

## Product Information L3

## FOOD

# Pressure, Level and Volume Sensor L3



## Range of applications

- Hydrostatic level measurement in dynamic temperature environments
- Pressure measurement in pipes and vessels up to 110 °C (230 °F)
- Hydrostatic level, volume and mass measurement in inventory silo's

## Application examples

- Hygienic pressure and level monitoring for brewing, dairy, and food and beverage processing

## Hygienic design/Process connection

- Use of Negele weld-in sleeve EMZ-352 or build-in system EHG-.../1" results in a hygienic installation situation that is free of gaps and dead space and is easy to sterilize.
- Conforming to 3-A Sanitary Standard 74-06 with DIRECTadapt
- EHEDG compliant hygienic design with CLEANadapt process connection
- CIP-/SIP-cleaning up to 130 °C (266 °F) for 60 minutes max.
- All materials in contact with the product have FDA approval
- Sensor completely made of stainless steel
- Further process connections available through CLEANadapt

## Features

- Intuitive user interface makes set-up and configuration easy
- Field repairable and reconfigurable through modular design
- State of the art temperature compensation allows temperature resistant pressure, level and volume measurement
- On board interface or HART protocol allows reconfiguration including 10:1 turndown and the units
- Optional displaying volume and mass values directly
- Predefined and customer specific tank tables as well as product informations adjustable
- Patented dual o-ring seals provide IP69K ingress protection
- Standard HART 7.0 communication and graphical LC display
- Wide range of measurement ranges

## Options/Accessories

- Optional remote kit provides a separate version of the sensor and display
- Optional M12 molded cordset available

## Measuring principle of the pressure sensor

This unit utilizes an internal piezoelectric transducer and an RTD temperature element to measure the pressure and temperature of the internal actuating fluid. The mV signal of the transducer and resistance of the RTD are measured and converted to a compensated pressure value by way of the signal acquisition board in the stem. This signal is digitally communicated to the head where the signal is converted to industry standard 4...20 mA and HART 7.0 signals.

For relative sensors the back of the diaphragm is vented and the output is relative to the atmospheric conditions.

