

Typenreihe/Type range T 85 N 400* 600 800 1000 1100 1200 1400 1600 1800*

Elektrische Eigenschaften

Electrical properties

Höchstzulässige Werte

Maximum permissible values

| | | | | |
|--------------------|---|--|---|--------------------------------------|
| V_{DRM}, V_{RRM} | Periodische Vorwärts- und Rückwärts-Sperrspannung | repetitive peak forward off-state and reverse voltages | 400...1800 | V |
| I_{TRMSM} | Effektiver Durchlaßstrom | RMS on-state current | 200 | A |
| I_{TAVM} | Dauergrenzstrom | average on-state current | $t_C = 85^\circ C$ $t_C = 56^\circ C$ | 85 127 |
| I_{TRM} | Periodischer Spitzenstrom | repetitive peak on-state current | 1200 | A |
| I_{TSM} | Stoßstrom-Grenzwert | surge current | $t_p = 10 \text{ ms}, t_{vj} = 45^\circ C$ $t_p = 10 \text{ ms}, t_{vj} = t_{vj \text{ max}}$ | 2300 2000 |
| $\int i^2 dt$ | Grenzlastintegral | $\int i^2 dt$ -value | $t_p = 10 \text{ ms}, t_{vj} = 45^\circ C$ $t_p = 10 \text{ ms}, t_{vj} = t_{vj \text{ max}}$ | 26500 20000 |
| $(di/dt)_{cr}$ | Kritische Stromsteilheit | critical rate of rise of on-state current | nicht periodisch/non repetitive | 800 |
| | | | Dauerbetrieb/continuous operation, $i_{TM} = 400 \text{ A}$, $V_L = 10 \text{ V}, i_G = 0,6 \text{ A}, di_G/dt = 0,6 \text{ A}/\mu\text{s}$ | 150 |
| $(dv/dt)_{cr}$ | Kritische Spannungssteilheit | critical rate of rise of off-state voltage | $v_D = 67\% V_{DRM}, t_{vj} = t_{vj \text{ max}}$ 5. Kennbuchstabe/5th letter C 5. Kennbuchstabe/5th letter F | 400 1000 |
| | | | | V/ μs V/ μs |

Charakteristische Werte

Characteristic values

| | | | | | |
|------------|---|---|--|-----|---------------|
| v_T | Oberer Durchlaßspannung | max. on-state voltage | $t_{vj} = 25^\circ C, i_T = 400 \text{ A}$ | 1,9 | V |
| $V_{(TO)}$ | Schleusenspannung | threshold voltage | $t_{vj} = t_{vj \text{ max}}$ | 1 | V |
| r_T | Ersatzwiderstand | slope resistance | $t_{vj} = t_{vj \text{ max}}$ | 2,6 | m Ω |
| v_{GT} | Oberer Zündspannung | max. gate trigger voltage | $t_{vj} = 25^\circ C, v_D = 6 \text{ V}, R_A = 5 \Omega$ | 1,4 | V |
| i_{GT} | Oberer Zündstrom | max. gate trigger current | $t_{vj} = 25^\circ C, v_D = 6 \text{ V}, R_A = 5 \Omega$ | 150 | mA |
| | Unterer Zündstrom | min. gate trigger current | $t_{vj} = t_{vj \text{ max}}, v_D = 6 \text{ V}, R_A = 5 \Omega$ | 5 | mA |
| I_H | Oberer Haltestrom | max. holding current | $t_{vj} = 25^\circ C, v_D = 6 \text{ V}, R_A = 5 \Omega$ | 200 | mA |
| I_L | Oberer Einraststrom | max. latching current | $t_{vj} = 25^\circ C, v_D = 6 \text{ V}, R_{GK} \geq 10 \Omega$ | 620 | mA |
| i_D, I_R | Oberer Vorwärts- und Rückwärts-Sperrstrom | max. forward off-state and reverse currents | $i_G = 0,6 \text{ A}, di_G/dt = 0,6 \text{ A}/\mu\text{s}, t_g = 20 \mu\text{s}$ $t_{vj} = t_{vj \text{ max}}, v_D = V_{DRM} (V_R = V_{RRM})$ | 25 | mA |
| t_{gd} | Oberer Zündverzögerung | max. gate controlled delay time | $i_G = 0,6 \text{ A}, di_G/dt = 0,6 \text{ A}/\mu\text{s}$ | 3 | μs |
| t_q | Typische Freiwerdezeit | typical turn-off time | Prüfbedingungen/test conditions 3.4.3.4 | 200 | μs |
| C_{null} | Typische Nullkapazität | typical zero capacitance | $t_{vj} = 25^\circ C, f = 10 \text{ kHz}$ | 3 | nF |

Thermische Eigenschaften

Thermal properties

| | | | | |
|----------------------|-----------------------------------|--------------------------------------|---|---|
| R_{thJC} | Innere Wärmewiderstand | thermal resistance, junction to case | $\theta = 180^\circ \text{el, sinus}$ DC | $\leq 0,3 \text{ }^\circ\text{C}/\text{W}$ $\leq 0,28 \text{ }^\circ\text{C}/\text{W}$ |
| $t_{vj \text{ max}}$ | Höchstzul. Sperrschichttemperatur | max. junction temperature | | 125 $^\circ\text{C}$ |
| $t_{vj \text{ op}}$ | Betriebstemperatur | operating temperature | | -40 $^\circ\text{C}$... +125 $^\circ\text{C}$ |
| t_{stg} | Lagertemperatur | storage temperature | | -40 $^\circ\text{C}$... +150 $^\circ\text{C}$ |

Mechanische Eigenschaften

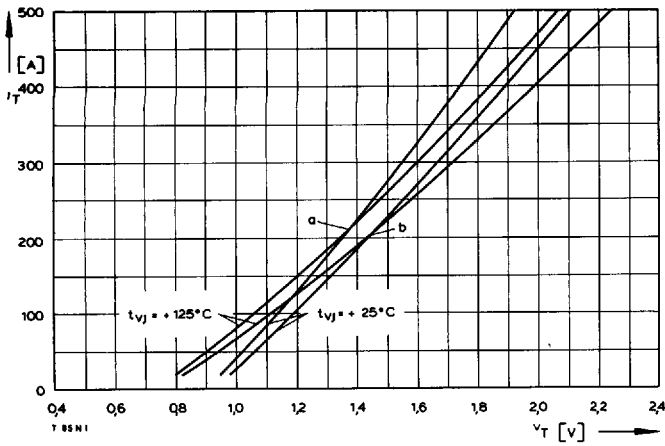
Mechanical properties

| | | | | |
|---|-----------------------------|---------------------------------|-------------------------|-------------------------|
| | Si-Element mit Druckkontakt | Si-pellet with pressure contact | | |
| G | Gewicht | weight | | 150 g |
| M | Anzugsdrehmoment | tightening torque | | 20 Nm |
| | Maßbilder B/V | outlines B/V | DIN 41892-204 B 3/TO 94 | Seite/page 238/239 |
| | Kriechstrecke | creepage distance | | 8 mm |
| | Feuchteklasse | humidity classification | DIN 40040 | C |
| | Schüttelfestigkeit | vibration resistance | f = 50 Hz | 5x9,81 m/s ² |

