

**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 635533  
 Fax: +44 1279 635262  
 E-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 6733 Myers Road  
 East Syracuse, NY 13057, USA  
 Phone: 315-437-5866  
 1-800-554-5866  
 Fax: 315-437-5860  
 E-mail: info.us@jumo.net  
 Internet: www.jumousa.com



# Mineral-Insulated RTD Temperature Probe According to DIN EN 60751

- For temperatures between -50 (-200) to +600 °
- Flexible sheath cable with vibration-resistant measuring insert
- As single or double RTD temperature probe in 2-wire, 3-wire, or 4-wire circuit
- Quick response time
- Application-specific insertion length

Due to their specific features, mineral-insulated RTD temperature probes are used in chemical plants, power plants, pipelines, engine building, test rigs, and any measuring locations requiring flexibility and simple replacement. Inside the flexible and thin-walled sheathed cable out of stainless steel, the low ohmic conductor copper wires are embedded in compressed, heat-resistant magnesium oxide.

The temperature sensor with 2-wire, 3-wire, or 4-wire technology is connected to the conductor copper wires and installed in the protection tube out of stainless steel. The protection tube and sheathed cable are welded to one another. The diameters already start at 1.9 mm.

The good thermal transfer between the protection tube and temperature sensor enables short response times ( $t_{0.5}$  from 0.7 s) and excellent measuring accuracy. The vibration-resistant construction guarantees a long operating life. The flexible probe tube allows temperature measurements to be made at measuring points that are difficult to access. The smallest bending radius is 5 times the outer diameter.

The measuring insert is normally fitted with a Pt100 temperature sensor according to DIN EN 60751, class B in 2-wire circuit; versions with Pt500 or Pt1000 can be ordered as well. The connection is also available in 3-wire and 4-wire circuits.



## Technical data

### Terminal head

Form B, diecast aluminum, M20 × 1.5; IP65, ambient temperature -40 to +100 °C  
 Form BUZ, diecast aluminum, M20 × 1.5; IP65, ambient temperature -40 to +100 °C  
 Form J, diecast aluminum, M16 × 1.5, IP65, ambient temperature -40 to +100 °C  
 Caution: reduced ambient temperature when using transmitter

### Connection

Cable ends stripped bare; alternatively available with ferrules, plug-in sleeves, or multi-pole electrical connectors

### Connecting cable

Silicone, ambient temperature -50 to +180 °C  
 PTFE, ambient temperature -190 to +260 °C  
 Metal braiding, ambient temperature -50 to +350 °C

### Process connection

Thread, stainless steel 1.4571

### Protection tube

Stainless steel 1.4571, Ø 1.9 mm, Ø 3 mm, and Ø 6 mm

### Adapter sleeve (end closure)

As standard, the adapter sleeve (end closure) is designed up to 120 °C; it is available up to 300 °C upon request.

### Measuring insert

Pt100/Pt1000 temperature sensor, DIN EN 60751, class B in 2-wire, 3-wire, or 4-wire circuit

### Response times

In water with 0.4 m/s / in air with 3 m/s  
 Ø 1.9 mm: water  $t_{0.5}$  = 0.7 s,  $t_{0.9}$  = 2.1 s / air  $t_{0.5}$  = 7.2 s,  $t_{0.9}$  = 20.5 s  
 Ø 3.0 mm: water  $t_{0.5}$  = 1.3 s,  $t_{0.9}$  = 4.0 s / air  $t_{0.5}$  = 13.5 s,  $t_{0.9}$  = 41.0 s  
 Ø 6.0 mm: water  $t_{0.5}$  = 5.0 s,  $t_{0.9}$  = 11.5 s / air  $t_{0.5}$  = 37.5 s,  $t_{0.9}$  = 117.5 s

### Transmitter

Analog transmitter, 4 to 20 mA output, data sheet 707030  
 Programmable transmitter, 4 to 20 mA / 20 to 4 mA output, data sheet 707010  
 Programmable transmitter, 4 to 20 mA / 20 to 4 mA and HART®-interface output, data sheet 707010

