Operating Manual
IM 261G/ A EN

Pressure Transmitters 2600T
Models 261G, 261A

ABB

Contents

Danger
Points out a dangerous situation. If ignored, this can cause serious bodily injury or even death.

Caution
Points out a potentially dangerous situation. If ignored, this can cause extensive material damage or serious bodily injury or even death.

Caution
Points out a potentially dangerous situation. If ignored, this can cause minor injuries or material damage.

Information
User tips or other particularly important information. If ignored, the equipment may fail to operate correctly.

1. Safety

Please read this instruction manual / operating manual carefully before installing and starting the machine!

For reasons of clarity, this manual does not attempt to describe all the details for all product types. Moreover, it cannot take into account every conceivable setup, operation or repair scenario.

If you require further information or should you encounter problems that are not dealt with in detail here, please contact the manufacturer. We would like to emphasize that the contents of this manual are not a part of an earlier or existing agreement, warranty or a legal provision, nor are they intended to be an alteration thereof.

All liabilities on behalf of ABB Automation Products GmbH are listed in the purchase contract which also contains the complete and sole warranty terms. The contractual terms of warranty are not restricted or extended by any statements made in this manual.

Observe all warning signs on the packaging materials!

Only qualified and authorized personnel are permitted to mount, electrically connect, start up, and repair the transmitter.

Qualified personnel are defined to be persons who have acquired the proper qualifications to mount, electrically connect, start up, and operate the transmitter or a similar device. This includes:

Training or instruction or authorization to operate and maintain equipment /system in accordance with acknowledged safety standards for electrical circuits, high levels of pressure and aggressive media.

Training or instruction in accordance with the safety standards in the maintenance and use of suitable safety equipment.

In your own interest we would like to point out that only insulated tools that comply with DIN EN 60 900 are to be used for electrically connecting the device.

Furthermore, you must observe:

- The relevant safety precautions for setting up and operating electrical equipment, such as the Equipment Safety Law.
- The relevant norms such as DIN 31 000 / VDE 1000.
- The regulations and guidelines concerning explosion protection, provided that explosion protected transmitters are installed.

The equipment can be operated at a high pressure and with aggressive media.

For this reason, you must be aware of the fact that improper use of this equipment can cause serious bodily injury and / or material damage.

The regulations, norms, guidelines and laws referred to this operating manual apply in the Federal Republic of Germany. When using the transmitter in other countries, observe the relevant national regulations.

1.1 Proper use

The pressure transmitter 261A measures absolute pressure. The transmitter 261G measures excess pressure or the filling level of gases, vapors, and fluids. For information on the possible measuring ranges or permissible loads, see Chapter 10.

2. Transport and Storage

After you unpack the transmitter, please inspect it for signs of damage. Inspect the packaging material for any accessories that have been included.

For intermediate storage / transport purposes, store or transport the pressure transmitter only in its original packaging materials. For information on the permissible ambient storage and transport conditions, see Chapter 10. The storage time is unrestricted, however, the agreed terms of warranty stated in the order confirmation apply.

3. General Description

The digital transmitters 261A/261G are communication field devices employing microprocessor-controlled electronics.

For bidirectional communication, a FSK signal according to the HART protocol is superimposed on the 4 ... 20 mA output signal.

Using the graphic user interface (DTM), you can configure, query, and test the transmitter. You can also communicate with the transmitter using a handheld terminal.

For onsite operation, there is a key available on the equipment electronic system with which you can adjust the zero and span. In combination with an optionally installed graphic LCD indicator, the transmitter can be configured and parameterized with the 4 local operating keys.

The rugged electronic housing is made of stainless steel and is thus resistant to an aggressive atmosphere. The process connection is also made of stainless steel or Hastelloy C.

The type label contains the following information on the transmitter: transmitter type, communication, material of the parts that come into contact with the measuring agent (O-ring, separating or measuring diaphragm, process connection), filling fluid, measuring range (LRL / URL), min. span, operating voltage, output signal, adjusted span, and serial number (S/N). For all enquiries, please always supply this number that is valid worldwide and the year indicated!

Explosion protected versions have a separate plate containing the specific version and / or the respective pressure sensor type for versions with mounted pressure sensors.

In addition, there may be a sign attached with the tag number (optional).

3.1 Function and layout

The transmitter is a compact unit and contains a pressure measuring mechanism and the electronic system with an operating key. Depending on the measuring range, either a ceramic or silicon pressure sensor is used. With the ceramic pressure sensor, the current process pressure (Pe / Pabs) is transferred directly to the measuring diaphragm; in the case of the silicon pressure sensor, the pressure is transferred to the measuring diaphragm over the separating diaphragm and the filling fluid. With the ceramic pressure sensor, there is minimal diaphragm displacement, and the diaphragm alters the internal output voltage of the pickup system. In the silicon pressure sensor, four piezo resistors doped in the measuring diaphragm change their impedances. This pressure-proportional internal output voltages are converted by the electronic system into an electric signal.

Depending on the version used, the transmitter is connected to the process by means of pins G ½ B (DIN EN 837-1), ½ -14 NPT male or female thread, front bonded diaphragm with a special thread G ½" for installation in a ball valve or over various pressure sensors.

The transmitter employs twin-conductor technology. Consequently, the same conductors (device-dependent, see Chapter 10) are used for the operating voltage and the 4...20 mA output signal. The electrical connection is made by inserting cables or using plugs.

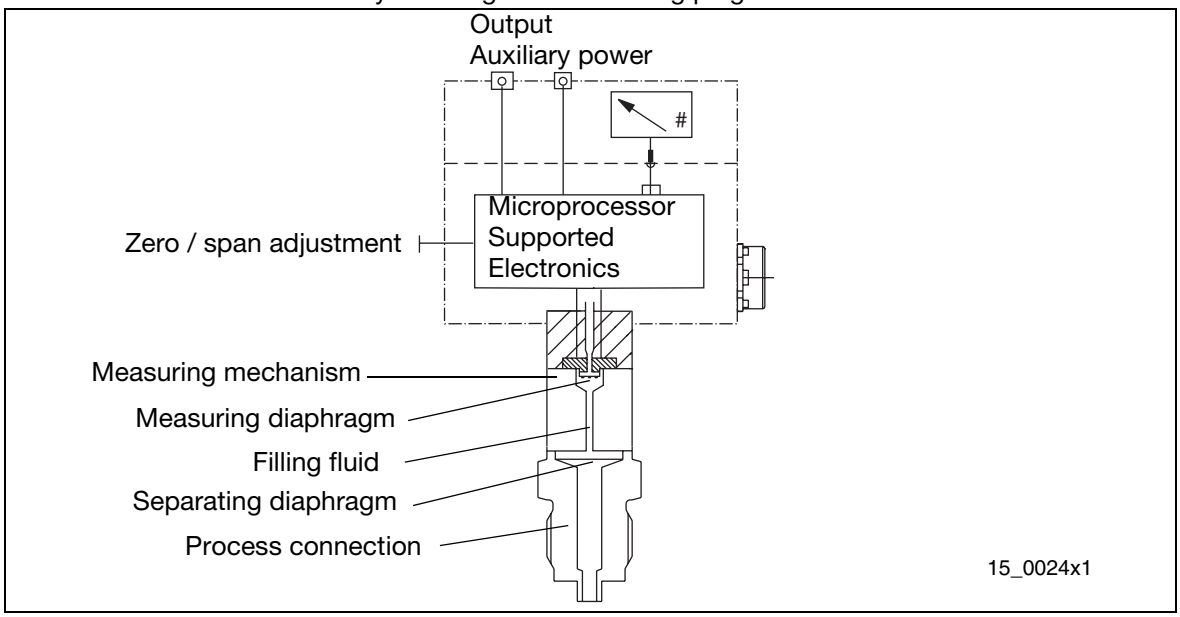


Fig. 1: Transmitter 265G for pressure and filling level (Figure: measuring ranges ≥ 250 kPa)

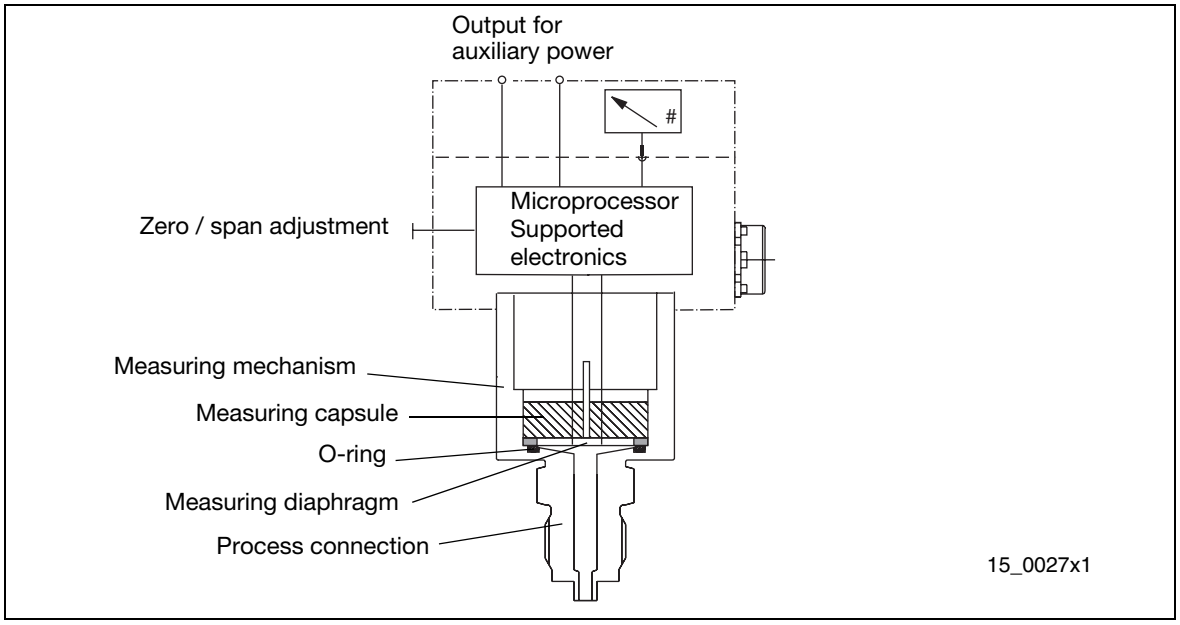


Fig. 2: Transmitter 261A for absolute pressure (Figure: measuring ranges ≤ 40 kPa abs.)

To measure the output signal and configure / calibrate the transmitter, an amperemeter must be connected directly to the output circuit.

Zero and span can be set over a key located on the electronic system.

Optionally, a stainless steel tie-on plate indicating the tag number can be fastened to the device.

The transmitter can be equipped with a graphic LCD indicator (optional, also available as add-on) that is read from the top. When used with this LCD indicator, the transmitter can be parameterized and configured with the most important functions / data completely using the local operating unit (4 keys on the indicator) (see Chapter 7 “Operation”).

4. Installation

4.1 General information

Prior to mounting the transmitter, you must check that the equipment version fulfills the technical and safety requirements of the measuring location in reference to the measuring range, resistance to excess pressure, temperature, explosion protection, operating voltage as well as the materials such as gaskets, process connection and their suitability for use with the media. In addition, the relevant directives, ordinances, norms and accident prevention regulations must be observed! (For example VDE/VDI 3512, DIN 19210, VBG, Elex V, etc.)

The accuracy of the measurement depends in large part on the proper installation of the transmitter and the related measuring line. Avoid measuring in areas exposed to critical ambient conditions such as temperature fluctuations, vibrations, and shocks. If you cannot avoid such conditions due to structural, technical or other reasons, this will influence the quality of the measurements! (See Chapter 10.)

If a pressure sensor with capillary tubing is mounted to the transmitter, the operating instructions for the pressure sensor as well as any datasheets provided must be observed.

4.2 Transmitter

The transmitter can be mounted directly to the isolation valve. There is also a mounting bracket for wall or pipe mounting (2” pipe) available as an accessory.

Try to select an installation position that allows you to easily access the device for mounting and making connections as well as adding the display and operating unit at a later time.

The transmitter should be mounted in a vertical position to prevent zero shifts. If the transmitter is installed in an angled position, the filling fluid would exert hydrostatic pressure on the measuring diaphragm according to the measuring range and thus create a zero shift! This would require you to calibrate the zero position.

Generally speaking, however, the transmitter functions in every installation position. It is installed according to the same guidelines as a pressure gauge.

Mounting options with mounting bracket, see Chapter 12.

4.2.1 Sealing - Screwing in

- Connecting pin G ½ B: a flat gasket according to DIN EN 837-1 is required for sealing.
- NPT threaded connection: seal the thread with Teflon or a similarly approved sealing material.
- Process connection with a front bonded diaphragm: For the installation, you must first weld a weld-in connection / thread hole to the process, while observing the relevant welding standards (for information on the process connection and weld-in connection dimensions, see Chapter 12).
- Process connection for ball valve: for the installation, a suitable ball valve connection or weld-in connection are required. A ball at the end of the process connection serves as a seal (metal / metal). Weld-in sleeve see Chapter 12.

4.2.2 Moisture

Use a suitable cable and tighten the cable gland firmly. You can effectively protect the transmitter against penetrating moisture by leading the connecting cable downward in front of the gland. This allows rainwater or condensed water to drip off. This is particularly true if you install the transmitter outdoors, in damp rooms (for example during the cleaning processes) or on cooled or heated containers.

