

Level measurement probes

Type 402090

Type 404390

Type 404391



B 40.4390.0 Operating Instructions



2009-10-30/00329534

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1 Notes



All necessary settings are described in these operating instructions. If any difficulties should nevertheless arise during startup, please do not tamper with the instrument in any way. By doing so, you could endanger your rights under the instrument warranty! Please contact the nearest subsidiary or the head office in such a case.

Please read these operating instructions before placing the instrument in service. Keep the manual in a place which is accessible to all users at all times. Please assist us in improving these operating instructions where necessary. Your comments will be appreciated.

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Level measurement probes are maintenance-free. They do not contain any components that you can repair or replace. Instruments must be returned to the factory for all repairs!



These operating instructions do not take every possible application and product variant into consideration. Should your specific terms of reference not be covered, please contact our head office.

Should you need detailed technical information about this instrument, please ask for the relevant data sheet.

2 Identifying the instrument version

You can find the instrument version of your level measurement probe on the nameplate. The connected supply voltage must match the voltage specified on the nameplate.

2.1 Type description for type 402090

(1) Basic type

402090 JUMO dTrans p90 level measurement probe

(2) Basic type extension

/000 none

/999 Special design

(3) Relative pressure input

451 0 - 0.25 bar

452 0 - 0.4 bar

453 0 - 0.6 bar

454 0 - 1.0 bar

455 0 - 1.6 bar

456 0 - 2.5 bar

457 0 - 4 bar

458 0 - 6 bar

999 Special measurement range (also as absolute pressure)

(4) Output

402 0 - 20 mA three wires

405 4 - 20 mA two wires

406 4 - 20 mA three wires

412 0.5 - 4.5 V three wires

413 0 - 5 V three wires

415 0 - 10 V three wires

418 1 - 5 V three wires

420 1 - 6 V three wires

	(5) Process connection (not front-flush)
567	G 1/4 internal
658	Connection closed underneath
659	Connection open underneath
	(6) Process connection material
20	Stainless steel
	(7) Electrical connection
14	PUR cable, e.g. suitable for use in water (seawater, well water, pit water and brine), as well as in coolant and lubricant (UV-resistant to EN ISO 4892-2)
15	PE-LD cable, e.g. suitable for use in water (seawater, well water, pit water and brine)
19	C-PE cable, e.g. suitable for use in oil and fuel (UV-resistant to EN ISO 4892-2)
	(8) Cable length "L"
005	5 m cable
010	10 m cable
020	20 m cable
...	...
100	100 m cable
999	Special lengths on request

Example: 402090/000-454-405-659-20-15-010

2.2 Type description for type 404390

(1) Basic type

404390 JUMO level measurement probe type 404390

(2) Basic type extension

000 none

999 Special design

(3) Relative pressure input

451 0 - 0.25 bar

452 0 - 0.4 bar

453 0 - 0.6 bar

454 0 - 1.0 bar

455 0 - 1.6 bar

456 0 - 2.5 bar

457 0 - 4 bar

458 0 - 6 bar

459 0 - 10 bar

460 0 - 16 bar

461 0 - 25 bar

999 Special measurement range

(4) Output

405 4 - 20 mA two wires

(5) Process connection (not front-flush)

567 G 1/4 internal

658 Connection closed underneath

659 Connection open underneath

(6) Process connection material

20 Stainless steel

(7) Electrical connection

- 14 PUR cable,
e.g. suitable for use in water
(seawater, well water, pit water and brine),
as well as in coolant and lubricant
(UV-resistant to EN ISO 4892-2)
- 15 PE-LD cable,
e.g. suitable for use in water
(seawater, well water, pit water and brine)
- 19 C-PE cable,
e.g. suitable for use in oil and fuel
(UV-resistant to EN ISO 4892-2)

(8) Cable length "L"

- 005 5 m cable
010 10 m cable
020 20 m cable
... ..
100 100 m cable
999 Special lengths on request

(9) Extra codes

- /000 none
/027 integrated Pt 100 temperature sensor

Example: 404390/000-454-405-659-20-15-20/000

2.3 Type description for type 404391

(1) Basic type

404391 JUMO level measurement probe with ceramic measuring cell

(2) Basic type extension

000 none
007 integrated Pt 100¹ temperature sensor
022 PTFE² plastic housing
999 Special design

(3) Relative pressure input

412 0 - 50 mbar
414 0 - 100 mbar
415 0 - 160 mbar
451 0 - 0.25 bar
452 0 - 0.4 bar
453 0 - 0.6 bar
454 0 - 1.0 bar
455 0 - 1.6 bar
999 Special measurement range

(4) Output

405 4 - 20 mA two wires
412 0.5 - 4.5 V three wires

(5) Process connection (not front-flush)

