

Pressure transmitter with flameproof enclosure

For applications in explosion-protected areas

Models E-10 and E-11



for further approvals
see page 6

Applications

- Borehole monitoring
- Refineries and petrochemical industry
- Drilling platforms and pipelines
- Gas compressors

Special features

- CSA and FM approved as “explosionproof” for class I, div. 1 hazardous areas
- ATEX and IECEx approved as “flameproof enclosure” for II 2G Ex db IIC T6...T1 Gb
- Current or voltage output
- Designed for harsh ambient conditions
- Low-power version available as an option



Fig. left: Model E-10, standard version (ATEX, IECEx)

Fig. centre: Model E-10, standard version (FM, CSA)

Fig. right: Model E-11, with flush diaphragm (FM, CSA)

Description

The model E-10 and E-11 flameproof pressure transmitters have been designed specifically for the high demands of industrial oil and gas applications.

These pressure transmitters can be delivered with various analogue signals from 4 ... 20 mA to a low-power version with DC 1 ... 5 V.

They feature an exceptionally high resistance to vibration, pressure spikes and moisture ingress. Furthermore, these pressure transmitters fulfil IP67 (NEMA 4x) ingress protection.

On each individual instrument a comprehensive quality control and calibration is performed, so that an accuracy

of $\leq 0.5\%$ can be ensured. Temperature compensation guarantees accuracy and long-term stability, even with strong fluctuations in the ambient temperature.

The models E-10 and E-11 are suitable for sour gas applications and feature particularly high resistance against sulphide stress cracking when in contact with sulphurous gases.

The pressure transmitters are approved as “explosionproof” for class I, II, III, div. 1 hazardous areas to FM and CSA as well as “flameproof” for II 2G Ex db IIC T6...T1 Gb to ATEX and IECEx.

Measuring ranges

| Gauge pressure | | | | | | | |
|----------------|------------------------|--------------------|---------------------------------|----------------------------------|----------------------------------|-------------------------------|---------------------------------|
| bar | Measuring range | 0 ... 0.4 | 0 ... 0.6 | 0 ... 1 | 0 ... 1.6 | 0 ... 2.5 | 0 ... 4 |
| | Overpressure limit | 3.1 | 3.1 | 3.1 | 6.2 | 6.2 | 14 |
| | Measuring range | 0 ... 6 | 0 ... 10 | 0 ... 16 | 0 ... 25 | 0 ... 40 | 0 ... 60 |
| | Overpressure limit | 31 | 31 | 62 | 62 | 80 | 120 |
| | Measuring range | 0 ... 100 | 0 ... 160 | 0 ... 250 | 0 ... 400 | 0 ... 600²⁾ | 0 ... 1,000¹⁾ |
| | Overpressure limit | 200 | 320 | 500 | 800 | 1,200 | 1,500 |
| psi | Measuring range | 0 ... 5 | 0 ... 10 | 0 ... 15 | 0 ... 25 | 0 ... 30 | 0 ... 60 |
| | Overpressure limit | 45 | 45 | 45 | 89 | 89 | 203 |
| | Measuring range | 0 ... 100 | 0 ... 160 | 0 ... 200 | 0 ... 250 | 0 ... 300 | 0 ... 500 |
| | Overpressure limit | 449 | 899 | 899 | 899 | 899 | 1,160 |
| | Measuring range | 0 ... 600 | 0 ... 750 | 0 ... 1,000 | 0 ... 1,500 | 0 ... 2,000 | 0 ... 3,000 |
| | Overpressure limit | 1,160 | 1,740 | 1,740 | 2,900 | 4,600 | 7,200 |
| | Measuring range | 0 ... 5,000 | 0 ... 8,000²⁾ | 0 ... 10,000¹⁾ | 0 ... 15,000¹⁾ | | |
| | Overpressure limit | 11,600 | 17,400 | 17,400 | 21,750 | | |

1) Measuring range not for model E-11.

