

Technical Datasheet



D Series

SMART Differential Pressure Transmitter

Model: DPR-2000

Key Features

- ATEX - Flameproof and Intrinsically Safe
IECEX - Flameproof and Intrinsically Safe
- SIL 2 certificate
- Compliant to NAMUR NE-43
- High accuracy $\pm 0.075\%$ (better accuracy upon request)
- Fully HART ® compatible
- Static pressure limit up to 420 bar
- 4-20mA, 0-20mA or 0-5mA analogue with digital communications
- Gold (Au) plated diaphragm option
- Hastelloy C276 wetted parts option
- Programmable range, zero shift, characteristic and damping ratio with local panel keys



Series Overview

- The D-Series pressure, differential pressure and temperature transmitters offer customers cost-effective and accurate solutions to their individual process requirements.
- Available with a wide range of process connections and easily configurable via the D-Soft software, the D-Series can be used for a variety of applications when pressure, differential pressure, temperature, level or flow measurements are needed.

Other products in the series include:

- DPR-2200 SMART Differential Pressure Transmitter with 2 remote chemical seals
- DPR-2000G SMART Differential Pressure Transmitter for low range
- DPC-2000 SMART Pressure Transmitter
- DPT-2000 SMART Temperature Transmitter



Product applications

The DPR-2000 is suitable for a wide range of applications for measuring:

- Differential Pressure
- Level
- Flow

The choice of models available ensures that the DPR-2000 is suitable for use in:

- Corrosive atmospheres
- Resistant to chemical attack

How can we help you?

Delta Controls' offers fast, efficient and knowledgeable support when and where you need it. Please visit our web site at www.delta-controls.com to find your local support centre or call us on:

+44 (0) 1252 729140

D-Series
Model: DPR-2000ALW

Application & Construction

The DPR SMART Differential Pressure Transmitters are suitable for measuring differential pressure of gases, vapours and liquids. The active sensing element is a piezoresistive silicon sensor separated from the medium by a diaphragm and by a specifically selected type of manometric liquid. The casing is made of cast aluminium alloy or 316 stainless steel with degree of protection IP66/67. The design of the casing enables the use of a local display, rotation of the display by 90°, rotation of the casing by 0-355° relative to the sensor, and a choice of cable direction.

The communication standard for data interchange with the transmitter is the Hart protocol.

Communication with the transmitter is carried out with:

- a KAP-03, KAP-03Ex communicator,
- some other Hart type communicators, (*)
- a PC using a HART/USB/Bluetooth converter and D-Soft configuration software

(*) .eddl file available at www.delta-controls.com

The data interchange with the transmitter enables the users to:

- ◆ identify the transmitter;
- ◆ configure the output parameters:
 - measurement units and the values of the start points and end points at the measurement range;
 - damping time constant;
 - conversion characteristic (inversion, user's non-linear characteristic);
- ◆ read the currently measured pressure value of the output current and the percentage output control level;
- ◆ force an output current with a set value;
- ◆ calibrate the transmitter in relation to a model pressure

Installation

The transmitter with **P** or **PN** type process connection is not heavy, so it can be installed without an additional mounting bracket on application. For fitting in any desired position we recommend a universal Delta mounting bracket for 2" pipe (AL mounting bracket). The version with **C** type process connections can be fitted directly to a 3- or 5- valve manifold. We recommend factory-mounted transmitters with VM type valve manifold. A transmitter without a valve manifold can be fitted in any position on a "2 pipe or on a wall using the C-2" mounting bracket. When the special process connections are required for the measurement of specific media levels in closed tanks (e.g. in the sugar and chemical industries) the transmitter is fitted with a Delta diaphragm seal.

Measuring Ranges

No.	Nominal measuring range (FSO)		Minimum set range		Rangeability	Overpressure limit/ Static pressure limit	
1	0...70 bar	(0...7 MPa)	7 bar	(700 kPa)	10:1	C-type: 250/320/420 bar P-type: 40 bar (for range no. 1:70 bar)	
2	0...16 bar*	(0...1,6MPa)	1,6 bar	(160 kPa)	10:1		
3	0...2,5 bar	(0...250 kPa)	0,2 bar	(20 kPa)	12,5:1		
4	0...1 bar*	(0...100 kPa)	50 mbar	(5 kPa)	20:1		
5	0...0,25 bar	(0...25 kPa)	10 mbar	(1 kPa)	25:1		
6	-0,5...0,5 bar*	(-50...50 kPa)	0,1 bar	(10 kPa)	10:1		
7	-100...100 mbar *	(-10...10 kPa)	10 mbar	(1 kPa)	20:1		
8	-5...70 mbar*	(-0,5...7 kPa)	4 mbar	(0,4 kPa)	18:1		
9	-25...25 mbar*	(-2,5...2,5 kPa)	2 mbar	(0,2 kPa)	25:1		C-type : 200 bar
10	-7...7 mbar**	(-700...700 Pa)	1 mbar	(0,1 kPa)	14:1	20 bar	

