

Level Probe LGC **Hydrostatic Level Measurement**

Operating Instructions



With regard to the supply of products, the current issue of the following document is applicable:
The General Terms of Delivery for Products and Services of the Electrical Industry, as published by
the Central Association of the "Elektrotechnik und Elektroindustrie (ZVEI) e.V.",
including the supplementary clause "Extended reservation of title".

We at Pepperl+Fuchs recognise a duty to make a contribution to the future.
For this reason, this printed matter is produced on paper bleached without the use of chlorine.

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1 Safety instructions

1.1 Intended application

The level probe LGC is a hydrostatic pressure sensor for measuring the level of fresh water, drinking water and wastewater. Versions with a Pt 100 resistance thermometer can detect temperature at the same time. The optional temperature transmitter converts the Pt 100 signal into a 4 mA ... 20 mA signal.

The manufacturer shall not accept any liability for damage arising from improper use or if the device is used for purposes for which it was not intended.

1.2 Installation, commissioning, operation

The level probe LGC and the temperature transmitter (optional) are designed as fail-safe to the state of the art and comply with prevailing regulations and EC directives. If the devices are not used properly or for purposes for which they were not intended, they may become hazards arising from the particular application, e. g. product overflow through incorrect installation or adjustment. For these reasons, only trained personnel authorised by the plant operator may install, connect electrically, commission, operate and maintain the measuring system. Trained personnel must have read and understood these Operating Instructions and heed the instructions. Any changes and repairs to the devices may only be performed if the Operating Instructions expressly permit this.

1.3 Operational safety

Explosion hazardous area:

If the measuring system is used in explosion hazardous areas, you must comply with the prevailing national standards. The device is supplied with a separate documentation on explosion hazards which is a component part of this documentation. Please comply with the installation instructions, connecting values and safety instructions contained therein.

- Make sure that trained personnel have received sufficient training.
- Please comply with the technical measuring and safety conditions at the measuring points.

Order Code (refer to chapter 2)




LGC-□□□□□-□□□□-□□

Code	Certificate	Protection
EX	ATEX	ATEX II 2 G EEx ia IIC T6
E3	ATEX	ATEX II 3 G EEx nA IIC T5
F1	FM	IS, Class I, Division 1, Groups A-D
C1	CSA	IS, Class I, Division 1, Groups A-D
CG	CSA	General purpose
NA	-	without approvals




1.4 Safety warnings and symbols

In order to emphasise safety or alternative processes, we have defined the following safety warnings and appended a pictogram to each one.






Safety warnings

Symbol	Meaning
	Warning! Warning indicates activities or processes which – if they are not performed properly – will lead to serious personal injury, a safety hazard or destruction of the device.
	Caution! Caution indicates activities or processes which – if they are not performed properly – will lead to personal injury or malfunctioning of the device.
	Note! Note indicates activities or processes which – if they are not performed properly – may have an indirect impact on functioning or an unforeseen response from the device.

Type of protection

	Explosion-protected, type tested apparatus If this symbol is on the device nameplate, the device may be used in explosion hazardous areas or in non explosion hazardous areas, depending on the approval.
	Explosion hazardous area This symbol in drawings in these Operating Instructions identifies an explosion hazardous area. – Devices which are located in a hazardous area or cables for such devices must be suitably protected.
	Safe area (non explosion hazardous area) This symbol in drawings in these Operating Instructions identifies a non explosion hazardous area. – Devices in a non explosion hazardous area must also be certified if connecting cables are routed in the explosion hazardous area.

Electrical symbols

	DC voltage A terminal to which a DC voltage is applied or through which a DC voltage flows.
	AC voltage A terminal to which a (sinusoidal) AC voltage is applied or through which an AC voltage flows.
	Ground connection A grounded terminal which is already grounded by a grounding system from the user's viewpoint.
	Protective earth terminal A terminal which must be grounded before any other connections are made.
	Equipotential terminal A terminal which must be connected with the equipment grounding system: this may be a potential matching line or a star-shaped grounding system, depending on national or corporate practice.

2 Identification

2.1 Device designation

- Level probe LGC for hydrostatic level measurement, refer to chapter 1.
- Level probe LGC with optional Pt 100 resistance thermometer for simultaneous level and temperature measurement, refer to chapter 1.
- Level probe LGC with optional Pt 100 resistance thermometer and optional temperature transmitter LGC-Z13, refer to chapter 1.

Nameplate of level probe LGC

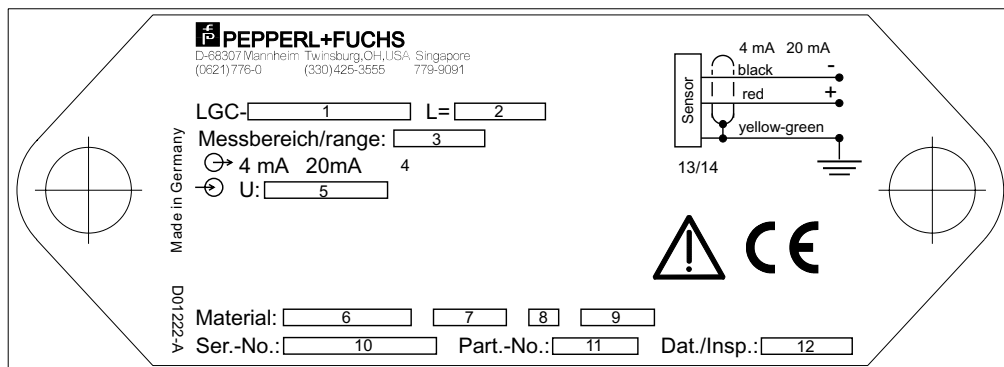


figure 1: Nameplates for level probe LGC (non hazardous area)

Nameplate A: example for non hazardous area

- | | |
|---|--|
| 1 Order code
The meaning of the individual letters and numbers is specified in the order confirmation. | 7 Measuring cell material: aluminium oxide Al_2O_3 |
| 2 Length of extension cable | 8 Extension cable material: (PE) polyethylene |
| 3 Measuring range | 9 Seal material: 1: Viton, 2: EPDM |
| 4 Current output: 4 mA ... 20 mA | 10 Serial No. |
| 5 Auxiliary energy/Supply voltage:
10 V ... 30 V DC | 11 Part No. |
| 6 Housing material: 1.4435 (AISI 316L) | 12 Test date/Tester |
| | 13 Wiring diagram of LGC |
| | 14 Wiring diagram of LGC with Pt 100 if level probe LGC was ordered with Pt 100. |

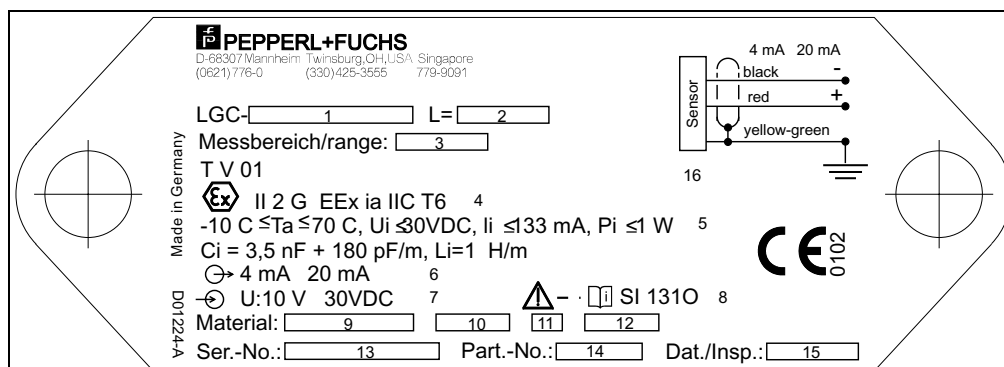


figure 2: Nameplates B for level probe LGC (hazardous area)

Nameplate B: example for hazardous area

- | | |
|---|---|
| 1 Order code
The meaning of the individual letters and numbers is specified in the order confirmation. | 8 Reference to related Safety Instructions
(e. g. SI 1310) |
| 2 Length of extension cable | 9 Housing material: 1.4435 (AISI 316L) |
| 3 Measuring range | 10 Measuring cell material: aluminium oxide Al_2O_3 |
| 4 Type of protection | 11 Extension cable material: (PE) polyethylene |
| 5 Permissible ambient temperature range and other electrical data | 12 Seal material: 1: Viton, 2: EPDM |
| 6 Current output: 4 mA ... 20 mA | 13 Serial No. |
| 7 Auxiliary energy/Supply voltage:
10 V ... 30 V DC | 14 Part No. |
| | 15 Test date/Tester |
| | 16 Wiring diagram of LGC |

**Hinweis!**

A sensor number and the measuring range are specified on each probe; in addition a certificate and the type of protection are specified on probes designed for explosion hazardous areas.

