

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstrasse 14,  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
 Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow - Essex CM20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 63 52 62  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 8 Technology Boulevard  
 Canastota, NY 13032, USA  
 Phone: 315-697-JUMO  
 1-800-554-JUMO  
 Fax: 315-697-5867  
 E-mail: info@jumo.us  
 Internet: www.jumo.us



## JUMO heatTHERM-AT and heatTHERM-DR

Type 603070, versions as mounting or room thermostat

### **PUSH IN** -Connection system – installation time reduced by 50%

- Ambient temperature compensation stable switching point position
- Contact rating 16 A, 230 V
- Tested to EN 14597 (replacing DIN 3440)
- At least 250,000 switching operations for TR, TW
- Deviation from switching point over entire service life of max.  $\pm 5\%$
- Max. enclosure protection IP 54
- UL approved

### Brief description

Key features of this new series of thermostats from JUMO are very flexible use and the most modern connection technology.

The thermostat housing is suitable for all commonly used mounting types: wall, immersion sleeve, and attachment fastening. It can be used universally and reduces the number of different types, since different mounting types are no longer required.

The heatTHERM-AT type (designs 7+8) is a special variation with a modified base that allows for DIN rail or wall mounting. This facilitates easy mounting on TH35 mounting rails to EN 60715 (for example in switch cabinets). The result is significantly less mounting time for this version. To use these surface mounting thermostats, the first of their kind in the world with "Push-In®" terminal technology, simply insert the connecting wires into the connecting points as far as they will go. That's it! No tool is needed to connect the wire or the strand with the ferrule and the wiring is more reliable. This solution also saves considerable time and money compared to the conventional screw terminal.

Using "Push-In®" technology, loads up to 16 A can be directly connected at 230 V AC. Because no contactor is required, the cost of installation is reduced still further.

Maintenance costs are reduced because of the small interval of about 10°K from the point of shutting off the safety temperature limiter to turning it back on.

The following are available: temperature controller (TR), operating temperature monitor (TW), safety temperature monitor (STW) and safety temperature limiter (STB) as single or double thermostat.

The high quality standards of this series of products are demonstrated by approvals under EN 14 597, DGRL and UL.



Type 603070/0170 (TR/STB)



Type 603070/0001 (TR)



Type 603070/0002 (TW)



Type 603070/0002-7 (TW)

### Switching function

#### Temperature controllers TR and temperature monitors TW

When the temperature present at the temperature probe exceeds the specified setpoint, the snap-action switch is activated by the transmission mechanism and the circuit is opened or closed. If the value falls below the specified setpoint (by the switching differential) the snap-action switch returns to its initial position.

#### Safety temperature monitor STW

When the temperature present at the temperature probe exceeds the specified setpoint, the snap-action switch operates and the circuit is opened or closed. If the value falls below the specified setpoint (by the switching differential of about 10°K) the snap-action switch returns to its initial position.

If the measuring system is destroyed, that is, should the expansion fluid escape, the pressure in the diaphragm will fall and the circuit will be permanently open.

The same circuit will open if the temperature at the probe cools to below about -20°C. However, it closes automatically if the temperature increases again.

#### Safety temperature limiter STB

If the temperature present at the temperature probe exceed the specified limit, the snap-action switch is activated, the circuit opens or closes, and the snap-action switch is mechanically locked.

After the temperature falls 10°K below the limit, the snap-action switch can be manually unlocked again.

If the measuring system is destroyed, that is, should the expansion fluid escape, the pressure in the diaphragm will fall and the circuit will be permanently open. Then it is no longer possible to deactivate the lockout.

The same circuit opens if the sensor cools off to a temperature under about -20°C. However, it closes automatically if the temperature increases again.

