lapesa

USER AND INSTALLATION MANUAL

CRYOGENIC TANKS FOR LNG STORAGE

LAPESA MODELS ref. LC...

MANUFACTURER:
LAGUENS Y PEREZ, S.L.U.
Pol. Malpica, calle A Parcela 1-B
50016 Zaragoza (Spain)

CONTENTS

1 FIELD OF APPLICATION AND GENERAL FEATURES

1.1 FIELD OF APPLICATION

Tanks for the storage of LNG and other liquefied gases at cryogenic temperatures, within the working and design limits of the equipment (see below).
Vertical and horizontal models, with different capacities, manufactured by LAPESA under reference **LC... (examples:LC60, LC80V, LC150/PSS...).**

1.2 LEGISLATION APPLICABLE IN SPAIN

- 2014/68/EU: Pressure equipment directive
  - ITC-EP 4: Cryogenic tanks
- R.D. 919/2006: Technical regulation on distribution and use of gaseous fuels.
  - ITC-IGC 04: Liquefied natural gas (LNG) satellite plants
  - UNE 60210 standard: Liquefied natural gas (LNG) satellite plants

1.3 GENERAL DESCRIPTION OF EQUIPMENT

It is a cryogenic tank for the purpose of storing Liquefied Natural Gas (LNG) under pressure.
It comprises:

- A pressurized **inner tank** (which contains the LNG) built in austenitic stainless steel suitable for working with pressure and low temperatures.
- An **outer casing**, made of carbon steel and designed to withstand the total vacuum inside it.
- Between both vessels there is an insulation **chamber** based on filling material, in which a vacuum has been created. The chamber is totally tight and effectively minimises the flow of heat from the exterior. For it to function correctly the absolute pressure of the chamber should be under 0.6 mbar. According to the aforementioned regulations, a tank with this degree of vacuum does not need to undergo an on-site tightness test LAPESA tanks are dispatched pursuant to this requirement.

The equipment is apt for storage at cryogenic temperatures.
It includes the set of elements that are necessary for the function it serves (to gain a better understanding consult the schematic diagram supplied with the tank). These elements are explained in detail further on (shut-off valves, level indicator, safety valves, PPR...).

1.4 WORKING AND DESIGN LIMITS:

- Maximum working pressure: according to model. This is the maximum storage pressure. It must not be mistaken for maximum design pressure (both are indicated on the equipment rating plate).
- Design and test pressures (according to equipment rating plate).
- Extreme working temperatures: -196 ºC, +50 ºC
- The insulation chamber is designed to function with an absolute vacuum
- Allowable pressure in insulation chamber: **0 bar** (although a very low pressure value is allowable it is not advisable to introduce positive pressure in the chamber).
- Allowable vacuum in inner tank: Except in the case of specific requirements, the storage tanks are not equipped to withstand a vacuum inside.

1.5 RATING PLATE DATA

All of the tanks have a rating plate. The following data are shown:

- Number and date of manufacture
- Tank model and type, approved according to the 2014/68/EU Directive.

- Theoretical geometric capacity (at ambient temperature), and useful capacity (95%) and theoretical tare. After cooling, capacity decreases by approximately 5 per thousand.
- Product for which it is designed (and group it belongs to, according to 2014/68/EU): GNL (gr1).
- Maximum working pressure, design pressure (PS) and test pressure (PT) (for inner storage tank).
- Minimum design temperature
- Type of insulation and calculation code used.
- Others: EC marking, notified body, period test dates.

2 GENERAL OPERATION OF A L.N.G. TANK.

The tank is filled with the product in the liquid phase, at cryogenic temperatures.
Consumption is usually in the liquid phase. Consumption in the gas phase is only possible for small quantities.
The liquid extracted from the tank is vaporized by means of external ambient vaporizers (forming part of the plant installation).
The tank must be kept at a higher pressure than that required by the installation. Since consumption can cause a drop in pressure, it is raised by the pressure booster gasifier (PPR), vaporising fluid and returning it to the tank.
If there is no consumption or very little, the input of heat from the exterior, which is inevitable, causes an increase in the pressure inside the tank and the safety valves may be triggered. This is considered to be normal. In cases of low consumption, unwanted increases in pressure can be minimized using and external economizer system.
Operating instructions are given further on.

2.1 DETAILS OF CONSUMPTION AND USE

- Max. rated consumption of NG: It depends on the tank (pipe diameter) and on the vaporiser that is used with the vessel. Consult.
- Maximum allowable level - liquid phase: 95 %
- Minimum allowable liquid phase level for correct functioning of PPR: 20% (although this value can be lowered this is not recommended)

3 DESCRIPTION ACCESSORIES AND EQUIPMENT

The following is a general description of each of the accessories that the tank incorporates:

a) Level and pressure gauge equipment

It can be electrical or mechanical. If the electrical equipment has been chosen (standard equipment supplied with LAPESA tanks) there must be a power supply for it at the installation site. Transmission of the level and pressure is always electrical (even in mechanical equipment). All the electrical elements are approved for installation in ATEX zones (zone 1)

This element carries out the following functions:

- Indicates liquid phase level inside vessel
- Indicates pressure inside the tank
- Transmits level and pressure

Level measurement is carried out by differential pressure (fluid column inside vessel). Given that, in the case of LNG, density is a variable parameter, level measurement is approximate.

Pressure is measured at the top part of the inside of the tank (a mark should be made to indicates maximum allowable working pressure)

As there are different models it is important to consult the instructions for the specific equipment being used. In general LAPESA tanks include one of the following types:

- Electrical equipment: Samson Media 6
- Mechanical equipment: WIKA.

In both cases, levels are set to function in the tank with which they are delivered.

The fluid level is shown on a digital dial in electrical equipment and on an analogue needle dial in the case of mechanical equipment. It is usual for there to be slight oscillations of the needle during the first few discharging operations due to the presence of bubbles.

In both cases pressure is indicated by an analogue pressure gauge.

Pressure and level transmission is carried out by a 4-20 mA electric signal.

The levels have two connections:

- Connection at bottom area of the tank. That is, the liquid phase, at the highest pressure point (greatest fluid column). This connection is marked with a plus (+) sign (high pressure) on the level.
- Connection at high zone of the tank, i.e. gas phase This is the zone with least pressure and it is marked with minus (-) sign.

LAPESA tanks are dispatched with shut-off valves on the pipes connected to the level equipment so that it can be dismounted by closing these valves.

Furthermore, this level equipment has a manifold with another two valves to shut off high pressure and low pressure zones separately as well as an equalising valve between the two phases that equalises the pressures upon opening. This manifold also incorporates a connection to the gas phase of the tank for the purpose of making measurements, purging....

b) Overflow

The shut-off valve that connects to the overflow pipe inside the storage tank indicates the maximum filling level (95%). When the liquid phase flows out of this pipe the maximum filling level has been reached.

c) Pressure build up unit

The purpose of this system is to increase the pressure inside the tank when it falls below the value required for its use.

It functions by automatically opening the **regulator** when the pressure drops, which allows the gas in the liquid phase to pass through it to the **exchanger**, where the liquid is turned into gas and returns to the tank producing an increase in pressure inside it. This device is not intended for a non stop operation.

Pressure regulator
This is a valve that opens when its calibrated pressure setting is exceeded (sometimes a pneumatic valve can be placed instead). This value is adjustable and the setting required (within the range of the equipment) should be calibrated at the installation (it is not factory-set).
The screw allows this value to be changed: loosening it lowers the pressure setting and tightening the screw increases it. We recommend marking the calibrated value on the valve plate.
Due to its characteristics the valve does not have EC marking.
As time passes, particles may be deposited on the shut-off seat preventing a tight seal. In this case the shut-off plunger can be replaced without having to replace the entire part.

Exchanger
Also known as pressure build up system, it consists of an ambient vaporiser formed by a series of heat exchange pipes and fins made of aluminium. Heat exchange takes place between the cryogenic fluid and the atmosphere.
It is located under the tank and forms part of it; it is connected by pipes to the inner tank, in a closed circuit

d) Economiser
The tank has a flanged connection from its gas phase, either for gas phase consumption or to fit an external economiser (gas phase input to consumption pipe only if the pressure is high).
The external economiser is not included in the tank supply.
If this outlet is not going to be used it should be closed with a blind flange which is supplied by LAPESA.

e) Safety valve block
The safety valve block prevents the pressure in the tank from reaching values that are higher than the maximum allowable pressure.
These valves are fitted at the gas phase of the tank.
There are no shut-off valves between the tank and the safety valve block.
It is formed by two groups of safety valves, 3-way valve and outlet manifold.
3-way valve
It is a valve which, located between the tank and the safety valves, allows one of the valve groups to be closed while the other remains in operation. It does not allow the two groups of valves to be closed at the same time (but it does allow the two groups to be kept open). We recommend keeping just one of the groups open in order to be able to use the other in the event of freezing.
Safety valves
These are valves designed to work with the fluid contained in the tank.
There are four valves on each tank and all four can be calibrated at the same pressure (maximum working pressure) or two at a set pressure and the other two at a slightly higher pressure.
One of the two groups is always in operation (see 3-way valve description).
Outlet manifold
All of the safety valves are connected to a common outlet manifold that allows the outlet of gas to the atmosphere. Valve relief forms part of the on-site tank installation and must be carried out in a way that there is no risk of injury to persons or damage to goods (including the tank). The tank has shields on which to weld the exhaust pipe brackets. As an option the relief pipe can be supplied with a flame arrester (and brackets for the same, welded to the shields). This pipe can be swivelled to prevent any risk of injury and to ensure that it is not pointing towards the tank or towards any other equipment that could be damaged.

f) Shut-off valves
These are seat valves made in an appropriate material for the purpose of their function, which comply with the following characteristics:

- Material that is resilient at cryogenic temperatures.
- They withstand pressures higher than the working pressure.

- They are compatible with the material to be contained.
- They are welded to piping at factory.
- They have a long spindle to facilitate handling operations in cryogenic applications.
- Body joined to spindle by nut or flange.
- Removable to replace internal parts.
- Normally do not require individual EC marking.
- According to the schematic diagram shown in the in annexes, the bottom filling valve (liquid phase) also acts as a one-way valve as its closure seat is loose (the seat is pushed during filling by the inflow, but closes when the flow travels in the opposite direction).
- If a retention valve is required for the gas phase filling connection, it should be added during installation.
- Optionally a unified fill connection is supplied.

g) Vacuum measuring device

The tank includes a DN16 ISO KF size connection in the insulation chamber. There is a shut-off valve with a vacuum sensor (normally a Teledyne DV-6M-KF16) in it. All these items are specifically for operating with vacuums and are protected by a cover.
The shut-off valve must always be closed and with the blind cover in place, except when the vacuum is being checked. It is made of aluminium. Special care must be taken not to knock it.
The protective cover and the valve clamping elements and sensor are supplied sealed. The fitter is responsible for checking that there has been no interference with seals. They shall only be removed to carry out vacuum measurements after which new seals shall be fitted.
An explanation on how to measure the existing vacuum is given further on.

h) Connection for carrying out vacuum

Device fitted in the insulation chamber. Connection that enables a vacuum to be made inside the chamber. It is protected by a bolt-on flange. DN40 ISO KF connection, with internal closure and external blind flange (specifically for working with vacuums). See maintenance section for instructions on how to carry out vacuum.

i) Casing overpressure device

On the upper zone of the collar there is a device that acts in the event of an accidental increase in (positive) pressure in the casing (e.g. due to a gas leak into the chamber), releasing it to protect both the inner and outer tank.

4 CONTROLS AND PERIODIC TESTS

The tank supplied has passed all of the controls and tests (hydraulic test, tightness, vacuum check..).

4.1 VACUUM CHECK

In accordance with the applicable regulations, if the absolute pressure of the chamber is below 0.6 mbar, an on-site tightness test is not necessary. It is sufficient to check the vacuum as indicated in 5.1.

4.2 PERIODIC TESTS

They shall be carried out as indicated in the applicable regulations. The tightness test can be replaced by checking the vacuum that exists in the chamber, provided that it is under 0.6 mbar (see "prior checks").

Pneumatic tests
If a pneumatic test is carried out on the tank it shall be performed:

- with dry gas and ensuring that no damp enters the tank.
- according to the procedure and safety regulations established by the installation company
- in accordance with applicable regulations.
- bearing in mind the tank's design conditions

5 INSTALLATION

All installation, handling and maintenance operations must be carried out:

- in accordance with applicable legislation.
- by qualified personnel with experience in LNG installations.
- in appropriate safety conditions (PPEs...)
- following the procedures established by the installation company.

The appropriate electrical installation should be in place when necessary (transmitters...)

5.1 PRIOR CHECKS

- Check that the chamber connections have not be manipulated. They should be sealed (seal marked with LP). Check all three connections:
  - Casing overpressure device/s (top zone of tank).
  - Connection for measuring vacuum (DN16 vacuum connection). The shut-off valve must be closed.
  - Connection for carrying out vacuum (flange).
- Checking vacuum in chamber. In the presence of the person responsible for the installation, carry out the following operations on the vacuum measurement connection.
  - Break the seals.
  - Remove the protective cover to gain access to the vacuum valve and vacuum sensor. Check that the shut-off valve is closed.
  - Connect the vacuum gauge (for example Teledyne HPM 4/6) to the sensor. If the above model is used, switch on the gauge at the DV6 position.
  - Open the valve slowly, checking that no air enters the chamber (there would be a faint whistling noise). Sometimes the valve may be slightly blocked. It can be loosened by gently hitting it with your hand.
  - Wait until the reading stabilises (this may take more than half an hour) and check the vacuum. This unit measures in Torr.
  - A value under 0.6 mbar is allowable (0.6 mbar is 0.45 Torr). If the reading is higher, we recommend scheduling vacuum regeneration.
  - Close the shut-off valve. Resealing is recommended.
- Carry out a visual inspection to ensure the correct state of the exterior. The tank should not have any dints or damage to its coating. Any damage to paintwork should be touched up.
- Check the correct state of all of the equipment (valves, pressure build up system...).
- Check that the outlet of the vent pipe is not pointing towards the tank. If it is, turn it away so that any hypothetical dripping does not fall onto the tank.
- The closed/open state of the valves during normal operation of the equipment is shown below: Use the schematic diagrams to identify the valves.

Valve	State
VG	Closed
VL	Closed
VC	Closed
VR	Closed
VEP	Open
VSP	Open

Valve	State
VEE	Closed
Vn	Open
Re	Closed
rs	Open
ri	Open
VA	Closed

5.2 HANDLING AND ANCHORING

The tank has lugs for handling and lifting it. Consult the number of lugs and their position on each model. They are designed to withstand the weight of the empty tank.

HORIZONTAL TANKS

The angle between the hoisting cable lines will be less than 90º.

The tanks have two cradles. One of them (opposite side to outlets area) is sliding to accommodate longitudinal expansion. Consult the position and size of holes for anchor bolts.

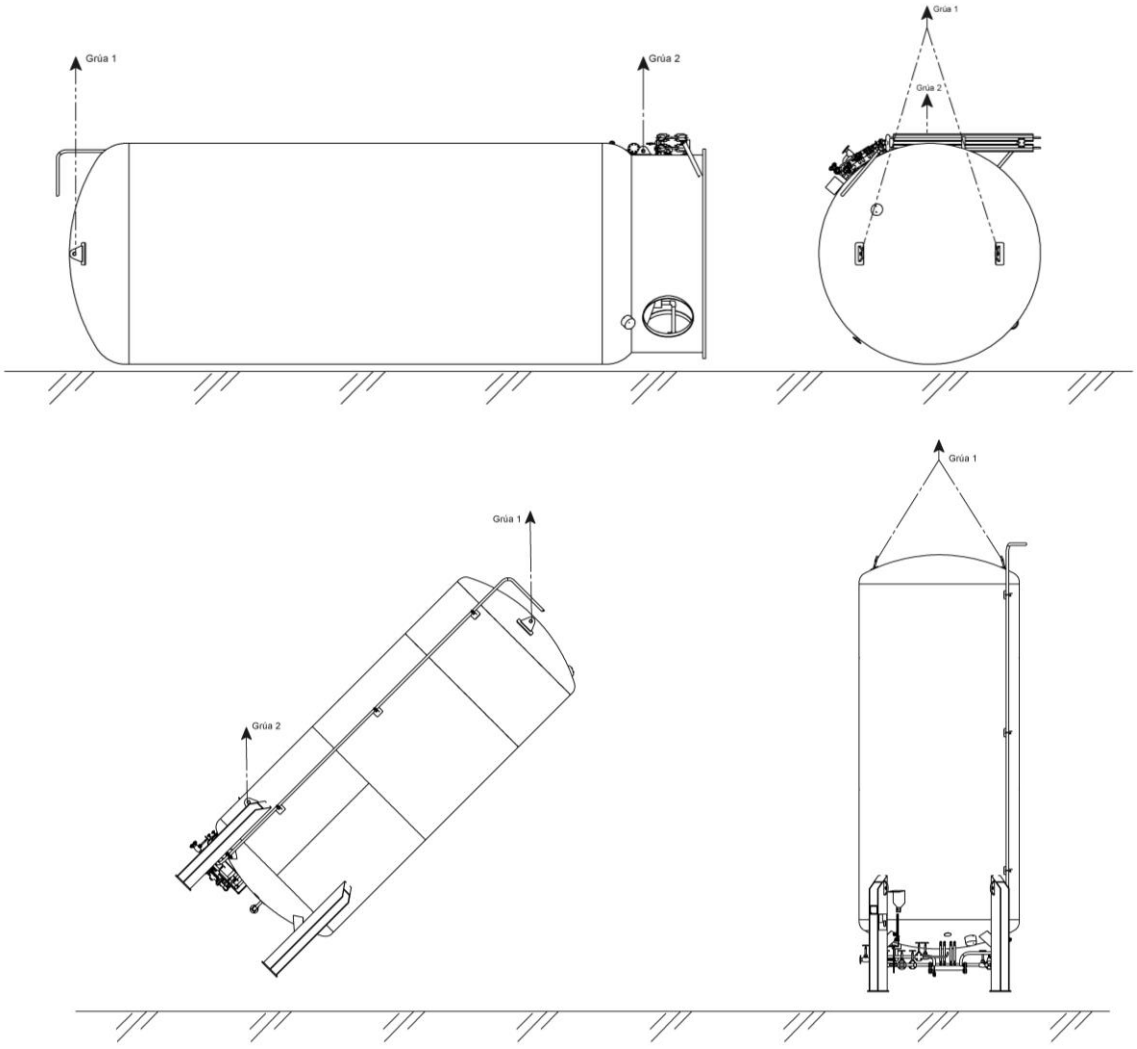
VERTICAL TANKS

The angle between the hoisting cable lines will be less than 60º.

Vertical tanks have two lugs at the top end and 2 lugs on legs or 1 lug on the skirting. In the horizontal position, lifting (offloading from truck...) can be carried out with straps around the tank (these must be non-metal to ensure that the tank coating is not damaged).

Once in the vertical position the tank can be held by just the top lugs.

The length of the chain must be as indicated in the diagram.



5.3 MECHANICAL INSTALLATION

Consult the location and size of tank outlets for each model.

The safety valves (tank and lines) should be guided until safe unloading.

Protect the tank with an adequate earth connection.

The tanks have a unified filling connection (one single connection for the filling hose that connects to the gas phase and liquid phase filling connections). We highly recommend fitting another two filling valves, one for each phase, as a precaution in case of a failure in either of the two existing valves.

5.4 BLANKETING WITH NITROGEN GAS

Blanketing can be carried out with nitrogen (approximately 5000 kg are sufficient for inerting, drying and cooling a 60 m^3 tank.

Action	**Valve/value**
Open the level equalising valve (ri and rs are open)	**re**
Check that the pressure never exceeds:	**Working pressure**
Connect liquid nitrogen tanker to the tank loading inlet.	
Tanker pressure of approximately	**2.5 bar**
Slowly open the liquid phase filling valve Only nitrogen gas should be introduced	**VL**
Open the relief valve	**VA**
Continue introducing nitrogen gas for approximately 20 minutes	
When the pressure is lower than the set pressure of the pressure regulator, blanketing of the PPR circuit takes place. Check that	**VEP and VSP are open**
To blanket the gas phase circuit, open	**VG**
To blanket the overflow circuit, open	**VR**
To blanket the economiser circuit (if there is one), open	**VEE**
To blanket the consumption line, open	**VC**
Once these circuits have been blanketed. Close	**VEP, VSP, VG, VR, VEE, and VC**
Close the filling connection	**VL**
Following blanketing, depressurise the vessel to less than	**100 mbar**
Close	**VA**

5.5 COOLING

Action	**Valve/value**
Introduce liquid nitrogen at the gas phase, opening	**VG**
Introduce to at least 10% of tank's capacity	
The pressure must not exceed	**Maximum working pressure of tank**
Control increase in pressure by opening (if necessary) and closing	**VA**
Continue until the tank has cooled (by way of reference, check that the VA vent pipe is beginning to freeze)	**Minimum 10% of tank's capacity**
Close	**VG**
Fill, at liquid phase, the rest with nitrogen by opening	**VL**
Control the increase in pressure by opening	**VA, VR**
Close	**VL**
Although there is a common filling valve prior to VG and VL, these valves must remain closed when the tank is not being filled.	
Check tank pressure for 12 hours, keeping it below the working pressure.	
If pressure has to be released, open	**VA, VR**
During this time, re-tighten all of the installation's flanges and connections and check tightness of seals with soapy water	
Check that there is no vacuum loss in the chamber.	

5.6 FILLING FOR THE FIRST TIME

Action	Valve/value
Ensure that ri and rs are open (never just one) and close	**re**
Before connecting the tanker, empty the liquid nitrogen from the tank by opening	**VL**
When no more liquid comes out, close	**VL**
Check that the level marked is zero. If not, adjust the zero at this point.	
Leave tank at a pressure of	**100 mbar**
Releasing, if necessary, via	**VA, VR**
Connect the LNG tanker to the vessel filling connection	
Keep tanker pressure at approx. 2 bar above the tank pressure	
Open the gas phase filling valve	**VG**
Keep the pressure in the tank below the maximum working pressure by opening and closing	**VA**
If the pressure is low, filling can be carried out via	**VL**
In this first-time filling, check that the level functions correctly (it should mark the fluid level as it rises).	
Towards the end of the filling operation keep the overflow outlet open.	**VR**
When the fluid flows out of it, close	**VG, VR, VL**
Check that the level marked is approximately 95%	
Although a common filling valve for VG and VG has been fitted, between these and the tanker hose, VG and VL must remain closed when the tank is not being filled (except if both have non-return valves)	
Purge the filling manifold and hoses and disconnect them	

5.7 COMMISSIONING

Adjustment of pressure regulating valve (PPR)

The valve that regulates the pressure booster is not factory-calibrated. Calibration of this valve is part of the installation process and depends on the pressure to be guaranteed.

It can be adjusted by means of the screw: loosening it lowers the pressure setting and tightening the screw increases it. We recommend marking the calibrated value on the valve plate.

Adjustments can be carried out during the nitrogen blanketing process.

For the PPR pressure booster to function correctly the level of the fluid must be above 20%.

6 OPERATING INSTRUCTIONS

Those responsible for the installation shall prepare safety, emergency, unloading and usage instructions etc. for the whole of the installation. The following indications are given in regard to the vessel.
All those involved in operating the plant should receive the necessary training on how to act safely.

6.1 USAGE

For the equipment **to operate normally** (gas consumption at facilities) ensure that the PPR pressure booster valves (PPR (VEPPR, VSPPR), the economiser valves (VEE), if these are fitted, and the consumption valve (VC) are open.
The **level of the fluid** must always be between 20% and 95%.
Do not **totally empty the vessel**, leave pressure inside it to prevent contamination and at the same time keep it cold.
Gauge equipment:
In normal operation the status of the gauge equipment valves is:

Connection	**Mark**	**Connection to**	**Normal status**
High pressure	+	Low zone of tank	Open
Low pressure	-	High zone of tank (gas phase)	Open
Equalisation		Connects both zones	Closed

If the equaliser valve is opened with the other two valves open, the pipes may be flooded with fluid.
If the tank is overfilled to more than 95% the pipes that connect to the upper level measurement may become flooded.
In both cases the measurements obtained for the differential level may be false, and for this reason pipes should be purged.
Incorrect handling may damage the equipment. If one of the two (upper or lower) channels is opened when the other channel and the equaliser valve is closed, the equipment may be damaged (if the tank is pressurised).
For this reason when opening the valves we recommend first opening the equaliser valve and then, with the said valve open, opening the other two and then slowly closing the equaliser valve.
Filling process: follow the steps indicated below:

Action	**Valve/value**
Connect the LNG tanker to the fill connection on the vessel, maintaining a pressure of at least 2 bar above that of the tank.	
Open the gas phase filling valve	**VG**
Keep the pressure in the tank under 5 bar or 9 bar (depending on model) by opening and closing	**VA**
If the pressure is low, filling can be carried out via	**VL**
When the level approaches 95% slowly open	**VR**
When the fluid flows out of it (95%), close	**VG, VR, VL**
Although there is a shared filling valve prior to VG and VL, these valves must remain closed when the tank is not being filled to prevent the effect of "communicating vessels".	
Purge the filling manifold and hoses and disconnect them	

Cooling: follow the indications given in previous sections.
How to measure the vacuum: follow the indications given in the section entitled "prior checks".

Carrying out vacuum: See maintenance section.

6.2 PROHIBITIONS

The following actions are prohibited:

- It's strictly prohibited to close both of the manual shut-off valves at the beginning and at the end of the pressure build up system (PPR) except for maintenance or replacement operations.
- Carrying out welding on any part of the tank or tank element except on the shields provided for this purpose.
- Manipulating seals or vacuum elements. If you have to manipulate the vacuum gauge equipment, bear in mind that
    - The first time it is opened the person responsible for the installation must be present.
    - Once measurements have been taken the protective cover should be put back on and sealed again.
- Striking any part of the tank with hammers or wrenches.
- Performing any operation that may endanger the safety of the installation:
    - Manipulating any of the equipment's elements
    - Manipulation by unauthorised people or anyone not wearing suitable safety gear (gloves...).
    - Hazardous operations in ATEX zones ...
- Introducing pressure in the insulation chamber.
- Producing a vacuum in the inner tank.
- Carrying out hydraulic testing in a horizontal position on vertical tanks.

7 MAINTENANCE

7.1 TANK

The **regular tests** defined in regulations shall be carried out to check the general state of the vessel and equipment.
Always take into account the design conditions of the tank which are indicated on the rating plate (test pressure). If a hydraulic test is performed it should be carried out in the installation position (vertical in the case of vertical tanks).
Do not introduce positive pressure in the tank insulation chamber or a vacuum in the inner tank.
The vacuum connections should not be manipulated.

Periodic checks
Regardless of the prescribed tests (pressure test...) we recommend carrying out at least the following periodic checks (the installer should decide how often these should be carried out depending on the number of planned filling operations):

- Check that the valves are in good working order.
- Tightness of equipment (with pressure gauge of a suitable scale, gas detectors or with soapy water).
- Valve manoeuvrability.
- State of tank surface free of rust spots (see further on).
- Check correct earth connection.

Washing tank
If the tank needs to be washed with soap then it should be a low-alkaline product and easy to rinse off.
Do not use aggressive cleaning products or scrapers that may damage the coating.

State of surface
Tanks undergo the same corrosive processes of all metal element that are subject to the harshness of the environment.
It is crucial to carry out the preventive maintenance of any defects that are detected.
Small timely repairs guarantee a long product life and minimise repair costs. A defect that is not resolved in time can cause widespread corrosion of the whole surface and can, on occasions, fully compromise the equipment.

Repair process

If the coating that protects the tank from inclement weather is damaged it should be repaired following the process described below:

1. First ensure that there is no explosive atmosphere (gas leaks).
2. Using sandpaper or a wire brush remove the rust from the affected areas until the clean base metal is visible. Sand the edges of the area.
3. Clean the area to remove all dirt and grease.
4. Apply a coat of anti-rust primer. We recommend using the 2-component, epoxy type primer supplied by LAPESA and following the instructions on mix proportions and the rest of the paint manufacturer's indications.
5. Wait until the primer cost is dry to the touch.
6. Apply a top coat. We recommend using the 2-component polyurethane paint supplied by LAPESA and following the indications of the product manufacturer.

7.2 LEVEL AND PRESSURE GAUGE EQUIPMENT

They do not require maintenance but do require care being taken during their use. They must only be handled by people who know how the equipment works.

Incorrect handling can damage the equipment.
During the first relief operations, bubbles may cause slight oscillations of the gauge needle.
The level transmitter does not require maintenance.
See the equipment manual and follow the instructions indicated.

7.3 PRESSURE BUILD UP (PPR)

No maintenance is required. However this equipment has isolation valves that allow it to be dismantled.

7.4 PRESSURE REGULATOR (PR)

In general, it does not require maintenance.
The trigger point can be adjusted by means of the screw: loosening it lowers the pressure setting and tightening the screw increases it. If the factory-set value is changed we recommend changing the mark on the valve plate to the new value.
It can be dismantled to replace some of its internal elements.
Prior to carrying out any repair work isolate the equipment by means of the shut-off valves on the line and without containing pressure or fluid.
For further details please consult the valve handbook.

7.5 SAFETY VALVE BLOCK

In principle it does not require any maintenance. However, the valves can be replaced, using for this this purpose the 3-way valve. Turn the 3-way valve handle as far as it will go to one of the ends. This closes the inlet to two of the valves while the rest remain active for safety purposes.
Ensure that the valves remain in a dismantled state for as short a time as possible.

7.6 SHUT-OFF VALVES

These are robust valves, which in general do not require maintenance.
If a leak from the plug is detected, re-tighten the nuts. If the leak persists, empty the gas from the tank in order to dismantle them.
There are spare parts at the disposal of installers: packing gland, seals and Teflon seats.
The manufacturer of these valves recommends replacing these components every two years.
The whole plug (top part of valve) can also be replaced.
We also recommend installing extra shut-off valves, following those that the tank incorporates, at loading and fluid supply outlet. These additional valves should be used regularly. This way, in the event of a malfunction, the tank can be isolated and the valves can be repaired without having to previously empty the tank. The valves on the tank should be operated annually to check that they are in good working order.

7.7 VACUUM MEASURING DEVICE

The operation to measure the vacuum is carried out as indicated in 5.1.

7.8 CARRYING OUT A VACUUM

The tank has a DN40ISOKF size connection on the insulation chamber.
Vacuum recovery is only carried out when the measurement taken indicates that it is necessary. Otherwise the vacuum connection is maintenance-free.
Do not remove the seal on this connection unless vacuum recovery is required.
Vacuum recovery procedure:

1. Remove the screwed blind flange (removing seal).
2. Connect the specific shut-off valve for this application (Leybold vacuum lock valve) with the appropriate cuffs. In this operation the valve stem must be totally "out".
3. This valve must be connected to the vacuum pump that is going to be used.

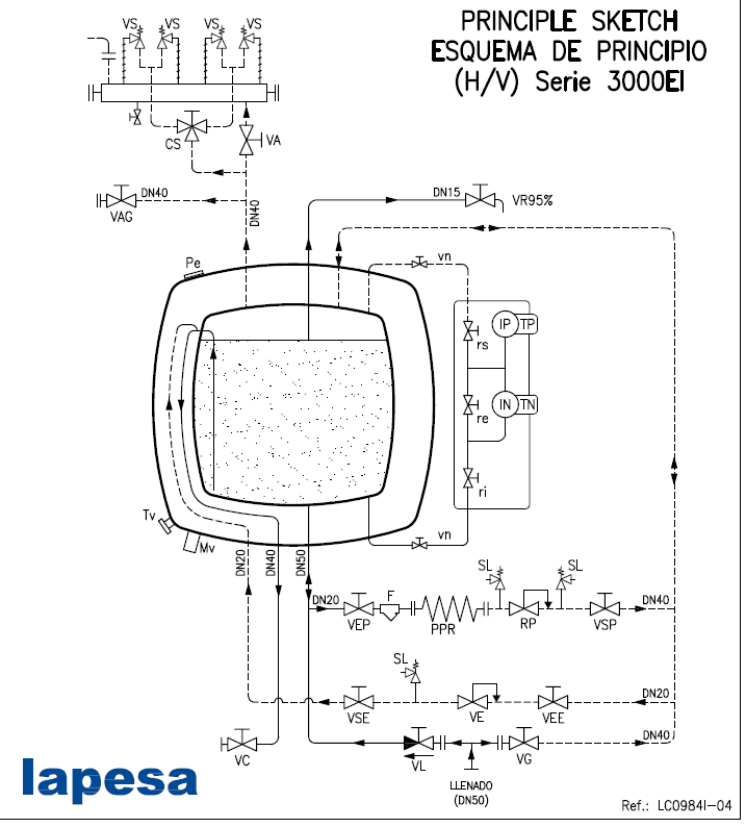
4. Tighten the stem as far as it will go (it does not need to be turned).
5. Connect the vacuum pump
6. Turn it slightly, tightening it until it is properly in place.
7. Turn it to open the internal cover.
8. Pull the stem completely out.
9. Leave the pump connected until the required vacuum is obtained.
10. Close the valve again by pressing the stem as far as it will go and then turning it (force is not required to close it).
11. Refit the blind flange using specific silicone for vacuums on the seal. We recommend replacing the seal. Seal the closure.
12. Keep a check on the vacuum in the tank and the pump at all times.

7.9 CASING OVERPRESSURE DEVICE

Located on the top of the tank. Do not remove its seal.
It should be kept clean (do not allow any accumulated dirt, nests, insects as this could impede pressure relief, if necessary).

8 EXAMPLE OF P&I

Legend Leyenda	Function / Función
VG	Top fill line valve/ Válv. llenado superior fase gas
VL	Bottom fill line valve/Válv. llenado inferior fase líquida
VC	Liquid withdrawal valve / Válv. Servicio
VR	Tricock / Válv. rebosadero
VEP	PBU inlet valve / Válv. entrada PPR
PPR	Pressure Build-Up Evaporador PPR (Puesta Presión Rápida)
RP	Pressure regulator / Regulador presión
VSP	PBU outlet valve / Válv. salida PPR
VAG	Gaz phase auxiliar valve / Válv. auxiliar fase gas
CS	Divertor / Válv. 3 vías (seguridad)
VA	Relief valve / Válv. de alivio
VS	Safety valve / Válv. Seguridad
SL	Line safety valve / Válv. seguridad línea
VE	Economizer / Válv. economizadora
VEE	Economizer inlet valve / Valv. entrada economizador
VSE	Economizer outlet valve / Valv. salida economizador
IN	Level / Nivel
IP	Pressure gauge / Manómetro
vn	Level valve / Válvula nivel
re	By-pass valve / Válv. by-pass
ri	Level bottom valve / Válv. nivel inferior
rs	Level top valve / Válv. nivel superior
TP	Pressure transmitter (acc. to model) Transmisor presión (según modelo)
TN	Level transmitter (acc. to model) Transmisor nivel (según modelo)
F	Filter / Filtro
Pe	Protection device Dispositivo seguridad envolvente
Tv	Vacuum pump / Toma de vacío
Mv	Vacuum sensor / Dispositivo medición vacío



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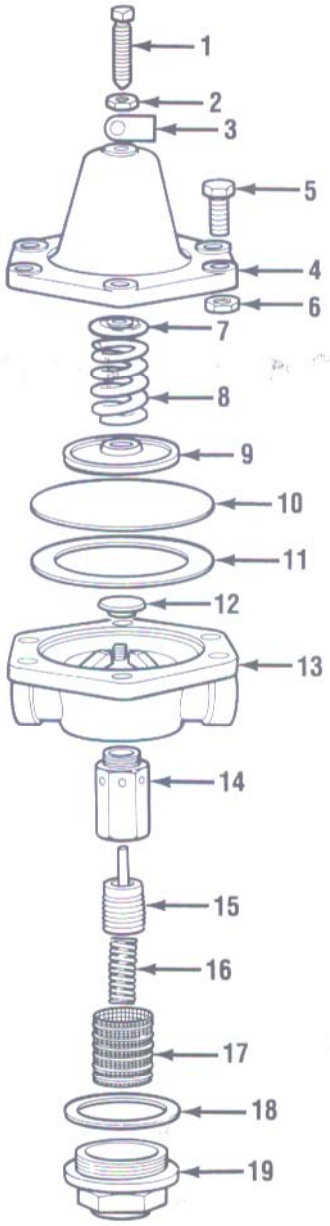


1. Adjusting Screw
2. Lock Nut
3. Identification Tag
4. Spring Chamber
5. Assembly Screw
6. Assembly Nut
7. Spring Button
8. Pressure Spring
9. Pressure Plate
10. Diaphragms
11. Gasket
12. Pusher Post Button
13. Body
14. Cylinder
15. Piston Assembly
16. Piston Spring
17. Strainer Screen
18. Gasket
19. Bottom Plug

DESCRIPTION

The Type B regulator is a fully automatic pressure regulating valve designed for cryogenic service in the pressure build-up circuit. Because the Type B may be used for either cryogenic liquids or gases, it may be installed either before or after the pressure build-up coil.

SPECIFICATION DATA

Service: Cryogenic liquids and gases (pressure reducing or pressure build-up service)

Sizes: 1/4", 3/8", 1/2", 3/4", 1", 1-1/4", 1-1/2" and 2"

Connections: Threaded (NPT) female inlet and outlet. BSPT also available (consult factory).

Temperature Rating: +150°F (339°K) to -320°F (78°K)

Maximum Initial Pressure: 400 psi

Pressure Control Range: Per Spring Range Table

CONSTRUCTION

Bronze body, internal trim, and diaphragms; Teflon seat, diaphragm gasket, and bottom plug gasket; stainless steel bolts and nuts; stainless steel pressure spring.

All parts commercially cleaned for cryogenic service.

GENERAL INSTALLATION INSTRUCTIONS

The Type B regulator may be installed in the horizontal position with the spring chamber up or down. For other installation requirements consult the factory. For ease of operation and maintenance, it is suggested that manual shut-off valves be installed upstream and downstream from the valve. Before installing the valve, all piping should be thoroughly flushed out to remove any foreign material. Install the valve with the inlet pipe fitted to the inlet connection identified on the valve body. Use a compatible sealant on the male pipe threads and do not overtighten the valve connections.

OPERATING INSTRUCTIONS

Adjusting the Delivery Pressure

The regulator's delivery pressure setting is adjusted by turning the adjusting screw (1) at the top of the spring chamber after loosening the adjusting screw lock nut (2). To increase the delivery pressure, turn the adjusting screw clockwise (into the spring chamber). To decrease the delivery pressure, turn the adjusting screw counter-clockwise (out of the spring chamber). Tighten the adjusting screw lock nut after the adjustment has been made.

Type B
CRYOGENIC
PRESSURE REGULATOR

This Bulletin No.	**TS-BCRY**
Date Of This Issue	**MARCH 2000**
Supersedes Bulletin No.	**TS-BCRY**
Dated	**APRIL 1999**

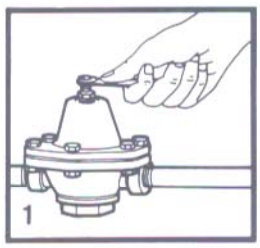
MAINTENANCE INSTRUCTIONS

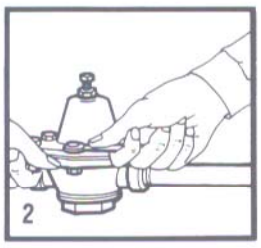
The following procedures are provided for servicing the recommended spare parts for the Type B regulator. Repair parts can easily be installed without removing the regulator from the line.

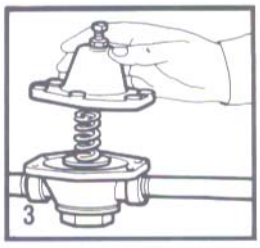
CAUTION: Before attempting to replace any spare parts be sure to shut off all pressure connections to the valve being serviced. Even with the valve closed, however, system pressure could still be locked between the shut-off valve and the inlet and/or outlet sides of the regulator. Before proceeding with any valve service be certain to relieve the pressure from BOTH sides of the regulator.

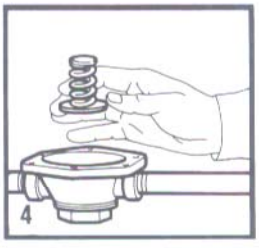
INSTALLATION, MAINTENANCE & REPAIR PARTS INFORMATION

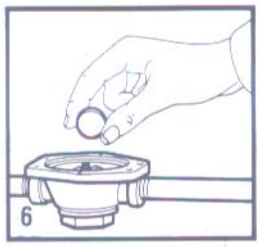
ISO 9001 CERTIFIED

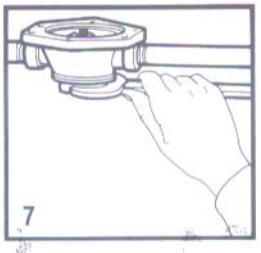


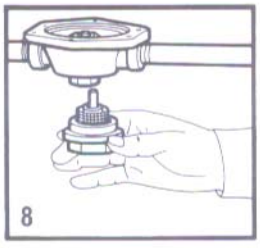


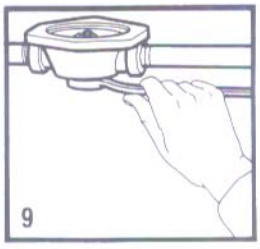


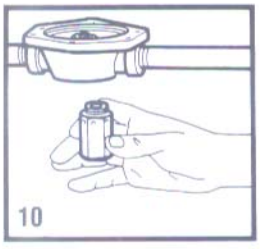












Refer to the Type B regulator exploded view for parts identification.

Servicing the Diaphragms (10) and Pressure Spring (8)

1. Loosen the lock nut (2) 1/4 turn and turn the adjusting screw (1) counter-clockwise until the pressure spring (8) is no longer under tension, Figure 1.
2. Remove the six assembly screws (5) and nuts (6) securing the spring chamber (4) to the valve body (13), Figure 2. During reassembly, tighten the screws evenly in an alternate diagonal pattern.
3. Lift the spring chamber (4) from the valve body, Figure 3. Then remove the spring button (7), pressure spring (8), and pressure plate (9), Figure 4. The pressure plate is **not** secured to the diaphragm.
4. Remove the Diaphragms (10), Figure 5, and the Teflon gasket (11) located under the diaphragms. Five metal diaphragms are used in valve sizes 1/4" through 3/4"; six are used in valve sizes 1" through 2".
5. Remove the pusher post button (12) from the protruding pusher post, Figure 6. During reassembly, be sure the pusher post button is centered properly on the pusher post.
6. Inspect all parts and replace if necessary. Reassemble the parts in reverse order.

Servicing the Cylinder (14), Piston (15), Strainer Screen (17), and Bottom Plug Gasket (18)

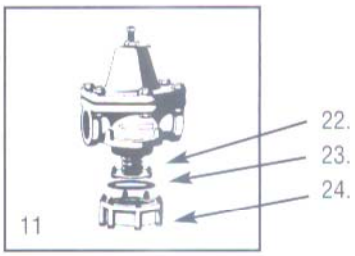
1. It is important that the load on the pressure spring (8) be relieved before attempting to service any parts through the bottom of the valve. Relieve the pressure spring tension as detailed in Step 1 under Servicing the Diaphragms (10) and pressure spring (8), above.
2. Remove the bottom plug (19) as follows:

   1/4" through 1-1/2" valves: The bottom plug is under slight tension as a result of the piston spring (16) acting against the plug. Loosen the bottom plug with a standard wrench, Figure 7, then carefully unscrew the plug by hand. The piston, (15), piston spring (16), and strainer screen (17) will normally "drift" out with the bottom plug.

   2" valves: Remove the six bottom screws (22) retaining the bottom plug (21) to the valve body. Next, carefully remove the two cylinder plate screws (24) and the cylinder plate (23). The piston (17), piston spring (18), and strainer screen (19) can now be removed. See Figure 11.

NOTE: The Teflon bottom plug gasket (18) not only provides a tight seal but also assures easy removal of the bottom plug by preventing sticking or bonding of the plug to the valve body.

3. Thoroughly clean the strainer screen and flush the valve body to remove any foreign material that may have collected around the strainer screen.
4. Unscrew the hexagon cylinder (14) from the valve body with a socket wrench, Figure 9, to prevent distortion. Note that the cylinder extends below the face of the valve body to permit convenient removal.
5. Inspect all parts and replace if necessary. Should either the cylinder (14), Figure 10, or the piston (15) need replacing, then it will be necessary to replace **both** parts because both parts wear equally.
6. Reassemble the valve in reverse order. After placing the valve in service, readjust the delivery pressure as detailed under Operating Instructions.



22. Bottom Screws
23. Cylinder Plate
24. Cylinder Plate Screws

REPAIR PARTS INFORMATION

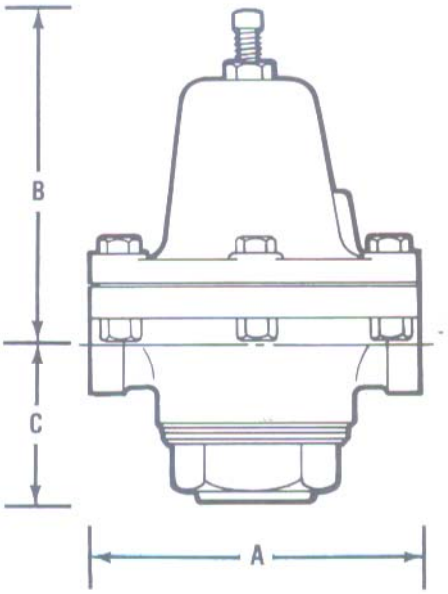
Refer to the exploded view of the Type B regulator for parts identification.

TYPE B REPAIR KITS

KIT NUMBER	PIPE SIZE	VALVE NUMBER	DIAPHRAGM	DIAPHRAGM GASKET	PISTON ASSEMBLY	CYLINDER	BOTTOM PLUG GASKET
12358	1/4"	12315	1632	12308	8597	1933	7984
12359	3/8"	12316	1763	12309	8598	1934	7984
12360	1/2"	12317	1580	12311	12394	1935	3109
13658	1/2"	12290	1580	12311	12294	12293	3109
13655	3/4"	12300	1582	12312	12294	12293	3109
12362	1"	12319	1781	12297	7795	1936	4068
13656	1-1/4"	12320	1802	12326	8561	1938	4068
13656	1-1/2"	12321	1802	12326	8561	1938	4068
18541	2"	8580	1834	18627	8576	1824	8578

SPECIFICATIONS

Each Type B pressure regulator is equipped with a pressure spring selected to provide the desired outlet or reduced pressure setting. The range of adjustment or satisfactory "working range" of individual springs is shown below for each valve size. Every regulator has the "set" pressure and range of adjustment stamped on a tag fastened to the valve. The ranges shown below are recommended for best performance.



SPRING RANGES

SIZE	SPRING NUMBER AND ADJUSTMENT RANGE (psi)					
1/4"	#4765 10-30	#7337 25-100	#8741 50-200	#10661 100-250	-	-
3/8"	#11143 10-50	#8691 40-150	8683 100-225	#14301 100-250	-	-
1/2"	#11143 10-30	#10016 20-75	#10017 25-125	#10018 100-200	#10019 150-250	-
3/4"	#11143 10-30	#10016 20-70	#10017 30-100	#10018 50-150	#10019 100-225	#9983 150-250
1"	#8484 10-35	#8485 20-60	#8486 50-100	#19068 50-150	-	-
1-1/4"	#8484 10-30	#8485 20-40	#8486 35-80	#8487 75-150	-	-
1-1/2"	#8484 10-30	#8485 20-40	#8486 35-80	#8487 75-150	-	-
2"	#6301 5-20	#8773 10-50	#12913 20-100	-	-	-

DIMENSIONS

VALVE SIZE	DIMENSIONS			SHIP. WT. (lbs)
	A	B	C	
1/4"	3"	2-7/8"	1-3/4"	3
3/8"	3-7/8"	4-1/2"	1-3/4"	5-1/2
1/2"	4-1/2"	4-1/2"	2-1/8"	8
3/4"	5-1/8"	4-5/8"	2-1/8"	10
1"	5-7/8"	5-3/8"	2-1/8"	16
1-1/4"	6-3/4"	6-1/8"	2-5/8"	20
1-1/2"	6-3/4"	6-1/8"	2-5/8"	20
2"	9-1/4"	8-1/2"	3-1/2"	37

HOW TO ORDER

Convenient, pre-packaged repair kits are available for the Type B regulators. Each kit includes diaphragm(s), diaphragm gasket, piston assembly, cylinder, strainer screen, piston spring and bottom plug gasket. The kits may be ordered by kit number as listed.

