

Series 10LX-GM

Highly accurate piezoresistive pressure transmitter capsules for gas volume correctors

Features

- Maximum accuracy in % reading und % full scale
- 10LXrs-GM: RS485 interface with Modbus RTU protocol
- 10LXt-GM: TTL interface with Modbus RTU protocol
- 10LXiic-GM: I2C interface with cyclic redundancy check (CRC)
- Excellent long-term stability
- Flush, crevice-free welded diaphragm
- Robust stainless-steel housing

Technology

- Insulated piezoresistive pressure sensor chip encapsulated in an oil-filled metal housing
- High-quality pressure transmitter capsules and tried-and-tested mathematical compensation
- Ideal for mounting with O-ring

Typical applications

- Gas volume correctors
- Smart gas meter
- Electronic gas volume corrector
- Energy and supply industry (gas supply)



Total error band

$\pm 0,04$ %FS @ -25...60 °C

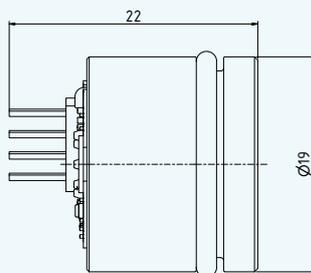
Measurement accuracy

$\pm 0,2$ %rdg @ -25...60 °C (20...100 %FS)

Pressure ranges

0...2 bar to 0...50 bar

Series 10LX-GM



Series 10LX-GM – Specifications

Standard pressure ranges

Absolute pressure PAA	Proof pressure
0...2	6
0...5	15
0...10	30
0...20	60
0...30	90
0...50	150
bar abs.	bar
Reference pressure at 0 bar abs. (vacuum)	Based on reference pressure

Performance

Pressure

Digital non-linearity	$\leq \pm 0,02$ %FS	Best fit straight line (BFSL)
Accuracy @ RT (20...25 °C)	$\leq \pm 0,04$ %FS	Non-linearity (best fit straight line, BFSL), pressure hysteresis, non-repeatability, zero point deviation and amplification deviation
Total error band (-25...60 °C)	$\leq \pm 0,04$ %FS	Non-linearity (best fit straight line, BFSL), pressure hysteresis, non-repeatability, zero point deviation and amplification deviation, incl. temperature deviation. Max. deviation within the compensated pressure and temperature range.
Total error band (-25...60 °C and 20...100 %FS)	$\leq \pm 0,2$ %rdg	Max. deviation within the compensated pressure and temperature range.
Compensated temperature range	-25...60 °C	
Long-term stability	Typ. $\leq \pm 0,05$ %FS	Per year under reference conditions.
	Max. $\leq \pm 0,10$ %FS	
Position dependency	$\leq \pm 2$ mbar	Calibrated in vertical installation position with diaphragm facing downwards.
Resolution	0,0005 %FS	Digital
Signal stability	0,0025 %FS	Digital, noise-free
Internal measurement rate	≥ 1800 Hz	
Pressure range reserve	± 10 %	Outside the pressure range reserve, +Inf / -Inf is displayed. If there is an error in the device, NaN is displayed.
Note	The specifications listed can only be guaranteed if the installation recommendations have been abided by.	

Temperature

Accuracy	$\leq \pm 2$ °C	The temperature is measured on the pressure sensor (silicon chip) that sits behind the metallic diaphragm. The data applies within the compensated temperature range.
Resolution	$\leq 0,01$ °C	
Internal measurement rate	≥ 10 Hz	

Series 10LX-GM – Specifications

Electrical data

Type	10LXrs-GM	10LXt-GM	10LXiic-GM
Connectivity	Digital	Digital	Digital
Digital interface	RS485	TTL (LVTTTL 3.3 V)	I2C
Voltage supply	3,2...5,5 VDC	3,2...5,5 VDC	3,2...5,5 VDC
Power consumption	< 7 mA	< 7 mA	< 7 mA
		< 9 uA (< 3 µA @ 25 °C (Sleep-Mode))	< 9 uA (< 3 µA @ 25 °C (Sleep-Mode))
Voltage insulation	± 5,5 VDC	+ 5,5 VDC against GND	+ 5,5 VDC against GND

Start-up time (power supply ON)	< 50 ms
Overvoltage protection and reverse polarity protection	± 5,5 VDC
GND-CASE case isolation	> 10 MΩ @ 500 VDC

Digital interface RS485

Type	RS485	Half-duplex
Communication protocols	Modbus RTU	
Identification	Class.Group: 5.24	
Pressure unit	Bar	Standard settings: Bus address 1, Baud rate 9600 bit/s
Unit of temperature	°C	
Data type (process data)	Float32, Int32, Int16	8 data bits, no parity, 1 stop bit (8N1).
Baud rate	9600 and 115'200 bits/s	Other default settings on request.
Cable length	Up to 1,2 km	Can be reconfigured via software by the customer later.

