

# Датчики проводимости BlackLine

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Россия +7(495)268-04-70

Казахстан +(727)345-47-04

Беларусь +(375)257-127-884

Узбекистан +998(71)205-18-59

Киргизия +996(312)96-26-47

эл.почта: [huj@nt-rt.ru](mailto:huj@nt-rt.ru) || сайт: <https://heju.nt-rt.ru/>

# BlackLine CR-GT/-EC/-GS

## Conductive 2-Electrode Conductivity Sensor

**Cell constants  $K = 0.01 - 1.0$**

### 202922 Series

- for universal application, e.g. drinking and surface water monitoring, ion exchangers and reverse osmosis plant, construction of air conditioning and cooling systems, horticultural technology, sea water and fresh water aquaculture, mildly contaminated industrial rinse and process water, high-purity water monitoring, etc.
- compact style for universal application
- manufactured from physiologically safe materials

#### BlackLine CR-GT with the cell constants $K = 1.0$

The GT version features a special graphite as the electrode material. The graphite has been especially treated to achieve - in conjunction with suitable evaluation devices - measuring ranges up to 100 mS/cm and above.

A temperature probe can optionally be integrated. The conductivity sensor with 120 mm fitting length and a shaft diameter of 12 mm can be used in combination with standard pH or redox electrodes in suitable built-in fittings. The sensor is also ideally suited for linking with handheld or laboratory measuring equipment. When used as an online sensor, suitable flow-through fittings must be employed (see JUMO data sheets 202810, 202820, 202822).

#### BlackLine CR-EC with the cell constants $K = 0.01$ , $K = 0.1$ and $K = 1.0$

The principal features of the EC version are its very compact construction and the Pt100 that is integrated as standard. With a fitting length of just 40 mm (or 63 mm), the sensors can also be screwed into pipelines with a small nominal diameter. To this end, the conductivity sensors either have a G 1/2A or 1/2"-14 thread.

The version with  $K = 1.0$  achieves a measuring range of 0.1 to about 5000  $\mu\text{S/cm}$  (5mS/cm). Titanium pins function as the measuring electrodes here. The version with  $K=1.0$  has been implemented as a coaxial cell and can be used to about 1000  $\mu\text{S/cm}$ . Sensors with  $K = 0.01$  cover ranges from 0.05 to 20  $\mu\text{S/cm}$ . They are therefore extremely suitable for pure and high-purity water applications. The electrode material for these sensors is stainless steel 1.4571.

#### BlackLine CR-GS glass conductivity sensors $K = 1.0$

Glass conductivity sensors are used to conductively determine the electrolytic conductivity of aqueous solutions. The cell constant of the sensor is  $K = 1.0 \frac{\text{cm}}{\text{cm}}$ . These sensor can be supplied with an integrated Pt100 measuring insert, as an option.

Versions with a Pg13.5 threaded cap can be incorporated in suitable fittings (see data sheets 202810, 202820, 202822 and 202825).



### Operating principle

The sensors in the 202922 series are 2-electrode conductivity sensors. A transmitter applies an AC voltage to the sensors. The current flowing through the liquid and the electrodes is determined by the conductivity of the liquid.

## Technical data

### BlackLine CR-GT

|                                      |                                                                                         |
|--------------------------------------|-----------------------------------------------------------------------------------------|
| Cell constant <sup>a</sup>           | K=1.0                                                                                   |
| Typical measuring range <sup>b</sup> | 0.1 to approx. 10 mS/cm<br>(with the appropriate evaluation equipment: up to 100 mS/cm) |
| Temperature compensation             | none/Pt100/Pt1000                                                                       |
| Process connection                   | Pg13.5 screw-in thread                                                                  |
| Electrode material                   | special graphite                                                                        |
| Body material                        | PPE, PS                                                                                 |
| Operating temperature                | -5 to +80 °C                                                                            |
| Maximum pressure                     | 6 bar (at 25 °C)                                                                        |
| Electrical connection                | attached cable (free cable ends) or M12 connector                                       |

<sup>a</sup> Depending on the production conditions, the cell constant can deviate by  $\pm 10$  % from the nominal value. This deviation can be compensated at the transmitter.

<sup>b</sup> The measuring ranges also depend on the transmitter used. When used for wider ranges than the "typical" ones, measurement errors may be caused by polarization.