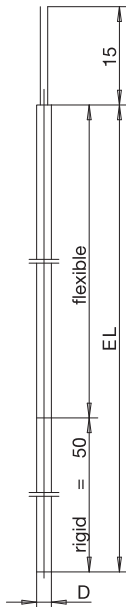
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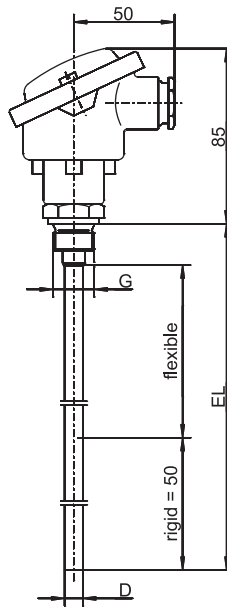
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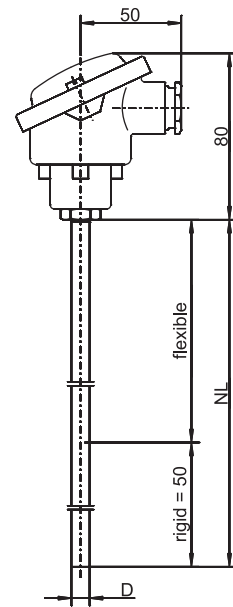
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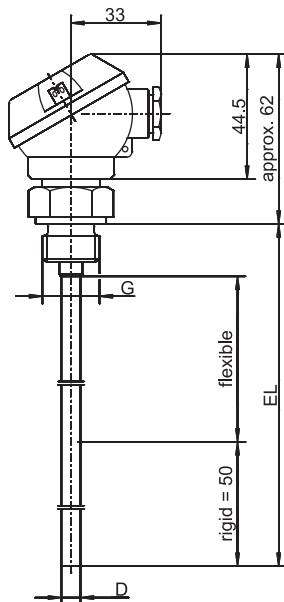
Basic type 902210/10



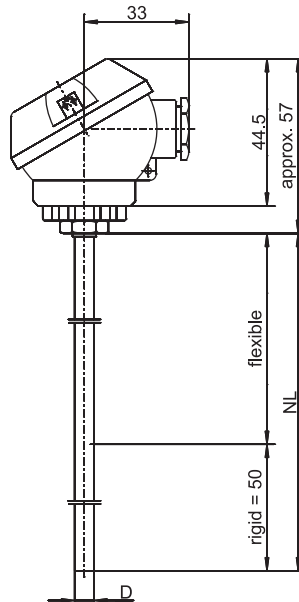
Basic type 902220/40



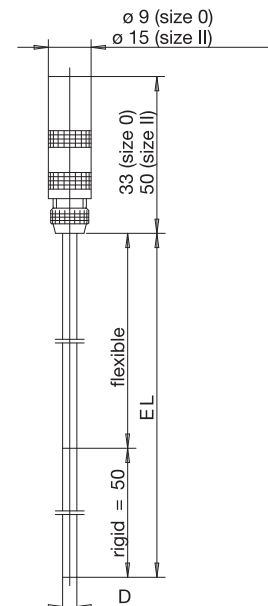
Basic type 902220/41



Basic type 902230/40



Basic type 902230/41



Basic type 902240/20

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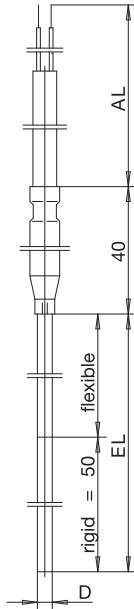
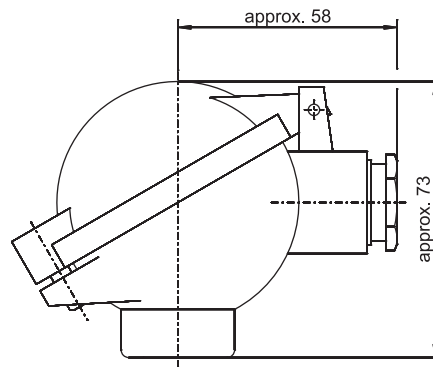
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**Basic type 902250/3x****Terminal head form BUZ  
extra code 320**

