MANUAL

D2415L

Submersible Level Transmitter

- **Level measurement of liquids, sludges, suspensions a emulsions.**
- **Ranges from 10 kPa to 10 MPa (1 to 100 m of water column).**
- **Accuracy 1 %, 0,5 % and 0,25 %.**
- **Diameter of probe 27 mm.**
- **For mediums compatible with stainless steel 1.4301, 1.4435 in combination PUR and Viton (FKM).**
- **Easy cleaning of isolating diaphragm.**
- **Cable with integrated air tube for atmosferic reference.**
- **Housing IP 68.**

Contents

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 government 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 -25 to +70 °C without condensation of water vapours.

1.6 Installation and commissioning

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

Products are covered by a warranty for a period of 24 months from the delivery date on the delivery note. The manufacturer guarantees technical and operational parameters of the products 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 disposale

2.1 End of service

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

2.2 Disponsal

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.

3. Product description

D2415L – Submersible Level Transmitter

- **Level measurement of liquids, sludges, suspensions a emulsions.**
- **Ranges from 10 kPa to 10 MPa (1 to 100 m of water column).**
- **Accuracy 1 %, 0,5 % and 0,25 %.**
- **Diameter of probe 27 mm.**
- **For mediums compatible with stainless steel 1.4301, 1.4435 in combination PUR and Viton (FKM).**
- **Easy cleaning of isolating diaphragm.**
- **Cable with integrated air tube for atmosferic reference.**
- **Housing IP 68.**

3.1 Application

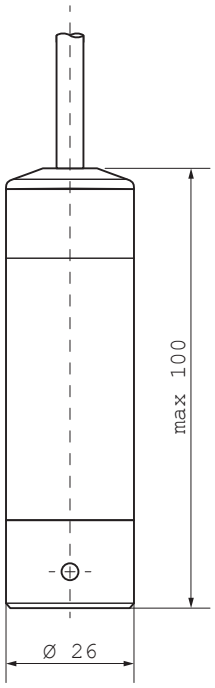
Submersible level transmitter D2415L is suitable for continuous fluid level measurement. By removing the protective cover, the transmitter can be easily adapted to level measurement of the medium with higher viscosity (sludge, etc.). The main areas of application of submersible level transmitters are sewage treatment plants, water treatment plants, level measurement in water wells, natural and artificial reservoirs, monitoring of groundwater levels, water gradient measurements in hydropower plants and level measurement in open tanks.

3.2 Description

The basic element of the submersible level transmitter D2415L is its own pressure sensor. It is a semiconductor strain gauge in stainless steel housing with welded stainless diaphragm and inert oil content. The hydrostatic pressure is directly proportional to the level of the liquid level above the diaphragm. It is transmitted through the inert oil to the measuring semiconductor diaphragm. The deflection of the measuring diaphragm causes balancing the strain gauge. The electronics unit provides power to the sensor, signal amplification, temperature compensation, and conversion to a standard signal. The standard signal is directly proportional to the level of liquid above the probe. The design of the level transmitter is robust, mechanically durable and miniature at the same time.

3.3 Dimensional drawings

Standard



4. Installation, operation and maintenance

4.1 Installation and commissioning

4.1.1 General information

Make sure that the measured media in contact with the medium and sensor fully correspond to the intended use. Technical specifications in this manual are mandatory and must be strictly observed.

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.

The probe must be installed in such a way that rubbing or impact of the device, e. g. against a tank wall, is prevented. It is also important to consider the operating conditions such as flow conditions.

In the case of relative pressure gauges, the cable contains a ventilation hose for pressure equalization. Route the end of the cable into an area or suitable connection box which is as dry as possible and free from aggressive gases, in order to prevent any damage.

To prevent damage to the diaphragm remove the protective cap just right before mounting.

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.

Do not use any force when installing the device to prevent damage of the device and the plant.

When placing the device into operation or after maintenance work, the probe has to be submerged slowly into the medium! A rough immersion into the medium can damage or destroy the diaphragm.

Mount the device according to your demands.

Device is put into operation by switching on the power supply.

4.1.2 Special information

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.

4.1.3 Installation steps

Removing the protection cap (if necessary)

For the protection of the diaphragm, some of the probes have a plugged-on protection cap. If the device shall be used in highviscosity media such as sludge, a removal of the cap before start-up is necessary. Thus, the sensor becomes flush and the medium will attain quickly to the diaphragm.

If it is necessary for your application to remove the protection cap, this has to be done with utmost care. To prevent a damage of the diaphragm.

4.1.4 Electrical connection

See the following figure.

4.2 Operation and maintenance

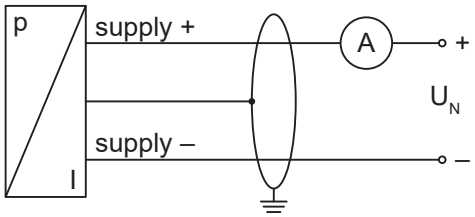
In principle, this device is maintenance-free. If desired, the housing of the device can be cleaned when switched off using a damp cloth and non-aggressive cleaning solutions.

