KELLER

Sensors

Transducers

Transmitters

Instruments

the love for perfection

Mandala (sanskrit: circle)

The becoming and being of life and universe was archetypically illustrated with concentrical circles as in Mandalas or Gothic-church-windows with a focus representing each culture's origine: God, Buddha or nous in old Greece. Meditation should lead mankind through all the circles closer to the focus.

Science explains the creation of life along these lines. Out of a nucleus, a monad, life started. Always in danger to be destroyed, sensory cells evolved to recognize the danger. New forms of life evolved to evade the danger. Millions of cycles later, sensory cells evolved to recognize a prey. New forms of life evolved to incorporate the prey.

Billions of concentrical circles, of creations of new sensory cells and new forms of life.

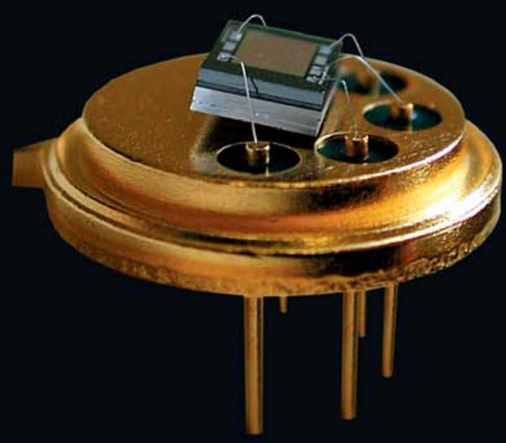
As sensor engineers, we strive to cross some of these circles towards the center.

On the Trail of Swiss Watchmakers

High precision mechanics has a long tradition in Switzerland, renowned mainly for the mechanical Swiss watches. These handmade masterpieces find a growing clientele who see in this item – as the marketing approach successfully infuses – a friend they can rely on when achieving extraordinary accomplishments as sportsmen, pioneers, scientists or as a 007-hero.

What is the secret? Does material have a soul striving for perfection as many philosophers have postulated? Is the watchmaker conveying his soul through many hours of manufacturing into this piece of art? Is it more than just a timepiece?

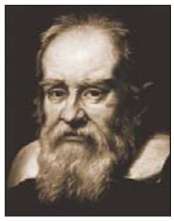
We believe so. A simple item such as a diaphragm is not just a diaphragm. There is more to it…



History of Pressure

1594

Galileo Galilei, born in Pisa (Italy), obtains the patent for a machine to pump water from a river for the irrigation of land. The heart of the pump was a syringe. Galileo Galilei found that 10 meters was the limit to which the water would rise in the suction pump, but had no explanation for this phenomenon. Scientists were then devoted to find the cause for this.



1644

Evangelista Torricelli (Torr), Italian physicist, filled a tube 1 meter long, hermetically closed at one end, with mercury and set it vertically with the open end in a basin of mercury. The column of mercury invariably fell to about 760 mm, leaving an empty space above its level. Torricelli attributed the cause of the phenomenon to a force on the surface of the earth, without knowing, where it came from. He also concluded that the space on top of the tube is empty, that nothing is in there and called it a "vacuum".

1648

Blaise Pascal, French philosopher, physicist and mathematician, heard about the experiments of Torricelli and was searching for the reasons of Galileo's and Torricelli's findings. He came to the conviction that the force, which keeps the column at 760 mm, is the weight of the air above. Thus, on a mountain, the force must be reduced by the weight of the air between the valley and the mountain. He predicted that the height of the column would decrease which he proved with his experiments at the mountain Puy de Dôme in central France. From the decrease he could calculate the weight of the air. Pascal also formulated that this force, he called it "pressure", is acting uniformly in all directions.

1656

Otto von Guericke, born in Magdeburg/Germany. Torricellis conclusion of an empty space or "nothingness" was contrary to the doctrine of an omnipresent God and was thus attacked by the church. Guericke developed new air pumps to evacuate larger volumes and staged a dramatic experiment in Magdeburg by pumping the air out of two metal hemispheres which had been fitted together with nothing more than grease. 8 horses at each hemisphere were not strong enough to separate them (see title page).

1661

Robert Boyle, an Anglo-Irish chemist, used "J"-shaped tubes closed at one end to study the relationship between the pressure and volume of trapped gas and stated the law of $P \times V = K$ (P: Pressure, V: Volume, K: Constant) which means that if the volume of a gas at a given pressure is known, the pressure can be calculated if the volume is changed, provided that neither the temperature nor the amount of gas is changed.

1820

Almost 200 years later, Joseph Louis Gay-Lussac, French physicist and chemist, detects that the pressure increase of a trapped gas at constant volume is proportional to the temperature. 20 years later, William Thomson (Lord Kelvin) defines the absolute temperature scale with the zero point at -273 °C (or 0 Kelvin).