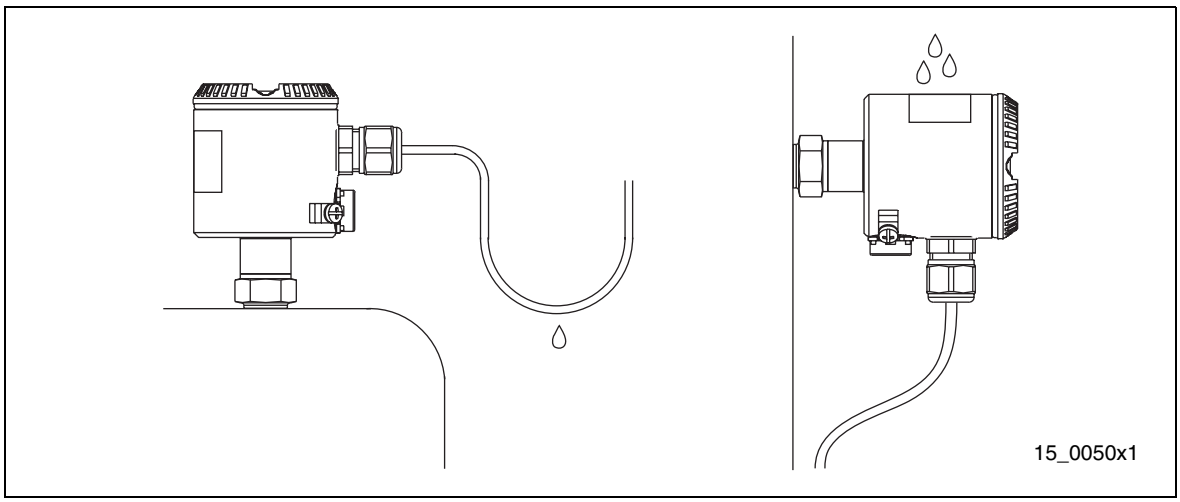


Fig. 3: Measures to prevent penetrating moisture

4.3 Measuring line

Please observe the following points for professional wiring results:

- Lay the measuring line as short as possible and avoid bending it sharply.
- Lay the measuring line so that deposits cannot form in it. Avoid angles of inclination of less than 8 %.
- The measuring line should be blown out or rinsed out with compressed air, or better yet, with the measuring agent.
- Bleed the measuring line when using liquid measuring agent.
- Lay the measuring line so that the gas bubbles are returned to the process line when measuring fluids, or condensate when measuring gas.
- When measuring vapors, lay the measuring line in such a way that no hot vapor can enter the process connection (hydraulic seal, for example a siphon that is filled with water prior to mounting).
- Check that the connections are tight.

5. Electrical Connection

During the electrical installation, observe the relevant regulations! Make connections only if the equipment is electrically discharged! Since the transmitter does not have any circuit-breaking elements, you must provide you own overload, lightning, or power disconnecting devices.

You must check if the existing operating voltage matches the voltage indicated on the type label.

The same lines are used for supplying energy and for the output signal.

Depending on the version, the electrical connection is made via cable entry M16x1.5 (for cable diameters of 5 to 10 mm), 1/2-14 NPT, M20x1.5 or plug Han 8U or miniature connector M12x1.

The screw terminals are designed for wire cross-sections up to 1.5 mm².

For the connection, we recommend that you strip approximately 30…35 mm (1.18…1.38 inch) of the cable jacket.

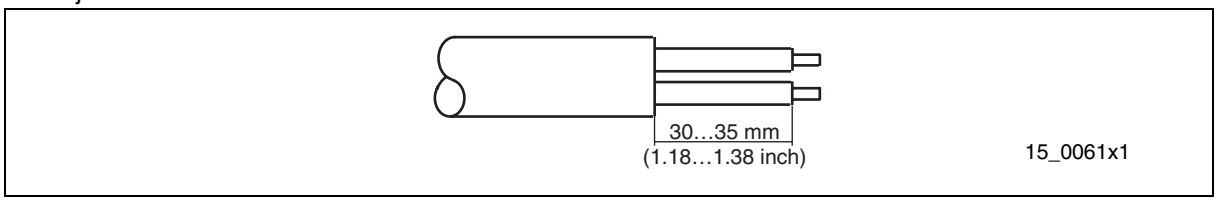


Fig. 4: Unsheathed connecting cable

It should be pointed out that you must exert increased force to remove the housing cover if it is not removed on a regular basis. This has nothing to do with the threads but is due to the type of gasket.

5.1 Electrical connection in the cable connecting compartment

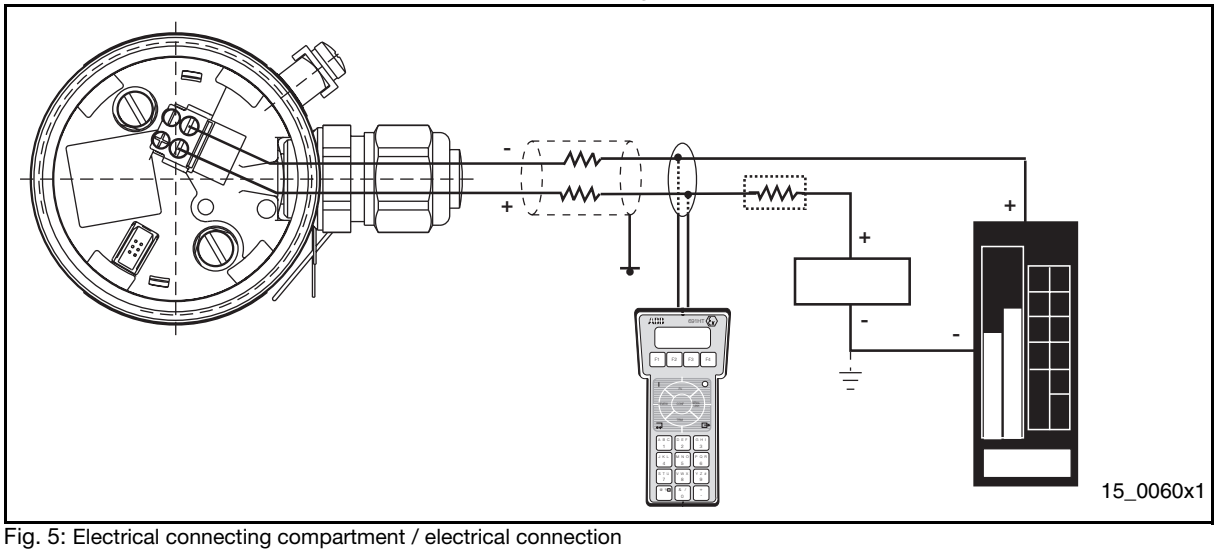


Fig. 5: Electrical connecting compartment / electrical connection

5.2 Electrical connection with a plug

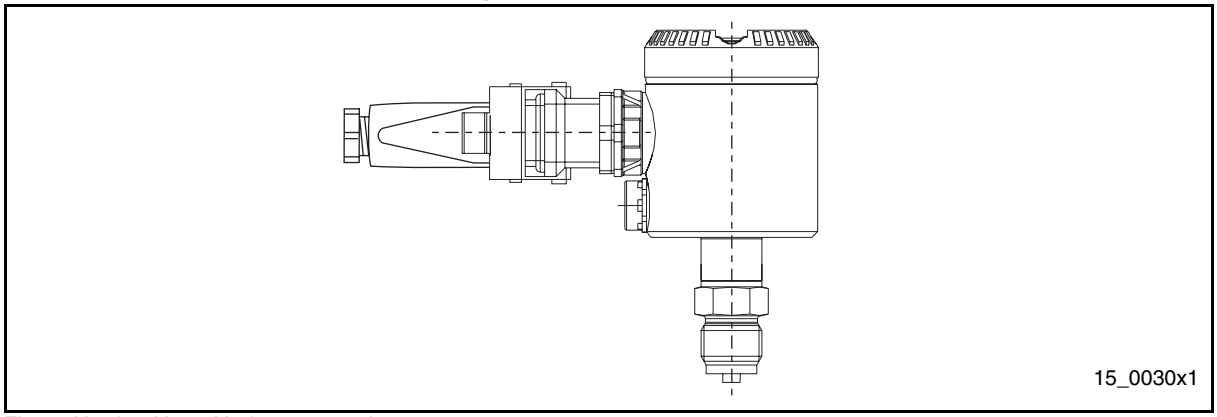


Fig. 6: Harting Han 8U plug connection

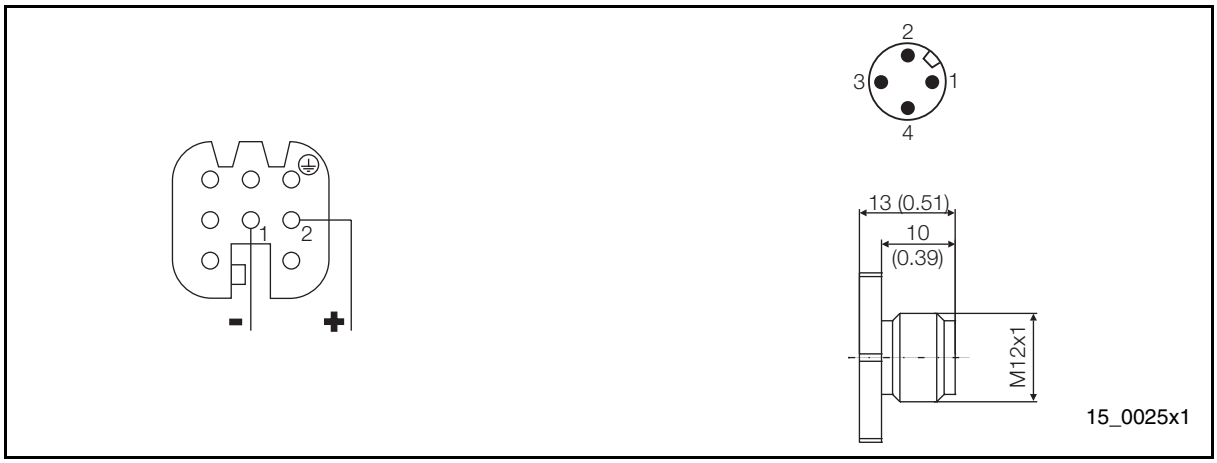


Fig. 7:

5.2.1 Assembling the coupler socket

The coupler socket for connecting the cable is included as an accessory to the transmitter unassembled. Please note the wiring diagram included with the plug! (Assembly see Fig. 8) The female contacts (2) are crimped or soldered on the 1.5...2 cm unsheathed and approx. 8 mm stripped cable ends (conductor cross section 0.75...1 mm^2) and inserted into the female socket (1). Slide the pressure screw (5), pressure ring (7), gasket (4) and socket shell (3) onto the cable in the order indicated before assembly (you may have to adapt the gasket (4) to the cable diameter).

Before you press the sockets completely into the female sockets, recheck the connecting points. Incorrectly inserted sockets can only be removed by using a press-out tool (item no.: 0949 813) or, as a makeshift tool, a standard ballpoint pen cartridge.

5.3 Protective conductor terminal / Ground (optional)

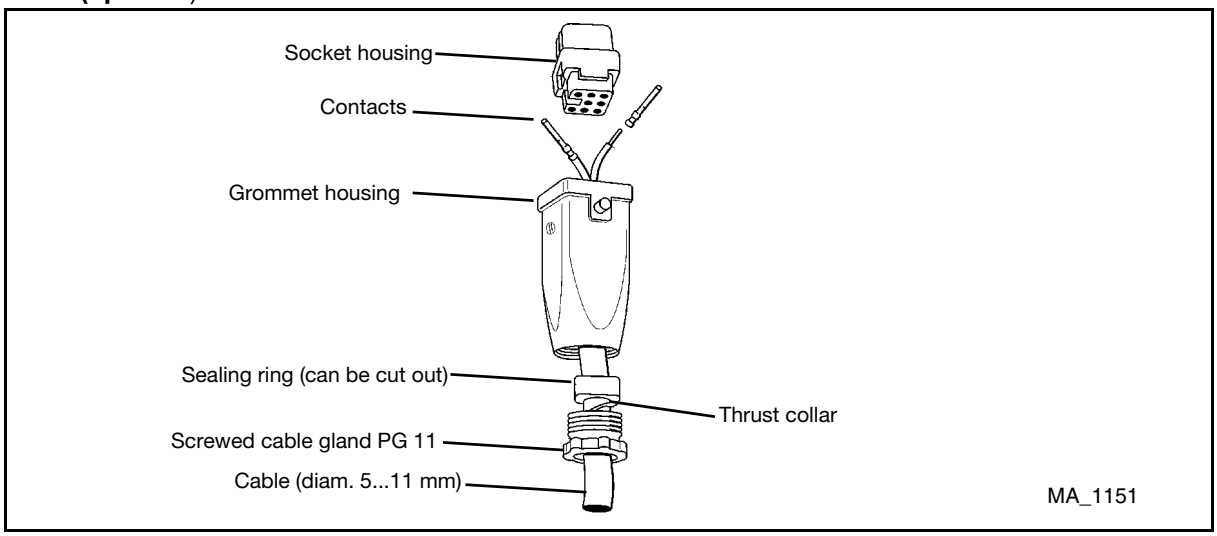


Fig. 8: Assembling the coupler socket Han 8U

A terminal is available on the outside of the housing for grounding (PE) the transmitter.

5.4 Layout of the communication circuit

The transmitter can be operated via modem with a PC or a notebook. The modem can be connected in parallel to any point to the transmitter in the signal current circuit. The transmitter communicates with the modem using AC current signals that are superimposed on the analog 4...20 mA output signal. The signal is modulated zero-mean and thus does not influence the measuring signal.

To ensure communication between the transmitter and the PC or notebook, the signal electric circuit must be set up as shown in figure 9. The resistance between the connection point of the FSK modem and the energy supply must be come to at least 250 ohms including the internal resistance. If this value cannot be attained in normal operation, you must use an additional resistor.

The ABB Contrans I supply modules with HART communication already have a factory-installed additional resistor. Some of these modules offer the option of communicating directly over the supply module in the operating mode “FSK bus”.

To provide current, supply devices, batteries or power supplies can be used that must be designed in such a way that the operating voltage U_B of the transmitter is always between DC 11 V and 42 V (30 V for “EEx i”).

In the process, a maximum current of 20…22.5 mA made possible by overmodulation must be taken into consideration by choosing the appropriate parameters. This yields the minimal value for U_S. If further signal receivers (for example indicators) are looped into the signal electric circuit, their resistance must be taken into consideration.

