

Pressure transmitter for precision measurements

Model P-30, standard version

Model P-31, flush version

WIKA data sheet PE 81.54



for further approvals
see page 5



CANopen
certified
CIA201106-301V402/20-0136

Applications

- Measurement and test benches
- Calibration technology
- Laboratories
- Plant construction and machine building

Special features

- Accuracy 0.1 %, without additional temperature error in a range of 50 ... 140 °F (10 ... 60 °C)
- Optional accuracy of 0.05 % (full scale) available
- Fast measuring rates up to 1 kHz
- Analogue, USB and CANopen® output signals available
- On-site calibration possible using product software



Fig. left: Pressure transmitter model P-30
Fig. right: Pressure transmitter model P-31

Description

Precise

The model P-30 and P-31 pressure transmitters have been developed for precision measurements. Through the use of a special WIKA pressure sensor, precision measurements with a maximum measuring deviation of as low as 0.05 % of span are guaranteed. Due to their active temperature compensation these pressure transmitters have no additional temperature error in the range of 50 ... 140 °F (10 ... 60 °C).

Fast

The high measuring and output rates of up to 1 kHz make the measured value available as quickly as possible.

Compact

The compact design makes the pressure transmitter ideal for mounting into test benches, such as 19" racks.

Versatile

The models P-30 and P-31 offer a wide selection of electrical connections, process connections, and measuring ranges, and output signals. In addition to the standard analog signals, USB and CANopen® versions are also available.

Via a USB service interface and the WIKA configuration software "EasyCom", the models P-30 and P-31 can quickly and easily be adjusted on site.

Thanks to the simple-to-use software "Wika data logger", the USB version can also be used to save measured values and create customised reports.

Measuring ranges

Relative pressure								
bar	Measuring range	0 ... 0.25	0 ... 0.4	0 ... 0.6	0 ... 1	0 ... 1.6	0 ... 2.5	0 ... 4
	Overpressure limit	1.5	2.4	3.6	4	6.4	7.5	12
	Measuring range	0 ... 6	0 ... 10	0 ... 16	0 ... 25	0 ... 40	0 ... 60	0 ... 100
	Overpressure limit	18	30	48	75	80	120	200
	Measuring range	0 ... 160	0 ... 250	0 ... 400	0 ... 600	0 ... 1,000¹⁾		
	Overpressure limit	320	500	800	1,200	1,500		
psi	Measuring range	0 ... 5	0 ... 10	0 ... 15	0 ... 25	0 ... 30	0 ... 50	0 ... 100
	Overpressure limit	20	40	45	75	90	150	300
	Measuring range	0 ... 160	0 ... 200	0 ... 300	0 ... 500	0 ... 1,000	0 ... 1,500	0 ... 2,000
	Overpressure limit	480	600	900	1,000	1,500	2,250	3,000
	Measuring range	0 ... 3,000	0 ... 5,000	0 ... 10,000				
	Overpressure limit	4,500	7,500	15,000				

1) not available for model P-31

Absolute pressure									
bar	Measuring range	0 ... 0.25²⁾	0 ... 0.4	0 ... 0.6	0 ... 1	0.8 ... 1.2²⁾	0 ... 1.6	0 ... 2.5	
	Overpressure limit	1.5	2.4	3.6	4	3.6	4.8	7.5	
	Measuring range	0 ... 4	0 ... 6	0 ... 10	0 ... 16	0 ... 25			
	Overpressure limit	12	18	30	48	48			
psi	Measuring range	0 ... 5	0 ... 10	0 ... 15	0 ... 25	0 ... 30	0 ... 50	0 ... 100	
	Overpressure limit	20	40	45	75	90	150	300	
	Measuring range	0 ... 160	0 ... 200	0 ... 300					
	Overpressure limit	480	600	600					

2) only available with an accuracy of 0.1 % of span

Vacuum and +/- measuring range						
bar	Measuring range	-1 ... 0	-0.6 ... 0	-0.4 ... 0	-0.25 ... 0	-1 ... +0.6
	Overpressure limit	1.5	1.5	1.5	1.5	3.2
	Measuring range	-1 ... +1	-1 ... +1.5	-1 ... +3	-1 ... +5	-1 ... +9
	Overpressure limit	4	5	8	12	20
	Measuring range	-1 ... +15				
	Overpressure limit	32				
psi	Measuring range	-30 inHg ... 0	-30 inHg ... +15	-30 inHg ... +30	-30 inHg ... +50	-30 inHg ... +100
	Overpressure limit	22.5	60	90	135	240
	Measuring range	-30 inHg ... +160	-30 inHg ... +200			
	Overpressure limit	360	450			

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

Other measuring ranges on request

Vacuum resistance

Yes

Output signal

Signal type	Signal
Current (2-wire)	4 ... 20 mA
Current (3-wire)	4 ... 20 mA 0 ... 20 mA
Voltage (3-wire)	DC 0 ... 10 V DC 0 ... 5 V
USB	per P-30/P-31 interface protocol
CANopen®	per CiA DS404

Voltage supply

Power supply

The permissible power supply depends on the corresponding output signal.