2) Measuring range not for model E-11 with FM and CSA approval

| Absolute pressure | | | | | | | | |
|-------------------|------------------------|------------------------|------------------|-----------------|------------------|------------------|------------------|--|
| bar | Measuring range | 0 ... 0.4 | 0 ... 0.6 | 0 ... 1 | 0 ... 1.6 | 0 ... 2.5 | | |
| | Overpressure limit | 2 | 4 | 5 | 10 | 10 | | |
| | Measuring range | 0 ... 4 | 0 ... 6 | 0 ... 10 | 0 ... 16 | | | |
| | Overpressure limit | 17 | 35 | 35 | 80 | | | |
| | psi | Measuring range | 0 ... 15 | 0 ... 25 | 0 ... 30 | 0 ... 60 | 0 ... 100 | |
| | | Overpressure limit | 72 | 145 | 145 | 240 | 500 | |

| Vacuum and +/- measuring range | | | | | | | | |
|--------------------------------|------------------------|--------------------------|-----------------------|-------------------------|-------------------------|--------------------------|--------------------------|--|
| bar | Measuring range | -1 ... 0 | -1 ... +0.6 | -1 ... +1.5 | -1 ... +3 | -1 ... +5 | | |
| | Overpressure limit | 2 | 4 | 5 | 10 | 17 | | |
| | Measuring range | -1 ... +9 | -1 ... +15 | -1 ... +25 | | | | |
| | Overpressure limit | 35 | 35 | 50 | | | | |
| | psi | Measuring range | -30 inHg ... 0 | -30 inHg ... +30 | -30 inHg ... +60 | -30 inHg ... +100 | -30 inHg ... +200 | |
| | | Overpressure limit | 29 | 145 | 240 | 500 | 1,160 | |
| Measuring range | | -30 inHg ... +300 | | | | | | |
| Overpressure limit | | 1,160 | | | | | | |

The given measuring ranges are also available in mbar, MPa, kPa, kg/cm² and further units.

Vacuum tightness

Yes

Output signals

| Signal type | Signal |
|------------------|--------------------------|
| Current (2-wire) | 4 ... 20 mA |
| Voltage (3-wire) | DC 0 ... 5 V |
| | DC 0.5 ... 4.5 V |
| | DC 1 ... 5 V (low power) |
| | DC 0 ... 10 V |

Load in Ω

4 ... 20 mA: $\leq (\text{power supply} - 10 \text{ V}) / 0.02 \text{ A}$
DC 0 ... 5 V: $> \text{maximum output signal} / 1 \text{ mA}$
DC 0.5 ... 4.5 V: $> 100\text{k}$
DC 1 ... 5 V: $> 100\text{k}$
DC 0 ... 10 V: $> \text{maximum output signal} / 1 \text{ mA}$

Voltage supply

Power supply

The power supply depends on the selected output signal.

4 ... 20 mA: DC 10 ... 30 V
DC 0 ... 5 V: DC 10 ... 30 V
DC 0.5 ... 4.5 V: DC 5 ... 30 V
DC 1 ... 5 V: DC 6 ... 30 V
DC 0 ... 10 V: DC 14 ... 30 V

Max. power consumption

1 W

Reference conditions (per IEC 61298-1)

Temperature

15 ... 25 °C [59 ... 77 °F]

Atmospheric pressure

860 ... 1,060 mbar

Humidity

45 ... 75 % r. h.

Power supply

DC 24 V

Mounting position

Calibrated in vertical mounting position with process connection facing downwards.

Accuracy specifications

Accuracy at reference conditions

0.5 % of span

Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measured error per IEC 61298-2).

Non-linearity (per IEC 61298-2)

$\leq 0.2 \%$ of span (BFSL)

Non-repeatability

$\leq 0.1 \%$ of span

Temperature error in range 0 ... 80 °C [32 ... 176 °F]

Mean temperature coefficient of zero point:

$\leq 0.2 \%$ of span/10 K

Mean temperature coefficient of span:

$\leq 0.2 \%$ of span/10 K

Settling time

$\leq 2 \text{ ms}$

$\leq 10 \text{ ms}$ (at medium temperature $< -30 \text{ °C}$ [-22 °F] and measuring range $\leq 0 \dots 25 \text{ bar}$; for model E-11)

Long-term stability

$\leq 0.2 \%$ of span/year

For the use in hydrogen applications, please observe technical information IN 00.40 on www.wika.com regarding long-term stability.

