Technical **Datasheet**

delta-controls

D-Series
SMART Pressure Transmitter
Models: DPC-2000

Key **Features**

- High accuracy ±0.075% (better accuracy upon request)
- 4-20mA, 0-20mA or 0-5mA analogue with digital communications
- Fully HART ® compatible
- Programmable range, zero shift, characteristic and damping ratio with local panel keys
- ATEX certified (Intrinsic Safety, Flameproof)
- Gold (Au) plated diaphragm option
- Lighter weight

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 models in this series include:

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

Product **Applications**

The DPC-2000 is suitable for a wide range of applications in many industry sectors:

- Oil & Gas
- Petrochemical
- Water & Wastewater
- Power

The choice of models available ensures that the DPC-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 website at **www.delta-controls.com** to find your local support centre or call us on:
+44 (0) 1252 729 140

D-Series
Models: DPC-2000ALW

Application & Construction

The DPC SMART Pressure Transmitters are suitable for measurement of pressure, underpressure, and absolute 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 sele 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 Raport2 configuration software.

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 can be installed directly on the installation. A universal mounting bracket is provided to transmitter fitting on 2" pipe
When the pressure of steam or other hot media is measured, a siphon or impulse line should be used.
The needle valve placed upstream the transmitter simplifies installation process and enables the zero point adjustment or the transmitter replacement. When the special process connections are required for the measurement of levels and pressures (e.g. at food and chemical industries), the transmitter is provided with a diaphragm seal. The transmitter's electrical connections should be performed with twisted cable. The place for the communicator should be assigned before the communicator installation.

Measuring Ranges

No.	Nominal measuring range (FSO)		Minimum set range		Rangeability	Overpressure limit (without hysteresis)∗∗	
1	0…1000bar	(0…100MPa)	10bar	(1MPa)	100:1	1200 bar	(120 MPa)
2	0..300 bar	(0..30 MPa)	3 bar	(300 kPa)	100:1	450 bar	(45 MPa)
3	0…160 bar	(0…16MPa)	1.6bar	(160kPa)	100:1	450 bar	(45 MPa)
4	0...70 bar	(0...7 MPa)	0.7 bar	(70 kPa)	100:1	140 bar	(14 MPa)
5	0...25 bar	(0...2.5 MPa)	0.25 bar	(25 kPa)	100:1	50 bar	(5 MPa)
6	0...7 bar	(0...0.7 MPa)	0.07 bar	(7 kPa)	100:1	14 bar	(1.4 MPa)
7	-1…7bar	(-100…700kPa)	0.07 bar	(7 kPa)	114:1	14 bar	(1.4 MPa)
8	0...2 bar	(0...200 kPa)	100 mbar	(10 kPa)	20:1	4 bar	(400 kPa)
9	0...1 bar	(0...100 kPa)	50 mbar	(5 kPa)	20:1	2 bar	(200 kPa)
10	-0.5...0.5 bar	(-50...50 kPa)	50 mbar	(5 kPa)	20:1	2 bar	(200 kPa)
11	0...0.25 bar	(0...25 kPa)	25 mbar	(2.5 kPa)	10:1	1 bar	(100 kPa)
12	-100...100 mbar	(-10...10 kPa)	20 mbar	(2 kPa)	10:1	1 bar	(100 kPa)
13	-15...70 mbar∗	(-1.5...7 kPa)	5 mbar	(0.5 kPa)	17:1	0.5 bar	(50 kPa)
14	0...1.3 bar abs	(0...130 kPa abs)	100 mbar abs	(10 kPa abs)	13:1	2 bar	(200 kPa)
15	0...7 bar abs	(0...0,7 MPa abs)	100 mbar abs	(10 kPa abs)	70:1	14 bar	(1.4 MPa)
16	0...25 bar abs	(0...2.5 MPa abs)	0.25 bar abs	(25 kPa abs)	100:1	50 bar	(5 MPa)
17	0...70 bar abs	(0...7 MPa abs)	0.7 bar abs	(70 kPa abs)	100:1	140 bar	(14 MPa)

∗ ***only for tranmitters without diaphragm seal***
Measurement of lower pressure ranges, possible using transmitter DPR-2000GALW with GP process connection.

