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# Panel-Mounted Thermostats, EM Series

## With 1, 2, 3, or 4 single-pole snap-action switches

## Special features

- Available with 1-, 2-, 3- or 4-pole jump-switches
- Approved according to the latest standards





## Brief description

Thermostats control and monitor thermal processes. The devices of the EM series are available as temperature controllers TR, temperature monitors TW, temperature limiters TB, safety temperature monitors STW (STB), and safety temperature limiter STB. In the event of a malfunction, the STB switches the monitored machine to a safe operating status.

Panel-mounted thermostats operate according to the fluid expansion principle – a microswitch is used as an electrical switching element.

## Switching function

**Temperature controller TR and safety temperature monitos STW**
If the temperature on the temperature probe exceeds the setpoint value, the microswitch is activated by the transmission mechanics and the electrical circuit is opened or closed. If the temperature falls below the selected setpoint (by the amount of the switching differential), the microswitch is reset to its initial position.

**Restart lock for temperature limiter TB and safety temperature limiter STB**
If the temperature on the temperature probe exceeds the set limit value, the electrical circuit is opened and the microswitch is mechanically locked.

The microswitch can be manually unlocked once the temperature has dropped by approx. 10 % of the scale range (approx. 15 % with a limit value setting > +350 °C).

For limit values exceeding 120 °C, the limit value set in the STB must be secured against incorrect adjustment (e.g. by a seal).

**Self-monitoring for the safety temperature limiter STB and safety temperature monitor STW (STB)**
If the measuring system is destroyed (i.e. if the expansion fluid leaks), the pressure in the diaphragm of the STB and STW (STB) drops and permanently opens the electrical circuit. Unlocking is then no longer possible.

The electrical circuit 1-2 opens when the probe of STW (STB) and STB cools down to the negative temperature range, but it closes again automatically if the temperature rises.

**Use of the safety temperature monitor STW as a safety temperature limiter STB**
The circuitry used with the thermostat must comply with DIN EN 14597 and VDE 0631.

## Approvals / approval marks

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## Types and DIN registry numbers

| Version | Types | Switching function | DIN register no. | Important note |
|---|---|---|---|---|
| 1 pole<br>snap-action switches | EM-1<br>EM-2<br>EM-3*<br>EM-4*<br>EM-5 | TR<br>TW<br>TW<br>TB<br>TB | TR 777<br>TW 778<br>TW 778<br>TB 780<br>TB 780 | DIN-tested up to max. +500 °C. The DIN registry no. will become null and void if thermowells are used that are not specified in our data sheet 606710<br><br>*Setpoint value / limit value permanently factory-set according to customer specifications |
| 2 single-pole<br>snap-action switches | EMF-13<br>EMF-23<br>EMF-33*<br>EMF-14<br>EMF-24<br>EMF-44*<br>EMF-54 | TR/TW<br>TW/TW<br>TW/TW<br>TR/TB<br>TW/TB<br>TB/TB<br>TB/TB | TR 777<br>TW 778<br>TW 778<br>TR 777<br>TW 778<br>TB 780<br>TB 780 | |
| 3 single-pole<br>snap-action switches<br><br>(without VDE approval) | EMF-133<br>EMF-134<br>EMF-233<br>EMF-234<br>EMF-333*<br>EMF-444*<br>EMF-544 | TR/TW/TW<br>TR/TW/TB<br>TW/TW/TW<br>TW/TW/TB<br>TW/TW/TW<br>TB/TB/TB<br>TB/TB/TB | TR 777<br>TR 777<br>TW 778<br>TW 778<br>TW 778<br>TB 780<br>TB 780 | |
| 4 single-pole<br>snap-action switches<br>(without VDE approval) | EMF-1333<br>EMF-2333<br>EMF-3333* | TR/TW/TW/TW<br>TW/TW/TW/TW<br>TW/TW/TW/TW | TR 777<br>TW 778<br>TW 778 | |
| Fail-safe version | EM-40*<br>EM-50<br>EM-20<br>EM-30* | STB<br>STB<br>STW (STB)<br>STW (STB) | STB 782<br>STB 782<br>STW (STB) 775 S<br>STW (STB) 775 S | |

## Technical data

**Table of control ranges and probes for TR, TW, TB – liquid-filled**

| Control range/ limit value range °C | Switching differential % | Max. probe temperature °C | Max. switching head temperature °C | Max. capillary length in mm | Max. sequence contact gap °C | Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard | |
|---|---|---|---|---|---|---|---|
| | | | | | | Ø 6 | Ø 8 |
| **-20 to +40** | 1<br>2.5<br>5<br>7 | +50<br>+50<br>+95<br>+100 | +50 | 5000 | 5<br>8<br>25<br>50 | 245<br>245<br>138<br>103 | 145<br>145<br>91<br>73 |
| **0 to 50** | 1<br>2.5<br>5<br>7 | +60<br>+60<br>+105<br>+110 | +60 | 3000<br>3000<br>5000<br>5000 | 5<br>10<br>25<br>50 | 283<br>283<br>159<br>117 | 165<br>165<br>101<br>80 |
| **20 to 90** | 1<br>2.5<br>5<br>7 | +115<br>+115<br>+140<br>+175 | +80 | 1000<br>1000<br>5000<br>5000 | 7<br>14<br>35<br>70 | 210<br>210<br>121<br>91 | 127<br>127<br>82<br>67 |
| **0 to 100** | 1<br>2.5<br>5<br>7 | +125<br>+125<br>+165<br>+200 | +80 | 2000<br>2000<br>5000<br>5000 | 10<br>20<br>50<br>100 | 157<br>157<br>94<br>73 | 100<br>100<br>68<br>58 |
| **30 to 110** | 1<br>2.5<br>5<br>7 | +135<br>+135<br>+170<br>+200 | +80 | 2000<br>2000<br>5000<br>5000 | 8<br>16<br>40<br>80 | 188<br>188<br>110<br>84 | 116<br>116<br>76<br>63 |
| **0 to 150** | 1<br>2.5<br>5 | +173<br>+173<br>+200 | +80 | 1000 | 15<br>30<br>75 | 113<br>113<br>72 | 78<br>78<br>57 |
| **0 to 200** | 1<br>2.5 | +230<br>+230 | +80 | 1000 | 20<br>40 | 113 | 78 |
| **50 to 200** | 1<br>2.5 | +230<br>+230 | +80 | 1000 | 15<br>30 | 139 | 92 |
| **50 to 250** | 1<br>2.5<br>5 | +288<br>+288<br>+300 | +80 | 1000<br>1000<br>5000 | 20<br>40<br>100 | 105<br>105<br>64 | 70<br>70<br>49 |
| **50 to 300** | 1<br>2.5 | +345<br>+345 | +80 | 2000 | 25<br>50 | 87 | 61 |