To order repair parts, refer to the exploded view of the Type B regulator to identify the part required. When ordering please use the part names listed and provide the valve serial number stated on the identification tag. Also state the following:

"Repair Parts for Type B Cryogenic Regulator" and provide:

1. Valve size
2. Service
3. Inlet pressure
4. Outlet or delivery pressure range and setting
5. Part description
6. Part number if stated
7. Quantity of each part
8. Valve assembly or serial number stated on the metal identification tag under the adjusting screw lock nut.

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DATA SHEET

T 2557 EN

Type 2357-1 Pressure Regulator · Types 2357-2 Excess Pressure Valve

Self-operated Pressure Regulators for special applications

CE

Application

Pressure regulators for cryogenic gases as well as other liquids, gases, and vapors · Operating pressures up to **50 bar** Set point ranges from **0.2** to **40 bar** · Temperatures from **–196** to **+200 °C** · Oxygen clean according to international standards and guidelines

Type 2357-1 · Pressure build-up regulator: valve **opens** when the upstream pressure **drops**
Type 2357-1 · Pressure reducing valve: valve **closes** when the downstream pressure **rises**
Type 2357-2 · Excess pressure valve: valve **opens** when the upstream pressure **rises**

Industrial gases (such as argon, nitrogen and oxygen) are stored in a liquefied condition at extremely low temperatures and at a constant pressure in thermally insulated tanks. Pipes transport the medium to the consumer. The extreme operating conditions (pressures up to 50 bar and temperatures down to –196 °C) require the use of special valves.

The Series 2357 Pressure Regulators are especially designed for the conditions in cryogenic service. These regulators can also be used for gases, liquids and vapors under other operating conditions.

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Wide set point range and convenient set point adjustment
- Rugged design and low overall height
- Cleaned and packed for oxygen service

Versions

The pressure regulators consist of a valve body with two ports (marked A and B), internal operating diaphragm and set point adjuster.

– **Types 2357-1 Pressure Build-up Regulators with safety function** · The upstream pressure is transmitted to the operating diaphragm. The valve opens when the upstream pressure drops. Direction of flow from port B to port A.

  Safety function: the plug in the pressure build-up regulator operates like a safety valve and relieves the pressure chamber. The pressure acts from below against the plug surface. The valve opens to equalize the pressures.

– **Types 2357-1 Pressure Reducing Valve (globe valve):** the valve regulates the downstream pressure to the adjusted set point. The valve closes when the downstream pressure rises. Direction of flow from port A to port B.

Fig. 1: *Type 2357-1 Pressure Regulator (pressure build-up regulator or pressure reducing valve)*

Fig. 2: *Type 2357-2 Pressure Regulator (excess pressure valve)*

– **Types 2357-2 Excess Pressure Valve (angle valve):** the valve regulates the upstream pressure to the set point adjusted at the set point adjuster. The valve opens when the pressure increases until the set point is reached.

  Type 2357-2 can be optionally equipped with a non-return unit. In thermally insulated tanks, the excess pressure is relieved by feeding the gas into the consumer pipeline.

Accessories

– **Types 2357-1/-2:** mounting parts - soldering nipple with ball-type bushing (for connection to 16 or 15 mm pipe diameter); filter with 270 or 50 µm mesh

– **Type 2357-2:** non-return unit

Further accessories in Data Sheet ▶ T 2570.

SAMSON AKTIENGESELLSCHAFT · Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507 · samson@samson.de · www.samson.de

Edition April 2020

Principle of operation

Functioning as a p**ressure build-up regulator** with direction of flow from port B to port A, the pressure upstream of the valve (port B) is transmitted to the operating diaphragm. The valve closes when the upstream pressure increases and opens when the upstream pressure drops.

The pressure build-up regulator operates as a safety valve and relieves the pressure chamber of pressure when the pressure exceeds the set point by 5 bar. After overcoming the spring force of the top springs (16), the valve opens to equalize the pressures.

The process medium flows from port A to port B when the Types 2357-1 Pressure Regulators are used as **pressure reducing valves**.

The valve is open when no pressure is applied. The pressure downstream of the valve (port B) is transmitted to the operating diaphragm (3). The positioning force produced moves the valve plug (2.1) depending on the spring force adjustable at the set point adjuster (10). The valve closes when the pressure downstream of the valve (port B) rises.

The medium always flows through the **Types 2357-2 Excess Pressure Valves** from port A to port B. The valve is closed when no pressure is applied. The pressure at port A is transmitted internally to the operating diaphragm (3). The positioning force produced opposes the adjustable spring force. The valve opens when the pressure increases until the set point is reached.

To discharge small quantities of gas, the Type 2357-2 Excess Pressure Valve can be used with special accessories. The safety valve does not react when just the gas volume must be discharged due to heat leak.

The excess pressure valve can additionally be equipped with a non-return unit, which prevents the medium from flowing back through the valve.

Installation

- Standard mounting position with the spring housing suspended downward. Other mounting positions on request.
- Build-up pressure regulator with safety function: direction of flow from port B to port A
- Pressure reducing valve: direction of flow from port A to port B
- Type 2357-2 Excess Pressure Valve with non-return unit: the center axis of the regulator must be vertical and port B must point upward.

EC type examination

An EC type examination according to the Pressure Equipment Directive 97/23/EC, Module B has been performed on the regulators (PN 50 version).

Serial number

The devices are marked with a serial number on the nameplate. Details on the nameplate are listed in ▶ EB 2557.

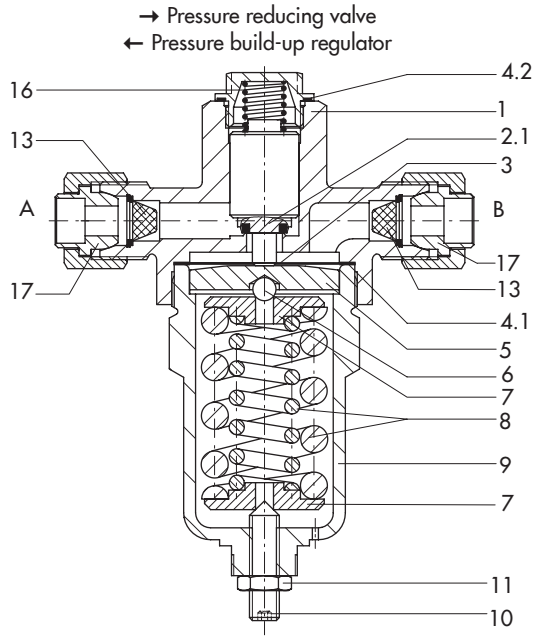


Fig. 3: *Type 2357-1 Pressure Build-up Regulator or Pressure Reducing Valve (PN 50)*

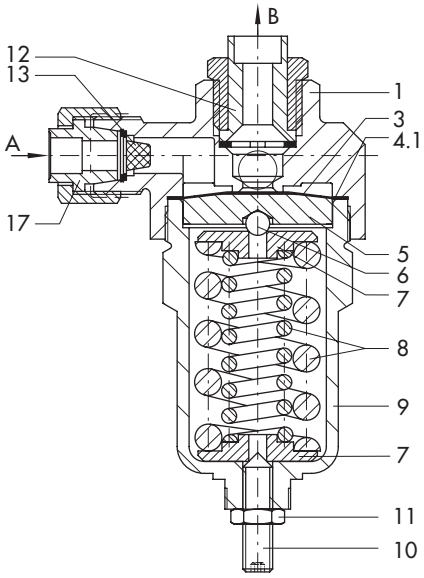


Fig. 4: *Type 2357-2 Excess Pressure Valve (PN 50)*

1 Valve body
2.1 Plug
3 Operating diaphragm
4.1 Gasket (bottom section of the body)
4.2 Seal (top section of body)
5 Diaphragm plate
6 Ball
7 Spring plate
8 Set point springs
9 Bottom section of the body (spring housing)
10 Set point adjuster (hexagon socket, SW 5)
11 Lock nut (SW 17)
12 Non-return unit (accessories)
13 Filter
16 Plug spring
17 Soldering nipple with ball-type bushing (accessories)

Sample application (schematic drawing)

Pressure regulator functioning as a pressure build-up regulator with safety function

When tapping the liquefied cryogenic gas, the gas pressure in the insulated tank causes the medium to be transferred to the vaporizer (8). The gas pressure in the tank drops below the adjusted operating pressure. The Type 2357-1 Regulator (installed as a pressure build-up regulator; 2) opens and allows the liquefied gas to flow into the pressure build-up vaporizer (7). The gas pressure increases and reaches the operating pressure again. The pressure build-up regulator (2) closes.

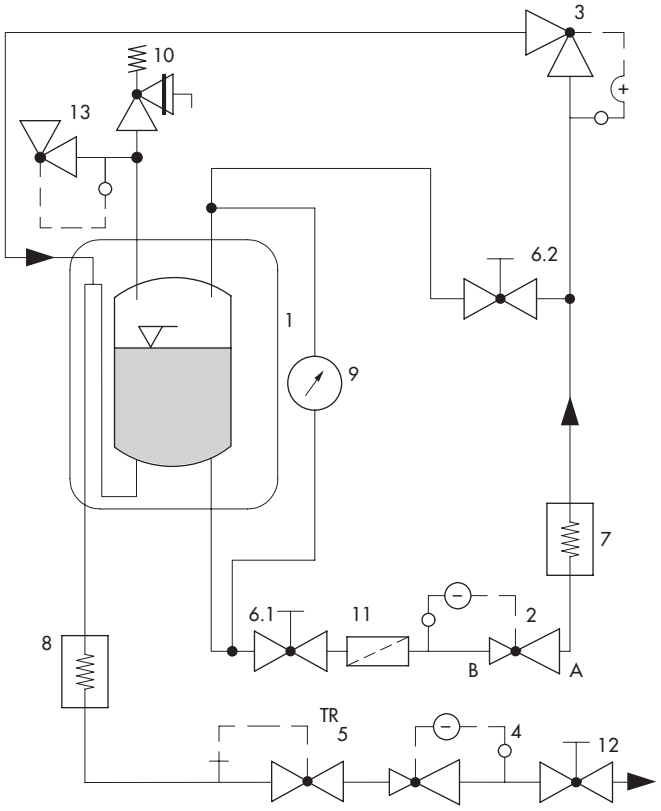
After closing the shut-off valve (6.1), the liquid remaining in the pipeline between shut-off valve (6.1) and regulator (2) vaporizes, causing the pressure to increase. The plug of the pressure build-up regulator (2) acts as safety valve by opening the valve (upstream pressure at port B) to equalize the pressures. The pressure chamber is relieved of pressure as a result.

Pressure regulator functioning as an excess pressure valve (economizer)

The Type 2357-2 Excess Pressure Valve (3) is adjusted to a pressure above the operating pressure. Any liquid trapped between the shut-off valves (6.1 and 6.2) vaporizes, causing the pressure to increase. The excess pressure valve (3) opens, allowing the gas to escape into the consumer pipeline.

Pressure regulator functioning as a pressure reducing valve

If a lower pressure is required in the draw-off pipe, the Type 2357-1 Pressure Regulator can be used to function as a pressure reducing valve (4).



1 Cryogenic tank
2 Type 2357-1 Pressure Build-up Regulator
3 Type 2357-2 Excess Pressure Valve (economizer)
4 Types 2357-1 Pressure Reducing Valve
5 Type 2040 Temperature Monitor
6.1 Shut-off valve
6.2 Shut-off valve
7 Pressure build-up vaporizer
8 Final vaporizer
9 Media 5/Media 6 Level Meter
10 Safety valve
11 Strainer (filter)
12 Shut-off valve
13 Pressure protection by Type 2357-2 with special accessories

Fig. 5: *Series 2357 Pressure Regulator for cryogenic service, schematic drawing*

Table 1: *Type 2357-... · Valve versions and end connections*

Type	Design	Version	Connections	
			Input	Output
2357-1	Pressure build-up regulator/pressure reducing valve	Globe valve	G ¾ A Conical joint	
2357-2	Excess pressure valve	Angle valve	G ¾ A Conical joint	G ¾ Female thread

Table 2: *Technical data · All pressures in bar (gauge)*

Type	2357-1		2357-2	
K_{VS} coefficient	0.25	0.8	1.25	0.4
Set point ranges [1] in bar	1 to 25 10 to 36	1 to 8 5 to 25 8 to 40		1 to 25 10 to 36
Nominal pressure	PN 40	PN 50 [2]		PN 40
Safety function for Types 2357-1	5 bar above the set point			
Max. perm. differential pressure Δp	Types 2357-1 Pressure Reducing Valves: Gases 30 bar · Liquids 6 bar Types 2357-2 Excess Pressure Valve: 3 bar (>3 bar only with special accessories)			
Temperature range	–196 to +200 °C			

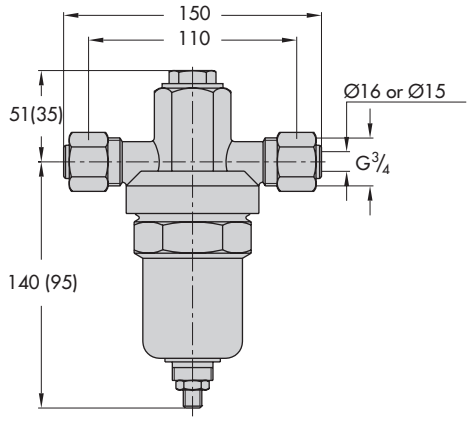
1) Further set point ranges on request
2) With oxygen p_{max} = 40 bar

Table 3: *Materials · Material numbers according to DIN EN*

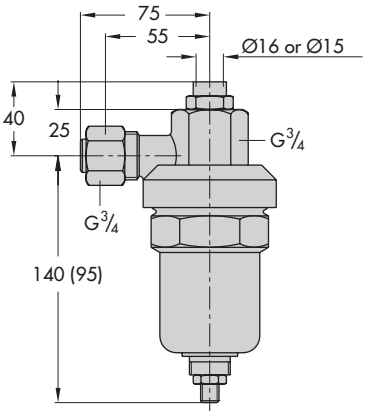
Type	2357-1	2357-2
Building	CC754S-GM (brass) [1]	
Cover	CC754S-GM (brass) [1]	
Plug	CW602N (brass) with PTFE soft seal	–
Operating diaphragm	CuBe	
Set point springs	Stainless steel (1.4310)	
Body gasket	PTFE	

1) PN 40: CW617N (brass)

Dimensions



Type 2357-1 Pressure Regulator with soldering nipple (accessories)
Weight 2.0 (0.9) kg



Type 2357-2 Pressure Regulator with soldering nipple and non-return unit (accessories) · Weight 1.7 (0.6) kg

Specifications in parentheses () apply for regulators in PN 40

Flow capacity of the regulator dependent on the liquid column in the cryogenic tank

The value table and the mass flow diagram show the flow capacity for the media nitrogen (N_2), oxygen (O_2), argon (Ar), carbon dioxide (CO_2) and natural gas (LNG).

The specifications apply to the Type 2357-1 Pressure Build-up Regulator installed in the liquid phase of the pressure build-up control loop; as shown in Fig. 5 (sample application).

The maximum flow capacity [kg/h] of the regulator arises from the liquid level of the medium in the tank and can be determined from the graph.

The data in the graph are based on theoretical calculations which do not take factors, such as pressure losses in the pipeline, into account. Therefore, the real flow capacity may deviate from the calculated value.

Table 4: *Mass flow dependent on the liquid column in the cryogenic tank*

Filling level [m]	Mass flow rate [kg/h]				
	N_2	O_2	Ar	CO_2	LNG
1	248	351	427	359	130
3	379	537	653	550	199
5	475	673	819	689	249
7	555	785	956	805	291
9	624	884	1,076	906	328
11	687	973	1,184	996	361
14	771	1,093	1,329	1,119	405
17	848	1,201	1,460	1,230	445
20	918	1,300	1,580	1,331	482

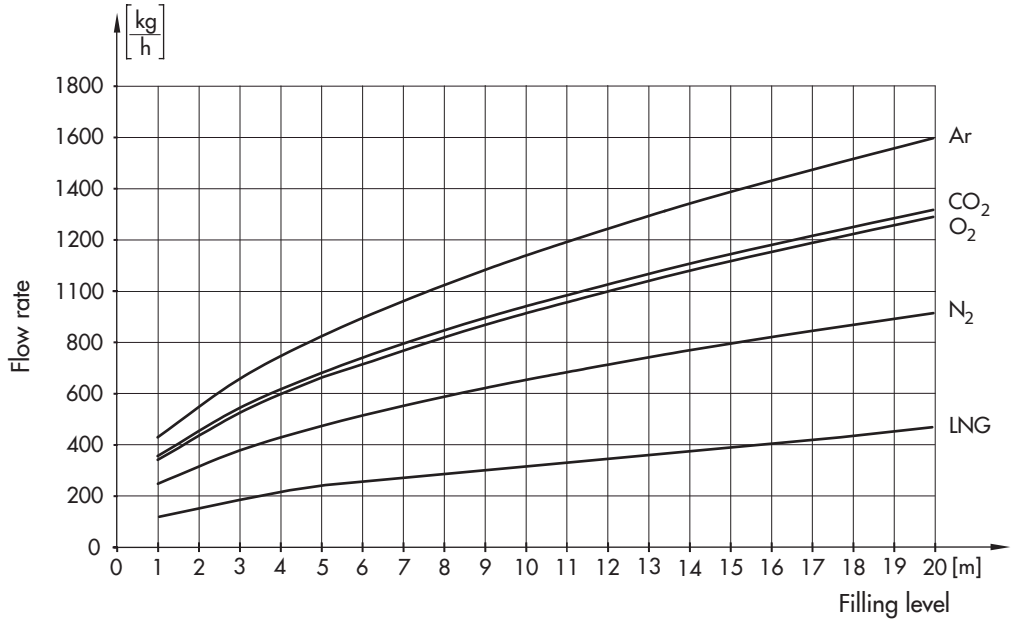


Fig. 6: *Mass flow dependent on the liquid column in the cryogenic tank*

Ordering text

Types 2357-1/-2 Pressure Regulators

Set point range ... bar

Optionally, accessories ...

Special version ...

MOUNTING AND
OPERATING INSTRUCTIONS

EB 9510 EN

Translation of original instructions

Media 7 Differential Pressure Meter

with remote data transmission

Firmware version 1.02.07

CE Ex certified

Edition September 2018

Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

➔ For the safe and proper use of these instructions, read them carefully and keep them for later reference.

➔ If you have any questions about these instructions, contact SAMSON's After-sales Service (aftersalesservice@samsongroup.com).

The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at ***www.samsongroup.com > Service & Support > Downloads > Documentation***.

Definition of signal words

⚠ DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

⚠ WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE

Property damage message or malfunction

Note

Additional information

Tip

Recommended action

1 Safety instructions and measures

Intended use

The Media 7 Differential Pressure Meter is a microprocessor-controlled transmitter with dp cell for measuring, indicating and transmitting the differential pressure, pressure or measured variables derived from them. The device is suitable for cryogenic gases, liquids, gases and vapors. The device is designed to operate under exactly defined conditions (e.g. operating pressure, process medium, temperature). Therefore, operators must ensure that the device is only used in operating conditions that meet the specifications used for sizing the device at the ordering stage.

The Media 7 device can be operated in hazardous areas in Zone 1 or higher only. The measurement of flammable or explosive media is only permitted with the following approvals:

– Type 5007-1-120x (ATEX): II 1/2G Ex ia IIB T4 Ga/Gb
– Type 5007-1-121x (IECEx): Ex ia IIB T4 Ga/Gb (IECEx)

In case operators intend to use the device in other applications or conditions than specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

➔ Refer to the technical data for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse

The Media 7 Differential Pressure Meter is ***not*** suitable for the following applications:

– Use outside the limits defined during sizing and by the technical data

Furthermore, the following activities do not comply with the intended use:

– Use of non-original spare parts
– Performing maintenance activities not specified by SAMSON

Qualifications of operating personnel

The device must be mounted, started up and serviced by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

Explosion-protected versions of this device must be operated only by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

Personal protective equipment

We recommend wearing the following protective equipment depending on the process medium:

– Protective clothing, gloves, eye protection and respiratory protection in applications with hot, cold and/or corrosive media

➔ Check with the plant operator for details on further protective equipment.

Revisions and other modifications

Revisions, conversions or other modifications of the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use. Use of the device is no longer permitted.

Warning against residual hazards

To avoid personal injury or property damage, operators and operating personnel must prevent hazards that could be caused in the device by the process medium and operating pressure by taking appropriate precautions. They must observe all hazard statements, warning and caution notes in these mounting and operating instructions, especially for installation, start-up and service work.

Responsibilities of the operator

The operator is responsible for proper operation and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions to the operating personnel and to instruct them in proper operation. Furthermore, the operator must ensure that operating personnel or third persons are not exposed to any danger.

Responsibilities of operating personnel

Operating personnel must read and understand these mounting and operating instructions as well as the specified hazard statements, warning and caution notes. Furthermore, the operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards and regulations

Devices with a CE marking fulfill the requirements of the Directives 2014/30/EU and 2014/34/EU. The declarations of conformity are included at the end of these instructions.

Referenced documentation

The following documents apply in addition to these mounting and operating instructions:

– Mounting and operating instructions for mounted pipeline valves (strainers, shut-off valves etc.)

1.1 Notes on possible severe personal injury

⚠ DANGER

Risk of fatal injury due to the formation of an explosive atmosphere.

Incorrect installation, operation or maintenance of the differential pressure meter in potentially explosive atmospheres may lead to ignition of the atmosphere and cause death, even with a harmless supply voltage.

➔ For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe.

➔ Do not connect the supply voltage before mounting is completed and any unused cable entries have been sealed.

➔ Installation, operation or maintenance of the differential pressure meter must only performed by personnel with qualifications according to Clause 4.5 of IEC 60079-14 who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

⚠ DANGER

Risk of fatal injury as a result of electrostatic discharge at the housing.

The housing of the Media 7 device is made of polycarbonate and may become electrostatically charged when handled improperly. An electric spark generated by electrostatic discharge may lead to ignition of a potentially explosive atmosphere and cause death.

➔ Ensure that the device, cables and other plant components cannot rub against each other.

➔ Do not rub dry the housing surface of the Media 7 device.

➔ Only use a damp cloth or wipes (e.g. with diluted mild soap or detergent) to clean the housing surface.

Risk of bursting in pressure equipment.

The dp cell of the Media 7 device and pipelines are pressure equipment according to Directive 2014/68/EU. Improper opening can lead to leakage or bursting of plant or device components.

➔ Before starting any work on the Media 7 device, depressurize all plant sections concerned and the dp cell.

➔ Drain the process medium from all the plant sections affected as well as the dp cell.

➔ Wear protective clothing as specified in the material safety data sheet (MSDS) of the medium used.

1.2 Notes on possible personal injury

⚠ WARNING

Incorrect electrical connection will render the explosion protection unsafe.

➔ Only operate the device with an intrinsically safe power supply while complying with the maximum permissible values for U_i or U_0, I_i or I_0 and P_i or P_0.

➔ Adhere to the terminal assignment and correct polarity.

➔ Do not undo the enameled screws.

⚠ WARNING

Risk of personal injury due to residual process medium in the dp cell.

While working on the dp cell, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

➔ Drain the process medium from all the plant sections concerned and the dp cell, if possible.

➔ Wear protective clothing, safety gloves and eye protection.

Risk of personal injury due to medium escaping from a damaged dp cell.

Ensure that all parts (including the dp cell) that come into contact with the process medium are made of materials with long-term durability.

➔ Only use process media which, according to their properties, are compatible with the materials used in the device.

➔ Observe the material numbers listed in the technical data as well as the material safety data sheets (MSDS) of the process media.

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, valve components and pipelines may get very hot or cold and cause burn injuries.

➔ Allow components and pipelines to cool down or heat up.

➔ Wear protective clothing and safety gloves.

➔ Devices intended to measure gaseous oxygen are labeled as follows:

Cleaned and degreased for oxygen according to:
ISO 23208 - cleaned oxygen
Inspection procedure according to appendix: A.2 and A.3

These versions are cleaned and assembled under special conditions. When replacing parts that come into contact with gaseous oxygen, wear suitable gloves and make sure that the parts do not come into contact with oil or grease.

➔ When returning devices for oxygen service for repair, the sender assumes full responsibility that the devices are handled to meet all requirements stipulated by VBG 62 or similar regulations until they are handed over to the manufacturer. Otherwise, SAMSON does not accept any responsibility.

1.3 Notes on possible property damage

NOTICE

Risk of dp cell damage due to contamination (e.g. solid particles) in the pipeline.

The plant operator is responsible for cleaning the pipelines in the plant.

➔ Observe the maximum permissible pressure for dp cell and plant.

Risk of damage to the differential pressure meter due to the maximum permissible values specified in the EC type examination certificate being exceeded.

The plant operator is responsible for cleaning the pipelines in the plant.

➔ Do not exceed the maximum permissible values (U_i or U_0, I_i or I_0, P_i or P_0, C_i or C_0 and L_i or L_0) when interconnecting intrinsically safe electrical equipment.

Risk of dp cell damage due to unsuitable medium properties.

The device is designed for process media with defined properties.

➔ Only use process media suitable for the device version according to the article code (see page 15).

Risk of damage to the dp cell due to incorrect use with oxygen.

When liquid oxygen is used as the process medium, the permissible temperature range is exceeded.

➔ When the device is used for oxygen service, make sure that the dp cell and any SAMSON accessories (e.g. valve block) only come into contact with **gaseous oxygen**.

➔ The maximum permissible oxygen pressure is 50 bar.

Risk of leakage and dp cell damage due to excessively high or low tightening torques.

Observe the specified torques on tightening connecting parts of the dp cell. Excessively tightened torques lead to parts wearing out quicker. Parts that are too loose may cause leakage.

➔ Observe tightening torques.

NOTICE

An incorrect electrical power supply will damage the electronics.

The Media 7 device is designed to operate under exactly defined electrical conditions.

➔ Observe the permissible tolerances of the supply voltage.

➔ For wiring, you are required to observe the relevant regulations concerning device safety and electromagnetic compatibility.

Risk of damage to the device due to incorrect mounting position.

➔ Mount the device in the upright position only.

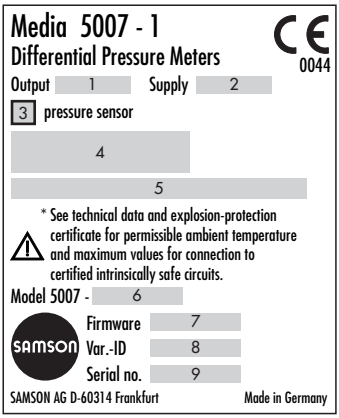
Incorrect installation or removal of the option modules will damage the differential pressure meter.

➔ Before inserting or removing the option modules, disconnect the power supply.

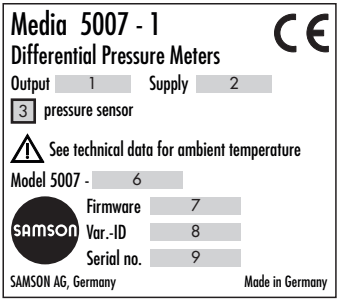
2 Markings on the device

2.1 Nameplate

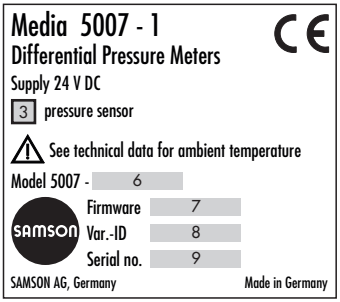
Two-wire version (explosion-protected):



Two-wire version (without explosion protection):



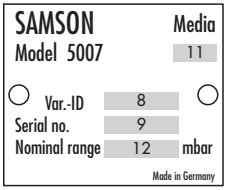
24 V version:



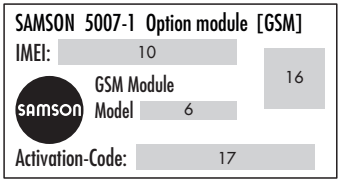
1 Signal range
2 Electric power supply
3 Pressure sensor (yes/no) [1]
4 Type of protection for explosion-protected devices
5 Temperature limits in the test certificates for the explosion-protected devices
6 Model number
7 Firmware version
8 Configuration ID
9 Serial number [2]
10 International Mobile Equipment Identity [3]
11 Pressure rating
12 Measuring range
13 Optional additional function
14 Ordering number
15 Abbreviation of optional additional function
16 QR code
17 Activation code

[1] There is no pressure sensor in devices used with flammable gases. Therefore, it is not specified on the nameplate.
[2] The first two figures of the serial number in reverse order indicate the year of manufacture (example: serial number 71xxxxx ➔ Year of manufacture = 2017).
[3] 15-digit serial number for unique identification of mobile devices

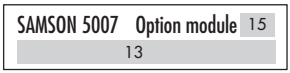
dp cell:



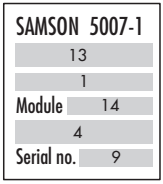
GSM module (see section 6.2):



Option module without explosion protection (see section 6.1):



Option module with explosion protection (see section 6.1):



2.2 Article code

Media 7	**5007-1-**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**0**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
With 4" LCD																			
Explosion protection																			
Without		0	0	0	1														
ATEX: II 2G Ex ia IIB T4 Gb		1	1	0															
IECEx: Ex ia IIB T4 Gb		1	1	1															
ATEX: II 1/2G Ex ia IIB T4 Ga/Gb		1	2	0															
IECEx: Ex ia IIB T4 Ga/Gb		1	2	1															
Energy supply																			
Two-wire					0														
Power supply unit, 24 to 36 V DC					1														
Option module slot 1																			
Without						0													
AO: Analog output						5													
AI: Analog input						4													
AIA: Analog input active						6													
Option module slot 2																			
Without							0												
AO: Analog output							5												
AI: Analog input							4												
AIA: Analog input active							6												
Option module slot 3																			
Without								0											
AO: Analog output								5											
AI: Analog input								4											
AIA: Analog input active								6											
Option module slot 4																			
Without									0										
AO: Analog output									5										
AI: Analog input									4										
AIA: Analog input active									6										

Media 7	**5007-1-**	x	x	x	x	x	x	x	x	x	**0**	x	x	x	x	x	x	x	x
GSM module with antenna																			
Without											0								
GSM module with antenna (including SIM card)											2								
dp cell material																			
Brass												0							
Measuring range																			
160 mbar													0	2					
600 mbar													0	5					
1600 mbar													0	7					
3600 mbar													0	9					
Diaphragm																			
ECO: –40 to +80 °C, REACH compliant															0				
Version																			
Version for cryogenic gases according to DIN EN ISO 23280, packed in plastic bags, free of oil and grease according to company standard WN 1.34-2 Sheets 1 and 1.1																1	1		
Version for oxygen according to DIN EN ISO 25208, packed in plastic bags, free of oil and grease according to company standard WN 1.34-2 Sheets 1 and 1.1																1	2		
Pressure rating																			
50 bar, version for oxygen service, without valve block																		1	
60 bar, without valve block																		2	
50 bar, with valve block PN 50																		3	
Pressure sensor																			
Without																			1
With, non-flammable gases																			2

3 Design and principle of operation

The Media 7 device is a microprocessor-controlled transmitter with dp cell for measuring, indicating and transmitting the differential pressure, pressure or measured variables derived from them in stationary pressure vessels and in transportation vehicles. The device is suitable for cryogenic gases, liquids, gases and vapors. Measuring ranges between 0 to 160 mbar and 0 to 3600 mbar, nominal pressure PN 60.

The device mainly consists of a dp cell (1), housing with transmitter and a display (6).

The differential pressure $\Delta p = p_1 - p_2$ is converted into an electric signal in the dp cell by a sensor and processed in the microcontroller (2) which controls the display and D/A converter of the two-wire version.

Four capacitive keys (4) are used to operate the differential pressure meter and allow the user to navigate within the menu on the display.

The modular design of the Media 7 device allows it to be adapted to specific requirements. Optional additional functions are available through the use of option modules (see section 6.1).

A remote data transmission using the optional GSM module (9) is possible in the 24 V version. Connection to the SAM TANK MANAGEMENT web interface is established over a mobile network (see section 6.2).

Operating mode

- **Differential pressure measurement** between flow and return flow pipe as well as pressure drop measurement across valves and filters
- **Liquid level measurement** in stationary pressure vessels and transportation vehicles

Power supply unit with standby power supply (SPS)

The power supply units include a battery compartment for a 1.5 V battery which provides standby power supply upon power failure (see section 6.3).

3.1 Configuration using the TROVIS-VIEW software

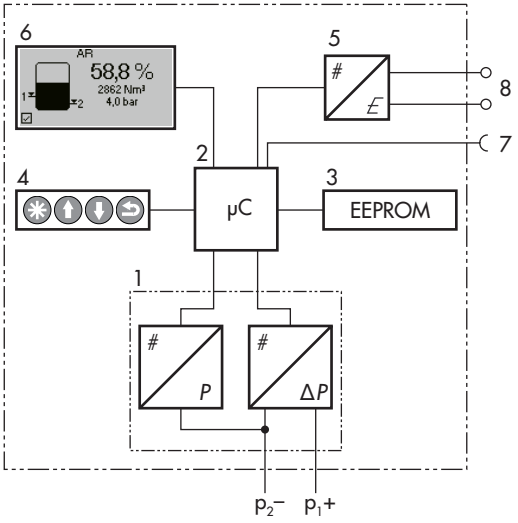
The differential pressure meter can be configured with SAMSON's TROVIS-VIEW Software (version 4). For this purpose, the differential pressure meter has a digital interface (SSP) to allow the USB port of a computer to be connected to it using an adapter cable.

The TROVIS-VIEW software enables the user to easily configure the differential pressure meter as well as view process parameters online.

i ***Note***

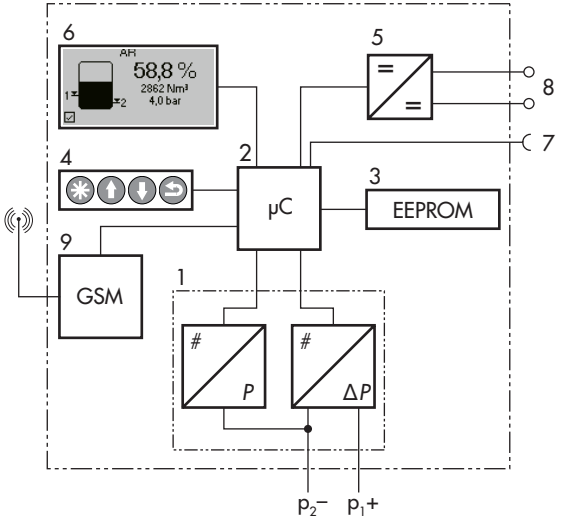
TROVIS-VIEW can be downloaded free of charge from our website at www.samsongroup.com > Service & Support > Downloads > TROVIS-VIEW.

Two-wire version



1 dp cell
2 Microcontroller
3 Data memory
4 Operating keys
5 D/A converter
6 Display
7 Serial interface
8 I_A = 4 to 20 mA

24 V version



1 dp cell
2 Microcontroller
3 Data memory
4 Operating keys
5 24 V power supply unit
6 Display
7 Serial interface
8 U_B = 24 to 36 V
9 GSM module

Fig. 1: *Media 7 · Block diagrams*

3.2 Application

The differential pressure of liquids, vapors and gases are measured by the integrated dp cell in the Media 7 device. The measured differential pressure is used for various possible applications.

3.2.1 Differential pressure measurement

Two absolute pressures p_1 and p_2 are compared for the differential pressure measurement. This way, for example the filters can be monitored by measuring the upstream and downstream pressures at the filter.

3.2.2 Liquid level measurement

The tank content (function of hydrostatic pressure, tank geometry and liquid density of the stored gas) is displayed proportionally and the operating pressure is indicated in the selected unit on the display. Fig. 2 illustrates the principle of the liquid level measurement.

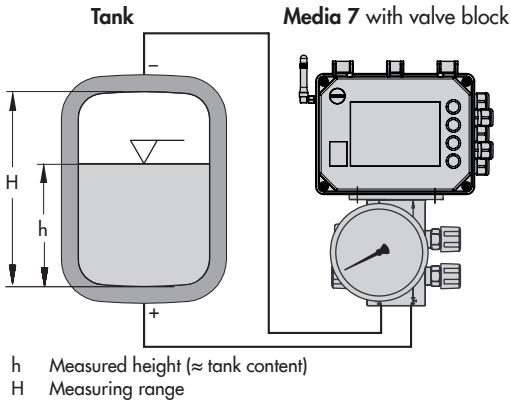


Fig. 2: *Principle of liquid level measurement*

3.2.3 Device arrangement for liquid level measurement

– Fig. 3, diagram 1: measurement on cryogenic tanks
– Fig. 3, diagram 2: measurement on pressure vessels with condensing or non-condensing pressure reserve. The additional height z is included in the measurement. As a result, this height (z) must be as low as possible.
– Fig. 3, diagram 3: measurement on open vessels with the meter located in a low position. The compensation height *K* can be as large as required depending on the conditions in the plant.

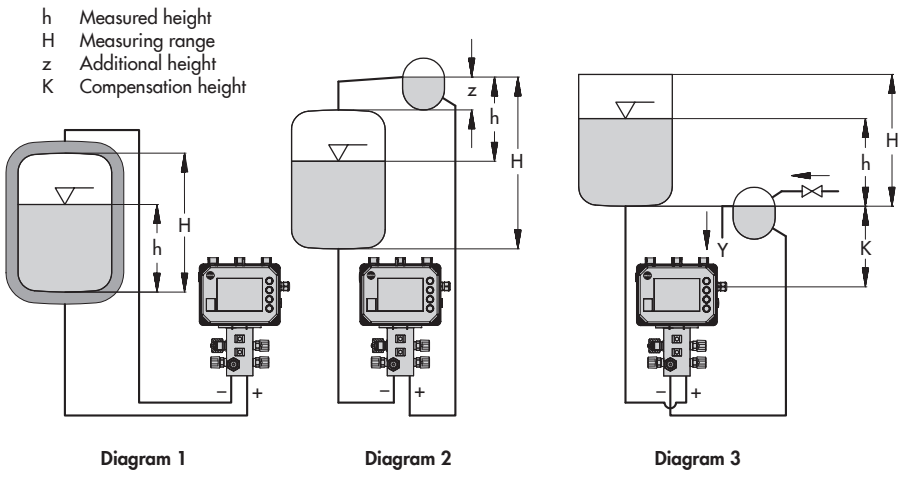


Fig. 3: *Liquid level measurement · Arrangement of devices (illustration with SAMSON valve block)*

3.3 Versions

3.3.1 Two-wire version

– **Type 5007-xxx0...**

The two-wire version is supplied with a 4 to 20 mA signal from a current source. This version is available with explosion protection.

3.3.2 24 V version

– **Type 5007-xxx1...**

The 24 V version has a wider ambient temperature range. Due to the greater electrical power, it has additional functions, such as illuminated display and remote data transmission through the use of a retrofittable GSM module.

3.4 Device overview and operating controls

➔ See Fig. 4

1 Display
2 Confirm key
3 Up arrow key
4 Down arrow key
5 Back key
6 Error LED
7 Battery LED (SPS)
8 Status LEDs for GSM module
9 Signal input terminal
10 Slot for GSM module
11 SSP interface
12 Slots 1 to 4 for option modules
13 SPS: standby power supply
14 Grounding connection

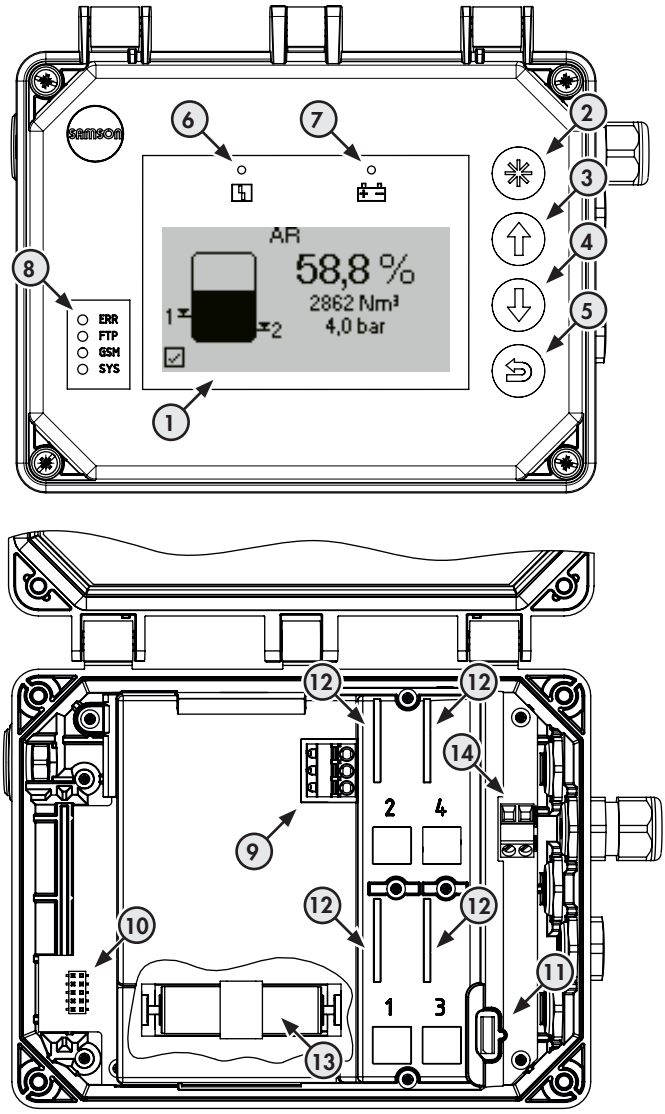


Fig. 4: *Operating controls*

3.5 Accessories

3.5.1 Valve block

Three valves are combined in the valve block for Media 7. The valve block is bolted onto the bottom of the Media 7 dp cell (see Fig. 5).

The valve block offers the following benefits:

- Mounting of an operating pressure gauge possible.
- Fastened using two additional mounting holes.
- The connected process lines can be bypassed. This allows a zero calibration to be performed regardless of the current filling level of the tank.
- The differential pressure meter can be easily removed by shutting off the measuring lines (e.g. to replace a defective device) without disturbing the running process.
- Lead-seal holes

➔ Details on the valve block:
see accessories for the Media Series
▶ T 9555

3.5.2 Further accessories

A list of available accessories for the Media Series can be found in the Data Sheet
▶ T 9555.

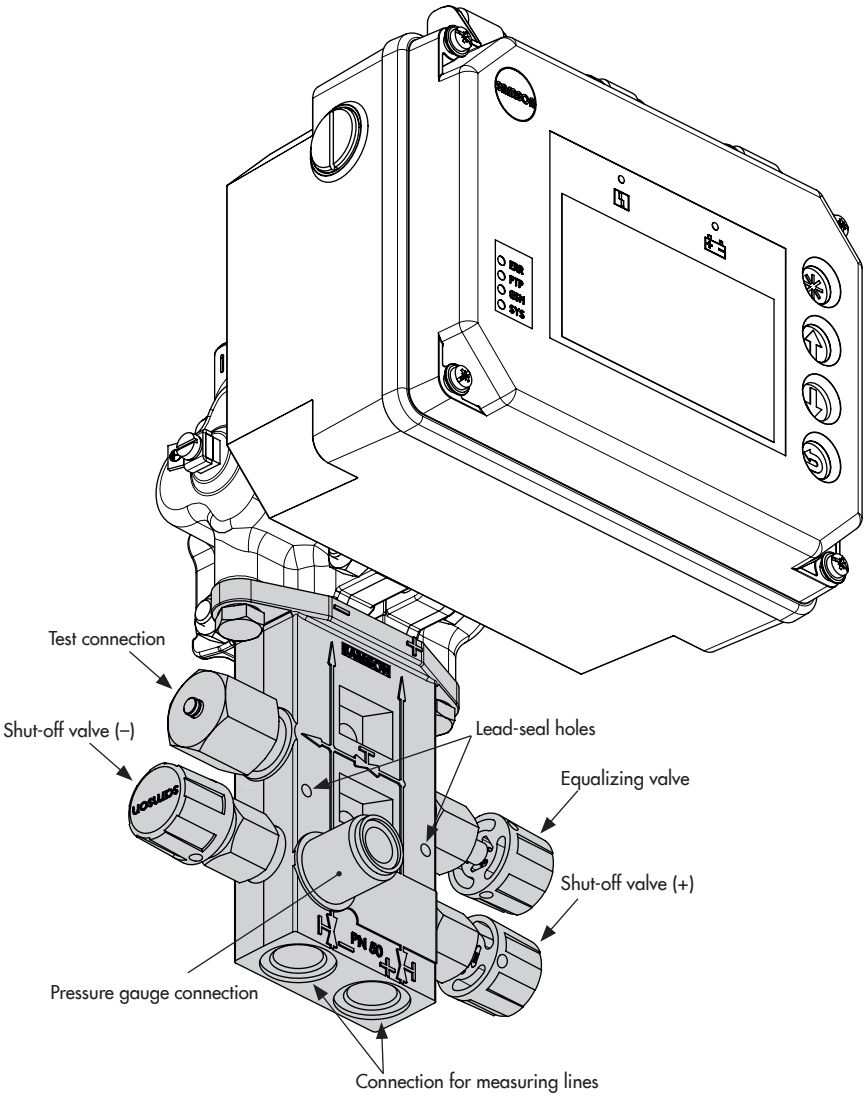


Fig. 5: *Media 7 · Valve block (in mounted state)*

3.6 Technical data

Table 1: *General technical data*

Media 7 Differential Pressure Meter (All pressure in bar (gauge); all errors and deviations are specified in % of the adjusted measuring span)				
Mounting position	Upright with display facing sideways			
Principle of operation	The differential pressure at the diaphragm is converted into an electric signal by the AMR system.			
Pressure rating	PN 60, overloadable on one side up to 60 bar Oxygen: PN 50, overloadable on one side within the adjusted system pressure			
Characteristic	Differential pressure proportional to the tank geometry			
Deviation from terminal-based linearity	<±1.6 % (including hysteresis)			
Sensitivity	≤0.25 % or <±0.5 % depending on measuring span selected			
Effect of static pressure	<0.03 %/1 bar			
Display				
Display	LCD 128 x 64 (90 x 40 mm)			
Storage temperature	–40 to approx. +80 °C			
Operating temperature	Two-wire version: –20 to approx. +70 °C 24 V version: –40 to +70 °C			
Measuring range in mbar	**0 to 160**	**0 to 600**	**0 to 1600** [1]	**0 to 3600** [1]
Adjustable measuring span in mbar				
Class ±1 %	–	≤630 to ≥150	≤1700 [1] to ≥320	≤3800 [1] to ≥720
Class ±1.6 %	≤170 to ≥60	≤150 to ≥120	–	–
Effect of ambient temperature in the range from –20 to +70 °C				
On zero in %/10 K	<±0.4	<±0.1	<±0.1	<±0.1
On span in %/10 K	<±0.4	<±0.1	<±0.1	<±0.1
Internal absolute pressure sensor				
Measuring range	0 to 60 bar			
Deviation from terminal-based linearity	<±1.6 %			
Effect of ambient temperature	≤0.018 % (within the range from –20 to +70 °C)			

[1] A class accuracy of 0.6 % can be expected in these measuring ranges with measuring spans ≤100 % to ≥75 % of the nominal range.