*available also in HS version

**available only in HS version

HS version with Exd certificate available from Q3/2016

Technical Data

Metrological parameters

Accuracy $\leq \pm 0.075\%$ of the calibrated range
 $\leq \pm 0.1\%$ of calibrated range (range no. 9)

Long-term stability \leq accuracy for 3 years
(for the nominal measuring range)

Thermal error for ranges no 1-8 $\leq \pm 0.05\%$ (FSO) / 10°C
for ranges no 9 $\leq \pm 0.08\%$ (FSO) / 10°C

max. $\pm 0.3\%$ (FSO) in temperature range -25...80°C

special version for ranges no 1-8 $\leq \pm 0.03\%$ (FSO) / 10°C

max. $\pm 0.1\%$ (FSO) in temperature range -25...80°C

Thermal compensation range -25...80°C

Zero shift error for static pressure 0.01% (FSO) / 10 bar for range 3, 4, 5, 6

0.03% (FSO) / 10 bar for range 1, 7, 8

0.08% (FSO) / 10 bar for ranges 2, 7

Zeroing the transmitter in conditions of static pressure can eliminate this error.

Additional electronic damping 0...60 s

Error due to supply voltage changes 0.002% (FSO) / V

Electrical parameters

Power supply:

Model DPR-2000ALW 12...55 V DC (Ex ia 13 ,5...28 V)
(Ex d 13,5...45V)

Model DPR-2000ALE 12...36 V DC

Additional voltage drop when display illumination switched on 3 V

Output signal 4...20 mA, two wire transmission

DPR-2000ALE: 0...20 or 0...5, 4...20 [mA]

Load resistance

$$R[\Omega] \leq \frac{U_{sp}[V] - 12V^*}{0,02A} - 0.85$$

* -15V when display illumination switched on

Resistance required for communication 250...1100 W

Technical Data (cont.)

Materials

Wetted parts: type P, PN process connection: 316Lss
 type P(H) process connection: Hastelloy C276
 type C process connection: 316ss

Diaphragms: 316Lss, Hastelloy C 276, Au

Casing : Aluminium
 Option : 316SS

Material of window: polycarbonate glass, hardened glass

Operating conditions

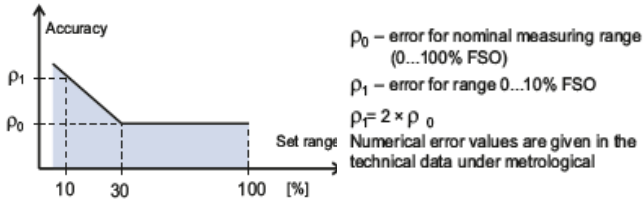
Operating temperature range (ambient temp.) -25...85°C
 Exi version -25...80°C
 Exd version -25...75°C

Medium temperature range -25...120°C

over 120°C – measurement with the use of impulse line or diaphragm seals

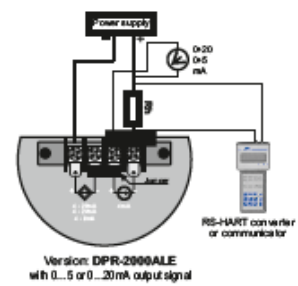
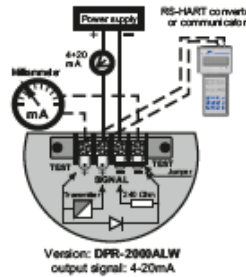
CAUTION: the medium must not be allowed to freeze in the impulse line or close to the process connection of the transmitter

Accuracy depending on the set range

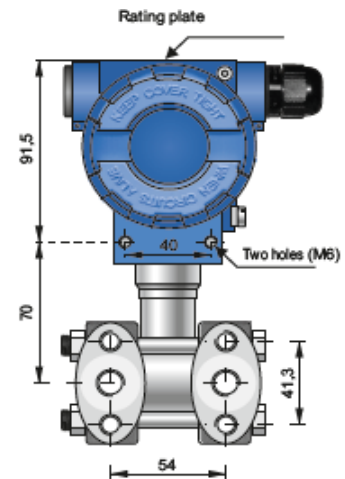
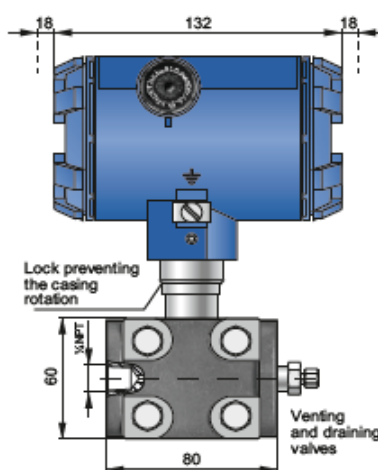
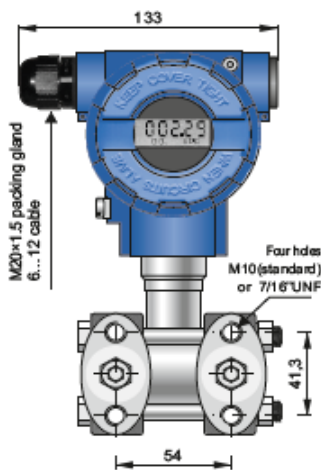