Operating conditions

Ingress protection (per IEC 60529)

IP67 (NEMA 4x)

Vibration resistance (per IEC 60068-2-6)

20 g
10 g (for variant ½ NPT male conduit, with potted cable outlet)

Shock resistance (per IEC 60068-2-27)

1,000 g (mechanical shock)
100 g (for variant ½ NPT male conduit, with potted cable outlet)

Permissible temperature ranges ¹⁾

■ for instruments per ATEX and IECEx

Ambient and medium:

T6: -40 ... +60 °C T6: -40 ... +140 °F

T5: -40 ... +75 °C T5: -40 ... +167 °F

T4: -40 ... +102 °C T4: -40 ... +215 °F

Storage:

-40 ... +102 °C -40 ... +215 °F

-40 °C [-40 °F] only valid when no sealing is used.

Sealings from NBR only admissible to -30 °C [-22 °F].

Sealings from FPM/FKM only admissible to -15 °C [5 °F].

■ for instruments per FM, CSA

Ambient and medium:

T6: -40 ... +60 °C T6: -40 ... +140 °F

T4: -40 ... +105 °C T4: -40 ... +221 °F

Storage:

-40 ... +105 °C -40 ... +221 °F

-40 °C [-40 °F] only valid when no sealing is used.

Sealings from NBR only admissible to -30 °C [-22 °F].

Sealings from FPM/FKM only admissible to -15 °C [5 °F].

1) Restricted medium temperature range for oxygen applications: -20 ... +60 °C [-4 ... +140 °F]

Explosion protection

ATEX and IECEx

II 2G Ex db IIC T6...T1 Gb (KEMA 05 ATEX 2240 X)

Ex db IIC T6...T1 Gb (IECEx DEK 15.0048X)

FM

XP / I / 1 ABCD / T6, T4

DIP / II, III / 1 EFG / T6, T4 type 4

CSA

Class I, division 1, groups A, B, C and D

Class II, division 1, groups E, F and G

Class III, division 1

Type 4X

Process connections

Process connections for model E-10

| Process connection per | Thread size |
|--------------------------|--------------|
| DIN 3852-E ¹⁾ | G ¼ A |
| EN 837 | G ¼ B |
| | G ¼ female |
| | G ½ B |
| ANSI/ASME B1.20.1 | ½ NPT |
| | ¼ NPT |
| | ¼ NPT female |
| | ½ NPT |

1) Max. ambient and medium temperature range, sealing for process connection: -30 ... +100 °C

Process connections for model E-11

For the flush process connections there is a limited selection of measuring ranges

| Process connection per | Thread size | Available for measuring ranges |
|------------------------|-------------|--------------------------------|
| - | G ½ B flush | 0 ... 2.5 to 0 ... 600 bar |
| - | G 1 B flush | 0 ... 0.4 to 0 ... 1.6 bar |

Sealing for model E-11

| Sealing for model E-11 | |
|------------------------|---------|
| Standard | NBR |
| Option 1 | FPM/FKM |
| Option 2 | EPDM |

Sealing material restrictions for G ½ B flush process connection

| Material | Max. measuring range | | | |
|----------|------------------------|------------------------|----------------------|------------------------|
| | T = -40 °C [-40 °F] | T = -30 °C [-22 °F] | T = -15 °C [5 °F] | T = 105 °C [221 °F] |
| NBR | - | 600 bar | 600 bar | 600 bar |
| FPM/FKM | - | - | 400 bar | 400 bar |
| EPDM | 200 bar | 200 bar | 200 bar | 200 bar |

T = ambient and medium temperature

Materials

Wetted parts

- Stainless steel (additionally Elgiloy® for model E-10 with measuring range > 0 ... 25 bar, NACE-compliant)
- For sealing materials see “Process connections”

Where the medium is hydrogen, contact the manufacturer.

