

**Product Information D3****FOOD**

# D3 Differential Pressure & Level Transmitter


**Range of applications**

- Level in pressurized vessels with continuous process temperatures up to 110°C (230°F)
- CIP/SIP at 135°C (275°F) for 1 hour when ambient is below 60°C (140°F)
- Differential pressure measurement across filters

**Application examples**

- Level monitoring in yogurt culture vessels
- Level monitoring in fermentation vessels
- Grain bed monitoring in lauter tuns
- Level monitoring in brite tanks
- Pressure drop measurement across filters

**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
- 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 repairability.
- 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	Relative	-14.7...500 PSI, -1...35 BAR, -400...13850 inches of w.c.
Overpressure strength	Factor	1.5 x nominal pressure of measuring element
Measurement accuracy	Differential (PV) error	+/- 0.15% (DIFF <sub>URV</sub> +TOP <sub>URV</sub> )
	Top/Bottom sensor (SV) error	+/-0.10% of calibrated range up to 5:1 turndown (+/-0.15% if over 5:1 turndown)
	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	135 °C (275 °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 <sub>a</sub> ≤ 0.8 μm (32 microinch)
	Metal cover	Stainless steel, AISI 304 (1.4301), R <sub>a</sub> ≤ 0.8 μm (32 microinch)
	Plastic cover	Polycarbonate
	Threaded connector	Stainless steel, AISI 304 (1.4301), R <sub>a</sub> ≤ 0.8 μm (32 microinch)
	Wetted parts	Stainless steel, AISI 316L, R <sub>a</sub> ≤ 0.64 μm (25 microinch)
	Diaphragm	Stainless steel, AISI 316L, R <sub>a</sub> ≤ 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	1.5", 2", 2.5", 3" Tri-Clamp® AIC CPM Flush Mount Anderson Flush Mount - Short and Long King Gage Flush Mount - Short, Medium and Long Rosemount/Foxboro Sanitary Spud - Short and Long Endress & Hauser Universal Adaptor - Short and Long
	not 3-A compliant	G1" CLEANadapt 1.5" NPT G1" Fixed Thread 38mm, 51mm SMS Liner (female) 40mm, 50mm DIN 11851 (Milk Coupling) M38x1.5 DRD
Electric connection	Cable gland	M16x1.5
	Plug-in connection	M12 plug, 5-pin, 1.4305
Approvals		3A CE Compliant CRN#OF19809.5 (consult factory for applicable regions and configurations) CAN/CSA-22.2 No. 61010-1 IP 69 K (with plug-in M12 connection) IP 67 (with cable gland) / NEMA 4X
Auxiliary Power Supply	Voltage	20...35 V DC
	Current Limit	4.2A
Output	Loop 1 (Differential)	analog 4...20 mA and Hart 7.0
	Loop 2 (Top or Bottom)	analog 4...20 mA
Tightening torque	For assembly all D3 components	27 Nm (20 ft-lbs)

**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, 0...166" w.c.
- 6 -14.7...30 PSI, -1...2 BAR, -400...830" w.c.
- 7 -14.7...100 PSI, -1...7 BAR, -400...2770" w.c.
- 8 -14.7...500 PSI, -1...35 BAR, -400...13850" w.c.

**Top Sensor Fitting**

XXX (See fittings table for 3 digit code)

**Top Sensor Remote Cable**

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

**Bottom Sensor URL**

- 5 0...6 PSI, 0...0.4 BAR, 0...166" w.c.
- 6 -14.7...30 PSI, -1...2 BAR, -400...830" w.c.
- 7 -14.7...100 PSI, -1...7 BAR, -400...2770" w.c.
- 8 -14.7...500 PSI, -1...35 BAR, -400...13850" w.c.

**Bottom Sensor Fitting**

XXX (See fittings table for 3 digit code)

**Bottom Sensor Remote Cable**

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

**Enclosure cap**

- 2 Clear cap
- 3 Stainless steel cap

**Connector Locations**

	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 Unit**

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

**Top Pressure Range**

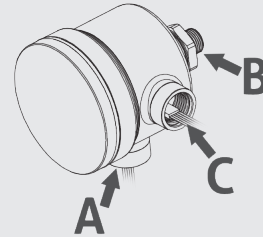
- XXX See "Calibrated Range" table
- 999 Specify custom range

**Differential Output Unit**

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

**Differential Output Range**

- XXX See "Calibrated Range" table
- 999 Specify custom range



D3 1 6 005 A 6 005 A 2 1 A P 060 W 294

Calibration range inches w.c.		
Code	Range	Stem URL
502	0...18	5
065	0...20	5
066	0...30	5
224	0...35	5
067	0...40	5
068	0...50	5
069	0...60	5
206	0...70	5
071	0...100	5, 6
294	0...140	5, 6
073	0...150	5, 6
074	0...160	5, 6
075	0...200	6
077	0...300	6, 7
078	0...350	6, 7
079	0...400	6, 7
503	0...415	6, 7
504	0...480	6, 7
081	0...500	6, 7
505	0...830	6, 7
084	0...1000	7
499	0...1200	7
506	0...1385	7, 8
507	0...1600	7, 8
086	0...2000	7, 8
508	0...3300	8
089	0...4000	8