History of Pressure Measurement

Mechanical Measurement Technologies

Aneroid Barometer

1843 Lucien Vidie, French scientist, invented and built the aneroid barometer, which uses a spring balance instead of a liquid to measure atmospheric pressure. The spring extension under pressure is mechanically amplified on an indicator system. Employing the indicator method of Vidie, Eugène Bourdon (founder of the Bourdon Sedeme Company) patented 1849 the Bourdon tube pressure gauge for higher pressures.

Bourdon Tube

Electrical Measurement Technologies

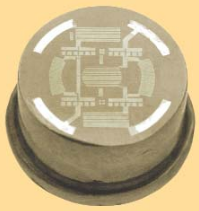
1930 The first pressure transducers were transduction mechanisms where the movements of diaphragms, springs or Bourdon tubes are part of an electrical quantity. Pressure diaphragms are part of a capacitance, the indicator movement is the tap of a potentiometer.

1938 The bonded strain gauges were independently developed by E. E. Simmons of the California Institute of Technology and A.C. Ruge of Massachusetts Institute of Technology. Simmons was faster to apply for a patent.

Foil Strain Gauge

1955 The first foil strain gauges came up with an integrated full resistor bridge, which, if bonded on a diaphragm, see opposite stress in the center and at the edge.

1965 The bonding connection of the gauges to the diaphragm was always the cause for hysteresis and instability. In the 1960's, Statham introduced the first thin-film transducers with good stability and low hysteresis. Today, the technology is a major player on the market for high pressure.



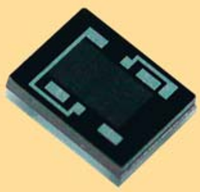
Thin Film

1973 William R. Poyle applied for a patent for capacitive transducers on glass or quartz basis, Bob Bell of Kavlico on ceramic basis a few years later in 1979. This technology filled the gap for lower pressure ranges (for which thin film was not suited) and is today, also with resistors on ceramic diaphragms, the widest spread technology for non-benign media.

The Sensor Age

1967 Honeywell Research Center, Minneapolis/USA, 1967: Art R. Zias and John Egan applied for patent for the edge-constrained silicon diaphragm. 1969, Hans W. Keller applied for patent for the batch-fabricated silicon sensor. The technology is profiting from the enormous progresses of IC-technology.

A modern sensor typically weighs 0.01 grams. If all non-cristalline diaphragms have inherent hysteresis, the precision limit of this item is not detectable by todays means.



Piezoresistive Silicon Pressure Sensor

The piezoresistive technology is the most universal one. It applies for pressure ranges from 100 mbar to 1500 bar in the absolute, gauge and differential pressure mode. The slow spread of the technology in high volume applications for non-benign media resulted
2000 from the inability of US-companies to develop a decent housing. In 30 years, KELLER has perfected it at costs comparable to any other technology.

Up to the 1970's, there were only transducer manufacturers.

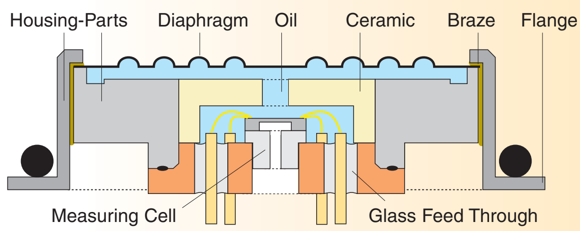
In 1977, KELLER introduced the first OEM modules, the Series 10 for lower pressures with Ø 19 mm, the Series 8 for higher pressures with Ø 15 mm, today a worldwide standard also in the imperial system.

This was the beginning of the modular design.

Basic Specifications (OEM's)

Ranges	0,1…1500 bar
Excitation	nom. 1 mA/constant current
Signal Output	nom. 150 mV/mA ≥ 1 bar
	nom. 200 mV/mA/bar < 1 bar
Linearity	typ. 0,25 %FS / max. 0,5 %FS
	(best straight line through Zero)
TC Zero	< 0,1 mV/K (-10…80 °C)
TC Gain	< 0,02 %/K (-10…80 °C)
Overload	depending on range and design
Precision	0,002 %FS best *
	0,02 %FS standard abs. *
	0,05 %FS standard rel. *
Response Time	20 kHz
Material	DIN 1.4435 (AISI 316L) standard
	Option: Titanium, Hastelloy

