SCHNEIDER MESSTECHNIK

Operating Manual

ILMK / ILMP probes for IS areas

DX14-ILMK 358, DX14-ILMK 382,
DX14B-ILMK 387, DX14B-ILMK 387H,
DX15A-ILMK 358H, DX15A-ILMK 382H,
DX19-ILMK 307, DX19-ILMP 307, DX19-ILMP 307i, DX19-ILMP 308, DX19-ILMP 308i

ILMP 308

CE 0637 Ex IEC IECEx

RCHS REACH SIL c UL us LISTED

READ THOROUGHLY BEFORE USING THE DEVICE
KEEP FOR FUTURE REFERENCE

ID: BA_TS_EX_E | Version: 01.2022.0

1. General and safety-related information on this operating manual

This operating manual enables safe and proper handling of the product, and forms part of the device. It should be kept in close proximity to the place of use, accessible for staff members at any time.

All persons entrusted with the mounting, installation, putting into service, operation, maintenance, removal from service, and disposal of the device must have read and understood the operating manual and in particular the safety-related information.

The following documents are an important part of the operating manual:

- *Data sheet*
- *Type-examination certificate*

For specific data on the individual device, please refer to the respective data sheet.

Download these by accessing *www.ics-schneider.de* or request them: info@ics-schneider.de

The IS versions of our products are variants of the standard products.

Example:

Standard: ILMK 358 → IS version: DX14-ILMK 358

In addition, the applicable accident prevention regulations, safety requirements, and country-specific installation standards as well as the accepted engineering standards must be observed.

For the installation, maintenance and cleaning of the device, the relevant regulations and provisions on explosion protection (VDE 0160, VDE 0165 and/or EN 60079-14) as well as the accident prevention regulations must absolutely be observed. The device was designed by applying the following standards:

DX14: EN IEC 60079-0:2018
EN 60079-11:2012

DX14B: EN 60079-0:2018
EN 60079-11:2012
IEC 60079-0: 2017 Edition 7
IEC 60079-11: 2011 Edition 6

DX15A: EN 60079-0:2012+A11:2013
EN 60079-11:2012

DX19: EN IEC 60079-0:2018
EN 60079-11:2012
IEC 60079-0:2011 Edition 6.0
IEC 60079-11:2011 Edition 6.0

1.1 Symbols used

Warning word	- Type and source of danger - Measures to avoid the danger

Warning word	Meaning
DANGER	- Imminent danger! - Non-compliance **will result in** death or serious injury.
WARNING	- Possible danger! - Non-compliance **may result in** death or serious injury.
CAUTION	- Hazardous situation! - Non-compliance **may result in** minor or moderate injury.

NOTE - draws attention to a possibly hazardous situation that may result in property damage in case of non-compliance.

✓ Precondition of an action

1.2 Staff qualification

Qualified persons are persons that are familiar with the mounting, installation, putting into service, operation, maintenance, removal from service, and disposal of the product, and have the appropriate qualification for their activity.

This includes persons that meet at least one of the following three requirements:

- They know the safety concepts of metrology and automation technology and are familiar therewith as project staff.
- They are operating staff of the measuring and automation systems and have been instructed in the handling of the systems. They are familiar with the operation of the devices and technologies described in this documentation.
- They are commissioning specialists or are employed in the service department and have completed training that qualifies them for the repair of the system. In addition, they are authorized to put into operation, to ground, and to mark circuits and devices according to the safety engineering standards.

All work with this product must be carried out by qualified persons!

1.3 Intended use

The devices are used to convert the physical parameter of pressure into an electric signal.

The **probes** are exclusively suitable for continuous hydrostatic filling-level measurement.

This operating manual applies to devices with explosion protection approval and is intended for the use in IS-areas. A device has an explosion-protection approval if this was specified in the purchase order and confirmed in our order acknowledgement. In addition, the manufacturing label includes a ⟨Ex⟩ sign.

The user must check whether the device is suited for the selected use. In case of doubt, please contact our sales department: info@ics-schneider.de

ICS assumes no liability for any wrong selection and the consequences thereof!

The fluids that can be measured are liquids that are compatible with the materials in contact with the fluids, described in the data sheet. For application, it must additionally be ensured that the fluid is compatible with the parts in contact with the fluid.