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# Technical data

**Table of control ranges and probes for TR, TW, TB – gas-filled**

| Control range/ limit value range °C | Switching differential % | Max. probe temperature °C | Max. switching head temperature °C | Max. capillary length in mm | Max. sequence contact gap °C | Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard | |
|---|---|---|---|---|---|---|---|
| | | | | | | Ø 6 | Ø 8 |
| **20 to 400** | 6<br>10 | +460<br>+500 | +80 | 5000 | 75<br>200 | 237<br>127 | 137<br>81 |
| **20 to 500** | 3/5<br>6<br>10 | +575 | +80 | 1000<br>5000<br>5000 | 48<br>95<br>250 | 278<br>176<br>95 | 158<br>106<br>65 |

**Control ranges and temperature probes for STB and STW (STB) – liquid-filled**

| Setting range °C | Scale range °C | Max. probe temperature °C | Max. switching head temperature °C | Max. capillary length in mm | Limit value tolerance °C | Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard | |
|---|---|---|---|---|---|---|---|
| | | | | | | Ø 6 | Ø 8 |
| **75 to 100** | **78** | +125 | +80 | 5000 | 0<br>-7 | 84 | 63 |
| 85 to 110 | 78 | +135 | | | 0<br>-7 | | |
| **120 to 150** | **77** | +173 | | | 0<br>-9 | 80 | 57 |
| 160 to 200 | 79 | +230 | | | 0<br>-12 | 64 | 49 |
| 210 to 250 | 71 | +288 | | | 0<br>-13 | 61 | 47 |
| 250 to 300 | 79 | +345 | | | 0<br>-16 | 55 | – |

**Control ranges and temperature probes for STB and STW (STB) – gas-filled**

| Setting range °C | Scale range °C | Max. probe temperature °C | Max. switching head temperature °C | Max. capillary length in mm | Limit value tolerance °C | Probe length "L" in mm, probe Ø "d" in mm, Ø "6" = Standard | |
|---|---|---|---|---|---|---|---|
| | | | | | | Ø 6 | Ø 8 |
| 300 to 400 | 70 | +460 | +80 | 3000 | 0<br>-23 | 148 | 92 |
| 350 to 500 | 72 | +575 | | | 0<br>-29 | 127 | 81 |

When the switching points are permanently factory-set, the deactivation value must be specified in addition to the control range (e.g. control range 80 to 100 °C, permanently set to 95 °C).

**Capillary and temperature probes**

| Type | Scale limit value | Capillary | Temperature probe | Notes |
|---|---|---|---|---|
| EM- . . | Up to 200 °C | Copper (Cu)<br>Ø 1.5 mm<br>Material no. Cu-DHP | Copper (Cu)<br>Material no. Cu-DHP<br>Hard soldered | – |
| | Up to 350 °C | Copper (Cu)<br>Ø 1.5 mm<br>Material no. Cu-DHP | Stainless steel (CrNi)<br>Material no. 1.4571<br>Hard soldered | – |
| | Up to 500 °C | Stainless steel (CrNi)<br>Ø 1.5 mm | Stainless steel (CrNi)<br>Material no. 1.4571<br>Welded | – |
| | Up to 350 °C | Stainless steel (CrNi)<br>Ø 1.5 mm | Stainless steel (CrNi)<br>Material no. 1.4571<br>Welded | Available at extra cost |
| Capillary length | Standard: 1000 mm, max. 5000 mm | | | |
| Min. bending radius of capillary | 5 mm | | | |

**Note:**
Upon request the capillary length can be increased up to a maximum of 5,000 mm if the allowable temperature on the sensor, capillary, and switching head is not reached.
Please let us know the actual temperature values to which the thermostat is exposed.