* not smaller than 1 mbar

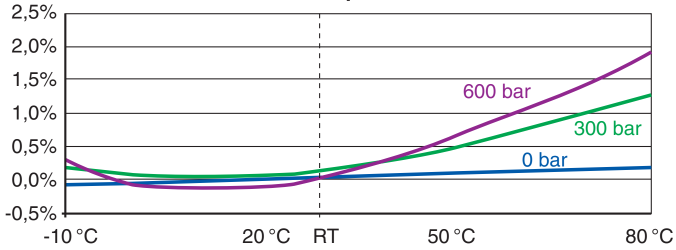


Error Bands (%FS)

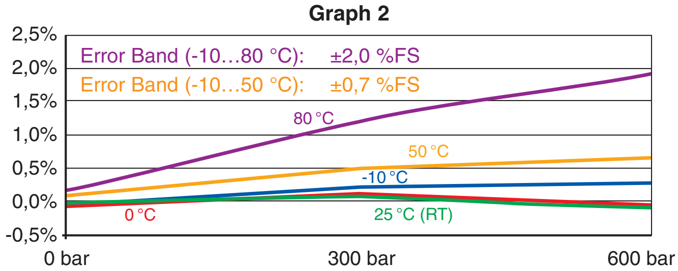
The error band as a specification describes the maximum deviation in accuracy from the target value of a transmitter of any point in the specified pressure and temperature range.
Over the temperature range, the accuracy is a combination of Linearity, TC Zero and TC Gain. The error band can be found if the measured data of the sensor or transmitter are drawn up in constant pressure lines over temperature (Graph 1) or constant temperature lines over pressure (Graph 2). In both graphs, the transmitter has been adjusted for highest accuracy at room temperature.

By offsetting the Zero to -1 % at room temperature, the error band of ±2 % (–10…80 °C) can be reduced to ±1 %, a practice which is used in industrial or automotive transmitters (Graph 3).

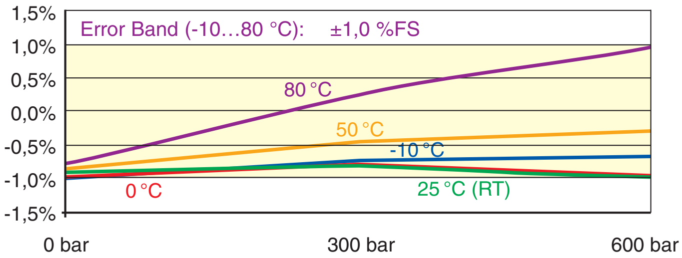
Graph 1



Graph 2

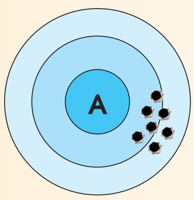


Graph 3

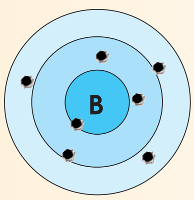


“Every sensor is as accurate as it is precise!”
A. R. Zias (1968)

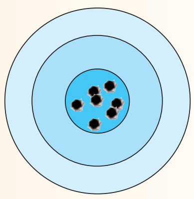
Accuracy and Precision should not be confused. Accuracy is the deviation from a target point. Precision is the deviation of the shots between them.



More precise

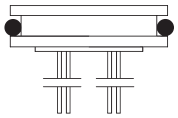


More accurate

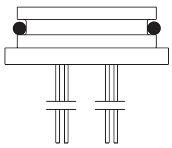


*By correction, the accuracy of the target **A** can be improved. Target **B** cannot be improved.*

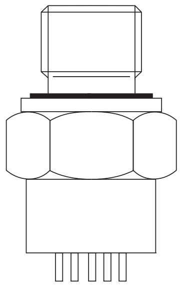
OEM: The KELLER Modular System



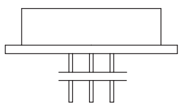
Form A (9 L)



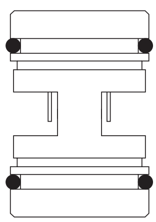
Form B (9 FL)



Form C (6 S)



Form D (9 S)



Form F (PD 10)

Today, the KELLER modular system contains many OEM sensor elements starting from only Ø 9,5 mm, suitable for mounting or welding. The most common are listed below. KELLER has developed various important technologies to amplify and compensate the signal from the OEM sensor. Examples of the available circuit boards can be seen on the following pages. All 500 KELLER standard transmitters are just a combination of one of these sensor elements and the appropriate circuit board. A small selection of transmitters are presented on the next pages.

