

# Standard transmitter

- *two-wire technology 4... 20 mA*
- *three-wire technology 0... 10 V*
- *measuring element with poly-silicon thin-film strain gauge, hence:*
  - *no moving mechanical parts*
  - *good long-term stability*
  - *high reproducibility*
- *pressure range finely-graduated according to DIN 16 128*
- *overload limit of 4 x measuring range (max. 600 bar)*
- *version with damping device*
- *diaphragm and couplings of stainless steel*
- *stainless steel housing with IP 65 protection (cable outlet with IP 68 protection)*



**Standard transmitter Precont KS**

## Application

The transmitters of the KS series detect and convert the applied pressure ranges of 0... 1 bar to 0... 400 bar into a pressure-proportional standard signal of 4... 20mA or 0... 10V.

The pressure-sensitive element of the transmitter of the KS series is a silicon substrate with a vacuum-deposited thin-film strain gauge bridge of poly-silicon.

Due to the small dimensions of the sensor, good behaviour with pulsating pressure media and vibrations is ensured. The elasticity of silicon ensures very good reproducibility and hysteresis as well as an overload limit of 4x range (max. 800 bar). Because of their high natural frequency, silicon sensors are also suitable for measuring fast pressure changes.

The transmitter KS has a stainless steel process coupling with an internal separating diaphragm. The KS transmitter has a stainless steel diaphragm even at the front which enables installation almost free of dead area.

The process coupling by KS is threaded G1/2 A or M 20 x 12.5 or G1/4 A according to DIN 16 288 and has a key width of 27. There are two versions of the coupling available: with or without a built-in damping device. The damping is provided by a screw installed in the process coupling.

For the KS, the process coupling is threaded in G1/2A or M20 x 1.5 for an elastomer FPM-seal or metal seal according to DIN 3852. There are also two different versions: with or without a built-in damping device. The damping is provided by a choke installed in the filling side. Pressures  $\geq 40$  bar also have a protective plate in front of the separating diaphragm.

The damped version is recommended for applications involving incompressible media in which pressure peaks exceeding the maximum pressure range are likely. Such peaks can be caused for example by pumps, quick shut-off valves, magnetic valves or hydraulic actuators, etc.

The transmitter of the KS series are designed for rough environments and the very compact stainless steel housing has protection type IP65.

The electronics of the transmitters work on the two-wire or three-wire principle and form a single entity together with the pressure sensor.

The specified measuring range (see ordering data) is factory set for an output signal of 4... 20 mA or 0... 10 V.

A DC-voltage supply is used for supplying energy.

Electrical connections are made via a connector according to DIN 43 650/C or with cable entry and terminals.

## Principle of operation

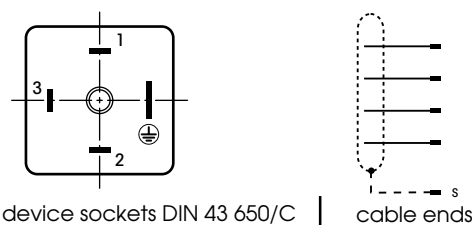
The process pressure is applied to the sensor where it acts on a semiconductor strain gauge bridge. The resistance change of the bridge results in a pressure-proportional output signal from the bridge. The bridge draws its power supply from a constant voltage source.

The output signal of the bridge is connected to the output terminals via the amplifier and the output stage. Two different electronic versions are available: the two-wire 4... 20 mA and three-wire 0... 10 V.

The output signals are factory-set with a tolerance for the initial value and end value (see technical data).

A diode provides protection against reversed polarity of the supply, whereas diode clips protect against smaller voltage peaks. The two-wire electrical system is supplied with 12... 30 V DC, the three-wire with 15... 30 V DC.

Fig. 1: Electrical connections



two-wire	device sockets DIN 43 650/C	cable ends
1 2 ⊕	output (+) output (-) measurement ground	(red) output (+) (black) unused (white) output (-) (blue) unused (green) measurement ground
three-wire	1 2 3 ⊕	(red) output (+) (black) supply (+) (white) supply and output (-) (blue) unused (green) measurement ground

Fig. 2: Dimensions P-30 (mm)