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## Order details: mineral-insulated RTD temperature probe according to DIN EN 60751

### (1) Basic type

902210/10 Mineral-insulated RTD temperature probes with bare connection wires



902240/20 Mineral-insulated RTD temperature probe with Lemosa coupling



### (2) Operating temperature in °C

|   |   |     |                           |
|---|---|-----|---------------------------|
| x | x | 150 | -200 to +600 °C           |
| x | x | 415 | -50 to +600 °C (standard) |

### (3) Measuring insert

|   |   |      |                                                                                    |
|---|---|------|------------------------------------------------------------------------------------|
| x | x | 1001 | 1x Pt100 in 3-wire circuit                                                         |
| x | x | 1003 | 1x Pt100 in 2-wire circuit                                                         |
| x | x | 1005 | 1x Pt1000 in 2-wire circuit (only for operating temperature -50 to +600 °C)        |
| x | x | 1006 | 1x Pt1000 in 3-wire circuit (only for operating temperature -50 to +600 °C)        |
| x | x | 1011 | 1x Pt100 in 4-wire circuit                                                         |
| x |   | 2001 | 2x Pt100 in 3-wire circuit (only in connection with protection tube diameter 6 mm) |
| x | x | 2003 | 2x Pt100 in 2-wire circuit                                                         |

### (4) Tolerance class according to DIN EN 60751

|   |   |   |                      |
|---|---|---|----------------------|
| x | x | 1 | Class B (standard)   |
| x | x | 2 | Class A              |
| x | x | 3 | Class AA (1/3 DIN B) |

### (5) Protection tube diameter D in mm

|   |   |     |                                                                                         |
|---|---|-----|-----------------------------------------------------------------------------------------|
| x | x | 1.9 | Ø 1.9 mm, for basic type 902240/20 incl. Lemosa-coupling size 0 (sheath cable Ø 1.5 mm) |
| x | x | 3   | Ø 3.0 mm, for basic type 902240/20 incl. Lemosa-coupling size 0                         |
| x | x | 6   | Ø 6.0 mm, for basic type 902240/20 incl. Lemosa-coupling size 2                         |

### (6) Insertion length EL in mm (70 to 1000 mm)

|   |   |     |                                            |
|---|---|-----|--------------------------------------------|
| x | x | 100 | 100 mm                                     |
| x | x | 200 | 200 mm                                     |
| x | x | 300 | 300 mm                                     |
| x | x | ... | Please specify in plain text (50 mm steps) |

Order code

|     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|
| (1) | (2) | (3) | (4) | (5) | (6) |
|     |     |     |     |     |     |

Order example

902240/20 - 415 - 1001 - 1 - 6 - 200

**JUMO GmbH & Co. KG**  
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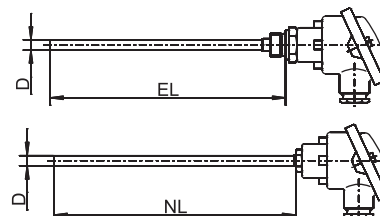


## Order details: mineral-insulated RTD temperature probe according to DIN EN 60751

### (1) Basic type

902220/40 Screw-in RTD mineral-insulated RTD temperature probe with form B terminal head

902220/41 Push-in mineral-insulated RTD temperature probe with form B terminal head



### (2) Operating temperature in °C

|   |   |     |                           |
|---|---|-----|---------------------------|
| x | x | 150 | -200 to +600 °C           |
| x | x | 415 | -50 to +600 °C (standard) |