## Authorizations



## Pressure, level and volume sensor L3



## L3 Remote version



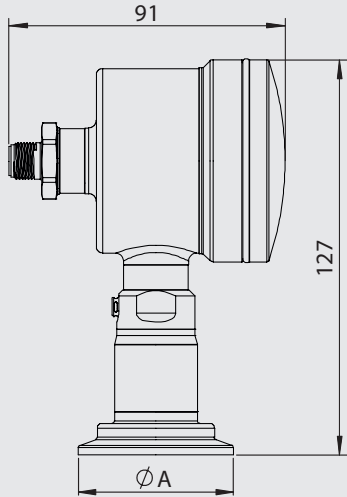
Specification		
<b>Measuring range [bar]</b> <b>Measuring range [psi]</b>	Relative Relative	0...0.4; -1...2; -1...7; -1...35 0...6; 30 "Hg/0/30; 30 "Hg/0/100; 30 "Hg/0/500
<b>Turndown</b>	max. 10:1	of upper range limit (see also measurement accuracy)
<b>Overpressure strength</b>	Factor	1.5 x nominal pressure of measuring element
<b>Measurement accuracy</b>	Turndown to 5:1 Turndown over 5:1 Repeatability Long-term stability	≤ 0.10 % in calibrated measuring range ≤ 0.15 % in calibrated measuring range 0.05 % 0.2 % URL every 2 years
<b>Temperature effect</b>	Process Ambient	< 0.016 % of calibrated measuring range / 5.5 °C (10 °F) < 0.016 % of calibrated measuring range / 5.5 °C (10 °F)
<b>Temperature range</b>	Process CIP-/SIP-cleaning Ambient	-18...110 °C (0...230 °F), at $t_{\text{ambient}} \leq 71 \text{ °C (160 °F)}$ 130 °C (266 °F) / 60 minutes max., at $t_{\text{ambient}} \leq 60 \text{ °C (140 °F)}$ 0...71 °C (32...160 °F)
<b>Response time</b>		< 0.1 seconds
<b>Sample rate</b>		< 0.05 seconds
<b>Materials</b>	Connection head Metal cover Plastic cover Threaded connector Wetted parts Diaphragm Diaphragm seal/oil filling	Stainless steel, AISI 304 (1.4301), $R_a \leq 0.8 \text{ }\mu\text{m (32 microinch)}$ Stainless steel, AISI 304 (1.4301), $R_a \leq 0.8 \text{ }\mu\text{m (32 microinch)}$ Polycarbonate Stainless steel, AISI 304 (1.4301), $R_a \leq 0.8 \text{ }\mu\text{m (32 microinch)}$ Stainless steel, AISI 316L, $R_a \leq 0.64 \text{ }\mu\text{m (25 microinch)}$ Stainless steel, AISI 316L, $R_a \leq 0.64 \text{ }\mu\text{m (25 microinch)}$ Medical white oil / mineral oil / paraffin oil FDA approval number 21CFR172.878, 21CFR178.3620, 21CFR573.680 Neobee M20 (optional)
<b>Process connection</b>	not 3-A compliant  3-A compliant	Flexibel thread G1", hygienic CLEANadapt Fixed thread G1", hygienic CLEANadapt Dairy flange DIN 11851 DN40 Dairy flange DIN 11851 DN50 DRD flange 65 mm 38 mm SMS Liner 51 mm SMS Liner Tri-Clamp® 1½" Tri-Clamp® 2" CPM Fitting Endress & Hauser Universal Adaptor - Short Endress & Hauser Universal Adaptor - Long
<b>Electric connection</b>	Cable gland Plug-in connection	M16x1.5 M12 plug, 5-pin, 1.4305
<b>Protection class</b>		IP 67 (with cable gland) / NEMA 4X IP 69 K (with plug-in connection)
<b>Auxiliary voltage</b>		18...36 V DC
<b>Output</b>	Current loop	analog 4...20 mA and HART 7.0
<b>Tightening torque</b>	For assembly all L3 components	27 Nm (20 ft-lbs)
<b>Weight</b>		approx. 780 g

#### Conventional usage

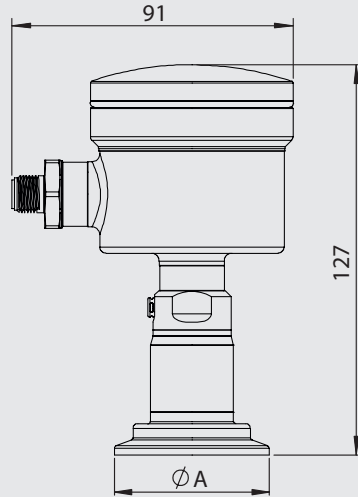
- Not suitable for applications in explosive areas.
- Not suitable for applications in security-relevant equipment (SIL).



