

## AC/DC AND 13-V CAR-RADIO VALVES WITH SIDE CONTACT BASES

| Type Number        | Valve type                                  | Maximum dimensions<br>mm | Base (Connection reference in brackets) <sup>15)</sup> | Application (see p. 2) | Filament data |                  |                  | Anode voltage $V_a$<br>Volts | Anode current $I_a$<br>mA   | Neg. grid bias $V_{g1}$<br>Volts | Screen-grid voltage $V_{g2}$<br>Volts              | Screen-grid current $I_{g2}$<br>mA | Voltage on grids 3 (and 5) $V_{g3(5)}$<br>Volts     | Voltage on grid 4 $V_{g4}$<br>Volts                                   | Mutual conduct. $S$<br>mA/V | Amplification factor $\mu$ | Internal resistance $R_i$<br>Ohms        | External anode resist. or optimum matching imped. $R_a$ Ohm | Output at 10% distortion $W_o$<br>Watts | Grid A.C. voltage at the indicated output $V_{R.M.S.}$ $V_i$ | Max. anode dissipation $W_{a,max}$<br>Watts | Grid anode capacity $C_{ag1}$<br>$\mu F$ | Type Number |
|--------------------|---------------------------------------------|--------------------------|--------------------------------------------------------|------------------------|---------------|------------------|------------------|------------------------------|-----------------------------|----------------------------------|----------------------------------------------------|------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------|-----------------------------|----------------------------|------------------------------------------|-------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------|---------------------------------------------|------------------------------------------|-------------|
|                    |                                             |                          |                                                        |                        | Heating       | Voltage<br>Volts | Current<br>Amps. |                              |                             |                                  |                                                    |                                    |                                                     |                                                                       |                             |                            |                                          |                                                             |                                         |                                                              |                                             |                                          |             |
| CK1                | Octode                                      | 116 × 46                 | P35 (38)                                               | 4                      | indir.        | 13               | 0,200            | 200                          | 1,6 <sup>1)</sup><br><0,015 | —1,5                             | 90                                                 | 2 <sup>2)</sup>                    | 70                                                  | —1,5<br>—25                                                           | 0,6<br><0,002               | —                          | 1,5·10 <sup>6</sup><br>>10 <sup>7</sup>  | —                                                           | —                                       | —                                                            | —                                           | <0,06 <sup>3)</sup>                      | CK1         |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 100                          | 1,6 <sup>1)</sup><br><0,015 | —2                               | 90                                                 | 2 <sup>2)</sup>                    | 70                                                  | —1,5<br>—25                                                           | 0,55<br><0,002              | —                          | 1,0·10 <sup>6</sup><br>>10 <sup>7</sup>  | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
| CH1                | Variable-Mu Hexode                          | 110 × 46                 | P35 (35)                                               | 5                      | indir.        | 13               | 0,200            | 200                          | 2,2 <sup>4)</sup><br><0,15  | —2<br>—24                        | 100                                                | 4 <sup>5)</sup>                    | —12 <sup>4)</sup><br>or $R_{g3} = 0,5 M\Omega$      | 50                                                                    | 0,55<br><0,002              | —                          | 2,0·10 <sup>6</sup><br>>10 <sup>7</sup>  | —                                                           | —                                       | —                                                            | —                                           | <0,003                                   | CH1         |
|                    |                                             |                          |                                                        | 1, 2                   | indir.        | 13               | 0,200            | 200                          | 4,0<br><0,015               | —2<br>—24                        | 100                                                | 2,0 <sup>7)</sup>                  | —2<br>—24                                           | 50                                                                    | 2,0<br><0,002               | —                          | 2,0·10 <sup>6</sup><br>>10 <sup>7</sup>  | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
| CF3                | Variable-Mu Pentode                         | 106 × 43                 | P30 (34)                                               | 1, 2                   | indir.        | 13               | 0,200            | 200                          | 8,0<br><0,015               | —3<br>—55                        | 100                                                | 2,6                                | 0                                                   | —                                                                     | 1,8<br><0,002               | 1600                       | 0,9·10 <sup>6</sup><br>>10 <sup>7</sup>  | —                                                           | —                                       | —                                                            | —                                           | <0,003                                   | CF3         |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 100                          | 8,0<br><0,015               | —3<br>—55                        | 100                                                | 2,6                                | 0                                                   | —                                                                     | 1,8<br><0,002               | 450                        | 0,25·10 <sup>6</sup><br>>10 <sup>7</sup> | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
| CF2                | Variable-Mu Pentode                         | 109 × 43                 | P30 (34)                                               | 1, 2                   | indir.        | 13               | 0,200            | 200                          | 4,5<br><0,015               | —2<br>—22                        | 100                                                | 1,4                                | 0                                                   | —                                                                     | 2,2<br><0,002               | 3000                       | 1,4·10 <sup>6</sup><br>>10 <sup>7</sup>  | —                                                           | —                                       | —                                                            | —                                           | <0,003                                   | CF2         |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 100                          | 4,5<br><0,015               | —2<br>—22                        | 100                                                | 1,4                                | 0                                                   | —                                                                     | 2,2<br><0,002               | 800                        | 0,4·10 <sup>6</sup><br>>10 <sup>7</sup>  | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