### BlackLine CR-EC

|                                      |                                                      |                                                      |                                                      |
|--------------------------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|
| Cell constant <sup>a</sup>           | K = 0.01                                             | K = 0.1                                              | K = 1.0                                              |
| Typical measuring range <sup>b</sup> | 0.05 to approx. 20 $\mu$ S/cm                        | 0.1 to approx. 1000 $\mu$ S/cm                       | 0.1 to approx. 5000 $\mu$ S/cm                       |
| Temperature compensation             | Pt100                                                | Pt100                                                | Pt100                                                |
| Process connection                   | G 1/2A or<br>1/2"-14 NPT screw-in thread             | G 1/2A or<br>1/2"-14 NPT screw-in thread             | G 1/2A or<br>1/2"-14 NPT screw-in thread             |
| Electrode material                   | stainless steel 1.4571                               | stainless steel 1.4571                               | titanium                                             |
| Body material                        | PEI                                                  | PEI                                                  | PEI                                                  |
| Operating temperature                | -5 to +90 °C                                         | -5 to +90 °C                                         | -5 to +90 °C                                         |
| Maximum pressure                     | 6 bar (at 25 °C)                                     | 6 bar (at 25 °C)                                     | 6 bar (at 25 °C)                                     |
| Electrical connection                | attached cable (free cable ends)<br>or M12 connector | attached cable (free cable ends)<br>or M12 connector | attached cable (free cable ends)<br>or M12 connector |

<sup>a</sup> Depending on the production conditions, the cell constant can deviate by  $\pm 10$  % from the nominal value. This deviation can be compensated at the transmitter.

<sup>b</sup> The measuring ranges also depend on the transmitter used. When used for wider ranges than the "typical" ones, measurement errors may be caused by polarization.

### BlackLine CR-GS

|                                       |                                                                     |
|---------------------------------------|---------------------------------------------------------------------|
| Cell constant <sup>a</sup>            | K = 1.0                                                             |
| Typical measuring range <sup>b</sup>  | 0 to 1 mS/cm (platinum raw)<br>0 to 100 mS/cm (platinum platinized) |
| Temperature compensation <sup>c</sup> | Pt100                                                               |
| Process connection                    | threaded cap Pg13,5 or plug cap                                     |
| Electrode material                    | platinum                                                            |
| Body material                         | glass                                                               |
| Operating temperature                 | -10 to +160 °C                                                      |
| Maximum pressure                      | 0 to 6 bar with threaded cap Pg13,5<br>unpressurized with plug cap  |
| Electrical connection                 | N-connector or M12 connector                                        |

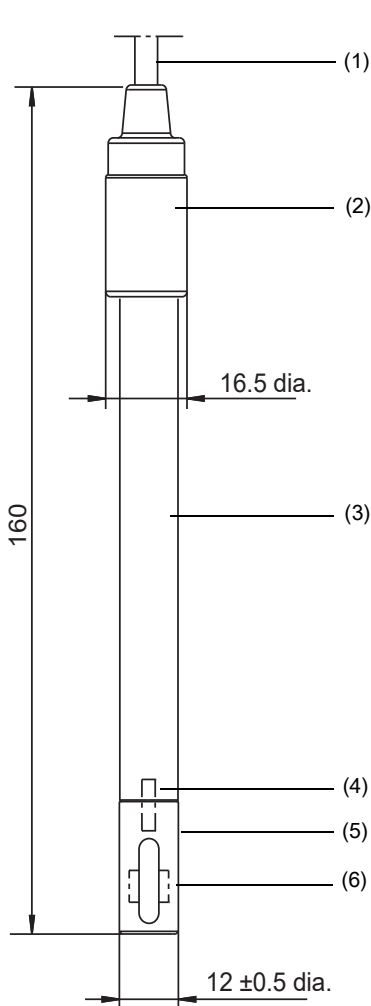
<sup>a</sup> Depending on the production conditions, the cell constant can deviate by  $\pm 10$  % from the nominal value. This deviation can be compensated at the transmitter.

<sup>b</sup> The measuring ranges also depend on the transmitter used. When used for wider ranges than the "typical" ones, measurement errors may be caused by polarization.

<sup>c</sup> Option.

