



## VA 500 - Flow meter for compressed air and gases

**NEW:** Integrated pressure sensor (optional)

Moveable mounting thread NPT 1/2" G 1/2"

Snap ring Ø 11.7 mm



### Special features:

- **NEW:** Optional with IO-Link interface
- Including temperature measurement, optional: pressure measurement
- RS 485 interface, Modbus-RTU as standard
- Integrated display for CFH and CF
- Applicable from 1/2" to 40"
- Easy installation under pressure
- 4...20 mA analog output for CFH or CF
- Pulse output for CF or M-Bus (optional)
- Inner diameter adjustable
- Flow meter can be reset
- Adjustable via keypad: Reference conditions, °F and mbar, 4...20 mA scaling, pulse weight

### TECHNICAL DATA VA 500

<b>Parameters:</b>	m <sup>3</sup> /h, CFM (1000 mbar, 20 °C) in case of compressed air or Nm <sup>3</sup> /h, NI/min (1013 mbar, 0 °C) in case of gases
<b>Units adjustable via keys at display:</b>	m <sup>3</sup> /h, m <sup>3</sup> /min, CFM, l/s, ft <sup>3</sup> /min, cfm, m/s, kg/h, kg/min, g/s, lb/min, lb/h
<b>Adjustable via keypad:</b>	Diameter for volume flow calculation, counter resettable
<b>Sensor:</b>	Thermal mass flow sensor
<b>Measured medium:</b>	Air, gases
<b>Gas types are adjustable over CS service software or CS data logger:</b>	Air, nitrogen, argon, CO <sub>2</sub> , oxygen, vacuum
<b>Measuring range:</b>	See table page 94
<b>Accuracy: (m.v.: of meas. value) (f.s.: of full scale)</b>	± 1.5% of m.v. ± 0.3 % of f.s. on request: ± 1% of m.v. ± 0.3% of f.s.
<b>Operating temperature:</b>	-22...+230 °F sensor tube -4...+185 °F with pressure sensor -4...+158 °F housing
<b>Operating pressure:</b>	-14.5...725 psi (for pressure > 145 psi - order additional high-pressure protection)
<b>Digital output:</b>	RS 485 interface, (Modbus-RTU), optional: Ethernet interface Modbus TCP / Modbus PoE, M-Bus, IO-Link
<b>Analog output:</b>	4...20 mA for CFM
<b>Pulse output:</b>	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
<b>Supply:</b>	18...36 VDC, 5 W
<b>Burden:</b>	< 500 Ω
<b>Housing:</b>	Polycarbonate (IP 65)
<b>Sensor tube:</b>	Stainless steel, 1.4301, Installation length 8.6 inch, Ø 0.3 Inch
<b>Mounting thread:</b>	1/2" NPT male thread (Optional G 1/2")
<b>Ø housing:</b>	2.5 inch
<b>Mounting position:</b>	any



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.



## VA 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 134 to 137)	
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	NPT 1/2" 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)
F11	Ethernet interface PoE (Power over Ethernet) (Modbus/TCP), 1 x 4...20 mA analog output (not electrically isolated), RS 485 (Modbus-RTU)
F12	IO-Link, 1 x 4...20 mA analog output (not galvanically isolated), RS 485 (Modbus RTU), pulse output not applicable
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 <b>J2</b> required)
K9	Propane (C3H8) (real gas adjustment <b>J2</b> 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	20 °C, 1000 mbar
L2	0 °C, 1013,25 mbar
L3	15 °C, 981 mbar
L4	15 °C, 1013,25 mbar

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	
N1	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	50 bar (725 psi) (only with Y1)
P2	16 bar (232 psi) (only with Y2)

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

Option pressure measurement (only with: D1, D4, D5, D6, 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 117
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 126 to 130