The nameplate does not specify the sensor number. If you need to assign a nameplate to a probe at a later date, please refer to the supplied calibration report. This is where the sensor and the serial number are specified.

2.2 Scope of supply

The scope of supply comprises:

- Level probe LGC, optionally with integrated Pt 100 resistance thermometer
- Optional accessories, refer to chapter 7

Supplied documentation:

- Operating instructions (this manual)
- Calibration report
- For hazardous areas: additional "Safety instructions" SI
- For FM, CSA: control drawing or installation drawing
- Drinking water approval (optional)

CE symbol, declaration of conformity

The devices are designed fail-safe to the state of the art and left the factory in perfect condition with regard to safety. The devices comply with the prevailing standards and regulations contained in DIN EN 61010 "Safety requirements for electrical equipment for measurement, control and laboratory use".

The measuring system described in these operating instructions therefore meet the statutory requirements of EC directives. Pepperl+Fuchs confirms the successful testing of the device by affixing the CE symbol.

3 Installation

3.1 Incoming acceptance

Check the following items on receipt of the product:

- Check whether the packaging or its contents are damaged.
- Check the delivered products for completeness and compare the scope of supply with your order data.

3.2 Installation conditions

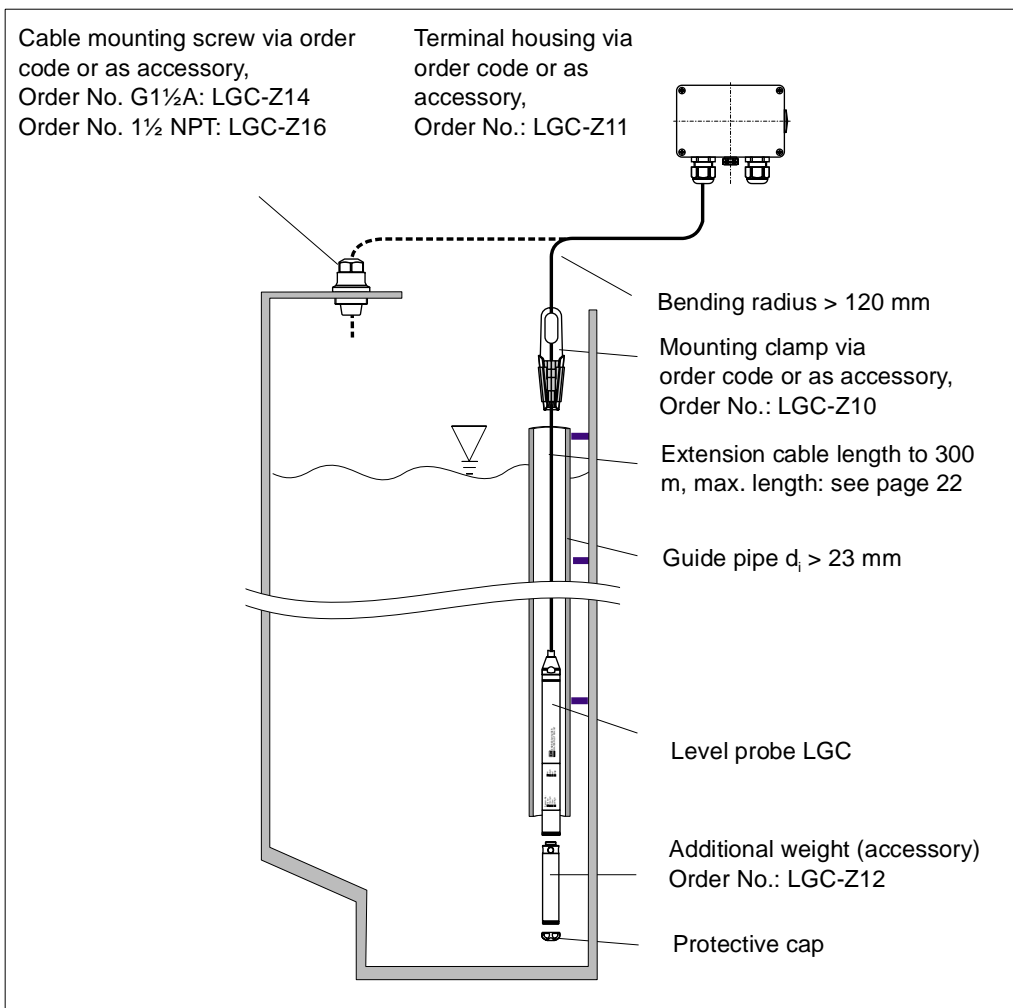


figure 3: Installation examples

Please note the following points:

- A sideways movement of the cable probe can lead to measuring errors. Therefore install the probe at a point free from flow and turbulence, or use a guide tube with an inner diameter of > 23 mm (> 0.91 inch).
- The cable must end in a dry room or in a proper terminal housing. The terminal housing from Pepperl+Fuchs provides optimum humidity and climatic protection and is suitable for outdoor installation.
- Protective cap: to avoid mechanical damage to the measuring cell, the device is provided with a protective cap.

Note!

You can order protective caps (5 pieces per set) as spare part directly from Pepperl+Fuchs using Order No.: LGC-Z17.



Installation dimensions

See chapter 9.3 for the dimensions.

3.3 Installation instructions

3.3.1 Installing level probe with a mounting clamp

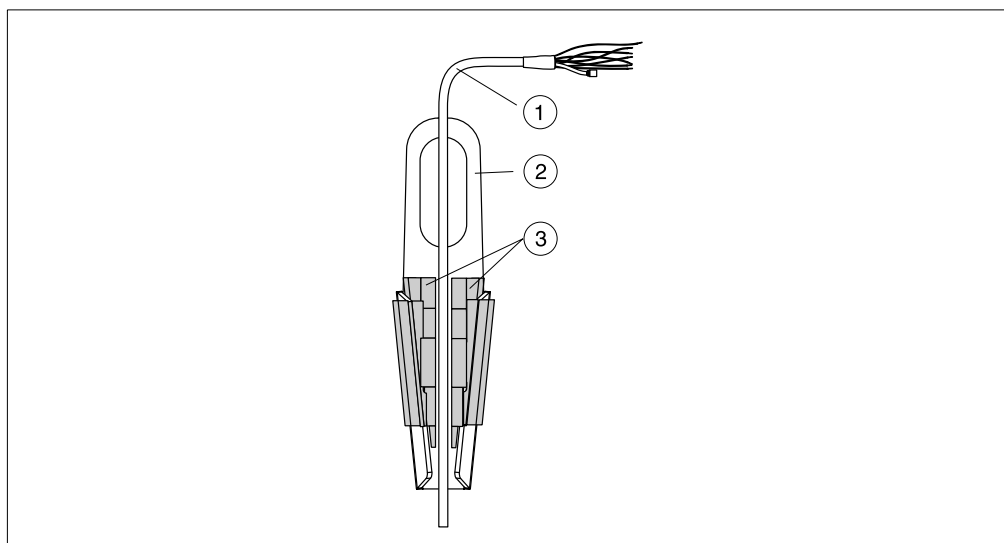


figure 4: Installing level probe LGC with a mounting clamp

- 1 Extension cable
- 2 Mounting clamp
- 3 Clamping jaws

How to mount the mounting clamp:

1. Mount the mounting clamp (pos. 2). When selecting the type of fixing, note the weight of the extension cable (pos. 2) and the device (refer to chapter 9.1.).
2. Raise clamping jaws (pos. 3). Place extension cable (pos. 1) acc. to fig. 4 between clamping jaws.
3. Hold extension cable (pos. 1) tight and push clamping jaws (pos. 3) back down. Fix clamping jaws by tapping lightly.