Environmental influences	
Storage according to EN 60721-3-1 (long-term storage)	1K5 (air temperature –40 to +80 °C); 1M3 (The following restriction applies to GSM module: air temperatures –30 to +75 °C)
Transportation according to EN 60721-3-2	2K4 (air temperature –40 to +40 °C in ventilated enclosures, up to +70 °C in unventilated enclosures), 2M1 (The following restriction applies to GSM module for low air temperatures down to –30 °C)
Operation according to EN 60721-3-4 (stationary use at non-weather-protected locations)	4K4 (with restrictions: air temperature –40 to +55 °C, temperature inside the housing must not exceed +70°C when exposed to direct sunlight); 4M4 – The display and GSM module are heated at low air temperatures (24 V version). – The restrictions for the oxygen testing additionally apply to versions for oxygen service: 50 bar/+60 °C. – Observe the limits in the test certificate for explosion-protected versions.
Mechanical vibration	
Vibrations (sinusoidal) according to IEC 60068-2-6	2 to 9 Hz; 3.5 mm amplitude 9 to 200 Hz; 10 m/s² acceleration 200 to 500 Hz; 15 m/s² acceleration
Random and guidance vibration according to IEC 60068-2-64	1.0 m²/s³; 10 to 200 Hz 0.3 m²/s³; 200 to 2000 Hz
Shocks according to IEC 60068-2-27	Acceleration 100 m/s²; duration 11 ms
Requirements	
EMC	Devices with a CE marking fulfill the requirements of the Directive 2014/30/EU. Compliance with EN 61000-6-2, EN 61000-6-3, EN 61326-1 and NAMUR Recommendation NE 21.
Degree of protection	IP 67 according to IEC 60529 (VDE 470 Part 1, 2014-09)
Explosion protection	
Type of protection	ATEX/IECEx: Ex ia IIB T4 Gb Devices with a CE marking fulfill the requirements of the Directive 2004/34/EU.
Oxygen service	
Gaseous oxygen (process medium)	Operating temperature from –40 to +60 °C at max. 50 bar operating pressure (applies to parts inside and on the device which are included in the oxygen testing)
Electrical connections	
Cable glands	M16 x 1.5 (max. 5)
Terminals	0.2 to 2.5 mm² wire cross-section
Spring-cage terminals (option modules)	0.13 to 1.5 mm² wire cross-section

Communication	
Local	SAMSON SSP interface and serial interface adapter, TROVIS-VIEW
Remote data transmission	GSM module
Weight	
Device without valve block	Approx. 3300 g
Device with valve block (without pressure gauge)	Approx. 5200 g

Table 2: *Power supply*

Optional power supply					
Two-wire version	5007-1-**000**0	5007-1-**110**0	5007-1-**111**0	5007-1-**120**0	5007-1-**121**0
Explosion protection	**No explosion protection**	**ATEX Ex ia**	**IECEx Ex ia**	**ATEX Ex ia**	**IECEx Ex ia**
Output	4 to 20 mA				
Permissible load R_B in Ω	$R_B = (U_B - 12\ V)/0.020\ A$				
Output circuit	–	Intrinsically safe according to EN/IEC 60079-11			
Power supply U_B for two-wire transmitter	12 to 36 V DC	12 to 28 V DC (only in conjunction with an intrinsically safe circuit)			
24 V version	5007-1-**000**1				
Input voltage	24 to 36 V DC				
Output voltage	12 V DC				
Power	24 W				
Version	Reverse polarity protection				

Table 3: *Optional additional functions*

AO: Analog output	
Version	Two-wire system, galvanic isolation, reverse polarity protection, reversible direction of action
Power supply	10 to 30 V DC
Output signal	4 to 20 mA
Operating range	3.8 to 20.5 mA (according to NAMUR Recommendation NE 43)
Error indication	3.4 or 21.6 mA
No-load current	1.36 mA
Static destruction limit	38 V DC · 30 V AC

AI: Analog input	
Version	4 to 20 mA current input, externally powered, galvanically isolated, reverse polarity protection
Load impedance	≤5.0 V external (corresponding to ≤200 Ω at 20 mA)
Measuring range	0.1 to 21.6 mA
Accuracy	≤0.5 %
Resolution	20 µA
Effect of temperature	0.1 %/10 K
Static destruction limit	38 V DC · 30 V AC
AIA: Analog input active	
Version	4 to 20 mA current input, internally powered, reverse polarity protection
Load impedance	≤1 V internal (corresponds to ≤50 Ω at 20 mA)
Output voltage at the terminal	≥12 VDC to power external two-wire devices
Measuring range	0.1 to 21.6 mA
Accuracy	≤0.5 %
Resolution	20 µA
Effect of temperature	0.1 %/10 K
Static destruction limit	38 V DC · 30 V AC
GSM module for remote data transmission	
GSM frequency	EGSM 850/900/1800/1900 MHz
Power output	Class 4 (2 W) with 850/900 MHz; Class 1 (1 W) with 1800/1900 MHz
Antenna connection	SMA connector in housing wall
Right-angle antenna	Type 2J010: SMA R/A male
Color	Black
Capacity	25 W
Impedance	50 Ω
Polarization	Vertical
Frequency	GSM (900 MHz), AMPS (824-894 MHz), ISM (868 MHz), DCS (1800 MHz), PCS (1900 MHz), 3G (UMTS 2.1 GHz)
SIM card	M2M Industrial Plug in High Temperature, operating temperature: –40 to +105 °C; Provider: Telefonica Germany GmbH
Operating temperature	–40 to +70 °C (with active heating control)
Storage temperature	–30 to +75 °C
Web interface	SAM TANK MANAGEMENT

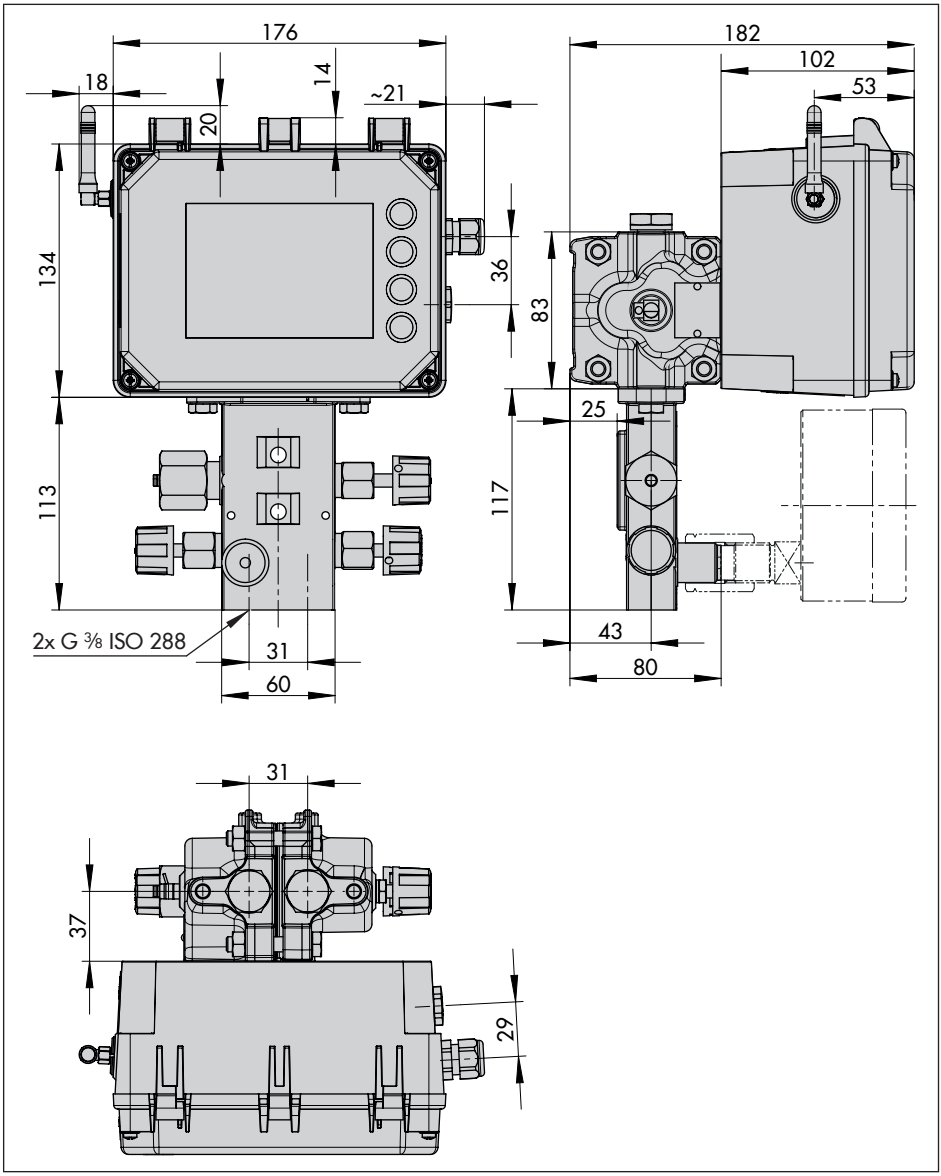
Table 4: *Materials*

dp cell	
dp cell housing, high-pressure and low-pressure chambers	Brass CW617N-H070 (according to DIN EN 12420)
Elastomers	Standard cryogenic gases, oxygen, flammable gases of Group I: ECO 60 Shore A Further versions: FPM/FKM, EPDM, NBR
Springs and diaphragm plate	Corrosion-resistant steel
Screw fitting of process connections	Corrosion-resistant steel A2-70 and A4-70
Screw plugs	Brass CW608N-R380
Electronics housing and indicating unit	
Housing	UV-stabilized polycarbonate
Screws (housing)	Corrosion-resistant steel
Cover (transparent)	UV-stabilized polycarbonate
Screw fastenings (cover)	Corrosion-resistant steel
Cable glands	Polyamide with NBR seal

Table 5: *Summary of explosion protection approvals*

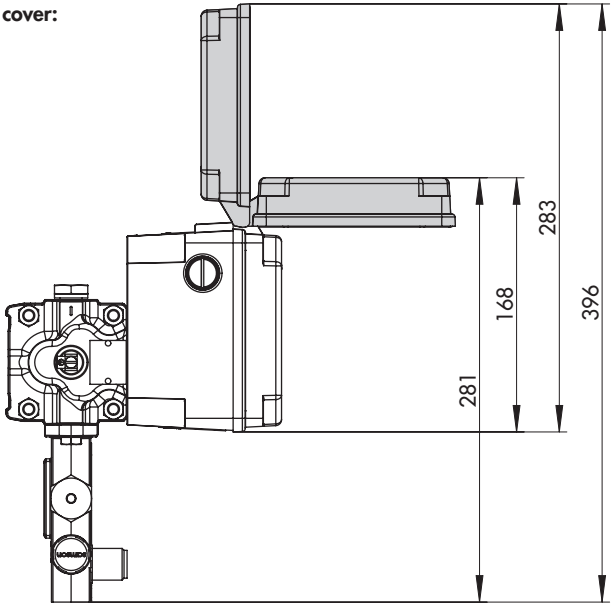
		Certification			Type of protection/comments
Type 5007-1	-110	EU type examination certificate	Number	KIWA 17ATEX0041X	II 2 G Ex ia IIB T4 Gb
			Date	2018-06-01	
	-120	EU type examination certificate	Number	KIWA 17ATEX0041X	II 1/2 G Ex ia IIB T4 Ga/Gb
			Date	2018-06-01	
	-111	**IECEx**	Number	IECEx KIWA 17.0020X	Ex ia IIB T4 Gb
			Date	2018-06-01	
	-121	**IECEx**	Number	IECEx KIWA 17.0020X	Ex ia IIB T4 Ga/Gb
			Date	2018-06-01	

3.7 Dimensions in mm

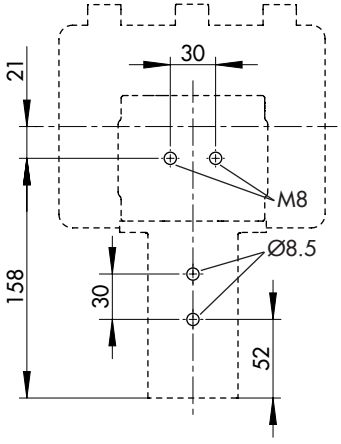


3.7.1 Dimensions for mounting (mm)

Dimensions with opened cover:



Drill pattern for wall/panel mounting:



4 Measures for preparation

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Compare the shipment received with the delivery note.
2. Check the shipment for transportation damage. Report any transportation damage.

4.1 Unpacking

NOTICE

Risk of device damage due to foreign particles entering it.
Do not remove the packaging and protective film/protective caps until immediately before mounting and start-up.

1. Remove the packaging from the device.
2. Dispose of the packaging in accordance with the valid regulations.

4.2 Transporting and lifting

4.2.1 Transporting

➔ Check whether a battery is inserted in the differential pressure meter and remove it before transporting the device.

➔ Protect the device against external influences (e.g. impact).

➔ Protect the device against moisture and dirt.

➔ Observe the permissible transportation temperature of –20 to +70 °C.

4.3 Storage

NOTICE

Risk of device damage due to improper storage.
– Observe the storage instructions.
– Avoid long storage times.
– Contact SAMSON in case of different storage conditions or long storage periods.

Storage instructions

➔ Protect the Media 7 device against external influences (e.g. impact).

➔ Protect the Media 7 device against moisture and dirt.

➔ Make sure that the ambient air is free of acids or other corrosive media.

➔ Observe the permissible storage temperature from –20 to +70 °C.

➔ Do not place any objects on the device.

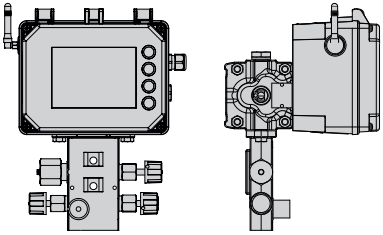
5 Mounting and start-up

NOTICE

Risk of damage to the device due to incorrect mounting position.

– Keep rear blow-out opening clear.

– Mount the device in the upright position only:



5.1 Preparation for installation

Proceed as follows:

➔ Flush the pipeline thoroughly before installation of the Media 7 device.

➔ Check the Media 7 device to make sure that it is clean and not damaged.

Note

The plant operator is responsible for cleaning the pipelines in the plant.

5.2 Mounting the Media 7 device

The following options to mount the Media 7 in the plant are available:

– Two M8 tapped holes in the dp cell (see Fig. 6, 1)

– Two through holes for M8 screws in the valve block (see Fig. 6, 2)

➔ Mounting material for pipe and wall mounting as accessories (▶ T 9555)

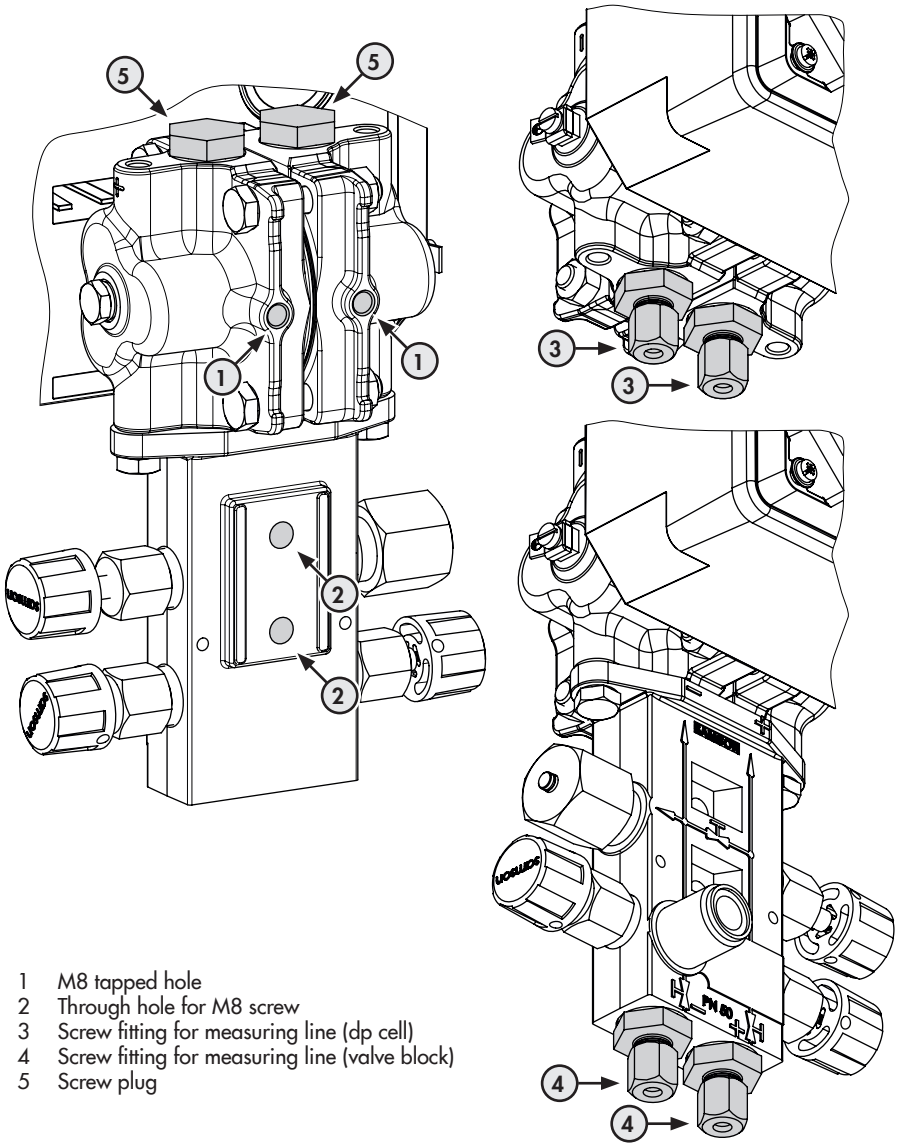
➔ Drill pattern for wall/panel mounting: see section 3.7.

Additional points that apply concerning installation:

➔ Mount the device to a pipe, wall or mounting plate free of vibration.

➔ Use mounting part with clamp for pipe mounting to attach it to a vertical or horizontal pipe.

➔ Use a mounting part without clamp for wall mounting.



1 M8 tapped hole
2 Through hole for M8 screw
3 Screw fitting for measuring line (dp cell)
4 Screw fitting for measuring line (valve block)
5 Screw plug

Fig. 6: *Fastening holes and measuring line connections of Media 7*

5.3 Connecting the measuring lines

Note

*In following, pressurized lines are designated "**measuring lines**".*

NOTICE

Risk of malfunction and incorrect measurements due to mixing up the measuring lines. Make sure that the high-pressure line is connected to the high-pressure connection and the low-pressure line to the low-pressure connection.

➔ Screw fittings are required to connect the measuring lines (see Fig. 6, 3/4 as well as accessories for Media Series ▶ T 9555).

➔ Depending on the device arrangement, seal the device connections that are left unused with screw plugs (see Fig. 6, 5 as well as accessories ▶ T 9555).

5.4 Electrical connections

⚠ DANGER

Risk of fatal injury due to the formation of an explosive atmosphere.

For mounting and electrical installation in hazardous areas, observe the explosion protection approvals as well as the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. EN 60079-14 applies in Europe.

⚠ WARNING

Incorrect electrical connection will render the explosion protection unsafe.

– Only operate the device with an intrinsically safe power supply while observing the maximum parameters for electrical connection specified in the explosion protection certificate.
– Adhere to the terminal assignment.
– Do not undo the enameled screws.

! *NOTICE*

Risk of damage to the differential pressure meter due to the maximum permissible values specified in the EC type examination certificate being exceeded.
Do not exceed the maximum permissible values (U_i or U_0, I_i or I_0, P_i or P_0, C_i or C_0 and L_i or L_0) when interconnecting intrinsically safe electrical equipment. Otherwise, the device is no longer protected against reverse polarity.

Selecting cables and wires

➔ Observe the relevant clauses of EN 60079-14 for installation of intrinsically safe circuits.

➔ Use cable glands with M16x1.5 thread whose diameter and shape have been approved by the manufacturer for the cable used.

➔ Seal cable entries left unused with plugs.

➔ The cable entry used must correspond with the ambient temperature range and have the specified IP rating (see technical data in section 3.6).

5.4.1 Cable glands and terminals

The housing of the Media 7 Differential Pressure Meter has five threaded boreholes, which can be fitted with cable glands as required.

➔ The cable gland version depends on the ambient temperature range. See technical data in section 3.6 on page 24.

➔ The cage clamp terminals hold wire cross-sections of 0.2 to 2.5 mm².

5.4.2 Connecting the wiring

➔ Connect the wiring as shown in Fig. 7.

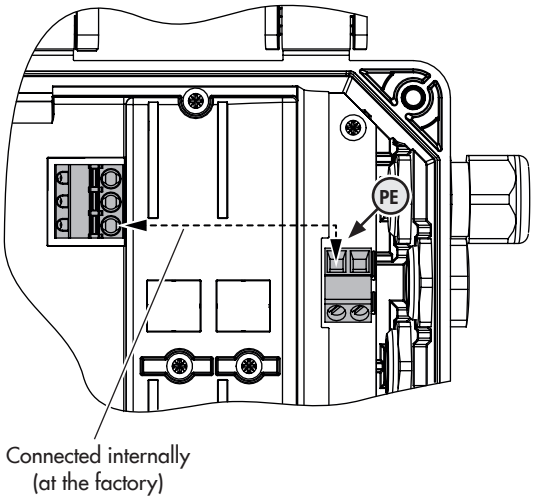
➔ Insert the wire without force.

➔ To remove the wire, use a slotted screwdriver to press the unlocking slot of the cage clamp terminal and remove the wire.

➔ Route the grounding connection (PE) to the corresponding terminal.

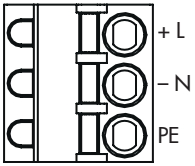
NOTICE

Risk of malfunction due to incorrect power line frequency setting.
The local power line frequency must be entered to be able to properly filter out any disturbances which are transmitted over ground wires or external power supply units.
The power line frequency (50/60 Hz) is entered in menu item 1.10 (see page 74).
The procedure to enter or change the parameters is described in section 7 on page 52 onwards.



24 V version:

Electrical power



Two-wire version:

Two-wire output signal

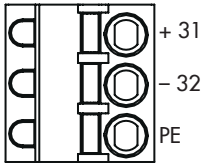


Fig. 7: *Terminal assignment*

6 Optional additional function

The modular design of the Media 7 device allows it to be adapted to specific requirements. Additional functions are available through the use of option modules (see section 6.1). A GSM module is also available for the 24 V version of the Media 7 device (see section 6.2).

The GSM module establishes connection to the SAM TANK MANAGEMENT web interface over a mobile network (see section 8.3).

When the Media 7 Differential Pressure Meter is ordered with additional option modules or the GSM module, they are already installed upon delivery.

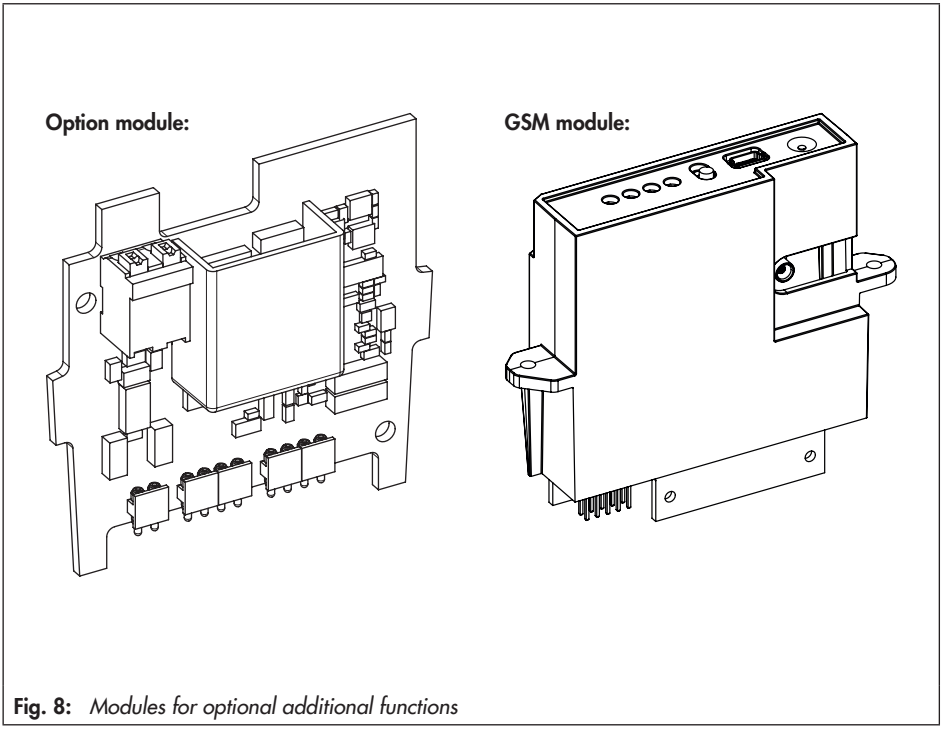


Fig. 8: *Modules for optional additional functions*

6.1 Option modules

Additional functions are available for the Media 7 Differential Pressure Meter, which can be added to the device by using option modules (see Fig. 8, left):

– **AO: Analog output**
  The ***Analog output*** option module issues an internal measuring signal (4 to 20 mA) representing the tank pressure or, depending on the operating mode, the filling level or differential pressure. The analog output parameters can be configured.

– **AI: Analog input**
  The ***AI: Analog input*** option module accepts signals from filling level or pressure sensors of external equipment with their own power supply.
  This module works passively and has galvanically isolated inputs.

– **AIA: Analog input active**
  The ***AIA: Analog input active*** option module accepts signals from filling level or pressure sensors of external equipment.
  This module works actively and has a 12 V output to power external equipment that do not have their own power supply.

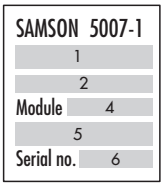
i ***Note***

The AO: Analog input option module is available with explosion protection.

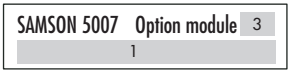
6.1.1 Nameplate

The following nameplates are used to identify the option modules:

Option module with explosion protection (AO: Analog output only):



Option module without explosion protection:



1 Optional additional function
2 Signal range
3 Abbreviation of optional additional function
4 Ordering number
5 Type of protection for explosion-protected devices
6 Serial number

6.1.2 Slots for option modules

Four slots to hold option modules exist in the Media 7 device (see Fig. 9).

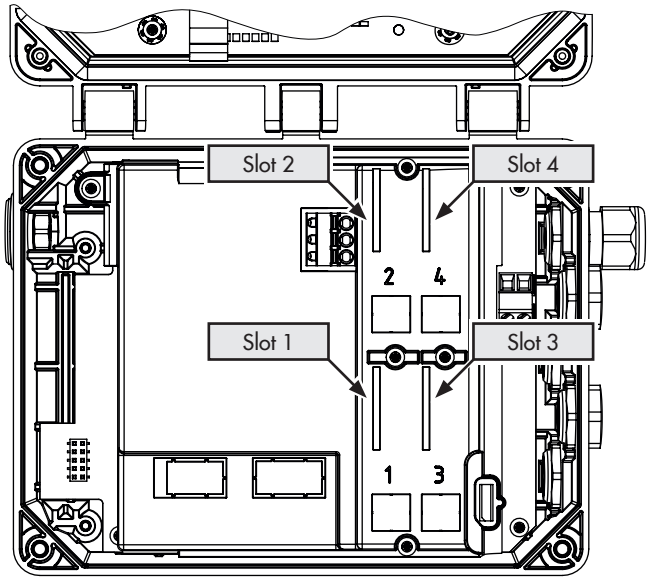


Fig. 9: *Slots for option modules*

NOTICE

Risk of malfunction due to the incorrect combinations of the AO: Analog output option modules

Refer to Table 6 when two option modules (AO: Analog output) are used.

Table 6: *Permissible combinations of the AO: Analog output option modules*

Option modules inserted	Permissible	Not permissible
Slot 1 and slot 2	•	
Slot 3 and slot 4	•	
Slot 1 and slot 4	•	
Slot 2 and slot 3	•	
Slot 1 and slot 3		•
Slot 2 and slot 4		•

6.1.3 Inserting or removing option modules

NOTICE

Incorrect installation or removal of the option modules will damage the differential pressure meter.
Before inserting or removing the option modules, disconnect the power supply.

NOTICE

Electrostatic discharge will damage the option modules.
– Observe the ESD requirements according to IEC 61340-5-1.
– Only store option modules in their original packaging.

Inserting the option module

➔ See Fig. 11

1. Disconnect the signal lines for the power supply.
2. Undo the five screws on the cover and remove the cover.
3. Insert the option module in one of the slots, making sure it is inserted correctly.

➔ Refer to Table 6 when an AO: Analog output option module is used.

4. If necessary, break open the openings for the terminals in the cover (by pressing the predetermined breaking points).
5. Place on the cover making sure that the option module is seated in the opening intended for it in the cover.
6. Fasten the cover.
7. Connect the wiring of the option module as shown in Fig. 10.
8. Connect the power supply of the differential pressure meter.

Removing the option module

1. Disconnect the signal lines for the power supply.
2. Disconnect the connecting lines on the option module.
3. Undo the five screws on the cover and remove the cover.
4. Pull the option module out of the slot and store it in its packaging.
5. Place on the cover and fasten it.
6. Connect the power supply of the differential pressure meter.

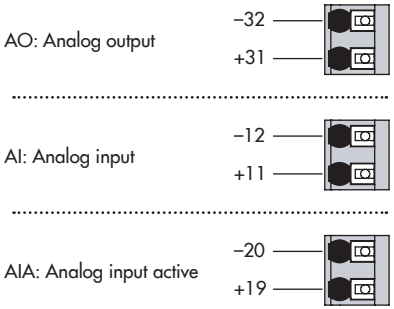


Fig. 10: *Terminals of the option modules*

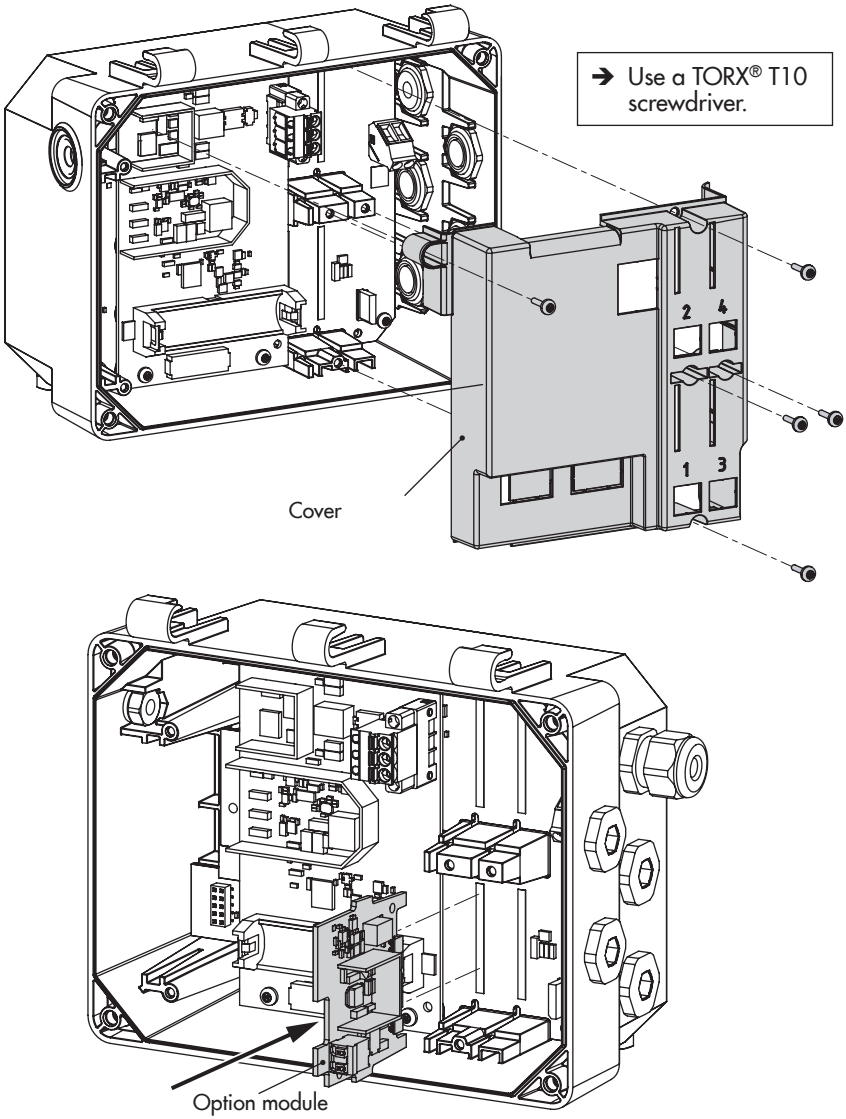


Fig. 11: *Inserting option modules*

6.2 GSM module

A GSM module is available for the 24 V version of the Media 7 device. The GSM module (see Fig. 8, right) establishes connection to the SAM TANK MANAGEMENT web interface over a mobile network (see section 8.3). It ensures a secure data exchange, polling of states as well as monitoring and operation of the Media 7 (see Fig. 12).

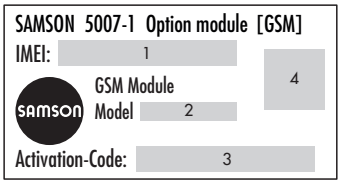
When the Media 7 Differential Pressure Meter is ordered with the GSM module, it is already installed upon delivery. The GSM module can also be retrofitted (see section 6.2.2).

i Note

The GSM module does not function when the differential pressure meter is operated with the standby power supply (SPS). See section 6.3.

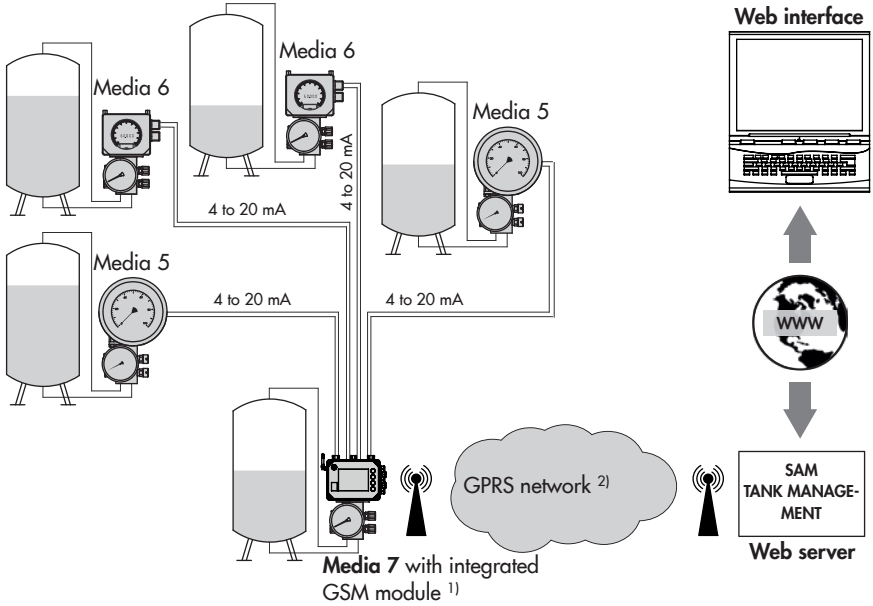
6.2.1 Nameplate

The following nameplate is used to identify the GSM module:



1 International Mobile Equipment Identity [1)]
2 Model number
3 Activation code
4 QR code

1) 15-digit serial number for unique identification of mobile devices



1) GSM (Global System for Mobile Communication): protocol currently used in mobile networks to transfer digital data. A SIM card of a mobile phone provider is required.

2) GPRS (General Packet Radio Service): packet-based wireless data communication service.

Fig. 12: *Media 7 · Remote data transmission*

6.2.2 Installing the GSM module

The GSM module unit consists of the module (including SIM card) and the right-angle antenna with cable and SMA bushing.

NOTICE

Incorrect installation and removal of GSM module will damage the differential pressure meter.
Before inserting or removing the GSM module, disconnect the power supply.

NOTICE

Electrostatic discharge will damage the GSM module and SIM card.
– Observe the ESD requirements according to IEC 61340-5-1.
– Store the GSM module and SIM card in their packaging.

NOTICE

Incorrect installation and removal of SIM card will damage it.
Before inserting or removing the SIM card, disconnect the power supply.

Mounting the cable and antenna

1. Disconnect the signal lines for the power supply.
2. Remove the stopper in the housing (1).
3. Place the O-ring (5) on the SMA bushing and push it into the groove intended for it.
4. Guide the SMA bushing (6) with O-ring (5) from inside through the hole in the housing (1) and push it as far as it will go.
5. Place the toothed lock washer (4) on the SMA bushing (6).
6. Place the nut (3) on the SMA bushing (6) and screw tight.
7. Screw the antenna (2) onto the SMA bushing.

Inserting the module

8. Insert the male connector (7) into the female connector (8) on the module.
9. Insert the module into the slot as shown in the diagram.
10. Tighten the two fastening screws (9) of the module.
11. Connect the power supply of the differential pressure meter.

Note

How to establish connection to the web interface is described in section 8.3.

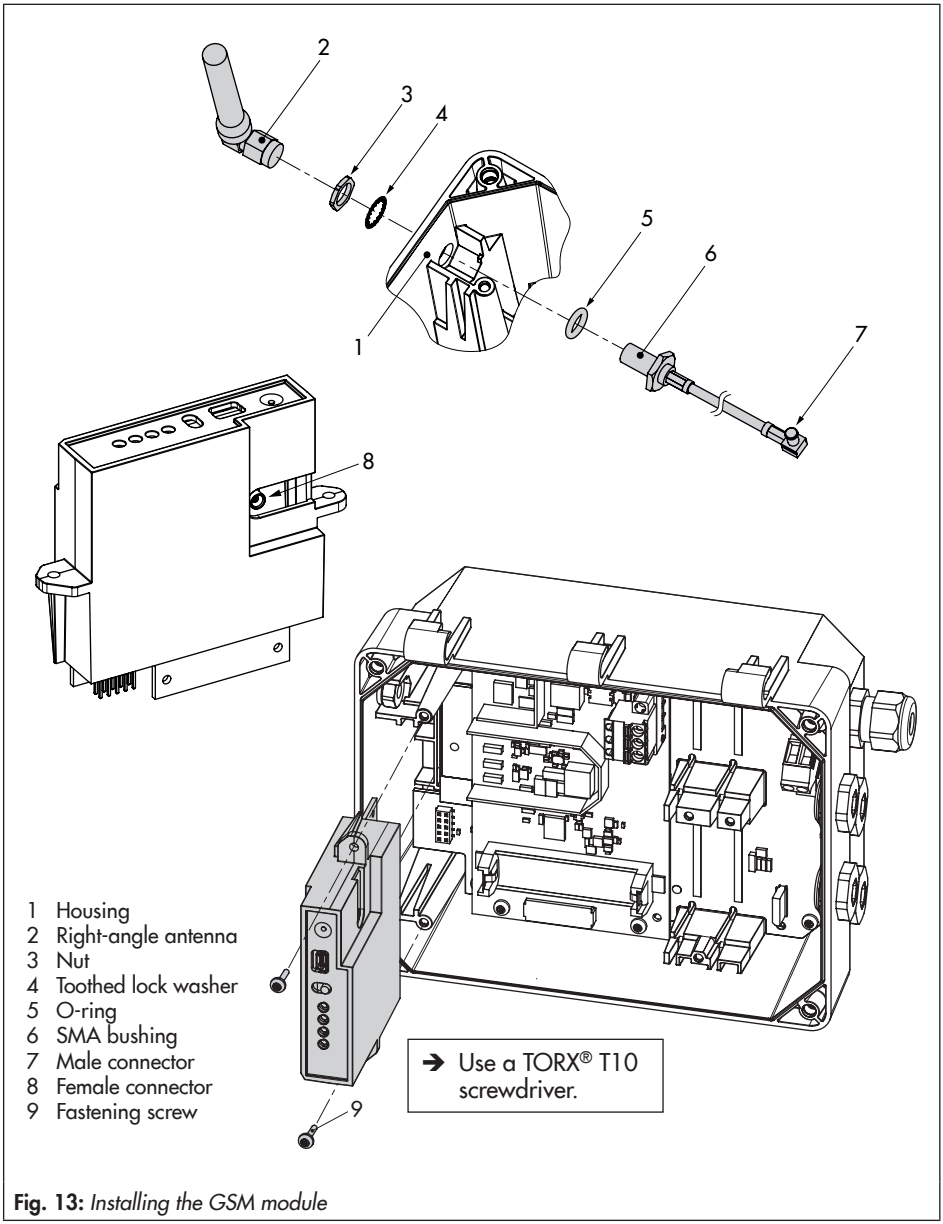


Fig. 13: *Installing the GSM module*

6.2.3 Aligning the antenna

Move the antenna to the upright position for the best reception results. If a weather guard or other housing parts are located directly above the device due to the mounting situation, tilt the antenna slightly.

➔ Refer to Fig. 14.

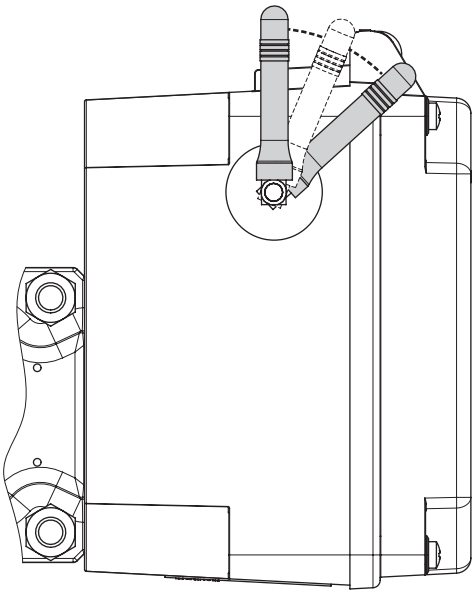


Fig. 14: *Aligning the antenna*

6.3 Standby power supply (SPS)

To continue to supply the power supply unit with power after a power failure, we recommend using a battery with the following specifications:

– AA lithium battery (mignon), 1.5 V
– Industrial battery with long service life (min. 3000 mAh recommended)
– Suitable for temperatures from –40 to +60 °C

NOTICE

The use of unapproved batteries will damage the differential pressure meter.
Do not use rechargeable batteries in the differential pressure meter.

Note

The battery is not included in the standard scope of delivery.
Operation with standby power supply (SPS) is restricted as follows:
– *The **GSM module** does not function in SPS mode.*
– *The **AIA: Analog input active option module** does not supply any voltage.*

Tip

The standby power supply can also be used during the first start-up when no other power supply is available. A lithium battery allows the device to run for approx. seven days.

6.3.1 Inserting the battery

NOTICE

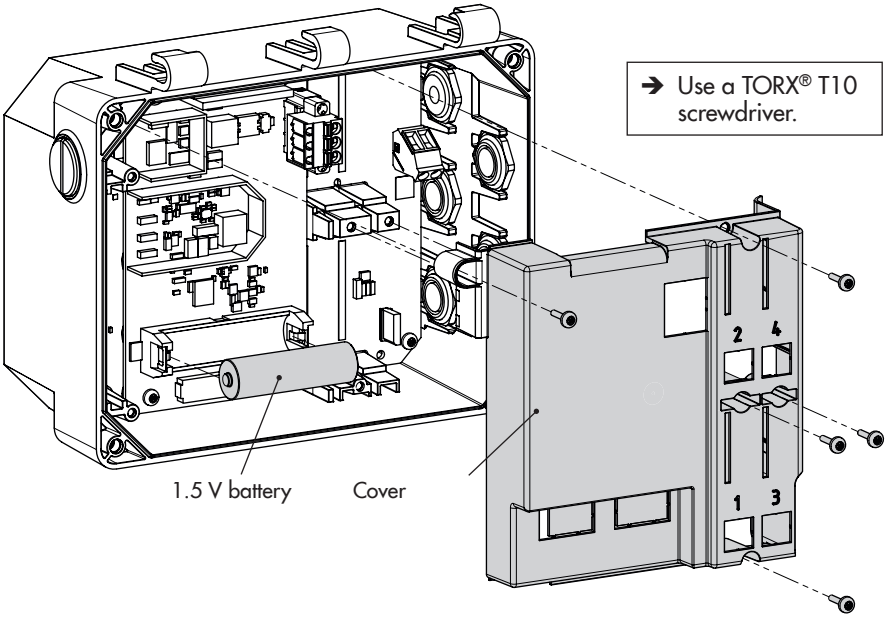
Incorrect installation or removal of the 1.5 V battery will damage the differential pressure meter.
Before inserting or removing the 1.5 V battery, disconnect the power supply.

➔ See Fig. 15

1. Disconnect the signal lines for the power supply.
2. Undo the five screws on the cover and remove the cover.
3. Place the 1.5 V battery in the battery compartment.

➔ **Observe the correct polarity.** A battery symbol with plus and minus signs on the battery compartment indicates the polarity.

4. Place on the cover and fasten it.
5. Connect the power supply of the differential pressure meter.



Observe the correct polarity on inserting the battery.

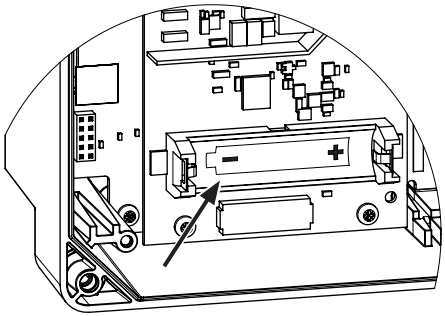


Fig. 15: *Inserting the 1.5 V battery*

7 Operation

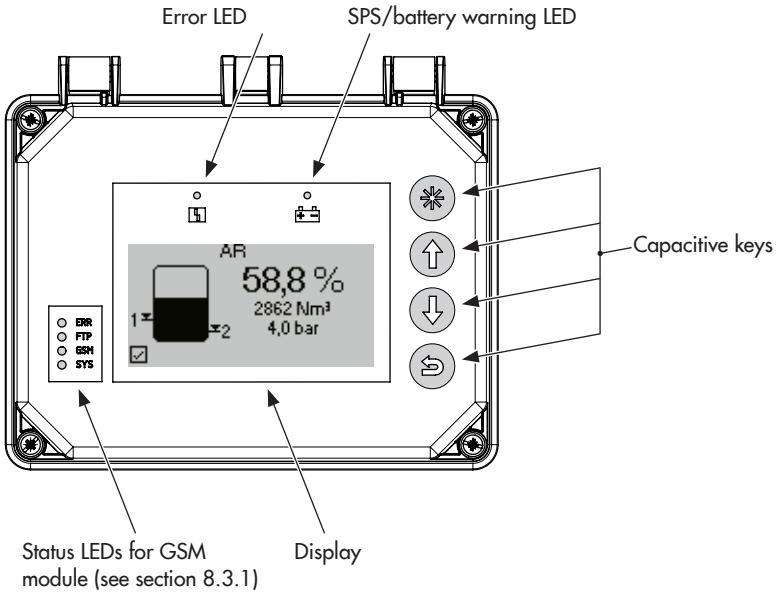


Fig. 16: *Operating controls of Media 7*

Tip

Examples for the operation of the Media 7 device are described in section 7.3.

7.1 Capacitive keys

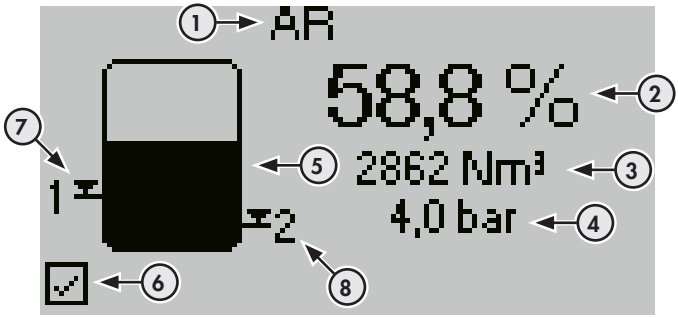
The capacitive keys for on-site operation are located to the right of the display.

- Confirm, select, change
- Scroll upward, increase value
- Scroll downward, reduce value
- Back

7.2 Display

After connection of the power supply for the first time, the **start-up wizard** automatically starts (see section 8.1.1). In all other cases, the **start screen** (see Fig. 17) appears. Press the key to go to the main menu. Settings can be made and process values read in the main menu.

Section 8.1 contains a description of the first start-up settings. A list of parameters for on-site operation is included in the Annex (section 12.2 on page 73 onwards).



1 Process medium selected
2 Filling level in %
3 Liquid level reading in the selected unit
4 Tank pressure in the selected unit
5 Animated filling level with filling limits 1 and 2 (see page 85)
6 Device status (see Table 7 on page 69)
7 Filling level pre-alarm
8 Filling level main alarm

Fig. 17: *Start screen of Media 7 (filling level mode in the example shown)*

7.3 Examples for the operation of the Media 7 device

Note

*The Media 7 device has two user levels with different access privileges: **Maintenance staff** and **Specialist**.*
*Values and parameters can only be changed in the **Specialist** user level. See section 8.1.3 for more information on the user level and maximum password protection.*
*If no settings are entered within five minutes, the display returns to the start screen and the user level returns to **Maintenance staff**.*

Tip

The instructions below apply to the general navigation through the menus of the Media 7 device and to changing the parameters.

➔ Description of the operating controls on page 52.

Example 1: changing the language

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select User level (1.1) with ↑ or ↓ key and confirm with ✳ key.
4. Press ✳ key and select 'Specialist' with ↑ or ↓ key.
5. Press ✳ key to confirm the setting.

⏩ It is now possible to change parameters in the Media 7 device.

Changing the language:

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select Sprache/Language (1.2) with ↑ or ↓ key and confirm with ✳ key.
4. Press ✳ key and select the required language with ↑ or ↓ key.
5. Press ✳ key to confirm the setting.

⏩ The language has been changed.

Example 2: changing the medium in the filling level mode

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select User level (1.1) with ↑ or ↓ key and confirm with ✳ key.
4. Press ✳ key and select 'Specialist' with ↑ or ↓ key.
5. Press ✳ key to confirm the setting.

⏩ It is now possible to change parameters in the Media 7 device.

Changing the medium (in the filling level mode only):

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Device settings (2) with ↑ or ↓ key and confirm with ✳ key.
3. Select Filling level mode (2.2) with ↑ or ↓ key and confirm with ✳ key.
4. Select Medium (2.2.2) with ↑ or ↓ key and confirm with ✳ key.
5. Select Medium selection (2.2.2.1) with ↑ or ↓ key and confirm with ✳ key.
6. Press ✳ key and select the required medium with ↑ or ↓ key.
7. Press ✳ key to confirm the setting.