Non-wetted parts

Case from stainless steel

For cable see “Electrical connections”

Internal pressure transmission medium

Synthetic oil (no pressure transmission medium for model E-10 with measuring range > 0 ... 25 bar)

For other materials see WIKA diaphragm seal programme

Electrical connections

| Electrical connection | Wire cross-section | Cable diameter | Cable lengths | Material |
|--|-----------------------------------|--------------------------|-------------------------------|----------------------|
| ½ NPT male conduit, with potted cable outlet (ATEX and IECEx approval) | 3 x 0.5 mm ² AWG20 | 6.8 mm [0.27 in] | 2 m [6.6 ft] 5 m [16.4 ft] | Polyolefin copolymer |
| ½ NPT conduit male, with cable outlet (FM and CSA approval) | 3 x 0.56 mm ² AWG20 | 5.4 mm [0.21 in] | up to 9 m [29.5 ft] | PVC |
| ½ NPT male conduit with potted cable leads (FM and CSA approval) | 3 x 0.5 mm ² AWG20 | 3 x 2.6 mm [3 x 0.10 in] | up to 9 m [29.5 ft] | Polyolefin |

Short-circuit resistance

S₊ vs. U₋

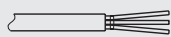
Reverse polarity protection


U₊ vs. U₋

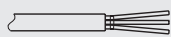
Insulation voltage

DC 500 V







Connection diagrams

| ½ NPT male conduit, with potted cable outlet (ATEX and IECEx approval) | | | |
|---|--------|--------------------------|--------|
| | | 2-wire | 3-wire |
|  | U+ | red | red |
| | U- | black | black |
| | S+ | - | brown |
| | Shield | Shield connected to case | |

| ½ NPT male conduit with potted cable leads (FM and CSA approval) | | | |
|---|--------|--------|--------|
| | | 2-wire | 3-wire |
|  | U+ | red | red |
| | U- | black | black |
| | S+ | - | brown |
| | Shield | green | green |

| ½ NPT conduit male, with cable outlet (FM and CSA approval) | | | |
|---|--------|--------------------------|--------|
| | | 2-wire | 3-wire |
|  | U+ | red | red |
| | U- | black | black |
| | S+ | - | brown |
| | Shield | Shield connected to case | |

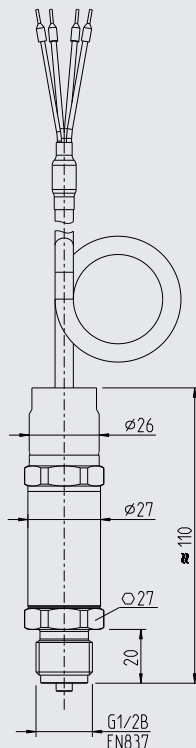
Approvals (option)

| Logo | Description | Country |
|---|--|-----------------------------|
|  | EC declaration of conformity <ul style="list-style-type: none"> ■ EMC directive EN 61326 emission (group 1, class B) and interference immunity (industrial application) ■ Pressure equipment directive ■ ATEX directive, flameproof (Ex d), EN 60079-0, EN 60079-1, EU | European Community |
|  | IECEx Hazardous areas flameproof (Ex d), IEC 60079-0, IEC 60079-1 | IECEx member states |
|  | FM Hazardous areas Explosionproof class 3600, class 3615, class 3810, NEMA-250 | USA |
|  | CSA <ul style="list-style-type: none"> ■ Safety (e.g. electr. safety, overpressure, ...) ■ Hazardous areas Class 2258 02, class 2258 82 | USA and Canada |
|  | EAC <ul style="list-style-type: none"> ■ Electromagnetic compatibility ■ Hazardous areas | Eurasian Economic Community |
|  | CRN Safety (e.g. electr. safety, overpressure, ...) | Canada |

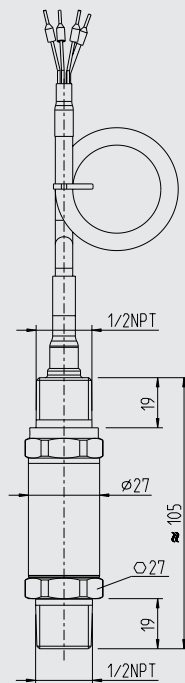
Approvals and certificates, see website

Dimensions in mm

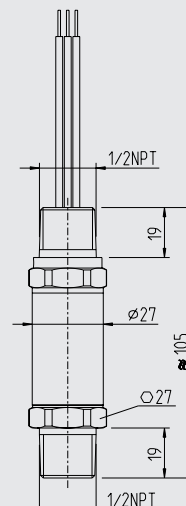
½ NPT male conduit with potted cable outlet (ATEX and IECEx approval)