3.3.2 Installing level probe with cable mounting screw

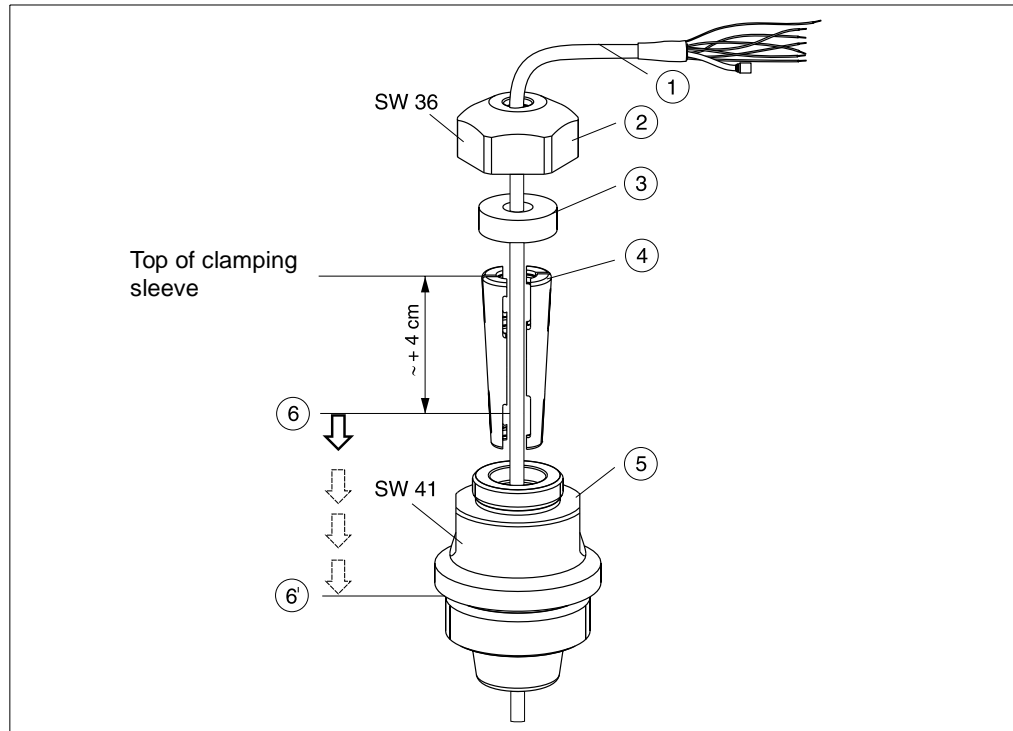


figure 5: Installing the level probe LGC with cable mounting screw, here depicted with G1½ thread

- 1 Extension cable
- 2 Mounting screw cap nut
- 3 Sealing ring
- 4 Clamping sleeve
- 5 Mounting screw adapter
- 6 required length of extension cable and LGC probe before assembly
- 6' after assembly pos. 6) is located next to the mounting screw with
G1½ thread: sealing surface of mounting screw adapter
1½ NPT thread: thread run-out of mounting screw adapter



Note!

If you want to lower the level probe to a certain depth, place the top edge of the clamping sleeve 4 cm higher than the required depth. Then push the extension cable and the clamping sleeve into the adapter as described in the following section, step 6.

How to mount the cable mounting screw with G1½ or 1½ NPT thread:

1. Mark required length of extension cable, refer to "Note" on this page.
2. Insert probe through measuring opening and carefully lower on extension cable. Fix extension cable to prevent it from slipping.
3. Push adapter (pos. 5) over extension cable and screw tightly in measuring opening.
4. Push sealing ring (pos. 3) and cap (pos. 2) from top onto cable. Press sealing ring into cap.
5. Place clamping sleeve (pos. 4) around extension cable (pos. 1) acc. to figure 5.
6. Push extension cable and clamping sleeve (pos. 4) into adapter (pos. 5).
7. Push cap (pos. 2) and sealing ring (pos. 3) onto adapter (pos. 5) and screw tightly to adapter (pos. 5).



Note!

Remove the cable mounting screw in the opposite sequence of operation to installation.

3.3.3 Mounting the terminal housing

Mount the optional terminal housing with four screws (M 4). See chapter 9.3 for the dimensions of the terminal housing. The drilling template for the housing is located in chapter 10.2.

3.3.4 Mounting the Temperature Transmitter LGC-Z13

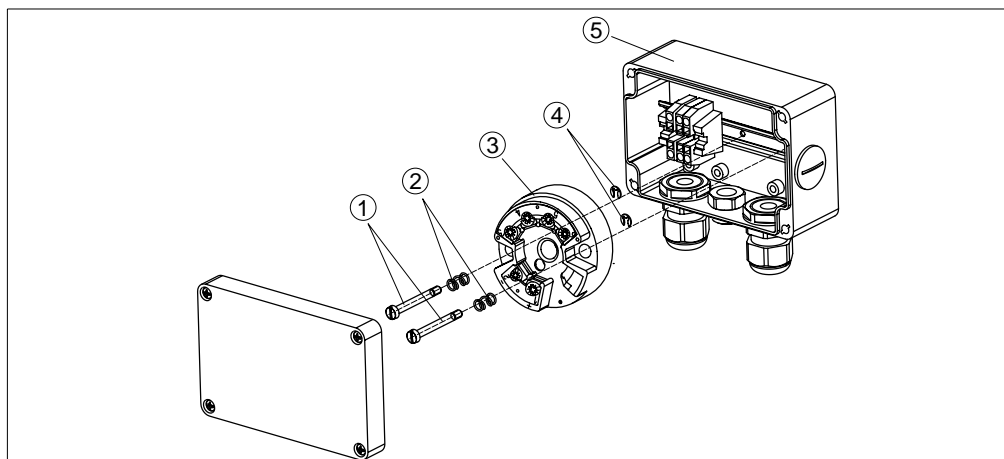


figure 6: Mounting the temperature transmitter, depicted here with terminal housing

- 1 Mounting screws
- 2 Mounting springs
- 3 Temperature Transmitter LGC-Z13
- 4 Circlips
- 5 Terminal housing

How to mount the temperature transmitter

1. Insert the mounting screws (pos. 1) with the mounting springs (pos. 2) through the boring of the temperature transmitter (pos. 3).
2. Fix the mounting screws with the circlips (pos. 4).
The circlips, mounting screws and springs are contained in the scope of supply of the temperature transmitter.
3. Screw the temperature transmitter tightly in the field housing.
(thread tapper max. 6 mm)



Warning!

Do not tighten the mounting screws too much to avoid damaging the temperature transmitter.

3.4 Checking the installation

Check that all screws are seated firmly.

4 Wiring



Warning!

When connecting devices with explosion protection certificates, please comply with national standards and the warnings and wiring diagrams in the additional explosion protection documentation accompanying these operating instructions. Also refer to chapters 9.1 and 9.2, section "Supplementary documentation". If you have any queries, please contact Pepperl+Fuchs service line.

4.1 Electrical connection

How to connect the devices:

- The supply voltage must match the specification on the nameplate, see Nameplate of level probe LGC
- Switch off supply voltage before you connect the device.
- The cable must end in a dry room or in a proper terminal housing. The terminal housing with GORE-TEX® filter, IP66/IP67 is suitable for outdoor installation.
- Connect device acc. to figures 8 and 9. A polarity protection is integrated in the level probe LGC and the temperature transmitter LGC-Z13. Changing the polarities will not destroy the devices.