568 G 1 internal³
658 Connection closed underneath
659 Connection open underneath

(6) Electrical connection

- 14 PUR cable,
e.g. suitable for use in water
(seawater, well water, pit water and brine),
as well as in coolant and lubricant
(UV-resistant to EN ISO 4892-2)
- 15 PE-LD cable,
e.g. suitable for use in water
(seawater, well water, pit water and brine)
- 19 C-PE cable,
e.g. suitable for use in oil and fuel
(UV-resistant to EN ISO 4892-2)

(7) Cable length "L" ⁴

- 005 5 m cable
010 10 m cable
020 20 m cable
... ..
100 100 m cable
999 Special lengths on request

¹ for output -405 only, not for basic type extension 022

² for process connection 568 only

³ for basic type extension 022 only

⁴ cable lengths longer than 5 meters in 5-meter increments
(e.g. 30 m, 125 m)

Example: 404391/000-452-405-659-15-010

3 Operating conditions

It is essential to ground the level measurement probe and protect it against electrical discharge (lightning protection)!

The temperature must not be above or below the temperature of the medium. The level measurement probe must not freeze in the medium!

Type	Permissible medium temperature
402090	0 to +50°C
404390	0 to +50°C
404391	-20 to +60°C

As with any sensitive measuring instrument, the level measurement probe should not be exposed to vast fluctuations in temperature. In the long term, these will alter the zero point and the measuring span.

The measurement range and the permissible overpressure must not be exceeded.

Under no circumstances must pointed objects come into contact with the diaphragm.

Do not point a pressure jet at the diaphragm.

If the sample medium is heavily polluted, it is advisable to use the "closed underneath" process connection (658) for type 404391.

The connected supply voltage must match the voltage specified on the nameplate.

4 Safety notice



For hazardous media such as combustible and toxic substances, please comply with existing, pertinent regulations!

Disregarding these regulations may result in damage to property or personal injury.

Only suitably qualified personnel should work on this instrument.

5 Electrical connection



The level measurement probe must only be connected by suitably trained and qualified personnel.

6 Mounting the fixed connecting cable



Minimum bending radius 120 mm (permanent installation).

The cable must not be compressed.

The end of the cable must finish in a dry compartment, to prevent condensation buildup. It is beneficial to run the cable directly to the connection compartment (control box).

When extending the cable, pay attention to pressure compensation - do not allow moisture to penetrate.

7 Schematic and connection diagrams

7.1 Level measurement probe in a two-wire circuit

7.1.1 Supply voltage

Type 402090 with output 405 (4 - 20 mA two wire)

10 to 30 V DC

Burden $\leq (U_B - 10 \text{ V}) / 0.02 \text{ A } (\Omega)$

Type 404390 with output 405 (4 - 20 mA two wire)

10 to 30 V DC

Burden $\leq (U_B - 10 \text{ V}) / 0.02 \text{ A } (\Omega)$

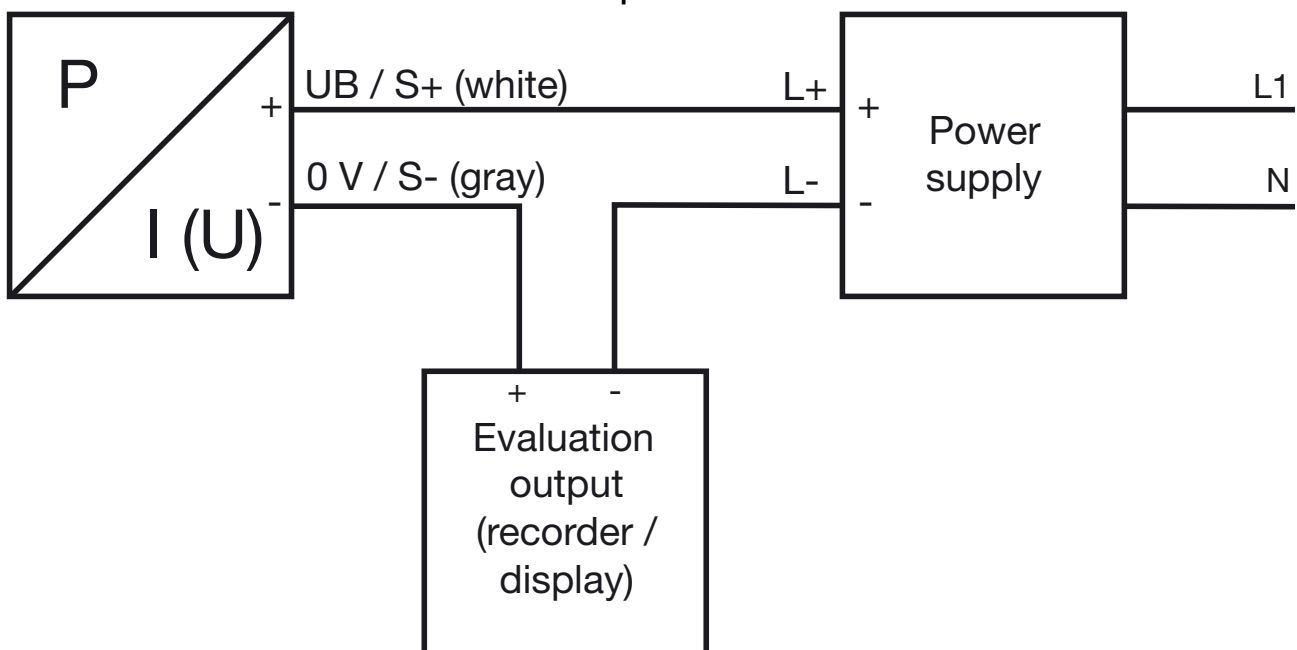
Type 404391 with output 405 (4 - 20 mA two wire)