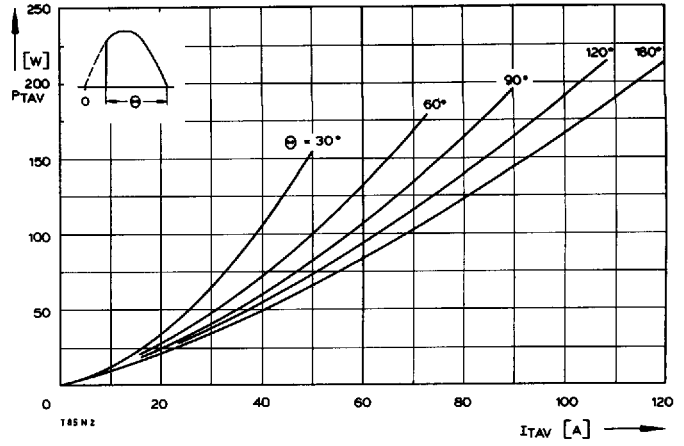
* Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

T 85 N

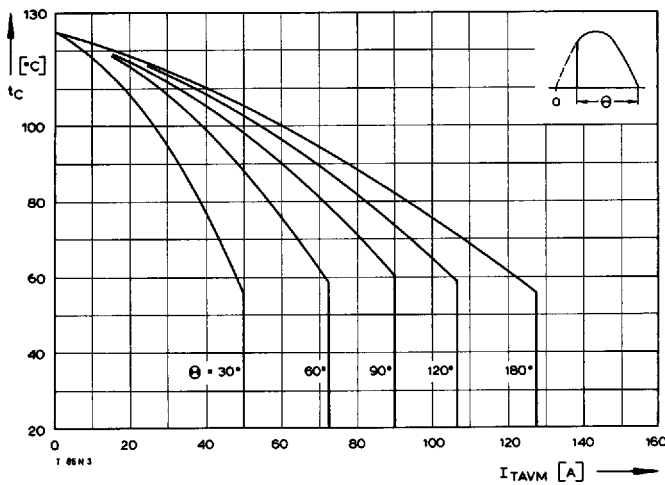
T-25-17



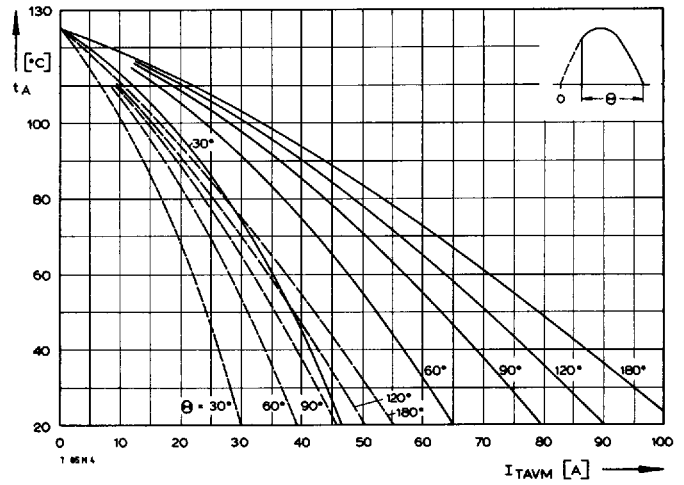
Bild/Fig. 1
Durchlaßkennlinien/On-state characteristics
a – Typische Kennlinien/typical characteristics
b – Grenzkennlinien/limiting characteristics



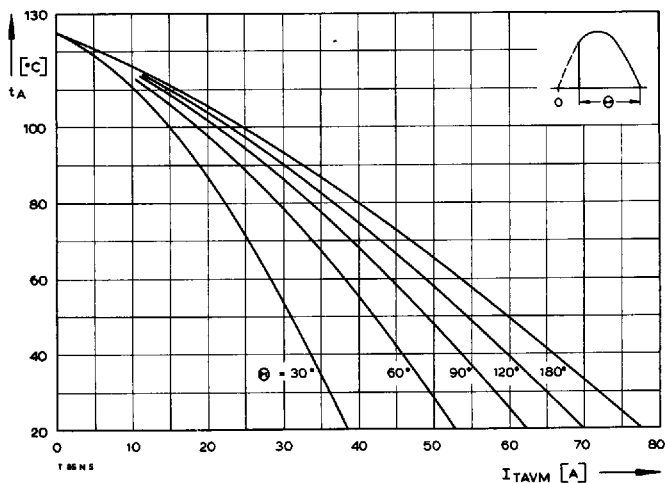
Bild/Fig. 2
Durchlaßverlustleistung P_T/On-state power loss P_T
Parameter: Stromfußwinkel theta/current conduction angle theta



Bild/Fig. 3
Höchstzulässige Gehäusetemperatur t_c
Maximum allowable case temperature t_c

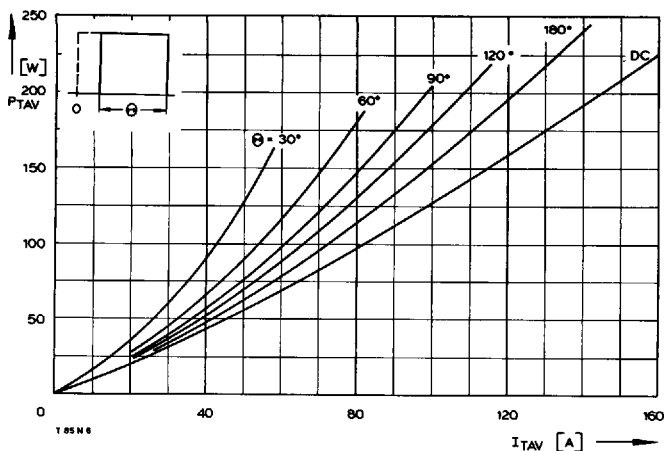


Bild/Fig. 4
Höchstzulässige Kühlmitteltemperatur t_A, Kühlkörper KL 42
Maximum allowable cooling medium temperature t_A, heatsink type KL 42
- - - Luftselbstkühlung/natural cooling
— Verstärkte Luftkühlung/forced cooling

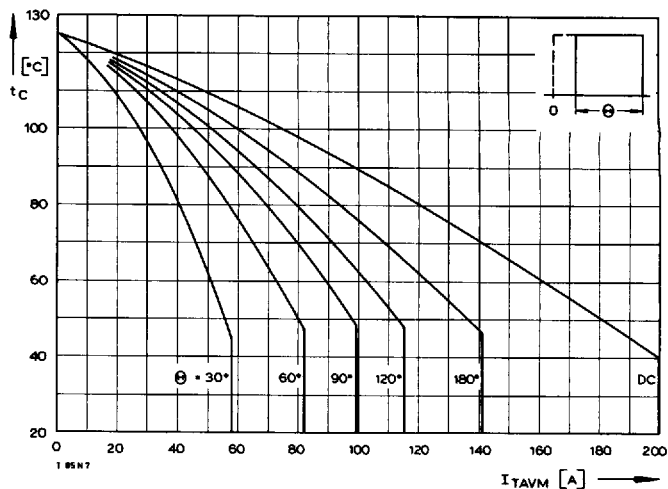


Bild/Fig. 5
Höchstzulässige Kühlmitteltemperatur t_A bei Luftselbstkühlung,
Kühlkörper KL 91
Maximum allowable cooling medium temperature t_A at natural cooling,
heatsink type KL 91