Absolute and Gauge

Type	Form	Dimensions in mm	Ranges in bar
3 L	A	Ø 9,5 x 4,2	20…200
4 L	A	Ø 11 x 4,2	10…200
5 L	A	Ø 12 x 4,5	10…200
6 L	A	Ø 13 x 4,5	10…200
6 LHP	A	Ø 13 x 8	400…1200
6 FL	C	G1/4", SW 19	10…200
6 S [1]	C	G1/4", SW 19	5…200
7 L	A	Ø 15 x 5	10…200
7 S	D	Ø 15 x 5	10…200
7 LHP	A	Ø 15 x 8	200…1000
8 L	A	Ø 17 x 7	0,2…50
9 L	A	Ø 19 x 5	0,2…200
9 S	D	Ø 17 / 21 x 5,5	0,5…20
9 FL	B	Ø 17 / 18 x 7	0,2…50
9 LHP	D	Ø 17 / 21 x 5,5	50…200
10 L	A	Ø 19 x 15	0,2…100
10 LHP	A	Ø 19 x 15	200…1500

Differential

Type	Form	Dimensions in mm	Ranges in bar
9 L	F	Ø 19 x 14	0,1…200 [2]
10	F	Ø 19 x 26 (35)	0,1…1000 [2]

[1] Fully brazed, no O-rings
[2] Base pressure


7/8'' - 16UN-2A

Signal Amplifiers

Conventional Amplifiers

For highest adjustment accuracy, Zero and Gain are optimally set by potentiometer at room temperature. Accuracy is defined by the linearity error.

Board: Ø 16,8 mm. Output: 0…10 V, 4…20 mA, 0,5…4,5 V.
All available ranges in absolute or gauge version.

Error Band

RT	0,25 %
0…50 °C	0,5 %
-10…80 °C	1 %

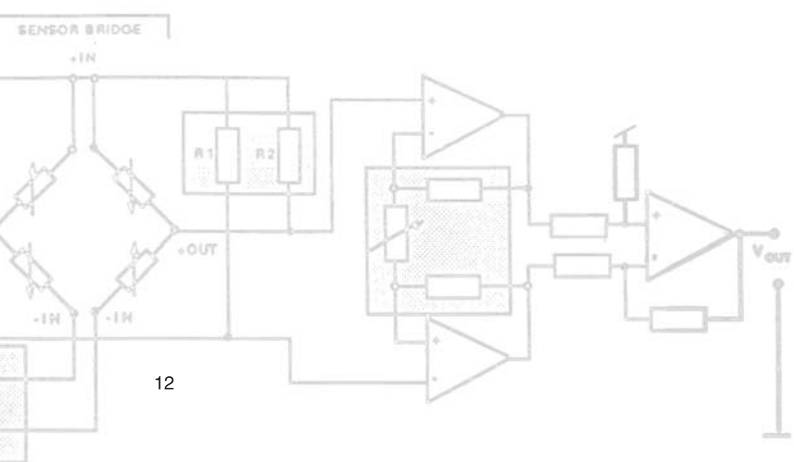
Industrial Amplifiers (ProgRes)

The industry requires reliable measurements within a certain temperature range. The error band describes the maximum deviation at any pressure within the compensated temperature range. Accuracy at room temperature is normally not of interest.

ProgRes is an amplifier with 4 programmable resistors for Zero, Gain, TC Zero and TC Gain (reprogrammable). The adjustment accuracy is ±0,25 %. Board: Ø 14,8 mm. Output: 4…20 mA, 0,5…4,5 V. Absolute or gauge versions ≥ 5 bar.

Error Band

0…50 °C	1 %
-10…80 °C	2 %
-20…120 °C	4 %



CIO: Chip-In-Oil (ProgRes)

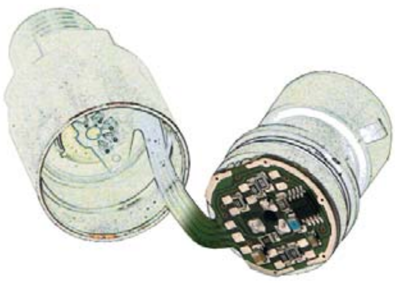
The ProgRes ASIC for 0,5…4,5 V output is integrated within the oil filled sensor housing, whereby the programmable amplifier-ASIC is mounted and contacted beside the actual absolute pressure measuring element on the same glass-feed-through. Only one pin is needed for the programming of the finished sensor. Output: 0,5…4,5 V. Absolute versions ≥ 5 bar.

Error Band

0…50 °C	1 %
-10…80 °C	2 %
-20…120 °C	4 %

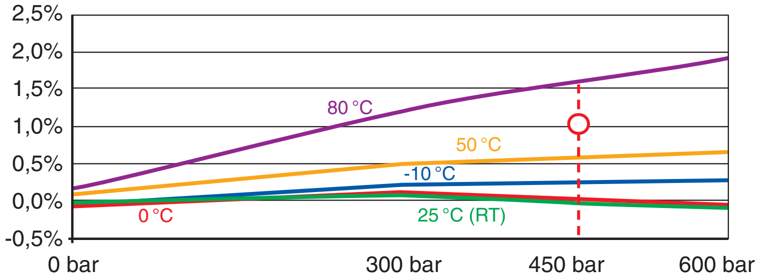
Automotive

Highest reliability at lowest cost is of priority for applications in the automotive field. A large temperature range from -40…135 °C and a high level EMC-protection is required. Adjustment and compensation either by fixed or laser trimmed resistors. Output: 4…20 mA, 0,5…4,5 V. Absolute versions ≥ 5 bar.



