D3 Differential Pressure & Level Transmitter

CLEANadapt

Range of applications

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

Application examples

- Hygienic pressure and level monitoring for life science applications
- Bio-reactor level and head space monitoring
- Filtration processes

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)
- Dual o-ring seals provide IP69K ingress protection
- Dual loop output with 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

FDA

AMSE BPE 2019 Compliant

Differential level sensor D3

Differential level sensor D3

Specification		
Measuring range URL	Relative	-14.7...500 PSI, -1...35 BAR, -400...13850 inches w.c.
Overpressure strength	Factor	1.5 x nominal pressure of measuring element
Measurement accuracy	Differential error Top/Bottom sensor error Repeatability Long-term stability	+/- 0.15% ($DIFF_{URV}$+TOP_{URV}) +/-0.10% of calibrated range up to 5:1 turndown (+/-0.15% over if 5:1 turndown) 0.05 % 0.2 % URL every 2 years
Temperature effect	Process Ambient	< 0.016 % of calibrated measuring range / 5.5 °C (10 °F) < 0.016 % of calibrated measuring range / 5.5 °C (10 °F)
Temperature range	Process Ambient CIP/SIP Cleaning	-18...110 °C (0...230 °F), at ambient ≤ 71 °C (160 °F) -18...71 °C (0...160 °F) 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 Metal cover Plastic cover Threaded connector Wetted parts Diaphragm Diaphragm seal/oil filling	Stainless steel, AISI 304 (1.4301), R_a ≤ 0.8 µm (32 microinch) Stainless steel, AISI 304 (1.4301), R_a ≤ 0.8 µm (32 microinch) Polycarbonate Stainless steel, AISI 304 (1.4301), R_a ≤ 0.8 µm (32 microinch) Stainless steel, AISI 316L, R_a ≤ 0.2 µm (8 microinch) Stainless steel, AISI 316L, R_a ≤ 0.2 µm (8 microinch) Medical white oil / mineral oil / paraffin oil FDA approval number 21CFR172.878, 21CFR178.3620, 21CFR573.680 Neobee M20 (optional)
Process connection		1-1/2" Tri-Clamp® 2" Tri-Clamp® 2½" Tri-Clamp® 3" Tri-Clamp® AIC CPM Flush Mount Anderson Flush Mount - Short and Long Rosemount/Foxboro Sanitary Spud - Short and Long Endress & Hauser Universal Adaptor - Short and Long G1" CLEANadapt DRD
Electric connection	Cable gland Plug-in connection	M16x1.5 M12 plug, 5-pin, 1.4305
Certifications/Compliances		AMSE BPE 2019 Compliant CE Compliant CRN: 0F19809.5C CAN/CSA-22.2 No. 61010-1 IP 67 (with cable gland) / NEMA 4X IP 69 K (with plug-in M12 connection)
Auxiliary Power Supply	Voltage Current Limit	18...35 V DC 4.2A
Output	Loop 1 (Differential) Loop 2 (Top or Bottom)	analog 4...20 mA 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

Internal fill

- **M** Mineral Oil (FDA approved)
- **N** 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

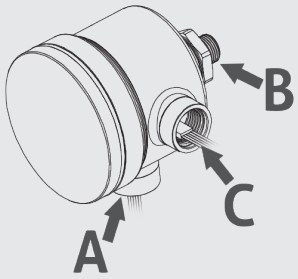
- **0** Integral
- **B** 10' Cable
- **E** 25' Cable
- **F** 50' Cable

Enclosure cap

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

Connector Locations (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

XXX see "Calibrated Range" table

D3	N	6	004	E	6	004	B	2	1	A	P	028	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

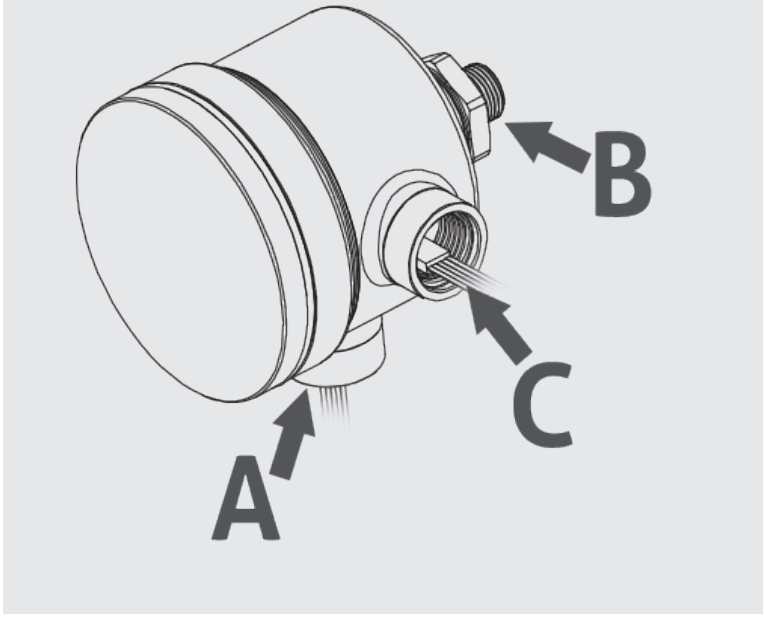
Top Pressure Range (see "Calibrated range" table)
XXX

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

Diff Pressure Range (see "Calibrated range" table)
XXX

D3E	2	1	A	P	028	W	294

Location Diagram



Calibrated Range

range code	range
251	-1...1
286	-1...2.5
217	-1...3
056	-1...4
304	-1...7
025	-14.7...0
028	-14.7...15
029	-14.7...30
031	-14.7...60
032	-14.7...100
314	-14.7...200
501	0...1.2
428	0...1.5
057	0...2
235	0...3
192	0...4
060	0...6
309	0...7
061	0...10
502	0...18
065	0...20
066	0...30
224	0...35
067	0...40
068	0...50
069	0...60
206	0...70
071	0...100
294	0...140
073	0...150
074	0...160
075	0...200
077	0...300
078	0...350
079	0...400
503	0...415
504	0...480
081	0...500
505	0...830
084	0...1000
499	0...1200
506	0...1385
507	0...1600
086	0...2000
508	0...3300
089	0...4000
999	custom range (must specify)

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

M	Mineral oil (FDA approved)
N	Neobee M20

Remote cable

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

L3S 5 004 N 0

Fittings Table

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)
089	Anderson Flush Mount Long (71060-A3, A5, 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
160	G1" CLEANadapt
181	DRD

Accessories

Cord Sets

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

Flush Mount Gaskets

Anderson - Silicon Gasket (3A, USP Class VI) 44348A0003

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

Anderson Long-Insulated Std. Vessel	71060A0003
Anderson Short-Uninsulated Std. Vessel	71060A0004
Anderson Long-Insulated Press. Vessel	71060A000
Anderson Short-Uninsulated Press. Vessel	71060A0006
Anderson Long-Insulated H/D Press. Vessel	71060A0009

Tank Shell Plugs (Supplied with nut and gasket)

Anderson Long	56511B0001
Anderson Short	56511B0002

Flush Mount Calibration Adapters

Anderson Fitting Calibration Adapter	73198A0001

Other Accesories

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	SP73328A0050
Rosemount/Foxboro Clamp Connection	46600A0001

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