

OEM Pressure Sensor RES15...

Type RES15...

for Absolute Pressure 100 ... 1 000 bar

Type RES15... OEM pressure sensors are particularly suitable for system and instrument manufacturers. They are versatile in application and can be used to measure pressures from 100 ... 1 000 bar abs. in liquids and gases in three temperature ranges between -40 ... 150 °C.

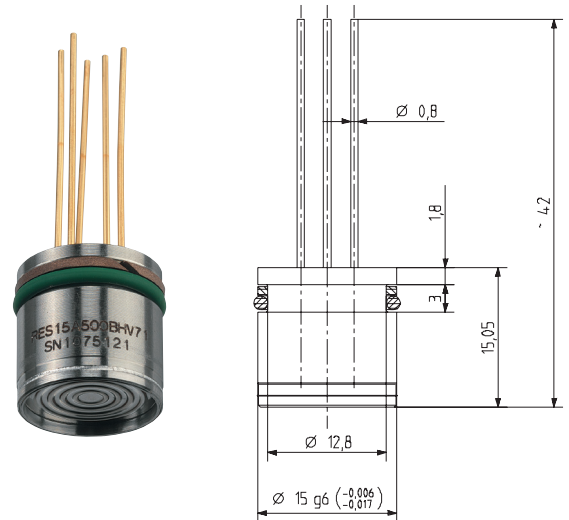
These sensors meet the highest measuring requirements by reason of their high natural frequency, good attenuation behavior, excellent linearity, combined with negligible hysteresis and high reproducibility.

- Corrosion resistant diaphragm
- High accuracy
- Excellent long term stability
- Very low temperature drift
- Measuring ranges from 100 ... 1 000 bar
- Absolute pressure
- Low power consumption
- Open Wheatstone bridge

Description

Type RES15... sensors are designed to measure absolute pressure. They contain a highly stable piezoresistive silicon measuring cell and are suitable for a constant current supply of 0,5 ... 5 mA. The pressure to be measured acts through thin corrosion resistant steel diaphragm on a silicon measuring element. The pressure transmitting medium is silicon oil. The measuring element contains diffused piezoresistive resistances which are configured in a Wheatstone bridge.

The sensors are manufactured completely of stainless steel 1.4435 (316 L) as standard. For applications in aggressive media, versions with a HASTELLOY®-C diaphragm are available. The hardening process 2 x Cond H 1150 guarantees very good media compatibility including acid gas, for example.



Application

These pressure sensors can be used for the widest variety of applications in industrial automation as well as in measuring instruments.

Examples

- Pressure transmitters
- Analyzers for physical units
- Deep well probes for oil exploration
- Instrumentation for aerospace technology
- Brake systems for automotive and railway industry
- Down hole probes for oil exploration
- R & D projects
- Hydraulic equipment manufacturing

RES15_000-057e-05.12

Technical Data

(based on Tref = 25 °C; power supply 1 mA constant)

Ranges

Type RES15...		A100...	A200...	A350...*	A500...	A700...*	A1 000...
Range	bar abs.	0 ... 100	0 ... 200	0 ... 350	0 ... 500	0 ... 700	0 ... 1 000
Overload	bar abs.	250	500	1 250	1 250	1 250	1 250
Burst pressure	bar abs.	>1 250					
Full scale signal (FSO nominal) at 1 mA	mV	135 ±40 %	135 ±40 %	135 ±40 %	200 ±40 %	250 ±40 %	350 ±40 %
Linearity (BSL) & hysteresis and repeatability	%FSO	≤±0,1	≤±0,1	≤±0,1	≤±0,3	≤±0,35	≤±0,35
Stability: of sensitivity	%/a	≤0,2					
of zero	%FSO/a	≤0,2					

* Typical value, depends on application

Temperatures

		Standard	L-Type	H-Type
Compensated temperature range	°C	0 ... 120	-40 ... 70	20 ... 140
Minimal/maximum temperature	°C	-10 ... 140	-40 ... 80	10 ... 150
Reference temperature	°C	25	25	25