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**Electrical data**

| | | | |
|---|---|---|---|
| Switching element 1, 2, 3, or 4 single-pole snap-action switches | EM.-1... EM-20<br>EM.-2... EM-30<br>EM.-3... | EM.-4... EM-40<br>EM.-5... EM-50 | EM.-4.../U EM-40/U<br>EM.-5.../U EM-50/U |
| | Microswitch with changeover contact | Microswitch with N/C contact and restart lock | Microswitch with N/C contact, restart lock, and additional signal contact |
| Max. contact rating | Switching function<br>Switching differential | N/C contact, terminal 2 | N/O contact, terminal 4 |
| | TR, TW, STW (STB)<br>2.5 %, 5 %, 6 %, 7 %, 10 % | AC 230 V +10 %<br>16 (3) A, cos φ = 1 (0.6)<br>DC 230 V +10 %, 0.25 A | AC 230 V +10 %<br>8 (1.5) A, cos φ = 1 (0.6)<br>DC 230 V +10 %, 0.25 A |
| | TB, STB | | AC 230 V +10 %<br>2 (1) A, cos φ = 1 (0.6)<br>DC 230 V +10 %, 0.25 A |
| | TR, TW<br>1 %, 3 % | AC 230 V +10 %, 6 (2) A, cos φ = 1 (0.6)<br>DC 230 V +10 %, 0.25A | |
| | TR, TW<br>2.5 % | Microswitch with gold plating, extra code "702"<br>AC/DC 24 V, 0.1 A | |
| Contact reliability | To ensure the greatest possible switching reliability we recommend a minimum load of: | | |
| | For silver contacts:<br>AC/DC = 24 V, 100 mA | For gold-plated contacts (abbreviation "702"):<br>AC/DC = 10 V, 5 mA | |
| Rating surge voltage | 2500 V (via the switching contacts 400 V) | | |
| Overvoltage category | II | | |
| Required fuse rating | See max. switching capacity | | |
| Electrical connection | Standard | Tab connector A 6.3 × 0.8 DIN 46 244 | |
| | Extra code 699 | Screw connection up to 2.5 $mm^2$ conductor cross section (available at extra cost) - also suitable for retrofitting - | |

**Operating data**

| | | | | |
|---|---|---|---|---|
| Switching differential in % from the control range / limit value range | Switching function | With liquid-filled measuring system | | |
| | | Rated value | Possible actual value | |
| | **TR, TW** | 2.5 | Approx. 2.5 - 3.5 | Standard |
| | | 5 | Approx. 5 - 6 | Upon request |
| | | 7 | Approx. 7 - 8 | Upon request |
| | | 1 | Approx. 1 - 2 | Surcharge |
| | | With gas-filled measuring system | | |
| | | 5 | Approx. 5 - 11 | Standard |
| | | 6 | Approx. 6 - 14 | Upon request |
| | | 10 | Approx. 10 - 16 | Upon request |
| | | 3 | Approx. 2.5 - 4 | Surcharge |
| | **STW (STB)** | With liquid-filled measuring system | | |
| | | 5 | Approx. 5 - 7 | Standard |
| | | With gas-filled measuring system | | |
| | | 6 | Approx. 6 - 16 | Standard |

| | | | | |
|---|---|---|---|---|
| Sequence contact gap on multi-pole version | With switching differential | Sequence contact gap relative to scale range | | Switching point accuracy of the sequence contact gaps from the scale range |
| | | Minimum | Maximum | |
| | 1 %<br>2.5 %<br>3 %, 5 %<br>6 %, 7 %, 10 % | 1 %<br>1 %<br>2 %<br>3 % | According to control range table | ≤ 1 %<br>≤ 1 %<br>< 2 %<br>< 3 % |
| | The spacing of the additional contacts can be specified in °C in relation to the setpoint of contact 1.<br>Prefix **-** = switching **before** reaching the setpoint value<br>Prefix **+** = switching **after** reaching the setpoint value<br>For the synchronized version, specify "0" as the sequence contact gap | | | |

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**Operating data**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Switching point accuracy in % of control range/ limit value range | Switching function | Switching differential | | | | | In the upper third of the scale or limit value | | | |
| | | Liquid-filled | | Gas-filled | | | | | | |
| | TR | 1 %, 2.5 %<br>5 %<br>7 % | | -<br>3 %, 5 %<br>6 %, 10 % | | | ±1.5 %<br>±3 %<br>±4 % | | | |
| | TW | 1 %, 2.5 %<br>5 %<br>7 % | | -<br>3 %, 5 %<br>6 %, 10 % | | | ±1.5 %<br>±3 %<br>±4 % | | | |
| | TB | - | | - | | | 0 %<br>-5 % | | | |
| | STB, STW (STB) | See table for control ranges and probes on page 3 | | | | | | | | |
| Mid ambient temperature influence | Deviation of the ambient temperature at the switching head and/or capillary from the 22 °C calibration ambient temperature produces a switching point offset.<br>Higher ambient temperatures = lower switching point<br>Lower ambient temperature = higher switching point | | | | | | | | | |
| | For temperatures with scale limit value/limit value | | | | | | | | | |
| | < 200 °C | | | ≥ 200 °C ≤ 350 °C | | | ≥ 400 °C ≤ 500 °C | | | |
| | TR, TW, TB | | STW, STB | TR, TW, TB | | STW, STB | TR, TW, TB, STW, STB | | | |
| | Switching differential in % | | | | | | | | | |
| | 1/2.5 | 5 | 7 | 7/- | 1/2.5 | 5 | 7/- | 3/5 | 6 | 10 |
| | Ambient temperature influence on the switching head in %/*°C* | | | | | | | | | |
| | 0.15 | 0.26 | 0.34 | 0.43 | 0.12 | 0.21 | 0.35 | 0.12 | 0.17 | 0.24 |
| | Ambient temperature influence on the capillary in %/*m* | | | | | | | | | |
| | 0.05 × °C × m | | 0.09 × °C × m | | 0.04 × °C × m | | 0.07 × °C × m | 0.05 × °C × m | | |
| Temperature compensation* **(TK)** | * For detailed information see diagram on page 9 | | | | | | | | | |
| Temperatures | Allowable storage temperature: -50 to +50 °C | | | | Allowable ambient temperature for use: max. 80 °C | | | | | |
| Nominal position (NL) | Any | | | | | | | | | |

