# Bimetal Cutouts
# Temperature Regulators
# Temperature Limiters

ADVANTAGES

- high pressure resistance
- high response sensitivity
- numerous applications
- various housings, connections and mounting styles

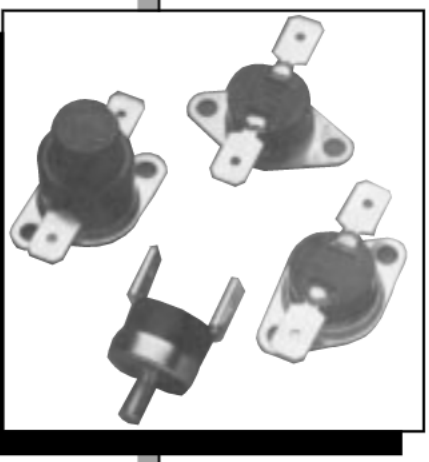
R 20
R 22
R 30
R 32
R 40

DESCRIPTION

Types R 20/R 22/R 40 are **bimetal detectors** and **temperature regulators.**

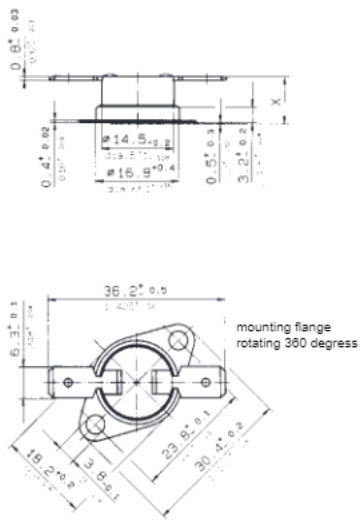
Types R 30/R 32 are **temperature limiters** (manual reset) without tripfree mechanism.
The thermal response works via a bimetal snap element electrically connected to the switch contact.

**The switch system is current insensitive.**
The thermal switches react only to external thermal effects. Double contacts ensure high switch performance and long service life.
The housing, base, and the mounting brackets are **voltage-free** (Standard version: base and mounting brackets are aluminium-plated steel).
Heat transfer occurs directly through the metallic base via convection, radiation and conduction in gaseous and solid media.



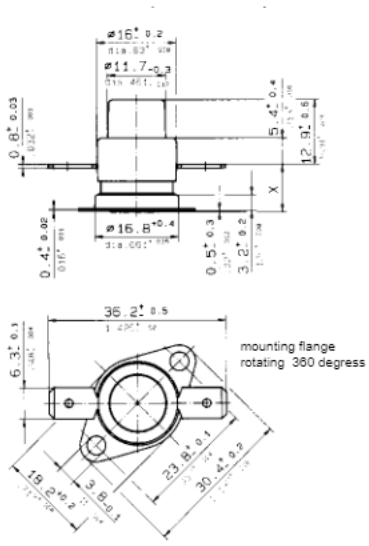
DIMENSIONS

**R 20 / R 22 / R 40**




Standard version

**R 30 / R 32**



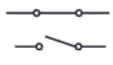
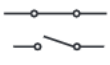