Calibration range PSI		
Code	Range	Stem URL
025	-14.7...0	6
028	-14.7...15	6, 7
029	-14.7...30	6, 7
031	-14.7...60	7, 8
032	-14.7...100	7, 8
314	-14.7...200	8
501	0...1.2	5
428	0...1.5	5
057	0...2	5
235	0...3	5, 6
192	0...4	5, 6
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

Calibration range BAR		
Code	Range	Stem URL
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	Stem URL
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, 6
079	0...400	5, 6
503	0...415	5, 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

**Note:**

When multiple stem URLs are available (**Example 5,6**), lower stem URL is recommended (**Select 5**).

**Order code of sensor stem**

**L3S** (Sensor stem)

**URL**

**5** 0...6 PSI, 0...0.4 BAR, 0...166" w.c.  
**6** -14.7...30 PSI, -1...2 BAR, -400...830" w.c.  
**7** -14.7...100 PSI, -1...7 BAR, -400...2770" w.c.  
**8** -14.7...500 PSI, -1...35 BAR, -400...13850" w.c.

**Fitting (See Fittings Table)**

**XXX**

**Capillary fill**

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

**Remote cable**

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

L3S 6 005 1 0

**Fittings Table**

**3-A compliant fittings**

- 004** 1.5" Tri-Clamp®
- 005** 2" Tri-Clamp®
- 006** 2.5" Tri-Clamp®
- 007** 3" Tri-Clamp®
- 123** AIC CPM Flush Mount
- 088** Anderson Flush Mount Short (71060-A4, A6)
- 089** Anderson Flush Mount Long (71060-A3, A5, A9)
- 092** King Gage Flush Mount Long (1773-3)
- 093** King Gage Flush Mount Medium (1773-1, -6 Std.)
- 094** King Gage Flush Mount Short (1773-2)
- 141** Rosemount/Foxboro Sanitary Spud - Short
- 142** Rosemount/Foxboro Sanitary Spud - Long
- 154** Endress & Hauser Universal Adaptor - Short
- 155** Endress & Hauser Universal Adaptor - Long

**Fittings not 3-A compliant**

- 160** G1" CLEANadapt
- 059** 1.5" 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)
- 180** M38x1.5
- 181** DRD

**Order code of sensor head**

**D3E**

**Enclosure cap**

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

**Connector Locations**

	Electric	Top Sensor	Bottom Sensor
<b>1</b>	A	B	C
<b>2</b>	A	C	B
<b>3</b>	B	A	C
<b>4</b>	B	C	A
<b>5</b>	C	A	B
<b>6</b>	C	B	A

**Electrical connection**

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

**Top Pressure Unit**

**P** PSI  
**B** BAR  
**W** inches of water  
**L** millibar

**Top Pressure Range**

**XXX** See "Calibrated Range" table  
**999** Specify custom range

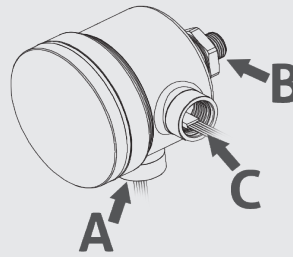
**Differential Output Unit**

**P** PSI  
**B** BAR  
**W** inches of water  
**L** millibar

**Differential Output Range**

**XXX** See "Calibrated Range" table  
**999** Specify custom range

D3E 2 1 A P 060 W 294



**Cord Sets**

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

**Weld-In Shells for Anderson Flush Mount (316L)**

Anderson Long - Insulated Standard Vessel	71060A0003
Anderson Short - Uninsulated Standar Vessel	71060A0004
Anderson Long - Insulated Pressure Vessel	71060A0005
Anderson Short - Uninsulated Pressure Vessel	71060A0006
Anderson Long - Insulated H/D Pressure Vessel	71060A0009

**Tank Shell Plugs (Supplied with nut and gasket)**

Anderson Long	56511B0001
Anderson Short	56511B0002
Cherry Burrell Long	56511A0001
Cherry Burrell Short	56511A0002
King Long	56511C0001
King Medium	56511C0002
King Short	56511C0003

**Flush Mount Calibration Adapters**

Anderson Fitting	73198A0001
Cherry Burrell Fitting	73198A0002
King Gage Fitting	73198A0003

**Gaskets for Flush Mount Fittings**

Anderson - Silicone (3A, USP Class VI)	44348A0002
Cherry Burrell - Silicone	44292B0001
Endress & Hauser	45352B0001
King Gage - Silicone O-Ring	36240S3212
Rosemount - Silicone O-Ring	36240S3341

**Other Accessories**

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	46600A0001

