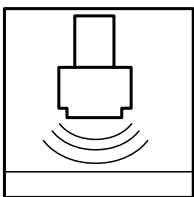


Ultrasonic level sensor



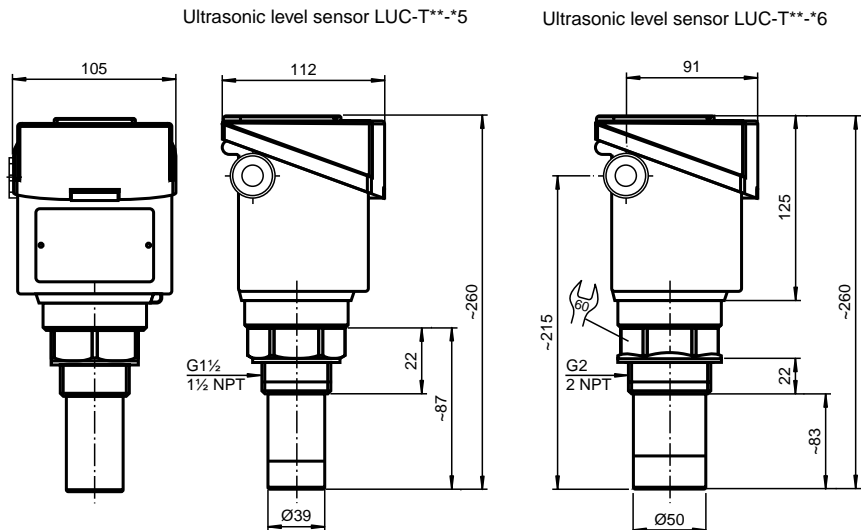
LUC-T



Features

- Optimised for the process:
Can be mounted with thread from G1½ or 1½ NPT or with DN 100 or 4"
- Rotatable housing:
Status information even if the housing cover is closed - LED can be seen from outside
- Intelligent operation and evaluation:
simple local push button operation, with optional plug-in display, HART protocol for remote operation, digital communication with PROFIBUS PA
- Integrated temperature compensation
- First echo detection
- Linearising function
- Active fixed target suppression

Dimensions



Function

The ultrasonic sensor LUC is a compact ultrasonic measurement instrument for continuous non-contact level measurement in liquids and in coarse-grained or pelleted solids. The LUC series consists of three sensors, which can be equipped with one of several electronic inserts, with graduated measuring ranges from 0.25 m (9.8 inches) upwards.

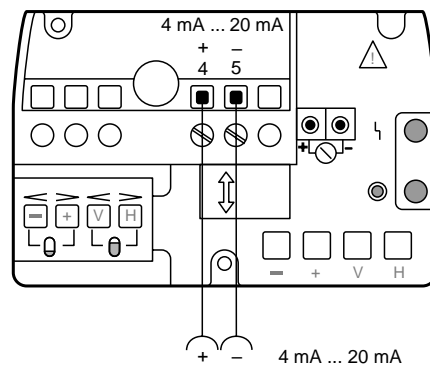
- LUC-T**-*5: in coarse-grained solids (grain size from 4 mm (0.16 inch)) up to 2 m (6.6 ft), in liquids up to 5 m (16.5 ft) (2-wire devices up to 4 m (13.2 ft))
- LUC-T**-*6: in coarse-grained solids (grain size from 4 mm (0.16 inch)) up to 3.5 m (11.5 ft), in liquids up to 8 m (26.4 ft) (2-wire device up to 7 m (23 ft))
- LUC-T30: in coarse-grained solids (grain size from 4 mm (0.16 inch)) up to 7 m (23 ft), in liquids up to 15 m (49 ft)

All sensors are equipped with an integrated temperature probe for ultrasonic time-of-flight compensation.