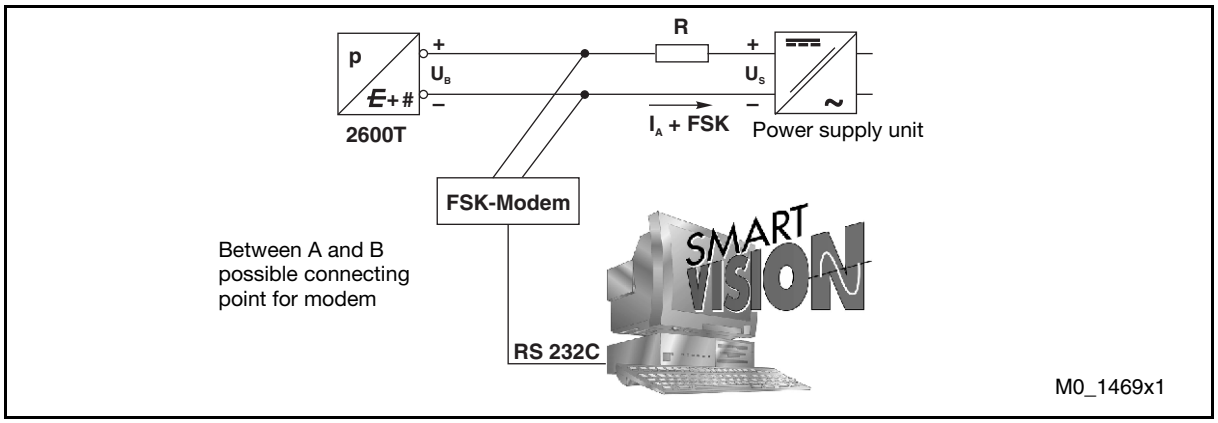


Fig. 9: Communication operating mode: Point-to-point

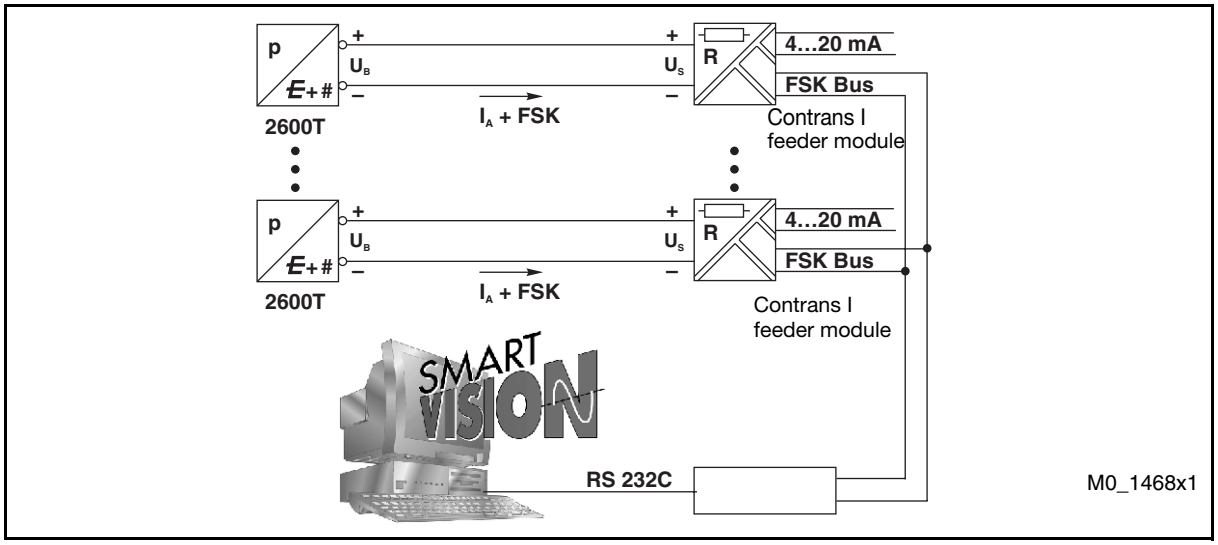


Fig. 10: Communication operating mode: FSK bus

5.5 Connecting cable

To enable communication between the transmitter and the PC/notebook, the cabling must fulfill the following requirements:

The minimum wire diameter should be:

- 0.51 mm for cable lengths up to 1500 m
- 0.81 mm for cable lengths over 1500 m

The maximum cable length is limited to:

- 3000 m for dual-core cables
- 1500 m for multi-core cables

The actual possible cable length of the electrical circuit depends on the overall capacity and resistance and can be estimated using the following formula:

$$L = \frac{65 \times 10^6}{R \times C} - \frac{C_f + 10000}{C}$$

L = Line length in m

R = Total resistance in ohms

C = Line capacity in pF

C_f = Capacity of the devices located in the circuit

You must avoid laying the cables together with other electric cables (with an inductive load) as well as laying them near large electrical equipment.

5.6 Explosion protection

according to directive 94/9/EC (ATEX):

The national legal ordinances, DIN/VDE provisions and explosion protection directives must be observed when installing explosion protected transmitters. The certified explosion protection of the transmitter is indicated on the type label.

5.6.1 Type examination certificate / Declaration of conformity

The type examination certificate / declaration of conformity of transmitters with explosion protected design must be observed as a part of this operating manual.

5.6.2 Explosion protection class “Intrinsically safe EEx i”

- Install only intrinsically safe devices in a transmitter signal electric circuit. The signal electric circuit may be interrupted while the transmitter is in operation (for example, connect and disconnect signal lines).
- The housing may be opened during operation.
- Transmitters with and without pressure sensors in the explosion protection class “intrinsically safe” may be set up directly near zone 0 if the current is supplied with an intrinsically safe electric current in the protection class EEx ia.

5.6.3 Use in areas with combustible dust

- The installation is to be made in accordance with EN 50281-1-2.
- The transmitter can only be made using a certified cable gland according to Directive 94/9/EC (ATEX) (not included in the delivery). The cable gland must also meet the IP 67 degree of protection. Taking the intrinsic heating into consideration, the glowing temperature of the dust must be at least 85 K higher than the ambient temperature.
- When using separating sensors with an anti-stick coating, you must be aware of the danger of a propagating bush discharge of the filling material and the delivery rate.

6. Startup Operation

Once the transmitter has been installed, startup is initiated by switching on the operating voltage.

Before you switch on the operating voltage, you must check the following:

- Process connections
- Electrical connection
- The measuring line and measuring chamber of the measuring mechanism. They must be completely full.

• Startup then follows. The isolation valves must then be actuated in the following order (basic setting of all valves closed):

1. Open the extraction shut-off valve – if present.
2. Open the shut-off valve.

• Shutdown is performed in the reverse order.

With the 261A for absolute pressure with measuring ranges ≤ 40 kPa absolute, you must note that the measuring mechanism was overloaded by the atmospheric pressure during transport and storage. This is why a run-in time of approx. 3 hours after startup is required until the sensor has stabilized to the point that the specified accuracy is met.

If, in case of transmitters of the protection type “Intrinsically safe”, a current meter is connected to the test sockets or a modem is connected in parallel when an explosion hazard is present, the sums of the capcitance and inductance of all circuits including transmitter (see type label) must be equal to or smaller than the permissible capacitance and inductance of the intrinsically safe signal circuit (see type label of the supply unit). Only passive or explosion protected test devices or indicators may be connected.

If the output signal stabilizes only slowly, a large damping time constant was likely set in the transmitter.

6.1 4…20 mA – output signal (HART® protocol)

If the applied pressure is within the values indicated on the type label, the output current ranges between 4 and 20mA. If the applied pressure exceeds the calibrated range, the output current is between 3.5 mA and 4 mA in case of underranging or between 20 mA and 22.5 mA (according to the respective parameter setting) in case of overranging; standard setting: 3.8 mA/20.5 mA. A current of < 4 mA or > 20 mA may also indicate that the microprocessor has detected an internal error; standard setting: 21 mA. Via the communication tool (DTM), an exact diagnosis of the error can be performed. A short-time interruption of the power supply results in an initialization of the electronics (restart of the program).

6.1.1 Write protection

The write protection prevents the configuration data from being overwritten. If the write protection is activated, the function of the zero /span key will be disabled.

It is still possible to read out the configuration data with the optional LCD display, handheld terminal as well as with the graphic user interface (DTM).

It is possible to deactivate the write protection via the graphic user interface (DTM), a HART handheld terminal or via the optional LCD display (see 7.2.2 or 7.4.3.2).

6.2 Zero correction

During the installation of the transmitter, zero shifts (e.g. additional remote seals etc.) caused by mounting may occur which must be corrected.

The transmitter must have reached its operating temperature (approx. 5 minutes after it was switched on, if the transmitter has already reached the ambient temperature) in order to be able to carry out the zero check. The correction must be made at Pe = 0 / pabs = 0!

There are two options (points 1A or 1B) for correcting the 4 ... 20 mA output signal directly on the transmitter:

1A. Set zero:

Apply pressure at lower range value (4 mA) - from the process or from a pressure pick-off. The pressure must be stable and applied with high accuracy << 0.15 % (observe adjusted damping). When the housing cover is unscrewed, press the key on the bore hole on the electronic system (see Fig. 11) with a pin that has a diameter of ≤ 2.5 mm for a maximum of 1 s. The output signal will settle to a value of 4 mA. The span remains unchanged. Subsequent to the last actuation of the 0% key, the non-volatile storing of the lower range value adjusted in this way is effected after < 25 s.

or

1B. Zero trim:

Together with the optionally installed LCD indicator, select the menu item *(Calibrate_Zero Trim)*

via the display keys. To start calibration, select *OK* by pressing the key ➢ (for menu control, see Chapter 7.2.1).

2. Afterwards, switch the transmitter to operating mode.

The procedure described above in "1A" has no bearing on how the physical pressure is displayed; it only calibrates the analog output signal. This is why a difference can occur between the analog output signal and the indication of the physical pressure on the digital display or the communication tool. To prevent this difference, the required zero shift must be carried out using the graphic user interface (DTM).

Menu path: *Configure_Pressure Measurement_Pressure*.

However, no set zero must have been previously performed with the key.

6.3 Mounting the LCD indicator

- Unscrew the housing cover.
- The LCD indicator consists of the top and bottom part. Both parts are connected to each other by means of a bayonet joint.
  Insert the indicator with both of the round guide pins into the notches of the electronic system so that the third pin can be inserted at the same time, with the receptacle fastened to it, into the 6-pin mating connector on the electronic system.
  The red outer cable marking is on the inside facing the middle of the device.
- The top indicator part can, depending in the installation position of the transmitter, be put in four positions (at ±90° or ±180°).
  Changing the display position: If the indicator is attached, detach it from the bottom indicator part by turning it counterclockwise 45° (bayonet joint) and then lifting it carefully. Now attach the indicator to part to the desired lower part position and then turn it 45° clockwise until it snaps into place. Be careful not to pinch then cable!
- Screw on the housing cover with the observation window hand tight.

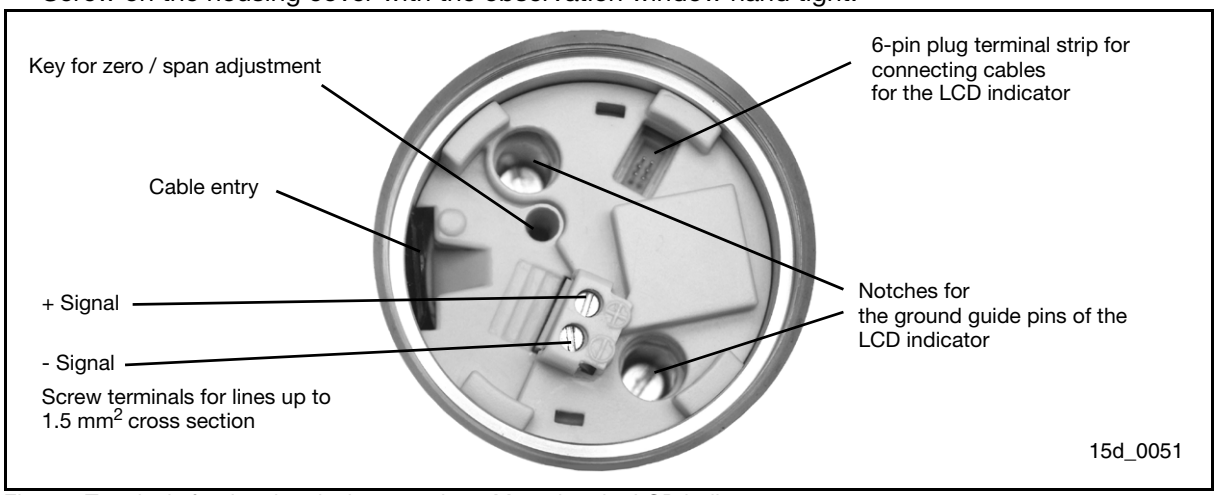


Fig. 11: Terminals for the electrical connection - Mounting the LCD indicator

6.4 Sensor ventilation

For technical measuring reasons it is necessary that you apply atmospheric pressure to the reference side of the pressure sensor.

A special ventilation unit is screwed into the electronic housing from the outside that is equipped with a PTFE filter on the inside. This is why you must ensure that the ventilation opening is not covered up (for example, do not paint over it).

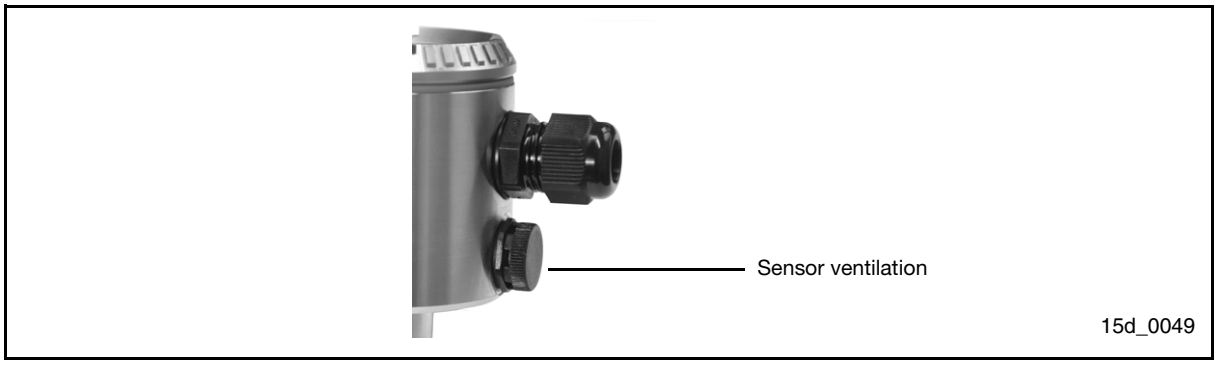


Fig. 12:

7. Operation

There is no protection against electric shock when the housing covers are open. Do not touch any live parts.

7.1 Operation via key zero and span adjustment

on the electronic system (without LCD indicator)

Operation is carried out via a key for setting zero (0 %) and span (100 %).

To access the adjusting key on the electronic system, you must unscrew the housing cover.

The key is located in a bore hole (position of key, see Fig. 11) and can be pressed with a pin or screwdriver with a diameter of ≤ 2.5 mm.

7.1.1 Configuration

Zero and span can be set directly on the transmitter by means of a key. The transmitter has already been set by the manufacturer according to the order specifications. The values set for zero and span are indicated on the type label.

Note the following:

The first pressure value (e.g. 0 kPa) is always assigned to the 4 mA signal, and the second pressure value (e.g. 40 kPa) is always assigned to the 20 mA signal.

To readjust the transmitter, apply the pressure for the lower and upper range value to the sensor. Make sure the measuring limits are not exceeded.

Reducing stations can be used as sensors with adjustable pressure and reference displays. When making the connection, please ensure that there are no residual fluids (for gaseous testing materials) or air bubbles in the connection lines, since they can lead to errors during the check.

The possible measuring deviation of the pressure transmitter should be at least three times smaller than the desired measuring deviation of the transmitter.