The technical data listed in the current data sheet are engaging and must absolutely be complied with. If the data sheet is not available, please order or download it from our homepage: http://www.ics-schneider.de

WARNING	**Danger through incorrect use** - In order to avoid accidents, use the device only in accordance with its intended use.

1.4 Limitation of liability and warranty

Failure to observe the instructions or technical regulations, improper use and use not as intended, alteration of or damage to the device as well as incorrect installation of signal connections or ground potential connections will result in the forfeiture of warranty and liability claims.

1.5 Safe handling

NOTE - Do not use any force when installing the device to prevent damage of the device and the plant!

NOTE - Treat the device with care both in the packed and unpacked condition!

NOTE - The device must not be altered or modified in any way.

NOTE - Do not throw or drop the device!

NOTE - Excessive dust accumulation (over 5 mm) and complete coverage with dust must be prevented!

NOTE - The device is state-of-the-art and is operationally reliable. Residual hazards may originate from the device if it is used or operated improperly.

1.6 Safety-related maximum values

DX14-…:

U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 14 nF, $L_i \approx 0$ µH;
C_{gnd} = 27 nF; plus cable inductivities 1.5 µH/m and
cable capacities 220 pF/m (for cable by factory)

application in zone 0 (p_{atm} 0.8 bar up to 1.1 bar): -20 ... 60 °C
application in zone 1 and higher: -25 ... 70 °C

Pt 100 circuit in type of protection Ex ia IIC:
U_i = 30 V, I_i = 54 mA, P_i = 405 mW, C_i = 0 nF, L_i = 0 µH
plus cable inductivities 1.5 µH/m and
cable capacities 220 pF/m (for cable by factory)

DX14B-…:

U_i = 28 V; I_i = 93 mA; P_i = 660 mW; C_i = 49.2 nF/14 nF;
L_i = 0 µH; C_{gnd} = 100 nF/27 nF;
plus cable inductivities 1 µH/m and
cable capacities 160 pF/m (for cable by factory)

application in zone 0 (p_{atm} 0.8 bar up to 1.1 bar): -20 ... 60 °C
application in zone 1 and higher: -25 ... 65 °C

Pt 100 circuit in type of protection Ex ia IIC:
U_i = 30 V, I_i = 54 mA, P_i = 405 mW, C_i = 0 nF, L_i = 0 µH

DX15A-…:

U_i = 28 V; I_i = 93 mA; P_i = 660 mW; C_i = 13.2 nF;
L_i = 0 µH; C_{gnd} = 27 nF;
plus cable inductivities 1 µH/m and
cable capacities 160 pF/m (for cable by factory)

application in zone 0 (p_{atm} 0.8 bar up to 1.1 bar): -20 ... 60 °C
application in zone 1 and higher: -25 ... 70 °C

DX19-…:

U_i = 28 V; I_i = 93 mA; P_i = 660 mW; $C_i \approx 0$ nF; Li ≈ 0 µH;
C_{gnd} = 27 nF;
plus cable inductivities 1 µH/m and
cable capacities 160 pF/m (for cable by factory)

application in zone 0 (p_{atm} 0.8 bar up to 1.1 bar): -20 ... 60 °C
application in zone 1 and higher: -40/-20 ... 70 °C

application in zone 1 and higher for ***type DX19- *** i***: -40/-20 ... 65 °C

1.7 Packaging content

Check that all parts listed in the scope of delivery are included free of damage, and have been delivered according to your purchase order:

- probe
- this operating manual
- in case of SIL2 design option:
  functional safety manual, safety data sheet

1.8 UL approval (for devices with UL marking)

The UL approval was effected by applying the US standards, which also conform to the applicable Canadian standards on safety.

Observe the following points so that the device meets the requirements of the UL approval:

- The device must be operated via a supply with energy limitation (acc. to UL 61010) or an NEC Class 2 energy supply.
- Maximum operating range: see data sheet

2. Product identification

The device can be identified by means of the manufacturing label with order code. The most important data can be gathered therefrom.

NOTE - The manufacturing label must not be removed!

3. Mounting

3.1 Mounting and safety instructions

DANGER	**Danger of death from explosion, airborne parts, leaking fluid, electric shock** - Always mount the device in a depressurized and de-energized condition! - Do not install the device while there is a risk of explosion.
DANGER	**Danger of death from explosion** - Explosion hazard due to high-charging processes in connection with free-hanging probe with cable FEP - Fixed installation of the FEP cable!
DANGER	**Danger of death from explosion** - The probe must be installed in such a way that rubbing or impact of the sensor head (sensor element), e. g. against a tank wall, is prevented. It is also important to consider the operating conditions such as flow conditions!