**Casing**

| | | |
|---|---|---|
| Casing: galvanized sheet steel | Standard mounting | With 2 M3 screws, spaced 22 mm |
| | Extra code 704 | With 2 M4 screws, spaced 28 mm |
| | Extra code 705 | With 2 M3 screws, spaced 33 mm |
| | Extra code 710 | Central mounting M10 × 1 with acorn nut (only for TB and STB) |
| Setpoint value setting | TR:<br>Switching point adjustable from the outside using the rotary knob | TW, TB, STB, STW (STB):<br>Switching point adjustable with a screwdriver |
| | Types EM-3, EM-4, EM-33, EM-44, EM-444, EM-3333, EM-30, EM-40<br>Permanently set at the factory to customer requirements | |
| Setpoint adjuster | See data sheet 606715 | |
| Scale range | Standard: 250°∢ (for STB and STW (STB) see table for control ranges and probes on page 3) | |
| Protection type | EN 60529-IP00 | |
| Weight | Approx. 0.3 kg | |

**Process connection***

| | | |
|---|---|---|
| EM series with capillary | **Plain cylindrical probe "10"** (standard) | |
| | **Screw-in protection tube "20"** (upon request)<br>Screw-in sleeve with screw-in spigot G 1/2 form A as per DIN 3852/2 and clamping piece with fixing screw for securing the probe | |
| Material | **Protection tube** | Up to 150 °C CuZn as standard<br>Above 150 °C CrNi |
| Insertion length S | Standard lengths: 100, 120, 150, 200, or 300 mm (different lengths upon request) | |
| Immersion tube Ø | D = 8 mm, D = 10 mm | |

* See data sheet 606710 for additional process connections and protection tubes

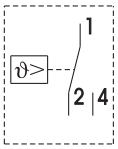
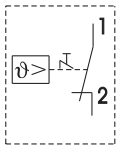
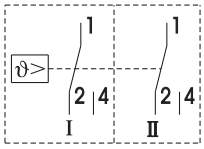
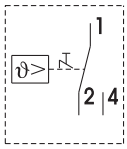
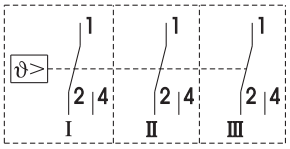
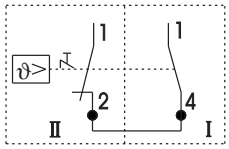
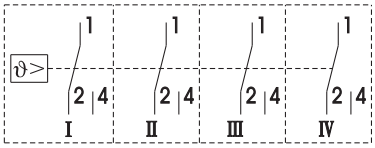
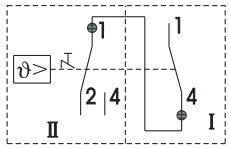
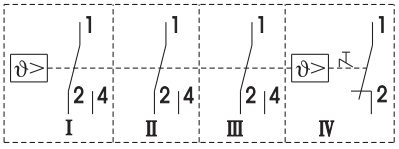
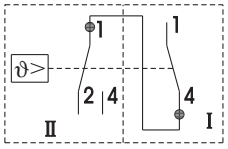
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**Connection diagrams**

| | | | |
|---|---|---|---|
| EM-1<br>EM-2<br>EM-3 |  | EM-4<br>EM-5 |  |
| EMF-13<br>EMF-23<br>EMF-33<br><br>Setpoint value: I<br>Sequence contact: II |  | EM-4/U<br>EM-5/U |  |
| EMF-133<br>EMF-233<br>EMF-333<br><br>Setpoint value: I<br>Sequence contact: II, III |  | EM-40<br>EM-50<br>**I** = N/C contact with system break and T < -10°C: I<br>**II** = Limit value: II |  |
| EMF-1333<br>EMF-2333<br>EMF-3333<br><br>Setpoint value: I<br>Sequence contact: II, III, IV |  | EM-40/U<br>EM-50/U<br>**I** = N/C contact with system break and T < -10°C: I<br>**II** = Limit value: II |  |
| Example: EMF-1334<br><br>For further type variants, combine the connection diagrams respectively |  | EM-20<br>EM-30<br>**I** = N/C contact with system break and T < -10°C: I<br>**II** = Limit value: II |  |

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# Approvals/approval marks

| Approval marks | Inspection authority | Certificates / inspection number | Inspection basis | Valid for |
|---|---|---|---|---|
| DIN | DIN CERTCO/TÜV Süd | TR777 | DIN EN 14597 | EM.-1 |
| DIN | DIN CERTCO/TÜV Süd | TW778 | DIN EN 14597 | EM.-2, EM.-3 |
| DIN | DIN CERTCO/TÜV Süd | TB780 | DIN EN 14597 | EM-4, EM-5 |
| DIN | DIN CERTCO/TÜV Süd | STW(STB)775 S | DIN EN 14597 | EM-20, EM-30 |
| DIN | DIN CERTCO/TÜV Süd | STB782 | DIN EN 14597 | EM-40, EM-50 |
| DIN | TÜV Süd | $B_{10d}$ = 250.000[a] | DIN EN ISO 13849-1 | EM-20, EM-30, EM-40, EM-50 |
| PED | TÜV Süd | Z-IS-TAF-MUC-18-06-2652099-07102504 | 2014/68/EU | EM-20, EM-30, EM-40, EM-50 |
| CSA | KEMA/Holland | 1701699; C481302 | CSA standard, C 22.2 | EM-1, EM-2, EM-4, EM-50 |
| c CSA us | KEMA/Holland | C3337-01; C3337-81 | Gas directive | EM-1, EM-2, EM-3, EM-4, EM-40, EM-50 |
| UL | UL | E66358 | UL 873, CSA-22.2 No. 24 | EM-... |
| UL | UL | MH45736 | UL 353, CSA-22.2 No. 24 | EM-4, EM-5, EM-40, EM-50, EM-80, EM-14, EM-24, EM-44, EM-54, EM-134, EM-234, EM-444, EM-544, EM-1334, EM-2334, EM-4444, EM-5444 |
| EAC[b] | Gost Norm AG | TC RU C-DE.AB98.B.00348 | Technical rules of the customs union Russia/ Belarus/Kazakhstan | EM-... |

[a] For detailed information please refer to safety manual JUMO EM: 602021, 602026.
[b] Russian documentation upon request.