### (3) Measuring insert

|   |   |      |                                                                               |
|---|---|------|-------------------------------------------------------------------------------|
| x | x | 1001 | 1x Pt100 in 3-wire circuit                                                    |
| x | x | 1003 | 1x Pt100 in 2-wire circuit (standard for transmitters extra code 330 and 333) |
| x | x | 1011 | 1x Pt100 in 4-wire circuit (standard for transmitters extra code 331 and 336) |
| x | x | 2003 | 2x Pt100 in 2-wire circuit                                                    |

### (4) Tolerance class according to DIN EN 60751

|   |   |   |                      |
|---|---|---|----------------------|
| x | x | 1 | Class B (standard)   |
| x | x | 2 | Class A              |
| x | x | 3 | Class AA (1/3 DIN B) |

### (5) Protection tube diameter D in mm

|   |   |   |        |
|---|---|---|--------|
| x | x | 3 | Ø 3 mm |
| x | x | 6 | Ø 6 mm |

### (6) Insertion length EL/NL in mm (100 to 10000 mm)

|   |   |     |                                            |
|---|---|-----|--------------------------------------------|
| x | x | 100 | 100 mm                                     |
| x | x | 200 | 200 mm                                     |
| x | x | 300 | 300 mm                                     |
| x | x | ... | Please specify in plain text (50 mm steps) |

### (7) Process connection

|   |   |     |                        |
|---|---|-----|------------------------|
|   | x | 000 | Without                |
| x |   | 102 | Screw connection G 1/4 |
| x |   | 103 | Screw connection G 3/8 |
| x |   | 104 | Screw connection G 1/2 |

### (8) Extra codes

|   |   |     |                                                                                                    |
|---|---|-----|----------------------------------------------------------------------------------------------------|
| x | x | 000 | Without                                                                                            |
| x | x | 320 | Terminal head form BUZ                                                                             |
| x | x | 330 | 1x analog transmitter, 4 to 20 mA output, data sheet 707030                                        |
| x | x | 331 | 1x programmable transmitter, 4 to 20 / 20 to 4 mA output, data sheet 707010                        |
| x | x | 333 | 1x analog transmitter, 0 to 10 V output, data sheet 707030                                         |
| x | x | 336 | 1x programmable transmitter, 4 to 20 mA / 20 to 4 mA and HART®-interface output, data sheet 707010 |

**Order code**      (1)      (2)      (3)      (4)      (5)      (6)      (7)      (8)  
 Order example      902220/40 - 415 - 1003 - 1 - 3 - 100 - 104 / 000 , ...<sup>a</sup>

<sup>a</sup> List extra codes in sequence, separated by commas.

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**Accessories**

| Article                                                                                                              | Part no. |
|----------------------------------------------------------------------------------------------------------------------|----------|
| Pipe screw connection M8 x 1 stainless steel, clamping ring stainless steel for protection tube diameter D = 3 mm    | 00080810 |
| Pipe screw connection M8 x 1 stainless steel, clamping ring PTFE for protection tube diameter D = 3 mm               | 00049709 |
| Pipe screw connection M8 x 1 steel, clamping ring PTFE for protection tube diameter D = 4.5 mm                       | 00049704 |
| Pipe screw connection M8 x 1 stainless steel, clamping ring PTFE for protection tube diameter D = 4.5 mm             | 00049710 |
| Pipe screw connection M10 x 1 stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm   | 00065416 |
| Pipe screw connection G 1/4 stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm     | 00080811 |
| Pipe screw connection G 3/8 steel, clamping ring steel for protection tube diameter D = 6 mm                         | 00057945 |
| Pipe screw connection G 3/8 stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm     | 00317966 |
| Pipe screw connection G 1/2 stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm     | 00305445 |
| Pipe screw connection 1/2-14NPT stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm | 00444210 |
| Sheet flange out of steel for protection tube diameter D = 6 mm                                                      | 00065042 |