⏩ The medium has been changed.

Example 3: changing the unit (medium) in the filling level mode

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select User level (1.1) with ↑ or ↓ key and confirm with ✳ key.
4. Press ✳ key and select 'Specialist' with ↑ or ↓ key.
5. Press ✳ key to confirm the setting.

⏩ It is now possible to change parameters in the Media 7 device.

Changing the unit (medium) in the filling level mode:

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Device settings (2) with ↑ or ↓ key and confirm with ✳ key.
3. Select Filling level mode (2.2) with ↑ or ↓ key and confirm with ✳ key.

4. Select Medium (2.2.2) with ↑ or ↓ key and confirm with ✳ key.
5. Select Unit (2.2.2.2) with ↑ or ↓ key and confirm with ✳ key.
6. Press ✳ key and select the required unit with ↑ or ↓ key.
7. Press ✳ key to confirm the setting.

▸▸ The unit has been changed.

Example 4: changing the unit of pressure sensor

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select User level (1.1) with ↑ or ↓ key and confirm with ✳ key.
4. Press ✳ key and select 'Specialist' with ↑ or ↓ key.
5. Press ✳ key to confirm the setting.

▸▸ It is now possible to change parameters in the Media 7 device.

Changing the unit (pressure sensor) in the filling level mode/differential pressure mode:

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Device settings (2) with ↑ or ↓ key and confirm with ✳ key.
3. Select General (2.1) with ↑ or ↓ key and confirm with ✳ key.
4. Select Pressure sensor (2.1.5) with ↑ or ↓ key and confirm with ✳ key.
5. Press ✳ key and select the required unit with ↑ or ↓ key.
6. Press ✳ key to confirm the setting.

▸▸ The unit has been changed.

Example 5: changing the medium identifier

The medium identifier is the user-defined name of the medium. A maximum of 15 characters can be used. The default setting for this parameter is 'MEDIA7'.

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select User level (1.1) with ↑ or ↓ key and confirm with ✳ key.
4. Press ✳ key and select 'Specialist' with ↑ or ↓ key.
5. Press ✳ key to confirm the setting.

⏩ It is now possible to change parameters in the Media 7 device.

Changing the medium identifier:

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Device settings (2) with ↑ or ↓ key and confirm with ✳ key.
3. Select General (2.1) with ↑ or ↓ key and confirm with ✳ key.
4. Select Identifier (2.1.1) with ↑ or ↓ key and confirm with ✳ key.

⏩ The identifier currently used is shown.

5. Press the ✳ key. The cursor jumps to the first of maximum 15 characters.
6. Move the cursor to the position you want to change with ↑ or ↓ key and activate it with ✳ key.

   Select a letter, number or special character with ↑ or ↓ key from the listed characters and confirm with ✳ key.

⏩ The cursor automatically jumps to the next position on the right.

7. Continue as described in step 6 to enter further characters (max. 15 characters can be selected).
8. Press ↩ key after you have completed entering the identifier.
9. Select OK with ↑ or ↓ key and confirm with ✳ key.

⏩ The medium identifier has been changed.

8 Operation of Media 7 Differential Pressure Meter

Once the mounting and start-up activities have been completed, you can start with the settings. The differential pressure meter is ready for use immediately after the electrical power supply has been connected.

8.1 First start-up

After the differential pressure meter is put into operation for the first time after shipment, the wizard starts automatically after the electrical power is connected.

Tip

We recommend proceeding as follows during first start-up:

1. *Run the start-up wizard (see section 8.1.1).*
2. *Set user level (see section 8.1.3).*
3. *Perform zero calibration (see section 8.1.4).*

8.1.1 Running the start-up wizard

Note

– The language is set to English by default on first start-up.
– If no settings are entered within five minutes, the display returns to the start screen.

Step 1 of 6: select language

1. Select the required language with ⇧ or ⇩ key.
2. Confirm the selected language with ✳ key. Press ✳ key again to continue.

Step 2 of 6: select unit

1. Select the required unit with ⇧ or ⇩ key.
2. Confirm the selected unit with ✳ key. Press ✳ key again to continue.

Step 3 of 6: set the minimum differential pressure Δp_0

1. Select the required digit within the number with ⇧ or ⇩ key. Press ✳ key to confirm the selected digit.

2. Select the required number with ↑ or ↓ key. Press ✳ key to confirm the changed number.
3. After selecting all digits of the number, press ↩ key.
4. Press ✳ key to continue.

Step 4 of 6: set the maximum differential pressure Δp_{100}

1. Select the required digit within the number with ↑ or ↓ key. Press ✳ key to confirm the selected digit.
2. Select the required number with ↑ or ↓ key. Press ✳ key to confirm the changed number.
3. After selecting all digits of the number, press ↩ key.
4. Press ✳ key to continue.

Step 5 of 6: enter the medium code

1. Press ✳ key to enter the first character.
2. Select the required character with ↑ or ↓ key. Press ✳ key to confirm the selected character.
3. Proceed in the same way to enter the other characters of the medium code.
4. Press ↩ key.
5. Select OK with ↑ or ↓ key and confirm with ✳ key.
6. Press ✳ key again to continue.

Step 6 of 6: complete start-up wizard

➔ Press ✳ key (Done) to close the wizard.
The display returns to the start screen.

i ***Note***

– Select ESC to exit the wizard at any time.
*– Select **forward** (>) and **back** (<) to navigate between steps 1 and 6.*
– The wizard can be started at any time in the start-up (1) menu by selecting menu item 1.4 ('Specialist' user level only).

8.1.2 Option module wizard

If option modules are installed, the option module wizard automatically starts during first start-up after completion or exiting the start-up wizard.

After the option module wizard starts, the slots for option modules are shown.

1. Press ↑ or ↓ key to select the required slot or option module.
2. Press ✳ key to confirm the setting.

▸▸ Depending on the selected option module, diverse settings, such as name, signal source, limit etc., can be made. Descriptions to the parameters can be found in the parameter list (section 12.2) for the corresponding option modules from menu item 2.4 onwards.

i ***Note***

– Select ESC to exit the option module wizard at any time.
*– Select **forward** (>) and **back** (<) to navigate between steps.*
– The option module wizard can be started from the Device settings (2) menu/Option modules (2.4)/Overview of option modules (2.4.1 and 2.4.1.1) by selecting a slot/option module ('Specialist' user level only).
– If no settings are entered within five minutes, the display returns to the start screen.

8.1.3 Setting the user level

The Media 7 device has two user levels with different access privileges:

– **Maintenance staff**: values and parameters can be selected and read in this user level. Changes are not possible in this level.
– **Specialist**: all values can be accessed and parameters changed in this user level. This user level can be password-protected to prevent unauthorized access.

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select User level (1.1) with ↑ or ↓ key and confirm with ✳ key.
4. Press ✳ key and select 'Specialist' with ↑ or ↓ key.
5. Press ✳ key to confirm the setting.

Activating password protection

The password can only be changed and activated in the Specialist user level.

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select Password protection (1.7) with ↑ or ↓ key.
4. Press ✳ key to activate password protection.

➔ The default password is ***1234***. To change the password, proceed as follows:

1. In the Start-up (1) menu, select Password (1.8) with ↑ or ↓ key and confirm with ✳ key.
2. Press ✳ key. Select the digit within the password with ↑ or ↓ key.
3. Press ✳ key. Change the number (0 to 9) within the password with ↑ or ↓ key.
4. Confirm with ✳ key (proceed in the same way for the rest of the password).
5. After selecting all digits of the password, press ⮌ key.

8.1.4 Performing zero calibration

We recommend performing a zero calibration after first start-up and after changes have been made to the plant.

To set zero, the pressure in the measuring lines must be equal. To check zero, make sure that the pressures in both measuring chambers are identical at atmospheric pressure, i.e. the signal at the terminals 31 and 32 must be 4 mA at a differential pressure of Δp = 0 mbar (see Fig. 7 on page 37).

At Δp = 0 mbar, the 0.0 % reading must be displayed.

i Note

The user level must be set to 'Specialist' for the zero calibration (see section 8.1.3).

i Note

When gas column correction is selected, you need to take into account that the gas columns in the measuring lines reduce the differential pressure because they oppose each other. When the pressures are identical (Δp = 0 mbar) a negative value appears on the display for the content. An output signal lower than 4 mA is indicated. In this case, readjust zero as described below so that the display reads 0 % at Δp = 0 mbar. The output signal will change but remains below 4 mA due to the adjusted gas column correction.

Zero calibration when the tank is empty

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select Zero (1.5) with ↑ or ↓ key and confirm with ✳ key.

▸▸ The current values for differential pressure, zero, and maximum differential pressure (Δp_{100}) are displayed.

4. Press ✳ key to set zero.

Zero calibration when the tank is filled

➔ To equalize the pressures, isolate the measuring lines to the tank and connect them over a bypass. When a SAMSON valve block is used, proceed as follows (see Fig. 5 on page 23):

1. Close shut-off valve (+) and shut-off valve (–).
2. Open the equalizing valve.

➔ The valve block is now in the test position.

3. Perform zero calibration (see Zero calibration when the tank is empty).

➔ Place the valve block or equalizing valve back into the operating position:

4. Open the shut-off valve in the low-pressure line.
5. Close the equalizing valve.
6. Open the shut-off valve in the high-pressure line.

8.2 Calibrating the measuring range (span)

NOTICE

Impermissible conditions during measurement will damage the differential pressure meter. The test medium must free of oil and grease when the device is used to measure oxygen. Additional conditions include:
– Gaseous oxygen (process medium)
– Temperature: max. +60 °C
– Oxygen pressure: max. 30 bar
When the device is used for oxygen service, make sure that the dp cell and any SAMSON accessories only come into contact with gaseous oxygen.

Upon delivery, the device is calibrated with a linear characteristic based on the upper measuring range value of the dp cell. After entering the tank and gas data, the device automatically adopts the tank characteristic. Based on the gas data for the activated gas type, the device calculates the readings and output signal (4 to 20 mA) proportional to the tank content. In the same way, the device calculates the max. possible differential pressure Δp_{100} in mbar for the gas type and the predefined reference height (total height or gauge pipe).

How to proceed:

Note

The user level must be set to 'Specialist' for the measuring range calibration (see section 8.1.3).

➔ Observe the sequence:
1. Calibrate zero.
2. Calibrate the measuring range (span).

➔ At Δp_{100}, the output signal must be 20 mA.

➔ To check the measuring range, connect the differential pressure meter as shown in Fig. 18.

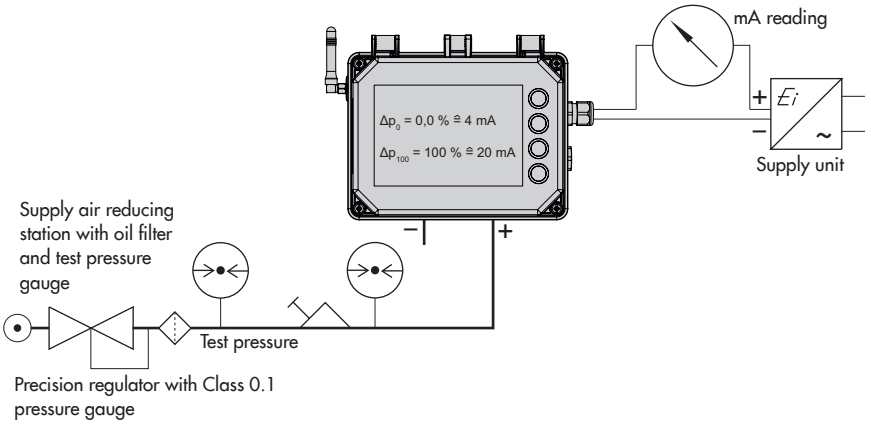


Fig. 18: *Test setup*

Checking the measuring range (span)

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select Span (1.6) with ↑ or ↓ key and confirm with ✳ key.

⏩ The current values for differential pressure, span and maximum differential pressure (Δp_{100}) are displayed.

4. Use a precision regulator to apply a test pressure corresponding to the max. differential pressure Δp_{100} while monitoring the pressure gauge.

➔ Set points: Δp = 0 mbar or 4 mA (read note on gas column correction)

➔ When the reading and output signal do not match the indicated Δp_{100} value, readjust the upper range value (span).

Adjusting the measuring range (span)

1. Press ✳ key (in start screen) to go to the main menu.
2. Select Start-up (1) with ↑ or ↓ key and confirm with ✳ key.
3. Select Span (1.6) with ↑ or ↓ key and confirm with ✳ key.
4. Press ✳ key to set the span.

8.3 Remote data transmission

Note

The remote data transmission can only be used when a GSM module is installed.

To use remote data transmission, SAMSON creates a user account for each customer in the SAM TANK MANAGEMENT web interface. All devices are added to the account by SAMSON.

➔ Contact SAMSON's After-sales Service department for more information on how to register in SAM TANK MANAGEMENT.

8.3.1 Status LEDs of the GSM module

The table below describes the meaning of the LEDs (see Fig. 16):

LED	Color	Illuminated	Blinks
ERR	Red	Error or failure	2x: GSM module without SIM card 3x: incorrect PIN
FTP	Green		Fast blinking: data transmission in progress
GSM	Green	Searching for a network	1x: GSM connection OK 2x: server connection OK 3x PIN code failed 4x: hardware error Fast blinking: incoming SMS text message
SYS	Green		1x: system ON

9 Servicing

i ***Note***

The differential pressure meter was checked by SAMSON before it left the factory.

- *The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's after-sales service.*
- *Only use original spare parts by SAMSON, which comply with the original specifications.*

9.1 Servicing explosion-protected devices

If a part of the device on which the explosion protection is based needs to be serviced, the device must not be put back into operation until a qualified inspector has assessed it according to explosion protection requirements, has issued an inspection certificate, or given the device a mark of conformity. Inspection by a qualified inspector is not required if the manufacturer performs a routine test on the device before putting it back into operation. Document the passing of the routine test by attaching a mark of conformity to the device.

➔ Retain testing and servicing documents as well as certificates issued by the manufacturer or inspector together with other safety-relevant documents for the device or plant.

Replace explosion-protected components only with original, routine-tested components by the manufacturer. Specify the type and serial number on ordering the device.

Devices that have already been operated outside hazardous areas and are intended for future use inside hazardous areas must comply with the safety requirements placed on serviced devices. Before being operated inside hazardous areas, test the devices according to the specifications for servicing explosion-protected devices.

Devices delivered without an intrinsically safe power supply unit must not be put back into operation in hazardous areas until a qualified inspector or manufacturer has tested it.

Maintenance, calibration and work on equipment

➔ Interconnection with intrinsically safe circuits to check or calibrate the equipment inside or outside hazardous areas is to be performed only with intrinsically safe current/voltage calibrators and measuring instruments to rule out any damage to components relevant to explosion protection.

➔ Observe the maximum permissible values specified in the certificates for intrinsically safe circuits.

9.2 Preparation for return shipment

Defective differential pressure meters can be returned to SAMSON for repair.

Proceed as follows to return devices to SAMSON:

1. Decontaminate the differential pressure meter. Remove any residual process medium.
2. Fill in the Declaration on Contamination. The declaration form can be downloaded from our website at ▶ *www.samsongroup.com > Service & Support > After-sales Service*.
3. Remove differential pressure meter (see section 11).
4. Send the differential pressure meter to your nearest SAMSON subsidiary. SAMSON subsidiaries are listed on our website at ▶ www.samsongroup.com (*About SAMSON > Sales offices*).

9.3 Firmware update

Contact your local SAMSON engineering and sales office or subsidiary to request a firmware update. SAMSON subsidiaries are listed on our website at ▶ www.samsongroup.com (*About SAMSON > Sales offices*).

Required specifications

Please submit the following details on requesting a firmware update:

– Type
– Serial number
– Configuration ID
– Current firmware version
– Required firmware version

10 Malfunctions

Malfunctions are indicated on the display by error messages in conjunction with an icon for status classification and an error ID. The meaning of the icons and their order of priority are listed in Table 7.

Table 7: *Icon showing status classification*

Status icon	Priority	Meaning
	1	Failure
	2	Out of specification
	3	Maintenance required
	4	No message

On the start screen, error messages can be cleared by pressing the  key. Error messages and recommended action for troubleshooting are listed in Table 8.

Table 8: *Troubleshooting*

Error ID	Message	Possible causes and recommended action
101	AMR magnet lost	The Media 7 device has an internal device error. ➔ Contact SAMSON's After-sales Service.
102	AMR sensor not recognized	
103	Memory error (calibration)	
104	Memory error (data)	
105	No factory calibration	
106	Pressure sensor error	
107	Internal data processing error	
201	AMR signal outside range	➔ Reset the Media 7 device. Contact SAMSON's After-sales Service when this error reoccurs.
202	Measuring span error	➔ Check the settings for the tank and media data. Correct them, if necessary.
203	Characteristic error	An invalid tank geometry has been entered: ➔ Re-enter tank data (only possible in TROVIS-VIEW).

Error ID	Message	Possible causes and recommended action
204	AMR temperature sensor	The temperature sensor has failed. ➔ Reset error message. Contact SAMSON's After-sales Service when this error reoccurs.
205	Temperature inside device below min. limit	The temperature limit inside the device has fallen below the adjusted min. limit. ➔ Check whether the heating functions properly and the heating control is switched on. ➔ Select lower temperature limit.
206	Temperature inside device above max. limit	The temperature limit inside the device has exceeded the adjusted max. limit. ➔ Check whether the heating functions properly and the heating control is switched on. ➔ Select a better location to mount the Media 7 device, if necessary.
207	Large differential pressure drop	The bypass valve has been opened. A diaphragm rupture in the dp cell exists. The dp cell leaks. ➔ Check all screw fittings.
301	Power supply unit not recognized	The current firmware of the device does not support the supply voltage. A firmware update is necessary. ➔ Contact SAMSON's After-sales Service.
302	Option not recognized	The current firmware of the device does not support the option. A firmware update is necessary. The option is defective. ➔ Contact SAMSON's After-sales Service.
303	Option module combination invalid	Option modules are inserted incorrectly or the incorrect combination of modules has been used. ➔ Check the combination and how the option modules are inserted.

11 Decommissioning and removal

11.1 Decommissioning

To decommission the differential pressure meter before removing it, proceed as follows:

1. Isolate measuring lines.

➔ When a valve block is used:

2. Close the shut-off valves.
3. Open the equalizing valve.
4. Slowly open the screw of the test connection to release the pressure.

5. Disconnect the power supply.
6. Open the housing cover of the differential pressure meter and disconnect the wires for the power supply.

11.2 Removing the differential pressure meter

1. Disconnect the wires for the power supply from the differential pressure meter.
2. To remove the differential pressure meter, loosen the fastening screws on the device.

11.3 Disposal

➔ Do not dispose of components, lubricants and hazardous substances together with your other household waste.

➔ Check whether a battery is inserted in the differential pressure meter and remove it before disposing of the device.

➔ Observe local, national and international refuse regulations before disposing of the device and its batteries.

Note

We can provide you with a recycling passport according to PAS 1049 on request. Simply e-mail us at aftersalesservice@samsongroup.com giving details of your company address.

Tip

On request, we can appoint a service provider to dismantle and recycle the product.

12 Annex

12.1 After-sales service

Contact SAMSON's after-sales service for support concerning service or repair work or when malfunctions or defects arise.

E-mail address

You can reach our after-sales service at aftersalesservice@samsongroup.com.

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on our website (www.samsongroup.com) or in all SAMSON product catalogs.

Required specifications

Please submit the following details:

- Order number and position number in the order
- Type, serial number
- Firmware version
- Device version
- Measured medium
- Pressure, differential pressure

12.2 Menu structure and parameters

i ***Note***

The availability of executed menu items and parameters depends on the version and configuration of the differential pressure meter as well as the option modules used. Default settings are marked 'default'.

Menu		Adjustment range/values/description
Start-up	**1**	
User level	1.1	Select user level ▪ Maintenance staff: restricted access ▪ Specialist: full access (password protection possible in menu item 1.7)
Sprache/Language	1.2	Select the menu and display language: ▪ German/English (default)/French/Italian/Spanish
Operating mode	1.3	Select the operating mode: ▪ Differential pressure (default): differential pressure measurement with linear characteristic ▪ Filling level: the device issues an mA signal (4 to 20 mA) which is proportional to the tank content.
Start-up wizard	1.4	Run the wizard.
Zero point	1.5	Set zero (resetting zero is possible)
Span	1.6	Set the span (resetting span is possible)
Password protection	1.7	The 'Specialist' user level can be protected by a four-digit code (menu item 1.8). ▪ Not active ▪ Active
Password	1.8	Enter a four-digit code ▪ 0000 to 9999
Write protection (data transmission module)	1.9	Activate write protection (data transmission module) ▪ Yes ▪ No

Menu		Adjustment range/values/description
Power line frequency	1.10	The local power line frequency must be entered to be able to properly filter out any disturbances which are transmitted over ground wires or external power supply units. ▪ 50 Hz (default) ▪ 60 Hz
Start test	1.11	Executable function: two-wire test signal issued.
Test mode	1.12	Test mode is *Active* while the test is in progress (test duration: 30 s). ▪ Not active ▪ Active
Test signal of analog output	1.13	Test signal in % based on the 4 to 20 mA signal range. ▪ –10.00 to +110.00 %
Device settings	**2**	
General	**2.1**	
Identifier	2.1.1	Enter a freely selectable code for the device (max. 15 characters) ▪ Enter characters as required (default: MEDIA7)
Filling level	2.1.2	The filling level in % can be displayed on the start screen. ▪ Yes ▪ No
Differential pressure	2.1.3	The differential pressure together with a unit can be displayed on the start screen. ▪ Yes ▪ No
Pressure sensor	2.1.4	The value measured by the pressure sensor together with a unit can be displayed on the start screen. ▪ Yes ▪ No
Unit of pressure sensor	2.1.5	Determine the unit for the value measured by the pressure sensor ▪ Selectable units: bar (default)/kPa/psi/cmH_2O/mH_2O/inH_2O
MCN/SCN	2.1.6	MCN (maximum tank content in %) or SCN (tank content up to overflow/gauge pipe) reading on the display. ▪ No (default) ▪ Yes

Menu		Adjustment range/values/description
Hazard warning for filling limit	2.1.7	Select filling limit to be indicated on the display when this limit is reached. ▪ SCN (volume up to gauge pipe) ▪ UCW (operating filling limit)
LCD backlight	2.1.8	The LCD backlight can be switched on or off (in 24 V version only). ▪ ON ▪ OFF
LCD deactivation time	2.1.9	The LCD of the Media 7 device can be switched off after the entered deactivation time (see 2.1.10, only when the OFF setting is selected). ▪ ON (default) ▪ OFF
Deactivation time	2.1.10	Enter the time after which the LCD of the Media 7 device is to be automatically switched off. ▪ 1 to 10 min (default: 10 min)
LCD heating control	2.1.11	The 'ON' setting causes the display to be heated when the outdoor temperature is low. The power consumption of the device increases by ***510 mA*** when the heating is activated. Upper switching temperature (deactivate): –12.5 °C Lower switching temperature (activate): –17.5 °C ▪ ON (default) ▪ OFF
Filling level mode	**2.2**	
Tank	2.2.1	Perform tank data settings (menu items 2.2.1.x) in TROVIS-VIEW software, ▶ EB 9510-2.
Tank identifier	2.2.1.1	▪ Settings performed in TROVIS-VIEW
Tank type	2.2.1.2	▪ Settings performed in TROVIS-VIEW
Shape of tank head	2.2.1.3	▪ Settings performed in TROVIS-VIEW
Tank truck	2.2.1.4	▪ Settings performed in TROVIS-VIEW
Diameter	2.2.1.7	▪ Settings performed in TROVIS-VIEW
Length/height of tank	2.2.1.8	▪ Settings performed in TROVIS-VIEW
Length/height of measuring line	2.2.1.11	▪ Settings performed in TROVIS-VIEW
Volume at 20 mA	2.2.1.12	▪ Settings performed in TROVIS-VIEW

Menu		Adjustment range/values/description
Permissible filling limit	2.2.1.13	▪ Settings performed in TROVIS-VIEW
Medium	**2.2.2**	
Medium selection	2.2.2.1	Select medium (depending on the entered medium identifier)
Unit	2.2.2.2	Unit for calculating the tank content [MCN], [SCN] and [UCW] and the filling level ▪ Selectable units: % · kg · Nm^3 · L · ft^3 · lbs
Medium database	2.2.3	
Medium 1	2.2.3.1	
to	to	
Medium 8	2.2.3.8	
Medium identifier	1	Enter a name (max. 11 characters) to identify the medium. ▪ Enter characters as required
Shrink factor	2	Enter tank's shrink factor. This value depends on the tank material, operating temperature, and the process medium. ▪ 0.95 to 1.00
Operating filling limit	3	Enter operating filling limit in % ▪ 0.00 to 100.00 %
Load filling level	4	Max. filling level (depending on medium and maximum payload) ▪ Reading in %
Additional pressure	5	Enter operating pressure ▪ Yes ▪ No
Operating pressure	6	Enter unit for the operating pressure
Unit of 'Operating pressure'	7	Selectable units for the operating pressure ▪ bar (default) ▪ kPa ▪ psi
Liquid density	8	Density value in kg/m^3 in liquid state ▪ Value in kg/m^3
Standard gas density	9	Standard gas density in kg/m^3 ▪ Value in kg/m^3
Gas density in tank	... .10	▪ Settings performed in TROVIS-VIEW

Menu		Adjustment range/values/description
Gas density in low-pressure pipe	... .11	▪ Settings performed in TROVIS-VIEW
Differential pressure mode	**2.3**	
Differential pressure [Δp0]	2.3.1	Set the minimum differential pressure. The setting range depends on the entered unit (see parameter 2.3.4).
Differential pressure [Δp100]	2.3.2	Set the maximum differential pressure. The setting range depends on the entered unit (see parameter 2.3.4).
Permissible filling limit	2.3.3	Set the permissible filling limit in %.
Unit	2.3.4	Set the unit for minimum and maximum differential pressure. ▪ Selectable units: mbar · bar · kPa · psi · cmH_2O · mH_2O · inH_2O
Medium identifier	2.3.5	Enter a name (max. 11 characters) to identify the medium.
Additional pressure	2.3.6	Enter operating pressure ▪ Yes ▪ No
Operating pressure	2.3.7	Enter unit for the operating pressure
Unit of 'Operating pressure'	2.3.8	Unit for the operating pressure ▪ Selectable units: mbar · bar · kPa · psi · cmH_2O · mH_2O · inH_2O
Option modules	**2.4**	
Overview of option modules	2.4.1	
	2.4.1.1	Overview of option modules in four slots as graph, starts option module wizard

Menu		Adjustment range/values/description
Slot 1	2.4.2	*The available parameters of inserted options modules are listed depending on the optional additional function.*
Slot 2	2.4.3	
Slot 3	2.4.4	
Slot 4	2.4.5	
AO: Analog output option		
Option module identification	1	Detection of optional additional function: AO: Analog output
Option module status	2	Read the current status of the option module ▪ No module inserted ▪ Module not permissible in this setup ▪ Module unknown ▪ Module active
Name	3	Enter a name (max. 15 characters) for identification.
Fault alarm output	4	Determines the signal for the fault alarm output: 'High' stands for >21 mA, 'Low' for <3.6 mA. ▪ High ▪ Low (default)
Error message E1	5	Determines whether an error message is issued in case of condensed state (E1) (see page 84). ▪ No ▪ Yes (default)
Error message E2	6	Determines whether an error message is issued in case of condensed state (E2) (see page 84). ▪ No (default) ▪ Yes
Error message E3	7	Determines whether an error message is issued in case of condensed state (E3) (see page 84). ▪ No (default) ▪ Yes
Assignment of analog output	8	Assignment of a measured value for the analog output (in filling level mode) ▪ Filling level ▪ Tank pressure (pressure sensor), only when pressure sensor exists

Menu		Adjustment range/values/description
Assignment of analog output	9	Assignment of a measured value for the analog output (in differential pressure mode) ▪ Differential pressure ▪ Tank pressure (pressure sensor), only when pressure sensor exists
Pressure at 20 mA	... .10	The adaptation to the tank can be made when a pressure sensor is used. ▪ 0 to 60 bar (based on 20 mA)
Signal of analog output	... .11	Read the applied signal in %
Start test	... .33	Executable function: two-wire test signal issued.
Test mode	... .34	Test mode is *Active* while the test is in progress (test duration: 30 s). ▪ Not active ▪ Active
Test signal of analog output	... .35	Test signal in % based on the 4 to 20 mA signal range. ▪ –10.00 to +110.00 %
AI: Analog input/AIA: Analog input active		
Option module identification	1	Detection of optional additional function: AI: Analog input
Option module status	2	Read the current status of the option module ▪ No module inserted ▪ Module not permissible in this setup ▪ Module unknown ▪ Module active
Name	3	Enter a name (max. 15 characters) for identification.
Signal source	... .12	Enter the signal source on which the 4 to 20 mA signal is based ▪ Unknown (default) ▪ Filling level ▪ Pressure ▪ Temperature
Medium identifier	... .13	Enter a name (max. 15 characters) to identify the medium. ▪ Enter characters as required (default: MEDIUM)
Measured value	... .14	Read the current measured value in the selected unit

Menu		Adjustment range/values/description
Unit	... .15	Unit in which the measured value is to be indicated. ▪ Selectable units: % · kg · Nm^3 · L · ft^3 · lbs · mbar · bar · kPa · psi · mmH_2O · cmH_2O · mH_2O · inH_2O · °C · °F · K
Lower measuring range value	... .16	Determine the lower limit of the measuring range at 4 mA (depending on the selected unit)
Upper measuring range value	... .17	Determine the upper limit of the measuring range at 20 mA (depending on the selected unit)
Event: Broken cable	... .18	Activates or deactivates the event for a detected cable breakage at the input of the AI option module. The event is activated when the signal falls below the switching threshold of 0.2 mA. ▪ ON (default) ▪ OFF
Event: Residual current	... .19	Activates or deactivates the event for a detected residual current violation at the input of the AI option module. The event is activated when the signal falls below the switching threshold of 3.6 mA or exceeds 21.0 mA. ▪ ON (default) ▪ OFF
Limit 1	... .20	Activate/deactivate limit 1 ▪ ON (default) ▪ OFF
Mode	... .21	An upper limit can be determined with 'Max. contact' and a lower limit with 'Min. contact' for limit 1. ▪ Max. contact ▪ Min. contact
Limit	... .22	Setting limit 1 ▪ The limit is set in % when the signal source parameter is set to 'Unknown' or 'Filling level'.
Limit	... .23	Setting limit 1 ▪ The limit is set in % when the signal source parameter is set to 'Unknown' or 'Filling level'.
Limit 2	... .24	Activate/deactivate limit 2 ▪ ON (default) ▪ OFF

Menu		Adjustment range/values/description
Mode	... .25	An upper limit can be determined with 'Max. contact' and a lower limit with 'Min. contact' for limit 2. ▪ Max. contact ▪ Min. contact
Limit	... .26	Setting limit 2 ▪ The limit is set in % when the signal source parameter is set to 'Unknown' or 'Filling level'.
Limit	... .27	Setting limit 2 ▪ The limit is set in % when the signal source parameter is set to 'Unknown' or 'Filling level'.
Limit 3	... .28	Activate/deactivate limit 3 ▪ ON (default) ▪ OFF
Mode	... .29	An upper limit can be determined with 'Max. contact' and a lower limit with 'Min. contact' for limit 3. ▪ Max. contact ▪ Min. contact
Limit	... .30	Setting limit 3 ▪ The limit is set in % when the signal source parameter is set to 'Unknown' or 'Filling level'.
Limit	... .31	Setting limit 3 ▪ The limit is set in % when the signal source parameter is set to 'Unknown' or 'Filling level'.
4 to 20 mA measured value	... .32	Read the current (in mA) at the option module
Start test	... .33	Executable function: two-wire test signal issued.
Test mode	... .34	Test mode is *Active* while the test is in progress (test duration: 30 s). ▪ Not active ▪ Active
Test signal of analog output	... .36	Test signals (depending on the selected unit) based on the 4 to 20 mA signal range.
Identification	**2.5**	
Firmware version	2.5.1	Read the current firmware version of the Media 7 device
Serial number of Media 7	2.5.2	Read the serial number of the Media 7 device

Menu		Adjustment range/values/description
Serial number of option 1	2.5.3	Read the serial number of the option module in slot 1
Serial number of option 2	2.5.4	Read the serial number of the option module in slot 2
Serial number of option 3	2.5.5	Read the serial number of the option module in slot 3
Serial number of option 4	2.5.6	Read the serial number of the option module in slot 4
Voltage supply	2.5.7	Display the type of voltage supply ▪ Unknown ▪ Two-wire ▪ 24 V DC ▪ Explosion-protected, two-wire
HW version/supply voltage	2.5.8	Read the hardware version of the voltage supply
Explosion protection certification	2.5.9	▪ No ▪ Yes
Oxygen approval	2.5.10	▪ No ▪ Yes
Process data	**3**	
Identifier	3.1	Read the entered identifier
Tank identifier	3.2	Read the tank identifier
Medium identifier	3.3	Read the entered medium identifier
Filling level active	3.4	Read the current filling level in %
Differential pressure active	3.5	Read the current differential pressure in %
Filling level	3.6	Read the current filling level in the selected unit
Pressure sensor	3.7	Read the tank pressure measured by the pressure sensor
Differential pressure [Δp]	3.8	Read the current differential pressure in the selected unit (differential pressure mode)
Differential pressure [Δp]	3.9	Read the current differential pressure in the selected unit (filling level mode)
Zero shift	3.10	Read the zero shift in mbar
Span offset	3.11	Read the span offset in mbar

Menu		Adjustment range/values/description
MCN (total volume)	3.12	Read the maximum tank content in the selected unit
SCN (volume up to gauge pipe)	3.13	Read the tank content up to overflow/gauge pipe in the selected unit
UCW (operating filling limit)	3.14	Read the tank content up to the operating filling limit in the selected unit
Differential pressure [Δp0]	3.15	Read the minimum differential pressure (differential pressure mode)
Differential pressure [Δp100]	3.16	Read the maximum differential pressure (differential pressure mode)
Differential pressure [Δp0]	3.17	Read the minimum differential pressure (filling level mode)
Differential pressure [Δp100]	3.18	Read the maximum differential pressure (filling level mode)
Temperature inside device	3.19	Read the current temperature in °C
Heating	3.20	Reading ON/OFF
Measuring range	3.21	Display the measuring range (0 to 3600 mbar)
4-20 mA measured value	3.22	Read measured value in mA (two-wire version only)
Battery voltage	3.23	Read the battery voltage in V
Diagnostics	**4**	
Status messages	4.1	Status messages provide an overview on the current states of individual functions or components of the Media 7 device. A corresponding status icon is assigned to failures and error messages: ⊗ Failure (error class E1) ⚠ Out of specification (error class E2) ◈ Maintenance required (error class E3) ☑ No message
	Possible status	⊗ ⚠ ◈ ☑

Menu		Adjustment range/values/description			
Media condensed state	4.1.1	•	•	•	•
Condensed state (E1)	4.1.2	•			•
101: AMR magnet	4.1.3	•			•
102: AMR sensor	4.1.4	•			•
103: Memory (calibration)	4.1.5	•			•
104: Memory (data)	4.1.6	•			•
105: Factory calibration	4.1.7	•			•
106: Pressure sensor	4.1.8	•			•
107: Data processing	4.1.9	•			•
Condensed state (E2)	4.1.10		•		•
201: AMR range	4.1.11		•		•
202: Measuring span error	4.1.12		•		•
203: Characteristic error	4.1.13		•		•
204: AMR temperature	4.1.14		•		•
205: Min. temperature	4.1.15		•		•
206: Max. temperature	4.1.16		•		•
207: Differential pressure drop	4.1.17		•		•
Condensed state (E3)	4.1.18		•		•
301: Power supply unit	4.1.19			•	•
302: Option not recognized	4.1.20			•	•
303: Option module combination invalid	4.1.21			•	•
Fault alarm output	**4.2**				
Fault alarm output	4.2.1	Determines the signal for the fault alarm output: 'High' stands for >21 mA, 'Low' for <3.6 mA. ▪ High (default setting) ▪ Low			

Menu		Adjustment range/values/description
Error message E1	4.2.2	Determines whether an error message is issued in case of condensed state (E1) (see page 84). ▪ No ▪ Yes
Error message E2	4.2.3	Determines whether an error message is issued in case of condensed state (E2) (see page 84). ▪ No ▪ Yes
Error message E3	4.2.4	Determines whether an error message is issued in case of condensed state (E3) (see page 84). ▪ No ▪ Yes
Diagnostic data	**4.3**	
Operation duration	4.3.1	Read the entire operating time of the device (dd:hh:mm:ss)
Temperature	**4.4**	
Temperature inside device	4.4.1	Read the current device temperature in °C
Max. temperature inside device	4.4.2	Set an upper temperature limit within the specified range. If the current device temperature is above the adjusted limit, an error message is generated and displayed. The status changes to 'Out of specification'. ▪ 10 to 80 °C (default: 70 °C)
Min. temperature inside device	4.4.3	Set a lower temperature limit within the specified range. If the current device temperature is below the adjusted limit, an error message is generated and displayed. The status changes to 'Out of specification'. ▪ –40 to +10 °C (default: –40 °C)
Filling level events	**4.5**	
Filling limit alarm (SCN)	4.5.1	Activate/deactivate the permissible filling level ▪ ON ▪ OFF (default)
Pre-alarm	4.5.2	Activate/deactivate the pre-alarm when the filling level falls below the limit. ▪ ON (default) ▪ OFF

Menu		Adjustment range/values/description
Limit	4.5.3	Set the limit in % (appears as marking 1 on the display). ▪ 0.0 to 100.0 % (default: 30 %)
Main alarm	4.5.4	Activate/deactivate the main alarm when the filling level falls below the limit. ▪ ON (default) ▪ OFF
Limit	4.5.5	Set the limit in % (appears as marking 2 on the display). ▪ 0.0 to 100.0 % (default: 15 %)
Differential pressure events	4.6	
Filling limit alarm (SCN)	4.6.1	Activate/deactivate the permissible filling level ▪ ON ▪ OFF (default)
Pre-alarm	4.6.2	Activate/deactivate the pre-alarm when the filling level falls below the limit. ▪ ON (default) ▪ OFF
Limit	4.6.3	Set the limit in % (appears as marking 1 on the display). ▪ 0.0 to 100.0 % (default: 30 %)
Main alarm	4.6.4	Activate/deactivate the main alarm when the filling level falls below the limit. ▪ ON (default) ▪ OFF
Limit	4.6.5	Set the limit in % (appears as marking 2 on the display). ▪ 0.0 to 100.0 % (default: 15 %)
Pressure sensor events	4.7	
Limit 1	4.7.1	Activate/deactivate limit 1 ▪ ON (default) ▪ OFF

Menu		Adjustment range/values/description
Mode	4.7.2	An upper pressure limit can be determined with 'Max. contact' and a lower pressure limit with 'Min. contact'. ▪ Max. contact (default) ▪ Min. contact
Limit	4.7.3	Set limit 1 in bar ▪ 0 to 60 bar (default: 40 bar)
Limit 2	4.7.4	Activate/deactivate limit 2 ▪ ON (default) ▪ OFF
Mode	4.7.5	An upper pressure limit can be determined with 'Max. contact' and a lower pressure limit with 'Min. contact'. ▪ Max. contact (default) ▪ Min. contact
Limit	4.7.6	Set limit 2 in bar ▪ 0 to 60 bar (default: 25 bar)
Limit 3	4.7.7	Activate/deactivate limit 3 ▪ ON (default) ▪ OFF
Mode	4.7.8	An upper pressure limit can be determined with 'Max. contact' and a lower pressure limit with 'Min. contact'. ▪ Max. contact ▪ Min. contact (default)
Limit	4.7.9	Set limit 3 in bar ▪ 0 to 60 bar (default: 5 bar)

CERTIFICATE

1 EU – Type Examination Certificate

2 Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 2014/34/EU

3 EU – Type Examination Certificate Number: **KIWA 17ATEX0041 X** **Issue:** 1

4 Product: **Differential Pressure Gauge / Transmitter Type 5007-1-1x0**

5 Manufacturer: **SAMSON AG**

6 Address: **Weismüllerstraße 3, 60314 Frankfurt**
Germany

7 This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Kiwa Nederland B.V., Notified Body number 0620 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in confidential ATEX Assessment Report No. 170701565.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0 : 2012 + A11 : 2013 **EN 60079-11 : 2012** **EN 60079-26 : 2015**

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

11 This EU – Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

II 2 G	Ex ia IIB T4 Gb (Type 5007-1-110)
or	
II 1/2 G	Ex ia IIB T4 Ga/Gb (Type 5007-1-120)

Kiwa Nederland B.V.
Unit Kiwa ExVision
Wilmersdorf 50
P.O. Box 137
7300 AC Apeldoorn
The Netherlands

Tel. +31 88 998 34 93
Fax +31 88 998 36 85
ExVision@kiwa.nl
www.kiwaexvision.com

Kiwa Nederland B.V.

Pieter van Breugel
Certification Officer

Issue date: 1 June 2018

First issue: ---

This certificate shall, as far as applicable, be revised before the date of cessation of presumption of conformity of (one of) the included standards above as communicated in the Official Journal of the European Union.

ExVision Form 81
Version 3.0 (2016-06)

13 **SCHEDULE**

14 **EU – Type Examination Certificate KIWA 17ATEX0041 X Issue No. 1**

15.1 **Description of Product**

The Differential Pressure Gauges / Transmitters type 5007-1-1x0 are 2 wire loop powered (4 – 20 mA) and are used to convert a differential pressure signal into an electrical signal.
The Gauge consists of a non-metallic enclosure for the electronics, equipped with an indicator for local read-out and a number of push buttons for control, mounted on a differential pressure measuring cell made from brass.
Optionally the Gauge can be equipped with up to 4 additional 4 - 20 mA analog outputs.

Gauges Type 5007-1-120 provide a EPL Ga/Gb separation towards the process in the sensor enclosure, where gauges type 5007-1-110 are equipped with an additional pressure sensor that is in contact with the process.

Ambient temperature range: -20 °C to +70 °C.

15.2 **Electrical Data**

Supply and output circuit (terminals +31, -31):
in type of protection intrinsic safety Ex ia IIB, only for connection to a certified intrinsically safe circuit, with the following maximum values:
U_i = 28 V; I_i = 115 mA; P_i = 1,0 W; C_i = 25 nF; L_i = 0 mH

Output circuit (option module terminals +31, -31):
in type of protection intrinsic safety Ex ia IIB, only for connection to a certified intrinsically safe circuit, with the following maximum values:
U_i = 28 V; I_i = 115 mA; P_i = 1,0 W; C_i = 25 nF; L_i = 0 mH

The output circuits of the option modules are galvanically isolated from each other and from the supply and output circuit up to a voltage of 500 V.

15.3 **Instructions**

The instructions provided with the product shall be followed in detail to assure safe operation.

16 **ATEX Assessment Report Number**

170701565.

17 **Specific Conditions of Use**

The equipment shall be installed and maintained such that hazards caused by electrostatic discharge are excluded.

18 **Essential Health and Safety Requirements**

All relevant Essential Health and Safety Requirements are covered by the standards listed at section 9.

19 **Drawings and Documents**

As listed in ATEX Assessment Report No. 170701565.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx KIWA 17.0020X
Issue No: 0
Certificate history:
Issue No. 0 (2018-06-01)

Status: Current

Page 1 of 3

Date of Issue: 2018-06-01

Applicant: SAMSON AG
Weismüllerstraße 3
60314 Frankfurt
Germany

Equipment: Differential Pressure Gauge / Transmitter type 5007-1-1x1
Optional accessory:

Type of Protection: Ex ia

Marking:
Ex ia IIB T4 Gb (Type 5007-1-111),
Ex ia IIB T4 Ga/Gb (Type 5007-1-121)

Approved for issue on behalf of the IECEx Certification Body: Pieter van Breugel

Position: Certification Officer

Signature:
(for printed version)

Date: 1st of June, 2018

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:
Kiwa Nederland B.V. (Unit Kiwa ExVision)
Wilmersdorf 50
7327 AC Apeldoorn
P.O. Box 137
The Netherlands

IECEx Certificate of Conformity

Certificate No:	IECEx KIWA 17.0020X	Issue No: 0
Date of Issue:	2018-06-01	Page 2 of 3
Manufacturer:	SAMSON AG Weismüllerstraße 3 60314 Frankfurt Germany	

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-26 : 2014-10 Edition:3.0	Explosive atmospheres – Part 26: Equipment with Equipment Protection Level (EPL) Ga

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

NL/KIWA/ExTR17.0022/00

Quality Assessment Report:

DE/TUN/QAR06.0011/07

IECEx Certificate of Conformity

Certificate No:	IECEx KIWA 17.0020X	Issue No: 0
Date of Issue:	2018-06-01	Page 3 of 3

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The Differential Pressure Gauges / Transmitters type 5007-1-1x1 are 2 wire loop powered (4 – 20 mA) and are used to convert a differential pressure signal into an electrical signal. The Gauge consists of a non-metallic enclosure for the electronics, equipped with an indicator for local read-out and a number of push buttons for control, mounted on a differential pressure measuring cell made from brass. Optionally the Gauge can be equipped with up to 4 additional 4 - 20 mA analog outputs.

Gauges Type 5007-1-121 provide a EPL Ga/Gb separation towards the process in the sensor enclosure, where gauges type 5007-1-111 are equipped with an additional pressure sensor that is in contact with the process.

Ambient temperature range: -20 °C to +70 °C.

Electrical Data

Supply and output circuit (terminals +31, -31):
in type of protection intrinsic safety Ex ia IIB, only for connection to a certified intrinsically safe circuit, with the following maximum values:
U_i = 28 V; I_i = 115 mA; P_i = 1.0 W; C_i = 25 nF; L_i = 0 mH

Output circuit (option module terminals +31, -31):
in type of protection intrinsic safety Ex ia IIB, only for connection to a certified intrinsically safe circuit, with the following maximum values:
U_i = 28 V; I_i = 115 mA; P_i = 1.0 W; C_i = 25 nF; L_i = 0 mH

The output circuits of the option modules are galvanically isolated from each other and from the supply and output circuit up to a voltage of 500 V.

SPECIFIC CONDITIONS OF USE: YES as shown below:

The equipment shall be installed and maintained such that hazards caused by electrostatic discharge are excluded.

EB 9510 EN

SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samson.de · www.samson.de

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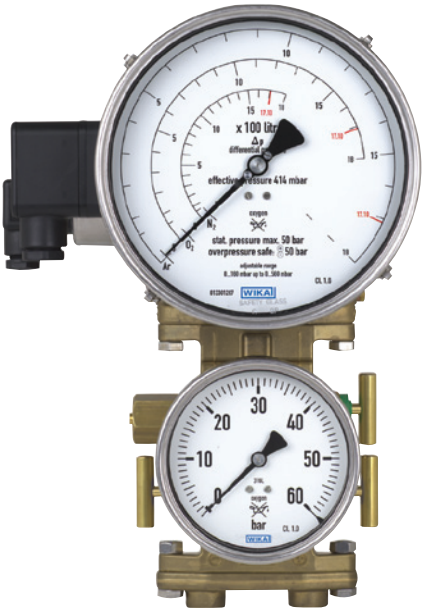
Manual de instrucciones

Manómetro diferencial
Modelos 712.15.160, 732.15.160

E

Cryo Gauge



Modelo 712.15.160 con transmisores opcionales para presión diferencial y presión de servicio

WIKA

Part of your business

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Manual de instrucciones para manómetros de presión diferencial
Modelos 712.15.160, 732.15.160 **Pàginas 3-19**

¡Leer el manual de instrucciones antes de comenzar cualquier trabajo!
¡Guardar el manual para una eventual consulta!

Contenido

Información
Este signo le proporciona informaciones, indicaciones o consejos.

¡Advertencia!
Este símbolo advierte sobre acciones que pueden provocar daños personales o al equipo.

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1. Seguridad

¡ADVERTENCIA!
Antes del montaje, la puesta servicio y el funcionamiento, asegurarse de que se haya seleccionado el manómetro diferencial adecuado con respecto a rango de medida, versión y condiciones de medición específicas.

Todos los trabajos que se ejecuten en los instrumentos han de hacerse sin someter el instrumento a presión.

Riesgo de lesiones graves y/o daños materiales en caso de inobservancia.

Los trabajos con los instrumentos deben estar exclusivamente a cargo de personal cualificado.

