

MANUAL

D2415

Pressure transmitter with stainless steel diaphragm








- Gauge and absolute pressure measurement of liquids, gases and steams
- Ranges from 100 kPa to 60 MPa
- Current output 4 to 20 mA powered by loop
- Accuracy 1 %, 0.5 % or 0.25 %
- Stainless steel diaphragm, various input designs
- For mediums compatible with stainless steel 1.4435, 1.4301 in combination with Viton

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1. General instructions and information

1.1 Symbols used

-  Symbol of warning; for safe use it is necessary to proceed according to the instructions
-  Symbol CE certifies compliance of the product with the respective EU directives
-  Symbol of "Output"
-  Symbol of "Supply"
-  This product does not belong to public waste and it is subjected to separate collection

1.2 Safety warnings and cautions

 The equipment shall be supplied from a safe voltage source that meets all requirements of the standard EN 61010-1 and must be installed in compliance with national requirements and standards providing safety.

The equipment may only be installed by a qualified personnel who are familiar with national and international laws, directives, standards and with the instructions manual. The instrument may not be used for other purposes than as specified in this instruction manual.

For elimination of a risk of injury from electric shock or fire the maximum operational parameters of the instrument may not be exceeded, particularly range of operating temperature because of exposure to heat from connected or surrounding technological equipment must not be exceeded!

The equipment should be installed in suitable environment without any direct sunlight, occurrence of dust, high temperatures, mechanical vibrations and shocks and protected against rain and excessive moisture.

1.3 Scope of delivery

With the product is delivered:

- Manual for installation, operation and maintenance
- Certificate of calibration (only with calibrated sensors)

1.4 Description of the delivery and packing

The product is packaged in a protective cover and provided with an identification label with a mark of the output control.

The product must not be exposed to direct rain, vibrations and shocks during transport.

1.5 Storage

Store the instrument in dry rooms at temperatures from -40 to +80 °C without condensation of water vapours.

1.6 Installation, operation and maintenance

During installation, commissioning, operation and maintenance follow the instructions in chapter 4.

1.7 Spare parts

Any of the compact parts of the product can be also ordered as a spare part if there are not required special procedures or technological operations for the exchange.

1.8 Repairs

Products are repaired by the manufacturer. The products for repair should be sent together with description of the fault or defect in a packing that guarantees damping of shocks and vibrations and protects against damage during transport.

1.9 Warranty

The manufacturer guarantees technical and operational parameters of the products during the warranty period within scope of the applicable documentation. Warranty period is specified with individual items and begins from the day of takeover of the goods by the purchaser or delivery to the carrier. Any claims concerning to defects of the goods together can be filed with the seller within the warranty period and the claimed product shall be presented. The claiming party shall give identification of the product, number of the delivery note and description of the fault or defect.



The manufacturer is not responsible for any defects caused by improper storage, incorrect connection, damages caused by external effects, in particular by effects of factors with excessive values, unqualified installation, improper operation or common wearing.

2. End of service and disposal

2.1 End of service

Dismounting and disposal of the device is possible after disconnecting of power supply.

2.2 Disposal

 The products do not contain any environmentally hazardous parts. When disposing the packing and  destroyed or irreparably damaged product proceed according to the local regulations.

4. Installation, operation and maintenance

4.1 Installation and commissioning

4.1.1 General information

- * Do not use any force when installing the device!
- * Keep in mind that this is an electronic device.
- * Handle this high-sensitive electronic precision measuring device with care to prevent damage of the device.
- * To avoid damaging the diaphragm, remove protective cap (if delivered) directly before starting assembly.
- * The protective cap has to be stored! Place the protective cap on the pressure port again immediately after disassembling.
- * Handle the unprotected diaphragm very carefully - it is very sensitive and may be easily damaged.
- * After installation and proper connection, check the tightness of pressure connections.
- * Device is put into operation by switching on the power supply.

