

# Electronic Measuring and Calibration Instruments



## Electronic Measuring and Calibration Instruments

Our electronic instruments and calibration equipment product area features instruments with long-term reliability, innovative calibration technology, and a comprehensive range of services from our own DKD laboratory for temperature, pressure and standardised electrical signals.

Tried and tested components for instrumentation and control equipment and systems help our customers ensure the consistent long-term quality of their products and the efficiency of their production processes. Our strength is our flexibility in developing customised solutions, based on our wealth of experience.

**Standard Signals**

**Temperature**

**Pressure**

**% r.F.**   **bar**   **Ω**

**mA**   **°C**   **psi**   **°F**   **mbar**



- Pneumatic pressure pumps
- Hydraulic pressure pumps
- Hydraulic pressure generators
- Digital pressure gauges
- Pressure calibrators



Including products with:



## PRESSURE CALIBRATORS



# Manual pressure pumps

## Mobile and simple

Pressure is one of the most commonly measured quantities in engineering, which is why exact and reliable pressure measurement is especially important.

However, the characteristics of the even best sensor or transducer can be altered by a wide variety of factors. This drift cannot be prevented, and it leads to incorrect readings.

Calibration allows these deviations to be measured and documented in a certificate. All pressure measuring devices that significantly affect processes or activities should be calibrated before being used.

Good reasons for proper and reliable calibration:

- Maintaining consistently high product quality
- Fulfilling industrial requirements
- Fulfilling quality assurance requirements
- Process optimisation
- Increasing productivity
- Avoiding unexpected production downtimes
- Employee and customer safety
- Environmental requirements / ecological aspects
- Profit optimisation / economic aspects

SIKA's mobile test and calibration devices are effective aids for performing the necessary test and calibration tasks quickly.



### Requirements for pressure sources

The essential requirements for manual pressure generation are:

- Easy connection to test samples
- Simple and easy pressure generation
- Maintenance free operation

These aspects have been taken into account and implemented in the design of our test pumps and pressure generators.



### Test pumps or pressure generators

SIKA portable pressure generators are the first choice for stationary use. Unlike complicated and sensitive plate scales, there is no need to take gravity into account or perform complicated alignment, since measurements are based on direct comparison. Another advantage of pressure generators is one-hand operation, which makes repetitive test runs more ergonomic.

## A single pump for a variety of requirements

### Hydraulic or pneumatic

Air, water and oil are used as pressure media. Especially in application areas in which wetting of the test sample is not allowed or the use of aggressive or ionising substances must be avoided, air is the ideal test medium.

SIKA's pneumatic test pump fulfils requirements that in many cases can only be covered by several pumps from other suppliers.

- ❶ Manual pressure generation in the medium pressure range up to 60 bar using a handle is unique – no other pump can do this.
- ❷ Integrated negative pressure capability enables operating with vacuum down to -950 mbar. A changeover valve enables switching from positive pressure to negative pressure with no need for special tools.
- ❸ A large-volume pressure regulator with ultrafine thread pitch is used for precise pressure adjustment in the low mbar range, enabling accurate settings in the low pressure region.

The easily operated hydraulic test pumps and pressure generators are specifically designed for the medium to high pressure range. They have a built-in reservoir for the hydraulic fluid. Pressures up to 350 bar, 700 bar or 1000 bar can be generated, depending on the model.



### OEM version and full version

Depending on the model a matching pressure hose is part of the basic configuration of the OEM version of the test pump. The hydraulic hoses are fitted with a self-sealing quick coupling. Inch, conical or metric adapters for all commonly used connection threads are available in the full version. A matching seal kit is also included with the pump. All of the equipment is held in a carrying case with a foam-rubber insert.



## Adapter kits

Standard adapter kit										
G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{3}{8}$	G $\frac{1}{2}$	$\frac{1}{8}$ NPT	$\frac{1}{4}$ NPT	$\frac{1}{2}$ NPT	M12 x 1.5	M20 x 1.5	G $\frac{1}{8}$ A	G $\frac{1}{4}$ A

# Pneumatic pressure pumps

## Type P 4



Type	P 4
OEM version	
Pressure medium	Air
Dimensions	Approx. 225 x Ø 55 mm
Weight	Approx. 980 g
Pressure ranges	
Negative pressure	-0.3 bar [depending on test sample / reference]
Positive pressure	4 bar
Connections	
Reference	G $\frac{1}{4}$ with Quick-Snap Y-plug-connection with PA hose (2 x 1m)
Test sample	G $\frac{1}{4}$ with quick coupling and pressure hose (1m)
Full version	
Adapter kit	Chrome-plated brass
Gasket kit	Teflon® Seals and O-rings
Dimensions	Approx. 450 x 370 x 110 mm
Weight	Approx. 4.2 kg

