör

| | |
|---|---|
| Insulating pedestal<br>Support isolant<br>Isoliersockel | 40654 |
| Grid and anode connector<br>Connecteur de l'anode et de la grille<br>Gitter- und Anodenanschluss | 40651 |
| Inner filament connector<br>Connecteur intérieur du filament<br>Innerer Heizfadenanschluss | 40652 |
| Outer filament connector<br>Connecteur extérieur du filament<br>Äusserer Heizfadenanschluss | 40653 |

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Eccentricity of outer diameters of the electrode terminals and of the protruding edge of the radiator housing with respect to the radiator housing max. 1 mm

Excentricité des diamètres extérieurs des connexions des électrodes et du bord saillant du radiateur au regard du radiateur 1 mm au max.

Exzentrizität der äusseren Durchmesser der Elektrodenanschlüsse und des herausragenden Randes des Radiatorgehäusses in Bezug auf den Radiator max. 1 mm

Mounting position: vertical with anode up or down
Montage : vertical avec l'anode en haut ou en bas
Einbau : senkrecht mit der Anode oben oder unten

Net weight :
Poids net : 9,5 kg
Nettogewicht:

# PHILIPS

H.F. class C telegraphy, grounded grid
H.F. classe C télégraphie, grille mise à la terre
HF-Klasse C Telegraphie, Gitterbasisschaltung

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 110 | Mc/s |
| $V_a$ | = max. | 5,5 | kV |
| $-V_g$ | = max. | 500 | V |
| $I_a$ | = max. | 6 | A |
| $I_g$ | = max. | 1,5 | A |
| $W_{ia}$ | = max. | 30 | kW |
| $W_a$ | = max. | 10 | kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 110 | Mc/s |
| $V_a$ | = | 5 | kV |
| $V_g$ | = | -300 | V |
| $I_a$ | = | 4,8 | A |
| $I_g$ | = | 1,2 | A |
| $V_{gp}$ | = | 520 | V |
| $W_{ig}$ | = | 2560 | W |
| $W_{ia}$ | = | 24 | kW |
| $W_a$ | = | 9 | kW |
| $W_o$ | = | 15+2 | kW [2] |
| $\eta$ | = | 62,5 | % [3] |

[1] Page 1; Seite 1
Anode fully screened from filament terminals by a flat metal screen connected to the grid terminal
L'anode blindée des connexions du filament par un blindage plan métallique connecté à l'anneau de connexion de la grille
Anode mittels einer mit dem Gitteranschlussring verbundenen flachen Metallplatte von den Heizfadenanschlüssen abgeschirmt

[2] Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pré-amplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[3] Pure valve efficiency
Rendement net du tube
Reiner Röhrenwirkungsgrad

H.F. class B telephony for television service; linear, grounded-grid amplifier Negative modulation, positive synchronisation (CCIR and FCC system)

H.F. classe B téléphonie pour télévision; amplificateur linéaire, grille mise à la terre Modulation négative, synchronisation positive (Systèmes CCIR et FCC)

HF-Klasse B Telephonie für Fernsehsender; linearer Verstärker in Gitterbasisschaltung Negative modulation, positive Synchronisierung (CCIR- und FCC-System)

Limiting values
Caractéristiques limites
Grenzdaten

| f | = max. 88 Mc/s | f | = max. 220 Mc/s |
|---|---|---|---|
| $V_a$ | = max. 5,5 kV | $V_a$ | = max. 4,5 kV |
| $W_{ia}$ sync | = max. 25 kW | $W_{ia}$ sync | = max. 22 kW |
| $W_a$ sync | = max. 10 kW | $W_a$ sync | = max. 10 kW |
| $I_a$ sync | = max. 6 A | $I_a$ sync | = max. 6 A |
| $I_g$ sync | = max. 1,2 A | $I_g$ sync | = max. 1,2 A |

Operating conditions (at centre frequency of the resonance curve)
Caractéristiques d'utilisation (à la fréquence centrale de la courbe de résonance)
Betriebsdaten (bei der mittleren Frequenz der Abstimmkurve)

| | | | |
|---|---|---|---|
| f | = | 48-88 | 170-220[1] Mc/s |
| B (-1,5 dB) | = | - | 7 Mc/s |
| B (-3 dB) | = | 6 | 12 Mc/s |
| $V_a$ | = | 5 | 4 kV |
| $V_g$ | = | -90 | -75 V |
| $V_{gp}$ sync | = | 270 | 255 V |
| $V_{gp}$ black, noir, schwarz | = | 200 | 180 V |
| $I_a$ sync | = | 4,8 | 4,8 A |
| $I_a$ black, noir, schwarz | = | 3,6 | 3,6 A |
| $I_g$ sync | = | 1,0 | 1,0 A |
| $I_g$ black, noir, schwarz | = | 0,35 | 0,35 A |
| $W_{ig}$ sync | = | 1,4 | 1,3 kW |
| $W_o$ sync | = | 17 | 12 kW |
| $W_o$ black, noir, schwarz | = | 9,6 | 6,75 kW |

[1])See page D; voir page D; siehe Seite D

# PHILIPS

H.F. class B telephony for television service; linear, grounded-grid amplifier Positive modulation, negative synchronisation (RTF and BBC system)

H.F. classe B téléphonie pour télévision; amplificateur linéaire, grille mise à la terre Modulation positive, synchronisation négative (Systèmes RTF et BBC)

HF-Klasse B Telephonie für Fernsehsender; linearer Verstärker in Gitterbasisschaltung Positive Modulation, negative Synchronisierung (RTF und BBC System)

Limiting values
Caractéristiques limites
Grenzdaten

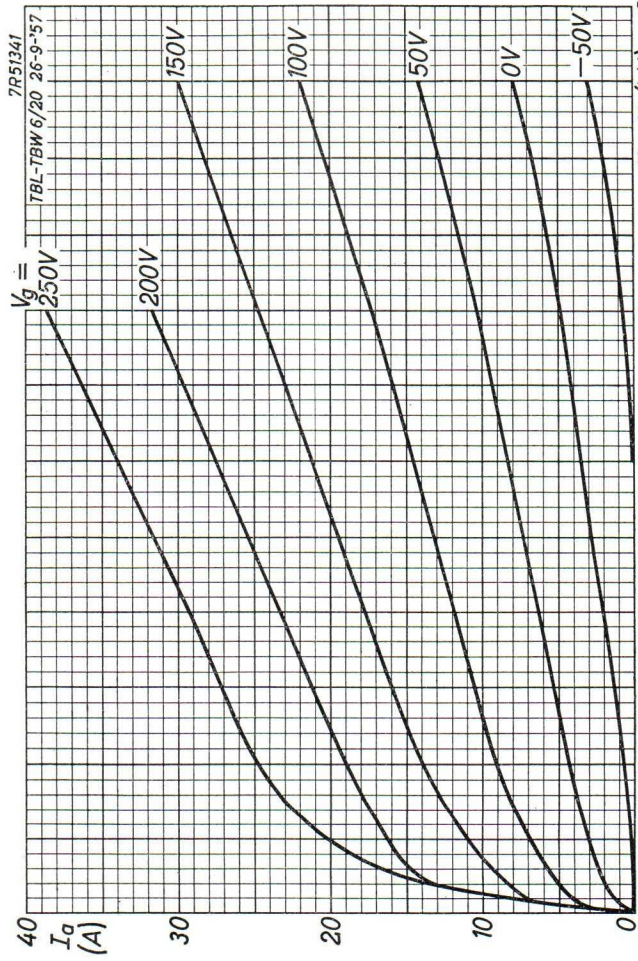
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| f | = max. | 88 Mc/s | | f | = max. | 220 Mc/s | |
| $V_a$ | = max. | 5,5 kV | | $V_a$ | = max. | 4,5 kV | |
| $W_{ia}$ | = max. | 25 kW | | $W_{ia}$ | = max. | 22 kW | |
| $I_a$ white, blanc, weiss | = max. | 6 A | | $I_a$ white, blanc | = max. | 6 A | |
| $I_g$ | = max. | 1,2 A | | $I_g$ weiss | = max. | 1,2 A | |
| $W_a$ | = max. | 10 kW | | $W_a$ | = max. | 10 kW | |

Operating conditions (at centre frequency of the resonance curve)
Caractéristiques d'utilisation (à la fréquence centrale de la courbe de résonance)
Betriebsdaten (bei der mittleren Frequenz der Abstimmkurve)

| | | | | | |
|---|---|---|---|---|---|
| f | | = | 48-88 | 170-220 | Mc/s |
| B (-3 dB) | | = | 6 | 12 | Mc/s |
| $V_a$ | | = | 5 | 4 | kV |
| $V_g$ | | = | -90 | -75 | V |
| $V_{gp}$ | white, blanc, weiss | = | 270 | 255 | V |
| | black, noir, schwarz | = | 110 | 95 | V |
| $I_a$ | white, blanc, weiss | = | 4,8 | 4,8 | A |
| | black, noir, schwarz | = | 1,45 | 1,45 | A |
| $I_g$ | white, blanc, weiss | = | 1 | 1 | A |
| | black, noir, schwarz | = | 0,2 | 0,2 | A |
| $W_{ig}$ | white, blanc, weiss | = | 1,4 | 1,3 | kW |
| $W_o$ | white, blanc, weiss | = | 17 | 12 | kW |
| | black, noir, schwarz | = | 1,7 | 1,2 | kW |

PHILIPS

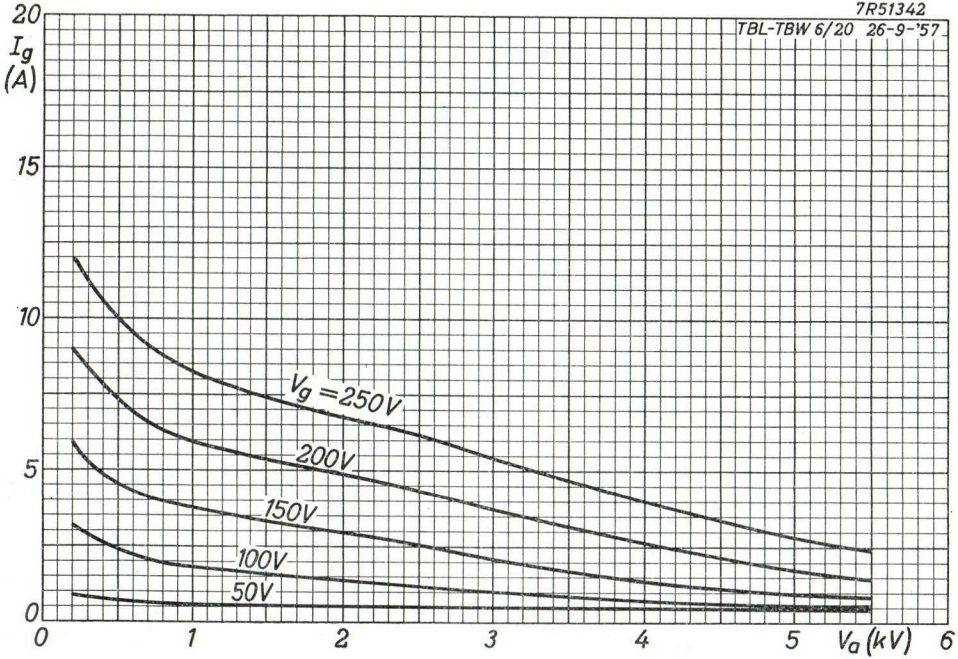
TBL 6/20




12.12.1957

A

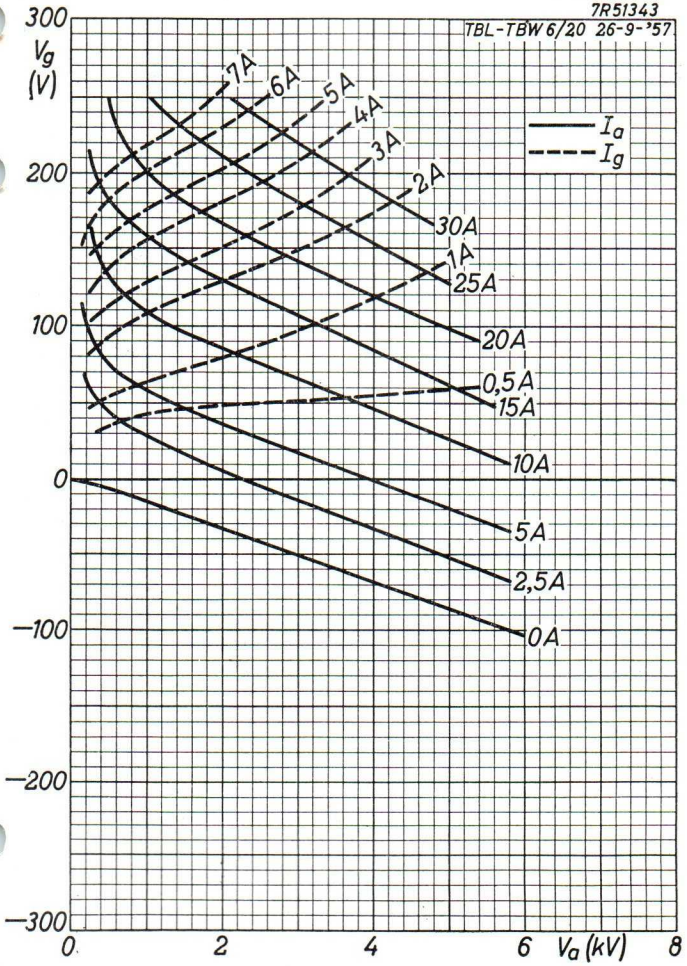
PHILIPS


7R51342
TBL-TBW 6/20 26-9-'57
$I_g$ (A)
20
15
10
5
0
$V_g$ = 250V
200V
150V
100V
50V
0
1
2
3
4
5
6
$V_a$ (kV)

B

# PHILIPS

**TBL 6/20**



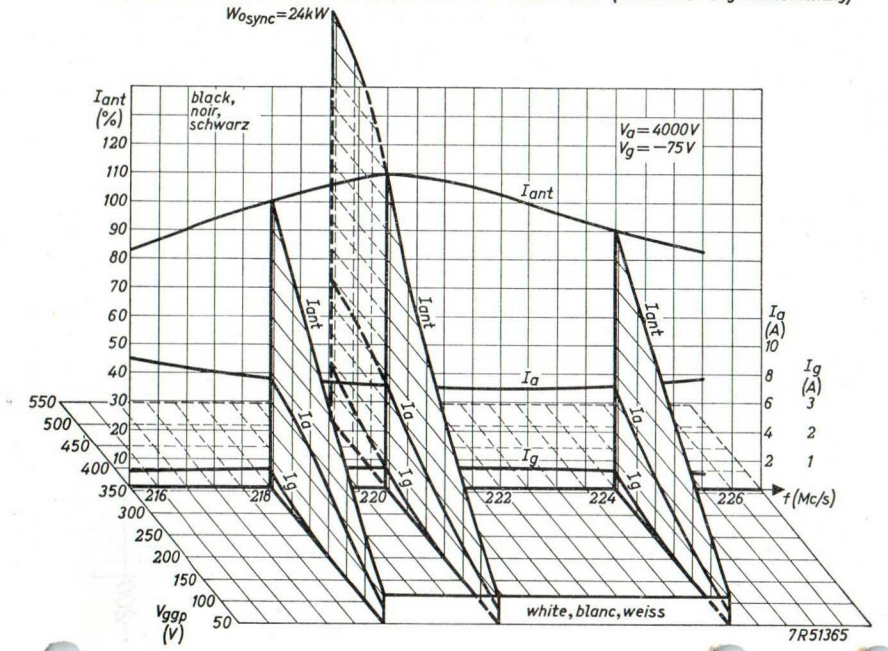

12.12.1957

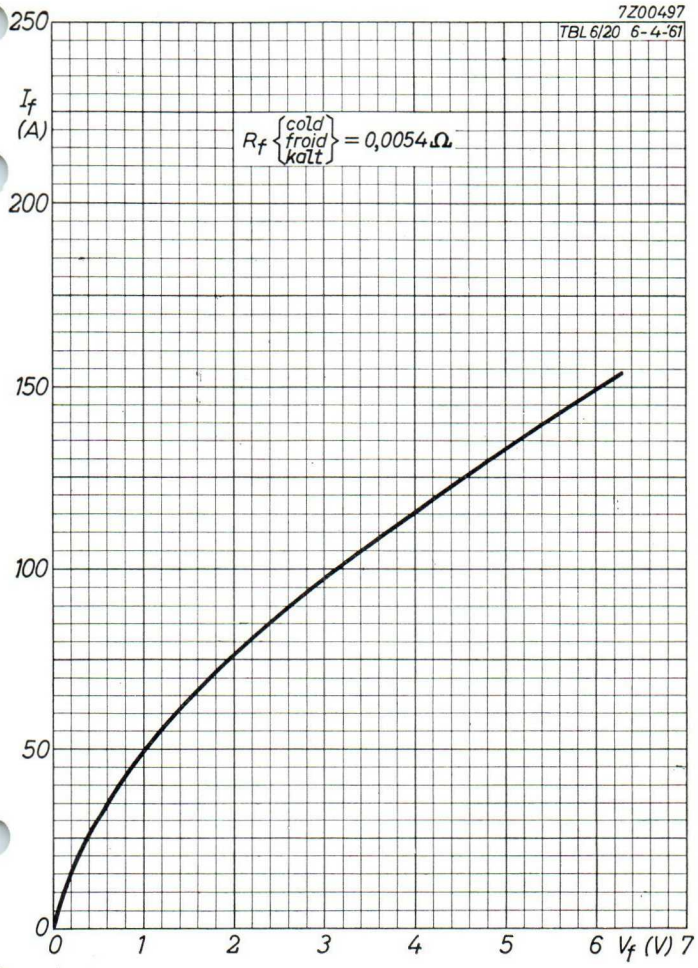
C

Grid-modulated H.F. class B amplifier for television service (2 valves in push-pull)
Amplificateur H.F. classe B modulé par la grille pour la télévision (2 tubes en montage push-pull)
H.F. Klasse B Verstärker mit Gittermodulation für Fernsehbetrieb (2 Röhren in Gegentaktschaltung)

TBL 6/20

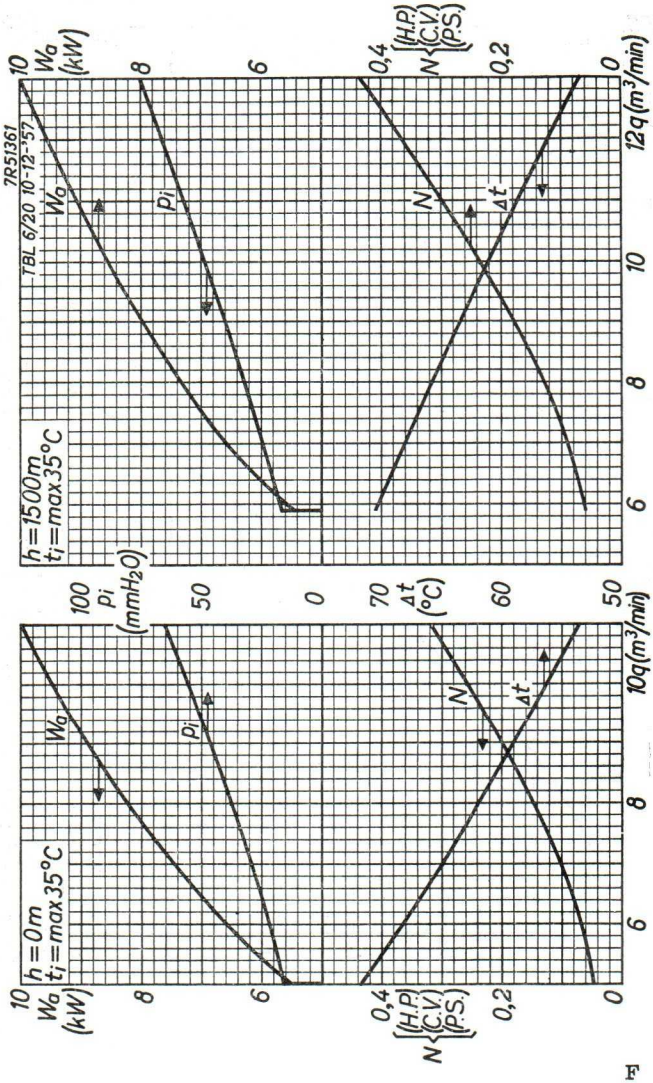
PHILIPS



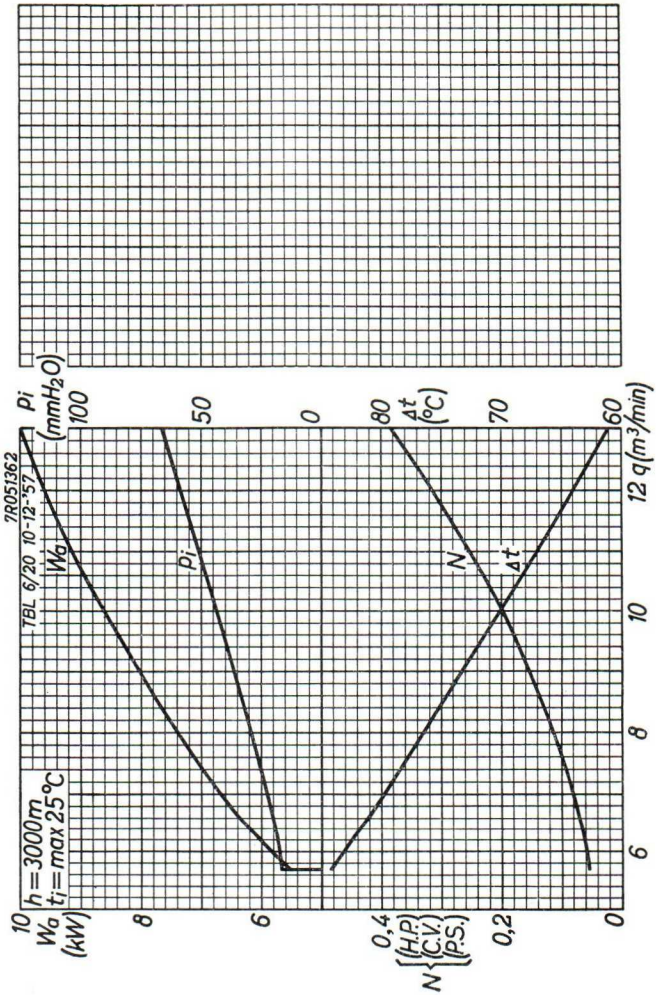

7Z00497
TBL 6/20 6-4-61
250
$I_f$ (A)
200
150
100
50
0
$R_f \left\{ \begin{matrix} cold \\ froid \\ kalt \end{matrix} \right\} = 0{,}0054\,\Omega$
0
1
2
3
4
5
6
$V_f$ (V)
7

TBL 6/20

# PHILIPS




F


7R051362
TBL 6/20 10-12-'57
h = 3000m
$t_i$ = max 25°C
$W_a$
$p_i$
N
Δt
$W_a$ (kW)
10
8
6
0,4
0,2
0
N {(H.P.) (C.V.) (P.S.)}
$p_i$ (mmH₂O)
100
50
0
Δt (°C)
80
70
60
q (m³/min)
6
8
10
12

TRIODE for use in industrial R.F. generators
TRIODE pour l'utilisation dans les générateurs H.F. industriels
TRIODE zur Verwendung in industriellen HF-Generatoren

Cooling : forced air and air flow to the envelope
Refroidissement: par ventilation forcée et par un courant d'air vers l'enveloppe
Kühlung : Pressluftkühlung und Luftstrom auf die Umhüllung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 6,3 V $\pm$ 5 % / − 10 %
$I_f$ = 65 A

Capacitances
Capacités
Kapazitäten

$C_a$ < 0,5 pF
$C_g$ = 13 pF
$C_{ag}$ = 7,5 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 6 kV
$I_a$ = 0,24 A
$\mu$ = 23
S = 7 mA/V

Temperatures
Températures
Temperaturen

Temperature of all seals
Température de tous les scellements = max. 220 °C
Temperatur aller Einschmelzungen

Temperature of external parts of the anode
Température des parties extérieures de l'anode = max.270°C
Temperatur der äusseren Teile der Anode

Net weight
Poids net 0,86 kg
Nettogewicht

Shipping weight
Poids brut 1,63 kg
Bruttogewicht

# PHILIPS

Cooling
Refroidissement
Kühlung

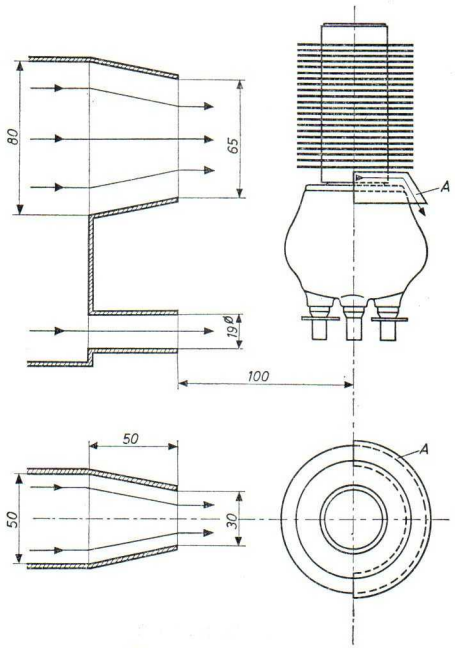
| $W_a$ (kW) | h (m) | $t_i$ max. ($^oC$) | q min. ($m^3$/min) | pi (mm $H_2O$) |
|---|---|---|---|---|
| 1,3 | 0 | 35 | 2,0 | |
| 1,7 | 0 | 35 | 2,8 | 25 [1]) |

For cooling the filament and grid seals an air flow of min. 0.3 $m^3$/min. is required.
At higher altitudes and/or higher temperatures a corresponding higher amount of air should be applied.
At frequencies above 4 Mc/s both grid terminals should be connected in parallel. At the highest frequencies care should be taken to distribute the R.F. current equally between both grid terminals to avoid excessive grid seal temperatures.
For intermittent service the permissible duty factor is shown at page B.

Pour le refroidissement des scellements du filament et de la grille un courant d'air de 0,3 $m^3$/min est requis au min.
Aux altitudes et/ou températures plus élevées il faut appliquer une quantité d'air conformément augmentée.
Aux fréquences supérieures à 4 MHz les deux broches de la grille doivent être reliées en parallèle. Aux fréquences les plus élevées il faut prendre soin à distribuer le courant H.F. uniformément entre les deux broches de la grille pour éviter des températures excessives des scellements de la grille.
Pour le facteur de march en service intermittent voir page B.

Für die Kühlung der Heizfaden- und Gittereinschmelzungen ist ein Luftstrom von mindestens 0,3 $m^3$/min erforderlich.
Bei grösseren Höhen und/oder Temperaturen soll die Luftmenge entsprechend vergrössert werden.
Bei Frequenzen höher als 4 MHz müssen die beiden Gitteranschlüsse parallelgeschaltet werden. Zur Vermeidung einer zu hohen Temperatur der Gittereinschmelzungen muss bei den höchsten Frequenzen der HF-Strom gleichmässig über die beiden Gitteranschlüsse verteilt werden.
Für den Arbeitsfaktor bei aussetzendem Betrieb siehe Seite B.

[1]) According to fig.1. In the arrangement according to fig.2 the pressure loss is about 7 mm $H_2O$.
Suivant la fig.1. Dans le dispositif suivant la fig.2 la perte de pression est d'environ 7 mm $H_2O$
Nach Abb.1. In der Vorrichtung nach Abb.2 ist der Druckverlust etwa 7 mm $H_2O$




Dimensions in mm
Dimensions en mm
Abmessungen in mm

Example of cooling arrangement
Exemple d'un dispositif de refroidissement
Beispiel einer Kühlvorrichtung

A = plate of suitable insulating material (e.g. tetrafluorethylene) which can be clipped on the anode or mounted on the tube socket or on the chassis.
A = plaque de matière isolante convenable (p.e. tétrafluoréthylène). Cette plaque peut être attachée à l'anode par moyen de mâchoires ou montée au support de tube ou au châssis.
A = Platte eines geeigneten Isolierstoffes (z.B. Tetrafluoraethylen). Diese Platte kann mittels Klammern an die Anode oder am Röhrenhalter oder Chassis befestigt werden.

PHILIPS

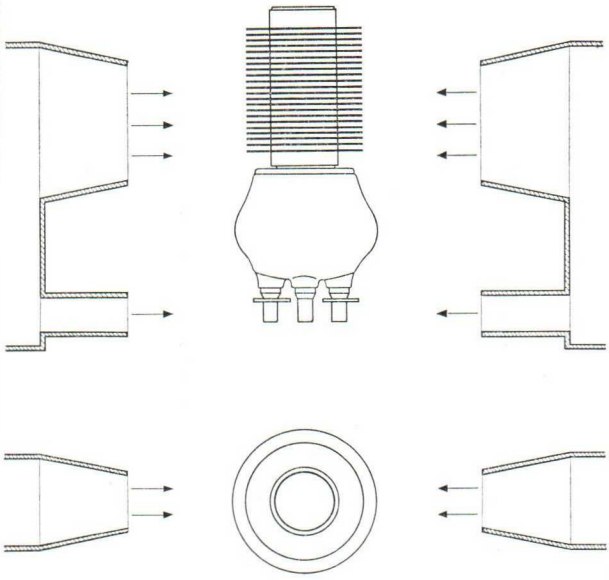
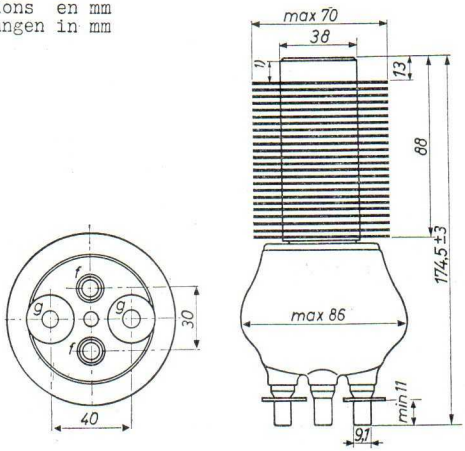


Fig.2; Abb.2

Dimensions in mm
Dimensions en mm
Abmessungen in mm

Example of cooling arrangement with two nozzles
Exemple d'un dispositif de refroidissement avec deux buses
Beispiel einer Kühlvorrichtung mit zwei Düsen

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Socket, support, Fassung: B8 700 51

Mounting position: Vertical with anode up or down
Montage : Vertical avec l'anode en haut ou en bas
Einbau : Senkrecht mit der Anode oben oder unten

1) Area for anode connector
Surface pour la connexion de l'anode
Fläche zum Anschliessen der Anode

Page 6; Seite 6

2) See page B; voir page B; siehe Seite B

3) Loaded; chargé; belastet

4) Unloaded; sans charge; unbelastet

5) In a typical circuit
Dans un montage pratique
In einer normalen Schaltung

6) Matching resistance
Résistance d'adaptation
Anpassungswiderstand

7) Useful power in the load measured in a circuit having an efficiency of about 85 %
Puissance utile dans la charge, mesurée dans un montage avec un rendement d'environ 85 %
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von etwa 85 %

# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from three-phase rectifier without filter.
Oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé sans filtre.
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasengleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| Continuous service<br>Service continu<br>Dauerbetrieb | | Intermittent service<br>Service intermittent<br>Aussetzender Betrieb | |
|---|---|---|---|
| f | = max. 50 Mc/s | f | = max. 50 Mc/s |
| $V_a$ | = max. 8 kV | $V_a$ | = max. 8 kV |
| $I_a$ | = max. 1 A | $I_a$ | = max. 1,5 A |
| $W_{ia}$ | = max. 7 kW | $W_{ia}$ | = max. 9 kW |
| $W_a$ | = max. 1,7 kW | $W_a$ | = max. 2,1 kW [2] |
| $-V_g$ | = max. 1250 V | $-V_g$ | = max. 1250 V |
| $I_g$ | = max. 0,4 A [3] | $I_g$ | = max. 0,4 A [3] |
| $I_g$ | = max. 0,5 A [4] | $I_g$ | = max. 0,5 A [4] |
| $R_g$ | = max. 10 kΩ | $R_g$ | = max. 10 kΩ |

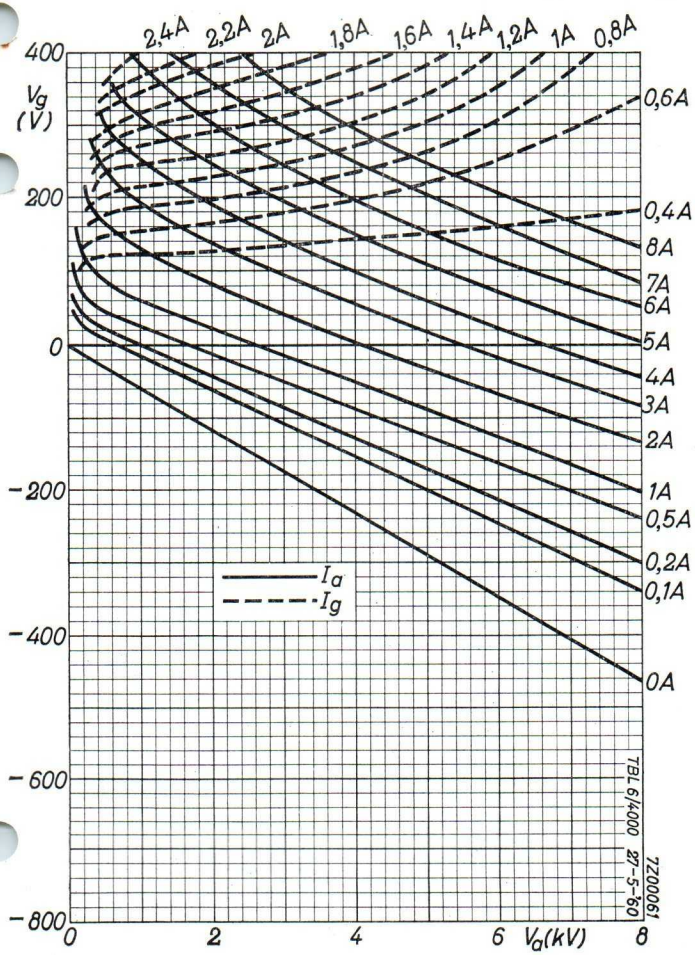
Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = | 50 Mc/s | f | = | 50 Mc/s |
| $V_{tr}$ | = | 6,0 5,1 $kV_{eff}$ | $V_{tr}$ | = | 5,1 $kV_{eff}$ |
| $V_a$ | = | 7,0 6 kV | $V_a$ | = | 6 kV |
| $I_a$ | = | 0,9 0,9 A [3] | $I_a$ | = | 1,33 A [3] |
| $I_a$ | = | 0,2 0,2 A [4][5] | $I_a$ | = | 0,33 A [4][5] |
| $I_g$ | = | 0,25 0,28 A [3] | $I_g$ | = | 0,38 A [3] |
| $I_g$ | = | 0,30 0,35 A [4][5] | $I_g$ | = | 0,48 A [4][5] |
| $R_g$ | = | 2,5 2 kΩ | $R_g$ | = | 1450 Ω |
| $R_{a\sim}$ | = | 3,85 3,3 kΩ [6] | $R_{a\sim}$ | = | 2200 Ω [6] |
| $V_{g\sim}/V_{a\sim}$ | = | 15 16 % | $V_{g\sim}/V_{a\sim}$ | = | 17 % |
| $W_{ia}$ | = | 6,3 5,4 kW | $W_{ia}$ | = | 8 kW |
| $W_a$ | = | 1,45 1,3 kW | $W_a$ | = | 2,1 kW [2] |
| $W_o$ | = | 4,85 4,1 kW | $W_o$ | = | 5,9 kW |
| $\eta$ | = | 77 76 % | $\eta$ | = | 74 % |
| $W_\ell$ | = | 4,0 3,3 kW [7] | $W_\ell$ | = | 4,75 kW [7] |

[2][3][4][5][6][7] See page 5; voir page 5; siehe Seite 5

# PHILIPS

**TBL 6/4000**

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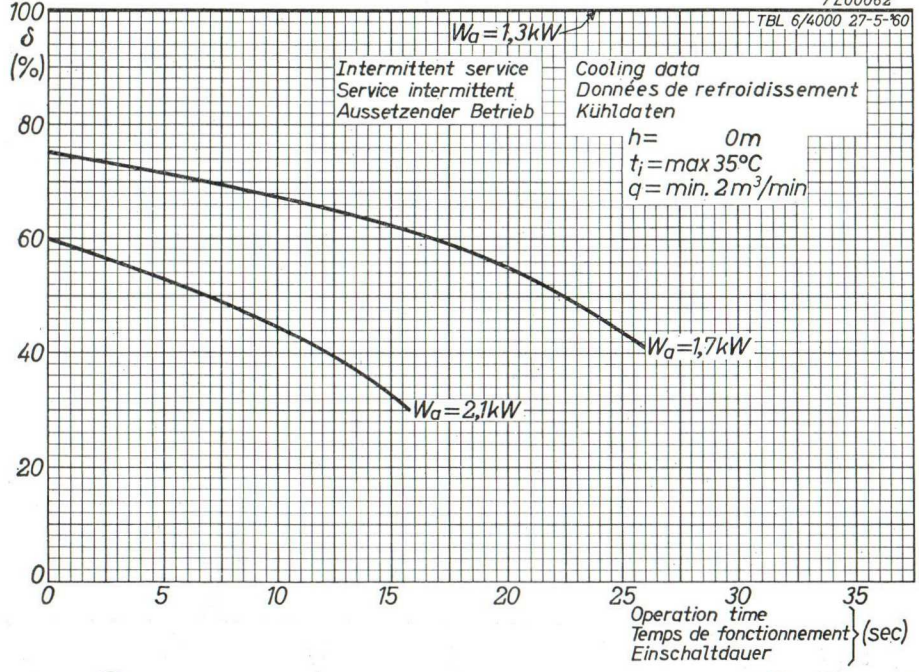
TBL 6/4000 27-5-'60




TBL 6/4000

PHILIPS

B

# PHILIPS

**TBL 6/6000**

TRIODE for use in television transmitters, A.M. or F.M. transmitters or industrial H.F. generators
TRIODE pour utilisation dans émetteurs de télévision, émetteurs A.M. ou F.M., ou générateurs H.F. industriels
TRIODE zur Verwendung in Fernsehsendern, AM- oder FM-Sendern, oder in HF-Industriegeneratoren

Cooling : forced air
Refroidissement: par ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct — $V_f$ = 12,6 V
Chauffage: direct — $I_f$ = 33 A
Heizung : direkt

Capacitances — $C_a$ = 0,3 pF
Capacités — $C_g$ = 16 pF
Kapazitäten — $C_{ag}$ = 11 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ($I_a$=1 A) = 32
S ($V_a$=4 kV) = 17 mA/V

| λ | Freq. | C telegr. | | B teleph. | | C an.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) |
| 4 | 75 | 6 | 6,9 | 6 | 1,9 | | | 6 | 13,3 |
| | | 5 | 5,6 | 5 | 1,45 | 5 | 4,7 | 5 | 6,6 |
| | | 4 | 4 | | | 4,5 | 4,1 | 4,5 | 6 |
| | | | | | | 4 | 3,5 | 4 | 5,3 |
| | | | | | | 3,5 | 3 | 3,5 | 4,6 |
| | | | | | | 3 | 2,2 | 3 | 3,3 |

Television, télévision, Fernsehen

| Freq. (Mc/s) | neg.mod. pos.synchr. | | | pos.mod. neg.synchr | |
|---|---|---|---|---|---|
| | $V_a$ (kV) | $W_o$ sync (kW) | $W_o$ (kW) black noir schwarz | $V_a$ (kV) | $W_o$ (kW) white blanc weiss |
| 75 | 5 | 9 | 5,35 | 5 | 9 |

[1])Two tubes; deux tubes; zwei Röhren

# PHILIPS

Air cooling characteristics
Caractéristiques du refroidissement par air
Luftkühlungsdaten

| $W_a$ (kW) | h (m) | $t_i$ max. (°C) | q min. ($m^3$/min) | $p_i$ (mm $H_2O$) |
|---|---|---|---|---|
| 1 | 0 | 35 | 3 | 8 |
| | 0 | 45 | 3,1 | 8 |
| | 1500 | 35 | 3,7 | 9 |
| | 3000 | 25 | 4,1 | 10 |
| 3 | 0 | 35 | 5,2 | 23 |
| | 0 | 45 | 6,1 | 29 |
| | 1500 | 35 | 6,2 | 26 |
| | 3000 | 25 | 6,6 | 26 |
| 5 | 0 | 35 | 9,2 | 68 |
| | 0 | 45 | 10,7 | 90 |
| | 1500 | 35 | 11,2 | 81 |
| | 3000 | 25 | 11,6 | 79 |

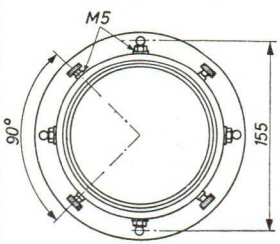
See cooling curves
Voir les courbes de refroidissement
Siehe die Kühlungskurven

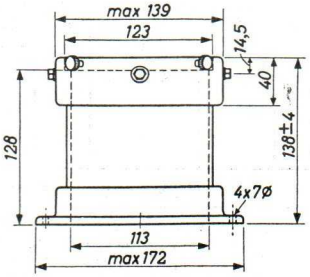
temperature of seals
temp. des scellements = max. 180 °C
Temp. der Einschmelzungen

Clips for filament
Bornes de connexion pour le filament 40634
Heizanschlussklemmen

Grid connector
Connecteur pour la grille 40650[1] or ou oder 40622
Gitteranschlussring

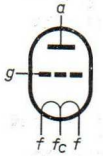
Insulating collar
Support isolant 40630
Isoliersockel

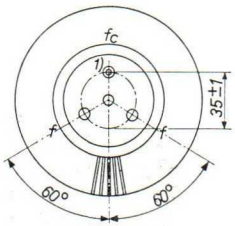


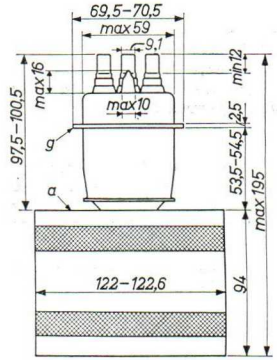




[1] The connector 40650 should be used only below 30 Mc/s
Le connecteur 40650 sera utilisé au-dessous de 30 MHz seulement
Der Anschlussring 40650 soll nur unterhalb 30 MHz verwendet werden

Dimensions in mm
Dimensions en mm
Abmessungen in mm




The centre tap $f_c$ must not be used for filament current supply. The clips type 40634, however, must be used for the cooling of all three filament pins, thus also of pin $f_c$.

La prise médiane $f_c$ ne doit pas être utilisée pour l'alimentation du filament. Toutefois les bornes de connexion no. de type 40634 doivent être utilisées pour le refroidissement de toutes les broches du filament, y comprise la broche $f_c$.

Die Mittelanzapfung $f_c$ darf nicht für die Heizfadenspeisung verwendet werden. Die Heizanschlussklemmen Typ No. 40634 müssen jedoch für die Kühlung aller Heizfadenstifte verwendet werden, also auch für den Stift $f_c$.

Mounting position: vertical with anode up or down
Montage : vertical avec l'anode en haut ou en bas
Einbau : senkrecht mit der Anode oben oder unten

---

[1]) This pin is marked "0"
Cette broche est marquée "0"
Dieser Stift ist mit "0" gekennzeichnet

# PHILIPS

Tube, tube, Röhre

| | | | |
|---|---|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 4,6 kg | Shipping weight<br>Poids brut<br>Bruttogewicht | 8,1 kg |

40630

| | | | |
|---|---|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 2,1 kg | Shipping weight<br>Poids brut<br>Bruttogewicht | 3,1 kg |

H.F. class C telegraphy
H.F. classe C télégraphie
HF Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| f | = max. | 75 Mc/s |
|---|---|---|
| $V_a$ | = max. | 6 kV |
| $-V_g$ | = max. | 1000 V |
| $I_a$ | = max. | 1,5 A |
| $I_g$ | = max. | 0,35 A |
| $W_g$ | = max. | 120 W |
| $W_{ia}$ | = max. | 9 kW |
| $W_a$ | = max. | 5 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | 4 | 4 | 4 m |
| f | = | 75 | 75 | 75 Mc/s |
| $V_a$ | = | 6 | 5 | 4 kV |
| $V_g$ | = | -400 | -300 | -200 V |
| $I_a$ | = | 1,5 | 1,5 | 1,37 A |
| $I_g$ | = | 0,31 | 0,33 | 0,35 A |
| $V_{gp}$ | = | 740 | 640 | 500 V |
| $W_{ig}$ | = | 210 | 190 | 160 W |
| $W_{ia}$ | = | 9 | 7,5 | 5,5 kW |
| $W_a$ | = | 2,1 | 1,9 | 1,5 kW |
| $W_o$ | = | 6,9 | 5,6 | 4 kW |
| $\eta$ | = | 76,5 | 75 | 73 % |

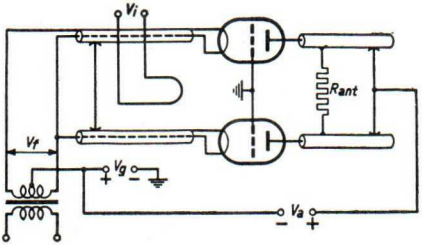
H.F. class C telegraphy, grounded grid
H.F. classe C télégraphie, circuit "grounded-grid"
HF - Klasse C Telegrafie, Gitterbasisschaltung

f ≦ 75 Mc/s

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 6 kV |
| $V_{kg}$ | = max. | 1000 V |
| $I_a$ | = max. | 1,5 A |
| $I_g$ | = max. | 0,35 A |
| $W_g$ | = max. | 120 W |
| $W_{ia}$ | = max. | 9 kW |
| $W_a$ | = max. | 5 kW |

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren




| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ = | 4 | 2,7[1] | 2,7[1] | 1,36[1] | m |
| f = | 75 | 110 | 110 | 220 | Mc/s |
| $V_a$ = | 6 | 5 | 4 | 4 | kV |
| $V_g$ = | 400 | 300 | 200 | 200 | V |
| $I_a$ = | 2x1,5 | 2x1,5 | 2x1,37 | 2x1,25 | A |
| $I_g$ = | 2x0,31 | 2x0,33 | 2x0,35 | 2x0,2 | A |
| $V_{gp}$ = | 740 | 640 | 500 | 450 | V |
| $W_{ig}$ = | 2x1120 | 2x920 | 2x675 | 2x380 | W |
| $W_{ia}$ = | 2x9 | 2x7,5 | 2x5,5 | 2x5 | kW |
| $W_a$ = | 2x2,1 | 2x2,2 | 2x1,7 | 2x2,5 | kW |
| $W_o$ [2] = | 13,8+1,82 | 10,6+1,46 | 7,6+1,03 | 5+0,6 | kW |
| $\eta$ [3] = | 76,5 | 71 | 69 | 50 | % |

[1]) See page 12; voir page 12; siehe Seite 12

[2]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage préamplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[3]) Pure valve efficiency; rendement net du tube; reiner Röhrenwirkungsgrad

H.F. class B telephony
H.F. classe B téléphonie
HF - Klasse B Telefonie

Limiting values
Caractéristiques limites
Grenzdaten

$f \leq 75$ Mc/s

| | | |
|---|---|---|
| $V_a$ | = max. | 6 kV |
| $I_a$ | = max. | 1,1 A |
| $W_{ia}$ | = max. | 6,6 kW |
| $W_a$ | = max. | 5 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | 4 | 4 | m |
| f | = | 75 | 75 | Mc/s |
| $V_a$ | = | 6 | 5 | kV |
| $V_g$ | = | -180 | -145 | V |
| $I_a$ | = | 0,99 | 0,9 | A |
| $V_{gp}$ | = | 250 | 225 | V |
| $W_{ia}$ | = | 5,9 | 4,5 | kW |
| $W_a$ | = | 4 | 3,05 | kW |
| $W_o$ | = | 1,9 | 1,45 | kW |
| $\eta$ | = | 32 | 32 | % |
| m | = | 100 | 100 | % |
| $I_g$ | = | 0,3 | 0,32 | A |
| $W_{ig}$ | = | 140 | 130 | W |

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF - Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

$f \leqq 75$ Mc/s

| | | |
|---|---|---|
| $V_a$ | = max. | 5 kV |
| $-V_g$ | = max. | 1000 V |
| $I_a$ | = max. | 1,3 A |
| $I_g$ | = max. | 0,35 A |
| $W_g$ | = max. | 120 W |
| $W_{ia}$ | = max. | 6,5 kW |
| $W_a$ | = max. | 3,4 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = 4 | 4 | 4 | 4 | 4 | m |
| f | = 75 | 75 | 75 | 75 | 75 | Mc/s |
| Va | = 5 | 4,5 | 4 | 3,5 | 3 | kV |
| Vg [1] | = -400 | -350 | -300 | -300 | -250 | V |
| Ia | = 1,2 | 1,2 | 1,2 | 1,2 | 1 | A |
| Ig | = 0,3 | 0,3 | 0,3 | 0,3 | 0,3 | A |
| Vgp | = 690 | 650 | 600 | 600 | 510 | V |
| Wig | = 190 | 180 | 165 | 165 | 140 | W |
| Wia | = 6 | 5,4 | 4,8 | 4,2 | 3 | kW |
| Wa | = 1,3 | 1,3 | 1,3 | 1,2 | 0,8 | kW |
| Wo | = 4,7 | 4,1 | 3,5 | 3 | 2,2 | kW |
| $\eta$ | = 78 | 76 | 73 | 71,5 | 73 | % |
| m | = 100 | 100 | 100 | 100 | 100 | % |
| Wmod | = 3 | 2,7 | 2,4 | 2,1 | 1,5 | kW |

[1]) Grid bias partially obtained by the grid resistor
Polarisation de grille obtenue partiellement par la résistance de grille
Gittervorspannung, teilweise durch den Gitterwiderstand erzeugt

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF - Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 6 kV |
| $I_a$ | = max. | 1,5 A |
| $W_{ia}$ | = max. | 9 kW |
| $W_a$ | = max. | 5 kW |
| $R_g$ | = max. | 15 kΩ |

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $V_a$ = | 6 | | 5 | | 4,5 | | kV |
| $V_g$ = | -165 | | -138 | | -125 | | V |
| $R_{aa}$ = | 4900 | | 6400 | | 6100 | | Ω |
| $V_{ggp}$= | 0 | 910 | 0 | 661 | 0 | 655 | V |
| $I_a$ = | 2x0,125 | 2x1,5 | 2x0,11 | 2x0,91 | 2x0,1 | 2x0,92 | A |
| $I_g$ = | 0 | 2x0,28 | 0 | 2x0,14 | 0 | 2x0,09 | A |
| $W_{ig}$ = | 0 | 2x115 | 0 | 2x42 | 0 | 2x27 | W |
| $W_{ia}$ = | 2x0,75 | 2x9 | 2x0,55 | 2x4,55 | 2x0,45 | 2x4,15 | kW |
| $W_a$ = | 2x0,75 | 2x2,35 | 2x0,55 | 2x1,25 | 2x0,45 | 2x1,15 | kW |
| $W_o$ = | 0 | 13,3 | 0 | 6,6 | 0 | 6 | kW |
| $d_{tot}$= | - | 4,3 | - | 3,3 | - | 3,7 | % |
| $\eta$ = | - | 74 | - | 73 | - | 72 | % |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $V_a$ = | 4 | | 3,5 | | 3 | | kV |
| $V_g$ = | -112 | | -100 | | -90 | | V |
| $R_{aa}$ = | 4900 | | 4200 | | 4400 | | Ω |
| $V_{ggp}$= | 0 | 632 | 0 | 618 | 0 | 570 | V |
| $I_a$ = | 2x0,1 | 2x0,94 | 2x0,075 | 2x0,95 | 2x0,065 | 2x0,8 | A |
| $I_g$ = | 0 | 2x0,19 | 0 | 2x0,18 | 0 | 2x0,2 | A |
| $W_{ig}$ = | 0 | 2x54 | 0 | 2x50 | 0 | 2x52 | W |
| $W_{ia}$ = | 2x0,4 | 2x3,75 | 2x0,26 | 2x3,3 | 2x0,2 | 2x2,4 | kW |
| $W_a$ = | 2x0,4 | 2x1,1 | 2x0,26 | 2x1 | 2x0,2 | 2x0,75 | kW |
| $W_o$ = | 0 | 5,3 | 0 | 4,6 | 0 | 3,3 | kW |
| $d_{tot}$= | - | 2,6 | - | 2,9 | - | 3,3 | % |
| $\eta$ = | - | 71 | - | 70 | - | 69 | % |

Grid-modulated H.F. class C amplifier for television service, negative modulation, positive synchronisation(American and European system)
Amplificatrice H.F.classe C pour télévision, modulation de grille, modulation négative, synchronisation positive (système américain et européen)
HF- Klasse C Verstärker für Fernsehsender, Gittermodulation, negative Modulation, positive Synchronisierung (amerikanisches und europäisches System)

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 75 Mc/s | | f = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 5 kV | $V_a$ | = max. 4 kV |
| $W_{ia}$ sync | = max. 9,5 kW | $W_{ia}$ sync | = max. 6,5 kW |
| $W_a$ sync | = max. 5 kW | $W_a$ sync | = max. 4 kW |
| $I_a$ sync | = max. 1,9 A | $I_a$ sync | = max. 1,6 A |
| $W_g$ sync | = max. 120 W | $W_g$ sync | = max. 120 W |
| $-V_g$ | = max.1000 V | $-V_g$ | = max. 1000 V |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | [1] |
|---|---|---|---|
| f | | = 48-75 | 170-220 Mc/s |
| B (-1,5 db) | | = 5,25 | 6,5 $Mc/s^2$) |
| B (-3 db) | | = 8 | 10 $Mc/s^2$) |
| $V_a$ | | = 5 | 4 kV |
| $V_g$ | sync | = -200 | -150 V |
| | black,noir, schwarz | = -300 | -225 V |
| | white,blanc,weiss | = -550 | -500 V |
| $V_{gg_p}$ | sync | = 1000 | 1000 V[3]) |
| $I_a$ | sync | = 3,8 | 3,2 A |
| | black,noir ,schwarz | = 2,6 | 2,6 A |
| $I_g$ | sync | = 0,5 | 0,4 A |
| | black, noir,schwarz | = 0,35 | 0,22 A |
| $W_{ig}$ | sync | = 250 | 350-450 W[4]) |
| $W_o$ | sync | = 9 | 6 kW |
| | black,noir, schwarz | = 5,35 | 3,37 kW |

[1]),[2]),[3]),[4])See page 12; voir page 12; siehe Seite 12

# PHILIPS

Grid-modulated H.F. class C amplifier for television service, positive modulation, negative synchronisation (BBC system)
Amplificatrice H.F. classe C pour télévision, modulation de grille, modulation positive, synchronisation négative, (système BBC)
HF Klasse C Verstärker für Fernsehsender, Gittermodulation, positive Modulation, negative Synchronisierung (BBC System)

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 75 | Mc/s |
| $V_a$ | = max. | 5 | kV |
| $-V_g$ | = max. | 1000 | V |
| $I_a$ white | = max. | 1,9 | A |
| $W_{ia}$ white | = max. | 9,5 | kW |
| $W_a$ white | = max. | 5 | kW |
| $W_g$ white | = max. | 120 | W |

Operating conditions, two valves in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | | |
|---|---|---|---|---|
| f | | = | 48-75 | Mc/s |
| B | (Iant = 85 %) | = | 5,25 | Mc/s |
| | (Iant = 70 %) | = | 8 | Mc/s |
| $V_a$ | | = | 5 | kV |
| $V_g$ | white, blanc, weiss | = | -200 | V |
| | black, noir, schwarz | = | -460 | V |
| | sync | = | -580 | V |
| $V_{ggp}$ | white, blanc, weiss | = | 1000 | V |
| $I_a$ | white, blanc, weiss | = | 3,8 | A |
| | black, noir, schwarz | = | 0,8 | A |
| $I_g$ | white, blanc, weiss | = | 0,5 | A |
| | black, noir, schwarz | = | 0 | A |
| $W_{ig}$ | white, blanc, weiss | = | 250 | W |
| $W_o$ | white, blanc, weiss | = | 9 | kW |
| | black, noir, schwarz | = | 0,6 | kW |

H.F. class B telephony for television service (American and European system)
H.F. classe B téléphonie pour télévision ( système américain et européen)
HF Klasse B Telephonie für Fernsehsender (amerikanisches und europäisches System)

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 75 Mc/s | | f = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 5 kV | $V_a$ | = max. 4 kV |
| $W_{ia}$ sync | = max. 9,5 kW | $W_{ia}$ sync | = max. 6,5 kW |
| $W_a$ sync | = max. 5 kW | $W_a$ sync | = max. 4 kW |
| $I_a$ sync | = max. 1,9 A | $I_a$ sync | = max. 1,6 A |
| $W_g$ sync | = max. 120 W | $W_g$ sync | = max. 120 W |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | [1] | |
|---|---|---|---|---|
| f | | = | 48-75 | 170-220 Mc/s |
| B (-1,5 db) | | = | 5,25 | 6,5 $Mc/s^2$) |
| B (-3 db) | | = | 8 | 10 $Mc/s^2$) |
| $V_a$ | | = | 5 | 4 kV |
| $V_g$ | | = | -200 | -150 V |
| $V_{gg_p}$ | sync | = | 1000 | 1000 V[3]) |
| | black, noir, schwarz | = | 800 | 750 V[3]) |
| | white, blanc, weiss | = | 0 | 200 V[3]) |
| $I_a$ | sync | = | 3,8 | 3,2 A |
| | black, noir, schwarz | = | 3 | 2,6 A |
| | white, blanc, weiss | = | 0,2 | - A |
| $I_g$ | sync | = | 0,5 | 0,4 A |
| | black, noir, schwarz | = | 0,22 | 0,22 A |
| | white, blanc, weiss | = | 0 | - A |
| $W_{ig}$ | sync | = | 250 | 350-450 W[4]) |
| $W_o$ | sync | = | 9 | 6 kW |
| | black, noir, schwarz | = | 5,35 | 3,37 kW |

[1], [2], [3], [4]) See page 12; voir page 12; siehe Seite 12

[1]) Pages 5,9,11; Seite 5,9,11

When using the tube above 108 Mc/s, particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, our guarantee for the tubes operating at frequencies above 108 Mc/s can only be given after approval of the installation

Lorsqu'on utilise le tube au-dessus de 108 Mc/s, il est requis d'effectuer le montage avec beaucoup de soin, autrement le tube est susceptible d'être endommagé. Par conséquent, nous ne pouvons garantir les tubes dans ce domaine de fréquences qu'après notre approbation de l'installation

Der Betrieb der Röhre bei höheren Frequenzen als 108 MHz erfordert eine sehr sorgfältige Durchführung der Schaltung und des Aufbaus. Vernachlässigung dieser Bedingung kann eine Beschädigung der Röhre zur Folge haben. Eine Garantie für den Betrieb der Röhren in diesem Frequenzgebiet wird infolgedessen nur dann gegeben, wenn die Anlage unserseits genehmigt worden ist.