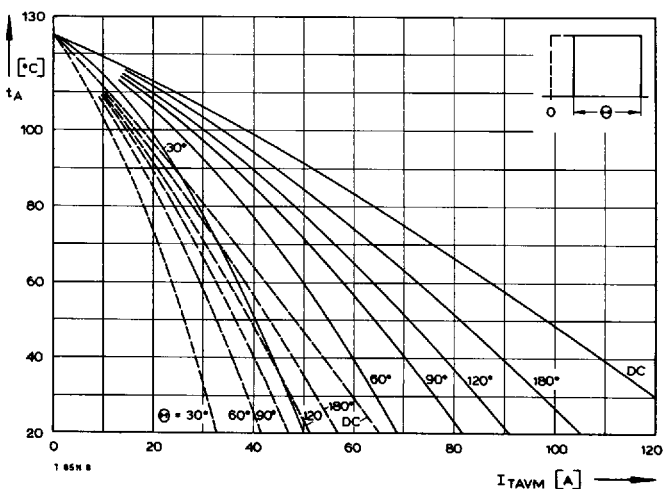
T-25-17



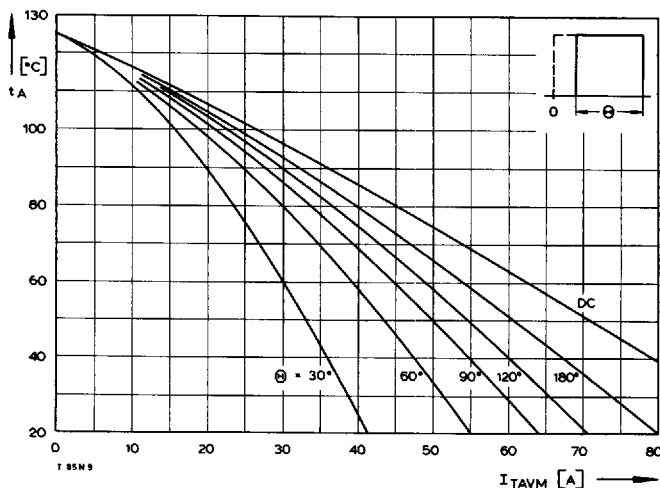
Bild/Fig. 6
Durchlaßverlustleistung P_T /On-state power loss P_T
Parameter: Stromflußwinkel Θ /current conduction angle Θ



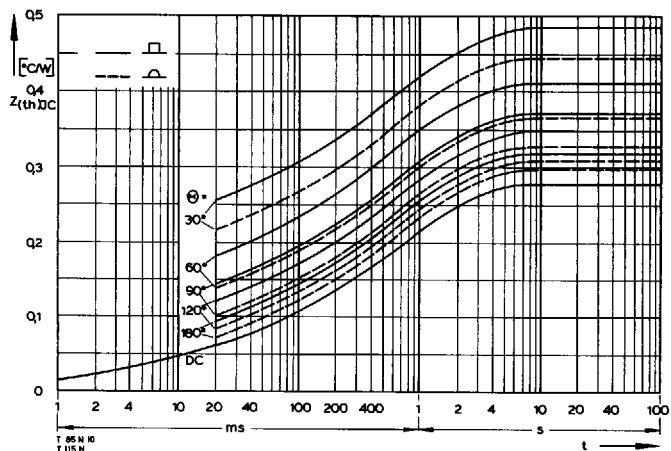
Bild/Fig. 7
Höchstzulässige Gehäusetemperatur t_c
Maximum allowable case temperature t_c



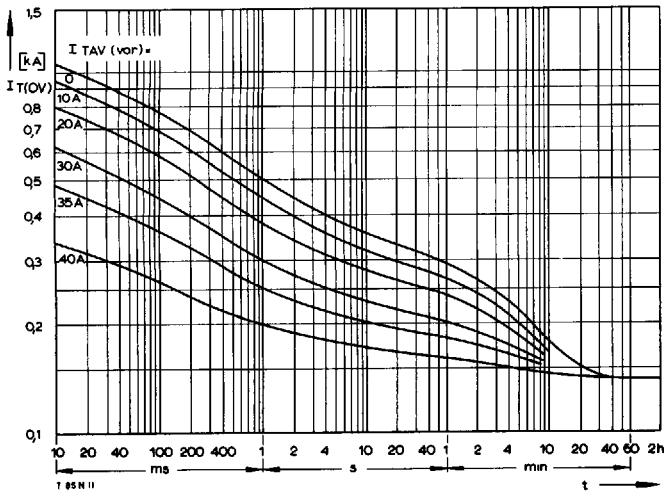
Bild/Fig. 8
Höchstzulässige Kühlmitteltemperatur t_A , Kühlkörper KL 42
Maximum allowable cooling medium temperature t_A , heatsink type KL 42
----- Luftselbstkühlung/natural cooling
———— Verstärkte Luftkühlung/forced cooling



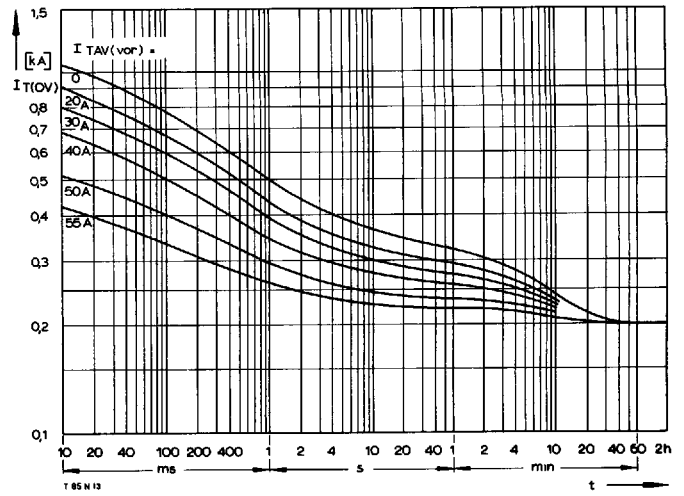
Bild/Fig. 9
Höchstzulässige Kühlmitteltemperatur t_A bei Luftselbstkühlung,
Kühlkörper KL 91
Maximum allowable cooling medium temperature t_A at natural cooling,
heatsink type KL 91



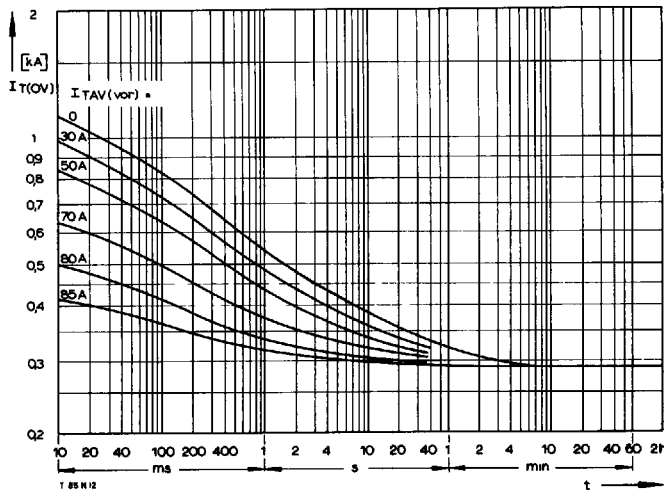
Bild/Fig. 10
Transienter innerer Wärmewiderstand $Z_{T(jc)}$ bei sinus- und rechteckförmigem
Stromverlauf.
Transient thermal impedance $Z_{T(jc)}$, junction to case at sinusoidal and
square wave current.