### Approvals



**DGRL**  
97 / 23 / EG



Design 5 + 6 \*



Design 7 + 8 \*

\* (with extra code 061 only)

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## Technical data

|                            |                        | Designs 5 + 6  | Designs 7 + 8   |
|----------------------------|------------------------|--|---|
| <b>Enclosure</b>           |                        | Base: PA (reinforced)<br>Color: silver gray RAL 7001<br><br>Cover: ABS with pane (PMMA)<br>Color: cobalt blue RAL 5013   |   |
| <b>Setpoint adjustment</b> | TR<br><br>TW, STW, STB | Switching point can be operated from outside with rotary knob.<br><br>Switching point adjustable by screwdriver once the cover is removed from the housing. Specified switching point can be monitored through the pane. | ---<br><br>Switching point adjustable by screwdriver  |
| <b>Protection</b>          |                        | IP 54 to EN 60529  | IP 20 to EN 60529                                     |
| <b>Cable entry</b>         |                        | Cable gland M20 x 1.5, for cable Ø 6-12 mm   | Cable connection directly to <b>PUSH IN</b> terminals |
| <b>Capillary</b>           |                        |  | Min. bending radius of capillary 5 mm                 |
| <b>Housing mounting</b>    |                        | Pipe installation with retaining strap for pipe diameters 15-100 mm, protection tube mounting, wall mounting   | Wall mounting, DIN rail mounting TH35 to EN 60715     |
| <b>Weight</b>              |                        |  | approx. 0.2 kg  |

## Electrical data

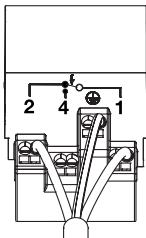
|                                 |  |  |  |
|---------------------------------|--|--|--|
| <b>Contact type</b>             | Snap-action switch with one-pole changeover contact  |  |  |
| <b>Contact rating</b>           | TR, TW, STW  | STB  |  |
|                                 | On the break (SPST-NC) contact (contacts 1-2):<br>AC 230 V +10%, 16 (2.5) A, cos φ = 1(0.6)<br>DC 230 V +10%, 0.25 A                                   | On the break (SPST-NC) contact (contacts 1-2):<br>AC 230 V +10%, 16 (2.5) A, cos φ = 1(0.6)<br>DC 230 V +10%, 0.25 A | On the signal contact (contacts 1-4):<br>AC 230 V +10%, 2 (0.4) A, cos φ = 1(0.6)<br>DC 230 V +10%, 0.25 A |
| <b>Connection</b>               | <b>PUSH IN</b> contact (plug-in terminal)<br>"Push-In®" terminal system: patented connection technology of Weidmüller GmbH & Co. KG, Detmold, Germany. |  |  |
| <b>Connection cross-section</b> | 0.75 to 2.5 mm <sup>2</sup> finely stranded (single core, finely stranded with ferrule)  |  |  |
| <b>Contact reliability</b>      | To ensure that switching is as reliable as possible, we recommend a minimum loading of:<br>for silver contacts: AC / DC = 24 V, 100 mA.                |  |  |

## Operating data

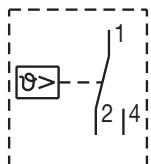
|                                 |   |   |                                     |                                      |
|---------------------------------|---|---|-------------------------------------|--------------------------------------|
| <b>Switching point accuracy</b> | TR, TW  | STW, STB with a setting range of:<br>+20°C to +80°C |                                     | +70°C to +130°C                      |
|                                 | Switching differential 2.5%   | in the first half<br>(+20 to +50°C)                 | in the upper half<br>(+50 to +80°C) | in the first half<br>(+70 to +100°C) |
|                                 | In the upper third of the scale ± 3%,<br>at start of scale ± 6%   | +0 / -5K  | +0 / -12K                           | +0 / -12K                            |
| <b>Temperature compensation</b> | If there is a deviation in the ambient temperature at the thermostat head and capillary from the calibration ambient temperature of +22°C, there is a shift in the switching point of about -0.1 K/K (change in the switching point in reference to the change in ambient temperature, measured at the limit value of +120°C permanently set and with capillary length of 2000 mm).<br>The standard temperature compensation reduces this switching point shift to a minimum. |   |                                     |                                      |
| <b>Limit value temperatures</b> | for transport and storage: -30 to +50°C<br>in operation: max. +80°C (design 7 max. +55°C, design 6 + 8 max. +50°C)<br>with pipe mounting max. pipe temperature +120°C   |   |                                     |                                      |
| <b>Nominal position (NL)</b>    | to DIN 16257, NL 0 to NL 90 (other nominal positions available on request)  |   |                                     |                                      |

|                  |      |                                       |  |
|------------------|------|---------------------------------------|--|
| <b>Approvals</b> | DIN  | EN 14597                              | TR 119107, TW 119207, STW (STB) 119307, STB 119407 |
|                  | DGRL | Pressure Equipment Directive 97/23/EC | STW and STB  |
|                  | UL   | UL 873                                | E 66358  |

