OPERATING INSTRUCTIONS
PRESSURE TRANSMITTER MODULES

CIO PRESSURE TRANSMITTER CAPSULES IN THE SERIES

4LC, 7LC, 6LHPC, 7LHPC, 8LC, 9FLC, 9LC, 10LC
4LD, 7LD, 6LHPD, 7LHPD, 9FLD, 9LD, 10LD

PRESSURE TRANSMITTER CAPSULES IN THE SERIES

7LY, 7LHPY, 8LY, 9FLY, 9LY, 10LY
7LX, 7LHPX, 8LX, 9FLX, 9LX, 10LX, 10LHPX

PRESSURE TRANSMITTER HEAD (WITH PRESSURE CONNECTION) IN THE SERIES

20C, 20D, 20PC, 20PD, 20PY, 20SC, 20SD, 20SY, 20SX, 20Y

as well as various other customer-specific and application-specific series

KELLER Pressure
www.keller-pressure.com
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You can find details of other international KELLER Pressure subsidiaries and agents at www.keller-pressure.com/en/company/subsidiaries

1. GENERAL INFORMATION AND SAFETY INSTRUCTIONS

These operating instructions contain important information about using the device correctly. The quick guide for pressure transmitters enclosed will be sufficient for experienced specialist personnel. Please read these operating instructions carefully for a detailed explanation of how to install the device and put it into operation. Follow the safety information in these operating instructions. You must also comply with national legislation, standards and regulations. These operating instructions form an integral part of the device and must always be accessible to the relevant staff.

DISCLAIMER

KELLER Pressure accepts no liability in case of improper use, damage or modification to the device or failure to observe this manual.

SUBJECT TO TECHNICAL ALTERATIONS!

1.1 SYMBOLS USED

SYMBOL	WARNING	NATURE AND SOURCE OF THE DANGER
⚠	DANGER	Danger of death or injury to staff.
⚠	WARNING	Potentially hazardous situation that could result in serious injuries or even death.
✓	NOTE	Tips and information for users.

1.2 INTENDED USE

- Pressure transmitters are used to convert a pressure into a standardised electrical signal.
- Pressure transmitters in the various series referred to have been developed for relative, absolute or differential pressure measurement applications depending on their type.
- Make sure that the device is suitable for your corresponding application. Please get in touch with your direct sales contact if you are unsure of anything.
- Please refer to the relevant data sheet and agreed specifications for information about the pressure transmitter's features.
- The technical specifications listed in the data sheet are only binding insofar as no other agreements have been made.
- The gases or liquids used as measuring media must be compatible with the materials specified in the data sheet that come into contact with the media.

⚠	DANGER	In the event of incorrect use!

1.3 STAFF QUALIFICATIONS

The product must only be assembled, installed, put into operation, operated, maintained, taken out of operation and disposed of by technically trained staff.

2. PRODUCT IDENTIFICATION

The laser engraving on the pressure transmitter is used to identify the product. This unique identifier provides context to the specifications that are found on the calibration sheet supplied or in myCalibration.

3. MOUNTING

⚠	DANGER	**Danger of death by electrocution, pressure discharge or leaking media!** The device must only be installed on systems when they are not pressurised or connected to a power supply.
⚠	WARNING	**Danger of death in the event of incorrect installation!** The device must only be installed by specialist personnel who have read and understood these operating instructions. Follow the national standards and safety regulations during the assembly and installation of the device.
⚠	WARNING	**The device must not be used in hazardous areas.**
⚠	DANGER	**Danger of death in the event of incorrect use!** For oxygen applications, only the pressure transmitters intended for this purpose and marked accordingly may be used.

3.1 INSTALLATION AND SAFETY INFORMATION

- ✓ Only operate the device within its technical performance limits. You can find these on the label, in the data sheet or in the specifications. The device must not be operated for long periods in its overload range as this can damage it.
- ✓ The measuring medium must not be permitted to ice up.
- ✓ Make sure that the material used for the selected pressure transmitter, including the associated seals, is suitable for the medium to be measured.
- ✓ Avoid electrochemical voltage potentials.
- ✓ Do NOT use the device to perform safety functions.
- ✓ Do not remove the packaging and protective cap until immediately before installation to avoid damaging the diaphragm and thread.
- ✓ In the case of pressure transmitters with a pressure range > 60 bar, there may be some oil left in the pressure connection from the calibration process.
- ✓ The output signal may be dependent on the installation position. Always tighten the transmitter to the manufacturers' instructions
- ✓ When installing the device on hydraulic systems, ensure that the system is adequately ventilated.