Standard version

Types: R20/22/30/32/40
03-03-00
1000-Y135

MICROTHERM

MIC
Microtherm International Cooperation

## TECHNICAL DATA

| Type | R 20 and R 22 | R 30 and R 32 | R 40 |
|---|---|---|---|
| Voltage rating | * 250 V 50–60 Hz | 250 V 50–60 Hz | * 250 V 50–60 Hz |
| Current rating at cos φ = 1.0 | * 10.0 A / * 16.0 A | 16.0 A | * 10.0 A |
| Current rating at cos φ = 0.6 | 6.3 A | 6.3 A | * 6.3 A |
| Max. load at cos φ = 1,0<br>250 V 50–60 Hz<br>110 V 50–60 Hz<br>60 V DC<br>42 V DC<br>6, 12, 24 V DC | <br>16.0 A / 20.0 A<br><br>6.0 A<br>7.2 A<br>8.5 A | <br>20.0 A | <br>16.0 A<br><br>6.0 A<br>7.2 A<br>8.5 A |
| Contacts Normally closed<br>Normally open |  |  |  |
| Switch operations at $I_N$ | * 10 000<br>0–170 °C / 16 A<br>–<br>* 100 000<br>50–160 °C / 10 A | * 200 | * 30 000 |
| Contact resistance | < 50 mΩ | < 50 mΩ | < 50 mΩ |
| Nominal temperature range | 0 °C to + 170 °C | +30 °C to + 160 °C | + 50 °C to + 160 °C |
| Tolerance<br>but at least | ± 3 % ± 6% ±10%<br>± 3 K ±5 K ± 10 K | ± 3 % ± 6% ±10%<br>± 3 K ±5 K ± 10 K | ± 3 % ± 6% ±10%<br>± 3 K ±5 K ± 10 K |
| Max. permanent temperature | * 175 °C | * 175 °C | * 175 °C |
| Dielectric strength Housing to earth | R 20: 3000 $V_{eff}$ 50–60 Hz<br>R 22: 4000 $V_{eff}$ 50–60 Hz | R 30: 3000 $V_{eff}$ 50–60 Hz<br>R 32: 4000 $V_{eff}$ 50–60 Hz | 3000 $V_{eff}$ 50–60 Hz |
| Dielectric strength across open contacts | 1500 $V_{eff}$ 50/60 Hz | 1500 $V_{eff}$ 50/60 Hz | 1500 $V_{eff}$ 50/60 Hz |
| Housing material | Duroplast | Duroplast | Duroplast |
| Housing insulation | on request | on request | on request |
| Overall height (mm) | R 20 $9.5^{+0.2}$<br>R 22 $11.5^{+0.2}$ | R 30 $9.5^{+0.2}$<br>R 32 $11.5^{+0.2}$ | R 40 $12.0^{+0.2}$ |

Note: * Approved nominal values. Other specific values on request.

### AREAS OF APPLICATION

Temperature regulation, temperature monitoring, temperature limiting and indication in electric appliances and industrial equipment, machinery and process engineering.

Examples:

Vacuum cleaners
Ironing machines
Cooking equipment
Dampers
Heat radiators
Hot water heaters
Coffee machines
Egg boilers
Electric appliances
Electrical household appliances
Electronic circuits
Machinery
Process engineering
Industrial electric elements
Electrical components

### RESPONSE TEMPERATURE, TOLERANCE, CODE-NO.

Nominal temperatures between 50 and 160 °C in 5 °C steps.
Nominal temperatures in geometrical series as per DIN 323 in °C.
For tolerance, see above – Technical Data.
Temperature code – 3 digits
Minimum rate of temperature change 0.1 K/min., max. 1.0 K/min.

### RESET TEMPERATURES

Reset temperature will be between 5 °C and 50 °C below the standard response temperatures.

### INSTALLATION/MOUNTING INFORMATION

Incorporation of the thermo-switch directly in the heat source or attachment to it, is possible without additional insulation.

Slightest changes in temperature are conducted through the metallic housing cap directly to the bimetal snap disc of the thermo-switch. This ensures that time delays of thermal control systems are kept very small: insensitive to installation position. The dust-proof and damp-proof construction of the thermo-switch allows various methods of attachment to, and incorporation in appliances.

To ensure the best heat transition, the cap respectively the mounting bracket should be soldered, rivetted, screwed or spot-welded to the heat source.