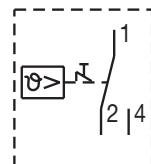
## Connection diagram



TR, TW, STW:



STB:



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### Temperature controller TR, design 5

| Type 603070/ 0001  |                     |                         |                        |                        |                        |  |  |
|--|---------------------|-------------------------|------------------------|------------------------|------------------------|--|--|
| <ul style="list-style-type: none"> <li>■ Enclosure protection IP 54</li> <li>■ Ambient temperature compensation</li> <li>■ Individual limiting of control range</li> </ul> |                     |                         |                        |                        |                        |  |  |
| <b>Sales No.</b>   |                     | <b>Type</b>             |                        |                        |                        |  |  |
| 60/60003185  | heatTHERM-AT / 0001 | <b>Control range °C</b> |                        |                        |                        |  |  |
| 60/60003186  |                     | 0 to +120               | 2000                   | 6 x 87                 | approx. 3K             | with internal capillary and contact sensor<br>Protection tube, nickel-plated brass |  |
| Sales No.  | Type                | Control range °C        | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection   |  |

Other versions (control range, switching differential, process connection) available on request – Minimum order quantity 100 units. Protective pipes see page 11.

### Temperature monitor TW, design 5

| Type 603070/ 0002  |                     |                         |                        |                        |                        |  |  |
|--|---------------------|-------------------------|------------------------|------------------------|------------------------|--|--|
| <ul style="list-style-type: none"> <li>■ Enclosure protection IP 54</li> <li>■ Ambient temperature compensation</li> <li>■ Switching value can be monitored through window in cover</li> </ul> |                     |                         |                        |                        |                        |  |  |
| <b>Sales No.</b>   |                     | <b>Type</b>             |                        |                        |                        |  |  |
| 60/60003187  | heatTHERM-AT / 0002 | <b>Control range °C</b> |                        |                        |                        |  |  |
| 60/60003188  |                     | 0 to +120               | 2000                   | 6 x 87                 | approx. 3K             | with internal capillary and contact sensor<br>Protection tube, nickel-plated brass |  |
| Sales No.  | Type                | Control range °C        | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection   |  |

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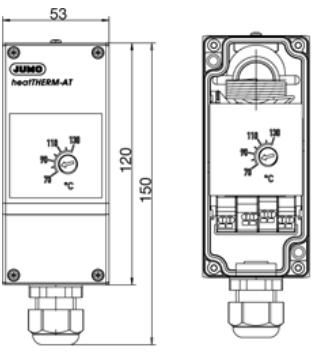
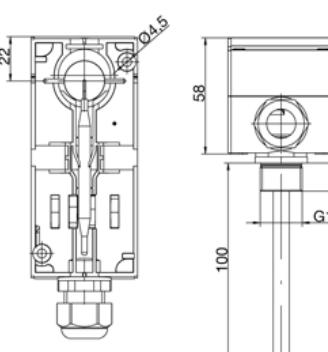
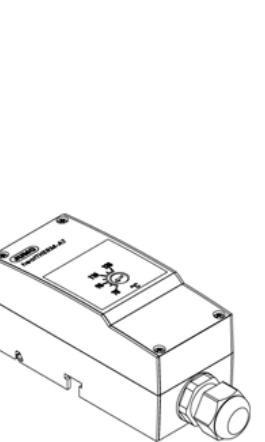
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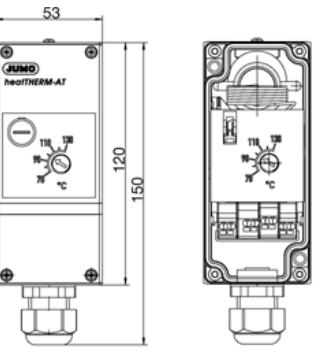
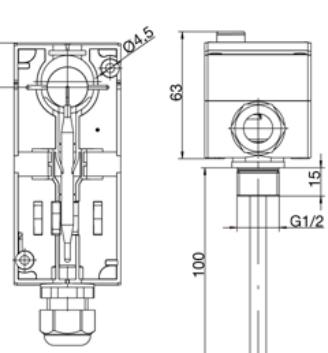
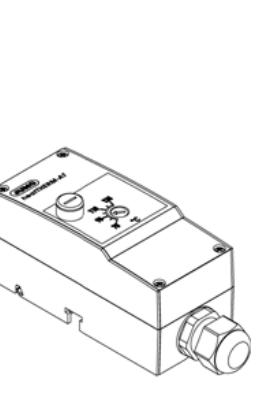
## JUMO heatTHERM-AT instruments held in stock (delivery in max. 3 days after order is received)