3.2 OXYGEN APPLICATIONS

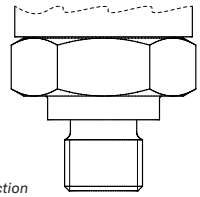
Note the following points:

- The pressure transmitter must be suitable for use with oxygen.
- Make sure the pressure and temperature thresholds permitted are not exceeded.
- Do not unpack the device until immediately before installation.
- Avoid skin contact with the device to prevent fingerprints and grease residues forming.
- We recommend wearing suitable safety gloves.

3.3 INSTALLATION INFORMATION

- ✓ Take care when handling the metal diaphragm and protect it from being damaged! Even minor distortions can have an effect on the pressure signal.
- ✓ Use the protective cap supplied to guard the metal diaphragm on the measuring instrument up until installation.
- ✓ Do not bend the connector pins and do not exert any axial force on the connector pins during installation.
- ✓ When installing the device outdoors or in another damp environment, do not allow liquid to accumulate on the seal surface or near the connector pins.

3.4 MECHANICAL INSTALLATION OF THE PRESSURE TRANSMITTER HEAD



Example of a pressure connection

- ✓ Before installation, make sure that the seal surfaces on the measuring instrument and on the measuring point are clean and undamaged.
- ✓ Make sure that the seal is intact and sitting correctly in its groove. Check that the seal specifications correspond with the environment in which it will be used.
- ✓ Use suitable tools for installing the device.
- ✓ Screw the pressure transmitter in with an appropriate amount of torque.

Follow the instructions below to ensure optimum installation:

1. Make sure that the seal surface is sealing correctly.
2. Screw the measuring instrument into the corresponding thread by hand.
3. Tighten the device in place using a suitable torque wrench on the spanner flats.

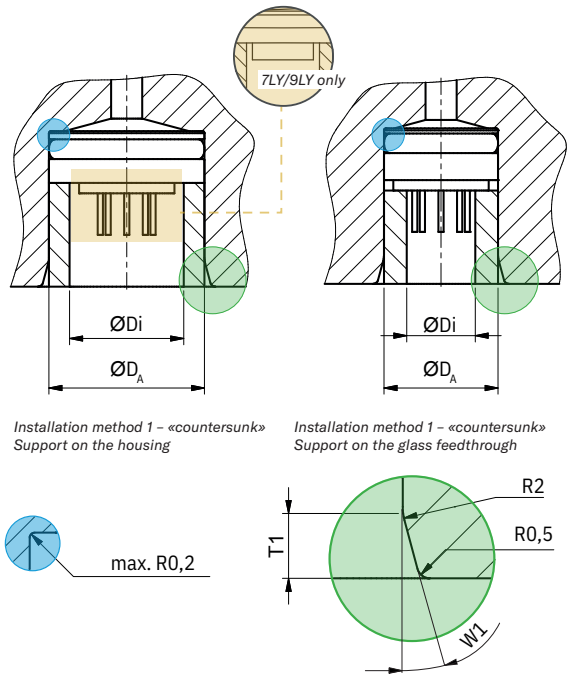
- ✓ Install the measuring instrument without exposing it to an undue degree of mechanical tension. This could have a negative effect on the zero point and/or the characteristic curve.

3.5 INSTALLATION OF PRESSURE TRANSMITTER CAPSULES

- ✓ During installation, make sure that no mechanical tension acts upon the housing or the glass feedthrough. The entire operating temperature range must be taken into account when establishing the axial and radial gap dimensions.
- ✓ The connector pins may not be directly bent on the glass feedthrough as this can break the glass and, in doing so, compromise the leak-tightness of the sensor. No mechanical tension (tension, compression, torsion) may act upon the electrical connection. The connector pins must not be pulled.
- ✓ Only suitable solvents may be used to clean the diaphragm. Ultrasonic cleaning is not recommended.
- ✓ A bevel must be provided at the installation opening which allows the O-ring to slide in. In doing so, please ensure that the O-ring, and a back-up ring if necessary, is not positioned near the inlet bevel (see also the following detail drawing of the respective types).
- ✓ Support must always be provided on the glass feedthrough for pressure loads of more than 200 bar (even short-term loads).
- ✓ All dimensions are designed for O-rings with a hardness of 75° shore.
- ✓ For non-tolerated dimensions, +/-0.1 applies.