12 to 30 V DC

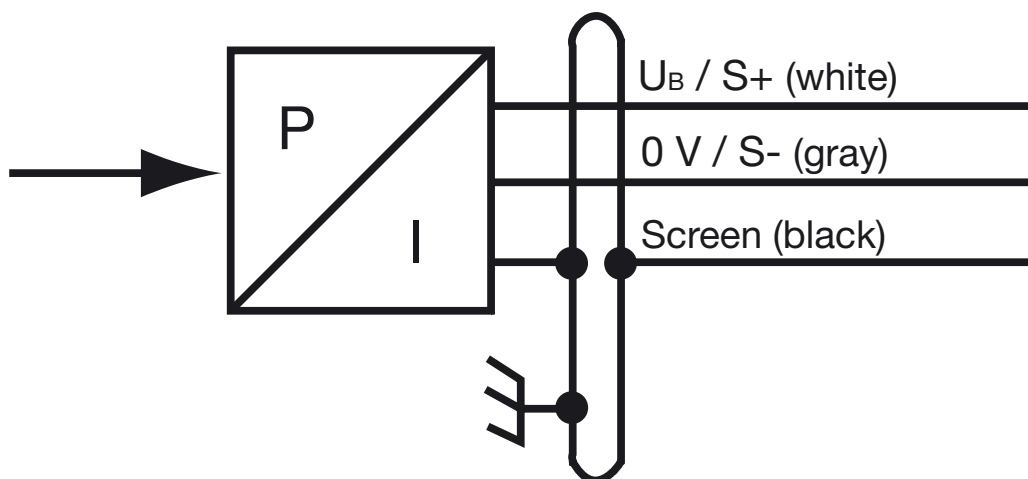
Burden $\leq (U_B - 12 \text{ V}) / 0.02 \text{ A } (\Omega)$

7.1.2 Schematic

All the measurement circuit components are connected in series.



7.1.3 Connection



7.2 Level measurement probe in a three-wire circuit

7.2.1 Supply voltage

Type 402090 with output 402 (0 to 20 mA)

11.5 to 30 V DC Burden $\leq (U_B - 12 \text{ V}) / 0.02 \text{ A } (\Omega)$

with output 406 (4 to 20 mA)

10 - 30 V DC Burden $\leq (U_B - 12 \text{ V}) / 0.02 \text{ A } (\Omega)$

with output 412 (0.5 to 4.5 V)

5 V DC Burden $\geq 50 \text{ k}\Omega$

with output 415 (0 to 10 V)

11.5 to 30 V DC Burden $\geq 10 \text{ k}\Omega$

with output 418 (1 to 5 V)

10 - 30 V DC Burden $\geq 10 \text{ k}\Omega$

with output 420 (1 to 6 V)

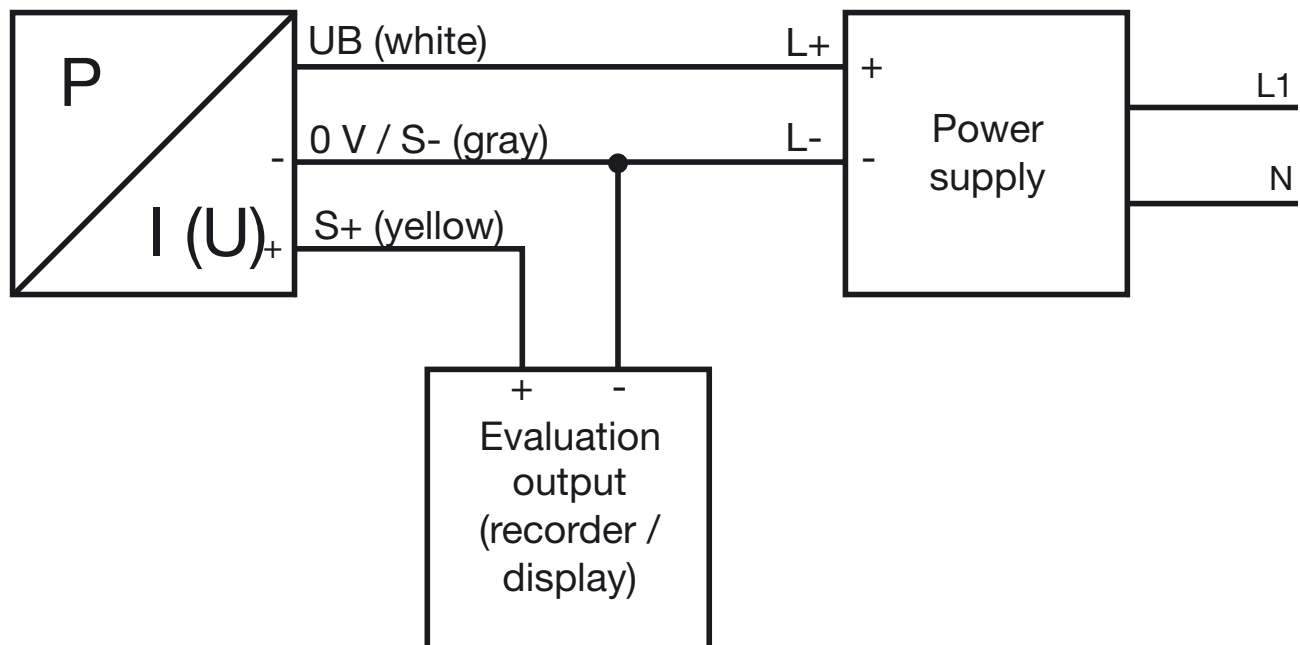
10 - 30 V DC Burden $\geq 10 \text{ k}\Omega$