### Safety temperature monitor STW, design 5

| Type 603070/ 0020 |                     |    |                        |                        |                        |   |
|-------------------|---------------------|--|------------------------|------------------------|------------------------|---|
| Sales No.         | Type                | Limit value range °C   | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection                            |
| 60/60003189       | heatTHERM-AT / 0020 | +70 to +130  | 2000                   | 6 x 60                 | approx. 10K            | Protection tube,<br>nickel-plated brass       |
| 60/60003229       |                     | +20 to + 80  |                        |                        |                        | with internal capillary<br>and contact sensor |

Other versions (control range, switching differential, process connection) available on request – Minimum order quantity 100 units. Protective pipes see page 11.

### Safetytemperaturelimiter STB, design 5

| Type 603070 / 0070 |                     |    |                        |                        |                        |   |
|--------------------|---------------------|--|------------------------|------------------------|------------------------|---|
| Sales No.          | Type                | Limit value range °C   | Capillary length in mm | Probe Ø x length in mm | Unlocking differential | Process connection                            |
| 60/60003190        | heatTHERM-AT / 0070 | +70 to +130  | 2000                   | 6 x 60                 | approx. 10K            | Protection tube,<br>nickel-plated brass       |
| 60/60003230        |                     | +20 to + 80  |                        |                        |                        | with internal capillary<br>and contact sensor |

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## JUMO heatTHERM-AT instruments held in stock (delivery in max. 3 days after order is received)

### Room thermostat temperature controller TR, design 6

| Type 603070/ 0001 |                     |                      |                        |                        |                        |                    |
|-------------------|---------------------|----------------------|------------------------|------------------------|------------------------|--------------------|
| Sales No.         | Type                | Limit value range °C | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection |
| 60/60003191       | heatTHERM-AT / 0001 | -10 to +40           | --                     | --                     | 1.5 - 2K               | Helix probe        |
| 60/60003192       |                     | 0 to +50             |                        |                        |                        |                    |

Other versions (control range, switching differential, process connection) available on request – Minimum order quantity 100 units. Protective pipes see page 11.

### Room thermostat temperature monitor TW, design 6

| Type 603070/ 0002 |                     |                  |                        |                        |                        |                    |
|-------------------|---------------------|------------------|------------------------|------------------------|------------------------|--------------------|
| Sales No.         | Type                | Control range °C | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection |
| 60/60003193       | heatTHERM-AT / 0002 | -10 to +40       | --                     | --                     | 1.5 - 2K               | Helix probe        |
| 60/60003194       |                     | 0 to +50         |                        |                        |                        |                    |

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## JUMO heatTHERM-AT instruments held in stock (delivery in max. 3 days after order is received)

### Temperature controller/safety temperature monitor TR/STW, design 5

| Type 603070/ 0120 |                     |                      |                        |                        |                        |  |
|-------------------|---------------------|----------------------|------------------------|------------------------|------------------------|--|
| Sales No.         | Type                | Limit value range °C | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection                         |
| 60/60003195       | heatTHERM-AT / 0120 | (TR) 0 to +120       | 2000                   | 6 x 87                 | (TR) approx. 3K        | with internal capillary and contact sensor |
|                   |                     | (STW) 70 to +130     |                        | 6 x 60                 | (STW) approx. 10K      |  |
| 60/60003231       | heatTHERM-AT / 0120 | (TR) 0 to +120       | 2000                   | 6 x 87                 | (TR) approx. 3K        | Protection tube, nickel-plated brass       |
|                   |                     | (STW) 70 to +130     |                        | 6 x 60                 | (STW) approx. 10K      |  |

Other versions (control range, switching differential, process connection) available on request – Minimum order quantity 100 units. Protective pipes see page 11.