We generally recommend these three installation methods:

«Countersunk» installation



Installation method 1 – «countersunk» Support on the housing

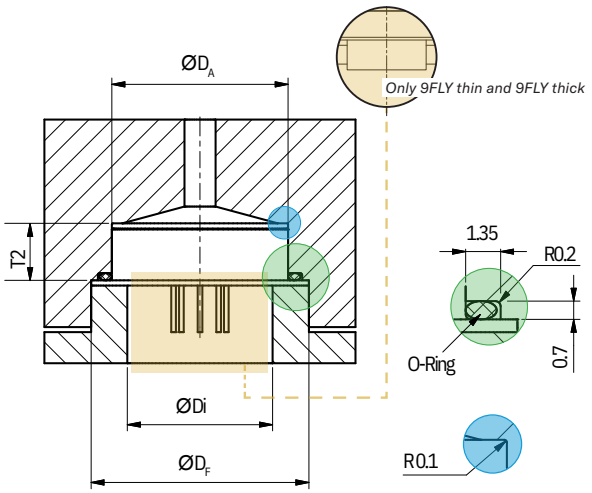
Installation method 1 – «countersunk» Support on the glass feedthrough

DIMENSIONS FOR INSTALLATION METHOD 1 – «COUNTERSUNK»

KELLER PRESSURE		HOLES TO BE DRILLED BY THE CUSTOMER						
	ø D_A	ø D_A	Hole tolerance up to 100 bar	Hole tolerance from 100 bar	ø Di (housing)	ø Di (glass feed-through)	T1	W1
Series/type \ Unit	[mm]	[mm]			[mm]	[mm]	[mm]	[°]
Low pressure								
4LC/4LD	11	11	F8	G7	–	6.6 *	2	15
7LC/7LD/7LX	15	15	F8	G7	12	6.6 *	2	15
7LY	15	15	F8	G7	12	–	2	15
9LC/9LD/9LX	19	19	F8	G7	12	6.6 *	2	15
9LY	19	19	F8	G7	15	–	2	15
10LC/10LD/10LX	19	19	F8	G7	6.6 *	–	2	15
10LY	19	19	F8	G7	15	–	2	15
High pressure								
6LHPC/6LHPD	13	13	–	G7	7.5	–	1.5	30
7LHPC/7LHPD	15	15	–	G7	7.5	–	1.5	30
7LHPX	15	15	–	G7	12	–	1.5	30
7LHPY	15	15	–	G7	12	–	1.5	30
10LHPX	19	19	–	G7	7.5	–	2	15
10LHPY	19	19	–	G7	15	–	2	15

**) for versions with soldered wires, increase the minimum diameter to 7.5*

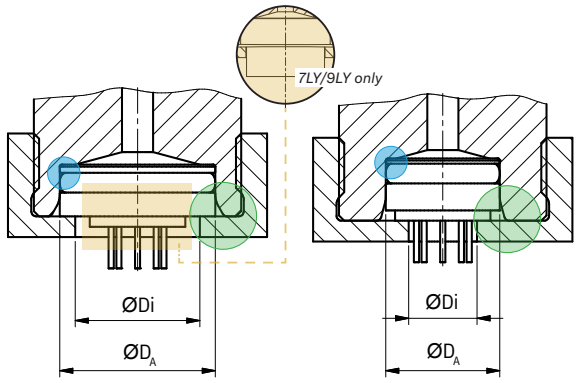
«Countersunk» installation – flange



DIMENSIONS FOR INSTALLATION METHOD 1 – «COUNTERSUNK»

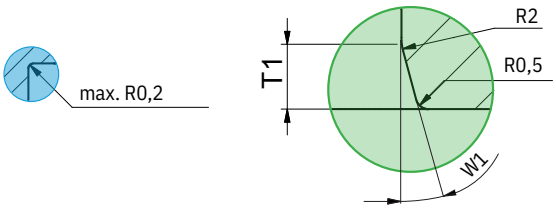
KELLER PRESSURE			HOLES TO BE DRILLED BY THE CUSTOMER				
	ø D_A	ø D_F	ø D_A	Hole tolerance	ø D_F	ø Di	T2
Series/type \ Unit	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]
9FLC/9FLD/9FLX thin	17	21.2	17	F8	21.2	14	5.5
9FLC/9FLD/9FLX thick	17	21.2	17	F8	21.2	14	4
9FLY thin	17	21.2	17	F8	21.2	15	5.5
9FLY thick	17	21.2	17	F8	21.2	15	4