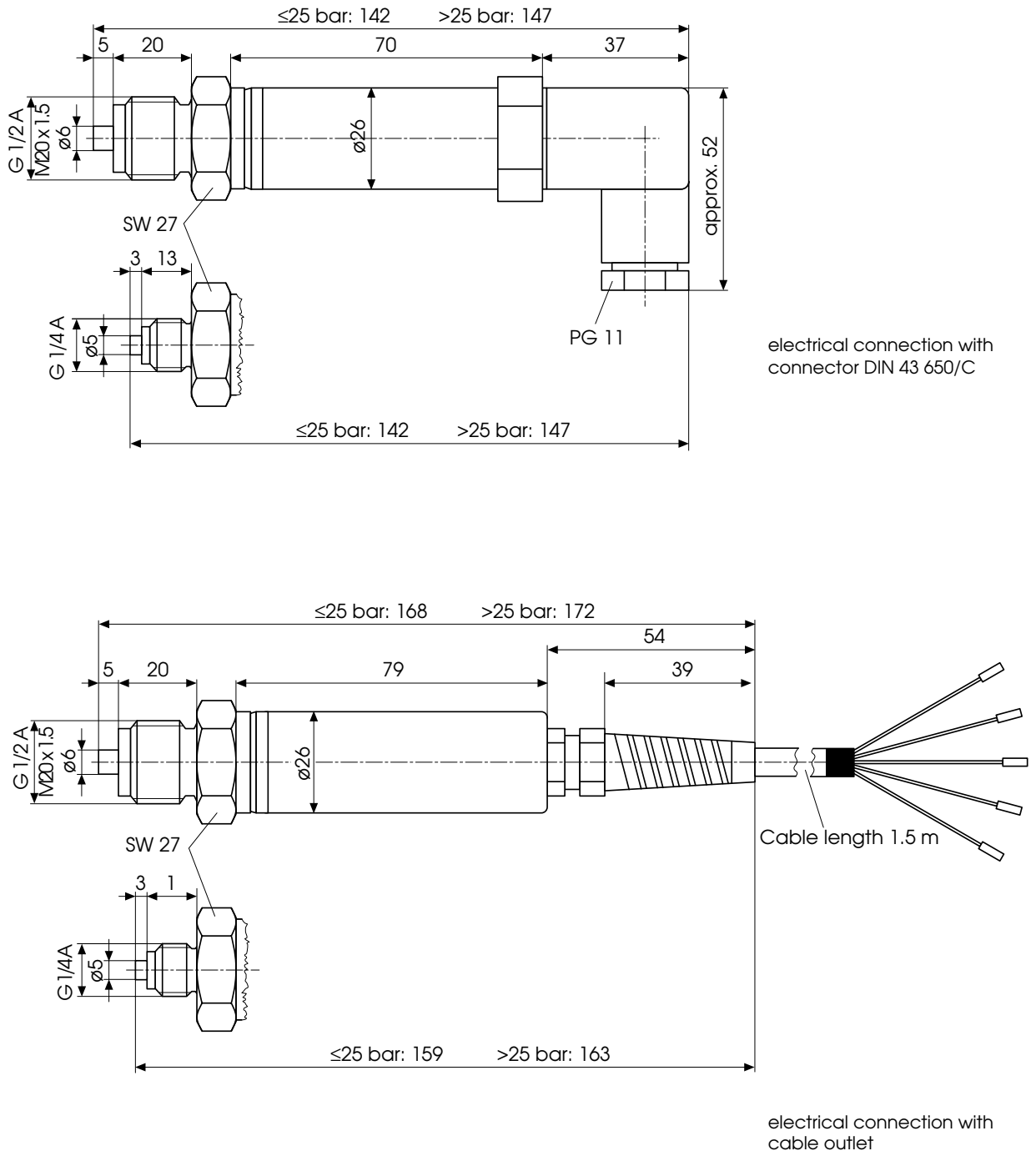
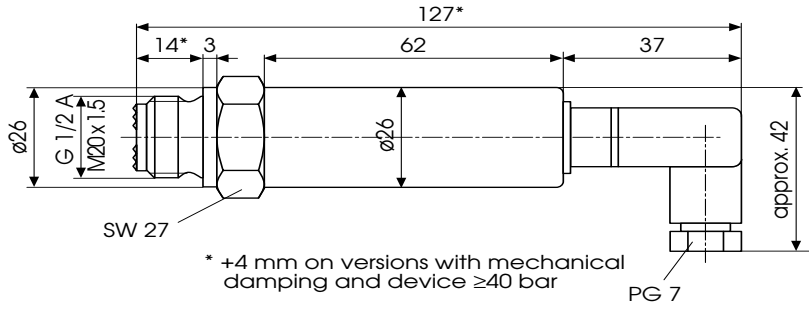
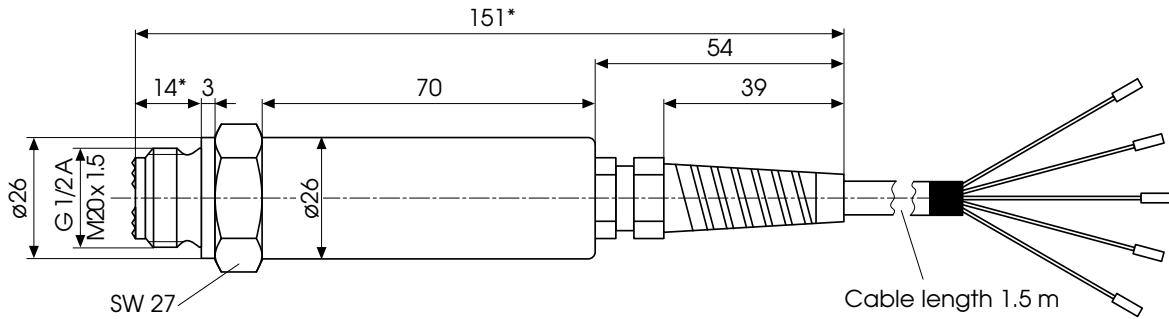