NOTE - The technical data listed in the EU-type examination certificate are binding. Download this by accessing www.ics-schneider.de or request it by e-mail or phone: info@ics-schneider.de

NOTE - Make sure that the entire interconnection of intrinsically safe components remains intrinsically safe. The owner-operator is responsible for the intrinsic safety of the overall system (entire circuitry).

NOTE - If there is increased risk of damage to the device by lightning strike or overvoltage, increased lightning protection must additionally be provided!

NOTE - Do not remove the packaging or protective caps of the device until shortly before the mounting procedure, in order to exclude any damage to the diaphragm and the threads!

Protective caps must be kept! Dispose of the packaging properly!

NOTE - Treat any unprotected diaphragm with utmost care; this can be damaged very easily.

3.2 Mounting steps for probes

✓ mounting accessory is available (as standard, the probe is supplied without fastening material; mounting clamps, terminal clamps and mounting flanges are available as accessories from ICS)

Fasten the probe properly according to your requirements.

NOTE - Always immerse the device slowly into the fluid to be measured! If the probe strikes the liquid surface, the diaphragm could be damaged or destroyed.

NOTE - Free-hanging probes with FEP cables may not be used if effects of highly charging processes can be expected.

3.3 Mounting steps for flange version (ILMK 382 / ILMK 382H)

✓ The mounting thread is clean and undamaged

✓ The O-ring is undamaged and seated in the designated groove at the probe end

1. Screw the mounting thread of the probe into the probe flange by hand
2. Tighten the device using an open-end wrench. (approx. 25 Nm)
3. Mount the flange according to your requirements.

If you need a new probe flange, this can be ordered from ICS as an accessory.

3.4 Removal of protective 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 high-viscosity 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.

Removal by hand

1. Hold the probe in a way that the protection cap points upwards.
2. Hold the probe with one hand on the sensor section (1).
3. Remove the protection cap (2) with the other hand.

Removal with a tool (recommended)

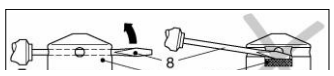

Fig.2 Removal of protection cap

1. Hold the probe in a way that the protection cap points upwards.
2. Slide a small tool such as a screwdriver (8) straight through two opposite drill holes in the protective cap (2).
3. Lever it off by moving up the handle of the screwdriver.

NOTE - Make sure that the sensor (7) under the protection cap will not be damaged!

3.5 Cable protection (optional)

According to order, the probe was supplied with cable protection; if the probe was prepared for mounting by means of a stainless steel or plastic tube (optional), the customer must affix a cable protection themselves.

4. Electrical connection

4.1 Connection and safety instructions

DANGER	**Danger of death from electric shock or explosion** - Explosion hazard if the operating voltage is too high (max. 28 V_{DC}) or by opening the field housing while an explosion hazard exists. - Always mount the device in a depressurized and de-energized condition! - Do not install the device while there is a risk of explosion. - Operate the device only within the specification! (data sheet)

✓ The limit values listed in the EU-type examination certificate are observed. (Capacity and inductance of the connection cable are not included in the values.)

✓ he supply corresponds to protection class III (protective insulation).

NOTE - When routing the cable, following bending radiuses have to be complied with:

cable without ventilation tube:
static installation: 8-fold cable diameter
dynamic application: 12-fold cable diameter

cable with ventilation tube:
static installation: 10-fold cable diameter
dynamic application: 20-fold cable diameter

NOTE - The PTFE filter located at the cable end on the air tube must neither be damaged nor removed!

NOTE - Use a shielded and twisted multicore cable for the electrical connection.

NOTE - If a transition is desired from a probe cable with gauge tube to a cable without gauge tube, we recommend our terminal box KL 1 or KL 2.

4.2 Conditions for the IS-area

Danger generated by electrostatic charging

DANGER	**Danger of death from explosion** - Explosion hazard due to spark formation from electrostatic charging of plastic components. - The cable must be installed tightly. - Do not clean the device and, if applicable, the connection cable, in a dry state! Use a moist cloth, for example.

