

Operating manualpage 20 – 36

Digital Pressure Gauges Types HTE2/D2/C2 & HTE2-L-E2/D2/C2



Ba_Ref-E2D2C2 • 09/2022





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0 About This Operating Manual

- Read carefully before use!
- Retain for later reference!

Symbols used:

	WARNING Failure to do so may result in death or serious injury.
	CAUTION Failure to do so may result in minor or moderate injury.
	IMPORTANT Failure to do so may result in damage to property and the environment.

If you have any problems or questions, please contact your supplier or contact us directly at:

Hydrotechnik UK Ltd.
1 Central Park, Lenton Lane
Nottingham NG7 2NR / United Kingdom
☎ +44 (0)115 900 3550

sales@hydrotechnik.co.uk
www.hydrotechnik.co.uk

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Exclusion of liability

We accept no liability for any damage or malfunctions resulting from incorrect installation, inappropriate use of the device or failure to follow the instructions in this operating manual.

1 Safety Instructions

Read the operating manual carefully. Follow all instructions and notices to prevent injury or damage to property.

Intended use

The digital pressure gauge may only be used for checking, adjusting and calibrating pressure measuring devices.

The digital pressure gauge must not be used outside the specification or in violation of the operating instructions.



WARNING

The digital pressure gauge is not a safety component in accordance with Directive 2006/42/EC (Machine Directive).

⚠ Never use the device as a safety component.

The operational safety of the device supplied is only guaranteed by intended use. The specified limits (→ p. 31) may under no circumstances be exceeded.

This applies in particular to compliance with the permissible pressure range end value and the permissible temperature range.



WARNING

Exceeding the maximum overload values can lead to material failure of the digital pressure gauge. This can cause serious damage to health.

⚠ Make sure that the overload values are never exceeded.

Qualified personnel

- The personnel in charge of the installation, operation and maintenance of the device must hold a relevant qualification. This can be based on training or relevant instructions.

General safety instructions

- Degree of protection according to EN 60529:
Ensure that the ambient conditions at the place of use do not exceed the requirements of the specified degree of protection (→ p. 31).
- Only use the device in perfect condition. Damaged or faulty devices must be checked immediately and replaced if necessary.
- Do not remove or destroy type plates or other markings on the device, or the warranty is rendered null and void.

2 Device Description

The types E2 / D2 / C2 are digital pressure gauges with actual value and MIN/MAX display. They have an accuracy of $\pm 0.5\%$ Type E2, $\pm 0.1\%$ Type D2 and $\pm 0.05\%$ Type C2, relative to the corresponding pressure range end value (FS).

Signals from the pressure measurement cells are recorded at a sampling rate of 10 ms (100 measurements/s), converted into pressure values and displayed. Thanks to the high sampling rate, dynamic pressure peaks can also be measured. They are written to the MIN/MAX memory, which is continuously updated.

Versions



Standard



Version with data logger

Accuracy (from end value)		E2 0.5%	D2 0.1%	C2 0.05%
Pressure range	Resolution			
-1...3 bar	1 mbar	✓	✓	
-1...5 bar	1 mbar	✓	✓	
-1...10 bar	1 mbar	✓	✓	✓
-1...20 bar	1 mbar	✓	✓	✓
-1...40 bar	10 mbar	✓	✓	✓
-1...60 bar	10 mbar	✓	✓	✓
0...100 bar	10 mbar	✓	✓	✓
0...160 bar	10 mbar	✓	✓	✓
0...250 bar	100 mbar	✓	✓	✓
0...400 bar	100 mbar	✓	✓	✓
0...700 bar	100 mbar	✓	✓	✓
0...1000 bar	100 mbar	✓	✓	✓

3 Structure

Components

- ① USB connection with protective cap (only version with data logger).
- ② Cast zinc housing with rubber protection cap.
- ③ LC display with backlight.
- ④ Control panel with buttons.
- ⑤ G $\frac{1}{4}$ " pressure connection.



Versions of rubber protection cap (rear side)



Rubber protection cap made of one piece



Rubber protection cap for opening

Display

- ⑥ Bar graph display.
- ⑦ Unit display.
- ⑧ MIN/MAX or Full Scale (FS).
- ⑨ Measured value display.