### Temperature controller/safety temperature limiter TR/STB, design 5

| Type 603070/ 0170 |                     |                      |                        |                        |                        |  |
|-------------------|---------------------|----------------------|------------------------|------------------------|------------------------|--|
| Sales No.         | Type                | Limit value range °C | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection                         |
| 60/60003196       | heatTHERM-AT / 0170 | (TR) 0 to +120       | 2000                   | 6 x 87                 | (TR) approx. 3K        | with internal capillary and contact sensor |
|                   |                     | (STB) 70 to +130     |                        | 6 x 60                 | (STB) approx. 10K      |  |
| 60/60003232       | heatTHERM-AT / 0170 | (TR) 0 to +120       | 2000                   | 6 x 87                 | (TR) approx. 3K        | Protection tube, nickel-plated brass       |
|                   |                     | (STB) 70 to +130     |                        | 6 x 60                 | (STB) approx. 10K      |  |

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### Room thermostat temperature monitor / Temperature monitor TW/TW, design 6

| Type 603070/ 0202 | <br><br><br>        |                      |                        |                        |                        |                    |
|-------------------|---------------------|----------------------|------------------------|------------------------|------------------------|--------------------|
| Sales No.         | Type                | Limit value range °C | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection |
| 60/60003212       | heatTHERM-AT / 0202 | -10 to +40           | --                     | --                     | 1.5 - 2K               | Helix probe        |
| 60/60003213       | heatTHERM-AT / 0202 | 0 to +50             | --                     | --                     |                        |                    |

Other versions (control range, switching differential, process connection) available on request – Minimum order quantity 100 units. Protective pipes see page 11.

## JUMO heatTHERM-AT instruments held in stock (delivery in max. 3 days after order is received)

### Temperature monitor with flange pocket, design 5

| Type 603070/ 0002 | <br><br>            |                  |                        |                        |                        |                                  |
|-------------------|---------------------|------------------|------------------------|------------------------|------------------------|----------------------------------|
| Sales No.         | Type                | Control range °C | Capillary length in mm | Probe Ø x length in mm | Switching differential | Process connection               |
| 60/60003282       | heatTHERM-AT / 0002 | +40 to +215      | --                     | --                     | approx. 6K             | Pocket with flange and extension |

Other versions (control range, switching differential, process connection) available on request – Minimum order quantity 100 units. Protective pipes see page 11.

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## JUMO heatTHERM-DR instruments held in stock (delivery in max. 3 days after order is received)

### Thermostat for DIN rail mounting TH35, to EN 60715, design 7

| Type 603070/ ....-  | 603070/0002-7 | 603070/0020-7    | 603070/0070-7          |                        |                                   |  |
|---|---------------|------------------|------------------------|------------------------|-----------------------------------|--|
| ■ Enclosure protection IP 20<br>■ DIN rail mounting TH35<br>■ Easy installation and user friendly |               |                  |                        |                        |                                   |  |
|   |               |                  |                        |                        |                                   |  |
|   |               |                  |                        |                        |                                   |  |
| Sales No.   | Type          | Control range °C | Capillary length in mm | Probe Ø x length in mm |                                   |  |
| <b>Temperature monitor TW</b>   |               |                  |                        |                        |                                   |  |
| 60/60003283   | 603070/0002   | 0 to +120        | 2000                   | 6 x 87                 | with capillary and contact sensor |  |
| 60/60003284   |               | 0 to +200        |                        | 6 x 78                 |                                   |  |
| 60/60003285   |               | +50 to +300      |                        | 6 x 66                 |                                   |  |
| <b>Safety temperature monitor STW</b>   |               |                  |                        |                        |                                   |  |
| 60/60003286   | 603070/0020   | +70 to +130      | 2000                   | 6 x 60                 |                                   |  |
| <b>Safety temperature limiter STB</b>   |               |                  |                        |                        |                                   |  |
| 60/60003287   | 603070/0070   | +70 to +130      | 2000                   | 6 x 60                 |                                   |  |
| approx. 10K   |               |                  |                        |                        |                                   |  |
| approx. 10K   |               |                  |                        |                        |                                   |  |