We recommend (time constant is known!) that you set the damping to zero (by means of the LCD indicator or graphic user interface).

With the 261A for absolute pressure with measuring ranges ≤ 40 kPa absolute, you must note that the measuring mechanism was overloaded by the atmospheric pressure during transport and storage. This is why a run-in time of approx. 3 hours after startup is required until the sensor has stabilized to the point that the specified accuracy is maintained.

7.1.2 Sequence of steps:

1. Adjust pressure for lower range value and wait approx. 30 s until it has stabilized.
2. Adjustment of lower range value: Press the adjusting key ≤ 1 - output voltage settles to 4 mA.
3. Apply pressure for upper range value and wait approx. 30 s until it has stabilized.
4. Adjustment of upper range value: Press the adjusting key for about 5 s - output voltage settles to 20 mA.
5. If necessary, reset damping to the initial value.
6. Document the new settings. Approximately 25 s after the you have pressed the key for the 0 % or 100 % setting, the respective parameter will be stored non-volatile.

*This configuration procedure only changes the **4...20 mA** current signal. The representation of the physical process pressure on the digital display or on the user interface is not altered by this. To avoid a possible difference, you can make a correction via the user interface and the menu path it contains: Calibrate_Calibrate Pressure Measurement_Balance Points.*

After such a correction, you must check the setting of the device.

7.2 Operation via the LCD display keys

In conjunction with the graphic LCD display (optional), you can configure the transmitter with the four display keys as described below:

7.2.1 Controlling the menus

To be able to access the keys, you must unscrew the housing cover with observation window.

With the right ➢ key you start the menu-driven programming. This takes you immediately to the initial main menu (*Device Setup*). The complete menu structure is shown in Fig. 14.

1. Scroll with ➚ or ➘ through the menu and select the desired configuration step according to the display with the left key ➢ or the right key ➢, for example ➢: *(Exit),* ➢: *(Select)*.
2. If the menu contains submenus, select the desired submenu, for example (*Set PV).* For further submenus, proceed as before.
3. Select the desired setting.
4. The left key ➢ will take you back with (*Back, Cancel or Exit)* to the previous menu level.

The following menu structure (Fig. 14) gives you an overview of the selection / configuration options.

Fig. 13: LCD display

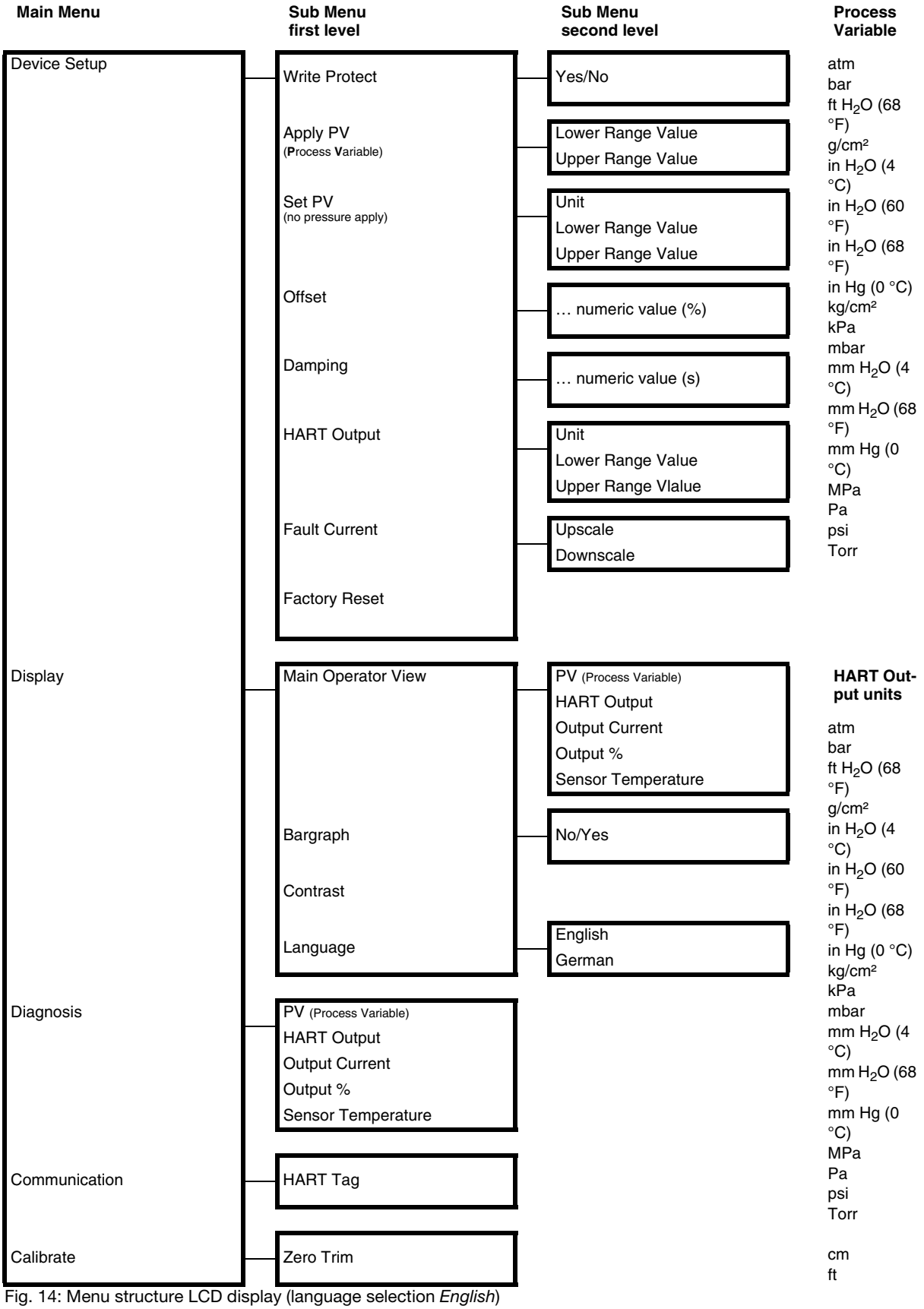


Fig. 14: Menu structure LCD display (language selection *English*)

Notes on menu items in the tree structure:

Note on canceling the menu:

In some menu items, you are required to enter a value. If no change is desired, the menu item can be exited in the following way:

Pressing the ◄(Next) key several times in succession, moves the editing cursor to the right. If the editing cursor is placed in the 8th (9th) position, (Cancel) will be displayed at the bottom right. By pressing the key, editing will be cancelled and exited or press the left key ◄(Next) and start all over.

If no key movement is detected, the menu will switch back automatically to the configured display about 5 minutes after the last key pressed.

7.2.2 Write Protect

Activation / Deactivation: via LCD indicator, DTM or HHT

If *Write Protect* is enabled, the editing options on the indicator (except for write protect) will be hidden, i. e. the 261G/A cannot be configured. Nevertheless, it is still possible to read out the values. The write protection refers to the entire device.

Caution: Furthermore, *local operation* can be disabled via the graphic interface (DTM) or a handheld (HHT).

Even when *Local Operation* is disabled, the editing options on the indicator are hidden, i.e. you can then no longer configure the 261G/A via the indicator.

It is then only possible to enable *Local Operation* via the graphic user interface (DTM) or the handheld terminal (see also 7.4.3.3).

7.2.3 Zero Trim

This function allows a zero adjustment of the measuring cell. If, for example, the transmitter indicates a small pressure value (transmitter was not installed in a true vertical position), this pressure can be trimmed to “0 Pa” via this function.

7.2.4 Apply PV

Setting of *Lower Range Value* and *Upper Range Value* with applying pressure on the device via the process or a pressure reducing station.

- Apply pressure for the lower range value and allow it to stabilize for about 30 s
- Press the right key for *OK* - output current settles to 4 mA.
- Apply pressure for upper range value and allow to stabilize for about 30 s
- Press the right key for *OK* - output current settles to 20 mA.

7.2.5 Set PV

Setting of the lower and uper range values without applying pressure from the local keys.

7.2.6 Offset

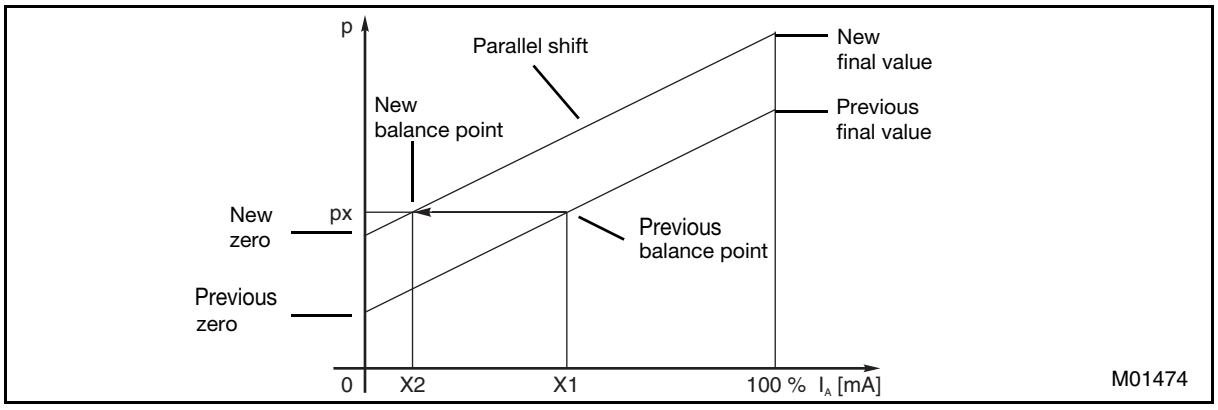


Fig. 15:

This function performs a parallel shift of the characteristic so that it runs through a point you have specified. This makes it possible to set the output signal of several measuring devices that measure the same process variable, to the same value without having to perform a calibration with applied pressure.

This function can - under the following circumstances - be carried out at any point on the characteristic:

Process variable with the adjusted measuring range - tranmsitter with linear transfer function.

By entering the desired output as a percentage value, an offset shift of the measuring range is performed.

When a pressure px is applied, the transmitter displays the standardized output value x1 as a percentage. Due to the present application, the value x2 should be displayed. The value x2 in % is set over the LCD display. The transmitter calculates the new zero and the new final value and adopts these new settings (see Fig. 15).

7.2.7 Damping

A rippled output signal from the transmitter caused by the process can be smoothed (dampened).

The additional time constant can be set in steps of 0.0001 s between 0 s and 60 s

The set damping does not influence the digitally displayed measured value as a physical unit; instead, it only affects the quantities derived from it such as the analog output current, HART output (free assignment of starting and final values and unit).

7.2.8 HART output

A HART output refers to the free assignment of starting and final values and unit to the measured pressure. If the values are configured so that the 0 % and 100 % points correspond to the 5 m and 20 m respectively, the HART output will indicate a value of 12.5 m at a pressure of 50 %.

7.2.9 HART tag

Each transmitter requires a unique bus ID in order to communicate within a bus structure. Via (*Communication)* the bus ID (tag) can be entered with a max. of 8 characters. Valid characters are uppercase letters, numbers, blanks and other special characters.

Editing the HART tag

Menu access via (*Communication)* according to the tree structure (Fig. 13/14). The editing mode is accessed by selection (*Select)* or (*Edit)*.

Now you can select step by step and character by character from the middle character selection list via both keys ⮜ (character block moves to the left) or ⮞ (character block moves to the right). In this case, selected means the desired character is located under the stationary cursor in the middle on a dark background. This character then appears in the upper area where the (*HART tag)* is listed. To proceed to the next editing area of the (*HART tag)*, press the left key ⮜ *(Next)*. Not until the (*HART tag)* has been completely entered (max. 8 char.), confirm the end with the right key ⮞ (*OK*). Pressing the key ⮜ *(Next)* several times in succession, moves the editing cursor to the right. If the editing cursor is placed in the 9th position, *(Cancel)* will be displayed at the bottom right. By confirming (cancel), editing mode will be cancelled and exited, or press the left key ⮜ *(Next)* and start all over.

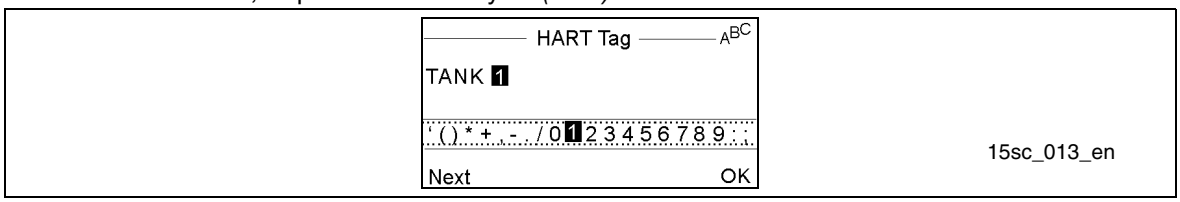


Fig. 16:

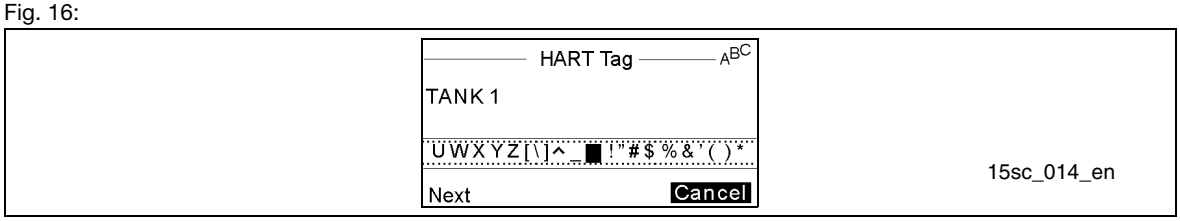


Fig. 17:

7.2.10 Fault current

If a serious error is detected during the internal monitoring routines performed by the transmitter, the transmitter switches the output signal to a defined minimum or maximum value as a message.

In the menu command *Alarm Current*, you can select the alarm response, the modulation direction of the output current in the event of a malfunction.

High alarm current means that the output current is switched to the configured high alarm current.

Low alarm current switches the output current onto the configured low alarm current. The level of the low or high alarm current can only be changed using the graphic user interface (DTM) or a handheld terminal with the loaded DD (device description) of the transmitter 261.

Setting limits:

- Low alarm current 3.5...4 mA,
- High alarm current 20...22.5 mA. Default setting at the factory:
  High alarm current, 21 mA.

7.2.11 Display – Main operator view

Choose a parameter from the list that will be displayed during normal operation.

7.2.12 Diagnostics

The listed parameters can be displayed temporarily. The display configuration set under main operator view is not altered.