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2. Información general

El presente manual de instrucciones se basa en la siguiente información:

- EN 837-2: Recomendaciones relativas a la selección y montaje de manómetros
- Hoja técnica PM 07.30: manómetros diferenciales modelos 712.15.160, 732.15.160
- Hoja técnica PM 02.01, PM 02.02, PM 02.04: Manómetros con muelle tubular

3. Montaje

El montaje del manómetro diferencial se realiza siguiendo las recomendaciones de instalación para manómetros según la norma EN 837-2/7.

- Antes de montar el instrumento, sacudir o limpiar con aire comprimido o agua las líneas de medición
- Los dispositivos de medición deben montarse y operarse de modo libre de vibraciones.
  Fijación mediante: - cordones de conexión rígidos y/o
  - 4 taladros de montaje M8 en bridas de fijación
- Proteger los dispositivos de medición contra la suciedad y las grandes oscilaciones de temperatura
- No debe excederse la temperatura máx. admisible del medio/ambiente

Montaje de las conexiones de presión según los símbolos estampados ⊕ e ⊖
⊕ presión alta ⇒ presión contra el suelo (p_B)
⊖ presión baja ⇒ presión de servicio/presión de superposición (p_D)
$p_B = p_{FL} + p_D$
(siendo p_{FL} = presión hidrostática del fluido = $\rho \cdot g \cdot h$)

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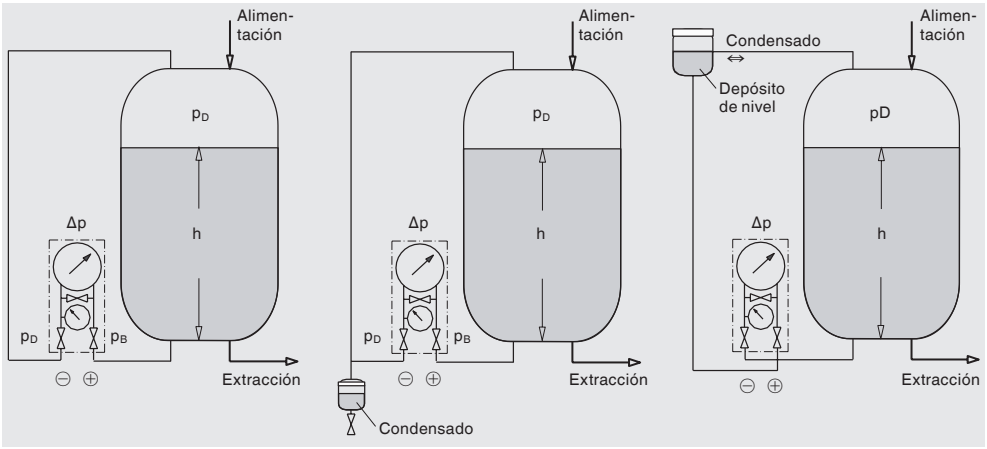
Tipos de montaje para medición de nivel

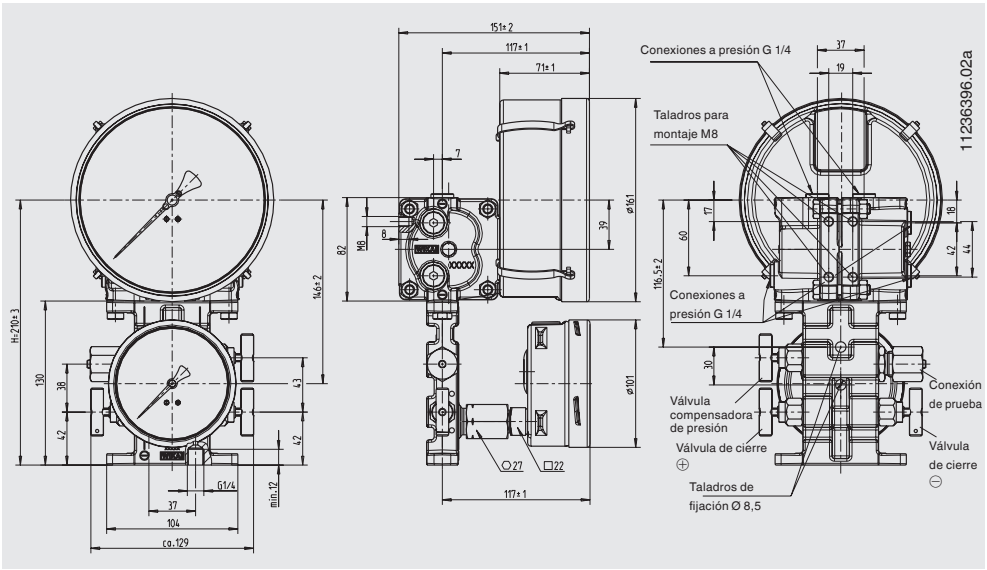
Estándar para las plantas criogénicas (gases liquificado)

2 ejemplos de condensación



Montaje en pared

Colocación/fijación con los 4 taladros de montaje M8/2 taladros de fijación Ø 8,5



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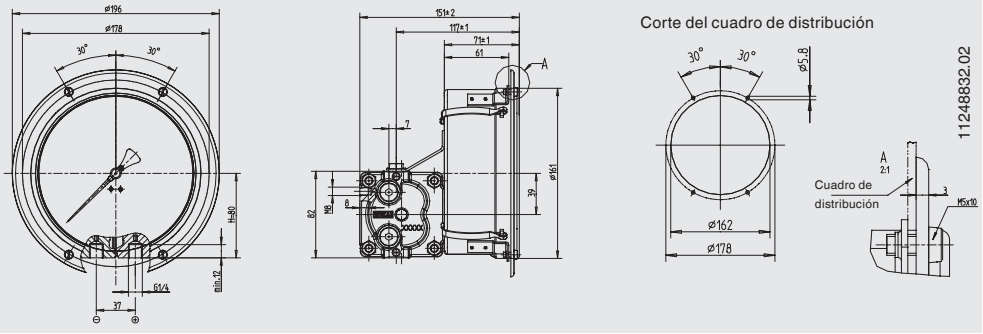
Opción

Montaje en cuadro de mando



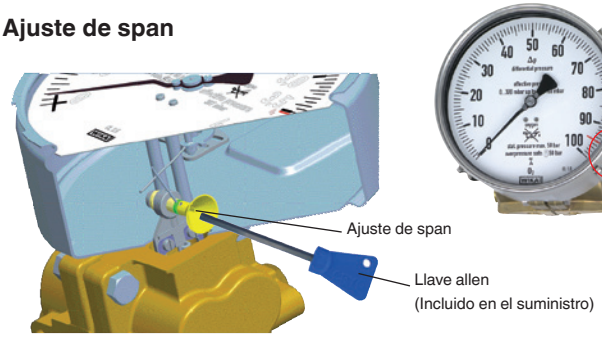
4. Indicador de presión diferencial

El span de medida del manómetro diferencial se puede ajustar, según la célula de medida, a los límites de rangos de medida indicados en la tabla. El ajuste se debería realizar preferiblemente en el banco de pruebas o directamente en el punto de medición utilizando una bomba de comprobación manual.

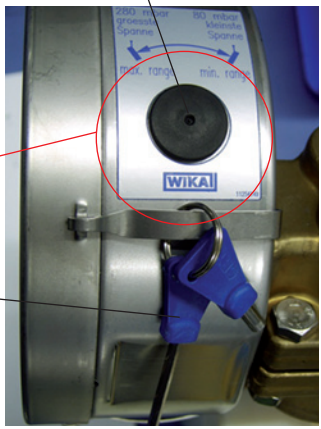
Límites de rango de medida

Célula de medida	Rangos de medida ajustables		
	de		hasta
140 mbar	0 ... 40 mbar	-	0 ... 140 mbar
280 mbar	0 ... 80 mbar	-	0 ... 280 mbar
560 mbar	0 ... 160 mbar	-	0 ... 560 mbar
1130 mbar	0 ... 320 mbar	-	0 ... 1130 mbar
2300 mbar	0 ... 650 mbar	-	0 ... 2300 mbar
4000 mbar	0 ... 1150 mbar	-	0 ... 4000 mbar

Ajuste de span



Tapón para ajuste del span



Giro hacia la derecha: Rango de medida menor
Giro hacia la izquierda: Rango de medida mayor

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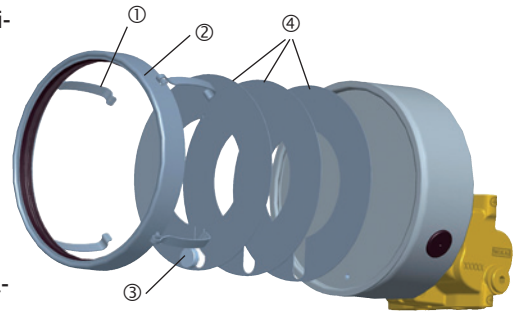
1. El ajuste de span se encuentra en la caja al retirar el tapón en la posición de las 4 horas.
2. Aplicar al instrumento la presión nominal deseada.
3. Insertar una llave allen (medida 3 mm) en el embudo guía y ajustar la aguja al valor final girando hacia la derecha (rango inferior) o hacia la izquierda (rango superior). Una vez finalizada esta operación, el instrumento estará ajustado al rango de medida deseado.
4. Si el instrumento de medición está equipado con un transmisor modelo 89x.44 (véase página 23), se ajusta simultáneamente la señal de salida al nuevo rango de medida.
5. Tras finalizar el ajuste se tiene que volver a cerrar el instrumento con el tapón.

Escalas intercambiables

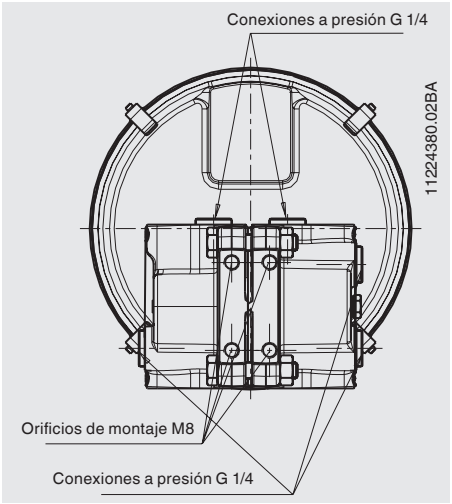
1. Soltar la abrazadera en la carcasa del manómetro diferencial y quitar el sobreanillo con mirilla
2. Aflojar el tornillo moleteado y retirarlo
3. Retirar las tres escalas, colocar la escala deseada arriba y reponer las otras
4. Colocar el tornillo moleteado y apretarlo, Montar el sobreanillo con la mirilla y enclavar nuevamente la abrazadera



Leyenda
① Abrazadera
② Sobreanillo
③ Tornillo moleteado
④ Escalas

Conexiones a presión adicionales

- Tres roscas hembra G ¼ adicionales en la cámara negativa del medio (brida de célula de medición derecha mirando el instrumento desde atrás), por ejemplo para conexión de un presostato, una válvula de seguridad o un transmisor modelo A-10 Cryo o IS-20
- Dos roscas hembra G ¼ en la cámara positiva del medio (brida de célula de medición izquierda mirando el instrumento desde atrás), por ejemplo
para recalibración



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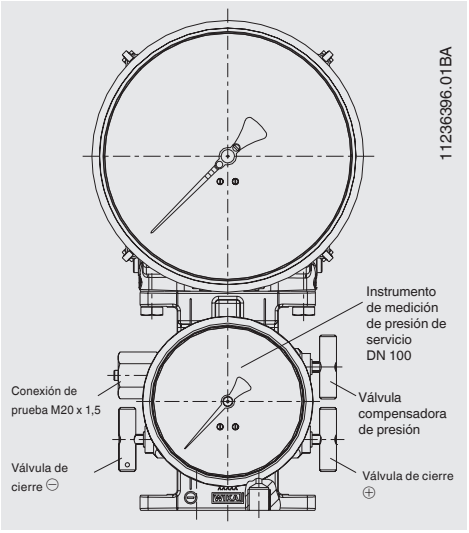
5. Bloque de válvulas con indicador de presión de servicio (opcional)

Un bloque de válvulas opcional con brida, con medidor de presión de servicio NG 100, permite la medición centralizada de nivel de llenado y presión de servicio en un mismo instrumento.



- Bloqueo de las presiones de la línea de medición sin interrupción de la operación -para desmontaje/comprobación del dispositivo- para proteger el dispositivo de una carga de sobrepresión no permitida en carga de presión de prueba de instalaciones de orden n.
- **Protección del instrumento** contra golpes de presión/golpes de ariete, y con ello de condiciones de funcionamiento indefinidas
- **Puesta fuera de servicio del dispositivo,** cuando durante períodos de funcionamiento prolongados no se requiera ninguna medición, es decir, sólo mediciones esporádicas (para aumentar la vida útil de manómetros diferenciales y de presión de servicio con alta frecuencia del cambio de presión)
- **Recalibración** del manómetro diferencial (indicador del contenido del depósito)

a) Abrir la válvula compensadora de presión
b) Cerrar el grifo de cierre positivo y negativo y a continuación cerrar nuevamente la válvula compensadora de presión
c) Mediante una rosca hembra G ¼ en la cámara positiva del sistema de medición se conecta el normal de presión y el generador de presión
d) En el bloque de válvulas, retirar el tornillo **de la conexión de prueba** del lateral negativo
e) Ahora puede aplicarse presión al lateral positivo
f) Tras un ajuste satisfactorio:
   - Volver a retirar el tornillo de la conexión de prueba
   - Retirar nuevamente el normal de presión y el generador de presión y cerrar la conexión.
   - Abrir la válvula compensadora de presión
   - Abrir lentamente primero el grifo de cierre positivo y luego el negativo
   - Cerrar nuevamente la válvula compensadora de presión

- **Conexión de prueba** M20 x 1,5 para la comprobación del manómetro de presión de servicio

La válvula compensadora de presión permite un **control del punto cero** en el proceso operativo en marcha (con la válvula abierta)

- El medio fluye desde el lado de presión superior hacia el lado opuesto y la presión diferencial en el medidor disminuye a cero (el indicador de presión diferencial debe moverse a cero, es decir, entrar en el área de la banda de tolerancia del punto cero; el funcionamiento del instrumento es entonces satisfactorio).
- En caso de desviación, la corrección del punto cero puede realizarse con el indicador regulable incorporado de forma estándar (aflojar antes la abrazadera y quitar la mirilla y la junta). El ajuste a cero se efectúa girando el tornillo ranurado en el indicador ajustable. Después de la corrección del punto cero, fijar nuevamente el anillo de retención incluyendo mirilla y junta, y cerrar la válvula compensadora de presión.
- A continuación, en las versiones con transmisor integrado debe controlarse también el punto cero de éste (véase página 27).

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6. Aplicaciones

En los casos de medios peligrosos, como por ejemplo oxígeno, acetileno, sustancias inflamables o tóxicas, así como en depósitos de presión, etc., deberán observarse tanto las normas generales como las disposiciones y directivas vigentes.

7. Adaptador para conexión al proceso (opcional)

Los adaptadores se pueden conectar mediante brida directamente al manómetro diferencial o al bloque de válvulas.

Están disponibles 5 diferentes conexiones al proceso:

- 2 roscas hembra G 1/4, distancia entre ejes 31 mm o 54 mm
- 2 roscas hembra NPT 1/4, distancia entre ejes 31 mm, 37 mm o 54 mm

En caso de pedido individual, todas las piezas necesarias para el montaje en el manómetro diferencial o en el bloque de válvulas están incluidas en el volumen de suministro: 2 tornillos hexagonales M8 x 16, 2 tornillos hexagonales M8 x 28, 2 tuercas M8 y 2 juntas tóricas

8. Transmisor para indicador de nivel de llenado (opcional)

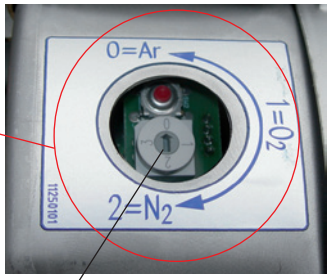
- Ejecución estándar modelo 891.44
- Versión Ex modelo 892.44

Los manómetros diferenciales WIKA con transmisor incorporado modelo 89x.44, combinan las ventajas de una indicación mecánica in situ con los requerimientos de una transmisión eléctrica de señales para un moderno registro de lectura en la industria.

El transmisor está integrado en la caja del indicador de nivel de llenado. El span de medición (señal de salida eléctrica) se ajusta automáticamente con la indicación mecánica, es decir, la escala de la totalidad del rango corresponde a 4 ... 20 mA. (véase el punto 4. "Indicador de presión diferencial").

En caso de **escalas múltiples** o de escalas intercambiables extraíbles (opcional), la señal de salida de 4 ... 20 mA sintonizada puede almacenarse en un microprocesador.

Girando el **conmutador BCD** opcional (al que se puede acceder retirando el tapón situado en el lado izquierdo de la caja) con un destornillador se puede configurar la señal de salida al tipo de gas deseado.



Conmutador BCD (conmutador de selección de escala) y pulsador de punto cero (tapón retirado)

Punto cero eléctrico (con opción de conmutador BCD)

Si se requiere un ajuste del punto cero (por ejemplo tras una corrección mecánica del punto cero), presionar el pulsador de punto cero durante aprox. 1 segundo dentro del lapso de 30 segundos con el equipo apagado (extraer el enchufe) y la válvula compensadora de presión abierta.

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Punto cero eléctrico (sin opción de conmutador BCD)

Si se modifica el punto cero mecánico mediante el indicador ajustable, el punto cero eléctrico debe adaptarse nuevamente al punto cero mecánico.

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Para ello, despresurice primero el manómetro.

Desconecte toda la cubierta de cables en el lateral derecho del manómetro, aflojando completamente el tornillo ①en la parte superior de la cubierta de cables ① con un destornillador (0,6 x 3,5 mm). Retire el tornillo. Desconecte la cubierta junto al inserto de casquillo ④de la parte inferior de la caja de cables ⑤, desconectando así el manómetro de la fuente de alimentación.

Retire la tapa ② de la cubierta de cables ③ y presione completamente hacia abajo el inserto de casquillo ④ a través de la cubierta ③, hasta extraerlo.

Puentee los contactos 5 y 6 en el inserto de casquillo con una pequeña pieza de cable pelado en ambos extremos (resistencia máx. admisible 30 Ω).

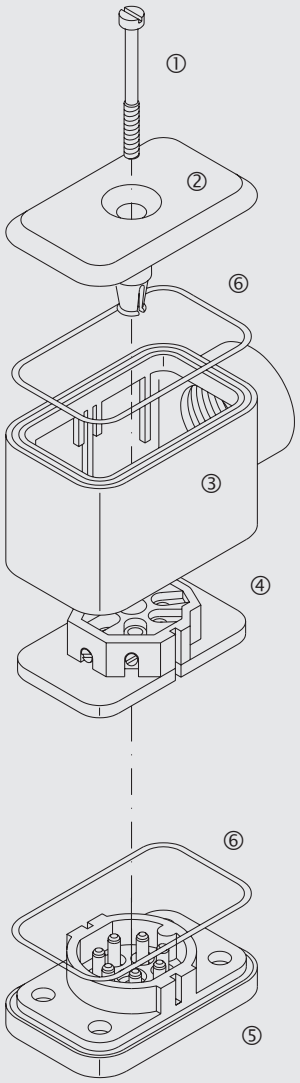
Vuelve a montar el conector en secuencia inversa. Inserte el conector con el alambre trenzado en la clavija de inserción ⑤ , restableciendo así el suministro de energía.

En un lapso máx. de 30 segundos, el nuevo punto cero se almacena en el sistema electrónico. Durante dicho lapso, la corriente en el bucle aumenta a 9,5 mA.

El nuevo punto cero permanece almacenado permanentemente incluso en caso de corte de corriente.

Desmonte ahora el enchufe en el orden descrito más arriba y retire el alambre trenzado. Tras montar otra vez el conector, la señal eléctrica de salida es nuevamente idéntica con la identidad del indicador mecánico.

Para que se mantenga la protección, es imprescindible montar las juntas ⑥ nuevamente.



① Tornillo
② Tapa de la cubierta de cables
③ Cubierta de cables
④ Inserto de casquillo
⑤ Parte inferior de la caja de cables
⑥ Juntas

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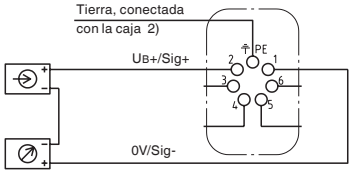
Datos técnicos		Modelos 891.44 y 892.44 (Versión Ex)
Alimentación auxiliar *UB*		
para versiones no EX	DC	12 V < *UB* ≤ 30 V
para versiones EX		¡Véase en la sección protección Ex!
Influencia de la alimentación auxiliar		≤ 0,1 % del valor final/10 V
Ondulación residual admisible	% ss	≤ 10
Señal de salida		4 … 20 mA, dos hilos
Carga máxima admisible *RA*		para versiones para atmósferas no potencialmente explosivas, modelo 891.44:
		RA ≤ (*UB* - 12 V)/0,02 A con *RA* en Ω y *UB* en voltios
		para versiones para atmósferas potencialmente explosivas, modelo 892.44:
		RA ≤ (*UB* - 14 V)/0,02 A con *RA* en Ω y *UB* en Volt
Influencia de la carga		≤ 0,1 % del valor final
Ajustabilidad		
Punto cero, eléctrico	Puesta a cero mediante puenteo breve de los bornes 5 y 6 o en la opción "conmutador de selección de escala" ajustable mediante pulsador 1)	
Selección de escala		Se pueden ajustar 4 escalas mediante el interruptor BCD
Desviación de la curva característica		≤ 1,0 % del span(ajuste de puntos límite)
Valores admisibles temperaturas ambiente		-40 … +80 °C, -40 … +60 °C con oxígeno
Rango de temperatura compensado		-40 … +80 °C
Coeficientes de temperatura en rango de temp. compensado		
CT medio del punto cero	% del span / 10 K	≤ 0,3
CT medio del span	% del span / 10 K	≤ 0,3
Protección Ex		según certificado CE de tipo
		BSV 08 ATEX E 018 X para modelo 892.44
Tipo de protección		EEx II 2G EEx ia IIC T6
Valores máximos de seguridad		
Alimentación auxiliar *Ui*	DC	14 … 30 V
Corriente de cortocircuito *Ii*	mA	máx. 100
Potencia P*i*	W	máx. 1
Capacidad interna *Ci*	nF	12
Inductividad interna **L***i*	mH	despreciable
Temperatura del medio	°C	-40 … +80, -40 … +60 con oxígeno
Temperatura ambiental	°C	-40 … +60 (T6)
Marcado CE	Emisión de perturbaciones y resistencia a interferencias según EN 61326	
Conexión eléctrica		Conector angular (terminal roscado hasta 2,5 mm²)
Protección eléctrica	Protección contra polarización inversa y sobretensiones	
Tipo de protección		IP 65 según EN 60529 / IEC 529
Asignación de los bornes de conexión, bifilar		

Bornes 3, 4, 5 y 6: sólo para uso interno

2) Esta conexión no debe utilizarse para conexión equipotencial. El instrumento debe integrarse en la conexión equipotencial a través de la conexión al proceso.

1) Solo posible dentro de los 30 segundos siguientes al establecimiento de la alimentación auxiliar

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Medidas en caso de averías .

Fallo	Posible causa	Medida
Ninguna señal de salida	No hay tensión de alimentación	Revisar alimentación de energía
	Cable roto	y cables; en caso necesario, reemplazar
		las piezas averiadas
	Transmisor erróneo	Revisar las conexiones;
	conectado	en caso necesario, corregir las conexiones
	No hay presión de entrada	Comprobar la alimentación de presión
	Abrir la válvula compensadora de presión	Cerrar la válvula compensadora de presión
	Sistema electrónico averiado, por ejemplo debido a	Enviar el instrumento de medición de vuelta
	tensión de alimentación demasiado elevada	al fabricante para reparación
	o debido a tensión externa	
Invariable	Conducto de entrada obstruido	Conducto de entrada o tornillo de estrangulación
Señal de salida		limpiar
en caso de modificación de presión	Abrir la válvula compensadora de presión	Cerrar la válvula compensadora de presión
	Sistema electrónico averiado, por ejemplo debido a	Enviar el instrumento de medición de vuelta
	tensión de alimentación demasiado elevada	al fabricante para reparación
	o debido a tensión externa	
	Transmisor averiado tras sobrecarga mecánica	Devolver el instrumento al fabricante para su reparación.
Señal de salida demasiado elevada, invariable con cambios de presión	Sistema electrónico averiado debido a tensión de alimentación demasiado elevada	Enviar el instrumento de medición de vuelta al fabricante para reparación
Insuficiente span de señal	Tensión de alimentación demasiado baja	Corregir la tensión de alimentación
	Carga demasiado alta	Observar la carga máxima admisible
	se eligió escala errónea	Comprobar la posición del conmutador de selección de escala
Señal de punto cero demasiado pequeña	Ajuste erróneo del punto cero	Reajustar el punto cero
Señal de punto cero demasiado grande	Ajuste erróneo del punto cero	Reajustar el punto cero
	Sobrecarga mecánica	Reajustar el transmisor; en caso necesario,
		Devolver el instrumento al fabricante para su reparación

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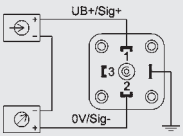
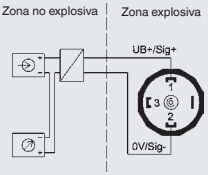
9. Transmisor para indicador de presión de servicio (opcional)

Versión estándar modelo A-10
o versión Ex modelo IS-20

Transmisor para indicación de presión de servicio

Los transmisores de la presión de servicio se atornillan en el lado izquierdo de la cámara del medio negativa y se pueden montarse también in situ.
Conexión a presión del transmisor: rosca hembra G 1/4

Datos técnicos		A-10	IS-20
Hoja técnica		PE 81.60	PE 81.50
Forma constructiva		estándar	de seguridad intrínseca
Rangos de medida	bar	0 ... 6 hasta 0 ... 60	0 ... 6 hasta 0 ... 60
Salidas	mA	4 ... 20	4 ... 20 (separador de alimentación)
Temperatura del medio	°C	-30 ... +100	-20 ... +80
Temperatura ambiental	°C	-30 ... +100	-20 ... +80
Piezas en contacto con el medio		Acero inoxidable	Acero inoxidable
Alimentación auxiliar *UB*	DC	8 V < *UB* ≤ 30 V	10 V < *UB* ≤ 30 V
Carga máxima admisible *RA*	ohmios	*RA* ≤ (*UB* - 8 V) / 0,02 A	*RA* ≤ (*UB* - 10 V) / 0,02 A
Exactitud			
Ajuste de la banda de tolerancia, BFSL	% del span	≤ 0,5	≤ 0,25
Rango de temperatura compensado	°C	0 ... +80 °C	0 ... +80 °C
Asignación de los bornes de conexión, 2 hilos			

Con cada manómetro diferencial con transmisor incorporado para indicación de la presión de servicio se adjunta en la entrega el correspondiente manual de instrucciones.

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10. Contactos eléctricos (opción)

Los contactos eléctricos para el indicador del nivel de llenado y/o presión de servicio abren circuitos eléctricos en función de la posición del indicador de los instrumentos de medición.

Versiones

Contactos magneticos de ruptura brusca simples y dobles, o contactos inductivos simples y dobles. Datos técnicos según la hoja técnica AC 08.01

En el caso del contacto eléctrico en sistema modular, se trata de una unidad complementaria que se puede montar en el manómetro en pocos minutos.
Los contactos eléctricos ofrecen el tipo de protección IP 65.
El acoplamiento a los indicadores del valor nominal se realiza mediante una horquilla especial, para no utilizar ningún vástago arrastrador en el propio indicador. Merced a este montaje sencillo, se puede convertir un instrumento de medición con contacto de forma rápida y económica.

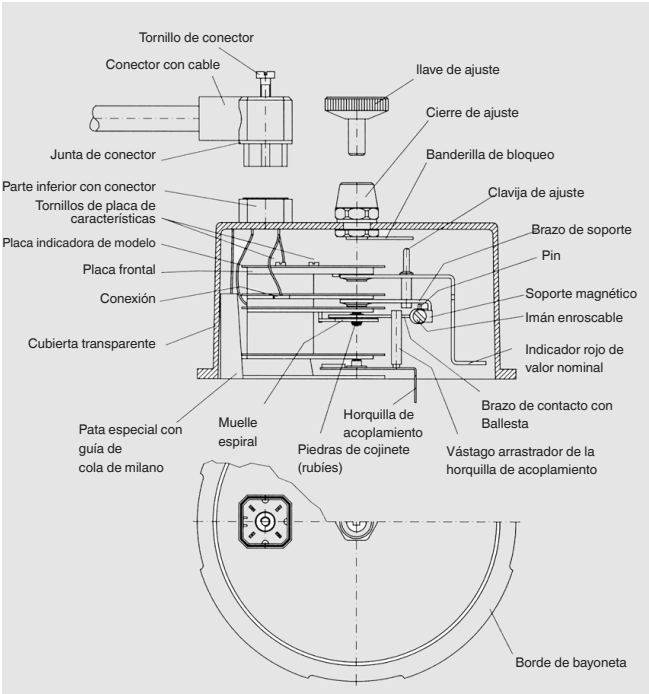
Los contactos eléctricos consisten esencialmente en:

- el contacto eléctrico ya cableado, equipado con una pata especial y un acoplamiento de horquilla,
- una cubierta transparente (de policarbonato) con guía de cola de milano, en la cual está introducido el interruptor de límite con la pata especial y fijado con un tornillo Phillips,
- una parte inferior con conector (de 4 polos) moldeada o soldada con la cubierta transparente,
- un cierre de ajuste montado en el centro de la cubierta transparente.

Mediante el cierre de ajuste con llave separada o fija se ajusta desde fuera el valor con el que se tiene que realizar el proceso de conmutación en los indicadores de valor nominal del contacto eléctrico montado.

Los contactos eléctricos están diseñados de tal manera que el indicador de valor real, después de haber hecho contacto, puede seguir desplazándose más allá del indicador de valor nominal; sin embargo, el contacto establecido se mantiene.

El diseño garantiza entonces también en caso de corte de corriente una situación de contacto estable correspondiente a la posición del indicador de valor real.



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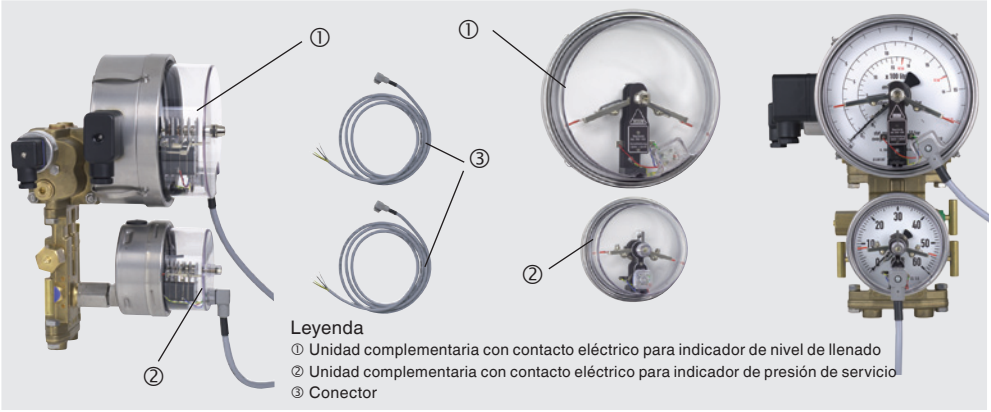
Montaje de los contactos eléctricos



Leyenda
① Unidad complementaria con contacto eléctrico para indicador de nivel de llenado
② Unidad complementaria con contacto eléctrico para indicador de presión de servicio
③ Conector

Primero hay que quitar del medidor el anillo de retención con junta y mirilla. Antes de colocar la cubierta transparente en el medidor hay que ajustar los contactos acorde al campo de aplicación.

En el caso del contacto magnético de ruptura hay que adaptar la fuerza de sujeción magnética a las circunstancias específicas del dispositivo ajustando (girando) el imán enroscable y asegurándolo luego contra un desajuste accidental mediante un compuesto de bloqueo adecuado.
Hay que doblar de forma acorde la pequeña ballesta en el brazo de contacto móvil

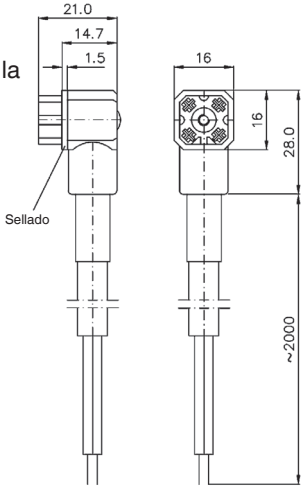
La unidad ya ajustada se coloca con el anillo de retención en el medidor y se alinea de tal forma que el acoplamiento de horquilla, que guía al brazo de contacto móvil, pase por encima del indicador de valor real del medidor, sin tocar la esfera. Sin embargo, si tal cosa sucediera, habrá que acortar la horquilla de arrastre con un útil de corte adecuado según necesidad.

En el montaje de fábrica, los contactos están ajustados de forma óptima.

Mediante el enclavamiento del anillo en la caja se sujeta toda la unidad de contacto al medidor.

Conector
Como equivalente de la parte inferior con conector soldada a la cubierta transparente,

- Material: piezas aislantes PA 6 - GF 30
- Color de la caja: gris
- Tipo de conexión: extremos pelados y estañados
- Tipo de protección: IP 65 según EN 60529/IEC 529



Para contactos magnéticos de ruptura brusca:
- Conector de 3 polos + ⏚ (hasta 250 V) con 2 m de cable 4 x 1,0 mm²

Para contactos inductivos:
Versión de baja tensión sin conductor de puesta a tierra
- Conector de 4 polos + I (hasta 50 V) con 2 m de cable 4 x 0,75 mm²

Volumen de suministro: 1 conector moldeado en el cable de conexión, 1 tornillo central M3 x 20 y 1 junta

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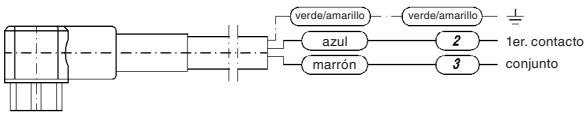
Detalles del conexionado

Contactos magnéticos de ruptura brusca:

- Contacto individual, NG 100



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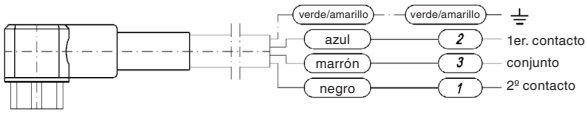
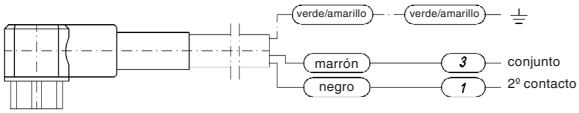
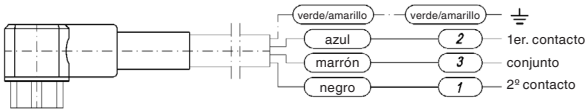
- Contacto doble, NG 100



- Contacto individual, NG 160

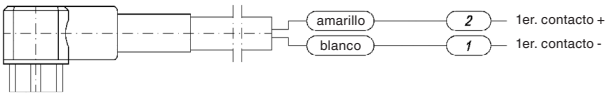


- Contacto doble, NG 160

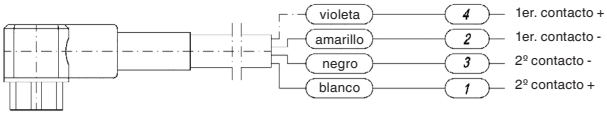


Contactos inductivos:

- Contacto individual, NG 100 y 160



- Contacto doble, NG 100 y 160



11. Mantenimiento

Los manómetros de presión diferencial WIKA no necesitan mantenimiento y destacan por su prolongada vida útil si se manejan y operan de forma apropiada.

12. Eliminación

Una eliminación incorrecta puede provocar peligros para el medio ambiente.
Eliminar los componentes de los instrumentos y los materiales de embalaje conforme a los reglamentos relativos al tratamiento de residuos y eliminación vigentes en el país de utilización.

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DEKRA

(1) # EG-Baumusterprüfbescheinigung

(2) **- Richtlinie 94/9/EG -**
Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen

(3) ## BVS 08 ATEX E 018 X

(4) **Gerät:** **Drehwinkelgeber Typ 892.44 / Manometer Typ PGT23, Typ PGT43, Typ DPGT43, Typ APGT43, Typ 712.15, Typ PGT43HP, Typ DPGT43HP Typ PGT63HP**

(5) **Hersteller:** **WIKA Alexander Wiegand GmbH & Co. KG**

(6) **Anschrift:** **63911 Klingenberg/Main**

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Zertifizierungsstelle der DEKRA EXAM GmbH, benannte Stelle Nr. 0158 gemäß Artikel 9 der Richtlinie 94/9/EG des Europäischen Parlaments und des Rates vom 23. März 1994, bescheinigt, dass das Gerät die grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.
Die Ergebnisse der Prüfung sind in dem Prüfprotokoll BVS PP 08.2026 EG niedergelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit:

EN 60079-0:2006	Allgemeine Anforderungen
EN 60079-11:2007	Eigensicherheit 'i'

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird in der Anlage zu dieser Bescheinigung auf besondere Bedingungen für die sichere Anwendung des Gerätes hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf die Konzeption und die Baumusterprüfung des beschriebenen Gerätes in Übereinstimmung mit der Richtlinie 94/9/EG.
Für Herstellung und in Verkehr bringen des Gerätes sind weitere Anforderungen der Richtlinie zu erfüllen, die nicht durch diese Bescheinigung abgedeckt sind.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

II 2G Ex ia IIC T4 / T5 / T6
I M2 Ex ia I

DEKRA EXAM GmbH
Bochum, den 11. März 2008

Zertifizierungsstelle — Fachbereich

DEKRA EXAM GmbH Dinnendahlstraße 9 44809 Bochum Telefon 0234/3696-105 Telefax 0234/3696-110 E-mail zs-exam@dekra.com

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E

(13) Anlage zur

(14) # EG-Baumusterprüfbescheinigung

BVS 08 ATEX E 018 X

(15) 15.1 Gegenstand und Typ

Drehwinkelgeber Typ 892.44 / Manometer Typ PGT23, Typ PGT43, Typ DPGT43, Typ APGT43, Typ 712.15, Typ PGT43HP, Typ DPGT43HP, Typ PGT63HP

15.2 Beschreibung

Der Drehwinkelgeber Typ 892.44 besteht aus einer Elektronik-Baugruppe, die eine in Vergussmasse eingebettete Isolierstoffplatte mit elektronischen Bauteilen enthält.

Die eigensicheren Stromkreise (Speise- und Signalstromkreis, Taster- / Tastaturanschluss, Programmier-Anschluss) sind auf Leiterplatten-Steckverbinder aufgelegt.

Der Drehwinkelgeber ist zum Einbau bzw. nachträglichen Einbau in nicht-elektrische Betriebsmittel (mechanische Messwerke z. B. Manometer Typ PGT23, Typ PGT43, Typ DPGT43, Typ APGT43, Typ 712.15, Typ PGT43HP, Typ DPGT43HP, Typ PGT63HP) bestimmt und dient zur Übertragung von Messdaten in einen eigensicheren Speise- und Signalstromkreis (4 – 20 mA Stromschleife).

Die mechanischen Bewegungen z. B. eines federelastischen Manometer-Messwerkes, werden mit Hilfe eines Permanentmagneten auf einen Magnetfeldsensor im Drehwinkelgeber übertragen.

15.3 Kenngrößen

Parameter	Versorgungs-stromkreis	Taster-/ Tastatur-Stromkreis	Programmier-stromkreis
Schutzniveau	Ex ia IIC / Ex ia I	Ex ia IIC / Ex ia I	Ex ia IIC / Ex ia I
Spannung U_i	DC 30 V	N / A	N / A
Stromstärke I_i	100 mA	N / A	N / A
Leistung P_i	1000 mW	N / A	N / A
innere wirksame Kapazität C_i	12 nF	N / A	N / A
innere wirksame Induktivität L_i	vernachlässigbar	N / A	N / A
Spannung U_o	N / A	DC 30 V	DC 30 V
Stromstärke I_o	N / A	15,3 mA)[1]	15,3 mA)[1]
Leistung P_o	N / A	115 mW)[1]	115 mW)[1]
max. äußere Kapazität C_o	N / A	66 nF)[1]	66 nF)[1]
max. äußere Induktivität L_o	N / A	150 mH)[1]	150 mH)[1]
max. Induktivitäts- / Widerstandsverhältnis $L_o(R_o$	N / A	310 µH/Ω)[1]	310 µH/Ω)[1]
Kennlinie	N / A	linear	linear
Steckverbinder	X3 Pin 7-8	X4 Pin 1-4	X3 Pin 1-3

Anmerkung:
)[1] 4-Leiter-Stromkreis; Summenwert: 3 Signalleitungen parallel gegen GND
N / A = nicht anwendbar

DEKRA EXAM GmbH Dinnendahlstraße 9 44809 Bochum Telefon 0234/3696-105 Telefax 0234/3696-110 E-mail zs-exam@dekra.com

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Umgebungstemperaturbereich: $-40\ °C \leq T_a \leq +60\ °C$ (T6)
$-40\ °C \leq T_a \leq +75\ °C$ (T5)
$-40\ °C \leq T_a \leq +85\ °C$ (T4)

(16) Prüfprotokoll

BVS PP 08.2026 EG, Stand 11.03.2008

(17) Besondere Bedingungen für die sichere Anwendung

17.1 Drehwinkelgeber

Der Drehwinkelgeber Typ 892.44 ist in ein Gehäuse einzubauen, das mindestens die Schutzart IP 20 (Gruppe II Anwendung) bzw. IP 54 (Gruppe I Anwendung) gemäß EN 60529 gewährleistet.

Die innere Verdrahtung in diesem Gehäuse muss entsprechend Abschnitt 6.3.11 und 7.6.e von EN 60079-11:2007 ausgeführt sein.

Anschlussklemmen oder Steckverbinder für den eigensicheren Stromkreis müssen entsprechend Abschnitt 6.2.1 bzw. 6.2.2 von EN 60079-11:2007 angeordnet sein.

Umgebungstemperaturbereich: $-40\ °C \leq T_a \leq +60\ °C$ (T6) / $+75\ °C$ (T5) / $+85\ °C$ (T4).

17.2 Manometer mit eingebautem Drehwinkelgeber

Entfällt

DEKRA EXAM GmbH Dinnendahlstraße 9 44809 Bochum Telefon 0234/3696-105 Telefax 0234/3696-110 E-mail zs-exam@dekra.com

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Europe

Austria
WIKA Messgerätevertrieb
Ursula Wiegand GmbH & Co. KG
1230 Vienna
Tel. (+43) 1 86916-31
E-Mail: info@wika.at
www.wika.at

Benelux
WIKA Benelux
6101 WX Echt
Tel. (+31) 475 535-500
E-Mail: info@wika.nl
www.wika.nl

Belarus
WIKA Belarus
Ul. Zaharova 50B, Office 3H
220088 Minsk
Tel. (+375) 17-294 57 11
E-mail: k.martynova@wika.by

Bulgaria
WIKA Bulgaria EOOD
Bul. „Al. Stamboliiski“ 205
1309 Sofia
Tel. (+359) 2 82138-10
E-Mail: t.antonov@wika.bg

Croatia
WIKA Croatia d.o.o.
Hrastovicka 19
10250 Zagreb-Lucko
Tel. (+385) 1 6531034
E-Mail: info@wika.hr
www.wika.hr

Finland
WIKA Finland Oy
00210 Helsinki
Tel. (+358) 9-682 49 20
E-Mail: info@wika.fi
www.wika.fi

France
WIKA Instruments s.a.r.l.
95610 Eragny-sur-Oise
Tel. (+33) 1 343084-84
E-Mail: info@wika.fr
www.wika.fr

Germany
WIKA Alexander Wiegand SE & Co. KG
63911 Klingenberg
Tel. (+49) 9372 132-0
E-Mail: info@wika.de
www.wika.de

Italy
WIKA Italia Srl & C. Sas
20020 Arese (Milano)
Tel. (+39) 02 9386-11
E-Mail: info@wika.it
www.wika.it

Poland
WIKA Polska S.A.
87-800 Wloclawek
Tel. (+48) 542 3011-00
E-Mail: info@wikapolska.pl
www.wikapolska.pl

Romania
WIKA Instruments Romania S.R.L.
Bucuresti, Sector 5, Calea Rahovei Nr.
266-268, Corp 61, Etaj 1
78202 Bucharest
Tel. (+40) 21 4048327
E-Mail: m.anghel@wika.ro

Russia
ZAO WIKA MERA
127015 Moscow
Tel. (+7) 495-648 01 80
E-Mail: info@wika.ru
www.wika.ru

Serbia
WIKA Merna Tehnika d.o.o.
Sime Solaje 15
11060 Belgrade
Tel. (+381) 11 2763722
E-Mail: info@wika.co.yu
www.wika.co.yu

Spain
Instrumentos WIKA, S.A.
C/Josep Carner, 11-17
08205 Sabadell (Barcelona)
Tel. (+34) 933 938630
E-Mail: info@wika.es
www.wika.es

Switzerland
MANOMETER AG
6285 Hitzkirch
Tel. (+41) 41 91972-72
E-Mail: info@manometer.ch
www.manometer.ch

Turkey
WIKA Instruments Istanbul
Basinc ve Sicaklik Ölcme Cihazlari
Bayraktar Bulvari No. 21
34775 Yukari Dudullu - Istanbul
Tel. (+90) 216 41590-66
E-Mail: info@wika.com.tr
www.wika.com.tr

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WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg • Germany
Tel. +49 9372 132-0
Fax +49 9372 132-406
info@wika.de
www.wika.de

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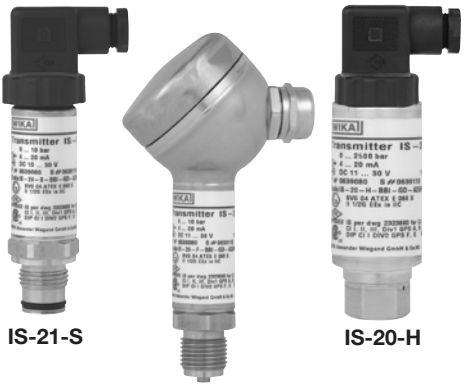
www.wika.de

Operating instructions
Betriebsanleitung
Mode d'emploi
Manual de instrucciones

IS-20-S, IS-21-S
IS-20-F, IS-21-F
IS-20-H

Pressure transmitter /
Druckmessumformer /
Transmetteur de pression /
Transmisor de presión



IS-21-S **IS-20-F** **IS-20-H**

WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Phone (+49) 93 72/132-295
Fax (+49) 93 72/132-706
E-Mail support-tronic@wika.de
www.wika.de

2132926.07 GB/D/F/E 03/2010

Part of your business

2132926.07 GB/D/F/E 03/2010

1. Important details for your information

Read these operating instructions before installing and starting the pressure transmitter. Keep the operating instructions in a place that is accessible to all users at any time.
The following installation and operating instructions have been compiled by us with great care but it is not feasible to take all possible applications into consideration. These installation and operation instructions should meet the needs of most pressure measurement applications. If questions remain regarding a specific application, you can obtain further information:

- Via our Internet address www.wika.de / www.wika.com
- The product data sheet is designated as PE 81.50, PE 81.51, PE 81.52
- Contact WIKA for additional technical support (+49) 9372 / 132-295

If the serial number on the product label and/or the 2D code on the hexagon gets illegible (e.g. by mechanical damage or repainting), the retraceability of the instrument is not possible any more.

WIKA pressure transmitters are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality and environmental inspection before assembly and each instrument is fully tested prior to shipment. Our environmental management system is certified to DIN EN ISO 14001.

Use of the product in accordance with the intended use IS-2X-S, IS-2X-F, IS-20-H:
Use the intrinsically safe pressure transmitter to transform the pressure into an electrical signal in hazardous areas.

Certificate ATEX:
Pressure transmitter for operation in hazardous areas in compliance with the respective certificate (see attached EC-type examination certificate BVS 04 ATEX E 068 X).
ATEX Approval ratings:
Gases and mist: Mounting to Zone 0; Installation in Zone 0, Zone 1 and Zone 2.
Dust: Mounting to Zone 20; Installation in Zone 20, Zone 21 and Zone 22.
Mining Category M1, M2.
Certificate FM/CSA:
Pressure transmitter for operation in hazardous areas in compliance with the respective certificate (see Control drawing No. 2323880).

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FM / CSA Approval ratings:
Intrinsically Safe with entity approval for Class I, II and III Division 1, Groups A, B, C, D, E, F, G and Class I, Zone 0, AEx ia IIC
Dust-ignitionproof for Class II and III, Division 1, Groups E, F, and G.
Non-incendive for Class I Division 2 Groups A, B, C and D

Knowledge required
Install and start the pressure transmitter only if you are familiar with the relevant regulations and directives of your country and if you have the qualification required. You have to be acquainted with the rules and regulations on hazardous areas, measurement and control technology and electric circuits. Depending on the operating conditions of your application you have to have the corresponding knowledge, e.g. of aggressive media or high pressures.