Thermal Sensitivity Shift**

RES15...	0 ... 100 °C	%	-0,5 ... 1,5
RES15...L...	-20 ... 50 °C	%	-0,5 ... 1,2
	-40 ... -20 °C	%	0 ... 3,0
RES15...H...	20 ... 140 °C	%	≤±1,0

Thermal Zero Shift**

RES15...	0 ... 100 °C	%FSO	≤±0,5
RES15...L...	-20 ... 50 °C	%FSO	≤±0,7
	-40 ... -20 °C	%FSO	±1,0
RES15...H...	20 ... 140 °C	%FSO	≤±0,5

General Data

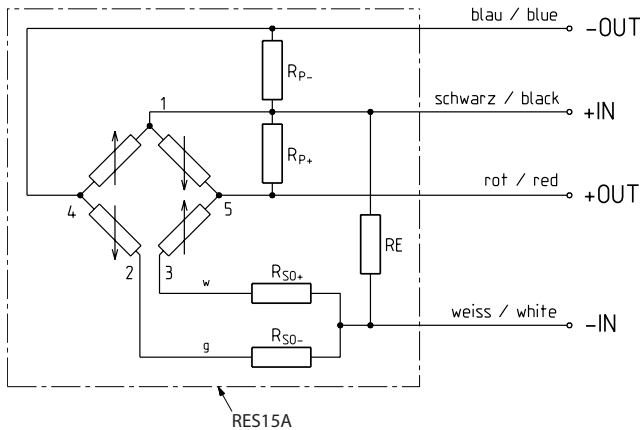
Zero shift** (with 1 mA supply)	mV	≤±5
Supply (constant current)	mA	1 (0,5 ... 2)
Voltage	V	<10
Output impedance (comp. temp range)	kΩ	2,2 ... 5,2
Vibration, 50 g peak, 10 Hz to 2 kHz per	%FS/g	<0.05
Shock resistance	g	MIL-STD-202G Method 204D, condition E, 1 000 g, 0,5 msec
Insulation resistance	MΩ	>100
Mass	g	15

Materials

Housing	Stainless steel 1.4435 (AISI 316 L) or HASTELLOY®-C 276 (V72)
Diaphragm	Stainless steel 1.4435 (AISI 316 L) or (V71 and V72) HASTELLOY®-C276, 25 µm
Gasket	FPM (Viton®)/ Back-up ring PTFE/Bronze (Standard-Type) NBR N7T40 (L-Type)
Potting compound	None
Oil filling	Wacker AK100
Electrical connection	Pins ø0,8 mm

** with analog compensated sensors

Electrical Connection



Excitation and Temperature Compensation

The calibration data are based on a **constant current excitation of 1 mA**. A supply of between **0,5 mA and 5 mA** is possible. However, the sensitivity and FSO signal respectively along with the zero measurand signal vary in proportion to the supply current. The sensors are designed and manufactured for use in three operating temperature ranges between $-40 \dots 150 \text{ }^\circ\text{C}$ and are provided with thermal compensation. The resistance values for compensation of thermal zero and sensitivity shift are provided with the sensor. The resistors will require user installation at the amplifier.

Analog Temperature Compensation

The piezoresistive pressure sensors are pre-aged before calibration with pressure and temperature cycles. They are then subjected to a computer-controlled stability-test program lasting for several days. Finally the pressure sensors are precisely calibrated with a 1 mA supply current.

Resistance values determined for the thermal zero point and sensitivity compensation as well as the zero offset are **documented in the compensation print-out** supplied with the sensors.

Digital Temperature Compensation

For even better compensation of temperature and linearity, the sensors can be supplied with a set of polynomial coefficients for digital compensation. Depending on the measuring and temperature ranges as well as the order of the polynomial, the error can be reduced down to 0,1 %FS. Data sheet Digi-Komp_000-280 provides details. These types of sensors are made customer specific.