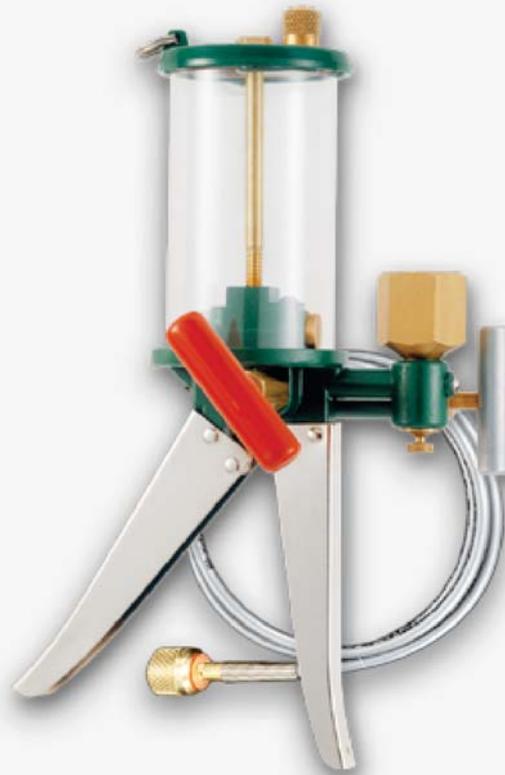
## Types P 40.2 and P 60



Type	P 40.2	P 60
<b>OEM version</b>		
Pressure medium	Air	
Dimensions	Approx. 240 x 170 x 50 mm	
Weight	Approx. 1.1 kg	
<b>Pressure ranges</b>		
Negative pressure	-0.95 bar	-0.95 bar
Positive pressure	40 bar	60 bar
<b>Connections</b>		
Reference	G $\frac{1}{4}$	
Test sample	G $\frac{1}{4}$ with quick coupling and pressure hose (1m)	
<b>Full version</b>		
Adapter kit	Chrome-plated brass	
Gasket kit	Teflon® Seals and O-rings	
Dimensions	Approx. 450 x 370 x 110 mm	
Weight	Approx. 4.2 kg	

# Hydraulic pressure pumps

## Type P 350.1



<b>Type</b>	<b>P 350.1</b>
<b>OEM version</b>	
<b>Pressure medium</b>	Distilled water or hydraulic fluid
<b>Dimensions</b>	Approx. 240 x 170 x 50 mm
<b>Weight</b>	Approx. 1.1 kg
<b>Pressure ranges</b>	
<b>With distilled water</b>	0...350 bar
<b>With hydraulic fluid</b>	0...350 bar
<b>Connections</b>	
<b>Reference</b>	G½
<b>Test sample</b>	G¼ with quick coupling and pressure hose (1m)
<b>Full version</b>	
<b>Adapter kit</b>	Chrome-plated brass
<b>Gasket kit</b>	Teflon® Seals and O-rings
<b>Dimensions</b>	Approx. 450 x 370 x 110 mm
<b>Weight</b>	Approx. 3.5 kg

**Type P 700.2**


<b>Type</b>	<b>P 700.2</b>
<b>OEM version</b>	
<b>Pressure medium</b>	Distilled water or hydraulic fluid
<b>Dimensions</b>	Approx. 255 x 225 x 85 mm
<b>Weight</b>	Approx. 1.7 kg
<b>Pressure ranges</b>	
<b>With distilled water</b>	0...700 bar
<b>With hydraulic fluid</b>	0...700 bar
<b>Connections</b>	
<b>Reference</b>	G¼
<b>Test sample</b>	G¼ with quick coupling and pressure hose (1m)
<b>Full version</b>	
<b>Adapter kit</b>	Stainless steel
<b>Gasket kit</b>	Teflon® Seals and O-rings
<b>Dimensions</b>	Approx. 450 x 370 x 125 mm
<b>Weight</b>	Approx. 4.8 kg

**Type P 700.2 - 1000**

<b>Type</b>	<b>P 700.2 - 1000</b>
<b>OEM version</b>	
<b>Pressure medium</b>	Distilled water or hydraulic fluid
<b>Dimensions</b>	Approx. 255 x 225 x 85 mm
<b>Weight</b>	Approx. 1.9 kg
<b>Pressure ranges</b>	
<b>With distilled water</b>	0...700 bar, test pressure 1000 bar
<b>With hydraulic fluid</b>	0...700 bar, test pressure 1000 bar
<b>Connections</b>	
<b>Reference</b>	G $\frac{1}{4}$
<b>Test sample</b>	G $\frac{1}{4}$ with quick coupling and high pressure hose (1 m), 1000 bar
<b>Full version</b>	
<b>Adapter kit</b>	Stainless steel
<b>Gasket kit</b>	Teflon® Seals and O-rings
<b>Dimensions</b>	Approx. 450 x 370 x 125 mm
<b>Weight</b>	Approx. 5 kg