---

[2]),[3]),[4]) Pages 9,11; Seite 9,11

[2]) This value of bandwidth is based on measurements on a circuit with a single LC section
Cette valeur de la largeur de bande se rapporte à des mesures à un montage avec un seul circuit LC.
Dieser Wert der Bandbreite bezieht sich auf Messungen an einer Schaltung mit einem einzigen LC-Kreis.

[3]) Measured by the slide back method
Mesuré par la méthode de glissement de la tension de polarisation.
Gemessen mittels Verschiebung der Gittervorspannung

[4]) Driving power is accounted for largely by circuit losses. The indicated driving power is required to take care of losses in damping resistors, circuit losses and tube driving power

La puissance d'entrée est nécessaire pour la plupart pour les pertes dans le circuit. La puissance mentionnée est nécessaire pour les pertes dans les résistances d'amortissement, dans le circuit et pour la puissance d'entrée du tube.

Die Eingangsleistung ist grossenteils nötig für die Verluste in der Schaltung. Die genannte Leistung ist nötig für die Verluste in Dämpfungswiderständen, in Kreisen und für die Eingangsleistung der Röhre.

Operating conditions as H.F. class C oscillator for industrial use with anode voltage from two-phase half-wave rectifier without filter
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur biphasé à une alternance sans filtre
Betriebsdaten als HF Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Zweiphasen- Einweggleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f = max. | 75 Mc/s | $I_g$ = max. | 0,31 A |
| $V_a$ = max. | 5400 V | $W_{ia}$ = max. | 9 kW |
| $-V_g$ = max. | 900 V | $W_a$ = max. | 5 kW |
| $I_a$ = max. | 1,35 A | $W_g$ = max. | 120 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| $V_{tr}$ = | 6,0[1] | 5,1[2] | $kV_{eff}$ |
| $V_a$ = | 5,4 | 4,6 | kV[3] |
| $I_a$ = | 1,35 | 1,15 | A |
| $I_g$ = | 0,31 | 0,27 | A |
| $R_g$ = | 1300 | 1100 | Ω |
| $W_{ig}$ = | 210 | 160 | W |
| $W_{ia}$ = | 9 | 6,5 | kW |
| $W_a$ = | 2,3 | 1,84 | kW |
| $W_o$ = | 6,5 | 4,5 | kW |
| $\eta$ = | 72 | 70 | % |

[1]) Care must be taken that under these operating conditions the absolute limiting values are not exceeded by variation of the supply voltage or the load or by tolerances in the circuit elements.
Il faut prendre garde de ne pas dépasser les caractéristiques limites absolues par suite de variation de la tension d'alimentation ou de la charge ou par suite des tolérances des éléments du circuit.
Es muss darauf geachtet werden dass die absoluten Grenzwerte nicht überschritten werden infolge Schwankungen der Speisespannung oder der Belastung oder infolge Abweichungen der Schaltteile.

[2]),[3]) see page 14; voir page 14; siehe Seite 14.

# PHILIPS

Operating conditions as H.F. class C oscillator for industrial use with anode voltage from three-phase half-wave rectifier without filter
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé à une seule alternance sans filtre
Betriebsdaten als H.F. Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasen-Einweggleichrichter ohne Filter.

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absulute Werte)

| | | | |
|---|---|---|---|
| $f$ | = max. 75 Mc/s | $I_g$ | = max. 0,35 A |
| $V_a$ | = max. 6000 V | $W_{ia}$ | = max. 9 kW |
| $-V_g$ | = max. 1000 V | $W_a$ | = max. 5 kW |
| $I_a$ | = max. 1,5 A | $W_g$ | = max. 120 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| $V_{tr}$ | = 5,1[1] | 4,4[2] | $kV_{eff}$ |
| $V_a$ | = 6,0 | 5,1 | kV[3] |
| $I_a$ | = 1,5 | 1,25 | A |
| $I_g$ | = 0,31 | 0,28 | A |
| $R_g$ | = 1300 | 1100 | Ω |
| $W_{ig}$ | = 210 | 160 | W |
| $W_{ia}$ | = 9 | 6,4 | kW |
| $W_a$ | = 1,9 | 1,74 | kW |
| $W_o$ | = 6,9 | 4,5 | kW |
| $\eta$ | = 76,5 | 70 | % |

[2]) Under these conditions normal deviations of voltages and load are permissible. The absolute limiting values of the valve must, however, not be exceeded.
Dans cettes conditions des déviations normales des tensions et de la charge sont permises. Il ne faut cependant pas dépasser les caractéristiques limites absolues.
Unter diesen Bedingungen sind normale Abweichungen der Spannungen und der Belastung gestattet. Die absoluten Grenzwerte dürfen jedoch nicht überschritten werden.
[3]) D.C. value; valeur moyenne; mittlerer Wert.
[1]) See page 13; voir page 13; siehe Seite 13.

Operating conditions as H.F. class C oscillator for industrial use with self rectification
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles à auto-redressement
Betriebsdaten als H.F.Klasse C Oszillator für industrielle Anwendungen mit Selbstgleichrichtung

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

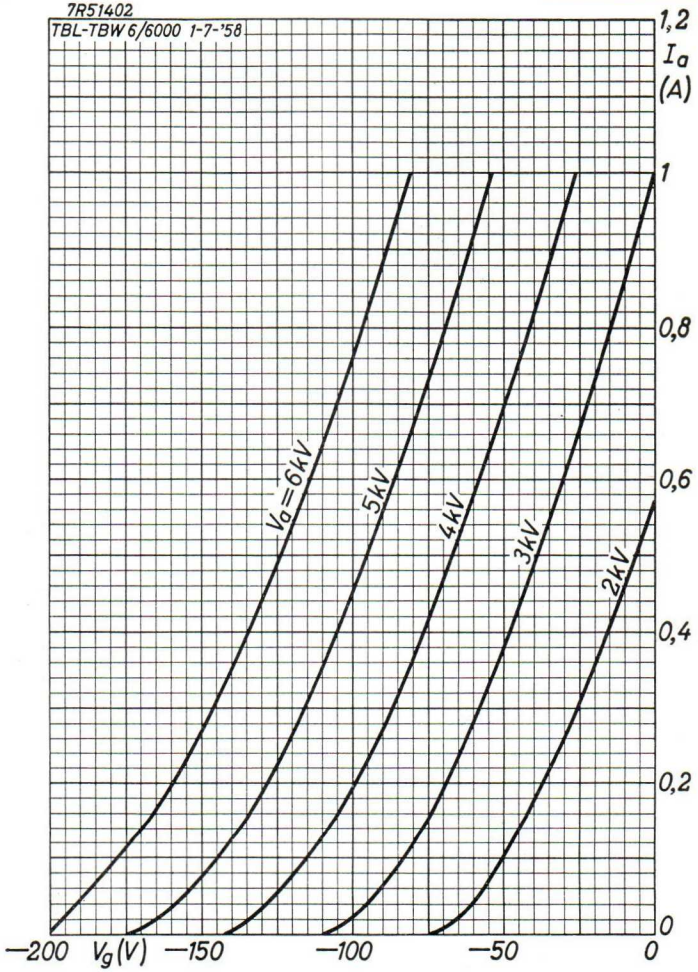
| | | | |
|---|---|---|---|
| $f$ | = max. | 75 | Mc/s |
| $V_{tr}$ | = max. | 6800 | $V_{eff}$ |
| $-V_g$ | = max. | 640 | V |
| $I_a$ | = max. | 0,8 | A |
| $I_g$ | = max. | 0,19 | A |
| $W_{ia}$ | = max. | 9 | kW |
| $W_a$ | = max. | 5 | kW |
| $W_g$ | = max. | 120 | W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $V_{tr}$ | = | 6,8[1] | 5,9[2] | $kV_{eff}$ |
| $I_a$ | = | 0,8 | 0,7 | A |
| $I_g$ | = | 0,19 | 0,165 | A |
| $R_g$ | = | 1050 | 1050 | Ω |
| $W_{ig}$ | = | | | W |
| $W_{ia}$ | = | 6,05 | 4,6 | kW |
| $W_a$ | = | 1,5 | 1,24 | kW |
| $W_o$ | = | 4,55 | 3,36 | kW |
| $\eta$ | = | 75 | 73 | % |

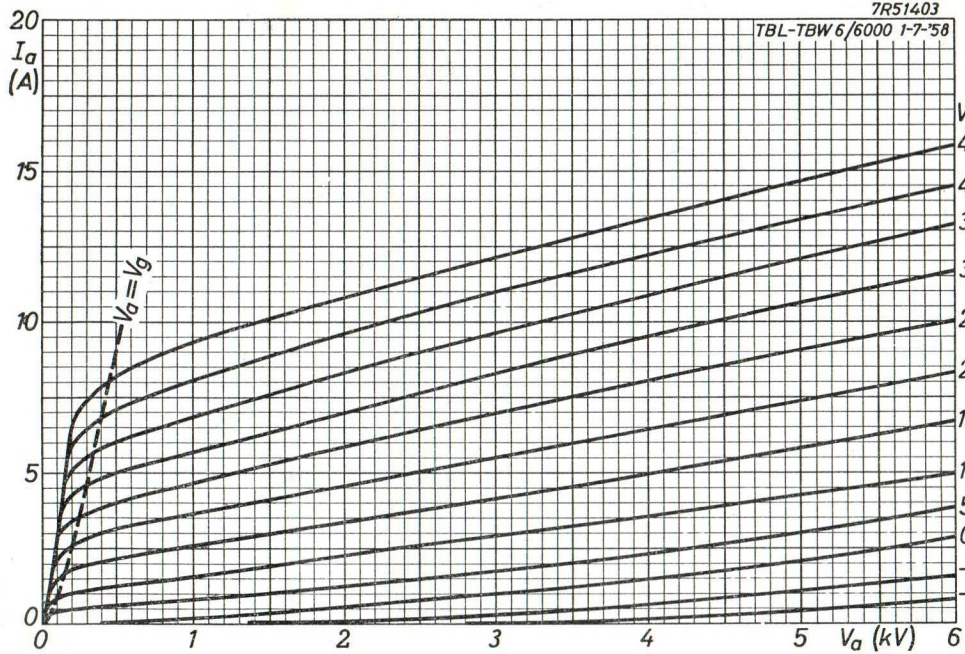
[1]) See note [1]) page 13; voir la note [1]) page 13; siehe Fussnote [1]) Seite 13.

[2]) See note [2]) page 14; voir la note [2]) page 14; siehe Fussnote [2]) Seite 14.


7R51402
TBL-TBW 6/6000 1-7-'58
1,2
$I_a$
(A)
1
0,8
0,6
0,4
0,2
0
$V_a$=6kV
5kV
4kV
3kV
2kV
−200
$V_g$(V)
−150
−100
−50
0

7.7.1958

A




TBL 6/6000

PHILIPS

g

PHILIPS

TBL 6/6000



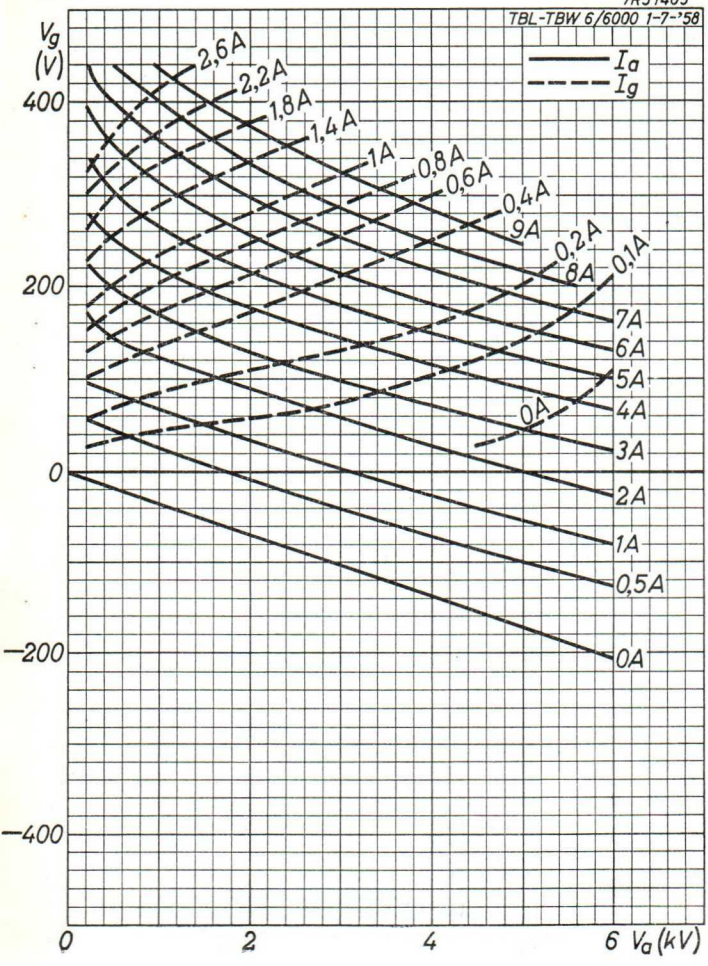

7.7.1958

C

TBL 6/6000

# PHILIPS

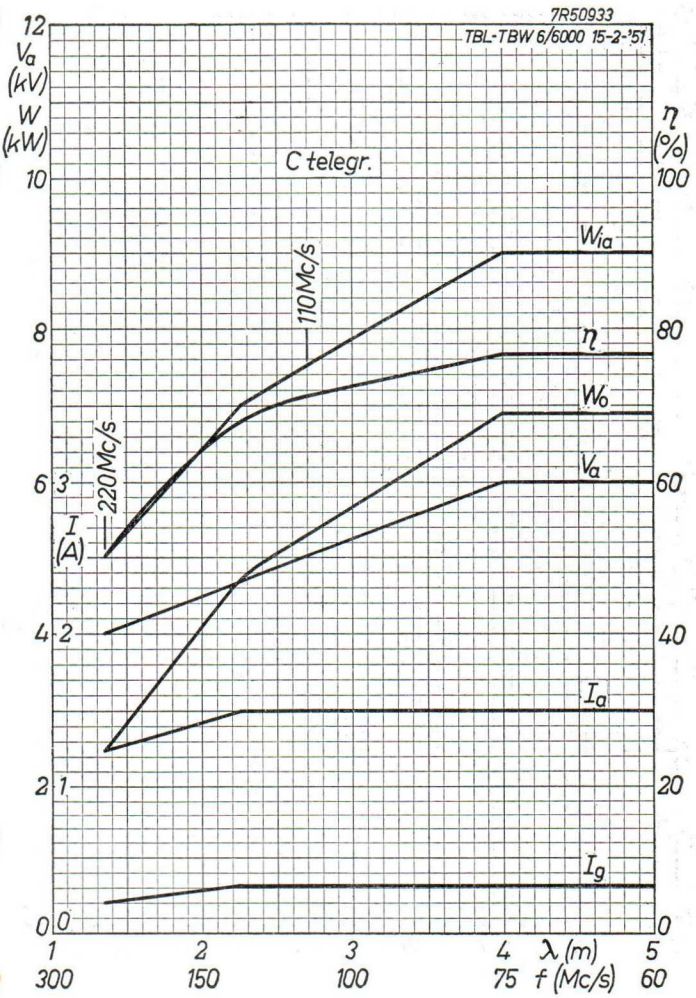
7R51405




D

# PHILIPS

**TBL 6/6000**

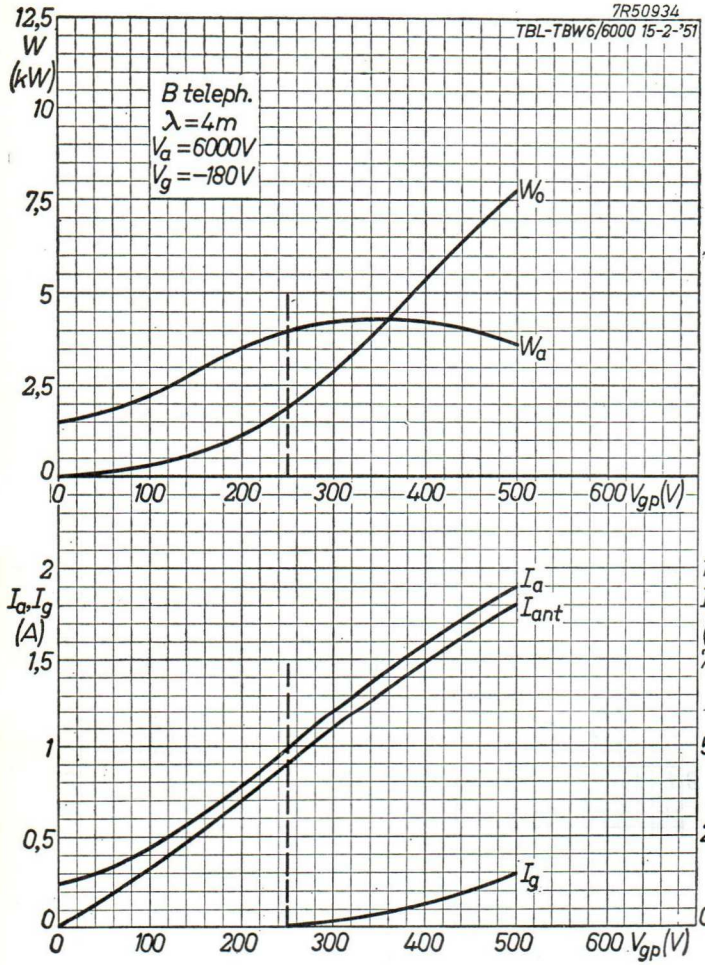



7.7.1954

E

**TBL 6/6000**

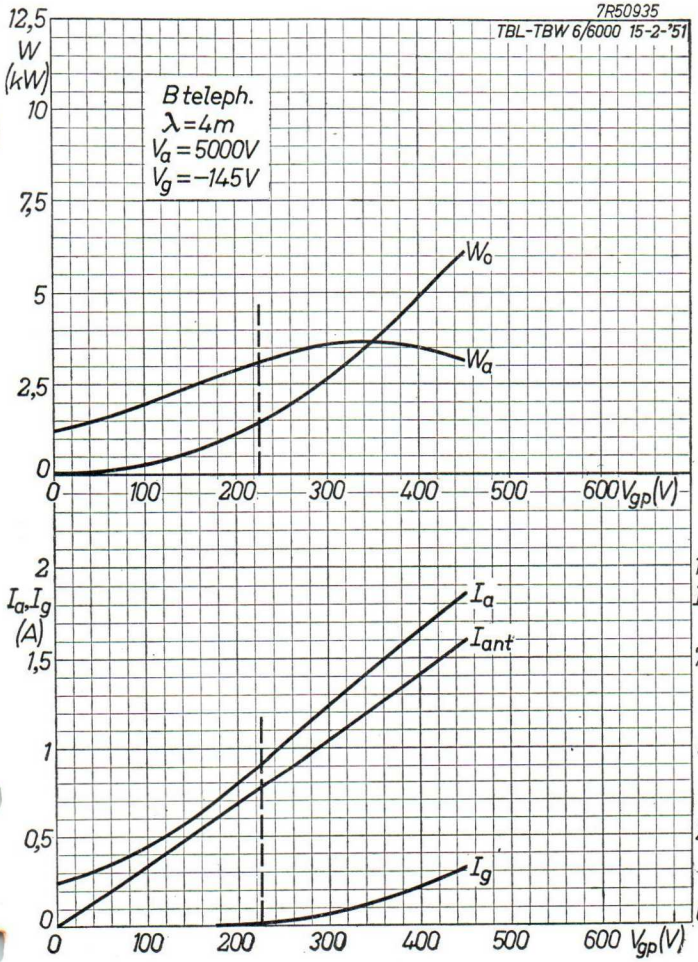
# PHILIPS




F

# PHILIPS

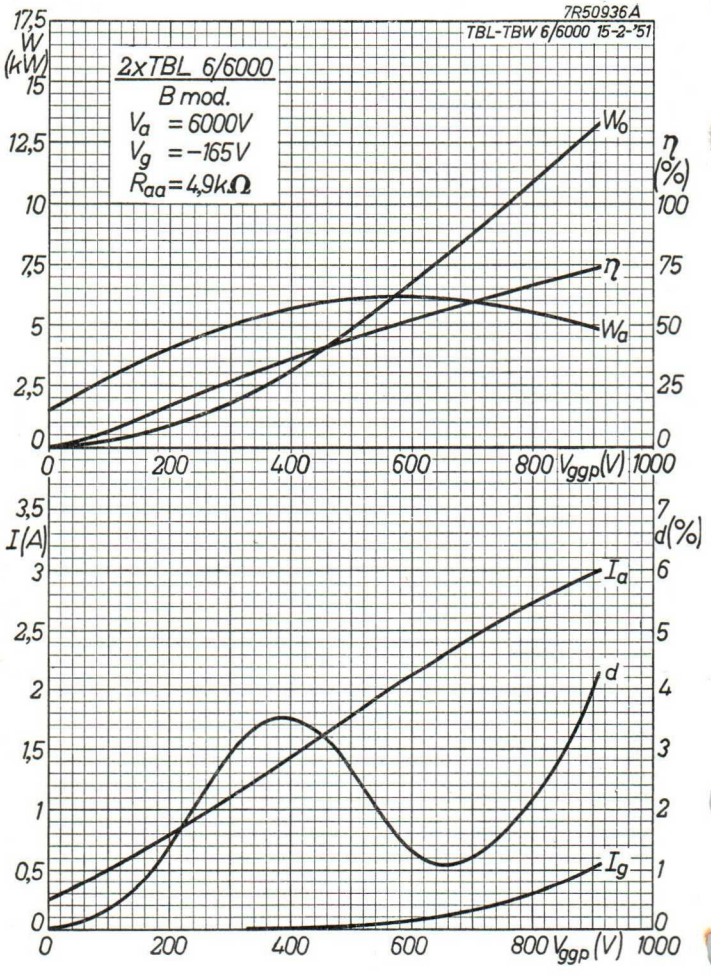
**TBL 6/6000**

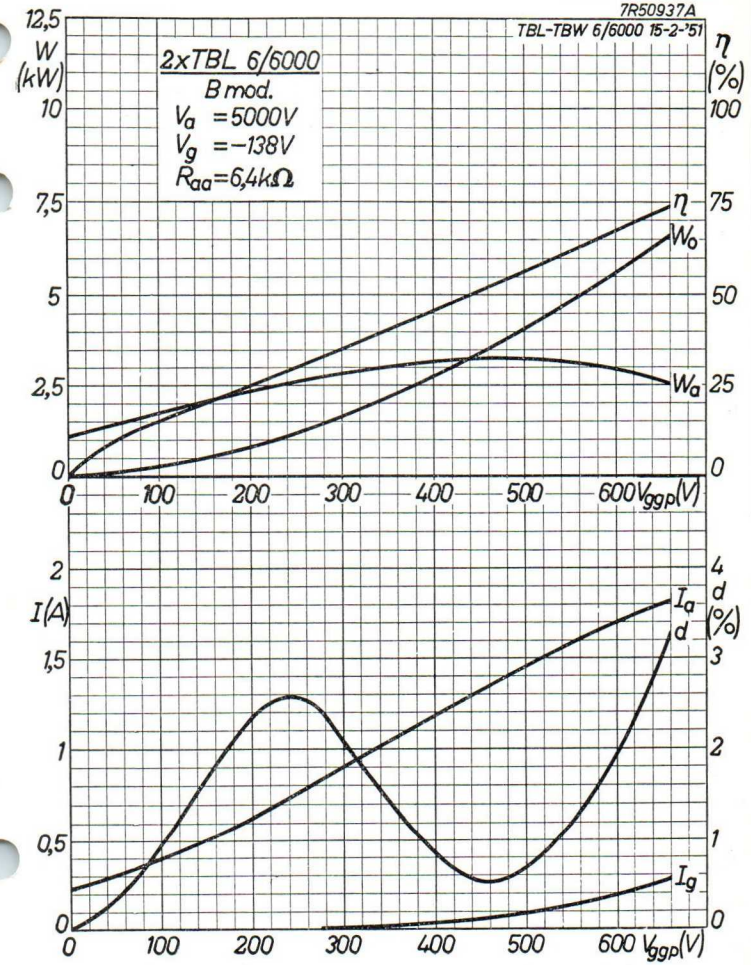



7.7.1954

G

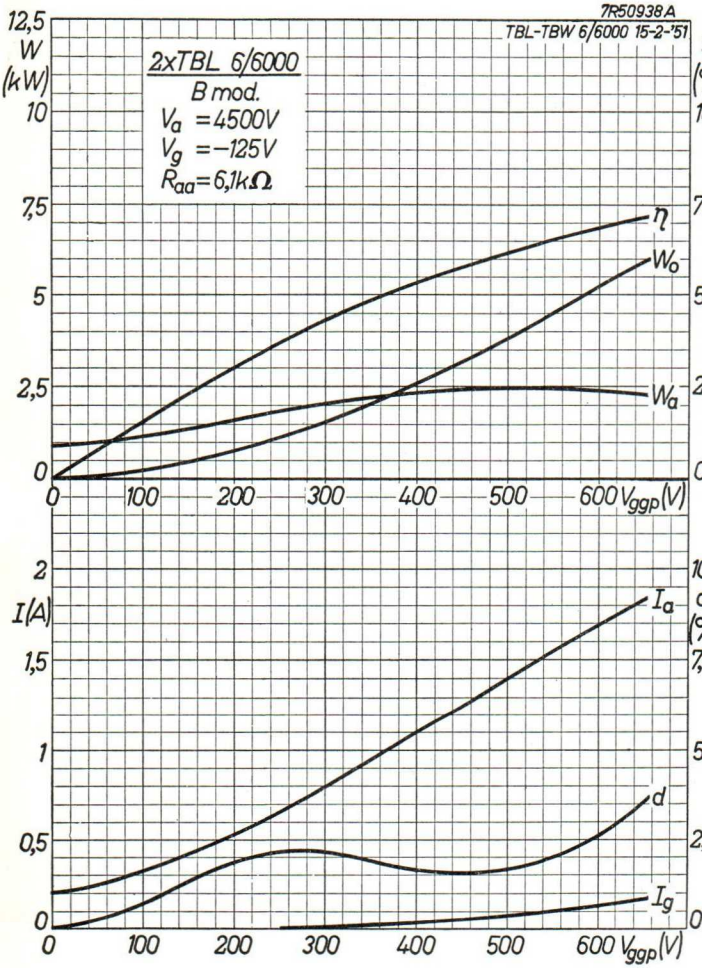
# PHILIPS


7R50936A
TBL-TBW 6/6000 15-2-'51
2xTBL 6/6000
B mod.
$V_a$ = 6000V
$V_g$ = −165V
$R_{aa}$ = 4,9kΩ
$W_o$
$\eta$
$W_a$
$I_a$
$I_g$
d
W (kW)
η (%)
I(A)
d(%)
$V_{ggp}$(V)
0
200
400
600
800
1000

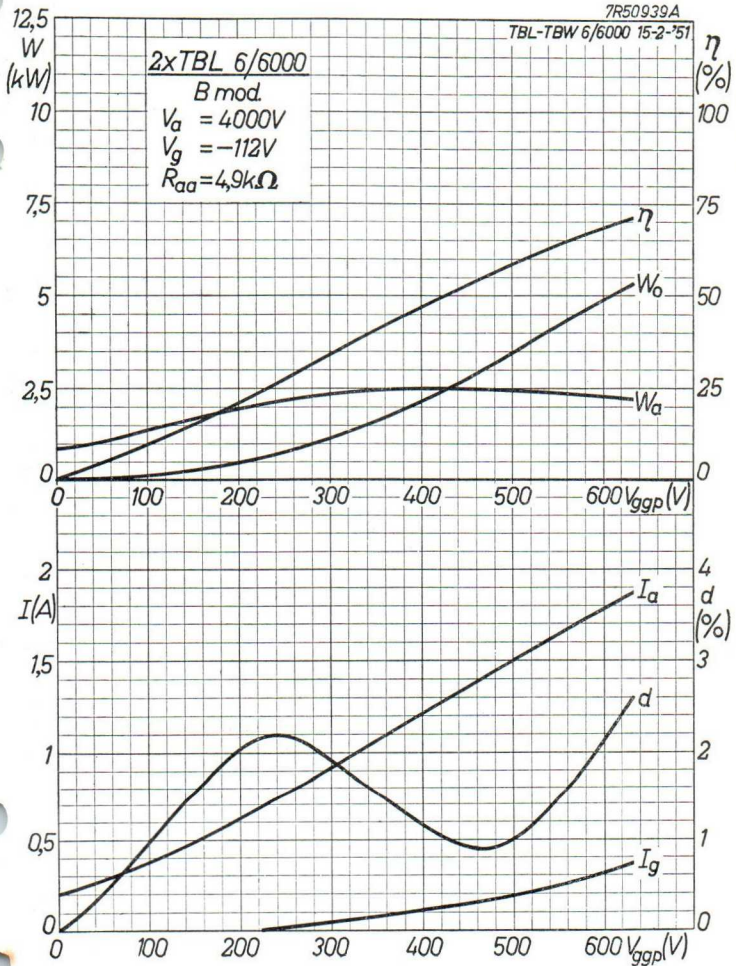

7R50937A
TBL-TBW 6/6000 15-2-'51
2xTBL 6/6000
B mod.
$V_a$ = 5000V
$V_g$ = −138V
$R_{aa}$ = 6,4kΩ
W (kW)
η (%)
$W_o$
$W_a$
$V_{ggp}$(V)
I(A)
d (%)
$I_a$
$I_g$
d

**TBL 6/6000**

# PHILIPS




J

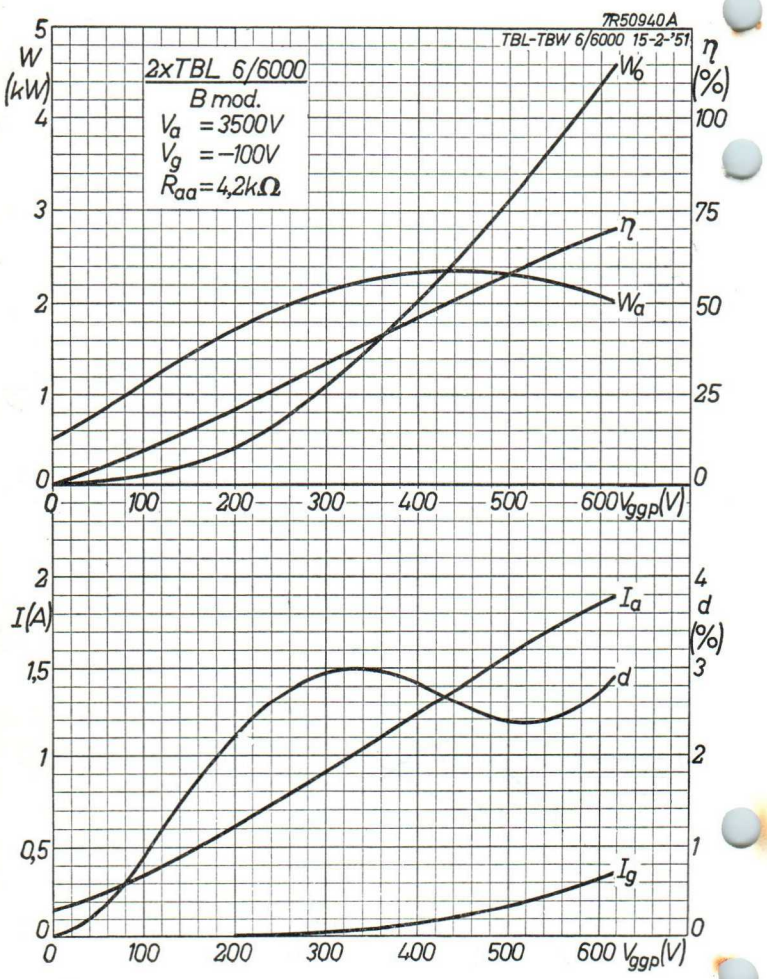

7R50939A
TBL-TBW 6/6000 15-2-'51
2xTBL 6/6000
B mod.
$V_a$ = 4000V
$V_g$ = −112V
$R_{aa}$ = 4,9kΩ
12,5
W
(kW)
10
7,5
5
2,5
0
η
(%)
100
75
50
25
0
η
$W_o$
$W_a$
0
100
200
300
400
500
600
$V_{ggp}$(V)
2
I(A)
1,5
1
0,5
0
4
d
(%)
3
2
1
0
$I_a$
d
$I_g$
0
100
200
300
400
500
600
$V_{ggp}$(V)

7.7. 1954

K

**TBL 6/6000**

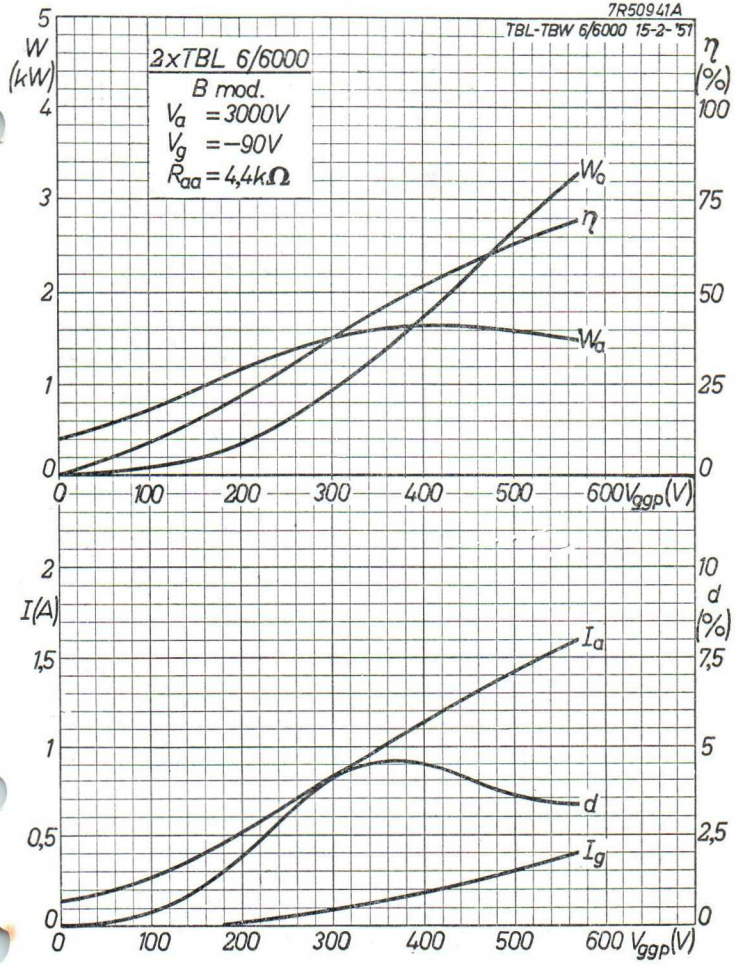
# PHILIPS




L

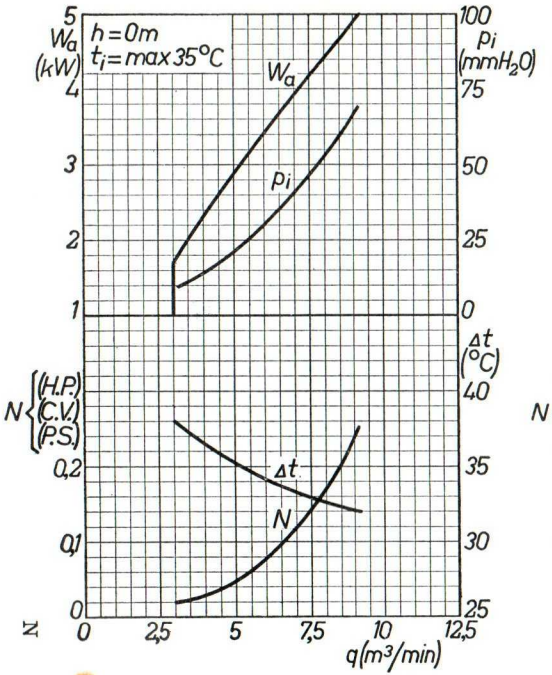
# PHILIPS

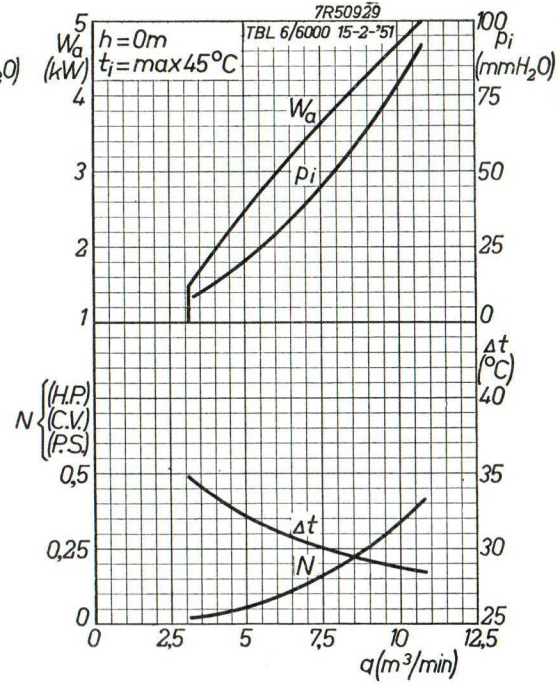
**TBL 6/6000**



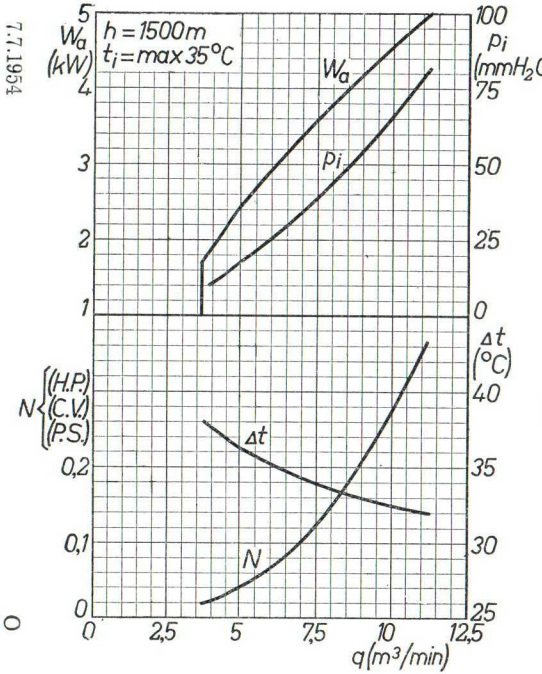

7.7.1954

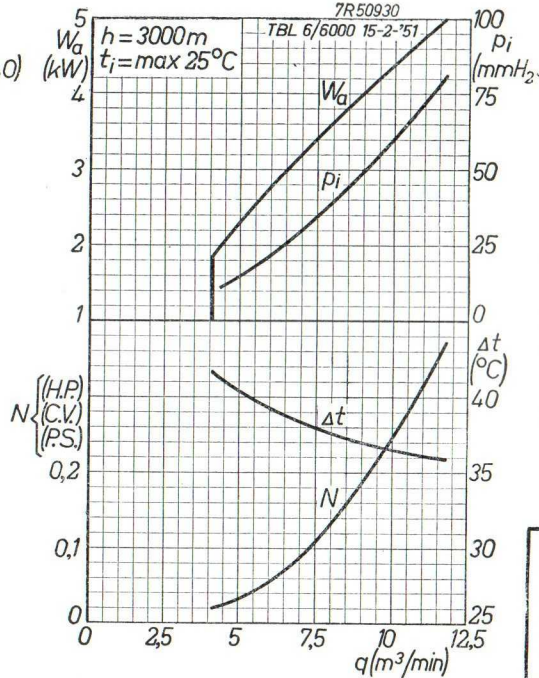
M


h = 0m
$t_i$ = max 35°C
$W_a$ (kW)
$p_i$ (mmH$_2$O)
$W_a$
$p_i$
$\Delta t$ (°C)
N {(H.P.) (C.V.) (P.S.)}
$\Delta t$
N
q(m$^3$/min)


7R509 29
TBL 6/6000 15-2-'51
h = 0m
$t_i$ = max 45°C
$W_a$ (kW)
$p_i$ (mmH$_2$O)
$W_a$
$p_i$
$\Delta t$ (°C)
N {(H.P.) (C.V.) (P.S.)}
$\Delta t$
N
q(m$^3$/min)

7.7.1954




PHILIPS

TBL 6/6000

TRIODE for use in industrial H.F. generators and in telegraphy and telephony transmitters
TRIODE pour utilisation dans les générateurs H.F. industriels et dans les émetteurs télégraphiques et téléphoniques
TRIODE zur Verwendung in HF-Industriegeneratoren und in Telegraphie- und Telephoniesendern

Cooling : forced air
Refroidissement: par ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 12,6 V
$I_f$ = 33 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,3 pF
$C_g$ = 16 pF
$C_{ag}$ = 11 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ($I_a$ = 1 A ; $V_a$ = 6 kV) = 32
S = 15 mA/V

| λ | Freq. | C telegr. | | C osc. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|
| (m) | (Mc/s) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) |
| 10 | 30 | 6,5 | 9,5 | | | 7,0 | 20 |
| | | 6,0 | 8,5 | | | 5,0 | 9,0 |
| | | 5,0 | 7,1 | | | 4,0 | 7,1 |
| 6 | 50 | | | 6,0 | 6,0 | | |

[1]) Two tubes; deux tubes; zwei Röhren

# PHILIPS

Air cooling characteristics
Caractéristiques du refroidissement par air
Luftkühlungsdaten

| $W_a$ | h | $t_i$ max. | q min. | $p_i$ |
|---|---|---|---|---|
| (kW) | (m) | (°C) | ($m^3$/min) | (mm $H_2O$) |
| 2 | 0 | 35 | 4,8 | 20 |
| | 0 | 45 | 5,7 | 25 |
| | 1500 | 35 | 5,7 | 23 |
| | 3000 | 25 | 6,1 | 23 |
| 3,5 | 0 | 35 | 6,2 | 32 |
| | 0 | 45 | 7,3 | 42 |
| | 1500 | 35 | 7,3 | 36 |
| | 3000 | 25 | 7,8 | 36 |
| 6 | 0 | 35 | 9,2 | 68 |
| | 0 | 45 | 10,7 | 91 |
| | 1500 | 35 | 11,2 | 81 |
| | 3000 | 25 | 11,7 | 80 |

See cooling curves
Voir les courbes de refroidissement
Siehe die Kühlungskurven

Temperature of filament seals
Température des scellements du filament
Temperatur der Heizfadeneinschmelzungen
= max. 210°C

Temperature of grid and anode seals
Température des scellements de l'anode et de la grille
Temperatur der Anoden- und Gittereinschmelzungen
= max. 180°C

Clips for filament
Bornes de connexion pour le filament
Heizanschlussklemmen
40634

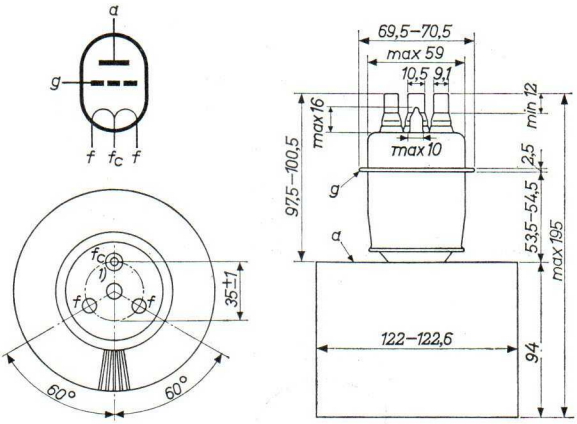
Clip for centre pin of filament
Borne pour la connexion centrale du filament
Klemme für die Mittelanzapfung des Heizfadens
40649[1])

Grid connector 40650[2]) or
Connecteur pour la grille ou 40622
Gitteranschlussring oder

Insulating pedestal (see page 4)
Support isolant (voir page 4)
Isoliersockel (siehe Seite 4)
40630

1)2) See page 3; voir page 3; siehe Seite 3

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical with anode up or down
Montage : vertical avec l'anode en haut ou en bas
Einbau : senkrecht mit der Anode oben oder unten

---

[1]) The centre tap $f_c$ (diameter 10.5 mm; marked 0) must not be used for filament current supply. The clip type 40649, however, must be used for the cooling of this pin ←

La prise médiane $f_c$ (diamètre de 10,5 mm; indiquée par 0) ne doit pas être utilisée pour l'alimentation du filament. Toutefois la borne de connexion no. de type 40649 doit être utilisée pour le refroidissement de cette broche ←

Die Mittelanzapfung $f_c$ (Durchmesser 10,5 mm; mit 0 bezeichnet) darf nicht für die Heizfadenspeisung verwendet werden. Die Heizanschlussklemme Type No. 40649 muss jedoch für die Kühlung dieses Stiftes verwendet werden ←

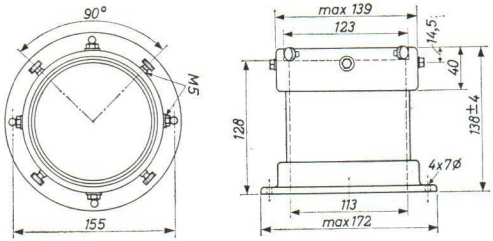
[2]) See page 4. The connector 40650 should only be used below 30 Mc/s

Voir page 4. Le connecteur 40650 sera utilisé au-dessous de 30 MHz seulement

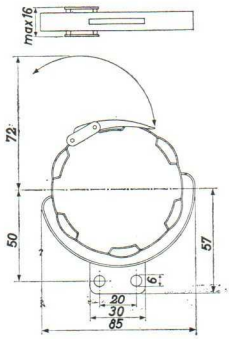
Siehe Seite 4. Der Anschlussring 40650 soll nur unterhalb 30 MHz verwendet werden

# PHILIPS

Dimensions in mm. Dimensions en mm
Abmessungen in mm




40630




40650

Tube, tube, Röhre

| | | | |
|---|---|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 4,6 kg | Shipping weight<br>Poids brut<br>Bruttogewicht | 8,1 kg |

40630

| | | | |
|---|---|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 2,1 kg | Shipping weight<br>Poids brut<br>Bruttogewicht | 3,1 kg |

