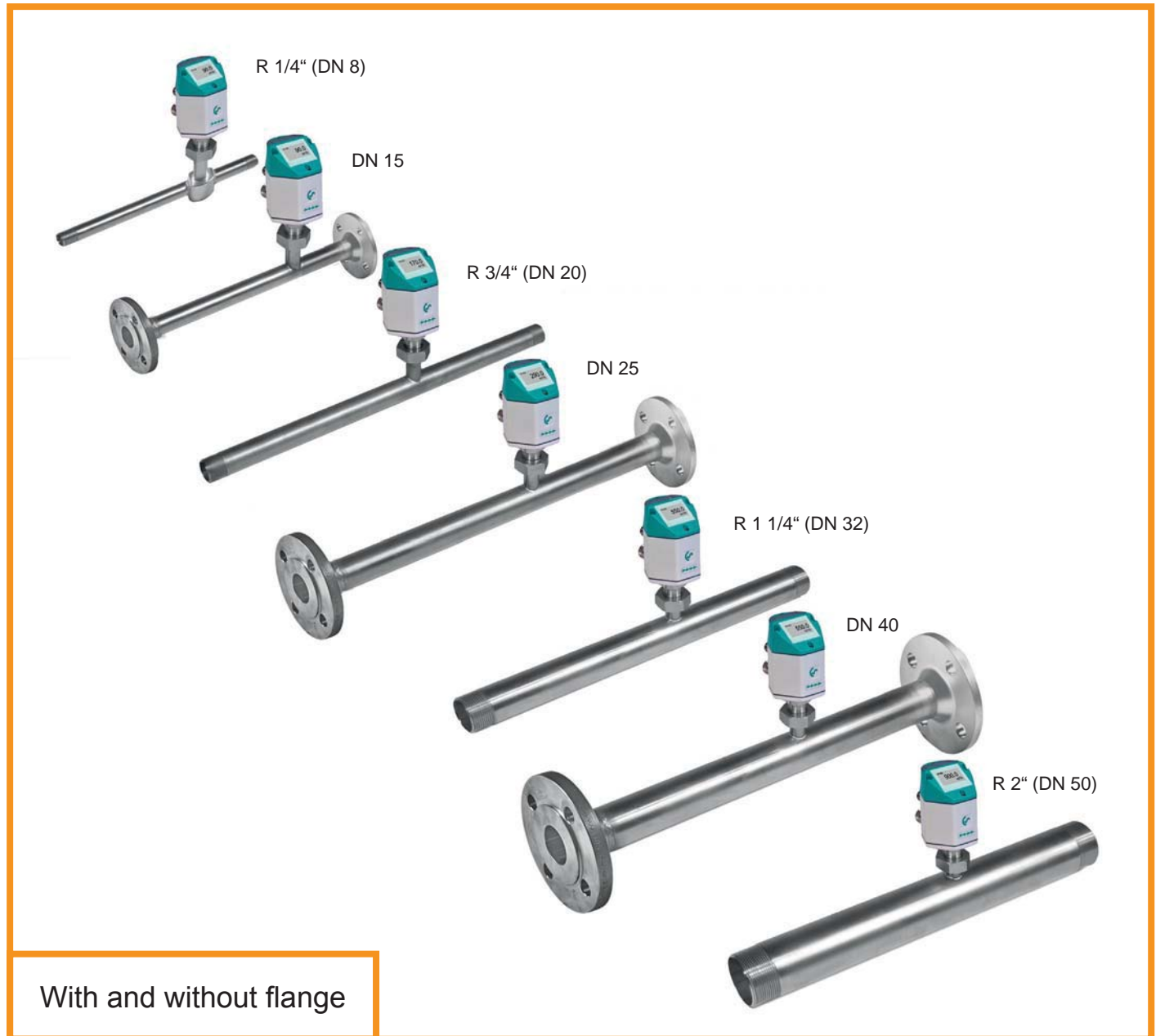




VA 420

The affordable flow meter for compressed air and gases



Intelligent solutions for accurate flow measurement for compressed air and gases

The new affordable flow meters VA 420 work according to the approved calorimetric measuring principle. In this process a heated sensor is cooled down by the gas circulating around it. The flow dependent cooling-down

is used as a measuring effect while the degree of cooling-down is directly depending on the passing air resp. gas mass. Therefore, an additional pressure and temperature compensation is not necessary.

Due to its compact design it is possible to monitor all compressed air systems from the compressor to the smallest compressed air tool (1/4" to 2 inch) with the affordable flow meter VA 420. VA 400 flow sensors are available for larger pipe diameters from DN 50 to

DN 300. Apart from compressed air also other gases like e.g. nitrogen, oxygen and CO₂ can be measured.

The installation of the compressed air flow meter VA 420 can be done easily and quickly. A special advantage is the removable measuring device. The measuring device can be demounted quickly and easily for calibration or cleaning purposes without removing the complete measuring section.