| CF7                | H.F. Pentode                                | 106 × 43                 | P30 (34)                                               | 1, 2, 7, 8, 11         | indir.        | 13               | 0,200            | 200                          | 3                           | —2                               | 100                                                | 1,1                                | 0                                                   | —                                                                     | 2,1                         | 4200                       | 2,0·10 <sup>6</sup>                      | —                                                           | —                                       | —                                                            | —                                           | <0,003                                   | CF7         |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 100                          | 3                           | —2                               | 100                                                | 1,1                                | 0                                                   | —                                                                     | 2,1                         | 1500                       | 0,7·10 <sup>6</sup>                      | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
| CF1                | H.F. Pentode                                | 109 × 43                 | P30 (34)                                               | 1, 2, 7, 8, 11         | indir.        | 13               | 0,200            | 200                          | 3                           | —2                               | 100                                                | 0,9                                | 0                                                   | —                                                                     | 2,3                         | 4000                       | 1,7·10 <sup>6</sup>                      | —                                                           | —                                       | —                                                            | —                                           | <0,003                                   | CF1         |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 100                          | 3                           | —2                               | 100                                                | 0,9                                | 0                                                   | —                                                                     | 2,3                         | 1400                       | 0,6·10 <sup>6</sup>                      | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
| CB1                | Duodiode                                    | 89 × 29                  | V24 (54)                                               | 13                     | indir.        | 13               | 0,200            | —                            | —                           | —                                | —                                                  | —                                  | —                                                   | —                                                                     | —                           | —                          | —                                        | —                                                           | —                                       | —                                                            | —                                           | —                                        | CB1         |
| CB2                | Duodiode                                    | 81 × 29                  | V24 (53)                                               | 13                     | indir.        | 13               | 0,200            | —                            | —                           | —                                | —                                                  | —                                  | —                                                   | —                                                                     | —                           | —                          | —                                        | —                                                           | —                                       | —                                                            | —                                           | —                                        | CB2         |
| CBC1               | Duodiode-Triode                             | 100 × 37                 | P30 (28)                                               | 9                      | indir.        | 13               | 0,200            | 200                          | 4,0                         | —5                               | —                                                  | —                                  | —                                                   | —                                                                     | 2,0                         | 27                         | 13.500                                   | —                                                           | —                                       | —                                                            | —                                           | —                                        | CBC1        |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 100                          | 2,0                         | —2,5                             | —                                                  | —                                  | —                                                   | —                                                                     | 1,8                         | 27                         | 15.000                                   | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
| CC2                | Triode                                      | 100 × 37                 | P30 (26)                                               | 3, 6, 10, 11           | indir.        | 13               | 0,200            | 200                          | 6,0                         | —1,5                             | —                                                  | —                                  | —                                                   | —                                                                     | 2,5                         | 30                         | 12.000                                   | —                                                           | —                                       | —                                                            | —                                           | 1,7                                      | CC2         |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 100                          | 2,0                         | —1,5                             | —                                                  | —                                  | —                                                   | —                                                                     | 1,8                         | 30                         | 16.000                                   | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
| CL1                | Power Pentode                               | 109 × 43                 | P30 (32)                                               | 12                     | indir.        | 13               | 0,200            | 200                          | 25                          | —14                              | 200                                                | —                                  | —                                                   | —                                                                     | 2,5                         | —                          | 50.000                                   | 8.000                                                       | 1,7                                     | 9                                                            | 5                                           | —                                        | CL1         |