4.1.2 Special information

- * Take note that no assembly stress occurs at the pressure connection, since this may cause a shifting of the characteristic curve. This is especially important for very small pressure ranges.
- * If there is any danger of damage by lightning or overpressure when the device is installed outdoor, we suggest putting a sufficiently dimensioned overpressure or overvoltage protection between the supply or switch cabinet and the device.
- * For outdoor and damp areas installations follow these instructions:
 - If possible, choose such assembly position and location, that the sensor is protected against rain and that the condensation water can freely flow-off on the surface and doesn't stay in the holes for screw, seal grooves or in vent opening (small hole next to the electrical connection).
 - Avoid permanent fluid at sealing surfaces!
 - Install the device in such way that it is protected from direct solar irradiation. Adverse conditions can cause that the permissible operating temperature can be overstepped and the operability of the device can be affected or damaged. In addition, if the internal pressure increases due to solar irradiation, temporary measurement errors may be caused.
- * For devices for gauge pressure with gauge reference (small hole next to the electrical connection), take note to:
 - Check and verify if the IP protection is sufficient for the intended environment.
 - Install the device in such a way, that the gauge reference necessary for the correct measurement of gauge pressure (small hole next to the electrical connection) is protected from dirt and moisture. If the gauge reference is clogged by liquid or dirt, the device will not function properly and will not measure precisely. Furthermore, getting moisture inside the sensor can lead to permanent damage of the device.

4.1.3 Installation steps

Follow detailed instructions according to specific pressure connection below:

Installation steps for DIN 3852

DO NOT USE ANY ADDITIONAL SEALING MATERIALS, LIKE YARN, HEMP OR TEFLON TAPE!

- * Check to ensure the proper groove fitting of the o-ring and additionally to ensure no damage to the o-ring.
- * Ensure that the sealing surface of the taking part is perfectly smooth and clean.
- * Screw the device into the corresponding thread by hand.
- * Devices with a spanner flat have to be tightened with an open-end wrench (for G1/4": approx. 5 Nm; G1/2" and M20x1.5: approx. 10 Nm).

Installation steps for EN 837

- * Use a suitable seal, corresponding to the medium and the pressure input (e. g. a cooper gasket). Sealing is not part of the supply.
- * Ensure that the sealing surface of the taking part is perfectly smooth and clean.
- * Screw the device into the corresponding thread by hand.
- * Tighten it with a wrench (for G1/4": approx. 20 Nm; G1/2": approx. 50 Nm).

Installation steps for NPT

- * Use a suitable seal (e. g. a PTFE-strip).
- * Screw the device into the corresponding thread by hand.
- * Tighten it with a wrench (for 1/4" NPT: approx. 30 Nm; 1/2 NPT": approx. 70 Nm).



When both connections of threaded parts are made of stainless steel, there is danger of galling (formation of cold weld). This can also occur during ordinary screwing by hand without using tightening key. If the cold weld is made, the thread is then damaged and parts are unusable. Before first screwing, it is therefore necessary to check whether threads are free of impurities (and clean if needed) and then treat the threads against galling (formation of cold weld) by appropriate lubricant. For example use paste G-Rapid plus. For tapered threads is usually used Teflon tape.

4.1.4 Electrical connection

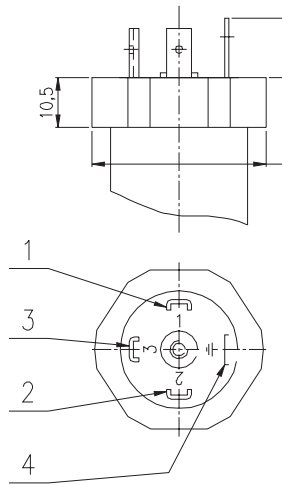
See the following figure.

4.2 Operation and maintenance

The device is maintenance free. In case of the contamination clean the pressure connection regularly and clean it regardless to medium and contamination. Do not use aggressive cleaning solvents. Do not use pressurized water.