Removal of the measuring device without complete dismounting of the measuring section



In most cases the compressed air is not free from oil, condensate, dirt and particles. In the course of time this leads to a soiling of the flow meters which may cause errors in mea-

surement or even a total breakdown. The flow meters which have been on the market up to now generally cannot be cleaned and will be exchanged if they are soiled. In case

of compressed air meters with integrated measuring section the „measuring device“ cannot be removed. For this reason an expensive bypass line is necessary.

The design of **VA 420** enables the removal and cleaning of the „measuring device“ with e.g. soap water without any dismounting of the measuring section. A closing cap grants a continuous use of the line for the duration of the cleaning. A bypass line is not necessary. The alignment pin grants an accurate installation of the measuring device.

2 Stationary use



For stationary use there are the following outputs available for the data transfer to a building management system or PLC:

4...20 mA for actual flow.

Pulse output (galvanically separated) for the total consumption.

3 Mobile use



By means of quick couplings the flow meter can be integrated quickly into the feed hose of a machine. During the shutdown of the machine it is possible to determine the leak rate, the actual flow can be obtained when the machine is running. The power supply is effected via the power socket by means of the mains unit. For data recording over a longer period of time we recommend to use the compressed air analyzer DS 400 mobile

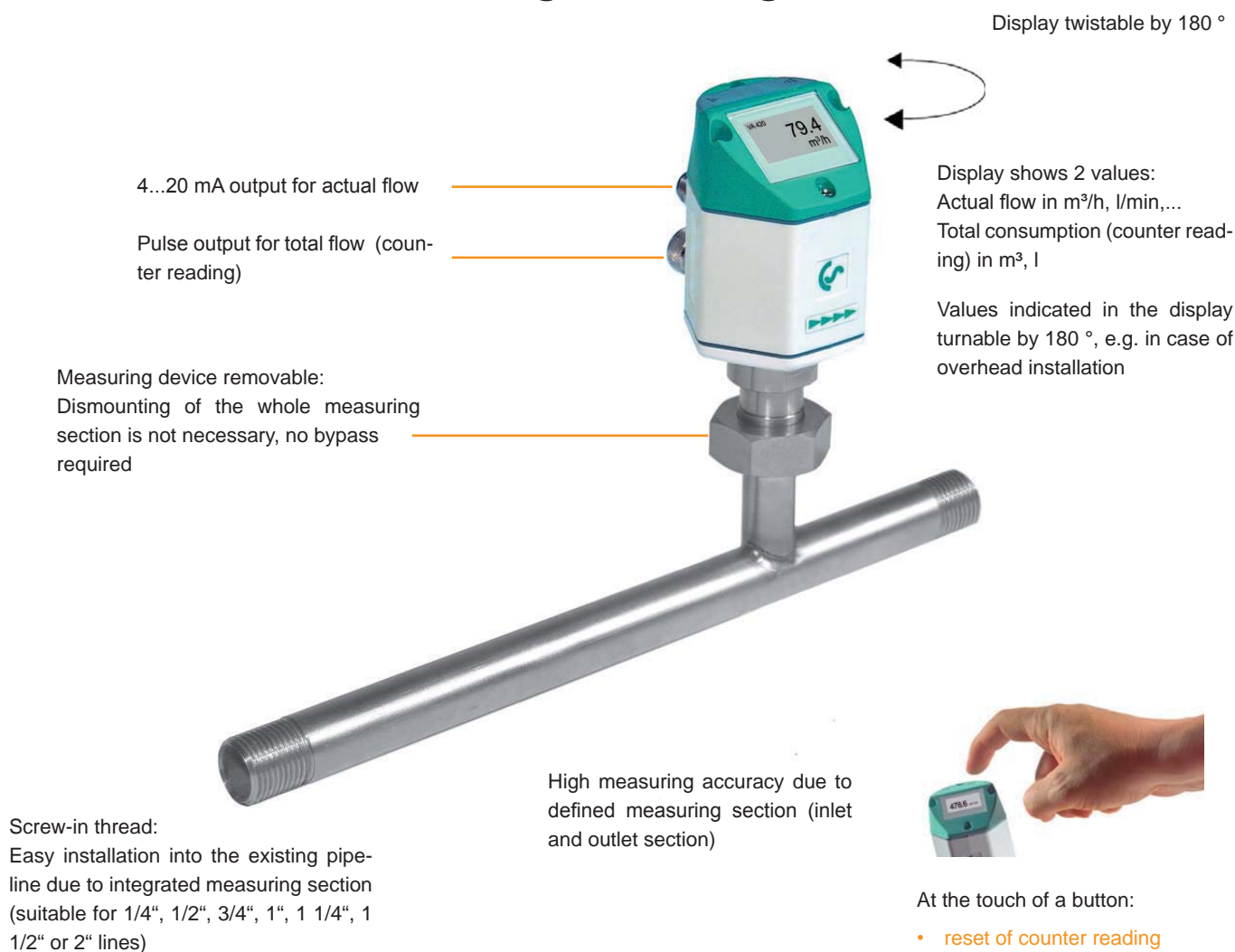
4 Solution for large pipe diameters



The approved flow sensor VA 400 is available for pipe diameters of 2" to DN 300. Its constructively sophisticated design enables the installation into pipes with nominal diameters up to DN 300 even under pressure. The installation is effected by means of standard 1/2" ball valve.