H.F. class C telegraphy
H.F. classe C télégraphie
HF Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 30 | Mc/s |
| $V_a$ | = max. | 7,2 | kV |
| $-V_g$ | = max. | 1250 | V |
| $I_a$ | = max. | 2,2 | A |
| $I_g$ | = max. | 0,6 | A |
| $W_{ia}$ | = max. | 14 | kW |
| $W_a$ | = max. | 6 | kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| $\lambda$ | = | 10 | 10 | 10 | m |
| f | = | 30 | 30 | 30 | Mc/s |
| $V_a$ | = | 6,5 | 6,0 | 5,0 | kV |
| $V_g$ | = | -450 | -400 | -300 | V |
| $I_a$ | = | 2,0 | 2,0 | 2,0 | A |
| $I_g$ | = | 0,5 | 0,5 | 0,5 | A |
| $V_{g_p}$ | = | 820 | 780 | 660 | V |
| $W_{ig}$ | = | 370 | 350 | 297 | W |
| $W_{ia}$ | = | 13 | 12 | 10 | kW |
| $W_a$ | = | 3,5 | 3,5 | 2,9 | kW |
| $W_o$ | = | 9,5 | 8,5 | 7,1 | kW |
| $\eta$ | = | 73 | 71 | 71 | % |

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 7,2 kV |
| $I_a$ | = max. | 2,2 A |
| $W_{ia}$ | = max. | 14 kW |
| $W_a$ | = max. | 6 kW |
| $R_g$ | = max. | 15 kΩ |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 7 | | 5 | | kV |
| $V_g$ | = | -250 | | -165 | | V |
| $R_{aa\sim}$ | = | 4150 | | 4800 | | Ω |
| $V_{gg_p}$ | = | 0 | 1300 | 0 | 880 | V |
| $I_a$ | = | 2x0,2 | 2x2,0 | 2x0,15 | 2x1,25 | A |
| $I_g$ | = | 0 | 2x0,53 | 0 | 2x0,33 | A |
| $I_{g_p}$ | = | - | 2x2,8 | - | 2x1,75 | A |
| $W_{ig}$ | = | 0 | 2x310 | 0 | 2x130 | W |
| $W_{ia}$ | = | 2x1,4 | 2x14 | 2x0,75 | 2x6,2 | kW |
| $W_a$ | = | 2x1,4 | 2x4,0 | 2x0,75 | 2x1,7 | kW |
| $W_o$ | = | 0 | 20 | 0 | 9 | kW |
| $\eta$ | = | - | 71,5 | - | 72,5 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 5 | | 4 | | kV |
| $V_g$ | = | -165 | | -135 | | V |
| $R_{aa\sim}$ | = | 5500 | | 3800 | | Ω |
| $V_{gg_p}$ | = | 0 | 730 | 0 | 930 | V |
| $I_a$ | = | 2x0,15 | 2x1,1 | 2x0,1 | 2x1,25 | A |
| $I_g$ | = | 0 | 2x0,22 | 0 | 2x0,36 | A |
| $I_{g_p}$ | = | - | 2x1,2 | - | 2x1,8 | A |
| $W_{ig}$ | = | 0 | 2x70 | 0 | 2x135 | W |
| $W_{ia}$ | = | 2x0,75 | 2x5,5 | 2x0,4 | 2x5,0 | kW |
| $W_a$ | = | 2x0,75 | 2x1,5 | 2x0,4 | 2x1,45 | kW |
| $W_o$ | = | 0 | 8,0 | 0 | 7,1 | kW |
| $\eta$ | = | - | 72,5 | - | 71 | % |

H.F. class C oscillator for industrial use with anode voltage from three-phase half-wave rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé à une seule alternance sans filtre
HF Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasen-Einweggleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f = max. | 52 Mc/s | $I_g$ = max. | 0,5 A[1] |
| $V_a$ = max. | 7 kV | $W_{ia}$ = max. | 11 kW |
| $-V_g$ = max. | 1250 V | $W_a$ = max. | 6 kW |
| $I_a$ = max. | 1,8 A | $R_g$ = max. | 10 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| f | = | 50 Mc/s |
| $V_{tr}$ | = | 5,1 $kV_{eff}$ |
| $V_a$ | = | 6,0 kV |
| $I_a$ | = | 1,5 A |
| $I_g$ | = | 0,4 A[1] |
| $R_g$ | = | 1000 Ω |
| $W_{ig}$ | = | 300 W |
| $W_{ia}$ | = | 9 kW |
| $W_a$ | = | 2,7 kW |
| $W_{osc}$ | = | 6 kW[2] |
| $\eta$ | = | 67 % |

[1] Unloaded
Non chargé 0,7 A
Unbelastet

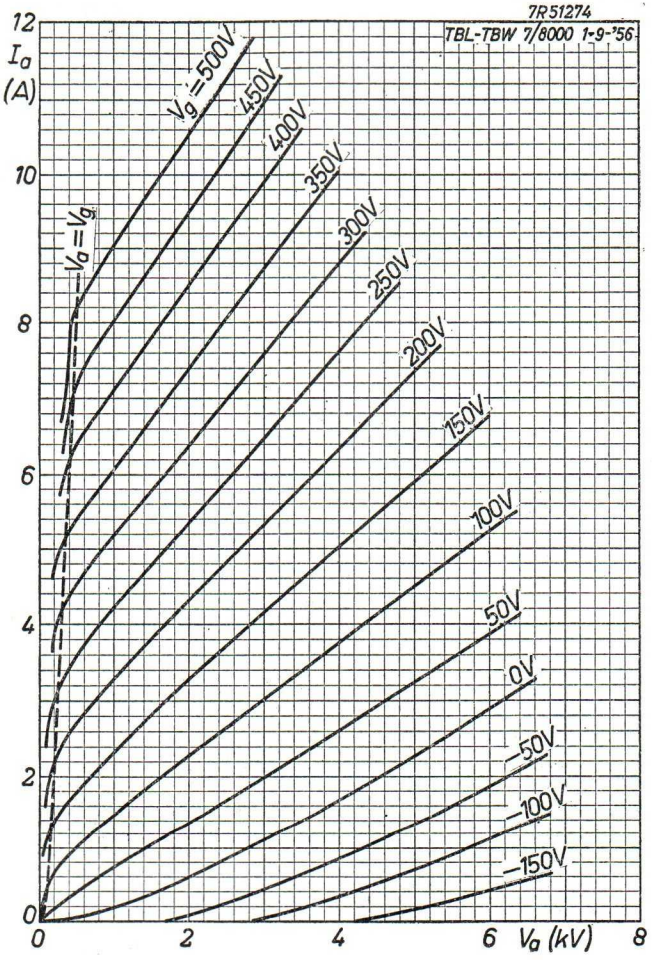
[2] Available power (load + circuit losses)
Puissance disponible (dans la charge + pertes de circuit)
Verfügbare Leistung (in der Belastung + Kreisverluste)

# PHILIPS

**TBL 7/8000**

7R51274

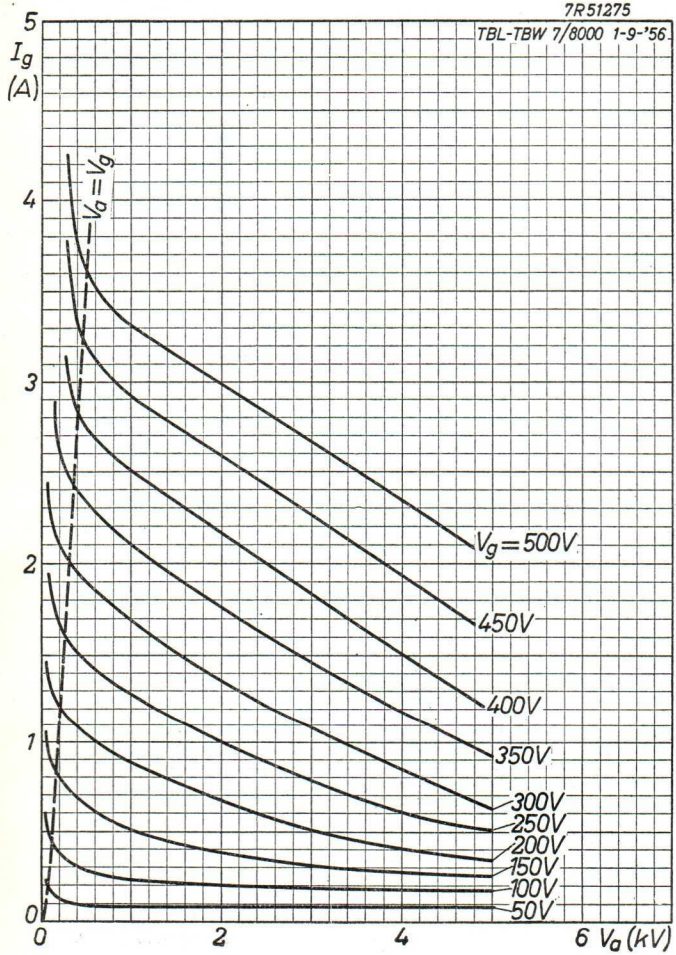
TBL-TBW 7/8000 1-9-'56

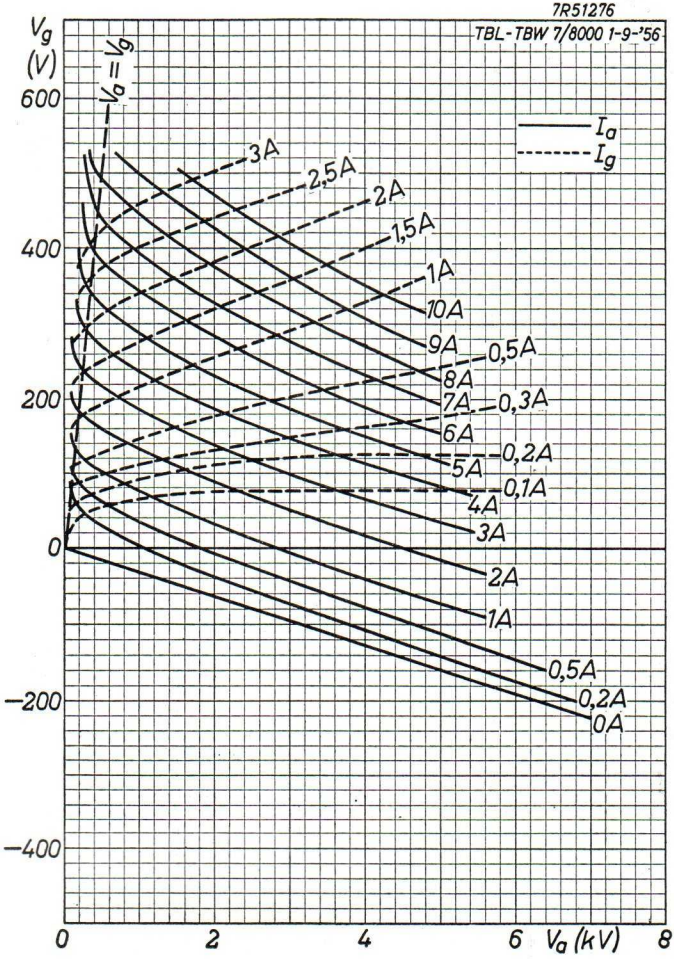



9.9.1956

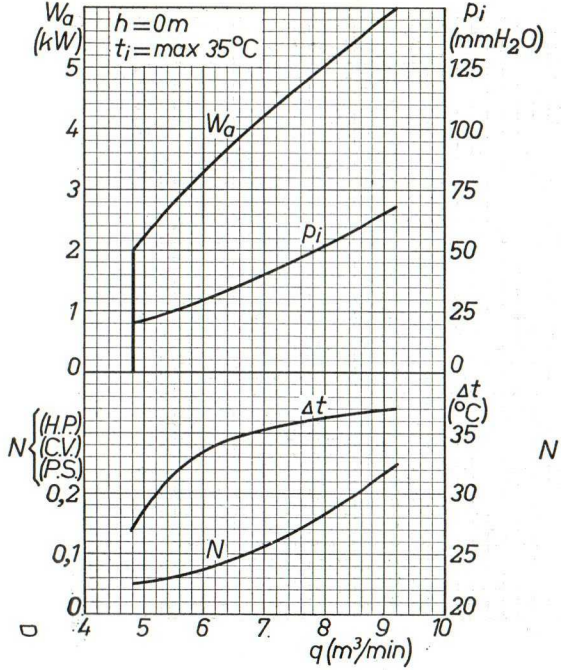
A

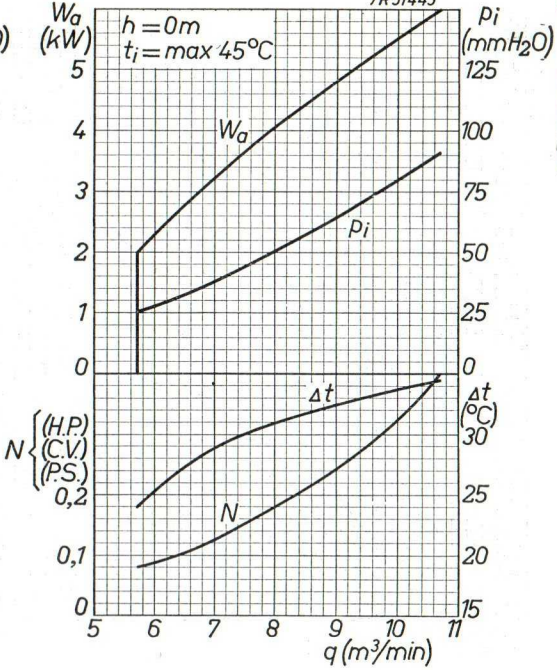
# PHILIPS


7R51275
TBL-TBW 7/8000 1-9-'56
$I_g$ (A)
5
4
3
2
1
0
$V_a = V_g$
$V_g = 500V$
450V
400V
350V
300V
250V
200V
150V
100V
50V
0
2
4
6 $V_a$ (kV)

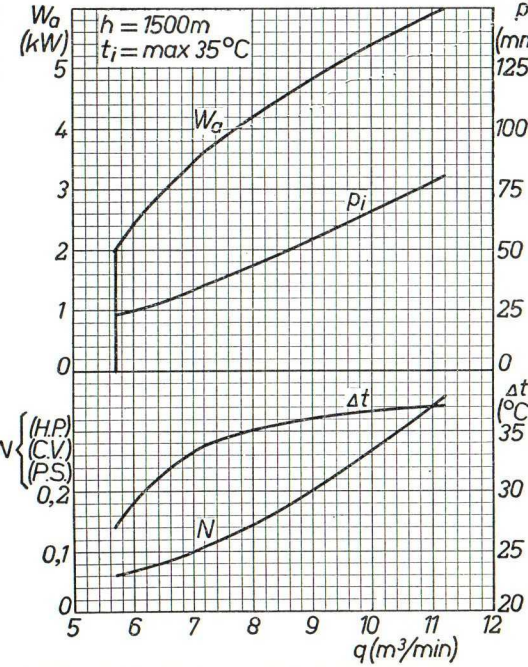

7R51276
TBL-TBW 7/8000 1-9-'56
$V_g$ (V)
$V_g = V_a$
$I_a$
$I_g$
3A
2,5A
2A
1,5A
1A
10A
9A
0,5A
8A
7A
0,3A
6A
0,2A
5A
0,1A
4A
3A
2A
1A
0,5A
0,2A
0A
600
400
200
0
−200
−400
0
2
4
6
8
$V_a$ (kV)

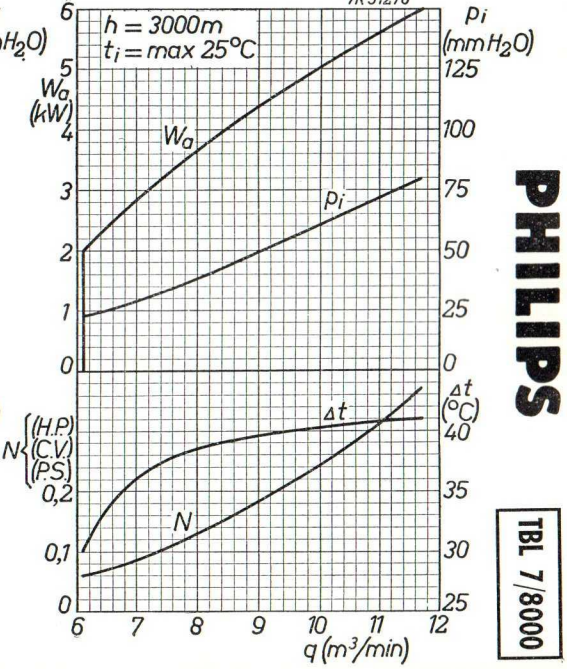
PHILIPS


h = 0m
t_i = max 35°C
W_a (kW)
p_i (mmH2O)
Δt (°C)
N (H.P.) (C.V.) (P.S.)
q (m³/min)


7R51445
h = 0m
t_i = max 45°C
W_a (kW)
p_i (mmH2O)
Δt (°C)
N (H.P.) (C.V.) (P.S.)
q (m³/min)

9.9.1956




PHILIPS

TBL 7/8000

E

# PHILIPS

**TBL 7/9000**

TRIODE for use in industrial R.F. generators
TRIODE pour l'utilisation dans les générateurs H.F. industriels
TRIODE zur Verwendung in HF-Industriegeneratoren

Cooling : Forced air
Refroidissement: Par ventilation forcée
Kühlung : Druckluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 12,6 V $^{+5\ \%}_{-10\ \%}$
$I_f$ = 33 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 1,0 pF
$C_g$ = 14,2 pF
$C_{ag}$ = 7,9 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 6 kV
$I_a$ = 1 A
S = 12 mA/V
$\mu$ = 24

| | TBL7/9000 | 40630 |
|---|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 4,4 kg | 2,1 kg |
| Shipping weight<br>Poids brut<br>Bruttogewicht | 10 kg | 3,1 kg |

# PHILIPS

Temperatures and cooling
Températures et refroidissement
Temperaturen und Kühlung

Temperature of anode and seals
Température de l'anode et des scellements = max. 220°C
Temperatur der Anode und der Einschmelzungen

Cooling characteristics for continuous service
Caractéristiques de refroidissement pour service continu
Kühldaten für Dauerbetrieb

For intermittent service see page B
Pour service intermittent voir page B
Für aussetzenden Betrieb siehe Seite B

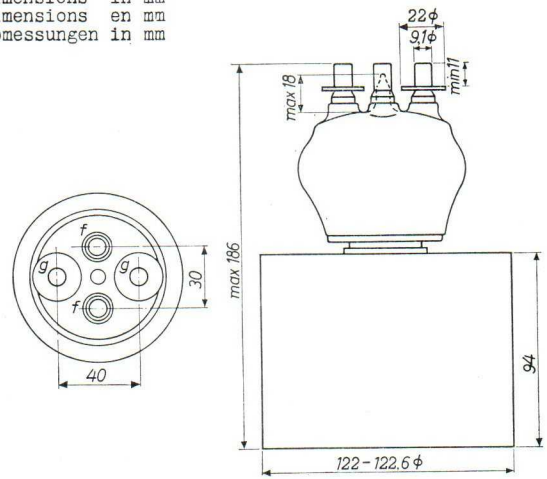
| $W_a$ (kW) | h (m) | $t_i$ (°C) | Qmin ($m^3$/min.) | pi (mm $H_2O$) |
|---|---|---|---|---|
| 2 | 0 | 35 | 4,8 | 20 |
| | 0 | 45 | 5,7 | 25 |
| | 1500 | 35 | 5,7 | 23 |
| | 3000 | 25 | 6,1 | 23 |
| 4 | 0 | 35 | 6,8 | 38 |
| | 0 | 45 | 7,9 | 49 |
| | 1500 | 35 | 7,8 | 42 |
| | 3000 | 25 | 8,4 | 42 |
| 6 | 0 | 35 | 9,2 | 68 |
| | 0 | 45 | 10,7 | 90 |
| | 1500 | 35 | 11,2 | 81 |
| | 3000 | 25 | 11,7 | 81 |

At frequencies above 4 Mc/s both grid terminals should be connected in parallel. At the highest frequencies care should be taken to distribute the R.F. current equally over both grid terminals to avoid excessive grid seal temperatures

Aux fréquences supérieures à 4 MHz les deux broches de la grille doivent être reliées en parallèle. Aux fréquences les plus élevées il faut prendre soin à distribuer le courant H.F. uniformément entre les deux broches de la grille pour éviter des températures excessives des scellements de la grille

Bei Frequenzen höher als 4 MHz müssen die beiden Gitteranschlüsse parallelgeschaltet werden. Zur Vermeidung einer zu hohen Temperatur der Gittereinschmelzungen muss bei den höchsten Frequenzen der HF-Strom gleichmässig über die beiden Gitteranschlüsse verteilt werden.

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Accessories
Accessoires
Zubehör

| | |
|---|---|
| Clip for grid and filament<br>Bornes de connexion pour la grille et le filament<br>Anschlussklemme für Gitter und Heizfaden | 40634 |
| Insulating pedestal<br>Support isolant<br>Isoliersockel | 40630 |

# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from three-phase rectifier without filter (Continuous service)
Oscillatrice H.F. classe C pour applications industrielles avec tension anodique dérivée d'un redresseur triphasé sans filtre (service continu).
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung von einem Dreiphasen-Gleichrichter ohne Filter abgenommen

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| | | | |
|---|---|---|---|
| f | = max. | 50 | Mc/s |
| $V_a$ | = max. | 8 | kV |
| $W_{i_a}$ | = max. | 12 | kW |
| $W_a$ | = max. | 6 | kW |
| $I_a$ | = max. | 1,8 | A |
| $-V_g$ | = max. | 1250 | V |
| $I_g$ | = max. | 0,4 | A [1] |
| $I_g$ | = max. | 0,5 | A [2] |
| $R_g$ | = max. | 10 | kΩ |

Operating characteristics
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 50 | 50 Mc/s |
| $V_a$ | = | 7200 | 6200 V |
| $I_a$ | = | 1,5 | 1,4 A [1] |
| $I_a$ | = | 0,37 | 0,40 A [2] |
| $I_g$ | = | 0,36 | 0,37 A [1] |
| $I_g$ | = | 0,47 | 0,47 A [2] |
| $R_g$ | = | 1850 | 1500 Ω |
| $Ra_\sim$ | = | 2300 | 2100 Ω |
| $V_{g\sim}/Va_\sim$ | = | 17 | 17 % |
| $W_{i_a}$ | = | 10,8 | 8,68 kW |
| $W_a$ | = | 3,3 | 2,5 kW |
| $\eta$ | = | 70 | 71 % |
| $W_\ell$ | = | 6,1 | 5,0 kW [3] |

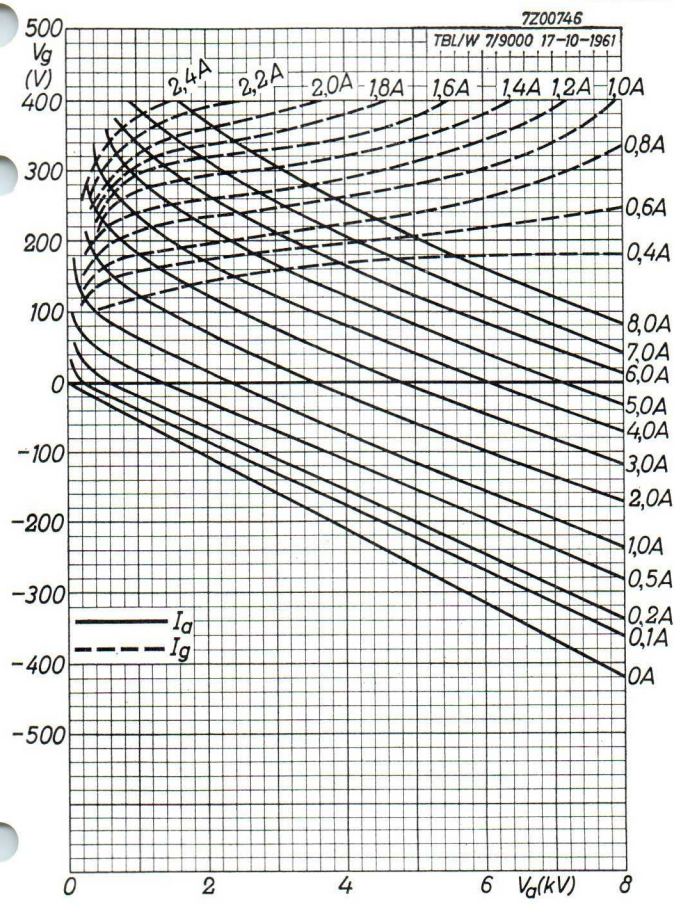
[1]) Loaded; chargé; belastet

[2]) Unloaded; sans charge; unbelastet

[3]) Useful power in the load, measured in a circuit having an efficiency of about 85 %
Puissance utile dans la charge, mesurée dans un circuit avec un rendement d'environ 85 %
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von 85 %.

# PHILIPS

**TBL 7/9000**



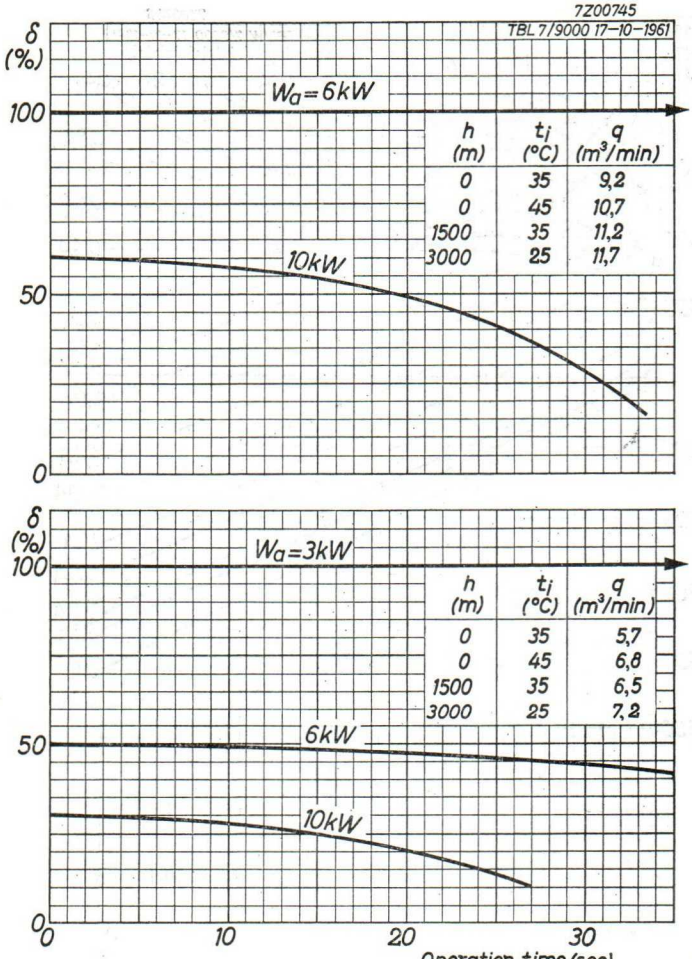

10.10.1961

A

TBL 7/9000

# PHILIPS

7Z00745
TBL 7/9000 17-10-1961




B

# PHILIPS

**TBL 12/25**

FORCED AIR COOLED TRIODE for use in industrial H.F. generators
TRIODE À REFROIDISSEMENT PAR AIR FORCE pour utilisation dans les générateurs H.F.
DRUCKLUFTGEKÜHLTE TRIODE zur Verwendung in industriellen HF-Generatoren

Filament : Thoriated tungsten
Filament : Tungstene thorié
Heizfaden: Thoriertes Wolfram

Heating : Direct
Chauffage: Direct
Heizung : Direkt

$V_f$ = 8,0 V $\pm$ 5% / 10%

$I_f$ = 98 A

The filament current must never exceed a peak value of 210 A instantaneously at any time during the initial energizing schedule.
Le courant d'enclenchement de chauffage ne doit jamais dépasser une valeur de 210 A.
Der Anlaufheizstrom darf niemals einen Scheitelwert von 210 A überschreiten.

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,4 pF
$C_g$ = 37 pF
$C_{ag}$ = 30 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 12 kV
$I_a$ = 2 A
$S$ = 20 mA/V
$\mu$ = 34

Temperatures
Températures
Temperaturen

Seal temperature
Température des scellements = max. 220 °C
Temperatur der Einschmelzungen

| Weight, poids, Gewicht | TBL 12/25 | 40648 |
|---|---|---|
| Net, Netto | 17,3 kg | 7,15 kg |
| Shipping, Brut, Brutto | 56,4 kg | 9,6 kg |

Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

# PHILIPS

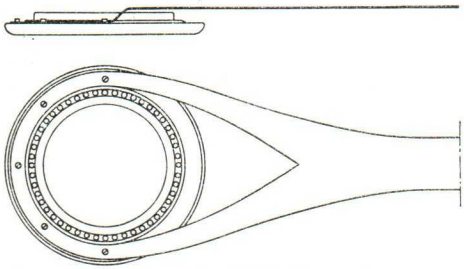
Air cooling characteristics
Caractéristiques du refroidissement par air
Luftkühlungsdaten

| $W_a$ (kW) | h (m) | ti max. (°C) | q min. ($m^3$/min.) | $p_i$ (mm $H_2O$) |
|---|---|---|---|---|
| 7 | 0 | 35 | 6,6 | 10 |
| | 0 | 45 | 7,7 | 13 |
| | 1500 | 35 | 7,9 | 12 |
| | 3000 | 25 | 8,3 | 12 |
| 10 | 0 | 35 | 10,5 | 23 |
| | 0 | 45 | 12,3 | 31 |
| | 1500 | 35 | 12,6 | 28 |
| | 3000 | 25 | 13,2 | 27 |
| 15 | 0 | 35 | 18,1 | 60 |
| | 0 | 45 | 21,2 | 79 |
| | 1500 | 35 | 21,7 | 73 |
| | 3000 | 25 | 22,8 | 70 |

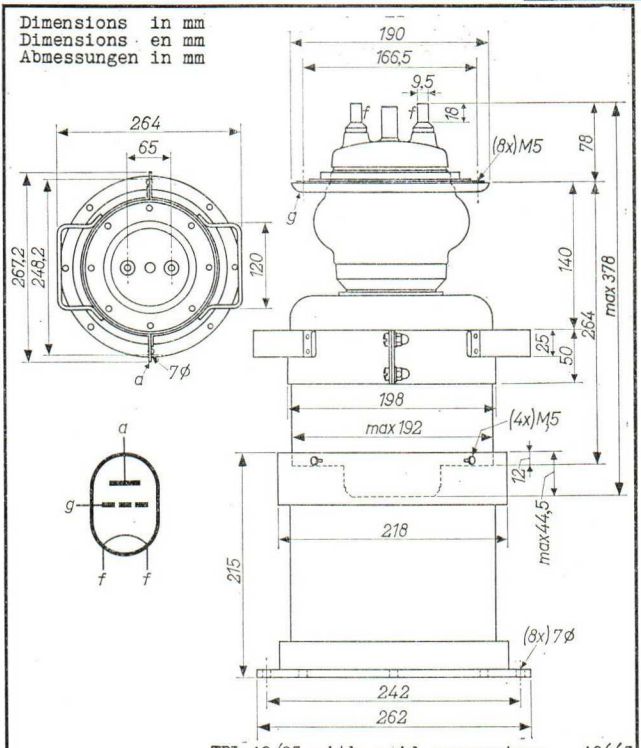
To ensure a uniform R.F. current distribution in the grid seal especially at frequencies higher than 4 Mc/s, the grid lead should be connected as shown below.

Afin d'assurer une distribution uniforme du courant H.F. dans le scellement de la grille spécialement à des fréquences supérieures à 4 MHz, le conducteur de la grille sera relié selon la figure ci-dessous.

Zur Gewährleistung einer gleichmässigen HF-Stromverteilung in der Gittereinschmelzung bei Frequenzen höher als 4 MHz, soll die Gitterleitung nach untenstehender Figur verbunden werden.



Dimensions in mm
Dimensions en mm
Abmessungen in mm




| | | |
|---|---|---|
| TBL 12/25 | with grid connector | 40663 |
| | and insulating pedestal | 40648 |
| TBL 12/25 | avec connecteur de grille | 40663 |
| | et support isolant | 40648 |
| TBL 12/25 | mit Gitteranschlussring | 40663 |
| | und Isoliersockel | 40648 |

| | | |
|---|---|---|
| Further accessories: | Filament clips with cable | 40662 |
| Autres accessoires : | Borne de filament avec câble | 40662 |
| Weitere Zubehören : | Heizfadenanschlussklemme mit Kabel | 40662 |

# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from three-phase half-wave rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé à une alternance sans filtre
HF-klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasen-Halbweggleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| $f$ = max. | 30 Mc/s | $W_{ia}$ = max. | 60 kW |
| $V_a$ = max. | 13 kV | $-V_g$ = max. | 1500 V |
| $I_a$ = max. | 4,8 A | $I_g$ = max. | 0,8 A |
| $W_a$ = max. | 15 kW | $R_g$ = max. | 10 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| $f$ | = | 30 | 30 | 30 | Mc/s |
| $V_{tr}$ | = | 8,9 | 7,4 | 6,0 | kV |
| $V_a$ | = | 12 | 10 | 8 | kV |
| $I_a$ [1] | = | 3,2 | 3,2 | 3,2 | A |
| $I_a$ [2] | = | 0,52 | 0,50 | 0,48 | A |
| $I_g$ [1] | = | 0,50 | 0,50 | 0,50 | A |
| $I_g$ [2] | = | 0,74 | 0,77 | 0,80 | A |
| $R_g$ | = | 2,0 | 1,6 | 1,1 | kΩ |
| $W_{ia}$ | = | 38,4 | 32,0 | 25,6 | kW |
| $W_a$ | = | 9,4 | 8,7 | 7,7 | kW |
| $W_o$ | = | 29,0 | 23,3 | 17,9 | kW |
| $\eta$ | = | 75,5 | 72,5 | 70 | % |
| $W_\ell$ [3] | = | 25 | 20 | 15,5 | kW |
| $R_{a\sim}$ | = | 1800 | 1450 | 1100 | Ω |
| $V_{g\sim}/V_{a\sim}$ | = | 16 | 17 | 19 | % |

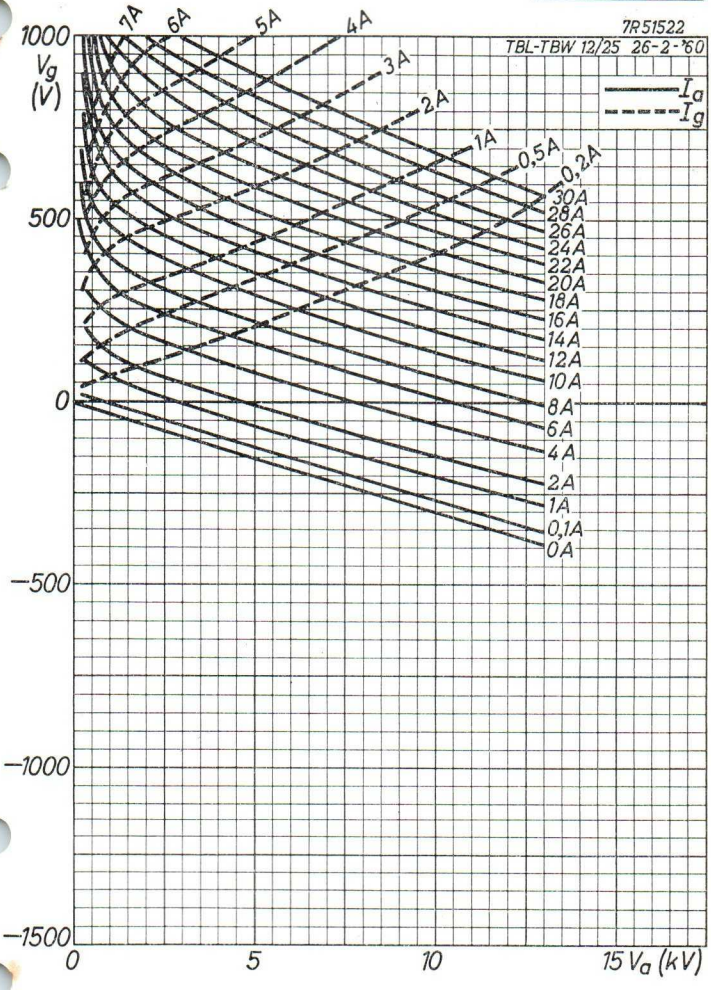
[1]) Loaded; chargé; belastet

[2]) Unloaded; non-chargé; nicht belastet

[3]) Useful power in the load measured in a circuit having an efficiency of about 90%
Puissance utile dans la charge, mesurée dans un circuit avec un rendement d'environ 90%
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von etwa 90%

# PHILIPS

**TBL 12/25**

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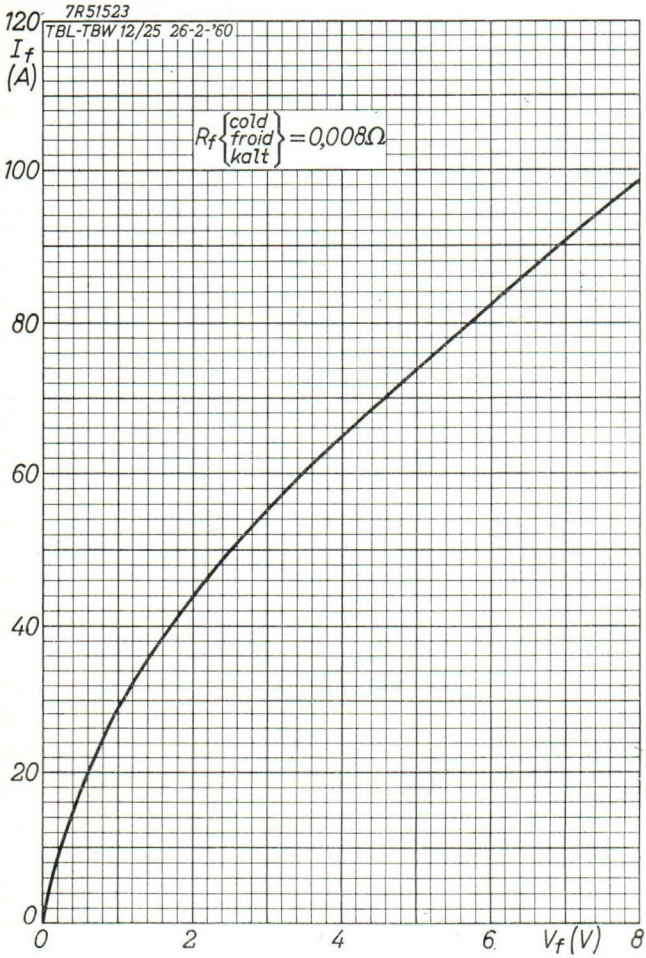
A

**TBL 12/25**

# PHILIPS



# PHILIPS

**TBL 12/38**

TRIODE for use in industrial R.F. generators
TRIODE pour utilisation dans les générateurs H.F.industriels
TRIODE zur Verwendung in industriellen HF-Generatoren

Cooling : forced air
Refroidissement: par ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct — $V_f$ = 8 V $^{+\ 5\ \%}_{-\ 10\ \%}$
Chauffage: direct
Heizung : direkt — $I_f$ = 130 A

The filament current must never exceed a peak value of 280 A at any time during the initial energizing schedule
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 280 A
Der Anlaufstrom darf niemals einen Scheitelwert von 280 A überschreiten

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,9 pF
$C_g$ = 45 pF ←
$C_{ag}$ = 23,5 pF

Typical characteristics $\mu$ ($V_a$ = 12 kV; $I_a$ = 2 A) = 21
Caractéristiques types $S$ ($V_a$ = 12 kV; $I_a$ = 2 A) = 25 mA/V
Kenndaten

Temperatures
Températures
Temperaturen

Temperature of all seals
Température de tous les scellements = max. 220 °C
Temperatur aller Einschmelzungen

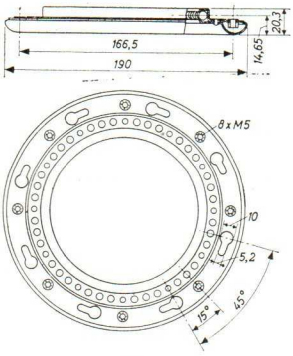
| Weight, poids, Gewicht | TBL 12/38 | 40648 |
|---|---|---|
| net, Netto | 16,1 kg | 7,15 kg ← |
| shipping, brut, Brutto | 55,1 kg | 9,6 kg |

# PHILIPS

Air cooling characteristics
Caractéristiques du refroidissement par air
Luftkühlungsdaten

| Wa (kW) | h (m) | ti max. (°C) | q min. ($m^3$/min) | pi (mm $H_2O$) |
|---|---|---|---|---|
| 7 | 0 | 35 | 6,6 | 10 |
| | 0 | 45 | 7,7 | 13 |
| | 1500 | 35 | 7,9 | 12 |
| | 3000 | 25 | 8,3 | 12 |
| 10 | 0 | 35 | 10,5 | 23 |
| | 0 | 45 | 12,3 | 31 |
| | 1500 | 35 | 12,6 | 28 |
| | 3000 | 25 | 13,2 | 27 |
| 15 | 0 | 35 | 18,1 | 60 |
| | 0 | 45 | 21,2 | 79 |
| | 1500 | 35 | 21,7 | 73 |
| | 3000 | 25 | 22,8 | 70 |

See also pages F,G
Voir aussi pages F,G
Siehe auch Seiten F,G




40663
Grid connector
Connecteur de grille
Gitteranschlussring

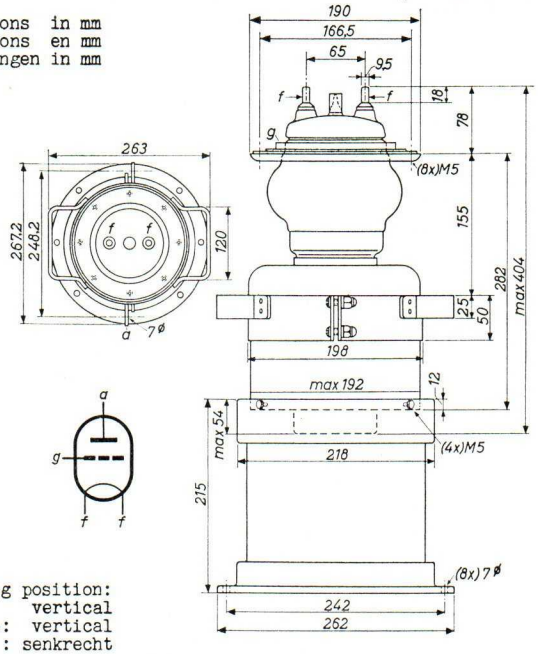
The rounded side of the grid connector should face the anode. To ensure a uniform R.F. current distribution in the grid seal at frequencies higher than 4 Mc/s, the grid lead should be connected as shown in the figure at page 3

Le côté arrondi du connecteur de la grille sera tourné vers l'anode. Afin d'assurer une distribution uniforme du courant H.F. dans le scellement de la grille à des fréquences supérieures à 4 MHz, le conducteur de la grille sera relié selon la figure page 3

Die abgerundete Seite des Gitteranschlussringes soll der Anode zugekehrt sein. Zur Gewährleistung einer gleichmässigen HF-Stromverteilung in der Gittereinschmelzung bei Frequenzen höher als 4 MHz, soll die Gitterleitung nach der Figur auf Seite 3 verbunden werden

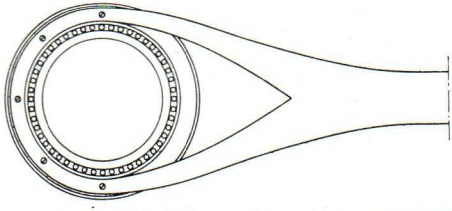
Tube with insulating pedestal 40648 and grid connector 40663
Tube avec support isolant 40648 et connecteur de grille 40663
Röhre mit Isoliersockel 40648 und Gitteranschlussring 40663

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position:
vertical
Montage: vertical
Einbau : senkrecht

Clips with cable for filament
Bornes avec câble pour le filament 40662
Klemmen mit Kabel für Heizfaden



# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from three-phase rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé sans filtre
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasengleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | |
|---|---|
| f = max. 30 Mc/s | $W_{ia}$ = max. 60 kW |
| $V_a$ = max. 13 kV | $-V_g$ = max. 2 kV |
| $I_a$ = max. 5 A | $I_g$ = max. 1,5 A [1] |
| $W_a$ = max. 20 kW | $I_g$ = max. 2,0 A [2] |
| | $R_g$ = max. 10 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| f | = 30 | 30 | 30 | Mc/s |
| $V_a$ | = 12 | 10 | 8 | kV |
| $I_a$ [1] | = 4,5 | 4,5 | 4,5 | A |
| $I_a$ [2] | = 0,65 | 0,63 | 0,62 | A |
| $I_g$ [1] | = 0,9 | 0,9 | 0,9 | A |
| $I_g$ [2] | = 1,22 | 1,3 | 1,35 | A |
| $R_g$ | = 1100 | 1000 | 900 | Ω |
| $R_{a\sim}$ | = 1450 | 1100 | 800 | Ω |
| $V_{g\sim}/V_{a\sim}$ | = 16 | 19 | 24 | % |
| $W_{ia}$ | = 54 | 45 | 36 | kW |
| $W_a$ | = 15 | 13,7 | 12,8 | kW |
| $W_o$ | = 39 | 31,3 | 23,2 | kW |
| $\eta$ | = 72,5 | 70 | 64,5 | % |
| $W_l$ [3] | = 30 | 25 | 18 | kW |

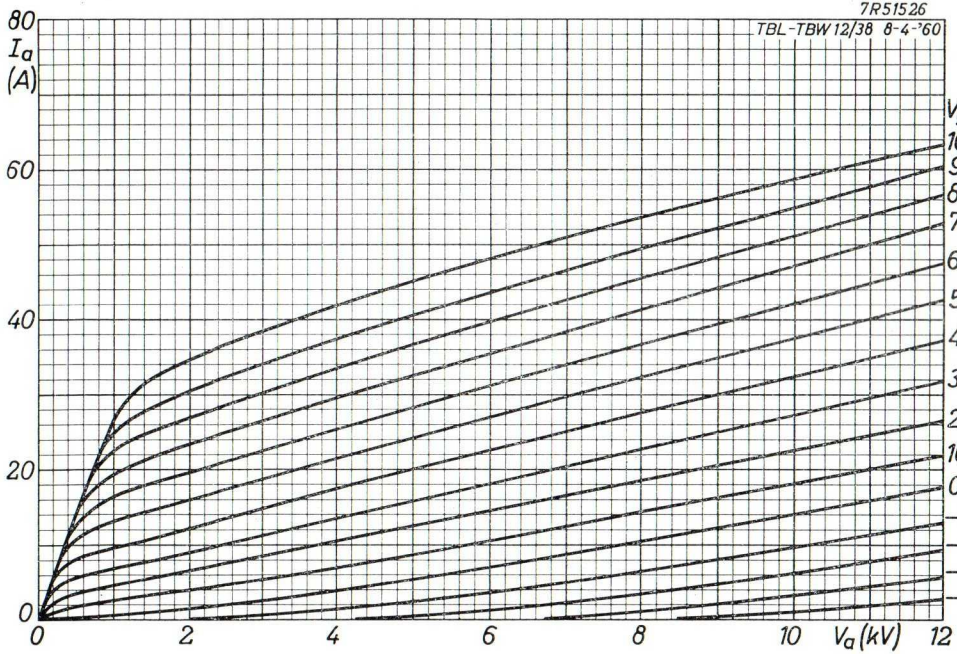
[1]) Loaded, chargé, belastet

[2]) Unloaded, sans charge, unbelastet

[3]) Useful power in the load, measured in a circuit having an efficiency of about 85 %.
Puissance utile dans la charge, mesurée dans un circuit avec un rendement de 85 %.
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von 85 %.

