

## Operating Manual

Pressure transmitter

IMP 303, IMP 304



IMP 304



### READ THOROUGHLY BEFORE USING THE DEVICE KEEP FOR FUTURE REFERENCE

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## 1. General and Safety-Related Information on this Operating Manual

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

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

**Complementary to this operating manual the current data sheet has to be adhered to.**

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

### 1.1 Symbols Used

	- Type and source of danger - Measures to avoid the danger
<b>Warning word</b>	
<b>Warning word</b>	<b>Meaning</b>
	- Imminent danger! - Non-compliance <b>will result in</b> death or serious injury.
<b>DANGER</b>	
	- Possible danger! - Non-compliance <b>may result in</b> death or serious injury.
<b>WARNING</b>	
	- Hazardous situation! - Non-compliance <b>may result in</b> minor or moderate injury.
<b>CAUTION</b>	

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

✓ Precondition of an action

### 1.2 Staff Qualification

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

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

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

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

### 1.3 Intended Use

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

The pressure transmitter IMP 303 / IMP 304 has been especially designed for the overpressure measuring.

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

BD|SENSORS assumes no liability for any wrong selection and the consequences thereof!

Permissible media are gases or liquids, which are compatible with the media wetted parts described in the data sheet.

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

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

### 1.4 Limitation of Liability and Warranty

Failure to observe the instructions or technical regulations, improper use and use not as intended, and alteration of or damage to the device will result in the forfeiture of warranty and liability claims.

### 1.5 Safe Handling

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

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

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

**NOTE** - Do not throw or drop the device!

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

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

### 1.6 Scope of Delivery

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

- pressure transmitter
- mounting instructions

## 2. Product Identification

The device can be identified by its manufacturing label. It provides the most important data. By the ordering code the product can be clearly identified.

**NOTE** - The manufacturing label must not be removed!

## 3. Mounting

### 3.1 Mounting and Safety Instructions

	<b>Danger of death from airborne parts, leaking fluid, electric shock</b> - Always mount the device in a depressurized and de-energized condition!
	<b>Danger of death from improper installation</b> - Installation must be performed only by appropriately qualified persons who have read and understood the user manual.

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

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

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

**NOTE** - Provide a cooling line when using the device in steam piping.

**NOTE** - When installing the device, avoid high mechanical stresses on the pressure port! This will result in a shift of the characteristic curve or to damage.

**NOTE** - In hydraulic systems, position the device in such a way that the pressure port points upward (ventilation).

**NOTE** - The specified tightening torques must not be exceeded!

**NOTE** - If the device is installed with the pressure port pointing upwards, ensure that no liquid drains off on the device. This could result in humidity and dirt blocking the gauge reference in the housing and could lead to malfunctions. If necessary, dust and dirt must be removed from the edge of the screwed joint of the electrical connection.

### **NOTES - for mounting outdoors or in a moist environment:**

- Please note that your application does not show a dew point, which causes condensation and can damage the pressure transmitter. There are specially protected pressure transmitters for these operating conditions. Please contact us in such case.
- Connect the device electrically straightaway after mounting or prevent moisture penetration, e.g. by a suitable protective cap. (The ingress protection specified in the data sheet applies to the connected device.)
- Select the mounting position such that splashed and condensed water can drain off. Stationary liquid on sealing surfaces must be excluded!
- If the device has a cable outlet, the outgoing cable must be routed downwards. If the cable needs to be routed upwards, this must be done in an initially downward curve.
- Mount the device such that it is protected from direct solar radiation. In the most unfavourable case, direct solar radiation leads to the exceeding of the permissible operating temperature.
- For devices with gauge reference in the housing (small hole next to the electrical connection), install the device in such a way, that the gauge reference is protected from dirt and moisture. Should the device be exposed to fluid admission, the functionality will be blocked by the gauge reference. An exact measurement in this condition is not possible. Furthermore, this can lead to damages on the device.