Other versions (control range, switching differential, process connection) available on request – Minimum order quantity 100 units. Protective pipes see page 11.

### Thermostat for DIN rail mounting TH35, to EN 60715, design 8

| Type 603070/ 0002-8   | 603070/0002-8 | 603070/0020-8 | 603070/0070-8 |  |
|---|---------------|---------------|---------------|--|
| ■ Enclosure protection IP 20<br>■ DIN rail mounting TH35<br>■ Easy installation and user friendly |               |               |               |  |
|   |               |               |               |  |
|   |               |               |               |  |
| (1) Fastening borehole Ø 4.5 mm   |               |               |               |  |
|   |               |               |               |  |

On request – Minimum order quantity 100 units.

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstrasse 14,  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 E-mail: mail@jumo.net  
 Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow - Essex CM20 2DY, UK  
 Phone: +44 1279 63 55 33  
 Fax: +44 1279 63 52 62  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 8 Technology Boulevard  
 Canastota, NY 13032, USA  
 Phone: 315-697-JUMO  
 1-800-554-JUMO  
 Fax: 315-697-5867  
 E-mail: info@jumo.us  
 Internet: www.jumo.us



## Order details:

Mounting thermostat type 603070

|            |  |  |
|------------|--|--|
| Order code | <b>(1) Basic type</b>  |  |
| 603070     | heatTHERM-AT with one-pole snap-action switches                              |  |
|            | <b>(2) Basic type extension</b>  |  |
| 0001       | Temperature controller (TR)  |  |
| 0002       | Temperature monitor (TW)   |  |
| 0020       | Safety temperature monitor (STW)   |  |
| 0070       | Safety temperature limiter (STB)   |  |
| 0202       | Room thermostat temperature monitor / temperature monitor (TW/TW)            |  |
| 0120       | Temperature controller / safety temperature monitor (TR / STW)               |  |
| 0170       | Temperature controller / safety temperature limiter (TR / STB)               |  |
|            | <b>(3) Design</b>  |  |
| 5          |  | Mounting thermostat, with protection tube, flange sleeve, capillary or as contact sensor |
| 6          |  | Room thermostat, with helix sensor   |
| 7          |  | DIN railthermostat, with capillary   |
| 8          |  | DIN railthermostat, with helix sensor  |
|            | <b>(4) Control/ limit value range 1</b>                                      |  |
| 016        | -10...+ 40°C (TR, TW)  |  |
| 021        | 0...+ 50°C (TR, TW)  |  |
| 040        | + 20...+ 80°C (STW)  |  |
| 026        | 0...+120°C (TR, TW)  |  |
| 671        | + 70...+130°C (STW, STB)   |  |
| 379        | + 40...+215°C  |  |
|            | Other control/limit value ranges up to +350°C available on request           |  |
|            | <b>(5) Control/ limit value range 2</b>                                      |  |
| 671        | +70...+130°C Adjustable (STW, STB)   |  |
|            | Other control/limit values permanently set up to +350°C available on request |  |
|            | <b>(6) Switching differential</b>  |  |
| 00         | No switching differential (STB)  |  |
| 25         | approx. 3K (TR, TW)  |  |
| 70         | approx. 10K (STW)  |  |
|            | <b>(7) Capillary length</b>  |  |
| 0          | 0 mm (for room thermostat only)  |  |
| 2000       | 2000 mm  |  |
| ....       | Special length on request  |  |
|            | <b>(8) Capillary material</b>  |  |
| 40         | Copper (Cu)  |  |
| 20         | Stainless steel (CrNi, 1.4571)   |  |
| 17         | Ø 17 mm  | Helix sensor for room thermostat   |