The following warning sign is affixed on devices with plastic components.

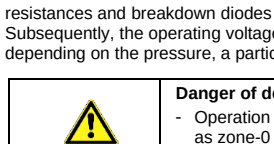

Fig. 3: Warning sign

NOTE - The warning sign must not be removed from the device!

Overvoltage protection

If the probe is used as electrical equipment of category 1 G, then a suitable overvoltage protection device must be connected in series (attend the valid regulations for operating safety as well as EN60079-14).

Schematic circuit design

The operation of an intrinsically safe probe in intrinsic safe areas requires special care when selecting the necessary Zener barrier or transmitter repeater devices to allow the utilization of the device's properties to the full extent. The following diagram shows a typical arrangement of power supply, Zener barrier and probe.

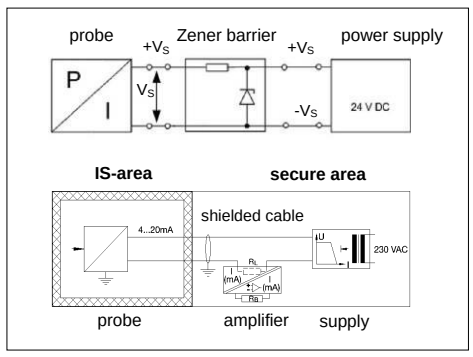

Fig. 4: Circuit diagrams

NOTE - Additionally observe item (17) of the EU-type examination certificate which specifies special conditions for intrinsically safe operation.

Exemplary circuit description

The supply voltage of e.g. 24 V_{DC} provided by the power supply is led across the Zener barrier. The Zener barrier contains series resistances and breakdown diodes as protective components. Subsequently, the operating voltage is applied to the device and, depending on the pressure, a particular signal current flows.

DANGER	**Danger of death from explosion** - Operation of intrinsically safe devices as zone-0 equipment only with ungrounded and galvanically isolated power supply.

Selection criteria for Zener barriers and galvanic power supply

The minimum supply voltage $V_{S\,min}$ of the device must not fall short since a correct function of the device can otherwise not be guaranteed. The minimum supply voltage has been defined in the respective product-specific data sheet under "Output signal / supply".

When using a galvanically insulated amplifier with linear bonding, note that the terminal voltage of the probe will decrease like it does with a Zener barrier. Furthermore, you have to note that the supply will additionally decrease with an optionally used signal amplifier.

Test criteria for the selection of the Zener barrier

In order not to fall below $V_{S\,min}$, it is important to verify which minimum supply voltage is available at full level control of the probe. The full level control, i.e. a maximum or nominal output signal (20 mA), can be reached by applying the maximum physical input signal (pressure).

The technical data of the barrier will usually provide the information needed for the selection of the Zener barrier. However, the value can also be calculated. If a maximum signal current of 0.02 A is assumed, then – according to Ohm's law – a particular voltage drop will result from the series resistance of the Zener barrier. This voltage drop is subtracted by the voltage of the power supply and as a result, the terminal voltage is obtained which is applied on the probe at full level control. If this voltage is smaller than the minimum supply voltage, another barrier or a higher supply voltage should be chosen.

NOTE - When selecting the ballasts, the maximum operating conditions according to the EU-type examination certificate must be observed. When assessing these, refer to their current data sheets to ensure that the entire interconnection of intrinsically safe components remains intrinsically safe.

NOTE for devices with HART® communication (H-devices)
When selecting the barrier or power supply, you must look out for any ballasts which are not suitable for HART® communication. Most manufacturers offer a device group specially developed for this application.

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Calculation example for the selection of the Zener barrier

The nominal voltage of the power supply in front of the Zener barrier is 24 V_{DC} ± 5 %. This results in:
- maximum supply voltage:
  $V_{Sup\ max}$ = 24 V * 1.05 = 25.2 V
- minimum supply voltage:
  $V_{Sup\ min}$ = 24 V * 0.95 = 22.8 V

The series resistance of the Zener barrier is listed with 295 ohm. The following values must still be calculated:
- voltage drop at the barrier (with full conduction):
  $V_{ab\ barrier}$ = 295 Ω * 0.02 A = 5.9 V
- terminal voltage at the device with Zener barrier:
  $V_{KI} = V_{S\ up\ min} - V_{ab\ Barriere}$ = 22.8 V – 5.9 V = 16.9 V
- minimum supply voltage of the device (according to data sheet):
  $V_{KI\ min}$ = 12 V_{DC} (corresponding to $V_{S\ min}$)

Condition:
$V_{KI} \geq V_{KI\ min}$

Result:

The terminal voltage of the device with Zener barrier lies at 16.9 V and is therefore higher than the minimum supply voltage of the device which lies at 12 V_{DC}. This means, the Zener barrier has been selected correctly regarding the supply voltage.