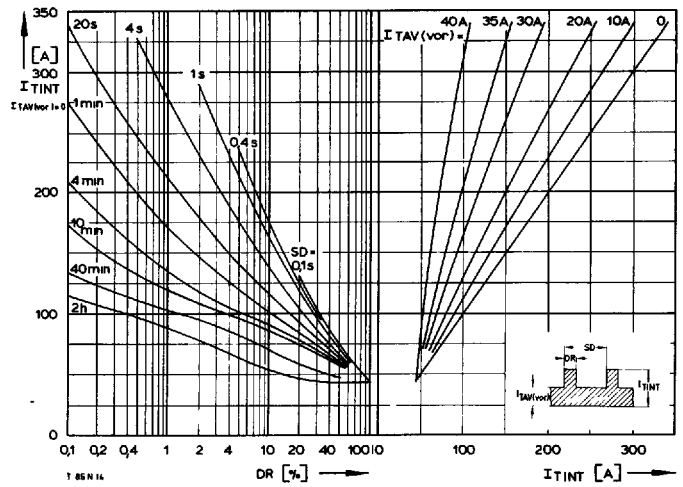
Bild/Fig. 11
Überstrom $I_{T(OV)}$ bei **Luftselbstkühlung**, $t_a = 45^\circ\text{C}$, Kühlkörper **KL 42**
Overload on-state current $I_{T(OV)}$ at **natural cooling**, $t_a = 45^\circ\text{C}$,
heatsink type **KL 42**
Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$



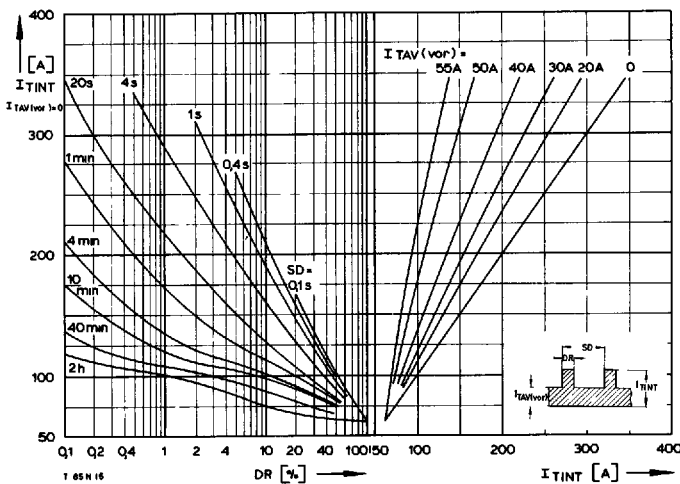
Bild/Fig. 12
Überstrom $I_{T(OV)}$ bei **Luftselbstkühlung**, $t_a = 45^\circ\text{C}$, Kühlkörper **KL 91**
Overload on-state current $I_{T(OV)}$ at **natural cooling**, $t_a = 45^\circ\text{C}$,
heatsink type **KL 91**
Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$



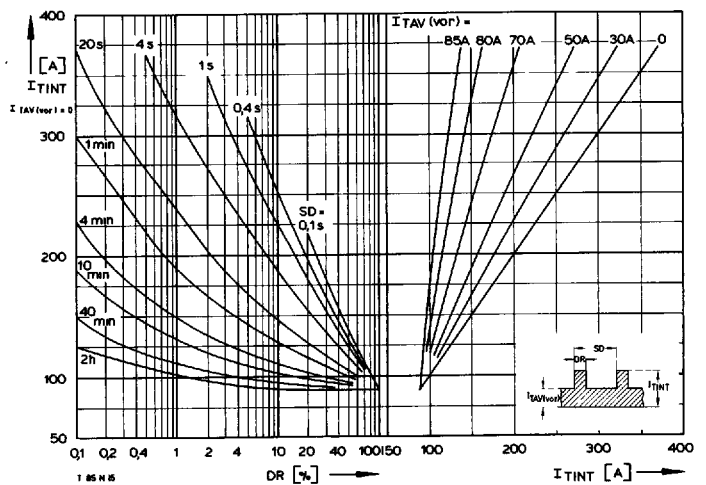
Bild/Fig. 13
Überstrom $I_{T(OV)}$ bei **verstärkter** Luftkühlung, $t_a = 35^\circ\text{C}$, Kühlkörper **KL 42**
Overload on-state current $I_{T(OV)}$ at **forced cooling**, $t_a = 35^\circ\text{C}$,
heatsink type **KL 42**
Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$



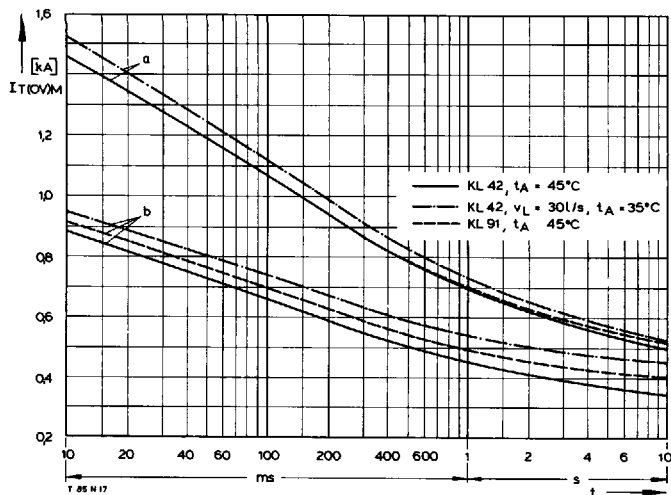
Bild/Fig. 14
Höchstzulässiger Durchlaßstrom I_{TINT} bei Aussetzbetrieb und **Luftselbstkühlung**,
 $t_a = 45^\circ\text{C}$, Kühlkörper **KL 42**
Limiting on-state current I_{TINT} during intermittent operation at **natural cooling**,
 $t_a = 45^\circ\text{C}$, heatsink type **KL 42**
Parameter: Spieldauer/cycle duration **SD**
Vorlaststrom/pre-load current $I_{TAV(vor)}$