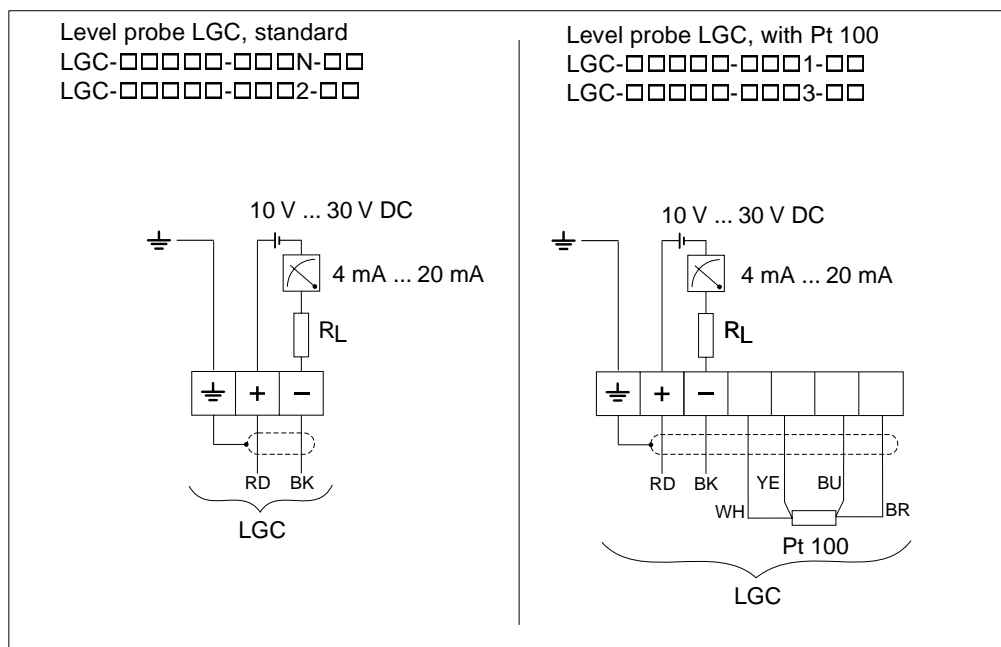


figure 7: Electrical connection: left for LGC, right for LGC with Pt 100

Wire colours: RD = red BK = black WH = white
YE = yellow BU = blue BR = brown

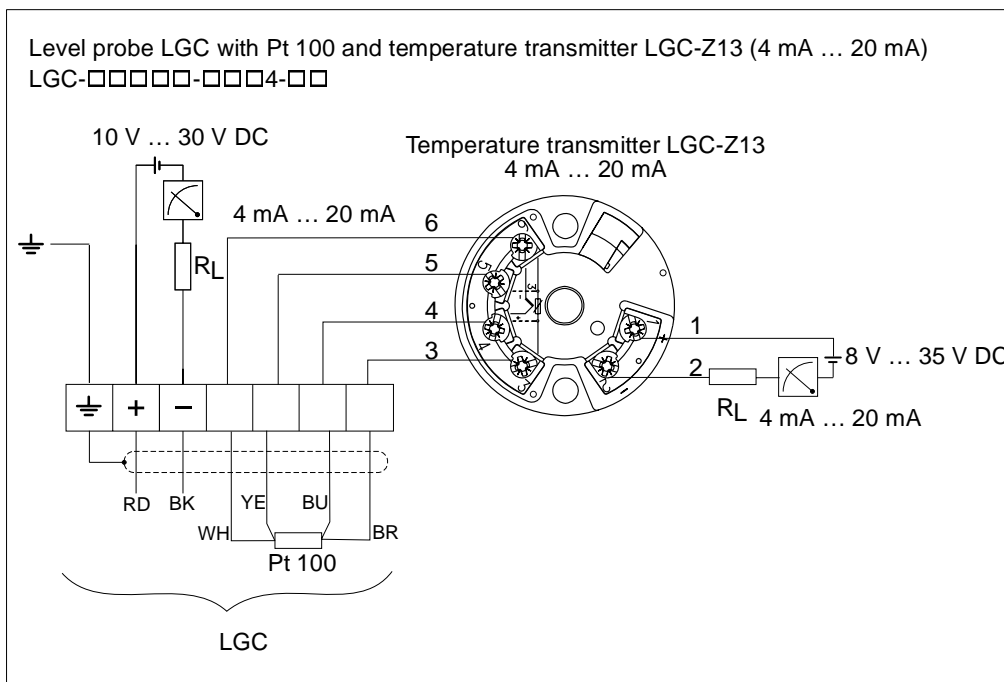


figure 8: Electrical connection: LGC with Pt 100 and temperature transmitter LGC-Z13

Wire colours: RD = red BK = black WH = white
YE = yellow BU = blue BR = brown

Evaluation units from Pepperl+Fuchs

KFDZ-STC4-1.20
KFDZ-STC4-Ex1
KFDZ-UT1
KFD2-UT1-Ex1

Supply voltage

Certificate	Supply voltage		Supply voltage
	LGC	LGC + Pt 100	Temperature transmitter
standard	10 V ... 30 V DC	10 V ... 30 V DC	8 V ... 35 V DC
EEx nA IIC T6	10 V ... 30 V DC	10 V ... 30 V DC	–
EEx ia IIC T6	10 V ... 30 V DC	–	–

Cable specification

LGC with Pt 100 (optional)	Temperature transmitter (optional)
<ul style="list-style-type: none"> – Commercially available installation cable – Terminals in terminal housing LGC: 0.08 mm² ... 2.5 mm². 	<ul style="list-style-type: none"> – Commercially available installation cable – Terminals in terminal housing LGC: 0.08 mm² ... 2.5 mm² – Transmitter terminals: max. 1.75 mm²



Note!

The extension cable of the level probe LGC is screened. In the following cases Pepperl+Fuchs recommends use of a screened cable for the cable extension:

- for large distances between extension cable end and display and/or evaluation unit,
- for large distances between extension cable end and temperature transmitter
- for directly connecting Pt 100 signals to the display and/or evaluation unit.

Power consumption/current drain

	LGC	LGC + Pt 100	Temperature transmitter
Power consumption	≤ 0.675 W at 30 V DC	≤ 0.675 W at 30 V DC	≤ 0.77 W at 35 V DC
Current drain	max. ≤ 22.5 mA min. ≥ 3.5 mA	max. ≤ 22.5 mA min. ≥ 3.5 mA Pt 100: ≤ 0.6 mA	max. ≤ 22 mA min. ≥ 3.5 mA

Load

The maximum load resistance is dependent on the supply voltage (U_b) and must be determined for every current loop separately. Refer to equations and diagrams for "LGC with Pt 100 (optional)" and "Temperature transmitter".

The total resistance resulting from the resistances of the connected devices, the connecting cable and if necessary, the resistor of the extension cable may not exceed the load resistance.

LGC with Pt 100 (optional)	Temperature transmitter (optional)
$R_{tot} \leq \frac{U_b - 10 \text{ V}}{0.0225 \text{ A}} - 2 \cdot 0.09 \frac{\Omega}{\text{m}} \cdot l - R_{add}$	$R_{tot} \leq \frac{U_b - 8 \text{ V}}{0.022 \text{ A}} - R_{add}$

- R_{tot} = Max. load resistance [Ω]
- R_{add} = Additional resistances, e. g. resistance of evaluating device and/or the display instrument, line resistance [Ω]
- U_b = Supply voltage [V]
- l = Simple length of extension cable [m] (cable resistance per wire ≤ 0.09 Ω /m)

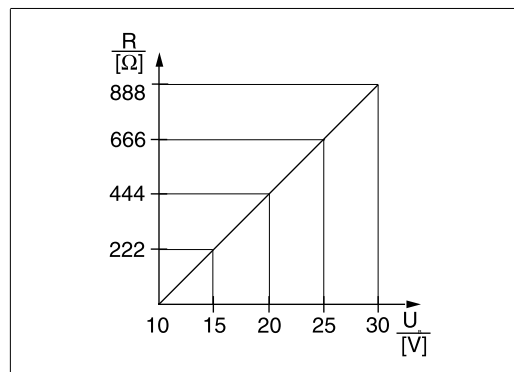


figure 9: Load chart of LGC for estimating load resistance

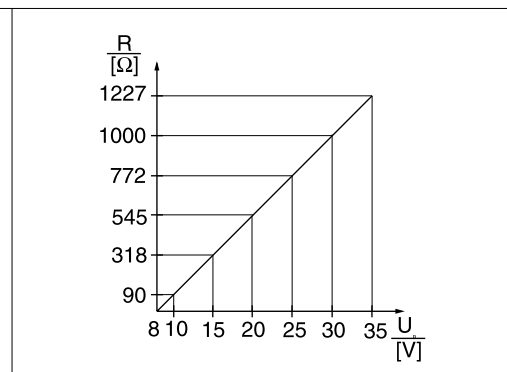


figure 10: Load chart of temperature transmitter for estimating load resistance



Note!

Additional resistances, e. g. resistance of extension cable, must then be subtracted from the value determined from the diagram, as shown in the equation.

4.2 Wiring up the measuring unit

Overvoltage protection



Note!

In order to protect the level probe LGC and the temperature transmitter LGC-Z13 from large transients, Pepperl+Fuchs recommends the installation of an overvoltage protector upstream and downstream of the display and/or evaluation device as shown in the figure.

The level probe LGC has an integrated overvoltage protection to EN 61000 of ≤ 1.2 kV as standard.