2. A quick overview for you

If you want to get a quick overview, read **Chapters 3, 5, 7 and 11**. There you will get some short safety instructions and important information on your product and its starting. **Read these chapters in any case.**

3. Signs, symbols and abbreviations

Warning	Potential danger of life or of severe injuries.	Warning	Potential danger of life or of severe injuries due to catapulting parts.
Warning	Instructions for hazardous areas: Potential danger of life or of severe injuries.	Caution	Potential danger of burns due to hot surfaces.
	Notice, important information, malfunction.	CE	The product complies with the applicable European directives.

ATEX European guideline for explosion protection (Atmosphère=AT, Explosible=EX). The product complies with the requirements of the European directive 94/9/EC (ATEX) on explosion protection.

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FM APPROVED	FM Factory Mutual The product was tested and certified by FM Approvals. It complies with the applicable US-American standards on safety (including explosion protection).
GL	GL Germanischer Lloyd The product was tested and certified by GL. It complies with the requirements of the GL Type Approval system.
C SP US	CSA Canadian Standard Association The product was tested and certified by CSA International. It complies with the applicable Canadian and US-American standards on safety (including explosion protection).

2-wire Two connection lines are intended for the voltage supply. The supply current is the measurement signal.
U+ Positive supply connection
U- Negative supply connection

4. Function

IS-2**0**: Pressure connection (intrinsically safe) with internal diaphragm (standard version).
IS-2**1**: Pressure connection with flush diaphragm (intrinsically safe) for highly viscous or solids entrained media which might clog the pressure port.
IS-2X-**S**: Pressure transmitter (intrinsically safe), version with electrical connector or flying leads.
IS-2X-**F**: Pressure transmitter (intrinsically safe), field case version.
IS-20-**H**: Pressure transmitter (intrinsically safe), highest pressure connection.

Function: The pressure prevailing within the application is transformed into a standardised electrical signal through the deflection of the diaphragm, which acts on the sensor element with the power supply fed to the transmitter. This electric signal changes in proportion to the pressure and can be evaluated correspondingly

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5. For your safety

Warning

- Select the appropriate pressure transmitter with regard to scale range, performance and specific measurement conditions prior to installing and starting the instrument.
- Observe the relevant national regulations (e.g.: IEC 60079-14, NEC, CEC) and observe the applicable standards and directives for special applications (e.g. with dangerous media such as acetylene, flammable gases or liquids and toxic gases or liquids and with refrigeration plants or compressors).
  If you do not observe the appropriate regulations, serious injuries and/or damage can occur!
- **Open pressure connections only after the system is without pressure!**
- Please make sure that the pressure transmitter is only used within the overload threshold limit all the time!
- Observe the ambient and working conditions outlined in section 7 „Technical data".
- Ensure that the pressure transmitter is only operated in accordance with the provisions i.e. as described in the following instructions.
- Do not interfere with or change the pressure transmitter in any other way than described in these operating instructions.
- Remove the pressure transmitter from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation
- **Take precautions with regard to remaining media in removed pressure transmitter. Remaining media in the pressure port may be hazardous or toxic!**
- Have repairs performed by the manufacturer only.

Information about material consistency against corrosion and diffusion can be found in our WIKA-Handbook, 'Pressure and Temperature Measurement'.

Warning

Consider the details given in the EC-type examination certificate as well as the respective country specific regulations for installation and operation in hazardous areas (e.g.: IEC 60079-14, NEC, CEC). If you do not observe these stipulations, serious injuries and/or damage can occur.

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6. Packaging

Has everything been supplied?

Check the scope of supply:
- Completely assembled pressure transmitters; with flush version IS-21 including pre-assembled sealings and protection cap.
- EC-type examination certificate and Control Drawing (FM, CSA)

- Inspect the pressure transmitter for possible damage during transportation. Should there be any obvious damage, inform the transport company and WIKA without delay.
- Keep the packaging, as it offers optimal protection during transportation (e.g. changing installation location, shipment for repair).
- Ensure that the pressure connection thread and the connection contacts will not be damaged.

In order to protect the diaphragm, the pressure connection of the instrument IS-21-S, -F is provided with a special protection cap.

- Remove this protection cap only just before installing the pressure transmitter in order to prevent any damage to the diaphragm or the thread.
- Keep the protection cap of the pressure connection thread and the diaphragm for later storage or transport.
- Mount the protection cap when removing and transporting the instrument.

7. Starting, operation

Required tools: wrench (flats 27 or flats 41), screw driver

Diaphragm test for your safety

It is necessary that before starting the pressure transmitter you test the diaphragm visually, as this is a **safety-relevant component.**

Warning

- Pay attention to any liquid leaking out, for this points to a diaphragm damage (not necessary for IS-20-H).
- Check the diaphragm visually for any damage (IS-21-S, -F).
- Use the pressure transmitter only if the diaphragm is undamaged.
- Use the pressure transmitter only if it is in a faultless condition as far as the safety-relevant features are concerned.

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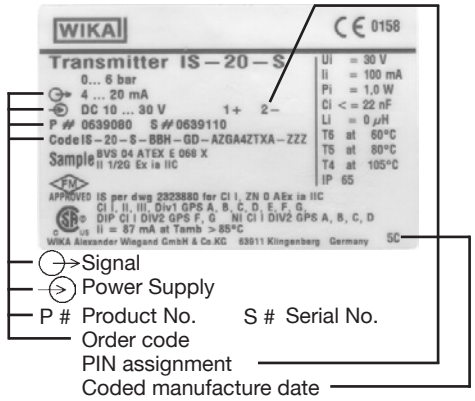
Mechanical connection

Generally the serial number on the product label applies. If there is no serial number on the product label, the number on the hexagon will apply.

Product label (example)



- Remove the protection cap only just before installation and absolutely avoid any damage to the diaphragm during installation as well (IS-21-S, -F).
- For Model IS-20-S, -F you have to provide for a sealing element; exceptions are instruments with self-sealing threads (e.g. NPT thread).
  For Model IS-21-S, -F the sealing ring is included in delivery.
- Please refer to our data sheet “Pressure gauge sealing washers AC 09.08” in WIKA’s product catalog Pressure and Temperature Measurement or our website www.wika.de for details about sealing washers.
- When mounting the instrument, ensure that the sealing faces of the instrument and the measuring point are clean and undamaged.
- Screw in or unscrew the instrument only via the flats using a suitable tool and the prescribed torque. The appropriate torque depends on the dimension of the pressure connection and on the sealing element used (form/material). Do not use the case as working surface for screwing in or unscrewing the instrument.
- When screwing the transmitter in, ensure that the threads are not jammed.

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- For tapped holes and welding sockets please see Technical Information IN 00.14 for download at www.wika.de

Warning

- Protect the diaphragm against any contact with abrasive substances and pressure peaks and do not touch it with tools. If you damage the diaphragm, no intrinsic safety can be guaranteed (ATEX, FM, CSA)!
- Ensure that under hazardous dust ennvironment the pressure transmitter is mounted in a shielded section and protect it against shocks.
- Observe the technical data for the use of the pressure transmitter in connection with aggressive/corrosive media and for the avoidance of mechanical hazards.

Installation in / mounting to zone 0 and zone 20 (zone 20 not with IS-20-H)
(In general Zone 0 is given when the pressure transmitter is surrounded by a mixture of explosive gases more than 1.000 hours per year = continuous hazard).

Warning

- When installing the pressure transmitter or the cable gland into areas whic require category 1G equipment, ensure that ingress protection IP67 according to IEC 60 529 is guaranteed.
- When installing the pressure transmitter or the cable gland into areas which require category 1D equipment, ensure that ingress protection IP 6X according to IEC 60 529 is guaranteed.

Measurement of process media with higher temperatures than the media temperature ranges specified in the tables of the EC-type examination certificate under item 15.1.2 is permissible, if special cooling elements are used (not for IS-20-H).

Warning

- Observe the permissible surface temperature applicable for this range according to the defined temperature classes.
- Observe the maximum temperature value (of the temperature range defined under item 15.1.2 in the EC-type examination certificate) at the hexagon of the tubular case.
- Ensure an unhindered air circulation at the cooling element.
- Protect the pressure transmitter against touching or affix a warning notice.
- Insulate heat sources thermally from the pressure transmitter (e.g. pipes or tanks).

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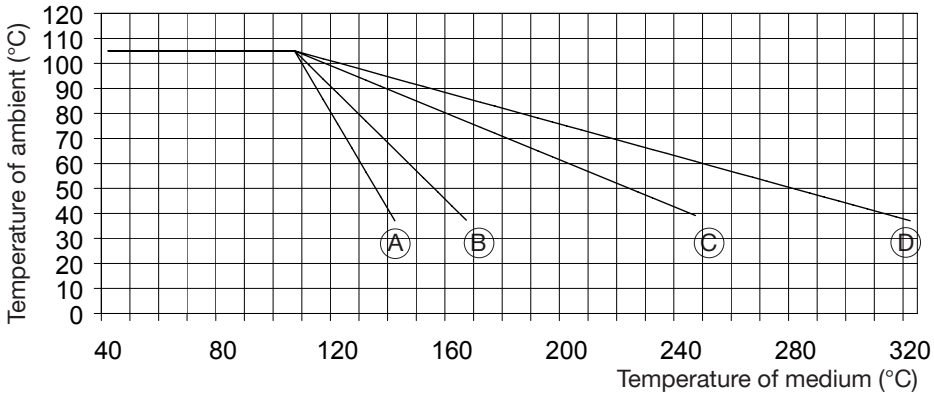
Advertencia

Ensure that, particularly in the dust hazardous area, the cooling elements will not be contaminated and that no dust can be deposited on them, because otherwise the cooling effect cannot be guaranteed.

Relation of medium temperature to ambient temperature



Model	IS-20-H	IS-2X-S /-F		
Version	(A)	(B)	(C)	(D)
Cooling fin	-	2	3	5
Constant K	0.34	0.47	0.68	0.76

Calculation of cooling element:

$T_B = T_{med} - (T_{med} - T_{amb}) \times K$

T_B = Operation temperature of transmitter
T_{med} = max. temperature of process medium
T_{amb} = max. temperature of ambience
K = Constant of cooling element

Calculation of max. temperature of ambience:

$T_{amb} = T_{med} + (T_B - T_{med}) / K$

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Electrical connection

Warning

Earth the housing, through the process connection, against electromagnetic fields and electrostatic discharge.

Warning

- Ground the cable screen at one end, preferably in the safe, thus non-Ex, area (EN 60079-14). For devices with flying leads, the screen is connected to the housing. The simultaneous connection of housing and cable screen to ground is only permitted if ground loop problems between the screen connection (e.g. at the power supply) and housing can be excluded (see EN 60079-14).
- Supply the pressure transmitter from an intrinsically safe current circuit (Ex ia).
- Consider both the internal capacitance and inductance.
- Cover flying leads with fine wires by an end splice (cable preparation).
- The bayonet-connector is made of light metal, a material which is not permissible for group I applications (mining).
- Consider that cables for use in **zones 1 and 2** must be checked with a test voltage between conductor/earth, conductor/screen, screen/earth of more than 500V (AC).

- Operate the pressure transmitter with a shielded cable and earth the shield at least on one side of the cable, if the cable is longer than 30 m or if it is run outside of the building.
- Ingress protection per IEC 60529 (The ingress protection classes specified only apply while the pressure transmitter is connected with female connectors that provide the corresponding ingress protection).
- Ensure that the cable diameter you select fits to the cable gland of the connector Ensure that the cable gland of the mounted connector is positioned correctly and that the sealings are available and undamaged. Tighten the threaded connection and check the correct position of the sealings in order to ensure the ingress protection.
- Please make sure that the ends of cables with flying leads do not allow any ingress of moisture.

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With a line transformer you realise the mandatory galvanic isolation of the voltage and current supply between hazardous and non-hazardous areas and ensure the safety connection data.

Wiring details

	L-Connector DIN 175301-803 A	CIrcular connector M12x1, 4-pin	Flying leads, 1.5 m
			
2-wire	U+ = 1 | U- = 2	U+ = 1 | U- = 3	U+ = brown | U- = green
Cable screen			PUR-cable: grey FEP-cable: twisted and tinned
Wire gauge	up to max. 1.5 mm²	-	0.5 mm² (AWG 20)
Diamter of cable	6 to 8 mm ship approval: 10 to 14 mm	-	6.8 mm (Code DL / EM) 7.5 mm (Code DM)
Ingress Protection per IEC 60 529	IP 65	IP 67	IP 67 - Order code: DL IP 68 zero/span not adjustable- Order code: EM / DM
	The ingress protection classes specified only apply while the pressure transmitter is connected with female connectors that provide the corresponding ingress protection.		

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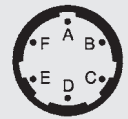
Wiring details

	Bayonet connector, 6-pin	Field case (with internal spring clip terminals)
		
2-wire	U+ = A | U- = B	U+ = 1 | U- = 2 | Test+ = 3 | Test- = 4 | Screen = 5
Ingress Protection per IEC 60 529	IP 65 (NEMA 4)	IP 67
	The ingress protection classes specified only apply while the pressure transmitter is connected with female connectors that provide the corresponding ingress protection.	

Model IS-20-F, IS-21-F, IS-20-H with field case:

Cable connection in the spring clip terminal

- Cover the stripped wire ends with end splices.
- Unscrew the case cover.
- Loosen the cable gland using an open-end wrench, wrench size 24.
- Lead the cable through the cable gland into the opened case head.
- Press the corresponding plastic lever at the spring clip terminal down using a screw driver, so that the clamped contact will be released.
- Lead the prepared flying lead into the opening and let go of the plastic lever, so that the flying lead will be squeezed inside the spring clip terminal.
- After connecting the individual wires, tighten the cable gland and screw down the case over.

Function of the test circuit for 2-wire:

By means of the test circuit the current can be metered during normal operation without having to disconnect the instrument. For that purpose you have to connect an ammeter (for applications in hazardous areas; internal resistance < 15 Ohm) to the test +/- terminals.

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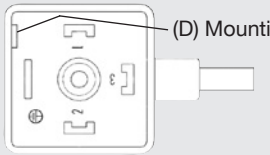
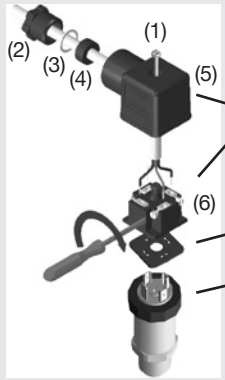
Assembly of L-connector DIN EN 175301-803





1. Loosen the screw (1).
2. Loosen the cable gland (2).
3. Pull the angle housing (5), with the terminal block (6) inside, away from the instrument.
4. Using the head of a small screwdriver in the mounting hole (D), lever the terminal block (6) out of the angle housing (5).
   In order not to damage the sealing of the angle housing, do not try to push the terminal block (6) out using the screw hole (1) or the cable gland (2).
5. Ensure that the conductor outer diameter you select is matched to the angle housing's cable gland. Slide the cable through the cable gland nut (2), washer (3), gland seal (4) and angle housing (5).
6. Connect the flying leads to the screw terminals on the terminal block (6) in accordance with the pin-assignment drawing.
7. Press the terminal block (6) back into the angle housing (5).
8. Tighten the cable gland (2) around the cable. Make sure that the sealing isn't damaged and that the cable gland and seals are assembled correctly in order to ensure ingress protection.
9. Place the flat, square gasket over the connection pins on the top of the instrument housing.
10. Slide the terminal block (6) onto the connection pins.
11. Secure the angle housing (5) and terminal block (6) to the instrument with the screw (1).

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Specifications	Model IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H												
Pressure ranges *) IS-2X-S, IS-2X-F	bar	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16
Over pressure safety IS-2X-S,IS-2X-F	bar	1	1.5	2	2	4	5	10	10	17	35	35	80
Burst pressure IS-2X-S, IS-2X-F	bar	2	2	2.4	2.4	4.8	6	12	12	20.5	42	42	96
Pressure ranges *) IS-2X-S, IS-2X-F	bar	25	40	60	100	160	250	400		600		1000 [1]	
Over pressure safety IS-2X-S,IS-2X-F	bar	50	80	120	200	320	500	800		1200		1500	
Burst pressure IS-2X-S, IS-2X-F	bar	96	400	550	800	1000	1200	1700 [2]		2400 [2]		3000	
	Pressure ranges for IS-20-H see additional operating instructions 11126418 High pressure												
	{Vacuum, gauge pressure, compound range, absolute pressure are available}												
	[1] Only Model IS-20-S, IS-20-F.												
	[2] For model IS-21-S, IS-21-F: the value specified in the table applies only when sealing is realised with the sealing ring underneath the hex. Otherwise max. 1500 bar applies.												
Materials													
■ Wetted parts													
» Model IS-20-S, IS-20-F, IS-20-H *)	Stainless steel												
» Model IS-21-S, IS-21-F	Stainless steel												
	O-ring: NBR {FPM/FKM or EPDM}												
■ Case	Stainless steel												
Internal transmission fluid [3]	Synthetic oil {Halocarbon oil for oxygen applications}												
	[3] Not for IS-20-S, IS-20-F with pressure ranges > 25 bar and IS-20-H.												
Power supply U+	DC V												
» Model IS-2X-S, IS-20-H	10 ... 30												
» Model IS-2X-F, IS-20-H with field case	11 ... 30												
Signal output and	R_A in Ohm	4 … 20 mA, 2-wire											
maximum ohmic load R_A													
■ Model IS-2X-S	$R_A \leq (U+ - 10\ V) / 0.02\ A$ - (length of flying leads in m x 0.14 Ohm)												

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Specifications	Model IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H		
■ Model IS-2X-F, IS-20-H with field case		$R_A \leq (U+ - 11\ V) / 0.02\ A$	
Test circuit signal and maximum load		RA ≤ 15 (only model IS-2X-F, IS-20-H with field case)	
Adjustability zero/span	%	± 5 using potentiometers inside the instrument	
Response time (10 ... 90 %)	ms	≤ 1 [4]	
	[4] Response time IS-20-S/-F: ≤ 10 ms at medium temp. below < -30 °C for pressure ranges up to 25 bar. Response time IS-21: ≤ 10 ms at medium temp. below < -30 °C (-22 °F).		
Power Pi	W	1 (750 mW with approval for Category 1D)	
Insulation voltage		Insulation complies with EN 60079-11	
Accuracy	% of span	≤ 0.5 [6] {0.25} [5] [6]	
	[5] Accuracy { } for pressure ranges ≥ 0.25 bar, not for IS-20-H		
	[6] Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2). Adjusted in vertical mounting position with lower pressure connection.		
Non-linearity	% of span	≤ 0.2	(BFSL) according to IEC 61298-2
Non-repeatability	% of span	≤ 0.1	
1-year stability	% of span	≤ 0.2	(at reference conditions)
Permissible temperature of			
■ Medium [8] *)		-20 ... +80 °C [7]	-4 ... +176 °F [7]
		(Extended temperature ranges see chapter 7 „Relation of medium temperature to ambience temperature“) [7]	
■ Ambience [8]		-20 ... +80 °C [7]	-4 ... +176 °F [7]
■ Storage		-30 ... +105 °C	-22 ... +221 °F
	[7] Other temperature ranges are possible, depending on the electrical connection; see EC-type examination certificate, e.g. -30 ... +105 °C / -22 ... +221 °F and table page 83 and 84		
Rated temperature range		0 ... +80 °C	32 ... +176 °F
Temperature coefficients within rated temperature range			

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Specifications	Model IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H		
■ Mean TC of zero	% of span	≤ 0.2 / 10 K (< 0.4 for pressure range ≤ 250 mbar)	
■ Mean TC of range	% of span	≤ 0.2 / 10 K	
Installation position	mbar	< 2 at +/- 30° tilted position with model IS-21-S and IS-21-F	
CE- conformitiy			
■ Pressure equipment directive		97/23/EC	
■ EMC directive		2004/108/EC, EN 61 326 Emission (Group 1, Class B) and Immunity (industrial locations)	
■ Directive ATEX of equipment intended for use in potentially explosive atmospheres		94/9/EC	
Ex-protection	ATEX	Category [8] 1G, 1/2G, 2G, 1D [9], 1/2D [9], 2D [9], M1, M2	
Ignition protection type		Ex ia I/II C T4, Ex ia I/II C T5, Ex ia I/II C T6	
	[8] **Read** the operating conditions and safety-relevant data in the **EC-type examination certificate in any cas**e (BVS 04 ATEX E 068 X)		
	[9] Not for IS-20-H		
Ex-protection	FM, CSA	Class I, II and III	
Ignition protection type		Instrinsic safe Class I, II, III Division 1,	
		Group A, B, C, D, E, F, G and Class I, Zone 0 AEx ia II C	
Approval German Lloyd GL		Environmental Category D, F, EMC 1	
RF-immunity	V/m	10	
Burst	kV	2	
Shock resistance » Model IS-2X-S	g	1000 [10] according to IEC 60068-2-27	(mechanical shock)
» Model IS-2X-F	g	600 [10] according to IEC 60068-2-27	(mechanical shock)
	[10] not with ship approval		
Vibration resistance » IS-2X-S	g	20 [11] according to IEC 60068-2-6	(vibration under resonance)
» IS-2X-F	g	10 [11] according to IEC 60068-2-6	(vibration under resonance)
	[11] with ship approval: Category H, up to 2KHz		
Wiring protection			
■ Reverse polarity protection		U+ towards U-	

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Specifications			Model IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H	
Weight	» Model IS-2X-S/F	kg	Model IS-2X-S: Approx. 0.2	Model IS-2X-F: Approx. 0.35
	» Model IS-20-H	kg	Approx. 0.3 (approx. 0.45 with version field case)	

*) In an oxygen version model IS-21 is not available. In an oxygen version model IS-20 is only available in gauge pressure ranges ≥ 0.25 bar with media temperatures between -4 … +140 °F / -20 … +60 °C and using stainless steel or Elgiloy® wetted parts.
{ } Items in curved brackets are optional extras for additional price.

When designing your plant, take into account that the stated values (e.g.burst pressure, over pressure safety) apply depending on the material, thread and sealing element used.

Functional test

The output signal must be proportional to the pressure. If not, this might point to a damage of the diaphragm. In that case refer to chapter 10 „Troubleshooting“.

Warning

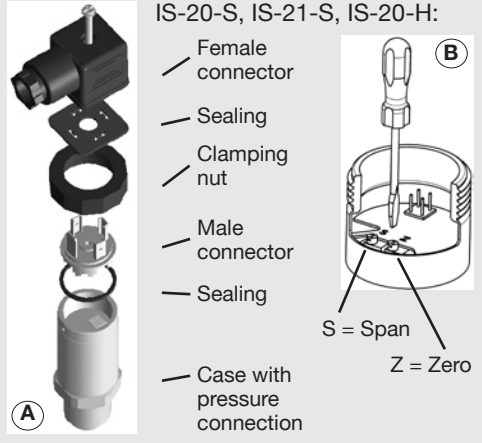
- Open pressure connections only after the system is without pressure!
- Observe the ambient and working conditions outlined in section 7 „Technical data.
- Please make sure that the pressure transmitter is only used within the over load threshold limit at all times!

Caution

When touching the pressure transmitter, keep in mind that the surfaces of the instrument components might get hot during operation.

8. Adjustment of zero point / span (only for pressure transmitter with clamping nut)

We do not recommend to adjust the span potentiometer. It is used for adjustment ex factory and should not be adjusted by you unless you have adequate calibration equipment at your disposal (at least three times more accurate than the instrument being tested).



- Make sure wires are not cut or pinche during disassembly and reassembly of the connector.
- IS-2X-S, IS-20-H: Remove the female connector. Open the pressure transmitter by deta-ching the clamping nut (see Fig. Ⓐ). Carefully remove the male connector from the case.
- IS-2X-F, IS-20-H with field case: Open the pressure transmitter by twisting off the fied case over.
- Adjust the zero point (Z) (see Fig. Ⓑ) by generating the lower limit of the pressure range.
- Adjust the span (S) by generating the higher limit of the pressure range.
- Check the zero point. ■ If the zero point is incorrect, repeat procedure as required.
- Reassemble the instrument carefully.
- Make sure all sealings and o-rings are not damaged and correctly installed to assure the rated moisture ingress protection.

Recommended recalibration cycle: 1 year

For further information (+49) 9372/132-295

9. Maintenance, accessories

- WIKA pressure transmitters require no maintenance.
- Have repairs performed by the manufacturer only.

Accessories: For details about the accessories (e. g. connectors), please refer to WIKA's price list, WIKA's product catalog on CD or or contact our sales department.

10. Trouble shooting

Warning

Open pressure connections only after the system is without pressure!

Warning

- Take precautions with regard to remaining media in removed pressure transmitters. Remaining media in the pressure port may be hazardous or toxic!
- Remove the pressure transmitter from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation.
- Have repairs performed by the manufacturer only.

Do not insert any pointed or hard objects into the pressure port for cleaning to prevent damage to the diaphragm of the pressure connection.

Please verify in advance if pressure is being applied (valves/ ball valve etc. open) and if the right voltage supply and the right type of wiring (2-wire) has been chosen?

Failure	Possible cause	Procedure
Output signal unchanged after change in pressure	Mechanical overload through over-pressure	Replace instrument; if failure reoccurs, consult the manufacturer *)
No output signal	No/incorrect voltage supply or current spike	Adjust the voltage supply to correspond with the Operating Instructions *)
	Cable break	Check connections and cable
No/False output signal	Incorrectly wired	Follow pin assignment (see Instrument Label / Operating Instructions)
Abnormal output signal	Span incorrectly adjusted	Use appropriate reference
Abnormal zero point signal	Overload limits exceeded	Ensure permissible overload limits are observed (see Operating Instructions); correct the zero point through the potentiometer *)

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Failure	Possible cause	Procedure
Abnormal zero point signal	Diaphragm is damaged, e.g. through impact, abrasive/agressive media; corrosion of diaphragm/pressure connector.	Replace instrument
Signal span dropping off/too small	Diaphragm is damaged, e.g. through impact, abrasive/agressive media; corrosion of diaphragm/pressure connector; transmission fluid missing.	Contact the manufacturer and replace the instrument
Signal span drops off	Seal/Sealing face damaged/contaminated, seal mounted incorrectly, threads crossed.	Clean the seal/sealing face, possibly replace the seal.
Signal span too small	Mechanical overload through over-pressure	Re-calibrate the instrument *)
Signal span erratic	Violent fluctuations in the process media pressure	Damping; consult with manufacturer

In case of unjustified reclamation we charge the reclamation handling expenses.

*) Make sure that after the setting the unit is working properly. In case the error continues to exist send in the instrument for reparation (or replace the unit).

If the problem persists, contact our sales department.
USA, Canada: If the problem continues, contact WIKA or an authorized agent for assistance. If the pressure transmitter must be returned obtain an RMA (return material authorization) number and shipping instructions from the place of purchase. Be sure to include detailed information about the problem. Pressure transmitters received by WIKA without a valid RMA number will not be accepted.

Process material certificate (Contamination declaration for returned goods)
Purge / clean dismounted instruments before returning them in order to protect our employees and the environment from any hazard caused by adherent remaining media.
Service of instruments can only take place safely when a Product Return Form has been submitted and fully filled-in. This Return Form contains information on all materials with which the instrument has come into contact, either through installation, test purposes, or cleaning.
You can find the Product Return Form on our internet site (www.wika.de / www.wika.com).

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11. Storage, disposal

When storing or disposing of the pressure transmitter, take precautions with regard to remaining media in removed pressure transmitters. We recommend cleaning the transmitter properly and carefully. Remaining media in the pressure port may be hazardous or toxic!

Storage

Mount the protection cap when storing the pressure transmitter in order to prevent any damage to the diaphragm (IS-21-S, IS-21-F).

Disposal

Dispose of instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the instrument is supplied.

WIKA reserves the right to alter these technical specifications.

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1. Wichtiges zu Ihrer Information

Lesen Sie diese Betriebsanleitung vor Montage und Inbetriebnahme des Druckmessgerätes. Bewahren Sie die Betriebsanleitung an einem für alle Benutzer jederzeit zugänglichen Ort auf. Die nachfolgenden Einbau- und Betriebshinweise haben wir mit Sorgfalt zusammengestellt. Es ist jedoch nicht möglich, alle erdenklichen Anwendungsfälle zu berücksichtigen. Sollten Sie Hinweise für Ihre spezielle Aufgabenstellung vermissen, können Sie hier weitere Informationen finden:

- Über unsere Internet-Adresse www.wika.de / www.wika.com
- Die Bezeichnung des zugehörigen Datenblattes ist PE 81.50, PE 81.51, PE 81.52
- Anwendungsberater: (+49) 9372/132-295

Wird die Seriennummer auf dem Typenschild und/oder der 2D-Code auf dem Sechskant unleserlich (z. B. durch mechanische Beschädigung oder Übermalen), ist eine Rückverfolgbarkeit nicht mehr möglich.
Die in der Betriebsanleitung beschriebenen WIKA-Druckmessgeräte werden nach den neuesten Erkenntnissen konstruiert und gefertigt. Alle Komponenten unterliegen während der Fertigung strengen Qualitäts- und Umweltkriterien. Unser Umweltmanagementsystem ist nach DIN EN ISO 14001 zertifiziert.

Bestimmungsgemäße Produktverwendung IS-2X-S, IS-2X-F, IS-20-H:
Verwenden Sie den eigensicheren Druckmessumformer, um in explosionsgefährdeten Bereichen Druck in ein elektrisches Signal zu wandeln.

Zulassung ATEX:
Druckmessgerät zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen (siehe beiliegende EG-Baumusterprüfbescheinigung BVS 04 ATEX E 068 X).
ATEX Zulassungseigenschaften:
für Gase und Nebel: Anbau an Zone 0; Einbau in Zone 0, Zone 1 und Zone 2
Stäube: Anbau an Zone 20; Einbau in Zone 20, Zone 21 und Zone 22 (nicht für IS-20-H).
Bergbau: Kategorie M1, M2.

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Zulassung FM/CSA:
Druckmessgerät zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen (siehe Control drawing Nr. 2323880)
FM / CSA Zulassungseigenschaften:
Intrinsically Safe mit Gerätezulassung für Class I, II und III Division 1, Gruppe A, B, C, D, E, F, G und Class I, Zone 0, AEx ia IIC.
Dust-ignitionproof für Class II und III, Division 1, Gruppe E, F und G.
Non-incendive für Class I Division 2 Gruppe A, B, C und D

Ihre erforderlichen Kenntnisse
Montieren und nehmen Sie das Druckmessgerät nur in Betrieb, wenn Sie mit den zutreffenden landesspezifischen Richtlinien vertraut sind und die entsprechende Qualifikation besitzen. Sie müssen mit den Vorschriften und Kenntnissen für explosionsgefährdete Bereiche, Mess- und Regeltechnik sowie elektrische Stromkreise vertraut sein. Je nach Einsatzbedingung müssen Sie über entsprechendes Wissen verfügen, z. B. über agressive Medien bzw. hohe Drücke.

2. Der schnelle Überblick für Sie

Wollen Sie sich einen schnellen Überblick verschaffen, **lesen Sie Kapitel 3, 5, 7 und 11**. Dort erhalten Sie kurze Hinweise zu Ihrer Sicherheit und wichtige Informationen über Ihr Produkt und zur Inbetriebnahme. **Lesen Sie diese unbedingt.**

3. Zeichenerklärungen, Abkürzungen

Warnung	Mögliche Gefahr für Ihr Leben oder schwerer Verletzungen.	Warnung	Mögliche Gefahr für Ihr Leben oder schwerer Verletzungen durch wegschleudernde Teile.
Warnung	Ex-Hinweise: Mögliche Gefahr für Ihr Leben oder schwerer Verletzungen.	Vorsicht	Mögliche Gefahr von Verbrennungen durch heisse Oberflächen.
	Hinweis, wichtige Information, Funktionsstörung.	CE	Das Produkt stimmt mit den zutreffenden europäischen Richtlinien überein.

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ATEX Europäische Explosionsschutz-Richtlinie (Atmosphère=AT, Explosible=EX)
Das Produkt stimmt überein mit den Anforderungen der europäischen Richtlinie 94/9/EG (ATEX) zum Explosionsschutz.

FM
Factory Mutual
Das Produkt wurde von FM Approvals geprüft und zertifiziert. Es stimmt überein mit den anwendbaren US-amerikanischen Normen zur Sicherheit (einschließlich Explosionsschutz).

CSA
Canadian Standard Association
Das Produkt wurde durch CSA International geprüft und zertifiziert. Es stimmt überein mit den anwendbaren kanadischen und US-amerikanischen Normen zur Sicherheit (einschließlich Explosionsschutz).

GL, Germanischer Lloyd
Das Produkt wurde von GL geprüft und zertifiziert.
Es stimmt überein mit den Anforderungen des GL Type Approval Systems.

2-Leiter Zwei Anschlussleitungen dienen zur Spannungsversorgung.
Der Speisestrom ist das Mess-Signal.
U+ Positiver Versorgungsanschluss
U- Negativer Versorgungsanschluss

4. Funktion

IS-2**0**: Druckanschluss (eigensicher) mit innenliegender Membran (Standardausführung)
IS-2**1**: Druckanschluss (eigensicher) mit frontbündiger Membrane für hochviskose oder kristallisierende Medien, die die Bohrung des Druckanschlusses zusetzen können.
IS-2X-**S**: Druckmessgerät (eigensicher) Ausführung mit Stecker- bzw. Kabelanschluss
IS-2X-**F**: Druckmessgerät (eigensicher) Ausführung Feldgehäuse
IS-20-**H**: Druckmessgerät (eigensicher) Ausführung Höchstdruck

Funktion: Mittels Sensorelement und unter Zuführung von Hilfsenergie wird über die Verformung einer Membran der anstehende Druck in Ihrer Anwendung in ein verstärktes standardisiertes elektrisches Signal umgewandelt. Dieses elektrische Signal verändert sich proportional zum Druck und kann entsprechend ausgewertet werden.

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5. Zu Ihrer Sicherheit

Warnung

- Wählen Sie das richtige Druckmessgerät hinsichtlich Messbereich, Ausführung und spezifischen Messbedingungen vor Montage oder Inbetriebnahme.
- Halten Sie die entsprechenden landesspezifischen Vorschriften ein (z. B.: IEC 60079-14, NEC, CEC) und beachten Sie bei speziellen Anwendungen die geltenden Normen und Richtlinien (z. B. bei gefährlichen Messstoffen wie Acetylen, brennbaren oder giftigen Stoffen sowie bei Kälteanlagen und Kompressoren).
  Wenn Sie die entsprechenden Vorschriften nicht beachten, können schwere Körperverletzungen und Sachschäden entstehen!
- **Öffnen Sie Anschlüsse nur im drucklosen Zustand!**
- Betreiben Sie das Druckmessgerät immer innerhalb des Überlastgrenzbereiches!
- Beachten Sie die Betriebsparameter gemäß Punkt 7 „Technische Daten“.
- Stellen Sie sicher, dass das Druckmessgerät nur bestimmungsgemäß -also wie in der folgenden Anleitung beschrieben- betrieben wird.
- Unterlassen Sie unzulässige Eingriffe und Änderungen am Druckmessgerät, welche nicht in dieser Betriebsanleitung beschrieben sind.
- Setzen Sie das Druckmessgerät außer Betrieb und schützen Sie es gegen versehentliche Inbetriebnahme, wenn Sie Störungen nicht beseitigen können.
- **Ergreifen Sie Vorsichtsmaßnahmen für Messstoffreste in ausgebauten Druckmessgeräten. Messstoffreste können zur Gefährdung von Menschen, Umwelt und Einrichtung führen!**
- Lassen Sie Reparaturen nur vom Hersteller durchführen

Angaben zu Korrosions- bzw. Diffusionsbeständigkeit der Gerätewerkstoffe entnehmen Sie bitte unserem WIKA-Handbuch zur Druck- und Temperaturmesstechnik.

Warnung

Beachten Sie die Angaben der geltenden Baumusterprüfbescheinigung sowie die jeweiligen landesspezifischen Vorschriften zur Installation und Einsatz in explosionsgefährdeten Bereichen (z.B.: IEC 60079-14, NEC, CEC). Wenn Sie diese nicht beachten, können schwere Körperverletzungen und Sachschäden entstehen.

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6. Verpackung

Wurde alles geliefert?

Überprüfen Sie den Lieferumfang:

- Komplett montierte Druckmessgeräte; bei frontbündiger Ausführung IS-21-S, -F mit vormontierten Dichtungen und Schutzkappe.
- Baumusterprüfbescheinigung und Control Drawing (FM, CSA).

- Untersuchen Sie das Druckmessgerät auf eventuell entstandene Transportschäden. Sind offensichtlich Schäden vorhanden, teilen Sie dies dem Transportunternehmen und WIKA unverzüglich mit.
- Bewahren Sie die Verpackung auf, denn diese bietet bei einem Transport einen optimalen Schutz (z. B. wechselnder Einbauort, Reparatursendung).
- Achten sie darauf, dass das Druckanschluss-Gewinde und die Anschlusskontakte nicht beschädigt werden.

Zum Schutz der Membran ist der Druckanschluss des Gerätes IS-21-S, -F mit einer speziellen Schutzkappe versehen.

- Entfernen Sie diese Schutzkappe erst kurz vor dem Einbau, damit die Membran bzw. das Druckanschluss-Gewinde nicht beschädigt wird.
- Bewahren Sie die Schutzkappe des Druckanschluss-Gewindes und der Membran zur späteren Lagerung oder Transport auf.
- Montieren Sie die Schutzkappe bei Ausbau und Transport des Gerätes.

7. Inbetriebnahme, Betrieb

Benötigtes Werkzeug: Maulschlüssel SW 27 oder SW 41, Schraubendreher

Membran-Prüfung zu Ihrer Sicherheit

Es ist erforderlich, dass Sie vor Inbetriebnahme des Druckmessgerätes die Membran optisch prüfen, denn sie ist ein **sicherheitsrelevantes Teil**.

Warnung

- Achten Sie auf auslaufende Flüssigkeit, denn sie ist ein Hinweis auf eine Membranbeschädigung (nicht nötig bei IS-20-H).
- Prüfen Sie die Membran optisch auf Beschädigung (IS-21-S, -F).
- Setzen Sie das Druckmessgerät nur ein, wenn die Membran unbeschädigt ist.
- Setzen Sie das Druckmessgerät nur in sicherheitstechnisch einwandfreiem Zustand ein.

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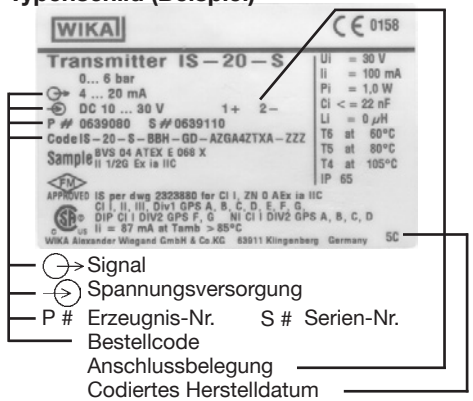
Montage mechanischer Anschluss

Es gilt grundsätzlich die Seriennummer auf dem Typenschild. Befindet sich keine Seriennummer auf dem Typenschild, so gilt die Nummer auf dem Sechskant.

Typenschild (Beispiel)



- Entfernen Sie die Schutzkappe erst kurz vor dem Einbau und achten Sie unbedingt darauf, dass die Membran auch während des Einbaus nicht beschädigt wird (IS-21-S, -F).
- Bei Typ IS-20-S, -F müssen Sie eine Dichtung vorsehen; Ausnahme sind Geräte mit selbst dichtendem Gewinde (z. B. NPT-Gewinde).
  Bei Typ IS-21-S, -F ist der Dichtring im Lieferumfang enthalten.
- Hinweise zu Dichtungen entnehmen Sie bitte unserer Information “Zubehör Dichtungen AC 09.08” im Gesamtkatalog Druck- und Temperaturmesstechnik oder unserer Internet-Seite unter www.wika.de.
- Achten Sie bei der Montage auf saubere und unbeschädigte Dichtflächen am Gerät und Messstelle.
- Schrauben Sie das Gerät nur über die Schlüsselflächen mit einem geeigneten Werkzeug und dem vorgeschriebenen Drehmoment ein bzw. aus. Das richtige Drehmoment ist abhängig von der Dimension des Druckanschlusses sowie der verwendeten Dichtung (Form/Werkstoff). Verwenden Sie zum Ein- bzw. Ausschrauben nicht das Gehäuse als Angriffsfläche.

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- Beachten Sie beim Einschrauben, dass die Gewindegänge nicht verkantet werden.
- Angaben zu Einschraublöchern und Einschweißstutzen entnehmen Sie bitte unserer Technischen Information IN 00.14 unter www.wika.de

Warnung

- Schützen Sie die Membran vor Kontakt mit abrasiven Medien und gegen Schläge. Wenn Sie die Membran beschädigen, ist kein Explosionsschutz gewährleistet (ATEX, FM, CSA)!
- Sorgen Sie in Staub-Ex-Bereichen für eine geschützte Anordnung des Druckmessgerätes und schützen Sie es vor Schlägen.
- Beachten Sie die Technischen Daten zur Verwendung des Druckmessgerätes in Verbindung mit agressiven/korrosiven Medien und zur Vermeidung von mechanischen Gefährdungen.

Ein- und Anbau an Zone 0 und Zone 20 (Zone 20 nicht bei IS-20-H)
(Zone 0 bedeutet, dass explosionsfähiges Gasgemisch >1000 Stunden pro Jahr am Druckmessgerät vorliegt).

Warnung

- Bauen Sie das Druckmessgerät oder die Kabeldurchführung so in die Wand von Bereichen, die Kategorie 1G Betriebsmittel erfordern, dass die Schutzart IP 67 gemäß IEC 60 529 gewährleistet ist.
- Bauen Sie das Druckmessgerät oder die Kabeldurchführung so in die Wand von Bereichen, die Kategorie 1D Betriebsmittel erfordern, dass die Schutzart IP 6X gemäß IEC 60 529 gewährleistet ist.

Die Messung von Prozessmedien mit höheren Temperaturen als der in den Tabellen der EG-Baumusterprüfbescheinigung unter Punkt 15.1.2 beschriebenen Medientemperaturbereichen ist mit speziellen Kühlstrecken zulässig (nicht für IS-20-H).

Warnung

- Halten Sie die zulässigen Oberflächentemperaturen ein, die für diesen Bereich auf Grund der festgelegten Temperaturklassen gelten.
- Halten Sie den maximalen Temperaturwert (des unter Punkt 15.1.2 in der EG-Baumusterprüfbescheinigung festgelegten Temperaturbereichs) am Sechskant des rohrförmigen Gehäuses ein.

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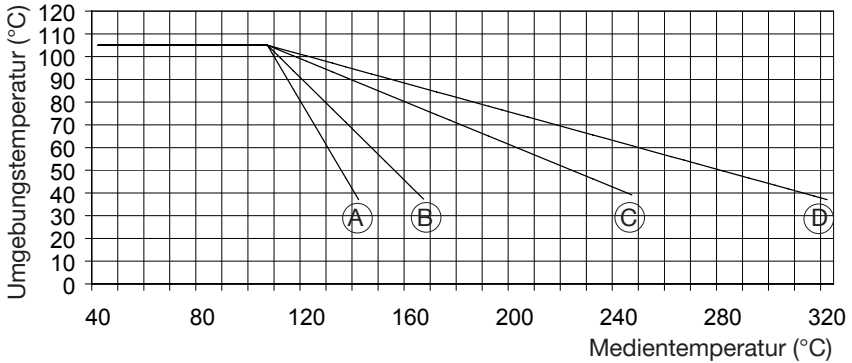
Warnung

- Stellen Sie durch waagrechte Montage eine ungehinderte Luftzirkulation am Kühlelement sicher.
- Schützen Sie das Gerät vor Berührungen oder bringen Sie einen Warnhinweis an.
- Isolieren Sie Wärmequellen thermisch gegenüber dem Druckmessumformer (z.B. Rohre oder Tanks).
- Stellen Sie insbesondere im Staub-Ex-Bereich sicher, dass die Kühlstrecken nicht verschmutzen und sich kein Staub auf ihnen ablagert, da sonst die Kühlwirkung nicht sichergestellt ist.

Bezug Mediumstemperatur zu Umgebungstemperatur



Typ	IS-20-H	IS-2X-S /-F		
Ausführ.	(A)	(B)	(C)	(D)
Kühlrippen	-	2	3	5
Konstante K	0,34	0,47	0,68	0,76

Berechnung der Kühlstrecke:

$T_B = T_{med} - (T_{med} - T_{amb}) \times K$

T_B = Betriebstemperatur Messumformer
T_{med} = max. Temperatur Prozessmedium
T_{amb} = max. Temperatur Umgebung
K = Kühlstrecken-Konstante

Max. zulässige Umgebungstemperatur:

$T_{amb} = T_{med} + (T_B - T_{med}) / K$

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Montage elektrischer Anschluss

Warnung

Erden Sie das Gehäuse über den Prozessanschluss gegen elektromagnetische Felder und elektrostatische Aufladungen.

Warnung

- Erden Sie den Kabelschirm einseitig und bevorzugt im sicheren, also Nicht-Ex-Bereich (EN 60079-14). Bei Geräten mit Kabelausgang ist der Schirm mit dem Gehäuse verbunden. Der gleichzeitige Anschluss von Gehäuse und Kabelschirm an Erde ist nur dann zulässig, wenn eine Potentialverschleppung zwischen Schirmanschluss (z.B. am Speisegerät) und Gehäuse ausgeschlossen werden kann (siehe EN 60079-14).
- Versorgen Sie den Druckmessumformer aus einem eigensicheren Stromkreis (Ex ia).
- Beachten Sie die innere wirksame Kapazität und Induktivität.
- Versehen Sie feindrahtige Leiterenden mit Aderendhülsen (Kabelkonfektionierung).
- Der Bajonett-Rundsteckverbinder ist aus Leichtmetall-Werkstoff, welcher nicht für Gruppe I-Anwendungen (Bergbau) zugelassen ist.
- Beachten Sie, dass bei Kabeln für den Einsatz in **Zone 1 und 2** die Prüfspannung Leiter/Erde, Leiter/Schirm, Schirm/Erde > 500V Wechselspannung betragen muss.

- Betreiben Sie den Druckmessumformer mit geschirmter Leitung und erden Sie den Schirm auf mindestens einer Leitungsseite, wenn die Leitungen länger als 30m sind oder das Gebäude verlassen.
- Schutzart IP nach IEC 60 529 (Die angegebenen Schutzarten gelten nur im gesteckten Zustand mit Leitungsteckern (Buchsen) entsprechender Schutzart).
- Wählen Sie den Kabeldurchmesser passend zur Kabeldurchführung des Steckers. Achten Sie darauf, dass die Kabelverschraubung des montierten Steckers korrekt sitzt und dass die Dichtungen vorhanden und nicht beschädigt sind. Ziehen Sie die Verschraubung fest und überprüfen Sie den korrekten Sitz der Dichtungen, um die Schutzart zu gewährleisten.
- Stellen Sie bei Kabelausgängen sicher, dass am Ende des Kabels keine Feuchtigkeit eintritt.

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Mit einem Speisetrenner realisieren Sie die zwingend nötige galvanische Trennung der Spannungs- und Stromversorgung zwischen Ex- und Nicht-Ex-Bereich und stellen die sicherheitstechnischen Anschlussdaten sicher.

Elektrische Anschlüsse

	Winkeldose DIN 175301-803 A	Rundsteckverbinder M12x1, 4-polig	Kabelausgang, 1,5 m
			
2-Leiter	U+ = 1 | 0V = 2	U+ = 1 | 0V = 3	U+ = braun | U- = grün
Kabelschirm			PUR-Kabel: grau FEP-Kabel: verdrillt und verzinnt
Aderquerschnitt	bis max. 1,5 mm²	-	0,5 mm² (AWG 20)
Kabeldurchmesser	6-8 mm Schiffszulassung: 10-14 mm	-	6,8 mm (Code DL und EM) 7,5 mm (Code DM)
Schutzart nach IEC 60 529	IP 65	IP 67	IP 67 - Bestellcode: DL IP 68 ohne Zugang zu Nullpunkt und Spanne-Potentiometer - Bestellcode: EM oder DM
	Die angegebenen Schutzarten gelten nur im gesteckten Zustand mit Leitungssteckern entsprechender Schutzart.		