Types: R20/22/30/32/40
03.03.00
1000-Y135

## OPTIONAL VARIATIONS Terminals, Fixings, Housings

| Type | | | Descrip-tion old | Descrip-tion new | Variations Terminals | |
|---|---|---|---|---|---|---|
| R 20/R 22 | R 30/R 32 | R 40 | A 008 | AA008 | Flat terminal for screw connection | ** |
| R 20/R 22 | R 30/R 32 | R 40 | A 117 | AB 117 | 6.3 x 0.8 mm terminal | ** |
| R 20/R 22 | R 30/R 32 | R 40 | A 118 | AC118 | 4.8 x 0.8 mm terminal | ** |
| R 20/R 22 | | R 40 | A 119 | AD119 | 6.3 x 0.8 mm terminal, angle 90° | * |
| R 20/R 22 | | R 40 | A 120 | AE120 | 4.8 x 0.8 mm terminal, angle 90° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | A 121 | AF121 | solder connection | * |
| R 20/R 22 | | R 40 | A 122 | AG122 | solder connection, angle 90° | ** |
| R 20/R 22 | | R 40 | A 123 | AH123 | flat conductors | ** |
| R 20/R 22 | | R 40 | A 125 | AI125 | connector pins 4.8 x 0.5 mm | ** |
| R 20/R 22 | R 30/R 32 | R 40 | A128 | AK128 | screw connection | |
| R 20/R 22 | R 30/R 32 | R 40 | A129 | AL129 | crimp connection | |
| R 20/R 22 | | R 40 | A 134 | AM134 | A119 with inside angled connection 6.3 x 0.8 mm | ** |
| R 20/R 22 | | R 40 | A 135 | AN 135 | A120 with inside angled connection 4.8 x 0.8 mm | ** |
| R 20/R 22 | R 30/R 32 | R 40 | A 137 | AP137 | crimp connection/ screw connection | |
| R 20/R 22 | R 30/R 32 | R 40 | A 138 | AR138 | crimp connection/flat terminal | |
| R 20/R 22 | R 30/R 32 | R 40 | A139 | AS139 | screw connection/flat terminal | |

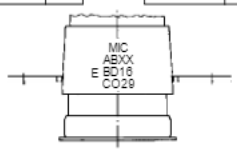
| Type | | | Descrip-tion old | Descrip-tion new | Variations Fixings | |
|---|---|---|---|---|---|---|
| R 20/R 22 | R 30/R 32 | R 40 | B000 | BX000 | no mounting bracket | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 120 | BA120 | 3 hole mounting flange | * |
| R 20/R 22 | R 30/R 32 | R 40 | B 214 | BB214 | mounting bracket, narrow | * |
| R 20/R 22 | R 30/R 32 | R 40 | B 215 | BC215 | mounting bracket-standard hole dia. 3.2 mm | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 217 | BD217 | brass central mounting M 5 x 6 mm | * |
| R 20/R 22 | R 30/R 32 | R 40 | B 218 | BE218 | brass central mounting M 4 x 8 mm | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 220 | BU220 | fixed mounting flange, steel, hole distance 23 mm, angle 0° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 221 | BG221 | fixed mounting flange, steel, hole distance 23 mm, angle 45° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 222 | BH222 | fixed mounting flange, steel, hole distance 23 mm, angle 90° | ** |

| Type | | | Descrip-tion old | Descrip-tion new | Variations Fixings | |
|---|---|---|---|---|---|---|
| R 20/R 22 | R 30/R 32 | R 40 | B 223 | BI223 | fixed mounting flange, steel, hole distance 23 mm, angle 135° | * |
| R 20/R 22 | R 30/R 32 | R 40 | B 225 | BF225 | fixed mounting flange, steel, hole distance 40 mm, narrow, angle 0° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 226 | BL226 | fixed mounting flange, steel, hole distance 40 mm, narrow, angle 45° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 227 | BM227 | fixed mounting flange, steel, hole distance 40 mm, narrow, angle 90° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 228 | BN228 | fixed mounting flange, steel, hole distance 40 mm, narrow, angle 135° | * |
| R 20/R 22 | R 30/R 32 | R 40 | B 235 | BP235 | raised flange, hole distance 23 mm, angle 0° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 236 | BR236 | raised flange, hole distance 23 mm, anglel 45° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 237 | BS237 | raised flange, hole distance 23 mm, angle 90° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 238 | BT238 | raised flange, hole distance 23 mm, angle 135° | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 250 | BK250 | with rotating mounting flange (Standard) hole dia. 3.8 mm | ** |
| R 20/R 22 | R 30/R 32 | R 40 | B 255 | BV255 | mounting element | * |