4 Connection and Battery Replacement

The digital pressure gauge has a G $\frac{1}{4}$ " (BSPP) male thread and is supplied with batteries fitted. The device is ready for operation after it is switched on.



WARNING

The connection (AF 27) is approved up to a nominal pressure of 1,000 bar.

- ✎ Observe the nominal pressure specifications of the installed measuring connections and the specified safety factors.
- ✎ Improper installation of the pressure gauges and the corresponding adapters can lead to the pressure gauges being torn off.

4.1 Connection

The housing of the digital pressure gauge can be rotated on the pressure connection. When mounting directly, make sure that no attachments obstruct the rotation.

- ✎ 1. Prepare the measurement setup for connection to the G $\frac{1}{4}$ " pressure connection.



WARNING

Only use adapters with corresponding nominal pressure specifications!

- ✎ 2. Make sure that the gasket is correctly seated in the pressure connection.
- ✎ 3. Carefully turn the digital pressure gauge by hand into the measurement setup thread.
- ✎ 4. Tighten the pressure connection with an open-end wrench (AF 27).



WARNING

The mounting must be carried out with a torque of 25 Nm.

- ✎ 5. Align the digital pressure gauge for your application.



4.2 Battery Replacement

The battery capacity is indicated by the number of bars (0...5 bars) in the battery symbol. The batteries should be replaced when no bar is visible and the battery symbol flashes. The digital pressure gauge is still completely functional.

The batteries must be replaced when the additional message **Lo batt** appears. The digital pressure gauge is no longer operational.



1. Switch off the device.

If you have a rubber protection cap for opening, you can simply remove the rubber protection cap from the housing. Otherwise, we recommend that you leave the protection rubber cap on the housing during battery replacement.



2. Open the housing:

Completely remove the screws from the rear cover.

3. Lever the rear cover off the housing.

4. Set the rear cover aside.

5. Replace the batteries (LR6 - AA).

!!! Pay attention to the POLARITY !!!

i NO HOUSEHOLD WASTE

The batteries must be disposed of.

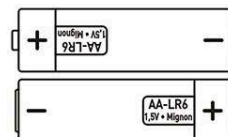


6. Check the seat of the gasket in the rear cover and watch out for signs of damage.





7. Carefully attach the rear cover to the housing.

8. Align the rear cover with the boreholes.

9. Re-tighten the rear cover screws with 0.6 Nm.



5 Operation

Button	1. function	2. function (press for 2 s)
	Switch the device on or off	Switch on backlight (20 s)
	Display MIN, MAX or full scale value (FS)	Setting the date and time*
	Correct zero point	Open device settings
	Delete MIN and MAX values / confirm entry	Start or stop data logger*

* Only version with data logger

5.1 Display Mode

During switching on, the serial number is displayed. Then the digital pressure gauge is in display mode and the current measured value is displayed.

The zero point suppression is 0.1% of the range. Example: Digital gauges with a pressure range of -1...10 bar only indicate pressures from 0.010 bar.



Pressure range exceeded / oFL display

The oFL display appears if the current pressure is outside the pressure range ($\geq 110\%$ FS) of the digital pressure gauge. If the pressure drops below this range again, the current measured value is displayed.

If the oFL display appears in depressurised state, there is a malfunction.

🔧 Please contact SIKA.

Zero point correction (ZERO)



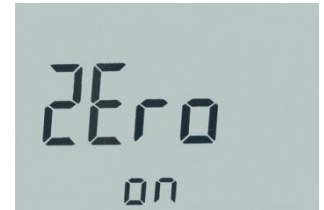
In case of unwanted deviations in depressurised condition (atmospheric pressure), the zero point can be corrected manually.



IMPORTANT

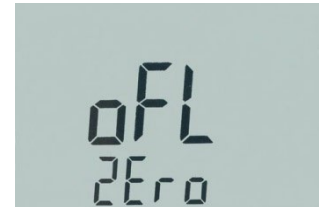
The zero point correction sets the current ACTUAL value to zero. If the ZERO function is activated when pressure is present, the pressure measurement is no longer carried out against ambient pressure and incorrect measurements will occur.