Electrical connection

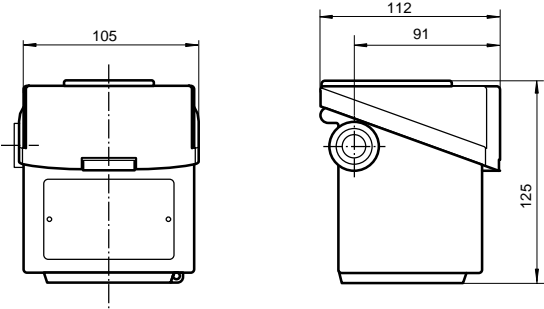
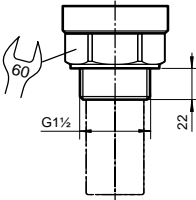
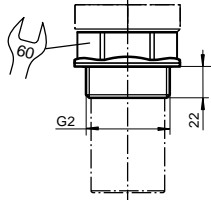
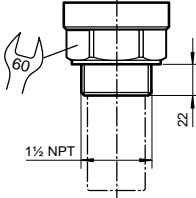
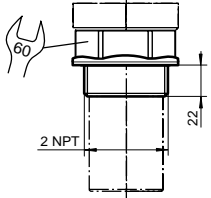
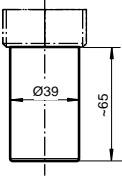
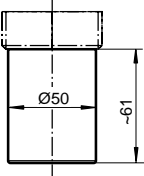
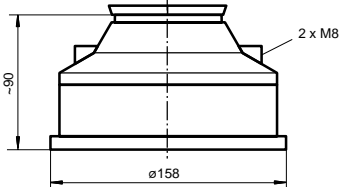
Example: connection type I2 (2-wire connection "loop powered" for ultrasonic level sensor LUC-T10, LUC-T20)

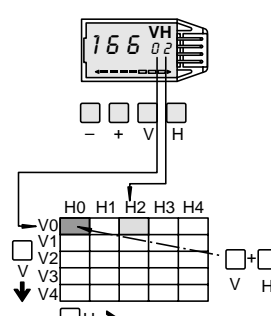
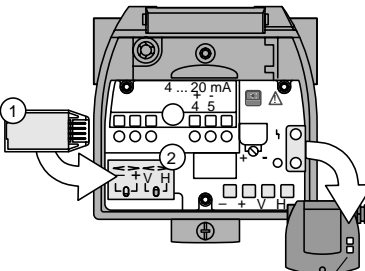
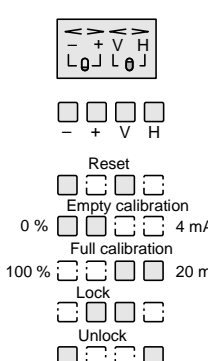






Other connection types see section electrical connections.



