# 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

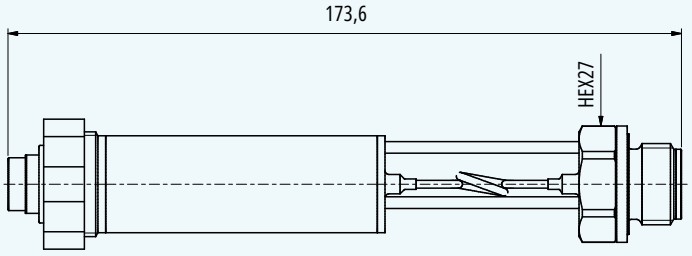
**Accuracy** ± 0,1 %FS

**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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# 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.<br>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:<br>bus address 1,<br>baud rate 9600 bit/s.<br><br>Other default settings available on request.<br>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<br>(DIN 43650) |
| | Bayonet plug | Souriau series 8525 | MIL-STD-1669, 6-pin<br>(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

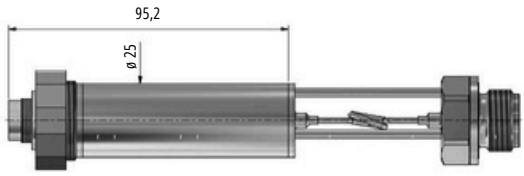
| | | |
|---|---|---|
| Pressure connection | G1/2 male, front-flush | See dimensions and options. |
| Diameter × length | ø 25 mm × approx. 180 mm | |
| Weight (excluding cable) | approx. 300 g | |

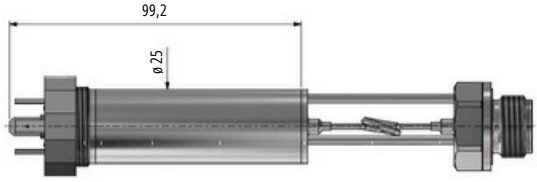
## Environmental conditions

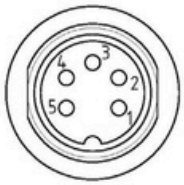
| | | | |
|---|---|---|---|
| Medium temperature range | 0…300 °C | | Icing not permitted. |
| Ambient temperature range | -20…85 °C | | |
| Storage temperature range | -20…85 °C | | |
| Protection | IP67 IP65 | Round plug, M16 x 0,75 | For relative pressure, use a cable with integrated capillary. |
| | | 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.<br>• 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

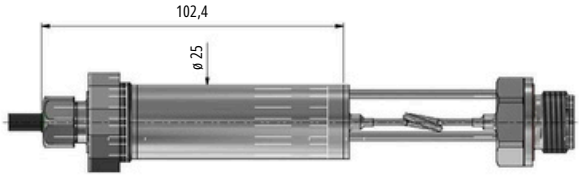
## Electrical connections

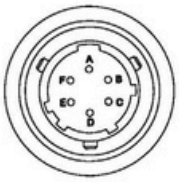


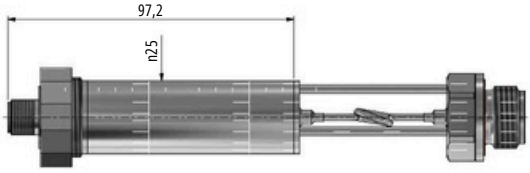

| **Round plug** | 2-wire | | 3-wire | |
|---|---|---|---|---|
| M16 × 0,75 | 4…20 mA | | 0…max. 10 V | |
|  | 1. | OUT/GND | 1 | GND |
| | 2 | n.c. | 2. | +OUT |
| | 3 | +Vs | 3 | +Vs |
| | 4 | RS485A | 4 | RS485A |
| | 5 | RS485B | 5 | RS485B |

| **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 0… | |
|---|---|---|---|---|
| Cable ø 5.8 mm | 4…20 mA | | 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 | |

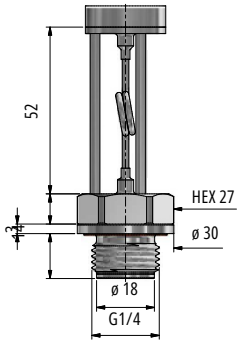



| **Round plug** | 2-wire | | 3-wire | |
|---|---|---|---|---|
| M12 x 1 | 4…20 mA | | 0…max. 10 V | |
|  | 1. | OUT/GND | 1 | GND |
| | 2 | n.c. +Vs | 2 | +OUT |
| | 3 | RS485A | 3 | +Vs |
| | 4 | RS485B | 4 | RS485A |
| | 5 | | 5 | RS485B |

# 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.<br>• Issued by KELLER. | • Deviation at room temperature with hysteresis.<br>• Issued by KELLER. | • Issued by an external calibration laboratory accredited by DakkS or SAS. | |

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