- Press the ZERO/MENU button.
 - **ZEro** appears in the display for 2 s. The ZERO function can be activated.
 - Press the SET/OK button to perform the zero point correction.
 - The display and the MIN/MAX values are reset.



or

- **oFL ZEro** appears in the display for 2 s. The measured pressure (0 bar) is greater than 5% of the pressure range. The ZERO function cannot be performed.
- The device switches back to measuring mode.
- Depressurise and press the ZERO/MENU button again.



Resetting the zero point correction



The zero point correction stays activated until the device is switched off. After it is switched on again, the zero point correction is no longer activated.

5.2 Device Settings

Press the ZERO/MENU button for 2 s.		
Press ZERO/MENU button to continue.		
Automatic shut-off (P _o oFF / P _o on)	Press the ZERO/MENU button for the next menu item.	Confirm your selection with the SET/REC button. You return to the display mode.
Measuring unit (u _n it)		
Display filter (F ilte)*		
Delete all measured data** (dEL dFtR)		
Device information		

* Value selection: 0...7 (0 = no damping)

** Only version with data logger

You will automatically return to the display mode if you do not press any button for about 5 s.

Automatic shut-off

When the function is activated, the device automatically switches off after 5 minutes.

The automatic shut-off is deactivated for devices with data logger during data recording.

If the function is deactivated, the device is in continuous duty and has to be manually switched off with the ON/OFF button.

The current setting is displayed when the digital pressure gauge is switched on:




- P_o on = activated (automatic shut-off);
- P_o oFF = deactivated (continuous duty).

The settings P_o on or P_o oFF remain stored and are active again when the device is switched on.



5.3 Setting the Date and Time

Only version with data logger:

Press the MIN/MAX/  button for 2 s.		
Press the SET/REC button to continue.		
Year (ЧЕР)	Press  /  to set the value.	Confirm with the SET/REC button.
Month (ПНБН)		
Day (дРЧ)		
Hour (НБНН)		
Minute (ПН)		Confirm with the SET/REC button. You return to the display mode.
Decimal separator* (COMMA / POINT 5 9)		

* Depending on the region, different decimal separators are used for the measured values.

6 Data Logger

Only version with data logger:

With the data logger function you can save up to 10 recording series. The longest recording duration is 48 h. The storage rate adapts automatically within the recording duration. You can transfer the measurement data in CSV format to your computer via the USB interface.

Recording duration	Max. time span	Storage rate	Max. data sets
0 s–1,800 s (0.5 h)	0.5 h (1,800 s)	100 ms	18,000
1,800 s–3,600 s (0.5 h–1 h)	1 h (3,600 s)	200 ms	18,000
1 h–2 h	2 h (7,200 s)	400 ms	18,000
2 h–4 h	4 h (14,400 s)	800 ms	18,000
4 h–8 h	8 h (28,800 s)	1,600 ms	18,000
8 h–16 h	16 h (57,600 s)	3,200 ms	18,000
16 h–48 h	48 h (172,800 s)	6,400 ms	27,000

6.1 Start or Stop Data Logger

Start data logger

- Press the SET/REC button for 2 s.
REC flashes on the display. The number (1-10) of the recording series is also displayed.

Stop data logger

- Press the SET/REC button for 2 s.
The data is saved and you return to the display mode.

6.2 Transfer and Delete Measured Data

Transfer measured data

- Connect the digital pressure gauge to your computer with the USB cable supplied.
- Switch on the digital pressure gauge if necessary.
The display shows $P_{\text{c}} 15.1$. The digital pressure gauge is integrated as a removable data carrier. You can access the measured data via your computer.

The measured data contains the time, MIN/MAX and ACTUAL values separated by a semi-colon. If the measured data is displayed incorrectly, import the data as "text".

Delete measured data

You can either delete all measured data via the device settings (DEL DATA) or delete individual measurement data via the file manager of your operating system.