## 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.

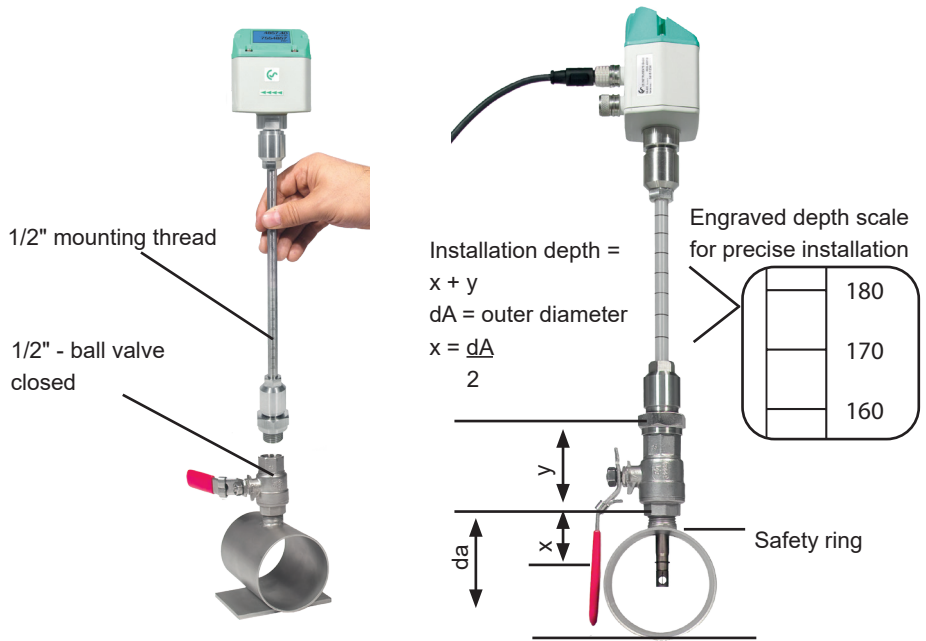
During mounting and dismounting the safety ring avoids an uncontrolled ejection of the probe which may be caused by the operating pressure.

For the mounting into different pipe diameters, VA 500 is available in the following probe lengths: 120mm, 160mm, 220mm, 300mm, 400mm, (longer probes available on request).

The flow probes are therefore suitable to be mounted into existing pipes with diameters of 12" and upwards.

The exact positioning of the sensor in the middle of the pipe is possible by means of the engraved depth scale.

The maximum mounting depth corresponds to the respective probe length. (Probe length 220mm = 220m maximum mounting depth).

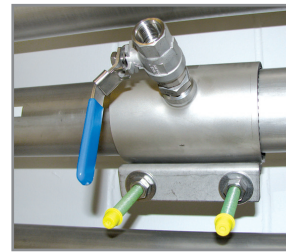


2) If there is no suitable measuring site with 1/2" ball valve, there are two easy ways to set up a measuring site:

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



**A** Welded Nipple



**B** Spot drilling collars



Drill under pressure with the CS drilling jig

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 dependent on the pipe diameter - see table on the right hand side.

Flow measuring ranges VA 500 for compressed air (ISO 1217: 1000 mbar, 20 °C)							
Measuring ranges for other types of gas see pages 134 to 137							
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 <sup>3</sup> /h	(cfm)	m <sup>3</sup> /h	(cfm)	m <sup>3</sup> /h	(cfm)
1/2"	16.1	759 l/min	26	1516 l/min	53	1836 l/min	64
3/4"	21.7	89 m <sup>3</sup> /h	52	177 m <sup>3</sup> /h	104	215 m <sup>3</sup> /h	126
1"	27.3	148 m <sup>3</sup> /h	86	294 m <sup>3</sup> /h	173	356 m <sup>3</sup> /h	210
1 1/4"	36.0	266 m <sup>3</sup> /h	156	531 m <sup>3</sup> /h	312	643 m <sup>3</sup> /h	378
1 1/2"	41.9	366 m <sup>3</sup> /h	215	732 m <sup>3</sup> /h	430	886 m <sup>3</sup> /h	521
2"	53.1	600 m <sup>3</sup> /h	353	1197 m <sup>3</sup> /h	704	1450 m <sup>3</sup> /h	853
2 1/2"	68.9	1028 m <sup>3</sup> /h	604	2051 m <sup>3</sup> /h	1207	2484 m <sup>3</sup> /h	1461
3"	80.9	1424 m <sup>3</sup> /h	838	2842 m <sup>3</sup> /h	1672	3441 m <sup>3</sup> /h	2025
4"	110.0	2644 m <sup>3</sup> /h	1556	5278 m <sup>3</sup> /h	3106	6391 m <sup>3</sup> /h	3761
5"	133.7	3912 m <sup>3</sup> /h	2302	7808 m <sup>3</sup> /h	4594	9453 m <sup>3</sup> /h	5563
6"	159.3	5560 m <sup>3</sup> /h	3272	11096 m <sup>3</sup> /h	6530	13436 m <sup>3</sup> /h	7907
8"	200.0	8785 m <sup>3</sup> /h	5170	17533 m <sup>3</sup> /h	10318	21229 m <sup>3</sup> /h	12493
10"	250.0	13744 m <sup>3</sup> /h	8088	27428 m <sup>3</sup> /h	16141	33211 m <sup>3</sup> /h	19544
12"	300.0	19814 m <sup>3</sup> /h	11661	39544 m <sup>3</sup> /h	23271	47880 m <sup>3</sup> /h	28177