L3 / Tri-Clamp with horizontal enclosure



L3 / Tri-Clamp with vertical enclosure



Tri-Clamp size

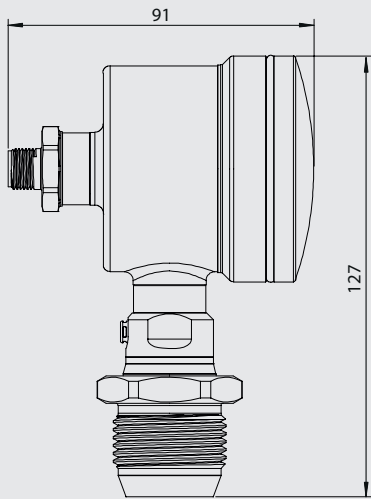
Type	Ø A
004	50,5 mm
005	64,0 mm

Information

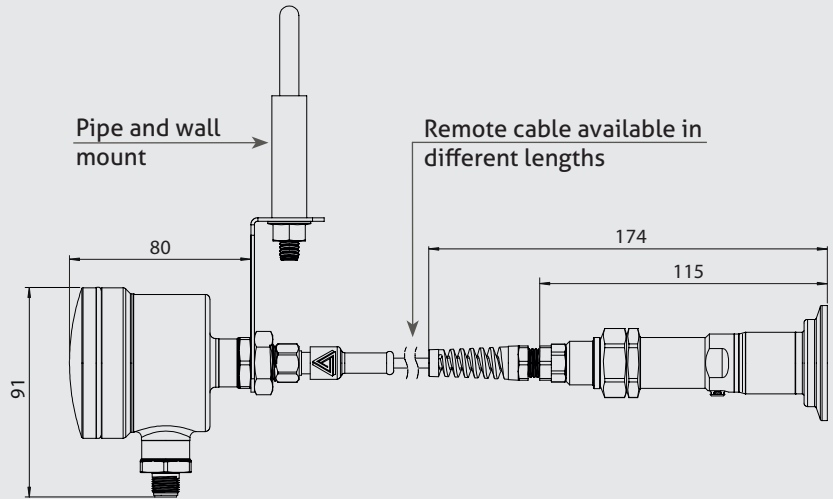


The remote kit, including all parts for separate mounting, can be ordered as accessory.

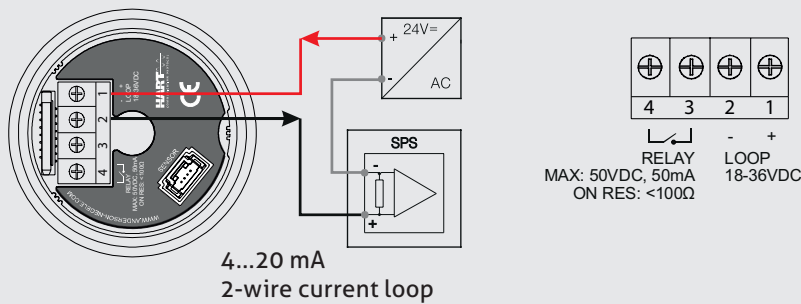
L3 / G1" Compact version



L3 Remote version

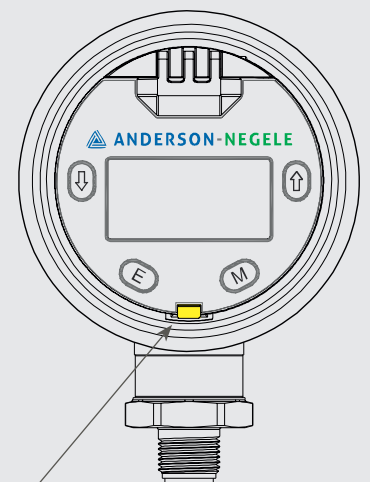


Electrical connection with cable gland



4...20 mA  
2-wire current loop

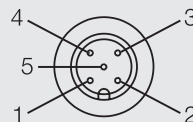
L3 with open cap



Pull up the clip to open the display.

Electrical connection with M12 plug

1: red	+ supply
2: black	- supply 4...20 mA
3: green	relay normally open
4: blue	relay normally open
5:	n. c.



## Order code of fully assembled sensor

L3A (Modular pressure sensor)

S (Stem)

## Measurement range

- 5 (0...6 psi; 0...0.4 bar)
- 6 (30 "Hg/0/30 psi; -1...2 bar)
- 7 (30 "Hg/0/100 psi; -1...7 bar)
- 8 (30 "Hg/0/500 psi; -1...35 bar)

## Process Connection/Fitting without 3-A TPV

- 160 (Flexibel thread G1", hygienic CLEANadapt)
- 182 (Fixed thread G1", hygienic CLEANadapt)
- 115 (Dairy flange DIN 11851 DN40)
- 124 (Dairy flange DIN 11851 DN50)
- 189 (DRD flange 65 mm)
- 109 (38 mm SMS Liner)
- 110 (51 mm SMS Liner)

Process Connection/Fitting with 3-A TPV  
acc. to standard 74-06

- 004 (Tri-Clamp 1½")
- 005 (Tri-Clamp 2")
- 123 (CPM Fitting)
- 154 (Endress & Hauser Universal Adaptor - Short)
- 155 (Endress & Hauser Universal Adaptor - Long)

## Capillary Fill

- 1 (Mineral oil / FDA approved)
- 5 (Neobee / FDA approved)