# Hydraulic pressure generator

**Type P 700.G**

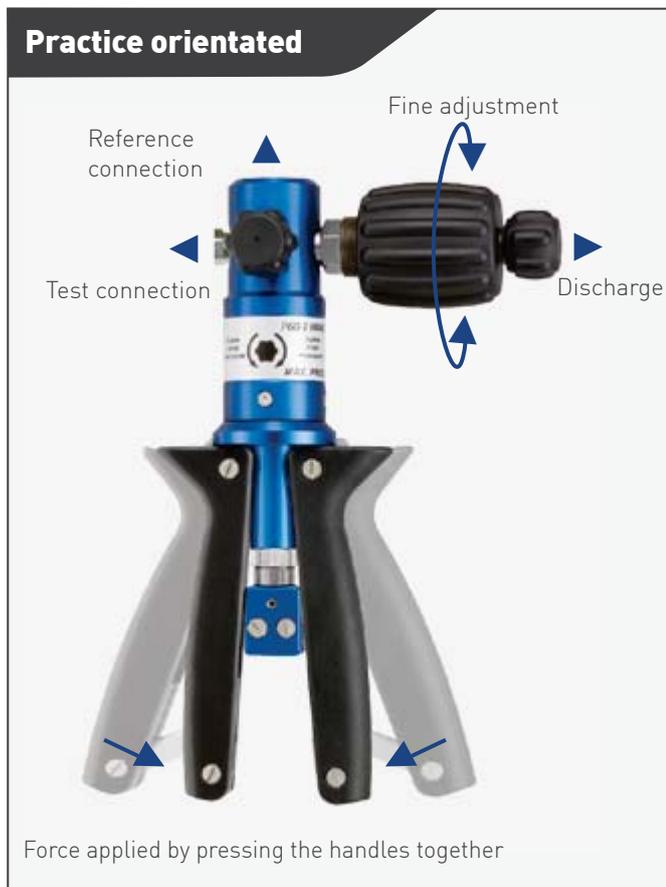


<b>Type</b>	<b>P 700.G</b>
<b>OEM version</b>	
<b>Pressure medium</b>	Hydraulic fluid
<b>Dimensions</b>	Approx. 230 x 180 x 40 mm
<b>Weight</b>	Approx. 6.6 kg
<b>Pressure ranges</b>	
<b>Distilled water</b>	
<b>Hydraulic fluid</b>	0...700 bar
<b>Connections</b>	
<b>Reference</b>	G½
<b>Test sample</b>	G½
<b>Full version</b>	
<b>Test sample</b>	G¼ with quick coupling and pressure hose (1m)
<b>Adapter kit</b>	Stainless steel
<b>Gasket kit</b>	Teflon® Seals and O-rings
<b>Dimensions</b>	Approx. 450 x 370 x 125 mm
<b>Weight</b>	Approx. 9.3 kg

# Practical and independent

## Practical

The test pumps and pressure generators are designed to enable the direct connection of all pressure systems to be tested using adapters. The test sample is easily connected using the rugged industrial hose with integrated quick coupling and supplied adapters. The reference is fitted directly at the top of the pump using a positioning adapter.



The required test pressure is initially generated using the handles and then adjusted precisely with the fine adjustment valve. As a result, the pressure on both instruments is the same.

The pressure relief valve allows continuous pressure reduction and ensures accurate and easy testing, even with decreasing pressure.

In the simplest case, the pressure is indicated by an analogue pressure gauge. An easy to read digital pressure gauge or handheld instrument can also be used. The accuracy or adjustment of the pressure measuring device being tested can be checked by comparing the indicated reference value with the measured value for the device under test.

## Mobile and independent

SIKA test pumps and pressure generators are ideal for mobile use. Their low weight and compact design make them easy to transport directly to the measurement site. The instruments can be used immediately and do not require an additional power supply. There is no need to take along nitrogen bottles or connect the equipment to a compressed air network. Wear-free manual pressure generation is simple and easy, regardless of ambient temperature and orientation.



## Possible areas of application

SIKA test pumps and pressure generators can be used everywhere, including on site in workshops, test and measurement rooms as well as laboratories. They cover a broad spectrum of industries with diverse applications.

- Assembly and commissioning
- Manufacturing and production
- Maintenance and service
- Quality assurance and test equipment monitoring
- Repair

SIKA test pumps and pressure generators are suitable for testing, adjusting and calibrating pressure sensors, pressure gauges, pressure switches, safety valves and all types of pressure devices. They are optimised in their function and use and assist in the performance of specific tests and inspections.

# Digital pressure gauges

## Exact and reliable

Digital pressure gauges are particularly suitable for both stationary and mobile measurement and display of pressure. They can be used as reference pressure gauges to simplify the checking, adjustment and calibration of other pressure measurement devices directly on site.

High accuracy in signal acquisition is achieved by using high-performance measuring cells with electronic linearisation of the characteristic curve. Suitable instruments are available for a wide variety of measurement tasks.