| Type | | | Descrip-tion old | Descrip-tion new | Variations Housings | |
|---|---|---|---|---|---|---|
| R 20/R 22 | | R 40 | G 108 | GA108 | hexagon threaded sleeve, brass, with flat terminals 6.3 x 0.8 mm | * |
| | R 30 | | G128 | GB128 | without rubber cap, with reset pin | * |
| | R 32 | | G 129 | GC129 | without rubber cap, with reset pin | * |
| R 20/R 22 | | R 40 | G 130 | GD130 | plastic cover horizontal, for leads and cable | ** |
| | R 30/R 32 | | G 135 | GE135 | housing without reset pin | ** |
| R 20/R 22 | | R 40 | G 145 | GF145 | hexagon threaded sleeve, brass, with sensor and leads 300 mm | ** |
| R 20/R 22 | | R 40 | G 146 | GG146 | hard paper sleeve | ** |
| R 20/R 22 | | R 40 | G 147 | GH147 | voltage-free housing with flange, for leads | ** |
| | R 30/R 32 | | G 408 | GI408 | cap silicone R 300019 | ** |
| | R 30/R 32 | | G 409 | GK409 | without reset cap | ** |

Reference to: page 4/5 · * see illustrations
** not illustrated

## Marking (example)




**Manufactur = MIC** **Version = ABXX**
**Version = BD16** **Temperature = C029**

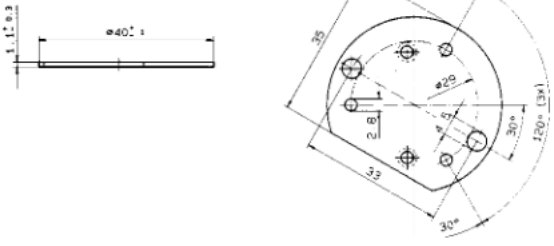
| Type | Terminals | Ref. letter | Housing | Standard | Fixing | Code letter | Base | 1996 | 60 °C ±5 K |
|---|---|---|---|---|---|---|---|---|---|
| R22 | A | B | X | X | B | D | 1 | 6 | C029 |

A B X X
- A for terminals
- Indicator for terminal options A-Z
- G for housing
- Indicator for housing options A-Z

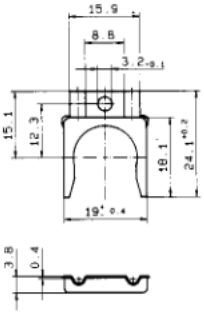
C 0 2 9
- Code-No. for response temp and tolerance

B D 1 6
- B for fixing
- Indicator for fixing option A-Z
- 1 = nickel plated steel (standard) 2 = stainless steel 3 = aluminium, anodised 4 = aluminium
- Ref. no. for base
- Year of manufacture 0-9 (6 = 1996)

### R 20 / R 22 / R 30 / R 32 / R 40
**B 120** 3 hole mounting flange




### R 20 / R 22 / R 30 / R 32 / R 40
**B 255** Mounting element






Types: R20/22/30/32/40
03.03.00
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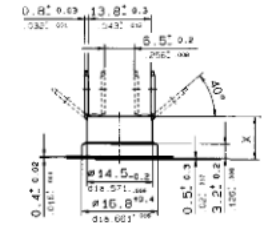
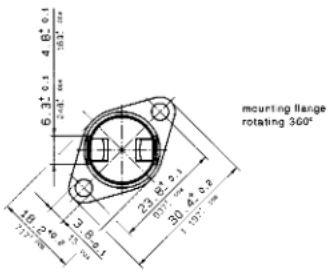
EXAMPLES
of Connectors, Mountings and Housing Types