NOTE - Note that no line resistances have been listed in this calculation. However, these will lead to an additional voltage drop that must be taken into account.

4.3 Electrical installation

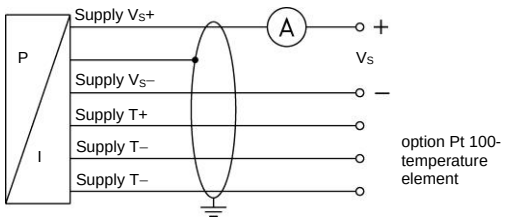
Connect the device electrically according to the information specified on the manufacturing label, the following table, and the connection circuit diagram.

Pin configuration:

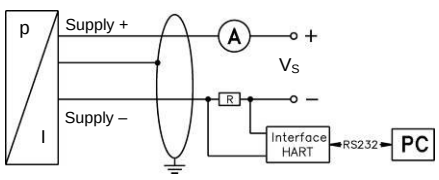
Electrical connections	Cable colours (IEC 60757)
Supply +	WH (white)
Supply -	BN (brown)
Supply T+ (with Pt 100)	YE (yellow)
Supply T– (with Pt 100)	GY (grey)
Supply T– (with Pt 100)	PK (pink)
Shield	GNYE (green-yellow)

Wiring diagrams:

2-wire-system current (pressure) / 3-wire-system (temperature)



2-wire system (current) HART®



NOTE - For a clear identification, the intrinsically safe cables are marked with light blue shrink tubing (over the cable insulation). If the cable has to be modified (e. g. shortened) and the marking at the cable end has been lost in the process, it must be restored (for example, by marking it again with light blue shrink tubing or an appropriate identification sign).

NOTE - With shielded cables, the cable shield must be connected to earth potential. Use the appropriate grounding clamps for this. Pay attention to a low-impedance connection. Avoid potential differences (earth potential) between measuring and connection points, because this can lead to a defect in the probe. To avoid this, use a suitable connection technology or suitable equipotential bonding.

NOTE - In the case of relative pressure gauges, the cable contains a ventilation tube 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.

NOTE - Usually, the required cable is included in the scope of delivery. If it is although necessary to connect an existing or special cable, the total resistance will increase. For applications, where this additional resistance of the connecting cable could cause problems, this cable has to be checked with the following calculation.

$$R_L = \frac{\rho \cdot 2 \cdot l}{A}$$

with R_L: resistance of connecting cable in Ω
ρ: specific resistance in Ω mm²/m
l: cable length in m
A: cross section of conductor in mm²

$$V_{tot} = (R_{L1} + R_{L2} + \ldots + R_{load}) \cdot 0.02\ A$$

with V_{tot}: total voltage drop
R_{load}: load resistance
(to be taken out of the current data sheet)

following condition has to be fulfilled:

$$V_S > V_{tot} + V_{S\,min}$$

with V_S: planned supply voltage
$V_{S\,min}$: minimal supply voltage
(to be taken out of the current data sheet)

5. Specific features

5.1 HART® communication (for H-Devices)

DANGER	**Danger of death from explosion** - The intrinsically safe circuit for connecting a HART® communications interface (HART® communicator or HART® modem) may be broken only if there is no risk of an explosion.

The analogue output signal is overridden by an additional signal according to the HART®-specification. The device can be configured via a HART®-communication device. Therefore, we suggest our programming kit CIS-G (available as accessory). It consists of HART®-modem, connecting cables as well as configuration software and allows a simple and time-saving configuration of all parameters. (The software is compatible with all Windows®-systems from Windows 98 and higher.)