	LUC-T
Application	
Function principle	non-contact continuous level measuring in liquids and coarse-grained solids
Function and system design	
Measuring principle	ultrasonic depth sounder, measuring of elapsed time The compact LUC-T ultrasonic sensor is a complete measuring point within itself, the simplest version allows access to all functions required for basic operation. Calibration can be carried out using the four push buttons on the device. With a plug-in display, the complete Pepperl+Fuchs user matrix can be accessed. The basic functionality may be enhanced by other optional operating possibilities or integration into a process control system.
Input characteristics	
Measured variable	level, obtaining from a distance between the ultrasonic and bulk surface
Measuring range	LUC-T**-*5: 0.25 ... 4 m, for 4-wire 0.25 ... 5 m (0.8 ... 16.5 ft) LUC-T**-*6: 0.4 ... 7 m, for 4-wire 0.4 ... 8 m (1.3 ... 26.4 ft) LUC-T30: 0.6 ... 15 m (2 ... 49 ft)
Blocking distance	LUC-T**-*5: 0.25 m (9.8 inches) LUC-T**-*6: 0.4 m (15.7 inches) LUC-T30: 0.6 m (23.6 inches)
Measuring conditions	frequency: LUC-T**-*5: approx. 70 kHz LUC-T**-*6: approx. 50 kHz LUC-T30: approx. 35 kHz pulse frequency: 0.5 ... 3 Hz, depending on sensor and electronics
Output characteristics	
Output signal	4 ... 20 mA, 8 mA/16 mA or 4 mA/20 mA selectable digital current output, output span 16 mA for analogue signal, for output *H additional digital communication signal (HART)
Signal on alarm	4 ... 20 mA or 4/20 mA: selectable -10 % ≤ 2.4 mA (with 4-wire only), +110 % ≥ 21.6 mA or "hold" last valid current value will be held 8 mA/16 mA: selectable -10 % = 7.2 mA, +110 % = 16.8 mA or "hold" Output PA: selectable -9999, +9999 or HOLD (hold last value)
Switching time	2-wire connection: approx. 5 s 4-wire connection: approx. 1 s
Power up response	when switching on the power supply the output assumes the alarm signal after max. 2 s it assumes the correct switching mode
Auxiliary energy	
Supply voltage	output I2/IH: 12 ... 36 V DC; Ex version: 12 ... 30 V DC output DC/DH: 18 ... 36 V DC output AC/AH: 180 ... 250 V AC output UC/UH: 90 ... 127 V AC output PA: 9 ... 30 V DC
Cable connector	screened commercial 2- or 4-wire cable for signal transmission and power, depending on electrical output under certain circumstances, the digital communication signal may be affected if unshielded cable is used
Power consumption	output DC/DH: < 2.5 W output AC/AH/UC/UH: < 4 VA
Current consumption	LUC-T20: 12 mA ± 1 mA, LUC-T30: 16 mA ± 1 mA
Performance characteristics	
Reference operating conditions	ideal reflection from calm, flat surface at 20 °C (293 K)
Maximum measured error	0.25 % for max. measuring span
Hysteresis	2-wire connection: 3 mm (0.12 inch) 4-wire connection: 2 mm (0.08 inch)
Operating conditions	
Mounting conditions	
Mounting position	at right angles to the product surface
Ambient conditions	
Ambient temperature	-20 ... +60 °C (253 ... 333 K) (only for electronics)
Storage temperature	-40 ... +80 °C (233 ... 353 K)
Climatic class	type of protection in acc. with IEC 68, part 2-30 Db
Protection class	DIN EN 60529, IP67
Vibration resistance	in acc. with IEC 68, part 2-6, tab. 2.C (10 ... 55 Hz)
Explosion protection	LUC-T10 (2-wire connection Ex): EEx ia IIC T6, zone 1 (PTB in Germany only) LUC-T20 (2-wire connection not Ex and 4-wire connection): without LUC-T30 (4-wire connection): Dust Ex, zone 20 (BVS Germany only)
Process conditions	
Process temperature	-40 ... +80 °C (233 ... 353 K) (built-in temperature probe)
Process pressure	LUC-T10, LUC-T20: 0.7 ... 3 bar absolute pressure LUC-T30 with slip-on flange or mounting bracket: 0.7 ... 2.5 bar absolute pressure

