

# Low Pressure Transmitters

## HD404... series

### WIDE VARIETY FOR ANY APPLICATION

Ranges from 50 Pa to 100 mbar  
Models with auto-zero circuit  
Optional airflow speed measurement

### GREAT FLEXIBILITY

Wide availability of output signals  
for **easy integration** in any installation

### HIGHLY ACCURATE AND RELIABLE SYSTEM

Sensor with **excellent linearity, repeatability** and **stability** over time

### IMMEDIATE AND DIRECT READING

Models with display option for direct reading in the selected measurement unit

### EASY TO SET UP AND QUICK TO INSTALL

Supplied **ready to use** and **already calibrated**



### Main Applications

Clean room monitoring  
Filter control  
Flow measures  
Air conditioning control  
Ventilation control

### Accurate measurements even at very low pressure!

The series of HD404T transmitters is able to measure **relative pressures** with reference to the **atmosphere** or **differential** in the range:

- **from 50 to 1000 Pa** (from 0.2" H<sub>2</sub>O to 4" H<sub>2</sub>O) for the versions with analog output;
- **250 Pa / 1000 Pa / 100 mbar** for the versions with RS485 Modbus-RTU output.

The transmitters use a "micromachined" temperature compensated silicon sensor that has an excellent linearity, repeatability and stability over time.

The sensor signal is amplified and converted, depending on the model, into a **standard current** (4-20 mA) or **voltage** (0-10 V) **analog output**, or into a **digital RS485 Modbus RTU output**, and can therefore be transmitted over long distances with a high noise immunity.

In the models with analog output it is possible to choose, via a dip switch, between two measurement ranges in order to select the optimal scale for each application.

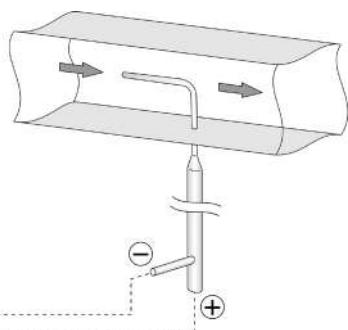
An optional **auto-zero circuit (AZ)** periodically equalizes the differential pressure at the sensor input and corrects the offset; the transmitters equipped with this circuit are insensitive to the mounting position. In addition, the auto zero circuit compensates the sensor aging and deviation of the zero with temperature changes, eliminating the maintenance.

The **display option (L)** is available, in which the pressure is visualized on a 4-digit display in the chosen measurement unit.

The "square root" **version (SR)** is especially useful if the transmitter is connected to a Pitot or Darcy tube, as the output is directly proportional to the speed of airflow. The SR version with L option also allows displaying, in addition to the pressure measured, the calculated airflow speed. It is possible to set the coefficient of the Pitot or Darcy tube used and the parameters for the calculation of the speed (air flow temperature, barometric pressure, differential static pressure in the duct). In the models with analog output it is possible to set the full scale speed for the output.

## Technical Specifications

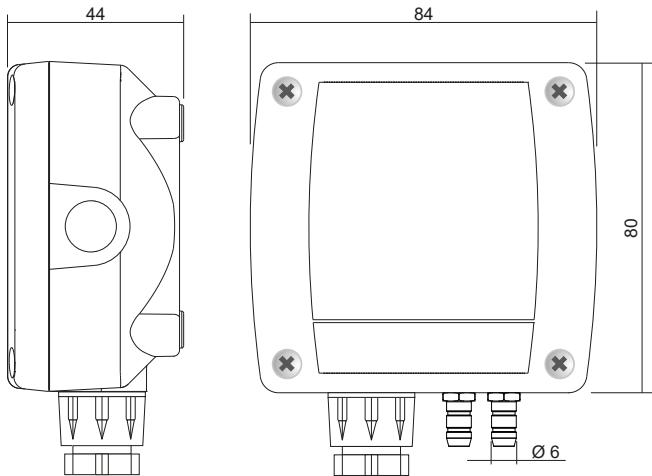
Sensor	Piezoresistive
Measuring range	See table 1 and 2 0.1 Pa for HD404ST2... 0.5 Pa for f.s. up to 500 Pa (except HD404ST2...) 1 Pa for f.s. 1000 Pa 0.1 mbar for HD404ST5... 0.05 mmH <sub>2</sub> O for f.s. up to 50 mmH <sub>2</sub> O 0.1 mmH <sub>2</sub> O for f.s. 100 mmH <sub>2</sub> O 0.002" H <sub>2</sub> O for f.s. up to 4" H <sub>2</sub> O 0.01 m/s (only SR versions)
Resolution	1 Pa for f.s. 1000 Pa 0.1 mbar for HD404ST5... 0.05 mmH <sub>2</sub> O for f.s. up to 50 mmH <sub>2</sub> O 0.1 mmH <sub>2</sub> O for f.s. 100 mmH <sub>2</sub> O 0.002" H <sub>2</sub> O for f.s. up to 4" H <sub>2</sub> O 0.01 m/s (only SR versions)
Accuracy	See table 1
Long-term stability	See table 1
Output	HD404T...: active analog 0...10 Vdc ( $R_{L_{min}} = 10$ kΩ) or 4...20 mA ( $R_{L_{max}} = 500\Omega$ ) HD404ST...: digital RS485 Modbus-RTU
Response time	HD404T... with dip-switch set to FAST: 0.125 s in pressure mode 1 s in speed mode (only SR versions) HD404T... with dip-switch set to LOW: configurable 1, 2 or 4 s (default 2 s) HD404ST... configurable 0.125, 1, 2 or 4 s (default 2 s)
Overpressure limit	50 kPa
Connection to PC	HD404T...: RS232 serial port can be connected to a USB port by using the optional CP27 adapter HD404ST...: can be connected to a USB port by using the optional RS48 adapter
Zero calibration	Automatic for the versions with AZ option
Compatible media	Only air and non-aggressive dry gases
Power supply	HD404T...: 24 Vac ± 10% or 18...40 Vdc HD404ST...: 12...30 Vdc
Absorption	HD404T...: < 1 W @ 24 Vdc HD404ST...: < 100 mW @ 12 Vdc
Pressure connection	Nickel-plated brass, Ø 6 mm
Electrical connections	Screw terminal block, max 1.5 mm <sup>2</sup> , PG9 cable gland
Operating conditions	-10...+60 °C (-5...+50 °C for the models with AZ option), 0...95% RH
Storage temperature	-20...+70 °C
Protection degree	IP65