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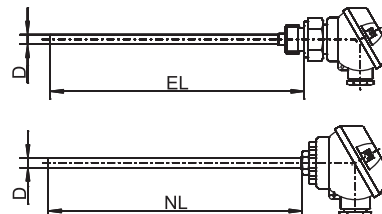
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**Order details: mineral-insulated RTD temperature probe according to DIN EN 60751****(1) Basic type**

902230/40 Screw-in mineral-insulated RTD temperature probe with form J terminal head

902230/41 Push-in mineral-insulated RTD temperature probe with form J terminal head

**(2) Operating temperature in °C**

|   |   |     |                           |
|---|---|-----|---------------------------|
| x | x | 150 | -200 to +600 °C           |
| x | x | 415 | -50 to +600 °C (standard) |

**(3) Measuring insert**

|   |   |      |                                                                       |
|---|---|------|-----------------------------------------------------------------------|
| x | x | 1001 | 1x Pt100 in 3-wire circuit                                            |
| x | x | 1003 | 1x Pt100 in 2-wire circuit (standard for transmitters extra code 330) |
| x | x | 1011 | 1x Pt100 in 4-wire circuit                                            |
| x | x | 2003 | 2x Pt100 in 2-wire circuit                                            |

**(4) Tolerance class according to DIN EN 60751**

|   |   |   |                      |
|---|---|---|----------------------|
| x | x | 1 | Class B (standard)   |
| x | x | 2 | Class A              |
| x | x | 3 | Class AA (1/3 DIN B) |

**(5) Protection tube diameter D in mm**

|   |   |   |        |
|---|---|---|--------|
| x | x | 3 | Ø 3 mm |
| x | x | 6 | Ø 6 mm |

**(6) Insertion length EL/NL in mm (100 to 10000 mm)**

|   |   |     |                                            |
|---|---|-----|--------------------------------------------|
| x | x | 100 | 100 mm                                     |
| x | x | 200 | 200 mm                                     |
| x | x | 300 | 300 mm                                     |
| x | x | ... | Please specify in plain text (50 mm steps) |

**(7) Process connection**

|   |   |     |                        |
|---|---|-----|------------------------|
|   | x | 000 | Without                |
| x |   | 102 | Screw connection G 1/4 |
| x |   | 104 | Screw connection G 1/2 |
| x |   | 105 | Screw connection G 3/4 |

**(8) Extra codes**

|   |   |     |                                                             |
|---|---|-----|-------------------------------------------------------------|
| x | x | 000 | Without                                                     |
| x | x | 330 | 1x analog transmitter, 4 to 20 mA output, data sheet 707030 |

Order code

Order example

|           |     |     |     |      |     |     |     |   |   |     |   |     |   |     |
|-----------|-----|-----|-----|------|-----|-----|-----|---|---|-----|---|-----|---|-----|
| (1)       | (2) | (3) | (4) | (5)  | (6) | (7) | (8) |   |   |     |   |     |   |     |
| 902230/40 | -   | 415 | -   | 1001 | -   | 1   | -   | 3 | - | 100 | - | 104 | / | 000 |

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| Article                                                                                                              | Part no. |
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| Pipe screw connection M8 x 1 stainless steel, clamping ring PTFE for protection tube diameter D = 3 mm               | 00049709 |
| Pipe screw connection M8 x 1 steel, clamping ring PTFE for protection tube diameter D = 4.5 mm                       | 00049704 |
| Pipe screw connection M8 x 1 stainless steel, clamping ring PTFE for protection tube diameter D = 4.5 mm             | 00049710 |
| Pipe screw connection M10 x 1 stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm   | 00065416 |
| Pipe screw connection G 1/4 stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm     | 00080811 |
| Pipe screw connection G 3/8 steel, clamping ring steel for protection tube diameter D = 6 mm                         | 00057945 |
| Pipe screw connection G 3/8 stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm     | 00317966 |
| Pipe screw connection G 1/2 stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm     | 00305445 |
| Pipe screw connection 1/2-14NPT stainless steel, clamping ring stainless steel for protection tube diameter D = 6 mm | 00444210 |
| Sheet flange out of steel for protection tube diameter D = 6 mm                                                      | 00065042 |