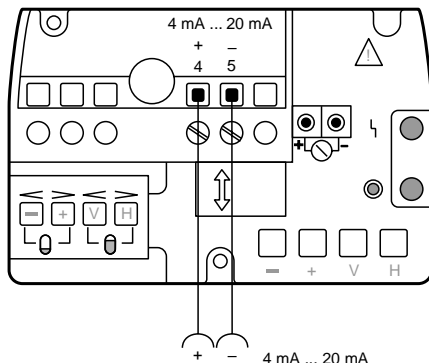
Date of issue 09/26/03

<p>Mechanical construction</p> <p>Design</p> <p>Dimensions</p>	<p>LUC-T</p> <p>compact version versions with threaded connection can be installed with 60 AF box spanner, max. torque 15 ... 20 Nm</p> <p>housing: width 105 mm (4.1 inches), depth 112 mm (4.4 inches), height 125 mm (4.9 inches)</p> <p>C, P, Q, M</p> 
	<p>process connection: *5: AF 60, height 22 mm (0.87 inch), *6: AF 60, height 22 mm (0.87 inch) FA: flange DN 100 or 4"</p> <p>G5  G6 </p> <p>N5  N6 </p>
<p>Weight</p>	<p>sensor: diameter max. 158 mm (6.2 inches), height max. 215 mm (8.5 inches)</p> <p>LUC-T**-*5  LUC-T**-*6  LUC-T30 </p> <p>LUC-T10-*5: 1500 g LUC-T10-*6: 1600 g LUC-T20-*5: 2200 g LUC-T20-*6: 2300 g LUC-T30: 2600 g</p>
<p>Material</p>	<p>housing: PBT-FR glass fibre-reinforced, flame resistant process connections *5, *6: PVDF, process connection FA: UP (unsaturated polyester) sensor: steel VA seals: EPDM</p>

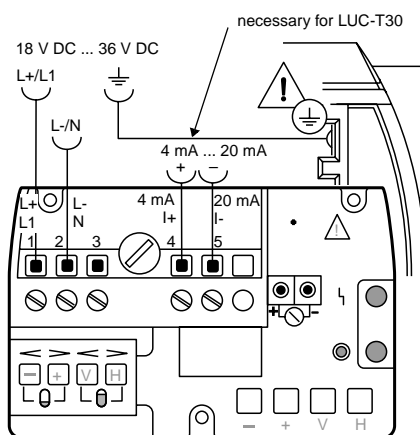
<p>Indication and operation</p> <p>Overview indication and operation</p>	<p>LUC-T</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>① Matrix operation with pluggable display LUC-Z10</p>  </div> <div style="width: 30%; text-align: center;"> <p>OR</p>  <p>Status indication and operating display also with housing cover closed</p> </div> <div style="width: 30%;"> <p>② Calibration without display</p>  </div> </div>		
<p>Display elements</p>	<p>4-character display of the values, with segment display for current, dimension L x B x H: 40 x 20 x 10 mm (1.6 x 0.8 x 0.4 inches) red LED indicates alarm or warning green LED indicates power on (with 4-wire versions only) and entry acknowledgement</p>		
<p>Operating elements</p>	<p>matrix operation across keypad, plug-in display, HART modem, handheld terminal or PROFIBUS PA</p>		
<p>Certificates and approvals</p>			
<p>Ex approval</p>	<p>see type code</p>		
<p>Type of protection</p>	<p>see type code</p>		
<p>General information</p>			
<p>Directive conformity</p>			
<p>Directive 89/336/EC (EMC)</p>	<p>emitted interference to EN 61326, class B equipment interference immunity to EN 61326, annex A (industrial sector) and NAMUR EMC recommendation (NE 21)</p>		
<p>Directive 94/9/EC (ATEX)</p>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> <p>approval</p> <p>PTB 01 ATEX 2160,  II 2 G EEx ia IIC T5/T6 (LUC-T10)</p> <p>DMT 01 ATEX E121,  II 1/3 D IP67 T108°C (LUC-T30)</p> </td> <td style="width: 50%; vertical-align: top;"> <p>standards</p> <p>EN 61326, EN 61010-1, EN 50014, EN 50020, EN 50081-1, EN 50081-2</p> <p>EN 61326, EN 61010-1, EN 50281-1-1</p> </td> </tr> </table>	<p>approval</p> <p>PTB 01 ATEX 2160,  II 2 G EEx ia IIC T5/T6 (LUC-T10)</p> <p>DMT 01 ATEX E121,  II 1/3 D IP67 T108°C (LUC-T30)</p>	<p>standards</p> <p>EN 61326, EN 61010-1, EN 50014, EN 50020, EN 50081-1, EN 50081-2</p> <p>EN 61326, EN 61010-1, EN 50281-1-1</p>
<p>approval</p> <p>PTB 01 ATEX 2160,  II 2 G EEx ia IIC T5/T6 (LUC-T10)</p> <p>DMT 01 ATEX E121,  II 1/3 D IP67 T108°C (LUC-T30)</p>	<p>standards</p> <p>EN 61326, EN 61010-1, EN 50014, EN 50020, EN 50081-1, EN 50081-2</p> <p>EN 61326, EN 61010-1, EN 50281-1-1</p>		
<p>Directive 73/23/EC (Low Voltage Directive)</p>	<p>EN 61010-1</p>		
<p>Supplementary information</p>	<p>EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com.</p>		
<p>Accessories</p>			
<p>Designation</p>	<ul style="list-style-type: none"> • LUC-Z10, plug-in LCD display • LUC-Z11, protective cover for electronics housing • LUC-Z12, mounting bracket for LUC-T30 installation • LUC-Z13, mounting angle for G5 installation • LUC-Z14, mounting angle for G6 installation • LUC-Z-F, cylindrical flange connection for G5, G6 • LUC-Z-A, conical flange connection for N5, N6 • LUC-Z-*, slip-on flange for LUC-T30 		