## 3.2 Mounting Steps for Connections According to EN 837

- ✓ A suitable seal for the medium and the pressure to be measured is available. (e.g. a copper seal)
  - ✓ The sealing face of the mating component has a flawless surface. ( $R_z$  6.3)
- 1 Screw the device into the corresponding thread by hand.
  - 2 Then tighten it using an open-end wrench:  
G1/2": approx. 50 Nm

**NOTE** - permitted pressure ranges according to EN 837

G1/2" EN 837	$P_N \leq 1000$ bar	Counterpart has to be of steel according to DIN 17440 with strength $R_p 0.2 \geq 190$ N/mm <sup>2</sup>
G1/2" EN 837	$P_N > 1000$ bar, $P_N \leq 1600$ bar	Counterpart has to be of steel according to DIN 17440 with strength $R_p 0.2 \geq 260$ N/mm <sup>2</sup>

## 3.3 Mounting Steps for Internal Threads M20x1.5 and 9/16" UNF

	<b>Danger of injury</b> - Due to wrong installation - Do not use any seal!
<b>WARNING</b>	

**NOTE** - The high-pressure tube will seal metal-to-metal in the chamfer of the pressure port. (sealing cone 60°)

- 1 Screw the high-pressure fitting into the internal thread of the pressure transmitter.
- 2 Then tighten it using an open-end wrench. The required tightening torque depends on the manufacturer's specifications for the high-pressure pipe you are using. (permissible tightening torque for pressure transmitter: max 120 Nm)

## 4. Electrical Connection

### 4.1 Connection and Safety Instructions

	<b>Danger of death from electric shock</b> - Always mount the device in a depressurized and de-energized condition!
<b>DANGER</b>	

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

**NOTE** - For the electrical connection a shielded and twisted multicore cable is recommended.

**NOTE** - If the device is equipped with **plug ISO 4400** or **field housing**, it must be ensured that the external diameter of the used cable is within the permissible clamping range:  
cable socket ISO 4400:  $\varnothing 4 \dots 6$  mm  
field housing code 850:  $\varnothing 2 \dots 8$  mm  
field housing code 880:  $\varnothing 5 \dots 14$  mm  
Moreover you have to ensure that it lies in the cable gland firmly and cleflessly!

**NOTE** - When devices with **plug ISO 4400** are used, the cable socket must be properly mounted so that the ingress protection specified in the data sheet is ensured! Ensure that the delivered seal is placed between plug and cable socket. After connecting the cable, fasten the cable socket on the device by using the screw.

**NOTE** - On devices with **field housing**, the terminal clamps are situated under the metal cap. To install the device electrically, the cap must be screwed off. Before the cap is screwed on again, the O-ring and the sealing surface on the housing have to be checked for damages and if necessary to be changed! Afterwards screw the metal cap on by hand and make sure that the field housing is firmly locked again.

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

<b>cable without ventilation tube:</b>	static installation: 5-fold cable diameter	dynamic application: 10-fold cable diameter
<b>cable with ventilation tube:</b>	static installation: 10-fold cable diameter	dynamic application: 20-fold cable diameter

- In case of devices with **cable outlet** and integrated ventilation tube, the PTFE filter located at the cable end on the air tube must neither be damaged nor removed! Route the end of the cable into an area or suitable connection box which is as dry as possible and free from aggressive gases, in order to prevent any damage.

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

### 4.2 Electrical Installation

Establish the electrical connection of the device according to the technical data shown on the manufacturing label, the following table and the wiring diagram.

**NOTE** - After the installation it is recommended to adjust the offset of the pressure transmitter (see chapter "5.2 offset and span configuration"). The calibration is not affected by adjustment of the offset.

Pin configuration:

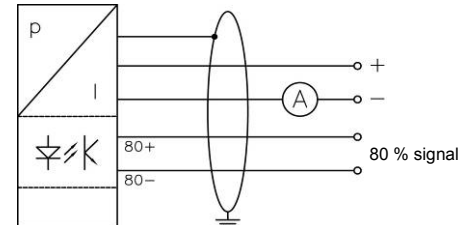
Electrical connections	ISO 4400	Binder 723 (5-pin)
Supply +	1	3
Supply -	2	4
Signal + (3-wire)	3	1
Shield	ground contact	5

Electrical connections	M12x1 (4-pin)	cable colours (DIN 47100)
Supply +	1	wh (white)
Supply -	2	bn (brown)
Signal + (3-wire)	3	gn (green)
Shield	4	grye (green-yellow)

