

Датчики давления LGC2

Технические характеристики

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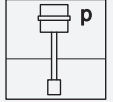
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Level probe LGC2



- Device for hydrostatic pressure measurement in liquids
- High resistance to overload
- High-precision, robust ceramic measuring cell with long-term stability
- Simultaneous level and temperature measuring by optional integrated Pt100 resistance thermometer
- Measuring ranges: 0 bar ... 0.1 bar to 0 bar ... 20 bar
- Electronics comprising 4 mA ... 20 mA output signal and integrated overvoltage protection
- KTW and NSF drinking water approval



Function

The level probe is a hydrostatic pressure sensor for measuring the level. One outstanding feature of these device is its mechanical and electrical durability. The embedded electronics, a heavy-duty conical cable seal and a 2-filter system guarantee a perfect seal resistant to any climatic conditions.

Highly accurate ceramic measuring cell with long-term stability guarantee reliable and secure filling level measurement.

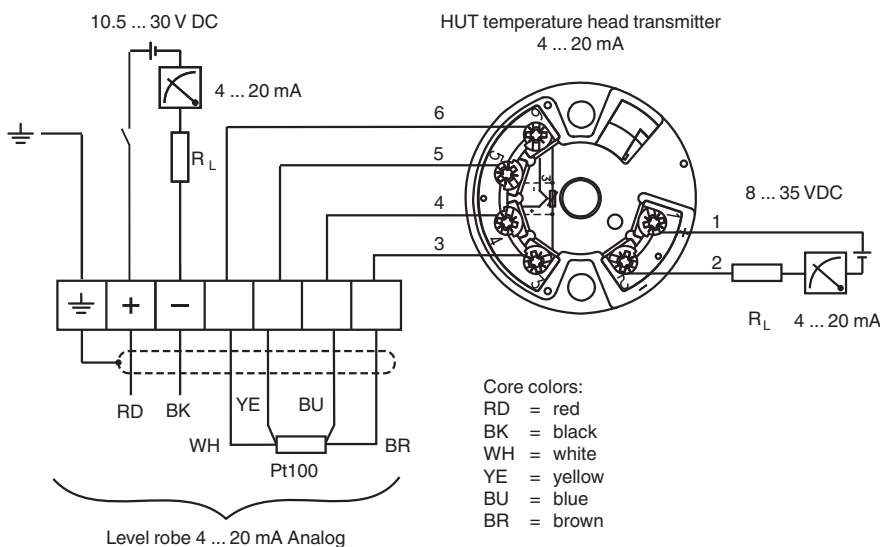
The device is offered in three variants:

- Device with a stainless steel housing, external diameter of 22 mm (0.87 inch): This version is excellently suited to drinking water applications and for use in bore holes and wells with small diameters
- Device with a stainless steel housing, external diameter of 42 mm (1.65 inch): Heavy-duty version and easy to clean thanks to flush-mounted process isolating diaphragm, ideally suited to wastewater and wastewater treatment plants
- Device with plastic insulation, external diameter of 29 mm (1.14 inch): Robust version for use in salt water and excellently suited to applications on ships (e. g. ballast water tanks)

With extensive measurement accessories, like display, power supply and evaluation device, solutions for all typical applications in fresh water and wastewater are guaranteed.