Fig. 3: Dimensions P-31 (mm)



\* +4 mm on versions with mechanical damping and device  $\geq 40$  bar

electrical connection with connector DIN 43 650/C



\* +4 mm on versions with mechanical damping and device  $\geq 40$  bar

electrical connection with cable outlet

**Coupling without  
damping device**

**Gauge  
pressure**

**Measuring range**

0 ..... 1.0	bar	05
0 ..... 1.6	bar	06
0 ..... 2.5	bar	07
0 ..... 4.00	bar	08
0 ..... 6.00	bar	09
0 ... 10.00	bar	10
0 ... 16.00	bar	11
0 ... 25.00	bar	12
0 ... 40.00	bar	13
0 ... 60.00	bar	14
0 .. 100.00	bar	15
0 .. 160.00	bar	16
0 .. 250.00	bar	17
0 .. 320.00	bar	18
0 .. 400.00	bar	19

**Coupling with  
damping device**

**Measuring range**

0 ..... 6.00	bar	59
0 ... 10.00	bar	60
0 ... 16.00	bar	61
0 ... 25.00	bar	62
0 ... 40.00	bar	63
0 ... 60.00	bar	64
0 .. 100.00	bar	65
0 .. 160.00	bar	66
0 .. 250.00	bar	67
0 .. 320.00	bar	68
0 .. 400.00	bar	69

**Output signal**

4... 20 mA, two-wire  
0... 10 V, three-wire

A  
B

**Electrical connection**

connector DIN 43 650/C  
cable outlet incl. 1.5 m cable  
cable outlet incl. Xm cable

S  
K  
9

**Process connection**

G 1/2 A  
M 20 x 1.5  
G 1/4 A

0  
1  
6



# Ordering data transmitter KS

Standard transmitter Precont KS

Coupling without damping device		Gauge pressure
<b>Measuring range</b>		
0 ..... 1.0 bar		05
0 ..... 1.6 bar		06
0 ..... 2.5 bar		07
0 ..... 4.00 bar		08
0 ..... 6.00 bar		09
0 ... 10.00 bar		10
0 ... 16.00 bar		11
0 ... 25.00 bar		12
0 ... 40.00 bar		13
0 ... 60.00 bar		14
0 .. 100.00 bar		15
0 .. 160.00 bar		16
0 .. 250.00 bar		17
0 .. 320.00 bar		18
0 .. 400.00 bar		19
<hr/>		
Coupling with damping device		
<b>Measuring range</b>		
0 ..... 6.00 bar		59
0 ... 10.00 bar		60
0 ... 16.00 bar		61
0 ... 25.00 bar		62
0 ... 40.00 bar		63
0 ... 60.00 bar		64
0 .. 100.00 bar		65
0 .. 160.00 bar		66
0 .. 250.00 bar		67
0 .. 320.00 bar		68
0 .. 400.00 bar		69
<hr/>		
Output signal		
4... 20 mA, two-wire		A
0... 10 V, three-wire		B
<b>Electrical connection</b>		
connector DIN 43 650/C		S
cable outlet incl. 1.5 m cable		K
cable outlet incl. Xm cable		9
<b>Process connection</b>		
G 1/2 A, metal seal	2	
M 20 x 1.5, metal seal	3	
G 1/2 A, FPM-seal	4	
M 20 x 1.5, FPM-seal	5	