VA 420 - The advantages at a glance

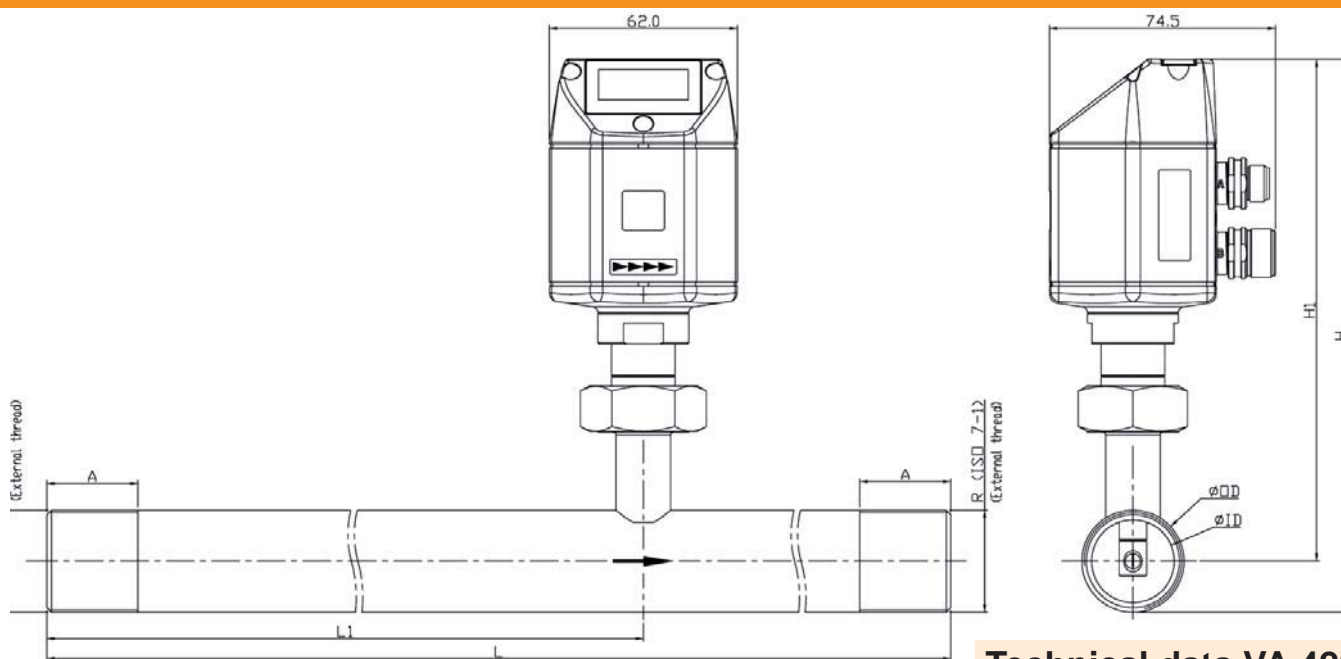


Application-technological features of the flow meters VA 420:

- Easy and affordable installation
- Units freely selectable via keypad m^3/h , m^3/min , l/min , l/s , kg/h , kg/min , kg/s , cfm
- Compressed air counter up to 1,999,999,999 m^3 , Resetable to „zero“ via keypad
- Analogue output 4...20 mA, pulse output (galvanically separated)
- High measuring accuracy also in the lower measuring range (ideal for leakage measurement)
- Negligibly small loss of pressure
- Calorimetric measuring principle, no additional pressure and temperature measurement necessary, no mechanically moved parts
- Gas types adjustable via software (nitrogen, oxygen, CO_2 , nitrous oxide, argon)

Application range of VA 420:

- Compressed air balancing, compressed air consumption measurement
- Leakage air / leak rate determination
- Mobile compressed air measurement in front of single machines / plants
- Flow measurement of process gases like e.g. nitrogen, CO_2 , oxygen, argon, nitrous oxide
- Flow measurement at nitrogen generators



Flow measuring ranges VA 420 for compressed air (ISO 1217:1000 mbar, 20 °C)

