

Product Information D3**FOOD**

D3 Differential Pressure & Level Transmitter

**Range of applications**

- Level in pressurized vessels with temperatures under 110°C (230°F)
- Differential pressure measurement across filters

Application examples

- Level monitoring in yogurt culture vessels
- Level monitoring in fermentation vessels
- Grain bed monitoring in Mashtuns
- Pressure drop measurement across membranes

Hygienic design/Process connection

- Front flush, 3-A installation for silos by Anderson flush fitting, E&H universal, or tank spud connections
- Conforming to 3-A Sanitary Standard 74-06 with Tri-Clamp® DIRECTadapt
- Continuous process up to 110°C (230°F)
- CIP/SIP at 130°C (266°F) for 1 hour when ambient is below 60°C (140°F)
- Product contacting materials compliant to FDA
- Sensor and product contact surfaces made of stainless steel
- Available with over 20 integral hygienic connections, more available through CLEANadapt adapters

Features

- Intuitive user interface makes set-up and configuration easy
- Electronic Differential provides 2 analog outputs (differential pressure and top or bottom pressure)
- State of the art temperature compensation minimizes error in dynamic temperature applications
- Fully electronic differential allows field replacement of components and reparability.
- Integrated tank tables allows volume and mass output when tank and product information are input
- Available in relative (vacuum and pressure)
- Patented dual o-ring seals provide IP69K ingress protection
- Dual loop output with Hart 7.0 communication and graphical LCD display

Options/Accessories

- Optional digital remote kit making display easier to view
- Optional M12 molded cordset available
- Wide range of ranges and fittings available

Measuring principle of the pressure sensor

In the D3 system each sensor uses a piezoresistive transducer to measure the difference between the atmospheric and process pressures. Additionally, a temperature sensor measures the temperature of the transducer and fill fluid to provide an output compensation. The resistive temperature signal and the voltage signal from the transducer are inputs to a correction algorithm which provides a pressure output in digital form. The digital signal is transferred from each sensor to the head where the microprocessor determines the difference and converts the output to a 4-20mA signal for the difference and one for the head pressure or total system pressure depending on the user's selection.

Authorizations**Differential level sensor D3****Differential level sensor D3**

Specification		
Measuring range URL [bar]	Relative	-1...35
Measuring range URL [psi]	Relative	-14.7...500
Overpressure strength	Factor	1.5 x nominal pressure of measuring element
Measurement accuracy	Differential error	+/- 0.15% (DIFF _{URV} +TOP _{URV})
	Secondary output (SV) Error	+/-0.15% (SV _{URV})
	Repeatability	0.05 %
	Long-term stability	0.2 % URL every 2 years
Temperature effect	Process	< 0.016 % of calibrated measuring range / 5.5 °C (10 °F)
	Ambient	< 0.016 % of calibrated measuring range / 5.5 °C (10 °F)
Temperature range	Process	-18...110 °C (0...230 °F), at ambient ≤ 71 °C (160 °F)
	Ambient	-18...71 °C (0...160 °F)
	CIP/SIP Cleaning	130 °C (266 °F) for 1 hour when ambient is below 60 °C (140 °F)
Response time		< 0.2 seconds
Sample rate		< 0.05 seconds
Materials	Connection head	Stainless steel, AISI 304 (1.4301), R _a ≤ 0.8 µm (32 microinch)
	Metal cover	Stainless steel, AISI 304 (1.4301), R _a ≤ 0.8 µm (32 microinch)
	Plastic cover	Polycarbonate
	Threaded connector	Stainless steel, AISI 304 (1.4301), R _a ≤ 0.8 µm (32 microinch)
	Wetted parts	Stainless steel, AISI 316L, R _a ≤ 0.64 µm (25 microinch)
	Diaphragm	Stainless steel, AISI 316L, R _a ≤ 0.64 µm (25 microinch)
	Diaphragm seal/oil filling	Medical white oil / mineral oil / paraffin oil FDA approval number 21CFR172.878, 21CFR178.3620, 21CFR573.680 Neobee M20 (optional)
Process connection	3-A compliant	1-1/2" Tri-Clamp® 2" Tri-Clamp® 2½" Tri-Clamp® 3" Tri-Clamp® AIC CPM Flush Mount Anderson Flush Mount Short (71060-A4, A6, A8) Anderson Flush Mount Long (71060-A3, A5, A7, A9) Rosemount/Foxboro Sanitary Spud - Short and Long Endress & Hauser Universal Adaptor - Short and Long M38x1.5 G1" 1-1/2" NPT G1" Fixed Thread 38mm SMS Liner (female) 51mm SMS Liner (female) 40mm DIN 11851 (Milk Coupling) 50mm DIN 11851 (Milk Coupling) DRD-SMS DIN11851
	not 3-A compliant	
Electric connection	Cable gland	M16x1.5
	Plug-in connection	M12 plug, 5-pin, 1.4305
Approvals		3A CE Compliant CRN (CSA-B51-03)* CSA22.2 IP 67 (with cable gland) / NEMA 4X IP 69 K (with plug-in M12 connection)
Auxiliary Power Supply	Voltage	18...35 V DC
	Current Limit	4.2A
Output	Loop 1 (Differential Pressure)	analog 4...20 mA and Hart 7.0
	Loop 2 (Top or Bottom Pressure)	analog 4...20 mA
Tightening torque	For assembly all D3 components	27 Nm (20 ft-lbs)
Weight		approx. 3.5 kg