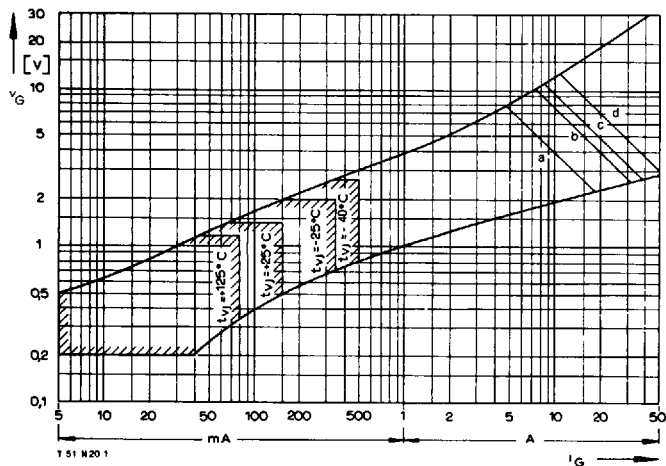
Bild/Fig. 15
Höchstzulässiger Durchlaßstrom I_{TINT} bei Aussetzbetrieb und **Luftselbstkühlung**,
 $t_a = 45^\circ\text{C}$, Kühlkörper **KL 91**
Limiting on-state current I_{TINT} during intermittent operation at **natural cooling**,
 $t_a = 45^\circ\text{C}$, heatsink type **KL 91**
Parameter: Spieldauer/cycle duration **SD**
Vorlaststrom/pre-load current $I_{TAV(vor)}$



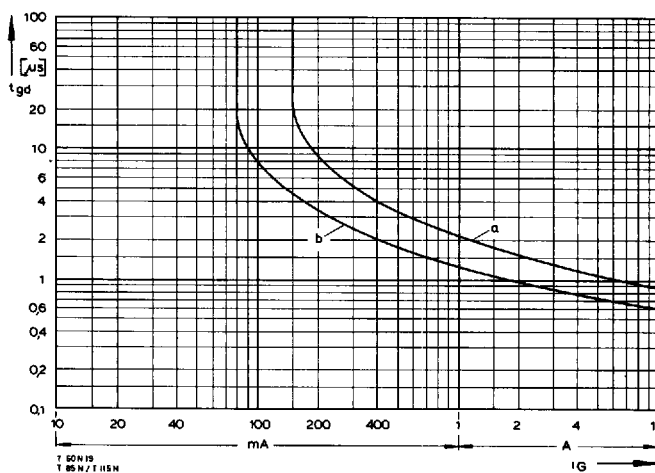
Bild/Fig. 16
Höchstzulässiger Durchlaßstrom I_{TINT} bei Aussetzbetrieb und **verstärkter**
Luftkühlung, $t_a = 35^\circ\text{C}$, Kühlkörper **KL 42**
Limiting on-state current I_{TINT} during intermittent operation at **forced cooling**,
 $t_a = 35^\circ\text{C}$, heatsink type **KL 42**
Parameter: Spieldauer/cycle duration **SD**
Vorlaststrom/pre-load current $I_{TAV(vor)}$



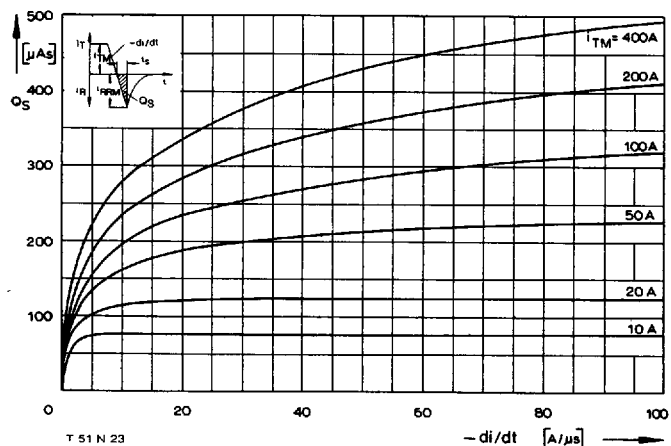
Bild/Fig. 17
 Grenzstrom $I_{T(OV)M}$ bei Luftselbstkühlung und verstärkter Luftkühlung, Kühlkörper KL 42... und KL 91..., $u_{RM} = 0,8 U_{RRM}$.
 Limiting overload on-state current $I_{T(OV)M}$ at natural and forced cooling, heatsink type KL 42... and KL 91..., $u_{RM} = 0.8 U_{RRM}$.
 a – Belastung aus Leerlauf/current surge under no-load conditions
 b – Belastung nach Betrieb mit Dauergrenzstrom I_{TAVM} /current surge occurs during operation at limiting mean on-state current rating I_{TAVM}



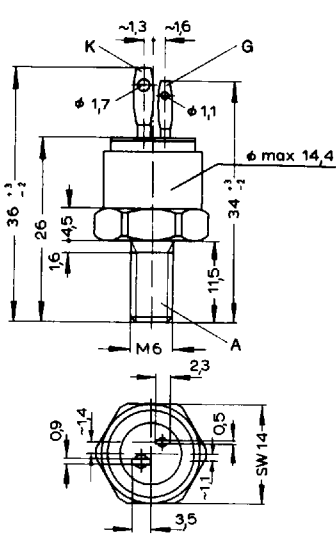
Bild/Fig. 18
 Zündbereich und Spitzensteuerleistung bei $v_D \geq 6\text{ V}$.
 Gate characteristic and peak gate power dissipation at $v_D \geq 6\text{ V}$.
 Parameter: a b c d
 Steuerimpulsdauer/Pulse duration t_g [ms] 10 1 0,5 0,1
 Höchstzulässige Spitzensteuerleistung/Maximum allowable peak gate power [W] 40 80 100 150



Bild/Fig. 19
 Zündverzögerung t_{gd} bei $i_{TM} = 30\text{ A}$, $t_{vj} = 25^\circ\text{C}$.
 Gate controlled delay time t_{gd} at $i_{TM} = 30\text{ A}$, $t_{vj} = 25^\circ\text{C}$
 a – äußerster Verlauf/limiting characteristic
 b – typischer Verlauf/typical characteristic

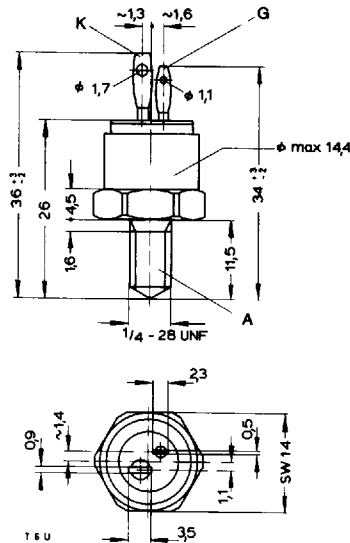


Bild/Fig. 20
 Nachlaufladung Q_S in Abhängigkeit von der abkommutierenden Stromsteilheit $-di/dt$ bei $t_{vj} = 125^\circ\text{C}$.
 Der angegebene Verlauf wird von 90% aller Thyristoren nicht überschritten.
 Lag charge Q_S versus the rate of decay of the forward on-state current $-di/dt$ at $t_{vj} = 125^\circ\text{C}$.
 These curves are valid for 90% of all thyristors.