## R 20 / R 22 / R 40

**A 119** with 6.3 x 0.8 mm push-on terminals, angle 90°

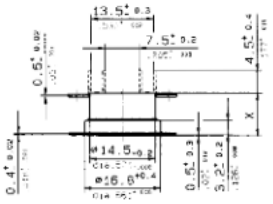
**A 120** with 4.8 x 0.8 mm push-on terminals, angle 90°

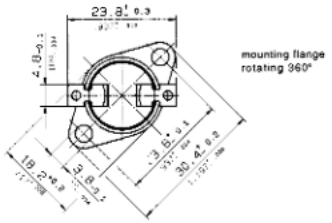





## R 20 / R 22 / R 40

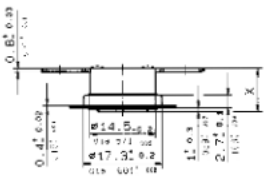
**A 121** with solder connection

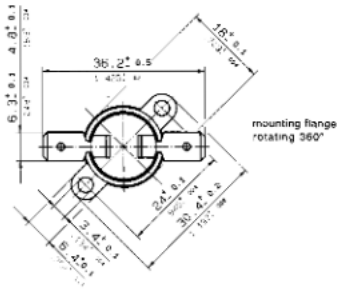





## R 20 / R 22 / R 40

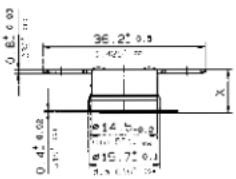
**B 214** mounting bracket, narrow

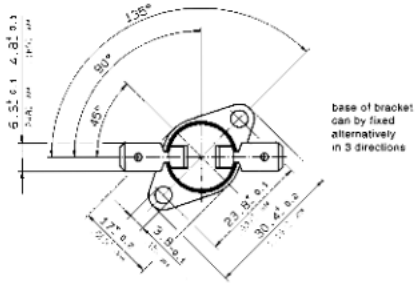





## R 20 / R 22 / R 40

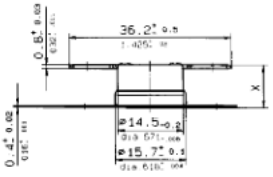
**B 223** fixed mounting flange, steel

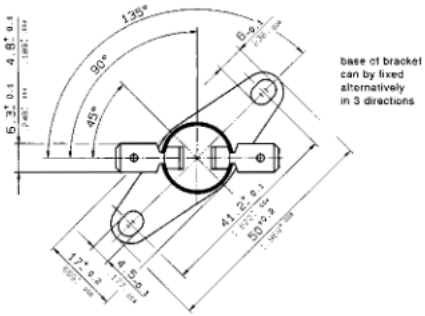





## R 20 / R 22 / R 40

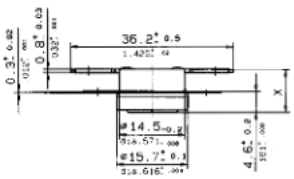
**B 228** fixed mounting flange, steel
hole distance 40 mm, narrow,
angle 135°

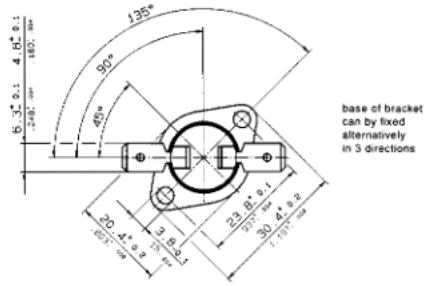





## R 20 / R 22 / R 40

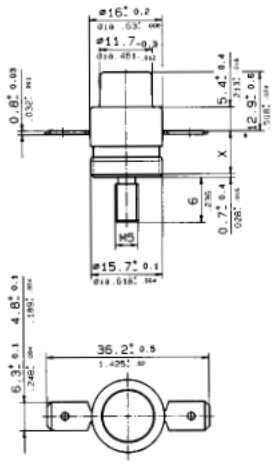
**B 238** raised flange, hole distance 23 mm,
angle 135°



