LEO3

Digital gauge with scaleable 4...20 mA output

Features

- High accuracy
- Piezoresistive pressure sensor chip, insulated encapsulated
- Licence-free software from KELLER Pressure available to download
- Analog output signal via RS485 interface and scaleable using buttons (turn-down)
- RS485 bus interface for communication with up to 128 devices

Functions

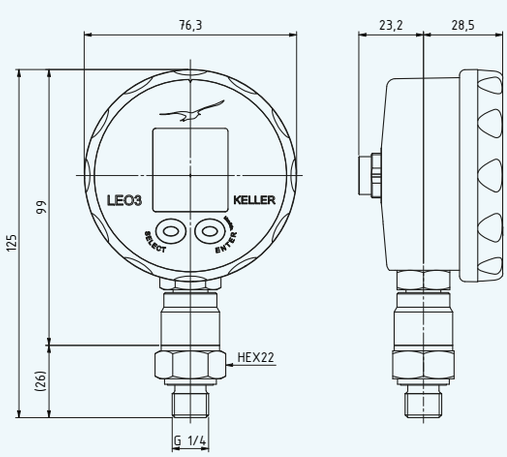
- Wide range of pressure units to choose from
- Zero point calibration via buttons
- Min/max display
- Additional display for the analog 4...20 mA output
- User-defined units of pressure can be configured

Typical applications

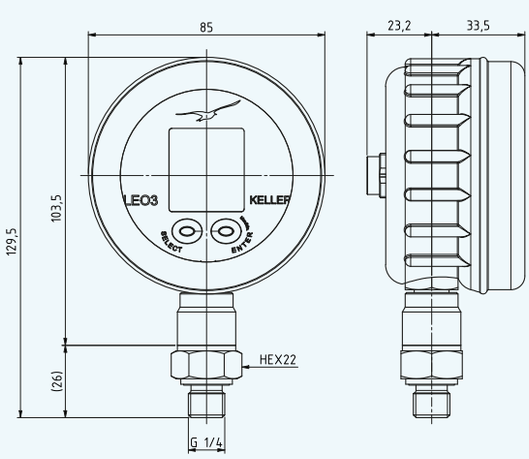
- Pump applications
- Fluid technology
- Pressure testing
- Industrial applications

Accuracy
± 0,1 %FS
Total error band
± 0,2 %FS
Pressure ranges
-1…3 bar to 0…1000 bar

LEO3



LEO3 with rubber cover



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LEO3 – Specifications

Standard pressure ranges

Relative pressure PR	Absolute pressure PAA	Absolute pressure PA	Proof pressure	Display resolution
-1…3	0…4		12	0,001
-1…10	0…11		30	0,002
-1…30	0…31		90	0,01
	0…101		300	0,02
		0…300	600	0,1
		0…700	1200	0,2
		0…1000	1200	0,2
bar rel.	bar abs.	bar	bar	bar
Reference pressure at atmospheric pressure	Reference pressure at 0 bar abs. (vacuum)	Reference pressure at 1 bar abs.	Based on reference pressure	

Performance

Pressure

Accuracy @ RT (20…25 °C)	≤ ± 0,1 %FS	Non-linearity (best fit straight line, BFSL), pressure hysteresis, non-repeatability, zero point deviation and amplification deviation
Total error band (0…50 °C)	≤ ± 0,2 %FS	Max. deviation within the compensated pressure and temperature range.
Compensated temperature range	0…50 °C	
Long-term stability	± 0,2 %FS	Per year under reference conditions, annual recalibration recommended.
Position dependency	≤ ± 1,5 mbar	Calibrated in vertical installation position with pressure connection facing downwards.
Pressure range reserve	± 10 %	Valid measured values outside the pressure range, no overflow/underflow.

LEO3 – Specifications

Electrical information

Connectivity	2-wire + digital
Analog interface	4…20 mA
Digital interface	RS485
Voltage supply	8…32 VDC
Power consumption	3,5…22,5 mA
RS485 voltage insulation	± 18 VDC
Note	Disturbance of the 4...20 mA signal occurs during communication via the digital interface.