- 4 ... 20 mA (2-wire): DC 9 ... 30 V
- 4 ... 20 mA (3-wire): DC 9 ... 30 V
- 0 ... 20 mA (3-wire): DC 9 ... 30 V
- DC 0 ... 5 V: DC 9 ... 30 V
- DC 0 ... 10 V: DC 14 ... 30 V
- USB: DC 4,5 ... 5,5 V
- CANopen®: DC 9 ... 30 V

Total current consumption

The total current consumption is dependent on the respective signal type.

- Current (2-wire): max. 25 mA
- Current (3-wire): max. 45 mA
- Voltage (3-wire): max. 10 mA
- USB: 40 mA
- CANopen®: 60 mA

Load

- Current (2-wire): $\leq (\text{power supply} - 9 \text{ V}) / 0,02 \text{ A}$
- Current (3-wire): $\leq (\text{power supply} - 9 \text{ V}) / 0,02 \text{ A}$
- Voltage (3-wire): $> \text{max. output signal} / 1 \text{ mA}$

Accuracy data

Accuracy at reference conditions

Accuracy	
Standard	$\leq \pm 0,1 \%$ of span
Option	$\leq \pm 0,05 \%$ of span ¹⁾

1) For +/- measuring ranges and measuring range ≤ 0.4 bar on request

Including non-linearity, hysteresis, non-repeatability, zero offset and end value deviation (corresponds to measured error per IEC 61298-2). Calibrated in vertical mounting position with process connection facing downwards.

Non-linearity (per IEC 61298-2)

$\leq \pm 0.04 \%$ of span BFSL

Temperature error

In the range of $-4 \dots 176 \text{ °F}$ ($-20 \dots +80 \text{ °C}$) the instrument is actively compensated.

- $-4 \dots 50 \text{ °F}$ ($-20 \dots +10 \text{ °C}$): $\leq \pm 0,2 \%$ of span/10 K
- $50 \dots 140 \text{ °F}$ ($10 \dots 60 \text{ °C}$): no additional error ¹⁾
- $140 \dots 176 \text{ °F}$ ($60 \dots 80 \text{ °C}$): $\leq \pm 0,2 \%$ of span/10 K

1) For the optional accuracy at reference conditions of $\leq \pm 0.05 \%$ of span there is an additional temperature error of $\leq \pm 0.05 \%$ of span.

Total error band 50 ... 140 °F (10 ... 60 °C)

$\leq \pm 0.1 \%$ of span

Long-term stability

$\leq \pm 0.1 \%$ of span/year

Adjustability

Adjustment via the "EasyCom 2011" or "EasyCom CANopen®" software

Zero point: $-5 \dots +10 \%$ of span

Span: $-50 \dots +5 \%$ of span

Measuring rate

The measuring rate is dependent on the respective signal type.

- 2-wire: 2 ms
- 3-wire: 1 ms
- USB: 3 ms
- CANopen®: 1 ms

Reference conditions

Temperature

59 ... 77 °F (15 ... 25 °C)

Atmospheric pressure

12.5 ... 15.4 psi (860 ... 1,060 mbar)

Humidity

45 ... 75 % relative

Power supply

- DC 24 V
- DC 5 V with USB version

Warm-up time

< 10 min

Mounting position

Process connection lower mount (LM)

Operating conditions

Ingress protection (per IEC 60529)

The ingress protection depends on the type of electrical connection.

- Angular connector DIN 175301-803 A: IP 65
- Circular connector M12 x 1 (4-pin): IP 67
- Circular connector M16 x 0.75 (5-pin): IP 67
- Bayonet connector: IP 67
- CANopen® M12 x 1 (5-pin): IP 67
- USB: IP 67
- Cable outlet: IP 67

The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

Vibration resistance

10 g (IEC 60068-2-6, under resonance)

Shock resistance

200 g (IEC 60068-2-27, mechanical)

Service life

10 million load cycles

Free fall test

The instrument is resistant to an impact onto concrete from a height of 3.3 ft (1 m).