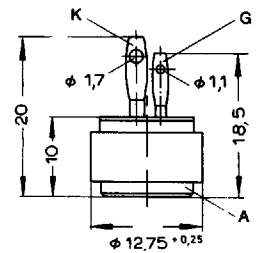
T 7 N...C
T 10 N...C
T 13 N...C

1



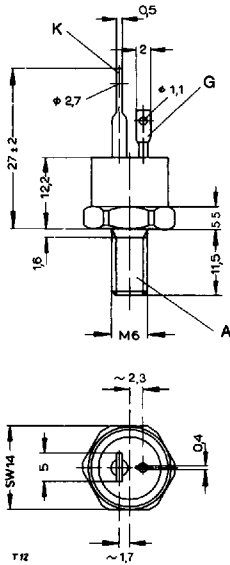
T 7 N...U
T 10 N...U
T 13 N...U

2



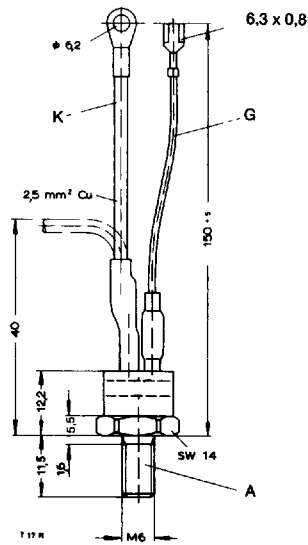
T 7 N...H
T 10 N...H
T 13 N...H

3



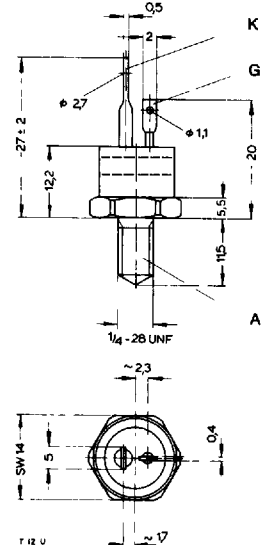
T 12 N...C
T 15.1 N...C
T 17 N...C
T 24 N...C
T 31 N...C

4



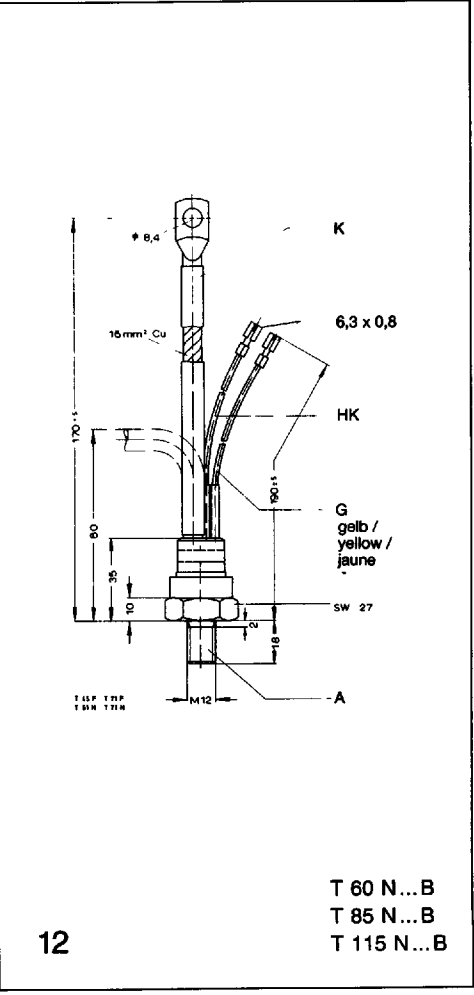
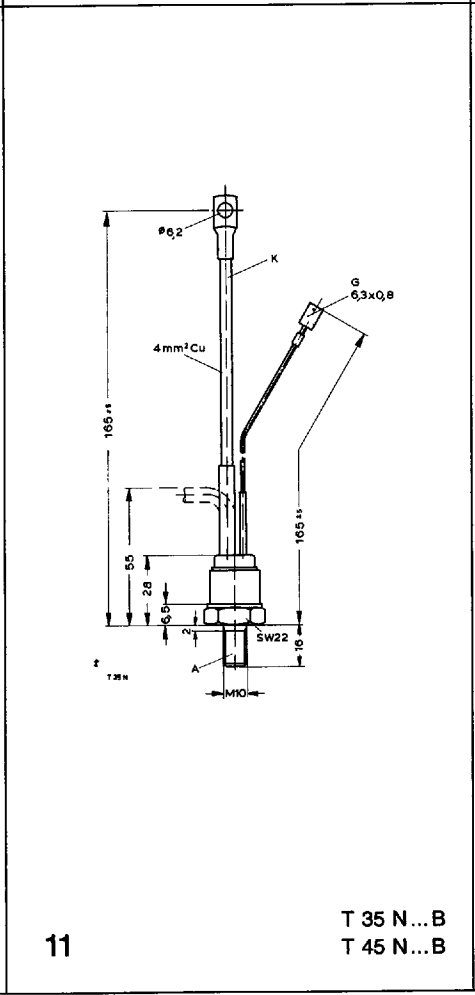
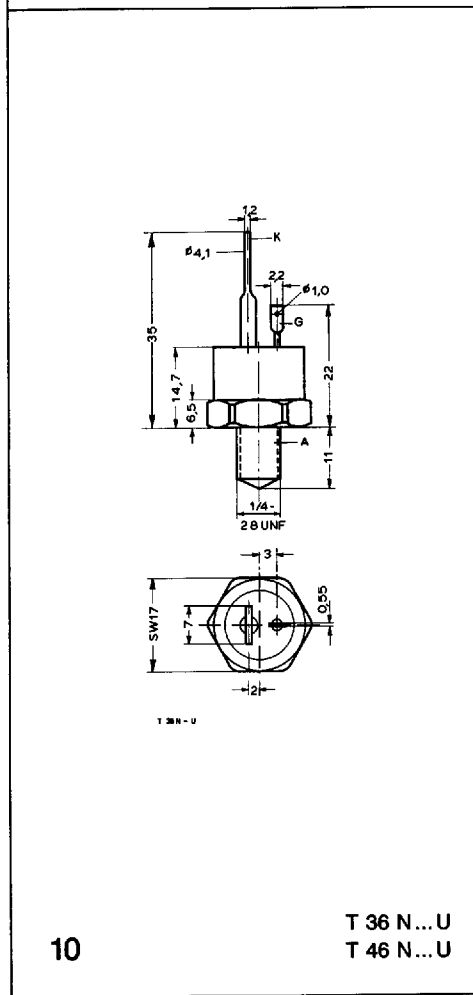
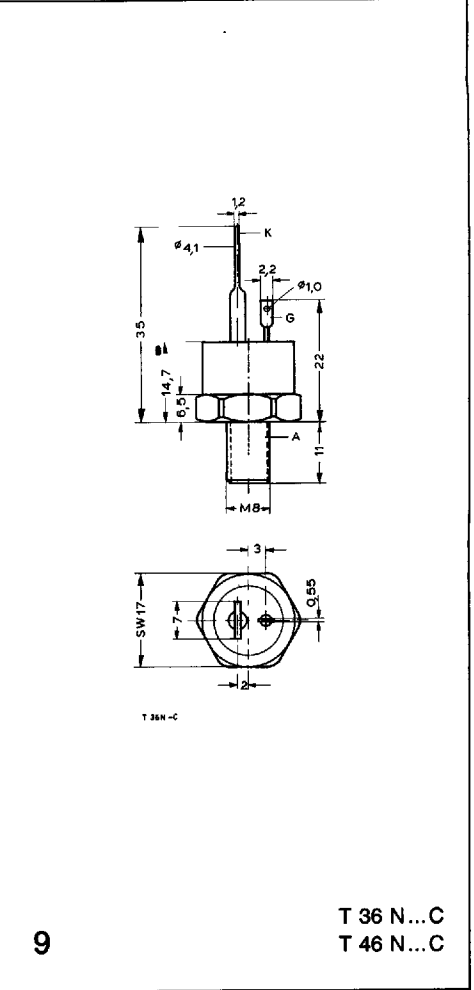
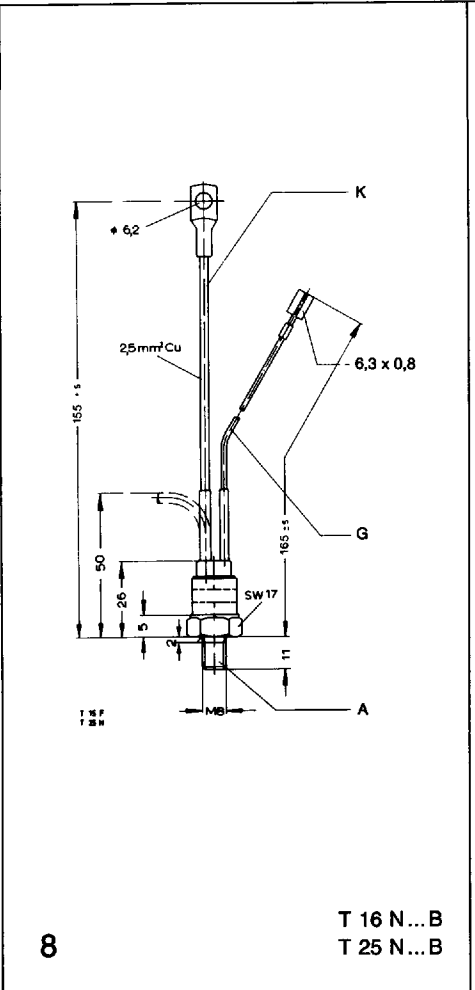
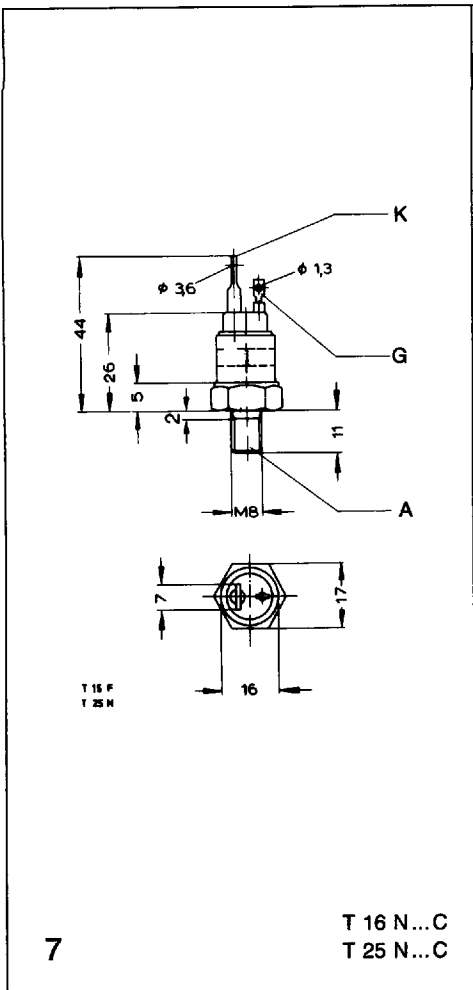
T 17 N...B
T 24 N...B
T 31 N...B

