Series 35HTCX

Piezoresistive high-temperature pressure transmitters with front-flush metal diaphragm

Features

- Suitable for medium temperatures up to 300 °C
- RS485 interface can be combined with analog interface
- Analog interface scaleable by RS485 interface (turn-down)
- Modbus RTU protocol for process values and configuration
- Excellent long-term stability
- Cooling coil for pressure transfer and thermal isolation of the electronics from the medium temperature

Technology

- Insulated and encapsulated piezoresistive pressure sensor
- Front-flush, seamless design with no internal seals
- High-quality pressure transducers and tried-and-tested mathematical compensation
- Based on technology from the well-known 33X series with the highest level of accuracy

Typical applications

- Research and development
- Process technology
- Biotechnology
- Food industry

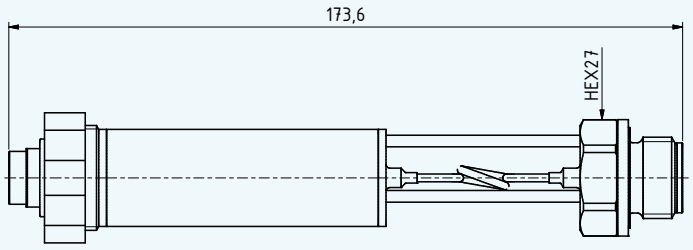
Accuracy
± 0,1 %FS

Total error band
± 0,5 %FS @ 20…300 °C

Pressure ranges
0…3 to 0…1000 bar

Modbus RTU

Series 35HTCX



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info@keller-pressure.com

Series 35HTCX – Specifications

Standard pressure ranges

Relative pressure PR		Proof pressure
0…3	-1…3	9
0…6	-1…6	18
0…10	-1…10	30
0…16	-1…16	48
0…30	-1…30	75
bar rel.		bar
Reference pressure at atmospheric pressure		Based on reference pressure

All intermediate ranges for the analog interface can be ranged (turn-down) from the standard ranges without surcharge.

Absolute pressure PAA	Absolute pressure PA	Proof pressure
0…10	0…10	30
0…16	0…16	48
0…30	0…30	90
0…60	0…60	180
0…100	0…100	300
0…300	0…300	600
0…700	0…700	1100
0…1000	0…1000	
bar abs.	bar	bar
Reference pressure at 0 bar abs. (vacuum)	Reference pressure at 1 bar abs.	Based on reference pressure

Performance

Pressure

Digital non-linearity	≤ ± 0,05 %FS.	Best fit straight line (BFSL)
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 (20…300 °C)	≤ ± 0.5 %FS	Max. deviation within the compensated pressure and temperature range.
Compensated temperature ranges	20…300 °C	Medium temperature (temperature of electronics max. 120 °C)
Long-term stability	≤ ± 0,2 %FS	Per year under reference conditions, annual recalibration recommended.
Position dependency	≤ ± 12 mbar	Calibrated in vertical installation position with pressure connection facing downwards.
Resolution	0,002 %FS	Digital
Signal stability	0,01 %FS	Digital noise-free
Pressure range reserve	± 10 %	Outside the pressure range reserve, +Inf / -Inf is displayed. If there is an error in the device, NaN is displayed.
Vacuum resistance	When operated below 300 mbar abs. Specifications not guaranteed.	

Temperature

Accuracy	≤ ± 2 °C	The temperature is measured in the electronics located **behind the cooling coil**.
Resolution	≤ 0,01 °C	
Internal measurement rate	> 10 Hz	

Series 35HTCX – Specifications

Electrical data

Connectivity	digital	2-wire + digital	3-wire + digital		
Analog interface		4…20 mA	0…10 V	0…5 V	0,1…2,5 V
Digital interface	RS485	RS485	RS485	RS485	RS485
Voltage supply	3,2…32 VDC	8…32 VDC	13…32 VDC	8…32 VDC	3,2…32 VDC
Power consumption (without communication)	< 8 mA	3,5…22,5 mA	< 8 mA	< 8 mA	< 8 mA
RS485 voltage insulation	± 32 VDC	± 18 VDC	± 32 VDC	± 32 VDC	± 32 VDC
Note	Disturbance of the 4…20 mA signal occurs during communication via the digital interface. 3-wire types are suitable for simultaneous operation of the analog and digital interface.				