7 Maintenance and Return Shipment



IMPORTANT

Important parts or components can be damaged if the customer modifies or interferes with the device.

The interference voids any warranty and manufacturer's responsibility!

Maintenance

The device is maintenance-free and cannot be repaired by the user. In case of a defect, the device must be replaced or returned to the manufacturer for repair.

Only the batteries need to be changed regularly. We recommend replacing them with new ones after 1.5 years at the latest (→ p. 25).



IMPORTANT

If the device is not used for a longer period, the batteries should be removed from the device to prevent leakage damage.

Return shipment

Contact your supplier of the product for return shipment instructions.

8 Disassembly and Disposal



CAUTION

Never remove the device from a plant in operation.

✚ Make sure that the plant is shut down professionally.

Before disassembly

Prior to disassembly, ensure that the plant

- ☐ is switched off.
- ☐ is in a safe and de-energised state.
- ☐ is depressurised and has cooled down.

Disassembly

- ✚ Watch out for any leaking media. Take appropriate precautions to collect them
- ✚ Loosen the pressure connection with an open-end wrench (AF 27).
- ✚ Manually turn the digital pressure gauge out of the measurement setup.

Disposal

Compliant with the Directives 2011/65/EU (RoHS) and 2012/19/EU (WEEE)*, the device must be disposed of separately as electrical and electronic waste.



NO HOUSEHOLD WASTE

The device consists of various different materials. It must not be disposed of with household waste.

✚ Take the device to your local recycling plant

or

✚ send the device back to your supplier or to SIKA.

* WEEE reg. no.: DE 25976360

9 Technical Data

The technical data of customised versions may differ from the data in these instructions. Please observe the information specified on the type plate.

E2 / D2 / C2	
Pressure ranges input - Piezo resistive pressure cell - Strain gauge pressure cell	-1...3/5 bar (E2) and -1...3/5/10 bar (D2 / C2) -1...10 (E2), -1...20/40/60 bar and 0...100/160/250/400/700/1000 bar
Accuracy (25°C) ±(% of full scale pressure value)(FS) - Type E2 - Type D2 - Type C2	0.5 % 0.1 % 0.05 % (0.1 % in vacuum)
Sampling rate	10 ms (100 measurements/s)
Internal resolution AD converter	12 bit = 4,096 steps
Temperature influence - Piezo resistive pressure cell - Strain gauge pressure cell	0.05 % FS / K 0.005 % FS / K
Display - Actual value - MIN/MAX or Full Scale(FS) - Bar graph • Sampling rate - Backlight	4 ½ digits (15 mm) 4 ½ digits (8 mm) 33 segments (drag indicator function) 50 ms (20 measurements/s) 50 x 34 mm
Pressure units	bar, PSI, mbar, kPa, MPa, kg/cm ² , mH ₂ O, inchH ₂ O
Electrical characteristics	
Supply voltage	Battery 2 x1.5 VDC AA (LR6 –AA), Alkaline (Mignon)
Battery life	1,500 h (without lighting)
Degree of protection (EN 60529)	IP 67
Data logger (optional)	
Max. data sets per recording series	27,000
Recording series	1...10
Storage rate	0.1 s...6.4 s automatically per recording duration
Max. recording duration	48 h
Data set information	Date / time Time / ACTUAL pressure / Min / Max
Interface	1x Mini USB port
Software required	No – detection as removable data carrier
Data format	CSV

E2 / D2 / C2

Ambient conditions and process variables

Operating temperature	0...50 °C
Media temperature	-20...+80 °C
Storage temperature	-20...+60 °C
Relative humidity	< 85%
Vibration (IEC 60068-2-6)	10...500 Hz / 5 g
Shock (IEC 60068-2-29)	11 ms / 25 g
Pressure connection: - Material - Connection thread (ISO 1179-2) - Gasket	Stainless steel 1.4404 G $\frac{1}{4}$ " NBR
Housing: - Material - Dimensions (without cap) - Dimensions (with cap)	Zinc cast (Rubber protection cap: TPE) Ø = 79 mm, T = 33 mm Ø = 90 mm, T = 45 mm
Weight	540 g