«Flush» installation



Installation method 2 – «flush»
Support on the housing

Installation method 2 – «flush»
Support on the glass feedthrough

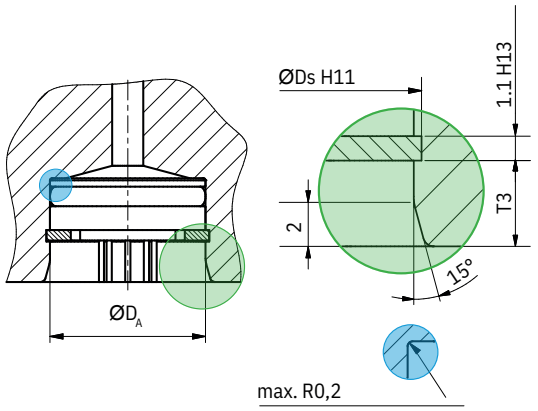


DIMENSIONS FOR INSTALLATION METHOD 2 – «FLUSH»

KELLER PRESSURE		HOLES TO BE DRILLED BY THE CUSTOMER						
	ø D_A	ø D_A	Hole tolerance up to 100 bar	Hole tolerance from 100 bar	ø Di (housing)	ø Di (glass feed-through)	T1	W1
Unit / Series/type	[mm]	[mm]			[mm]	[mm]	[mm]	[°]
Low pressure								
4LC/4LD	11	11	F8	G7	–	6.6 *	2	15
7LC/7LD/7LX	15	15	F8	G7	12	6.6 *	2	15
7LY	15	15	F8	G7	12	–	2	15
9LC/9LD/9LX	19	19	F8	G7	12	6.6 *	2	15
9LY	19	19	F8	G7	15	–	2	15
10LC/10LD/10LX	19	19	F8	G7	6.6 *	–	2	15
10LY	19	19	F8	G7	15	–	2	15
High pressure								
6LHPC/6LHPD	13	13	–	G7	7.5	–	1.5	30
7LHPC/7LHPD	15	15	–	G7	7.5	–	1.5	30
7LHPX	15	15	–	G7	12	–	1.5	30
7LHPY	15	15	–	G7	12	–	1.5	30
10LHPX	19	19	–	G7	7.5	–	2	15
10LHPY	19	19	–	G7	15	–	2	15

**) for versions with soldered wires, increase the minimum diameter to 7.5*

«Locking ring» installation



Installation method 3 – «locking ring»
in accordance with DIN 472 – standard design.

Design of the installation situation and permissible load in accordance with DIN 472.

DIMENSIONS FOR INSTALLATION METHOD 3 – «LOCKING RING»

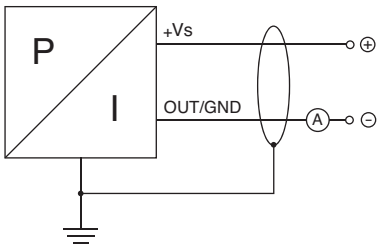
KELLER PRESSURE		HOLES TO BE DRILLED BY THE CUSTOMER					
	ø D_A	ø D_A	Hole tolerance up to 100	Hole tolerance from 100 bar	P max.	ø Ds	T3 (min)
Unit / Series/type	[mm]	[mm]			[bar]	[mm]	[mm]
9FLC/9FLD/9FLX thin	11	11	F8	G7	120	11.4	3.4
9FLC/9FLD/9FLX thick	15	15	F8	G7	160	15.7	3.9
9FLY thin	19	19	F8	G7	180	20	4.3
9FLY thick	19	19	F8	G7	180	20	4.3

Electrical installation

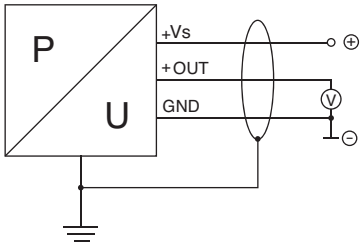
- ✓ Connect the measuring instrument in accordance with the electrical connections on the electrical connections chart delivered with the measuring instrument or the following connection circuit diagrams.
- ✓ Make sure that reference measuring instruments (PR versions) have adequate ventilation for the capillary.
- ✓ Pressure transmitter modules only meet the current EMC standards under certain circumstances. The user/customer is responsible for ensuring comprehensive EMC protection