D-Series
Models: DPC-2000ALW

Technical Data

Metrological parameters

Accuracy ≤ ±0.075% of the calibrated range

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

Thermal error < ±0.05% (FSO) / 10°C
(0.1% for ranges 12, 13)
max. ±0.25% (FSO) in the whole compensation range
(0.4% for ranges 12, 13)

Thermal compensation range -25...80°C
-40...80°C – special version

Additional electronic damping 0...60 s

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

Electrical parameters

Power supply:
model DPC-2000ALW 12...55 V DC (Ex ia 13,5...28 V)
(Ex d 13,5…45V)
model DPC-2000ALE 12...36 V DC

Additional voltage drop
when display illumination switched on 3 V

Output signal 4...20 mA, two wire transmission
special version: 0…20 or 0…5, 4…20 [mA]

Load resistance $R[\Omega] \le \frac{U_{sup}[V] - 12V^{*}}{0{,}02A} \cdot 0.85$

∗ - 15 V when display illumination switched on

Resistance required for communication 250...1100 Ω

Materials

Wetted parts and diaphragms: 316Lss, Hastelloy C 276, Au

Casing: Aluminium, 316SS

Material of window: polycarbonate glass, hardened glass

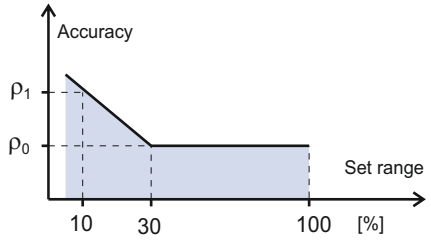
Operating conditions

Operating temperature range (ambient temp.)	-40...85°C
Exi version	-40…80°C
Exd version	-40…75°C
Medium temperature range	-40...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



ρ_0 – error for nominal measuring range (0...100% FSO)

ρ_1 – error for range 0...10% FSO

$\rho_1 = 2 \times \rho_0$

Numerical error values are given in the technical data under metrological

Measurements in the hazardous areas

For pressure measurements in the areas under explosion hazard the Atex intrinsically safe transmitters, Ex II 1/2G Ex ia IIB T5 Ga/Gb are available

Technical data

Metrological parameters, materials of process connection, diaphragms and casing, and operating conditions – see the description on previous page.

Electrical parameters

Power supply (from DP/PA coupler)

10.5 ÷28V DC

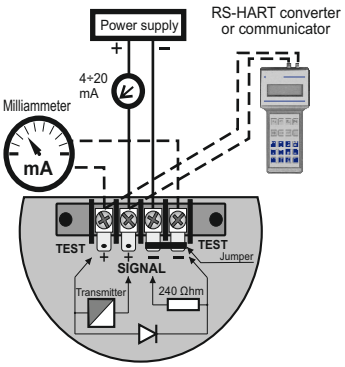
12.05 ÷28V DC - when display illumination switched on. Power supply from intrinsically-safe coupler according to FISCO requirements.

Vi=15VDC

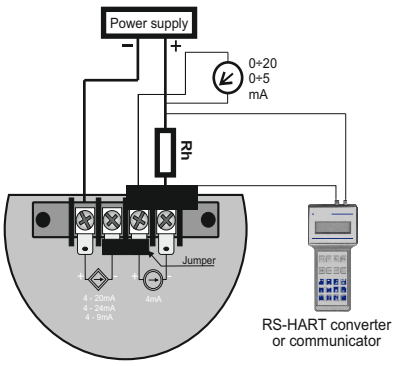
Ii=0.38A for IIB

Current consumption 14mA

Electrical diagrams for transmitters



Version: **DPC-2000ALW**
output signal: 4-20mA



Version: **DPC-2000ALE**
with 0…5 or 0…20mA output signal

D-Series
Models: DPC-2000ALW

How to Order

Model	Code	Description
DPC-2000		Smart pressure transmitter.
Casing, output signal,	→ ALW	Aluminum housing, IP66/IP67, with display, output 4- 20mA + Hart
	ALE	Aluminium housing, IP66/IP67, with display, output 4-20mA + Hart, 0 – 20mA+ Hart, 0 – 5mA+ Hart,
	ALW/SS	Stainless steel housing, IP66/IP67, with display, output 4-20mA + Hart
Versions, certificates∗	/Exia	Ex I M1 Ex ia I Ma (steel enclosure only) Ex II 1/2G Ex ia IIC T4/T5 Ga/Gb Ex II 1/2G Ex ia IIIB T4/T5 Ga/Gb (version with Teflon shielded cable) Ex II 1D Ex ia IIIC T105°C Da — (not available for ALE)
	/Exd	Ex I M2 Ex d ia I Mb (steel enclosure only) Ex II 1/2G Ex ia/d IIC T6/T5 Ga/Gb Ex II 1/2D Ex ia/t IIIC T85°C/T100°C Da/Db Packing gland available on request. — For pressures >250mbar (not available for ALE)
	/TIen	For oxygen service (sensor filled with Fluorolube fluid), only M and G1/2 conn.
	/-60…+50C	Extended thermal compensation range -60 ÷ 50°C
∗) more than one option is available	/-40…+80C	Extended thermal compensation range -40 ÷ 80°C