Ease of use is assured by innovative design and advanced technology. All essential functions for everyday use can be selected conveniently at the press of a button. Excellent protection against dust and moisture is provided by a membrane keypad or rubber buttons. Integrated supplementary functions make our digital pressure gauges true all-rounders.



### Advantages at a glance

- Exact and reliable measurement
- High operational readiness
- Easy and clear readout
- Well suited to difficult on-site tasks
- Easy to assemble and use
- Supplementary functions for extra value
- EX-version available on request

### Negative / Positive / and Differential Pressure

Measuring ranges from -1 bar negative pressure to 2500 bar positive pressure with high overpressure protection are available. Very small differential pressures in the millibar range can also be measured. Differential pressure measuring cells or two independent measuring inputs are used for this purpose.

### Resolution / Accuracy

It is often necessary to use several mechanical pressure gauges when measurements must be made over a wide pressure range with sufficient accuracy. Digital pressure gauges with high resolution and precision can handle this task with just one instrument.

An indicating accuracy of 0.5% to 0.01% covers the entire spectrum of requirements. This precision is often found only in sensitive laboratory instruments, whereas SIKA digital pressure gauges are designed for use in harsh industrial environments.

### Tare / Zero

User-defined zero point setting at the push of a button makes offset adjustment easy and eliminates the need for tedious mechanical adjustment. Single-point adjustment allows the linear characteristic curve to be shifted in positive or negative direction over the entire measuring range.

### Linearisation

Multi-point adjustment can be performed if it is necessary to adjust the indicated values at different test points. Two-point adjustment is available for setting the zero point and slope of the measuring cell curve. Some digital pressure gauges allow up to six offset values to be programmed in order to shift the characteristic curve to meet the most stringent customer expectations.

### Battery operation / Auto-Off

Power is supplied by long-life batteries (ordinary or rechargeable). An external AC adapter can also be used. To increase battery operating time, a programmable Auto-Off function switches off the power to the instrument after prolonged inactivity. The electronics are designed for extremely low power consumption, which enables a battery life of significantly more than 1000 hours.

## Easy on-site use

### Display

The large illuminated digital local display shows the measured pressure and indicates the current status of the digital pressure gauge, even under poor lighting conditions. This eliminates the difficult task of reading a dial gauge and avoiding parallax errors. Needle jitter due to vibration or pressure fluctuations is eliminated. Display damping or averaging can be configured directly using display filters. This ensures easy, tireless readout.

### Selectable pressure units

Another feature is the large selection of pressure units. Up to 13 different units are possible – far more than any complicated dual-scale or multi-scale gauge can offer.

The required display unit is selected directly on the digital pressure gauge and is clearly indicated on the display. No conversion necessary; the desired value can be read directly.



### Area of application

The right measuring system is available for every measuring task. For simple applications with air or non-corrosive and non-ionising substances, low-cost unenclosed pressure sensors are used. In difficult applications with water or other aggressive media, high-quality stainless steel versions are used.

Once the intended use has been determined and the pressure range has been specified, a digital pressure gauge with an internal measuring cell is preferably used. For frequently changing application conditions, plug-in pressure sensors for various pressure ranges and applications can be fitted using adapters. Automatic sensor recognition using standard DIN connectors offers a simple Plug-&-Play solution.

### Electronics / Pressure measuring cell

The measuring cells and electronics used in the gauges are temperature compensated, so that the effect of temperature on the readings is negligible. Liquid entry into the measuring system is not necessary, which eliminates the risk of damage from media residues. Another unbeatable feature of the electronic measuring cells is their immunity to pressure surges.

### Min / Max Displays and Peak function

Experience shows that excess pressure and pressure peaks significantly higher than normal operating pressure occur at some measuring points. Min / max displays and fast peak value measurement cycles in digital pressure gauges assist in system analysis and allow peak values to be determined. This allows incorrect readings and violations of range limits to be detected and helps avoid damage to pressure systems. Preventive service is often less expensive than repairing or replacing defective instruments.

### Protection class

High IP protection classes are available to minimise dust and water sensitivity. Rugged, impact-resistant digital pressure gauges are fitted with rubber caps for protection during transport and field use.



### Direct mounting, built-in version and hand-held instrument

The compact, handy design proves its worth in everyday use. It puts an end to large-diameter gauges with sizes up to 250 mm, as is common with precision pressure gauges. The small size simplifies direct mounting. If necessary, built-in versions are available for switchgear cabinet or control panel mounting. Hand-held digital pressure gauges are especially suitable for applications where short-term pressure measurements are desired instead of continuous measurement.