| CL2 <sup>8)</sup>  | Power Pentode                               | 123 × 46                 | P35 (32)                                               | 12                     | indir.        | 24               | 0,200            | 200                          | 40                          | —19                              | 100                                                | —                                  | —                                                   | —                                                                     | 3,1                         | —                          | 23.000                                   | 5.000                                                       | 3,0                                     | 8,8                                                          | 8                                           | —                                        | CL2         |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 200                          | 40                          | —11                              | 75                                                 | —                                  | —                                                   | —                                                                     | 3,7                         | —                          | 19.000                                   | 5.000                                                       | 2,5                                     | 6,9                                                          | 8                                           | —                                        |             |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 100                          | 50                          | —15                              | 100                                                | —                                  | —                                                   | —                                                                     | 3,8                         | —                          | 16.000                                   | 2.000                                                       | 1,7                                     | 9,7                                                          | 5                                           | —                                        |             |
| CL4 <sup>9)</sup>  | High-sensitivity Power Pentode              | 127 × 50                 | P35 (32)                                               | 12                     | indir.        | 33               | 0,200            | 200                          | 45                          | —8,5 <sup>10)</sup>              | 200                                                | 6,0                                | —                                                   | —                                                                     | 8,0                         | —                          | 35.000                                   | 4.500                                                       | 4                                       | 5                                                            | 9                                           | —                                        | CL4         |
| CBL1 <sup>9)</sup> | Duodiode and high-sensitivity Power Pentode | 130 × 52                 | P35 (33)                                               | 13, 12                 | indir.        | 44               | 0,200            | 200                          | 45                          | —8,5 <sup>10)</sup>              | 200                                                | 6,0                                | —                                                   | —                                                                     | 8,0                         | —                          | 35.000                                   | 4.500                                                       | 4                                       | 5                                                            | 9                                           | —                                        | CBL1        |
| EM1                | Tuning Cross <sup>12)</sup>                 | 75 × 27                  | P26 (39)                                               | 14                     | indir.        | 6,3              | 0,200            | 200 <sup>14)</sup>           | 0,075<br>0,020              | 0<br>—4                          | —                                                  | $I_s = 0,13$<br>$I_s = 0,14$       | —                                                   | $\phi = 10^{\circ 14}$<br>$\phi = 90^{\circ 14}$                      | —                           | —                          | —                                        | 2,0·10 <sup>6</sup>                                         | —                                       | —                                                            | —                                           | —                                        | EM1         |
| C/EM2              | Electron ray Tuning Indicator               | 75 × 31                  | P30 (40)                                               | 14                     | indir.        | 6,3              | 0,200            | 200 <sup>11)</sup>           | —                           | —                                | $V_{s1} = 200$<br>$V_{s2} = 200$<br>$V_{s3} = 200$ | —                                  | $V_{g1}' = +3$<br>$V_{g2}' = 0$<br>$V_{g3}' = -4,5$ | $\phi = 160^{\circ}$<br>$\phi = 150^{\circ}$<br>$\phi = 5^{\circ 14}$ | —                           | —                          | —                                        | —                                                           | —                                       | —                                                            | —                                           | —                                        | C/EM2       |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 200 <sup>11)</sup>           | —                           | —                                | $V_{s1} = 200$<br>$V_{s2} = 200$                   | —                                  | $V_{g1}' = 0$<br>$V_{g2}' = 0$                      | $\phi = 150^{\circ}$<br>$\phi = 90^{\circ 14}$                        | —                           | —                          | —                                        | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 200 <sup>11)</sup>           | —                           | —                                | $V_{s1} = 200$<br>$V_{s2} = 200$                   | —                                  | $V_{g1}' = 0$<br>$V_{g2}' = 0$                      | $\phi = 150^{\circ}$<br>$\phi = 90^{\circ 14}$                        | —                           | —                          | —                                        | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |
|                    |                                             |                          |                                                        |                        |               |                  |                  | 200 <sup>12)</sup>           | 3                           | —2,5                             | —                                                  | —                                  | —                                                   | —                                                                     | 2,0                         | 50                         | 25.000                                   | —                                                           | —                                       | —                                                            | —                                           | —                                        |             |

1) The data of this horizontal column apply for the oscillating condition at  $V_{osc} = 8,5 V_{R.M.S.}$  ( $I_{g1} = 190 \mu A$ ) and for all-wave receivers. The valve must not be controlled by A.V.C. in the short wave range. The grid leak resistance amounts to 50,000 ohms and is connected to the neutral. The figure given in column Mutual Conductance indicates the conversion conductance.

2) Screen-grid current  $I_{g2} + I_{g3} = 3,8 \text{ mA}$ .

3) Capacity between anode and grid 4.

4) The data of this horizontal column apply for the oscillating condition at  $V_{osc} = 9 V_{R.M.S.}$ . The figure in column Mutual Conductance gives the conversion conductance.

5)  $I_{g4} = 0,1 \text{ mA}$ .  
With fixed bias.

6)  $I_{g4} = 0,25 \text{ mA}$ .

7) Not for car-radio.

8) Only for high anode voltages.

9) Only for automatic grid bias ( $R_k = 167 \text{ ohms}$ ).

11) Voltage on the triode anode.

12) Data for using the triode section for other amplifier purposes.

13) Electron ray tuning indicator.

14) Light sector, measured at the edge of the screen.

15) See page 15.