

HIGH-RESOLUTION MANOMETER WITH PEAK AND RECORDING FUNCTION LEO 5

STAINLESS STEEL HOUSING / PEAK MEASURING RATE 5 KHZ / RECORDING FUNCTION

The LEO 5 combines the notable features of Keller's successful LEO-Record and LEX 1 digital pressure gauges, featuring an IP66-rated stainless steel enclosure. This robust housing combines contemporary microcontroller-based electronics and capacitive-touch controls, operated through the environmentally-sealed safety glass front panel. The large backlit LCD display ensures readability in any lighting conditions.

Two selectable measurement modes, standard and peak, are included to ensure maximum versatility. In standard mode, high-resolution pressure measurements are taken twice per second. When operating in peak mode, sampling frequency increases to 5 kHz with 16 bit resolution.

The LEO 5 interfaces with a PC via USB connectivity, allowing access to active measurements and recorded data including pressure, peak pressure, temperature, and measurement interval. PC connection also allows device configuration, firmware updates, and recharging of the integral accumulator power supply.

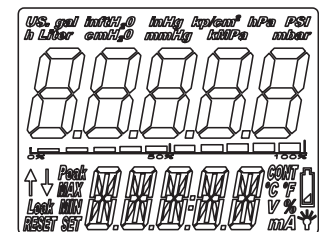
The unique modular design of the LEO 5 makes possible adaptation to customer-specific measuring requirements.

Functions and Features

- Rugged, waterproof stainless steel housing with safety glass face
- Large, easy-to-read 5-digit LCD display with 5/8" digits
- Operation by capacitive touch buttons
- Pressure peak with 5 kHz sampling frequency and high resolution measurement in standard mode
- Rechargeable accumulator power supply
- Record function (pressure, peak pressure, temperature, measurement time)
- USB-interface for configuration, download, and power recharge

Options

- External supply and RS-485 BUS Interface
- Radio interface (bluetooth) for measurements in inaccessible places
- Barosensor integrated in manometer for AA measurements
- Analog outputs 4...20 mA or 0...10 V / up to 2 contacts (PNP)
- Custom software / custom specific test procedures
- Customized front cover
- Special pressure connections



Display LEO 5



SPECIFICATIONS

Pressure Ranges rel. PR	-1...3	-1...10	-1...30					bar
Pressure Ranges abs. PA				0...100	0...300	0...700	0...1000	bar
PAA	0...4	0...11	0...31					bar
Overpressure	8	20	60	200	600	1100	1100	bar
Resolution of Pressure Disp. (LCD)	1	2	10	20	100	200	200	mbar
LCD Number of Digits upper/lower	5 (7 Segments) / 5 (14 Segments)							
Accuracy*	0,05 %FS (incl. linearity, repeatability and hysteresis)							
Total Error Band (0...50 °C)	0,10 %FS (Accuracy incl. temperature error)							
Precision*	Optional for ≥ 20 bar: 0,025 %FS or 0,01 %FS							
Storage- / Operating Temperature	-10...60 °C / 0...50 °C							
Data Storage	> 56'000 measuring values with time indication							
Long Term Stability	Reference: 1 mbar or 0,05 %FS Absolute: 0,5 mbar or 0,025 %FS							
Compensated Temperature Range	0...50 °C							
Temperature Measurement	Accuracy ± 1 °C							
Accumulator	Lithium-Ion 4,2 V / 1,6 Ah							
Accumulator Run Time	Standardmode ~ 1'600 hours, Peakmode ~ 160 hours							
Accumulator Charge Cycles	> 300							
Pressure Connection	G 1/4							
Interface / Plug Type	USB / Mini USB-B							
Ø x H x D / Weight / Protection	76 x 118 x 42 mm / approx. 340 g / IP 66							

*Accuracy and Precision

"Accuracy" is an absolute term, "Precision" a relative term. Dead weight testers are primary standards for pressure, where the pressure is defined by the primary values of mass, length and time. Highest class primary standards in national laboratories indicate the uncertainty of their pressure references with 70 to 90 ppm or close to 0,01%.

Commercial dead weight testers as used in our facilities to calibrate the transmitters and manometers indicate an uncertainty or accuracy of 0,025%. Below these levels, KELLER use the expression "Precision" as the ability of a pressure transmitter or manometer to be at each pressure point within 0.01 %FS relative to these commercial standards.

The manometer's full-scale output can be set up to match any standard of your choice by correcting the gain with a calibration software.

Subject to alterations

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DIGITAL MANOMETER

WITH RECORD FUNCTION

LEO Record is an autonomous battery powered instrument with digital display designed to record pressure and temperature over long periods. LEO Record (piezoresistive) as well as LEO Record Capo (capacitive), ideal for low pressure ranges, offer the following advantages:

- High measuring accuracy, resolution and robustness
- High data security due to the use of a non-volatile memory
- Display of the actual pressure and the record status
- Recording of the pressure and temperature
- Simple and well structured configuration- and read-out software (Logger 4.x) for PC or PDA
- Combination of event-controlled recording and interval recording prevents unnecessary data being recorded (i.e. only measuring the pressure changes...)
- Installation data (and comments) of the measuring station can be stored in the instrument
- Pressure connection with G1/4" thread (other threads on demand)

The pressure is measured and displayed once per second (shortest interval). The top display indicates the actual pressure, the bottom display shows the record status.

All LEO Record versions have two operating keys. The left key is to turn the instrument on, to select the functions and the pressure units. The right key executes the selected function or unit.