Type 404390 -

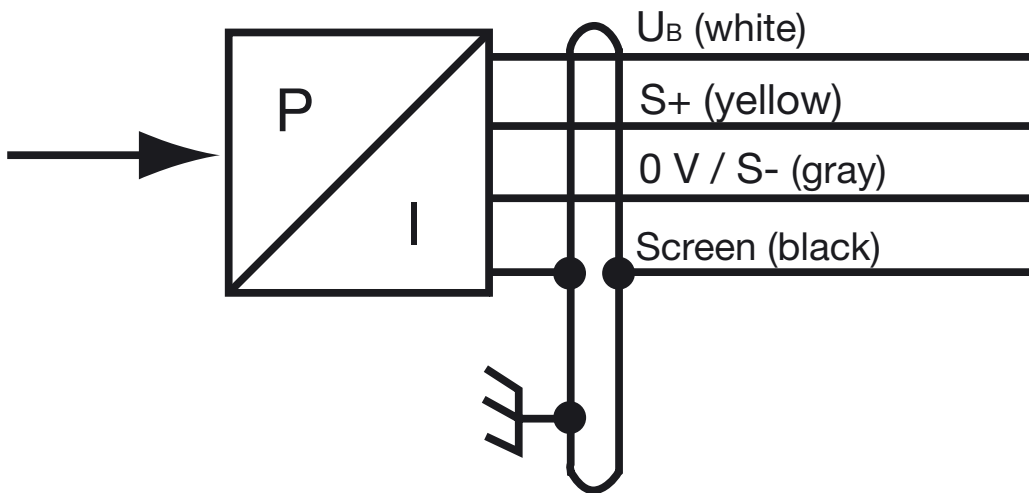
Type 404391 for output 412 (0.5 to 4.5 V)