Display resolution

Pressure range	bar	PSI	mbar	kPa
-1...3 bar	-999...3.000	-9.99...43.51	-999...3000	-99.9...300.0
-1...5 bar	-999...5.000	-9.99...72.52	-999...5000	-99.9...500.0
-1...10 bar	-999...10.000	-9.99...145.04	-999...10000	-99.9...1000.0
-1...20 bar	-999...19.999	-14.5...290.1	-999...19999	-99.9...1999.9
-1...40 bar	-1.00...40.00	-14.5...580.2	-/-	-100...4000
-1...60 bar	-1.00...60.00	-14.5...870.2	-/-	-100...6000
0...100 bar	0.00...100.00	0...1450.4	-/-	0...10000
0...160 bar	0.00...160.00	0...2321	-/-	0...16000
0...250 bar	0.0...250.0	0...3626	-/-	-/-
0...400 bar	0.0...400.0	0...5802	-/-	-/-
0...700 bar	0.0...700.0	0...10153	-/-	-/-
0...1000 bar	0.0...1000.0	0...14504	-/-	-/-
Pressure range	MPa	kg/cm2	mH2O	inH2O
-1...3 bar	-1.00...0.300	-9.99...3.059	-9.99...30.59	-99.9...1204.4
-1...5 bar	-1.00...0.500	-9.99...5.099	-9.99...50.99	-99.9...1999.9
-1...10 bar	-1.00...1.000	-9.99...10.197	-9.99...101.97	-401...4015
-1...20 bar	-1.00...2.000	-9.99...19.999	-9.99...199.99	-401...8029
-1...40 bar	-1.00...4.000	-1.02...40.79	-10.2...407.9	-401...16059
-1...60 bar	-1.00...6.000	-1.02...61.18	-10.2...611.9	-/-
0...100 bar	0.000...10.000	0.00...101.97	0.0...1019.7	-/-
0...160 bar	0.000...16.000	0.00...163.15	0.0...1631.6	-/-
0...250 bar	0.000...25.00	0.0...254.9	0...2549	-/-
0...400 bar	0.000...40.00	0.0...407.9	0...4079	-/-
0...700 bar	0.000...70.00	0.0...713.8	0...7138	-/-
0...1000 bar	0.000...100.00	0.0...1019.7	0...10197	-/-

**WARNING**

Exceeding the maximum overload values (Pmax) can lead to malfunctions and result in the digital pressure gauge being destroyed.

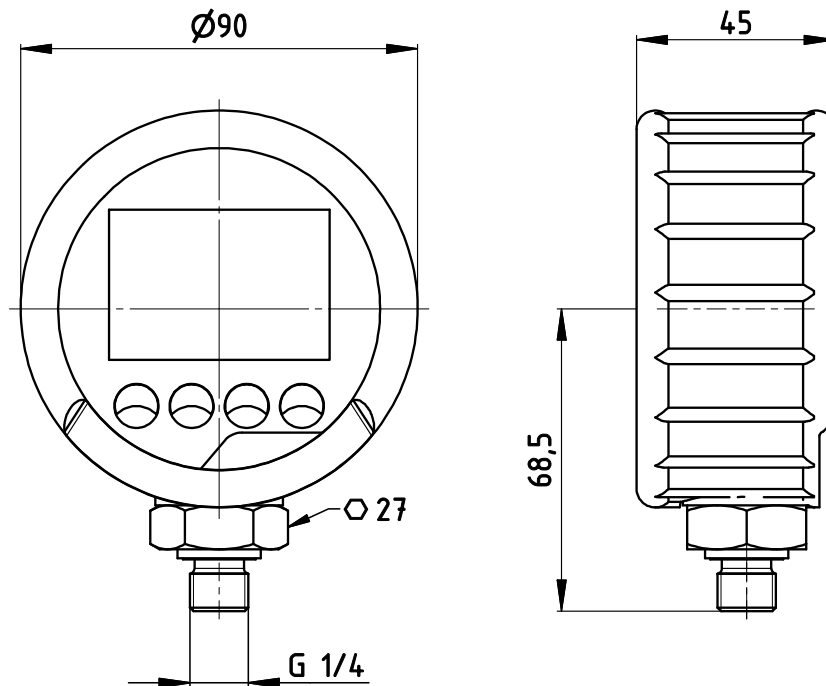
Overload values		
Pressure range	Overload	Burst pressure
-1...3 bar	12 bar	20 bar
-1...5 bar	18 bar	30 bar
-1...10 bar	30 bar	50 bar
-1...20 bar	50 bar (E2) 48 bar (D2 / C2)	250 bar (E2) 80 bar (D2 / C2)
-1...40 bar	80 bar	400 bar
-1...60 bar	120 bar	550 bar
0...100 bar	200 bar	800 bar
0...160 bar	320 bar	1000 bar
0...250 bar	500 bar	1200 bar
0...400 bar	800 bar	1700 bar
0...700 bar	1200 bar	2400 bar
0...1000 bar	1500 bar	2500 bar