Electrical connection

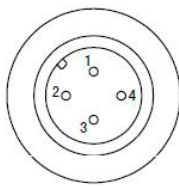
Connector ISO 4400 (DIN 43650) (IP 65, in the short-term, not suitable for outdoor installation without additional rain-proof protection)



Output 4 to 20 mA, power supply from the current loop:
 1 - PLUS output and power supply
 2 - MINUS output and power supply

Connector M12 (IP 65)

When measuring small relative pressures, it is necessary to use the electric cable with a through capillary for supply of ambient atmospheric pressure to the measuring membrane in order to provide correct measurement results.



Output 4 to 20 mA, power supply from the current loop:
 1 - PLUS output and power supply
 3 - MINUS output and power supply

4.3 Error handling

Malfunction	Possible cause	Error detection / corrective
no output signal	faulty connection	inspect the connection
	line break	inspect all line connections necessary to supply the device (including the connector plugs)
	defective amperemeter (signal input)	inspect the amperemeter (fuse) or the analogue input of the PLC
analogue output signal too low	load resistance too high	verify the value of the load resistance
	supply voltage too low	verify the output voltage of the power supply
	defective energy supply	inspect the power supply and the applied supply voltage at the device
small shift of output signal	diaphragm is highly contaminated	careful cleaning with non-aggressive cleaning solution and a soft brush or sponge; incorrect cleaning can cause irreparable damages on diaphragm or seals
	diaphragm is calcified or coated with deposit	if possible, it is recommended to send the device to JSP, s.r.o. for decalcification or cleaning
large shift of output signal	diaphragm is damaged (caused by overpressure or manually)	check the diaphragm; if it is damaged, please send the device to JSP, s.r.o. for repair
wrong or no output signal	manually, thermally or chemically damaged cable	check the cable; a possible consequence of a damaged cable is pitting corrosion on the stainless steel housing; if you determine this please return the device to JSP, s.r.o. for repair

5. Product specifications

5.1 Technical specifications

Supply voltage:

12 to 36 VDC for 4 to 20 mA current output
(internally protected against polarity inversion)

Power consumption:

max. 0.8 W

Range of ambient temperature:

-20 to +85 °C

Humidity:

0 to 100 % r. h. with condensation

Working position:

arbitrary (for lower pressure zero calibration after installation may be needed)

Connection of wires:

screw terminals for cross section 0.5 to 1.5 mm²

Protection:

IP 65 (in the short-term)

Dimensions:

see dimensional drawing

Weight:

approx. 140 g

Materials:

housing - stainless steel 1.4301
connector - PA
media wetted materials - stainless steel
1.4435 and 1.4301

Reference conditions:

temperature 23 ± 5 °C
vertical working position with pressure port down
supply voltage 24 VDC
load of 250 Ohm

5.1.1 Input

Input pressure ranges:

see ordering table

Design of pressure port:

see ordering table and dimensional drawings

Overpressure:

150 % of span

5.1.2 Output

Output signal:

4 to 20 mA current signal

Characteristics:

linear with pressure

Total accuracy:

≤ ±1 % of span

Nonlinearity:

≤ ±0.3 % of range

Hysteresis:

≤ ±0.1 % of range

Adjustability of span:

Adjustability of start:

Damping:

Step response time (90%):

10 ms

Load resistance:

$R_L [\Omega] \leq (U_N [V] - 12) / 0.022$

5.2 Supplementary parameters

Lifetime:

> 100 x 10⁶ pressure cycles

Output current limitation:

max. 23 mA

Indication of sensor or transmitter error:

Influence of ambient temperature:

zero accuracy < ±0.6 % of max span for temperature from -20 to +85 °C for G116 to G910 and A116 to A240 ranges
span accuracy < ±0.8 % of span for temperature from -20 to +85 °C for G116 to G910 and A116 to A240 ranges
zero accuracy < ±1.5 % of max span for temperature from 0 to +50 °C for G040 and A040 ranges
span accuracy < ±1 % of span for temperature from 0 to +50 °C for G040 and A040 ranges