5 V DC Burden $\geq 10 \text{ k}\Omega$

7.2.2 Schematic



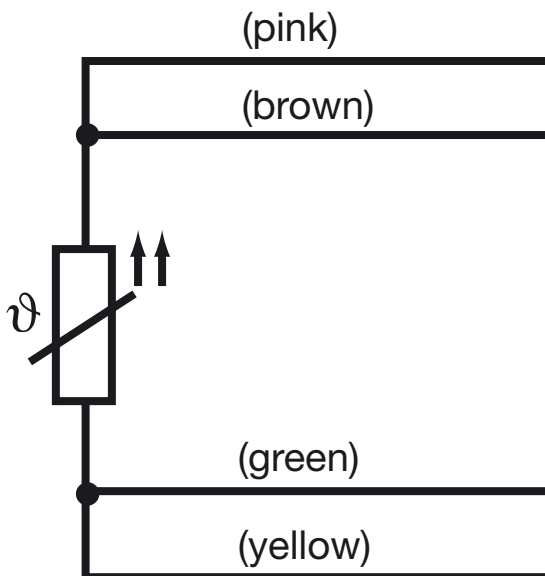
7.2.3 Connection



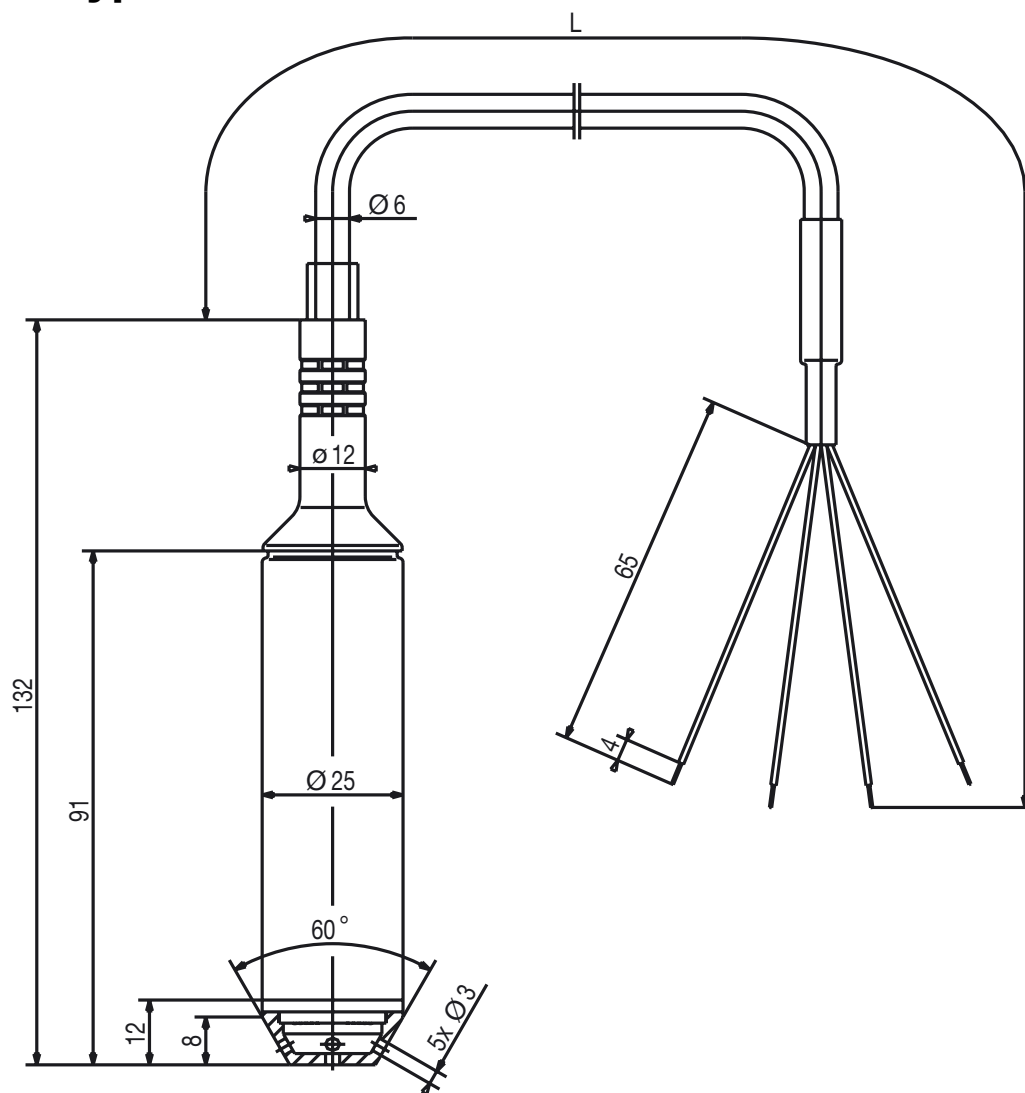
7.3 Temperature sensor in a four-wire circuit