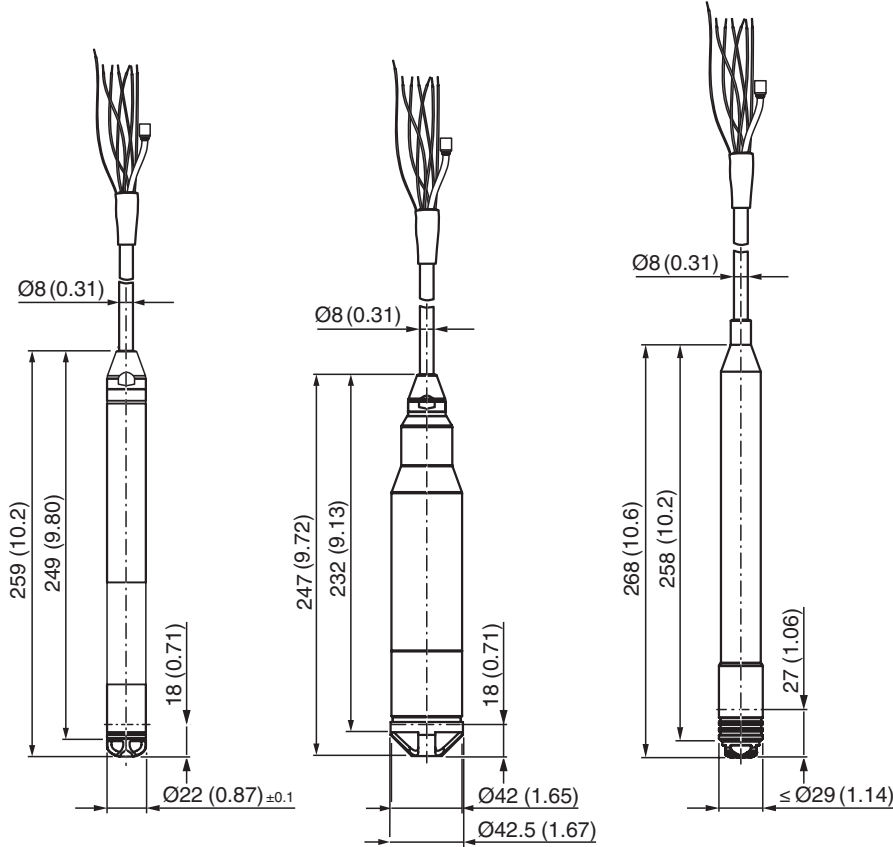
Connection

Example: level probe with Pt100 and HUT temperature head transmitter (4 ... 20 mA)



Other connection types see section electrical connections.

Dimensions



Technical Data

General specifications

Measuring method		Level control with ceramic measuring cell (dry measuring cell). The pressure acts directly on the rugged ceramic membrane of the device 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 compensating tube through the extension cable to the rear of the ceramic membrane and compensated. Pressure-dependent changes in capacitance caused by membrane 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.
Equipment architecture		As standard, the complete measuring system consists of a level probe and a transmitter power supply unit with a supply voltage of 10.5 to 30 V DC.
Construction type		device with rod probe
Series		LGC2
Supply		
Rated voltage	U _r	level probe and Pt100 (optional): - 10.5 ... 35 V DC (non-hazardous area) - 10.5 ... 30 V DC (hazardous area) temperature head transmitter (optional): 8 ... 35 V DC
Current consumption		level probe and Pt100 (optional): max. ≤ 23 mA, min. ≥ 3.6 mA temperature head transmitter (optional): max. ≤ 25 mA, min. ≥ 3.5 mA
Power consumption		level probe and Pt100 (optional): - ≤ 0.805 W at 35 V DC (non-hazardous area) - ≤ 0.690 W at 30 V DC (hazardous area) temperature head transmitter (optional): ≤ 0.875 W at 35 V DC
Reverse polarity protection		Reverse voltage protection is integrated in the level probe and in the temperature head transmitter changing the polarities has no impact on operation.