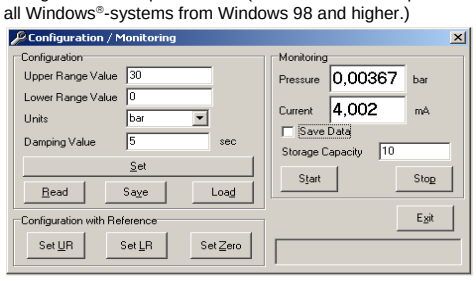


Fig. 5: Configuration software

✓ for trouble-free operation, the following requirements are fulfilled:

maximal cable length between device and power supply:

$$L_{max} = \frac{65 \cdot 10^6}{R_V \cdot C_V} - \frac{40 \cdot 10^3}{C_V}$$

with L_{max}: maximum length of cable in [m]
R_V: resistance of the cable together with the load resistance in [Ω]
C_V: capacity of the cable in [pF/m]

resistance R:

$$R = \frac{U - 12}{0.024}\ \Omega$$

with U: power supply in [V_{DC}]

The resistance must be at least 240 Ω.

5.2 Detachable probes

DANGER	**Danger of death from explosion** - Only separate the sensor head from the cable part when no explosion hazard exists.

In order to facilitate stock keeping and maintenance, the sensor head is plugged to the cable assembly with a connector and can be easily changed. The following probes are detachable: ILMK 358, ILMK 358H, ILMP 308 and ILMP 308i.

Disassembly:
- Hold the probe on the sensor section (2) with one hand and turn the nut (4) carefully to the left with the other hand. Prevent torsion of the cable section (3) against the housing!
- While screwing and pulling off the sensor section (2) from the cable section (3), hold it straight to prevent damages on the plugs.

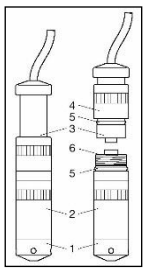


Fig. 6 Separability

Assembly:
✓ O-rings are not damaged (5, 6) or damaged O-rings have been replaced
✓ Radial O-rings (5) have been greased with Vaseline or O-ring grease
✓ Any grease residues have been removed from the axial O-ring (6).

1. Plug the cable section (3) straight into the plug of the sensor section (2).
2. Hold the probe onto the sensor section (2) with one hand. Screw on and tighten the nut (4) carefully with the other hand. Prevent torsion of the cable section (3) against the housing!

Pin configuration

Electrical connections	Binder series 723 (5-pin)	Binder series 723 (7-pin)
Supply +	3	3
Supply –	1	1
Shield	5	2
RxD	-	4
TxD	-	5
GND	-	7

6. Commissioning

DANGER	**Danger of death from explosion** - Explosion hazard if the operating voltage is too high (max. 28 V_{DC})! - Operate the device only within the specification! (according to data sheet)

✓ The device has been installed properly
✓ The device does not have any visible defect
✓ The device is operated within the specification. (see data sheet and EU-type examination certificate)

In case of highly precise devices with an accuracy of 0.1 % FSO, a microcontroller-controlled electronic system is used for signal processing. This electronic system is used for signal improvement. Due to the principle, the processing of measured values requires a longer time than with purely analogue sensors, which only comprise amplification circuitry. Due to the longer processing time, the output signal follows the measured value not continuously but in jumps. In case of relatively stable and slowly changing measured values, this property plays a minor role. Compare this with the information on the adjusting time in the data sheet.

In the case of i-devices with optional communication interfaces can also be configured by these electronics. Offset, span and damping are programmable within the limits given in the data sheet. For configuring the device, the programming kit CIS-G consisting of Adapt 1, Windows® compatible programming software P-Scale 510, power supply and connecting cable is necessary. This can be ordered additionally from ICS.

7. Maintenance

DANGER	**Danger of death from explosion, airborne parts, leaking fluid, electric shock** - Always service the device in a depressurized and de-energized condition! - Do not service the device while there is a risk of explosion.
WARNING	**Danger of injury from aggressive fluids or pollutants** - Depending on the measured medium, this may constitute a danger to the operator. - Wear suitable protective clothing e.g. gloves, safety goggles.

If necessary, clean the housing of the device using a moist cloth and a non-aggressive cleaning solution.

The cleaning medium for the device may be gases or liquids which are compatible with the selected materials. Observe the permissible temperature according to the data sheet.

Deposits or contamination may occur on the diaphragm in case of certain media. Depending on the quality of the process, suitable maintenance intervals must be specified by the operator. As part of this, regular checks must be carried out regarding corrosion, damage to the diaphragm and signal shift.