# Digital pressure gauge selection table

## Direct-mounting display instruments

	BASIC				SOLID
	E-Ex	E2	D-Ex	D2	R
<b>Accuracy (full scale)</b>	0.5 %	0.5 %	0.1 %	0.1 %	0.2 %
<b>Pressure range</b>					
					-1...1 bar
		-1...3 bar	-1...3 bar		-1...2,5 bar
					-1...5 bar
	-1...30 bar	-1...40 bar	-1...30 bar	-1...40 bar	-1...10 bar
		-1...60 bar	-1...60 bar	-1...60 bar	-1...20 bar
					-1...40 bar
					-1...60 bar
	0...300 bar	0...400 bar	0...300 bar	0...400 bar	0...100 bar
		0...700 bar	0...700 bar	0...700 bar	0...250 bar
		0...1000 bar		0...1000 bar	0...350 bar
					0...500 bar
					0...700 bar
					0...1000 bar
					0...1500 bar
					0...2000 bar
<b>Multi-point adjustment</b>					✓
<b>Interchangeable measuring cell</b>					
<b>PC connection</b>					○
<b>Data memory</b>					✓
<b>Analogue output</b>					
<b>Second measuring input</b>					
<b>Relais output</b>					
<b>Built-in version</b>					
<b>Ex version</b>	✓		✓		
<b>Version free of oil and grease</b>	○		○		

○ = optionally available

## Hand-held instruments

		PREMIUM	BASIC	SOLID	BASIC	SOLID	PREMIUM
	P	L	MH 3161	MH 3181	MH 3111	MH 3151	MH 3156
	0.5 % 0.2 % 0.05 %	0.05 % 0.025 % 0.01 %	0.2 %	0.2 %	0.2 %	0.2 %	0.2 %
			-1...25 mbar  -10...350 mbar		-2...2.5 mbar -20...25 mbar 0...100 mbar 0...250 mbar -200...350 mbar 0...400 mbar		
	-1...1 bar  -1...2,5 bar  -1...5 bar	-1...2 bar	0...1.3 bar  -100...2000 mbar		0...1 bar 0...1.3 bar -1...1.5 bar -1...2 bar 0...2.5 bar -1...3 bar 0...4 bar  0...6 bar		
	-1...10 bar  -1...20 bar  -1...40 bar  -1...60 bar	-1...10 bar  -1...20 bar			0...7 bar -1...10 bar 0...16 bar  0...25 bar 0...40 bar  0...60 bar		
	0...100 bar  0...250 bar 0...350 bar  0...500 bar  0...700 bar	0...100 bar  0...200 bar  0...400 bar  0...700 bar			0...100 bar 0...160 bar  0...250 bar  0...400 bar  0...600 bar		
	0...1000 bar 0...1500 bar 0...2000 bar 0...2500 bar	0...1000 bar			0...1000 bar		
	✓		✓	✓	✓	✓	✓
					✓	✓	✓
	○	✓	✓	✓	✓	✓	✓
				✓		✓	✓
	○			✓		✓	✓
							✓
	○						
		○	○	○	○	○	○
		○					

# Supplementary functions

## Data memory

The logger function for local data storage can be used to record pressure curves automatically and perform leak tests. The integrated data memory in digital pressure gauges allows a variety of data sets to be recorded directly. The time interval between samples is programmable and the maximum recording interval is configurable. The stored values can be displayed on a PC. Data import at the press of a button is also possible. In this case the data is shown directly on the display. In this process the values are automatically annotated with the date and time of day using an integrated real-time clock.



## Analogue output

An electrical output signal enables remote display on a control console or in a control room as well as the connection of external recorders and indicating instruments.

## Relay output / Alarm signalling

Digital pressure gauges allow limit contacts to be closed even at low pressures. There is no need for high actuation forces for magnetic spring or inductive contacts, which makes it easier to signal critical equipment conditions and perform supplementary control tasks. A built-in buzzer generates an alarm when the pressure exceeds the range of the programmed minimum and maximum pressure levels.

## Temperature display

Temperature measurement is often required in addition to pressure measurement. For this purpose, a temperature sensor is integrated in the measuring cell to detect the temperature of the medium. The process temperature can be displayed at the press of a button. This allows two quantities to be measured at a single measuring point, which saves costs.

## Explosion protection

Explosion-proof versions are also available for use in potentially explosive locations, e.g. oil refineries, chemical plants and drilling platforms.