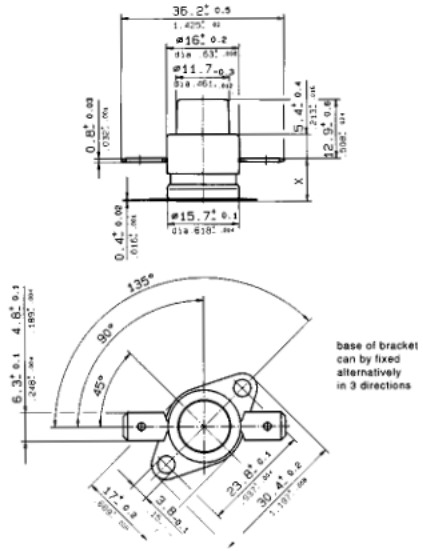


EXAMPLES
of Connectors, Mountings and Housing Types

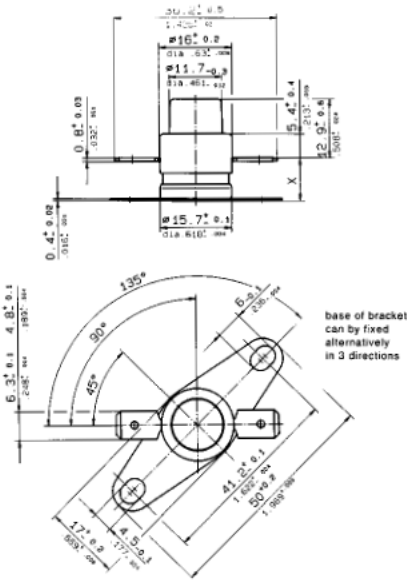
## R 30 / R 32
**B 217** brass central mounting
M 5 x 6 mm



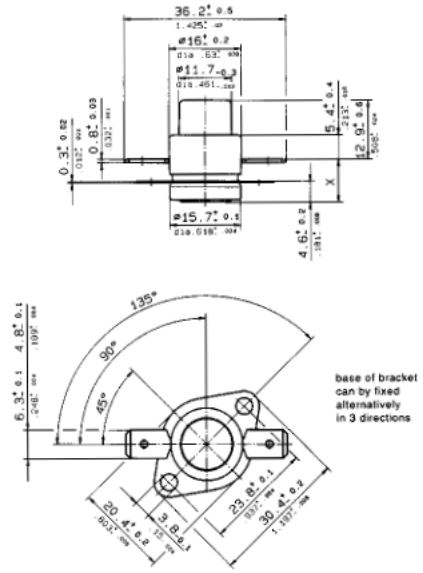
## R 30 / R 32
**B 223** fixed mounting flange, steel