Temperatures

- Ambient: -4 ... 176 °F (-20 ... +80 °C)
- Medium: -4 ... 221 °F (-20 ... +105 °C)
- Storage: -40 ... 185 °F (-40 ... +85 °C)

Electrical connections

Short-circuit resistance

- S₊ vs. U₋
- CAN-High/CAN-Low vs. U₊/U₋

Reverse polarity protection

U₊ vs. U₋

Overvoltage protection

DC 36 V (not with USB version)

Insulation voltage

DC 500 V

Connection diagrams

Circular connector M12 x 1 (4-pin)		
	2-wire	3-wire
	U ₊ 1	1
	U ₋ 3	3
	S ₊ -	4

Angular connector DIN 175301-803 A		
	2-wire	3-wire
	U ₊ 1	1
	U ₋ 2	2
	S ₊ -	3

Circular connector M16 x 0.75 (5-pin)		
	2-wire	3-wire
	U ₊ 3	3
	U ₋ 1	4
	S ₊ -	1

Bayonet connector		
	2-wire	3-wire
	U ₊ A	A
	U ₋ B	B
	S ₊ -	C

Circular connector M12 x 1 (5-pin), CANopen®		
	2-wire	
	U ₊	2
	U ₋	3
	Shield	1
	CAN-High	4
	CAN-Low	5

Cable outlet unshielded		
	2-wire	3-wire
	U ₊ brown	brown
	U ₋ blue	blue
	S ₊ -	black

Cable lengths on request.

Process connections

Model P-30

Standard	Thread size
EN 837	G ¼ B G ¼ female G ½ B
DIN 3852-E	G ¼ A
ANSI/ASME B1.20.1	¼ NPT ½ NPT
-	M18 x 1.5 male with G ¼ female
-	G ½ male with G ¼ female

Other connections on request

Model P-31

Standard	Thread size
EN 837	G ½ B with flush diaphragm G 1 B with flush diaphragm

Sealings

Thread size	Standard	Option
G ¼ B	Without	Cu Stainless steel
G ½ B	Without	Cu Stainless steel
G ¼ A	Without	NBR FPM/FKM

For all other process connections no sealings are available.

Materials

Wetted parts

- Stainless steel
- Additionally Elgiloy® for measuring ranges > 25 bar
- For sealing materials see "Process connections"

Non-wetted parts

Stainless steel

CE conformity

Pressure equipment directive

97/23/EC, PS > 200 bar; module A, pressure accessory

EMC directive

2004/108/EC, EN 61326 emission (group 1, class B) and immunity (industrial application)

Approvals

- **GOST-R**, import certificate, Russia
- **CRN**, safety (e.g. electr. safety, overpressure, ...), Canada

Certificates

- Accuracy test report (included in the delivery)
- 2.2 test report per EN 10204 ¹⁾
- 3.1 inspection certificate per EN 10204 ¹⁾

¹⁾ option

Approvals and certificates, see website

Manufacturer's declaration

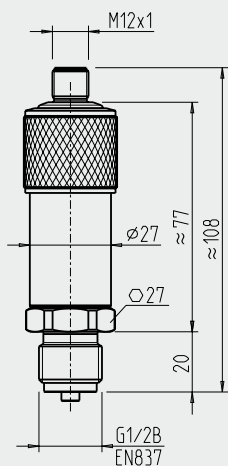
RoHS conformity

Yes, instruments with bayonet connector are not RoHS-compliant

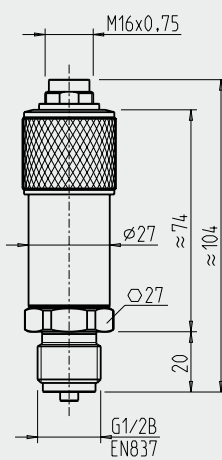
Dimensions in mm

Pressure transmitters

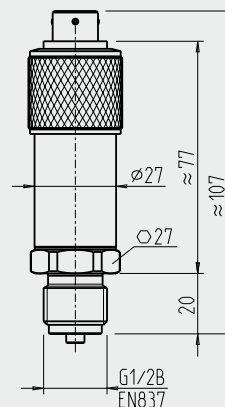
with M12 x 1 circular connector



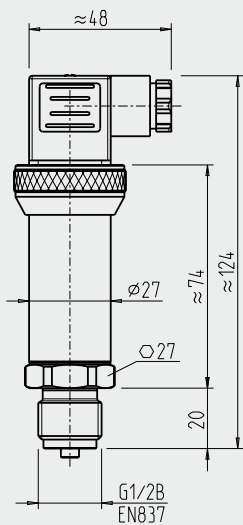
with M16 x 0.75 circular connector



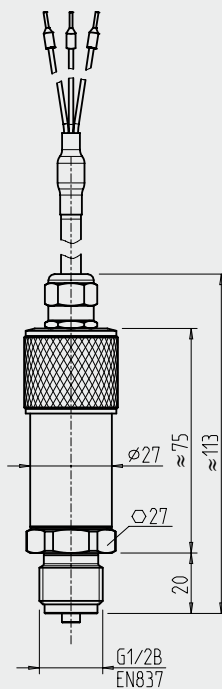
with bayonet connector



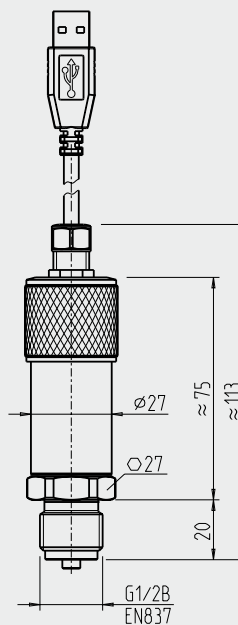
with angular connector
DIN 175301-803 form A