Error Band

-40 °C…135 °C	3 %…4 %

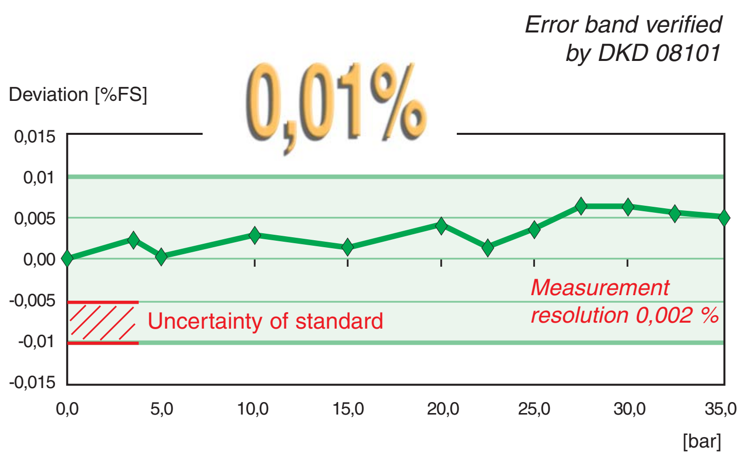


The graphs in the error band description can be used to considerably improve the accuracy of certain measurements.

For instance, a measurement is made at 65 °C at 450 bar: By interpolation between the 50 °C and the 80 °C line at 450 bar, the deviation is roughly +1 %. Subtracting 1 % from the measured value improves the accuracy to approximately 0,1 %.

Digital Compensation with µP's

µP-based signal conditioners create a coherent map of the deviations from the target value from a set of measurements at defined pressures and temperatures. This map is defined by a set of coefficients.



In operation, the µP attributes the exact pressure value to a set of pressure and temperature signals. By this method, called mathematical modelling, the error band is typically narrowed down by a factor of 100.

Characteristics Series 30 X (µP-based amplifier)

Resolution:
0,002 % FS (FS ≥ 60 mV/mA)

Measurement Rate:
500 times per second

Output Signals:
RS485 / 4…20 mA / 0…10 V

Sensor Ports:
2 pressure and 2 temperature

Error Band (20 ±5 °C):
0,01 % best (verified by DKD)

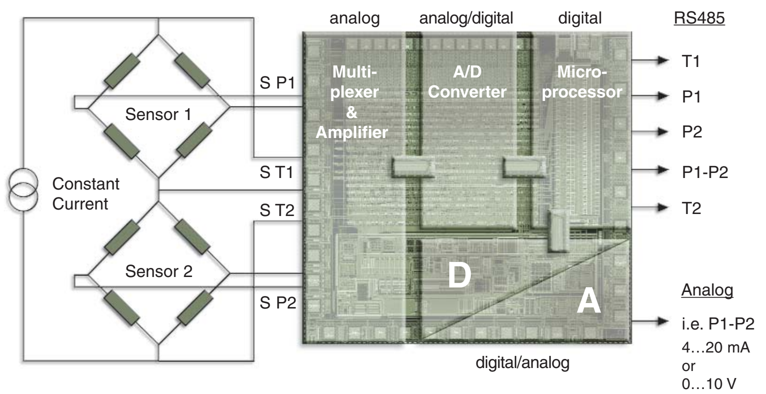
Error Band (-20…80 °C):
0,05 % or 1 mbar

1

2

1 Circular board Ø 16,8 mm for RS485 and 4…20 mA output

2 Double sensor for differential measurements with Series 30 X board



S T1 / S T2 Temperature Signals

The sensor bridges are excited with constant current. The voltage S T1 resp. S T2 over the bridge increases by 22% over +100 K. S T1 resp. S T2 is the perfect correlation for the compensation of S P1 resp. S P2 over temperature. Accuracy and precision are limited by the pressure and temperature references.

AA-Technology

Autonomous Data Logger: The AA-technology (absolute/absolute) is the realisation of a gauge or differential measurement with 2 absolute sensors and with digital signal conditioning, offering a completely sealed system for gauge measurements. The level sensor is connected by a cable to the electronics housing, which incorporates the electronics with the latest µP-technology (16 Bit A/D converter). The waterproof mounted absolute pressure sensor has a stainless steel diaphragm for air pressure measurement and barometric correction of the depth sensor.
The processor circuit collects the signals of the two pressure and temperature sensors and calculates the differential pressure with an accuracy of 1 cm for ranges up to 10 mWC.