7.2.13 Contrast

If the lighting conditions are unfavorable, making it difficult to read the indicator, you can adjust the background by making it darker or lighter (or keys). The standard setting is 50 %. If it is not possible to read the menu due to a strong contrast adjustment or change in temperature, pressing both outer keys > for 5 s will restore the default contrast setting.

7.2.14 Factory reset (restoring the default settings)

This restores the transmitter setting to the the value set at the factory.

7.3 Display of measured values

7.3.1 LCD indicator

The indicator is a graphic display. The display is dependent on the respective configuration step.

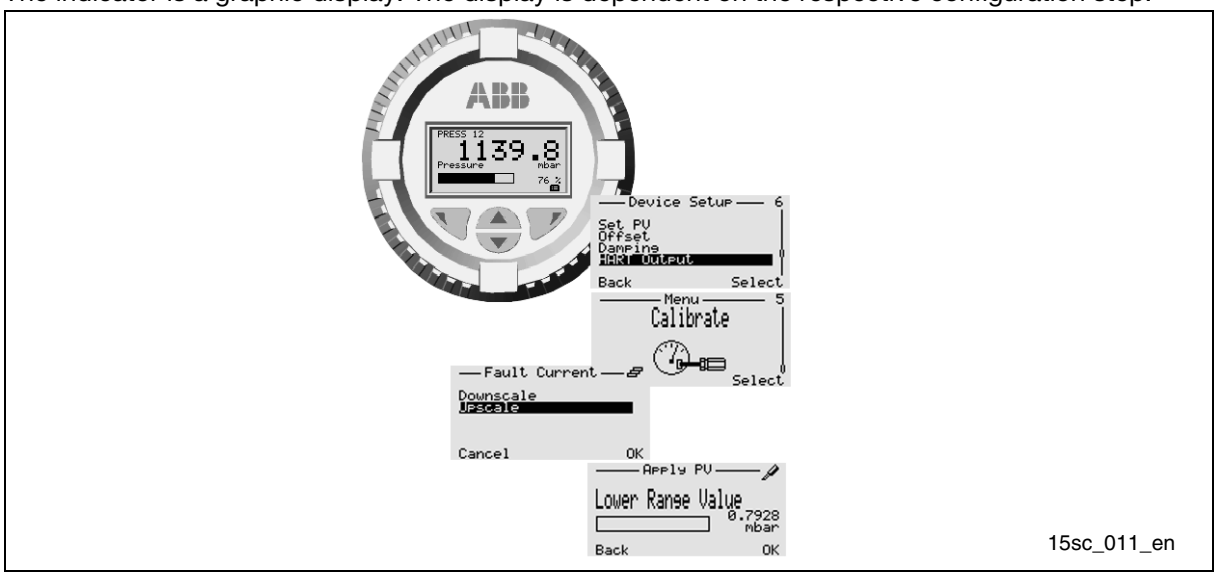


Fig. 18: Indicator (Option)

7.3.1.1 Displaying the physical value

Fig. 19: Display

Line 1: *HART tag*

Line 2: Amount of the configured display value
Maximum display: ±999999.
The decimal point is positioned automatically so that the maximum value can be displayed as a six-figure value. If the value is exceeded, “Overflow” is shown as 6 upward or downward pointing arrows. A decimal point counts as a place and is no longer displayed after the sixth place.
(Example of positioning the decimal point:
Setting 0...1000.0 - in this case even smaller values are only displayed with only one decimal place)
The following variables are displayed with a fixed decimal place:

Variable	Decimal places
T (Sensor temperature)	1
OUT (Output) %	1
OUT (Output current)	2

Table 1:

Line 3:

left: PV, HART, OUT or T

right: the configured dimension.

PV = Process variable (process pressure)

HART = Selectable process variable assigned to the output

OUT = Output (%, current)

T = Sensor temperature

Line 4: Bar display + numerical % value (only if configured)

Line 5

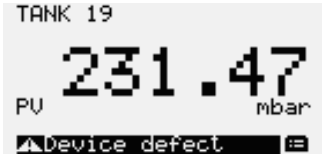
left: A character with a blinking message text can appear here (see Table 2).
in the middle: icon when write protection is enabled (is covered for message text).

right: Icon for access to the menu.

Symbols	Message priority	Type of message	Examples
		**Write protection**	Write protection is set
	1	**Error message** *Device defect* Indicates that a serious device error has occurred (the device must be replaced)	• An internal component is not working properly, for example the AD converter, sensor equipment, pressure or temperature sensors.
	2 3	**Warning message** *Simulation active* *Maintenance required* Indicates a current special operating condition or event.	• Test function is running • Simulation of the output current • Exceeded the max. number of write cycles
	4a 4b 4c	**Process message** *Press. < > Limit* *Pressure < > Span* *Temperature* Message indicating that a parameter has fallen below or exceeded a process alarm condition.	• Pressure from outside the adjusted span • Pressure outside of the sensor limits • Sensor temperature outside of the range

Table 2: Explanation of the symbols

- **Error, warning or process message is present:**
  A symbol according to table 1 and a blinking error message will appear until the message status is no longer present.
  If you press the left indicator key ➢ when a message is blinking, the blinking messages will become a permanent one.
  A write protection icon will be covered by one of these messages.



15sc_015

Fig. 20:

7.4 Configuration

7.4.1 Transmitter with HART communication and 4 to 20 mA output current in the default configuration

The transmitter is factory set to a span specified by the customer. The range set and the measuring location number are printed on the type label. If this data has not been specified by the customer, the transmitter will be delivered with the following configuration:

4 mA	zero point
20 mA	upper range limit (URL)
Output	linear
Damping	0.1 s
Transmitter in error mode	21 mA
Optional LCD display	0 to 100 %

Individual or all of the parameters specified above, including zero and span, can be easily changed with the optional LCD display, a mobile HART handheld terminal or with the PC configuration software SMART VISION with the DTM for 2600T.

7.4.2 Operation with PC/notebook or handheld terminal

To configure the transmitter via PC/notebook, the graphic user interface (DTM) is required. For operating instructions, please refer to the software description.

Further information: Datasheet for the DTM / SMART VISION.

Communication protocol:	HART®
Hardware:	FSK modem for PC/notebook
HART handheld terminal (HHT):	for example 691 HT, HHT275 / 375

With a handheld terminal you can read out or configure/calibrate the transmitter. If a communication resistor has already been installed in the connected supply device, you can clamp the HHT directly along the 4 ... 20 mA cable.

If there is no communication resistor (min. 250 Ω), then one must be connected to the cable. The HHT is connected between the resistor and the transmitter, not between the resistor and supply device!

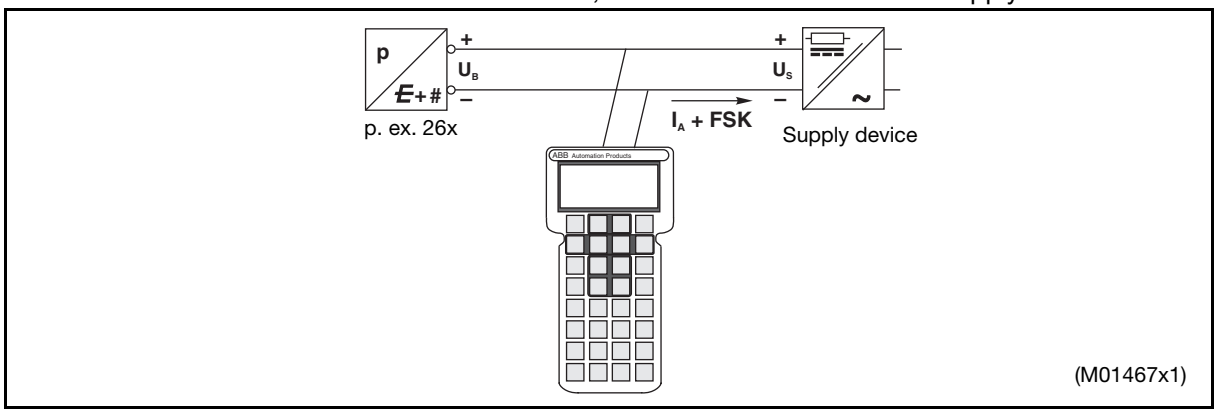


Fig. 21: Setting up communication using a handheld terminal

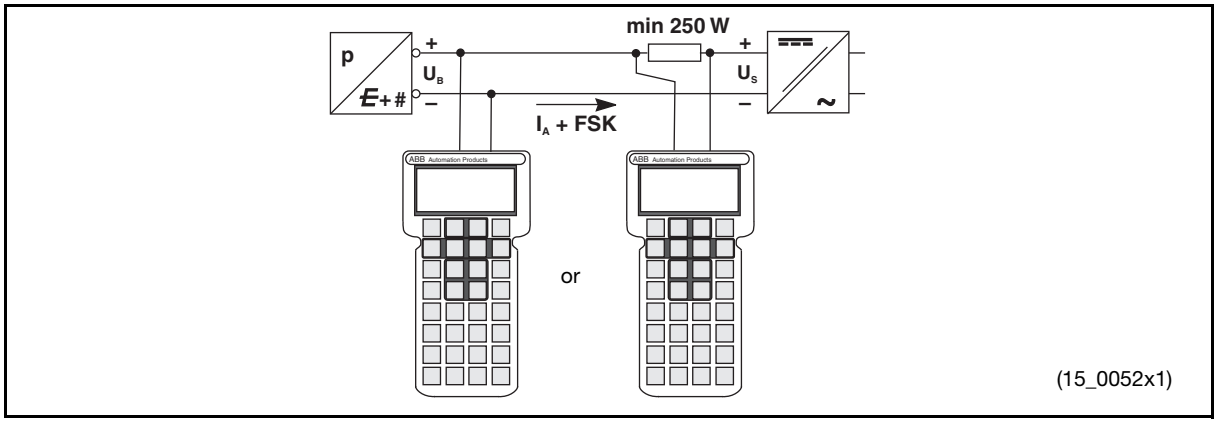


Fig. 22: Connection examples with communication resistor in the connection line

For further information, see the operating manual enclosed with the handheld terminal.
If the transmitter was configured in the manufacturer's plant according to specification made by the user for the measuring location, all you have to do is mount the transmitter according to the regulations (correct any tilt of the measuring mechanism: see s 6.2), and switch it on. The measuring station is now ready for operation. If the transmitter is equipped with an LCD indicator, the current pressure / absolute pressure in % (factory setting, if not ordered otherwise) will be displayed.

If, however, you still wish to make changes to the configuration, you will need the graphic user interface (DTM). This tool makes the device fully configurable. It supports the HART protocol and runs on a PC/ notebook or on an automated system.

Please refer to the installation manual enclosed with the software for steps required to install the operating tool. The most important parameters can be set under the path C*onfigure_Pressure Measurement*.

The program offers the option of configuring, querying, and testing the transmitter. Furthermore, an offline configuration can be performed by using an internal database. Each configuration step is subject to a plausibility check. You can call up context-sensitive help at any time by pressing the <F1> key.

After you have received the transmitter or before you change the configuration, we recommend that you save the existing configuration data on a separate data storage medium under the path File_Safe.

7.4.3 Operating the graphic operating interface (DTM)

7.4.3.1 System requirements

- Operating control program for example SMART VISION version 4.01 or later
- DTM (Device Type Manager) (graphic user interface)

Operating system

- according to the respective control program.

To start the DTM, use the right mouse key or select the menu command “Device” and then “More” and “Edit”. After you select the “Connect” (3rd step), the data of the 261G/A should at first be completely loaded. Modified data appears underlined in blue. If a modified value is not displayed underlined in blue, click in another window before the data is transferred to the device. The modified value will then be displayed underlined in blue. This data is sent to the device with *Safe to device*.

After the data is saved in the transmitter, the data will be automatically saved non-volatile. For this purpose, the transmitter must be supplied with auxiliary power for 2 minutes. If you fail to observe this, the previous data will be reactivated for the next operation.

The communication name is automatically updated when the data is loaded from the device.

The most important configuration/parameterization options within the user interface are briefly listed below: For further information on the menu commands, please refer to the context-sensitive help.

Before you start with the settings, please make sure that neither *write protection* has been enabled nor *local operation* has been disabled.

Menu path: *Configure_Basic Parameter_General*

7.4.3.2 Write Protection

Enabling / Disabling: via LCD, DTM or HHT indicator.

If *Device write locked* has been enabled, it is not possible to make configurations on the device or over external tools, for example the handheld terminal (HHT). However, it is possible to read out data.

Write protection is cancelled with *User data write enabled*.

7.4.3.3 Local Operation

Enabling / Disabling: only via DTM or HHT.

Local Operation “*disabled”* means that the transmitter cannot be configured with the adjusting key for zero /span or, if an LCD display (optional) is present, cannot be configured from the indicator menu.

A *disabled local operation* can not be re-***enabled*** on the LCD indicator.

7.4.3.4 Correcting the zero shift

Menu path: *Configure_Pressure Measurement_Pressure*

Press the key <Adjust> in the field “Zero Shift.”

Calibration is performed immediately and saved non-volatile in the transmitter.

7.4.3.5 Setting the upper and lower range value

Menu path: *Configure_Pressure Measurement_Pressure*

The field “Scaling” offers two setting options:

Enter value:

Enter the desired values in the entry fields: “Lower Range Value” and “Upper Range Value.”

or

Process Pressure Transfer:

For the settings, the lower range value and upper range value are applied as pressures on the measuring mechanism. After the desired stabilized pressure has been reached, click the keys < Set lower range value > or < Set upper range value >. Ensure that measuring limits are not exceeded.

Reducing stations can be used as sensors with adjustable pressure and comparative indicator. When making the connection, please ensure that there are no residual fluids (for gaseous testing materials) or air bubbles in the connection lines, since they can lead to errors during the check.

The possible measuring deviation of the pressure sensor should be at least three times smaller than the desired measuring deviation of the transmitter.

7.4.3.6 Adjust Damping

Menu path: *Configure_Pressure Measurement_Pressure*

Enter the desired damping value in the field “Output parameter” in the line “Damping.”

The additional time constant can be set in steps of 0.0001 s between 0 s and 60 s

7.4.3.7 Offset

Menu path: *Configure_Pressure Measurement_Pressure*

This function performs an offset shift of the characteristic so that it runs through a point you have specified. This makes it possible to set the output signal of several measuring devices that measure the same process variable to the same value without having to perform a calibration with pressure specification. For further information, see 7.2.6. The respective new X2 value (in %) is to be entered in the window < *The current measurement value corresponds to* > .

7.4.3.8 Description

Menu path: *Device_Identification_Device*

Here you can enter a tag with a maximum number of 16 characters.

Valid characters are uppercase letters, numbers, blanks and other special characters.