## Example applications

- Continuous or temporary checking of a wide variety of system pressures
- Air density measurement in building shells for the detection and elimination of problem areas and avoiding structural damage
- Monitoring the degree of soiling of filter units in ventilation or air conditioning systems
- Recording pressure drops for the determination of leakage rates in leak tests
- Measurement of barometric air pressure for the determination of weather conditions
- Reference pressure gauge for calibration tasks

# Analogue pressure gauges

Technical data	
<b>Accuracy (full scale)</b>	0.6 %
Pressure ranges	Resolution
-0.6...0 bar	5 mbar
-1...0 bar	10 mbar
-1...0.6 bar	20 mbar
-1...1.5 bar	20 mbar
-1...3 bar	50 mbar
-1...5 bar	50 mbar
-1...9 bar	0.1 bar
-1...15 bar	0.2 bar
-1...24 bar	0.2 bar
0...0.6 bar	5 mbar
0...1 bar	10 mbar
0...1.6 bar	20 mbar
0...2.5 bar	20 mbar
0...4 bar	50 mbar
0...6 bar	50 mbar
0...10 bar	0.1 bar
0...16 bar	0.2 bar
0...25 bar	0.2 bar
0...40 bar	0.5 bar
0...60 bar	0.5 bar
0...100 bar	1 bar
0...160 bar	2 bar
0...250 bar	2 bar
0...400 bar	2 bar
0...600 bar	5 bar

**Type A**



Functions	
Selectable Units	
<b>Pressure</b>	Bar
Features	
<b>Measuring inputs</b>	1 x direct
<b>Relay output</b>	Optional
<b>Built-in version</b>	Optional
Display / Representation	
<b>Display</b>	Analogue
<b>Damping</b>	Optional
Measuring rate	
<b>Standard</b>	Analogue
Process connection	
<b>Connection options</b>	G $\frac{1}{4}$
<b>Material</b>	1.4542
<b>Operating temperature</b>	0...50 °C
Housing	
<b>Degree of protection</b>	IP54 (front)
<b>Dimensions</b>	Ø 100 mm T=50 mm H=120 mm
<b>Material</b>	Stainless steel
<b>Weight</b>	250 g

# Digital pressure gauges

**Type E-Ex**



**Type D-Ex**



**Technical data**

<b>Accuracy (full scale)</b>	0.5 %
<b>Pressure range</b>	<b>Resolution</b>
-1...30 bar	10 mbar
0...300 bar	100 mbar

**Technical data**

<b>Accuracy (full scale)</b>	0.1 %
<b>Pressure range</b>	<b>Resolution</b>
-1...3 bar	1 mbar
-1...30 bar	10 mbar
-1...60 bar	10 mbar
0...300 bar	100 mbar
0...700 bar	200 mbar

Functions		
Type	E-Ex	D-Ex
Adjustment options		
Linearisation	✓	✓
Tare / Zero	✓	✓
Selectable units		
Pressure	bar	bar, mbar, hPa, kPa, MPa, PSI, kp/cm <sup>2</sup>
Temperature		
Features		
Measuring inputs	1 x direct	
PC connection		
Analogue output		
Relay output		
Built-in version		
Explosion protection	Ex II 1G EEx ia II C T5/T6	
Version free of oil and grease (optional)	✓ (< 200 bar)	
Data memory		
Number of memories		
Recording interval		
Recording duration		
Data sets		
Display / Representation		
Multi-functional LCD	4 digit	
Bargraph		
Illumination		
Display filter		
Min / max value	✓	
Measuring rate		
Standard	500 msec.	
Peak / Fast		
Process connection		
Connection options	G $\frac{1}{4}$ / H16 UNF	
Material	1.0718 zinc-plated / 1.4435	
Medium temperature	0...50 °C	
For aggressive media	✓	
Housing		
Degree of protection	IP65 (front) / IP65	
Dimension	Ø 70 mm T=30 mm H=100 mm	
Material	ABS plastic	
Operating temperature	0...50 °C	
Weight	130 g	
Power		
Auto-off function	✓	
Battery type	1 x 3V CR	
Ext. power		
Battery operation	1000 h	

## Type E2, D2



## Type R



### Technical data

Accuracy (full scale)	E2 0.5 %	D2 0.1 %
Pressure range	Resolution	
-1...3 bar	1 mbar	
-1...40 bar	10 mbar	10 mbar
-1...60 bar	10 mbar	10 mbar
0...400 bar	100 mbar	100 mbar
0...700 bar	100 mbar	100 mbar
0...1000 bar	100 mbar	100 mbar

### Technical data

Accuracy (full scale)	0.2 %
Pressure range	Resolution
-1...1 bar	1 mbar
-1...2.5 bar	1 mbar
-1...5 bar	1 mbar
-1...10 bar	10 mbar
-1...20 bar	10 mbar
-1...40 bar	10 mbar
-1...60 bar	10 mbar
0...100 bar	100 mbar
0...250 bar	100 mbar
0...350 bar	100 mbar
0...500 bar	100 mbar
0...700 bar	100 mbar
0...1000 bar	1 bar
0...1500 bar	1 bar
0...2000 bar	1 bar