Technical Data

Residual ripple		level probe and Pt100 (optional): No impact on the 4 to 20 mA signal up to $\pm 5\%$ residual ripple within the permitted voltage range. temperature head transmitter (optional): $U_{ss} \geq 5\text{ V}$ at $U \geq 13\text{ V}$, $f_{max} = 1\text{ kHz}$
Electrical specifications		
Surge protection		level probe and Pt100 (optional): - integrated overvoltage protection acc. to EN 61000-4-5 (500 V symmetrical/1000 V asymmetrical) - overvoltage protection $\geq 1.0\text{ kV}$, external if necessary temperature head transmitter (optional): provide overvoltage protection, externally if necessary
Input		
Input signal		level probe: change in capacitance Pt100 (optional): change in resistance temperature head transmitter (optional): Pt100 resistance signal, 4-wire
Measured variable		level probe: hydrostatic pressure of a liquid Pt100 (optional): temperature temperature head transmitter (optional): temperature
Measurement range		level probe: - predefined pressure measuring ranges in bar, see type code - customer-specific measuring ranges, factory-calibrated Pt100 (optional): temperature measurement from $-10 \dots 70\text{ }^{\circ}\text{C}$ ($+14 \dots +158\text{ }^{\circ}\text{F}$)
Output		
Load		level probe and Pt100 (optional): $R_{Lmax} \leq (U - 10.5\text{ V})/0.023\text{ A} - 2 \times 0.09\text{ }\Omega/\text{m} \times l - R_{add}$ temperature head transmitter (optional): $R_{Lmax} \leq (U - 8\text{ V})/0.025\text{ A} - R_{add}$ - R_{Lmax} = max. load resistance [Ω] - R_{add} = additional resistances such as resistance of evaluating device and/or display instrument, line resistance [Ω] - U = supply voltage [V]
Output signal		level probe: 4 ... 20 mA, 2-wire for hydrostatic pressure measured value Pt100 (optional): temperature-dependent resistance value temperature head transmitter (optional): 4 ... 20 mA Analog for temperature measured value, 2-wire
Signal range		3.8 ... 20.5 mA
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 , EN 61326-2-3:2013
Low voltage		
Directive 2014/35/EU		EN 61010-1:2010
Conformity		
Degree of protection		IEC 60529:2001
Measurement accuracy		
Resolution		current output: 1 μA
Reference operating conditions		level probe and Pt100 (optional): acc. to IEC 60770, T_{amb} = constant in the range: $+21 \dots +33\text{ }^{\circ}\text{C}$ ($+70 \dots +91\text{ }^{\circ}\text{F}$) temperature head transmitter (optional): calibration temperature $23\text{ }^{\circ}\text{C}$ ($+73\text{ }^{\circ}\text{F}$) $\pm 5\text{ K}$
Accuracy		level probe and Pt100 (optional): The reference accuracy comprises the non-linearity after limit point configuration, hysteresis and non-reproducibility in accordance IEC 60770. - standard version $\pm 0.2\%$ - platinum version $\pm 0.1\%$ temperature head transmitter (optional): $\pm 0.2\text{ K}$, with Pt100: max. $\pm 0.9\text{ K}$
Long-term drift		level probe and Pt100 (optional): - $\leq 0.1\%$ of URL/year - $\leq 0.25\%$ of URL/5 years temperature head transmitter (optional): $\leq 0.1\text{ K}$ per year
Influence of medium temperature		thermal change in the zero output and the output span: - $0 \dots +30\text{ }^{\circ}\text{C}$ ($+32 \dots +86\text{ }^{\circ}\text{F}$): $< (0.15 + 0.15 \times \text{TD})\%$ of set span - $-10 \dots +70\text{ }^{\circ}\text{C}$ ($+14 \dots +158\text{ }^{\circ}\text{F}$): $< (0.4 + 0.4 \times \text{TD})\%$ of set span temperature coefficient (T_K) of the zero output and the output span: - $-10 \dots +70\text{ }^{\circ}\text{C}$ ($+14 \dots +158\text{ }^{\circ}\text{F}$): 0.1% /10 K of URL
Warm-up time		level probe: $< 6\text{ s}$ Pt100 (optional): 20 m temperature head transmitter (optional): 4 s
Response time		level probe: 400 ms (T90 time), 500 ms (T99 time) Pt100 (optional): 160 s (T90 time), 300 s (T99 time)
Operating conditions		
Installation conditions		
Installation position		vertical from above