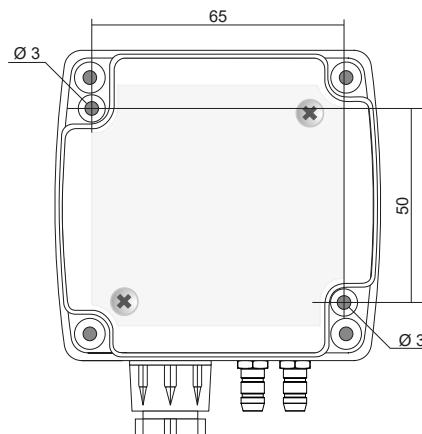
Transmitter with SR option connected to a Pitot tube

## Installation

By opening the lid, 3 mm diameter holes are available so to allow securing the base of the instrument directly to a panel or to the wall.



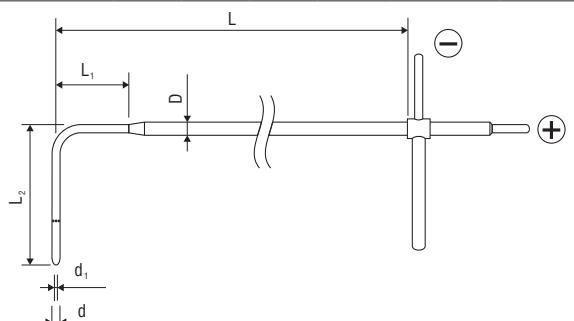
Dimensions (mm)



Fixing holes (mm)

## PITOT TUBES

AISI 316 stainless steel Pitot tubes for measuring the air speed. The models with TC suffix also measure the temperature with K thermocouple sensor. Supplied with two pieces of silicone tube, internal Ø 4 mm / external Ø 6 mm, length 1.5 m.



	d mm	d <sub>1</sub> mm	D mm	L mm	L <sub>1</sub> mm	L <sub>2</sub> mm	Operating temp.	Temp. sensor
T1-300	3	1	6	300	30	72	0...600 °C	---
T2-400	5	2	8	400	45	120		---
T3-800	8	3.2	8	800	---	192		---
T3-800TC	8	3.2	8	800	---	192		TCK

TABLE 1	MEASURING RANGE		ACCURACY ( @ 0...50 °C)		LONG-TERM STABILITY	
MODEL	LOW	HIGH	AZ	NO AZ	AZ	NO AZ
MODELS WITH ANALOG OUTPUT (HD404T...)						
Pa (HD404TxP...)						
HD404T1PGAZ...	0...50	0...100	±(0.8% measure + 0.5)	-	≤±0.2	-
HD404T2PGAZ...	0...100	0...250		±1% f.s. nom.		≤±8
HD404T3PG...	0...250	0...500		-		-
HD404T4PG...	0...500	0...1000		-		-
HD404T1PDAZ...	±50	±100		±1% f.s. nom.		≤±8
HD404T2PDAZ...	±100	±250		-		-
HD404T3PD...	±250	±500		-		-
HD404T4PD...	±500	±1000		-		-
mmH <sub>2</sub> O (HD404TxM...)						
HD404T1MGAZ...	0...5	0...10	±(0.8% measure + 0.05)	-	≤±0.02	-
HD404T2MGAZ...	0...10	0...25		±1% f.s. nom.		≤±0.8
HD404T3MG...	0...25	0...50		-		-
HD404T4MG...	0...50	0...100		±1% f.s. nom.		-
HD404T1MDAZ...	±5	±10		-		-
HD404T2MDAZ...	±10	±25		-		-
HD404T3MD...	±25	±50		±1% f.s. nom.		≤±0.8
HD404T4MD...	±50	±100		-		-
inchH <sub>2</sub> O (HD404TxI...)						
HD404T1IGAZ...	0...0.2	0...0.4	±(0.8% measure + 0.002)	-	≤±0.0008	-
HD404T2IGAZ...	0...0.4	0...1		±1% f.s. nom.		≤±0.04
HD404T3IG...	0...1	0...2		-		-
HD404T4IG...	0...2	0...4		±1% f.s. nom.		-
HD404T1IDAZ...	±0.2	±0.4		-		-
HD404T2IDAZ...	±0.4	±1		-		-
HD404T3ID...	±1	±2		±1% f.s. nom.		≤±0.04
HD404T4ID...	±2	±4		-		-
MODELS WITH RS485 MODBUS-RTU OUTPUT (HD404ST...)						
HD404ST2AZ...	±250 Pa		±(0.8% measure + 0.5) Pa	±1% f.s.	≤±0.2 Pa	≤±8 Pa
HD404ST4...	±1000 Pa					
HD404ST5...	±100 mbar		±(0.8% measure + 0.005) mbar	±1% f.s.	≤±0.002 mbar	≤±0.08 mbar