## Sensor Type

- O (Compact version)
- A (Remote with 1.5 m (= 5') cable)
- B (Remote with 3 m (= 10') cable)
- C (Remote with 4.5 m (= 15') cable)
- D (Remote with 6 m (= 20') cable)
- E (Remote with 7.5 m (= 25') cable)

E (Enclosure)

## Cap

- 2 (Clear plastic)
- 3 (Stainless steel without control window)

## Enclosure orientation

- 1 (Vertical)
- 2 (Horizontal)

## Electrical connection

- A (M12 plug)
- C (Cable gland M16x1,5)

## Engineering units

- B (bar)
- L (mbar)
- P (psi)

## Calibration range

- XXX (Preset acc. to table on next page)
- 999 (Factory setting acc. to custom calibration)
- 000 (Full measurement range acc. to stem)

## Certificate

- X (No certificate)
- Z (3.1 inspection certificate)

L3A S 5 004 1 0 E 2 1 A P 025 X

Calibration range Bar		
Code	Range	Span range of stem
251	(-1...1)	6, 7
286	(-1...2.5)	7
217	(-1...3)	7
056	(-1...4)	7, 8
304	(-1...7)	7, 8
501	(0...1.2)	6, 7
428	(0...1.5)	6, 7
057	(0...2)	6, 7
235	(0...3)	7
192	(0...4)	7, 8
060	(0...6)	7, 8
309	(0...7)	7, 8
061	(0...10)	8
502	(0...18)	8
065	(0...20)	8
066	(0...30)	8
224	(0...35)	8

Calibration range mBar		
Code	Range	Span range of stem
224	(0...35)	5
067	(0...40)	5
068	(0...50)	5
069	(0...60)	5
206	(0...70)	5
071	(0...100)	5
294	(0...140)	5
073	(0...150)	5
074	(0...160)	5
075	(0...200)	5, 6
077	(0...300)	5, 6
078	(0...350)	5
079	(0...400)	5, 6
503	(0...415)	6
504	(0...480)	6
081	(0...500)	6
505	(0...830)	6, 7
084	(0...1000)	6, 7
499	(0...1200)	6, 7
506	(0...1385)	6, 7
507	(0...1600)	6, 7
086	(0...2000)	6, 7
508	(0...3300)	7
089	(0...4000)	7, 8

Calibration range PSI		
Code	Range	Span range of stem
025	(30 "Hg/0)	6
304	(30 "Hg/0/7)	6
028	(30 "Hg/0/15)	6, 7
029	(30 "Hg/0/30)	6, 7
031	(30 "Hg/0/60)	7, 8
032	(30 "Hg/0/100)	7, 8
314	(30 "Hg/0/200)	8
501	(0...1.2)	5
428	(0...1.5)	5
057	(0...2)	5
235	(0...3)	5
192	(0...4)	5
060	(0...6)	5, 6
309	(0...7)	6
061	(0...10)	6, 7
502	(0...18)	6, 7
065	(0...20)	6, 7
066	(0...30)	6, 7
224	(0...35)	7
067	(0...40)	7
068	(0...50)	7, 8
069	(0...60)	7, 8
206	(0...70)	7, 8
071	(0...100)	7, 8
294	(0...140)	8
073	(0...150)	8
074	(0...160)	8
075	(0...200)	8
077	(0...300)	8
078	(0...350)	8
079	(0...400)	8
503	(0...415)	8
504	(0...480)	8
081	(0...500)	8

## Order code of sensor head

L3E (Sensor head)

## Cap

- 2 (Clear plastic)
- 3 (Stainless steel without control window)

## Enclosure orientation

- 1 (Vertical)
- 2 (Horizontal)

## Electrical connection

- A (M12 plug)
- C (Cable gland M16x1,5)

## Engineering units

- B (bar)
- L (mbar)
- P (psi)

## Calibration range

- 999 (Factory setting acc. to custom calibration)
- 000 (Full measurement range acc. to stem)

L3E 2 1 A P 025

## Order code of sensor stem

L3S (Sensor stem)

## Measurement range

- 5 (0...6 psi; 0...0.4 bar)
- 6 (30 "Hg/0/30 psi; -1...2 bar)
- 7 (30 "Hg/0/100 psi; -1...7 bar)
- 8 (30 "Hg/0/500 psi; -1...35 bar)