Nominal measuring range	Range	Min. set range
/0÷1000bar∗∗	0÷1000bar (0÷100MPa)	10bar (1MPa)
/0÷300bar	0÷300bar (0÷30MPa)	3bar (300kPa)
/0÷160bar∗∗	0÷160bar (0÷16MPa)	1.6 bar (160kPa)
/0÷70bar	0÷70bar (0÷7MPa)	0,7bar (70kPa)
/0÷25bar	0÷0.25bar (0÷2,5MPa)	0.25bar (25kPa)
/0÷7bar	0÷7bar (0÷700KPa)	0.07bar(7kPa)
/0÷2bar	0÷2bar (0÷200kPa)	100mbar (10kPa)
/0÷1bar	0÷1bar (0÷100kPa)	50mbar (5kPa)
/0÷0.25bar	0÷0.25bar (0÷25kPa)	25mbar (2.5kPa)
/-0.5÷ +0.5bar	-0.5÷0,5bar (-50÷50kPa)	50mbar (5kPa)
/-1÷6bar	-1÷6bar (-100÷600kPa)	300mbar (30kPa)
/-100÷100mbar	-100÷100mbar (-10÷10kPa)	20mbar (2kPa)
/-15÷70mbar	-15÷70mbar (-1,5÷7kPa)	5mbar (0.5kPa)
/0÷1.3bar ABS	0÷1.3bar absolute pressure (0÷130kPa abs)	50mbar abs (5kPa abs)
/0÷7barABS	0÷7bar absolute pressure (0÷700kPa abs)	0,07bar abs (7kPa abs)
/0÷25barABS	0÷25bar absolute pressure (0÷2.5MPa abs)	0.25bar abs (25kPa abs)
/0÷70bar ABS	0÷70bar absolute pressure (0÷7MPa abs)	0.7bar abs (70kPa abs)

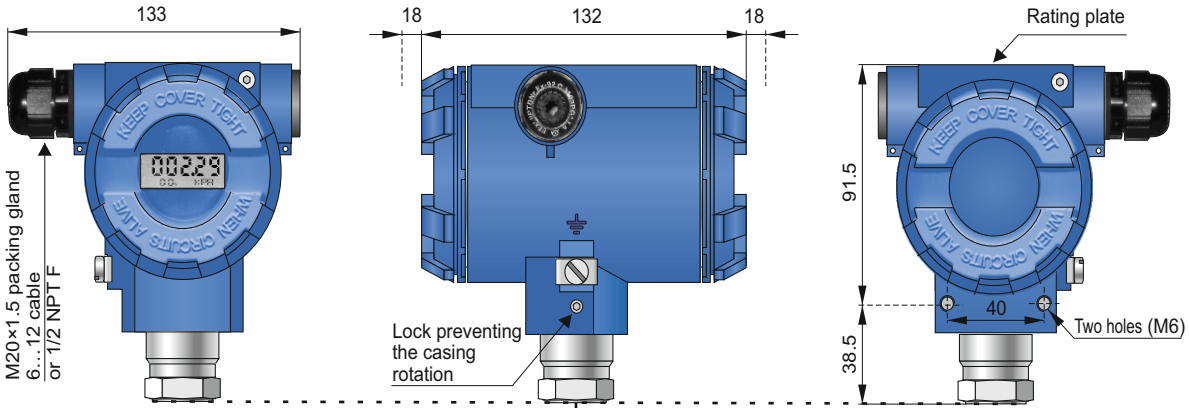
∗∗) non-standard ranges available on request