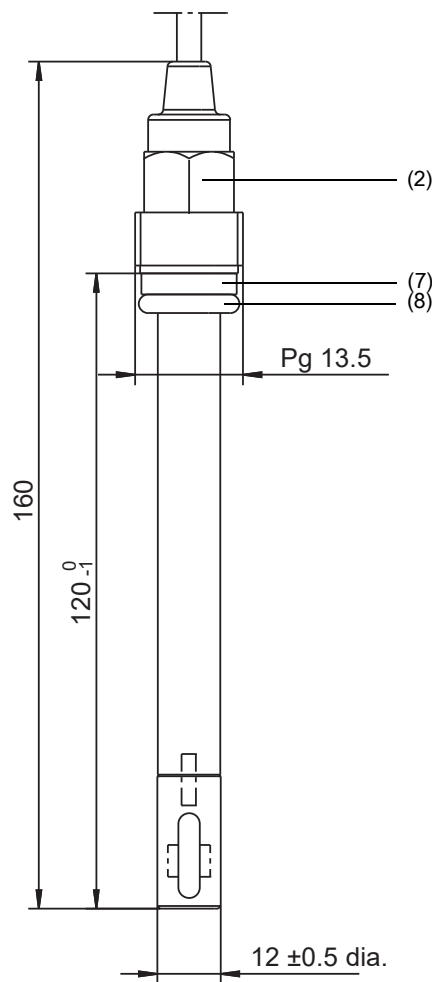
## Dimensions

### BlackLine CR-GT



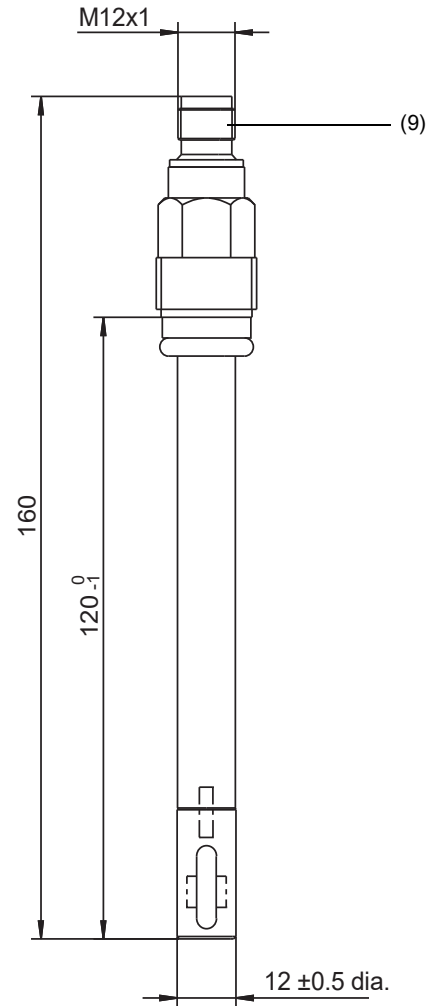
**Type 202922/10-...**  
**plug cap with attached cable**

- 1 Connecting cable 5 mm dia.
- 4 Measuring insert (Temperature sensor)
- 7 Ring, PSU



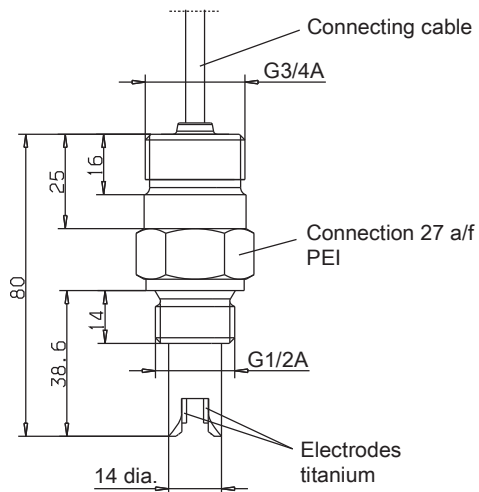
**Type 202922/10-...**  
**threaded cap with attached cable**