*consult factory for regions and configurations

Cleaning/Maintenance

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

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!

Advice to conformity

- Applicable guidelines:
Electromagnetic compatibility 2004/108/EC
- The accordance with applicable EC-guidelines is confirmed with CE-labeling of the device.
- You have to guarantee the compliance of all guidelines applicable for the entire equipment.

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 %

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.

Order code of fully assembled sensor

D3 Sensor assembled

Capillary fill

- 1** Mineral Oil (FDA approved)
- 5** Neobee M20

Top Sensor URL

- 5** 0...6 PSI; 0...0.4 Bar G
- 6** 30/0/30 PSI; -1...2 Bar C
- 7** 30/0/100 PSI; -1...7 Bar C
- 8** 30/0/500 PSI; -1...35 Bar C

Top Sensor Fitting

XXX (See fittings table for 3 digit code)

Top Sensor Remote Cable

- O** Integral
- B** 10' Cable
- E** 25' Cable
- F** 50' Cable

Bottom Sensor URL

- 5** 0...6 PSI; 0...0.4 Bar G
- 6** 30/0/30 PSI; -1...2 Bar C
- 7** 30/0/100 PSI; -1...7 Bar C
- 8** 30/0/500 PSI; -1...35 Bar C

Bottom Sensor Fitting

XXX (See fittings table for 3 digit code)

Bottom Sensor Remote Cable

- O** Integral
- B** 10' Cable
- E** 25' Cable
- F** 50' Cable

Enclosure cap

- 2** Clear cap
- 3** Stainless steel cap

Connector Locations (see location diagram)

	Electric	Top Sensor	Bottom Sensor
1	A	B	C
2	A	C	B
3	B	A	C
4	B	C	A
5	C	A	B
6	C	B	A

Electrical connection

- A** M12 QDR
- C** Cable gland
- N** 1/2" NPTF adaptor

Top Pressure Units

- P** PSI
- B** Bar
- W** inches of water
- L** millibar

Top Pressure Range

XXX See "Calibrated Range" table

Diff Pressure Units

- P** PSI
- B** Bar
- W** inches of water
- L** millibar

Diff Pressure Range (see "Calibrated range" table)

XXX See "Calibrated Range" table

D3 1 6 004 A 6 004 A 2 1 A P 000 W 294

Order code of sensor head

D3E

Enclosure cap

- 2 Clear cap
- 3 Stainless steel cap

Connector Locations (see location diagram)

	Electric	Top Sensor	Bottom Sensor
1	A	B	C
2	A	C	B
3	B	A	C
4	B	C	A
5	C	A	B
6	C	B	A