5.5.1960

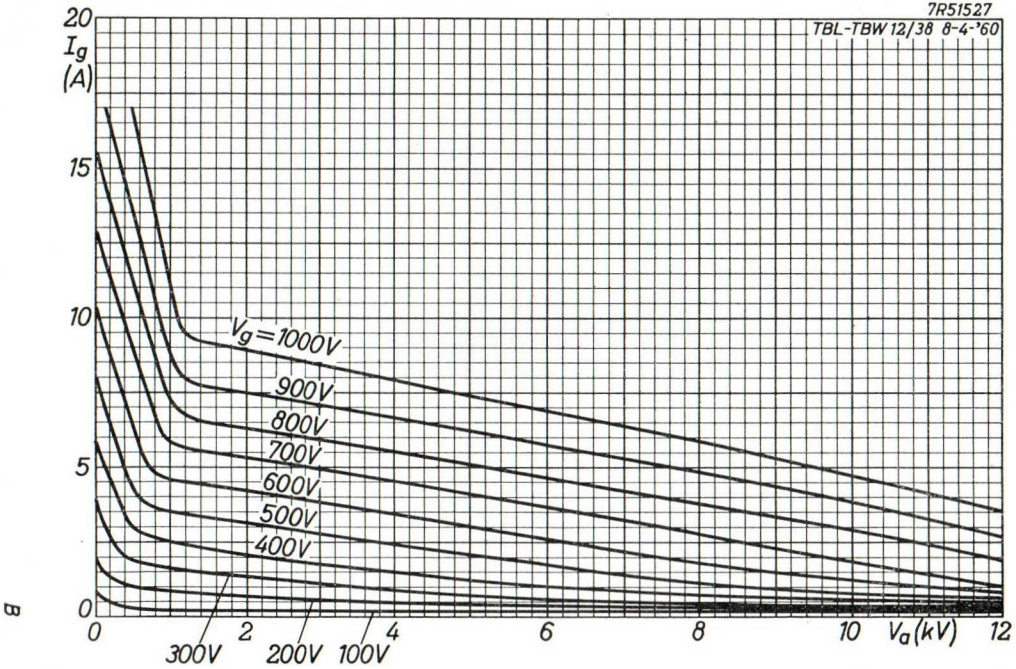
A



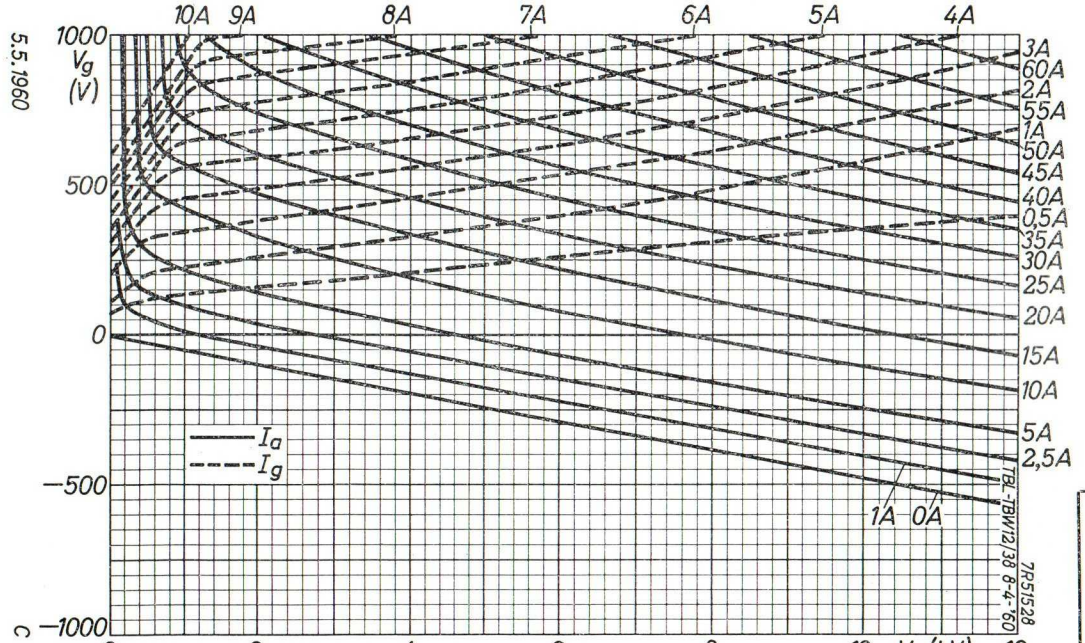

PHILIPS

TBL 12/38

PHILIPS


7R51527
TBL-TBW 12/38 8-4-'60
20
$I_g$ (A)
15
10
5
0
$V_g$ = 1000V
900V
800V
700V
600V
500V
400V
300V
200V
100V
0
2
4
6
8
10
12
$V_a$ (kV)

B

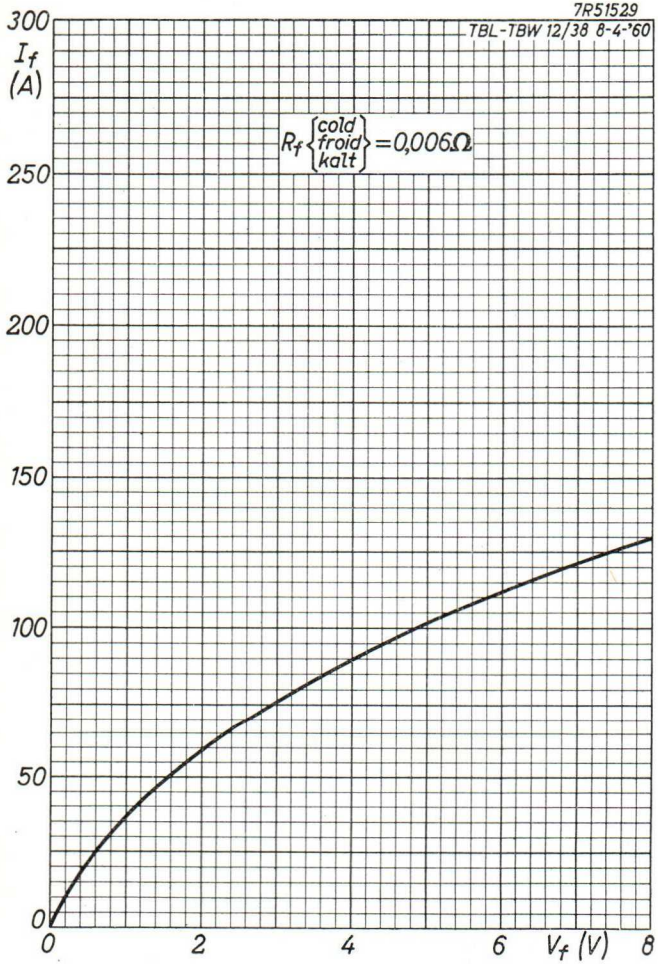



PHILIPS

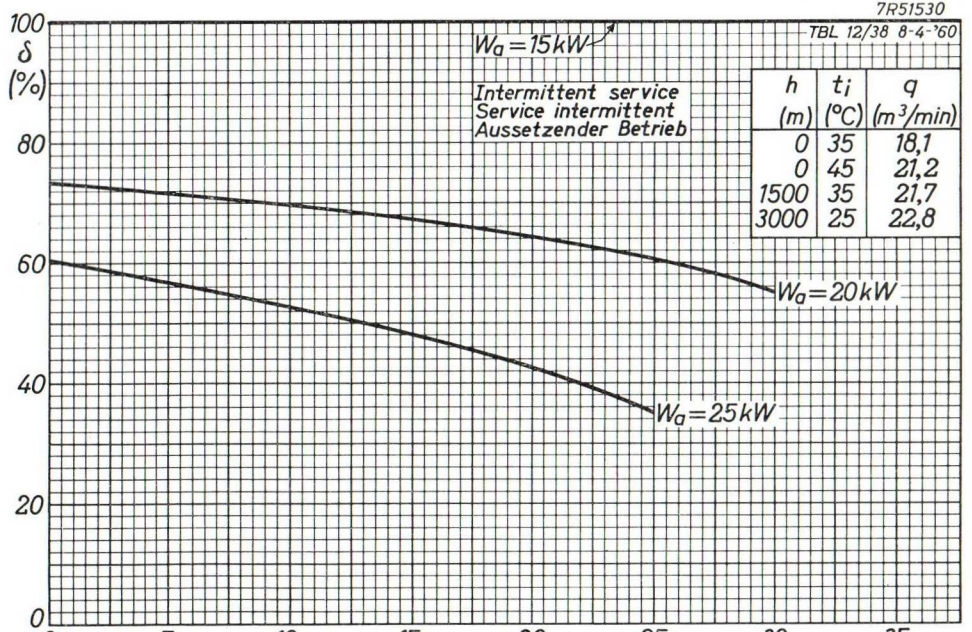
TBL 12/38

TBL 12/38

# PHILIPS




D



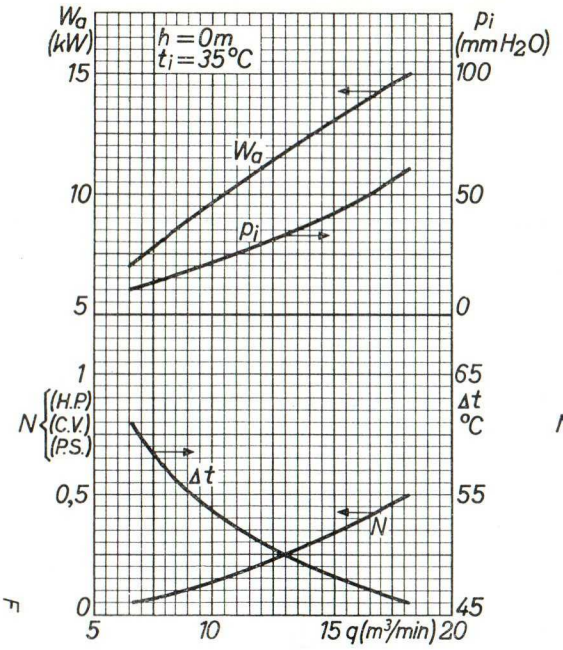

| h (m) | $t_i$ (°C) | q ($m^3$/min) |
|---|---|---|
| 0 | 35 | 18,1 |
| 0 | 45 | 21,2 |
| 1500 | 35 | 21,7 |
| 3000 | 25 | 22,8 |

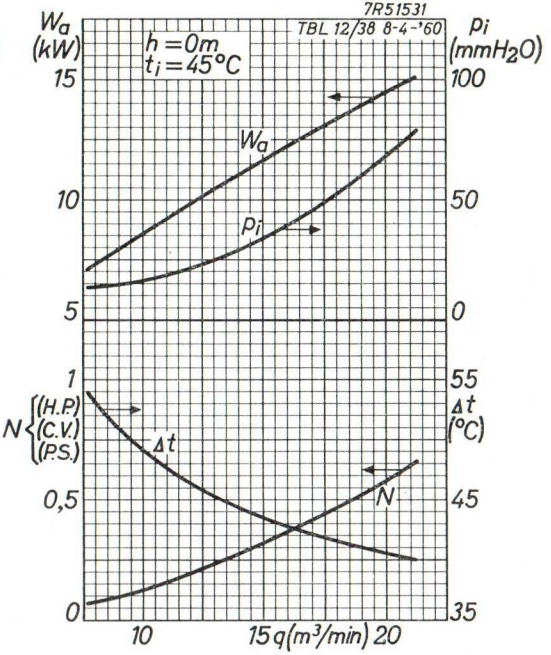
5.5.1960
E

PHILIPS

TBL 12/38

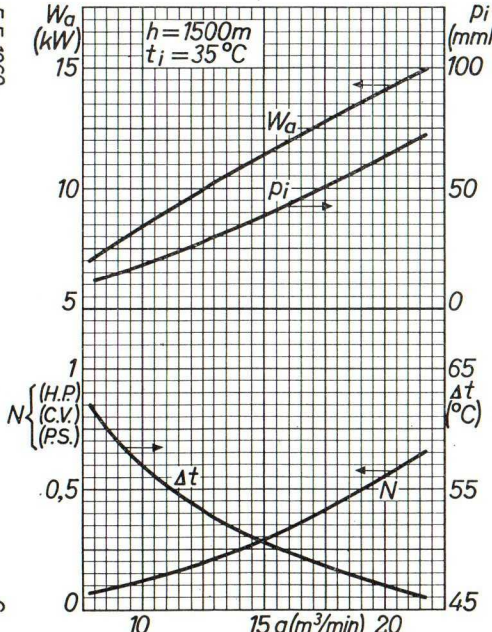
PHILIPS

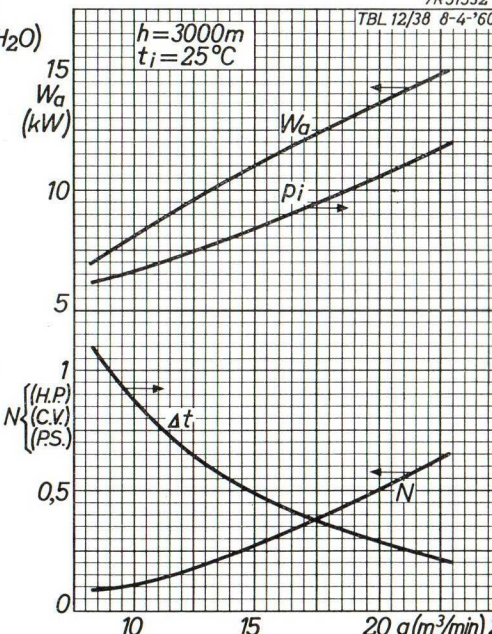

$W_a$ (kW)
$p_i$ (mm $H_2O$)
$h = 0m$
$t_i = 35°C$
15
10
5
1
0,5
0
100
50
0
65
55
45
$W_a$
$p_i$
$\Delta t$
N
N {(H.P.) (C.V.) (P.S.)
$\Delta t$ °C
5
10
15 q($m^3$/min) 20


7R51531
TBL 12/38 8-4-'60
$W_a$ (kW)
$p_i$ (mm $H_2O$)
$h = 0m$
$t_i = 45°C$
15
10
5
1
0,5
0
100
50
0
55
45
35
$W_a$
$p_i$
$\Delta t$
N
N {(H.P.) (C.V.) (P.S.)
$\Delta t$ (°C)
10
15 q($m^3$/min) 20

F

5.5.1960




PHILIPS

TBL 12/38

G

TRIODE for use as R.F. or A.F. amplifier or oscillator
TRIODE pour utilisation comme amplificatrice ou oscillatrice H.F. ou B.F.
TRIODE zur Verwendung als HF- oder NF-Verstärker oder Oszillator

Cooling : forced air
Refroidissement: par ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

| | | | | |
|---|---|---|---|---|
| Heating : direct | $V_f$ | = | 8 | V |
| Chauffage: direct | $I_f$ | = | 130 | A |
| Heizung : direkt | | | | |

The filament current must never exceed a peak value of 280 A at any time during the initial energizing schedule
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 280 A
Der Anlaufstrom darf niemals einen Scheitelwert von 280 A überschreiten

| | | | | |
|---|---|---|---|---|
| Capacitances | $C_a$ | = | 0,6 | pF |
| Capacités | $C_g$ | = | 45 | pF |
| Kapazitäten | $C_{ag}$ | = | 27 | pF |
| Typical characteristics | $\mu$ ($V_a$ = 12 kV) | = | 33 | |
| Caractéristiques types | S ($I_a$ = 2 A) | = | 25 | mA/V |
| Kenndaten | | | | |

Temperatures
Températures
Temperaturen

Temperature of all seals
Température de tous les scellements = max. 220 °C
Temperatur aller Einschmelzungen

Mounting position: vertical
Montage : vertical
Einbau : senkrecht

Net weight
Poids net 19 kg
Nettogewicht

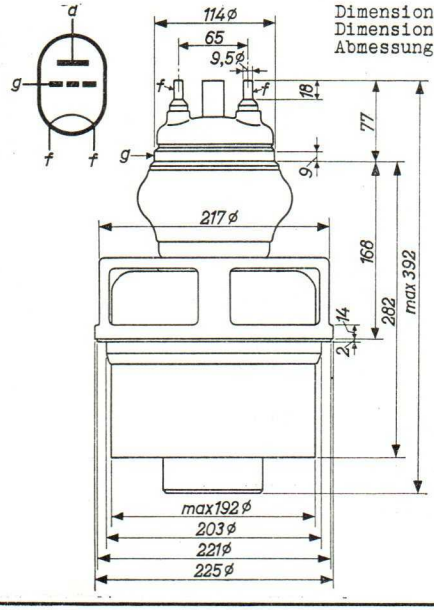
Shipping weight
Poids brut 84,5 kg
Bruttogewicht

# PHILIPS

Air cooling characteristics
Caractéristiques du refroidissement par air
Luftkühlungsdaten

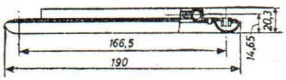
| W (kW) | h (m) | $t_i$ max. (°C) | q min. ($m^3$/min) | $p_i$ (mm $H_2O$) |
|---|---|---|---|---|
| 7 | 0 | 35 | 6,6 | 10 |
| | 0 | 45 | 7,7 | 13 |
| | 1500 | 35 | 7,9 | 12 |
| | 3000 | 25 | 8,3 | 12 |
| 10 | 0 | 35 | 10,5 | 23 |
| | 0 | 45 | 12,3 | 31 |
| | 1500 | 35 | 12,6 | 28 |
| | 3000 | 25 | 13,2 | 27 |
| 15 | 0 | 35 | 18,1 | 60 |
| | 0 | 45 | 21,2 | 79 |
| | 1500 | 35 | 21,7 | 73 |
| | 3000 | 25 | 22,8 | 70 |

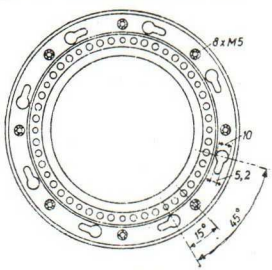
Dimensions in mm
Dimensions en mm
Abmessungen in mm



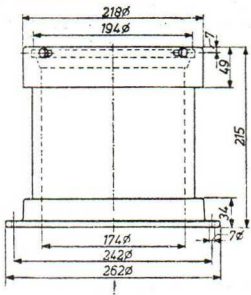
Accessories; accessoires; Zubehör

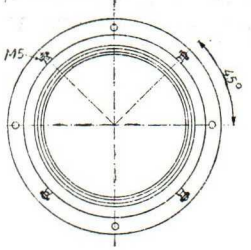
Clips with cable for filament
Bornes avec câble pour le filament 40662
Klemmen mit Kabel für Heizfaden




40663
Grid connector
Connecteur de la grille
Gitteranschlussring



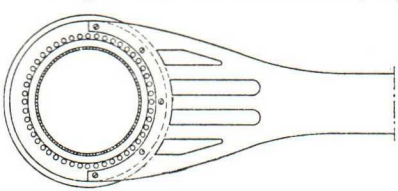




40648
Insulating pedestal
Support isolant
Isoliersockel

The rounded side of the grid connector should face the anode. To ensure a uniform R.F. current distribution in the grid seal at frequencies higher than 4 Mc/s, the grid lead should be connected as shown below

Le côté arrondi du connecteur de la grille sera tourné vers l'anode Afin d'assurer une distribution uniforme du courant H.F. dans le scellement de la grille à des fréquences supérieures à 4 MHz, le conducteur de la grille sera relié selon la figure ci-dessous

Die abgerundete Seite des Gitteranschlussringes soll der Anode zugekehrt sein. Zur Gewährleistung einer gleichmässigen HF-Stromverteilung in der Gittereinschmelzung bei Frequenzen höher als 4 MHz, soll die Gitterleitung nach nebenstehender Figur verbunden werden



# PHILIPS

R.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| f | = | 30 Mc/s |
|---|---|---|
| $V_a$ | = max. | 13 kV |
| $W_{ia}$ | = max. | 60 kW |
| $W_a$ | = max. | 15 kW |
| $I_a$ | = max. | 4,8 A |
| $-V_g$ | = max. | 1500 V |
| $I_g$ | = max. | 1,0 A |
| $R_g$ | = max. | 10 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| f | = | 30 Mc/s |
| $V_a$ | = | 12 kV |
| $V_g$ | = | -1000 V |
| $I_a$ | = | 4,5 A |
| $I_g$ | = | 0,8 A |
| $V_{gp}$ | = | 1600 V |
| $W_{ig}$ | = | 1150 W |
| $W_{ia}$ | = | 54 kW |
| $W_a$ | = | 13 kW |
| $W_o$ | = | 41 kW |
| $\eta$ | = | 76 % |

R.F. class C anode modulation
H.F. classe C modulation d'anode
HF-Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = 30 Mc/s | $W_a$ | = max. 10 kW |
| $V_a$ | = max. 10 kV [1]) | $I_a$ | = max. 3,8 A |
| $W_{ia}$ | = max. 40 kW | $-V_g$ | = max. 1500 V |
| | | $I_g$ | = max. 1,0 A |
| | | $R_g$ | = max. 10 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| f | = | 30 Mc/s |
| $V_a$ | = | 10 kV |
| $V_g$ | = | -1000 V [2]) |
| $I_a$ | = | 3,5 A |
| $I_g$ | = | 0,8 A |
| $V_{gp}$ | = | 1500 V |
| $W_{ig}$ | = | 1080 W |
| $W_{ia}$ | = | 35 kW |
| $W_a$ | = | 7,5 kW |
| $W_o$ | = | 27,5 kW |
| $\eta$ | = | 78,5 % |
| m | = | 100 % |
| $W_{mod}$ | = | 17,5 kW |

[1]) With 120 % modulation and 3000 m above seal level
A un taux de modulation de 120 % et 3000 m au-dessus du niveau de la mer
Bei 120 % Modulation und 3000 m über dem Meerespiegel

[2]) Grid bias partially obtained by grid resistor
Polarisation de grille obtenue partiellement par la résistance de grille
Gittervorspannung teilweise mittelsdes Gitterwiderstandes erhalten

A.F. class B amplifier and modulator (especially for use with cathode-follower)
Amplificatrice et modulatrice B.F. classe B (spécialement pour utilisation avec tube d'attaque à charge cathodique)
NF-Klasse B Verstärker und Modulator (besonders für Gebrauch mit Treiberröhre in Anodenbasisschaltung)

Limiting values
Caractéristiques limites
Grenzdaten

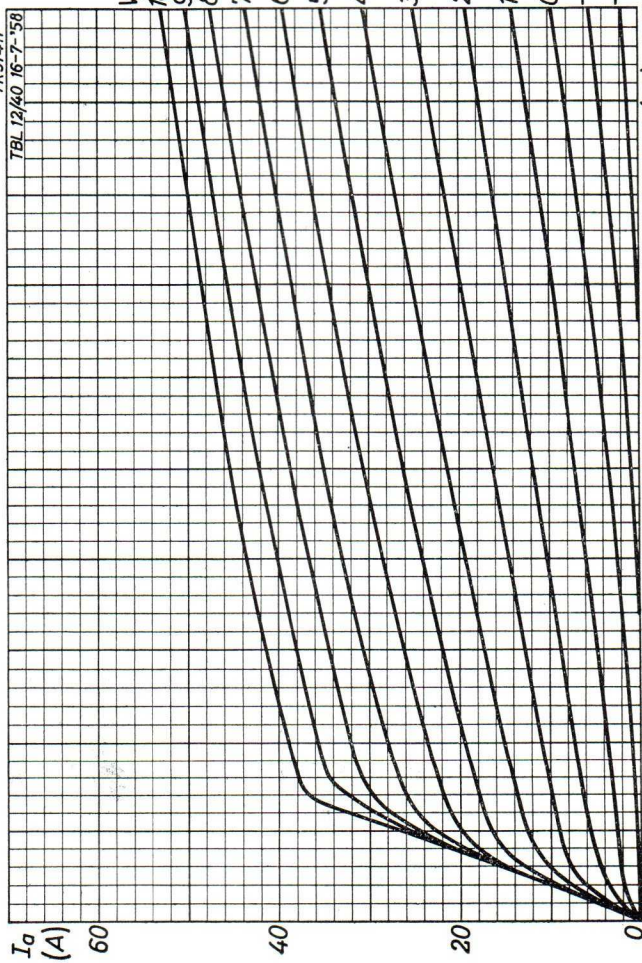
| | | | |
|---|---|---|---|
| $V_a$ | = max. | 13 | kV |
| $W_{ia}$ | = max. | 60 | kW |
| $W_a$ | = max. | 15 | kW |
| $I_a$ | = max. | 4,5 | A |
| $R_g$ | = max. | 10 | kΩ |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | |
|---|---|---|---|---|
| $V_a$ | | 10 | | kV |
| $V_g$ | | -290 | | V |
| $R_{aa\sim}$ | | 6240 | | Ω |
| $V_{ggp}$ | = | 0 | 900 | V |
| $I_a$ | = | 2x0,1 | 2x1,6 | A |
| $I_g$ | = | 0 | 2x0,035 | A |
| $I_{gp}$ | = | - | 2x0,24 | A |
| $W_{ig}$ | = | 0 | 2x14 | W |
| $W_{ia}$ | = | 2x1,0 | 2x16 | kW |
| $W_a$ | = | 2x1,0 | 2x6,4 | kW |
| $W_o$ | = | 0 | 19,2 | kW |
| $\eta$ | = | - | 60 | % |

PHILIPS

TBL 12/40

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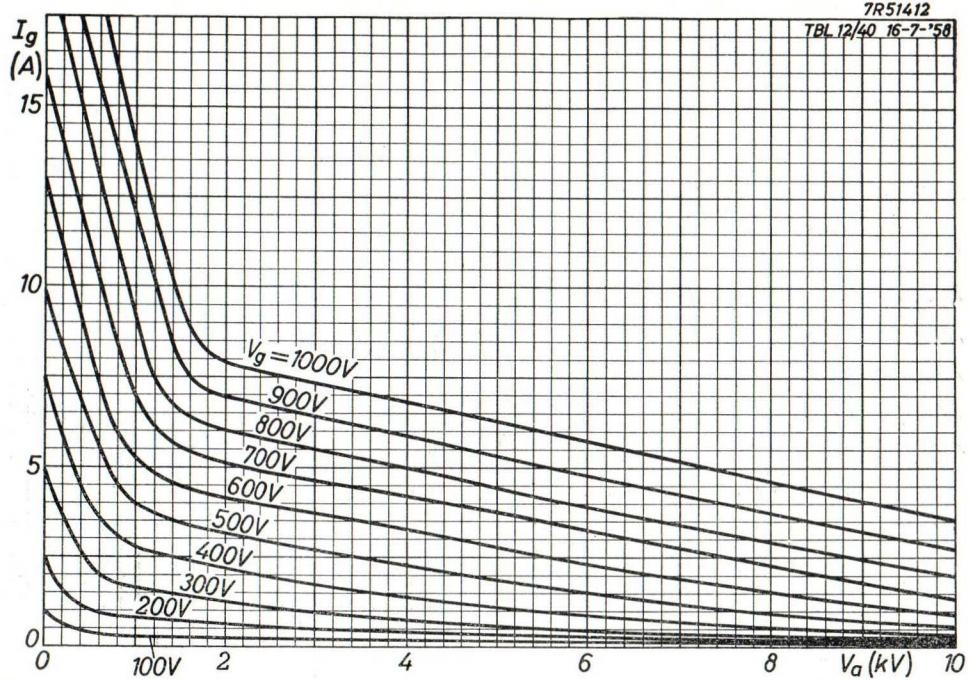
A

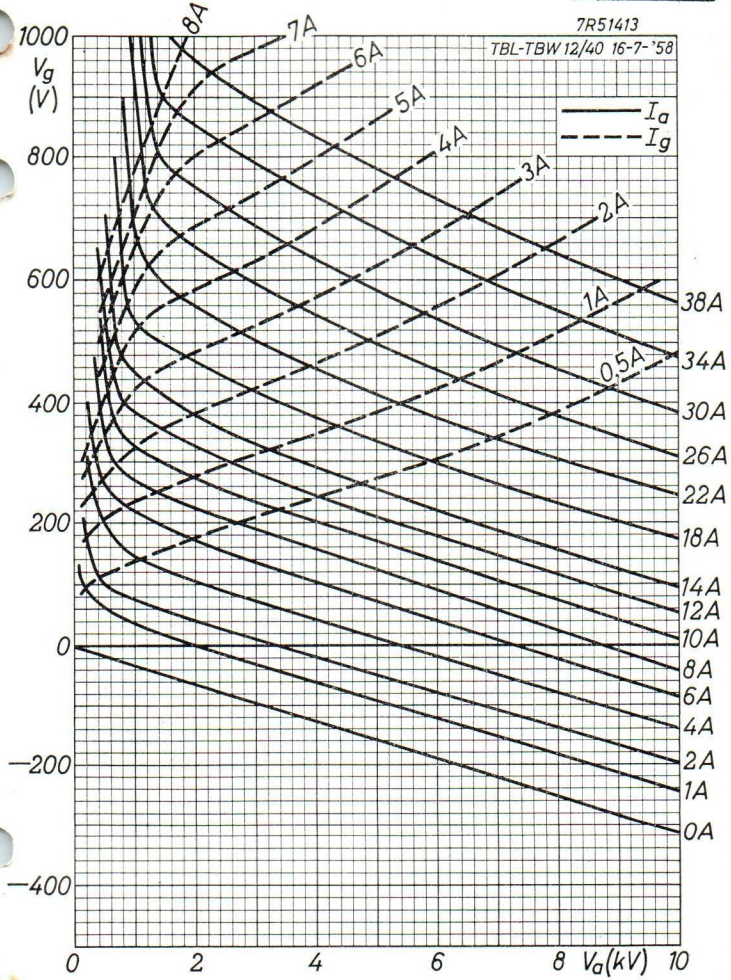

7R51412
TBL 12/40 16-7-'58
$I_g$ (A)
15
10
5
0
$V_g$ = 1000V
900V
800V
700V
600V
500V
400V
300V
200V
100V
0
2
4
6
8
10
$V_a$ (kV)

B

PHILIPS

# PHILIPS

**TBL 12/40**

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C

# PHILIPS

**TBL 12/100**

TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour utilisation en amplificatrice H.F. ou B.F. ou en oscillatrice
TRIODE zur Verwendung als HF- oder NF- Verstärker oder Oszillator

Cooling : forced air
Refroidissement : par ventilation forcée
Kühlung : Pressluftkühlung

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden : thoriertes Wolfram

Heating : direct
Chauffage : direct
Heizung : direkt

$V_f$ = 17,5 V
$I_f$ = 196 A

Filament current must never exceed a peak value of 420 A at any time during initial energising schedule
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 420 A
Der Anlaufstrom darf niemals einen Scheitelwert von 420A überschreiten

Capacitances
Capacités
Kapazitäten

$C_a$ = 3,4 pF
$C_g$ = 116 pF
$C_{ag}$ = 86 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ($I_a$= 5 A ; $V_a$=10 kV) = 27
S ($I_a$= 5 A ; $V_a$=10 kV) = 50 mA/V
$S_{max}$ ($I_a$=50 A ; $V_a$= 3 kV) = 92 mA/V

| λ | Freq. | C telegr. | | C an.mod. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) |
| | | | | | | 12 | 202 |
| 20 | 15 | 12 | 108 | 10 | 80 | 10 | 116 |
| 15 | 20 | 12 | 94,5 | 10 | 54,5 | 10 | 77 |
| 12 | 25 | 11 | 70 | 9 | 42,5 | 9 | 62 |
| 11 | 27,5 | 10,5 | 59 | 8,5 | 36,5 | 8,5 | 54 |
| 10 | 30 | 10 | 50 | 8 | 31 | 8 | 46,8 |

Television, télévision
Fernsehen

| neg.mod. pos.synchr. | | |
|---|---|---|
| Freq. (Mc/s) | $V_a$ (kV) | $W_o$ sync (kW) |
| 48-68 | 6,5 | 100 [2] |

[1] Two tubes; deux tubes; Zwei Röhren

[2] Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pré-amplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung.

Air cooling characteristics
Caractéristiques du refroidissement par air
Luftkühlungsdaten

| $W_a$ (kW) | h (m) | $t_i$ max. (°C) | q min. ($m^3$/min) | Pi (mm $H_2O$) | |
|---|---|---|---|---|---|
| 30 | 0 | 35 | 35 | 114 | See cooling curves<br>Voir les courbes de refroidissement<br>Siehe die Kühlungskurven |
| | 0 | 45 | 40 | 143 | |
| | 1500 | 35 | 42 | 136 | |
| | 3000 | 25 | 44 | 132 | |
| 45 | 0 | 35 | 54 | 275 | |
| | 0 | 45 | 62,5 | 335 | |
| | 1500 | 35 | 64,5 | 322 | |
| | 3000 | 25 | 68 | 319 | |

temperature of seals
temp. des scellements
Temp. der Einschmelzungen
} = max. 180 °C

When the valve is used at frequencies above 6 Mc/s, special attention must be given to the anode- and grid-seal temperatures.
Cooling of these seals is effected by air flowing through the slots provided at the top of the cooler housing. In certain cases, e.g. at low anode dissipation and with cooling by the minimum quantity of air (according to the cooling curves), the air flow to the seals will not be sufficient to maintain the seal temperatures below the maximum permissible value at frequencies above 6 Mc/s.
Consequently, in these cases, a larger quantity of air must be supplied.

When using the special filament connectors type no. 40628, together with connecting leads of adequate cross-section, additional air cooling of the filament terminals is, as a rule, not necessary.

Care should be taken to ensure firm contact of the filament terminals in order to obtain equal distribution of current over these terminals.

Il faut faire attention aux températures des scellements de l'anode et de la grille lorsqu'on utilise le tube aux fréquences supérieures à 6 Mc/s.
Le refroidissement de ces scellements s'effectue par air traversant les fentes prévues du côté supérieur du refroidisseur. Dans certains cas, p.ex. aux basses valeurs de la dissipation anodique, le débit d'air minimum prescrit aux courbes de refroidissement ne produira pas un courant d'air suffisant pour un refroidissement effectif des scellements aux fréquen-

ces supérieures à 6 Mc/s et, par conséquent, la température maximum admissible sera dépassée.
Dans ces cas, il est nécessaire d'élever le débit d'air.

Généralement, un refroidissement additionnel des scellements du filament n'est pas nécessaire en utilisant les bornes de connexion spéciales no. de type 40628 et des câbles de raccordement d'une section suffisante.

Il faut veiller à un bon contact des bornes de connexion du filament pour assurer une répartition uniforme du courant sur ces bornes.

Insbesondere sind die Temperaturen der Anoden- und Gitterverschmelzung zu beachten, wenn die Röhre bei höheren Frequenzen als 6 MHz benutzt wird.
Durch die an der Oberseite des Luftkühlgehäuses vorgesehenen Spalte wird ein Luftstrom auf diese Verschmelzungen gerichtet. In gewissen Fällen, z.B. bei einer niedrigen Anodenverlustleistung, wird bei dem erforderlichen Mindestluftstrom (siehe die Kühlungskurven nicht genügend Luft für die Kühlung der Verschmelzungen geliefert bei Frequenzen höher als 6 MHz. Folglich muss in diesen Fällen der Luftstrom in dem Masse den Mindestwert übersteigen, dass die Temperatur der Verschmelzungen den höchstzulässigen Wert nicht überschreitet.

Im allgemeinen bedürfen die Heizfadenstifte keiner zusätzlichen Kühlung, vorausgesetzt, dass die Anschlussklemmen Typ No. 40628 verwendet werden, und der Leitungsquerschnitt genügend gross bemessen ist.

Es ist darauf zu achten, dass die Heizfadenanschlüsse guten Kontakt geben, damit eine gleichmässige Stromverteilung über die Anschlussklemmen gewährleistet ist.

Clips for filament
Bornes de connexion pour le filament 40628
Anschlussklemmen für den Heizfaden

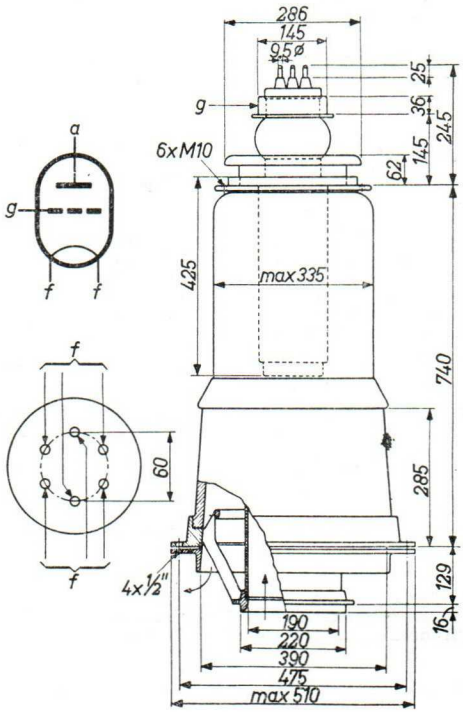
Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

| Weight, poids, Gewicht | TBL 12/100 | K 506 |
|---|---|---|
| net, netto | 28,5 kg | 72 kg |
| shipping, brut, brutto | 97 kg | 105 kg |

# PHILIPS

Valve mounted in cooler housing type K 506
Tube monté dans le refroidisseur type K 506
Röhre im Luftkühlgehäuse Typ K 506 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm




When connecting the filament the three pins of each group must be joined
Toutes les broches de chaque groupe doivent être réunies en connectant le filament
Der Anschluss des Heizfadens muss an allen Stiften beider Gruppen erfolgen

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegrafie

Limiting values
Caractéristiques limites
Grenzdaten

| | | max. |
|---|---|---|
| $V_a$ | = | 15 kV[1] |
| $-V_g$ | = | 1200 V |
| $I_a$ | = | 12 A |
| $I_g$ | = | 3 A |
| $W_{ia}$ | = | 162 kW |
| $W_a$ | = | 45 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\lambda$ | = | 20 | 15 | 12 | 11 | 10 | m |
| f | = | 15 | 20 | 25 | 27,5 | 30 | Mc/s |
| $V_a$ | = | 12 | 12 | 11 | 10,5 | 10 | kV |
| $V_g$ | = | -1000 | -1000 | -900 | -850 | -800 | V |
| $I_a$ | = | 12 | 10,5 | 8,5 | 7,5 | 6,7 | A |
| $I_g$ | = | 2,25 | 2 | 1,6 | 1,5 | 1,4 | A |
| $V_{gp}$ | = | 1700 | 1650 | 1450 | 1350 | 1300 | V |
| $W_{ig}$ | = | 3,5 | 3 | 2,1 | 1,9 | 1,7 | kW |
| $W_{ia}$ | = | 144 | 126 | 93,5 | 79 | 67 | kW |
| $W_a$ | = | 36 | 31,5 | 23,5 | 20 | 17 | kW |
| $W_o$ | = | 108 | 94,5 | 70 | 59 | 50 | kW |
| $\eta$ | = | 75 | 75 | 75 | 75 | 75 | % |

[1]) Up to 4 Mc/s. Up to 15 Mc/s $V_a$ = max. 13.5 kV.
Jusqu'à 4 Mc/s. Jusqu'à 15 Mc/s $V_a$ = max. 13,5 kV.
Bis 4 MHz. Bis 15 MHz $V_a$ = max. 13,5 kV.

# PHILIPS

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF - Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f = max. | 15 Mc/s | f = max. | 20 Mc/s |
| $V_a$ = max. | 10 kV | $V_a$ = max. | 10 kV |
| $-V_g$ = max. | 1200 V | $W_{ia}$ = max. | 80 kW |
| $I_a$ = max. | 10,5 A | | |
| $I_g$ = max. | 3,5 A | f = max. | 30 Mc/s |
| $W_{ia}$ = max. | 105 kW | $V_a$ = max. | 8 kV |
| $W_a$ = max. | 30 kW | $W_{ia}$ = max. | 50 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| f | = | 15 | 15 | 20 | 25 | 27,5 | 30 Mc/s |
| $V_a$ | = | 10 | 10 | 10 | 9 | 8,5 | 8 kV |
| $V_g$[1] | = | -1050 | -1050 | -1050 | -925 | -900 | -850 V |
| $I_a$ | = | 10,5 | 8,5 | 7,0 | 6,2 | 5,7 | 5,25 A |
| $I_g$ | = | 3,5 | 2,6 | 2,0 | 2,0 | 1,9 | 1,8 A |
| $V_{gp}$ | = | 1960 | 1750 | 1650 | 1500 | 1450 | 1400 V |
| $W_{ig}$ | = | 6,2 | 4,1 | 3,0 | 2,7 | 2,5 | 2,3 kW |
| $W_{ia}$ | = | 105 | 85 | 70 | 56 | 48,5 | 42 kW |
| $W_a$ | = | 25 | 17 | 15,5 | 13,5 | 12 | 11 kW |
| $W_o$ | = | 80 | 68 | 54,5 | 42,5 | 36,5 | 31 kW |
| $\eta$ | = | 76 | 80 | 78 | 76 | 75 | 74 % |
| m | = | 100 | 100 | 100 | 100 | 100 | 100 % |
| $W_{mod}$ | = | 52,5 | 42,5 | 35 | 28 | 24,5 | 21 kW |

[1]) Grid bias partially obtained by the grid resistor
Polarisation de grille obtenue partiellement par la résistance de grille
Gittervorspannung, teilweise durch den Gitterwiderstand erzeugt

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF - Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

| | | max. |
|---|---|---|
| $V_a$ | = | 15 kV |
| $I_a$ | = | 12 A |
| $W_{ia}$ | = | 162 kW |
| $W_a$ | = | 45 kW |
| $R_g$ | = | 20 kΩ |

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 12 | | 10 | | 10 | | kV |
| $V_g$ | = | -450 | | -375 | | -400 | | V |
| $R_{aa}$ | = | 1200 | | 1500 | | 2060 | | Ω |
| $V_{ggp}$ | = | 0 | 2060 | 0 | 1680 | 0 | 1460 | V |
| $I_a$ | = | 2x0,65 | 2x12 | 2x0,5 | 2x7,9 | 2x0,2 | 2x5,4 | A |
| $I_g$ | = | 0 | 2x2,5 | 0 | 2x1,9 | 0 | 2x0,7 | A |
| $W_{ig}$ | = | 0 | 2x2,4 | 0 | 2x1,44 | 0 | 2x0,5 | kW |
| $W_{ia}$ | = | 2x7,8 | 2x144 | 2x5 | 2x79 | 2x2 | 2x54 | kW |
| $W_a$ | = | 2x7,8 | 2x43 | 2x5 | 2x21 | 2x2 | 2x15,5 | kW |
| $W_o$ | = | 0 | 202 | 0 | 116 | 0 | 77 | kW |
| $\eta$ | = | - | 70 | - | 75 | - | 71 | % |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 9 | | 8,5 | | 8 | | kV |
| $V_g$ | = | -350 | | -325 | | -300 | | V |
| $R_{aa}$ | = | 2080 | | 2120 | | 2210 | | Ω |
| $V_{ggp}$ | = | 0 | 1300 | 0 | 1200 | 0 | 1120 | V |
| $I_a$ | = | 2x0,25 | 2x4,8 | 2x0,25 | 2x4,4 | 2x0,25 | 2x4,1 | A |
| $I_g$ | = | 0 | 2x0,65 | 0 | 2x0,55 | 0 | 2x0,4 | A |
| $W_{ig}$ | = | 0 | 2x0,4 | 0 | 2x0,3 | 0 | 2x0,25 | kW |
| $W_{ia}$ | = | 2x2,25 | 2x43,2 | 2x2,1 | 2x37,4 | 2x2 | 2x32,8 | kW |
| $W_a$ | = | 2x2,25 | 2x12,2 | 2x2,1 | 2x10,4 | 2x2 | 2x9,4 | kW |
| $W_o$ | = | 0 | 62 | 0 | 54 | 0 | 46,8 | kW |
| $\eta$ | = | - | 72 | - | 72 | - | 71 | % |

H.F. class B amplifier for television service, negative modulation, positive synchronisation
Amplificatrice H.F. classe B pour télévision, modulation négative, synchronisation positive
HF Klasse B Verstärker für Fernsehsender, negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | | = max. | 6,5 kV |
| $I_a$ | sync | = max. | 16 A |
| $W_{ia}$ | sync | = max. | 100 kW |
| $W_a$ | sync | = max. | 50 kW |
| $I_g$ | sync | = max. | 2 A |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | |
|---|---|---|---|
| f | | = | 48-68 Mc/s[1]) |
| B (-1,5 db) | | = | 5,5 Mc/s[2]) |
| B (-3 db) | | = | 7,5 Mc/s[2]) |
| $V_a$ | | = | 6,5 kV |
| $V_g$ | | = | -250 V |
| $V_{gg_p}$ | sync | = | 1740 V[3]) |
| | black, noir, schwarz | = | 1300 V[3]) |
| $I_a$ | sync | = | 32 A |
| | black, noir, schwarz | = | 24 A |
| $I_g$ | sync | = | 3,4 A |
| | black, noir, schwarz | = | 2,2 A |
| $W_{ig}$ | sync | = | 22,4 kW[4]) |
| $W_o$ | sync | = | 80+20 kW[5]) |
| | black, noir, schwarz | = | 45+11 kW[5]) |

[1])...[5])See page 9; voir page 9; siehe Seite 9

[1]) In the frequency range of 60-68 Mc/s a special version of the tube is necessary
Pour la gamme de fréquences de 60-68 Mc/s une exécution speciale du tube est nécessaire
Für das Frequenzbereich von 60-68 MHz ist eine spezielle Ausführung der Röhre erforderlich

[2]) This value of bandwidth is based on measurements on a circuit with a single LC section
Cette valeur de la largeur de bande se rapporte à des mesures à un montage avec un seul circuit LC.
Dieser Wert der Bandbreite bezieht sich auf Messungen an einer Schaltung mit einem einzigen LC-Kreis.

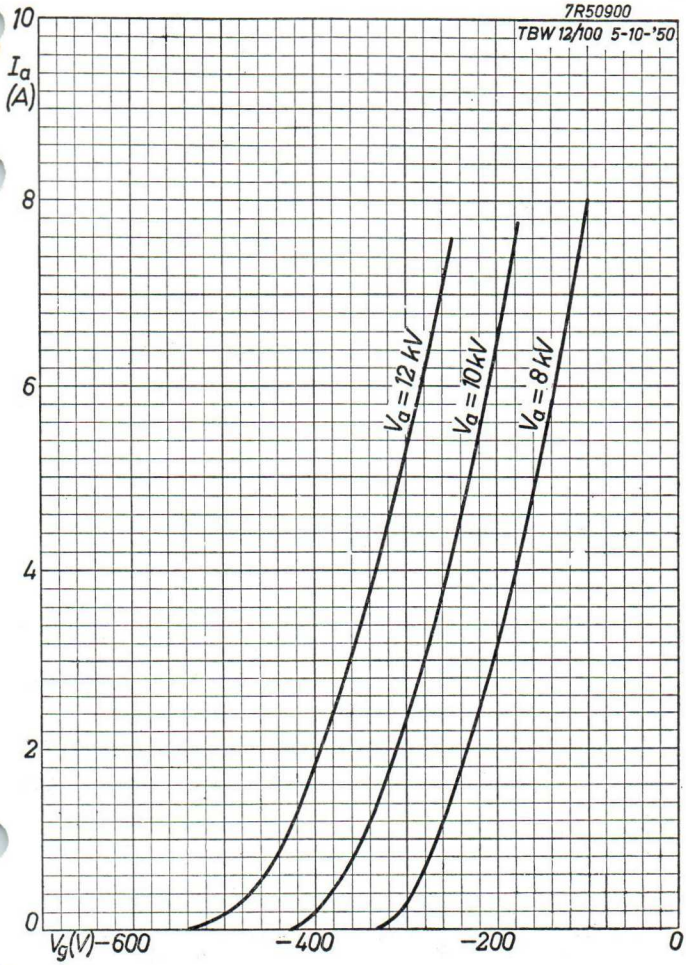
[3]) Measured by the slide back method
Mesuré par la méthode de glissement de la tension de polarisation
Gemessen mittels Verschiebung der Gittervorspannung.

[4]) Driving power is accounted for largely by circuit losses. The indicated driving power is required to take care of losses in damping resistors, circuit losses and tube driving power
La puissance d'entrée est nécessaire pour la plupart pour les pertes dans le circuit. La puissance mentionnée est nécessaire pour les pertes dans les résistances d'amortissement, dans le circuit et pour la puissance d'entrée du tube.
Die Eingangsleistung ist grossenteils nötig für die Verluste in der Schaltung. Die genannte Leistung ist nötig für die Verluste in Dämpfungswiderständen, in Kreisen und für die Eingangsleistung der Röhre.

[5]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pre-amplificateur.
Einschliesslich der vom Vorverstärker übertragenen Leistung

# PHILIPS

**TBL 12/100**

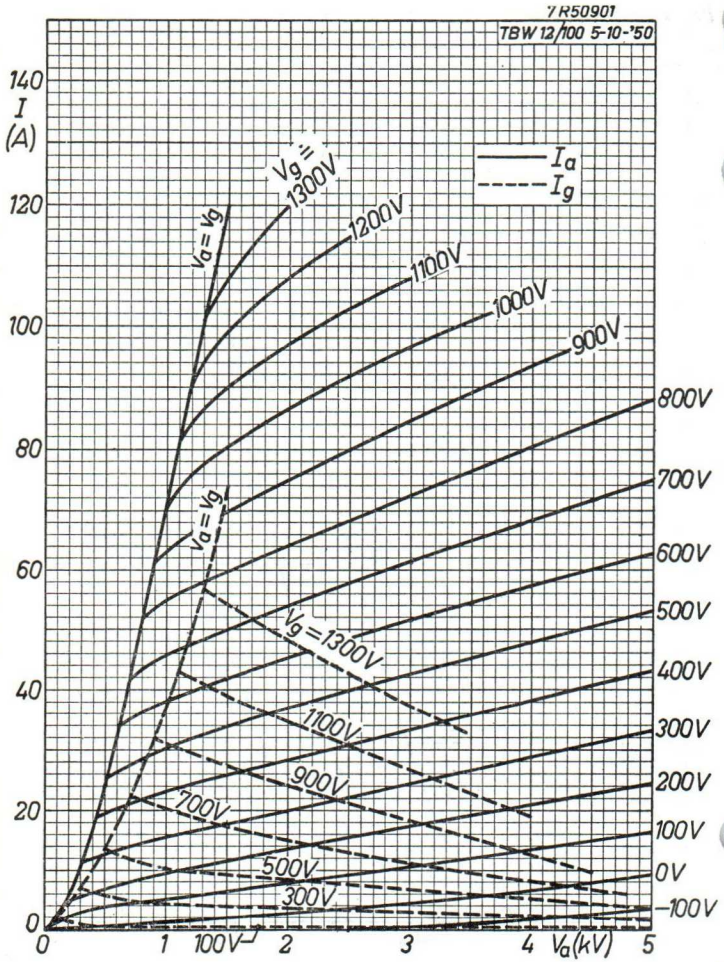



7.7.1954

A

TBL 12/100

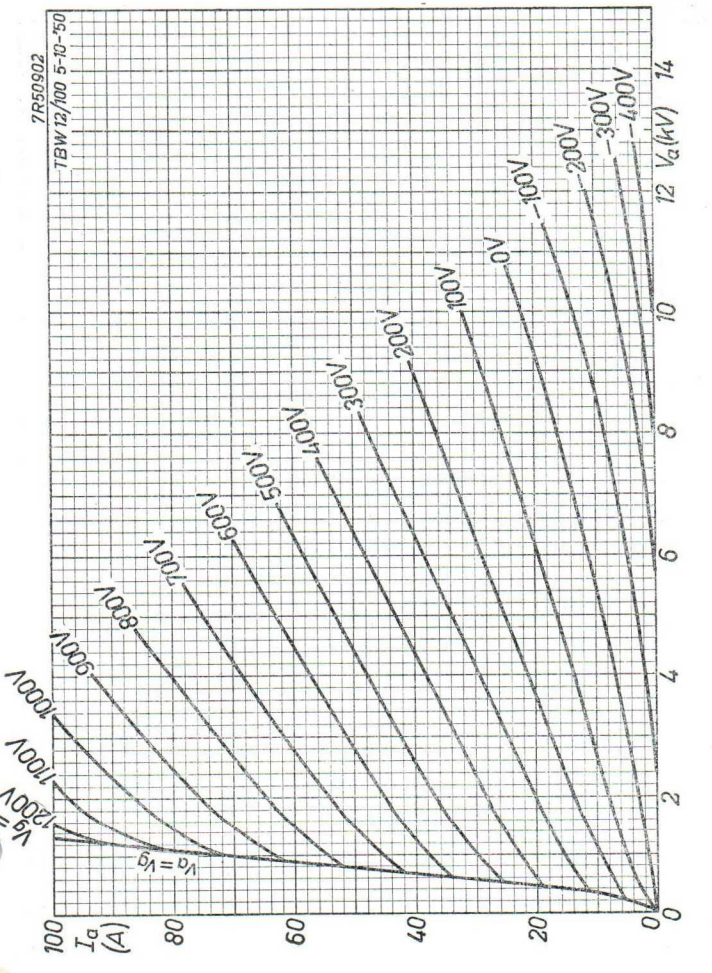
# PHILIPS




B

# PHILIPS

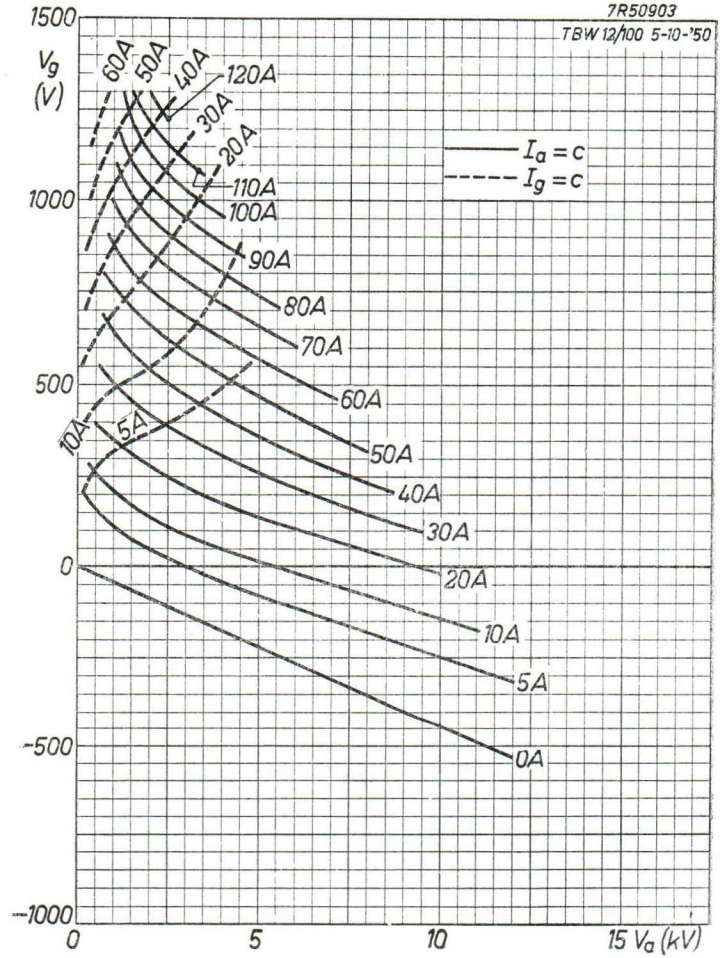
**TBL12/100**



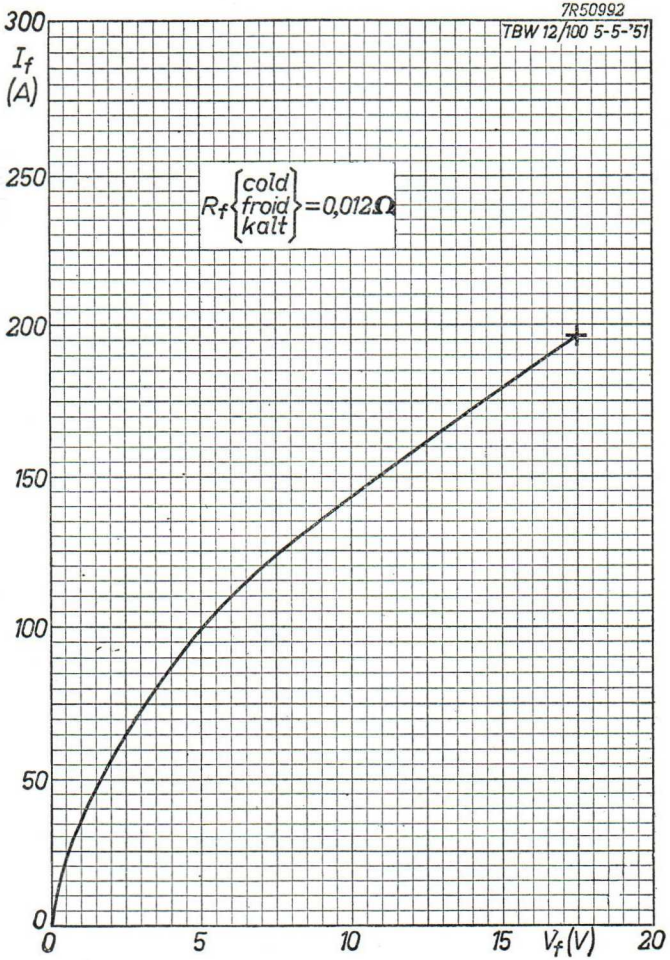

C

7.7.1954

PHILIPS

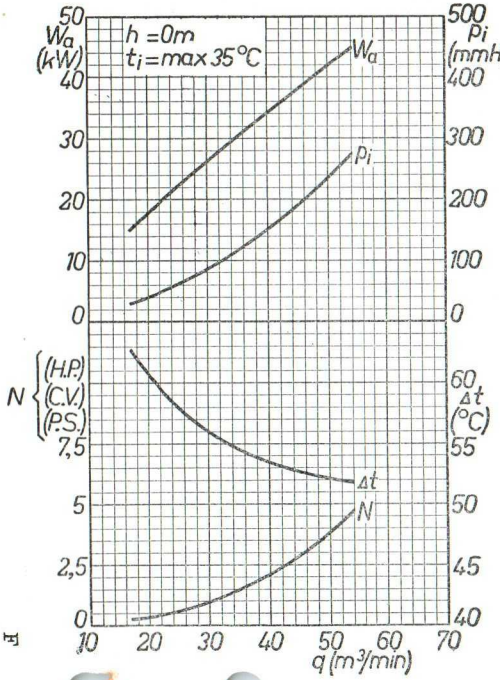

7R50903
TBW 12/100 5-10-'50
$V_g$ (V)
1500
1000
500
0
-500
-1000
0
5
10
15 $V_a$ (kV)
$I_a = c$
$I_g = c$
120A
110A
100A
90A
80A
70A
60A
50A
40A
30A
20A
10A
5A
0A
60A
50A
40A
30A
20A
10A
5A

