OPERATING INSTRUCTIONS OEM PRESSURE TRANSDUCERS

OEM PRESSURE TRANSDUCER CAPSULES IN THE SERIES
3L, 4L, 5L, 6L, 7L, 6LHP, 7LHP, 8L, 9FL, 9L, 10L, 10LHP
PD-10L, PD-10LHP

OEM PRESSURE TRANSDUCER HEAD (WITH PRESSURE CONNECTION) IN THE SERIES
6M, 15, 15S, 20, 20S, 20P, 30S, 30

COMPLETE OEM PRESSURE TRANSDUCERS IN THE SERIES
2Mi, 11, 13, 15, M5

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

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1. GENERAL INFORMATION AND SAFETY INSTRUCTIONS

These operating instructions contain important information about using the product correctly. Please read these operating instructions carefully for a detailed explanation of how to install the device and put it into operation. Follow the safety and installation 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 accepts no liability in the event of improper use, damage or modification to the device or failure to observe these operating instructions.

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. PROPER USE

- The pressure transducers in the various series referred to have been developed for relative, absolute or differential pressure applications depending on their type.
- Make sure that the device is suitable for your chosen location. 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 transducer's features.
- The technical specifications listed in the data sheet are only binding if no differing agreements have been made.
- The gases or liquids used as measuring media must be compatible with the materials that come into contact with the media as specified in the data sheet.

⚠	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 transducer 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. INSTALLATION

⚠	DANGER	**Danger of death from 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.
⚠	DANGER	**Danger of death in the event of incorrect use!** When used with oxygen, only the pressure transducers intended for this may be used.

3.1. ASSEMBLY AND SAFETY INFORMATION

✓ Only operate the pressure transducer within its technical performance limits. You can find these in the data sheet or in the specifications. The device must not be operated for long periods in its overload range as this can cause long-term damage.

✓ The measuring medium must not be allowed to ice up.

✓ Make sure that the material used for the selected pressure transducer, 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 the thread.

✓ The output signal may be dependent on the installation position. The maximum force exerted by the installation position is described in the technical data sheet.

✓ When installing the device onto hydraulic systems, ensure that the system is adequately ventilated.

3.2. APPLICATIONS WITH OXYGEN

Note the following points:

- The pressure transducer must be suitable for use with oxygen.
- Make sure that the permitted pressure and temperature thresholds are not exceeded.
- Do not unpack the device until immediately before its installation.
- Avoid skin contact with the device to prevent fingerprints and grease residues from 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.

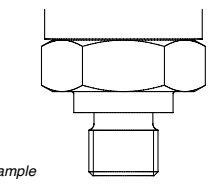
✓ Leave the pressure transducer in its original packaging right up until installation.

✓ Use the protective cap supplied to guard the metal diaphragm on the device 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



Pressure connection example

✓ Before installation, make sure that the seal surfaces on the device 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.

✓ Tighten the head of the pressure transducer to an appropriate torque.

Follow the instructions below to ensure optimum installation:

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

✓ Install the device in such a way that it cannot be exposed to any prohibited mechanical tension. This could have a negative effect on the zero point and/or the characteristic curve.

3.5. INSTALLATION

✓ When installing the device, 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 must not be bent directly onto 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.

✓ 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).

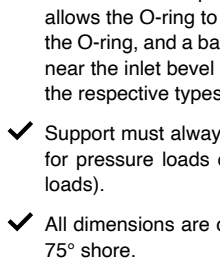
✓ All dimensions are designed for O-rings with a hardness of 75° shore.