For type 404391/007-... only

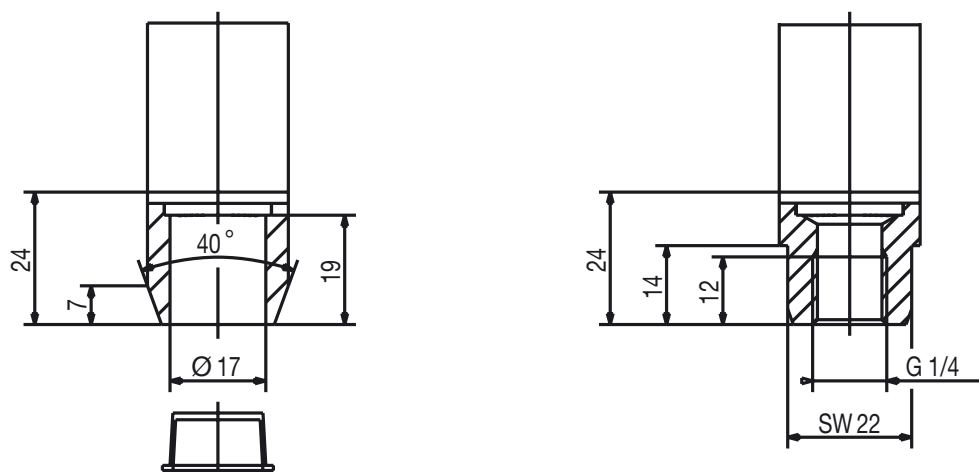
7.3.1 Connection



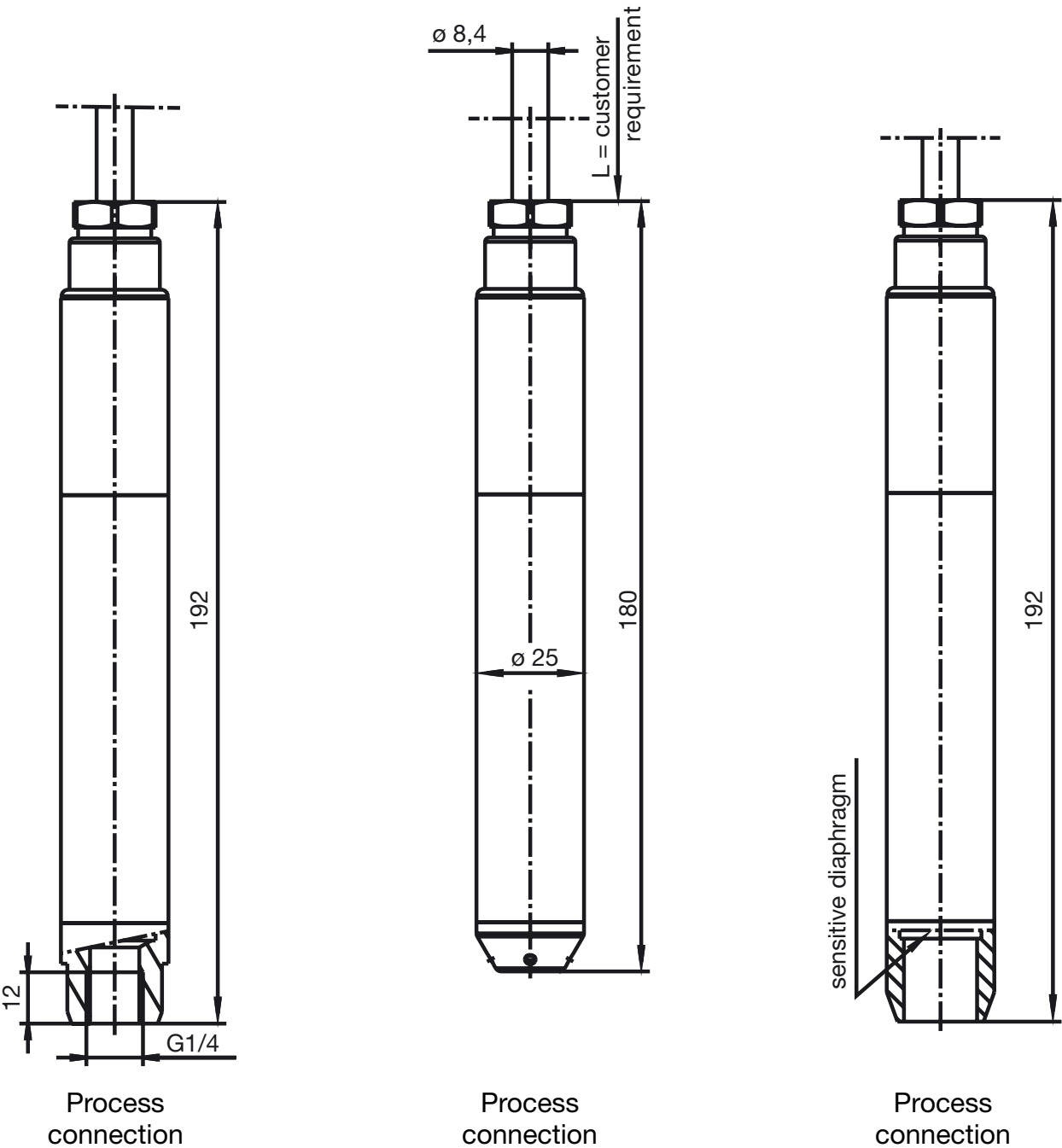
8.1 Type 402090



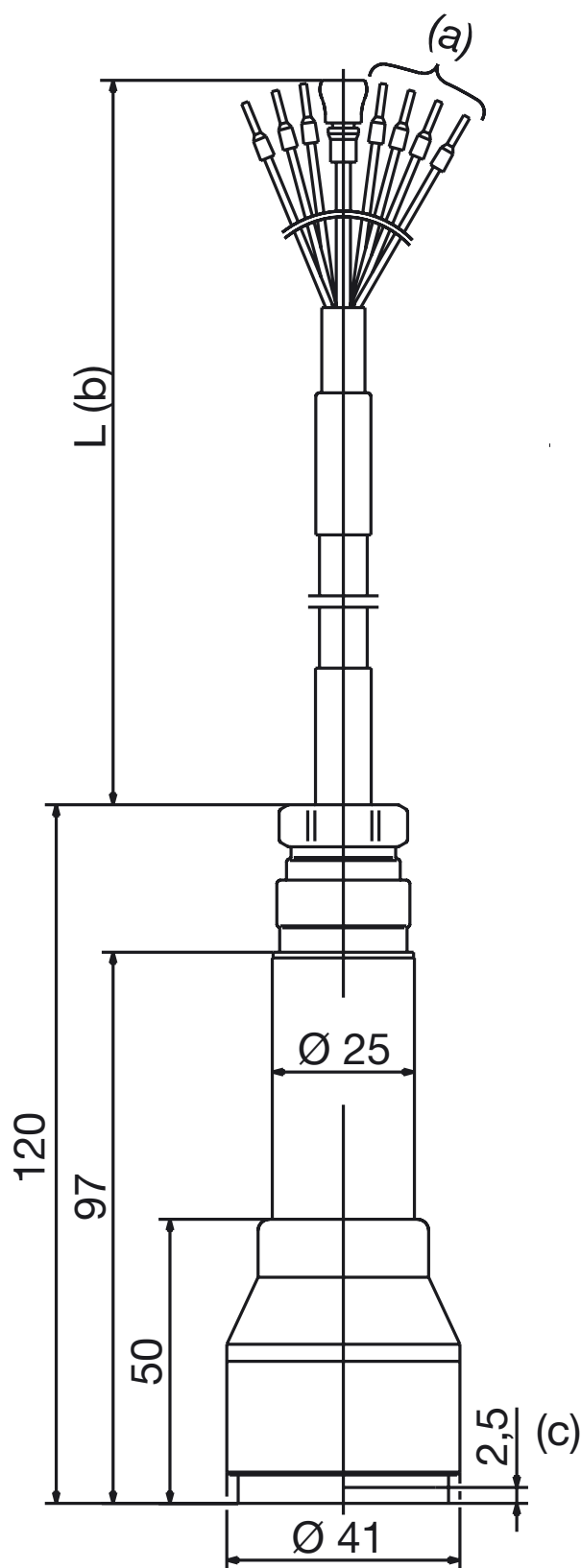