(1) f.s. nom. (nominal) = full scale of "HIGH" measuring range. - (2) Long-term stability refers to 1 year.

TABLE 2	MAX SPEED MEASURABLE (m/s)*		ANALOG OUTPUT DEFAULT FULL SCALE (m/s)	
MODEL	LOW	HIGH		
HD404TxP...SR				
HD404T1PGAZ...SR	9.06	12.82		10
HD404T2PGAZ...SR	12.82	20.27		20
HD404T3PG...SR	20.27	28.67		25
HD404T4PG...SR	28.67	40.55		40
HD404TxM...SR				
HD404T1MGAZ...SR	8.98	12.70		10
HD404T2MGAZ...SR	12.70	20.08		20
HD404T3MG...SR	20.08	28.39		25
HD404T4MG...SR	28.39	40.16		40
HD404TxI...SR				
HD404T1IGAZ...SR	9.05	12.80		10
HD404T2IGAZ...SR	12.80	20.24		20
HD404T3IG...SR	20.24	28.62		25
HD404T4IG...SR	28.62	40.48		40

\* maximum speed measurable with the factory default values: K = 1.0; T = 16.0 °C; Patm = 1013.25 mbar; Ps = 0. In SR models, the analog output full scale is configurable.

## Ordering Codes

### HD404T

(models with analog output)

Blank = pressure output  
SR = speed output  
(only G version)

Blank = without LCD  
L = with LCD

Blank = without auto-zero circuit (only HD404T3... and HD404T4...)  
AZ = with auto-zero circuit

D = differential pressure -f.s. ... +f.s.

G = relative pressure with respect to the atmosphere 0...+f.s.

#### Nominal full scale (f.s.)

1P = 100 Pa

1M = 10 mmH<sub>2</sub>O

1I = 0.4" H<sub>2</sub>O

2P = 250 Pa

2M = 25 mmH<sub>2</sub>O

2I = 0.8" H<sub>2</sub>O

3P = 500 Pa

3M = 50 mmH<sub>2</sub>O

3I = 2" H<sub>2</sub>O

4P = 1000 Pa

4M = 100 mmH<sub>2</sub>O

4I = 4" H<sub>2</sub>O

### HD404ST

(models with RS485 Modbus-RTU)

Blank = pressure output  
L = speed output

Blank = without LCD  
AZ = with auto-zero circuit

Blank = without auto-zero circuit (only HD404ST4... and HD404ST5...)

AZ = with auto-zero circuit

#### Nominal full scale (f.s.)

2 = -250 ... +250 Pa

4 = -1000 ... +1000 Pa

5 = -100 ... +100 mbar



All transmitters are supplied with 2 m silicone tube, internal Ø 5 mm / external Ø 8 mm and two plastic fittings (HD434T.5).

#### Further accessories

RS27	RS232 null-modem serial connection cable with SubD 9-pin connector on the PC side and 3-pole connector on the instrument side.
CP27	Connection cable with built-in USB/RS232 converter. USB connector on the PC side and 3-pole connector on the instrument side.
RS48	Cable for RS485 connection with built-in USB/RS485 converter. The cable has USB connector for PC and 3 separate wires for the instruments.
AP3719	Flow port for square or cylindrical duct. Supplied with two pieces of silicone tube internal Ø 4 mm / external Ø 6 mm, length 1 m.
AP3721	Plastic flow port for cylindrical duct. Supplied with two pieces of silicone tube, internal Ø 4 mm / external Ø 6 mm, length 1 m.
PW	K thermocouple extension cable. Length 2 m, miniature connector. For Pitot tubes with K thermocouple sensor.



In order to ensure the quality of our instruments, we are constantly re-evaluating our products. Improvements can imply changes in specification; we advise you to always check our website for the newest version of our documentation.

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