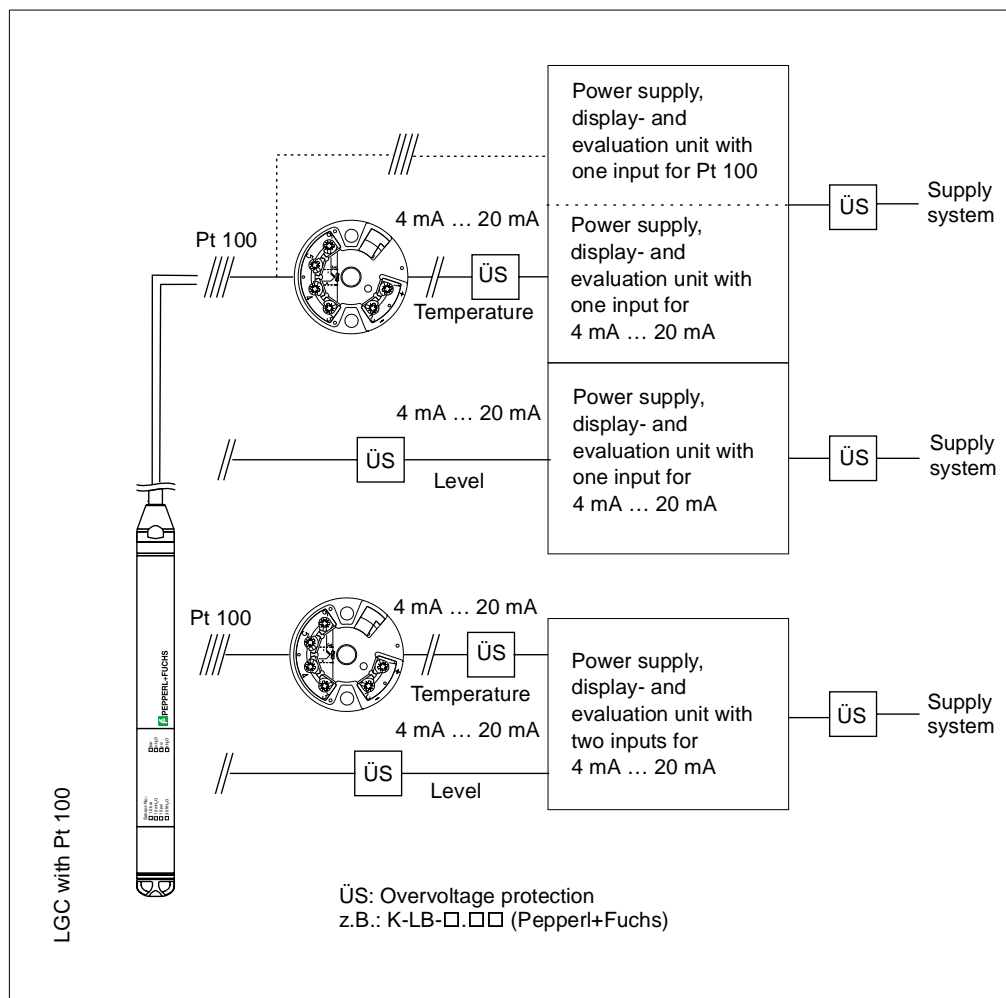


figure 11: Wiring up the measuring unit

4.3 Checking the wiring

After wiring up the measuring instrument, carry out the following inspections:

- Does the supply voltage match the specification on the nameplate?
- Is the device connected as shown in figures 8 and 9?
- Are all the screws tightened?
- Optional terminal housing: are the cable glands tight?

5 Operation



Note!

Pepperl+Fuchs offers extensive measuring point solutions with display and/or evaluation units for the level probe LGC and the temperature transmitter LGC-Z13. For more information, please contact Pepperl+Fuchs. Please refer to the back page of this documentation for contact addresses.

6 Maintenance

No special maintenance work is required for the level probe LGC or for the optional temperature transmitter LGC-Z13.

Cleaning the device exterior

When cleaning the exterior of the measuring device, please note the following:

- Do not use a cleaning agent that is aggressive to the housing surface or the seal.
- Level probe LGC: avoid any mechanical damage to the membrane or the extension cable.

7 Accessories

There are a number of accessories available for the level probe LGC. You can order them separately from Pepperl+Fuchs.

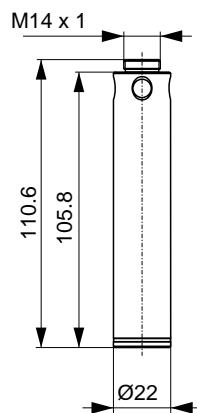
Mounting clamp

Pepperl+Fuchs offers a mounting clamp for simple mounting. Refer to page 25.
Material: 1.4435 (AISI 316L), Order No.: LGC-Z10

Terminal housing

Terminal housing IP66/IP67 with GORE-TEX® filter incl. 3 mounted terminals.
The terminal housing is also suitable for installing a temperature transmitter (Order No. LGC-Z13) or for four additional terminals (Order No. LGC-Z15).
Refer to page 26.
Order No.: LGC-Z11

Additional weight



To prevent sideways movement leading to measuring errors or to ensure that the device lowers into a guide tube, Pepperl+Fuchs provides additional weights. You can attach several weights to the LGC.

Material: 1.4435 (AISI 316L)
Weight: 300 g
Order No.: LGC-Z12

Temperature transmitter LGC-Z13, 4 mA ... 20 mA

Temperature transmitter, 2-wire, pre-set for measuring range from -20 °C ... +80 °C (-4 °F ... +176 °F).

This setting offers an easily displayable temperature range of 100 K. Note that the Pt 100 resistance thermometer is designed for a temperature range of -10 °C ... +70 °C (+14 °F ... +158 °F).

Refer to page 26. Order No.: LGC-Z13

Cable mounting screw

Pepperl+Fuchs offers cable mounting screws to simplify the installation of the LGC and to close the measuring open.

Refer to page 25. Material: 1.4301 (AISI 304)

Order No. for cable mounting screw with G1½A thread: LGC-Z14

Order No. for cable mounting screw with 1½ NPT thread: LGC-Z16

Terminals

Four terminals in strip for LGC terminal housing, suitable for wire cross section of 0.08 mm² ... 2.5 mm²
Order No.: LGC-Z15

8 Trouble-shooting

8.1 Faults on level probe LGC and Level probe LGC with Pt 100 (optional)

Error description	Cause	Action
No measuring signal	Connection of 4 mA ... 20 mA line incorrect	Connect device acc. to chapter 4.1, figs. 7 or 8
	No supply voltage over 4 mA ... 20 mA line	Check current loop
	Supply voltage too low (min. 10 V DC)	Check supply voltage Total resistance greater than max. load resistance, refer to chapter 4.1, page 14
	LGC defective	Replace LGC
Temperature measuring value inaccurate/incorrect (only with level probe LGC with Pt 100)	Pt 100 connected to 2-wire circuit, line resistance not compensated	Compensate line resistance Connect Pt 100 as 3-wire or 4-wire circuit

8.2 Faults of temperature transmitter LGC-Z13 (optional)

Error description	Cause	Action
No measuring signal	Connection of 4 mA ... 20 mA line incorrect	Connect device acc. to chapter 4.1, fig. 8
	No supply voltage over 4 mA ... 20 mA line	Check current loop
	Supply voltage too low (min. 8 V DC)	Check supply voltage Total resistance greater than max. load resistance, refer to chapter 4.1, page 14
Error current ≤ 3.6 mA or ≥ 21 mA	Connection of Pt 100 incorrect	Connect device acc. to chapter 4.1, fig. 8
	Connection of 4 mA ... 20 mA line incorrect	Connect device acc. to chapter 4.1, fig. 8
	No supply voltage over 4 mA ... 20 mA line	Check current loop, refer to chapter 4.1, fig. 8
	Pt 100 resistance thermometer defective	Replace level probe LGC
	Temperature transmitter defective	Replace temperature transmitter
Measuring value inaccurate/incorrect	Pt 100 connected in 2-wire circuit, line resistance not compensated	Compensate line resistance Connect Pt 100 as 3-wire or 4-wire circuit

8.3 Spare parts

Note!

You can order spare parts directly from Pepperl+Fuchs.



Membrane protective cap

5 pieces in set, refer to fig. 2, page 8

Order No.: LGC-Z17

Pressure compensation set

10 pieces in set, comprising Teflon filter and sleeve for extension cable, refer to fig. 2, page 8

Order No.: LGC-Z18

9 Technical data

9.1 Technical data level probe LGC and level probe LGC with Pt 100 (optional)

Applications

Applications	The level probe LGC is a hydrostatic pressure sensor for measuring the level of fresh water, drinking water and wastewater. The version with a Pt 100 resistance thermometer detects temperature at the same time.
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Input parameters

Measured variable	<ul style="list-style-type: none"> Hydrostatic pressure of a liquid Pt 100: temperature of a liquid
Measuring range	<ul style="list-style-type: none"> Nine fixed pressure measuring ranges in psi, ftH₂O, bar and mH₂O, Customer-specific measuring ranges between 1.5 psi ... 300 psi (0.1 bar ... 20 bar); factory-calibrated and special measuring ranges on request Pt 100 (optional): temperature measurement from -10 °C ... +70 °C (+14 °F ... +158 °F)
Input signal	<ul style="list-style-type: none"> Change in capacitance of the ceramic measuring cell Change in resistance of the Pt 100 (optional)

Output parameters

Output signal	<ul style="list-style-type: none"> 4 mA ... 20 mA for hydrostatic pressure measured value, two-wire Pt 100 (optional): temperature-dependent resistance of the Pt 100
Load	see chapter 4.1, section Load

Auxiliary energy

Electrical connection	see chapter 4.1, integrated polarity protection
Supply voltage	<ul style="list-style-type: none"> 10 V ... 30 V DC, EEx nA and EEx ia: 10 V ... 30 V DC Pt 100: 10 V ... 30 V DC, EEx nA: 10 V ... 30 V DC
Cable specification	see chapter 4.1, section Cable specification
Power consumption	≤ 0.675 W at 30 V DC
Current drain	<ul style="list-style-type: none"> Max. current drain: ≤ 22.5 mA; Min. current drain: ≥ 3.5 mA Pt 100 (optional): ≤ 0.6 mA
Residual ripple	No effect for 4 mA ... 20 mA signal up to ± 5% residual ripple within permissible range