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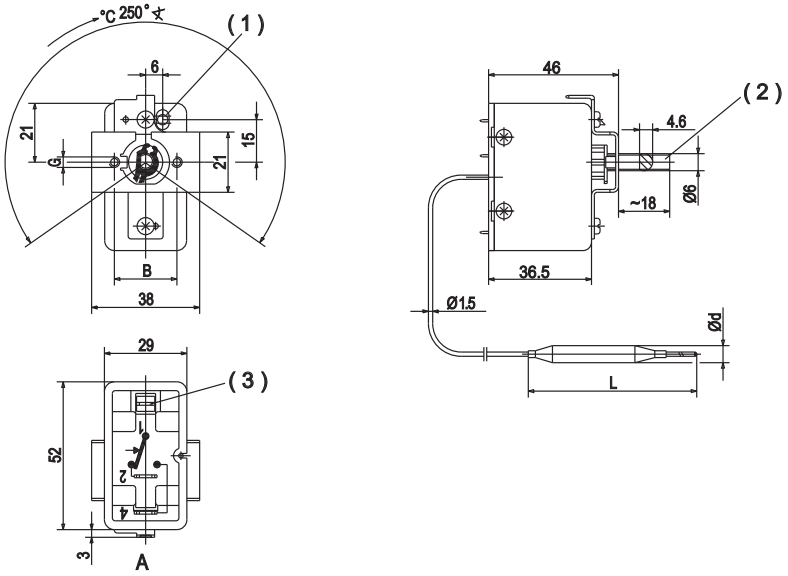
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# Dimensions

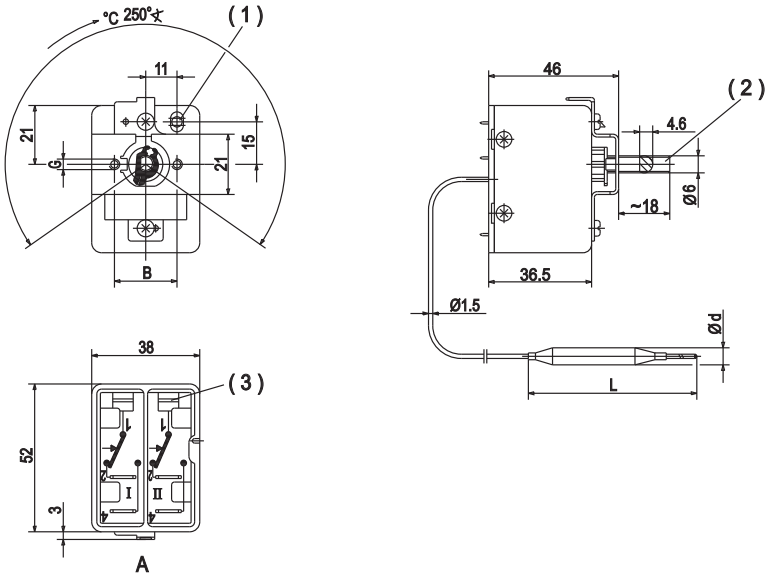
EM-1
EM-2
EM-3
EM-4
EM-5




(1) Restart knob only with abbreviation 4 and 5
(2) Not applicable with abbreviation 2, 3, 4, and 5
(3) Tab connector DIN 46244-A6.3-0.8

| | B | G |
|---|---|---|
| Standard | 22 | M3 |
| Extra code 704 | 28 | M4 |
| Extra code 705 | 33 | M3 |

EMF-13
EMF-20
EMF-23
EMF-30
EMF-33
EMF-14
EMF-24
EMF-40
EMF-44
EMF-50
EMF-54




(1) Restart knob only with abbreviation 40, 44, 50, and 5
(2) Not applicable with abbreviation 2, 3, 4, 5, 20, 30, 40, and 50
(3) Tab connector DIN 46244-A6.3-0.8

| | B | G |
|---|---|---|
| Standard | 22 | M3 |
| Extra code 704 | 28 | M4 |
| Extra code 705 | 33 | M3 |

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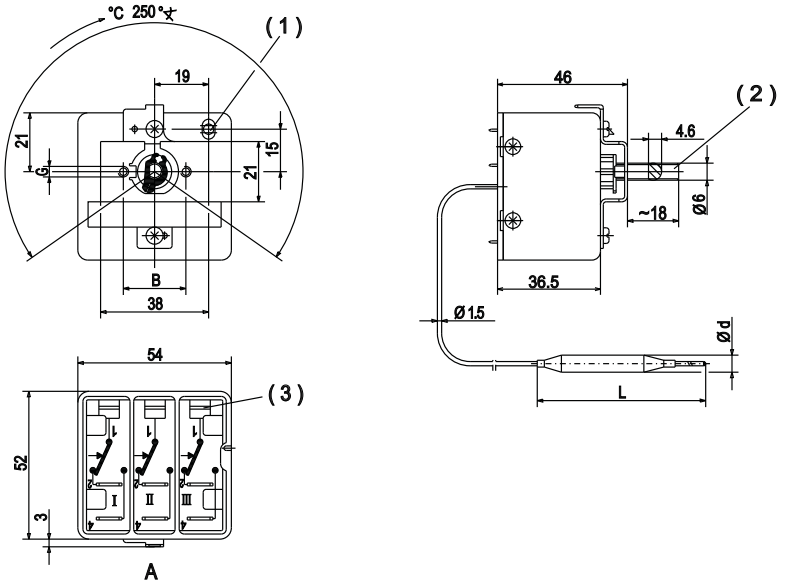
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# Dimensions