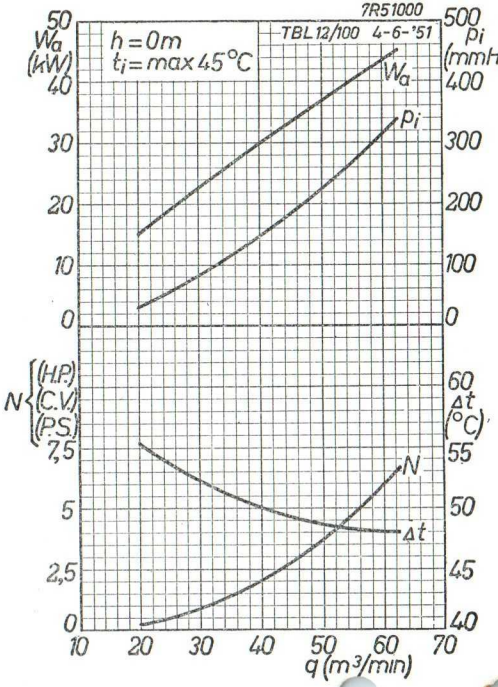
**PHILIPS** **TBL 12/100**




4.4.1955

E




TBL 12/100

PHILIPS

PHILIPS

TBL 12/100





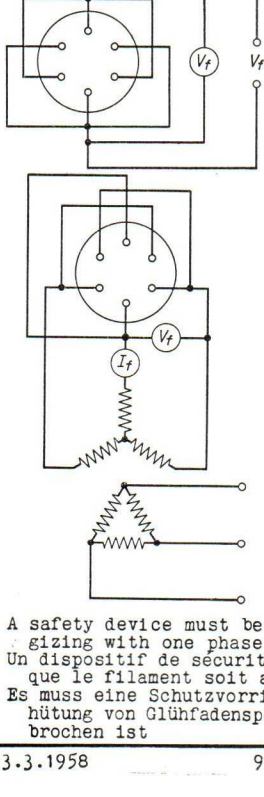


4.4.1959

G

TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour l'utilisation comme amplificatrice H.F. ou B.F. ou comme oscillatrice
TRIODE zur Verwendung als HF- oder NF-Verstärker oder als Oszillator

This type is equivalent to type TBL 12/100 except for the filament data
Ce type est équivalent au type TBL 12/100 à l'exception des données du filament
Dieser Typ ist dem Typ TBL 12/100 gleichwertig mit Ausnahme der Glühfadendaten




Single-phase filament energizing
Alimentation de filament monophasée
Einphasige Glühfadenspeisung

Vf = 17,5 V

If = 196 A

Filament current must never exceed a peak value of 420 A at any time during initial energizing schedule

Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 420 A

Der Anlaufstrom darf niemals einen Scheitelwert von 420 A überschreiten

Three-phase filament energizing
Alimentation de filament triphasée
Dreiphasige Glühfadenspeisung

Vf = 15,5 V

If = 131 A

Heater current must never exceed a peak value of 280 A at any time during initial energizing schedule

Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 280 A

Der Anlaufstrom darf niemals einen Scheitelwert von 280 A überschreiten

A safety device must be used to prevent filament energizing with one phase interrupted
Un dispositif de sécurité doit être utilisé pour prévenir que le filament soit alimenté à une phase interrompue
Es muss eine Schutzvorrichtung verwendet werden zur Verhütung von Glühfadenspeisung wenn eine der Phasen unterbrochen ist

# PHILIPS

**TBW 6/14**

TRIODE for use in industrial R.F. generators
TRIODE pour utilisation dans les générateurs H.F. industriels
TRIODE zur Verwendung in industriellen HF-Generatoren

Cooling : water
Refroidissement: circulation d'eau
Kühlung : Wasser

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 6,3 V $^{+5\%}_{-10\%}$
$I_f$ = 130 A

The filament current must never exceed a peak value of 280 A at any time during the initial energizing schedule
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 280 A
Der Anlaufstrom darf niemals einen Scheitelwert von 280 A überschreiten

Capacitances
Capacités
Kapazitäten

$C_a$ = 1,2 pF
$C_g$ = 44,5 pF ←
$C_{ag}$ = 33,5 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 6 kV
$I_a$ = 2,5 A
S = 23 mA/V
$\mu$ = 17,5

Temperatures; températures; Temperaturen

Temperature of all seals
Température de tous les scellements = max. 220 °C
Temperatur aller Einschmelzungen

Net weight
Poids net 2,5 kg
Nettogewicht

Shipping weight
Poids brut 7,0 kg
Bruttogewicht

Net weight of water jacket K 720
Poids net du refroidisseur K 720 2,2 kg
Nettogewicht des Kühltopfes K 720 ←

Shipping weight of water jacket K 720
Poids brut du refroidisseur K 720 2,9 kg
Bruttogewicht des Kühltopfes K 720

# PHILIPS

Cooling
Refroidissement
Kühlung

Water cooling characteristics
Caractéristiques de refroidissement par eau
Wasserkühlungsdaten

| Wa (kW) | ti (°C) | qmin (l/min) | Pi (atm.) |
|---|---|---|---|
| 5 | 20<br>50 | 4,5<br>12 | 0,03<br>0,2 |
| 10 | 20<br>50 | 9,5<br>22 | 0,15<br>0,6 |
| 15 | 20<br>50 | 15<br>34 | 0,3<br>1,4 |

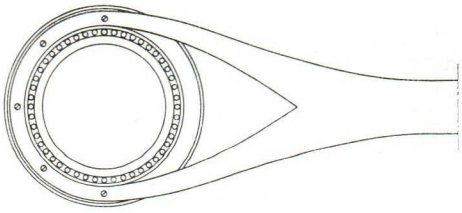
Accessories
Accessoires
Zubehör

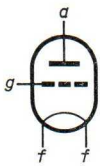
Water jacket
Refroidisseur
Kühltopf — K720

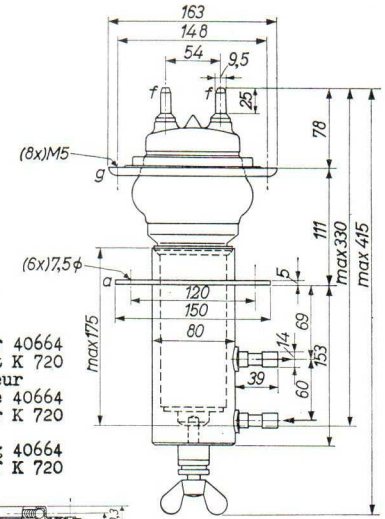
Grid connector
Connecteur de la grille
Gitteranschlussring — 40664

Filament clip
Borne de filament
Heizfadenklemme — 40662

Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

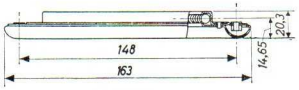


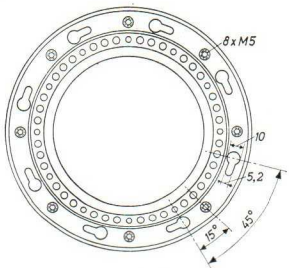



Dimensions in mm
Dimensions en mm
Abmessungen in mm

Tube with grid connector 40664 and water jacket K 720
Tube avec connecteur de la grille 40664 et refroidisseur K 720
Röhre mit Gitteranschlussring 40664 und Kühltopf K 720




40664
Grid connector
Connecteur de grille
Gitteranschlussring

The rounded side of the grid connector should face the anode. To ensure a uniform R.F. current distribution in the grid seal at frequencies higher than 4 Mc/s, the grid lead should be connected as shown in the figure at page 2

Le côté arrondi du connecteur de la grille sera tourné vers l'anode. Afin d'assurer une distribution uniforme du courant H.F. dans le scellement de la grille à des fréquences supérieures à 4 MHz, le conducteur de la grille sera relié selon la figure page 2

Die abgerundete Seite des Gitteranschlussringes soll der Anode zugekehrt sein. Zur Gewährleistung einer gleichmässigen HF-Stromverteilung in der Gittereinschmelzung bei Frequenzen höher als 4 MHz, soll die Gitterleitung nach der Figur auf Seite 2 verbunden werden

# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from three-phase rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec la tension anodique dérivée d'un redresseur triphasé sans filtre
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasengleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | |
|---|---|
| f = 30 Mc/s | $I_a$ = max. 4,0 A |
| $V_a$ = max. 8 kV | $-V_g$ = max. 1600 V |
| $W_{ia}$ = max. 30 kW | $I_g$ = max. 1,5 A [1] |
| $W_a$ = max. 15 kW | $I_g$ = max. 2,0 A [2] |
| | $R_g$ = max. 10 kΩ |

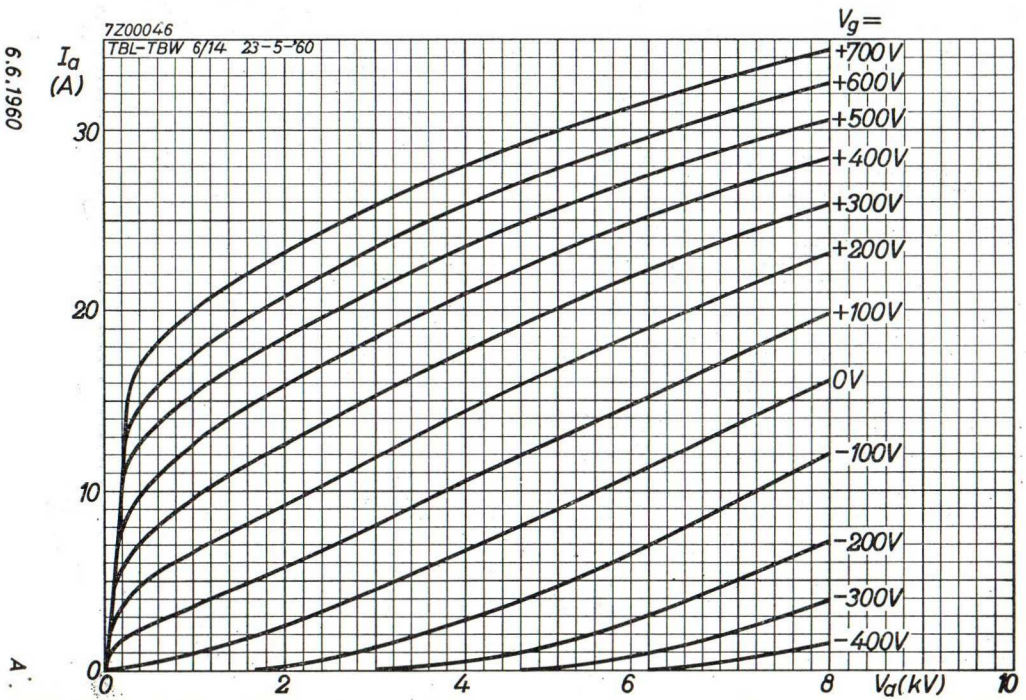
Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| f | = 30 | 30 Mc/s |
| $V_a$ | = 7 | 6 kV |
| $I_a$ | = 3,5 | 3,3 A [1] |
| $I_a$ | = 0,7 | 0,51 A [2] |
| $I_g$ | = 0,95 | 0,8 A [1] |
| $I_g$ | = 1,35 | 1,1 A [2] |
| $R_g$ | = 950 | 1000 Ω |
| $R_{a\sim}$ | = 1000 | 870 Ω |
| $V_{g\sim}/V_{a\sim}$ | = 25 | 26 % |
| $W_{ia}$ | = 24,5 | 19,8 kW |
| $W_a$ | = 6,8 | 5,5 kW |
| $W_o$ | = 17,7 | 14,3 kW |
| $\eta$ | = 72 | 72 % |
| $W_\ell$ [3] | = 14 | 11 kW |

[1] Loaded; chargé; belastet

[2] Unloaded; sans charge; unbelastet

[3] Useful power in the load, measured in a circuit having an efficiency of about 85 %
Puissance utile dans la charge, mesurée dans un circuit avec un rendement d'environ 85 %
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von etwa 85 %




6.6.1960

PHILIPS

TBW 6/14

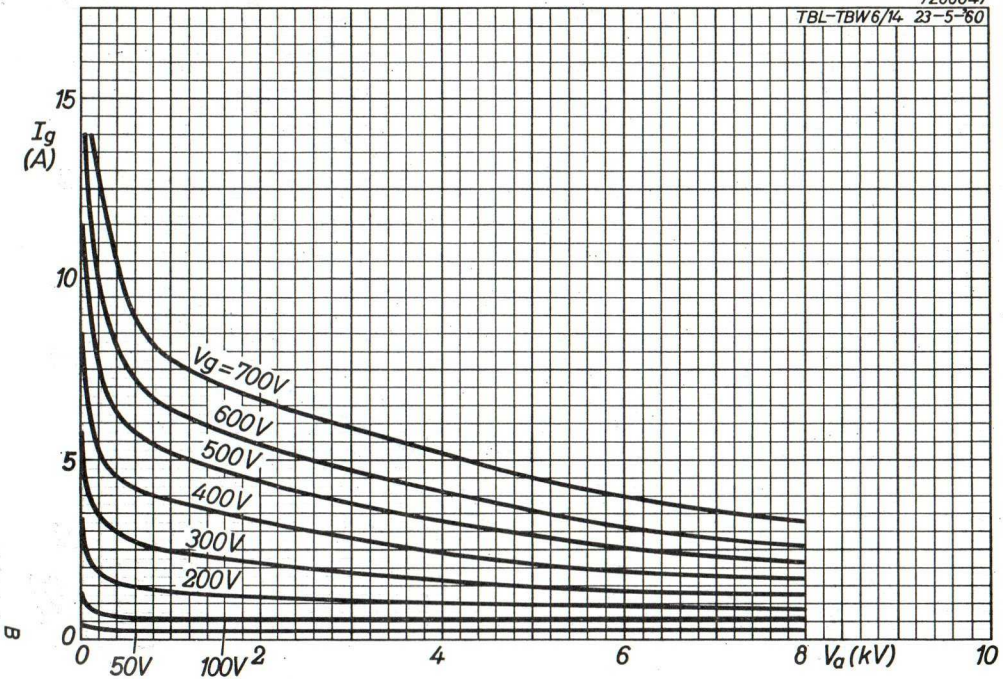
A.

7Z00047

TBL–TBW6/14 23–5–60

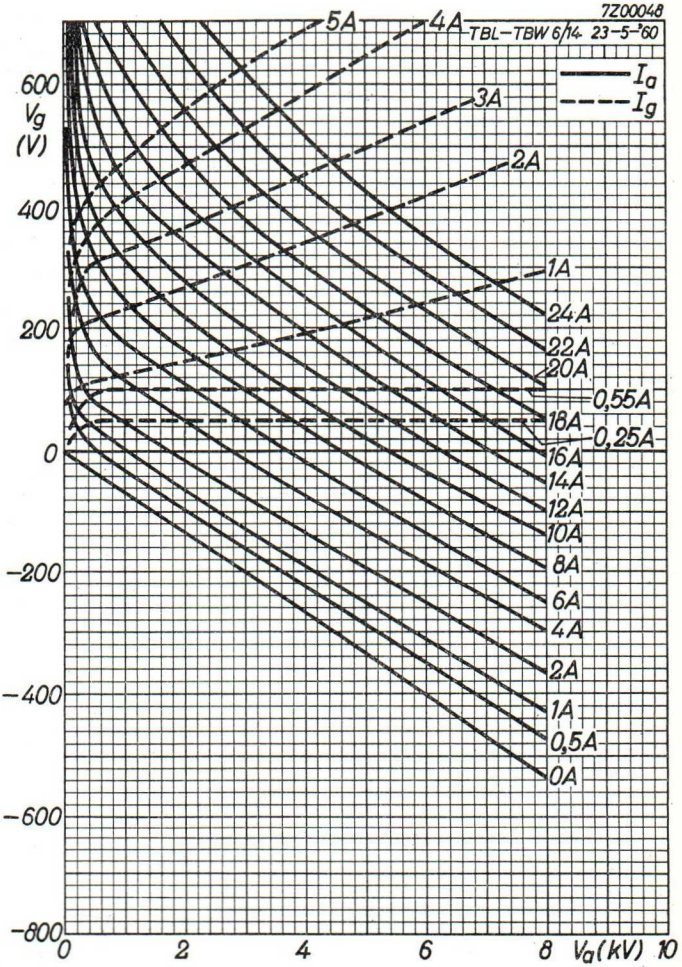
TBW 6/14

PHILIPS



# PHILIPS

**TBW 6/14**




6.6.1960

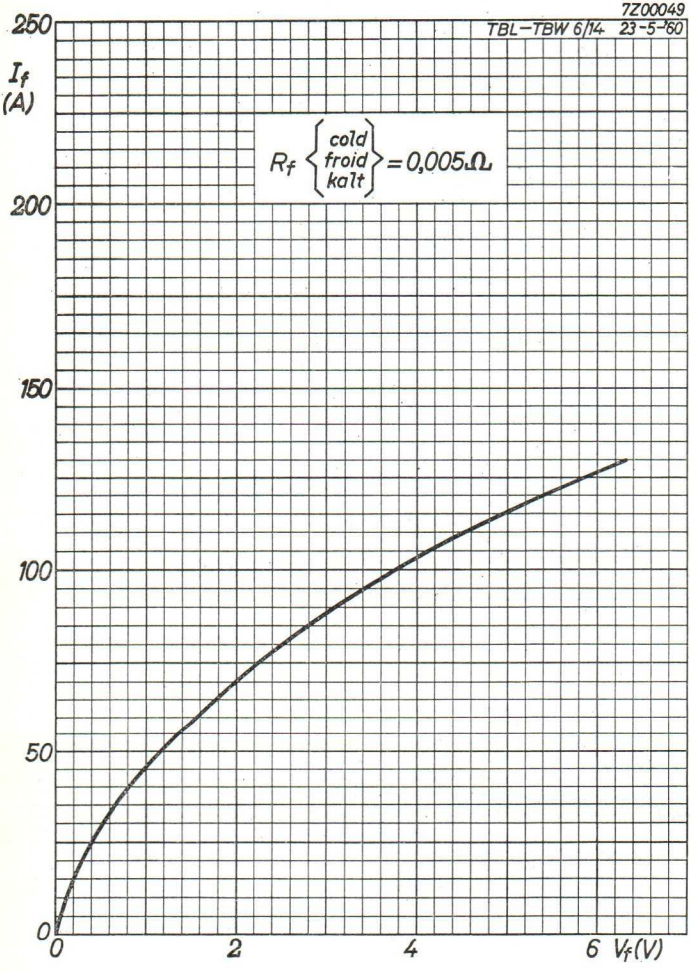
C

TBW 6/14

PHILIPS

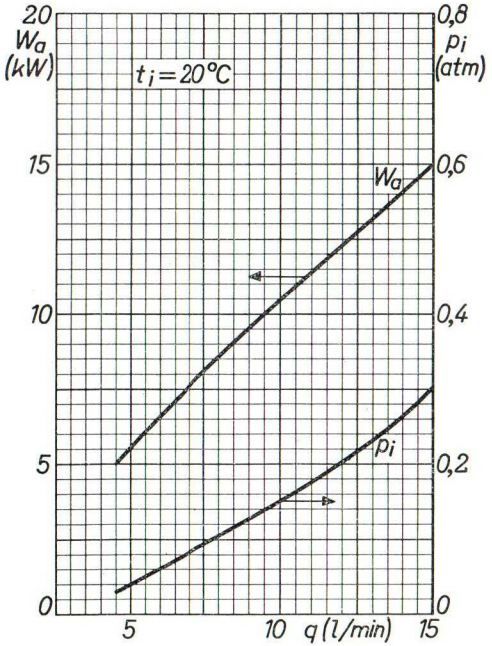
7Z00049

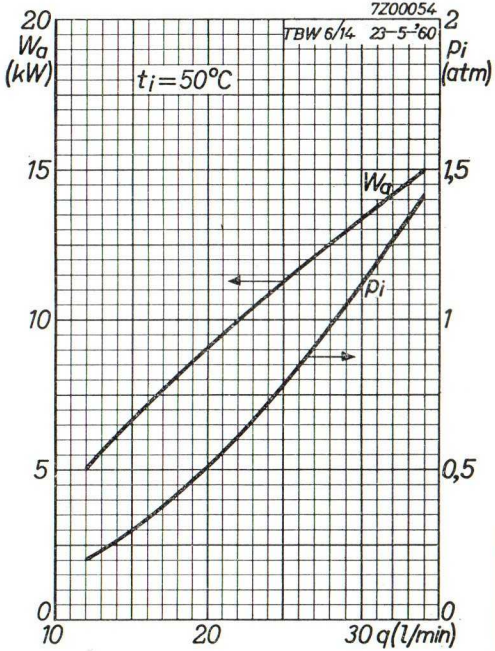
TBL–TBW 6/14 23-5-60




D

6.6.1960




PHILIPS

TBW 6/14

E

COAXIAL TRIODE for use in A.M., F.M. and television transmitters
TRIODE COAXIALE pour utilisation dans émetteurs A.M., F.M. et de télévision
KOAXIALE TRIODE zur Verwendung in AM-,FM- und Fernsehsendern

Cooling : water/additional air flow
Refroidissement: circulation d'au/courant d'air additionnel
Kühlung : Wasser/zusätzlicher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 6,3 V
$I_f$ = 154 A

The filament current must never exceed a peak value of 500 A at any time during the initial energizing schedule
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 500 A
Der Anlauf-Heizstrom darf niemals einen Scheitelwert von 500 A überschreiten

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,6 pF [1])
$C_g$ = 65 pF
$C_{ag}$ = 29 pF

Typical characteristics
Caractéristiques types
Kenndaten

$I_a$ = 1 A, $V_a$ = 4 kV

$\mu$ = 60
$S$ = 60 mA/V

Water cooling characteristics
Caractéristiques de refroidissement par eau
Wasserkühlungsdaten

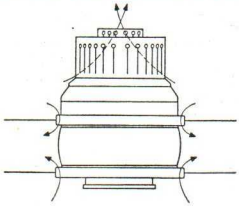
| $W_a$ (kW) | $t_i$ (°C) | $q_{min}$ (l/min) | $\Delta p_i$ (atm) |
|---|---|---|---|
| 6 | 20 | 6 | 0,08 |
| | 50 | 12 | 0,30 |
| 8 | 20 | 8 | 0,13 |
| | 50 | 16 | 0,54 |
| 10 | 20 | 10 | 0,21 |
| | 50 | 20 | 0,84 |
| 12 | 20 | 12 | 0,30 |
| | 50 | 24 | 1,20 |

See also the cooling curves (page E)
Voir aussi les courbes de refroidissement (page E)
Siehe auch die Kühlungskurven (Seite E)

[1])See page 4; voir page 4; siehe Seite 4

# PHILIPS

Recommended direction of additional air flow
Direction recommandée du courant d'air additionnel
Empfohlene Richtung des zusätzlichen Luftstromes



Temperature of seals
Température des scellements = max. 180 °C
Temperatur der Einschmelzungen

Generally it is necessary to direct an air flow on the grid, anode and filament seals. E.g. at 220 Mc/s an air flow of 0.6 m³/min on each of these seals is necessary

En général il faut diriger un courant d'air sur les scellements de l'anode, de la grille et du filament. Par exemple à 220 MHz un courant d'air de 0,6 m³/min sur chaque de ces scellements est nécessaire

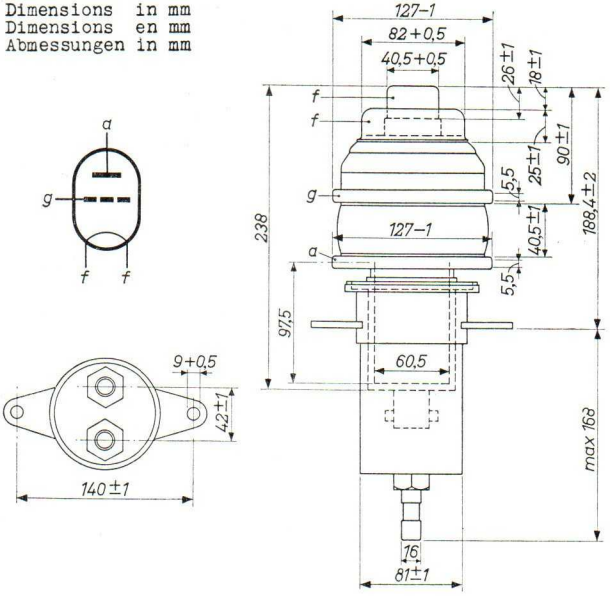
Im allgemeinen ist ein Luftstrom auf die Anoden-, Gitter- und Heizfadeneinschmelzungen erforderlich. Bei 220 MHz zum Beispiel ist ein Luftstrom von 0,6 m³/min auf jede dieser Einschmelzungen notwendig

Accessories
Accessoires
Zubehör

| | |
|---|---|
| Water jacket<br>Refroidisseur<br>Kühltopf | K718 |
| Grid and anode connector<br>Connecteur de l'anode et de la grille<br>Gitter- und Anodenanschluss | 40651 |
| Inner filament connector<br>Connecteur intérieur du filament<br>Innerer Heizfadenanschluss | 40652 |
| Outer filament connector<br>Connecteur extérieur du filament<br>Äusserer Heizfadenanschluss | 40653 |

Tube mounted in water-jacket type K718
Tube monté dans le refroidisseur type K718
Röhre in Kühltopf Type K718 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Eccentricity of outer diameters of the grid and filament terminals with respect to the outer diameter of the anode terminal max. 1 mm

Excentricité des diamètres extérieurs des connexions de la grille et du filament au regard du diamètre extérieur de la connexion de l'anode 1 mm au max.

Exzentrizität der äusseren Durchmesser der Gitter- und Glühfadenanschlüsse in Bezug auf den äusseren Durchmesser des Anodenanschlusses max. 1 mm

Mounting position: Vertical with anode down
Montage : Vertical avec l'anode en bas
Einbau : Senkrecht mit der Anode unten

# PHILIPS

H.F. class C telegraphy, grounded grid
H.F. classe C télégraphie, grille mise à la terre
HF-Klasse C Telegraphie, Gitterbasisschaltung

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 110 | Mc/s |
| $V_a$ | = max. | 5,5 | kV |
| $-V_g$ | = max. | 500 | V |
| $I_a$ | = max. | 6 | A |
| $I_g$ | = max. | 1,5 | A |
| $W_{ia}$ | = max. | 30 | kW |
| $W_a$ | = max. | 12 | kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 110 | Mc/s |
| $V_a$ | = | 5 | kV |
| $V_g$ | = | -300 | V |
| $I_a$ | = | 4,8 | A |
| $I_g$ | = | 1,2 | A |
| $V_{gp}$ | = | 520 | V |
| $W_{ig}$ | = | 2560 | W |
| $W_{ia}$ | = | 24 | kW |
| $W_a$ | = | 9 | kW |
| $W_o$ [2] | = | 15+2 | kW |
| $\eta$ [3] | = | 62,5 | % |

---

[1] Page 1; Seite 1
Anode fully screened from filament terminals by a flat metal screen connected to the grid terminal
L'anode blindée des connexions du filament par un blindage plan métallique connecté à l'anneau de connexion de la grille
Anode mittels einer mit dem Gitteranschlussring verbundenen flachen Metallplatte von den Heizfadenanschlüssen abgeschirmt

[2] Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pré-amplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[3] Pure valve efficiency
Rendement net du tube
Reiner Röhrenwirkungsgrad

H.F. class B telephony for television service; linear, grounded-grid amplifier Negative modulation, positive synchronisation (CCIR and FCC system)

H.F. classe B téléphonie pour télévision; amplificateur linéaire, grille mise à la terre Modulation négative, synchronisation positive (Systèmes CCIR et FCC)

HF-Klasse B Telephonie für Fernsehsender; linearer Verstärker in Gitterbasisschaltung Negative modulation, positive Synchronisierung (CCIR- und FCC-System)

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. 88 Mc/s | f | = max. 220 Mc/s |
| $V_a$ | = max. 5,5 kV | $V_a$ | = max. 4,5 kV |
| $W_{ia}$ sync | = max. 25 kW | $W_{ia}$ sync | = max. 22 kW |
| $W_a$ sync | = max. 12 kW | $W_a$ sync | = max. 12 kW |
| $I_a$ sync | = max. 6 A | $I_a$ sync | = max. 6 A |
| $I_g$ sync | = max. 1,2 A | $I_g$ sync | = max. 1,2 A |

Operating conditions (at centre frequency of the resonance curve)
Caractéristiques d'utilisation (à la fréquence centrale de la courbe de résonance)
Betriebsdaten (bei der mittleren Frequenz der Abstimmkurve)

| | | | |
|---|---|---|---|
| f | = | 48-88 | 170-220 [1] Mc/s |
| B (-1,5 dB) | = | - | 7 Mc/s |
| B (-3 dB) | = | 6 | 12 Mc/s |
| $V_a$ | = | 5 | 4 kV |
| $V_g$ | = | -90 | -75 V |
| $V_{gp}$ sync | = | 270 | 255 V |
| $V_{gp}$ black, noir, schwarz | = | 200 | 180 V |
| $I_a$ sync | = | 4,8 | 4,8 A |
| $I_a$ black, noir, schwarz | = | 3,6 | 3,6 A |
| $I_g$ sync | = | 1,0 | 1,0 A |
| $I_g$ black, noir, schwarz | = | 0,35 | 0,35 A |
| $W_{ig}$ sync | = | 1,4 | 1,3 kW |
| $W_o$ sync | = | 17 | 12 kW |
| $W_o$ black, noir, schwarz | = | 9,6 | 6,75 kW |

[1]) See page D; voir page D; siehe Seite D

# PHILIPS

H.F. class B telephony for television service; linear, grounded-grid amplifier Positive modulation, negative synchronisation (RTF and BBC system )

H.F. classe B téléphonie pour télévision; amplificateur linéaire, grille mise à la terre Modulation positive, synchronisation négative (Systèmes RTF et BBC)

HF-Klasse B Telephonie für Fernsehsender; linearer Verstärker in Gitterbasisschaltung Positive Modulation, negative Synchronisierung (RTF und BBC System)

Limiting values
Caractéristiques limites
Grenzdaten

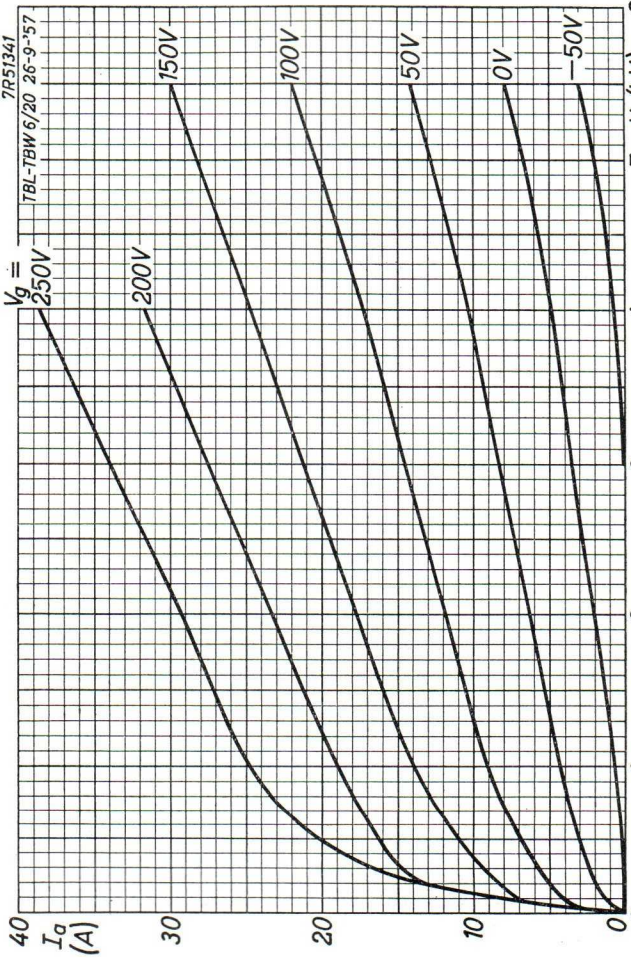
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| f | | = max. 88 Mc/s | | f | | = max. 220 Mc/s | |
| $V_a$ | | = max. 5,5 kV | | $V_a$ | | = max. 4,5 kV | |
| $W_{ia}$ | white blanc weiss | = max. 25 kW | | $W_{ia}$ | white blanc weiss | = max. 22 kW | |
| $I_a$ | | = max. 6 A | | $I_a$ | | = max. 6 A | |
| $I_g$ | | = max. 1,2 A | | $I_g$ | | = max. 1,2 A | |
| $W_a$ | | = max. 12 kW | | $W_a$ | | = max. 12 kW | |

Operating conditions (at centre frequency of the resonance curve)
Caractéristiques d'utilisation (à la fréquence centrale de la courbe de résonance)
Betriebsdaten (bei der mittleren Frequenz der Abstimmkurve)

| | | | | |
|---|---|---|---|---|
| f | = | 48-88 | 170-220 | Mc/s |
| B (-3 dB) | = | 6 | 12 | Mc/s |
| $V_a$ | = | 5 | 4 | kV |
| $V_g$ | = | -90 | 75 | V |
| $V_{gp}$ white, blanc, weiss | = | 270 | 255 | V |
| $V_{gp}$ black, noir, schwarz | = | 110 | 95 | V |
| $I_a$ white, blanc, weiss | = | 4,8 | 4,8 | A |
| $I_a$ black, noir, schwarz | = | 1,45 | 1,45 | A |
| $I_g$ white, blanc, weiss | = | 1 | 1 | A |
| $I_g$ black, noir, schwarz | = | 0,2 | 0,2 | A |
| $W_{ig}$ white, blanc, weiss | = | 1,4 | 1,3 | kW |
| $W_o$ white, blanc, weiss | = | 17 | 12 | kW |
| $W_o$ black, noir, schwarz | = | 1,7 | 1,2 | kW |

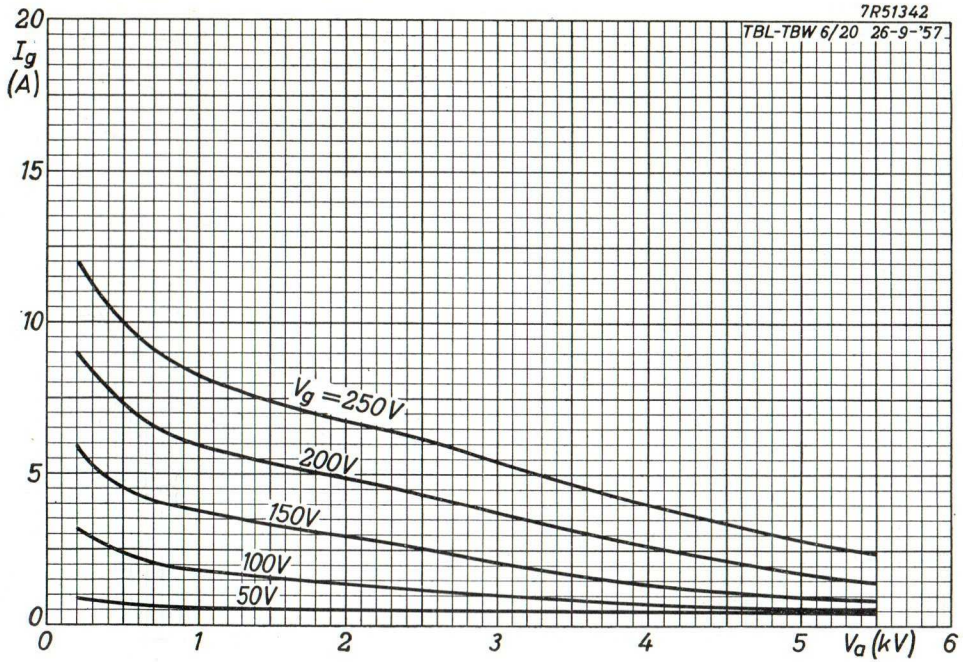
PHILIPS

TBW 6/20



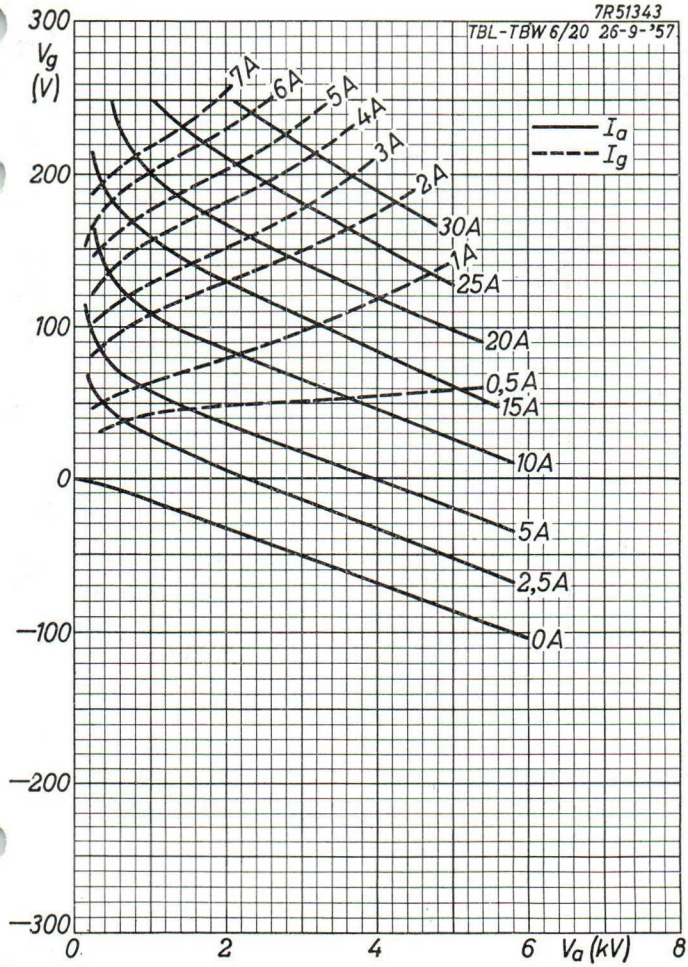

12.12.1957

A


7R51342
TBL-TBW 6/20 26-9-'57
$I_g$ (A)
20
15
10
5
0
$V_g$ = 250V
200V
150V
100V
50V
0
1
2
3
4
5
$V_a$ (kV)
6

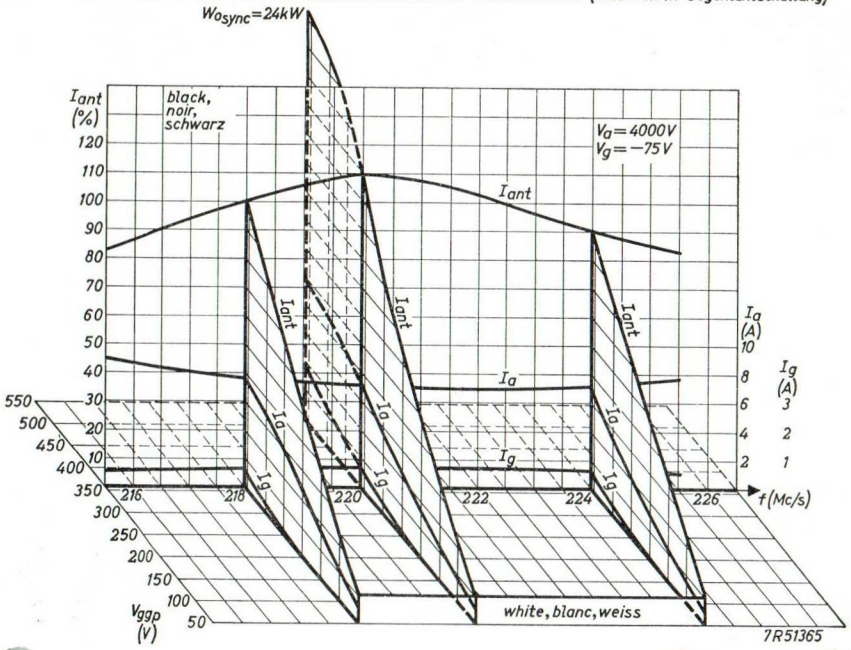
B

PHILIPS


7R51343
TBL-TBW 6/20 26-9-'57
$V_g$ (V)
300
200
100
0
−100
−200
−300
0
2
4
6
8
$V_a$ (kV)
$I_a$
$I_g$
7A
6A
5A
4A
3A
2A
1A
30A
25A
20A
0,5A
15A
10A
5A
2,5A
0A

PHILIPS

Grid-modulated H.F. class B amplifier for television service (2 valves in push-pull)
Amplificateur H.F. classe B modulé par la grille pour la télévision (2 tubes en montage push-pull)
H.F. Klasse B Verstärker mit Gittermodulation für Fernsehbetrieb (2 Röhren in Gegentaktschaltung)



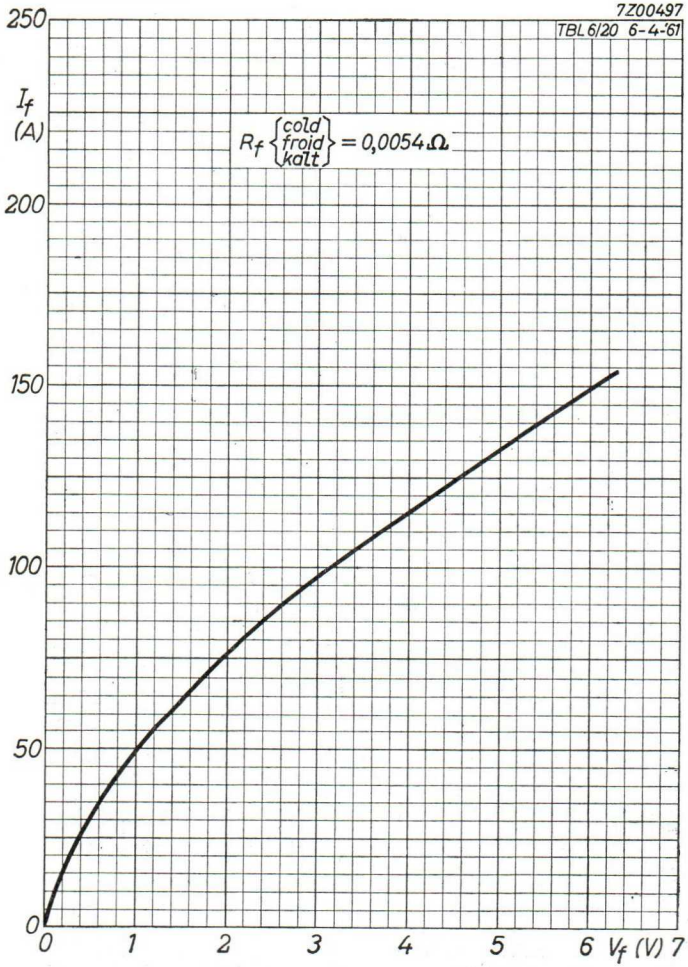

D

Wo
ti = 50°C
Wo (kW)
12
10
8
6
pi (atm)
1
0,5
pi
to
to (°C)
60
50
10
15
20 q (l/min) 25


ZR51360
TBW 6/20 10-12-'57
Wo
ti = 20°C
Wo (kW)
12
10
8
6
0,4
pi (atm)
0,2
0
to
to (°C)
40
30
20
pi
6
8
10 q (l/min) 12

**TBW6/20**

# PHILIPS




F

# PHILIPS

**TBW 6/6000**

TRIODE for use in television transmitters, A.M. or F.M. transmitters or industrial H.F. generators
TRIODE pour utilisation dans émetteurs de télévision, émetteurs A.M. ou F.M., ou générateurs H.F. industriels
TRIODE zur Verwendung in Fernsensendern, AM-oder FM-Sendern, oder in HF-Industriegeneratoren

Cooling : water/low velocity air flow
Refroidissement: circulation d'eau/léger courant d'air
Kühlung : Wasser/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 12,6 V
$I_f$ = 33 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,3 pF
$C_g$ = 16 pF
$C_{ag}$ = 11 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ($I_a$=1 A ; $V_a$=4 kV) = 32
S ($I_a$=1 A ; $V_a$=4 kV) = 17 mA/V

| λ | Freq. | C telegr. | | B teleph. | | C an.mod. | | B mod.[1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) |
| 4 | 75 | 6<br>5<br>4 | 6,9<br>5,6<br>4 | 6<br>5 | 1,9<br>1,45 | 5<br>4,5<br>4<br>3,5<br>3 | 4,7<br>4,1<br>3,5<br>3<br>2,2 | 6<br>5<br>4,5<br>4<br>3,5<br>3 | 13,3<br>6,6<br>6<br>5,3<br>4,6<br>3,3 |

Television, télévision, Fernsehen

| Freq. (Mc/s) | neg. mod. pos. synchr. $V_a$ (kV) | $W_o$ sync (kW) | pos.mod.neg. synchr. $W_o$ (kW) black noir schwarz | $V_a$ (kV) | $W_o$ (kW) white blanc weiss |
|---|---|---|---|---|---|
| 75 | 5 | 9 | 5,35 | 5 | 9 |

[1])Two tubes; deux tubes; zwei Röhren

# PHILIPS

Cooling characteristics
Caractéristiques du refroidissement
Kühlungsdaten

| Wa (kW) | $t_i$ (°C) | $q_{min}$ [1] (l/min) | $p_i$ (atm) | |
|---|---|---|---|---|
| 1 | 20<br>50 | 2,5<br>3 | 0,08<br>0,1 | See cooling curves<br>Voir les courbes de refroidissement<br>Siehe die Kühlungskurven |
| 2 | 20<br>50 | 2,5<br>5 | 0,08<br>0,3 | |
| 4 | 20<br>50 | 4<br>9 | 0,18<br>0,9 | |
| 6 | 20<br>50 | 6<br>14 | 0,4<br>2,5 | |

$t_i$ = max. 50 °C

temperature of seals )
temp. des scellements ) = max. 180 °C
Temp. der Einschmelzungen)

It is necessary to direct a low velocity air flow to anode and grid seal at frequencies above 30 Mc/s. Air flow must be started upon or before application of the filament voltage.

Il faut diriger un léger courant d'air sur les scellements de l'anode et de la grille aux fréquences supérieures à 30 Mc/s. Ce courant d'air doit être mis en marche en même temps ou avant l'application de la tension du filament.

Bei höheren Frequenzen als 30 MHz ist ein schwacher Luftstrom auf die Anoden- und Gittereinschmelzungen notwendig. Dieser Luftstrom muss vor oder gleichzeitig mit der Heizfadenspannung eingeschaltet werden.

---

[1]) At temperatures $t_i$ between 20 and 50°C the required quantity of water can be found by proportional interpolation.

Le débit d'eau aux températures $t_i$ entre 20 et 50 °C peut être calculé par interpolation linéaire.

Die benötigte Wassermenge für Temperaturwerte $t_i$ zwischen 20 und 50 °C kann durch Proportionalinterpolation berechnet werden.

| | |
|---|---|
| Water-jacket<br>Refroidisseur<br>Kühltopf | K 713 |
| Clips for filament<br>Bornes de connexion pour le filament<br>Heizanschlussklemmen | 40634 |
| Grid connector<br>Connecteur pour la grille<br>Gitteranschlussring | 40650[2]) or ou oder 40622 |

Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

| Weight, poids, Gewicht | TBW 6/6000 | K 713 |
|---|---|---|
| net, netto | 0,45 kg | 0,52 kg |
| shipping, brut, brutto | 1,2 kg | 0,75 kg |

[1])Page 6; Seite 6
When using the tube above 108 Mc/s, particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, our guarantee for the tubes operating at frequencies above 108Mc/s can only be given after approval of the installation

Lorsqu'on utilise le tube au-dessus de 108 MHz, il est requis d'effectuer le montage avec beaucoup de soin, autrement le tube est susceptible d'être endommagé. Par conséquent, nous ne pouvons garantir les tubes dans ce domaine de fréquences qu'après notre approbation de l'installation

Der Betrieb der Röhre bei höheren Frequenzen als 108 MHz erfordert eine sehr sorgfältige Durchführung der Schaltung und des Aufbaus. Vernachlässigung dieser Bedingung kann eine Beschädigung der Röhre zur Folge haben. Eine Garantie für den Betrieb der Röhren in diesem Frequenzgebiet wird infolgedessen nur dann gegeben, wenn die Anlage unserseits genehmigt worden ist.

[2])The connector 40650 should be used only below 30 Mc/s. When the tube is used with this connector at maximum ratings additional cooling of the grid seal will be required.

Le connecteur 40650 sera utilisé au-dessous de 30 MHz seulement. Si le tube est utilisé avec ce connecteur à ses caractéristiques limites, refroidissement additionnel au scellement de la grille sera nécessaire.