At 0 bar relative, the following threshold values must be exceeded for a measured value to be displayed:

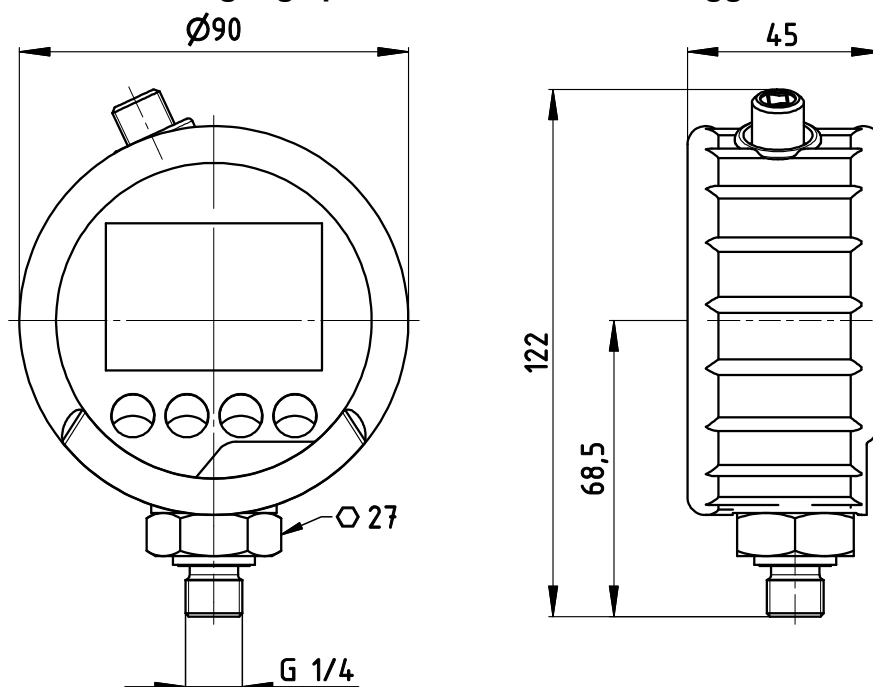
Threshold values	Type E2		Type D2 / C2	
Pressure range	Threshold value [bar]	Resolution [bar]	Threshold value [bar]	Resolution [bar]
-1...3 bar	0.006	0.002	0.003	0.002
-1...5 bar	0.010	0.002	0.005	0.002
-1...10 bar	0.020	0.003	0.01	0.003
-1...20 bar	0.04	0.01	0.02	0.01
-1...40 bar	0.08	0.01	0.04	0.01
-1...60 bar	0.12	0.02	0.06	0.02
0...100 bar	0.20	0.03	0.1	0.03
0...160 bar	0.32	0.04	0.16	0.04
0...250 bar	0.5	0.1	0.3	0.1
0...400 bar	0.8	0.1	0.4	0.1
0...700 bar	1.4	0.2	0.7	0.2
0...1000 bar	2.0	0.3	1.0	0.3