Electrical diagrams

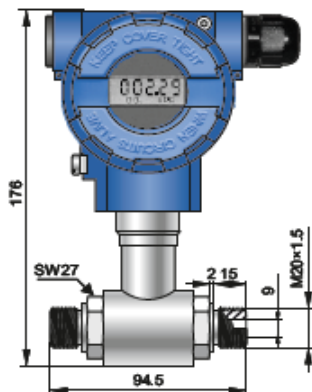
Electrical diagrams for transmitters with HART protocol



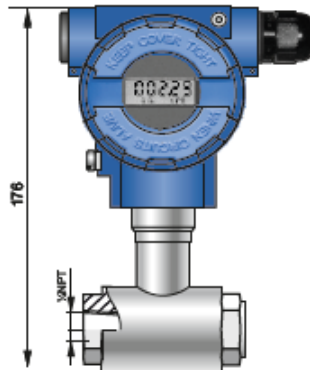
Dimensions



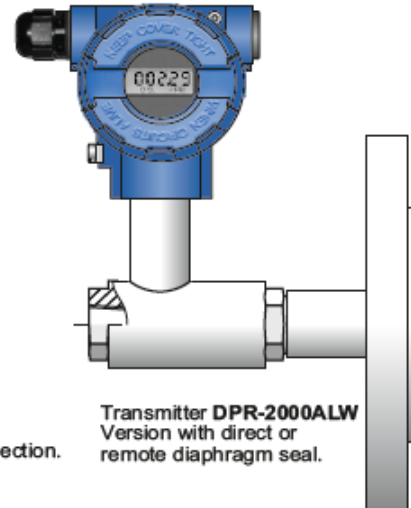
Transmitter DPR-2000ALW – version with type C process connection to be mounted together with a valve manifold



Transmitter DPR-2000ALW
 Version with P type process connection.



Transmitter DPR-2000ALW
 Version with PN type process connection.



Transmitter DPR-2000ALW
 Version with direct or remote diaphragm seal.