Performance characteristics

Reference operating conditions	DIN EN 60770 T ₀ = 25 °C
Accuracy	<ul style="list-style-type: none"> Linearity including hysteresis and repeatability as per DIN EN 60770: ± 0.2 % of full scale Pt 100: max.: ± 0.7 K (Class B to DIN EN 60751)
Long-term stability	± 0.1 % of full scale per year
Influence of medium temperature	<ul style="list-style-type: none"> Thermal change in zero signal and output span for typical temperature range 0 °C ... +30 °C (+32 °F ... +86 °F): ± 0.4 % (± 0.5 %)* of span Thermal change in zero signal and output span for the total medium temperature range -10 °C ... +70 °C (+14 °F ... +158 °F): ± 1.0 % (± 1.5 %)* of span Maximum temperature coefficient (T_K) in zero signal and output span: 0.15 %/10 K (0.3 %/10 K)* of span <p>* Specifications for sensors 1.5 psi (3 ft H₂O, 0.1 bar, 1 mH₂O), 10 psi (20 ft H₂O, 0.6 bar, 6 mH₂O)</p>

Performance characteristics (continuation)

Warm-up period	20 ms
Rise time (T90-time)	<ul style="list-style-type: none"> • 80 ms • Pt 100 (optional): 160 s
Setting time	<ul style="list-style-type: none"> • 150 ms • Pt 100 (optional): 300 s

Ambient conditions

Ambient temperature range	-10 °C ... +70 °C (+14 °F ... +158 °F), (= medium temperature range)
Storage temperature	-40 °C ... +80 °C (-40 °F ... +176 °F)
Ingress protection	<ul style="list-style-type: none"> – IP68, permanently hermetically sealed – Optional terminal housing: IP66/IP67
Elektromagnetic compatibility	Interference emission to EN 61326; Equipment Class B Interference immunity to EN 61326, appendix A (industrial usage)
Overvoltage protection	Integrated overvoltage protection to EN 61000-4-5 ≤ 1.2 kV Install overvoltage protection ≥ 1.2 kV, external if necessary.

Process conditons

Medium temperature range	-10 °C ... +70 °C (+14 °F ... +158 °F) For devices approved for use in hazardous areas, see Safety Instructions.
Medium temperature limits	-20 °C ... +70 °C (-4 °F ... 158 °F) (You may operate the LGC in this temperature range. The values quoted in the specifications may then be exceeded, e. g. measuring accuracy. Also refer to DIN 16086.)

Mechanical construction

Constructions, dimensions	see chapter 9.3
Weight	<ul style="list-style-type: none"> – Level probe: 290 g – Extension cable: 52 g/m – Mounting clamp: 170 g – Cable mounting screw G1½A: 770 g – Cable mounting screw 1½ NPT: 724 g – Terminal housing: 235 g – Additional weight: 300 g
Materials	<p>Level probe:</p> <ul style="list-style-type: none"> – Level probe 1.4435 (AISI 316L) – Process ceramic: Al₂O₃ aluminium oxide ceramic – Seal (internal): EPDM or Viton – Protctive cap: PE-HD (high-density polyethylene) – Extension cable insulation: PE (polyethylene), for more details, see section Extension cable <p>optional:</p> <ul style="list-style-type: none"> – Mounting clamp 1.4435 (AISI 316L) and glass fibre reinforced PA (polyamide) – Cable mounting scew G½A: 1.4301 (AISI 304) – Cable mounting screw 1½ NPT: 1.4301 (AISI 304) – Additional weight: 1.4435 (AISI 316L) – Terminal housing: PC (polycarbonate)

**Mechanical construction
(continuation)**

<p>Extension cable</p>	<p>Construction</p> <ul style="list-style-type: none"> – Slip-resistant extension cable with strain-relief members made of Kevlar; screened using aluminium-coated film; insulated with polyethylene (PE), black; copper wires, twisted – Pressure compensation tube with Teflon filter <p>Cross section</p> <ul style="list-style-type: none"> – LGC: 3 x 0.227 mm² + pressure compensation tube with Teflon filter – LGC with Pt 100 (optional): 7 x 0.227 mm² + pressure compensation tube with Teflon filter – Total outer diameter: 8.0 mm ± 0.25 mm (0.315 inch ± 0.0098 inch) – Pressure compensation tube with Teflon filter: Outer diameter OD = 2.5 mm (0.098 inch), Internal diameter ID = 1.5 mm (0.059 inch) <p>Cable resistance</p> <ul style="list-style-type: none"> – Cable resistance per wire: ≤ 0,09 Ω/m <p>Cable length</p> <ul style="list-style-type: none"> – Max. free suspended length (mechanical stability under load): 1000 m (39370 inch) – Max. free length for non-Ex and EEx nA IIC T6: see section Load, chapter 4.1 – Max. free length for EEx ia IIC T6: see safety instructions (SI) <p>further technical data</p> <ul style="list-style-type: none"> – Minimum bending radius: 120 mm (4.724 inch) – Tensile strength: ≥1200 N – Cable extraction force: ≥ 450 N (The extension cable could be extracted from the cable probe at a tensile force ≥ 450 N.) – Approved for use with drinking water – Increased resistance to UV light
<p>Terminals</p>	<ul style="list-style-type: none"> – 3 standard terminals in terminal housing – 4-terminal strip available as accessory, Order No. LGC-Z15 for wire cross section of 0.08 mm ... 2.5 mm²

Certificates and approvals

<p>Explosion protection approval, type of protection</p>	<ul style="list-style-type: none"> – ATEX II 2G/EEEx ia IIC T6 – ATEX II 3 G/EEEx nA IIC T6 – FM: IS, Class I, Division 1, Groups A-D – CSA: IS, Class I, Division 1, Groups A-D – CG: General purpose <p>All explosion protection data are contained in separate explosion protection documentation which you can also request. Explosion protection documents are supplied as standard for all devices approved for use in explosion hazardous areas.</p>
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Supplementary documentation

<p>Supplementary documentation</p>	<ul style="list-style-type: none"> – Flyer – Product information level probe LGC – Safety information, ATEX II 2 G/EEEx ia IIC T6 (SI 1310) – Safety information, ATEX II 3 G/EEEx nA IIC T6 (SI 1320)
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9.2 Technical data
temperature transmitter LGC-Z13 (optional)

Applications

Applications	The temperature transmitter LGC-Z13 converts the Pt 100 signal into a 4 mA ... 20 mA.
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Input parameters

Measured variable	Temperature
Measuring range	The temperature transmitter is pre-set for a measuring range of -20 °C ... +80 °C (-4 °F ... +176 °F). This setting offers an easily displayable temperature range of 100 K. Please note that the Pt 100 resistance thermometer is designed for a temperature range of -10 °C ... +70 °C (+14 °F ... +158 °F).
Input signal	Pt 100 resistance signal, 4-wire

Output parameters

Output signal	4 mA ... 20 mA for temperature measured value, two-wire
Load	see chapter 4.1, section Load

Auxiliary energy

Electrical connection	see chapter 4.1, integrated polarity protection
Supply voltage	8 V ... 35 V DC, EEx ia: 9.6 V ... 30 V DC
Cable specifications	see chapter 4.1, section Cable specification
Power consumption	≤ 0.77 W at 35 V DC
Current drain	<ul style="list-style-type: none"> • Max. current drain: ≤ 22 mA • Min. current drain: ≥ 3.5 mA • with optional Pt 100 of the LGC: ≤ 0.6 mA
Residual ripple	$U_{ss} \leq 5 \text{ V}$ at $U_B \geq 13 \text{ V}$, $f_{max.} = 1 \text{ KHz}$

Performance characteristics

Reference operating conditions	Calibration temperature: 23 °C (73 °F) ± 5K
Accuracy	<ul style="list-style-type: none"> • ± 0.2 K • with optional Pt 100 of the LGC: max. ± 0.9 K
Warm-up period	4 s

Ambient conditions

Ambient temperature range	-40 °C ... +85 °C (-40 °F ... +185 °F)
Storage temperature	- 40 °C ... +100 °C (-40 °F ... +212 °F)
Ingress protection	<ul style="list-style-type: none"> – IP 00, moisture condensation permissible – When mounted in optional terminal housing: IP66/IP67
Electromagnetic compatibility (EMC)	Interference emission to EN 61326; Equipment Class B Interference immunity to EN 61326, appendix A (industrial usage)
Overvoltage protection	Install overvoltage protection, external if necessary.