Technical Data

Process conditions		
Medium temperature		level probe and Pt100 (optional): - Ø22 mm and Ø42 mm: -10 ... +70 °C (+14 ... +158 °F) - Ø29 mm: 0 ... +50 °C (+32 ... +122 °F) temperature head transmitter (optional): -40 ... +85 °C (-40 ... +185 °F) (= ambient temperature), install temperature head transmitter outside the medium.
Medium temperature limits		level probe and Pt100 (optional): - Ø22 mm and Ø42 mm: -20 ... +70 °C (-4 ... +158 °F) - Ø29 mm: 0 ... +50 °C (+32 ... +122 °F)
Ambient conditions		
Ambient temperature		level probe and Pt100 (optional): - Ø22 mm and Ø42 mm: -10 ... +70 °C (+14 ... +158 °F) (= medium temperature) - Ø29 mm: 0 ... +50 °C (+32 ... +122 °F) (= medium temperature) temperature head transmitter (optional): -40 ... +85 °C (-40 ... +185 °F)
Storage temperature		level probe and Pt100 (optional): -40 ... +80 °C (-40 ... +176 °F) temperature head transmitter (optional): -40 ... +85 °C (-40 ... +185 °F)
Mechanical specifications		
Degree of protection		level probe and Pt100 (optional): IP68, permanently hermetically sealed, optional terminal box IP66/IP67 temperature head transmitter (optional): IP00, moisture condensation permissible, when mounted in the optional terminal box IP66/IP67
Connection		3 terminals in terminal box (accessory) as standard 4 terminals in terminal block (accessory), conductor cross section 0.08 ... 2.5 mm ²
Material		level probe: 1.4435/316L process ceramic: Al ₂ O ₃ (aluminium oxide ceramic) seal (internal): EPDM or Viton protection cap: POM or PFA terminal box: PC (polycarbonate) temperature head transmitter: housing PC (polycarbonate) probe connection insulation (extension cable): PE-LD (low-density polyethylene) or FEP (fluorinated ethylene propylene) pressure compensation tube: PA
Cable		level probe and Pt100 (optional): - commercially available instrument cable - terminals of the terminal box: 0.08 ... 2.5 mm ² temperature head transmitter (optional): - commercially available instrument cable - terminals of the terminal box: 0.08 ... 2.5 mm ² - transmitter connection: max. 1.75 mm ² probe connection (extension cable): - total outer diameter: 8.0 mm ± 0.25 mm - level probe: 3 x 0.2 mm ² and pressure compensation tube with PTFE filter - Pt100 (optional): 7 x 0.2 mm ² and pressure compensation tube with PTFE filter - pressure compensation tube with PTFE filter: external diameter Ø2.5 mm, internal diameter Ø1.5 mm
Mass		level probe Ø22 mm: 344 g level probe Ø42 mm: 1376 g level probe Ø29 mm: 394 g probe connection (extension cable) PE: 52 g/m probe connection (extension cable) FEP: 108 g/m suspension clamp: 170 g cable mounting screw G1-1/2: 770 g cable mounting screw N1-1/2: 724 g terminal box: 235 g temperature head transmitter: 40 g additional weight: 300 g testing adapter: 39 g
Mechanical load		probe connection (extension cable): - minimum bending radius: 120 mm - tensile strength: max. 950 N - cable extraction force: ≥ 400 N - PE: for use in drinking water - UV-resistant - cable resistance per wire: ≤ 0.09 Ω/m
Dimensions		level probe Ø22 mm: Ø22 x 259 mm level probe Ø42 mm: Ø42 x 247 mm level probe Ø29 mm: Ø29 x 268 mm probe connection (extension cable): Ø8 mm suspension clamp: Ø48 x 175 mm cable mounting screw G1-1/2: Ø55 x 71 mm cable mounting screw N1-1/2: Ø38 x 71 mm terminal box: 55 x 80 x 120 mm temperature head transmitter: Ø44 x 21 mm additional weight: Ø22 x 110 mm testing adapter: 25 x 25 x 33 mm
Data for application in connection with hazardous areas		
EU-type examination certificate		DEKRA 17 ATEX 0101

Technical Data

Marking	Ⓔ II 2G Ex ia IIC T6...T4 Gb
Certificate	PF 17 CERT 1658
Marking	Ⓔ II 3G Ex nA IIC T6...T5 Gc
Directive conformity	
Directive 2014/34/EU	EN 60079-0:2012+A11:2013 , EN 60079-11:2012 EN 60079-15:2010
International approvals	
FM approval	
FM certificate	FM 17 US 0106
Approved for	Class I, Division 1, Groups A - D Class I, Zone 1, AEx ia IIC T6...T4
CSA approval	
CSA certificate	70133438
Approved for	Class I, Division 1, Groups A - D Ex ia IIC Class I, Zone 1, AEx ia IIC
IECEX approval	
IECEX certificate	IECEX DEK 17.0045
IECEX marking	Ex ia IIC T6...T4 Gb
Standards	IEC 60079-0:2011 , IEC 60079-11:2011
Certificates and approvals	
Drinking water approval	KTW certificate and NSF approval
General information	
Supplementary documentation	technical information (TI) manuals, brief instructions (BA, KA) instruction manuals (SI) control drawings (ZD)
Supplementary information	
Accessories	
Designation	- Pt100 resistance thermometer - suspension clamp - cable mounting screw G1-1/2 - cable mounting screw N1-1/2 - terminal box (IP66/IP67) - additional weight - testing adapter - shortening kit for probe connection - HUT temperature head transmitter, 2-wire, 4 ... 20 mA