9.1 Dimensions

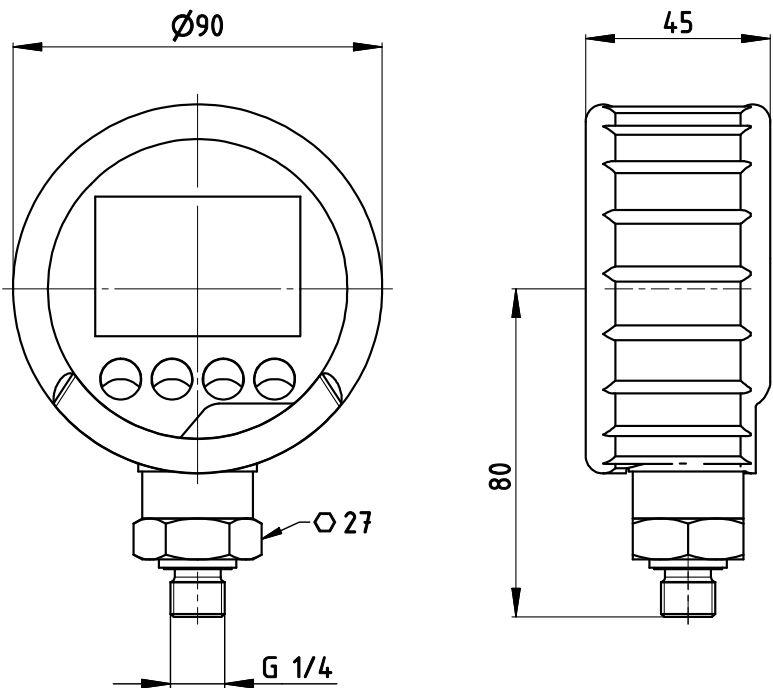
Strain gauge pressure cell without data logger



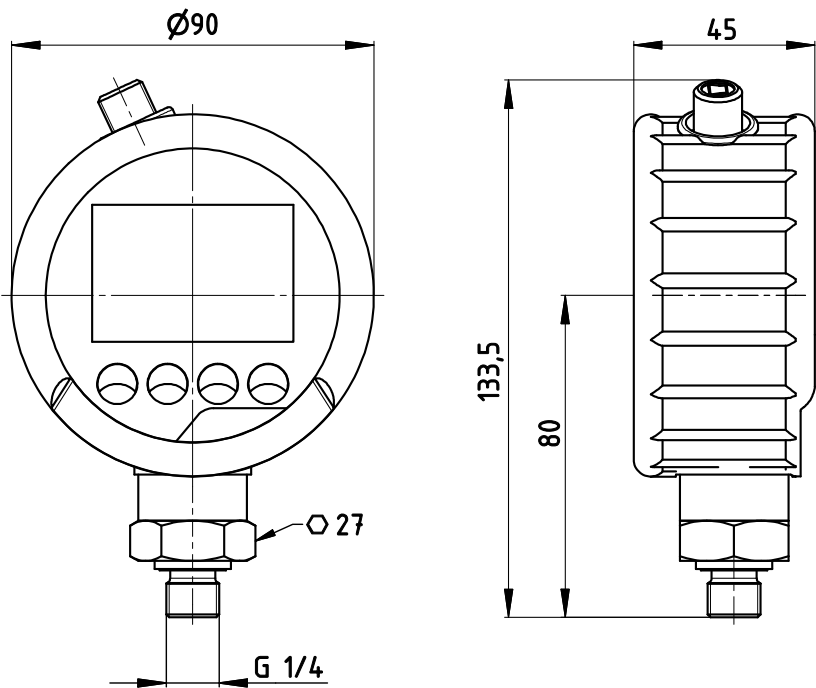
Strain gauge pressure cell with data logger



Piezo resistive pressure cell without data logger



Piezo resistive pressure cell with data logger



10 EU Declaration of Conformity

The digital pressure gauges types E2 / D2 / C2 comply with the 2014/30/EU, 2014/68/EU and 2011/65/EU directives.

The types E2 / D2 / C2 comply with the technical regulations DIN EN 61000-6-2 + rectification 1:2011, DIN EN 61000-6-3:2007 + rectification 1:2011 and DIN EN 50581:2013.