## Process Connection/Fitting without 3-A TPV

- 160 (Flexibel thread G1", hygienic CLEANadapt)
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## Process Connection/Fitting with 3-A TPV acc. to standard 74-06

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- 005 (Tri-Clamp 2")
- 123 (CPM Fitting)
- 154 (Endress & Hauser Universal Adaptor - Short)
- 155 (Endress & Hauser Universal Adaptor - Long)

## Capillary fill

- 1 (Mineral oil / FDA approved)
- 5 (Neobee / FDA approved)

## Sensor type

- 0 (Compact version)
- A (Remote with 1.5 m (= 5') cable)
- B (Remote with 3 m (= 10') cable)
- C (Remote with 4.5 m (= 15') cable)
- D (Remote with 6 m (= 20') cable)
- E (Remote with 7.5 m (= 25') cable)

## Certificate

- X (No certificate)
- Z (3.1 inspection certificate)

L3S 5 004 1 0 X

**Transport/Storage**

- No outdoor storage
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration
- Storage temperature -55...+90 °C
- Relative humidity max. 95 %

**Cleaning/Maintenance**

- In case of using pressure washers, don't point nozzle directly to electrical connections and gaskets!

**Advice to conformity**

- Applicable guidelines:  
Electromagnetic compatibility 2014/30/EC
- The accordance with applicable EC-guidelines is confirmed with CE-labeling of the device.
- The operator is responsible for ensuring compliance with the directives that are applicable to the overall system.

**Reshipment**

- Sensors shall be clean and must not be contaminated with dangerous media! Note the advice for cleaning!
- Use suitable transport packaging only to avoid damage of the equipment!

**Standards and guidelines**

- You have to comply with applicable regulations and directives.

**Disposal**

- This instrument is not subject to the WEEE directive 2002/96/EC and the respective national laws.
- Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points.

**L3 Remote kit**

Complete accessories to convert compact version into remote version, including:

- M12 remote adaptor with nut
- Stem adaptor
- Wall mount
- Pipe mount

**Note:**

The remote cable is not part of the remote kit and must be ordered separately.

**Remote cable for L3****Pre-assembled remote cable for L3****L3 R-CABLE / 4-15**

PVC cable, 4-pin, length 1.5 m

**L3 R-CALBE / 4-30**

PVC cable, 4-pin, length 3.0 m

**L3 R-CABLE / 4-45**

PVC cable, 4-pin, length 4.5 m

**L3 R-CABLE / 4-60**

PVC cable, 4-pin, length 6.0 m

**L3 R-CABLE / 4-75**

PVC cable, 4-pin, length 7.5 m

**Remote cable for L3****Accessories****PVC cable with M12 connection made of 1.4305, IP 69 K, unshielded****M12-PVC / 4-5 m**

PVC cable, 4-pin, length 5 m

**M12-PVC / 4-10 m**

PVC cable, 4-pin, length 10 m

**M12-PVC / 4-25 m**

PVC cable, 4-pin, length 25 m

**PVC cable with M12 connection, nickel-plated brass, IP 67, shielded****M12-PVC / 4G-5 m**

PVC cable, 4-pin, length 5 m

**M12-PVC / 4G-10 m**

PVC cable, 4-pin, length 10 m

**M12-PVC / 4G-25 m**

PVC cable, 4-pin, length 25 m

**Remote kit****L3 R-Kit**

Complete accessories incl. wall mount

**Cap / Gaskets****L3 C-GASKET**

Replacement silicone gaskets for cap (6 pieces)

**L3 C-CLEAR**

Clear plastic cap (incl. gasket)

**L3 C-STEEL**

Stainless steel cap without control window (incl. gasket)

**PVC cable with M12 connection****Optionen****CERT / 2.2**Factory certificate 2.2 acc. to EN10204  
(only product contacting surface)**CAL / L3 / C3**Factory calibration certificate with 3 calibration points  
(0 %, 50 %, 100 %)**CAL / L3 / C5**Factory calibration certificate with 5 calibration points  
(0 %, 25 %, 50 %, 75 %, 100 %)