Signal Processing and Connections

These sensors are delivered uncompensated. This offers the possibility to the user to compensate sensor and electronic together.

The output signal is the differential output of the Wheatstone bridge. It has to be processed by a differential amplifier with symmetrical input.

On request, Kistler delivers custom made electronic units to OEM customers or complete transmitters with standardized industrial output signals.

RES15_000-057e-05.12

Mounting

It is essential to comply with the following points when installing the sensor:

- Check that your housing will withstand the required pressure rating
- Insure that the O-ring seal and support ring is inserted and that compatibility to the application media is given

- As far as possible, protect the diaphragm, which is very thin and must not be damaged
- Always fit the sensor into a suitable hole $\varnothing 15$ H7
- Note the sensor connections

Note:

Consider static and dynamic pressure change effects.

Mounting Proposals

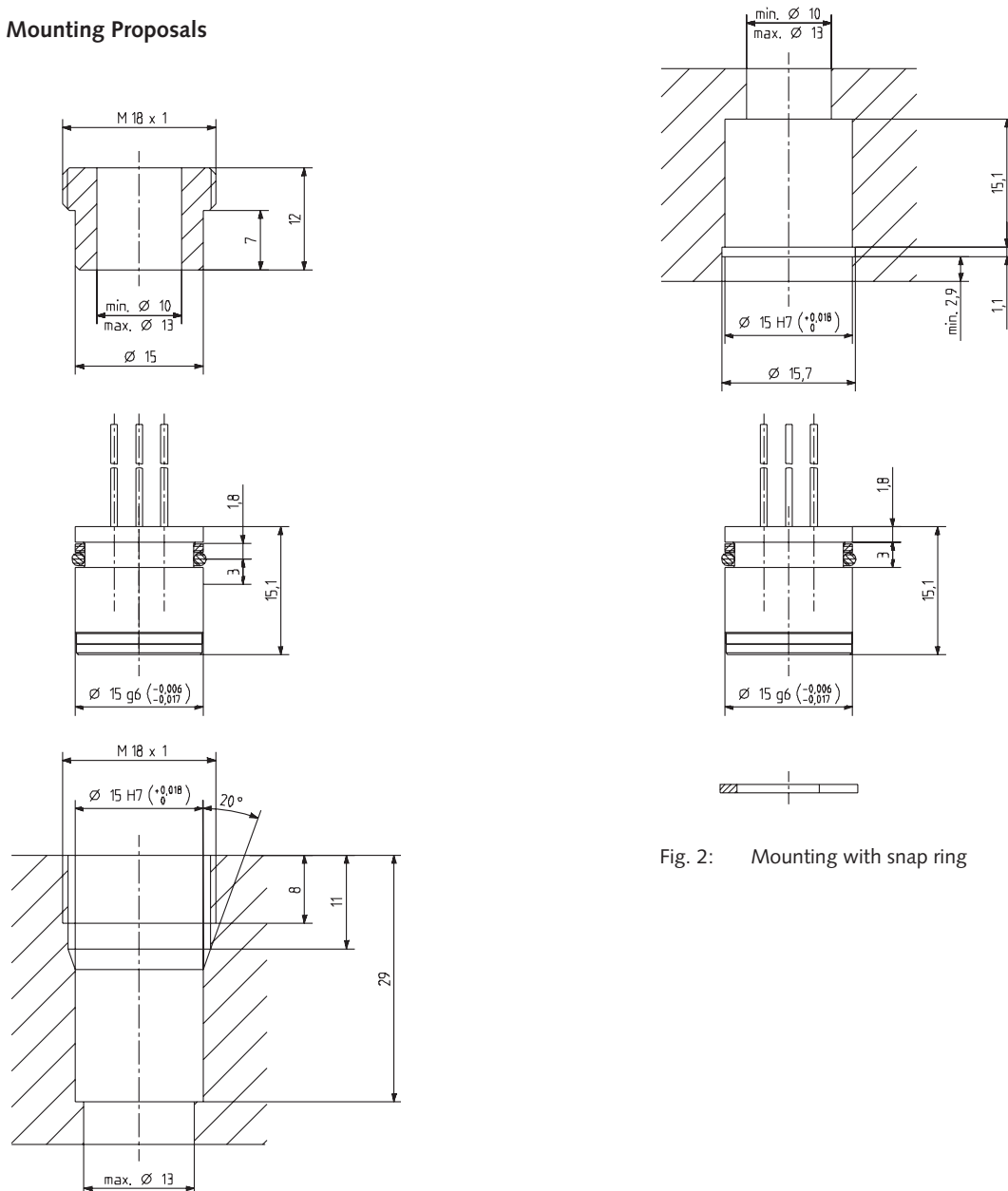


Fig. 1: Mounting with screw

Fig. 2: Mounting with snap ring