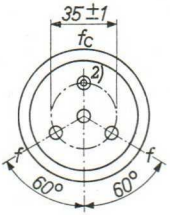
Der Anschlussring 40650 soll nur unterhalb 30 MHz verwendet werden. Wenn die Röhre mit diesem Anschlussring bei seinen Grenzdaten verwendet wird, wird eine zusätzliche Kühlung der Gittereinschmelzung nötig sein

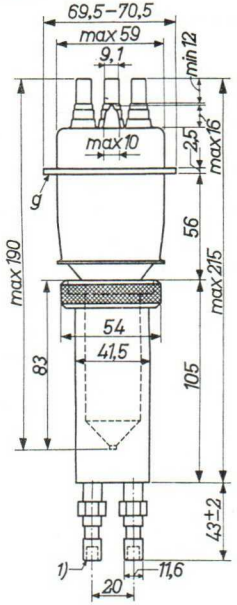
# PHILIPS

Tube mounted in water-jacket type K 713
Tube monté dans le refroidisseur type K 713
Röhre in Kühltopf Typ 713 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm




The centre tap $f_c$ must not be used for filament current supply. The clips type 40634, however, must be used for the cooling of all three filament pins, thus also of pin $f_c$

La prise médiane $f_c$ ne doit pas être utilisée pour l'alimentation du filament. Toutefois les bornes de connexion no. de type 40634 doivent être utilisées pour le refroidissement de toutes les broches du filament, y comprise la broche $f_c$

Die Mittelanzapfung $f_c$ darf nicht für die Heizfadenspeisung verwendet werden. Die Heizanschlussklemmen Type No.40634 müssen jedoch für die Kühlung aller Heizfadenstifte verwendet werden, also auch für den Stift $f_c$

1) 1/8" pipe thread; 1/8" pas à gaz; 1/8" Gasrohrgewinde

2) This pin is marked "0"
Cette broche est marquée "0"
Dieser Stift ist mit "0" gekennzeichnet

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| f | = max. | 75 Mc/s |
|---|---|---|
| $V_a$ | = max. | 6 kV |
| $-V_g$ | = max. | 1000 V |
| $I_a$ | = max. | 1,5 A |
| $I_g$ | = max. | 0,35 A |
| $W_g$ | = max. | 120 W |
| $W_{ia}$ | = max. | 9 kW |
| $W_a$ | = max. | 6 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| $\lambda$ = | 4 | 4 | 4 m |
|---|---|---|---|
| f = | 75 | 75 | 75 Mc/s |
| $V_a$ = | 6 | 5 | 4 kV |
| $V_g$ = | -400 | -300 | -200 V |
| $I_a$ = | 1,5 | 1,5 | 1,37 A |
| $I_g$ = | 0,31 | 0,33 | 0,35 A |
| $V_{g_p}$ = | 740 | 640 | 500 V |
| $W_{ig}$ = | 210 | 190 | 160 W |
| $W_{ia}$ = | 9 | 7,5 | 5,5 kW |
| $W_a$ = | 2,1 | 1,9 | 1,5 kW |
| $W_o$ = | 6,9 | 5,6 | 4 kW |
| $\eta$ = | 76,5 | 75 | 73 % |

# PHILIPS

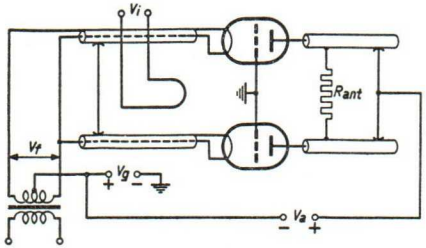
H.F. class C telegraphy, grounded grid
H.F. classe C télégraphie, circuit "grounded-grid"
HF - Klasse C Telegrafie, Gitterbasisschaltung

f ≦ 75 Mc/s

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 6 kV |
| $V_{kg}$ | = max. | 1000 V |
| $I_a$ | = max. | 1,5 A |
| $I_g$ | = max. | 0,35 A |
| $W_g$ | = max. | 120 W |
| $W_{ia}$ | = max. | 9 kW |
| $W_a$ | = max. | 6 kW |

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren




| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = | 4 | 2,7[1] | 2,7[1] | 1,36[1] | m |
| f | = | 75 | 110 | 110 | 220 | Mc/s |
| $V_a$ | = | 6 | 5 | 4 | 4 | kV |
| $V_g$ | = | 400 | 300 | 200 | 200 | V |
| $I_a$ | = | 2x1,5 | 2x1,5 | 2x1,37 | 2x1,25 | A |
| $I_g$ | = | 2x0,31 | 2x0,33 | 2x0,35 | 2x0,2 | A |
| $V_{gp}$ | = | 740 | 640 | 500 | 450 | V |
| $W_{ig}$ | = | 2x1120 | 2x920 | 2x675 | 2x380 | W |
| $W_{ia}$ | = | 2x9 | 2x7,5 | 2x5,5 | 2x5 | kW |
| $W_a$ | = | 2x2,1 | 2x2,2 | 2x1,7 | 2x2,5 | kW |
| $W_o$ [2] | = | 13,8+1,82 | 10,6+1,46 | 7,6+1,03 | 5+0,6 | kW |
| $\eta$ [3] | = | 76,5 | 71 | 69 | 50 | % |

[1]) See page 3; voir page 3; siehe Seite 3

[2]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage préamplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

[3]) Pure valve efficiency; rendement net du tube; reiner Röhrenwirkungsgrad

H.F. class B-telephony
H.F. classe B téléphonie
HF - Klasse B Telefonie

Limiting values
Caractéristiques limites
Grenzdaten

$f \leq 75$ Mc/s

| | | |
|---|---|---|
| $V_a$ | = max. | 6 kV |
| $I_a$ | = max. | 1,1 A |
| $W_{ia}$ | = max. | 6,6 kW |
| $W_a$ | = max. | 6 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | 4 | 4 | m |
| f | = | 75 | 75 | Mc/s |
| $V_a$ | = | 6 | 5 | kV |
| $V_g$ | = | -180 | -145 | V |
| $I_a$ | = | 0,99 | 0,9 | A |
| $V_{gp}$ | = | 250 | 225 | V |
| $W_{ia}$ | = | 5,9 | 4,5 | kW |
| $W_a$ | = | 4 | 3,05 | kW |
| $W_o$ | = | 1,9 | 1,45 | kW |
| $\eta$ | = | 32 | 32 | % |
| m | = | 100 | 100 | % |
| $I_g$ | = | 0,3 | 0,32 | A |
| $W_{ig}$ | = | 140 | 130 | W |

# PHILIPS

H.F. class C anode modulation
H.F. classe C modulation d'anode
HF - Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

f ≦ 75 Mc/s

| | | |
|---|---|---|
| $V_a$ | = max. | 5 kV |
| $-V_g$ | = max. | 1000 V |
| $I_a$ | = max. | 1,3 A |
| $I_g$ | = max. | 0,35 A |
| $W_g$ | = max. | 120 W |
| $W_{ia}$ | = max. | 6,5 kW |
| $W_a$ | = max. | 4 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ | = | 4 | 4 | 4 | 4 | 4 | m |
| f | = | 75 | 75 | 75 | 75 | 75 | Mc/s |
| $V_a$ | = | 5 | 4,5 | 4 | 3,5 | 3 | kV |
| $V_g$ [1] | = | -400 | -350 | -300 | -300 | -250 | V |
| $I_a$ | = | 1,2 | 1,2 | 1,2 | 1,2 | 1 | A |
| $I_g$ | = | 0,3 | 0,3 | 0,3 | 0,3 | 0,3 | A |
| $V_{gp}$ | = | 690 | 650 | 600 | 600 | 510 | V |
| $W_{ig}$ | = | 190 | 180 | 165 | 165 | 140 | W |
| $W_{ia}$ | = | 6 | 5,4 | 4,8 | 4,2 | 3 | kW |
| $W_a$ | = | 1,3 | 1,3 | 1,3 | 1,2 | 0,8 | kW |
| $W_o$ | = | 4,7 | 4,1 | 3,5 | 3 | 2,2 | kW |
| $\eta$ | = | 78 | 76 | 73 | 71,5 | 73 | % |
| m | = | 100 | 100 | 100 | 100 | 100 | % |
| $W_{mod}$ | = | 3 | 2,7 | 2,4 | 2,1 | 1,5 | kW |

[1]) Grid bias partially obtained by the grid resistor
Polarisation de grille obtenue partiellement par la résistance de grille
Gittervorspannung, teilweise durch den Gitterwiderstand erzeugt.

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF - Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| $V_a$ | = max. | 6 | kV |
| $I_a$ | = max. | 1,5 | A |
| $W_{ia}$ | = max. | 9 | kW |
| $W_a$ | = max. | 6 | kW |
| $R_g$ | = max. | 15 | kΩ |

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ = | 6 | | 5 | | 4,5 | | kV |
| $V_g$ = | -165 | | -138 | | -125 | | V |
| $R_{aa}$ = | 4900 | | 6400 | | 6100 | | Ω |
| $V_{ggp}$ = | 0 | 910 | 0 | 661 | 0 | 655 | V |
| $I_a$ = | 2x0,125 | 2x1,5 | 2x0,11 | 2x0,91 | 2x0,1 | 2x0,92 | A |
| $I_g$ = | 0 | 2x0,28 | 0 | 2x0,14 | 0 | 2x0,09 | A |
| $W_{ig}$ = | 0 | 2x115 | 0 | 2x42 | 0 | 2x27 | W |
| $W_{ia}$ = | 2x0,75 | 2x9 | 2x0,55 | 2x4,55 | 2x0,45 | 2x4,15 | kW |
| $W_a$ = | 2x0,75 | 2x2,35 | 2x0,55 | 2x1,25 | 2x0,45 | 2x1,15 | kW |
| $W_o$ = | 0 | 13,3 | 0 | 6,6 | 0 | 6 | kW |
| $d_{tot}$ = | - | 4,3 | - | 3,3 | - | 3,7 | % |
| $\eta$ = | - | 74 | - | 73 | - | 72 | % |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ = | 4 | | 3,5 | | 3 | | kV |
| $V_g$ = | -112 | | -100 | | -90 | | V |
| $R_{aa}$ = | 4900 | | 4200 | | 4400 | | Ω |
| $V_{ggp}$ = | 0 | 632 | 0 | 618 | 0 | 570 | V |
| $I_a$ = | 2x0,1 | 2x0,94 | 2x0,075 | 2x0,95 | 2x0,065 | 2x0,8 | A |
| $I_g$ = | 0 | 2x0,19 | 0 | 2x0,18 | 0 | 2x0,2 | A |
| $W_{ig}$ = | 0 | 2x54 | 0 | 2x50 | 0 | 2x52 | W |
| $W_{ia}$ = | 2x0,4 | 2x3,75 | 2x0,26 | 2x3,3 | 2x0,2 | 2x2,4 | kW |
| $W_a$ = | 2x0,4 | 2x1,1 | 2x0,26 | 2x1 | 2x0,2 | 2x0,75 | kW |
| $W_o$ = | 0 | 5,3 | 0 | 4,6 | 0 | 3,3 | kW |
| $d_{tot}$ = | - | 2,6 | - | 2,9 | - | 3,3 | % |
| $\eta$ = | - | 71 | - | 70 | - | 69 | % |

# PHILIPS

Grid-modulated H.F. class C amplifier for television service, negative modulation, positive synchronisation (American and European system)
Amplificatrice H.F. classe C pour télévision, modulation de grille, modulation négative, synchronisation positive (système américain et européen)
HF-Klasse C Verstärker für Fernsehsender, Gittermodulation, negative Modulation, positive Synchronisierung (amerikanisches und europäisches System)

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 75 Mc/s | | f = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ = max. | 5 kV | $V_a$ = max. | 4 kV |
| $W_{ia}$ sync = max. | 9,5 kW | $W_{ia}$ sync = max. | 6,5 kW |
| $W_a$ sync = max. | 5 kW | $W_a$ sync = max. | 4 kW |
| $I_a$ sync = max. | 1,9 A | $I_a$ sync = max. | 1,6 A |
| $W_g$ sync = max. | 120 W | $W_g$ sync = max. | 120 W |
| $-V_g$ = max. | 1000 V | $-V_g$ = max. | 1000 V |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | | |
|---|---|---|---|---|
| f | | = 48-75 | 170[1])-220 | Mc/s |
| B | ( -1,5 db ) | = 5,25 | 6,5 | Mc/s[2]) |
| | ( - 3 db ) | = 8 | 10 | Mc/s[2]) |
| $V_a$ | | = 5 | 4 | kV |
| $V_g$ | sync | = -200 | -150 | V |
| | black, noir, schwarz | = -300 | -225 | V |
| | white, blanc, weiss | = -550 | -500 | V |
| $V_{ggp}$ | sync | = 1000 | 1000 | V[3]) |
| $I_a$ | sync | = 3,8 | 3,2 | A |
| | black, noir, schwarz | = 2,6 | 2,6 | A |
| $I_g$ | sync | = 0,5 | 0,4 | A |
| | black, noir, schwarz | = 0,35 | 0,22 | A |
| $W_{ig}$ | sync | = 250 | 350-450 | W[4]) |
| $W_o$ | sync | = 9 | 6 | kW |
| | black, noir, schwarz | = 5,35 | 3,37 | kW |

[1]), [2]), [3]), [4]) See page 13 ; voir page 13 ; siehe Seite 13

Grid-modulated H.F. class C amplifier for television service, positive modulation, negative synchronisation (BBC system)
Amplificatrice H.F. classe C pour télévision, modulation de grille, modulation positive, synchronisation négative, (système BBC)
HF Klasse C Verstärker für Fernsehsender, Gittermodulation, positive Modulation, negative Synchronisierung (BBC System)

Limiting values
Caractéristiques limites
Grenzdaten

| | | | |
|---|---|---|---|
| f | = max. | 75 | Mc/s |
| $V_a$ | = max. | 5 | kV |
| $-V_g$ | = max. | 1000 | V |
| $I_a$ white | = max. | 1,9 | A |
| $W_{ia}$ white | = max. | 9,5 | kW |
| $W_a$ white | = max. | 6 | kW |
| $W_g$ white | = max. | 120 | W |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt.

| | | | |
|---|---|---|---|
| f | = | 48-75 | Mc/s |
| B ($I_{ant}$ = 85 %) | = | 5,25 | Mc/s |
| B ($I_{ant}$ = 70 %) | = | 8 | Mc/s |
| $V_a$ | = | 5 | kV |
| $V_g$ white, blanc, weiss | = | -200 | V |
| $V_g$ black, noir, schwarz | = | -460 | V |
| $V_g$ sync | = | -580 | V |
| $V_{ggp}$ white, blanc, weiss | = | 1000 | V |
| $I_a$ white, blanc, weiss | = | 3,8 | A |
| $I_a$ black, noir, schwarz | = | 0,8 | A |
| $I_g$ white, blanc, weiss | = | 0,5 | A |
| $I_g$ black, noir, schwarz | = | 0 | A |
| $W_{ig}$ white, blanc, weiss | = | 250 | W |
| $W_o$ white, blanc, weiss | = | 9 | kW |
| $W_o$ black, noir, schwarz | = | 0,6 | kW |

H.F. class B telephony for television service (American and European system)
H.F. classe B téléphonie pour télévision (système américain et européen)
HF Klasse B Telefonie für Fernsehsender (amerikanisches und europäisches system)

Limiting values
**Caractéristiques limites**
Grenzdaten

| f = max. 75 Mc/s | | f = max. 220 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 5 kV | $V_a$ | = max. 4 kV |
| $W_{ia}$ sync | = max. 9,5 kW | $W_{ia}$ sync | = max. 6,5 kW |
| $W_a$ sync | = max. 5 kW | $W_a$ sync | = max. 4 kW |
| $I_a$ sync | = max. 1,9 A | $I_a$ sync | = max. 1,6 A |
| $W_g$ sync | = max. 120 W | $W_g$ sync | = max. 120 W |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | | |
|---|---|---|---|---|
| f | = | 48–75 | 170–220[1] | Mc/s |
| B ( -1,5 db ) | = | 5,25 | 6,5 | Mc/s[2] |
| B ( - 3 db ) | = | 8 | 10 | Mc/s[2] |
| $V_a$ | = | 5 | 4 | kV |
| $V_g$ | = | -200 | -150 | V |
| $V_{ggp}$ sync | = | 1000 | 1000 | V[3] |
| $V_{ggp}$ black, noir, schwarz | = | 800 | 750 | V[3] |
| $V_{ggp}$ white, blanc, weiss | = | 0 | 200 | V[3] |
| $I_a$ sync | = | 3,8 | 3,2 | A |
| $I_a$ black, noir, schwarz | = | 3 | 2,6 | A |
| $I_a$ white, blanc, weiss | = | 0,2 | - | A |
| $I_g$ sync | = | 0,5 | 0,4 | A |
| $I_g$ black, noir, schwarz | = | 0,22 | 0,22 | A |
| $I_g$ white, blanc, weiss | = | 0 | - | A |
| $W_{ig}$ sync | = | 250 | 350–450 | W[4] |
| $W_o$ sync | = | 9 | 6 | kW |
| $W_o$ black, noir, schwarz | = | 5,35 | 3,37 | kW |

1),2),3),4) See page 13, voir page 13, siehe Seite 13

1) Pages 10, 12; Seite 10, 12

When using the tube above 108 Mc/s, particular attention must be given to a careful design of the installation, otherwise the tube may be damaged. Therefore, our guarantee for the tubes operating at frequencies above 108 Mc/s can only be given after approval of the installation

Lorsqu'on utilise le tube au-dessus de 108 Mc/s, il est requis d'effectuer le montage avec beaucoup de soin, autrement le tube est susceptible d'être endommagé. Par conséquent, nous ne pouvons garantir les tubes dans ce domaine de fréquences qu'après notre approbation de l'installation

Der Betrieb der Röhre bei höheren Frequenzen als 108 MHz erfordert eine sehr sorgfältige Durchführung der Schaltung und des Aufbaus. Vernachlässigung dieser Bedingung kann eine Beschädigung der Röhre zur Folge haben. Eine Garantie für den Betrieb der Röhren in diesem Frequenzgebiet wird infolgedessen nur dann gegeben, wenn die Anlage unserseits genehmigt worden ist.

2) This value of bandwidth is based on measurements on a circuit with a single LC section
Cette valeur de la largeur de bande se rapporte à des mesures à un montage avec un seul circuit LC.
Dieser Wert der Bandbreite bezieht sich auf Messungen an einer Schaltung mit einem einzigen LC-Kreis.

3) Measured by the slide back method
Mesuré par la méthode de glissement de la tension de polarisation.
Gemessen mittels Verschiebung der Gittervorspannung

4) Driving power is accounted for largely by circuit losses. The indicated driving power is required to take care of losses in damping resistors, circuit losses and tube driving power

La puissance d'entrée est nécessaire pour la plupart pour les pertes dans le circuit. La puissance mentionnée est nécessaire pour les pertes dans les résistances d'amortissement, dans le circuit et pour la puissance d'entrée du tube.

Die Eingangsleistung ist grossenteils nötig für die Verluste in der Schaltung. Die genannte Leistung ist nötig für die Verluste in Dämpfungswiderständen, in Kreisen und für die Eingangsleistung der Röhre.

# PHILIPS

Operating conditions as H.F. class C oscillator for industrial use with anode voltage from two-phase single-wave rectifier without filter
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur biphasé à une alternance sans filtre
Betriebsdaten als HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Zweiphasen-Einweggleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f | = max. 75 Mc/s | $I_g$ | = max. 0,31 A |
| $V_a$ | = max. 5400 V | $W_{ia}$ | = max. 9 kW |
| $-V_g$ | = max. 900 V | $W_a$ | = max. 6 kW |
| $I_a$ | = max. 1,35 A | $W_g$ | = max. 120 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $V_{tr}$ | = | 6,0[1] | 5,1[2] | kVeff |
| $V_a$ | = | 5,4 | 4,6 | kV[3] |
| $I_a$ | = | 1,35 | 1,15 | A |
| $I_g$ | = | 0,31 | 0,27 | A |
| $R_g$ | = | 1300 | 1100 | Ω |
| $W_{ig}$ | = | 210 | 160 | W |
| $W_{ia}$ | = | 9 | 6,5 | kW |
| $W_a$ | = | 2,3 | 1,84 | kW |
| $W_o$ | = | 6,5 | 4,5 | kW |
| η | = | 72 | 70 | % |

[1]) Care must be taken that under these operating conditions the absolute limiting values are not exceeded by variation of the supply voltage or the load or by tolerances in the circuit elements.
Il faut prendre garde de ne pas dépasser les caractéristiques limites absolues par suite de variation de la tension d'alimentation ou de la charge ou par suite des tolérances des éléments du circuit
Es muss darauf geachtet werden dass die absoluten Grenzwerte nicht überschritten werden infolge Schwankungen der Speisespannung oder der Belastung oder infolge Abweichungen der Schaltteile

[2]), [3]) see page 15; voir page 15; siehe Seite 15

Operating conditions as H.F. class C oscillator for industrial use with anode voltage from three-phase half-wave rectifier without filter
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé à une seule alternance sans filtre
Betriebsdaten als HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasen-Einweggleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f = max. | 75 Mc/s | $I_g$ = max. | 0,35 A |
| $V_a$ = max. | 6000 V | $W_{ia}$ = max. | 9 kW |
| $-V_g$ = max. | 1000 V | $W_a$ = max. | 6 kW |
| $I_a$ = max. | 1,5 A | $W_g$ = max. | 120 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| $V_{tr}$ | = | 5,1[1] | 4,4[2] kV eff |
| $V_a$ | = | 6,0 | 5,1 kV[3] |
| $I_a$ | = | 1,5 | 1,25 A |
| $I_g$ | = | 0,31 | 0,28 A |
| $R_g$ | = | 1300 | 1100 Ω |
| $W_{ig}$ | = | 210 | 160 W |
| $W_{ia}$ | = | 9 | 6,4 kW |
| $W_a$ | = | 1,9 | 1,74 kW |
| $W_o$ | = | 6,9 | 4,5 kW |
| η | = | 76,5 | 70 % |

[1] See page 14; voir page 14; siehe Seite 14

[2] Under these conditions normal deviations of voltages and load are permissible. The absolute limiting values of the valve must, however, not be exceeded
Dans ces conditions des déviations normales des tensions et de la charge sont permises. Il ne faut cependant pas dépasser les caractéristiques limites absolues.
Unter diesen Bedingungen sind normale Abweichungen der Spannungen und der Belastung gestattet. Die absoluten Grenzwerte dürfen jedoch nicht überschritten werden.

[3] D.C. value; valeur moyenne; mittlerer Wert.

Operating conditions as H.F. class C oscillator for industrial use with self rectification
Caractéristiques d'utilisation en oscillatrice H.F. classe C pour des applications industrielles à auto-redressement
Betriebsdaten als HF-Klasse C Oszillator für industrielle Anwendungen mit Selbstgleichrichtung

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

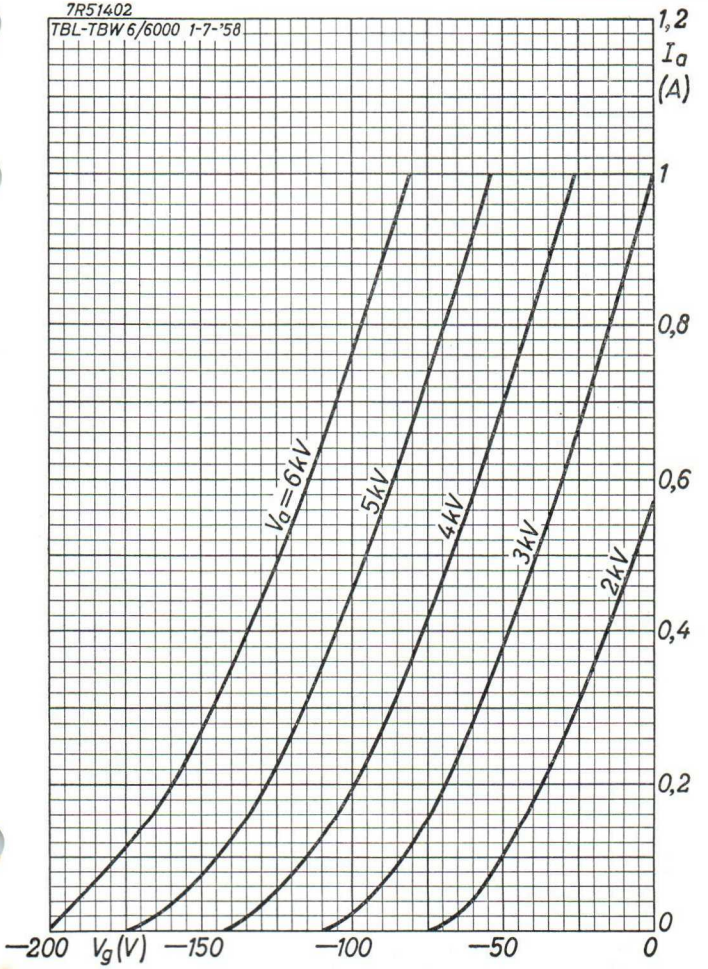
| | | | |
|---|---|---|---|
| f = max. | 75 Mc/s | $I_g$ = max. | 0,19 A |
| $V_{tr}$ = max. | 6800 $V_{eff}$ | $W_{ia}$ = max. | 9 kW |
| $-V_g$ = max. | 640 V | $W_a$ = max. | 6 kW |
| $I_a$ = max. | 0,8 A | $W_g$ = max. | 120 W |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| $V_{tr}$ = | 6,8 [1] | 5,9 [2] | $kV_{eff}$ |
| $I_a$ = | 0,8 | 0,7 | A |
| $I_g$ = | 0,19 | 0,165 | A |
| Rg = | 1050 | 1050 | Ω |
| $W_{ig}$ = | | | W |
| $W_{ia}$ = | 6,05 | 4,6 | kW |
| $W_a$ = | 1,5 | 1,24 | kW |
| $W_o$ = | 4,55 | 3,36 | kW |
| $\eta$ = | 75 | 73 | % |

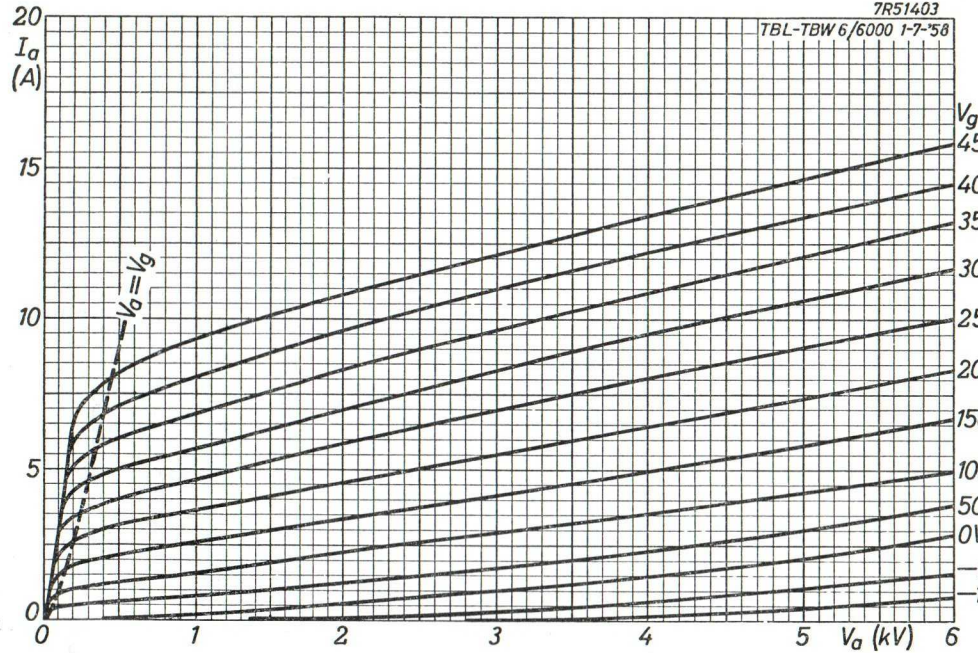
[1]) See note [1]) page 14; voir la note [1]) page 14; siehe Fussnote [1]) Seite 14

[2]) See note [2]) page 15; voir la note [2]) page 15; siehe Fussnote [2]) Seite 15


7R51402
TBL-TBW 6/6000 1-7-'58
1,2
Ia
(A)
1
0,8
0,6
0,4
0,2
0
Va=6kV
5kV
4kV
3kV
2kV
−200
Vg(V)
−150
−100
−50
0

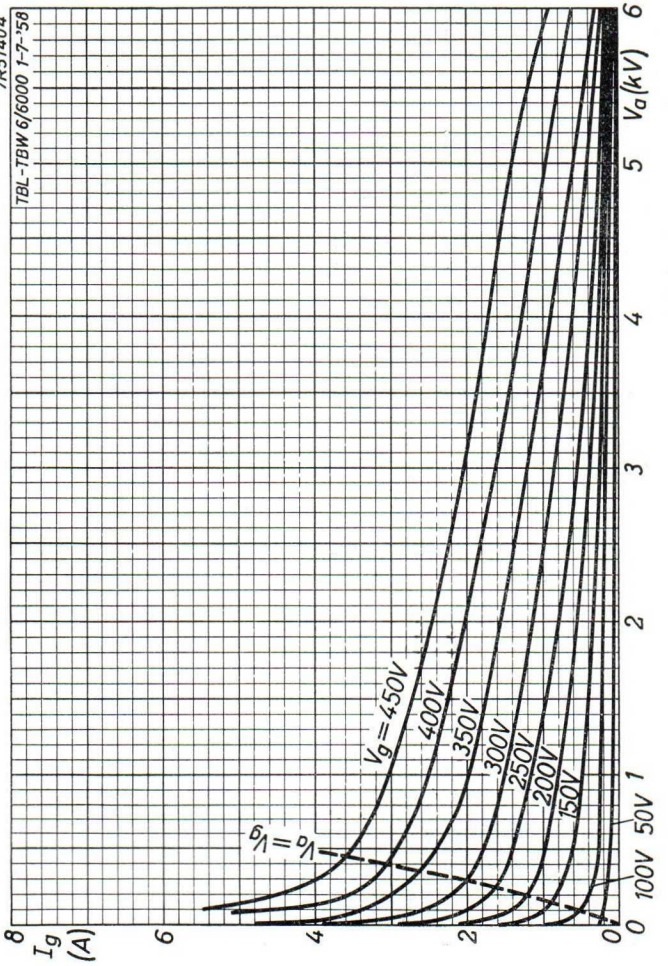
7.7.1958

A


7R51403
TBL-TBW 6/6000 1-7-'58
$I_a$ (A)
20
15
10
5
0
$V_a = V_g$
$V_g =$
450V
400V
350V
300V
250V
200V
150V
100V
50V
0V
—50V
—100V
0
1
2
3
4
5
6
$V_a$ (kV)

# PHILIPS

**TBW 6/6000**

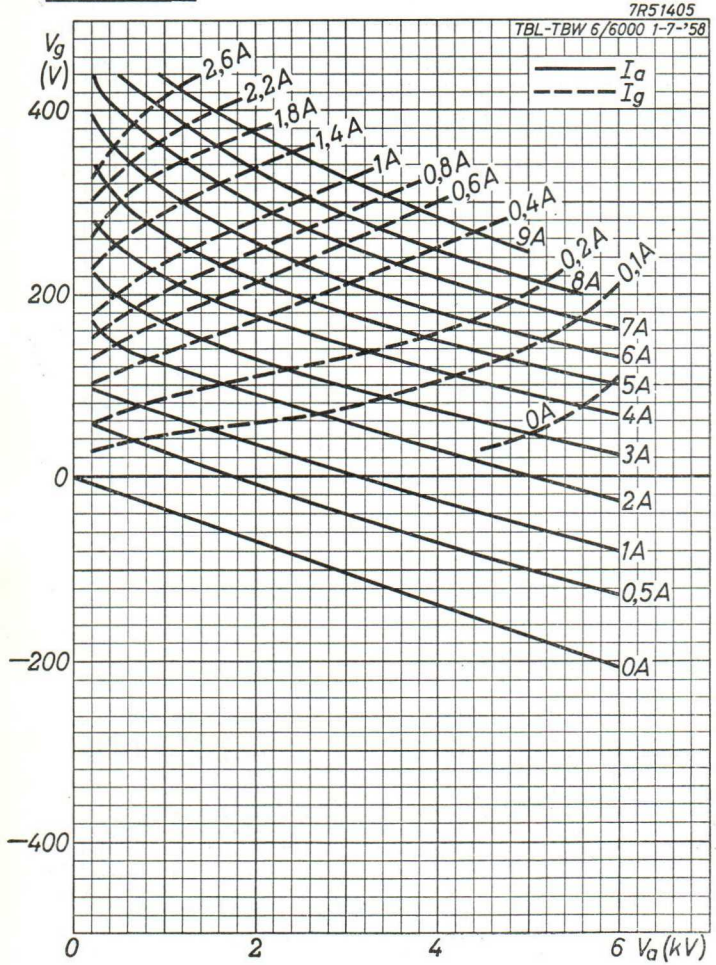



7.7.1958

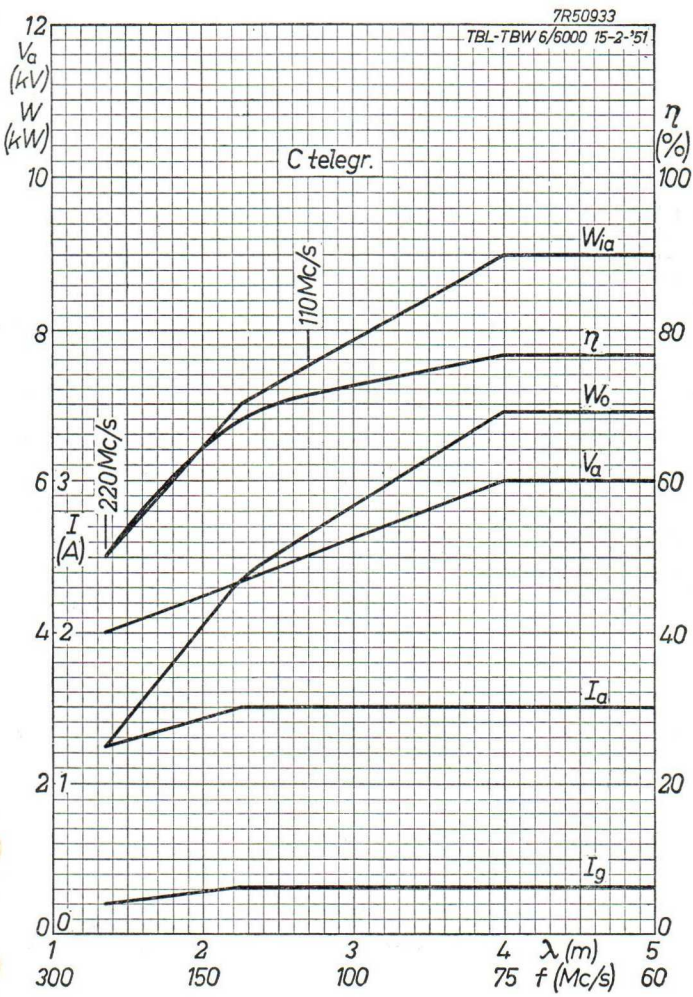
C

TBW 6/6000

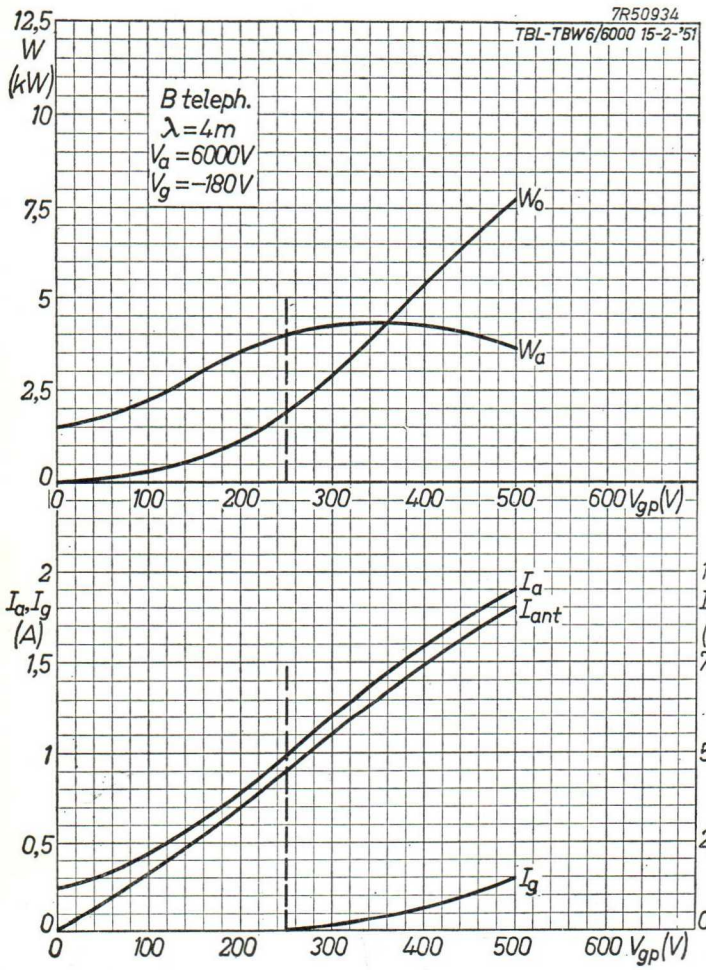
# PHILIPS

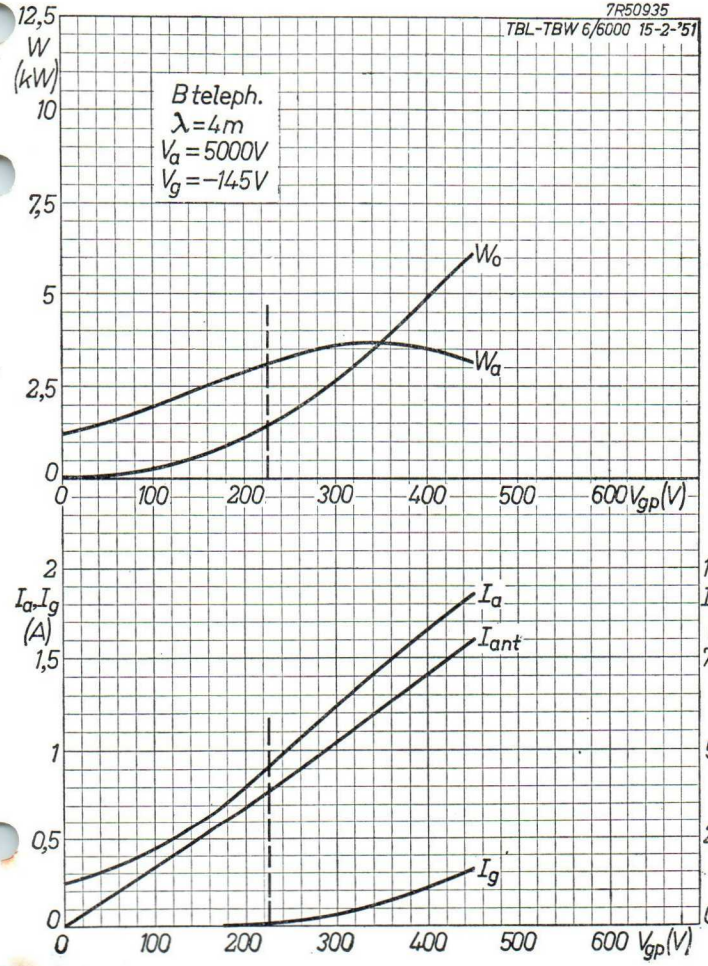



D


7R50933
TBL-TBW 6/6000 15-2-'51
C telegr.
Va (kV)
W (kW)
η (%)
110Mc/s
220Mc/s
I (A)
Wia
η
Wo
Va
Ia
Ig
λ (m)
f (Mc/s)

# PHILIPS

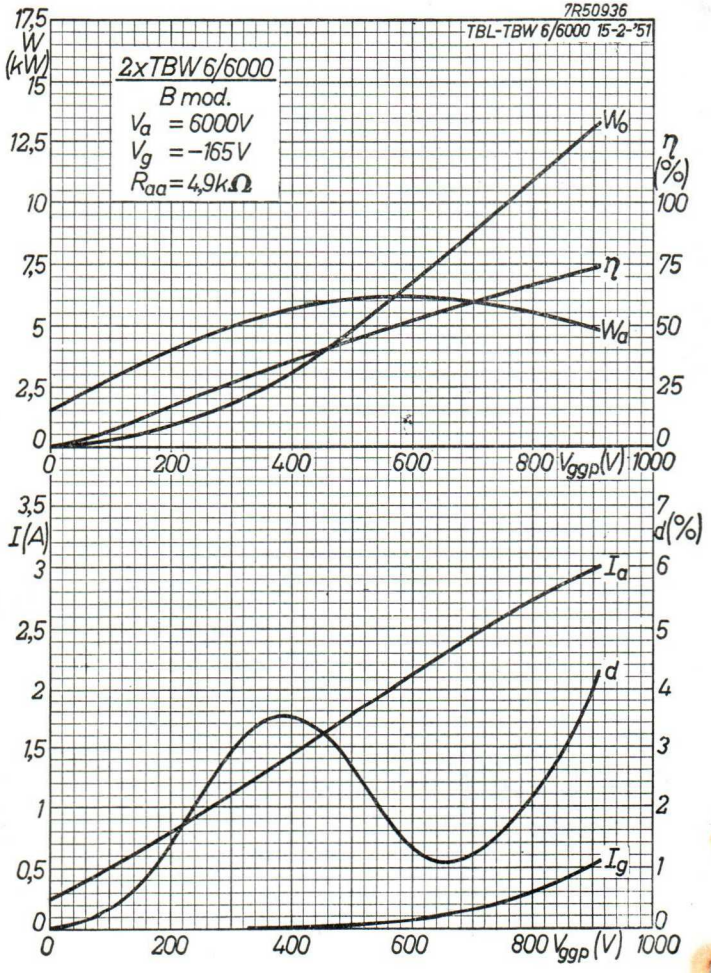

7R50934
TBL-TBW6/6000 15-2-'51
12,5
W
(kW)
10
7,5
5
2,5
0
B teleph.
λ=4m
Va=6000V
Vg=-180V
Wo
Wa
0
100
200
300
400
500
600 Vgp(V)
2
Ia, Ig
(A)
1,5
1
0,5
0
Ia
Iant
Ig
10
Iant
(A)
7,5
5
2,5
0
0
100
200
300
400
500
600 Vgp(V)

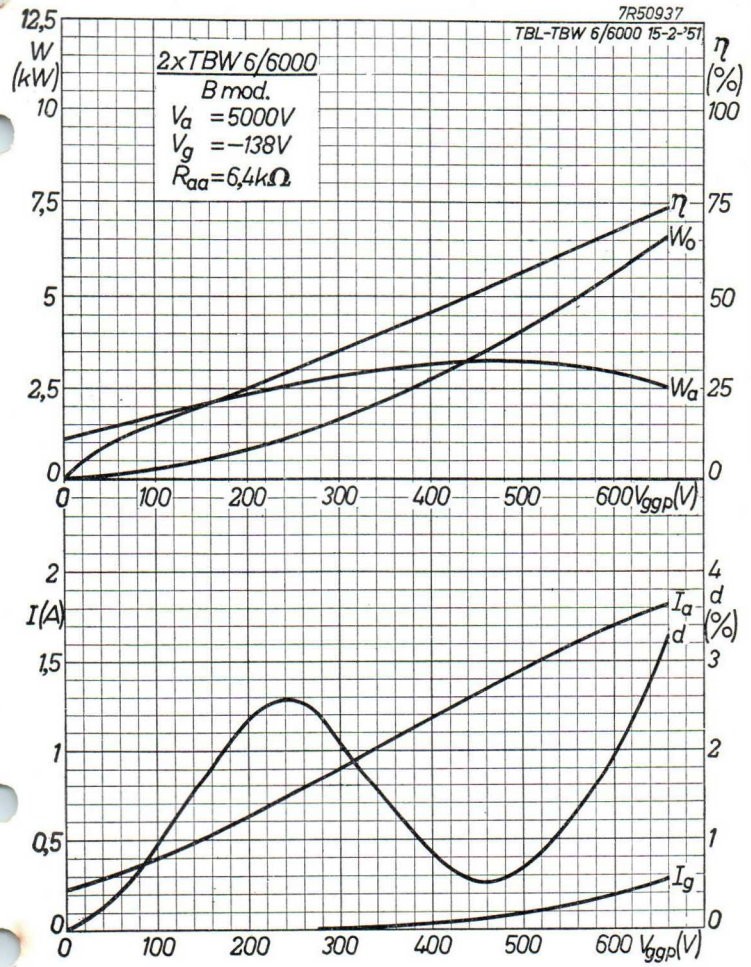

7R50935
TBL-TBW 6/6000 15-2-'51
B teleph.
λ=4m
$V_a$=5000V
$V_g$=−145V
W (kW)
12,5
10
7,5
5
2,5
0
$W_o$
$W_a$
0
100
200
300
400
500
600 $V_{gp}$(V)
$I_a$-$I_g$ (A)
2
1,5
1
0,5
0
$I_a$
$I_{ant}$
$I_g$
$I_{ant}$ (A)
10
7,5
5
2,5
0

7.7.1954

G

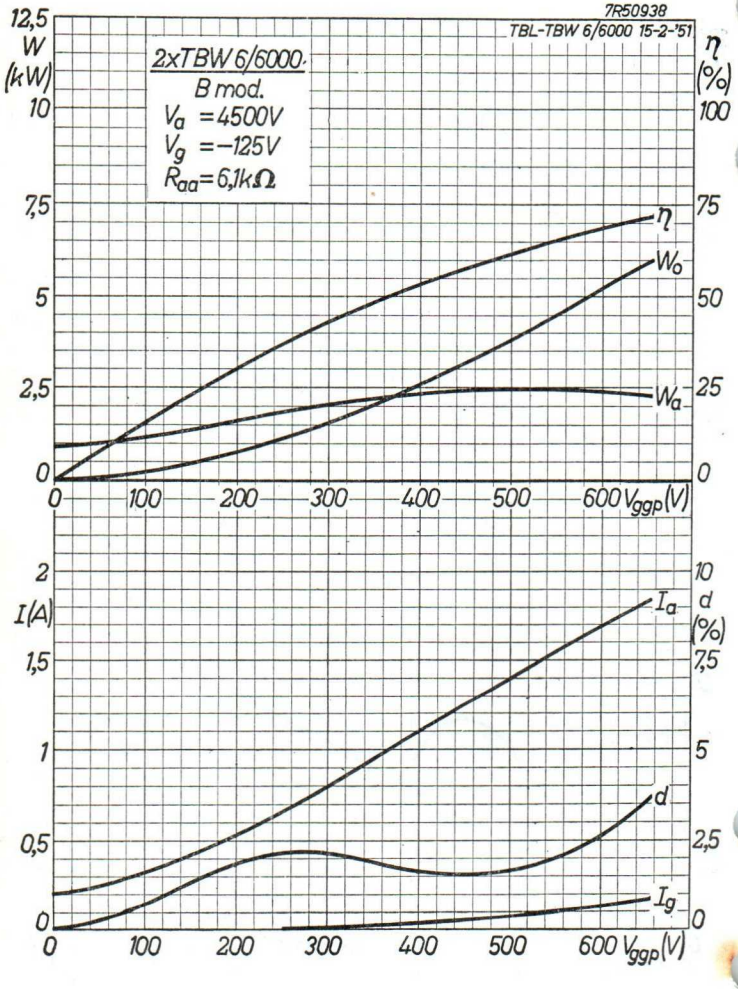
# PHILIPS


7R50936
TBL-TBW 6/6000 15-2-'51
2xTBW 6/6000
B mod.
$V_a$ = 6000V
$V_g$ = −165V
$R_{aa}$ = 4,9kΩ
W (kW)
η (%)
$W_o$
η
$W_d$
$V_{ggp}$ (V)
I (A)
d (%)
$I_a$
d
$I_g$


7R50937
TBL-TBW 6/6000 15-2-'51
2xTBW 6/6000
B mod.
$V_a$ =5000V
$V_g$ =−138V
$R_{aa}$=6,4kΩ
W (kW)
η (%)
$W_o$
$W_a$
$V_{ggp}$(V)
I(A)
d (%)
$I_a$
$I_g$
d

**TBW 6/6000**

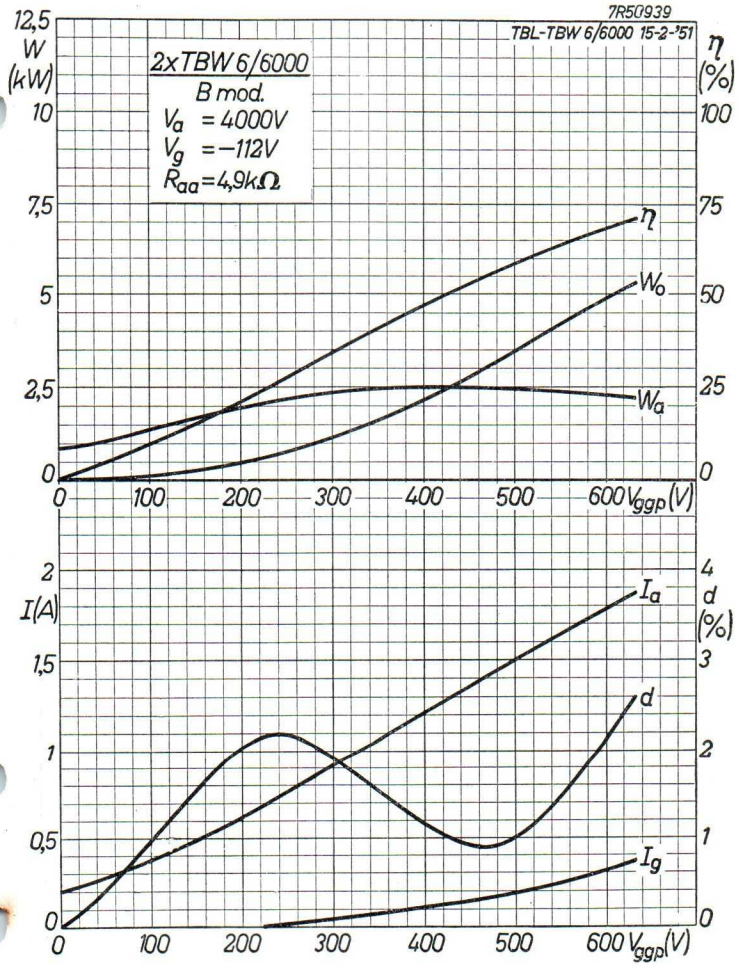
# PHILIPS




J

# PHILIPS

**TBW 6/6000**

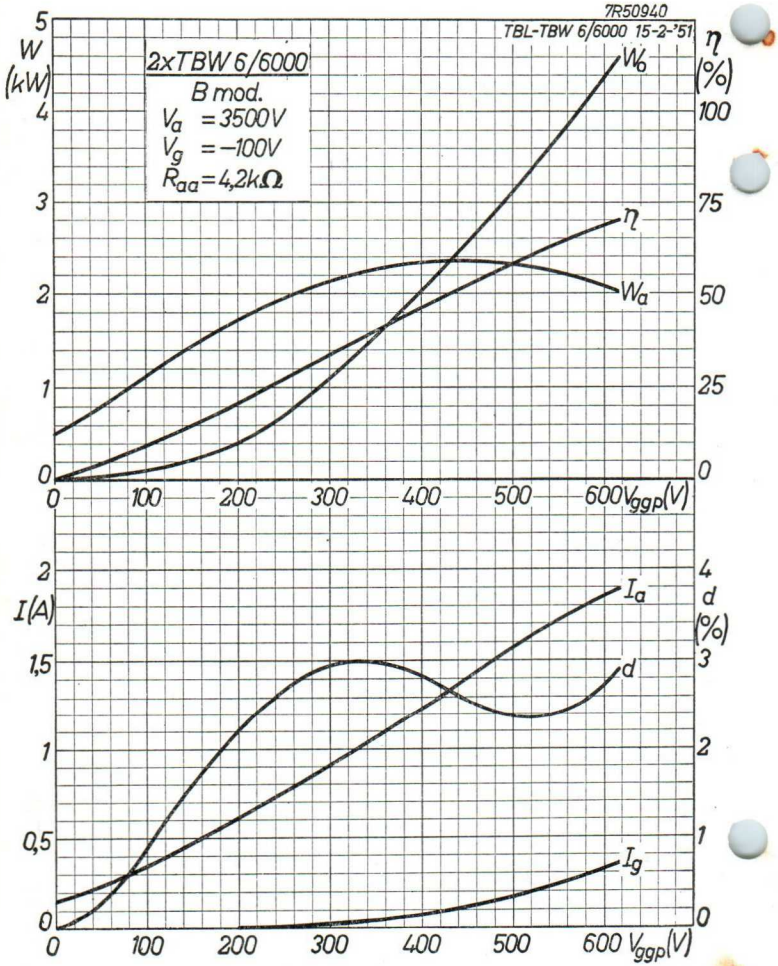



7.7.1954

K

**TBW 6/6000**

# PHILIPS



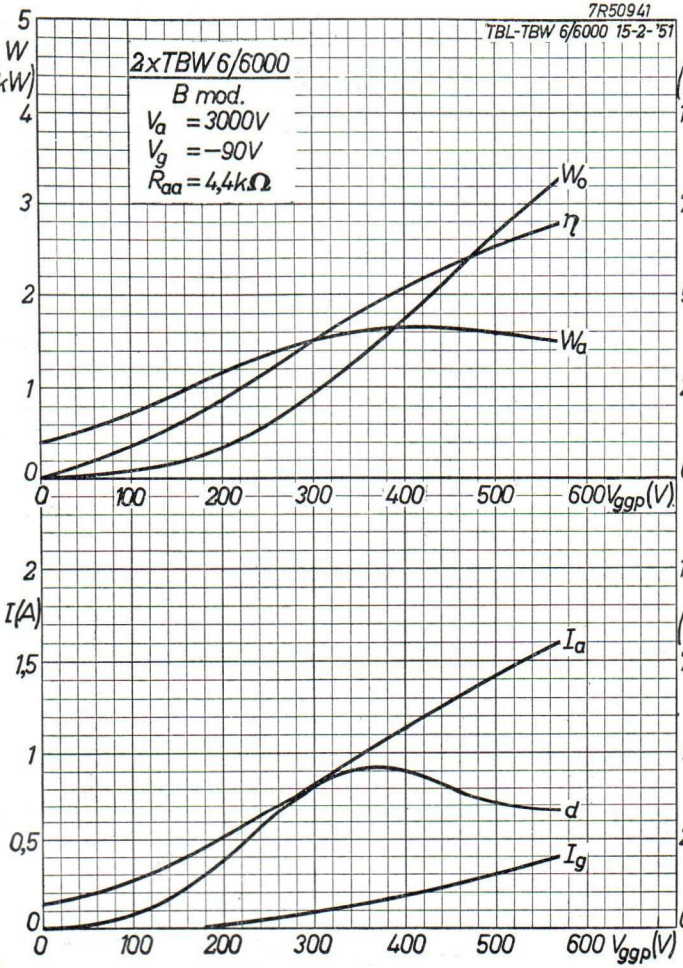

L

# PHILIPS

**TBW 6/6000**

7R50941

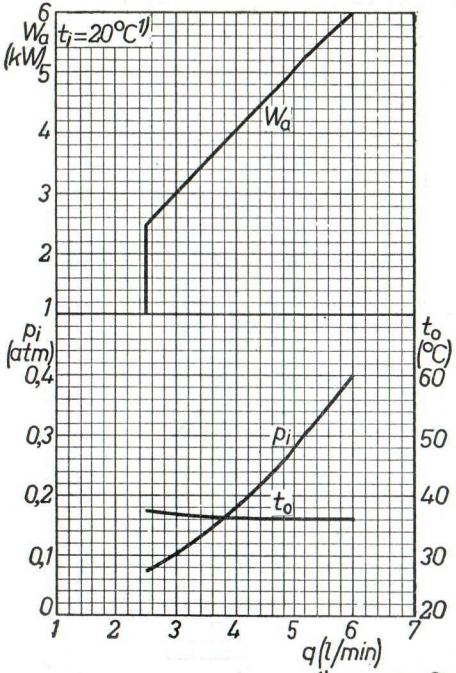
TBL-TBW 6/6000 15-2-'51

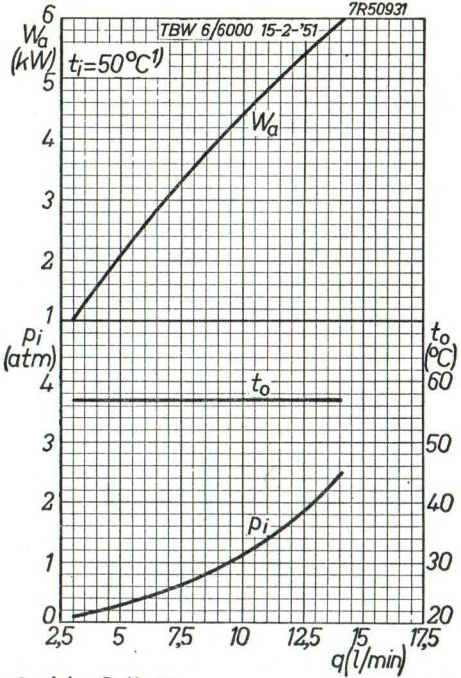



7.7.1954

M

PHILIPS




1) see page 2; voir page 2; siehe Seite 2

# PHILIPS

**TBW 7/8000**

TRIODE for use in industrial H.F. generators and in telegraphy and telephony transmitters
TRIODE pour utilisation dans les générateurs H.F. industriels et dans les émetteurs télégraphiques et téléphoniques
TRIODE zur Verwendung in HF-Industriegeneratoren und in Telegraphie- und Telephoniesendern