D-Series
 Model: DPR-2000ALW

How to Order

Model	Code	Description		
DPR-2000		Smart differential pressure transmitter		
Casing, output signal	ALW	Aluminum housing, IP66, with display, output 4-20mA + Hart		
	ALE	Aluminum housing, IP66, with display, 0-20mA, 0-5mA+ Hart, Exia and Exd version not available		
	ALW/SS	Stainless steel housing IP66, with display, output 4-20mA + Hart		
Versions, certificates*	/Exia	II 1/2G Ex ia IIC T5/T6 Ga/Gb II 1/2G Ex ia IIB T5/T6 Ga/Gb (version with Teflon-Shielded Cable) IECEx Ex ia IIC T4/T5 Ga/Gb IECEx Ex ia IIB T4/T5 Ga/Gb (version with Teflon-Shielded Cable)		
	/Exia (Da).....	II 1/2G Ex ia IIC T5/T6 Ga/Gb II 1/2G Ex ia IIB T5/T6 Ga/Gb (version with Teflon-Shielded Cable) I M1 Ex ia I Ma (version with Enclosure SS316) II 1D Ex ia IIIC T105°C Da IECEx Ex ia IIC T4/T5 Ga/Gb IECEx Ex ia IIB T4/T5 Ga/Gb (version with Teflon-Shielded Cable) IECEx Ex ia I Ma (version with Enclosure SS316) IECEx Ex ia IIIC T105°C Da		
	/Exd	II 1/2G Ex ia/d IIC T6/T5 Ga/Gb II 1/2D Ex ia/t IIIC T85°C/T100°C Da/Db I M2 Ex ia I Mb IECEx Ex ia/db IIC T6/T5 Ga/Gb IECEx Ex ia/t IIIC T85°C/T100°C Da/Db IECEx Ex db ia I Mb		Packing gland available on request
	/Exd (2G)	II 1/2G Ex ia/d IIC T6/T5 Ga/Gb II 1/2D Ex ia/t IIIC T85°C/T100°C Da/Db I M2 Ex ia I Mb IECEx Ex ia/db IIC T6/T5 Gb IECEx Ex ia/t IIIC T85°C/T100°C Db		Packing gland available on request
	*more than one option is available	/SA	Surge arrester for Exia version	
	/Safety	SIL2 - Functional Safety certificate according to PN-EN 61508-1:2010; PN-EN 61508-2:2010; PN-EN 61508-3:2010; PN-EN 61511-1:2003; PN-EN 62061:2005+A1		
	/HS	Ultra stable version (only ranges no. 2, 4 to 10)		
	/0.05%	Accuracy L ±0,05%		
	/Tlen	For oxygen service (sensor filled with Fluorolube fluid)		
	/320 bar	Static pressure 320 bar, only for C process connection		
	/420 bar	Static pressure 420 bar, only for C process connection		
	/IP67.....	Protection class IP67		
Nominal measuring range		Range	Min. set range	
	/0÷70bar	0÷70bar (0÷7000kPa)	7bar (700kPa)	
	/0÷16bar	0÷16bar (0÷1600kPa)	1,6bar (160kPa)	
	/0÷2,5bar	0÷2,5bar (0÷250kPa)	0,2bar (20kPa)	
	/0÷1bar	0÷1bar (0÷100kPa)	50mbar (5kPa)	
	/0÷0,25bar	0÷0,25bar (0÷25kPa)	10mbar (1kPa)	
	/-0,5÷0,5bar	-0,5÷0,5bar (-50÷50kPa)	0,1bar (10kPa)	
	/-0,1÷0,1bar	-1÷0,1bar (-10÷10kPa)	10mbar (1kPa)	
	/-5÷70mbar	-5÷70mbar (-0,5÷7kPa)	4mbar (0,4kPa)	
	/-25÷25mbar	-25÷25mbar (-2,5÷2,5kPa)	2mbar (0,2kPa)	
/-7÷7mbar	-7÷7mbar (-0,7÷0,7kPa)	1mbar (0,1kPa)		
Measuring set range	/...+... (required units)	Calibrated range in relation to 4mA and 20mA output		
Process connections	/C	Thread 1/4"NPT F on the cover flanges cover flanges material SS316. Allows mounting with a valve manifold. Process connection of cover flange: M10 (option /C(7/16) - 7/16"UNF acc. to IEC 61518)		
Process connection C available with NACE MR-01-75 certificate	/CR	C-type process connection rotated 90°		
	/P	Thread M20x1,5 (male)		
	/PN	Thread 1/4"NPT (female)		
	/code of diaphragm seal.....	Diaphragm seal (see chapter of diaphragm seals) mounted on Hi side of transmitter, Lo side 1/4"NPT Female		
Material of diaphragms (refers only to C, CR, P, PN process connection)	(without marking).....	Diaphragms material SS316L		
	/H).....	Diaphragms material Hastelloy C276 (/P and /PN – all wetted parts in Hastelloy C276 on request) (not available for transmitters in HS version) Gold plated diaphragms (not available for transmitters in HS version)		
Gasket (refers only to C, CR process connection)	(without marking).....	FPM Viton		
	/NBR.....	NBR (for oxygen service)		
	/PTFE.....	PTFE		
Electrical connection	(without marking)	Packing gland M20x1,5		
	/US	Thread 1/2NPT Female		
Accessories*	/C-2".....	Mounting bracket for 2" pipe (to C process conn.), mat. zined steel		
	/C-2"(SS).....	Mounting bracket for 2" pipe (to C process conn.), mat. Stainless Steel		
	/F125.....	Mounting bracket for 1" pipe (to P process conn.), mat. Stainless Steel		
	/RedSpaw P.....	Connector to weld impulse pipes dia. 12 and 14 mm, material 15HM(SO) or SS316(S). Only process connection P type		
	/RedSpaw C.....	Connector to weld impulse pipes dia. 12 and 14 mm, material 15HM. Only process connection C type.		
*more than one options is available.	/Red d/P 1/2".....	Adapter for differential pressure transmitters with C type process connection, output thread 1/2NPT F. Material SS316L		
	/ST.....	Stainless Steel plate riveted to the housing		
	/MT.....	Stainless Steel Tag plate mounted on wire		
Other specification	/	Description of required parameters (e.g. IP66/67)		

Example: Differential pressure transmitter with display, output 4..20mA + HART, version EExia, nominal measuring range 0..2,5bar, calibrated range 0..1,5bar, process connection G1/2", electrical connection 1/2NPT F, mounting bracket for 2" pipe **DPR-2000ALW/EEExia/0..2,5bar/0..1,5bar/G1/2/US/AL**

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