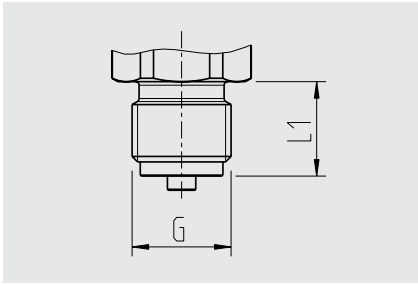
½ NPT male conduit with cable outlet (FM and CSA approval)



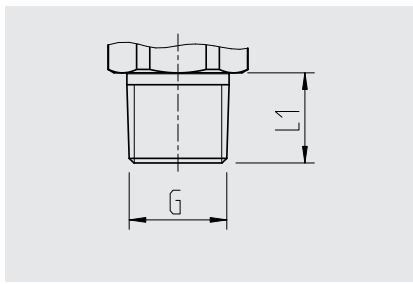
½ NPT male conduit with potted cable leads (FM and CSA approval)



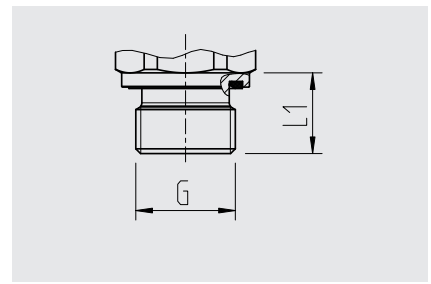
Process connections model E-10



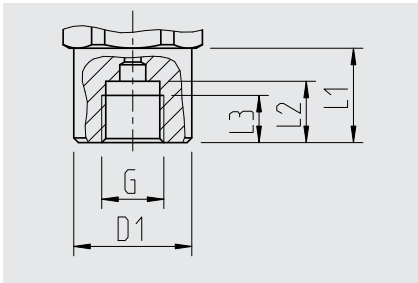
| G | L1 |
|-------|-----------|
| G ¼ B | 13 [0.51] |
| G ½ B | 20 [0.79] |



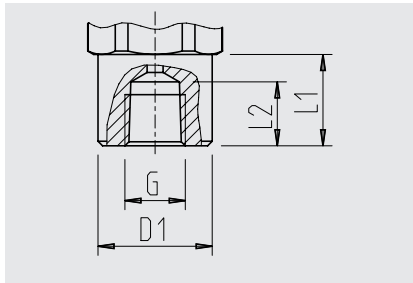
| G | L1 |
|-------|-----------|
| ¼ NPT | 10 [0.39] |
| ¼ NPT | 13 [0.51] |
| ½ NPT | 19 [0.75] |



| G | L1 |
|-------|-----------|
| G ¼ A | 14 [0.55] |

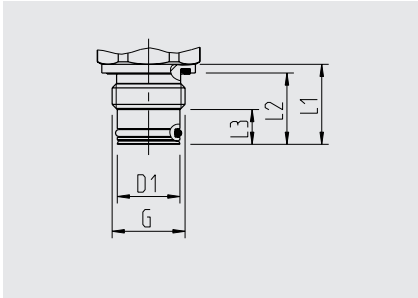


| G | L1 | L2 | L3 | D1 |
|-----------------|----------------|--------------|--------------|-----------------|
| G ¼ fe- male | 19.5 [0.77] | 13 [0.51] | 10 [0.39] | Ø17.5 [0.69] |

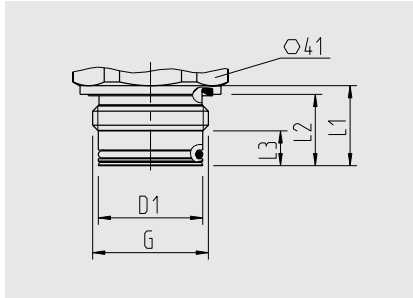


| G | L1 | L2 | D1 |
|--------------|--------------|--------------|------------------|
| ¼ NPT female | 20 [0.79] | 14 [0.55] | Ø 26.5 [1.04] |

Process connections model E-11



| G | L1 | L2 | L3 | D1 |
|-------|--------------|----------------|--------------|----------------|
| G ½ B | 23 [0.90] | 20.5 [0.81] | 10 [0.39] | Ø 18 [0.71] |



| G1 | L1 | L2 | L3 | D1 |
|-------|--------------|----------------|--------------|--------------|
| G 1 B | 23 [0.90] | 20,5 [0.81] | 10 [0.39] | 30 [1.18] |