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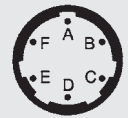
Elektrische Anschlüsse

	Bajonett-Rundsteckverbinder, 6-polig	Feldgehäuse (innenliegende Federklemmen)
		
2-Leiter	U+ = A | U- = B	U+ = 1 | U- = 2 | Test+ = 3 | Test- = 4 | Schirm = 5
Schutzart nach IEC 60 529	IP 65 (NEMA 4)	IP 67
	Die angegebenen Schutzarten gelten nur im gesteckten Zustand mit Leitungssteckern entsprechender Schutzart.	

Typen IS-2X-F, IS-20-H mit Feldgehäuse

Kabelanschluss im Federklemmblock

- Konfektionieren Sie die abgemantelten Aderenden mit Aderendhülsen.
- Schrauben Sie den Gehäusedeckel auf.
- Lösen Sie mit einem Maulschlüssel SW24 die Kabelverschraubung.
- Führen Sie das Kabel durch die Kabelverschraubung in den geöffneten Gehäusekopf.
- Drücken Sie den entsprechenden Kunststoffhebel am Federklemmblock mit einem Schraubendreher herunter, damit sich der Klemmkontakt öffnet.
- Führen Sie das konfektionierte Kabelende in die Öffnung ein und lassen den Kunststoffhebel los, so dass das Kabelende im Federklemmblock eingeklemmt wird.
- Nach Anschließen der einzelnen Adern ziehen Sie die Kabelverschraubung fest und verschrauben den Gehäusedeckel.

Funktion des Testkreises für 2-Leiter

Anhand des Testkreises ist es möglich, während des normalen Betriebes eine Strommessung durchzuführen ohne das Gerät abzuklemmen. Sie müssen hierzu ein Amperemeter (für Ex-Anwendungen; Innenwiderstand < 15 Ohm) an die Klemmen Test +/- anschließen.

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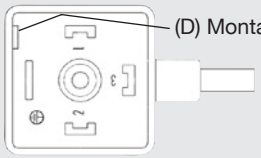
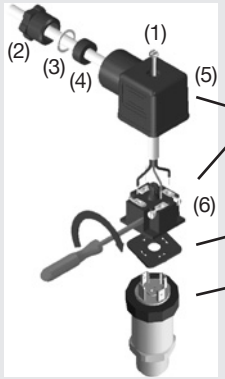
Montage des Winkelsteckverbinder nach DIN EN 175301-803





1. Lösen Sie die Schraube (1).
2. Lösen Sie die Kabelverschraubung (2).
3. Ziehen Sie Winkelgehäuse (5) mit Klemmblock (6) vom Gerät ab.
4. Hebeln Sie mit dem Schraubendreher in die Montageöffnung (D), so dass Sie den Klemmblock (6) aus dem Winkelgehäuse (5) herausdrücken. Drücken Sie nicht den Klemmblock (6) durch die Schraubenöffnung (1) bzw. Kabelverschraubung (2) heraus, sonst beschädigen Sie die Dichtungen des Winkelgehäuses.
5. Wählen Sie den Leitungsaußendurchmesser passend zur Kabeldurchführung des Winkel gehäuses. Schieben Sie das Kabel durch Kabelverschraubung (2), Ring (3), Dichtung (4) und Winkelgehäuse (5).
6. Schließen Sie die Kabelenden entsprechend der Belegungszeichnung in den Anschluß klemmen des Klemmblocks (6) an.
7. Drücken Sie das Winkelgehäuse (5) auf den Klemmblock (6).
8. Verschrauben Sie das Kabel mit der Kabelverschraubung (2). Achten Sie darauf, dass die Dichtungen unbeschädigt sind und Kabelverschraubung und Dichtungen korrekt sitzen, um die Schutzart zu gewährleisten.
9. Legen Sie die quadratische Flachdichtung über die Anschlußpins im Gehäuse.
10. Schieben Sie den Klemmblock (6) auf die Anschlußpins im Gehäuse.
11. Verschrauben Sie mit der Schraube (1) das Winkelgehäuse (5) mit dem Klemmblock (6) im Gerät.

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Technische Daten	Typ IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H												
Messbereich *)	IS-2X-S, IS-2X-F	bar	0,1	0,16	0,25	0,4	0,6	1	1,6	2,5	4	6	10	16
Überlastgrenze	IS-2X-S, IS-2X-F	bar	1	1,5	2	2	4	5	10	10	17	35	35	80
Berstdruck	IS-2X-S, IS-2X-F	bar	2	2	2,4	2,4	4,8	6	12	12	20,5	42	42	96
Messbereich *)	IS-2X-S, IS-2X-F	bar	25	40	60	100	160	250	400		600		1000 [1]	
Überlastgrenze	IS-2X-S, IS-2X-F	bar	50	80	120	200	320	500	800		1200		1500	
Berstdruck	IS-2X-S, IS-2X-F	bar	96	400	550	800	1000	1200	1700 [2]		2400 [2]		3000	
		Druckbereiche für IS-20-H siehe Zusatz-Betriebsanleitung 11126418 Höchstdruck.												
		{Unterdruck, Überdruck, +/- , sowie Absolutdruck erhältlich}												
		[1] Nur für Typ IS-20-S, IS-20-F gültig.												
		[2] Bei Typ IS-21-S, IS-21-F: Der Tabellenwert gilt ausschließlich bei Abdichtung mittels Dichtring unterhalb vom Sechskant. Andernfalls gilt max. 1500 bar.												
Werkstoff														
■ Messstoffberührte Teile														
» Typ IS-20-S, IS-20-F, IS-20-H *)			CrNi-Stahl											
» Typ IS-21-S, IS-21-F			CrNi-Stahl											
			O-Ring: NBR {FPM/FKM oder EPDM}											
■ Gehäuse			CrNi-Stahl											
Interne Übertragungsflüssigkeit [3]			Synthetisches Öl {Halocarbonöl für Sauerstoff-Ausführungen}											
		[3] Nicht vorhanden bei Typ IS-20-S, IS-20-F für Messbereiche > 25 bar und IS-20-H.												
Hilfsenergie U+		DC V												
» Typen IS-2X-S, IS-20-H			10 ... 30											
» Typen IS-2X-F, IS-20-H mit Feldgehäuse			11 ... 30											
Ausgangssignal und zulässige			4 ... 20 mA, 2-Leiter											
max. ohmsche Bürde R_A		R_A in Ohm												
» Typen IS-2X-S, IS-20-H			$R_A \leq (U+ - 10\,V) / 0{,}02\,A$ - (Länge der Kabelausführung in m x 0,14 Ohm)											
» Typen IS-2X-F, IS-20-H mit Feldgehäuse			$R_A \leq (U+ - 11\,V) / 0{,}02\,A$											
Testkreissignal und zulässige Bürde			RA ≤ 15 (nur bei Typen IS-2X-F, IS-20-H mit Feldgehäuse)											

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Technische Daten		Typ IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H
Einstellbarkeit Nullpunkt/Spanne	%	± 5 durch Potentiometer im Gerät
Einstellzeit (10 … 90 %)	ms	≤ 1 [4]
	[4] Einstellzeit bei IS-20-S/-F: ≤ 10 bei Messstofftemp. < -30 °C für Messbereiche bis 25 bar. Einstellzeit bei IS-21-S/-F: ≤ 10 bei Messstofftemp. < -30 °C.	
Leistung P_i	W	1 (750 mW mit Zulassung für Kategorie 1D)
Isolationsspannung		Isolierung entspricht EN 60079-11
Genauigkeit	% d. Spanne	≤ 0,5 [6] {0,25} [5] [6]
	[5] Genauigkeit { } für Messbereiche ≥ 0,25 bar. Nicht möglich bei IS-20-H.	
	[6] Einschließlich Nichtlinearität, Hysterese, Nullpunkt- und Endwertabweichung (entspricht Messabweichung nach IEC 61298-2). Kalibriert bei senkrechter Einbaulage Druckanschluss nach unten.	
Nichtlinearität	% d. Spanne	≤ 0,2 (BFSL) nach IEC 61298-2
Nichtwiederholbarkeit	% d. Spanne	≤ 0,1
Stabilität pro Jahr	% d. Spanne	≤ 0,2 (bei Referenzbedingungen)
Zulässige Temperaturbereiche		
■ Messstoff [8] [7]	°C	-20 … +80 [7] (Erweiterte Temperaturbereiche siehe unter Punkt 7. Inbetriebnahme, Betrieb: “Bezug Medientemperatur zu Umgebungstemperatur“) [7]
■ Umgebung [8]	°C	-20 ... +80 [7]
■ Lagerung	°C	-30 ... +105
	[7] Weitere Temperaturbereiche in Abhängigkeit der elektrischen Anschlüsse, siehe EG-Baumusterprüfbescheinigung, z.B. -30 ... +105 °C und Tabelle Seite 83 + 84	
Nenntemperaturbereich	°C	0 ... +80
Temperaturkoeffizienten im Nenntemperaturbereich		
■ Mittlerer TK des Nullpunktes	% d. Spanne	≤ 0,2 / 10 K (< 0,4 für Messbereiche ≤ 250 mbar)
■ Mittlerer TK der Spanne	% d. Spanne	≤ 0,2 / 10 K
Einbaulage	mbar	< 2 bei +/- 30° Schräglage bei Typ IS-21-S/-F mit Schiffszulassung
CE- Kennzeichen		
■ Druckgeräterichtlinie		97/23/EG

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Technische Daten		Typ IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H	
■ EMV-Richtlinie		2004/108/EG, EN 61326 Emission (Gruppe 1, Klasse B) und Störfestigkeit (industrieller Bereich)	
■ ATEX-Richtlinie für Geräte zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen		94/9/EG	
Ex - Schutz	ATEX	Kategorie [8] 1G, 1/2G , 2G, 1D [9], 1/2D [9], 2D [9], M1, M2	
Zündschutzart		Ex ia I/II C T4, Ex ia I/II C T5, Ex ia I/II C T6	
	[8] **Lesen Sie unbedingt** die Einsatzbedingungen und sicherheitstechnischen Daten in der **EG Baumusterprüfbescheinigung** nach (BVS 04 ATEX E068 X).		
	[9] Nicht für IS-20-H.		
Ex - Schutz	FM, CSA	Class I, II und III	
		Eigensicher Class I, II, II Division 1,	
		Groups A, B, C, D, E, F, G und Class I, Zone 0 AEx ia II C	
Zulassung German Lloyd GL		Environmental Category D, F, EMC 1	
HF-Immunität	V/m	10	
Burst	kV	2	
Schockbelastbarkeit » Typ IS-2X-S	g	1000 [10] nach IEC 60068-2-27	(Schock mechanisch)
» Typ IS-2X-F	g	600 [10] nach IEC 60068-2-27	(Schock mechanisch)
	[10] nicht gültig mit Schiffszulassung		
Vibrationsbelastbarkeit » IS-2X-S	g	20 [11] nach IEC 60068-2-6	(Vibration bei Resonanz)
» IS-2X-F	g	10 [11] nach IEC 60068-2-6	(Vibration bei Resonanz)
	[11] bei Schiffbau: Category H, bis 2KHz		
Elektrische Schutzarten			
■ Verpolschutz		U+ gegen U-	
Gewicht » Typ IS-2X-S	kg	Ca. 0,2	
» Typ IS-2X-F	kg	Ca. 0,35	
» Typ IS-20-H	kg	Ca. 0,3 (ca. 0,45 in Ausführung Feldgehäuse)	

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*) In Sauerstoff-Ausführung ist Typ IS-21 nicht erhältlich. In Sauerstoff-Ausführung ist Typ IS-20 nur möglich mit Überdruck-Messbereich ≥ 0,25 bar, Messstofftemperatur -20 … +60 °C und messstoffberührte Teile in CrNi-Stahl oder Elgiloy®.

{ } Angaben in geschweiften Klammern beschreiben gegen Mehrpreis lieferbare Sonderheiten.

Beachten Sie bei der Auslegung Ihrer Anlage, dass die angegebenen Werte (z. B. Berstdruck, Überlastgrenze) in Abhängigkeit vom verwendeten Material, Gewinde und Dichtung gelten.

Funktionsprüfung

Das Ausgangssignal muss sich dem anstehenden Druck proportional verhalten. Wenn dies nicht so ist, kann das ein Hinweis auf eine Beschädigung der Membran sein. Lesen Sie in diesem Fall in Kapitel 10 „Störbeseitigung“ nach.

Warnung

- Öffnen Sie Anschlüsse nur im drucklosen Zustand!
- Beachten Sie die Betriebsparameter gemäß Punkt 7„Technische Daten“.
- Betreiben Sie das Druckmessgerät immer innerhalb des Überlastgrenzbereichs!

Vorsicht

Beachten Sie beim Berühren des Druckmessgerätes, dass die Oberflächen der Gerätekomponenten während des Betriebes heiß werden können.

8. Einstellung Nullpunkt / Spanne (nur bei Geräten mit Griffring)

Wir empfehlen Ihnen, das Spannepotentiometer nicht zu verstellen. Es dient zur werkseitigen Justage und sollte nur von Ihnen verstellt werden, wenn Sie über die ausreichende Kalibrierausstattung (mindestens 3x genauer als die angegebene Genauigkeit) verfügen.

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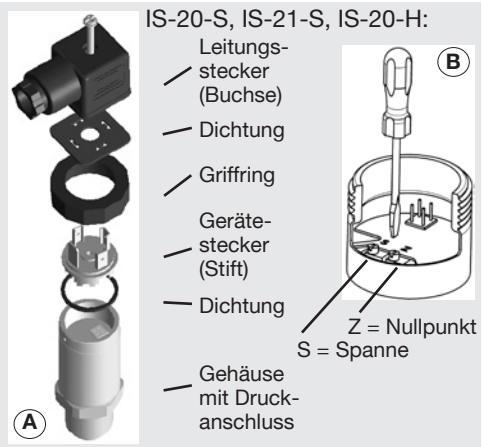

- Achten Sie bei der Steckerdemontage /- montage darauf, dass keine Litzen abgerissen bzw. eingequetscht werden.
- IS-2X-S, IS-20-H: Ziehen Sie den Leitungstecker (Buchse) ab. Öffnen Sie das Druckmessgerät, indem Sie den Griffring lösen (siehe Abbildung Ⓐ). Ziehen Sie vorsichtig den Gerätestecker(Stift) aus dem Gehäuse.
- IS-2X-F, IS-20-H mit Feldgehäuse: Öffnen Sie das Druckmessgerät, indem Sie den Deckel des Feldgehäuse aufschrauben.
- Stellen Sie den Nullpunkt (Z) ein (siehe Abbildung Ⓑ), indem Sie den Druckanfangswert anfahren.
- Stellen Sie die Spanne (S) ein, indem Sie den Druckendwert anfahren.
- Überprüfen Sie den Nullpunkt.■Wenn der Nullpunkt nicht stimmt ggf. Prozedur wiederholen.
- Schließen Sie das Druckmessgerät wieder sorgfältig. Achten Sie darauf, dass die Dichtungen unbeschädigt und sauber sind und auf die korrekte Lage der Dichtungen, um die Schutzart zu gewährleisten.

Empfohlener Nachkalibrier-Zyklus: 1 Jahr

Bei Rückfragen (+49) 9372/132-295

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9. Wartung, Zubehör

- WIKA Druckmessgeräte sind wartungsfrei.
- Lassen Sie Reparaturen nur vom Hersteller durchführen.

Zubehör

Entnehmen Sie bitte Zubehörangaben (z. B. Stecker) unserer aktuellen Standardpreisliste, dem CD-Katalog oder setzen Sie sich mit unserem Vertriebsmitarbeiter in Verbindung.

10. Störbeseitigung

Warnung

Öffnen Sie Anschlüsse nur im drucklosen Zustand!

Warnung

- Ergreifen Sie Vorsichtsmaßnahmen für Messstoffreste in ausgebauten Druckmessgeräten. Messstoffreste können zur Gefährdung von Menschen, Umwelt und Einrichtung führen!
- Setzen Sie das Druckmessgerät außer Betrieb und schützen Sie es gegen versehentliche Inbetriebnahme, wenn Sie Störungen nicht beseitigen können.
- Lassen Sie Reparaturen nur vom Hersteller durchführen.

Verwenden Sie keine spitzen bzw. harten Gegenstände zur Reinigung, denn die Membran des Druckanschlusses darf nicht beschädigt werden.

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Prüfen Sie bitte vorab, ob Druck ansteht (Ventile/Kugelhahn usw. offen) und ob Sie die richtige Spannungsversorgung und die richtige Verdrahtungsart (2-Leiter) gewählt haben.

Störung	Mögliche Ursache	Maßnahme
Gleichbleibendes Ausgangssignal bei Druckänderung	Mechanische Überlastung durch Überdruck	Gerät austauschen; bei wiederholtem Ausfall Rücksprache mit Hersteller *)
	Falsche Versorgungsspannung oder Stromstoß	Gerät austauschen
Kein Ausgangssignal	Keine/Falsche Versorgungsspannung oder Stromstoß	Versorgungsspannung gemäß Betriebsanleitung korrigieren *)
	Leitungsbruch	Durchgang überprüfen
Kein/Falsches Ausgangssignal	Verdrahtungsfehler	Verdrahtungsfehler (z. B. 2-Leiter als 3-Leiter verdrahtet)
Abweichendes Ausgangssignal	Bei Justage Spanne verstellt	Geeignete Referenz benutzen
Abweichendes Nullpunkt-Signal	Überlastgrenze überschritten	Zulässige Überlastgrenze einhalten (siehe Betriebsanleitung); Nullpunkt mittels Potentiometer korrigieren; *)
	Membranbeschädigung, z. B. durch Schläge, abrasives/agressives Medium; Korrosion an Membran/Druckanschluss	Gerät austauschen
Signalspanne fällt/ab/zu klein	Membranbeschädigung, z. B. durch Schläge, abrasives/agressives Medium; Korrosion an Membran/Druckanschluss; Übertragungsmedium fehlt	Hersteller kontaktieren und Gerät austauschen
Signalspanne fällt ab	Dichtung/Dichtfläche beschädigt/ verschmutzt, Dichtung sitzt unkorrekt, Gewindegänge verkantet	Dichtung/-Fläche säubern, evtl. Dichtung austauschen
Signalspanne zu klein	Mechanische Überlastung durch Überdruck	Gerät neu kalibrieren *)
	Versorgungsspannung zu hoch/niedrig	Versorgungsspannung gemäß Betriebsanleitung korrigieren
Signalspanne schwankend	Stark schwankender Druck des Prozessmediums	Dämpfung; Beratung durch Hersteller

Im unberechtigtem Reklamationsfall berechnen wir die Reklamationsbearbeitungs-Kosten.

*) Überprüfen Sie nach dem Justieren die korrekte Arbeitsweise des Systems. Besteht der Fehler weiterhin, senden Sie das Gerät zur Reparatur ein (oder tauschen Sie das Gerät aus).

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Wenn das Problem bestehen bleibt, setzen Sie sich mit unserem Vertriebsmitarbeiter in Verbindung.

Prozess Material Zertifikat (Kontaminationserklärung im Servicefall)
Spülen bzw. säubern Sie ausgebaute Geräte vor der Rücksendung, um unsere Mitarbeiter und die Umwelt vor Gefährdung durch anhaftende Messstoffreste zu schützen.
Eine Überprüfung ausgefallener Geräte kann nur sicher erfolgen, wenn das vollständig ausgefüllte Rücksendeformular vorliegt. Eine solche Erklärung beinhaltet alle Materialien, welche mit dem Gerät in Berührung kamen, auch solche, die zu Testzwecken, zum Betrieb oder zur Reinigung eingesetzt wurden. Das Rücksendeformular ist über unsere Internet-Adresse (www.wika.de / www.wika.com) verfügbar.

11. Lagerung, Entsorgung

Warnung

Ergreifen Sie bei Lagerung und Entsorgung Vorsichtsmaßnahmen für Messstoffreste in ausgebauten Druckmessgeräten. Wir empfehlen eine geeignete und sorgfältige Reinigung. Messstoffreste können zur Gefährdung von Menschen, Umwelt und Einrichtung führen!

Lagerung

Montieren Sie die Schutzkappe bei Lagerung des Druckmessgerätes, damit die Membran nicht beschädigt wird (IS-21-S, -F).

Entsorgung

Entsorgen Sie Gerätekomponenten und Verpackungsmaterialien entsprechend den einschlägigen landesspezifischen Abfallbehandlungs- und Entsorgungsvorschriften des Anliefergebietes.

Technische Änderungen vorbehalten.

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1. Informations importantes

Veuillez lire ce mode d'emploi avant le montage et la mise en service de transmetteur de pression. Conservez ce mode d'emploi dans un endroit accessible en tout temps pour tous les utilisateurs. Les instructions de montage et de service présentées ci-après ont été établi avec grand soin. Il reste toutefois impossible d'envisager tous les cas d'applications possibles. Dans le cas où vous constateriez des lacunes dans ces instructions pour les tâches spéciales qu'il vous faut exécuter, vous avez la possibilité de recevoir des compléments d'informations:

- Sous notre adresse internet www.wika.de / www.wika.com
- La fiche technique de ce produit a la désignation PE 81.50, PE 81.51, PE 81.52.
- Par contact direct avec notre conseiller applications (+49) 9372/132-295

Si le numéro de série sur la plaque de fabrication et/ou la codification 2D sur l'hexagone du raccord n'est (ne sont) plus lisible (s) (par exemple par endommagement mécanique ou si le numéro est recouvert de peinture), la traçabilité n'est plus assurée.
La conception et la fabrication des transmetteurs de mesure WIKA, tels que décrits dans les instructions de service, satisfont aux toutes dernières règles de l'art. Tous les composants sont soumis à un contrôle strict des critères de qualité et d'environnement en cours de fabrication. Notre système de gestion de l'environnement est certifié selon DIN EN ISO 14001.

Définition conforme d'utilisation du produit IS-2X-S, IS-2X-F, IS-20-H
Utilisez le transmetteur de pression à sécurité intrinsèque afin de transformer le signal de pression en signal électrique dans les zones sous danger d'explosion.

Homologation ATEX:
Ces transmetteurs de pression sont certifiés pour utilisation dans un environnement explosible conforme a la directive correspondante (voir certificat d'examen CE de type ici inclus BVS 04 ATEX E 068 X).
ATEX homologation:
gazes et brumes: montage rapporté à la Zone 0; incorporation à la Zone 0, Zone 1 et Zone 2.
Poussières: montage rapporté à la Zone 20; incorporation à la Zone 20, Zone 21 et Zone 22.
Industrie minière Catégorie M1, M2.
FM/CSA: Ces transmetteurs de pression sont certifiés pour utilisation dans un environnement explosible conforme a la directive correspondante (voir Control drawing No: 2323880).

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FM / CSA Propriétés de l'homologation:
Sécurité intrinsèque avec approbation de l'appareil pour class I, II et III division 1, groupes A, B, C, D, E, F, G et class I, Zone 0, AEx ia IIC.
Mesures de protection contre les explosions dues à la présence de poussières pour class II et III, division 1, groupes E, F, et G.
Sans danger d'inflammation pour class I, division 2, groupes A, B, C et D.

Vos connaissances nécessaires
N'installez et ne mettez en service le transmetteur de pression que si vous avez les connaissances exactes des directives spécifiques nationales et si vous êtes en possession de la qualification en rapport. Vous devez posséder des connaissances des prescriptions pour les zones sous danger d'explosion ainsi que de la technique de mesure et régulation et des circuits électriques étant donné. Suivant les conditions d'utilisation vous devez disposer de connaissances parti-culières, par exemple sur les fluides agressifs ou les hautes pression.

2. Aperçu rapide

Si vous voulez vous procurer un résumé rapide, veuillez lire les chapitres 3, 5, 7 et 11. Là vous trouverez des indications concernant votre sécurité et des informations importantes sur votre produit et sa mise en service. Veuillez absolument en prendre connaissance.

3. Explication des symboles, abréviations

Avertissement	Risque de danger de mort ou de blessures graves.
Avertissement	Consignes spéciales pour la sécurité intrinsèque: Risque de danger de mort ou de blessures graves.
	Remarques, informations importantes, dérangement de fonction.
Avertissement	Risque de danger de mort ou de blessures graves par des pièces éjectées.
Attention	Possibilité de danger de brûlures par surfaces brûlantes.
CE	Ce produit est conforme aux directives européennes correspondantes.

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ATEX
Directive européen pour atmosphères explosibles (Atmosphère=AT, Explosible=EX)
Ce produit est conforme aux exigences selon la directive 94/9/CE (ATEX) protection contre les explosions.

FM Factory Mutual
Ce produit a été contrôlé et certifié par "FM Approvals". Il est en accord avec les normes utilisables aux USA sur la sécurité (protection contre les explosions inclue).

CSA
Canadian Standard Association
Ce produit a été contrôlé et certifié par "CSA International". Il est en accord avec les normes utilisables au Canada et aux USA sur la sécurité (protection contre les explosions inclue).

GL
Germanischer Lloyd
Ce produit a été contrôlé et certifié par "FM Approvals". Il est en accord avec la réquistion "GL Type Approval System".

2-fils	Deux conducteurs servent à l'alimentation. Le courant de l'alimentation est le signal de mesure.
U+	Alimentation positive raccord
U-	Alimentation négative raccord

4. Fonction

IS-2**0**: Raccord pression (sécurité intrinsèque) avec membrane intérieure (exécution standard).
IS-2**1**: Raccord de pression avec membrane affleurante (sécurité intrinsèque) pour fluides hautement visqueux ou cristallisants pouvant obstruer le trou du raccord de pression standard.
IS-2X-**S**: Transmetteur de pression (sécurité intrinsèque) avec connecteur ou sortie câble
IS-2X-**F**: Transmetteur de pression (sécurité intrinsèque) exécution série robuste
IS-20-**H**: Transmetteur de pression (sécurité intrinsèque) exécution à très haute pression

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Fonction: A l'aide d'un capteur et sous alimentation électrique, on obtient la transformation en un signal amplifié, normalisé et électrique de la pression appliquée, par la déformation d'une membrane. Ce signal électrique varie proportionnellement par rapport à la pression et peut être exploité en rapport.

5. Pour votre sécurité

Avertissement

- Choisissez le transmetteur de pression adéquat, avant le montage et la mise en service, en rapport à l'étendue de mesure, l'exécution et les conditions de mesure spécifiques.
- Respectez les prescriptions de sécurité nationales (comme par exemple: IEC 60079-14, NEC, CEC) et observez lors d'applications spéciales les normes et règle-ments en rigueur (par exemple pour fluides dangereux tels que : acétylène, fluides combustibles ou toxiques ainsi que les installations frigorifiques et compresseurs). **Si vous ne respectez pas les prescriptions correspondantes, de graves lésions corporelles et dégâts matériels peuvent en résulter!**
- **N'ouvrez les raccords que hors pression!**
- N'utilisez le transmetteur de pression qu'à l'intérieur de la zone limite!
- Prenez en considération les paramètres de service selon le chapitre 7 „Caractéristiques techniques".
- Assurez-vous que le transmetteur de pression ne soit utilisé qu'en accord avec le règlement, c'est-à-dire comme décrit dans la directive suivante.
- Abstenez-vous d'effectuer des empiétements et changements inadmissibles sur le transmetteur de pression n'étant pas décrits dans le mode d'emploi.
- Si vous ne pouvez pas éliminer des dérangements sur le transmetteur de pression, mettez celui-ci hors service et protégez le contre une remise en service par inadvertance.
- **Prenez des mesures de sécurité pour les restes de fluides se trouvant dans les transmetteurs de pression démontés. Ces restes de fluides peuvent mettrent en danger les personnes, l'environnement ainsi que l'installation!**
- Ne faites effectuer les réparations que par le fabricant.

Les données relatives à la résistance à la corrosion et diffusion des instruments se trouvent dans le manuel WIKA sur la mesure des pressions et des températures.

Avertissement

Prenez en considération les indications du certificat d'examen CE de types en vigueur ainsi que les prescriptions nationales respectives concernant l'utilisation en zone sous danger d'explosion (par exemple: IEC 60079-14, NEC, CEC). Si vous ne respectez pas celles-ci, de graves lésions corporelles et des dégâts matériels peuvent en résulter.

6. Emballage

Est-ce que la livraison est complète ?

Contrôlez le volume de la livraison:

- Transmetteurs de pression complets; pour l'exécution à membrane affleurante IS-21-S, -F avec le joint prémonté et le capuchon de protection.
- La liste selon homologation CE des types et Control Draiwing (FM, CSA)

- Examinez le transmetteur de pression en vue de dommages éventuels résultant du transport. Si des dommages sont évidents, veuillez en informer immédiatement i'entreprise de transport et WIKA.
- Conservez l'emballage, celui-ci offre lors d'un transport une protection optimale (par exemple changement du lieu d'utilisation, renvoi pour réparation).
- Veillez à ce que le filetage du raccord pression ainsi que les contacts de branchement ne soient pas détériorés.

Afin de protéger la membrane, le raccord pression de l'appareil IS-21-S, -F est muni d'un capuchon de protection.

- N'enlevez ce capuchon que juste avant le montage afin que la membrane ne soit pas endommagée.
- Conservez le capuchon de protection du filetage du raccord pression et la membrane pour un stockage ou pour un transport futur.
- Remontez le capuchon de protection lors du démontage ou transport de transmetteur de pression.

7. Mise en service, exploitation

Outillage nécessaire: clé à fourche de 27 ou 41, tournevis

Pour votre sécurité contrôler la membrane

Il est nécessaire que, avant la mise en service de transmetteur de pression, vous contrôlez visuellement la membrane, car celle-ci est une **pièce élémentaire de sécurité**.

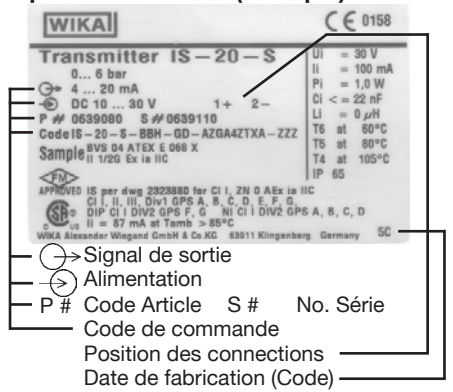
Avertissement

- Surveillez les fuites de liquide, celles-ci pouvant indiquer une membrane endommagée.
- Contrôlez visuellement si la membrane est endommagée (IS-21-S, -F).
- N'utilisez le transmetteur de pression que si la membrane est intacte.
- Utilisez le transmetteur de pression uniquement s'il est dans un état parfait quant à la sécurité technique.

Montage du raccord

Fondamentalement est valable le numéro de série sur la plaque de fabrication. S'il n'y a pas de numéro de série sur la plaque de fabrication, le numéro sur l'hexagone est valable.

Plaque de fabrication (exemple)



- N'enlevez le capuchon de protection que juste avant le montage et faites absolument attention à ne pas endommager la membrane lors du montage (IS-21-S, -F).
- Pour le type IS-20-S, -F veuillez prévoir un joint; à l'exception des appareils avec filetage autoétanchéifiant (par exemple filetage NPT).
  Pour le type IS-21-S, -F le joint fait partie de la livraison.
- Les renseignements concernant les joints figurent dans notre information "accessoires joints AC 09.08" dans le Catalogue Général Mesure de Pression et Température ou sur notre site internet www.wika.de

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- Veuillez faire attention lors du montage à ce que les surfaces d'étanchéité de l'appareil et du point de mesure ne soient pas détériorées ou malpropres.
- Serrez ou desserrez l'appareil uniquement par l'intermédiaire des surfaces pour clés à l'aide d'un outil approprié en respectant le couple de serrage. Le couple de serrage correct dépend de la dimension du raccord de pression ainsi que du joint utilisé (forme / matière). Pour visser ou dévisser l'appareil, n'utilisez pas le boîtier en tant que surface d'attaque.
- Prenez garde lors du vissage de l'appareil, que le pas de vis ne se coince pas.
- Pour les taraudages et les embases à souder voir Information Technique IN 00.14 sous www.wika.de

Avertissement

- Protégez la membrane du contact avec des fluides abrasifs et contre les coups. Si vous endommagez la membrane, la protection contre les risques d'explosion n'est plus garantie (ATEX, FM, CSA)!
- Dans les environnements explosibles en raison de la présence de pous sières, veillez à ce que la disposition de transmetteur de pression soit protégée également contre les coups.
- Prenez en considération les données techniques pour l'utilisation de transmetteur de pression liaison avec des fluides agressifs/corrosifs et pour éviter des mises en danger mécaniques.

Incorporation en zone 0 et zone 20 et montage rapporté à la zone 0 et à la zone 20

(Zone 20 ne pas pur IS-20-H)

(Rappel: Zone 0 implique que l'instrument est soumis à un environnement explosif où le risque dépasse 1.000 heures par an).

Avertissement

- Montez le transmetteur de pression ou la traversée de câble dans la paroi d'environnement demandant des moyens électriques de catégorie 1G, de façon à ce que l'indice de protection IP 67 selon IEC 60 529 soit assuré.
- Montez le transmetteur de pression ou la traversée de câble dans la paroi d'environnement demandant des moyens électriques de catégorie 1D, de façon à ce que l'indice de protection IP 6X selon IEC 60 529 soit assuré.

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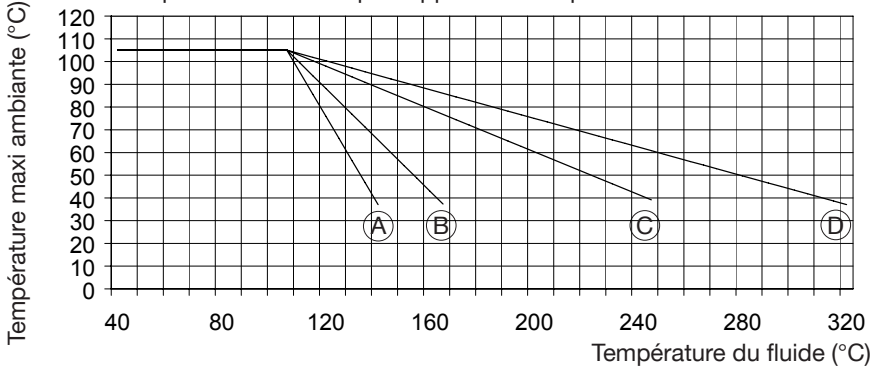
Les mesures de fluides ayant des températures plus élevées que citées dans les tableaux de procédure d'attestation de la certificat d'examen CE de type sous le point 15.1.2, plages de mesure des températures de fluides, sont admissibles en utilisant un parcours de refroidissement (ne pas pour IS-20-H).

Avertissement

- Respectez la température de surface admissible ayant été déterminée pour ce domaine dans les classes de température.
- Respectez la valeur de température maximale (comme déterminé dans la procédure d'attestation de la certificat d'examen CE de type sous le point 15.1.2, plages de mesure) sur l'hexagonal se trouvant sous le boîtier tubulaire.
- Assurez, par un montage horizontal, une libre circulation d'air sur l'élément de refroidissement.
- Protégez l'appareil contre des contacts ou fixez un panneau indicateur de danger.
- Découplez thermiquement la source de chaleur de transmetteur de pression (par exemple par tuyauterie ou récipient).
- Assurez-vous que, spécialement dans la zone ex poussières, les trajets de refroidissement ne s'encrassent pas et qu'il n'y ait pas de dépôt de poussière, étant donné que, dans ce cas, l'effet de refroidissement n'est pas garanti.

Référence température du fluide par rapport à la température ambiante



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Type	IS-20-H	IS-2X-S /-F		
Exécution	(A)	(B)	(C)	(D)
Ailettes de refroidissement	-	2	3	5
Constante K	0,34	0,47	0,68	0,76

Calcul Température maxi ambiante:

$T_{amb} = T_{med} + (T_B - T_{med}) / K$

Calcul du elément de refroidissement:

$T_B = T_{med} - (T_{med} - T_{amb}) \times K$

T_B = Température de fonctionnement du transducteur

T_{med} = Température maxi du fluide du processus

T_{amb} = Température maxi ambiante

K = Constante du parcours de refroidissement

Montage branchement électrique

Avertissement

Mettez le boîtier à la terre contre des champs électromagnétiques et des charges électrostatiques par le raccord au processus.

Avertissement

- Mettez le blindage à la terre d'un seul côté et de préférence en zone de sécurité, donc en zone sans danger d'explosion (EN 60079-14). Dans les instruments avec sortie de câble, le blindage est relié au boîtier. Le raccord simultané du boîtier et du blindage à la terre n'est admissible que si une transmission de potentiel peut être exclue entre le raccord de blindage (par ex. à l'alimentation) et le boîtier (voir EN 60079-14).
- Alimentez le transducteur de pression avec un circuit sécurité intrinsèque (Ex ia).
- Observez la capacité et inductivité efficace interne.
- Veuillez munir les embouts avec brins de câble ténus de cosses tubulaires (confection de câbles).
- La matière du connecteur baionnette est en alliage léger, laquelle n'est pas homologuée pour les utilisations du groupe I (mines).
- Considérez que pour l'utilisation avec câble en **zone 1 et 2** la tension de test entre conducteur / terre, conducteur / blindage et blindage / terre doit être de > 500V.

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- Utilisez le transducteur de pression avec un câble blindé et mettez-le à la terre au moins d'un côté si la longueur du câble dépasse 30 m ou si vous sortez le câble d'un bâtiment.
- Protection IP selon IEC 60 529 (les degrés de protection indiqués ne sont valables que pour les connecteurs enfichés avec connecteurs femelles possédant l'indice de protection correspondant).
- Choisissez le diamètre du câble en rapport au presse étoupe du connecteur. Faites attention à ce que le serre-câble du connecteur assemblé soit bien positionné et que les joints soient tous présents et non endommagés. Serrez les raccords à fond et contrôlez la position correcte des joints afin d'assurer l'indice de protection.
- En cas d'utilisation de sorties par câble, veuillez vous assurer qu'aucune humidité ne puisse entrer à la sortie du câble.

Avec une alimentation isolateur galvanique vous réaliserez la séparation galvanique impérativement nécessaire pour l'alimentation en courant et tension entre atmosphère explosible et non-explosible et assurer les caractéristiques de sécurité technique.

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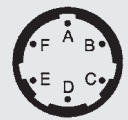
Branchement électrique

	Connecteur coudé DIN 175301-803 A	Connecteur M12x1, 4-pôles	Sortie câble, 1,5 m
			
2-fils	U+ = 1 | U- = 2	U+ = 1 | U- = 3	U+ = brun | U- = vert
Gaine de câble			câble PUR: gris câble FEP: torsadé et étamé
Section de conducteur	up to max. 1,5 mm²	-	0,5 mm² (AWG 20)
Diamètre de câble	6-8 mm homologation construction navale: 10-14 mm	-	6,8 mm (Code DL / EM) 7,5 mm (Code DM)
Protection selon IEC 60 529	IP 65	IP 67	IP 67 - Code de commande: DL IP 68 sans réglage zéro/gain - Code: EM / DM
	Les degrés de protection indiqués ne sont valables que pour les connecteurs enfichés avec connecteurs femelles possédant l'indice de protection correspondant.		

Branchement électrique

	Connecteur bajonnette, 6-pôles	Série robuste (bornes à ressort à l'intérieur)
		
2-fils	U+ = A | U- = B	U+ = 1 | U- = 2 | Test+ = 3 | Test- = 4 | Blindage = 5
Protection selon IEC 60 529	IP 65 (NEMA 4)	IP 67
	Les degrés de protection indiqués ne sont valables que pour les connecteurs enfichés avec connecteurs femelles possédant l'indice de protection correspondant.	

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Type IS-20-F, IS-21-F, IS-20-H Série robuste

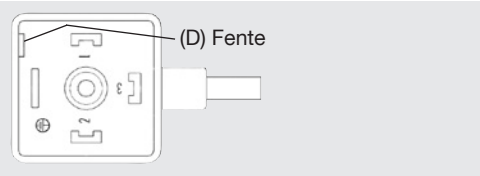
Branchement du câble sur le bloc de bornes à ressort

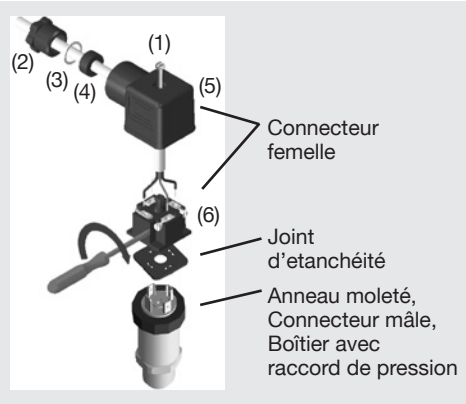
- Pourvoyez les bouts de fils dénudés de cosses d'embouts.
- Revissez le couvercle du boîtier.
- Déserrez le passe-câble avec une clé à fourche de 24.
- Introduisez le câble dans la tête du boîtier ouvert en passant par le passe-câble.
- Appuyez à l'aide d'un tournevis sur le levier en plastique correspondant du bloc de bornes à ressort, de façon que la borne à ressort s'ouvre.
- Introduisez le bout du fil confectionné dans l'ouverture et lâcher le levier en plastique de façon que l'embout du fil soit bloqué dans la borne à ressort.
- Après avoir connecté tous les fils, reserrez le passe-câble et revissez le couvercle du boîtier.

Fonction du circuit de test pour 2-fils

Par l'utilisation du circuit de test il est possible, pendant le fonctionnement normal, d'effectuer une mesure de courant sans devoir débrancher l'appareil. Pour ce faire, vous devez brancher un ampèremètre (pour applications dans la zone explosives; résistance interne < 15 Ohm) aux bornes de test +/-.

Montage de Connecteur coudé DIN EN 175301-803





1. Desserrez la vis (1).
2. Desserrez le presse-étoupe (2).
3. Retirez le connecteur femelle (5) de l'appareil y compris le porte-contact (6).
4. A l'aide d'un tournevis introduit dans la fente (D), dégagez le porte-contact du boîtier du connecteur. N'essayez pas de dégager le porte-contact (6) en introduisant le tournevis dans le trou de la vis (1) ou dans le presse-étoupe (2), vous endommageriez les joints du boîtier.
5. Choisissez le diamètre du câble par rapport au presse-étoupe du boîtier. Introduisez le câble dans le presse-étoupe (2), l'anneau (3), le joint (4) et le boîtier (5).
6. Branchez les conducteurs conformément au plan de câblage sur les bornes de branche ment du porte-contact (6).
7. Pressez le porte-contact (6) dans le boîtier (5).
8. Vissez le presse-étoupe (2) avec le câble. Afin de garantir le degré de protection, veillez à ce que les joints ne soient pas endommagés et que ceux-ci et le presse-étoupe soient correctement positionnés.
9. Enfilez le joint carré plat sur les contacts du boîtier.
10. Connectez le porte-contact (6) sur l'embase mâle du boîtier.
11. A l'aide de la vis (1), vissez le boîtier (5) avec le porte-contact (6) sur l'appareil.

Données techniques	Type IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H												
Etendue de mesure *) IS-2X-S, IS-2X-F	bar	0,1	0,16	0,25	0,4	0,6	1	1,6	2,5	4	6	10	16
Limites de surcharge IS-2X-S, IS-2X-F	bar	1	1,5	2	2	4	5	10	10	17	35	35	80
Pression de destruction IS-2X-S,IS-2X-F	bar	2	2	2,4	2,4	4,8	6	12	12	20,5	42	42	96
Etendue de mesure *) IS-2X-S, IS-2X-F	bar	25	40	60	100	160	250	400		600		1000 1)	
Limites de surcharge IS-2X-S, IS-2X-F	bar	50	80	120	200	320	500	800		1200		1500	
Pression de destruction IS-2X-S,IS-2X-F	bar	96	400	550	800	1000	1200	1700 2)		2400 2)		3000	
	Etendues de mesure pour IS-20-H voir additionnel mode d'emploi 11126418 Hautes pressions												
	{Livrable pour le vide, la pression, pression positive/négative, la pression absolue}												
	1) Seulement type IS-20-S, IS-20-F.												
	2) Pour le type IS-21-S, IS-21-F: La valeur du tableau est uniquement valable en utilisant le joint plat en-dessous de l'hexagone pour étancher l'appareil. Autrement, la valeur maxi est de 1500 bar.												
Matériaux													
■ Parties en contact avec le fluide													
» Type IS-20-S, IS-20-F, IS-20-H *)		Acier inox											
» Type IS-21-S, IS-21-F		Acier inox											
		Joint torique: NBR {FPM/FKM ou EPDM}											
■ Boîtier		Acier inox											
Liquide interne de transmission de pression 3)		Huile synthétique {Halocarbone pour exécution oxygène}											
	3) Non existant avec type IS-20-S, -F pour des étendues de mesure > 25 bar et IS-20-H.												
Alimentation U+													
» Type IS-2X-S, IS-20-H	DC V	10 ... 30											
» Type IS-2X-F, IS-20-H série robuste	DC V	11 ... 30											
Signal de sortie et		4 ... 20 mA, 2-fils											
charge ohmique max autorisée RA	RA en Ohm												
» Type IS-2X-S, IS-20-H		RA ≤ (U+ - 10 V) / 0,02 A - (0,14 Ohm x cable en m)											

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Données techniques	Type IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H	
» Type IS-2X-F,IS-20-H série robuste		RA ≤ (U+ - 11 V) / 0,02 A
Signal de circuit de test		RA ≤ 15 (seulement avec Type IS-2X-F, IS-20-H série robuste)
Réglage: point zero, gain	%	± 5 par potentiomètres dans l'instrument
Temps de transmission (10 ... 90 %)	ms	≤ 1 4)
	4) Temps de transmission IS-20-S/-F: ≤ 10 avec temp. de fluide < -30 °C pour des étendue de mesure à 25 bar. Temps de transmission IS-21-S/-F: ≤ 10 avec temp. de fluide < -30 °C	
Puissance Pi	W	1 (750 mW avec homologation pour catégorie 1D)
Tension d'isolement		L'isolation correspond à EN 60079-11
Précision	% du gain	≤ 0,5 6) {0,25} 5) 6)
	6) Inclusif non-linéarité, hystérésis, zéro et déviation de l'étendue de mesure (correspond à l'erreur de mesure selon IEC 61298-2). Calibré en position verticale, raccord de pression vers le bas.	
Non-linéarité	% du gain	≤ 0,2 (BFSL) selon IEC 61298-2
Non-répétabilité	% du gain	≤ 0,1
Stabilité sur un an	% du gain	≤ 0,2 (pour les conditions de référence)
Température autorisée		
■ Du fluide 8) *)	°C	-20 … +80 7) (Plages de température élargies voir chapitre 7, „température du fluide par rapport à la température ambiante") 7)
■ De l'environnement 8)	°C	-20 ... +80 7)
■ De stockage	°C	-30 ... +105
	7) Autres températures en fonction de raccords électriques voir certificat d'examen CE de type, e.g. -30 ... +105 °C et table page 83+84.	
Plage de température nominale	°C	0 ... +80
Coefficient de température sur plage température nominale:		
■ Coef. de temp. moy. du point 0	% du gain	≤ 0,2 / 10 K (< 0,4 pour étendue de mesure ≤ 250 mbar)
■ Coef. de temp. moy.	% du gain	≤ 0,2 / 10 K
Position de montage	mbar	< 2 à +/- 30° position oblique pour Type IS-21-S et IS-21-F

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Données techniques	Type IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H		
Conformité - CE			
■ Directive Equipements sous Pression		97/23/CE	
■ CEM Directive		2004/108/CE, Emission de perturbations (group 1, classe B) et résistance aux perturbations	
■ Directive ATEX pour les appareils à être utilisé en atmosphères explosibles		94/9/CE	
Ex - Protection	ATEX	Catégorie [8] 1G, 1/2G , 2G, 1D [9], 1/2D [9], 2D [9], M1, M2	
Homologation		Ex ia I/II C T4, Ex ia I/II C T5, Ex ia I/II C T6	
	[8] Veuillez **absolument lire les** conditions d'utilisation et les données techniques de sécurité dans la procédure d'attestation de la liste selon **homologation CE des types (BVS 04 ATEX E068 X)**		
	[9] Ne pas pour IS-20-H.		
Ex - Protection	FM, CSA	Class I, II et III	
Homologation		Sécurité intrinsèque Class I, II, III Division 1,	
		Groups A, B, C, D, E, F, G et Class I, Zone 0 AEx ia II C	
Homologation German Lloyd GL		Environmental Category D, F, EMC 1	
RF-Immunitée	V/m	10	
Burst	KV	2	
Résistance aux chocs » Type IS-2X-S	g	1000 [10] selon IEC 60068-2-27	(chock méchanique)
» Type IS-2X-F	g	600 [10] selon IEC 60068-2-27	(chock méchanique)
	[10] pas pour homologation German Lloyd		
Résistance aux vibrations » IS-2X-S	g	20 [11] selon IEC 60068-2-6	(vibration en cas de résonance)
» Type IS-2X-F	g	10 [11] selon IEC 60068-2-6	(vibration en cas de résonance)
	[11] pour homologation German Lloyd: Category H, jusqu'à 2KHz		
Protection électrique			
■ Protection fausse polarité		U+ contre U-	
Poids » Type IS-2X-S	kg	Environ 0,2	
» Type IS-2X-F	kg	Environ 0,35	

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Données techniques	Type IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H		
» Type IS-20-H	kg	Environ 0,3 (environ 0,45 avec série robuste)	

*) En exécution oxygène le modèle IS-21 n'est pas livrable. En exécution oxygène le modèle IS-20 n'est possible que pour les étendues de mesure de ≥ 0,25 bar, température du fluide de -20 ... +60 °C et avec les pièces en contact avec le fluide en acier inox ou Elgiloy®.