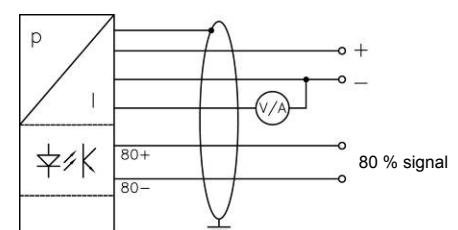
Electrical connections	MIL-/ Bendix-connection	
	2-wire	3-wire
Pin A	supply + / signal +	signal +
Pin B	supply - / signal -	supply - / signal - / calibration - (80-)
Pin C	-	supply +
Pin D	-	-
Pin E	calibration + (80+)	-
Pin F	calibration - (80-)	calibration + (80+)

Wiring diagrams:

2-wire-system (current)



3-wire-system (voltage)



## 5. Commissioning

	<b>Danger of death from airborne parts, leaking fluid, electric shock</b> - Operate the device only within the specification! (according to data sheet)
<b>DANGER</b>	

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

### 5.1 Generation of the 80 % Calibration Signal

For the generation of the 80 % calibration signal you have to put on the connection contacts 80+ and 80- a voltage about minimal 5 V in the pressureless condition. The maximum voltage has to be the same as the maxi-mum supply voltage of the device. By feeding the voltage on 80+ and 80- an additional current about 12.8 mA is given out and there flows a complete current about 16.8 mA.

### 5.2 Offset and Span Configuration

	<b>Danger of death from electric shock</b> - Always configure offset and span in a depressurized and de-energized condition! - For the configuration of offset and / or span the device has to be opened. Therefore, this only may be done by persons who have appropriate experience in this sector and who are familiar with the danger of this.
<b>GEFAHR</b>	

**NOTE** - When opening your transmitter sensitive electronic components are exposed. These are very sensitive and can be easily damaged. Handle the opened device carefully and properly so that no damage occurs.

**NOTE** - By the adjustment of offset and / or span the characteristic of the transmitter changes.

**NOTE** - You are responsible for the precision of the adjustment.

Preparation for 4...20 mA / 2-wire:

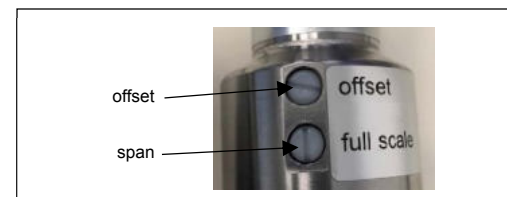


Fig. 2 Configuration on the side of the device

The configuration of offset and / or span is possible via potentiometers. Loosen and open the respective lock screw, which is on the side of the device.

**NOTE** - Use for the configuration a clockmaker screwdriver 0.5 mm.

Preparation for 0...10 V / 3-wire:

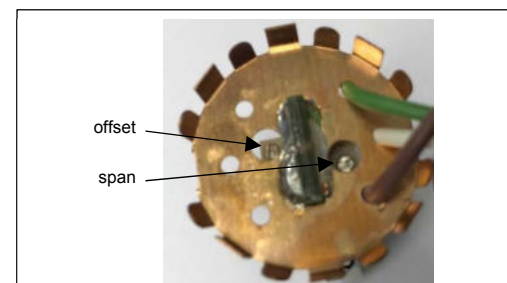


Fig. 3 Configuration inside the device

The potentiometer for offset and span are located inside the device, below the electrical connection. For configuration the device must be opened in the depressurized and currentless condition! Necessary steps are explained following

1. Remove the plug (socket), which supplies the device.
2. Loosen the grip ring by turning it carefully anti-clockwise, by hand.
3. Pull the plug assembly out of the housing carefully and hold it non-tensioned.

**NOTE** - Take note, when putting down the plug assembly no short circuit can arise!

**NOTE** - When removing the plug assembly ensure that the lines do not get damaged. They are connected to the electronics in the devices, via cords. Please do not pull on the cords or turn them and do not touch or damage any electronic components.

4. In the device the circuit board is placed. The potentiometers are marked with "Z" (offset) and "S" (span) on the copper feather.