7.4.3.9 Communication tag (HART tag)

Menu path: *Device_Identification_Device*

Each transmitter requires a unique bus ID in order to communicate within a bus structure. The bus ID can be entered with a max. of 8 characters here. Valid characters are uppercase letters, numbers, blanks and other special characters.

7.4.3.10 Reset to Factory Default

Menu path: *Device_Reset_Reset to factory default*

This restores the transmitter setting to the the default value set at the factory.

7.4.3.11 Warm start

Menu path: *Device_Reset_Warm Start*

The transmitter is restarted with its basic settings. Temporary settings such as simulating the output or the diagnostic messages are reset.

Caution: This action will briefly interrupt the connection.

8. Maintenance

If used as directed, the transmitter does not require any maintenance.

It suffices to check the output signal in regular intervals, depending on the operating conditions described in section 7.

If deposits are expected in the measuring mechanism, the measuring mechanism should also be cleaned on a regular basis, depending on the operating conditions. The mechanism should be cleaned, if at all possible, in a workshop.

If a pressure sensor is mounted to the measuring mechanism, it must not be detached!

9. Repairs

Explosion protected transmitters may only be repaired by the manufacturer or else must be approved by a certified expert after the repairs!

Observe the relevant safety precautions before, during and after the repairs.

Disassemble the transmitter only as far as needed to be able to clean, inspect and repair it.

Observe section 8!

This type of transmitter does not require repairs, the replacement of the electronic components or the measuring mechanism at the user's location.

Repairs can only be carried out in the manufacturer's plant.

Returns

When you send a defective transmitter to the repair department, include information describing the error and, if possible, the cause of each defective component.

This helps us perform the repairs quickly without having to contact you for further details.

Before you return the device, please clean it and pack it safely and securely.

When ordering spare parts or replacement devices, please always provide the serial number (S/N) of the original device as well as the year of manufacture.

Address:

ABB Automation Products GmbH

Abteilung Parts & Repair

Schillerstrasse 72

D-32425 Minden

GERMANY

10. Technical data

10.1 Functional specification

Measuring range and span limit values

Sensor code	Upper range limit (URL)	Lower range limit (LRL)	Minimum span	
			261G Gauge pressure	261A Absolute pressure
C	6 kPa 60 mbar 24 inH2O	-6 kPa -60 mbar -24 inH2O	0.3 kPa 3 mbar 1.2 inH2O	0.3 kPa 3 mbar 2.25 mmHg
F	40 kPa 400 mbar 160 inH2O	-40 kPa -400 mbar -160 inH2O	2 kPa 20 mbar 8 inH2O	2 kPa 20 mbar 15 mmHg
L	250 kPa 2500 mbar 1000 inH2O	0 absolute	12.5 kPa 125 mbar 50 inH2O	12.5 kPa 125 mbar 93.8 mmHg
D	1000 kPa 10 bar 145 psi	0 absolute	50 kPa 500 mbar 7.25 psi	50 kPa 500 mbar 375 mmHg
U	3000 kPa 30 bar 435 psi	0 absolute	150 kPa 1.5 bar 21.7 psi	150 kPa 1.5 bar 21.7 psi
R	10000 kPa 100 bar 1450 psi	0 absolute	500 kPa 5 bar 72.5 psi	
V	60000 kPa 600 bar 8700 psi	0 absolute	3000 kPa 30 bar 435 psi	

Table 3:

Note:

The lower range limit (LRL) for 261A is 0 absolute for all measuring ranges.

Span values

Maximum span = URL = Upper range limit

WE RECOMMEND THAT YOU SELECT THE TRANSMITTER SENSOR WITH THE TURNDOWN AS SMALL AS POSSIBLE AS A WAY TO OPTIMIZE THE PERFORMANCE DATA.

TURNDOWN = Range limit/set span

Zero point suppression and increase

Zero and span can be set to any value within the table of the measuring range limits listed if the following condition is met:

– Adjusted span ≥ Minimum span

Damping

Adjustable time constant: 0 to 60 s

These times apply in addition to the sensor response time and can be set using the optional LCD display, handheld terminal or via the PC user interface.

Warm-up time

Operation with the specification: ≤ 10 s for minimal damping

Insulation resistance

> 100 MΩ at 500 V DC (between connecting terminals and ground)

10.2 Operating limit values

10.2.1 Temperature limits in °C (°F):

Ambient (operating temperature)

-40°C...+85°C (-40°F...+185°F)

White oil filling:	-10°C...+85°C (-14°F...+185°F)
Lower ambient temperature limit for LCD display and Viton gasket:	-20°C (+68°F)
Lower ambient temperature limit for Perfluorelastomer gasket:	-25°C (-13°F) or -15°C (+5°F) (see the section Pressure limits)
Upper ambient temperature limit for Perfluorelastomer gasket:	+80°C (+176°F)
Upper ambient temperature limit for LCD display	+70°C (+158°F)

Note:

For applications in an explosion hazardous atmosphere the specified temperature range of the approval must be observed.

Process

Lower limit

-50°C (-58°F); -20°C (-4°F) for Viton gasket

-25°C (-13°F) or -15°C (+5°F) for the Perfluorelastomer gasket (see the section Pressure limits)

-10°C (+14°F) for white oil

Upper limit

+120°C (+248°F)

+80°C (+176°F) for a Perfluorelastomer gasket

Storage

Lower limit:	-50°C (-58°F); -40°C (-40°F) for LCD display -10°C (+14°F) for white oil
Upper limit:	+85°C (+185°F)

10.2.2 Pressure limits

Gauge pressure limits (without damaging the transmitter)

absolute 0 to

- 1 MPa, 10 bar, 145 psi for sensor code C, F
- 0.5 MPa, 5 bar, 72.5 psi for sensor code L
- 2 MPa, 20 bar, 290 psi for sensor code D
- 6 MPa, 60 bar, 870 psi for sensor code U
- 20 MPa, 200 bar, 2900 psi for sensor code R
- 90 MPa, 900 bar, 13050 psi for sensor code V
- 0.6 MPa abs, 6 bar abs, 87 psia for the Perfluorelastomer gasket, T ≥-15°C (+5°F)
- 0.18 MPa abs, 1.8 bar abs, 26 psia for the Perfluorelastomer gasket, T ≥-25°C (-13°F)

Proof pressure

For a pressure test, the transmitter can be tested with the following pressures:

see the section Gauge pressure limits

10.3 Limit values for environmental influences

Electromagnetic Compatibility (EMC)

Conforms to the requirements and tests of the EMC Directive 89/336/EC as well as EN 61000-6-3 in reference to emitted interference and EN 61000-6-2 in reference to interference resistance. Fulfils the NAMUR recommendations.

Low voltage directive

Compliant with 73/23/EC

Pressure equipment directive (PED)

Compliant with 97/23/EC category III, module H.

Moisture

Relative humidity:	up to 100 %
Condensation, icing:	permissible

Resistance to vibration

Acceleration up to 2 g at frequencies of up to 1000 Hz (in accordance with IEC 60068-2-6)

Shock resistance (according to IEC 600068-2-27)

Acceleration:	50 g
Duration:	11 ms

Moist and dusty atmosphere

The transmitter is resistant to dust and sand and protected against submersion effects according to IEC EN60529 (1989) with IP 67 (on request with IP 68, IP 69K) or according to NEMA 4X or in accordance with JIS C0920.

10.3.1 Explosion hazardous atmospheres

Transmitter of the explosion protection class "intrinsically safe EEX ia/ib" according to the directive 94/9/EC (ATEX)

Transmitter with an output signal of 4...20 mA and HART communication

Marking: II 1/2 G EEx ia IIC T4...T6
II 2 G EEx ib IIC T4...T6

Permissible ambient temperature range dependent on the temperature class:

Ambient temperature Temperature class

-40°C...+85°C (-40°F...+185°F)T1 to T4

-40°C...+71°C (-40°F...+159°F)T5

-40°C...+56°C (-40°F...+132°F)T6

or

Marking: II 1/2 D IP65 T95°C Ex ia D
II 2 D IP65 T95°C Ex ib D

Permissible ambient temperature range:

-40°C...+85°C (-40°F…+185°F)

Supply and signal current circuit in explosion protection class intrinsic safety EEx ia/ib IIB/IIC with the following peak values:

Ui = 30 V

Ii = 130 mA

Pi = 0.8 W

Effective inner capacity: Ci = 10 nF

Effective inner inductivity: Li = 10 µH

Factory Mutual (FM) (pending approval)

Transmitter with an output signal of 4...20 mA and HART communication

Intrinsically safe: Class I, II and III; Division 1; Groups A, B, C, D, E, F, G
Class I; Zone 0; AEx ia Group IIC T6; T4

Non-incentive Class I, II, and III, Division 2, Groups A, B, C, D, F, G

Type of protection: NEMA Type 4X (inside and outside)

Canadian Standard (CSA) (pending approval)

Transmitter with an output signal of 4...20 mA and HART communication

Intrinsically safe: Class I, II and III; Division 1; Groups A, B, C, D, E, F, G
Class I; Zone 0; AEx ia Group IIC T6; T4

Non-incentive Class I, II, and III, Division 2, Groups A, B, C, D, F, G

Type of protection: NEMA Type 4X (inside and outside)

10.4 Electrical data and options

10.4.1 HART digital communication and 4 to 20 mA output voltage

Power supply

The transmitter works with voltages of 11 to 42 V DC without load impedance and is protected against incorrectly polarized connections (load impedances in the shunt circuit allow the use of voltages above 42 V DC).

For EEx ia and other intrinsically approved variants, the power supply must not exceed 30 V DC.

Ripple

Maximum possible ripple of the power supply during communication:

According to HART FSK “Physical Layer” specification revision 8.1

Load impedance limit

Total shunt circuit resistance at 4 to 20 mA and HART:

$$R(k\Omega) = \frac{\text{Supply voltage} - \text{Minimum operating voltage}}{22.5\ \text{mA}}$$

A minimum resistance of 250 Ω is required for HART communication.

LCD display (optional)

Digital, graphic LCD display for customized display of:

Gauge pressure/absolute pressure or

Output current in percent or

Output current in mA or

HART output (free assignment of starting and final values and unit)

In addition to diagnostic messages, alarms, errors and values exceeding the measuring range are shown on the display.

Furthermore, the LCD display can be used with 4 keys for configuring and parameterizing the transmitter.

Output signal

Dual wire 4 to 20 mA output

HART® communication delivers digital process information (%, mA or physical units), that is superimposed on the signal (4 to 20 mA) (protocol in accordance with Standard Bell 202 FSK).

Output current limit value (in accordance with the NAMUR standard)

Overload condition

- Lower limit: 3.8 mA (configurable up to 3.5 mA)
- Upper limit: 20.5 mA (configurable up to 22.5 mA)

Alarm current

Minimal alarm current:	configurable from 3.5 mA to 4 mA, standard setting: 3.6 mA
Maximum alarm current:	configurable from 20 mA to 22.5 mA, standard setting: 21 mA
Standard setting:	maximum alarm current

SIL - functional security (optional)

according to IEC 61 508 / 61 511

Device with certificate of conformity for use in security relevant applications up to SIL 2

10.5 Performance specification

This applies to reference conditions according to IEC 60770: Ambient temperature 20°C (68°F), relative humidity 65 %, atmospheric ambient pressure 1013 hPa, zero point based measuring range for transmitter with separating diaphragm of ceramic or Hastelloy and silicon oil filling. Characteristic setting: linear, 4-20 mA.

If not noted elsewhere, errors are indicated as a percentage of the span.

The measuring precision, based on the upper range limit (URL), is subject to the influence of turndown (TD) and the ratio of upper range limit to the set span (URL/span).

WE RECOMMEND THAT YOU SELECT THE TRANSMITTER SENSOR WITH THE TURNDOWN AS SMALL AS POSSIBLE AS A WAY TO OPTIMIZE THE ACCURACY OF MEASUREMENT.

Dynamic performance (according to IEC 61298-1)

Dead time: 100 ms

Time constant (63.2 % change of overall level):

- for all sensors: 150 ms

Accuracy rating

Percentage of adjusted span including the general influences of linearity, hysteresis, and reproducibility.

- ±0.15 % at a turndown of 1:1 to 10:1

$$\pm\left(0.15\% + 0.005 \times \frac{\text{URL}}{\text{Span}} - 0{,}05\%\right)$$ with a turndown ratio > 10:1

10.5.1 Operation influences

Ambient temperature

per 10 K (18°F) change between the limit values of -10°C...+60°C (+14°F...+140°F)

±(0.15 % of upper range limit +0.15 % of span)

Power supply

Within which the specified limit value of the voltage/load impedance, the total influence is smaller than 0.001 % of the upper range limit per volt.

Load impedance

The total influence is negligible within the load impedance/voltage limits.

Electromagnetic fields

Total influence: less that 0.3 % of the span, from 80 to 1000 MHz and at field strengths up to 10 V/m, during tests with unshielded lines, with or without display.

Stability

±0.10 % of the upper range limit over a period of 12 months

Vibration influence

±0.10 % of the upper range limit (according to IEC 61298-3)

10.6 Technical specification

(The availability of different variants of the selected transmitter can be checked in the order lists.)

10.6.1 Materials

Separating diaphragm (*)

Ceramic (AL_2O_3) gold plated, Hastelloy C276™; Hastelloy C276™ gold plated, stainless steel (1.4435 / 316L)

Process connection (*)

Hastelloy C276™, stainless steel (1.4404 / 316L)

Gasket (only for Sensor Code C, F)

Viton™, Perfluorelastomer, Perbunan (NBR)

Sensor filling fluid

Silicon oil, Inert filling (fluorocarbons), white oil (FDA)

Mounting bracket

Stainless steel

Sensor body

Stainless steel (1.4404 / 316L)

Electronic housing and cover

Stainless steel (1.4404 / 316L)

Filter for atmosphere ventilation

Plastic (standard), stainless steel

O-ring cover

EPDM

Type label

Plastic data plate attached to the electronic housing

™ Hastelloy is a trademark of the Cabot Corporation

™ Viton is a trademark of Dupont de Nemour

(*) Parts of the transmitter that come into contact with the medium

10.6.2 Calibration

Standard: 0 to upper range limit (URL)

Optional: at specific span

10.6.3 Optional accessories

Mounting brackets

For perpendicular and horizontal 60 mm tubes (2") or wall fastenings

LCD display

Graphical display, pluggable and rotating model

Additional tag number plate

Attachment sign with wire hoop (both stainless steel) attached to transmitter, max. 30 characters including blanks.