- 2 Electrode head, PC
- 5 Electrode holder, PPO
- 8 O-ring 10 × 3,5, FPM

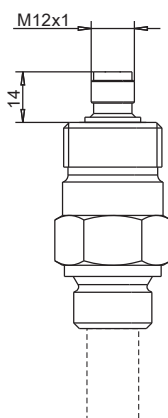


**Type 202922/10-...**  
**threaded cap with M12 connector**

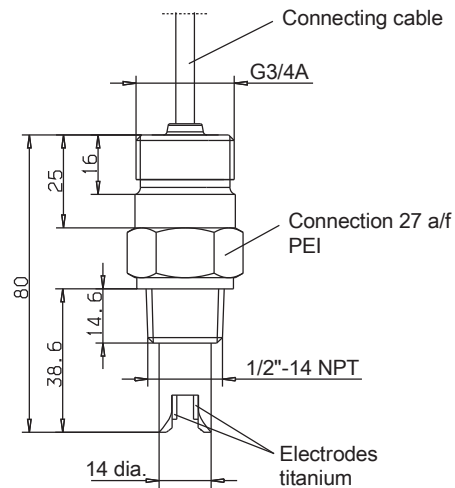
- 3 Electrode shaft, PPO
- 6 Graphite electrodes
- 9 Built-in connector M12 × 1, 4-pole, 713 series

**BlackLine CR-EC**

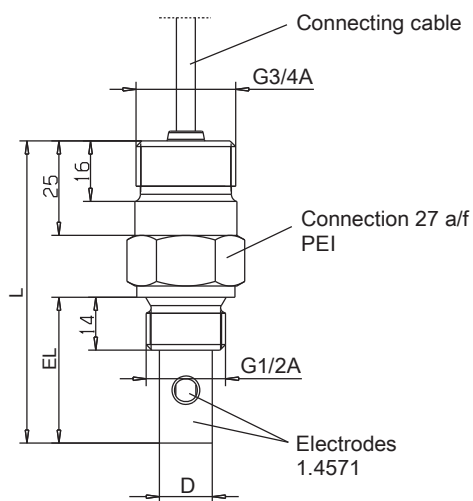
**Type 202922/20-0100-1003-60-104-20-5000-040**  
**Cell constant K = 1.0**



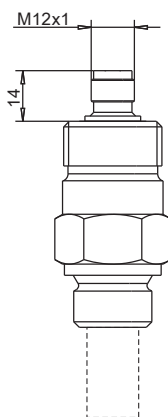
**Type 202922/20-... with M12 connector**



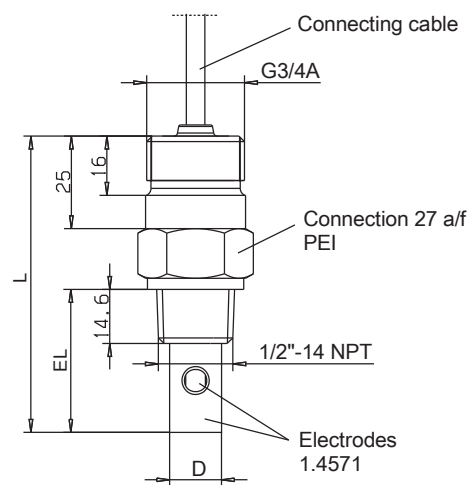
**Type 202922/20-0100-1003-60-144-20-5000-040**  
**Cell constant K = 1.0**



**Type 202922/20-0010-1003-26-104-20-5000-040**  
**Cell constant K = 0.1**  
**Type 202922/20-0001-1003-26-104-20-5000-063**  
**Cell constant K = 0.01**