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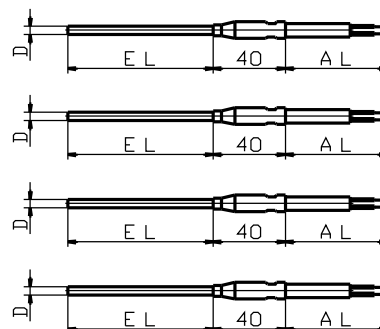
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## Order details: mineral-insulated RTD temperature probe according to DIN EN 60751

### (1) Basic type

|           |                                                                                                                         |
|-----------|-------------------------------------------------------------------------------------------------------------------------|
| 902250/30 | Mineral-insulated RTD temperature probe with PVC connecting cable<br>(line temperature range 5 to +80 °C (+105 °C))     |
| 902250/32 | Mineral-insulated RTD temperature probe with silicone connecting cable<br>(line temperature range -50 to +180 °C)       |
| 902250/33 | Mineral-insulated RTD temperature probe with PTFE connecting cable<br>(line temperature range -190 to +260 °C)          |
| 902250/34 | Mineral-insulated RTD temperature probe with metal-braiding connecting cable<br>(line temperature range -50 to +350 °C) |



### (2) Operating temperature in °C

|   |   |   |   |     |                           |
|---|---|---|---|-----|---------------------------|
| x | x | x | x | 150 | -200 to +600 °C           |
| x | x | x | x | 415 | -50 to +600 °C (standard) |

### (3) Measuring insert

|   |   |   |   |      |                                                                                    |
|---|---|---|---|------|------------------------------------------------------------------------------------|
| x | x | x | x | 1001 | 1× Pt100 in 3-wire circuit                                                         |
| x | x | x | x | 1003 | 1× Pt100 in 2-wire circuit                                                         |
| x | x | x | x | 1005 | 1× Pt1000 in 2-wire circuit (only for operating temperature -50 to +600 °C)        |
| x | x | x | x | 1006 | 1× Pt1000 in 3-wire circuit (only for operating temperature -50 to +600 °C)        |
| x | x | x | x | 1011 | 1× Pt100 in 4-wire circuit                                                         |
|   | x | x | x | 2001 | 2× Pt100 in 3-wire circuit (only in connection with protection tube diameter 6 mm) |
| x | x | x | x | 2003 | 2× Pt100 in 2-wire circuit                                                         |

### (4) Tolerance class according to DIN EN 60751

|   |   |   |   |   |                      |
|---|---|---|---|---|----------------------|
| x | x | x | x | 1 | Class B (standard)   |
| x | x | x | x | 2 | Class A              |
| x | x | x | x | 3 | Class AA (1/3 DIN B) |

### (5) Protection tube diameter D in mm

|   |   |   |   |     |                                  |
|---|---|---|---|-----|----------------------------------|
| x | x | x | x | 1.9 | Ø 1.9 mm (sheath cable Ø 1.5 mm) |
| x | x | x | x | 3   | Ø 3 mm                           |
| x | x | x | x | 6   | Ø 6 mm                           |

### (6) Insertion length EL in mm (70 to 1000 mm)

|   |   |   |   |     |                                            |
|---|---|---|---|-----|--------------------------------------------|
| x | x | x | x | 100 | 100 mm                                     |
| x | x | x | x | 200 | 200 mm                                     |
| x | x | x | x | 300 | 300 mm                                     |
| x | x | x | x | ... | Please specify in plain text (50 mm steps) |