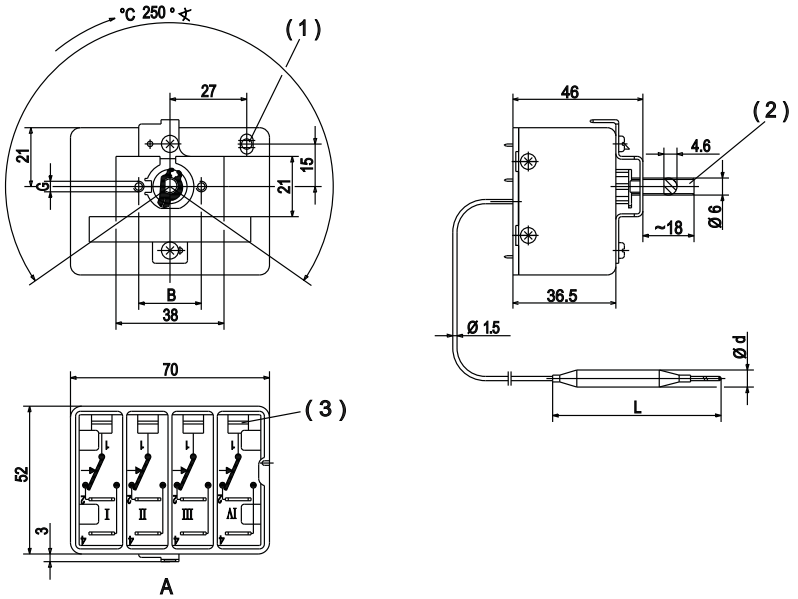
EMF-133
EMF-134
EMF-233
EMF-234
EMF-333
EMF-444
EMF-544




(1) Restart knob only with abbreviation 444, 544
(2) Not applicable with abbreviation 2, 3, 4, and 5
(3) Tab connector DIN 46244-A6.3-0.8

| | B | G |
|---|---|---|
| Standard | 22 | M3 |
| Extra code 704 | 28 | M4 |
| Extra code 705 | 33 | M3 |

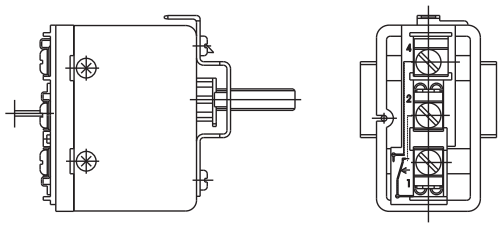
EMF-1333
EMF-2333
EMF-3333




(1) Restart knob only with abbreviation 4444
(2) Not applicable with abbreviation 2, 3, 4, and 5
(3) Tab connector DIN 46244-A6.3-0.8

| | B | G |
|---|---|---|
| Standard | 22 | M3 |
| Extra code 704 | 28 | M4 |
| Extra code 705 | 33 | M3 |

Screw connection
EM-1
Extra code 699



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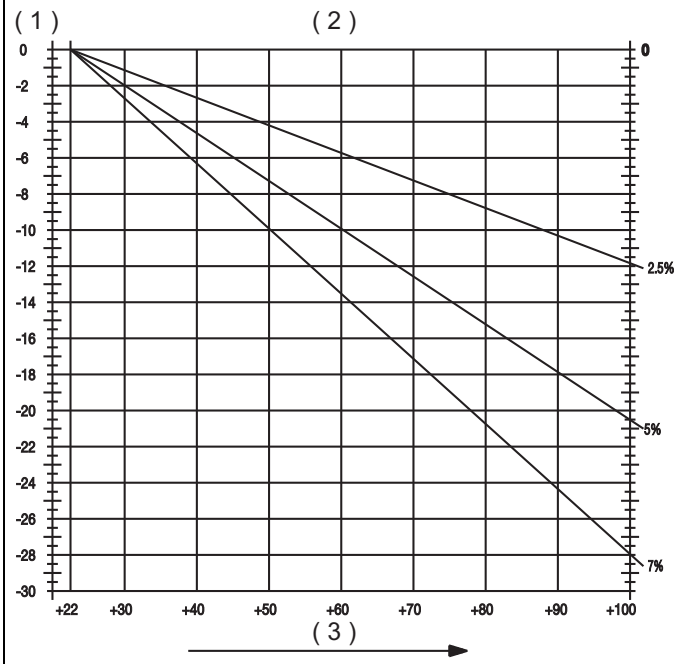
# Temperature compensation (TK)

Any change in the temperature at the switching head from the 22 °C calibration ambient temperature will produce a deviation of the switching point. For ambient temperatures that fluctuate strongly, it is advisable to use thermostats with temperature compensation (extra code "TK").

The switching point deviation depends on the ambient temperature at the switching head and takes the switching differential into consideration.