Functions		
Type	E2 / D2	R
Adjustment options		
Linearisation		6 points
Tare / Zero	✓	✓
Selectable units		
Pressure	bar, mbar, kPa, MPa, PSI, kg/cm <sup>2</sup>	bar
Temperature		°C
Features		
Measuring inputs	1 x direct	1 x direct
PC connection		RS232 (optional)
Analogue output		
Relay output		
Built-in version		
Explosion protection		
Data memory		
Number of memories		60.000 values (auto)
Recording interval		1 sec...10 h
Recording duration		1 min...1000 h
Data sets		Pressure / Temperature
Display / Representation		
Multi-functional LCD	4 ½ digit	4 digit
Bargraph	✓	
Illumination	✓	
Display filter	✓	✓
Min / max value	✓	✓
Measuring rate		
Standard	10 msec.	100 msec.
Peak / Fast	10 msec.	8 msec.
Process connection		
Connection options	G¼	G½
Material	1.4404	1.4542
Medium temperature	-20...80 °C	-10...70 °C
For aggressive media	✓	✓
Housing		
Degree of protection	IP67 (front) / IP67	IP65 (front) / IP40
Dimension	Ø 80 mm T=30 mm H=100 mm	Ø 85 mm T=30 mm H=30 mm
Material	Zinc casting	Aluminium
Operating temperature	0...50 °C	-10...70 °C
Weight	540 g	450 g
Power		
Auto-off function	✓	✓
Battery type	2x 1.5 V AA	2x 1.5 V AAA
Ext. power		
Battery operation	1500 h	8000 h

## Type P



### Technical data

Accuracy (full scale)	0.5 %	0.2 %	0.05 %
Pressure range	Resolution		
-1...1 bar	1 mbar	1 mbar	0.1 mbar
-1...2.5 bar	1 mbar	1 mbar	0.5 mbar
-1...5 bar	1 mbar	1 mbar	0.5 mbar
-1...10 bar	10 mbar	10 mbar	1 mbar
-1...20 bar	10 mbar	10 mbar	2 mbar
-1...40 bar	10 mbar	10 mbar	5 mbar
-1...60 bar	10 mbar	10 mbar	5 mbar
0...100 bar	100 mbar	100 mbar	10 mbar
0...250 bar	100 mbar	100 mbar	20 mbar
0...350 bar	100 mbar	100 mbar	50 mbar
0...500 bar	100 mbar	100 mbar	50 mbar
0...700 bar	100 mbar	100 mbar	50 mbar
0...1000 bar	1 bar	1 bar	100 mbar
0...1500 bar	1 bar	1 bar	200 mbar
0...2000 bar	1 bar	1 bar	500 mbar
0...2500 bar	1 bar	1 bar	

## Type L



### Technical data

Accuracy (full scale)	0.05 %	0.025 %*	0.01 %*
Pressure range	Resolution		
-1...2 bar	0.1 mbar		
-1...10 bar	1 mbar		
-1...20 bar	1 mbar	1 mbar	1 mbar
0...200 bar	10 mbar	10 mbar	10 mbar
0...400 bar	50 mbar	50 mbar	50 mbar
0...700 bar	100 mbar	100 mbar	100 mbar
0...1000 bar	100 mbar	100 mbar	100 mbar

\* 0.01 % is a precision declaration

Functions		
Type	P	L
Adjustment options		
Linearisation	6 points	
Tare / Zero	✓	✓
Selectable units		
Pressure	bar, mbar, kPa, MPa, PSI	bar, mbar, hPa, kPa, MPa, PSI, mmHg, inHg, cmH2O, mH2O, inH2O, ftH2O, Kp/cm <sup>2</sup>
Features		
Measuring inputs	1 x direct	1 x direct
PC connection	RS232 (optional)	RS-485
Analogue output	0(4)...20mA / 0...10 V (optional)	
Relay output	2 x 24 VDC/1A (optional)	
Built-in version	✓ (optional)	
Explosion protection (optional)		Ex II 2G Ex ia II C T6
Data memory		
Number of memories		
Recording interval		
Recording duration		
Data sets		
Display / Representation		
Multi-functional LCD	4 digit (0,5 % / 0,1 %), 5 digit (0,05 %)	5 digit
Bargraph	✓	
Illumination		
Display filter	✓	
Min/max value	✓	✓
Measuring rate		
Standard	100 msec.	500 msec.
Peak / Fast		
Process connection		
Connection options	G½	G¼
Material	1.4542	1.4435
Medium temperature	0...50 °C	0...50 °C
For aggressive media	✓	✓
Housing		
Degree of protection	IP65 (front) / IP40	IP65 (front) / IP54
Dimension	80 x 80 mm T=50 mm H=130 mm	Ø 80 mm T=40 mm H=120 mm
Material	Aluminium	ABS plastic
Operating temperature	0...50 °C	0...50 °C
Weight	900 g	210 g
Power		
Auto-off function	✓	✓
Battery type	2x 1,5 V AAA	1x 3 VCR
Ext. power	24 VDC	
Battery operation	8000 h	2000 h

# Accessories

## PC connection and software

Many digital pressure gauges have a serial interface port to allow measurement values and stored data to be transferred directly to a PC and documented. An inexpensive measurement data acquisition system can easily be assembled with suitable software and an interface converter. Processes can be readily monitored and analysed using the recorded and visualised measurements and all data can be exported using standard programs such as Microsoft Excel. Remote control is also possible. Various software packages with extensive recording and display functions, logger and alarm evaluation as well as for calibration are available.