Mechanical construction

Construction, dimensions	see chapter 9.3
Weight	40 g
Material	Housing PC (polycarbonate)
Terminals	Connection terminals temperature transmitter: 1.75 mm ²

Certificates and approvals

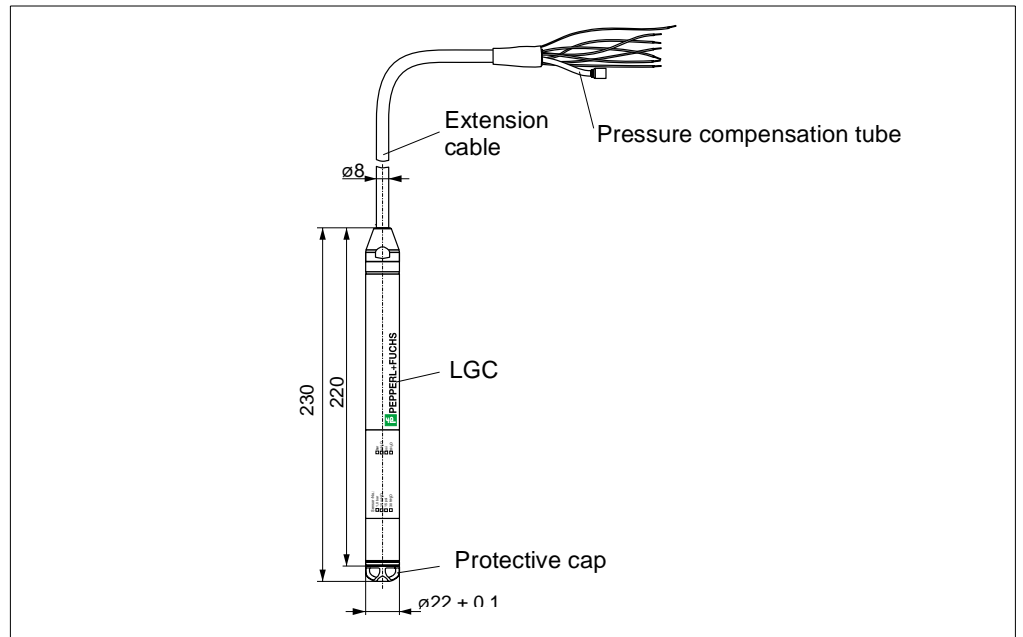
Explosion protection approval, Type of protection	For information of use of the temperature transmitter in explosion hazardous area please contact Pepperl+Fuchs.
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Ordering information

Ordering information	You will receive ordering information and order code details from Pepperl+Fuchs.
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9.3 Dimensions

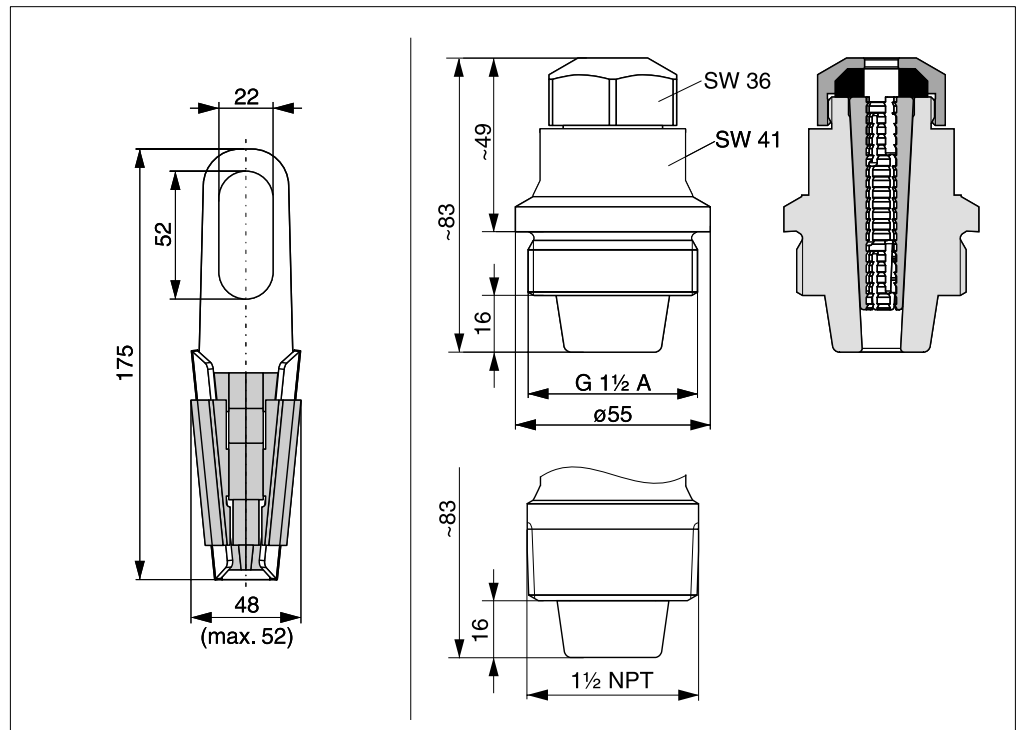
Dimensions of cable probe



Dimensions of cable mounting screw G 1½A
LGC-G□□□□-□□□□-□□

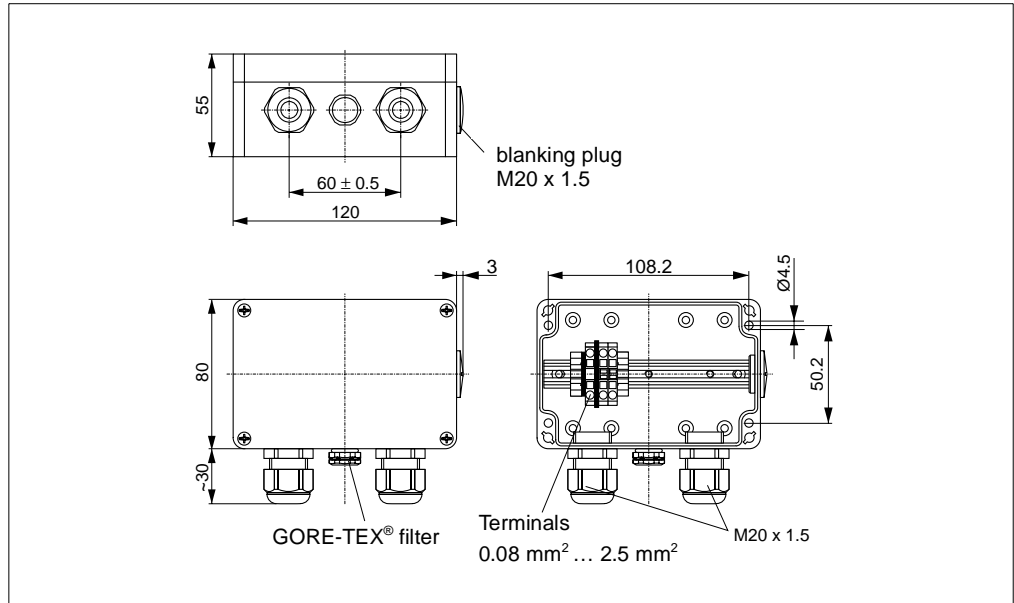
Dimensions of mounting clamp
LGC-A□□□□-□□□□-□□

Dimensions of cable mounting crew 1½ NPT
LGC-N□□□□-□□□□-□□



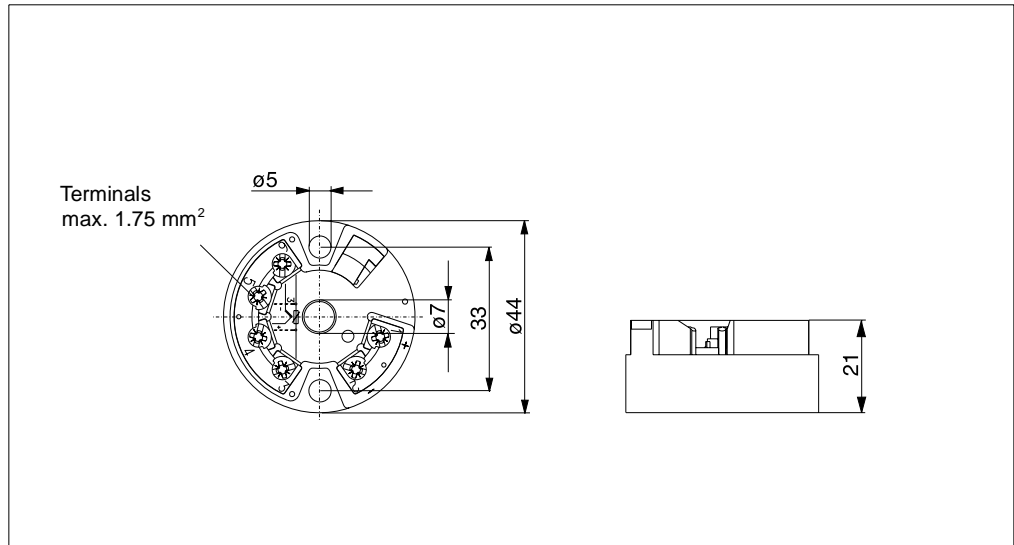
Dimensions terminal housing IP66/IP67 with filter

LGC-□□□□□-□□□2-□□: Terminal housing incl. 3 terminals,
 LGC-□□□□□-□□□3-□□: Terminal housing incl. 7 terminals for LGC with Pt 100,
 LGC-□□□□□-□□□4-□□: Terminal housing incl. 3 terminals + temperature transmitter LGC-Z13, 4 mA ... 20 mA for LGC with Pt 100



Dimensions temperature transmitter LGC-Z13 (4 mA ... 20 mA)

LGC-□□□□□-□□□4-□□: Terminal housing incl. 3 terminals + temperature transmitter LGC-Z13, 4 mA ... 20 mA for LGC with Pt 100



10 Appendix

10.1 Functions and system design

The ceramic measuring cell is dry, i.e. pressure acts directly on the rugged ceramic diaphragm of level probe LGC and causes it to move by about max. 0.005 mm. The effects of air pressure on the liquid surface are transferred via a pressure compensation tube through the cable to the rear of the ceramic diaphragm and compensated. Pressure-dependent changes in capacitance caused by diaphragm movement are measured at the electrodes of the ceramic carrier. The electronics convert the movement into a pressure-proportional signal which is linear to the medium level.