If the diaphragm is calcified, it is recommended to send the device to ICS for decalcification.

NOTE - Wrong cleaning or improper touch may cause an irreparable damage on the diaphragm. Therefore, never use pointed objects or pressured air for cleaning the diaphragm

8. Troubleshooting

DANGER	**Danger of death from airborne parts, leaking fluid, electric shock** - If malfunctions cannot be resolved, put the device out of service (proceed according to chapter 9 up to 11)
DANGER	**Danger of death from explosion** - As a matter of principle, work on energized parts, except for intrinsically safe circuits, is prohibited while there is an explosion hazard.

In case of malfunction, it must be checked whether the device has been correctly installed mechanically and electrically. Use the following table to analyse the cause and resolve the malfunction, if possible.

Fault: no output signal	
Possible cause	**Fault detection / remedy**
Connected incorrectly	Checking of connections
Conductor/wire breakage	Checking of all line connections.
Defective measuring device (signal input)	Checking of ammeter (miniature fuse) or of analogue input of your signal processing unit

Fault: analogue output signal too low	
Possible cause	**Fault detection / remedy**
Load resistance too high	Checking of load resistance (value)
Supply voltage too low	Checking of power supply output voltage
Defective energy supply	Checking of the power supply and the supply voltage being applied to the device

Fault: slight shift of the output signal	
Possible cause	**Fault detection / remedy**
Diaphragm of senor is severely contaminated	Cleaning using a non-aggressive cleaning solution and soft paintbrush or sponge
Diaphragm of sensor is calcified or crusted	**Recommendation:** Have the decalcification or cleaning performed by ICS

Fault: large shift of the output signal	
Possible cause	**Fault detection / remedy**
Diaphragm of sensor is damaged (caused by overpressure or mechanically)	Checking of diaphragm; when damaged, send the device to ICS for repair

Fault: wrong or no output signal	
Possible cause	**Fault detection / remedy**
Cable damaged mechanically, thermally or chemically	Checking of cable; pitting corrosion on the stainless-steel housing as a result of damage on cable; when damaged, send the device to ICS for repair

9. Removal from Service

DANGER	**Danger of death from airborne parts, leaking fluid, electric shock** - Disassemble the device in a depressurized and de-energized condition!
WARNING	**Danger of injury from aggressive media or pollutants** - Depending on the measured medium, this may constitute a danger to the operator. - Wear suitable protective clothing e.g. gloves, goggles.

NOTE - After dismounting, mechanical connections must be fitted with protective caps.

10. Service / repair

Information on service / repair:

- www.ics-schneider.de
- info@ics-schneider.de

10.1 Recalibration

During the life-time of a transmitter, the value of offset and span may shift. As a consequence, a deviating signal value in reference to the nominal pressure range starting point or end point may be transmitted. If one of these two phenomena occurs after prolonged use, a recalibration is recommended to ensure furthermore high accuracy

10.2 Return

WARNING	**Danger of injury from aggressive media or pollutants** - Depending on the measured medium, this may constitute a danger to the operator. - Wear suitable protective clothing e.g. gloves, goggles.

Before every return of your device, whether for recalibration, decalcification, modifications or repair, it has to be cleaned carefully and packed shatter-proofed. You have to enclose a notice of return with detailed defect description when sending the device. If your device came in contact with harmful substances, a declaration of decontamination is additionally required.

Appropriate templates can be found on our homepage. Download these by accessing www.ics-schneider.de or request them by e-mail or phone:

- info@ics-schneider.de

In case of doubt regarding the fluid used, devices without a declaration of decontamination will only be examined after receipt of an appropriate declaration!

11. Disposal

WARNING	**Danger of injury from aggressive media or pollutants** - Depending on the measured medium, this may constitute a danger to the operator. - Wear suitable protective clothing e.g. gloves, goggles.

The device must be disposed of according to the European Directive 2012/19/EU (waste electrical and electronic equipment). Waste equipment must not be disposed of in household waste!

NOTE - Dispose of the device properly!

12. Warranty terms

The warranty terms are subject to the legal warranty period of 24 months, valid from the date of delivery. If the device is used improperly, modified or damaged, we will rule out any warranty claim. A damaged diaphragm will not be accepted as a warranty case. Likewise, there shall be no entitlement to services or parts provided under warranty if the defects have arisen due to normal wear and tear.

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