Digital interface TTL

Type	TTL (UART)	
Communication protocols	Modbus RTU	
Identification	Class.Group: 5.24	
Logic levels	LVTTTL 3.3V or TTL 5V	Standard settings: Address 1 (no bus-system capability), Baud rate 9600 bit/s
Pressure unit	Bar	
Unit of temperature	°C	8 data bits, no parity, 1 stop bit (8N1).
Data type (process data)	Float32, Int32, Int16	Other default settings on request.
Baud rate	9600 and 115'200 bits/s	Can be reconfigured via software by the customer later.
Cable length	< 0,5 m	

Digital interface I2C

Type	I2C	
Identification	Class.Group: 5.24	
Pressure unit	Bar	Standard settings: I2C address: 0x40
Unit of temperature	°C	
Data type (process data)	Float32 and Int32	Other default settings on request (e.g. filter and clock stretch mode).
I2C clock frequency	400 kHz (Fast Mode)	Can be reconfigured via software by the customer later.
Cable length	Short (depending on capacity and pull-up resistance)	

Electrical connection

Standard	Male connector	4 pin, 0,5 mm x 0,5 mm, 2 mm contact spacing, L=5 mm
----------	----------------	--

Series 10LX-GM – Specifications

Mechanical data

Materials in contact with media

Housing and diaphragm	Stainless steel AISI 316L
O-ring	FVMQ (90 Shore, -60...200 °C) ø 15,6 mm x 1,78 mm

Other materials

Pressure transducer oil filling	Silicone oil
---------------------------------	--------------

Further details

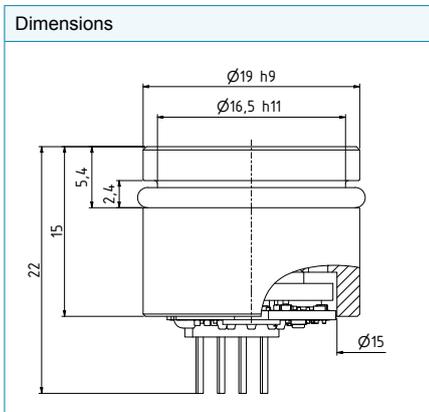
Diameter × height	ø 19 x 15 mm	See Dimensions and variants
Weight	approx. 20 g	

Environmental conditions

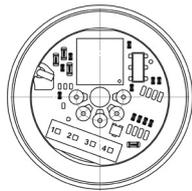
Medium temperature range	-25...125 °C	Operating temperature, consider seals. Icing not permitted.
Ambient temperature range	-25...85 °C	
Storage temperature range	-25...85 °C	
Load cycles @ RT (20...25 °C)	> 10 million pressure cycles	0...100 %FS

Series 10LX-GM – Dimensions and variants

Dimensions



Electrical connection

Male connector	I2C	
	1	GND
	2	+Vs
	3	SCL
	4	SDA

Customer-specific versions, on request

- Other compensated pressure ranges
- O-rings made of other materials

Examples of similar products

- Series 10L: Low-pressure version for pressure ranges < 200 bar
- Series 10LX / 10LHPX: with digital compensation electronics
- Series 23Xrs-GM: Pressure transmitters with RS485 interface for the gas market
- Series 23Xiic-GM: Pressure transmitters with I2C interface for the gas market

Series 10LX-GM – Software, scope of delivery and accessories

Modbus interface

The X-line products have a digital interface (RS485 half-duplex), which supports the Modbus RTU and KELLER bus protocols. 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 for integrating the communication protocol into your own software.

Interface converters

The connection to a computer is established via an RS485-USB interface converter. To ensure smooth operation, we recommend the K-114 with the corresponding mating plug, robust driver module, fast RX/TX switching and connectable bias and terminating resistors.

"CCS30" software

The licence-free software CCS30 is used to carry out configurations and record measured values.

Measurement collection

- Live visualisation
- Adjustable measuring and storage interval
- Export function
- Parallel recording in bus operation
- Up to 100 measured values per second

Configuration

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

I2C interface

The pressure transmitter is equipped with an I2C interface (inter-integrated circuit), enabling reliable, efficient digital communication. I2C is a two-wire serial protocol with an SDA (data) and SCL (clock) line enabling connection to microcontrollers and embedded systems.

Features of the I2C interface:

- Addressing: 7 bit
- Data transmission rate: Standard mode (up to 100 kHz), fast mode (up to 400 kHz)
- Voltage level: Compatible with 3,3 V and 5 V systems
- Communication protocol: Master/device principle; the transmitter functions as a device
- Operation: Read and write access via standardised I2C commands
- Data integrity: Integrated CRC checksum (cyclic redundancy check) to identify transmission errors

The I2C interface enables easy access to measured values and device configurations. Thanks to the low power consumption, the interface is particularly suitable for battery-operated applications and networked sensor systems. Details of the communication protocols can be found at www.keller-pressure.com.

Scope of delivery

KELLER Pressure calibration certificate