Type Code

This overview does not mark options which are mutually exclusive.

L	G	C	2	-	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	.	L
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LGC2	Device
LGC2	Level probe

(1)	Reference accuracy
D	Platinum, accuracy 0.1 %
G	Standard, accuracy 0.2 %

(2)	Probe tube
P	Ø29 mm, PPS/Polyolefin, application salt-water
R	Ø42 mm, 1.4435/316L, flush mount
S	Ø22 mm, 1.4435/316L
X	Special version

(3)	Measuring range
R1A	100 mbar/10 kPa/1.5 psi relative, 1 m H2O/3 foot H2O/40 inch H2O
R1C	200 mbar/20 kPa/3 psi relative, 2 m H2O/6 foot H2O/80 inch H2O
R1D	400 mbar/40 kPa/6 psi relative, 4 m H2O/13 foot H2O/160 inch H2O
R1E	600 mbar/60 kPa/9 psi relative, 6 m H2O/20 foot H2O/240 inch H2O
R2A	1 bar/100 kPa/15 psi relative, 10 m H2O/33 foot H2O/400 inch H2O
R2C	2 bar/200 kPa/30 psi relative, 20 m H2O/67 foot H2O/800 inch H2O

Type Code

(3)	Measuring range
R2D	4 bar/400 kPa/60 psi relative, 40 m H ₂ O/133 foot H ₂ O/1600 inch H ₂ O
R3A	10 bar/1 MPa/150 psi relative, 100 m H ₂ O/333 foot H ₂ O/4000 inch H ₂ O
R3C	20 bar/2 MPa/300 psi relative, 200 m H ₂ O/667 foot H ₂ O/8000 inch H ₂ O
A2C	2 bar/200 kPa/30 psi absolute, 20 m H ₂ O/67 foot H ₂ O/800 inch H ₂ O
A2D	4 bar/400 kPa/60 psi absolute, 40 m H ₂ O/133 foot H ₂ O/1600 inch H ₂ O
A3A	10 bar/1 MPa/150 psi absolute, 100 m H ₂ O/333 foot H ₂ O/4000 inch H ₂ O
A5A	20 bar/2 MPa/300 psi absolute, 200 m H ₂ O/667 foot H ₂ O/8000 inch H ₂ O
XXX	Special version

(4)	Electrical output
I2	2-wire, 4 mA to 20 mA

(5)	Seal
1	Measurement cell sealing: FKM Viton
2	Measurement cell sealing: EPDM

(6)	Probe connection, extension cable
2A	10 m cable, shortable, PE
2C	20 m cable, shortable, PE
2M	30 foot cable, shortable, PE
2N	60 foot cable, shortable, PE
3A	10 m cable, shortable, FEP
3C	20 m cable, shortable, FEP
3M	30 foot cable, shortable, FEP
3N	60 foot cable, shortable, FEP
CF	Specification in foot cable, shortable, FEP
CM	Specification in m cable, shortable, FEP
XF	Specification in foot cable, shortable, PE
XM	Specification in m cable, shortable, PE
XX	Special version

(7)	Calibration, unit
A	Sensor range, %
B	Sensor range, mbar/bar
C	Sensor range, kPa/MPa
D	Sensor range, mm H ₂ O/m H ₂ O
E	Sensor range, inch H ₂ O/foot H ₂ O
F	Sensor range, psi
J	Customized pressure
X	Special version