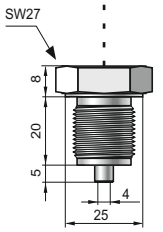
Measuring set range	/…÷… [required units]	Calibrated range in relation to 4mA and 20mA output
Process connections	/M	Thread M20x1.5 (male) with Ø4hole, wetted parts SS316L
	/M..(Au)	Thread M20x1.5 (male) with Ø4hole, gold plated diaphragm (range no. 1, 2, 3, 4)
	→ /G1/2”	Thread G1/2” (male) with Ø4hole , wetted parts SS316L
	/G1/2”(Au)	Thread G1/2” (male) with Ø4hole , gold plated diaphragm (range no. 1, 2, 3, 4)
	/G1/4”	Thread G1/4” (male), wetted parts SS316L (Pressure limits: min. 10mbar / max. 350bar)
	/P	Thread M20x1.5 (male) with Ø12hole, wetted parts SS316L
	/P (Hastelloy)	Thread M20x1.5 (male) with Ø12hole, wetted parts Hastelloy C 276
	/GP	Thread G1/2” (male) with Ø12hole , wetted parts SS316L
	/GP (Hastelloy)	Thread G1/2” (male) with Ø12hole , wetted parts Hastelloy C 276
		Not avaliable with range 1, 2
	/CM30x2	Thread M30x2 with flush diaphragm, wetted parts SS316L (Pressure limits: min. 0.1bar / max. 70bar)
	/CM30x2 (Hastelloy)	Thread M30x2 with flush diaphragm, wetted parts Hastelloy C 276 (Pressure limits: min. 0.1bar / max. 70bar)
	/CG1”	Thread G1” with flush diaphragm, wetted parts SS316L (Pressure limits: min. 0.1bar / max. 70bar)
	/CG1/2”	Thread G1/2” with flush diaphragm, wetted parts SS316L (Pressure limits: min. 2.5bar / max. 600bar)
	/1/2”NPT M	Thread ½”NPT Male, wetted parts SS316L
	/1/2”NPT F	Thread M20x1.5 with adapter to ½”NPT Female, wetted parts SS316L
	/code of diaphragm seal	Diaphragm seal (see chapter of diaphragm seals)
Electrical connection	→ *(without marking)*	Packing gland M20x1.5
	/US	Thread 1/2NPT Female
Accessories	/AL	Mounting bracket type AL. for 2” pipe, material zinced steel
	/AL..(SS)	Mounting bracket type AL. for 2” pipe, material stainless steel
	/ST	Stainless Steel plate riveted to the housing
∗) more than one option is available	/MT	Stainless Steel Tag plate mounted on wire
Other specification	/…	Description of required parameters (e.g. non-standard process connection G3/4”, M22x1.5)
The most typical specification is marked by “→” mark.		

Example 2: Pressure transmitter with display, output 4..20mA + HART, version EExia, nominal measuring range 0..25bar, calibrated range 0..16bar, process connection G1/2”, electrical connection 1/2NPT F, mounting bracket for 2” pipe

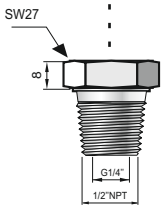
DPC-2000ALW/EExia/0..25bar/0..16bar/G1/2/US/AL

Dimensions

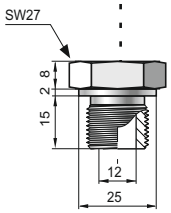




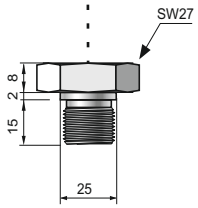
G1/2 type
G1/2″, 4 hole
M type
M20×1.5, 4 hole



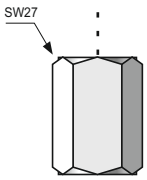
1/2"NPT type
1/2"NPT male +
internal thread G1/4"



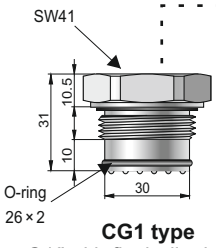
GP type
G1/2″, 12 hole
P type
M20×1.5, 12 hole



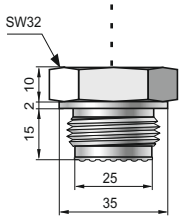
G1/4"



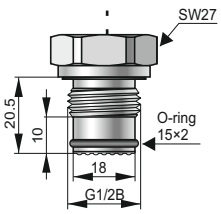
1/2"NPT F type
internal thread 1/2-
14NPT



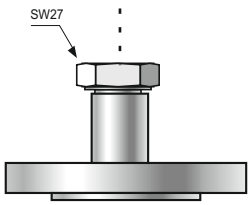
CG1 type
G1″ with flush diaphragm



CM30×2 type
M30×2 with flush
diaphragm



CG1/2 type
G1/2″ with flush
diaphragm



Version with direct or remote mount diaphragm seal.
Diaphragm seal data

D-Series
Models: DPC-2000ALW

ISO9001

FM00720

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