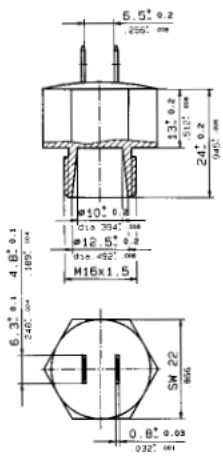

## R 30 / R 32
**B 228** fixed mounting flange, steel,
hole distance 40 mm, narrow,
angle 135°



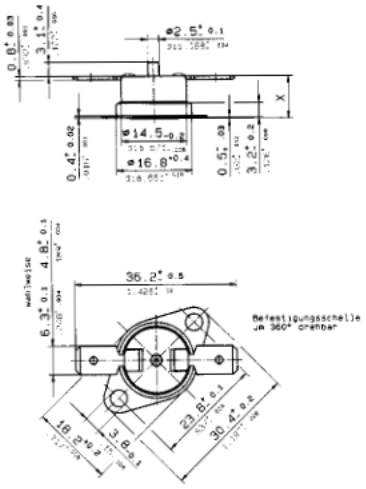

## R 30 / R 32
**B 238** raised flange, hole distance 23 mm,
angle 135°



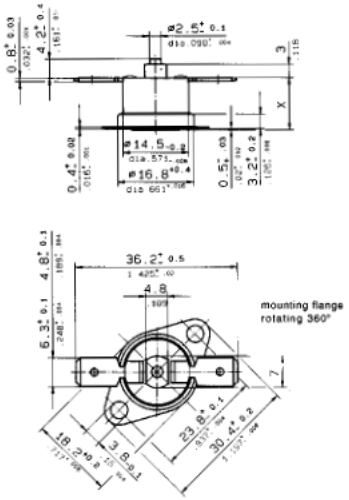

## R 20 / R 22 / R 40
**G 108** hexagonal head, threaded,
brass



## R 30
**G 128** with reset pin



## R 32
**G 129** with reset knob






Types R20/22/30/32/40
03-03.00
1000-Y135

## NOMINAL RESPONSE TEMPERATURE, TOLERANCE, CODE-NO.

| Series 10 Tol. ± 10 % | | Series 20 Tol. ± 6 % | | Series 40 Tol. ± 3 % | |
|---|---|---|---|---|---|
| °C | Code No. | °C | Code No. | °C | Code No. |
| Normally closed | | | | | |
| **000** | **007** | **000** | **008** | **000** | **009** |
| | | 02 | 131 | 02 | 132 |
| 05 | 010 | 05 | 133 | 05 | 134 |
| | | | | 08 | 135 |
| 10 | 011 | 10 | 136 | 10 | 137 |
| | | | | 12 | 138 |
| | | 14 | 139 | 14 | 140 |
| 15 | 012 | 15 | 013 | 15 | 014 |
| | | | | 16 | 141 |
| | | 18 | 142 | 18 | 143 |
| 20 | 015 | 20 | 016 | 20 | 144 |
| | | 22 | 145 | 22 | 146 |
| 25 | 017 | 25 | 018 | 25 | 019 |
| | | 26 | 147 | 26 | 148 |
| | | 28 | 020 | 28 | 021 |
| 30 | 022 | 30 | 149 | 30 | 150 |
| | | | | 33 | 151 |
| 35 | 023 | 35 | 152 | 35 | 153 |
| | | | | 37 | 154 |
| 40 | 024 | 40 | 155 | 40 | 156 |
| | | | | 42 | 157 |
| 45 | 025 | 45 | 158 | 45 | 159 |
| | | | | 47 | 160 |
| **50** | **161** | **50** | **162** | **50** | **163** |
| 53 | 026 | 53 | 027 | 53 | 164 |
| 56 | 028 | 56 | 165 | 56 | 166 |
| 60 | 030 | 60 | 029 | 60 | 167 |
| 63 | 168 | 63 | 169 | 63 | 170 |
| 67 | 031 | 67 | 032 | 67 | 171 |
| 71 | 033 | 71 | 172 | 71 | 173 |
| 75 | 034 | 75 | 035 | 75 | 174 |
| 80 | 175 | 80 | 176 | 80 | 177 |
| 85 | 036 | 85 | 037 | 85 | 178 |
| 90 | 038 | 90 | 179 | 90 | 180 |
| 95 | 039 | 95 | 040 | 95 | 181 |
| 100 | 182 | 100 | 183 | 100 | 184 |
| 106 | 041 | 106 | 042 | 106 | 185 |
| 112 | 043 | 112 | 186 | 112 | 187 |
| 118 | 044 | 118 | 045 | 118 | 188 |
| 125 | 189 | 125 | 190 | 125 | 191 |
| 132 | 046 | 132 | 047 | 132 | 192 |
| 140 | 048 | 140 | 193 | 140 | 194 |
| 150 | 049 | 150 | 050 | 150 | 195 |
| 160 | 196 | 160 | 197 | 160 | 198 |
| | | | | 170 | 199 |