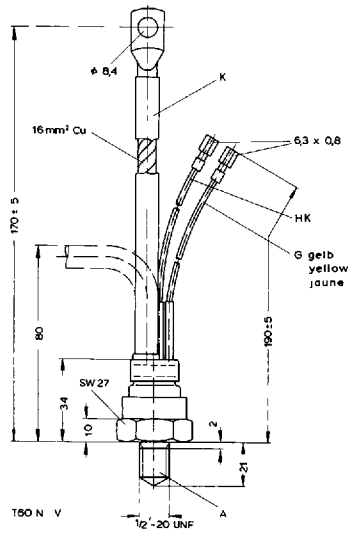
5



T 12 N...U
T 15.1 N...U
T 17 N...U
T 24 N...U
T 31 N...U

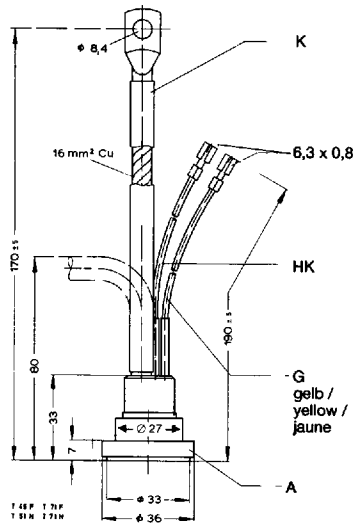
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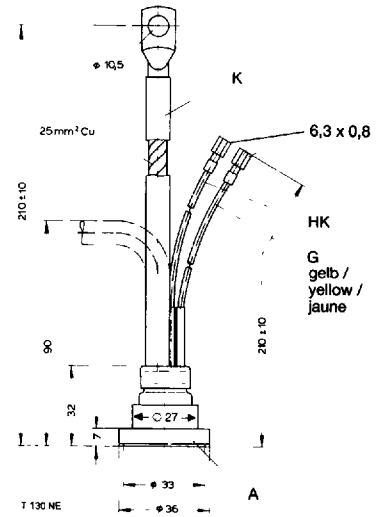
13

T 60 N...V
T 85 N...V
T 115 N...V



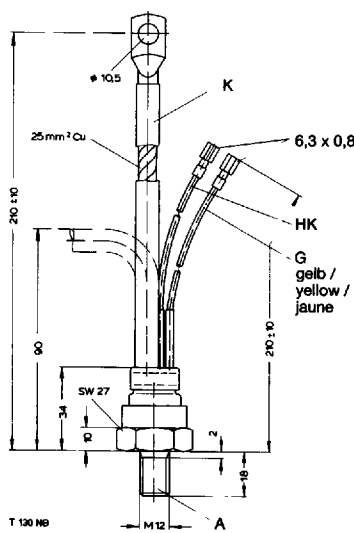
14

T 115 N...E



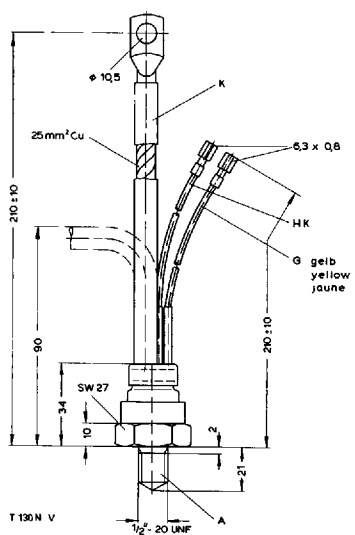
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T 130 N...E
T 160 N...E



