

VD 500 - Flow meter for compressed air and gases

Special features:

- Including temperature measurement, optional: pressure measurement
- RS 485 interface, Modbus-RTU as standard
- Integrated display for m³/h and m³
- Applicable from 1/2" to DN 1000
- Easy installation under pressure
- 4...20 mA analog output for m³/h or m³/min
- Pulse output for m³ or M-Bus (optional)
- Inner diameter adjustable by means of keys
- Flow meter can be reset
- Adjustable by means of keypad on the display: Reference conditions, °C and mbar, 4...20 mA scaling, pulse weight



NEW: Integrated pressure sensor (optional)

Bewegliches Montagegewinde G 1/2"

Sicherungsring Ø 11,7 mm



Inner diameter adjustable via keypad



Option:

Bi-directional measurement. Blue or green arrows in the display indicate the direction of flow. A meter reading is available for each flow direction.



The sensor can be removed during operation and cleaned if necessary.

TECHNICAL DATA VA 500

Parameters:	m ³ /h, CFM (1000 mbar, 20 °C) in case of compressed air or Nm ³ /h, NI/min (1013 mbar, 0 °C) in case of gases
Units adjustable via keys at display:	m ³ /h, m ³ /min, CFM, l/s, ft/min, cfm, m/s, kg/h, kg/min, g/s, lb/min, lb/h
Adjustable via keypad:	Diameter for volume flow calculation, counter resettable
Sensor:	Thermal mass flow sensor
Measured medium:	Air, gases
Gas types are adjustable over CS service software or CS data logger:	Air, nitrogen, argon, CO ₂ , oxygen, vacuum
Measuring range:	See table page 12
Accuracy: (m.v.: of meas. value) (f.s.: of full scale)	± 1.5% of m.v. ± 0.3 % of f.s. on request: ± 1% of m.v. ± 0.3% of f.s.
Operating temperature:	-22...230 °F sensor tube -4...185 °C with pressur sensor -4...158 °F housing
Operating pressure:	-14.5...725 psi (for pressure > 145 psi - order additional high-pressure protection)
Digital output:	RS 485 interface, (Modbus-RTU), optional: Ethernet interface PoE, M-Bus
Analog output:	4...20 mA for CFM
Pulse output:	1 pulse per CF or per litre electrically isolated. Pulse weight can be set on the display. Alternatively, the pulse output can be used as an alarm
Supply:	18...36 VDC, 5 W
Burden:	< 500 Ω
Housing:	Polycarbonate (IP 65)
Sensor tube:	Stainless steel, 1.4301, Installation length 8.6 inch, Ø 0.3 Inch
Mounting thread:	1/2" NPT male thread
Ø housing:	2.5 inch
Mounting position:	any

VD 500 - Flow meter

Example order code VA 500:

0695 5001_B1_C1_D1_E1_F1_H1_J1_K1_L1_M1_N1_O1_P1_R1_Y1

Measuring range (see table page 114 to 117)	
B1	Standard version (304 ft/s)
B2	Max version (607 ft/s)
B3	High-Speed version (735 ft/s)
B4	Low-Speed version (164 ft/s)

Screw-in thread	
C1	G 1/2" male thread
C2	1/2" NPT male thread
C3	PT 1/2" male thread

Installation length / shaft length	
D1	220 mm
D2	120 mm
D3	160 mm
D4	300 mm
D5	400 mm
D6	500 mm
D7	600 mm
D8	700 mm

Display option	
E1	with integrated display
E2	without display

Signal outputs / bus connection option	
F8	M-Bus, 1 x 4...20 mA analog output (not electrically isolated), RS 485 (Modbus-RTU)
F9	1 units 4...20 mA analog output (electrically isolated), pulse output, RS 485 (Modbus-RTU)
F10	Ethernet interface (Modbus / TCP), 1 x 4...20 mA analog output (not electrically isolated), RS 485 (Modbus-RTU)

Signal outputs / bus connection option	
F11	Ethernet interface PoE (Power over Ethernet) (Modbus/ TCP), 1 x 4...20 mA analog output (not electrically isolated), RS 485 (Modbus-RTU)

Surface condition	
H1	standard version
H2	special cleaning - oil and grease free (e.g. for oxygen applications and so on)
H3	Silicone-free version including special cleaning oil- and grease-free

Adjustment / calibration	
J1	No real gas adjustment - gas type configuration per gas constant
J2	Real gas adjustment in the gas type selected below

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) (real gas adjustment J2 required)
K9	Propane (C3H8) (real gas adjustment J2 required)
K10	Methane (CH4)
K12	Further gas/ please indicate gas type (on request)
K13	Gas mixture / please indicate mixture ratio (on request)

Reference standard	
L1	68 °F, 14.5 psi
L2	32 °F, 14.7 psi
L3	59 °F, 14.2 psi
L4	59 °F, 14.7 psi

Accuracy class	
M1	± 1.5% of the measured value ± 0.3% f.s. (standard)
M2	± 1% of the measured value ± 0.3% f.s. (precision)

Approvals	
M1	Non-explosive area - no approval

Bi-directional measurement	
O1	without
O2	with 2 x 4...20 mA analog, pulse Above omitted with Ethernet and M-Bus.