Start-up time (power supply ON)	< 300 ms
Overvoltage protection and reverse polarity protection	± 32 VDC
GND case insulation	> 10 MΩ @ 300 VDC

Analog interface

Load resistance	< (U – 8 V) / 25 mA	2-wire
Limiting frequency	≥ 30 Hz	2-wire

Digital interface

Type	RS485	Half-duplex
Communication protocols	KELLER bus protocol	Proprietary
	MODBUS RTU is not supported	
Identification	Class.Group: 7.09	Standard settings: bus address 1, baud rate 9600 bit/s. Other default settings available on request. Can be reconfigured via software by the customer later.
Unit of pressure	bar	
Unit of temperature	°C	
Data type	Float32 and Int32	
Baud rates	9600 bit/s.	
Interface measuring rate	100/s	
Cable length	up to 1,2 km	

Electrical connection

Plug	Round plug 423 - 723 - 425	M16 x 0,75	DIN EN 61076-2-106, 5-pin

Electromagnetic compatibility

CE-conformity as per 2014/30/EU (EMC)	EN IEC 61326-1 / EN IEC 61326-2-3 / EN IEC 61000-6-1 / EN IEC 61000-6-2 / EN IEC 61000-6-3 / EN IEC 61000-6-4

LC display

Dimensions/appearance	Width × height: 27,8 mm × 30 mm (see dimensions and variants)
Number of digits on LC display	2 rows with 4 1/2 digits each
Display mode	Pressure + min/max or 4...20 mA signal
Display interval	2/s
Configurable pressure units	bar, mbar, hPa, kPa, Mpa, PSI, kp/cm2
Additional pressure units	5 user-defined units can be configured via software

LEO3 – Specifications

Mechanical data

Materials in contact with media

Pressure connection	Stainless steel AISI 316L	≤ 400 bar
	Stainless steel AISI 318LN, 1.4462	> 400 bar
Pressure transducer diaphragm	Stainless steel AISI 316L	
Pressure transducer seal (internal)	none	
Pressure connection seal (external)	FKM (75 Shore, -20…200 °C)	For media temperatures < -20 °C, FVMQ (70 Shore, -60…175 °C) is used Optional: EPDM (-40…125 °C)

Other materials

Display housing	Faradex NS003
Front glass	LEXAN® 163R
Pressure transducer oil filling	Silicone oil

Further details

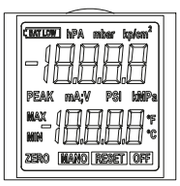
Pressure connection	G1/4 male	See dimensions and variants
	1/4-18NPT male	
Diameter × height × depth	76 × 125 × 52 mm	Without rubber cover
	85 × 130 × 57 mm	With rubber cover
Weight	approx. 210 g	Without rubber cover

Environmental conditions

Media temperature range	-40…85 °C	Icing not permitted
Ambient temperature range	-10…60 °C	
Storage temperature range	-20…70 °C	
Protection	IP65	
Load cycles @ RT (20…25 °C)	> 10 m. pressure cycles	0…100 %FS
Note	Readability of the LC display is guaranteed between 0 °C and 50 °C. Outside of this temperature range, the readability of the display may be limited.	

LEO3 – Dimensions and variants

LC display

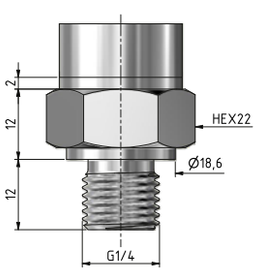
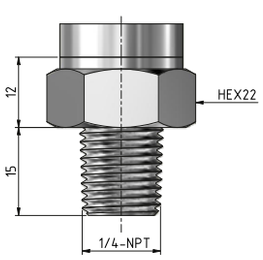
Front cover	Content	Dimensions
		Width × height: 27,8 mm × 30,0 mm Digit size: top: 8,0 mm × 3,6 mm bottom: 7,0 mm × 3,2 mm