Electrical connection

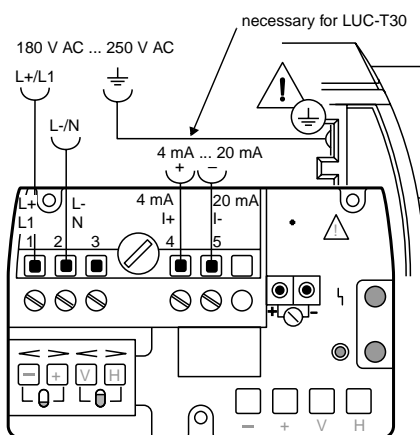
- connection I2: 2-wire connection "loop powered" for ultrasonic sensor LUC-T10, LUC-T20
connection IH: 2-wire connection "loop powered" for ultrasonic sensor LUC-T10, LUC-T20
communication via HART modem



- connection DC: 4-wire DC connection for ultrasonic sensor LUC-T20, LUC-T30
connection DH: 4-wire DC connection for ultrasonic sensor LUC-T20, LUC-T30
communication via HART modem

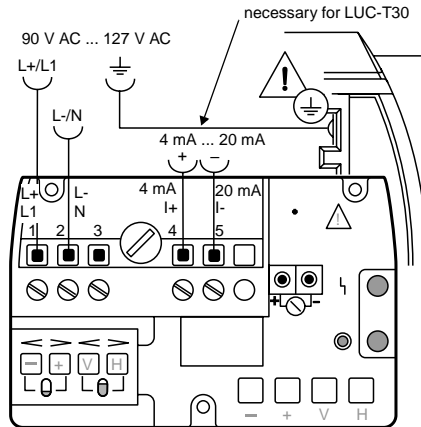


- connection AC: 4-wire AC connection for ultrasonic sensor LUC-T20, LUC-T30
connection AH: 4-wire AC connection for ultrasonic sensor LUC-T20, LUC-T30
communication via HART modem

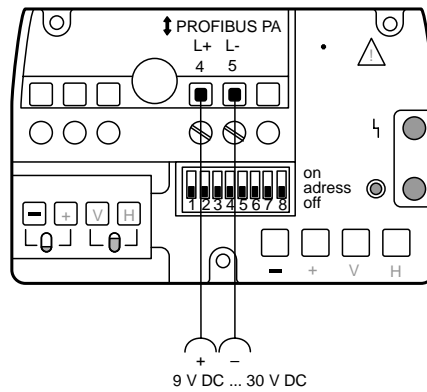


Electrical connection

- connection UC: 4-wire AC connection for ultrasonic sensor LUC-T20, LUC-T30
- connection UH: 4-wire AC connection for ultrasonic sensor LUC-T20, LUC-T30
- communication via HART modem



- connection PA: 2-wire DC connection for ultrasonic sensor LUC-T**
- communication PROFIBUS PA



Each device receives a unique bus address.