Software package						
Function	AnalyserLight	DEMO	PressKAL	CCS30	EBS20M	SOFT3050
<b>Memory management</b> → PC download / delete / export → Storage interval setting → Graphics function	✓ ✓ ✓					✓ ✓ ✓
<b>Display management</b> → Remote indication → Real time data recording → Storage interval setting → Export function		✓ ✓ ✓ ✓		✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	
<b>Calibration management</b> → Remote indication → Set up calibration routines → Set up calibration certificates			✓ ✓ ✓			
References						
	R	P R	P	L	Complete MH series	MH 3181 MH 3151 MH 3158

# Pressure calibrators

## Comparison of digital and analogue pressure gauges

Pressure calibration is the comparison between the indicated values of a pressure measuring device with the indicated values of a pressure standard with a known accuracy.

In many cases, the device to be tested cannot be removed from the active process.

Calibration is performed on site to avoid lengthy downtimes. Portable SIKA pressure calibrators are especially suitable for this purpose.

In order to perform a specified functional test or accuracy check, the test sample is often connected to the calibration device with a pressure hose. Digital pressure gauges with sufficient precision can be used as compact reference instruments.

Manual test pumps or pressure generators are used for simple pressure generation.

SIKA offers a complete range of pressure calibrators for a wide variety of applications to allow specified test and calibration tasks to be performed.

Routine on-site calibrations can be performed very quickly and economically with the right combination of pressure generator and reference. This ensures that the indicated pressure values are correct and reliable and that all specified requirements are fulfilled.



## Possible combinations

	Reference A	Reference E-Ex	Reference E2	Reference D-Ex	Reference D2	Reference R	Reference P	Reference L
<b>P 40.2</b>	PM 40.2 A	PM 40.2 E-Ex	PM 40.2 E2	PM 40.2 D-Ex	PM 40.2 D2	PM 40.2 R	PM 40.2 P	PM 40.2 L
<b>P 60</b>	PM 60 A		PM 60 E2		PM 60 D2	PM 60 R	PM 60 P	
<b>P 350.1</b>	PM 350.1 A	PM 350.1 E-Ex	PM 350.1 E2	PM 350.1 D-Ex	PM 350.1 D2	PM 350.1 R	PM 350.1 P	PM 350.1 L
<b>P 700.2</b>	PM 700.2 A		PM 700.2 E2	PM 700.2 D-Ex	PM 700.2 D2	PM 700.2 R	PM 700.2 P	PM 700.2 L
<b>P 700.G</b>	PM 700.G A	PM 700.G E-Ex	PM 700.G E2	PM 700.G D-Ex	PM 700.G D2	PM 700.G R	PM 700.G P	PM 700.G L
<b>P 1000.1</b>			PM 1000.1 E2		PM 1000.1 D2	PM 1000.1 R	PM 1000.1 P	PM 1000.1 L

All manual pressure pumps and references can be combined as indicated above for various measuring ranges, resolutions and accuracy classes.



Type	PC 700+
Accuracy	0.025 %
Pressure ranges (Resolution)	0...60 bar (5 mbar) 0...200 bar (20 mbar) 0...350 bar (30 mbar) 0...700 bar (70 mbar)
<b>Functions</b>	
Adjustment options Tare / Zero	✓
Selectable units (pressure)	bar, PSI, kPa, MPa, atm, at (kgf/cm <sup>2</sup> ), mmHg, mHg, inHg, cmH <sub>2</sub> O, mH <sub>2</sub> O, inH <sub>2</sub> O, torr
<b>Features</b>	
Measuring inputs PC connection Explosion protection Electronic measuring inputs	1 x direct RS232 EEx ia IIC T4 0...30 mA / 0...15 V
<b>Data memory</b>	
Store function	30 x 10 values (manual)
<b>Display / Representation</b>	
Multi-functional LCD Illumination Display filter Min / max value	5 digit ✓ ✓ ✓
<b>Measuring rate</b>	
Standard	100 msec.
<b>Process connection</b>	
Connection options Material Medium temperature For aggressive media	G <sup>1</sup> / <sub>4</sub> 2.4602 -20...80 °C ✓
<b>Housing</b>	
Degree of protection Dimension, weight Material Operating temperature	IP65 (front) / IP40 350 x 160 x 180 mm, 8.1 kg Aluminium 0...50 °C
<b>Power</b>	
Auto-off function Battery type, battery operation Ext. power	✓ 1x 9 V Block, 35 h 12 VDC

**Calibrator PC 700+**







Mechanical Measuring Instruments



Flow Measuring Instruments



Electronic Measuring and Calibration Instruments



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