Maximum pressure (more than 10 bar high-pressure protection required!)	
P1	725 psi
P2	232 psi

Special measuring range	
R1	Special measuring range (please specify when placing order)

Option pressure measurement (only with: D1, D4, K1, K2, K3, H1, O1, P2)	
Y1	without pressure sensor
Y2	with integrated pressure sensor 0...232 psi(g) (Output only via digital interfaces)
Y3	with integrated pressure sensor 0,16...29,0 psi (abs), for vacuum applications (output only via digital interfaces)

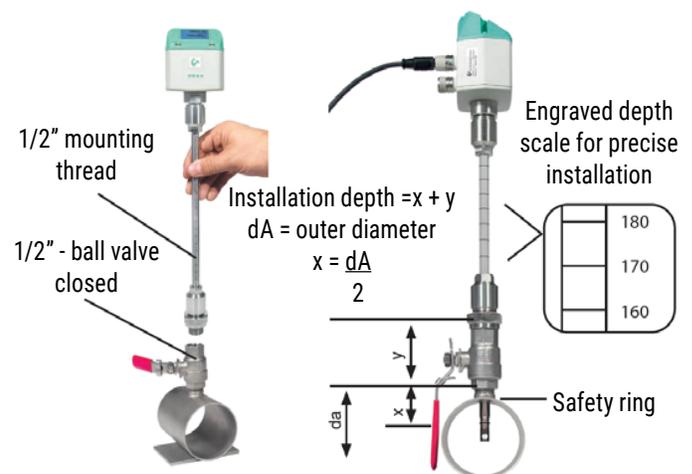
DESCRIPTION	ORDER NO.
High-pressure protection recommended for installation from 10 to 50 bar (for VA 400/500)	See page 105
ISO calibration certificate (5 calibration points) for VA sensors	3200 0001
Additional calibration curve stored in the sensor	Z695 5011
Certificate of origin	Z695 5012

For further accessories refer to pages 106 to 110

Simple installation and removal under pressure

1) Even under pressure, the flow probe VA 500 is mounted by means of a standard 1/2" ball valve. During mounting and dismantling the safety ring avoids an uncontrolled ejection of the probe which may be caused by the operating pressure. For the mounting into different pipe diameters, VA 500 is available in the following probe lengths: 4.72, 6.30, 8.66, 11.81, 15.75 inches, (longer probes available on request).

The flow probes are therefore suitable for being mounted into existing pipes with diameters of 1/2" to DN 300 upwards. The exact positioning of the sensor in the middle of the pipe is granted by means of the engraved depth scale. The maximum mounting depth corresponds to the respective probe length. (Probe length 8.66 inch = 220 mm maximum mounting depth).



2) If there is no suitable measuring site with 1/2" ball valve, there are two easy ways to set up a measuring site:

- A Weld on a 1/2" screw neck and screw on a 1/2" ball valve
- B Mount spot drilling collar incl. ball valve (see accessories).

By means of the drilling jig, it is possible to drill under pressure through the 1/2" ball valve into the existing pipe. The drilling chips are collected in a filter. Then install the probe as described under 1).

3) Due to the large measuring range of the probe even extreme requirements to the consumption measurement (high volume flow in small pipe diameters) can be met.

The measuring range is depending on the pipe diameter - see table on the right hand side.



A Screw neck



B Spot drilling collars



Drill under pressure with the CS drilling jig

Flow measuring ranges VA 500 for compressed air (ISO 1217: 1000 mbar, 20 °C)
Measuring ranges for other types of gas see pages 114 to 117

Inside diameter of pipe		VA 500 Standard (304 ft/s)		VA 500 Max. (607 ft/s)		VA 500 High-Speed (735 ft/s)	
Inch	mm	Measuring range full scale		Measuring range full scale		Measuring range full scale	
		m ³ /h	(cfm)	m ³ /h	(cfm)	m ³ /h	(cfm)
1/2"	16.1	759 l/min	26	1516 l/min	53	1836 l/min	64
3/4"	21.7	89 m3/h	52	177 m3/h	104	215 m3/h	126
1"	27.3	148 m3/h	86	294 m3/h	173	356 m3/h	210
1 1/4"	36.0	266 m3/h	156	531 m3/h	312	643 m3/h	378
1 1/2"	41.9	366 m3/h	215	732 m3/h	430	886 m3/h	521
2"	53.1	600 m3/h	353	1197 m3/h	704	1450 m3/h	853
2 1/2"	68.9	1028 m3/h	604	2051 m3/h	1207	2484 m3/h	1461
3"	80.9	1424 m3/h	838	2842 m3/h	1672	3441 m3/h	2025
4"	110.0	2644 m3/h	1556	5278 m3/h	3106	6391 m3/h	3761
5"	133.7	3912 m3/h	2302	7808 m3/h	4594	9453 m3/h	5563
6"	159.3	5560 m3/h	3272	11096 m3/h	6530	13436 m3/h	7907
8"	200.0	8785 m3/h	5170	17533 m3/h	10318	21229 m3/h	12493
10"	250.0	13744 m3/h	8088	27428 m3/h	16141	33211 m3/h	19544
12"	300.0	19814 m3/h	11661	39544 m3/h	23271	47880 m3/h	28177

Note



A series of horizontal dotted lines for taking notes.