**The temperature influence on the capillary is not yet taken into account and can result in an additional error.**

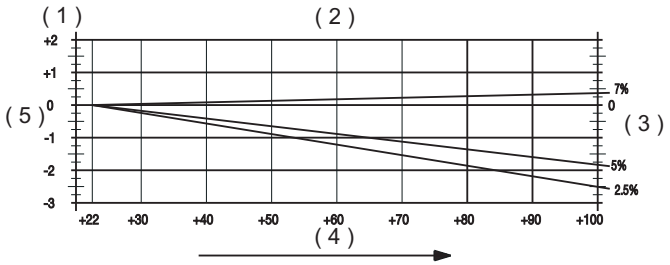
| Version **without** temperature compensation | Version **with** temperature compensation |
|---|---|
| Scale limit value < +200 °C | |
| **EM 1-pole/EM 2-pole** | **EM 1-pole temperature compensation TK** |




(1) % of the control range

**(2) Without temperature compensation**

(3) Ambient temperature [°C]




**Note:**
Additional graphs of the temperature compensation TK with higher scale limit values and for the EM 2-pole version are available upon request.

(1) % of the control range scope

**(2) With temperature compensation**

(3) Switching differential

(4) Ambient temperature [°C]

(5) Switching point deviation

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## Stock items

(Delivery within 3 working days after receipt of order)

| Part no. | Type | Control range °C | Switching differential % | Capillary mm | Process connection | Probe Ø × length mm |
|---|---|---|---|---|---|---|
| 60001231 | EM-1 | -20 to +40 | 2.5 | 2000 | **"10"** plain cylindrical probe | 6×245 |
| 60000492 | EM-1 | 0 to 50 | 2.5 | 1000 | | 6×283 |
| 60001142 | EM-1 | 20 to 90 | 2.5 | 1000 | | 6×210 |
| 60000493 | EM-1 | 20 to 90 | 7.0 | 1000 | | 6×91 |
| 60000494 | EM-1 | 0 to 100 | 2.5 | 1000 | | 6×157 |
| 60000219 | EM-1 | 0 to 100 | 2.5 | 2000 | | 6×157 |
| 60000285 | EM-1 | 30 to 110 | 7.0 | 1000 | | 6×84 |
| 60000921 | EM-1 | 0 to 150 | 2.5 | 1000 | | 6×113 |
| 60001141 | EM-1 | 0 to 200 | 2.5 | 1000 | | 6×114 |
| 60000220 | EM-1 | 0 to 200 | 2.5 | 2000 | | 6×114 |
| 60000495 | EM-1 | 50 to 300 | 2.5 | 1000 | | 6×88 |
| 60000923 | EM-1 | 50 to 300 | 2.5 | 2000 | | 6×88 |
| 60002119 | EM-1 | 20 to 400 | 6.0 | 1000 | | 8×137 |
| 60002083 | EM-1 | 20 to 500 | 5.0 | 1000 | | 8×159 |
| 60000214 | EM-2 | 0 to 50 | 2.5 | 1000 | | 6×286 |
| 60000497 | EM-2 | 0 to 150 | 2.5 | 1000 | | 6×113 |
| 60000213 | EM-2 | 0 to 150 | 2.5 | 2000 | | 6×113 |
| 60001380 | EM-2 | 50 to 300 | 2.5 | 1000 | | 6×88 |
| 60002120 | EM-2 | 20 to 400 | 6.0 | 1000 | | 8×137 |
| 60002084 | EM-2 | 20 to 500 | 5.0 | 1000 | | 8×159 |
| 60002112 | EM-2 | 20 to 500 | 6.0 | 2000 | | 8×159 |
| 60000924 | EM-5 | 0 to 150 | 2.5 | 1000 | | 6×113 |
| 60000929 | EM-5 | 0 to 200 | 2.5 | 1000 | | 6×114 |
| 60000211 | EM-5 | 50 to 300 | 2.5 | 1000 | | 6×88 |
| 60002085 | EM-5 | 20 to 500 | 5.0 | 1000 | | 8×159 |
| 60002244 | EM-50/574, 710 | 300 to 400 | — — | 1000 | | 6×148 |
| 60002245 | EM-50/574, 710 | 350 to 500 | — — | 1000 | | 6×127 |

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# Order details:

**Panel-mounted thermostats, EM series**

| Order code | (1) | Basic type | | | |
|---|---|---|---|---|---|
| 602021 | | EM panel-mounted thermostat with microswitch, with capillary | | | |
| | **(2)** | **Basic type extensions** | | | |
| 0001 | | EM-1 | Temperature controller | TR | |
| 0002 | | EM-2 | Temperature monitor | TW | |
| 0003 | | EM-3* | Temperature monitor | TW | 1-pole |
| 0004 | | EM-4* | Temperature limiter | TB | |
| 0005 | | EM-5 | Temperature limiter | TB | |
| 0013 | | EMF-13 | Temperature controller | TR/TW | |
| 0023 | | EMF-23 | Temperature monitor | TW/TW | |
| 0033 | | EMF-33* | Temperature monitor | TW/TW | |
| 0014 | | EMF-14 | Temperature controller | TR/TB | 2-pole |
| 0024 | | EMF-24 | Temperature monitor | TW/TB | |
| 0044 | | EMF-44* | Temperature limiter | TB/TB | |
| 0054 | | EMF-54 | Temperature limiter | TB/TB | |
| 0133 | | EMF-133 | Temperature controller | TR/TW/TW | |
| 0134 | | EMF-134 | Temperature controller | TR/TW/TB | |
| 0233 | | EMF-233 | Temperature monitor | TW/TW/TW | |
| 0234 | | EMF-234 | Temperature monitor | TW/TW/TB | 3-pole |
| 0333 | | EMF-333* | Temperature monitor | TW/TW/TW | |
| 0444 | | EMF-444* | Temperature limiter | TB/TB/TB | |
| 0544 | | EMF-544 | Temperature limiter | TB/TB/TB | |
| 1333 | | EMF-1333 | Temperature controller | TR/TW/TW/TW | |
| 2333 | | EMF-2333 | Temperature monitor | TW/TW/TW/TW | 4-pole |
| 3333 | | EMF-3333* | Temperature monitor | TW/TW/TW/TW | |
| 0020 | | EM-20 | Safety temperature monitor | STW (STB) | |
| 0030 | | EM-30* | Safety temperature monitor | STW (STB) | |
| 0040 | | EM-40* | Safety temperature limiter | STB | |
| 0050 | | EM-50 | Safety temperature limiter | STB | |
| | | * Setpoint value/limit value permanently set at the factory to customer requirements | | | |