402090/000-xxx-xxx-658-20-15-xxx



8.2 Type 404390



8.3 Type 404391

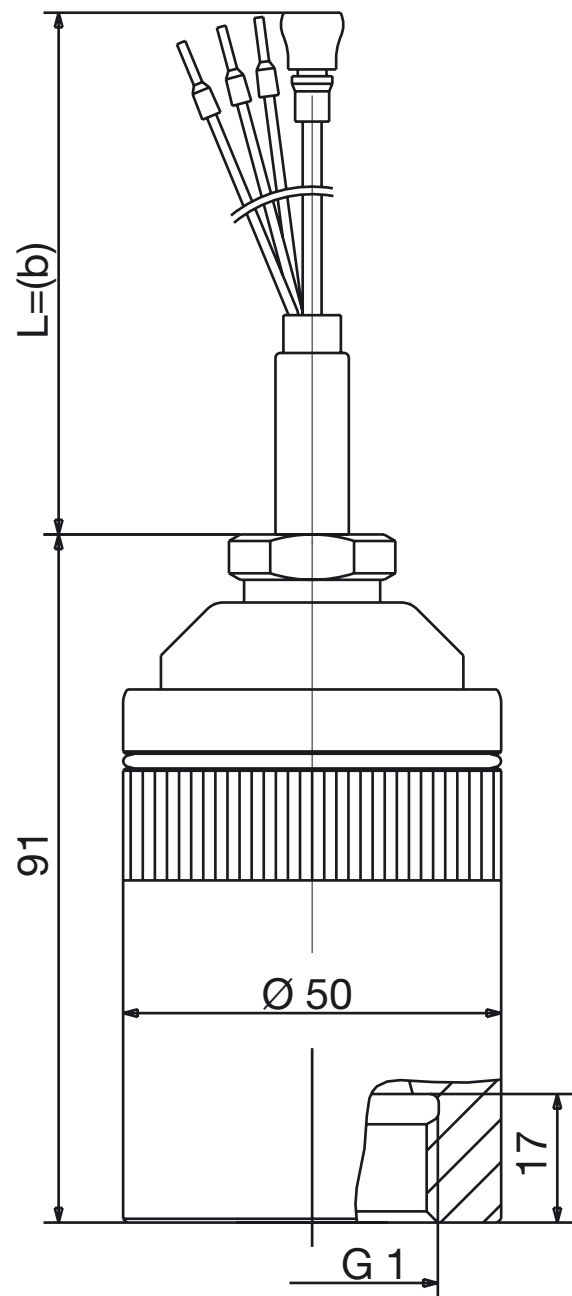


(a) for basic type extension 007 only (with Pt 100 temperat. sensor)