Cooling : water/low velocity air flow
Refroidissement: circulation d'eau/léger courant d'air
Kühlung : Wasser/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 12,6 V
$I_f$ = 33 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 0,3 pF
$C_g$ = 16 pF
$C_{ag}$ = 11 pF

Typical characteristics
Caractéristiques types
Kenndaten

$\mu$ ($I_a$ = 1 A ; $V_a$ = 6 kV) = 32
S = 15 mA/V

| λ | Freq. | C telegr. | | C osc. | | B mod. [1] | |
|---|---|---|---|---|---|---|---|
| (m) | (Mc/s) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) | Va (kV) | Wo (kW) |
| 10 | 30 | 6,5 | 9,5 | | | 7,0 | 20 |
| | | 6,0 | 8,5 | | | 5,0 | 9,0 |
| | | 5,0 | 7,1 | | | 4,0 | 7,1 |
| 6 | 50 | | | 6,0 | 6,0 | | |

[1]) Two tubes; deux tubes; zwei Röhren

# PHILIPS

Cooling characteristics
Caractéristiques du refroidissement
Kühlungsdaten

| $W_a$ (kW) | $t_i$ (°C) | $q_{min}$ [1] (l/min) | $p_i$ (atm) |
|---|---|---|---|
| 1 | 20 | 2,5 | 0,08 |
| | 50 | 3 | 0,1 |
| 2 | 20 | 2,5 | 0,08 |
| | 50 | 5 | 0,3 |
| 4 | 20 | 4 | 0,18 |
| | 50 | 9 | 0,9 |
| 6 | 20 | 6 | 0,4 |
| | 50 | 14 | 2,5 |

See cooling curves
Voir les courbes de refroidissement
Siehe die Kühlungs-Kurven

$t_i$ = max. 50°C

Temperature of filament seals
Température des scellements du filament
Temperatur der Heizfadeneinschmelzungen
= max. 210°C

Temperature of grid and anode seals
Température des scellements de l'anode et de la grille
Temperatur der Anoden- und Gittereinschmelzungen
= max. 180°C

Clips for filament
Bornes de connexion pour le filament
Heizanschlussklemmen
40634

Clip for centre pin of filament
Borne pour la connexion centrale du filament
Klemme für die Mittelanzapfung des Heizfadens
40649[2])

Grid connector
Connecteur pour la grille
Gitteranschlussring
40650[3]) or ou oder 40622

Water jacket
Refroidisseur
Kühltopf
K713

1) At temperatures $t_i$ between 20 and 50°C the required quantity of water can be found by proportional interpolation
Le débit d'eau aux températures $t_i$ entre 20 et 50°C peut être calculé par interpolation linéaire
Die benötigte Wassermenge für Temperaturwerte $t_i$ zwischen 20 und 50°C kann durch Proportionalinterpolation berechnet werden

2)3) See page 3; voir page 3; siehe Seite 3

In general, no air-cooling will be required at frequencies up to 30 Mc/s and at ambient temperatures below 35 °C. At higher frequencies or at higher ambient temperatures a low velocity air flow to the grid and filament seals will be necessary

En général refroidissement par air n'est pas nécessaire à des fréquences au-dessous de 30 MHz et à des températures de l'ambiance au-dessous de 35 °C. A des fréquences plus hautes ou à des températures plus élevées il faut diriger un léger courant d'air aux scellements de la grille et du filament

Im allgemeinen wird Luftkühlung bei Frequenzen unterhalb 30 MHz und bei Temperaturen niedriger als 35 °C nicht nötig sein. Bei höheren Frequenzen oder höheren Temperaturen wird ein schwacher Luftstrom auf die Gitter- und Heizfadeneinschmelzungen nötig sein

| Weight, poids, Gewicht | TBW 7/8000 | K713 |
|---|---|---|
| Net, netto | 0,45 kg | 0,52 kg |
| Shipping, brut, brutto | 1,2 kg | 0,75 kg |

[2]) The centre tap $f_c$ (diameter 10.5 mm; marked 0) must not be used for filament current supply. The clip type 40649, however, must be used for the cooling of this pin

La prise médiane $f_c$ (diamètre de 10,5 mm; indiquée par 0) ne doit pas être utilisée pour l'alimentation du filament. Toutefois la borne de connexion no. de type 40649 doit être utilisée pour le refroidissement de cette broche

Die Mittelanzapfung $f_c$ (Durchmesser 10,5 mm; mit 0 bezeichnet) darf nicht für die Heizfadenspeisung verwendet werden. Die Heizanschlussklemme Type No. 40649 muss jedoch für die Kühlung dieses Stiftes verwendet werden

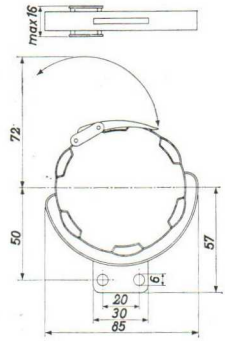
[3]) See page 4. The connector 40650 should only be used below 30 Mc/s

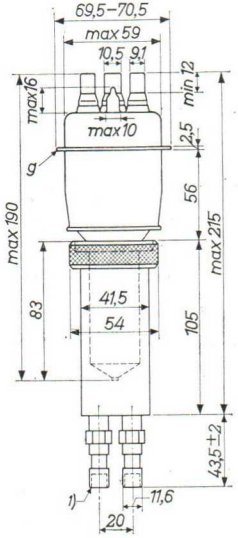
Voir page 4. Le connecteur 40650 sera utilisé au-dessous de 30 MHz seulement

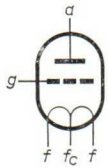
Siehe Seite 4. Der Anschlussring 40650 soll nur unterhalb 30 MHz verwendet werden

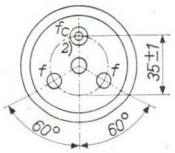
# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

---

[1]) 1/8" pipe thread; 1/8" pas à gaz; 1/8" Gasrohrgewinde

[2]) See page 3; voir page 3; siehe Seite 3

H.F. class C telegraphy
H.F. classe C télégraphie
HF Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| f | = max. | 30 Mc/s |
| $V_a$ | = max. | 7,2 kV |
| $-V_g$ | = max. | 1250 V |
| $I_a$ | = max. | 2,2 A |
| $I_g$ | = max. | 0,6 A |
| $W_{ia}$ | = max. | 14 kW |
| $W_a$ | = max. | 6 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $\lambda$ | = | 10 | 10 | 10 m |
| f | = | 30 | 30 | 30 Mc/s |
| $V_a$ | = | 6,5 | 6,0 | 5,0 kV |
| $V_g$ | = | -450 | -400 | -300 V |
| $I_a$ | = | 2,0 | 2,0 | 2,0 A |
| $I_g$ | = | 0,5 | 0,5 | 0,5 A |
| $V_{gp}$ | = | 820 | 780 | 660 V |
| $W_{ig}$ | = | 370 | 350 | 297 W |
| $W_{ia}$ | = | 13 | 12 | 10 kW |
| $W_a$ | = | 3,5 | 3,5 | 2,9 kW |
| $W_o$ | = | 9,5 | 8,5 | 7,1 kW |
| $\eta$ | = | 73 | 71 | 71 % |

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

| | | |
|---|---|---|
| $V_a$ | = max. | 7,2 kV |
| $I_a$ | = max. | 2,2 A |
| $W_{ia}$ | = max. | 14 kW |
| $W_a$ | = max. | 6 kW |
| $R_g$ | = max. | 15 kΩ |

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 7 | | 5 | | kV |
| $V_g$ | = | -250 | | -165 | | V |
| $R_{aa\sim}$ | = | 4150 | | 4800 | | Ω |
| $V_{gg_p}$ | = | 0 | 1300 | 0 | 880 | V |
| $I_a$ | = | 2x0,2 | 2x2,0 | 2x0,15 | 2x1,25 | A |
| $I_g$ | = | 0 | 2x0,53 | 0 | 2x0,33 | A |
| $I_{g_p}$ | = | - | 2x2,8 | - | 2x1,75 | A |
| $W_{ig}$ | = | 0 | 2x310 | 0 | 2x130 | W |
| $W_{ia}$ | = | 2x1,4 | 2x14 | 2x0,75 | 2x6,2 | kW |
| $W_a$ | = | 2x1,4 | 2x4,0 | 2x0,75 | 2x1,7 | kW |
| $W_o$ | = | 0 | 20 | 0 | 9 | kW |
| $\eta$ | = | - | 71,5 | - | 72,5 | % |

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_a$ | = | 5 | | 4 | | kV |
| $V_g$ | = | -165 | | -135 | | V |
| $R_{aa\sim}$ | = | 5500 | | 3800 | | Ω |
| $V_{gg_p}$ | = | 0 | 730 | 0 | 930 | V |
| $I_a$ | = | 2x0,15 | 2x1,1 | 2x0,1 | 2x1,25 | A |
| $I_g$ | = | 0 | 2x0,22 | 0 | 2x0,36 | A |
| $I_{g_p}$ | = | - | 2x1,2 | - | 2x1,8 | A |
| $W_{ig}$ | = | 0 | 2x70 | 0 | 2x135 | W |
| $W_{ia}$ | = | 2x0,75 | 2x5,5 | 2x0,4 | 2x5,0 | kW |
| $W_a$ | = | 2x0,75 | 2x1,5 | 2x0,4 | 2x1,45 | kW |
| $W_o$ | = | 0 | 8,0 | 0 | 7,1 | kW |
| $\eta$ | = | - | 72,5 | - | 71 | % |

H.F. class C oscillator for industrial use with anode voltage from three-phase half-wave rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé à une seule alternance sans filtre
HF Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasen-Einweggleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f | = max. 55 | Mc/s | |
| $V_a$ | = max. 7 | kV | $I_g$ = max. 0,5 A[1]) |
| $-V_g$ | = max. 1250 | V | $W_{ia}$ = max. 11 kW |
| $I_a$ | = max. 1,8 | A | $W_a$ = max. 6 kW |
| | | | $R_g$ = max. 10 kΩ |

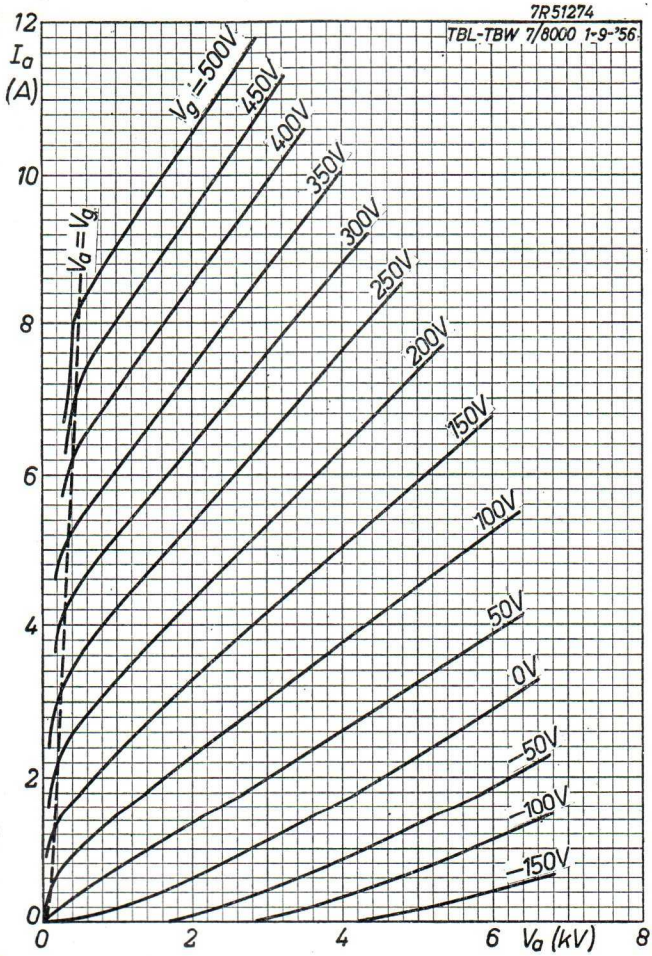
Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| f | = | 50 Mc/s |
| $V_{tr}$ | = | 5,1 $kV_{eff}$ |
| $V_a$ | = | 6,0 kV |
| $I_a$ | = | 1,5 A |
| $I_g$ | = | 0,4 A[1]) |
| $R_g$ | = | 1000 Ω |
| $W_{ig}$ | = | 300 W |
| $W_{ia}$ | = | 9 kW |
| $W_a$ | = | 2,7 kW |
| $W_{osc}$ | = | 6 kW[2]) |
| $\eta$ | = | 67 % |

---

[1]) Unloaded
Non chargé 0,7 A
Unbelastet

[2]) Available power (load + circuit losses)
Puissance disponible (dans la charge + pertes de circuit)
Verfügbare Leistung (in der Belastung + Kreisverluste)

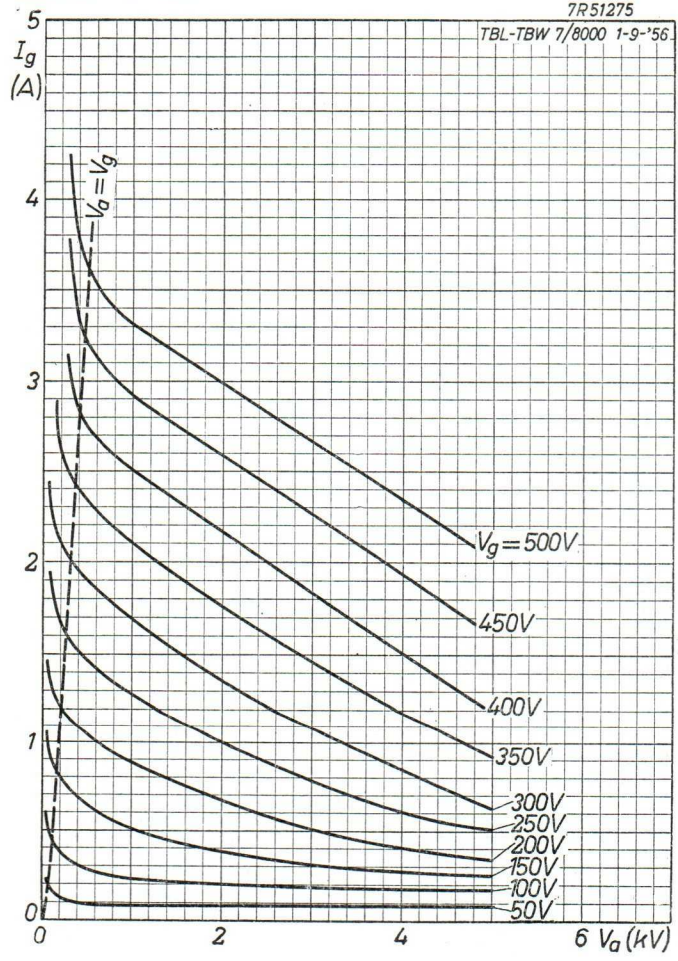

7R51274
TBL-TBW 7/8000 1-9-'56
$I_a$ (A)
12
10
8
6
4
2
0
$V_g$ = 500V
450V
400V
350V
300V
250V
200V
150V
100V
50V
0V
−50V
−100V
−150V
$V_a = V_g$
0
2
4
6
8
$V_a$ (kV)

9.9.1956

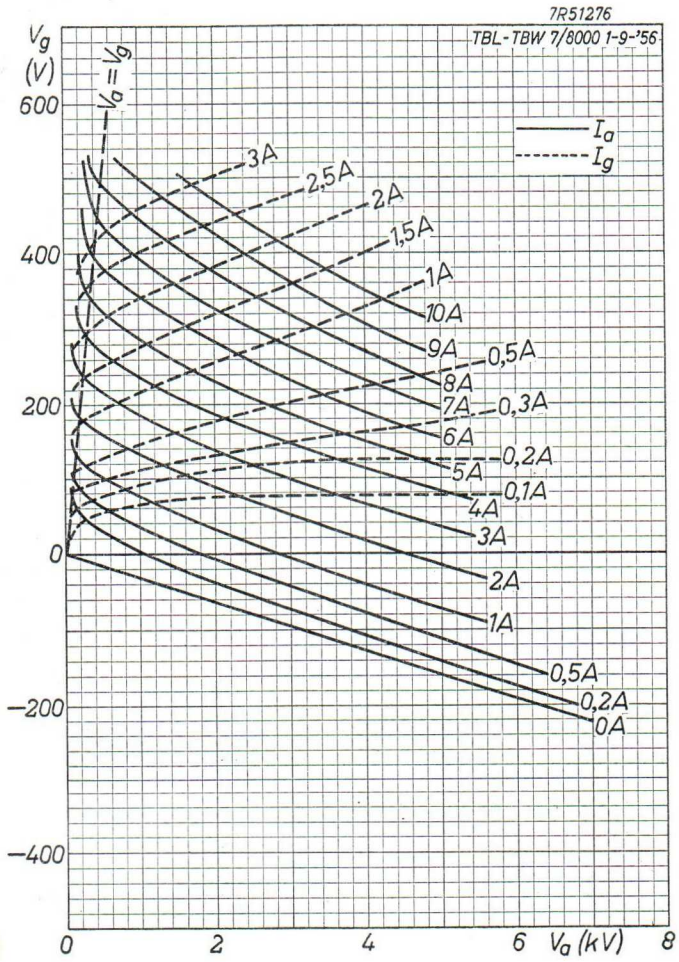
A

**TBW 7/8000**

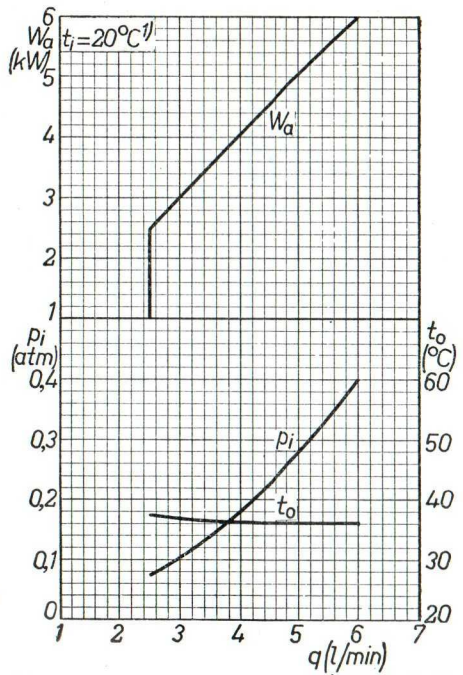
# PHILIPS

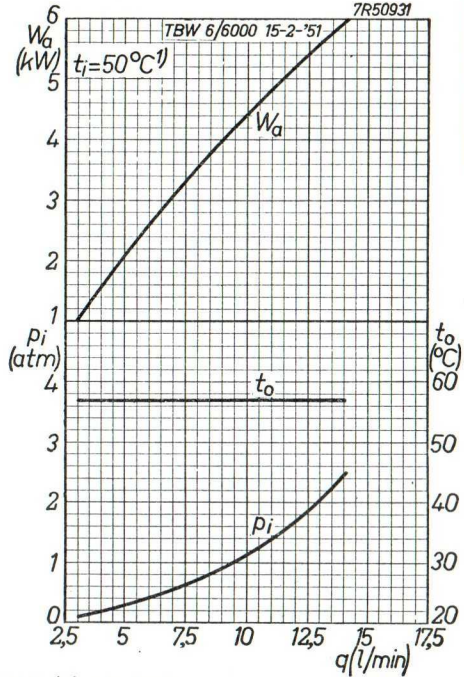



B


7R51276
TBL-TBW 7/8000 1-9-'56
$V_g$ (V)
$V_g = V_a$
600
400
200
0
−200
−400
$I_a$
$I_g$
3A
2,5A
2A
1,5A
1A
10A
9A
0,5A
8A
7A
0,3A
6A
0,2A
5A
0,1A
4A
3A
2A
1A
0,5A
0,2A
0A
0
2
4
6
$V_a$ (kV)
8

PHILIPS




1) see page 2; voir page 2; siehe Seite 2

D

# PHILIPS

**TBW7/9000**

TRIODE for use in industrial R.F. generators
TRIODE pour l'utilisation dans les générateurs H.F. industriels
TRIODE zur Verwendung in HF-Industriegeneratoren

Cooling : Water cooling for anode
Low velocity air flow on terminals at frequencies above 4 Mc/s
Refroidissement: Circulation d'eau pour l'anode
Léger courant d'air pour les bornes aux fréquences supérieures à 4 MHz
Kühlung : Wasserkühlung für die Anode
Schwacher Luftstrom für die Anschlüsse bei Frequenzen höher als 4 MHz

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 12,6 V $^{+5}_{-10}$ %
$I_f$ = 33 A

Capacitances
Capacités
Kapazitäten

$C_a$ = 1,0 pF
$C_g$ = 14,2 pF
$C_{ag}$ = 7,9 pF

Typical characteristics
Caractéristiques types
Kenndaten

$V_a$ = 6 kV
$I_a$ = 1 A
S = 12 mA/V
$\mu$ = 24

| | TBW7/9000 | K721 |
|---|---|---|
| Net weight<br>Poids net<br>Nettogewicht | 0,57 kg | 0,76 kg |
| Shipping weight<br>Poids brut<br>Bruttogewicht | 1,35 kg | 0,9 kg |

Temperatures and cooling
Températures et refroidissement
Temperaturen und Kühlung

Temperature of the seals
Température des scellements = max. 220 °C
Temperatur der Einschmelzungen

Cooling characteristics
Caractéristiques de refroidissement
Kühlungsdaten

| $W_a$ (kW) | $t_i$ (°C) | $q_{min}$ (l/min.) | $p_i$ (atm.) |
|---|---|---|---|
| 2 | 20 | 2,5 | 0,06 |
| | 50 | 5 | 0,2 |
| 4 | 20 | 4 | 0,14 |
| | 50 | 9 | 0,7 |
| 6 | 20 | 6 | 0,3 |
| | 50 | 14 | 1,9 |

$t_i$ = max. 50 °C. At temperatures $t_i$ between 20 and 50 °C the required quantity of water can be found by proportional interpolation

$t_i$ = max. 50 °C. Le débit d'eau aux températures $t_i$ entre 20 et 50 °C peut être calculé par interpolation linéaire

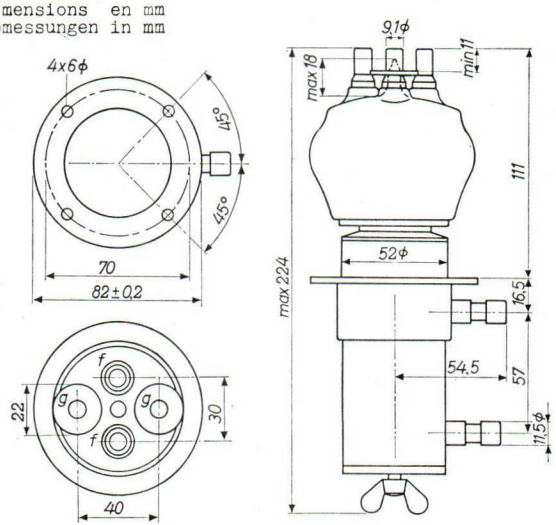
$t_i$ = max. 50 °C. Die benötigte Wassermenge für Temperaturwerte $t_i$ zwischen 20 und 50 °C kann durch Proportionalinterpolation berechnet werden.

At frequencies above 4 Mc/s both grid terminals should be connected in parallel. At the highest frequencies care should be taken to distribute the R.F. current equally over both grid terminals to avoid excessive grid seal temperatures

Aux fréquences supérieures à 4 MHz les deux broches de la grille doivent être reliées en parallèle. Aux fréquences les plus élevées il faut prendre soin à distribuer le courant H.F. uniformément entre les deux broches de la grille pour éviter des températures excessives des scellements de la grille

Bei Frequenzen höher als 4 MHz müssen die beiden Gitteranschlüsse parallelgeschaltet werden. Zur Vermeidung einer zu hohen Temperatur der Gittereinschmelzungen muss bei den höchsten Frequenzen der HF-Strom gleichmässig über die beiden Gitteranschlüsse verteilt werden.

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Accessories
Accessoires
Zubehör

| | |
|---|---|
| Grid and filament clip<br>Pince pour la grille et le filament<br>Gitter- und Heizfadenanschlüsse | 40634 |
| Water jacket<br>Refroidisseur<br>Kühltopf | K 721 |

H.F. class C oscillator for industrial use with anode voltage from three-phase rectifier without filter (Continuous service)
Oscillatrice H.F. classe C pour applications industrielles avec tension anodique dérivée d'un redresseur triphasé sans filtre (service continu).
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung von einem Dreiphasen-Gleichrichter ohne Filter abgenommen

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| | | | |
|---|---|---|---|
| f | = max. 50 Mc/s | | |
| $V_a$ | = max. 8 kV | $-V_g$ | = max. 1250 V |
| $W_{ia}$ | = max. 12 kW | $I_g$ | = max. 0,4 A [1] |
| $W_a$ | = max. 6 kW | $I_g$ | = max. 0,5 A [2] |
| $I_a$ | = max. 1,8 A | $R_g$ | = max. 10 kΩ |

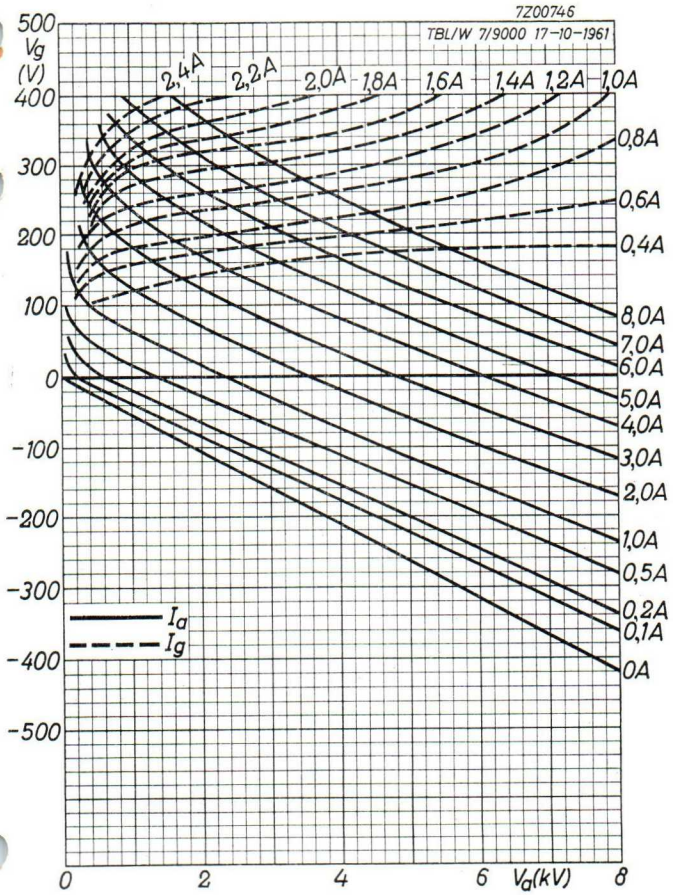
Operating characteristics
Caractéristiques d'utilisation
Betriebsdaten

| | | | |
|---|---|---|---|
| f | = | 50 | 50 Mc/s |
| $V_a$ | = | 7200 | 6200 V |
| $I_a$ | = | 1,5 | 1,4 A [1] |
| $I_a$ | = | 0,37 | 0,40 A [2] |
| $I_g$ | = | 0,36 | 0,37 A [1] |
| $I_g$ | = | 0,47 | 0,47 A [2] |
| $R_g$ | = | 1850 | 1500 Ω |
| $R_{a\sim}$ | = | 2300 | 2100 Ω |
| $V_{g\sim}/V_{a\sim}$ | = | 17 | 17 % |
| $W_{ia}$ | = | 10,8 | 8,68 kW |
| $W_a$ | = | 3,3 | 2,5 kW |
| $\eta$ | = | 70 | 71 % |
| $W_\ell$ | = | 6,1 | 5,0 kW [3] |

[1]) Loaded; chargé; belastet

[2]) Unloaded; sans charge; unbelastet

[3]) Useful power in the load, measured in a circuit having an efficiency of about 85 %
Puissance utile dans la charge, mesurée dans un circuit avec un rendement d'environ 85 %
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von 85 %.


7Z00746
TBL/W 7/9000 17-10-1961
500
Vg
(V)
400
300
200
100
0
-100
-200
-300
-400
-500
2,4A
2,2A
2,0A
1,8A
1,6A
1,4A
1,2A
1,0A
0,8A
0,6A
0,4A
8,0A
7,0A
6,0A
5,0A
4,0A
3,0A
2,0A
1,0A
0,5A
0,2A
0,1A
0A
Ia
Ig
0
2
4
6
Va(kV)
8

10.10.1961

A

WATER COOLED TRIODE for use in industriel H.F. generators
TRIODE À REFROIDISSEMENT PAR EAU pour utilisation dans les générateurs H.F.
WASSERGEKÜHLTE TRIODE zur Verwendung in industriellen HF-Generatoren

Filament : Thoriated tunsten
Filament : Tungstène thorié
Heizfaden: Thoriertes Wolfram

| | | |
|---|---|---|
| Heating : Direct<br>Chauffage: Direct<br>Heizung : Direkt | $V_f$ = 8,0 V $^{+5\%}_{-10\%}$ | |
| | $I_f$ = 98 A | |

The filament current must never exceed a peak value of 210 A instantaneously at any time during the initial energizing schedule.
Le courant d'enclenchement de chauffage ne doit jamais dépasser une valeur de 210 A.
Der Anlaufheizstrom darf niemals einen Scheitelwert von 210 A überschreiten

| | |
|---|---|
| Capacitances<br>Capacités<br>Kapazitäten | $C_a$ = 0,4 pF |
| | $C_g$ = 37 pF |
| | $C_{ag}$ = 30 pF |

| | |
|---|---|
| Typical characteristics<br>Caractéristiques types<br>Kenndaten | $V_a$ = 12 kV |
| | $I_a$ = 2 A |
| | S = 20 mA/V |
| | $\mu$ = 34 |

Temperatures
Températures
Temperaturen

Seal temperature
Température des scellements = max. 220 °C
Temperatur der Einschmelzungen

Generally a low velocity air flow to the seals is required.
En général il faut diriger un léger courant d'air sur les scellements.
Im allgemeinen ist ein schwacher Luftstrom auf die Einschmelzungen erforderlich.

| Weight, poids, Gewicht | TBW 12/25 | K 717 |
|---|---|---|
| Net, Netto | 2,8 kg | 2,1 kg |
| Shipping, Brut, Brutto | 31,2 kg | 3,0 kg |

Mounting position: Vertical with anode down
Montage : Vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

# PHILIPS

Water cooling characteristics
Caractéristiques de refroidissement par eau
Wasserkühlungsdaten

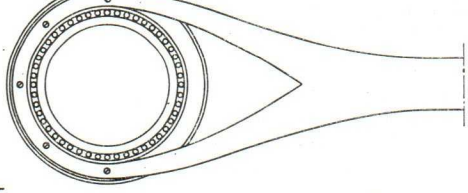
$t_i$ = max. 50 °C

| $W_a$ (kW) | $t_i$ (°C) | $q_{min}$ [1] (l/min) | $p_i$ (atm.) |
|---|---|---|---|
| 5 | 20 | 6 | 0,02 |
| | 50 | 15 | 0,22 |
| 10 | 20 | 11 | 0,1 |
| | 50 | 25 | 0,7 |
| 15 | 20 | 16 | 0,25 |
| | 50 | 37 | 1,3 |
| 20 | 20 | 22 | 0,5 |
| | 50 | 49 | 2,3 |

To ensure a uniform R.F. current distribution in the grid seal especially at frequencies higher than 4 Mc/s, the grid lead should be connected as shown below.

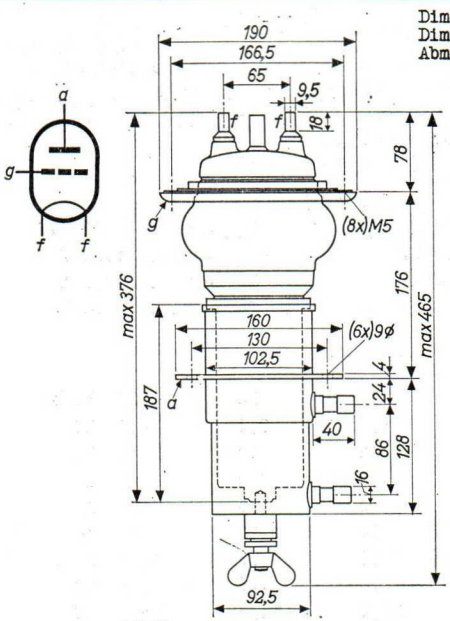
Afin d'assurer une distribution uniforme du courant H.F. dans le scellement de la grille spécialement à des fréquences supérieures à 4 MHz, le conducteur de la grille sera relié selon la figure ci-dessous.

Zur Gewährleistung einer gleichmässigen HF-Stromverteilung in der Gittereinschmelzung bei Frequenzen höher als 4 MHz, soll die Gitterleitung nach untenstehender Figur verbunden werden.



[1]) At temperatures $t_i$ between 20 and 50 °C the required quantity of water can be found by proportional interpolation.
Le débit d'eau aux températures $t_i$ entre 20 et 50°C peut être calculé par interpolation linéaire
Die benötigte Wassermenge für Temperaturwerte $t_i$ zwischen 20 und 50 °C kann durch Proportionalinterpolation berechnet werden

Dimensions in mm
Dimensions en mm
Abmessungen in mm




| | |
|---|---|
| TBW 12/25 with grid connector | 40663 |
| and water jacket | K 717 |
| TBW 12/25 avec connecteur de grille | 40663 |
| et chemise de refroidissement par eau | K 717 |
| TBW 12/25 mit Gitteranschlussring | 40663 |
| und Kühltopf | K 717 |

| | |
|---|---|
| Further accessories: filament clips with cable | 40662 |
| Autres accessoires : Borne de filament avec câble | 40662 |
| Weitere Zubehören : Heizfadenanschlussklemme mit Kabel | 40662 |

# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from three-phase half-wave rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé à une alternance sans filtre
HF-klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasen-Halbweggleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | | | |
|---|---|---|---|
| f = max. | 30 Mc/s | $W_{ia}$ = max. | 60 kW |
| $V_a$ = max. | 13 kV | $-V_g$ = max. | 1500 V |
| $I_a$ = max. | 4,8 A | $I_g$ = max. | 0,8 A |
| → $W_a$ = max. | 20 kW | $R_g$ = max. | 10 kΩ |

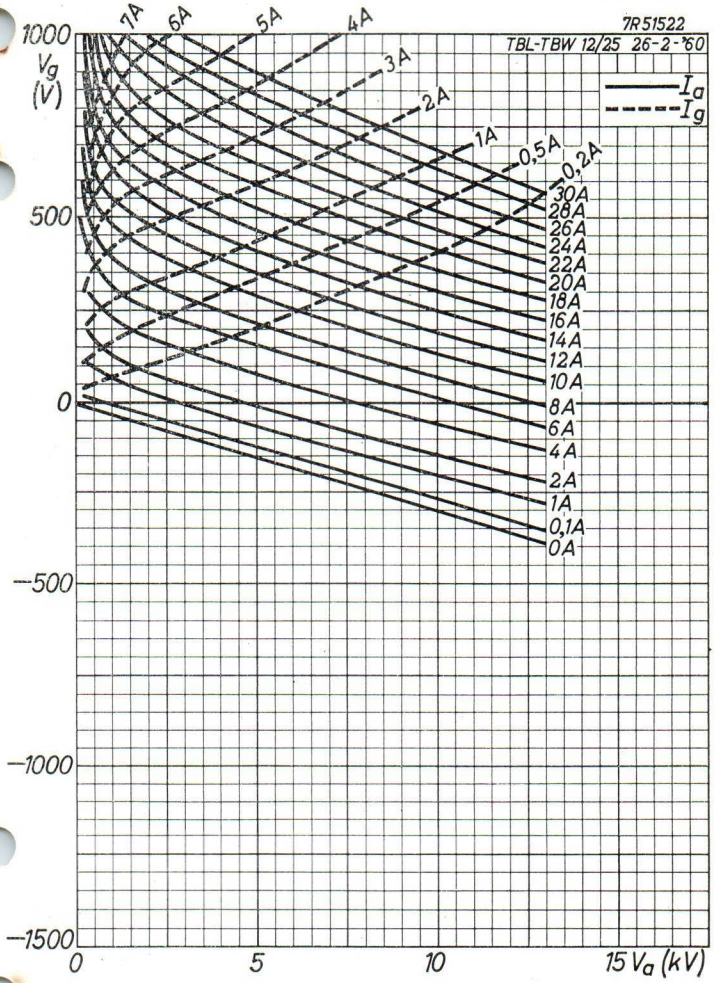
Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | |
|---|---|---|---|---|---|
| f | = | 30 | 30 | 30 | Mc/s |
| $V_{tr}$ | = | 8,9 | 7,4 | 6,0 | kV |
| $V_a$ | = | 12 | 10 | 8 | kV |
| $I_a$ [1] | = | 3,2 | 3,2 | 3,2 | A |
| $I_a$ [2] | = | 0,52 | 0,50 | 0,48 | A |
| $I_g$ [1] | = | 0,50 | 0,50 | 0,50 | A |
| $I_g$ [2] | = | 0,74 | 0,77 | 0,80 | A |
| $R_g$ | = | 2,0 | 1,6 | 1,1 | kΩ |
| $W_{ia}$ | = | 38,4 | 32,0 | 25,6 | kW |
| $W_a$ | = | 9,4 | 8,7 | 7,7 | kW |
| $W_o$ | = | 29,0 | 23,3 | 17,9 | kW |
| $\eta$ | = | 75,5 | 72,5 | 70 | % |
| $W_\ell$ [3] | = | 25 | 20 | 15,5 | kW |
| $R_{a\sim}$ | = | 1800 | 1450 | 1100 | Ω |
| $V_{g\sim}/V_{a\sim}$ | = | 16 | 17 | 19 | % |

[1]) Loaded; chargé; belastet

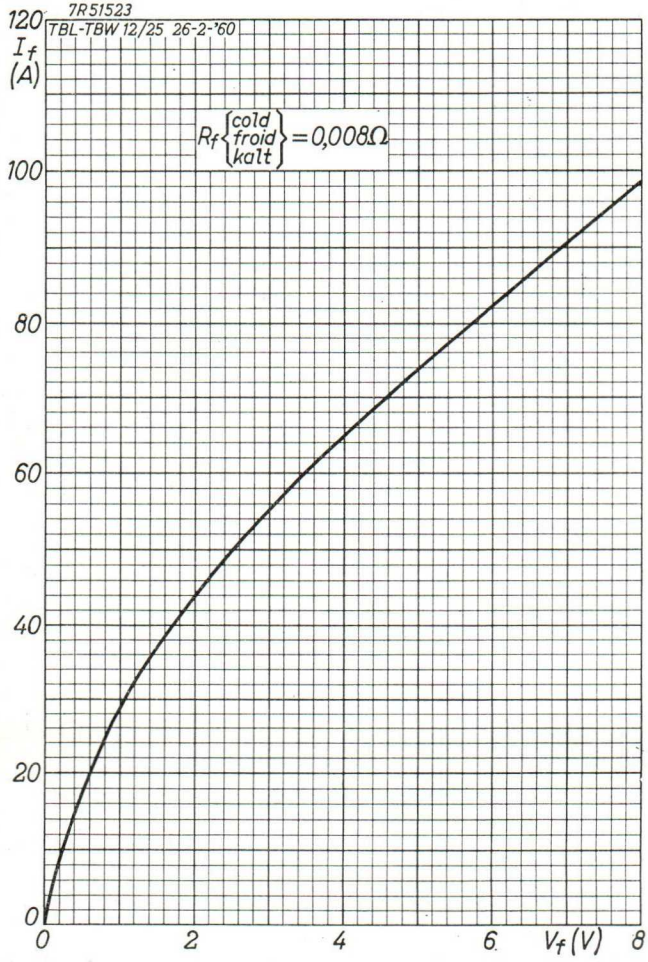
[2]) Unloaded; non-chargé; nicht belastet

[3]) Useful power in the load measured in a circuit having an efficiency of about 90%
Puissance utile dans la charge, mesurée dans un circuit avec un rendement d'environ 90%
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von etwa 90%


7R51522
TBL-TBW 12/25 26-2-'60
$I_a$
$I_g$
1000
$V_g$ (V)
500
0
−500
−1000
−1500
0
5
10
15 $V_a$ (kV)
7A
6A
5A
4A
3A
2A
1A
0,5A
0,2A
30A
28A
26A
24A
22A
20A
18A
16A
14A
12A
10A
8A
6A
4A
2A
1A
0,1A
0A

**TBW 12/25**

# PHILIPS



TRIODE for use in industrial R.F. generators
TRIODE pour utilisation dans les générateurs H.F.industriels
TRIODE zur Verwendung in industriellen HF-Generatoren

Cooling : water/air flow to the seals
Refroidissement: circulation d'eau/courant d'air vers les scellements
Kühlung : Wasser/Luftstrom auf die Einschmelzungen

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct $V_f = 8\ V^{+5\ \%}_{-10\ \%}$
Chauffage: direct
Heizung : direkt $I_f = 130$ A

The filament current must never exceed a peak value of 280 A at any time during the initial energizing schedule.

Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 280 A

Der Anlaufstrom darf niemals einen Scheitelwert von 280 A überschreiten

| | | | |
|---|---|---|---|
| Capacitances<br>Capacités<br>Kapazitäten | $C_a$ | = | 0,9 pF |
| | $C_g$ | = | 45 pF |
| | $C_{ag}$ | = | 23,5 pF |
| Typical characteristics<br>Caractéristiques types<br>Kenndaten | $\mu$ ($V_a$ = 12 kV) | = | 21 |
| | S ($I_a$ = 2 A) | = | 25 mA/V |

Temperatures
Températures
Temperaturen

Temperature of all seals
Température de tous les scellements = max. 220 °C
Temperatur aller Einschmelzungen

| Weight, poids, Gewicht | TBW 12/38 | K722 |
|---|---|---|
| net, Netto | 3,0 kg | 2,7 kg |
| shipping, brut, Brutto | 31,7 kg | 3,5 kg |

1) $t_i$ = max. 50 °C

2) At temperatures $t_i$ between 20°and 50 °C the required quantity of water can be found by proportional interpolation
Le débit d'eau aux températures $t_i$ entre 20°et 50 °C peut être calculé par interpolation linéaire
Die benötigte Wassermenge für Temperaturwerte $t_i$ zwischen 20°und 50 °C kann durch Proportionalinterpolation berechnet werden

Cooling
Refroidissement
Kühlung

Generally a low velocity airflow to the seals is required.
En général il faut diriger un léger courant d'air sur les scellements.
Im allgemeinen ist ein schwacher Luftstrom auf die Einschmelzungen erforderlich

Water cooling characteristics
Caractéristiques de refroidissement par eau
Wasserkühlungsdaten

| Wa (kW) | $t_i$ [1] (°C) | qmin [2] (l/min) | pi (atm.) |
|---|---|---|---|
| 5 | 20 | 6 | 0,02 |
| | 50 | 15 | 0,22 |
| 10 | 20 | 11 | 0,1 |
| | 50 | 25 | 0,7 |
| 15 | 20 | 16 | 0,25 |
| | 50 | 37 | 1,3 |
| 20 | 20 | 22 | 0,5 |
| | 50 | 49 | 2,3 |

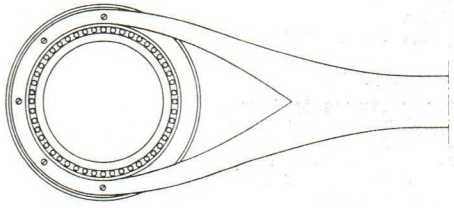
See also page E
Voir aussi page E
Siehe auch Seite E

Accessories
Accessoires
Zubehör

Water jacket
Refroidisseur K722 ←
Kühltopf

Grid connector
Connecteur de la grille 40663
Gitteranschlussring

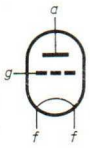
Clips with cable for filament
Bornes avec câble pour le filament 40662
Klemmen mit Kabel für Heizfaden

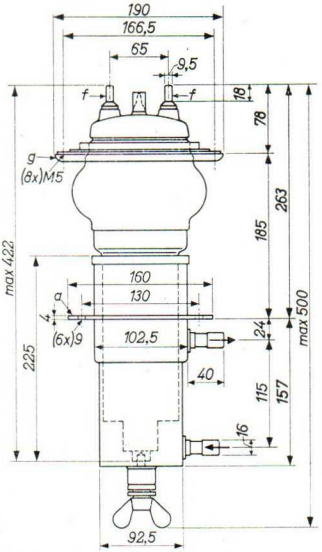


[1][2]) See page 1; voir page 1; Siehe Seite 1

Tube mounted in water jacket type K 722
Tube monté dans le refroidisseur K 722
Röhre in Kühltopf Type K 722 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm

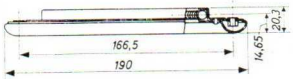


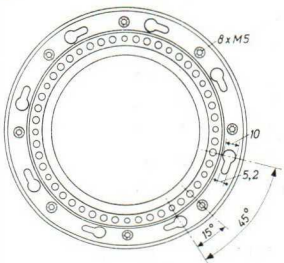




Mounting position:
vertical with anode down

Montage: vertical avec l'anode en bas

Einbau: senkrecht mit der Anode unten




40663
Grid connector
Connecteur de grille
Gitteranschlussring

The rounded side of the grid connector should face the anode. To ensure a uniform R.F. current distribution in the grid seal at frequencies higher than 4 Mc/s, the grid lead should be connected as shown in the figure at page 2

Le côté arrondi du connecteur de la grille sera tourné vers l'anode. Afin d'assurer une distribution uniforme du courant H.F. dans le scellement de la grille à des fréquences supérieures à 4 MHz, le conducteur de la grille sera relié selon la figure page 2

Die abgerundete Seite des Gitteranschlussringes soll der Anode zugekehrt sein. Zur Gewährleistung einer gleichmässigen HF-Stromverteilung in der Gittereinschmelzung bei Frequenzen höher als 4 MHz, soll die Gitterleitung nach der Figur auf Seite 2 verbunden werden

# PHILIPS

H.F. class C oscillator for industrial use with anode voltage from three-phase rectifier without filter
Oscillatrice H.F. classe C pour des applications industrielles avec tension anodique dérivée d'un redresseur triphasé sans filtre
HF-Klasse C Oszillator für industrielle Anwendungen mit der Anodenspannung abgenommen von einem Dreiphasengleichrichter ohne Filter

Limiting values (absolute values)
Caractéristiques limites (valeurs absolues)
Grenzdaten (absolute Werte)

| | |
|---|---|
| $f$ = max. 30 Mc/s | $W_{ia}$ = max. 60 kW |
| $V_a$ = max. 13 kV | $-V_g$ = max. 2 kV |
| $I_a$ = max. 5 A | $I_g$ = max. 1,5 A [1] |
| $W_a$ = max. 20 kW | $I_g$ = max. 2,0 A [2] |
| | $R_g$ = max. 10 kΩ |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | |
|---|---|---|---|---|
| $f$ | = 30 | 30 | 30 | Mc/s |
| $V_a$ | = 12 | 10 | 8 | kV |
| $I_a$ [1] | = 4,5 | 4,5 | 4,5 | A |
| $I_a$ [2] | = 0,65 | 0,63 | 0,62 | A |
| $I_g$ [1] | = 0,9 | 0,9 | 0,9 | A |
| $I_g$ [2] | = 1,22 | 1,3 | 1,35 | A |
| $R_g$ | = 1100 | 1000 | 900 | Ω |
| $R_{a\sim}$ | = 1450 | 1100 | 800 | Ω |
| $V_{g\sim}/V_{a\sim}$ | = 16 | 19 | 24 | % |
| $W_{ia}$ | = 54 | 45 | 36 | kW |
| $W_a$ | = 15 | 13,7 | 12,8 | kW |
| $W_o$ | = 39 | 31,3 | 23,2 | kW |
| $\eta$ | = 72,5 | 70 | 64,5 | % |
| $W_\ell$ [3] | = 30 | 25 | 18 | kW |

[1]) Loaded, chargé, belastet

[2]) Unloaded, sans charge, unbelastet

[3]) Useful power in the load, measured in a circuit having an efficiency of about 85 %.
Puissance utile dans la charge, mesurée dans un circuit avec un rendement de 85 %.
Nutzleistung in der Belastung, gemessen in einer Schaltung mit einem Wirkungsgrad von 85 %.