We generally recommend these three installation methods:

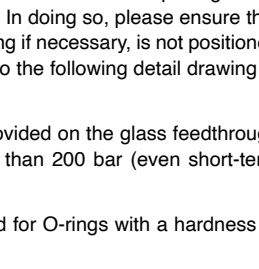
"Recessed" installation

DIMENSIONS FOR INSTALLATION METHOD 1 – "RECESSED"

Series/type	Nominal diameter	Bore tolerance up to 100 bar	Bore tolerance from 100 bar	ID (housing)	ID (glass feed-through)	T1	W1
Unit	[mm]			[mm]	[mm]	[mm]	[°]
Low pressure							
3L	9.5	F8	G7	–	6.6 *	2	15
4L	11	F8	G7	–	6.6 *	2	15
5L	12	F8	G7	–	6.6 *	2	15
6L	13	F8	G7	–	6.6 *	2	15
7L	15	F8	G7	12	6.6 *	2	15
9L	19	F8	G7	12	6.6 *	2	15
10L	19	F8	G7	6.6 *	–	2	15
High pressure							
6LHP	13	–	G7	7.5	–	1.5	30
7LHP	15	–	G7	7.5	–	1.5	30
10LHP	19	–	G7	7.5	–	2	15



Installation method 1 – "recessed" Support on the housing



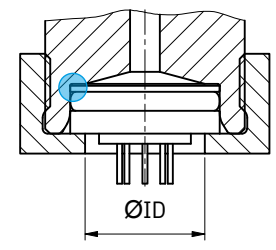
Installation method 1 – "recessed" Support on the glass feedthrough

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

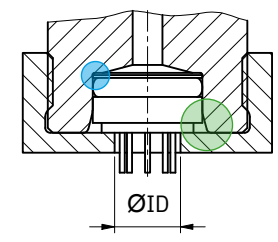
"Countersunk" installation

DIMENSIONS FOR INSTALLATION METHOD 2 – "COUNTERSUNK"

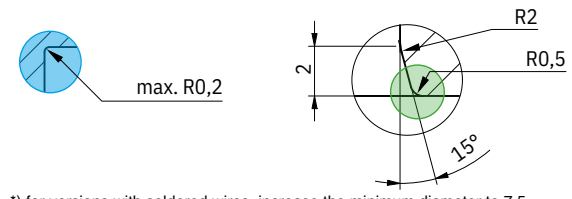
Series/type	Nominal diameter	Bore tolerance up to 100 bar	Bore tolerance from 100 bar	ID (housing)	ID (glass feedthrough)
Unit	[mm]			[mm]	[mm]
3L	9.5	F8	G7	–	6.6 *
4L	11	F8	G7	–	6.6 *
5L	12	F8	G7	–	6.6 *
6L	13	F8	G7	–	6.6 *
7L	15	F8	G7	12	6.6 *
9L	19	F8	G7	12	6.6 *
10L	19	F8	G7	6.6 *	–



Installation method 2 – "countersunk" Support on the housing



Installation method 2 – "countersunk" Support on the glass feedthrough

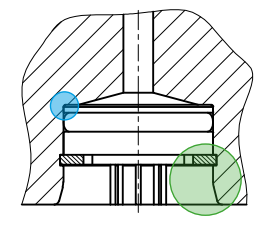


*) for versions with soldered wires, increase the minimum diameter to 7.5

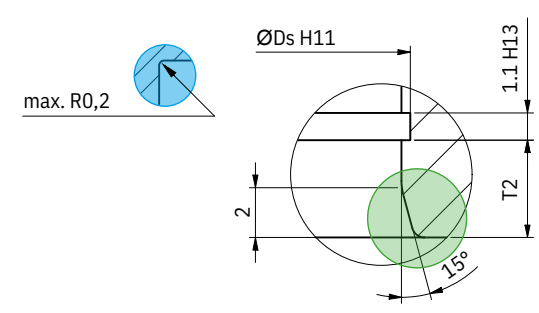
"Circlip" installation

DIMENSIONS FOR INSTALLATION METHOD 3 – "CIRCLIP"