3.5 CONNECTION DIAGRAMS

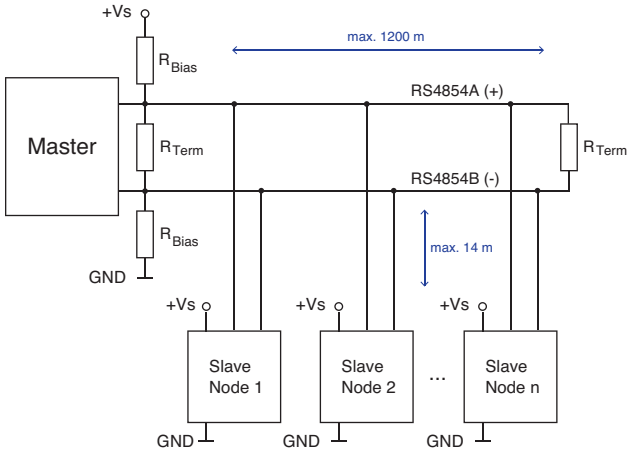
2-wire / 4...20 mA



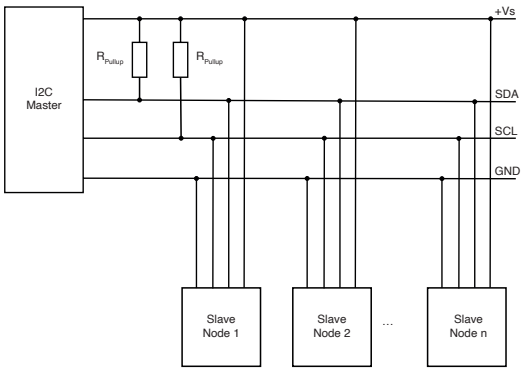
3-wire / 0...10 V / 0,5...4,5 V / etc.



RS485



I2C



Please see the relevant **communication protocol** for additional information.

✓ You can find links to these via the relevant product on the KELLER Pressure website at www.keller-pressure.com.

4. COMMISSIONING

⚠	WARNING	Before operating the device for the first time, check whether the device has been installed properly.
⚠	WARNING	The device may only be operated by qualified personnel who have read and understood the operating instructions.
⚠	WARNING	The device may only be operated within the specifications. See the technical data sheet or the agreed specifications.

5. TROUBLESHOOTING

Common installation errors:

DIFFERENT ZERO POINT SIGNAL

Possible cause:
- Diaphragm damaged
- Ambient temperature too high / low

Action:
- Contact the manufacturer and, if necessary, replace the device
- Keep to the permitted temperatures given in the data sheet

SIGNAL SPAN DECLINES / IS TOO LOW

Possible cause:
- Mechanical overload
- Abrasive / aggressive medium; corrosion on the diaphragm / pressure connection

Action:
- Contact the manufacturer

CONSISTENT OUTPUT SIGNAL WHEN PRESSURE CHANGES

Possible cause:
- Mechanical overload caused by overpressure
- Electrical fault

Action:
- Replace the device; if the fault occurs again, contact the manufacturer

NO OUTPUT SIGNAL

Possible cause:
- No supply voltage
- Transmitters polarities reversed
- Broken cable

Action:
- Check the supply voltage
- Check that the connection corresponds with the pin assignment
- Check the cable continuity

SIGNAL SPAN FLUCTUATING

Possible cause:
- Source of EMC interference nearby (e.g. pump, frequency converter, etc.)

Action:
- Remove the source of interference
- Shield the source of interference properly

6. SERVICING AND REPAIRS

6.1 MAINTENANCE

KELLER Pressure products require no maintenance and, if used in accordance with the specifications, are fault free.

6.2 RECALIBRATION

Depending on the conditions where the device is used, its zero point or amplification may change over time, causing an incorrect output signal.

We recommend that highly accurate devices with an accuracy of < 0,1 %FS are periodically recalibrated or have their zero point adjusted.

6.3 RETURNS

Register your return using our online form and describe the reason for the return as precisely as possible. After reviewing your request, you will receive a confirmation with all the necessary documents and detailed information on the further shipping process.

Important note: If your device has come into contact with harmful substances (e.g. chemical or hazardous substances), this must be specified when registering online. In the event of false information or insufficient decontamination, processing will be suspended until the situation has been clarified.

Clean the device thoroughly before each return and pack it securely for transport.

Return form: keller-pressure.com/en/rma

7. DISPOSAL

To dispose of the device, either return it to the supplier or dispose of it in a professional manner in accordance with the corresponding EU directive. Under no circumstances should the device be disposed of in household waste.

8. WARRANTY TERMS

The warranty is limited to 12 months from the date of delivery. KELLER Pressure guarantees that the products are free of manufacturing and material defects and that they comply with the specifications confirmed in writing.

9. EU DECLARATION OF CONFORMITY

The device supplied complies with the legal requirements. The relevant directives and harmonised standards are listed in the EU Declaration of Conformity applicable to the product. You can find the EU Declarations of Conformity by the relevant product at www.keller-pressure.com.

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Subject to technical alterations.
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