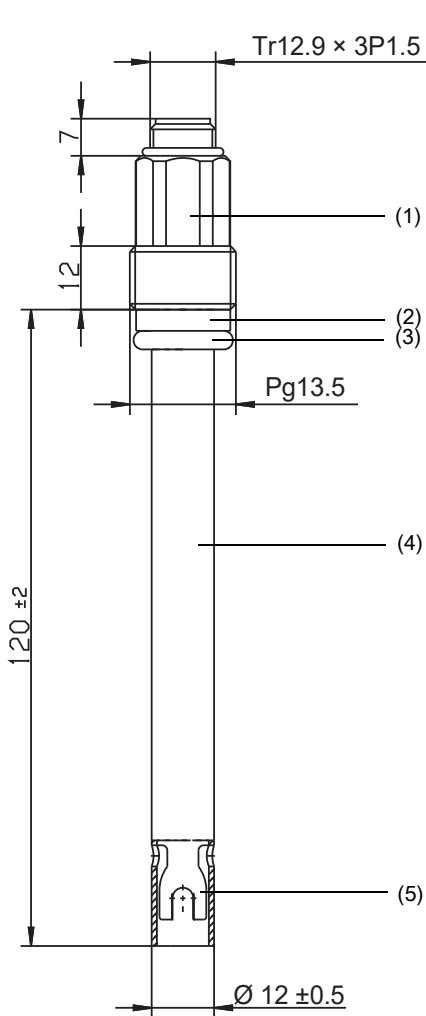


**Type 202922/20-... with M12 connector**



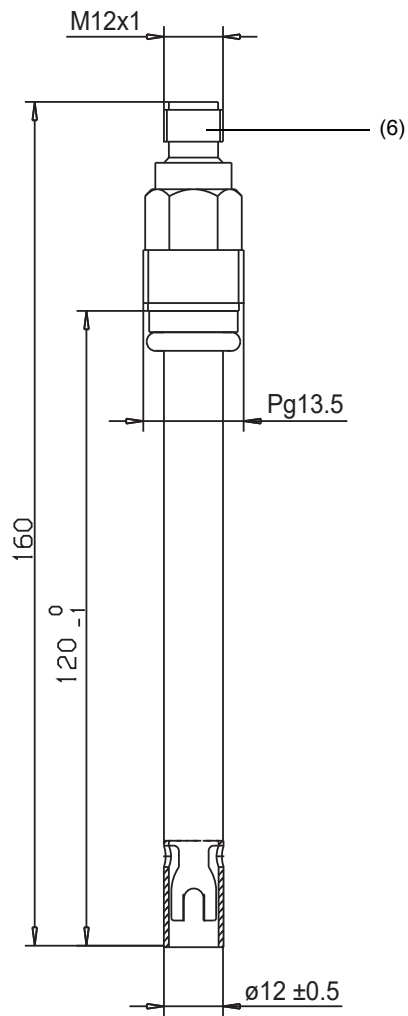
**Type 202922/20-0010-1003-60-144-20-5000-040**  
**Cell constant K = 0.1**  
**Type 202922/20-0001-1003-26-144-20-5000-063**  
**Cell constant K = 0.01**

| Type               | Fitting length EL<br>mm | L<br>mm | D<br>mm |
|--------------------|-------------------------|---------|---------|
| 202922/20-0010-... | 38.6                    | 80      | Ø 14    |
| 202922/20-0001-... | 63                      | 105     | Ø 16    |