Series/type	Nominal diameter	Bore tolerance up to 100 bar	Bore tolerance from 100 bar	P max.	Ds	T2 (min)
Unit	[mm]			[bar]	[mm]	[mm]
3L	9.5	F8	G7	150	10.4	3.4
4L	11	F8	G7	120	11.4	3.4
5L	12	F8	G7	140	12.5	3.6
6L	13	F8	G7	160	13.6	3.7
7L	15	F8	G7	160	15.7	3.9
9L	19	F8	G7	180	20	4.3
10L	19	F8	G7	180	20	4.3



Installation method 3 – "locking ring" according to DIN 472 – standard design



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

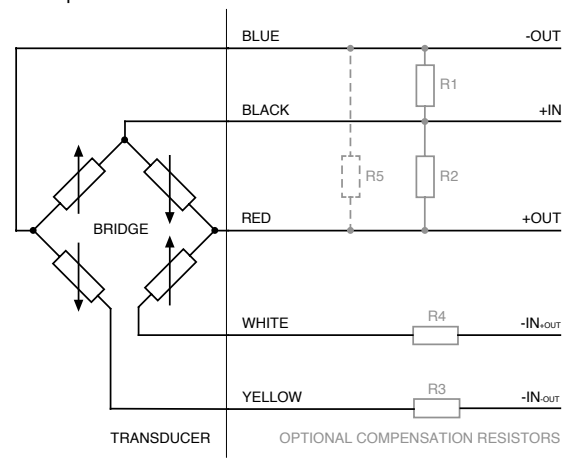
ELECTRICAL INSTALLATION OF OEM PRESSURE TRANSDUCERS

✓ Connect the device in accordance with the electrical connections on the electrical connections chart delivered with the device or the following connection circuit diagrams.

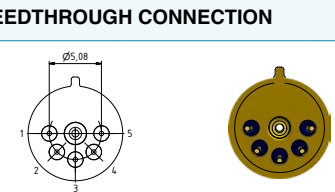
✓ Make sure that reference pressure transmitters (PR versions) have adequate ventilation for the capillary.

✓ The user/customer bears complete responsibility for adhering to the EMC directives.

Connection circuit diagrams
OEM pressure transducers:



GLASS FEEDTHROUGH CONNECTION



HALF-OPEN MEASUREMENT BRIDGE PIN ASSIGNMENT

PIN	Label	Designation	Wire colour
1	+OUT	Pos. Output	red
2	+IN	Pos. Supply	black
3	-OUT	Neg. Output	blue
4	$-IN_{-OUT}$	Neg. Supply (half bridge -Out)	yellow
5	$-IN_{+OUT}$	Neg. Supply (half bridge +Out)	white

*Electrical connections can differ and must be taken from the small chart attached.

4. COMMISSIONING

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

5. TROUBLESHOOTING

Common installation errors:

DIFFERENT ZERO POINT SIGNAL

Possible cause:
- Metal 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

CONSISTENT OUTPUT SIGNAL WHEN THE PRESSURE CHANGES

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

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

SIGNAL SPAN DECLINES/LOAD RESISTANCE IS TOO HIGH OR TOO LOW

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

Action:
- Contact the manufacturer

NO OUTPUT SIGNAL

Possible cause:
- No power supply
- Pressure transducer connected incorrectly
- Broken cable

Action:
- Check the power supply
- Check that the connection corresponds to the specifications for the electrical connections
- Check the cable continuity

SIGNAL SPAN FLUCTUATING

Possible cause:
- Source of EMC interference in close proximity(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 products require no maintenance and, if used in accordance with the specifications, are free of faults.

6.2. RETURNS

Before returning a device for recalibration or repair, it must be thoroughly cleaned and securely packaged.

For faulty devices, use the KELLER returns form and describe the fault in as much detail as possible.

If your device has come into contact with harmful substances, you must state this on the returns form.

If you return a device without mentioning contact with harmful substances and our repair department suspects that this is the case, the device will not be repaired until the facts have been established.

7. DISPOSAL

To dispose of the device, either return it to the supplier or dispose of it in a professional manner in accordance with Directive 2012/19/EU. Never allow it to enter household waste.

8. WARRANTY TERMS

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