Start-up time (power supply ON)	< 250 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
	> 5 kΩ	3-wire
Limiting frequency – electronics	≥ 300 Hz	2-wire
		3-wire (0,1…2,5 V)
	≥ 1000 Hz	3-wire (0…10 V, 0…5 V)
Note	Filter properties can be adjusted by the customer.	

Digital interface

Type	RS485	Half-duplex
Communication protocols	Modbus RTU	
	KELLER bus protocol	Proprietary
Identification	Class.Group: 5.24	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 and 115'200 bit/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
	Valve plug (without RS485)	Form A (18 mm)	DIN EN 175301-803-A (DIN 43650)
	Bayonet plug	Souriau series 8525	MIL-STD-1669, 6-pin (max. 5 pins are used)
Cable	ø 5,8 mm, PE sheath	5-pin, cable gland	

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

Series 35HTCX – Specifications

Mechanical data

Materials in contact with media

Pressure connection	Stainless steel AISI 316L
Pressure transducer separating diaphragm	Stainless steel AISI 316L
Pressure transducer seal (internal)	none
Pressure connection seal (external)	Copper

Other materials

Pressure transducer oil filling	Silicone oil

Further details

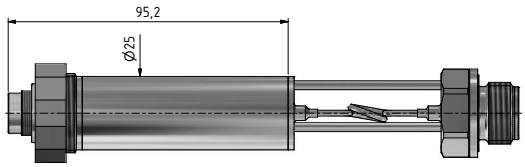
Pressure connection	G1/2 male, front-flush	See dimensions and options.
Diameter × length	ø 25 mm × approx. 180 mm	
Weight (excluding cable)	approx. 300 g	

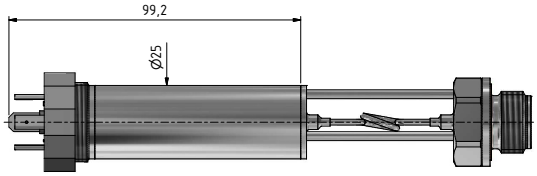
Environmental conditions

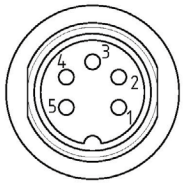
Medium temperature range	0…300 °C		Icing not permitted.
Ambient temperature range	-20…85 °C		
Storage temperature range	-20…85 °C		
Protection	IP67	Round plug, M16 x 0,75	For relative pressure, use a cable with integrated capillary.
	IP65	Valve plug, form A	
	IP67	Bayonet plug, Souriau series 8525	
	IP67	Cable gland	For relative pressure, use a cable with integrated capillary.
Notes	• Degrees of protection are only valid with the corresponding mating plug in the connected state. • The design implementation of the ventilation for relative pressure versions can be found in the respective technical drawing.		
Load cycles @ RT (20…25 °C)	> 10 m. pressure cycles	0…100 %FS	

Series 35HTCX – Dimensions and options

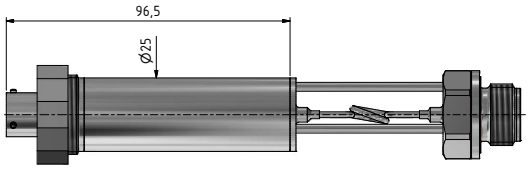
Electrical connections

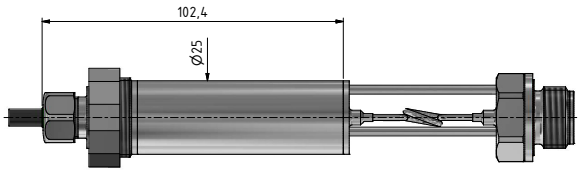


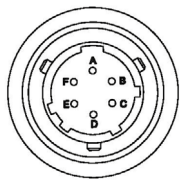


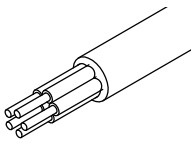
Round plug	2-wire		3-wire	
M16 × 0,75	4…20 mA		0…max. 10 V	
	1	OUT/GND	1	GND
	2	n.c.	2	+OUT
	3	+Vs	3	+Vs
	4	RS485A	4	RS485A
	5	RS485B	5	RS485B