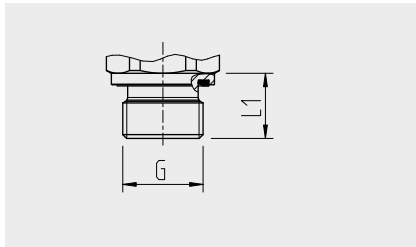
with cable outlet



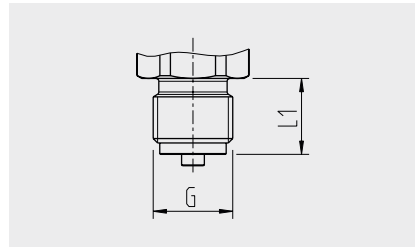
with USB connector type A



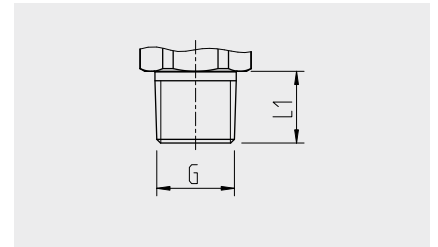
Process connections for model P-30



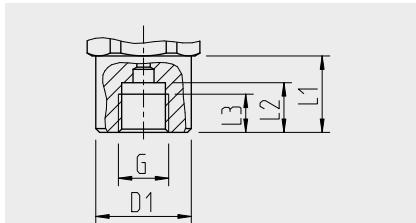
G	L1
G 1/4 A DIN 3852-E	12



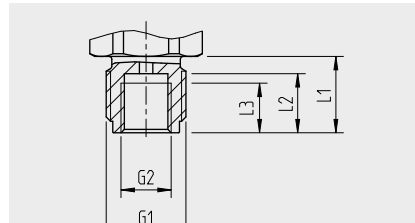
G	L1
G 1/4 B EN 837	13
G 1/2 B EN 837	20



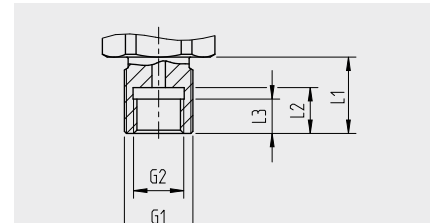
G	L1
1/4 NPT	13
1/2 NPT	19



G	L1	L2	L3	D1
G 1/4	20	13	10	Ø 25

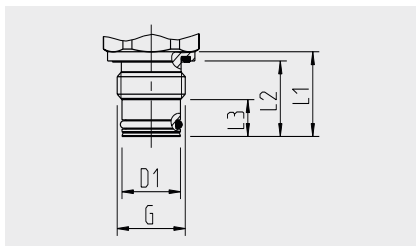


G1	G2	L1	L2	L3
G 1/2 B	G 1/4	20	15,5	13

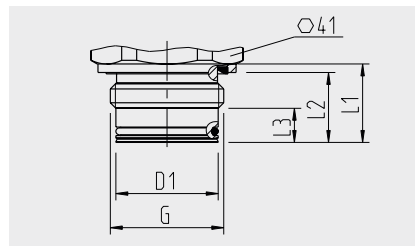


G1	G2	L1	L2	L3
M18 x 1,5	G 1/4	20	12	9

Process connections for model P-31



G	L1	L2	L3	D1
G 1/2 B	23	20,5	10	Ø 18



G1	L1	L2	L3	D1
G 1 B	23	20,5	10	30

Accessories

CANopen® design

Designation	Order no.
Y-connector (M12 x 1 female connector, male/female connector)	2344526
Terminating resistor (120 Ω, M12 x 1 connector)	2308274
Bus cable 0.5 m (M12 x 1 male/female connector)	2308240
Bus cable 2 m (M12 x 1 male/female connector)	2308258
Software EasyCom CANopen®, incl. PCAN-USB adapter, cable set and power supply	7483167
P-30/P-31 software CD	11478901

Analogue design

Designation	Order no.
P-30/P-31 USB service interface, incl. WIKA software CD	13193075

Software

The full software is available to download as freeware from the following path.
[www.wika.com / Download / Software / Electronic Pressure Measurement](http://www.wika.com/Download/Software/Electronic%20Pressure%20Measurement)

Ordering information

Model / Measuring range / Output signal / Accuracy at reference conditions / Process connection / Sealing / Electrical connection

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