| Series 10 Tol. ± 10 % | | Series 20 Tol. ± 6 % | | Series 40 Tol. ± 3 % | |
|---|---|---|---|---|---|
| °C | Code No. | °C | Code No. | °C | Code No. |
| Normally open | | | | | |
| **000** | **257** | **000** | **258** | **000** | **259** |
| | | 02 | 331 | 02 | 332 |
| 05 | 260 | 05 | 333 | 05 | 334 |
| | | | | 08 | 335 |
| 10 | 261 | 10 | 336 | 10 | 337 |
| | | | | 12 | 338 |
| | | 14 | 339 | 14 | 340 |
| 15 | 262 | 15 | 263 | 15 | 264 |
| | | | | 16 | 341 |
| | | 18 | 342 | 18 | 343 |
| 20 | 265 | 20 | 266 | 20 | 344 |
| | | 22 | 345 | 22 | 346 |
| 25 | 267 | 25 | 268 | 25 | 269 |
| | | 26 | 347 | 26 | 348 |
| | | 28 | 270 | 28 | 271 |
| 30 | 272 | 30 | 349 | 30 | 350 |
| | | | | 33 | 351 |
| 35 | 273 | 35 | 352 | 35 | 353 |
| | | | | 37 | 354 |
| 40 | 274 | 40 | 355 | 40 | 356 |
| | | | | 42 | 357 |
| 45 | 275 | 45 | 358 | 45 | 359 |
| | | | | 47 | 360 |
| **50** | **361** | **50** | **362** | **50** | **363** |
| 53 | 276 | 53 | 277 | 53 | 364 |
| 56 | 278 | 56 | 365 | 56 | 366 |
| 60 | 280 | 60 | 279 | 60 | 367 |
| 63 | 368 | 63 | 369 | 63 | 370 |
| 67 | 281 | 67 | 282 | 67 | 371 |
| 71 | 283 | 71 | 372 | 71 | 373 |
| 75 | 284 | 75 | 285 | 75 | 374 |
| 80 | 375 | 80 | 376 | 80 | 377 |
| 85 | 286 | 85 | 287 | 85 | 378 |
| 90 | 288 | 90 | 379 | 90 | 380 |
| 95 | 289 | 95 | 290 | 95 | 381 |
| 100 | 382 | 100 | 383 | 100 | 384 |
| 106 | 291 | 106 | 292 | 106 | 385 |
| 112 | 293 | 112 | 386 | 112 | 387 |
| 118 | 294 | 118 | 295 | 118 | 388 |
| 125 | 389 | 125 | 390 | 125 | 391 |
| 132 | 296 | 132 | 297 | 132 | 392 |
| 140 | 298 | 140 | 393 | 140 | 394 |
| 150 | 299 | 150 | 300 | 150 | 395 |
| 160 | 396 | 160 | 397 | 160 | 398 |

### SPECIAL TEMPERATURE SETTINGS

Response temperatures and reset temperatures with specific values and alternative tolerance can be supplied.

### SPECIAL CONNECTIONS

Leads or solid wire from 0.25 mm² to 1.0 mm².
Lengths from 40 mm to 10 000 mm,
with or without stripping possible.
Lead ends with DIN connectors or shrouds.
Freon and oil resistant leads,
PTFE-, PVF², Nomex and Silicone leads
available from stock.

### SPECIAL HOUSINGS

When selecting the switch-off temperatures of thermostats in special housings or with non-standard mounting, the time delay due to the thermal mass of the housing/mounting has to be considered.

Closer tolerances of nominal switch-off temperatures and reset temperatures, as well as small differentials, are also available **for small quantities** on request.

### QUALITY STANDARD

Production item testing
Voltage test, switch function,
Nominal response temperature

### APPROVALS

Life expectancy, voltage rating and current rating comply with VDE 0631 or EN 60730, see page 2.
Further approvals obtained for many countries.
Information on request.

### ORDERING INFORMATION

| Quantity | Type | Code | Temperature °C | Version | Tolerance |
|---|---|---|---|---|---|
| 6000 | R 22 | C 183 | 100 | A 119 | ± 6 % |

Technical data and other specifications may be altered without prior notice.

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Types: R20/22/30/32/40
03-03-00
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