VD 500 - Flow sensor for wet compressed air

For measuring immediately downstream of the compressor in moist air up to 356 °F

FIELD OF APPLICATION:

- Measurement immediately downstream of the compressor
- Measurement at high temperatures

Benefits at a glance:

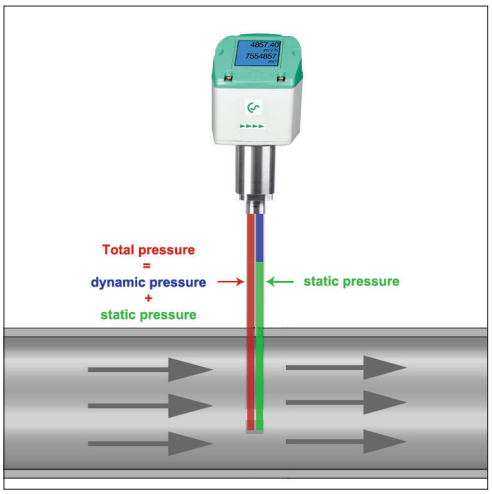
- New: Unique sensitivity in the lower measuring range: Measures from as little as 2 m/s and thus covers the complete operating range of variable speed drive (VSD) compressors
- Particularly suitable for extremely high flow rates
- Flow, total consumption, temperature and pressure
- Measurement at high temperatures, max. temperature 356 °F
- Can be used in pipes from 3/4" to 24"
- Installation via 1/2″ ball valve under pressure

Typical applications:

- Measurement of the capacity of compressors
- Compressed air audits
- Efficiency measurement of compressed air systems

Installation requirements:

- After functioning water separator
- In horizontal lines (recommended) or in risers



The integrated, precise differential pressure sensor measures the differential pressure/dynamic pressure at the sensor tip. The pressure depends on the respective gas velocity. The flow is therefore easy to determine by means of the pipe diameter.

The additional measurement of temperature and absolute pressure and calculation of the relevant density means that measuring can be carried out for various gases, a wide variety of temperatures and pressures.

TECHNICAL DATA VD 500	
Measuring range:	6.56 ft/s up to 735 ft/s / 196 ft/s (Compressed air) 0.04 to 500 mbar Differential pressure for gases
Measured medium:	Air, non-aggressive gases
Accuracy: **(m.v.: of meas. value)**	± 1.5% of m.v.
Measuring principle:	Differential pressure
Measuring span:	1:100
Response time:	t 99: < 1 sec.
Temperature of the medium:	-22 °…356 °F
Operating pressure:	-14.5...+435 psi (g)
Ambient temperature:	-4…158 °F
Power supply:	18…36 VDC, 5 W
Signal outputs:	As standard: RS 485 (Modbus-RTU), 4…20 mA, pulse **Optional**: Ethernet Interface (PoE), M-Bus

Example order code VD 500:

0690 5001_A1_B1_C1_D1_E1_G1_J1_K1_M1

Measuring range	
A1	735 ft/s
A2	1967 ft/s
A3	0.04 - 500 mbar Differential pressure (gases)

Screw-in thread	
B1	G 1/2″
B2	1/2″ NPT male thread
B3	PT 1/2″

Installation length / shaft length	
C1	220 mm
C2	400 mm

Display	
D1	with integrated display

Signal outputs / bus connection option	
E1	2x 4…20 mA analog output (electrically not isolated), pulse output, RS 485 (Modbus-RTU)
E2	Ethernet interface (Modbus/TCP), 1 x 4…20 mA analog output (not electrically isolated), RS 485 (Modbus-RTU)
E3	Ethernet interface PoE (Power over Ethernet) (Modbus/TCP), 1 x 4…20 mA analog output (not electrically isolated), RS 485 (Modbus-RTU)
E4	M-Bus, 1 x 4…20 mA analog output (not electrically isolated), RS 485 (Modbus-RTU)

Reference standard	
G1	20 °C, 1000 mbar
G2	0 °C, 1013,25 mbar
G3	15 °C, 981 mbar
G4	15 °C, 1013,25 mbar

Calibration	
J1	No real gas calibration - Adjustment of gas type via gas constant
J2	Real gas calibration in selected gas type

Gas type	
K1	Compressed air
K2	Nitrogen (N2)
K3	Argon (Ar)
K4	Carbon dioxide (CO2)
K5	Oxygen (O2)
K6	Nitrous oxide (N2O)
K7	Natural gas (NG)
K8	Helium (He)
K9	Propane (C3H8)
K10	Methane (CH4)
K11	Biogas (Methane 50%: CO2 50%)
K12	Hydrogen (H2)
K90	Further gas / please indicate gas type (on request)
K91	Gas mixture / please indicate mixture ratio (on request)

Max. pressure	
M1	435.1 psi (g)
M3	29.0 psi (g)
M4	145.0 psi (g)

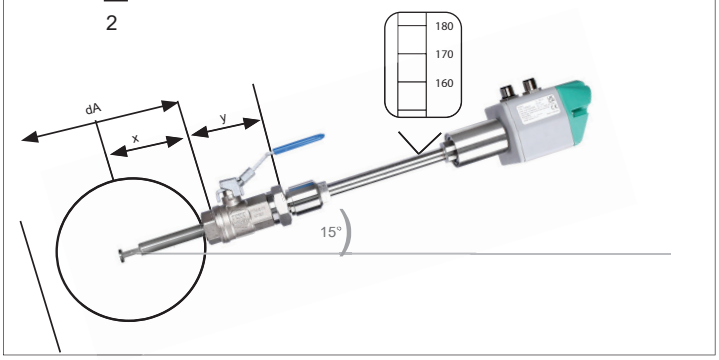
DESCRIPTION	ORDER NO.
VD 500 flow sensor for wet compressed air	0690 5001 + Order code A_...K_
Accessories:	
ISO calibration certificate	3200 0001
High-pressure protection	0530 2205

Configuration see page 103

Simple installation and removal under pressure

Installation depth = x + y
dA = outer diameter
$x = \frac{dA}{2}$

Engraved depth scale for precise installation



Recommended installation position

Flow measuring ranges VD 500 (ISO 1217:1000 mbar, 20 °C)		
Inside diameter of pipe	**VD 500** 6.56 … 735 ft/s	
	Measuring range initial values and full scale	
Inch	**m³/h**	**cfm**
3/4″	2 … 215	1.2 … 127
1″	3.2 … 357	1.9 … 210
1 1/4″	5.7 … 644	3.4 … 379
1 1/2″	8 … 886	4.7 … 522
2″	13 … 1450	8 … 853
2 1/2″	23 … 2484	13 … 1462
3″	31 … 3440	18 … 2025
4″	57 … 6391	34 … 3762
5″	85 … 9453	50 … 5564
6″	120 … 13436	71 … 7908
8″	190 … 21230	112 … 12495
10″	296 … 33211	175 … 19547
12″	428 … 47881	252 … 28182