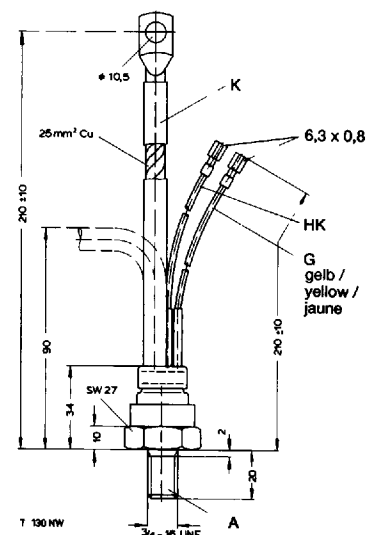
16

T 130 N...B
T 160 N...B
T 210 N...B



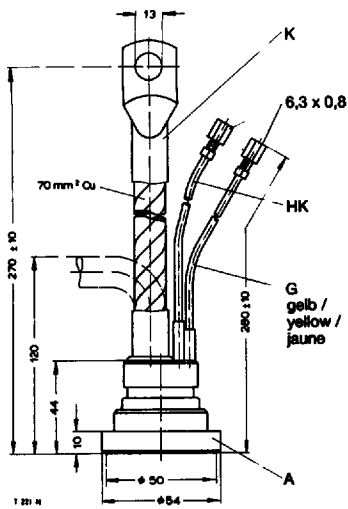
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T 130 N...V
T 160 N...V
T 210 N...V



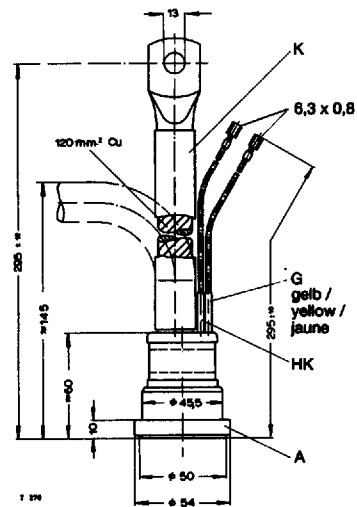
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T 130 N...W
T 160 N...W
T 210 N...W



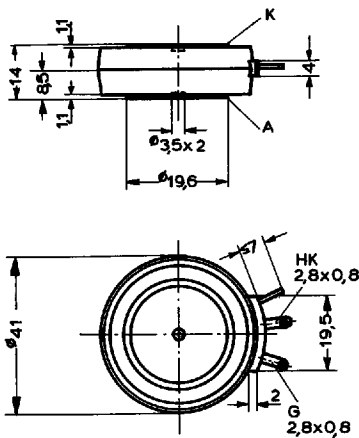
T 175 N
T 221 N
T 235 N
T 236 N
T 345 N

19



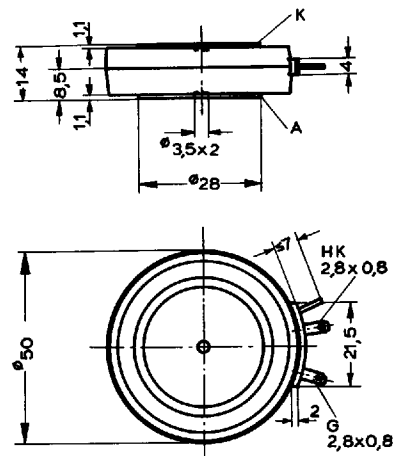
T 270 N

20



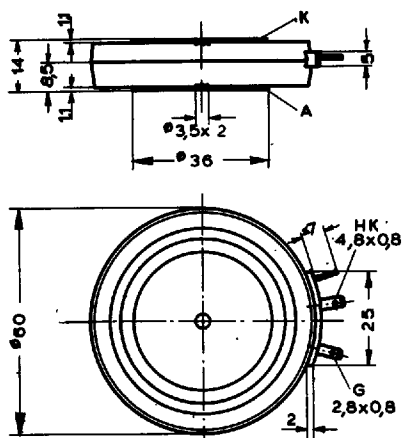
T 178 N
T 198 N
T 218 N
T 298 N
T 348 N
T 358 N
T 398 N

21



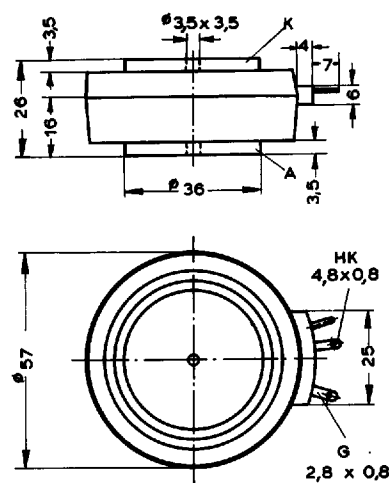
T 308 N
T 388 N
T 508 N
T 588 N
T 828 N

22



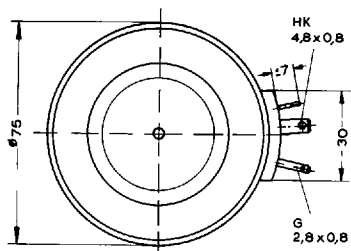
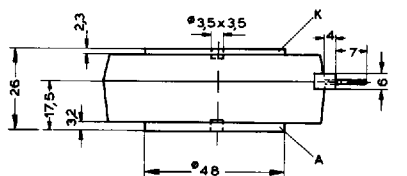
T 718 N
T 1258 N

23



T 459 N
T 509 N
T 529 N
T 719 N
T 1259 N

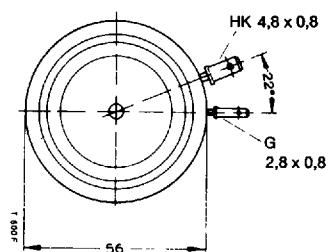
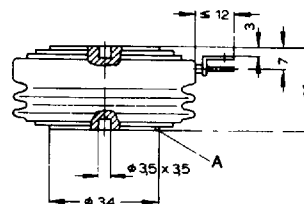
24



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25

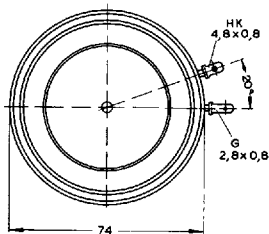
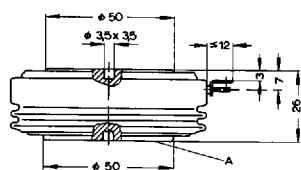
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1000 I

26

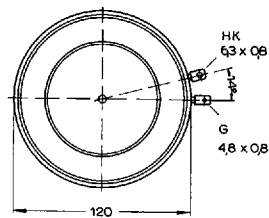
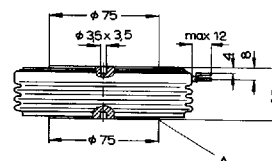
T 380 N



T 660 N

27

T 625 N
T 860 N
T 1050 N
T 1200 N



T 1370 N

28

T 1270 N
T 1580 N
T 1900 N