(b) cable length as required by the customer

(c) dimension to sensor surface

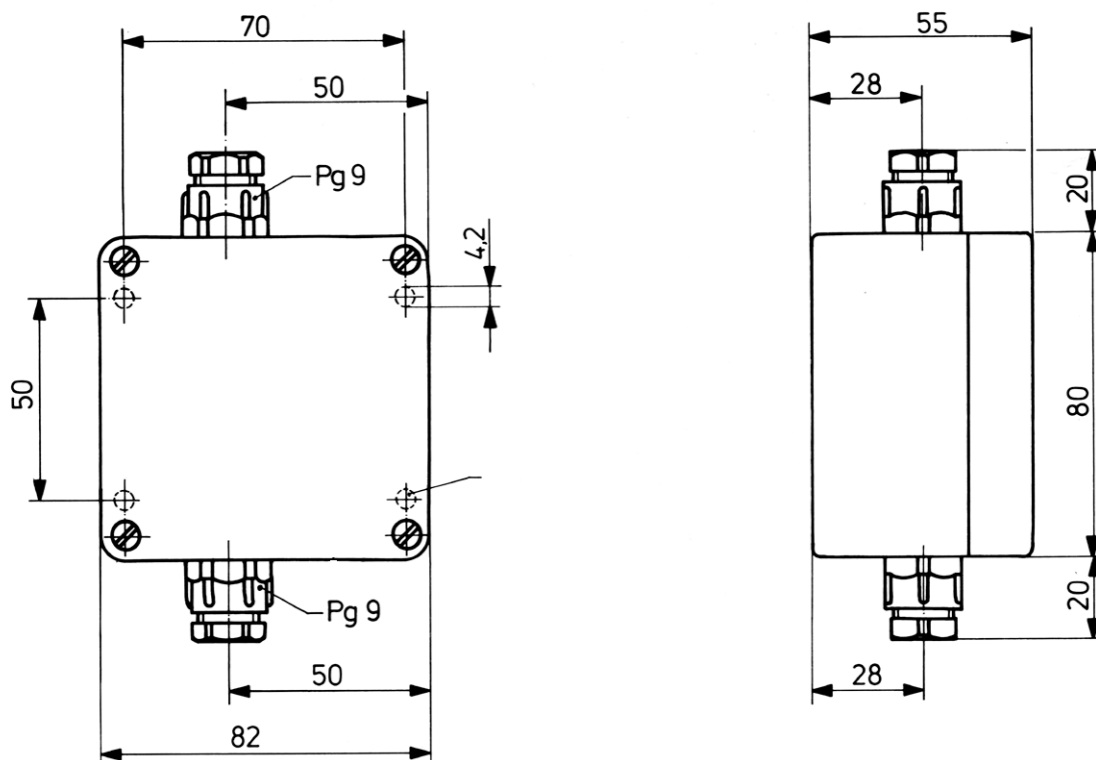
8.4 Type 404391/022



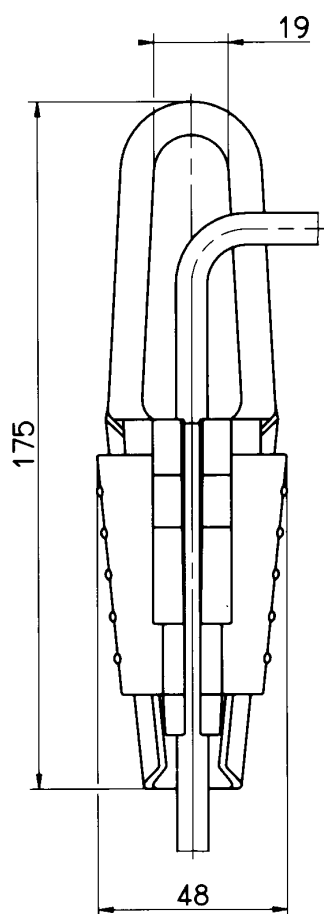
(b) cable length as required by the customer

8.5 Accessories

Terminal box with pressure compensation, part no. 00061206



Cable clamp assembly, part no. 00061389



9 Faults / errors

Type of fault	Possible cause	Measure
No output signal	No supply voltage	Test the supply voltage
	Lead break, false connection	Check the connecting cables
	Pressure transmitter error caused by unacceptable operating conditions	Return the transmitter to your supplier with a description of the error
Output signal constant even when the pressure changes	Overpressure has destroyed the instrument measurement system	
	Because of overvoltage, current limiting has falsified the output signal of the pressure transmitter	Provide the correct supply voltage
		The measurement range is too small - return the transmitter to your supplier with a description of the error

Output signal is too high	The selected measurement range is too small	Return the transmitter to your supplier with a description of the error
	The pressure transmitter electronics are faulty or the supply voltage is too high	
Type of fault	Possible cause	Measure
Output signal is too small	Current output signal: burden is too big Voltage output signal: burden is too small	Modify the burden of the measurement circuit
	Supply voltage is too low	Change the supply voltage
The zero point of the output signal is incorrect	Pressure transmitter has been adjusted by unacceptable operating conditions (such as overpressure)	Return the transmitter to your supplier with a description of the error
Output signal characteristic is not linear	Pressure transmitter has been adjusted by unacceptable operating conditions (such as overpressure)	



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