| | (3) | Control ranges/limit value ranges |
|---|---|---|
| | | **For TR, TW, and TB** |
| 013 | | -20 to +40 |
| 021 | | 0 to 50 |
| 041 | | 20 to 90 |
| 025 | | 0 to 100 |
| 052 | | 30 to 110 |
| 027 | | 0 to 150 |
| 028 | | 0 to 200 |
| 062 | | 50 to 200 |
| 063 | | 50 to 250 |
| 064 | | 50 to 300 |
| 045 | | 20 to 400 |
| 046 | | 20 to 500 |
| | | **Adjustable for STB and STW (STB)** |
| 075 | | 75 to 100 |
| 085 | | 85 to 110 |
| 090 | | 120 to 150 |
| 091 | | 160 to 200 |
| 092 | | 210 to 250 |
| 094 | | 250 to 300 |
| 095 | | 300 to 400 |
| 096 | | 350 to 500 |
| 000 | | For limits with fixed settings |

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# Order details:

**Panel-mounted thermostats, EM series**

| Order code | | Limit value with fixed settings | |
|---|---|---|---|
| 000 | | For adjustable control range/limit value range | |
| ... | | Specification in °C (must be only within the control ranges/limit value ranges) | |
| | **(5)** | **Switching differential** | |
| 00 | | Without switching differential (-40 STB, -50 STB) | |
| 10 | | 1 %* of the scale range | with liquid-filled measuring systems |
| 25 | | 2.5 %* of the scale range | |
| 50 | | 5 %** of the scale range | |
| 70 | | 7 %** of the scale range | |
| 30 | | 3 %* of the scale range | with gas-filled measuring systems |
| 50 | | 5 %** of the scale range | |
| 60 | | 6 %* of the scale range | |
| 01 | | 10 %* of the scale range | |
| | | * Only with TR + TW | |
| | | ** Only with TR, TW, and STW | |
| | **(6)** | **Capillary length** | |
| 1000 | | 1000 mm | |
| 2000 | | 2000 mm | |
| 3000 | | 3000 mm | |
| 4000 | | 4000 mm | |
| 5000 | | 5000 mm | |
| .... | | Special length, specification in mm<br>(for the max. allowable length see "Technical data") | |
| | **(7)** | **Capillary material** | |
| 40 | | Cu (Copper) | |
| 20 | | CrNi (stainless steel) | |
| | **(8)** | **Process connection*** | |
| 10 | | Plain cylindrical probe  | |
| 20 | | Screw-in protection tube  | |
| | | * For different types of connections and protection tube refer to data sheet 606710 | |
| | **(9)** | **Thread of process connection** | |
| 00 | | Without thread (process connection "10") | |
| 13 | | External thread G 1/2 | |
| | **(10)** | **Material of process connection** | |
| 00 | | Only with process connection "10" | |
| 46 | | CuZn (brass) | |
| 20 | | CrNi (stainless steel 1.4571) | |
| | **(11)** | **Insertion length "S" (immersion tube length)** | |
| 000 | | Without thermowell | |
| 100 | | 100 mm | |
| 150 | | 150 mm | |
| 200 | | 200 mm | |
| 300 | | 300 mm | |
| 400 | | 400 mm | |
| .... | | Special length, specification in mm (max. 500 mm) | |

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# Order details:

**Panel-mounted thermostats, EM series**

| Order code | (12) | Diameter "D" (immersion tube diameter) |
|---|---|---|
| 00 | | Without protection tube |
| 8 | | 8 mm |
| 10 | | 10 mm |

| | (13) | Diameter "d" (probe diameter) |
|---|---|---|
| 6 | | 6 mm |
| 8 | | 8 mm |

| | (14) | Extra codes* |
|---|---|---|
| 000 | | Without extra codes |
| 574 | | Microswitch with N/C contact, restart lock, and additional signal contact (only for TB and STB) |
| 702 | | Snap-action switch contact, gold plated (only with 1-pole and 2-pole version) |
| 699 | | Screw connection up to 2.5 $mm^2$ conductor cross section |
| 704 | | Switching head mounting with 2 M4 screws, spaced 28 mm |
| 705 | | Switching head mounting with 2 M3 screws, spaced 33 mm |
| 710 | | Central mounting with acorn nut (only for TB and STB) |
| 707 | | Temperature compensation (only with 1-pole and 2-pole version) |

* State extra codes one after another, separated by commas

**Sequence contact gap for 2-pole, 3-pole, and 4-pole devices**
Specify in plain text (e.g. 2 °C, 5 °C, 8 °C)

**Order code**

| (1) | | (2) | | (3) | | (4) | | (5) | | (6) | | (7) | | (8) | | (9) | | (10) | | (11) | | (12) | | (13) | | (14) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 602021 | / | .... | - | ... | - | ... | - | .. | - | .... | - | .. | - | .. | - | .. | - | .. | - | ... | - | .. | - | . | / | ... | , | ... | , | ... |

**Order example**

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 602021 | / | 0005 | - | 052 | - | 000 | - | 00 | - | 2000 | - | 40 | - | 10 | - | 00 | - | 00 | - | 000 | - | 00 | - | 6 | / | 574* | , | 710 | | |

***** State extra codes one after another, separated by commas.