Depending on the measuring medium, however, the diaphragm may be polluted or coated with deposit. If the medium is known for such tendencies, the user has to set appropriate cleaning intervals. After placing the device out of service correctly, the diaphragm can usually be cleaned carefully with a non-aggressive cleaning solution and a soft brush or sponge. If the diaphragm is calcified, it is recommended to send the device to manufacturer for decalcification.

Pin configuration:

Connection	Wire colors (DIN 47100)
	2-wire
Supply +	red
Supply –	black
Grounding	shielding

2-wire connection (current):



4.3 Error handling

-- No output signal --

Possible cause	Error detection / correction
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 --

Possible cause	Error detection / correction
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 --

Possible cause	Error detection / correction
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 --

Possible cause	Error detection / correction
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 --

Possible cause	Error detection / correction
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

Application::
liquids, sludges, suspensions a emulsions

Measuring principle:
piezoresistive

Ranges and overload capacity:
see ordering table

Output signal:
current 4 to 20 mA (2-wire)

Supply voltage:
U_N = 12 to 36 V_{DC}

Load resistance:
$R_{max} = [(U_N - U_{N\,min}) / 0{,}022\ A]\ \Omega$

Accuracy::
≤ ±1 % HMR
≤ ±0,5 % HMR
≤ ±0,25 % HMR for ranges over 40 kPa

Long term stability:
≤ ±0,1 % HMR / year (at reference conditions)

Response time:
≤ 10 ms

5.2 Supplementary specifications

Effect of temperature changes:
ranges < 40 kPa ≤ ±1,0 % HMR
(in compensated range -10 to 70 °C)
rozsah ≥ 40 kPa ≤ ±0,75 % HMR
(in compensated range -10 to 70 °C)

Influence effects – load:
≤ 0,05 % HMR / kΩ

Influence effects – supply:
≤ ±0,05 % HMR / 10 V

EMC (Electromagnetic compatibility):
emission and immunity according to EN 61326

Short-circuit protection:
permanent

Reverse polarity protection:
no damage, but also no function

Current consumption:
max. 25 mA

5.3 Operation conditions

Permissible temperatures:
medium temperature -10 to +80 °C

Storage temperature:
-25 to +70 °C

5.4 Other data

Housing:
IP 68

Weight:
approx. 200 g (without cable)

Materials:
Housing: stainless steel 1.4301
Seal: Viton (FKM)
Diaphragm: stainless steel 1.4435
Protection cap: POM
Cable sheath: PUR (-10 to +70 °C), black

Electrical connections:
cable with integrated air tube for atmospheric pressure reference

HMR ... upper range limit

6. Ordering information

6.1 Ordering table D2415L

Range		D2415 ① ② ③ ④ ⑤ ◯
1. code	**Range**	**Overload capacity**
L110	0 to 1,0 m H_2O (0 to 9,807 kPa)	30 kPa
L116	0 to 1,6 m H_2O (0 to 15,691 kPa)	30 kPa
L125	0 to 2,5 m H_2O (0 to 24,517 kPa)	50 kPa
L140	0 to 4,0 m H_2O (0 to 39,227 kPa)	100 kPa
L160	0 to 6,0 m H_2O (0 to 58,84 kPa)	150 kPa
L210	0 to 10 m H_2O (0 to 98,07 kPa)	150 kPa
L216	0 to 16 m H_2O (0 to 156,91 kPa)	240 kPa
L225	0 to 25 m H_2O (0 to 245,17 kPa)	380 kPa
L240	0 to 40 m H_2O (0 to 392,27 kPa)	600 kPa
L260	0 to 60 m H_2O (0 to 558,4 kPa)	1 MPa
L310	0 to 100 m H_2O (0 to 980,7 kPa)	1,5 MPa
L999	other range	

Seal	D2415 ① ② ③ ④ ⑤ ◯
2. code	**Seal**
1	Viton (FKM)
9	other

Accuracy	D2415 ① ② ③ ④ ⑤ ◯
3. code	**Accuracy**
P10	1 %
P05	0,5 %
P02	0,25 % (for ranges min. 4 m H_2O)
P99	other

Output signal	D2415 ① ② ③ ④ ⑤ ◯
4. code	**Output signal**
CR	4 to 20 mA / 2-wire

Cable length	D2415 ① ② ③ ④ ⑤ ◯
5. code	**Cable length**
KN4(___)	specify length in meters

Optional versions and accessories	D2415 ① ② ③ ④ ⑤ ●
Code	**Description**
KTL	certificate of calibration

Example of orde:

D2415 L116 1 P10 CR KN4(10 m) KTL

JSP Industrial Controls

JSP, s.r.o.
Raisova 547, 506 01 Jičín
Czech Republic
+420 493 760 811
jsp@jsp.cz
www.jsp.cz

JSP Service Line
+420 605 951 061

www.jsp.cz