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36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
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Fax: +49 661 6003-607  
E-mail: mail@jumo.net  
Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**

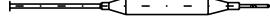
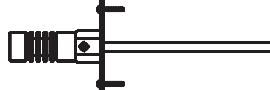
JUMO House  
Temple Bank, Riverway  
Harlow - Essex CM20 2DY, UK  
Phone: +44 1279 63 55 33  
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**JUMO Process Control, Inc.**

8 Technology Boulevard  
Canastota, NY 13032, USA  
Phone: 315-697-JUMO  
1-800-554-JUMO  
Fax: 315-697-5867  
E-mail: info@jumo.us  
Internet: www.jumo.us

**Order details:**

Mounting thermostat type 603070

| Order code                         | (9) Process connection   |
|------------------------------------|--|
| 10                                 | Smooth cylindrical probe / contact sensor  |
| 15                                 | Helix sensor                               |
| 35                                 | Flange sleeve                              |
| (10) Diameter (probe diameter)     |  |
| 6                                  | Ø 6 mm (for process connection 10 and 35)  |
| 17                                 | Ø 17 mm Helix sensor for room thermostat (with process connection 15)  |
| (11) Extra codes (TZ) <sup>1</sup> |  |
| 000                                | No extra code  |
| 402                                | Enclosure protection IP54  |
| 758                                | Retaining strap for contact sensor   |
| 061                                | UL approved  |

Order code: (1) 603070 / (2)  / (3)  - (4)  - (5)  - (6)  - (7)  - (8)  - (9)  - (10)  - (11)  ,   
 Sample order: 603070 / 0001 / 5 - 021 - 671 - 70 - 2000 - 40 - 10 - 00 / 000<sup>1</sup>, 000<sup>1</sup>

<sup>1</sup> List extra codes one after the other, separated by commas.

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## Accessories

| <b>Protection tube set</b><br>Suitable for<br><b>one</b> sensor | Protection tube with sealing collar          |      | Bracket for strain relief | Plate for mounting thermostat     | Screw for mounting thermostat |
|---|--|------|---------------------------|-----------------------------------|-------------------------------|
|   |  |      |                           |                                   |                               |
| Sales no.   | Type   | Code | Connection                | Ø pocket x fitting length EL (mm) | Material                      |
| 60/60003177   | Screw-in protection tube with sealing collar | 28   | G 1/2                     | 8 x 100                           | Brass / nickel plated         |
| 60/60003203   |  |      |                           | 8 x 150                           |                               |
| 60/60003171   |  |      |                           | 8 x 200                           |                               |
| 60/60003172   |  |      |                           | 8 x 100                           | Stainless steel / 1.4571      |
| 60/60003205   |  |      |                           | 8 x 150                           |                               |
| 60/60003173   |  |      |                           | 8 x 200                           |                               |
| Sales no.   | Type   | Code | Connection                | Ø pocket x fitting length EL (mm) | Material                      |
| 60/60003178   | Screw-in protection tube with sealing collar | 29   | G 1/2                     | 2 x 8 x 100                       | Brass / nickel plated         |
| 60/60003204   |  |      |                           | 2 x 8 x 150                       |                               |
| 60/60003174   |  |      |                           | 2 x 8 x 200                       |                               |
| Protection tube set   | Protection tube with sealing collar          |      | Bracket for strain relief | Plate for mounting thermostat     | Screw for mounting thermostat |
| Suitable for<br><b>two</b> sensors                              |  |      |                           |                                   |                               |
| Sales no.   | Type   | Code | Connection                | Ø pocket x fitting length EL (mm) | Material                      |
| 60/60003175   | Screw-in protection tube with sealing collar | 29   | G 1/2                     | 15 x 100                          | Stainless steel / 1.4571      |
| 60/60003206   |  |      |                           | 15 x 150                          |                               |
| 60/60003176   |  |      |                           | 15 x 200                          |                               |
| Adapter piece for pocket  |  |      |                           | Material                          |                               |
| Sales no.   |  |      |                           | Steel / 1.0718                    |                               |
| 60/00507273   |  |      |                           |                                   |                               |