The data collector DCX-22 AA allows measuring stations to be set up at considerably lower costs compared to conventional systems, offering furthermore the following advantages:

- Autonomous: Easily replaceable battery with a lifetime ≥10 years
- High data security due to the use of a non-volatile memory
- 100 % waterproof (no ventilation tube)
- Combination of event-controlled recording and interval recording prevents unnecessary data being recorded
- Simple and well structured configuration- and read-out PC-software
- Option of recording the barometric pressure, water and ambient temperature
- Small level sensor diameter (19 mm and 21 mm)
- Installation data can be stored in the level sensor
- The system is configured for a wireless data transfer via modem

For conventional application with AA-technology, KELLER alternatively offers the DACS-2.

DACS-2 is a simpler, less expensive version to replace the relative level transmitter for 4…20 mA output. It contains the µP-electronics and a barometric pressure sensor.

The level sensor signal is transferred via the RS485 over long distances to the DACS-2 which is located in the control room, taking the signals of the absolute level sensor and the barometric pressure and transfers the pressure difference into a 4…20 mA signal.


KELLER
druckmesstechnik
TYPE PR- 41/8686-0.01
RANGE 0 .. 10 mbar
OUTPUT 4 .. 20 mA
SUPPLY +8 .. 28 VDC
4: +Vcc
8: OUT/GND
KELLER
druckmesstechnik
47317
Industrial


KELLER
22768
KELLER
KELLER
38499
OUT/GND

Flush mounting

Indicators


SET
CAL
16.78
ON/Sp.
max.
Scale
OFF/Hy.
min.
Analog
ALARM
SET


12.68


14.279
EV-100
KELLER druckmesstechnik


WIND
KELLER
30/02

Automotive


Level
KELLER
druckmesstechnik
TYPE
RANGE
OUTPUT
SUPPLY
WH: GND
RD: +OUT
BK: +Vcc


KELLER
druckmesstechnik
DATA COLLECTOR


Mano 2000
bar
0.959
MAX
0.962
KELLER
SELECT
ENTER
Max./Min.
swiss made
www.keller-druck.ch


Mano 2000
bar
0.959
LEO 2
MAX
0.960
KELLER
SELECT
ENTER


Mano 2000
bar
8.968
MAX
10.562
KELLER
LEO 3
SELECT
ENTER
Max./Min.
swiss made
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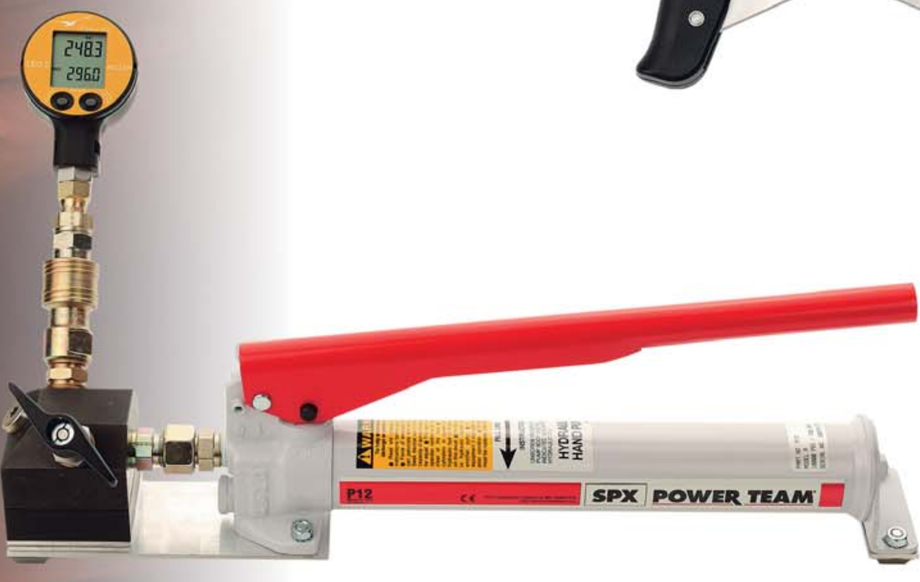
Digital Manometers