Warm-up time:

5 s

Long-term stability:

≤ ±0.5 % of span per year

6. Tests, certificates, standards and marking

6.1 Standards

Metrological parameters:

EN 60770-1

Electromagnetic compatibility:

EN 61326-1

6.2 Marking and type tag information

	JSP Industrial Controls		D2415
	Raisova 547, CZ-50601 Jicin, Czech Republic		
Model: D2415 G310 GE2 P10 CR1 KN1		⚡ 12...36 VDC	  
Thread: G1/4" Sensor: 0.16 MPa G		➡ 4...20 mA	
Connection: 1.U+ 2.U- 4.GND S/No.: 1234567890			

7. Ordering information

7.1 Ordering table

Type	Description
◦ D2415	Pressure transmitter with stainless steel diaphragm
Code	Version, range
◦ A110	Absolute pressure, 0 ÷ 100 kPa
◦ A116	Absolute pressure, 0 ÷ 160 kPa
◦ A125	Absolute pressure, 0 ÷ 250 kPa
◦ A140	Absolute pressure, 0 ÷ 400 kPa
◦ A160	Absolute pressure, 0 ÷ 600 kPa
◦ G110	Gauge pressure, 0 ÷ 100 kPa
◦ G116	Gauge pressure, 0 ÷ 160 kPa
◦ G125	Gauge pressure, 0 ÷ 250 kPa
◦ G140	Gauge pressure, 0 ÷ 400 kPa
◦ G160	Gauge pressure, 0 ÷ 600 kPa
◦ G210	Gauge pressure, 0 ÷ 1.0 MPa
◦ G216	Gauge pressure, 0 ÷ 1.6 MPa
◦ G225	Gauge pressure, 0 ÷ 2.5 MPa
◦ G240	Gauge pressure, 0 ÷ 4.0 MPa
◦ G260	Gauge pressure, 0 ÷ 6.0 MPa
◦ G310	Gauge pressure, 0 ÷ 10 MPa
◦ G316	Gauge pressure, 0 ÷ 16 MPa
◦ G325	Gauge pressure, 0 ÷ 25 MPa
◦ G340	Gauge pressure, 0 ÷ 40 MPa
◦ G360	Gauge pressure, 0 ÷ 60 MPa
◦ G910	Gauge pressure, -100 ÷ 0 kPa
999	Other
Code	Pressure connector
◦ ME2	M20x1.5 EN 837-1/-3 (manometric)
◦ GD4	G1/4" DIN 3852
◦ GE2	G1/2" EN 837-1/-3 (manometric)
◦ GD2	G1/2" DIN 3852
◦ N2	1/2" NPT
◦ N4	1/4" NPT
999	Other
Code	Sealing
◦ 1	Viton (FKM)
Code	Accuracy
◦ P10	1 %
◦ P05	0.5 %
◦ P03	0.25 %
P99	Other
Code	Calibration
◦ KTL	Certificate of calibration
Code	Output signal
◦ CR	4 to 20 mA / 2-wire
Code	Electrical connection
◦ KN1	ISO 4400 (DIN 43650) connector (IP 65)
KN3	M12x1, 4-pin (Binder 713 metal) (IP 67)
KN4	Cable outlet / cable 2 m (IP 67) (other lengths of cable consult with supplier)
999	Other
Code	Optional accessories
PGM1	Thread reduction G1/4" female / M20x1.5 male (manometric, EN 837-1/-3), stainless steel material 1.4541
PGM2	Thread reduction G1/2" female / M20x1.5 male (manometric, EN 837-1/-3), stainless steel material 1.4541
• VZNM	Testing valve of stainless steel with M20x1.5 nut, (1 110 416, see data sheet No. 0082)
• VZNG	Testing valve of stainless steel with G1/2" nut, (1 110 492, see data sheet No. 0082)
Example of order: D2415 G216 ME2 P10 KTL CR KN1	

• ... Ex stock version ◦ ... Marked version can be dispatched up to four weeks



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