The instruments have the following functions:

- ZERO** The ZERO-function allows to set any value as a new Zero reference.
- UNITS** All standard instruments are calibrated in bar. The pressure can be indicated in the following units: bar, mbar/hPa, kPa, MPa, PSI, kp/cm², (m)H₂O
- RECORD** The record can be started or ended with the operating keys.
The configuration of the record takes place via interface/software.

- Optional accessories: - Protective rubber covering
- Carrying bag



LEO RECORD (Ei) LEO RECORD CAPO (Ei)



LEO Record



LEO Record Capo Ei

SPECIFICATIONS LEO Record (Ei)

Pressure Ranges ¹ , resolution, overpressure:	Ranges	Resolution	Overpressure
	-1...3 bar	1 mbar	10 bar
	-1...30 bar	10 mbar	60 bar
	0...300 bar	100 mbar	400 bar
	0...700 bar	100 mbar	700 bar
	0...1000 bar	100 mbar	1000 bar
Total Error Band (0...50 °C)	± 0,1 %FS		

SPECIFICATIONS LEO Record Capo (Ei)

	Standard FS Pressure Ranges ¹		
PR (relative) / PD ² (differential)	30	100	300
Overpressure	300	1000	1500
Negative Overpressure	30	100	300
Total Error Band (10...40 °C)	± 0,2 %FS		
Stability	FS ≥ 100 mbar: ± 0,1 %FS		FS ≤ 100 mbar: ± 0,1 mbar

¹ Other pressure ranges as well as instruments with relative pressure measuring cells on request

² For the PD-version, a tube connection Ø 6 mm for the reference is available

LEO Record Ei / LEO Record Capo Ei

Intrinsically safe version, 94/9/CE

Classification: II 2 G EEx ia IIC T4
Certification File: PTB 05 ATEX 2012 X

The EEx ia version of LEO Record / LEO Record Capo incorporates an additional protection switch.

Functions, ranges and accuracy are identical to the standard LEO Record (Capo) version.



The factory setting of the Zero for sealed gauge instruments (i.e. „Range in bar abs.“) is at 0 bar absolute and for reference pressure instruments (i.e. „Range in bar rel.“) at ambient pressure. Sealed gauge pressure instruments can be activated with "ZERO SEI" at ambient pressure for referential pressure measurements.



KELLER

Specifications LEO Record (Ei) / LEO Record Capo (Ei)

Storage- / Operating Temperature	-10...60 °C / 0...50 °C
Measuring Cycle	Adjustable (shortest interval 1 x per second)
Memory	≈ 57'000 measuring values with time indication @ a measuring cycle of ≤15 s ≈ 28'000 measuring values with time indication @ a measuring cycle of >15 s
Supply	3,6 V Lithium battery, type SL-760
Battery Life	up to 2 years @ 1 recording every 10 seconds
Pressure Connection	G 1/4" (other threads on demand)
Temperature Measurements	Accuracy typ. 0,5 °C
Interface	RS485; rear-sided mating plug "Fischer" compatible with PC-converter cable K103-A (RS232) and K104-A(USB)
Material in Contact with Media	LEO Record: Stainless steel (AISI 316L), Viton® O-ring LEO Record Capo: Viton® O-ring, gold-coated ceramic diaphragm
Protection	IP 65
Diameter x Height x Depth (approx.)	76 x 120 x 55 mm (LEO Record) / 76 x 150 x 55 mm (LEO Record Capo)

LOGGER 4.X

The Logger 4.X-software, if needed, is delivered along with the interface cable or may be downloaded from our web site. The software is compatible with Windows 2000/NT/XP/ME and 9X and allows to configure and read out our data loggers (DCX, LEO Record, and LEO Record Capo).

The measuring values may be graphically displayed, exported, air pressure compensated or converted into other units. The Online-function shows the actual values of the instrument.

The Logger includes the Reader and Writer.

WRITER

The Writer enables the start and configuration of LEO Record (Capo).

General functions:

- Online-display of measuring channels
- Status-indication
- Editing of installation data
- Ring buffer record storage or normal
- Readjustment of the zero

Recording parameter:

- Pressure- and temperature channels selectable

Start methods:

- Time start
- When exceeding or dropping below a certain pressure
- Measuring interval for starting conditions selectable

Recording methods:

- Interval (1s...99 days) and event-controlled recording
- Recording at pressure change
- Averaging over selectable number of measurements
- Combination of fixed interval and event recording possible

READER

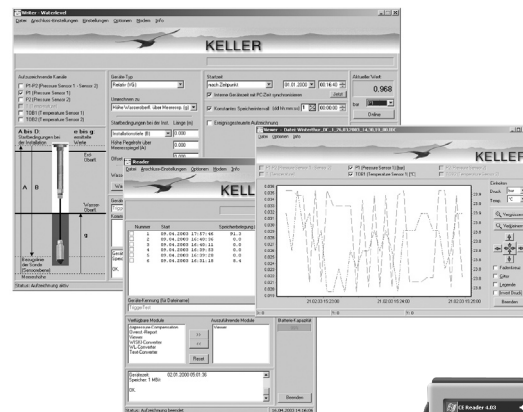
The Reader allows the data to be read out into a file and to be saved onto a PDA or PC.

The data file, which can be imported by programs such as Excel, contains the following data recorder information: Serial number, measuring range, sensor name, installation data, read-out data, units, measuring values with date and clock time,...

General functions:

- Status-indication
- Reading of the recordings' directory with starting time and storage size in %
- Read-out of the individual recordings
- Graphical display of the data
- Conversion of the data into a text file for Excel import
- Miscellaneous calculations possible

Special calculations or an export of the data into customer specific databases are possible (only on request).



Logger 4.x also includes the WindowsCE-software for PDA's.