Electrical connection

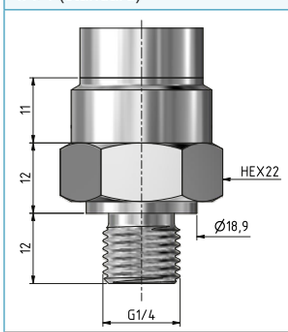
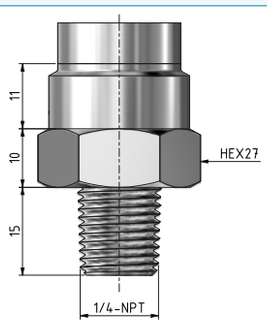
Placement	Connection	Pin assignment	
	Round plug 423 - 723 - 425, M16 × 0,75, 5-pin	1	OUT/GND
		2	n.c.
		3	+Vs
		4	RS485A
		5	RS485B

Available pressure connections

For pressure ranges ≤ 400 bar

G1/4 (standard)	1/4-18NPT
	
DIN EN ISO 1179-2	ASME/ANSI B 1.20.1

For pressure ranges > 400 bar

G1/4 (standard)	1/4-18NPT
	
DIN EN ISO 1179-2	ASME/ANSI B 1.20.1

Customised configurations on request

- Other compensated pressure ranges
- Other compensated temperature ranges
- Other pressure connections
- Parts made of other materials that come into contact with media
- Customer-specific front covers
- Customer-specific firmware (e.g. application-specific calculations or leak measurement)
- Other pressure units can be configured ex works

LEO3 – Software, scope of delivery and accessories

Interface

The LEO3 gauge has a digital interface (RS485 half-duplex) which supports the KELLER bus protocol. Details of the communication protocols can be found at www.keller-pressure.com. Documentation, a Dynamic Link Library (DLL) and various programming examples are available to integrate the communication protocol into your own software.

Interface converters

The connection to a computer is established via an RS485-USB interface converter. Suitable converters are available as accessories. To ensure smooth operation, we recommend the K-114 with the corresponding USB connector.

«CCS30» software

The CCS30 software has no licence costs and is used to perform configurations and record measured values.

Measurement recording
- Graphical live visualisation of the measured values in a configurable time interval
- Configurable measuring and storage interval
- Export function for the measured values recorded (csv, etc.)

Configuration
- Call up of information (pressure and temperature range, firmware version, serial number etc.)
- Readjustment of zero point and amplification
- Rescaling of analog output (unit, pressure range)
- Selection of instrument address and baud rate

PressureSuite Desktop

With the «PressureSuite Desktop» Windows software, data recorded using KELLER Pressure products with a recording function can be read and visualised. This data can be exported in CSV, JSON, Excel or Word format, as an image, or in other formats for further processing or documentation. The devices are easy to configure, thanks to the intuitive software interface. And, the various recording functions provide an optimum level of adaptability to suit the measuring task at hand. Additionally, installation site information and other parameters necessary for water level calculations can be saved directly in the measuring device.

PressureSuite Desktop has a free license and compatible with all products of the PressureSuite.

Configuration options
- Pressure and temperature channels, selectable.
- Adjustable measurement interval (1s…99 days)
- Averaging with selectable number of measurements
- Recording modes
  - – Continuous interval measurement
  - – Event-controlled recording
    - · recording starts when value is exceeded
    - · recording starts when value is undercut
    - · recording starts when value changes
    - → combination of continuous and event-controlled recording is possible
- Adjustment of pressure zero point
- Start measurements immediately or at a set time
- Water level calculation
- Data storage: linear or ring-type memory

PRESSURESUITE DESKTOP

Scope of delivery

Plastic case	Operating instructions D/E/F
	

Accessories

Rubber cover	Interface converter	Calibration certificate with 5 measuring points	Calibration certificate with 11 measuring points	External calibration certificate
				
For additional protection in harsh environments.	K-114-B For round plug 423 - 723 - 425, M16 x 0,75	Measurement deviation at room temperature. Issued by KELLER Pressure.	Measurement deviation at room temperature with hysteresis. Issued by KELLER Pressure.	Issued by an external calibration laboratory accredited by DakkS or SAS.

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