RES15_000-057e-05.12

Electrical Connections

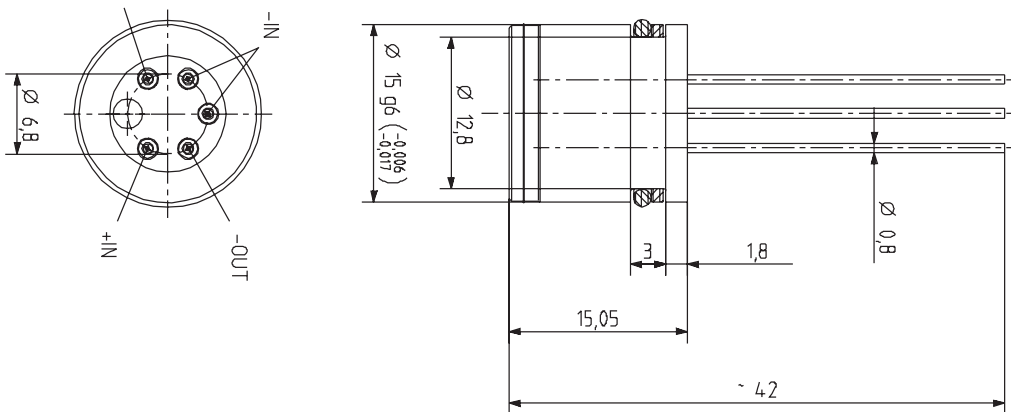


Fig. 3: Electrical connections RES15... V70 ... V73, V103

Included Accessories

- O-ring, Viton®, 12x1,5 mm (standard, H) mounted
- O-ring, NBR N7T40, 12x1,5 mm (L)
- Back up ring, PTFE/Bronze (mounted)
- Calibration certificate

Type/Art. No.

- 5.110.153
- 5.110.196
- 1100A93
-

Ordering Key

Bold = standard design

Measuring Range (absolute pressure)

Measuring range 100 bar	100
Measuring range 200 bar	200
Measuring range 350 bar	350*
Measuring range 500 bar	500
Measuring range 700 bar	700*
Measuring range 1 000 bar	1 000

Range in bar	B
--------------	----------

Temperature Range

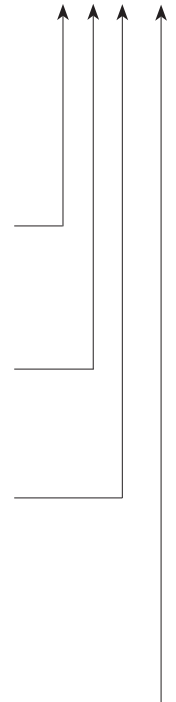
Standard temperature 0 ... 120 °C	S
L-Type temperature -40 ... 70 °C	L*
H-Type temperature 20 ... 140 °C	H*

Material

Standard 1.4435 diaphragm	V70
HASTELLOY®-C diaphragm	V71
HASTELLOY®-C full	V72*
Customer specific	Vxxx

* on request

Type RES15A **B**



RES15_000-057e-05.12

Viton® is a registered trademark of DuPont Performance Elastomers. HASTELLOY® is a registered trademark of Haynes International, Inc.