(8)	Approval
C1	CSA C/US IS Cl. I Div. 1 Group A-D, Ex ia, Zone 1
CG	CSA C/US General Purpose
E3	ATEX II 3G Ex nA IIC T6...T4 Gc
EX	ATEX II 2G Ex ia IIC T6...T4 Gb
F1	FM IS Cl. I Div. 1 Group A-D, AEx ia, Zone 1
IC	IEC Ex ia IIC T6...T4 Gb
NA	Version for non-explosion-hazardous area

(9)	Additional approval
NA	Without potable water approval
QL	KTW potable water approval
RL	NSF potable water approval

L	Probe connection length
Length	- Options CF, XF: 3 to 985 foot - Options CM, XM: 1 to 300 m

Additional Options

(10)	Calibration
1F	Factory calibration certificate, 5-point

(10)	Service
RI	Cable marking > installation, specification in m: 2 to 299 m
SI	Cable marking > installation, specification in foot: 6 to 982 foot
XX	Special version

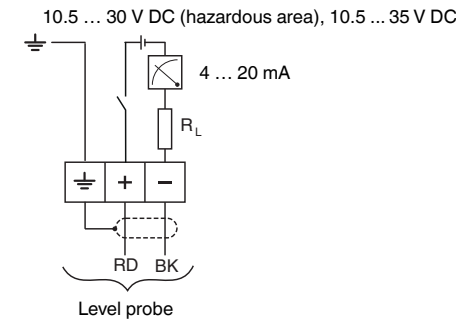
Type Code

(10)	Accessories
BN	Pt100 resistance thermometer, 4-wire
OP	Suspension clamp, 316L
QP	Cable mounting screw G1-1/2, 304
RP	Cable mounting screw NPT1-1/2, 304
SP	Terminal box, IP66/67
UP	Additional weight, 316L
VP	Adapter, function test
WP	Shortening kit for probe connection
XP	Temperature head transmitter HUT, 2-wire, 4 to 20 mA
X9	Special versiong

(10)	Marking
1Z	Tagging (TAG), see additional specification

Connection

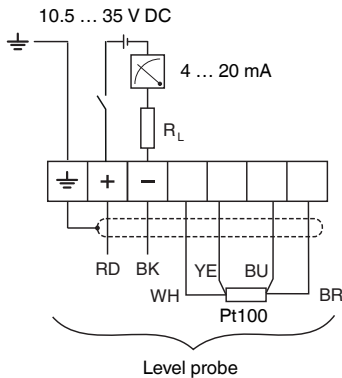
Level probe, standard



Core colors
RD = red

Level probe with Pt100

Pt100 resistance thermometer: product structure, feature "Accessories", option "BN".

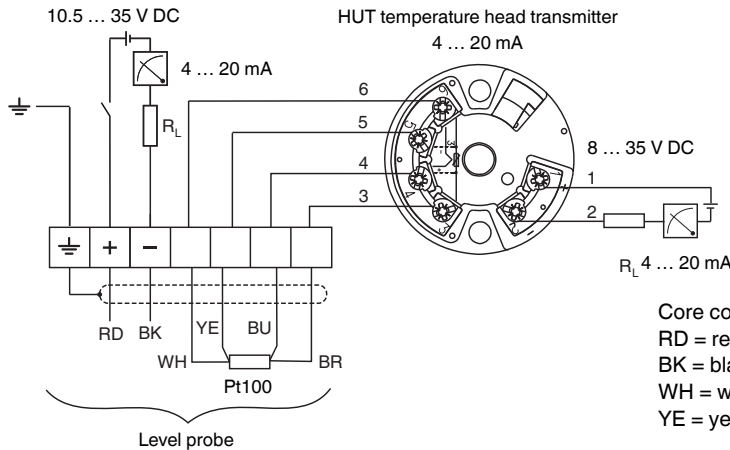


Core colors:
RD = red
BK = black
WH = white
YE = yellow

Level probe with Pt100 and HUT temperature head transmitter (4 mA ... 20 mA)

Pt100 resistance thermometer: product structure, feature "Accessories", option "BN".

HUT temperature head transmitter: product structure, feature "Accessories", option "XP"



Core colors:
RD = red
BK = black
WH = white
YE = yellow

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