KELLER
1.157
BAR
KELLER
696.0
HOLD
698 696
KELLER
25.97
BAR
Pressure Calibrators

Pumps

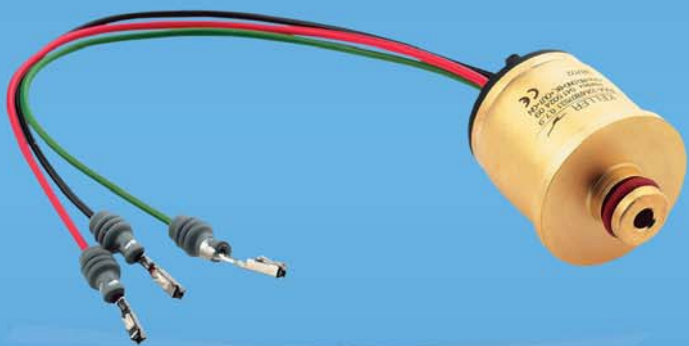

LEO 1
KELLER
HANDPUMP HTP1
DO NOT EXCEED
10,000 PSI / 700 BAR
KELLER AG


KELLER
PUSH FOR
VACUUM


P12
SPX POWER TEAM


manufactured by:
KELLER AG / WINTERTHUR CH
Keller P/N: PAA-23/80437.34-2
BATTERY
+ E 3601.0028
SL361S/SL761S
04.01
/80963-3.0
3:RD: +Vcc
4:BK: GND
KELLE
TYPE
RANGE
OUTPUT
SUPPLY
A: +Vcc
B: GND
0863

Custom made



OEM Transducers

Series 3 L

Ø 9,5 x 4,2 mm
20…200 bar, abs. / gauge

Series 4 L

Ø 11 x 4,2 mm
10…200 bar , abs. / gauge

Series 5 L

Ø 12 x 4,5 mm
10…200 bar, abs. / gauge

Series 6 L

Ø 13 x 4,5 mm
10…200 bar, abs. / gauge

Series 6 LHP

Ø 13 x 8 mm
400…1200 bar, absolute

Series 6 FL

Flush mount diaphragm
10…200 bar, abs. / gauge

Series 6 S

Brazed steel diaphragm
0,5…200 bar, abs. / gauge

Series 7 L

Ø 15 x 5 mm
10…200 bar, abs. / gauge

Series 7 S

Ø 15 x 5 mm, brazed
10…50 bar, abs. / gauge

Series 7 LHP

Ø 15 x 8 mm
200…1000 bar, absolute

Series 8 L

Ø 17 x 7 mm
0,2…50 bar, abs. / gauge

Series 9 L

Ø 19 x 5 mm
0,2…200 bar, abs. / gauge

Series 9 S

Ø 17 / 21 x 5,5 mm, brazed
0,5…20 bar, abs. / gauge

Series 9 FL

Ø 17 / 18 x 7 mm
0,2…50 bar, abs. / gauge

Series 9 LHP

Ø 17 / 21 x 5,5 mm
50…200 bar, absolute

Series 10 L

Ø 19 x 15 mm
0,2…100 bar, abs. / gauge

Series 10 LHP

Ø 19 x 15 mm
200…1500 bar, absolute

Series PD 9 L differential

Ø 19 x 14 mm, wet/wet
0,1…50 bar diff.
Line pressure max. 200 bar

Series PD 10 differential

Ø 19 x 26 mm, wet/wet
0,1…50 bar diff.
Line pressure max. 1000 bar

OEM Transmitters

All OEM absolute transducers are available with 0,5…4,5 V amplifier (CIO = Chip In Oil).

(see page 13)

All OEM transducers (abs. or gauge) with Ø ≥15 mm are available with ProgRes amplifiers Ø 14,8 mm.

(see page 12)

All OEM transducers (abs. or gauge) with Ø ≥17 mm are available with conventional amplifiers Ø 16,8 mm.

(see page 12)

All OEM transducers with flex-board or free wire connection are available with µP-based amplifiers.

(see page 15)

The following transmitters are available in different error bands depending on signal conditioning, pressure and temperature range. They come with most common output signals, i.e. 4…20 mA / 0,5…4,5 V / 0…10 V.

Any modifications to these shown standard products, such as other materials, special temperatures, pressure ports, signal outputs and electrical connections are available upon request.

Our application engineers will support you in selecting or adapting one of these variants to your specific needs, both in terms of special construction, non-standard specifications as well as special EMC-protection.

Industrial Transmitters

Series 21 SC compact

ProgRes, fully brazed
5…200 bar

Series 21 LT protec

Laser-compensated
5…200 bar

Series 21 progres

ProgRes, programmable
5…1000 bar

Series 23

Conventional standard
0,2…1000 bar

Series PD 23 / Series PD 33 X diff.