$$(2) + (8) = 10$$



on: Software address
off: Hardware address

Type code/model number


LUC-T 1 0 - - - - -

- Certificates**
 - EX**  ATEX II 2 G, EEx ia IIC T6
 - FM** FM, IS, Cl. I, II, III, Div. 1, Gr. A - G
 - CS** CSA, IS, Cl. I, II, III, Div. 1, Gr. A - G
- Display**
 - B** no display selected
 - D** display: 4 character LCD
- Electrical output**
 - I2** 2 wire, 4 mA ... 20 mA
 - IH** 2 wire, 4 mA ... 20 mA, HART
 - PA** PROFIBUS PA
- Housing, cable gland**
 - C** polyester housing, NEMA 6, ½ NPT
 - P** polyester housing, M20 x 1.5
 - Q** polyester housing, G¾A
 - M** polyester housing, M12 PROFIBUS plug
- Process connection**
 - G5** G1½ thread (range 4 m (13.2 ft))
 - G6** G2 thread (range 7 m (23 ft))
 - N5** 1½ NPT thread (range 4 m (13.2 ft))
 - N6** 2 NPT thread (range 7 m (23 ft))

LUC-T 2 0 - - - - -

- Certificates**
 - NA** version for non-explosion hazardous areas
 - CG** CSA General Purpose
- Display**
 - B** no display selected
 - D** display: 4 character LCD
- Electrical output**
 - I2** 2 wire, 4 mA ... 20 mA (max. range 4 m (13.2 ft) or 7 m (23 ft))
 - IH** 2 wire, 4 mA ... 20 mA, HART (max. range 4 m (13.2 ft) or 7 m (23 ft))
 - DC** 4-wire, 24 V DC, 4 mA ... 20 mA
 - DH** 4-wire, 24 V DC, 4 mA ... 20 mA/HART
 - AC** 4-wire, 230 V AC, 4 mA ... 20 mA
 - AH** 4-wire, 230 V AC, 4 mA ... 20 mA/HART
 - UC** 4-wire, 115 V AC, 4 mA ... 20 mA
 - UH** 4-wire, 115 V DC, 4 mA ... 20 mA/HART
 - PA** PROFIBUS PA
- Housing, cable gland**
 - C** polyester housing, NEMA 6, ½ NPT
 - P** polyester housing, M20 x 1.5
 - Q** polyester housing, G¾A
 - M** polyester housing, M12 PROFIBUS plug
- Process connection**
 - G5** G1½ thread (range 5 m (16.5 ft))
 - G6** G2 thread (range 8 m (26.4 ft))
 - N5** 1½ NPT thread (range 5 m (16.5 ft))
 - N6** 2 NPT thread (range 8 m (26.4 ft))

LUC-T 3 0 - F A - - - - -

- Certificates**
 - NA** version for non-explosion hazardous areas
 - SX**  ATEX II 1/3 D, BVS/DMT (St-Ex), zone 10
 - F1** FM, Cl. II, Div. 1, Group E, F, G
 - C1** CSA, Cl. II, Div. 1, Group E, F, G
 - CG** CSA General Purpose
- Display**
 - B** no display selected
 - D** display: 4 character LCD
- Electrical output**
 - DC** 4-wire, 24 V DC, 4 mA ... 20 mA
 - DH** 4-wire, 24 V DC, 4 mA ... 20 mA/HART
 - AC** 4-wire, 230 V AC, 4 mA ... 20 mA
 - AH** 4-wire, 230 V AC, 4 mA ... 20 mA/HART
 - UC** 4-wire, 115 V AC, 4 mA ... 20 mA
 - UH** 4-wire, 115 V DC, 4 mA ... 20 mA/HART
 - PA** PROFIBUS PA
- Housing, cable gland**
 - C** polyester housing, NEMA 6, ½ NPT
 - P** polyester housing, M20 x 1.5
 - Q** polyester housing, G¾A
 - M** polyester housing, M12 PROFIBUS plug
- Process connection**
 - FA** flange DN 100 or 4"