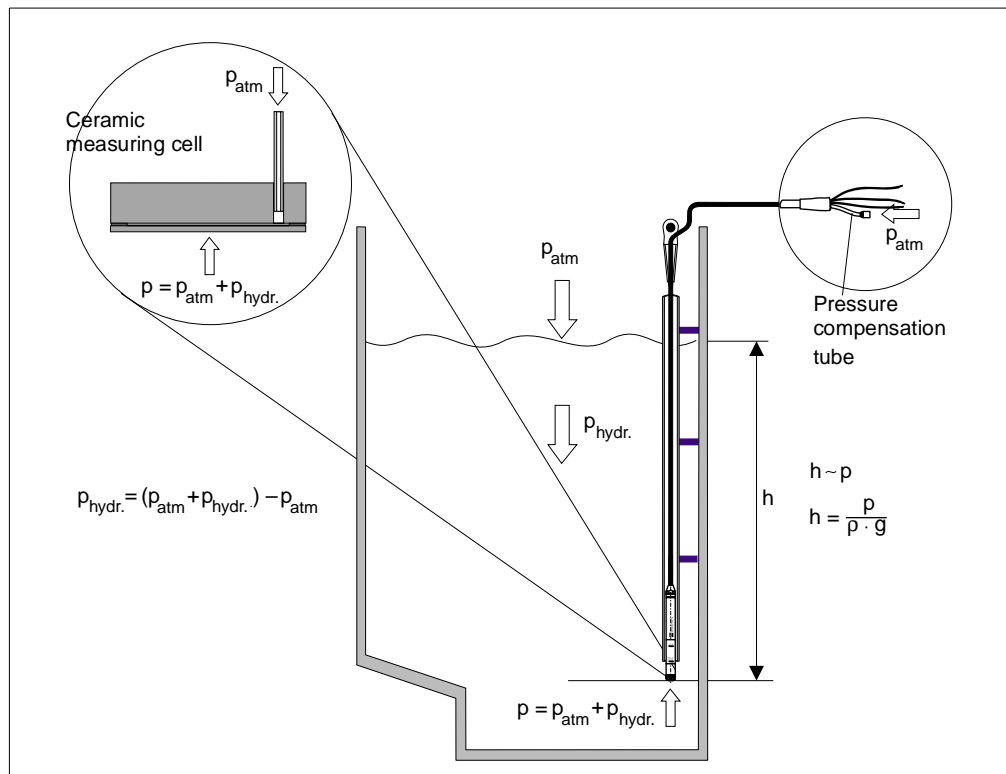


figure 12: Functions and system design

- h = level height
- p = total pressure = hydrostatic pressure + atmospheric pressure
- ρ = medium density
- g = gravitational acceleration
- $p_{hydr.}$ = hydrostatic pressure
- p_{atm} = atmospheric pressure

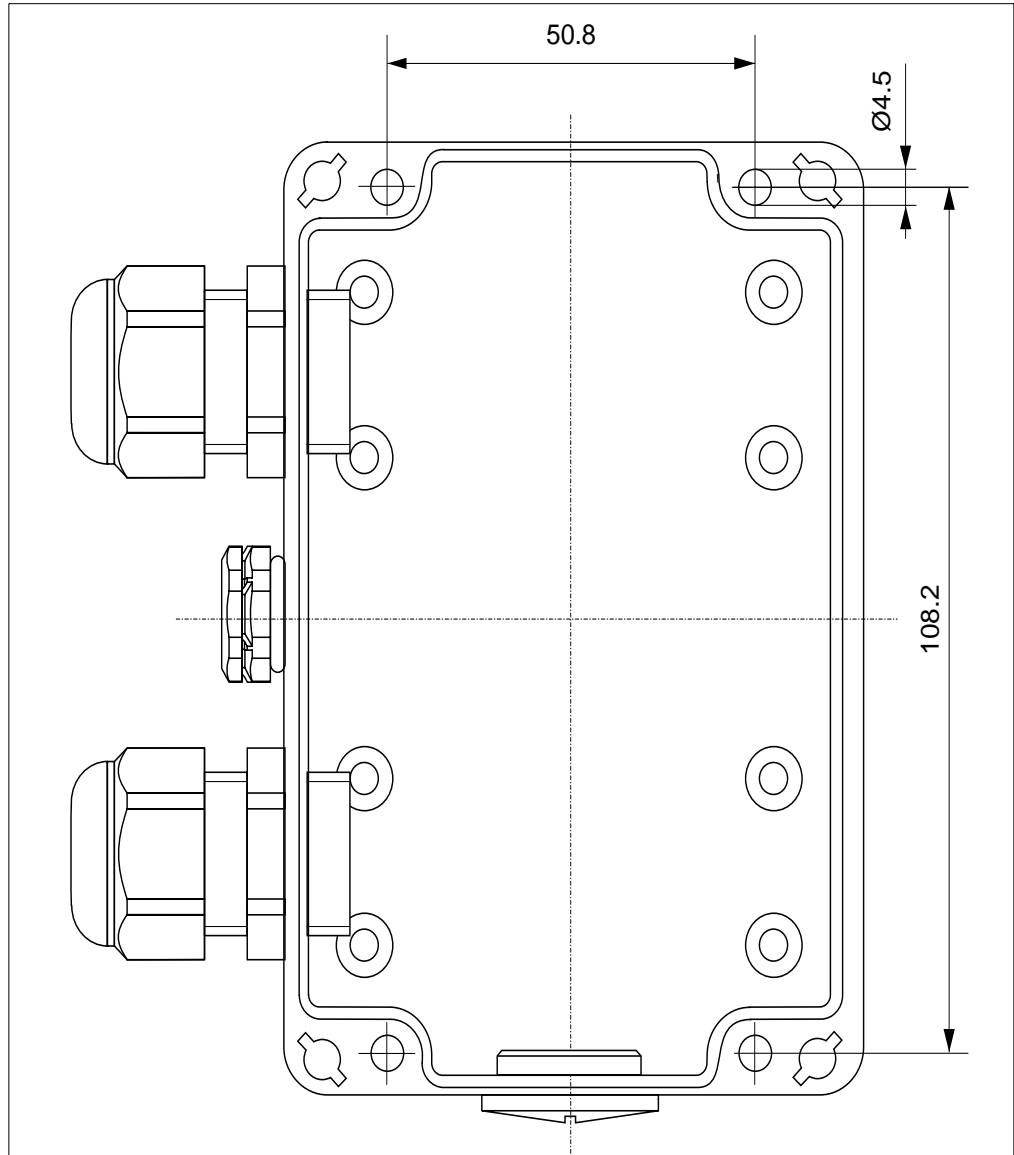
Temperature measurement with Pt 100 (optional)

Pepperl+Fuchs offers an optional 4-wire Pt 100 resistance thermometer for level probe LGC to measure level and temperature simultaneously. The Pt 100 belongs to Accuracy Class B to DIN EN 60751.

Temperature measurement with Pt 100 and temperature transmitter LGC-Z13 (optional)

To convert Pt 100 signals into a 4 mA ... 20 mA signal Pepperl+Fuchs also offers a temperature transmitter for mounting in terminal housing or to convert the PT 100 signals with the measuring transmitter KFDZ-UT-□□.

10.2 Drilling template terminal housing



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Temperature Transmitter LGC-Z1318

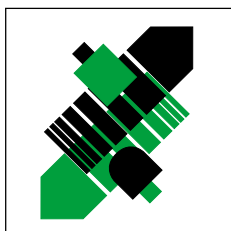
Terminal housing18

Terminals18

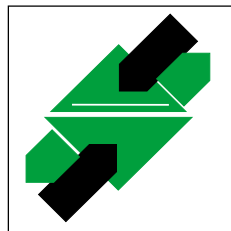
With regard to the supply of products, the current issue of the following document is applicable:
The General Terms of Delivery for Products and Services of the Electrical Industry, as published by
the Central Association of the "Elektrotechnik und Elektroindustrie (ZVEI) e.V.",
including the supplementary clause "Extended reservation of title".

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