**KS**

## Technical data

### Input

#### Measuring ranges

##### Gauge pressure

0... 1 bar to 0... 400 bar

#### Zero point

preset

#### Span

preset

#### Overload limit

4 x range, max. pressure 600 bar (static overload)

#### Overload effect

≤0.1% of range

#### Process media

gases and liquids

#### Materials wetted by process

stainless steel  
diaphragm: 1.4435 (X2 CrNiMo 1812)

coupling: 1.4301 (X5 CrNi 189)

#### Filling medium

silicone oil

### Output

#### Output signal

4... 20 mA (two-wire)

0... 10 V (three-wire)

(0 ≅ 20 mV)

#### Characteristic

linear

#### Conformity

(terminal based)

≤0.5% of range

#### Tolerance

start/end value ≤0.2% of range

#### Load

two-wire 4... 20 mA

$$R_b = \frac{U_s - 12 \text{ V}}{0.02 \text{ A}} \quad U_s = \text{supply voltage}$$

three-wire 0... 10 V

>5 kΩ

#### Settling time

approx. 2 ms without mech. damping

approx. 5 ms with mech. damping

### Power supply

#### D.C.

12... 30 V DC (two-wire)

15... 30 V DC (three-wire)

#### Effect of supply voltage

≤0.3% 12... 30 V DC (two-wire)

≤0.3% 15... 30 V DC (three-wire)

#### Permissible ripple

$U_{ss} \leq 4 \text{ V}$

#### Power consumption

≤6 mA three-wire (load 5 kΩ)

### Environmental conditions

#### Ambient temperature limits

-25... +70 °C

#### Process temperature limits

-25... +70 °C

#### Temperature effect on zero point

typically 0.2% / 10 K,

max. 0.5% / 10 K of range

with measuring ranges ≤6 bar, the

values are 0.1% / 10 K higher

#### Temperature effect on range

typically 0.2% / 10 K, max. 0.4% / 10 K of range

#### Storage temperature

-40... +80 °C

#### Climate category

class 4 Z (with Z = 70 °C) according

to VDI/VDE 3540 (corresponds with

HSC according to DIN 40 040)

#### Interference suppression

##### RF-interference

IEC 801-3 level 2; <1% effect at

10 V/m, 27... 500 MHz and

shielded cable

##### Interference on leads

IEC 801-4 level 3; 2 kV CM burst

IEC 801-5 level 2; 1 kV CM, 0.5 kV DM

##### Electrostatic discharge

IEC 801-2 level 3; 6 kV housing

#### Shock and vibration

shock test Eb:

according to DIN IEC 68-2-29

vibration test Fc:

according to DIN IEC 68-2-6

### General

#### Materials

housing: stainless steel 1.4301

socket: polyamide

#### Mode of protection

##### Housing with DIN-plug

IP 65 according to DIN 40 050

##### Cable

IP 68 (1 m water depth) according to DIN 40 050

#### Process connection

G 1/2 A; M 20 x 1.5 or G 1/4 A

according to DIN 16 288 form B  
sealing ring B, DIN 16 258

G 1/2 A or M 20 x 1.5

metal seal:

according to DIN 3852, form A;

sealing ring A21 x 26 mm ø according to DIN 7603 not included in

scope of supply

elastomer seal:

based on DIN 3852, part 11

elastomer seal made of FPM

(Viton) included in scope of supply

#### Electrical connection

device plug according to DIN 43

650/C or cable end

#### Mounting position

not critical

#### Mounting method

threaded coupling G 1/2 A;

M 20 x 1.5 or G 1/4 A

#### Mounting torque error

<0.2%

typical <0.3%

#### Weight:

approx. 0.22 kg

approx. 0.18 kg

#### Operating instruction

5600 14 00

5600 14 01

#### Accessories

1 operating instruction

Subject to alterations

Endress+Hauser GmbH+Co. KG  
Division envec  
Hauptstraße 1  
D-79689 Maulburg

Tel. (+49) 76 22 / 28 - 2147  
Fax (+49) 76 22 / 28 - 2049

homepage: <http://www.envec.de>  
e-mail: [envec@pcm.endress.com](mailto:envec@pcm.endress.com)

Postal address: P.O. Box 1261  
D-79690 Maulburg

**envec**  
*OEM pressure transducer*

**Endress + Hauser**