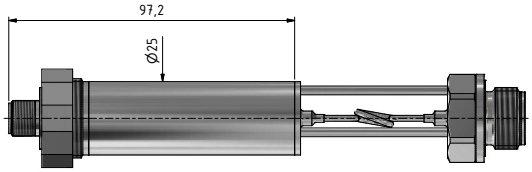
Valve plug	2-wire		3-wire	
Form A (18 mm)	4…20 mA		0…max. 10 V	
	1	OUT/GND	1	GND
	2	n.c.	2	+OUT
	3	+Vs	3	+Vs
	⏚	CASE	⏚	CASE





Bayonet plug	2-wire		3-wire	
Souriau series 8525	4…20 mA		0…max. 10 V	
	A	+Vs	A	+Vs
	B	n.c.	B	+OUT
	C	OUT/GND	C	GND
	D	RS485A	D	RS485A
	E	n.c.	E	n.c.
	F	RS485B	F	RS485B

Cable gland	2-wire		3-wire	
Cable ø 5.8 mm	4…20 mA		0…max. 10 V	
	WH	OUT/GND	WH	GND
	RD	n.c.	RD	+OUT
	BK	+Vs	BK	+Vs
	BU	RS485A	BU	RS485A
	YE	RS485B	YE	RS485B
	Shield on CASE		Shield on CASE	



Round plug	2-wire		3-wire	
M12 x 1	4…20 mA		0…max. 10 V	
	1	OUT/GND	1	GND
	2	n.c.	2	+OUT
	3	+Vs	3	+Vs
	4	RS485A	4	RS485A
	5	RS485B	5	RS485B

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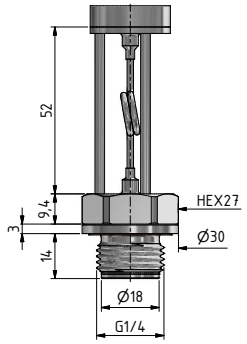
Series 35HTCX – Dimensions and options

Available pressure connections

G1/2 front-flush



ÖNORM EN ISO 228-1 : 2003-06-01

Other customer-specific options

- Other compensated pressure ranges
- Other electrical connections
- Integration of application-specific calculations
- Modifications to customer-specific applications

Examples of similar products

- Series 35X: Pressure transmitters with front-flush metal diaphragm and excellent accuracy
- Series 35HTX: Pressure transmitters with front-flush metal diaphragm for use in bioreactors and autoclaves
- Series M5HB: Ultra-fast high-temperature transmitters
- Series M8coolHB: Ultra-fast and precise high-temperature transmitters
- OEM series: Pressure transducers with electronics (e.g. series 10LX or 15SX with thread) for integration into one's own systems

Series 35HTCX – 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-druck.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.

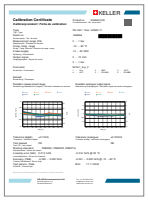
«CCS30» software

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

Measurement recording
- Live visualisation
- Configurable 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

Scope of delivery

Calibration certificate	Mating plug to round plug, M16 x 0,75	Mating plug to valve plug, form A
		

Accessories

Calibration certificate with 5 measuring points	Calibration certificate with 11 measuring points	Calibration certificate	Mating plug to bayonet plug
			
• Deviation at room temperature. • Issued by KELLER.	• Deviation at room temperature with hysteresis. • Issued by KELLER.	• Issued by an external calibration laboratory accredited by DakkS or SAS.	

Interface converter		Mating plug to M12
		
K-114 • Analog measurement 0…10 V and 4…20 mA • 12 V measuring device supply via USB • USB interface galvanically isolated • Bias and terminating resistors can be activated	Connection options • E.g. K-114-B with cable outlet instead of screw-type terminals for Binder series 723 (5-pin) • Various adapter cables available	• Angled socket, cable 5 m *PN 602515.0093* • Angled socket, cable 2 m *PN 602515.0094* • Female connector, cable 5 m *PN 602515.0095* • Female connector, cable 2 m *PN 602515.0096*