**BlackLine CR-GS**

**Type 202922/30-...  
threaded cap Pg13.5**

- 1 Electrode head, PC Ø 5 mm
- 4 Electrode shat, glass

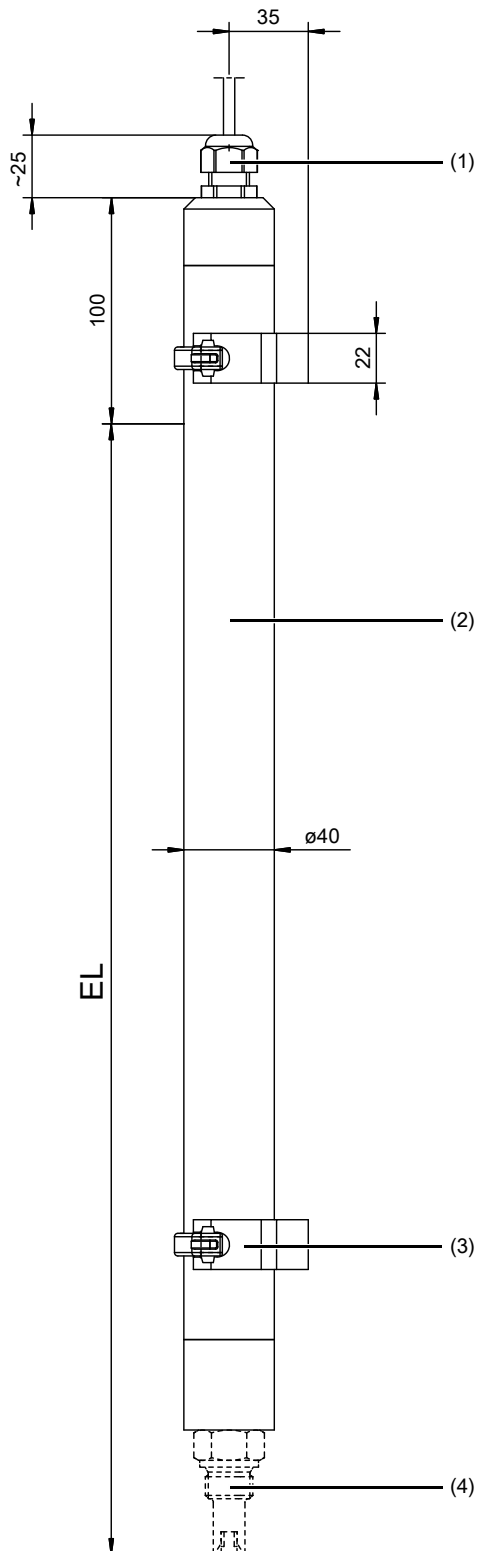


**Type 202922/30-...  
threaded cap with M12 connector**

- 2 Ring, PSU
- 3 O-Ring 10 × 3.5, FPM
- 5 Measuring surface, platinum
- 6 Built-in connector M12 × 1, 4-pole, 713 series

## Accessories for BlackLine CR-EC

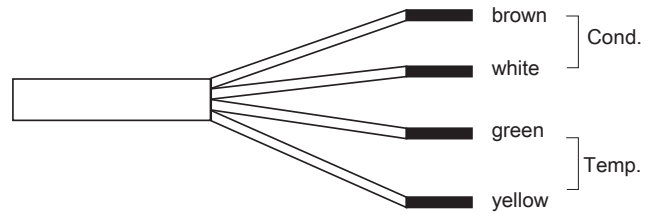
### Immersion fitting<sup>1</sup>



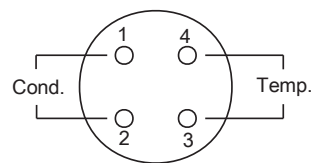
<sup>1</sup> Only suitable for process connection 104 (screw-in thread G1/2").

## Electrical connection

### Connection for cable



### Connection for M12 connector



EL Immersion length 500 mm or 1000 mm

- 1 Cable gland, protection class IP68 (up to 0.2 bar)
- 2 Protection tube
- 3 Pipe clip
- 4 Conductivity sensor JUMO BlackLine CR-EC

## Order details

| (1) Basic type            |           |                                                 |
|---------------------------|-----------|-------------------------------------------------|
|                           | 202922/10 | Style: JUMO BlackLine CR-GT                     |
|                           | 202922/20 | Style: JUMO BlackLine CR-EC                     |
|                           | 202922/30 | Style: JUMO BlackLine CR-GS                     |
| (2) Cell constant         |           |                                                 |
| - o -                     | 0001      | K = 0.01 <sup>a</sup>                           |
| - o -                     | 0010      | K = 0.1                                         |
| o o x                     | 0100      | K = 1.0                                         |
| (3) Measuring insert      |           |                                                 |
| x x x                     | 0000      | none                                            |
| x x o                     | 1003      | Pt100                                           |
| o o o                     | 1005      | Pt1000                                          |
| (4) Electrode material    |           |                                                 |
| - o -                     | 26        | stainless steel 1.4571 <sup>b</sup>             |
| - o -                     | 60        | titanium <sup>c</sup>                           |
| - - x                     | 61        | platinum (platinized)                           |
| x - -                     | 84        | special graphite                                |
| (5) Process connection    |           |                                                 |
| - o -                     | 104       | G1/2" screw-in thread                           |
| - o -                     | 144       | 1/2" NPT screw-in thread                        |
| x - x                     | 413       | Pg13.5 thread                                   |
| (6) Electrical connection |           |                                                 |
| o o -                     | 20        | attached cable                                  |
| - - x                     | 22        | threaded cap Pg13.5                             |
| o o o                     | 83        | M12 connector                                   |
| (7) Cable length          |           |                                                 |
| x o x                     | 0         | no cable (with electrical connection 83 and 22) |
| x x -                     | 5000      | length in mm (other lengths on request)         |
| (8) Fitting length        |           |                                                 |
| - x -                     | 40        | 40 mm                                           |
| - x -                     | 63        | 63 mm (for cell constant K = 0.01 only)         |
| x - x                     | 120       | 120 mm                                          |

x = standard

o = optional

- = not available

<sup>a</sup> Only in conjunction with fitting length 063.<sup>b</sup> Only in conjunction with cell constant 0001 or 0010.<sup>c</sup> Only in conjunction with cell constant 0100.

|                      | (1)                  | (2) | (3)                  | (4) | (5)                  | (6) | (7)                  | (8) |                      |   |    |   |   |   |     |
|----------------------|----------------------|-----|----------------------|-----|----------------------|-----|----------------------|-----|----------------------|---|----|---|---|---|-----|
| <b>Order code</b>    | <input type="text"/> | -   | <input type="text"/> | -   | <input type="text"/> | -   | <input type="text"/> | -   | <input type="text"/> |   |    |   |   |   |     |
| <b>Order example</b> | 202922/10            | -   | 0100                 | -   | 0000                 | -   | 84                   | -   | 104                  | - | 83 | - | 0 | - | 120 |

### Note:

The type code is a type designation, not a modular system.