Cleanliness level for oxygen application

Certificates (testing, design, characteristic, material certificate)

Language of operation manual

Process connections

1/2-14 NPT internal or external thread; DIN EN 837-1 G 1/2 B or G 1/2 B (HP) for convex seal; front bonded diaphragm; for ball valve connection

Electrical connections

M16 x 1.5 tap hole for cable gland, directly on the housing

or 1/2-14 NPT (delivery without cable gland)

or M20 x 1.5 (delivery without cable gland)

or Harting Han 8U connector

or miniature connector (delivery without mating electrical socket)

Connecting terminals

HART version: two connections for signal/auxiliary power, for cross wire section up to 1.5 mm^2 (AWG)

Ground (optional)

External ground terminals for cross wire sections up to 4 mm^2 (12 AWG).

Installation position

The transmitter can be installed in any position.

Weight (without options)

Approx. 0.7 kg, packaging additional 650 g

Packaging

Box with the dimensions of approx. 240 x 140 x 190 mm (9.45 x 5.51 x 7.48 inch)

11. Device Designation

11.1 Type label

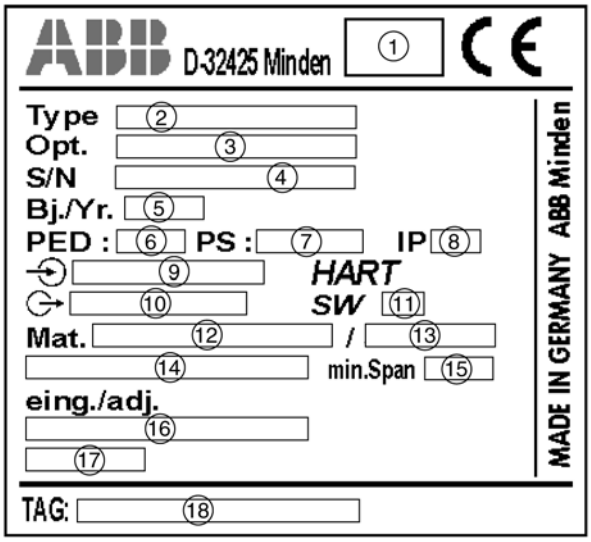


Fig. 23: Type label for transmitter 261xx 15_0053x1

1 “SIL2” identification code (optional)
2 Device type/Order code
For the meaning of the individual letters/digits, please see the order confirmation or the device datasheet.
3 Options - further information on the order code
4 Device serial number (factory no.)
5 Year of manufacture
6 Identification code in reference to the pressure equipment directive (SEP or 1 G) see 11.2
7 Permissible pressure
8 Protection class
9 Auxiliary power
10 Output signal
11 Software version
12 Materials that come into contact with the media
13 Filling fluid, if present
14 Lower to upper range limit (LRL to URL)
15 Minimum span
16 Span, set to ...
17 HART output (process variable)
18 Tag (max. 32 places)

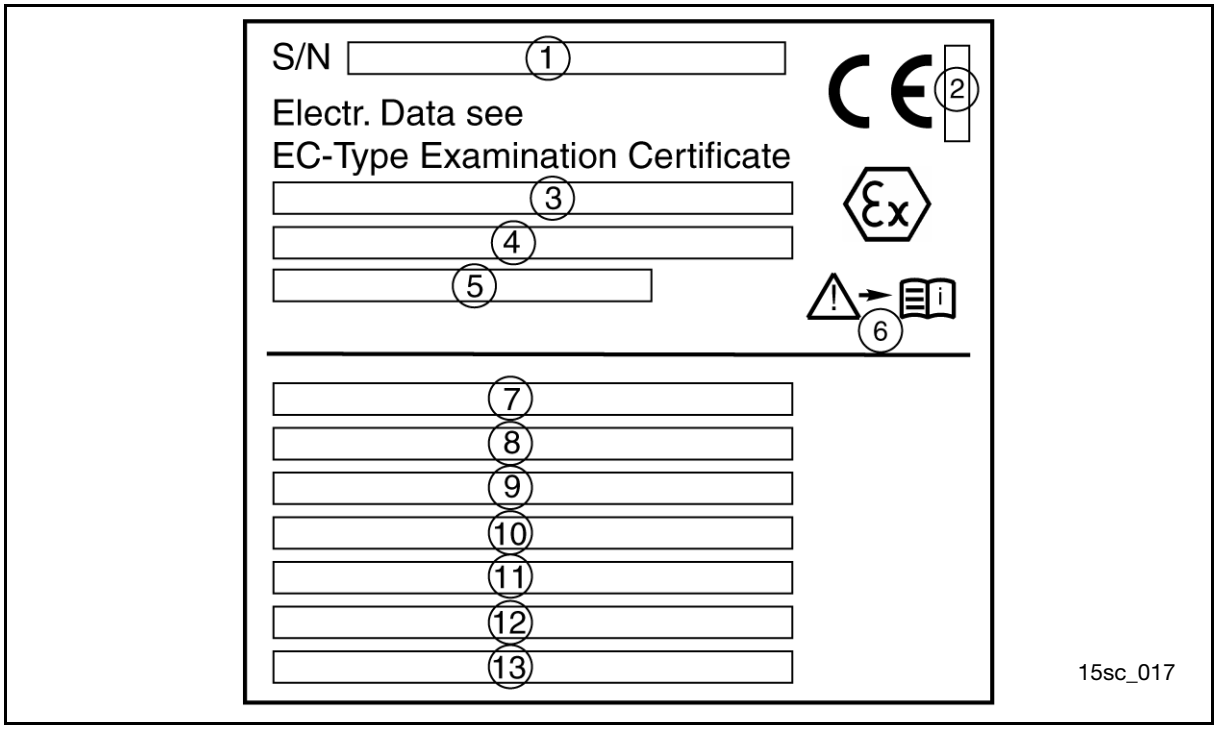


Fig. 24: Additional type label for devices for hazardous areas and for devices with direct mount or remote seals (optional)

1 Serial number (factory no.)

2 Identification number of the notified body in reference to ATEX (optional)

3 Explosion protection class e.g. II 1/2 G EEx ia IIC T6/T4

4 Continuation of line 3

5 Number of the EC type examination certificate

6 Symbol: Caution observe the specifications in the operating manual and type examination certificate

7 Order code for the direct mount or remote seal
For the meaning of the individual letters/digits, please see the order confirmation or the device datasheet.

8 to 13 type of the direct mount or remote seal, nominal width, max. pressure, temperature limits, seal surface, material, filling liquid

11.2 Compliance with the pressure equipment directive (97/23/EC)

11.2.1 Devices with PS > 200 bar (20 Mpa)

Devices with a permissible pressure PS > 200 bar (20 Mpa) were tested for conformity by the Technical Supervisory Association (TÜV NORD) in accordance with module H and can be used for fluids of the group 1 (PED: 1 G).

The type label contains the following identification codes (example).

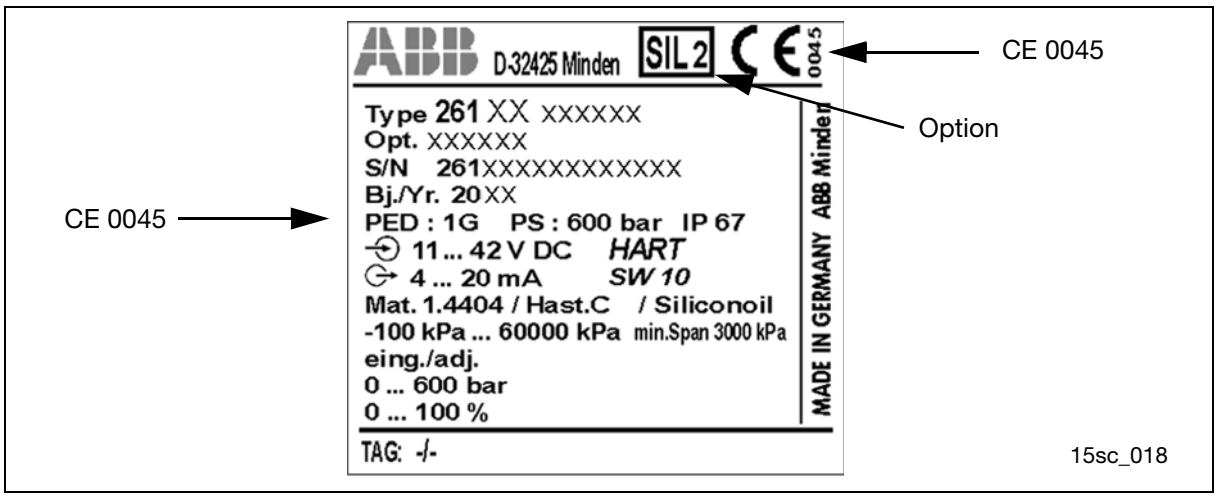


Fig. 25:

11.2.2 Devices with PS ≤ 200 bar (20 Mpa)

Devices with a permissible pressure PS ≤ 200 bar (20 MPa) conform to sec. 2 para. (3) and were not tested for conformity. The devices were constructed and manufactured according to valid standard engineering principles (SEP).

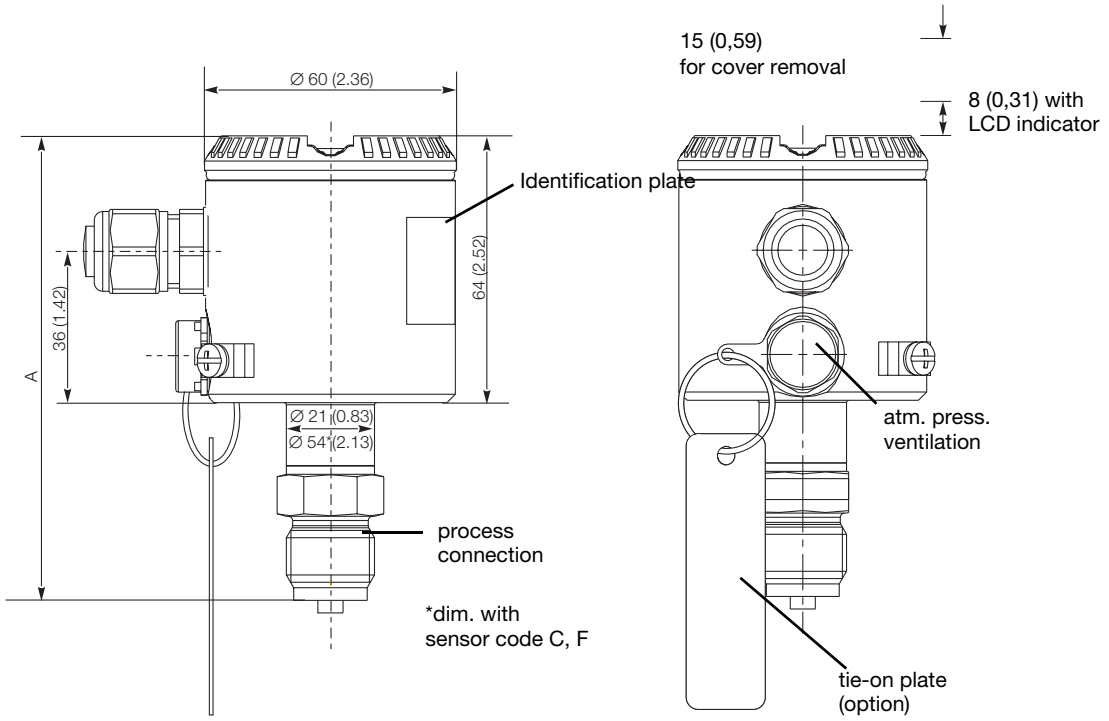
The CE marking on the device applies not only to the pressure equipment directive.

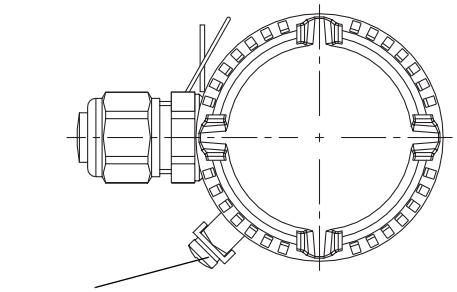
The type label contains the following codes: PED: SEP.

12. Dimensional Drawings

INSTALLATION DIMENSIONS (no design specifications) - dimensions in mm (inch)

12.1 Version with cable gland





earthing /
potential equalization
terminal (option)

Dim. “A” depends on the process connection

Process connection	
1/2-14 NPT male thread	111 (4.37)
1/2-14 NPT female thread	106 (4.17)/(110(4.33) sensor V
DIN EN 837-1 G 1/2 B	111 (4.37)
DIN EN 837 G 1/2 B (HP) for connections with convex seal	121 (4.76)E

Fig. 26:

12.2 Version with the options LCD display and Harting Han plug

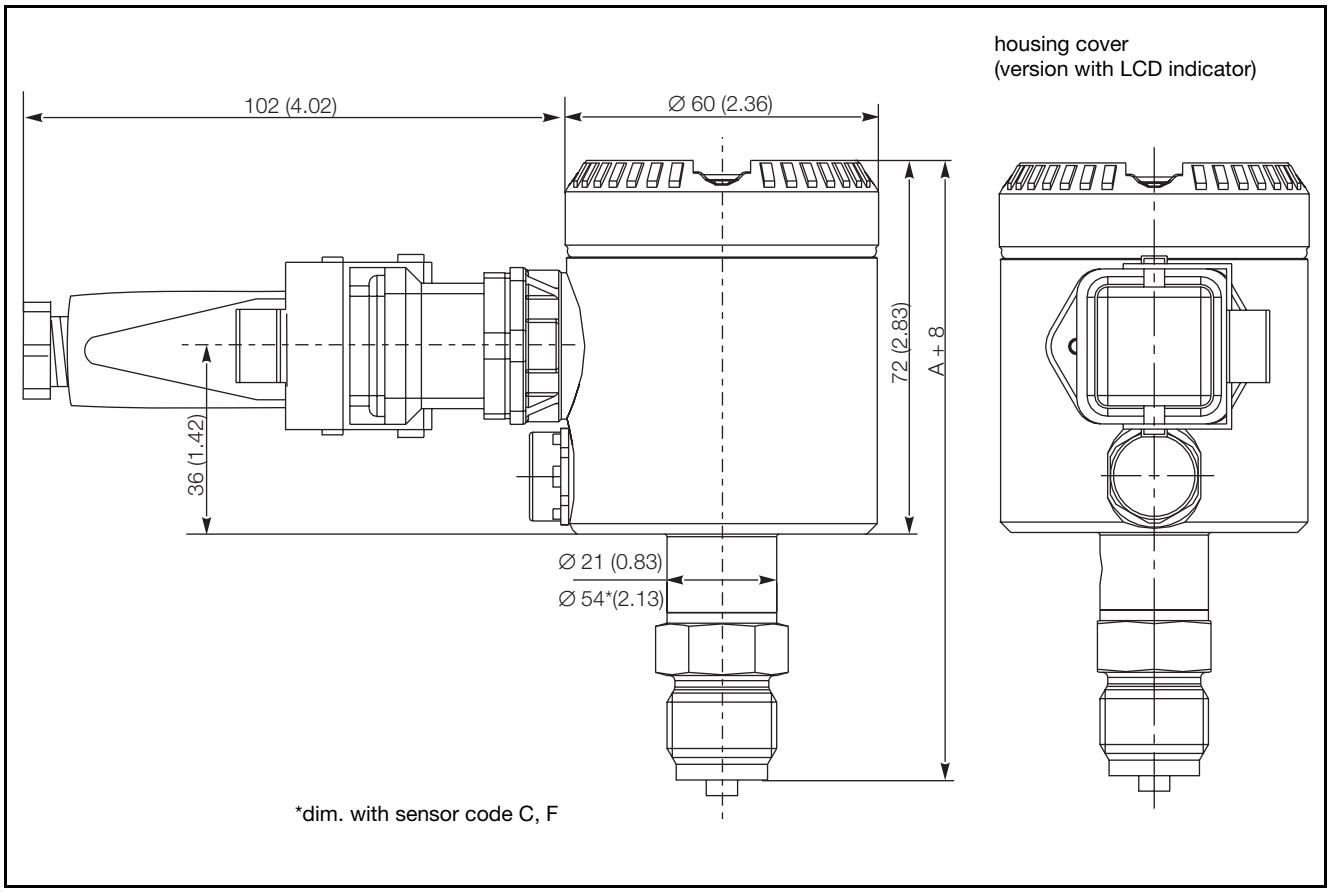
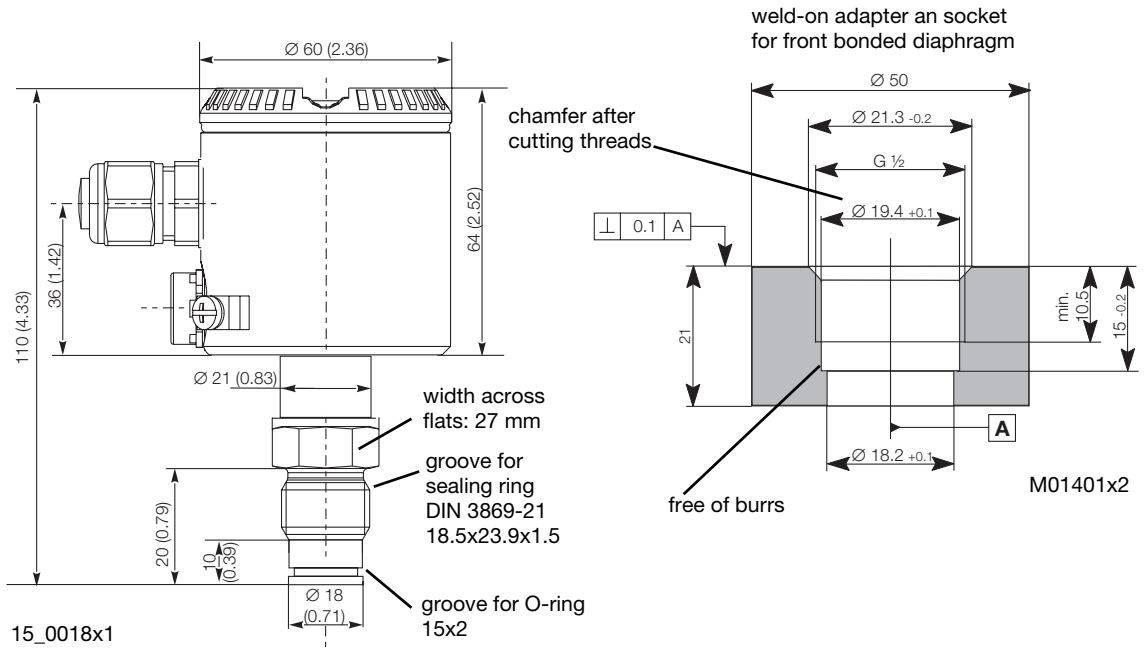


Fig. 27:

Dim. “A” depends on the process connection

Process connection	
1/2-14 NPT male thread	111 (4.37)
1/2-14 NPT female thread	106 (4.17)/(110(4.33) sensor V
DIN EN 837-1 G 1/2 B	111 (4.37)
DIN EN 837 G 1/2 B (HP) for connections with convex seal	121 (4.76)E

12.3 Version with a front bonded diaphragm



12.4 Transmitter with ball valve connection

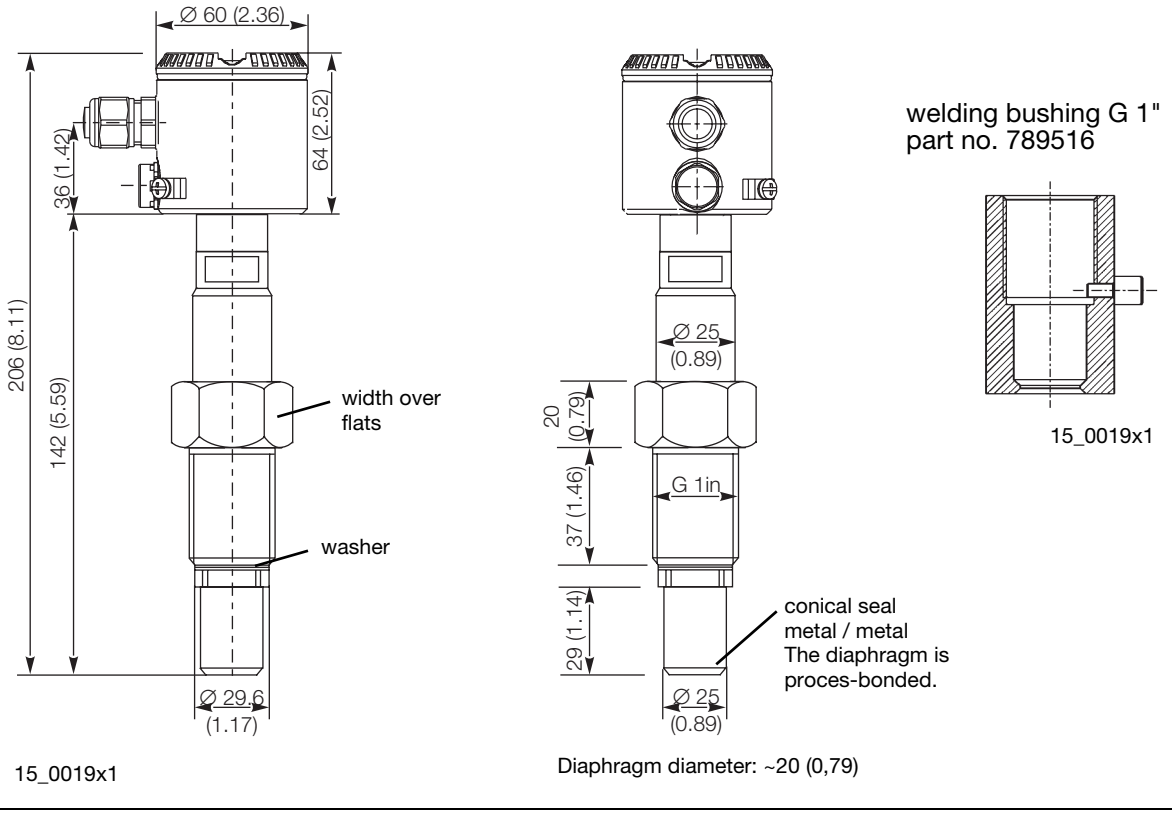
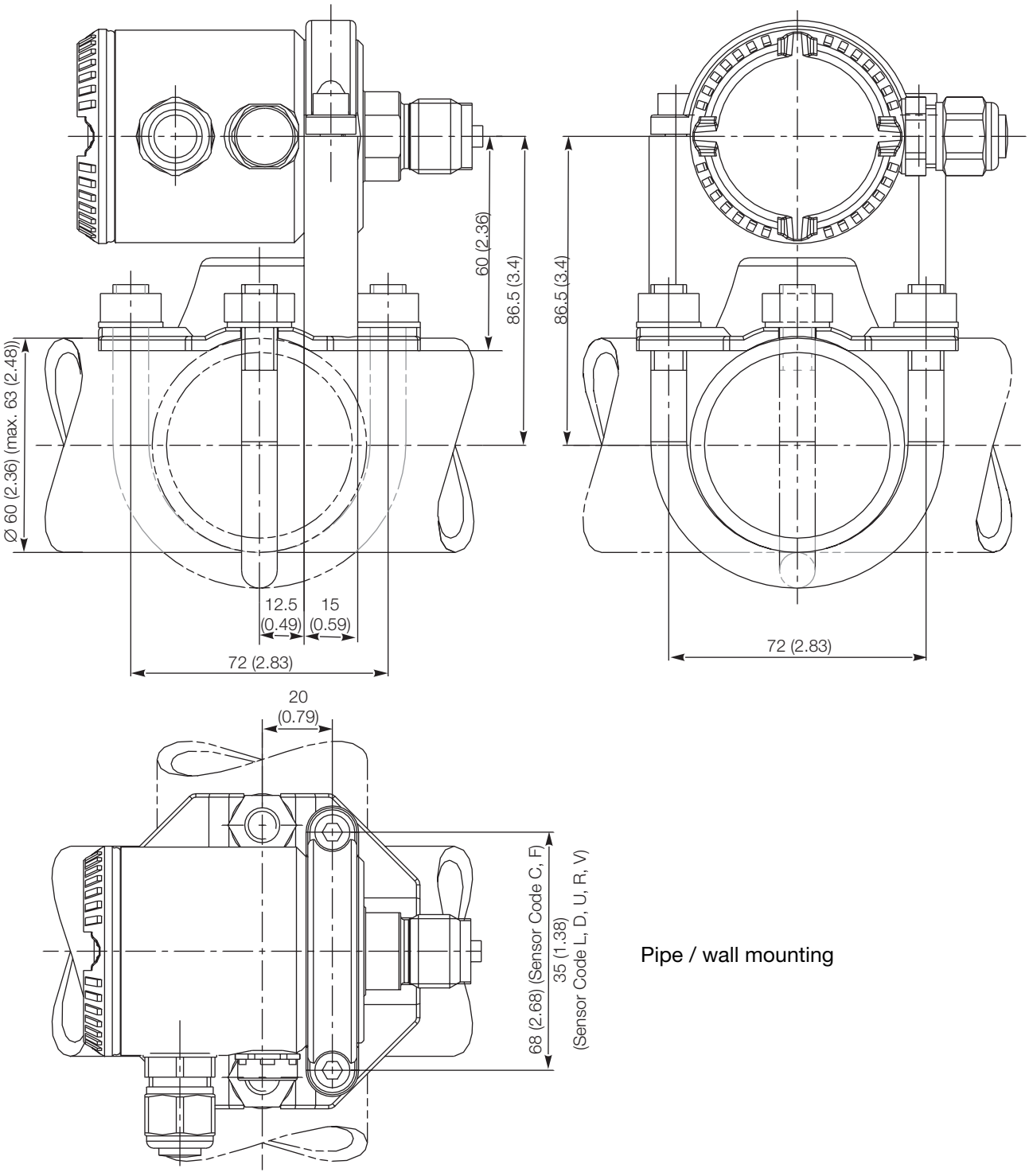


Fig. 28:

12.5 Installation option with mounting bracket (optional)

Note: The bracket for wall and tube mounting has four holes (Ø 10.5 mm); the holes are arranged in a square spaced 72 mm from each other.



Pipe / wall mounting

Fig. 29:

13. EC Declaration of Conformity

EG-KONFORMITÄTSERKLÄRUNG

EC DECLARATION OF CONFORMITY
ATTESTATION DE CONFORMITE C.E.

Hersteller: *Manufacturer / Fabricant:*	**ABB Automation Products GmbH** **Minden**
Anschrift: *Address / Adresse:*	**Schillerstraße 72** **D-32425 Minden**
Produktbezeichnung: *Product name:* *Désignation du produit:*	**Druck-Messumformer - 261A, 261G** *Pressure Transmitter – 261A, 261G* *Transmetteur de Pression – 261A, 261G*

Das Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:
This product meets the requirements of the following European directives:
Les produits répondent aux exigences des Directives C.E. suivantes:

89/336/EWG *89/336/EEC* *89/336/C.E.E.*	**EMV-Richtlinie *** *Electromagnetic Compatibility Directive ** *Directives concernant la compatibilité électromagnétique **	
73/23/EWG *73/23/EEC* *73/23/C.E.E.*	**Niederspannungsrichtlinie *** *EC-Low-Voltage Directive ** *Directives concernant la basse tension **	
97/23/EG *97/23/EEC* *97/23/C.E.E.*	**Druckgeräterichtlinie, Kategorie III Modul H** *Pressure Equipment Directive, Category III Module H* *Directive Equipements sous Pression, Catégorie III Module H*	**(für Druck PS > 200bar)** *(for pressure PS > 200 bar)* *(pour pression PS > 200 bar)*
	Druck/*Pressure/Pression* **PS ≤ 200bar: SEP**	

CE 0045

Für Geräte in Ex-Ausführung gemäß Kennzeichnung auf Typschild gilt zusätzlich:
For products in Ex design according to identification on nameplate the following is additionally applicable:
Pour des produits en exécution Ex selon marque sur plaque signalétique le suivant est aussi applicable:

94/9/EG	**ATEX-Richtlinie**
94/9/EEC	*ATEX Directive*
94/9/C.E.E.	*ATEX Directive*

*** einschließlich Änderungen und deutscher Umsetzung durch das EMVG und Gerätesicherheitsgesetz**
* *including alterations and German realization by the EMC law and the instruments safety law*
* *y compris les modifications et la réalisation allemande par la loi cocernant la compatibilité électromagnétique et la sécurité d'appareils*

Die Übereinstimmung mit den Vorschriften dieser Richtlinien wird nachgewiesen durch die vollständige Einhaltung folgender Normen:
Conformity with the requirements of these Directives is proven by complete adherence to the following standards:
La conformité avec les exigences de ces directives est prouvée par l'observation complète des normes suivantes:

EN 61 000-6-2 / EN 61 000-6-3 / EN 61 010-1
Ex: EN 50 014 / EN 50 284 / EN 50 018 / EN 50 020

04.01.2005		
Datum *Date* *Date*	**Dr. Wolfgang Scholz** **Leiter R&D** Head of R&D Responsable R&D	**Bernhard Kruse** **Leiter Qualitätsmanagement** Head of Quality Management Responsible Assurance de la Qualité

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