Electrical connection

- A M12 QDR
- C Cable gland
- N 1/2" NPT adaptor

Top Pressure Units

- P PSI
- B Bar
- W inches of water
- L millibar

Top Pressure Range

XXX See "Calibrated Range" table

Diff Pressure Units

- P PSI
- B Bar
- W inches of water
- L millibar

Diff Pressure Range

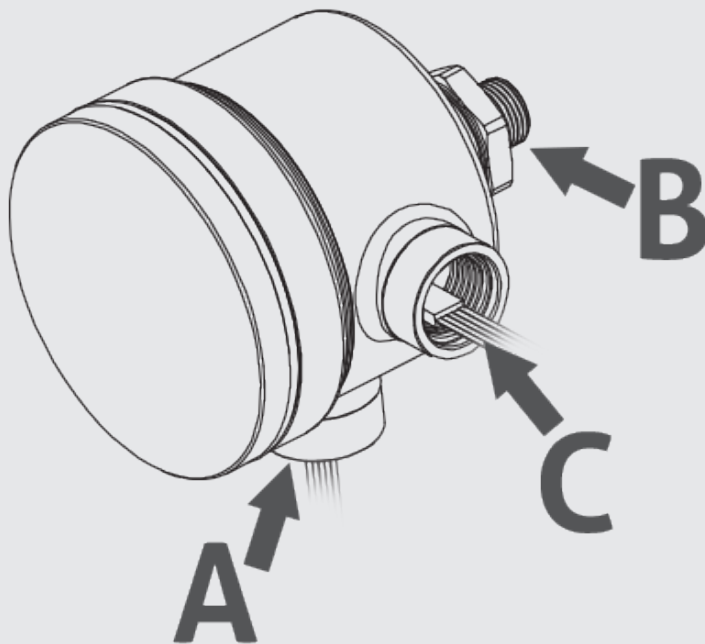
XXX See "Calibrated Range" table

D3E 2 1 A P 000 W 294

Calibrated Range

range code	range
025	full vac-0
028	full vac-0-15
029	full vac-0-30
031	full vac-0-60
032	full vac-0-100
314	full vac-0-200
066	0-30
068	0-50
069	0-60
071	0-100
073	0-150
074	0-160
075	0-200
077	0-300
081	0-500
084	0-1000
251	-1-0-1
286	-1-0-2.5
217	-1-0-3
056	-1-0-4
304	-1-0-7
057	0-2
235	0-3
192	0-4
060	0-6
309	0-7
061	0-10
065	0-20
224	0-35
206	0-70
294	0-140
503	0-415
505	0-830
506	0-1385
078	0-350
086	0-2000
508	0-3300
089	0-4000
428	0-1.5
067	0-40
079	0-400
501	0-1.2
499	0-1200
502	0-18
504	0-480
507	0-1600
000	full range (field configuration)
999	custom range (must specify)

Location Diagram



Order code of sensor stem

L3S (Sensor stem)

URL

- 5 0...6 PSI; 0...0.4 Bar G
 6 30/0/30 PSI; -1...2 Bar C
 7 30/0/100 PSI; -1...7 Bar C
 8 30/0/500 PSI; -1...35 Bar C

Fitting (See Fittings Table)

XXX

Capillary fill

- 1 Mineral oil (FDA approved)
 5 Neobee M20

Remote cable

- 0 Integral
 B 10' Cable
 E 25' Cable
 F 50' Cable

L3S 5 004 1 0

Fittings Table

3-A compliant fittings

- 004 1-1/2" Tri-Clamp®
 005 2" Tri-Clamp®
 006 2½" Tri-Clamp®
 007 3" Tri-Clamp®
 123 AIC CPM Flush Mount
 088 Anderson Flush Mount Short (71060-A4, A6, A8)
 089 Anderson Flush Mount Long (71060-A3, A5, A7, A9)
 141 Rosemount/Foxboro Sanitary Spud - Short
 142 Rosemount/Foxboro Sanitary Spud - Long
 154 Endress & Hauser Universal Adaptor - Short
 155 Endress & Hauser Universal Adaptor - Long
 180 M38x1.5

Fittings not 3-A compliant

- 160 G1" CLEANadapt
 059 1-1/2" NPT
 182 G1" Fixed Thread
 109 38 mm SMS Liner (female)
 110 51 mm SMS Liner (female)
 115 40 mm DIN 11851 (Milk Coupling)
 124 50 mm DIN 11851 (Milk Coupling)
 189 DRD

Accessories

Cord Sets

Shielded Molded w/25' cable	42117H0025
Shielded Molded w/50' cable	42117H0050
Shielded Molded w/100' cable	42117H0100

Clear Cap w/gaskets	5632800001
Stainless Steel Cap w/gaskets	5632900001
M12 Quick Disconnect Receptacle	SP56726A0004
Cord Grip	SP5633100000
1/2" NPTF adaptor	SP5633200000
Seal Kit (6) gaskets	5633000001
Field Wireable Connector-Straight	42119B0000
Field Wireable Connector-90°	42119A0000
10' Remote Kit	SP73228A0010
25' Remote Kit	SP73228A0025
50' Remote Kit	SP73228A0050
Rosemount/Foxboro Clamp Connection	46600A00010