Diff. convent. / Diff. µP-comp.
0,2…50 bar

Series 23 S

ProgRes, fully brazed or welded, 0,2…600 bar

Series 33 X

µP-compensated (0,01 %)
0,2…1000 bar

Series PD 39 X differential

2 abs. sensors / µP-comp.
1…100 bar

Series 41

Capacitive, low range
10…3000 mbar

Flush Mounting

Series 25

ProgRes, G3/4" thread
0,2…1000 bar

Series 25 S

ProgRes, G1/2" thread
0,2…200 bar

Series 25 HT

ProgRes, up to 150 °C
0,5…20 bar

Series 25 HTT

ProgRes, up to 150 °C
0,5…400 bar

Series 25 HTC

Conventional, up to 300 °C
0,5…400 bar

Series 25 FL

ProgRes, G1/4" thread
10…200 bar

Series 35 X HT

Tri-Clamp, µP-compensated
0,5…100 bar

Series 35 X

µP-compensated
0,2…1000 bar

Series 45 F

Capacitive
10…3000 mbar

Automotive

Series 22

Laser-comp., G1/4″ male
5…200 bar

Series 22

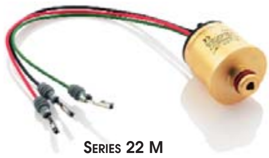
Laser-comp., G1/4″ female
5…200 bar

Series 22

Laser-comp., with tempe-
rature sensor, 5…200 bar

Series 22 M

Laser-comp., Brass
5…200 bar



Series 22 M

Laser-comp., Brass
5…200 bar

Level Transmitters

Series 26

ProgRes, Low Cost
0,2…20 bar

Series 26 W / 36 WX

Conv. / µP-compensated
0,2…20 bar

Series 46 W

Capacitive
20…3000 mbar

Series DCX-22

Data logger
0,8…10 bar

Series DCX-22 AA

Data logger
800…2300 mbar

Digital Manometers

ECO 1

Low Cost
-1…300 bar

LEO 1 (with Peak function)

5000 meas./sec.
-1…1000 bar

LEO 2

High accuracy
-1…700 bar

LEO 3

With analog output
0…1000 bar

Intelligent Manometer

Memory option
-1…1000 bar

Digital Indicators

EV-120

For Series 30 transmitters

EV-94

24 x 48 mm, RS485
Miniature format, low cost

EV-98/EV-99

48 x 96 mm
Highly precise, universal

EV-101…EV-104

48 x 96 mm
Most signal-inputs, RS485

EV-97

Digital on-site display
Supply from 4…20 mA

Pressure Calibrators

LP Calibrator

Low pressure
Ranges: -1…10 bar

MP Calibrator

Medium pressure
Ranges: -1…25 bar

HP Calibrator

High pressure
Ranges: up to 700 bar

HTP 1 Pump (Pump only)

High pressure hand pump
Ranges: up to 700 bar

K/P Pump (Pump only)

Low pressure hand pump
Ranges: -0,85…30 bar

Custom Made Products

Diving computers,
circuit mounting

Circuit mounting,
abs./gauge/diff.

Helicopters,
turbines

Military helicopters,
filter monitoring

Display modules,
pneumatics

Medical,
air pressure tools

Chromatography,
high pressure pumps

Painting industry,
battery driven (100 kV)

Military application,
track vehicles

Industrial cleaners,
water purification

Ink-jet plotters,
CMYK

Aviation,
cabin pressure

Biotechnology,
fermentation

Metering systems,
pump control

High temp. 350 °C,
water cooled

Company Profile

Administration and production facilities,
Headquarters Winterthur / Switzerland

KELLER was founded in 1975 by Hans W. Keller who is the driving force within KELLER and a very active Company President.

Based in Switzerland, KELLER is Europe's largest manufacturer of piezoresistive stainless steel pressure capsules, transducers and transmitters. The KELLER product range is one of widest on offer from a single source.

KELLER manufactures everything from high volume OEM piezoresistive pressure sensors to high-accuracy digitally compensated transmitters and sophisticated digital manometers and calibrators.

KELLER specialises in the field of high volume industrial OEM sensors and transmitters which are produced using the latest automated techniques.

This philosophy has been extended to the signal conditioning circuits, most of which are programmable and can be fully calibrated and compensated using computer controlled test equipment.

By adopting modern methods KELLER has reduced manufacturing cost while achieving the unrivalled quality and performance that is normal for Swiss engineering. This is why KELLER leads the world in the transducer industry.

KELLER AG für Druckmesstechnik, the Group headquarters and main production plant, is located in Winterthur, Switzerland.

KELLER Gesellschaft für Druckmesstechnik mbH based in Jestetten, Germany, is the core of all KELLER European operations and is a single sales administration and distribution centre for all KELLER satellite companies within the European Union.

KELLER worldwide subsidiaries and representative network service all customers in the respective country, providing full technical and sales support for all KELLER products.

Both facilities, Winterthur in Switzerland and Jestetten in Germany, are certified ISO 9001:2000.

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Subject to change

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This catalog lists the most common products with their main features. Detailed technical information is available upon request or can be viewed on our website

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