### (7) Connecting cable end

|   |   |   |   |    |                                                   |
|---|---|---|---|----|---------------------------------------------------|
| x | x | x | x | 11 | Ferrules according to DIN 46228 part 4 (standard) |
| x | x | x | x | 80 | Multi-pole connector (enter type in plain text)   |

### (8) Connection cable length AL in mm (500 to 500000 mm)

|   |   |   |   |      |                                             |
|---|---|---|---|------|---------------------------------------------|
| x | x | x | x | 2500 | 2500 mm                                     |
| x | x | x | x | ...  | Please specify in plain text (500 mm steps) |

### (9) Extra codes

|   |   |   |   |     |                           |
|---|---|---|---|-----|---------------------------|
| x | x | x |   | 000 | Without                   |
| x | x | x | x | 317 | Shielded connecting cable |

Order code  
 Order example

|             |     |             |     |             |     |             |     |             |   |             |  |    |  |      |  |     |
|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|---|-------------|--|----|--|------|--|-----|
| (1)         | (2) | (3)         | (4) | (5)         | (6) | (7)         | (8) | (9)         |   |             |  |    |  |      |  |     |
| <div></div> | -   | <div></div> | -   | <div></div> | -   | <div></div> | -   | <div></div> | / | <div></div> |  |    |  |      |  |     |
| 902250/32   |     | 415         |     | 1001        |     | 1           |     | 3           |   | 200         |  | 11 |  | 2500 |  | 000 |

**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 635533  
Fax: +44 1279 635262  
E-mail: sales@jumo.co.uk  
Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**

6733 Myers Road  
East Syracuse, NY 13057, USA  
Phone: 315-437-5866  
1-800-554-5866  
Fax: 315-437-5860  
E-mail: info.us@jumo.net  
Internet: www.jumousa.com

**Stock versions**

| (1)       | (2)   | (3)    | (4) | (5)   | (6)   | (7)  | (8)      | (9) | Part no. |
|-----------|-------|--------|-----|-------|-------|------|----------|-----|----------|
| 902250/32 | - 150 | - 1011 | - 1 | - 1.9 | - 300 | - 11 | - 2500 / | 000 | 00066531 |
| 902250/32 | - 415 | - 1003 | - 1 | - 3   | - 100 | - 11 | - 2500 / | 000 | 00068243 |
| 902250/32 | - 415 | - 1003 | - 1 | - 3   | - 200 | - 11 | - 2500 / | 000 | 00068244 |
| 902250/32 | - 415 | - 1003 | - 1 | - 3   | - 300 | - 11 | - 2500 / | 000 | 00055763 |
| 902250/32 | - 415 | - 1001 | - 1 | - 3   | - 100 | - 11 | - 2500 / | 000 | 00068247 |
| 902250/32 | - 415 | - 1001 | - 1 | - 3   | - 300 | - 11 | - 2500 / | 000 | 00055764 |
| 902250/32 | - 415 | - 1001 | - 1 | - 3   | - 500 | - 11 | - 2500 / | 000 | 00068248 |
| 902250/32 | - 415 | - 1001 | - 1 | - 6   | - 300 | - 11 | - 2500 / | 000 | 00055767 |
| 902250/32 | - 415 | - 1001 | - 1 | - 6   | - 500 | - 11 | - 2500 / | 000 | 00068250 |

**Stock versions**

| (1)       | (2)   | (3)    | (4) | (5) | (6)   | (7)     | (8) | Part no. |
|-----------|-------|--------|-----|-----|-------|---------|-----|----------|
| 902230/40 | - 415 | - 1003 | - 1 | - 3 | - 100 | - 104 / | 000 | 00066731 |
| 902230/40 | - 415 | - 1003 | - 1 | - 3 | - 300 | - 104 / | 000 | 00057512 |
| 902230/40 | - 415 | - 1003 | - 1 | - 6 | - 200 | - 104 / | 000 | 00068252 |
| 902230/40 | - 415 | - 1003 | - 1 | - 6 | - 300 | - 104 / | 000 | 00055775 |