If at all possible, choose the articles listed under "Stock items" or "Non-stock items".

Any free combination of individual code features must be technically checked by us and released.

Please ask us in case of doubt!

## Stock items

| Type                                   | Brief description                                       | Part No. |
|----------------------------------------|---------------------------------------------------------|----------|
| 202922/10-0100-0000-84-413-20-5000-120 | K = 1.0, without Pt100, attached cable, Pg13.5, 120 mm  | 00430769 |
| 202922/10-0100-1003-84-413-20-5000-120 | K = 1.0, with Pt100, attached cable, Pg13.5, 120 mm     | 00430770 |
| 202922/10-0100-1003-84-413-83-0-120    | K = 1.0, with Pt100, M12 connector, Pg13.5, 120 mm      | 00439265 |
| 202922/20-0100-1003-60-104-20-5000-40  | K = 1.0, with Pt100, attached cable, G 1/2A, 40 mm      | 00437646 |
| 202922/20-0100-1003-60-144-20-5000-40  | K = 1.0, with Pt100, attached cable, 1/2"-14 NPT, 40 mm | 00437647 |
| 202922/20-0010-1003-26-104-20-5000-40  | K = 0.1, with Pt100, attached cable, G 1/2A, 40 mm      | 00418069 |
| 202922/20-0010-1003-26-144-20-5000-40  | K = 0.1, with Pt100, attached cable, 1/2"-14 NPT, 40 mm | 00441398 |
| 202922/20-0010-1003-26-104-83-0-40     | K = 0.1, with Pt100, M12 connector, G 1/2A, 40 mm       | 00457199 |
| 202922/20-0001-1003-26-104-20-5000-63  | K = 0.01, with Pt100, attached cable, G 1/2A, 63 mm     | 00448986 |
| 202922/20-0001-1003-26-104-83-0-63     | K = 0.01, with Pt100, G 1/2", M12 connector, 63 mm      | 00457197 |
| 202922/20-0100-1003-60-104-83-0-40     | K = 1.0, with Pt100, G 1/2", M12 connector, 40 mm       | 00459296 |
| 202922/30-0100-0000-61-413-22-0-120    | K = 1.0, Pg13.5, 120 mm                                 | 00303396 |

## Accessories for version with M12 connector

| Brief description                                                                                 | Part No. |
|---------------------------------------------------------------------------------------------------|----------|
| 4-pole cable connector M12 × 1, 713 series, angled (supplied without cable), gold-plated contacts | 00318906 |
| 25 m connecting cable, for self-assembly, 4-pole + screen                                         | 00303681 |
| Connecting cable incl. (straight) M12 cable socket, length 10 m, 4-pole + screen                  | 00458513 |
| Connecting cable incl. (straight) M12 cable socket, length 25 m, 4-pole + screen                  | 00458514 |

## Accessories for JUMO BlackLine CR-EC

| Brief description                                  | Part No. |
|----------------------------------------------------|----------|
| Immersion fitting, EL = 500 mm <sup>a</sup>        | 00452567 |
| Immersion fitting, EL = 1000 mm <sup>a</sup>       | 00452571 |
| Retainer for immersion fitting with 40 mm diameter | 00453191 |

<sup>a</sup> Only suitable for process connection 104 (screw-in thread G1/2").

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Чита (3022)38-34-83  
Якутск (4112)23-90-97  
Ярославль (4852)69-52-93

**Россия** +7(495)268-04-70

**Казахстан** +(727)345-47-04

**Беларусь** +(375)257-127-884

**Узбекистан** +998(71)205-18-59

**Киргизия** +996(312)96-26-47

эл.почта: [huj@nt-rt.ru](mailto:huj@nt-rt.ru) || сайт: <https://heju.nt-rt.ru/>