PHILIPS

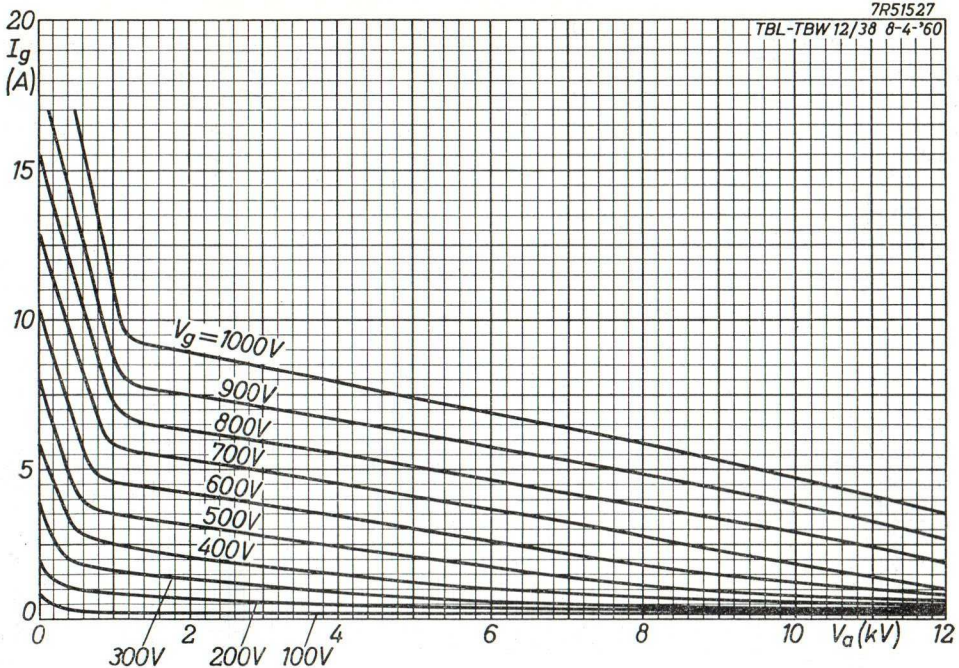
TBW 12/38



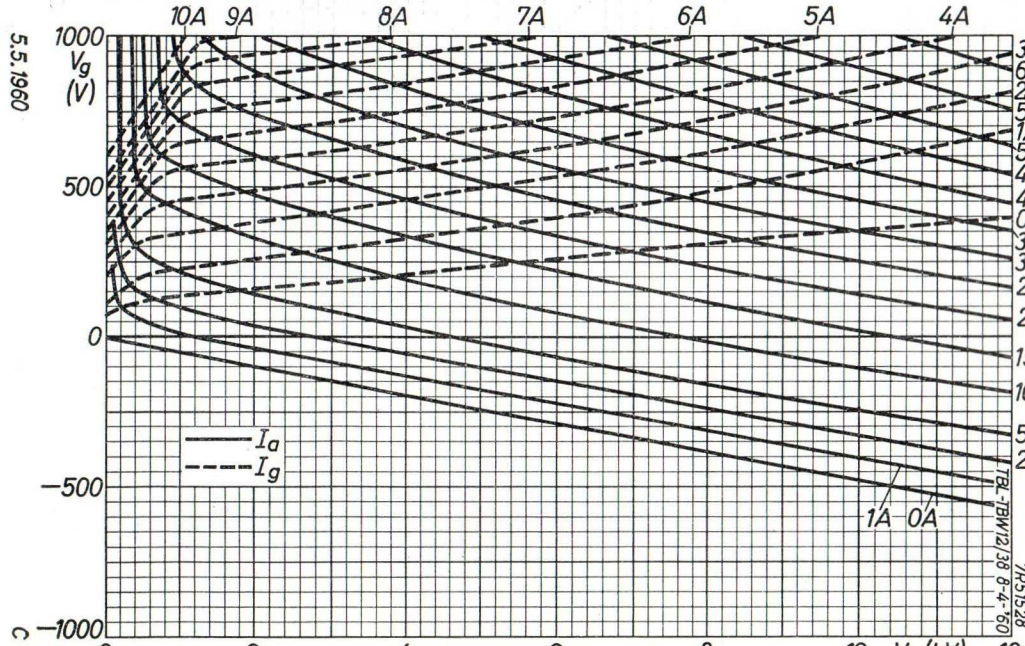

5.5.1960

A

PHILIPS


7R51527
TBL-TBW 12/38 8-4-'60
$I_g$ (A)
20
15
10
5
0
$V_g$ = 1000V
900V
800V
700V
600V
500V
400V
300V
200V
100V
0
2
4
6
8
10
12
$V_a$ (kV)

B




5.5.1960

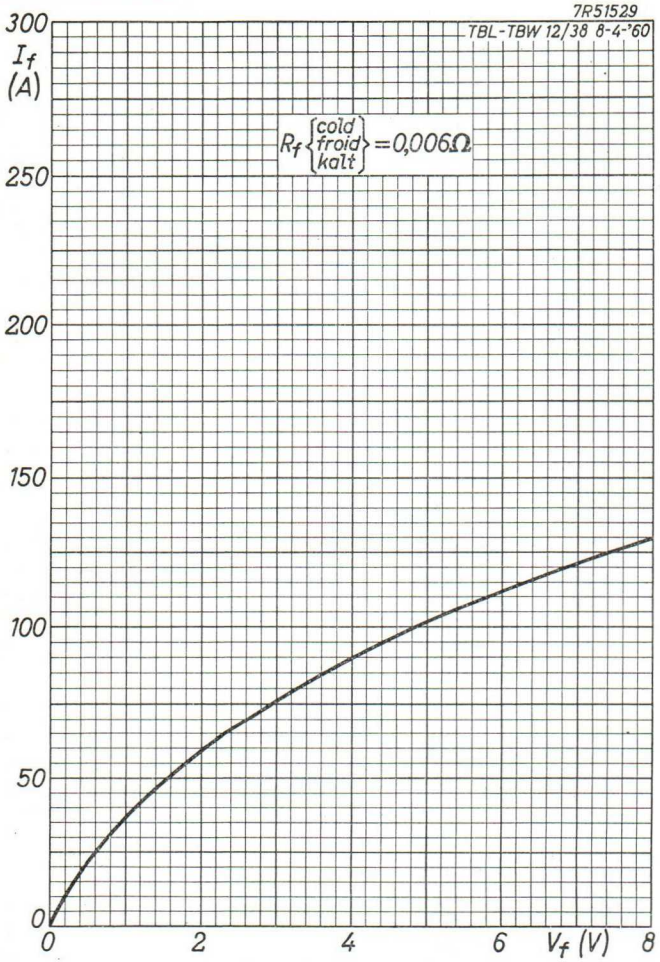
C

PHILIPS

TBW 12/38

**TBW 12/38**

# PHILIPS




D

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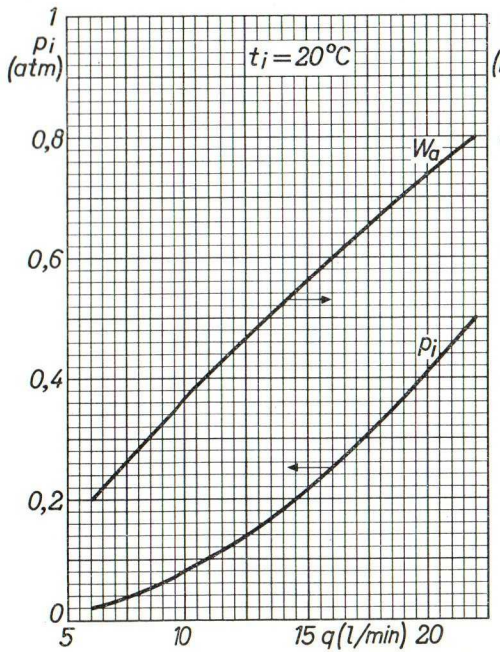


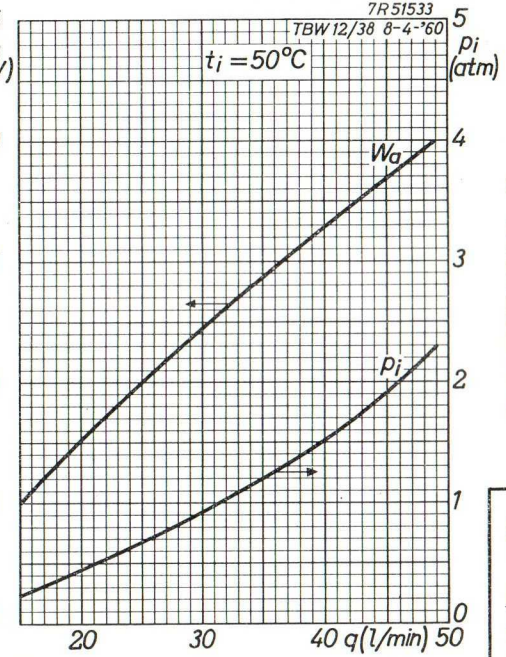


PHILIPS

TBW 12/38

E

TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour utilisation en amplificatrice H.F. ou B.F. ou en oscillatrice
TRIODE zur Verwendung als HF- oder NF-Verstärker oder Oszillator

Cooling : water/air flow to seals
Refroidissement: circulation d'eau/air aux scellements
Kühlung : Wasser/Luftstrom auf Einschmelzungen

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct — $V_f$ = 17,5 V
Chauffage: direct — $I_f$ = 196 A
Heizung : direkt

Filament current must never exceed a peak value of 420 A at any time during initial energising schedule
Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 420 A
Der Anlaufstrom darf niemals einen Scheitelwert von 420 A überschreiten

Capacitances / Capacités / Kapazitäten

$C_a$ = 3,4 pF
$C_g$ = 116 pF
$C_{ag}$ = 86 pF

Typical characteristics / Caractéristiques types / Kenndaten

$\mu_{(I_a=5\ A\ ;\ V_a=10\ kV)}$ = 27
$S_{(I_a=5\ A\ ;\ V_a=10\ kV)}$ = 50 mA/V
$S_{max(I_a=50\ A\ ;\ V_a=3\ kV)}$ = 92 mA/V

| λ | Freq. | C telegr. | | B teleph. | | C an.mod. | | B mod.[1] | |
|---|---|---|---|---|---|---|---|---|---|
| m | Mc/s | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $V_a$ (kV) | $W_o$ (kW) | $\hat{V}_a$ (kV) | $W_o$ (kW) |
| | | | | | | | | 12 | 202 |
| 20 | 15 | 12 | 108 | 12 | 51,5 | 10 | 80 | 10 | 116 |
| 15 | 20 | 12 | 94,5 | | | 10 | 54,5 | 10 | 77 |
| 12 | 25 | 11 | 70 | | | 9 | 42,5 | 9 | 62 |
| 11 | 27,5 | 10,5 | 59 | | | 8,5 | 36,5 | 8,5 | 54 |
| 10 | 30 | 10 | 50 | | | 8 | 31 | 8 | 46,8 |

Television, télévision
Fernsehen

| neg.mod. pos.synchr. | | |
|---|---|---|
| Freq. (Mc/s) | $V_a$ (kV) | $W_o$ sync (kW) |
| 48-68 | 6,5 | 100[2]) |

[1]) Two tubes; deux tubes; Zwei Röhren

[2]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pré-amplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung.

# PHILIPS

Cooling characteristics
Caractéristiques du refroidissement
Kühlungsdaten

| $W_a$ (kW) | $t_i$ (°C) | $q_{min}$ [1] (l/min) | $p_i$ (atm) | |
|---|---|---|---|---|
| 30 | 20 | 25 | 0,15 | See cooling curves<br>Voir les courbes de refroidissement<br>Siehe die Kühlungskurven |
| | 50 | 45 | 0,45 | |
| 50 | 20 | 32 | 0,25 | |
| | 50 | 65 | 0,85 | |
| 100 | 20 | 55 | 0,6 | |
| | 50 | 120 | 3 | |

$t_i$ = max. 50 °C

temperature of seals
temp. des scellements
Temp. der Einschmelzungen
= max. 180 °C

To keep the seal temperatures below 180 °C it will often be necessary to direct an air flow of sufficient velocity to the seals. This air flow must be started upon or before application of the filament voltage.

Anode- and grid seals can be cooled by connecting a blower of suitable size to the air inlet of the anti-corona ring, attached to the valve. At frequencies below 6 Mc/s, ai cooling will,as a rule, not be necessary. Above 6 Mc/s air cooling must be used in order to prevent overheating of anode- and grid seals. At maximum frequency (30 Mc/s) and the published operating conditions at least 2.5 $m^3$ (95 cub.ft.)per minute is required with a pressure loss of about 500 mm (20 inch) water column.

When using the special filament connectors type no. 40628, together with connecting leads of adequate cross-section, additional air cooling of the filament terminals is, as a rule, not necessary.

Care should be taken to ensure firm contact of the filament terminals in order to obtain equal distribution of current over these terminals.

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[1]) At temperatures $t_i$ between 20 and 50 °C the required quantity of water can be found by proportional interpolation.

Le débit d'eau aux températures $t_i$ entre 20 et 50 °C peut être calculé par interpolation linéaire.

Die benötigte Wassermenge für Temperaturwerte $t_i$ zwischen 20 und 50 °C kann durch Proportionalinterpolation berechnet werden.

Dans bien des cas un courant d'air à vitesse suffisante sera nécessaire, afin que la température des scellements ne dépasse pas 180 °C. Ce courant d'air doit être mis en marche en même temps ou avant l'application de la tension du filament.

On peut refroidir les scellements de l'anode et de la grille en reliant un ventilateur d'une capacité appropriée à l'entrée d'air de l'anneau protecteur fixé au tube. En général, le refroidissement par air ne sera pas nécessaire au dessous de 6Mc/s. Pour les fréquences supérieures à 6 Mc/s le refroidissement par air est indispensable pour éviter le surchauffage des scellements. A la fréquence maximum (30 Mc/s) et aux caractéristiques d'utilisation publiées ci-après, le débit d'air devra être 2,5 $m^3$/min au moins avec une perte de charge d'environ 500 mm d'eau.

Généralement, le refroidissement additionnel des scellements du filament n'est pas nécessaire en utilisant les bornes de connexion spéciales no. de type 40628 et des câbles de raccordement d'une section suffisante.

Il faut veiller à un bon contact des bornes de connexion du filament pour assurer une répartition uniforme du courant sur ces bornes.

In vielen Fällen ist ein auf die Einschmelzungen gerichteter genügend starker Luftstrom notwendig, damit die Höchsttemperatur der Einschmelzungen 180 °C nicht überschreitet. Dieser Luftstrom muss vor oder gleichzeitig mit der Heizfadenspannung eingeschaltet werden.

Die Anoden- und Gitterverschmelzung kann durch ein geeignetes Gebläse gekühlt werden, das mit dem Lufteinlass des Anodenschutzringes verbunden wird. Im allgemeinen brauchen die Verschmelzungen bei Frequenzen bis zu 6 MHz nicht gekühlt zu werden. Bei Frequenzen höher als 6 MHz ist jedoch zur Vermeidung einer Überhitzung der Anoden- und Gitterverschmelzung eine zusätzliche Kühlung erforderlich.
Bei der Höchstfrequenz (30 MHz) und den angegebenen Betriebsdaten ist mindestens 2,5 $m^3$/min bei einem Druckverlust von ungefähr 500 mm Wassersäule erforderlich.

Im allgemeinen bedürfen die Heizfadenstifte keiner zusätzlichen Kühlung, vorausgesetzt, dass die Anschlussklemmen Typ No. 40628 verwendet werden, und der Leitungsquerschnitt genügend gross bemessen ist.

Es ist darauf zu achten, dass die Heizfadenanschlüsse guten Kontakt geben, damit eine gleichmässige Stromverteilung über die Anschlussklemmen gewährleistet ist.

# PHILIPS

Water-jacket
Refroidisseur
Kühltopf K 714

Clips for filament
Bornes de connexion pour le filament 40628
Anschlussklemmen für den Heizfaden

When connecting the filament the three pins of each group must be joined
Toutes les broches de chaque groupe doivent être réunies en connectant le filament
Der Anschluss des Heizfadens muss an allen Stiften beider Gruppen erfolgen

Mounting position: vertical with anode down
Montage : vertical avec l'anode en bas
Einbau : senkrecht mit der Anode unten

Tube
Röhre

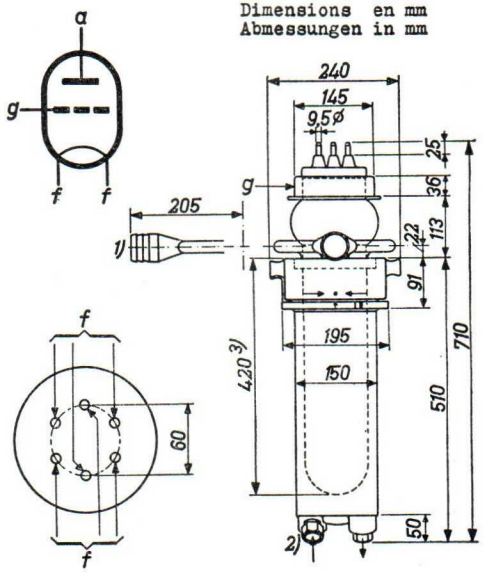
| Net weight / Poids net / Nettogewicht | | Shipping weight / Poids brut / Bruttogewicht | |
|---|---|---|---|
| | 14 kg | | 82 kg |

Water-jacket
Refroidisseur
Kühltopf

| Net weight / Poids net / Nettogewicht | | Shipping weight / Poids brut / Bruttogewicht | |
|---|---|---|---|
| | 20,5 kg | | 39 kg |

Valve mounted in water-jacket type K 714
Tube monté dans le refroidisseur type K 714
Röhre in Kühltopf Typ K 714 montiert

Dimensions in mm
Dimensions en mm
Abmessungen in mm




1) Use connecting hose with an inner diameter of 1¾"
Pour un tuyau flexible d'un diamètre intérieur de 1¾ pouces
Für Schlauch von 1¾ Zoll Innendurchmesser

2) Coupling for metal tubing with an outer diameter of 28 mm
Raccord pour un tuyau d'un diamètre extérieur de 28 mm
Anschluss für Rohr mit Aussendurchmesser von 28 mm

3) For removing the valve from its water-jacket the free height above the valve must be at least 420 mm
Pour enlever le tube la hauteur libre au dessus du tube doit être 420 mm au moins
Zum Herausnehmen der Röhre ist eine freie Höhe von mindestens 420 mm oberhalb der Röhre erforderlich

# PHILIPS

## H.F. class C telegraphy
## H.F. classe C télégraphie
## HF - Klasse C Telegrafie

| | | max. | max. |
|---|---|---|---|
| Limiting values<br>Caractéristiques limites<br>Grenzdaten | | $V_a$ = 15 kV [1]<br>$-V_g$ = 1200 V<br>$I_a$ = 12 A | $I_g$ = 3 A<br>$W_{ia}$ = 162 kW<br>$W_a$ = 50 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | | | | | |
|---|---|---|---|---|---|---|
| $\lambda$ = | 20 | 15 | 12 | 11 | 10 | m |
| f = | 15 | 20 | 25 | 27,5 | 30 | Mc/s |
| $V_a$ = | 12 | 12 | 11 | 10,5 | 10 | kV |
| $V_g$ = | -1000 | -1000 | -900 | -850 | -800 | V |
| $I_a$ = | 12 | 10,5 | 8,5 | 7,5 | 6,7 | A |
| $I_g$ = | 2,25 | 2 | 1,6 | 1,5 | 1,4 | A |
| $V_{gp}$ = | 1700 | 1650 | 1450 | 1350 | 1300 | V |
| $W_{ig}$ = | 3,5 | 3 | 2,1 | 1,9 | 1,7 | kW |
| $W_{ia}$ = | 144 | 126 | 93,5 | 79 | 67 | kW |
| $W_a$ = | 36 | 31,5 | 23,5 | 20 | 17 | kW |
| $W_o$ = | 108 | 94,5 | 70 | 59 | 50 | kW |
| $\eta$ = | 75 | 75 | 75 | 75 | 75 | % |

## H.F. class B telephony
## H.F. classe B téléphonie
## HF - Klasse B Telefonie

| | max. |
|---|---|
| Limiting values<br>Caractéristiques limites<br>Grenzdaten | $V_a$ = 15 kV [1]<br>$I_a$ = 12,5 A<br>$W_{ia}$ = 150 kW<br>$W_a$ = 100 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| | | |
|---|---|---|
| $\lambda$ = | 20 | m |
| f = | 15 | Mc/s |
| $V_a$ = | 12 | kV |
| $V_g$ = | -420 | V |
| $I_a$ = | 12,2 | A |
| $V_{gp}$ = | 700 | V |
| $W_{ia}$ = | 146 | kW |
| $W_a$ = | 94,5 | kW |
| $W_o$ = | 51,5 | kW |
| $\eta$ = | 35 | % |
| m = | 100 | % |
| $I_g$ = | 4,5 | A |
| $W_{ig}$ = | 5,7 | kW |

[1]) See page 7; voir page 7; siehe Seite 7

H.F.class C anode modulation
H.F.classe C modulation d'anode
HF Klasse C Anodenmodulation

Limiting values
Caractéristiques limites
Grenzdaten

| f = max. 15 Mc/s | | f = max. 20 Mc/s | |
|---|---|---|---|
| $V_a$ | = max. 10 kV | $V_a$ | = max. 10 kV |
| $-V_g$ | = max. 1200 V | $W_{ia}$ | = max. 80 kW |
| $I_a$ | = max. 10,5 A | | |
| $I_g$ | = max. 3,5 A | f = max. 30 Mc/s | |
| $W_{ia}$ | = max. 105 kW | $V_a$ | = max. 8 kV |
| $W_a$ | = max. 30 kW | $W_{ia}$ | = max. 50 kW |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

| f = | 15 | 15 | 20 | 25 | 27,5 | 30 Mc/s |
|---|---|---|---|---|---|---|
| $V_a$ = | 10 | 10 | 10 | 9 | 8,5 | 8 kV |
| $V_{g1}$ [2] = | -1050 | -1050 | -1050 | -925 | -900 | -850 V |
| $I_a$ = | 10,5 | 8,5 | 7,0 | 6,2 | 5,7 | 5,25 A |
| $I_g$ = | 3,5 | 2,6 | 2,0 | 2,0 | 1,9 | 1,8 A |
| $V_{gp}$ = | 1960 | 1750 | 1650 | 1500 | 1450 | 1400 V |
| $W_{ig}$ = | 6,2 | 4,1 | 3,0 | 2,7 | 2,5 | 2,3 kW |
| $W_{ia}$ = | 105 | 85 | 70 | 56 | 48,5 | 42 kW |
| $W_a$ = | 25 | 17 | 15,5 | 13,5 | 12 | 11 kW |
| $W_o$ = | 80 | 68 | 54,5 | 42,5 | 36,5 | 31 kW |
| $\eta$ = | 76 | 80 | 78 | 76 | 75 | 74 % |
| m = | 100 | 100 | 100 | 100 | 100 | 100 % |
| $W_{mod}$ = | 52,5 | 42,5 | 35 | 28 | 24,5 | 21 kW |

[1] Up to 4 Mc/s. Up to 15 Mc/s $V_a$ = max. 13.5 kV
Jusqu'à 4 Mc/s. Jusqu'à 15 Mc/s $V_a$ = max. 13,5 kV
Bis 4 MHz. Bis 15 MHz $V_a$ = max. 13,5 kV

[2] Grid bias partially obtained by the grid resistor
Polarisation de grille obtenue partiellement par la résistance de grille
Gittervorspannung, teilweise durch den Gitterwiderstand erzeugt

# PHILIPS

L.F. class B amplifier and modulator
Amplificatrice et modulatrice B.F. classe B
NF - Verstärker und Modulator Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

| | | max. | |
|---|---|---|---|
| $V_a$ | = | 15 | kV |
| $I_a$ | = | 12 | A |
| $W_{ia}$ | = | 162 | kW |
| $W_a$ | = | 50 | kW |
| $R_g$ | = | 20 | kΩ |

Operating conditions, two valves
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 12 | | 10 | | 10 | | kV |
| $V_g$ | = | -450 | | -375 | | -400 | | V |
| $R_{aa}$ | = | 1200 | | 1500 | | 2060 | | Ω |
| $V_{ggp}$ | = | 0 | 2060 | 0 | 1680 | 0 | 1460 | V |
| $I_a$ | = | 2x0,65 | 2x12 | 2x0,5 | 2x7,9 | 2x0,2 | 2x5,4 | A |
| $I_g$ | = | 0 | 2x2,5 | 0 | 2x1,9 | 0 | 2x0,7 | A |
| $W_{ig}$ | = | 0 | 2x2,4 | 0 | 2x1,44 | 0 | 2x0,5 | kW |
| $W_{ia}$ | = | 2x7,8 | 2x144 | 2x5 | 2x79 | 2x2 | 2x54 | kW |
| $W_a$ | = | 2x7,8 | 2x43 | 2x5 | 2x21 | 2x2 | 2x15,5 | kW |
| $W_o$ | = | 0 | 202 | 0 | 116 | 0 | 77 | kW |
| $\eta$ | = | - | 70 | - | 75 | - | 71 | % |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $V_a$ | = | 9 | | 8,5 | | 8 | | kV |
| $V_g$ | = | -350 | | -325 | | -300 | | V |
| $R_{aa}$ | = | 2080 | | 2120 | | 2210 | | Ω |
| $V_{ggp}$ | = | 0 | 1300 | 0 | 1200 | 0 | 1120 | V |
| $I_a$ | = | 2x0,25 | 2x4,8 | 2x0,25 | 2x4,4 | 2x0,25 | 2x4,1 | A |
| $I_g$ | = | 0 | 2x0,65 | 0 | 2x0,55 | 0 | 2x0,4 | A |
| $W_{ig}$ | = | 0 | 2x0,4 | 0 | 2x0,3 | 0 | 2x0,25 | kW |
| $W_{ia}$ | = | 2x2,25 | 2x43,2 | 2x2,1 | 2x37,4 | 2x2 | 2x32,8 | kW |
| $W_a$ | = | 2x2,25 | 2x12,2 | 2x2,1 | 2x10,4 | 2x2 | 2x9,4 | kW |
| $W_o$ | = | 0 | 62 | 0 | 54 | 0 | 46,8 | kW |
| $\eta$ | = | - | 72 | - | 72 | - | 71 | % |

H.F. class B amplifier for television service, negative modulation, positive synchronisation
Amplificatrice H.F. classe B pour télévision, modulation négative, synchronisation positive
HF Klasse B Verstärker für Fernsehsender, negative Modulation, positive Synchronisierung

Limiting values
Caractéristiques limites
Grenzdaten

| f | | = max. | 68 Mc/s |
|---|---|---|---|
| $V_a$ | | = max. | 6,5 kV |
| $I_a$ | sync | = max. | 16 A |
| $W_{ia}$ | sync | = max. | 100 kW |
| $W_a$ | sync | = max. | 50 kW |
| $I_g$ | sync | = max. | 2 A |

Operating conditions, two tubes in push-pull
Caractéristiques d'utilisation, deux tubes en push-pull
Betriebsdaten, zwei Röhren in Gegentakt

| | | | |
|---|---|---|---|
| f | | = | 48-68 Mc/s[1] |
| B (-1,5 db) | | = | 5,5 Mc/s[2] |
| B (-3 db) | | = | 7,5 Mc/s[2] |
| $V_a$ | | = | 6,5 kV |
| $V_g$ | | = | -250 V |
| $V_{gg_p}$ | sync | = | 1740 V[3] |
| | black, noir, schwarz | = | 1300 V[3] |
| $I_a$ | sync | = | 32 A |
| | black, noir, schwarz | = | 24 A |
| $I_g$ | sync | = | 3,4 A |
| | black, noir, schwarz | = | 2,2 A |
| $W_{ig}$ | sync | = | 22,4 kW[4] |
| $W_o$ | sync | = | 80+20 kW[5] |
| | black, noir, schwarz | = | 45+11 kW[5] |

[1])...[5]) See page 10; voir page 10; siehe Seite 10

[1]) In the frequency range of 60-68 Mc/s a special version of the tube is necessary
Pour la gamme de fréquences de 60-68 Mc/s une exécution speciale du tube est nécessaire
Für das Frequenzbereich von 60-68 MHz ist eine spezielle Ausführung der Röhre erforderlich

[2]) This value of bandwidth is based on measurements on a circuit with a single LC section
Cette valeur de la largeur de bande se rapporte à des mesures à un montage avec un seul circuit LC.
Dieser Wert der Bandbreite bezieht sich auf Messungen an einer Schaltung mit einem einzigen LC-Kreis.

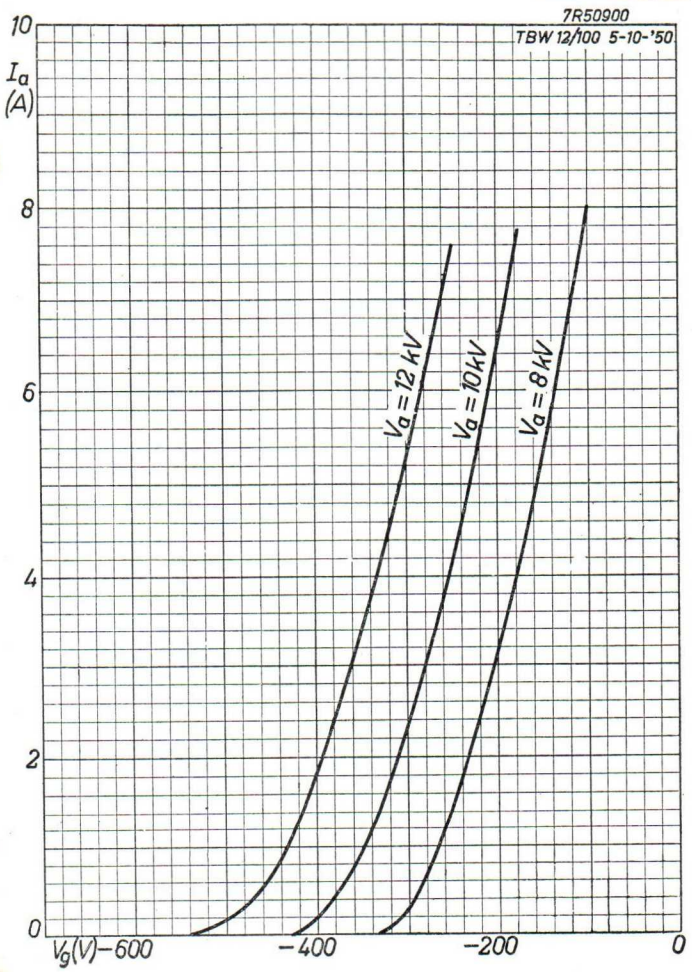
[3]) Measured by the slide back method
Mesuré par la méthode de glissement de la tension de polarisation
Gemessen mittels Verschiebung der Gittervorspannung

[4]) Driving power is accounted for largely by circuit losses. The indicated driving power is required to take care of losses in damping resistors, circuit losses and tube driving power
La puissance d'entrée est nécessaire pour la plupart pour les pertes dans le circuit. La puissance mentionnée est nécessaire pour les pertes dans les résistances d'amortissement, dans le circuit et pour la puissance d'entrée du tube
Die Eingangsleistung ist grossenteils nötig für die Verluste in der Schaltung. Die genannte Leistung ist nötig für die Verluste in Dämpfungswiderständen, in Kreisen und für die Eingangsleistung der Röhre

[5]) Power transferred from driving stage included
Y compris l'énergie transmise de l'étage pre-amplificateur
Einschliesslich der vom Vorverstärker übertragenen Leistung

PHILIPS

TBW 12/100

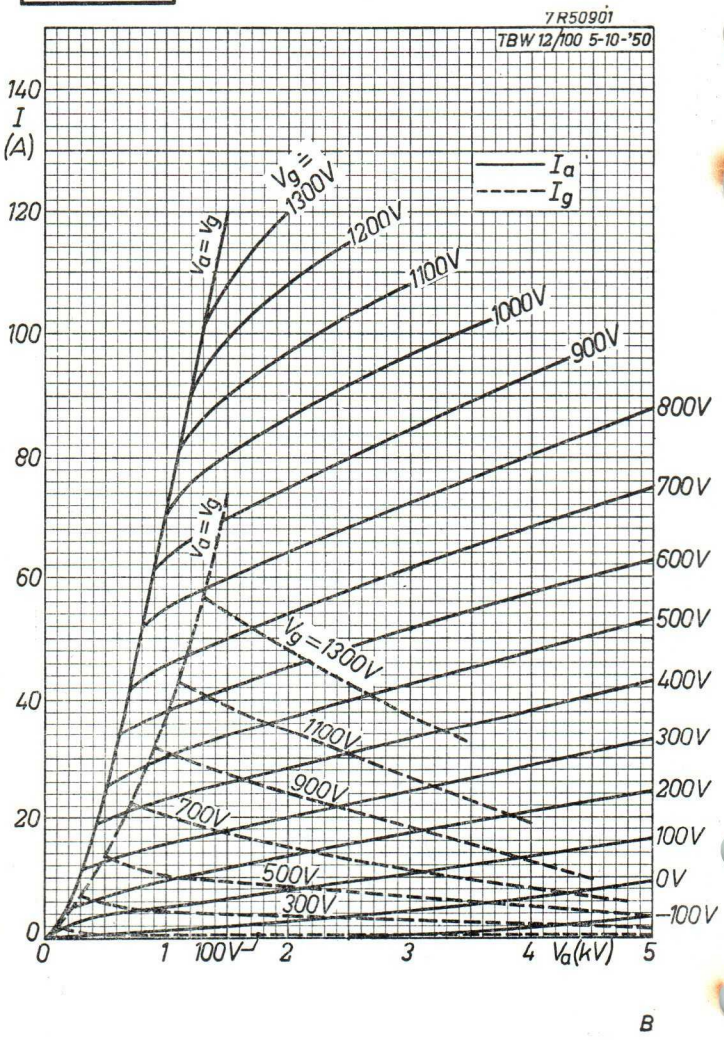



7.7.1954

A

**TBW 12/100**

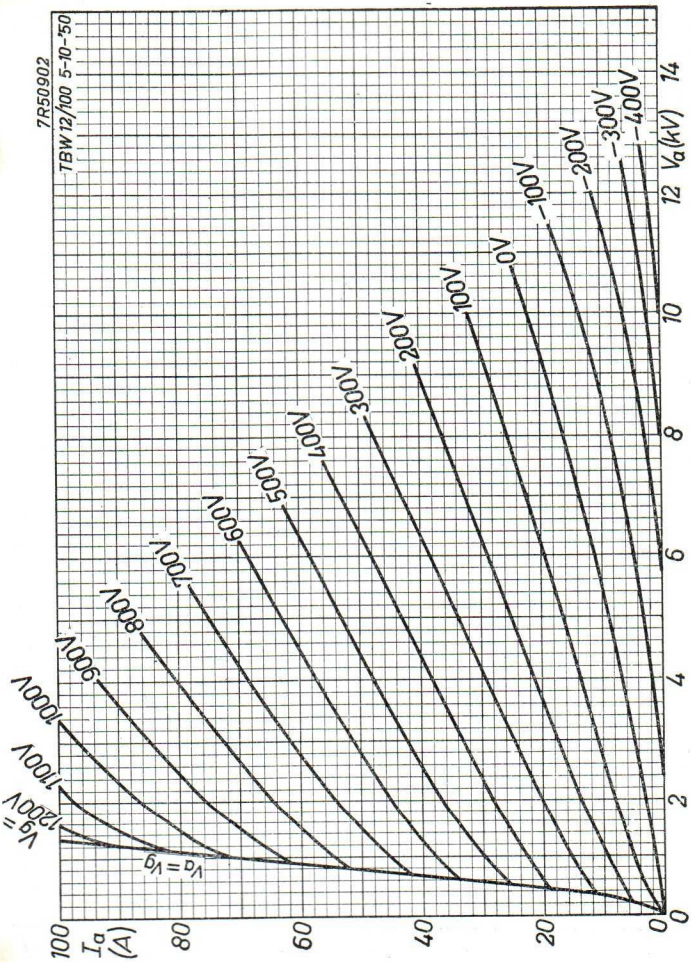
# PHILIPS




B

# PHILIPS

**TBW 12/100**

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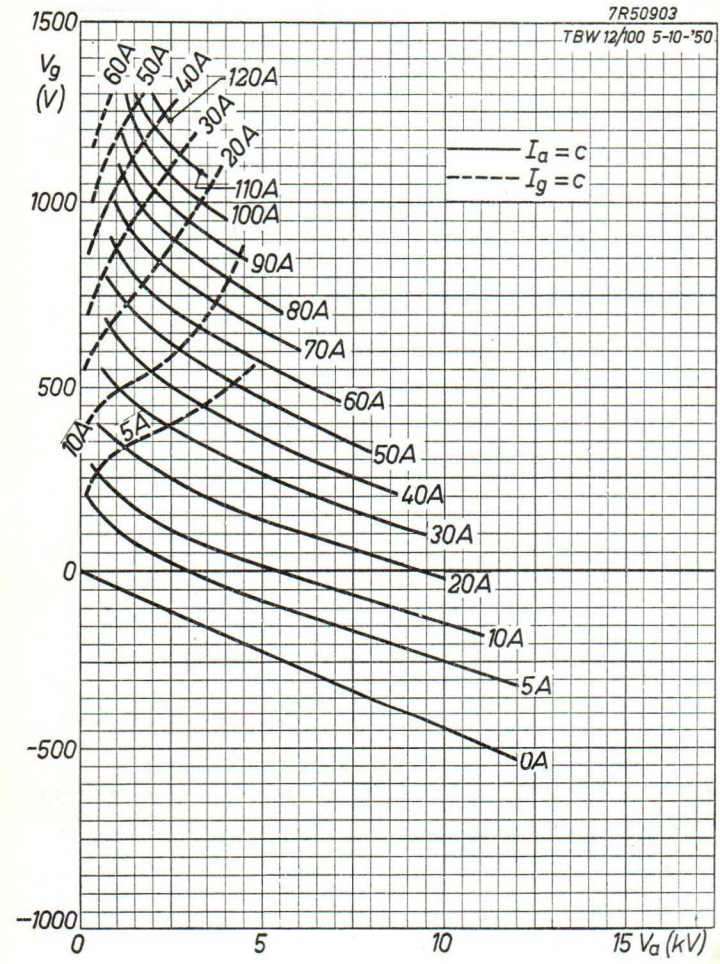
C

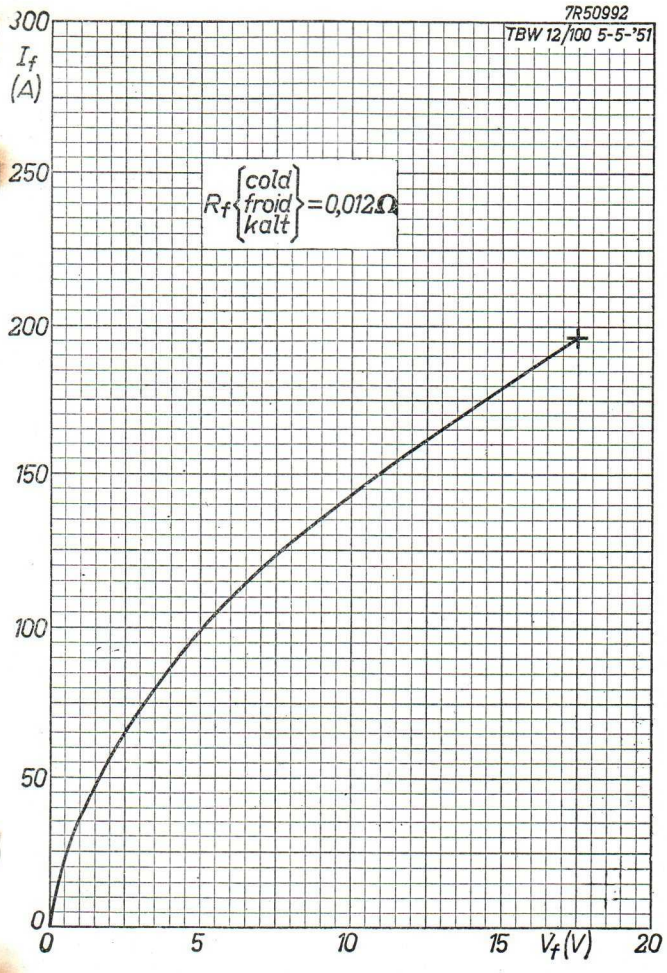
**TBW 12/100**

# PHILIPS




D

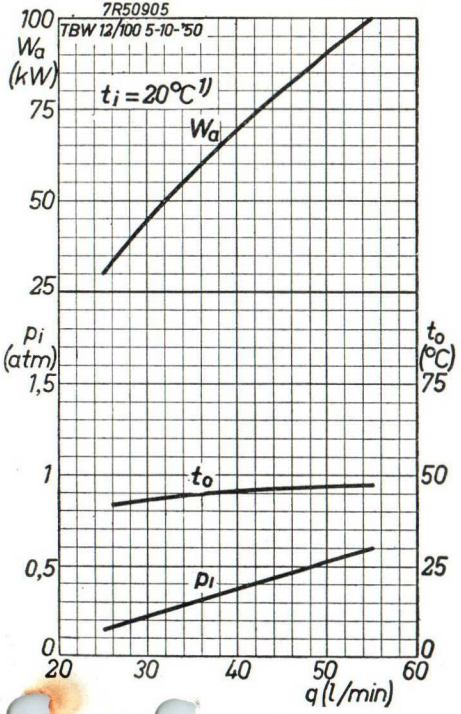
**PHILIPS** **TBW 12/100**

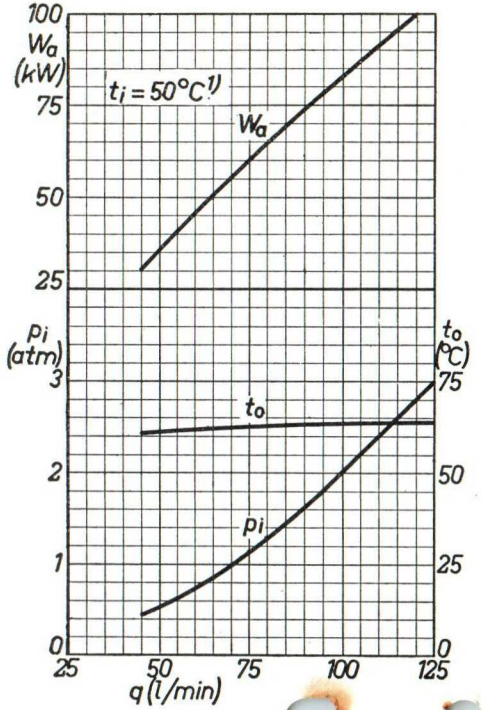



4.4.1955

E

1)see page 2 ; voir page 2 ; siehe Seite 2



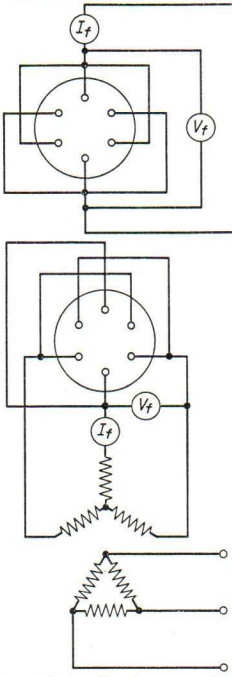

TBW 12/100

PHILIPS

F

TRIODE for use as H.F. or L.F. amplifier or oscillator
TRIODE pour l'utilisation comme amplificatrice H.F. ou B.F. ou comme oscillatrice
TRIODE zur Verwendung als HF- oder NF-Verstärker oder als Oszillator

This type is equivalent to type TBW 12/100 except for the filament data
Ce type est équivalent au type TBW 12/100 à l'exception des données du filament
Dieser Typ ist dem Typ TBW 12/100 gleichwertig mit Ausnahme der Glühfadendaten




Single-phase filament energizing
Alimentation de filament monophasée
Einphasige Glühfadenspeisung

$V_f$ = 17,5 V
$I_f$ = 196 A

Filament current must never exceed a peak value of 420 A at any time during initial energizing schedule

Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 420 A

Der Anlaufstrom darf niemals einen Scheitelwert von 420 A überschreiten

Three-phase filament energizing
Alimentation de filament triphasée
Dreiphasige Glühfadenspeisung

$V_f$ = 15,5 V
$I_f$ = 131 A

Heater current must never exceed a peak value of 280 A at any time during initial energizing schedule

Le courant d'enclenchement ne doit jamais dépasser une valeur de crête de 280 A

Der Anlaufstrom darf niemals einen Scheitelwert von 280 A überschreiten

A safety device must be used to prevent filament energizing with one phase interrupted
Un dispositif de sécurité doit être utilisé pour prévenir que le filament soit alimenté à une phase interrompue
Es muss eine Schutzvorrichtung verwendet werden zur Verhütung von Glühfadenspeisung wenn eine der Phasen unterbrochen ist

Grid-controlled MERCURY VAPOUR RECTIFYING TUBE
TUBE REDRESSEUR A VAPEUR DE MERCURE à grille
Gittergesteuerte GLEICHRICHTERRÖHRE MIT QUECKSILBERDAMPF-FÜLLUNG

Filament : oxide-coated
Filament : oxyde
Heizfaden: Oxyd

Heating : direct
Chauffage: direct
Heizung : direkt

$V_f$ = 5 V [1]
$I_f$ = 13 A
$T_w$ = min. 90 sec [2]

[1]) Phase shift of $90^o \pm 30^o$ between $V_a$ and $V_f$ and/or use of a centre-tapped filament transformer are recommended.
Il est conseillé de faire fonctionner le tube avec un décalage de phase entre $V_a$ et $V_f$ de $90^o \pm 30^o$ et/ou d'utiliser un transformateur de chauffage à prise médiane
Eine $90^o \pm 30^o$ Phasenverschiebung zwischen $V_a$ und $V_f$ und/oder die Verwendung eines Heiztransformators mit Mittelanzapfung wird empfohlen

[2]) For average conditions, i.e. temperature within limits and proper distribution of mercury (see page A)
After transport and also after a long interruption of service a longer waiting time is required before anode voltage is applied to ensure proper distribution of the mercury. In general, a time of 60 minutes will be sufficient

Pour les conditions, où les températures se trouvent entre leurs limites et où il existe une bonne répartition du mercure (voir page A)
Après le transport et après une longue interruption de service il faut prévoir un délai d'attente plus long avant que la tension d'anode soit appliquée, afin d'obtenir une propre répartition du mercure. En general, un délai de 60 minutes sera suffisant

Für normale Betriebsverhältnisse, d.h. zwischen den Grenzen liegende Temperaturen und richtige Quecksilberverteilung (siehe Seite A)
Nach Transport oder nach längerer Unterbrechung des Betriebs ist vor der Anlegung der Anodenspannung eine längere Wartezeit einzuhalten, damit das Quecksilber sich richtig verteilt. Im allgemeinen wird eine Anheizzeit von 60 Minuten genügen

Typical characteristics
Caractéristiques types
Kenndaten

| | | |
|---|---|---|
| $T_{dion}$ | < | 500 µsec |
| $T_{ion}$ | < | 10 µsec |
| $V_{arc}$ ($I_o$=3A) | = | 12 V |

Limiting values (Absolute limits)
Caractéristiques limites (Limites absolues)
Grenzdaten (Absolute Grenzwerte)

| | | | | | | |
|---|---|---|---|---|---|---|
| $V_{a\ inv_p}$ | = max. | 21 | | 15 | 2,5 kV | 1) |
| $V_{ap}$ | = max. | 21 | | 15 | 2,5 kV | |
| $I_o$ | = max. | 2,5 | max. 3 | max. 5 | A | 2) |
| $I_{ap}$ | = max. | 10 | max. 12 | max. 20 | A | |
| $I_{surge}$ | = max. | 100 | max. 120 | max. 200 | A | 3) |
| $-V_g$ | = max. | 300 | max. 300 | max. 300 | V | 4) |
| $R_g$ | = min. | 10 | min. 10 | min. 10 | kΩ | 5) |
| | = max. | 100 | max. 100 | max. 100 | kΩ | |

Temperature limits
Limites de la température
Temperaturgrenzen

| $V_{a\ inv_p}$ | kV | 21 | 15 | 10 | 2,5 |
|---|---|---|---|---|---|
| $t_{Hg}$ 6) | °C | 25-45 | 25-55 | 25-60 | 25-75 |
| $t_{amb}$ 7) | °C | 15-30 | 15-35 | 15-40 | 15-55 |

1) f = max. 150 c/s

2) $T_{av}$ = max. 30 sec

3) T = max. 0,1 sec

4) 5) See page 3; voir page 3; siehe Seite 3.

6) If the equipment is started not more than twice daily it is permitted to apply high tension at a condensed mercury temperature which is 5 °C less than the values mentioned in the table

Si l'équipement n'est mis en circuit que deux fois par jour au max., il est permis d'appliquer la haute tension à une température du mercure condensé qui est de 5 °C moins que les valeurs mentionnées dans la table

Wenn die Anlage nicht mehr als zweimal täglich eingeschaltet wird, ist es erlaubt die Hochspannung bei einer Temperatur des kondensierten Quecksilbers die um 5 °C niedriger ist als die in der Tabelle erwähnten Werte einzuschalten

7) See page 3; voir page 3; siehe Seite 3.

4) Direct voltage; before conduction
Tension continue; avant l'allumage
Gleichspannung; gelöschte Röhre

5) Recommended value 33 kΩ
Valeur conseillée 33 kΩ
Empfohlener Wert 33 kΩ

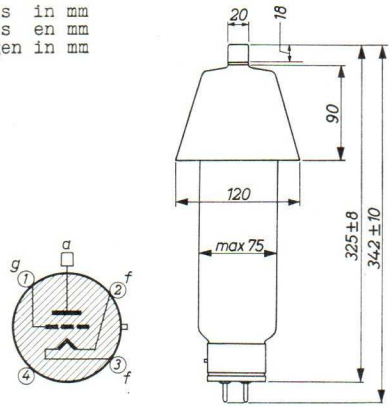
7) Approximate values with natural cooling
The ambient temperature is defined as the temperature of the surrounding air and should be measured under the following conditions:
a. normal atmospheric pressure
b. the tube should be adjusted to the worst probable operating conditions
c. the temperature should be measured when thermal equilibrium has been reached
d. the distance of the thermometer from the envelope shall be 75 mm (measured in the plane perpendicular to the main axis of the tube at the height of the condensed mercury boundary)
e. the thermometer shall be shielded to avoid direct heat radiation

Valeurs approchées avec refroidissement naturel
La température ambiante est définie comme la température de l'air ambiant et doit être mesurée sous les conditions suivantes:
a. pression atmosphérique normale
b. le tube doit être ajusté aux conditions de fonctionnement les pires probables
c. la température doit être mesurée quand l'équilibre thermique a été atteint
d. la distance du thermomètre jusqu'à l'enveloppe doit être de 75 mm (mesurée dans le plan perpendiculaire à l'axe principal du tube et au niveau du mercure condensé)
e. le thermomètre doit être blindé contre la radiation thermique directe

Näherungswerte bei natürlicher Kühlung
Die Umgebungstemperatur wird definiert als die Temperatur der umgebenden Luft und soll unter den folgenden Bedingungen gemessen werden:
a. normaler atmosphärischer Druck
b. die Röhre soll bei den ungünstigst wahrscheinlichen Betriebsbedingungen eingestellt werden
c. die Temperatur soll gemessen werden nachdem thermisches Gleichgewicht erreicht ist
d. der Abstand vom Thermometer bis zum Kolben soll 75 mm betragen (gemessen in der Ebene senkrecht zu der Hauptachse der Röhre auf der Höhe des Quecksilberspiegels)
e. das Thermometer muss für direkte Wärmestrahlung abgeschirmt sein

# PHILIPS

Dimensions in mm
Dimensions en mm
Abmessungen in mm




Base : Super Jumbo with bayonet
Culot : Super Jumbo à baïonnette
Sockel: Super Jumbo mit Bajonett

Socket
Support 40403
Fassung

Anode connector
Connecteur anodique 40620
Anodenanschluss

Anode cap (delivered with tube)
Chapeau anodique ( fourni avec le tube) 40616
Anodenkappe (mit der Röhre geliefert)

This cap must always be mounted on the tube, also during preheating
Ce chapeau doit être monté toujours sur le tube, aussi pendant le préchauffage
Diese Kappe muss immer, auch während der Vorwärmung, auf der Röhre montiert sein

Mounting position: vertical, base down
Montage : vertical, le culot en bas
Einbau : senkrecht mit dem Sockel unten

| Net weight | | Shipping weight | |
|---|---|---|---|
| Poids net | 0,75 kg | Poids brut | 2,3 kg |
| Nettogewicht | | Bruttogewicht | |

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

Transformer regulation and voltage drop in the tubes have been neglected
Les chutes de tension dans le transformateur et dans les tubes ont été négligées
Spannungsverluste im Transformator und in den Röhren sind vernachlässigt

$V_g$ ($V_a$ $inv_p$ = 21 kV) = -100 V
$V_g$ ($V_a$ $inv_p$ = 10 kV) = -50 V
$I_g$ = 2 mA

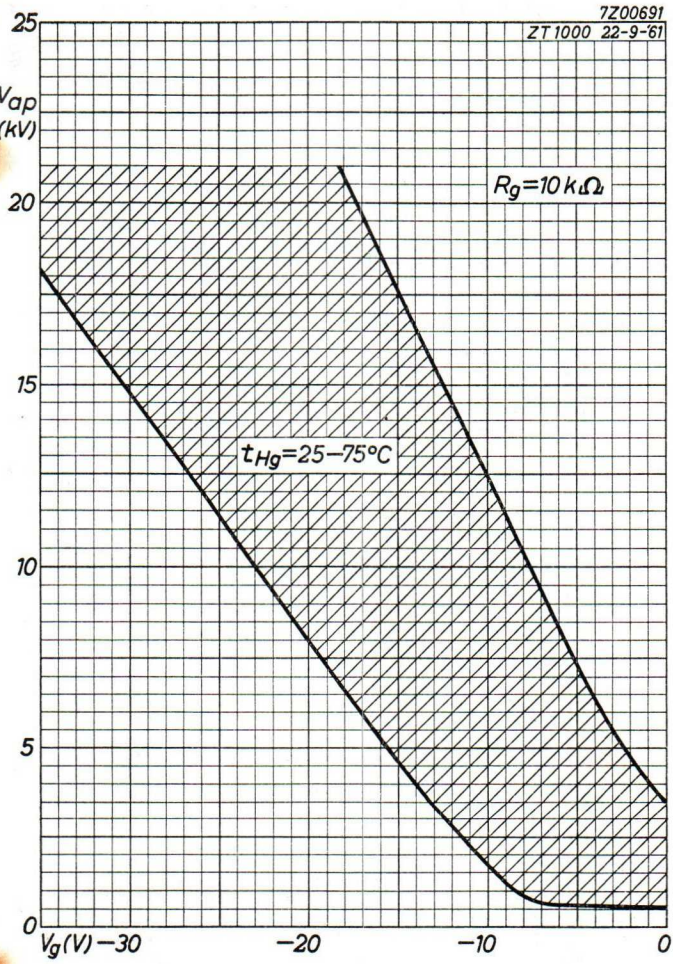
| | $V_a$ $inv_p$ = 21 kV | | | |
|---|---|---|---|---|
| Circuit [1]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 7,4 | 6,7 | 5 | 33,5 |
| b | 14,8 | 13,4 | 5 | 67 |
| c | 8,5 | 10 | 7,5 | 75 |
| d | 14,8 | 20 | 7,5 | 150 |

| | $V_a$ $inv_p$ = 15 kV | | | |
|---|---|---|---|---|
| Circuit [1]) Schaltung | $V_{tr}$ ($kV_{eff}$) | $V_o$ (kV) | $I_o$ (A) | $W_o$ (kW) |
| a | 5,3 | 4,8 | 6 | 28,8 |
| b | 10,6 | 9,6 | 6 | 57,6 |
| c | 6,1 | 7,2 | 9 | 64,8 |
| d | 10,6 | 14,4 | 9 | 130 |

[1]) See page T 150 in front of this section
Voir page T 150 en tête de ce chapitre
Siehe Seite T 150 am Anfang dieses Abschnitts

PHILIPS

ZT1000

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ZT1000

PHILIPS