{ } Les données entre accolades précisent les options disponibles contre supplément de prix.

Veuillez prendre en considération lors de la conception de votre installation, que les valeurs indiquées (par exemple pression d'éclatement, limite de surcharge) dépendent de la matière utilisée, du filetage et du joint utilisé.

Vérification du fonctionnement

Le signal de sortie doit se comporter proportionnellement à la pression présente. Si ce n'est pas le cas, ceci peut être une indication que la membrane est endommagée. Dans ce cas veuillez lire "élimination de perturbations" dans le chapitre 10.

Avertissement

- **N'ouvrez les raccords que hors pression!**
- Prenez en considération les paramètres de service selon le chapitre 7 "Caractéristiques techniques".
- N'utilisez le transmetteur de pression qu'à l'intérieur de la zone limite de surcharge!

Attention

Considérez que quand vous touchez le transmetteur de pression en fonctionnement, la surface des composants des appareils peut être brûlante.

8. Réglage du zéro / gain (uniquement pour appareils à anneau moleté)

Nous vous recommandons de ne pas dérégler le potentiomètre de gain. Il sert au réglage d'usine et ne devrait être réajusté de votre part que si vous disposez d'un équipement de calibration suffisant (au minimum 3x plus précis que la précision donnée).

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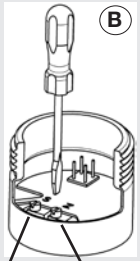
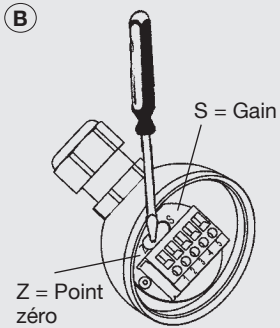
IS-20-S, IS-21-S, IS-20-H:

- Connecteur femelle
- Joint d'etanchéité
- Anneau moleté
- Connecteur mâle
- Joint d'etanchéité
- Boîtier avec raccord de pression



IS-20-F, IS-21-F,
IS-20-H série robuste:



- Veillez lors du montage et démontage du connecteur à ce qu'aucun fil ne soit arraché ou pincé.
- IS-2X-S, IS-20-H: Débranchez le connecteur femelle. Ouvrez l'appareil de mesure de pression (voir image Ⓐ) en dévissant l'anneau moleté. Retirez le connecteur mâle du boîtier avec précaution.
- IS-2X-F, IS-20-H série robuste: Ouvrez l'appareil de mesure de pression en dévissez le couvercle du série robuste.
- Réglez le zéro (Z) (voir image Ⓑ) en appliquant la valeur de pression de départ.
- Réglez le gain (S) en appliquant la valeur de pression finale.
- Contrôlez le zéro.
- Au cas où le zéro n'est pas correct, répéter la procédure.
- Refermez soigneusement l'appareil de mesure de pression. Faites attention à ce que les joints ne soient pas endommagés et à leur position correcte afin d'assurer l'indice de protection.

Il est recommandé de procédur à un réétalonnage tous les ans.

En cas de problèms (+49) 9372/132-295

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9. Entretien, accessoires

- Les transmetteurs WIKA ne demandent aucune maintenance.
- Ne faites effectuer les réparations que par le fabricant.

Accessoires: Les renseignements concernant les accessoires (par exemple connecteurs) figurent dans le tarif de stock actuel, le "Product Catalog" en CD-Rom ou veuillez prendre contact avec notre département commercial.

10. Elimination de perturbations

Avertissement

N'ouvrez les raccords que hors pression!

Avertissement

- Prenez des mesures de sécurité pour les restes de fluides se trouvant dans les transmetteurs de pression démontés. Ces restes de fluides peuvent mettrent en danger les personnes, l'environnement ainsi que l'installation !
- Si vous ne pouvez pas éliminer des dérangements sur le transmetteur de pression, mettez celui-ci hors service et protégez le contre une remise en service par inadvertance.
- Ne faites effectuer les réparations que par le fabricant.

N'utilisez aucun objet pointu ou dur pour le nettoyage, car la membrane du raccord pression ne doit en aucun cas être endommagée.

Veuillez contrôler au préalable si la pression est présente (vannes / robinets à boisseau sphérique, etc. ouvert) et si vous avez choisi la tension d'alimentation correcte et le système de câblage correspondant (2 fils).

Perturbations	Cause	Mesures à prendre
Lors d'une variation de pression le signal de sortie reste constant	Surcharge mécanique par pression excessive	Remplacer l'appareil; en cas de panne répétitive consulter le fabricant *)
Pas de signal de sortie	Tension d'alimentation manquante / fausse ou pointe de surtension	Corriger la tension d'alimentation selon le mode d'emploi *)
	Rupture de conducteur	Contrôler le passage du courant

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Perturbations	Cause	Mesures à prendre
Zéro du signal diverge	Limite de surcharge dépassée	Respecter la limite de surcharge (voir le mode d'emploi); Corriger le zéro a l'aide du potentiometre *)
	Endommagement de la membrane, par ex. par des coups, des fluides abrasifs / agressifs; corrosion sur la membrane / sur les raccords de pression	Remplacer l'appareil
Gains du signal tombe / est trop faible	Endommagement de la membrane, par ex. par des coups, des fluides abrasifs / agressifs; corrosion sur la membrane / sur les raccords de pression; liquide de transmission manque	Prendre contact avec le fabricant et remplacer l'appareil
Gain du signal tombe	Joint / surface d'étanchéité endommagé / souillé, le joint n'est pas monté correctement, pas de vis coincé	Nettoyer le joint / la surface d'étanchéité, éventuellement remplacer le joint
Gain du signal trop faible	Surcharge mécanique par pression excessive	Recalibrer l'appareil *)
Gain du signal fluctuant	Pression du fluide de processus soumise a de fortes fluctuations	Amortissement; conseils par le fabricant

En cas de réclamation non justifiée, nous mettrons en facture les coûts de traitement de celle-ci.

*) Contrôlez après le réglage le fonctionnement correct du système. Au cas où l'erreur persiste, renvoyez l'appareil pour réparation (ou remplacez l'appareil).

Si un problème reste présent, veuillez prendre contact avec notre département commercial.

Certificat de matière de processus (déclaration de contamination en cas de réparation)
Veuillez laver ou nettoyer les appareils démontés avant de les renvoyer afin de protéger nos employés et l'environnement des risques présentés par les résidus de fluide adhérents.
Un contrôle des appareils en panne ne peut être effectué de façon sure que si la déclaration de contamination est complète. Cette déclaration comporte toutes les matières ayant été en contact avec l'appareil, également celles ayant été utilisées lors d'essais, en service ou lors du nettoyage. La "Product Return Form" peut être déchargée de notre adresse Internet (www.wika.de / www.wika.com)

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11. Stockage, mise au rebut

Avertissement

Veuillez prendre les précautions de sécurité pour la mise au rebut et pour le stockage des fluides se trouvant dans les transmetteurs de pression démontés. Nous recommandons un nettoyage approprié et méticuleux. Ces restes de fluides peuvent mettrent en danger les personnes, environnement ainsi que l'installation !

Stockage

Remontez le capuchon de protection lors du stockage de l'appareil afin d'éviter que la membrane ne soit endommagée (IS-21-S, -F).

Mise au rebut

Mettez les composants des appareils et les emballages au rebut en respectant les prescriptions nationales pour le traitement et la mise au rebut des régions de livraison.

WIKA se réserve le droit de modifier les présentes spécifications.

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1. Detalles importantes para su información

Lea estas instrucciones de servicio antes del montaje y puesta en servicio del transmisor de presión. Guarde las instrucciones de servicio en un lugar accesible a cualquier usuario en cualquier momento.

Las siguientes instrucciones de montaje y de servicio han sido redactadas cuidadosamente. Pero a pesar de ello no es posible tener en cuenta todos los casos de aplicación. Si echara en falta informaciones para su problemática específica, podrá obtener más información:

- A través de nuestra dirección de Internet www.wika.de / www.wika.com
- La designación de la ficha técnica correspondiente PE 81.50
- Asesores de utilización (+49) 9372/132-295

Si el número de serie en el placa de identificación y/o el código 2D en el hexágono se vuele ilegible (p. ej. por daños mecánicos o sobrepintado) ya no es posible la posibilidad de seguimiento.

Los transmisores de presión WIKA descritos en las instrucciones de servicio son diseñados y fabricados conforme a los conocimientos más recientes. Todos los componentes están sometidos a unos estrictos criterios de calidad y medioambientales durante la fabricación. Nuestro sistema de gestión medioambiental posee la certificación según la norma DIN EN ISO 14001.

Utilización del producto según el uso de destinación IS-2X-S, IS-2X-F, IS-20-H

Utilice el transmisor de presión de seguridad intrínseca para convertir la presión en una señal eléctrica en áreas con riesgo de explosión.

Aprobación ATEX:

El transmisor de presión para el uso previsto en áreas de riesgo de explosión (véase el certificado de comprobación de modelo de construcción CE: BVS 04 ATEX E 068 X).

Características de la aprobación ATEX:

Para gases y niebla: montaje adosado en zona 0; incorporación en zona 0, zona 1 y zona 2.

Polvos: montaje adosado en zona 20; incorporación en zone 20, zona 21 y zona 22.

Minería: categoría M1, M2.

Aprobación FM/CSA:

El transmisor de presión para el uso previsto en áreas de riesgo de explosión (véase Control drawing Nr. 2323880).

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Características de la aprobación FM / CSA:

Seguridad intrínseca con aprobación de aparatos para clase I, II y III Division 1, grupo A, B, C, D, E, F, G y clase I, Zone 0, AEx ia IIC.

Dust-ignitionproof para clase II y III, Division 1, grupo E, F y G.

Non-incendive para Class I Division 2 grupo A, B, C y D

Conocimientos requeridos

Instale y ponga en servicio el transmisor de presión sólo si está familiarizado con las regulaciones y directivas relevantes de su país y si posee la cualificación necesaria. Debe estar familiarizado con las reglas y las regulaciones de las áreas de riesgo de explosión, de la tecnologia de medicíon y control y los circuitos eléctricos. Según las condiciones de aplicación, debe poseer los conocimientos corres-pondientes de, p.ej. medios agresivos respectivamente altas presiones.

2. Resumen rápido para usted

Si quiere un resumen rápido, léase las **secciones 3, 5, 7 y 11**. Allí, encontrará instrucciones para su seguridad y importantes informaciones sobre su producto y la puesta en funcionamiento. **Es imprescindible leerlas.**

3. Signos, símbolos y abrevaciones

 Advertencia	Peligro potencial para su vida o lesiones graves.	 Advertencia	Peligro potencial para su vida o lesiones graves por coponentes proyectados.
 Advertencia	Indicaciones para Ex: Peligro potencial para su vida o lesiones graves.	 Advertencia	Peligro potencial de quemaduras por superficies calientes.
	Nota, información importante, falla de funcionamiento.		El producto cumple con las directivas europeas respectivas.
	ATEX: Directiva europea de protección contra explosiones (Atmosphère=AT, Explosible=EX); El producto cumple los requisitos de la directiva europea de protección contra explosiones 94/9/EG.		

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FM
Factory Mutual
El producto ha sido probado y certificado por parte de FM Approvals. Cumple las normas norteamericanas aplicables de seguridad (incluido protección contra explosiones).

CSA
Canadian Standard Association
El producto ha sido probado y certificado por parte de CSA International. Cumple las normas aplicables de seguridad de Canadá y Estados Unidos (incluido protección contra explosiones).

GL Germanischer Lloyd
El producto ha sido probado y certificado por parte de GL.
Cumple el requerimiento "GL Type Approval System".

2 hilos	Dos conexiones sirven para la energía auxiliar. El corriente de alimentación es el señal de medición.
U+	Conexión de alimentación positiva
U-	Conexión de alimentación negativa

4. Función

IS-2**0**: Conexión de presión (Seguridad intrínseca) with internal diaphragm(versión estándar).
IS-2**1**: Conexión de presión (Seguridad intrínseca) con membrana enrasada para medios altamente viscosos o cristalizantes pudiendo embotar el agujero de la conexión de presión.
IS-2X-**S**: transmisor (de seguridad intrínseca), versión con conexión de enchufe /conexión de cable
IS-2X-**F**: transmisor (de seguridad intrínseca), versión caja de campo
IS-20-**H**: transmisor (de seguridad intrínseca), versión presión máxima

Función: Mediante un elemento sensor y el suministro de energía auxiliar, la presión existente en su aplicación se convertirá en una señal eléctrica reforzada, estandarizada , a través de la deformación de una membrana. Esta señal eléctrica cambia de forma proporcional respecto de la presión y puede ser evaluada respectivamente.

5. Para su securidad

Advertencia

- Seleccione el transmisor de presión adecuado con respecto al rango de medición, versión, condiciones de medición específicas antes de instalar o poner en servicio el instrumento.
- Observe el reglamento nacional relevante (p.ej. IEC 60079-14, NEC, CEC) y, para aplicaciones especiales, tenga en cuenta las normas y directivas vigentes (p.ej. en medios de medición peligrosos tales, materias inflamables o tóxicas así como en instalaciones de refrigeración y compresores). **Si no se observan las prescripciones de seguridad, ¡eso puede tener consecuencias graves como lesiones físicas graves y daños materiales!**
- ¡Abrir las conexiones de presión sólo en estado sin presión!
- Hay que respetar los límites de sobrecarga del rango de medición correspondiente.
- Observe los parámetros de servicio según sección 7 „Datos técnicos“.
- Asegurése de que se utilizen los instrumentos de acuerdo con su destinación, comodescrito en las siguientes instrucciones.
- Abstenerse de intervenciones y modificaciones en el transmisor de presión no descritas en estas instrucciones de servicio.
- Ponga fuera de servicio el instrumento y protejalo contra la puesta en servicio por error, si no puede eliminar las perturbaciones.
- **¡Tome medidas de precaución en cuanto a residuos de medios de medición en transmisores de presión desmontados. Medios residuales pueden causar daños en personas, medio ambiente y equipo!**
- Sólo el fabricante puede efectuar reparaciones.

Las especificaciones respecto a resistencia a la corrosión y indifusibilidad de los materiales de los instrumentos las encuentra en nuestro manual WIKA Medición de presión y de temperatura.

Avertissement

Observe las especificaciones del certificado de ensayo de tipo en vigor, así como el reglamento específico del país respecto a la instalación y la utilización en zonas explosibles (p.ej. IEC 60079-14, NEC, CEC). En caso de no observar esas especificaciones pueden resultar lesiones graves y daños materiales.

6. Embalaje

¿Se entregó todo?

Verifique el volumen del suministro:
- Transmisores de presión completos; en versión frontalemente enrasada IS-21-S, -F con juntas premontadas y capuchón de protección.
- Declaración de conformidad CE y Control Drawing (FM, CSA)

- Rogamos revisen los equipos por eventuales daños que se hayan producido durante el transporte. Si detectara daños visibles, debe comunicarlo inmediatamente al transportista y a WIKA.
- Guárdese el embalaje ya que éste ofrece una protección ideal durante el transporte (p.ej. lugar de instalación cambiante, envío para revisión).
- Procure que la rosca de conexión de presión y los contactos de unión no resulten dañados.

Para proteger la membrana, hemos provisto la conexión de presión del instrumento IS-21-S, -F de un capuchón protector especial.

- Saque este capuchón solamente justo antes de la instalación para evitar una avería de la membrana.
- Guárdese la tapa de protección de la rosca y del diafragma para almacenaje o transporte posterior.
- Reinstale el capuchón protector al desmontaje y transporte del instrumento.

7. Puesta en servicio, funcionamiento

Herramienta necesaria: llave de boca SW 27 ó SW 41, destornillador

Control de la membrana para su seguridad

Es necesario que controle visual la membrana antes de la puesta en servicio del transmisor de presión, puesto que **es un componente relevante de seguridad**.

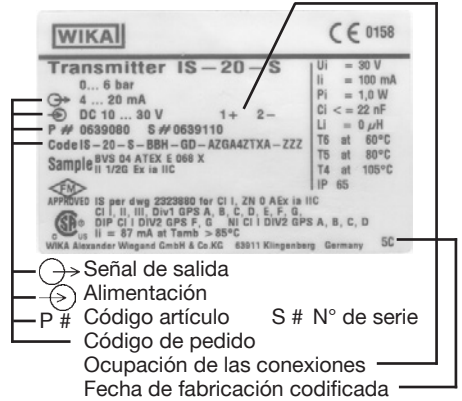
Advertencia

- Asegúrese de que no se escape líquido siendo eso un indicio de un defecto de la membrana (No para IS-20-H).
- Haga un control visual de la membrana para deterioro (IS-21-S, -F).
- Utilice el transmisor de presión sólo si la membrana es indemne.
- Utilice el transmisor de presión sólo si está en un estado impecable en razón de la seguridad.

Montaje de la conexión mecánica

En principio es válido el número de identificación en la placa de idendificación. Si no se encuentra ningún número de serie en la placa de identificación, se tomará el número del hexágono.

Placa de identificación (ejemplo)



- Saque este capuchón solamente justo antes de la instalación para evitar una avería de la membrana tambien durante de la instalación (IS-21-S, -F).
- Para el tipo IS-20-S, -F hay que prever una junta; a excepción de instrumentos con filete autosellador (p. ej. filete NPT).
  Para el modelo IS-21-S, -F la junta anular esta incluido en la entrega.
- Indicaciones para juntas encontrarán en nuestra hoja de datos „Accesorios para juntas AC 09.08“ en nuestro catálogo general Técnica de medición de presión y de temperatura o en nuestra página web www.wika.de.
- Asegúrese, al montaje, de que las superficies de estanqueidad del instrumento y de los puntos de medición queden limpias y intactas.
- Atornille o destornille el instrumento sólo a través de las superficies de llave utilizando una herramienta apropiada y el momento de torsión prescrito. El momento de torsión prescrito depende de la dimensión de la conexión de presión y de la junta utilizada (forma/material). No utilize la caja del instrumento para atornillar o destornillarlo.
- Al atornillar, asegúrese de que las vueltas de rosca no resulten ladeadas.
- Orificios de roscado y racor de soldar, ver hoja de informacion tecnica IN 00.14 bajo www.wika.de

Advertencia

- Proteja la membrana frente al contacto con sustancias abrasivas y golpes. Si se daña la membrana, no se garantiza la protección contra explosiones (ATEX, FM, CSA).
- Procure que el instrumento se coloque en un lugar protegido en las áreas Ex de polvos y protéjalo de los golpes.
- Tenga en cuenta los datos técnicos para la utilización del manómetro en contacto con fluidos agresivos/corrosivos y para prevenir posibles peligros mecánicos.

Incorporación y montaje adosado en zona 0 y zona 20 (Zona 20 no para IS-20-H)
(Zona 0 significa que una mezcla de gases explosivos está presente en el instrumento más de 1.000 horas al año).

Advertencia

- Monte el instrumento o el paso de cable en la pared de las áreas que requieran medios de producción de la categoría 1G, de forma que se garantice el tipo de protección IP 67 según IEC 60 529.
- Monte el instrumento o el prensaestopas para cables en la pared de las áreas que requieran medios de producción de la categoría 1D, de forma que se garantice el tipo de protección IP 6X según IEC 60 529.

Se permite la medición de medios de proceso con temperaturas más altas que los rangos de temperatura media especificados en las tablas del certificado de comprobación de modelo de construcción CE en el punto 15.1.2 si se utilizan secciones de enfriamiento especiales (no para IS-20-H).

Advertencia

- Tenga en cuenta las temperaturas de superficie permitidas que son válidas para este rango según las clases de temperatura determinadas
- Tenga en cuenta el valor máximo de temperatura (del rango de temperatura determinado en el certificado de comprobación de modelo de construcción CE en el punto 15.1.2) en el hexágono de la carcasa tubular.
- Asegure una circulación de aire sin obstáculos en el elemento de enfriamiento mediante un montaje horizontal.
- Proteja el aparato de cualquier contacto o coloque una nota de advertencia.
- Aísle térmicamente el convertidor de medición de presión de fuentes de calor (por ejemplo, tubos o depósitos).

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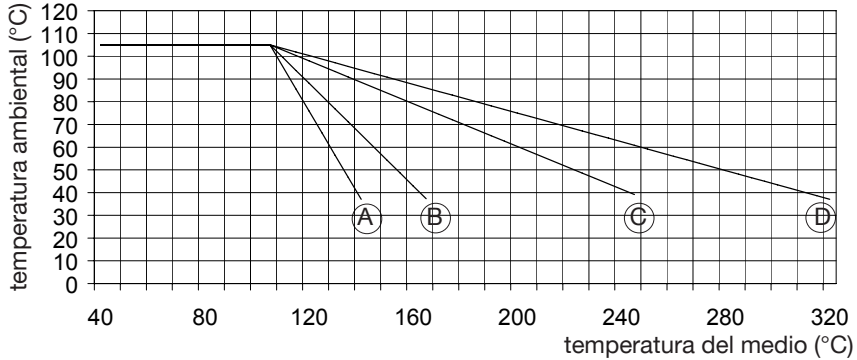
Advertencia

- Asegúrese, especialmente en el área Ex polvo que los trayectos de enfriamiento no se ensucien y no haya depósito de polvo encima, ya que no se garantiza el efecto refrigerante.

Relación temperatura del medio a la temperatura ambiental



Tipo	IS-20-H	IS-2X-S /-F		
versión	(A)	(B)	(C)	(D)
aletas refrigeradoras	-	2	3	5
constante K	0,34	0,47	0,68	0,76

temperatura ambiental máx. admisible:
$T_{amb} = T_{med} + (T_B - T_{med}) / K$

Cálculo del trayecto de enfriamiento:
$T_B = T_{med} - (T_{med} - T_{amb}) \times K$
T_B = temperatura de trabajo del transductor
T_{med} = temperatura máx. medio de proceso
T_{amb} = temperatura máx. del ambiente
K = constante del trayecto de enfriamiento

Montaje de la conexión eléctrica

Advertencia

Ponga a tierra la caja vía el racor de proceso para evitar campos electromagnéticos y cargas electroestáticas.

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Advertencia

- Ponga a tierra el blindaje de cable de un lado, de preferencia en zona segura, o sea en zona antiexplosiva (EN 60079-14). En instrumentos con salida de cable está conectado el blindaje a la caja. La conexión simultánea de la caja y el blindaje de cables a la tierra sólo es admisible si se excluye una transmisión de potencial entre la conexión de blindaje (p. ej. en el alimentador) y la caja (ver EN 60079-14).
- Alimente el transmisor de presión con un circuito de corriente seguridad intrínseca (Ex ia).
- Tenga en cuenta la capacidad e inductividad de efecto interior.
- Provea los extremos de los cables de hilo fino de virolas de cable (preparación de cables).
- El conector circular de bayoneta está fabricado a partir de metal ligero, el cual no es válido para las aplicaciones del grupo I (minería).
- Tenga en cuenta que la tensión de prueba para los cables utilizados en las **zonas 1 y 2** entre conductor/tierra, conductor/pantalla y pantalla/tierra debe ser una tensión alterna superior a 500V.

- Utilice el transmisor de presión con un cable blindado y ponga a tierra el blindaje, como mínimo en un lado del cable, cuando los cables tengan una longitud superior a 30 m o salgan al exterior del edificio.
- Modo de protección IP según IEC 60 529 (las clases de protección indicadas se aplican sólo cuando el transmisor de presión esté conectado a unas hembrillas procurando el modo de protección correspondiente).
- Escoje el diámetro de cable de forma que sea apropiado para la boquilla de paso de la clavija. Asegúrese de que el racor de cable de la clavija ensamblada sea posicionado correctamente y que existan juntas no deterioradas. Aprete el racordaje y verifique la posición correcta de las juntas para asegurar el modo de protección.
- Asegúrese de que en las salidas de cables no entre ninguna humedad a la extremidad del cable.
- Con un separador de alimentación, lleve a cabo el aislamiento galvánico imprescindible de la fuente de tensión y alimentación entre el área Ex y no Ex, y asegure los datos de conexión de seguridad técnica.

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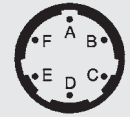
Conexión eléctrica

	Conector con salida lateral DIN 175301-803 A	Conector M12x1, 4-polar	Salida de cable, 1,5 m
			
Sistema 2 hilos	U+ = 1 | U- = 2	U+ = 1 | U- = 3	U+ = marrón | U- = verde
Cable apantallado			cable PUR: gris cable FEP: trenzado y estañado
Sección del conductor	hasta máx. 1,5 mm^2	-	0,5 mm^2 (AWG 20)
Diámetro del cable	6-8 mm Homologación: 10-14 mm	-	6,8 mm (Código: DL / EM) 7,5 mm (Código: DM)
Modo de protección según IEC 60 529	IP 65	IP 67	IP 67 - Código de pedido: DL IP 68 sin acceso al potenciómetro de punto cero y de rango - Código de pedido: EM / DM
	Las clases de protección indicadas se aplican sólo cuando el transmisor de presión esté conectado a unas hembrillas procurando el modo de protección correspondiente).		

Conexión eléctrica

	Conector circular de bayoneta, 6-polar	Caja de campo (con terminales de conexión tipo clip)
		
Sistema 2 hilos	U+ = A | U- = B	U+ = 1 | U- = 2 | Test+ = 3 | Test- = 4 | Blindaje = 5
Modo de protección según IEC 60 529	IP 65 (NEMA 4)	IP 67
	Las clases de protección indicadas se aplican sólo cuando el transmisor de presión esté conectado a unas hembrillas procurando el modo de protección correspondiente).	

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Tipo IS-20-F, IS-21-F, IS-20-H con caja de campo:

Conexión de cable en el conector terminal

- Complete las extremidades de conductor peladas con puntas de cable.
- Enrosque la tapa de la caja.
- Destornille el racor para cables con una llave de boca SW24.
- Pase el cable a través del racor de cable en la cabeza de caja abierta.
- Apriete hacia abajo la palanca de plástico respectiva en el conector terminal con un destornillador para que se abra el contacto de apriete.
- Introduzca la extremidad de cable completada en la abertura y suelte la palanca de plástico para que la extremidad sea apretada en el conector terminal.
- Después de conectar los diferentes conductores apriete el racor atornillado para cables y atornille la tapa de la caja.

Función del círculo de prueba para 2 hilos

El círculo de prueba permite una medición del corriente durante el funcionamiento normal sin desconectar el instrumento. Para ello, debe conectar un amperímetro (para aplicaciones en zonas explosibles; resistencia interior < 15 ohmios) a los bornes prueba +/-.

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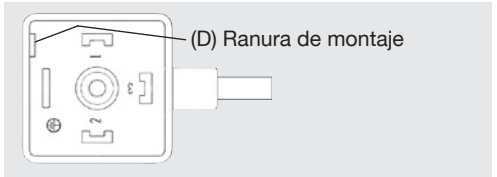
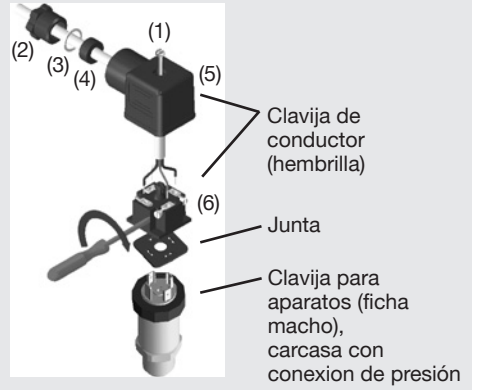
Conexión eléctrica DIN EN 175301-803





1. Destornille el tornillo central (1).
2. Abre el prensaestopas (2).
3. Estire el conector angular (5) con el bloque de terminales (6) en su interior, del instrumento.
4. Saque el bloque de terminales (6) del conector angular (5), usando un destornillador pequeño como palanca en la ranura de montaje (D). Para no dañar la junta del conector angular, por favor no trate de expulsar el bloque de terminales (6) a través del prensaes topas (2) o del tornillo central (1).
5. Asegúrese que el diametro exterior del cable usado es adecuado para el prensaestopas del conector angular. Pase el cable a través de la rosca (2), de la junta metalica (3), de la junta de goma (4) y del conector angular (5).
6. Conecte los conductores a los terminales del bloque (6) según el dibujo de asignación.
7. Monte el bloque de terminales (6) a presión adentro del conector angular (5).
8. Cierre el prensaestopas (2). Asegúrese que la junta de goma no este dañada y que todas las juntas estén montadas de forma correcta para asegurar la protección IP.
9. Ponga la junta plana cuadrada por encima de los conectores en el tope de la caja del instrumento.
10. Enchufe el bloque de terminales (6) a los conectores.
11. Monte el conector angular (5) y el bloque de conectores (6) al instrumento atornillando el tornillo central (1).

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Datos técnicos		Tipo IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H												
Rango de medición *)	IS-2X-S, -F	bar	0,1	0,16	0,25	0,4	0,6	1	1,6	2,5	4	6	10	16
Límite de sobrecarga	IS-2X-S, -F	bar	1	1,5	2	2	4	5	10	10	17	35	35	80
Presión de rotura	IS-2X-S, -F	bar	2	2	2,4	2,4	4,8	6	12	12	20,5	42	42	96
Rango de medición *)	IS-2X-S, -F	bar	25	40	60	100	160	250	400		600		1000 [1]	
Límite de sobrecarga	IS-2X-S, -F	bar	50	80	120	200	320	500	800		1200		1500	
Presión de rotura	IS-2X-S, -F	bar	96	400	550	800	1000	1200	1700 [2]		2400 [2]		3000	
		Gamas de presiones para IS-20-H, véase instrucciones de empleo adicionales 11126418 presión máxima												
		{Vacío, presiones positivas,escalas compuestas, presión absoluta disponibles}												
		[1] Solamente en el modelo IS-20-S, IS-20-F.												
		[2] Para el modelo IS-21-S, IS-21-F: el valor especificado en la tabla solo se aplica cuando la estanqueidad se realiza con la junta anular debajo de la hexagonal. Si no aplica max 1500 bar.												
Material														
■ Piezas en contacto con el medio														
» Tipo IS-20-S, IS-20-F, IS-20-H *)														
» Tipo IS-21-S, IS-21-F														
■ Carcasa														
Líquido interno de transmisión [3]														
		[3] No existe en el tipo IS-20-S, IS-20-F para rangos de medición > 25 bar y IS-20-H con caja de campo												
Energía auxiliar U+		DC V												
» Tipo IS-2X-S, IS-20-H														
» Tipo IS-2X-F, IS-20-H con caja de campo														
Señal de salida y														
carga óhmica máx. admisible RA		RA en Ohm												

Acero CrNi
Acero CrNi
Junta tórica: NBR {FPM/FKM o EPDM}
Acero CrNi
Aceite sintético {Aceite carbónico halogenado para versiones de oxígeno}
10 ... 30
11 ... 30
4 ... 20 mA, sistema 2 hilos

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Datos técnicos		Tipo IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H
» Tipo IS-2X-S, IS-20-H		RA ≤ (U+ -10 V) / 0,02 A - (longitud de cable en m x 0,14)
» Tipo IS-2X-F, IS-20-H con caja de campo		RA ≤ (U+ -11 V) / 0,02 A
Señal de circuito de prueba y carga permitida		RA ≤ 15 (solamente en el modelo IS-2X-F, IS-20-H con caja de campo)
Posibilidad de ajuste punto cero/ rango	%	± 5 mediante potenciómetro dentro del equipo
Tiempo de respuesta (10 ... 90 %)	ms	≤ 1 [4]
		[4] Tiempo de respuesta con IS-20-S/-F: ≤ 10 con temperaturas del material de medición < -30°C para rangos de medición de hasta 25 bar. Tiempo de respuesta con IS-21: ≤ 10 con temperaturas del material de medición < -30°C
Potencia Pi	W	1 (750 mW para homologación Category 1D)
Tensión de aislamiento		Aislamiento corresponde a EN 60079-11
Precisión	% del rango	≤ 0,5 [6] {0,25} [5] [6]
		[5] Deviación de característica { } para rangos de medición ≥0,25 bar, no para IS-20-H
		[6] No-Linealidad, histéresis y error de punto cero y span incluidas (correspondiente al error de medición según IEC 61298-2). Ajuste con posición vertical de instalación, conexión de presión hacia abajo.
No-Linealidad	% del rango	≤ 0,2 (BFSL) conforme a IEC 61298-2
No-repetibilidad	% del rango	≤ 0,1
Estabilidad al año	% del rango	≤ 0,2 (con condiciones de referencia)
Rangos de temperatura admisibles		
■ Medio [8] *)	°C	-20 ... +80 °C [7] (Rangos de temperatura ampliados, véase punto 7. Puesta en servicio, funcionamiento: Relación de temperatura media con temperatura ambiente) [7]
■ Entorno [8]	°C	-20 ... +80 °C [7]
■ Almacenamiento	°C	-30 ... +105 °C
		[7] Más gamas de temperatura según las conexiones eléctricas, véase certificado del examen CE de tipo, p.ej. –30 … +105 °C y tabla en página 83+84
Rango de temperatura nominal	°C	0 ... +80

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Datos técnicos	Tipo IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H	
Coeficientes de temperatura en el rango de temperatura nominal		
■ CT medio del punto cero	% del rango	≤ 0,2 / 10 K (< 0,4 para rangos de medición ≤ 250 mbar)
■ CT medio del rango	% del rango	≤ 0,2 / 10 K
Posición de montaje	mbar	< 2 con +/-30° de posición oblicua en el modelo IS-21-S /-F con homologación de buque
CE- Indicativo		
■ Directiva para aparatos de presión		97/23/CE
■ CEM Directiva		2004/108/CE, EN 61326 Emisión (grupo 1, clase B) y resistencia (sector industrial)
■ Directiva ATEX sobre los aparatos para uso en atmósferas potencialmente explosivas		94/9/CE
Protección Ex	ATEX	Category [8] 1G, 1/2G , 2G, 1D [9], 1/2D [9], 2D [9], M1, M2
Tipo de protección		Ex ia I/II C T4, Ex ia I/II C T5, Ex ia I/II C T6
	[8] Es imprescindible consultar las condiciones de aplicación y datos técnicos de seguridad en el certificado CE de comprobación de modelo de construcción (BVS 04 ATEX E068 X).	
	[9] No para IS-20-H	
Protección Ex	FM, CSA	Class I, II y III
Tipo de protección		Seguridad intrínseca Clase I, II, III Division 1,
		Group A, B, C, D, E, F, G y Class I, Zone 0 AEx ia II C
Homologación German Lloyd GL		Environmental Category D, F, EMC 1
Inmunidad AF	V/m	10
Ráfaga	kV	2
Resistencia a choques » IS-2X-S	g	1000 [10] conforme a IEC 60068-2-27 (impacto mecánico)
» Tipo IS-2X-F	g	600 [10] conforme a IEC 60068-2-27 (impacto mecánico)
	[10] No válido con homologación de equipos marinos	
Resistencia a vibraciones » IS-2X-S	g	20 [11] conforme a IEC 60068-2-6 (vibración con resonancia)
» Tipo IS-2X-F	g	10 [11] conforme a IEC 60068-2-6 (vibración con resonancia)

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Datos técnicos	Tipo IS-20-S, IS-21-S, IS-20-F, IS-21-F, IS-20-H		
		[11] Para construcción de buques: Category H, hasta 2KHz	
Tipos de protección eléctrica			
■ Protección contra polaridad inversa			U+ con U-
Peso	» Tipo IS-2X-S	kg	Aprox. 0,2
	» Tipo IS-2X-F	kg	Aprox. 0,35
	» Tipo IS-20-H	kg	Aprox. 0,3 (aprox. 0,45 m en versión caja de campo)

*) El modelo IS-21 no está disponible en versión oxígeno. La versión oxígeno es posible solamente con el modelo IS-20 con rango de medición de sobrepresión de ≥ 0,25 bar y temperatura del fluido de -20 … +60 °C y usando partes en contacto con el medio en acero inox. o Elgiloy®.

{ } Datos entre corchetes describen las especialidades que se pueden suministrar por un precio adicional.

En el momento de diseñar su instalación, por favor tome en cuenta que los valores indicados (por ej. presión de rotura, seguridad de sobrepresión) dependen del material, de la rosca y de la junta usado.

Prueba de funcionamiento

La señal de salida debe ser proporcional a la presión. Si no lo es, eso podría ser un indicio de un deterioro de la membrana. Léase en este caso en la sección 10 „Eliminación de perturbaciones“.

Advertencia

- ¡Abra las conexiónes sólo en estado sin presión!
- Tenga en cuenta los parámetros de servicio según sección 7 „Datos técnicos“.
- ¡Respete el límite de sobrecarga del rango de medición respectivo!

Advertencia

Al tocar el transmisor de presión, tenga en cuenta de que las superficies de los compontes del instrumento puedan calentarse durante el funcionamiento.

8. Ajuste de cero / margen (sólo para instrumentos con anillo roscado)

No recomendamos que ajuste el potentiometro del span. Se usa para ajustes en fábrica y no debería ser ajustado si no dispone de los equipos de calibración adecuados (precisión por lo menos 3-veces superior al del instrumento).

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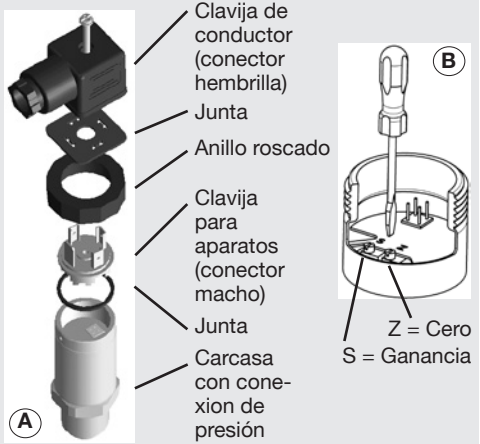
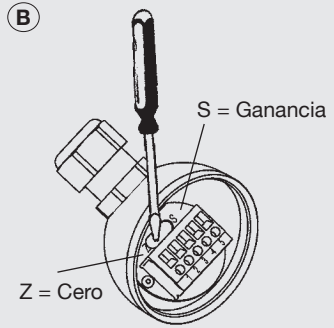
IS-20-S, IS-21-S, IS-20-H:



IS-20-F, IS-21-F,
IS-20-H con caja de campo:



- Asegúrese al desmontaje / montaje de la clavija de que no se rompan o compriman ningún conductor.
- IS-2X-S, IS-20-H: Desmonta el conector hembrilla. Abrir transmisor de presión, desmontando el anillo roscado (ver Ⓐ). Desmonta el conector macho del la carcasa con cuidado.
- IS-2X-F, IS-20-H con caja de campo: Abrir el transductor de presión destornillando la tapa de la caja de campo.
- Ajustar el cero (Z) (ver Ⓑ), generando el límite inferior del rango de presión.
- Ajuste el margen (S) y generando el límite superior del rango de presión
- Controle el cero.
- Si el cero es erróneo, repetir el procedimiento.
- Cierre el transmisor de presión cuidadosamente. Asegúrese de que las juntas no estén deterioradas y verifique su posición correcta para asegurar el modo de protección.

Recomendamos realizar una recalibración cada año.

Para más información (+49) 9372/132-295

9. Mantenimiento, accessorios

- ¡Los transmisores WIKA estan libres de mantenimiento!
- Sólo el fabricante puede efectuar reparaciones.

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Accesorios: Detalles para los accesorios (p. ej. conectores) encontrará en la lista de precios WIKA, catálogo de productos WIKA sobre CD-Rom o póngase en contacto con nuestro departamento de venta.

10. Eliminación de perturbaciones

Advertencia

¡Abrir las conexiones de presión sólo en estado sin presión!

Advertencia

- ¡Tome medidas de precaución en cuanto a residuos de medios de medición en transmisores de presión desmontados. Medios residuales pueden causar daños en personas, medio ambiente y equipo!
- Ponga fuera de servicio el instrumento y protejalo contra la puesta en servicio por error, si no puede eliminar perturbaciones.
- Sólo el fabricante es autorizado para efectuar reparaciones.

Para no dañar las membranas de la conexión de presión, no utilizar para la limpieza objetos puntiagudos ni duros.

Compruebe previamente si hay presión (válvulas/llave esférica, etc. abiertas), y si ha elegido la fuente de tensión correcta y el tipo de cableado correspondiente (2 hilos).

Avería	Posible causa	Medida
Señal de salida constante en caso de cambio de presión	Sobrecarga mecánica por presión excesiva	Cambiar el instrumento; en caso de fallo repetido, consultar con el fabricante *)
	Falsa tensión de alimentación o golpe de corriente	Cambiar el instrumento
Sin señal de salida	Sin o falsa tensión de alimentación o golpe de corriente	Corregir tensión de alimentación según instrucciones de servicio *)
	Ruptura de línea	Comprobar continuidad
Sin o falsa señal de salida	Error de cableado	Observar empleo de los conductores (ver placa indicad. de tipo / instrucciones de uso)
Señal de salida distinta	Desajuste del alcance	Utilizar referencia adecuada
Desviación de la señal del cero	Límite de sobrecarga sobrepasado	Observar límite de sobrecarga (ver instrucciones de uso); corregir cero por potenciómetro *)
	Deterioro de la membrana, p.ej. por golpes, medios abrasivo/agresivo; corrosion en membrana/racor de presión	Cambiar el aparato

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Avería	Posible causa	Medida
Señal cae o demasiado baja	Deterioro de membrana, p. ej. por golpes, medio abrasivo/agresivo; corrosión en membrana/racor de presión ; falta el medio de transmisión	Contactar con el fabricante y cambiar el instrumento
Alcance de la señal cae	Junta/superficie de obturación deteriorada/ ensuciada, posición incorrecta de la junta, espiras bloqueadas	Limpiar junta/superficie de junta, eventualmente cambiar junta
Alcance de la señal demasiado pequeño	Sobrecarga mecánica por sobrepresión	Recalibrar el instrumento *)

En caso de reclamación sin justificación alguna, tendrá que abonar los costes de tramitación de la reclamación.

*) Tras el ajuste, compruebe el funcionamiento correcto del sistema. Si el error persiste, envíe el aparato a reparar (o reemplácelo).

Si el problema perdura, póngase en contacto con nuestro departamento de venta.

Certificado de process material (declaración de contaminación en caso de asistencia técnica)

Fregue / limpie los instrumentos desmontados antes de la devolución a la fábrica, con el fin de proteger a nuestros empleados y al medio ambiente de los peligros ocasionado por los residuos de medios de medición adheridos. Una revisión de instrumentos con avería sólo se puede efectuar seguramente, si se ha presentado una declaración de contaminación completamente llenada. Tal declaración contiene informaciones sobre todos materiales en contacto con el instrumento hasta los que se utilizaban por fines de prueba, funcionamiento o limpieza.

La declaración de contaminación es disponible a través de nuestra página web www.wika.com

11. Almacenaje, eliminación de desechos

Advertencia

Al almacenar los instrumentos o eliminar los desechos tome medidas de precaución en cuanto a residuos de medios de medición en transmisors de presión desmontados. Recomendamos que la limpieza se realice de forma adecuada y cuidadosa.

Medios residuales pueden causar daños en personas, medio ambiente y equipo.

Almacenaje

Al almacenaje del transmisor de presión hay que montar el capuchón de protección para no deteriorar la membrana (IS-21-S /-F).

Eliminación de los desechos

Elimine los desechos de componentes de instrumentos y materiales de embalaje según el reglamento respectivo del tratamiento de residuos y eliminación de desechos de la región o del país donde el instrumento se ha suministrado.

WIKA se reserva el derecho de modificar las especificaciones detalladas.

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Zulässige Temperaturbereiche in Abhängigkeit des elektrischen Anschlusses / Permissible temperature ranges depending on electrical connections / Domaines de températures admissibles en fonction du raccordement électrique / Gamas de temperaturas admisibles en función de la conexión eléctrica

Electrical connection / Elektrischer Anschluss / Branchement électrique / Conexiones eléctrica	Order code Bestellcode Code de commande Código de pedido	Category / Kategorie / Catégorie / Categoría	Ambience-/ Medium temperature range / Umgebungs-/Medien-temperaturbereich / Température du fluide / ambiante / Rango de temperatura entorno / medio
IS-20-S, IS-21-S, IS-20-F, IS-21-F			
DIN 175301-803 A L-Connector / Winkeldose / Connecteur coudé / Conector con salida lateral	A4	1/2 G (IIC)	-40 ... +60 °C (T6) -40 ... +80 °C (T5) -40 ... +105 °C (T4)
		M1	-40 ... +105 °C
M 12x1 Circular connnector / Rundsteckverbinder / Connecteur / Conector circular	M4	1/2 G (IIC)	-25 ... +60 °C (T6) -25 ... +80 °C (T5) -25 ... +90 °C (T4)
		M1	-25 ... +90 °C
Flying leads / Kabelausgang / sortie câble / salida de cable	DL	1/2 G (IIC)	-20 ... +60 °C (T6) -20 ... +80 °C (T5) -20 ... +80 °C (T4)
		M1	-20 ... +60 °C
Bajonett-Rundsteckverbinder, (nicht für Bergbau) / Bayonet connector (not with mining) / Connecteur bajonette (pas pour l'exploitation dan les mines) / Conector circular de bayoneta (no para la minería)	C6	1/2 G (IIC)	-50 ... +60 °C (T6) -50 ... +80 °C (T5) -50 ... +105 °C (T4)
Kabelausgang ohne Zugang zu Nullpunkt und Spanne-Potentiometer / Flying leads zero/span not adjustable	EM	1/2 G (IIC)	-20 ... +60 °C (T6) -20 ... +80 °C (T5) -20 ... +80 °C (T4)
		M1	-20 ... +80 °C
Field case / Feldgehäuse / série robuste / con caja de campo	FH, FC	1/2 G (IIC)	-50 ... +60 °C (T6) -50 ... +80 °C (T5) -50 ... +105 °C (T4)
		M1	-50 ... +105 °C (T4)

Permissible temperature ranges depending on electrical connections

Electrical connection / Elektrischer Anschluss / Branchement électrique / Conexiones eléctrica	Order code Bestellcode Code de commande Código de pedido	Category / Kategorie / Catégorie / Categoría	Ambience-/ Medium temperature range / Umgebungs-/Medien-temperaturbereich / Température du fluide / ambiante / Rango de temperatura entorno / medio
Kabelausgang, PUR, ohne Zugang zu Null-punkt- und Spanne-Potentiometer / flying leads, PUR, zero/span not adjustable / sortie câble, PUR, sans réglage zéro/gain / salida de cable, PUR, sin acceso al potenció-metro de punto cero y de rango	DM	1 G (IIA), 1/2 G (IIC)	-10 ... +60 °C (T6) -10 ... +60 °C (T5) -10 ... +60 °C (T4)
		1D, M1	-10 ... +60 °C
Kabelausgang FEP, ohne Zugang zu Nullpunkt- und Spanne-Potentiometer / flying leads, FEP, zero/span not adjustable / sortie câble, FEP, sans réglage zéro/gain / salida de cable, FEP, sin acceso al potenció-metro de punto cero y de rango	DM	1 G (IIA), 1/2 G (IIC)	-30 ... +60 °C (T6) -30 ... +80 °C (T5) -30 ... +105 °C (T4)
		1D	-30 ... +60 °C
		M1	-30 ... +105 °C
IS-20-H			
DIN 175301-803 A L-Connector / Winkeldose / Connecteur coudé / Conector con salida lateral	A4	1/2 G (IIC)	-40 ... +60 °C (T6) -40 ... +80 °C (T5) -40 ... +105 °C (T4)
		M1	-40 ... +105 °C
M 12x1 Circular connnector / Rundsteckverbinder / Connecteur / Conector circular	M4	1/2 G (IIC)	-25 ... +60 °C (T6) -25 ... +80 °C (T5) -25 ... +90 °C (T4)
		M1	-25 ... +90 °C
Flying leads / Kabelausgang / sortie câble / salida de cable	DL	1/2 G (IIC)	-20 ... +60 °C (T6) -20 ... +80 °C (T5) -20 ... +80 °C (T4)
		M1	-20 ... +60 °C
Field case / Feldgehäuse / série robuste / con caja de campo	FH, FC	1/2 G (IIC)	-50 ... +60 °C (T6) -50 ... +80 °C (T5) -50 ... +105 °C (T4
		M1	-50 ... +105 °C (T4)

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