Connection thread	Outer pipe dia. mm	Inner pipe dia. mm	Measuring range from to		L mm	L1 mm	H mm	H1 mm	A mm
R 1/4"	13.7	8.9	0.8	90 l/min	194	137	174.7	165.7	15
R 1/2"	21.3	16.1	0.2	90 m³/h	300	210	176.4	165.7	20
R 3/4"	26.9	21.7	0.3	170 m³/h	475	275	179.2	165.7	20
R 1"	33.7	27.3	0.5	290 m³/h	475	275	182.6	165.7	25
R 1 1/4"	42.4	36.0	0.7	480 m³/h	475	275	186.9	165.7	25
R 1 1/2"	48.3	41.9	1.0	550 m³/h	475*	275	186.9	165.7	25
R 2"	60.3	53.1	2.0	900 m³/h	475*	275	195.9	165.7	30

*Attention: Shortened inlet section! Please observe the recommended minimum inlet section (length = 10 x inner diameter) on site

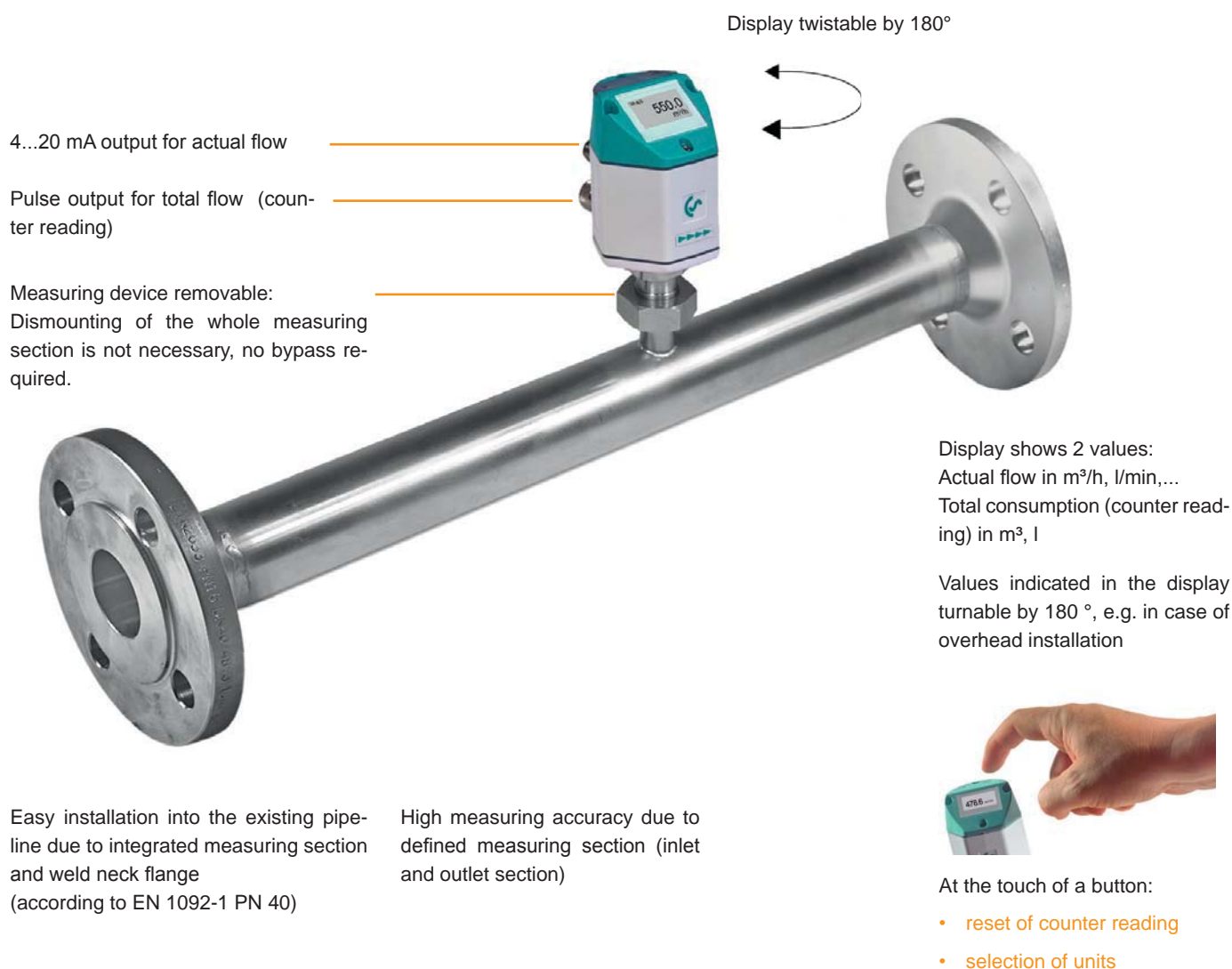
Technical data VA 420

Parameters:	m³/h, l/min (1000 mbar, 20°C) in case of compressed air resp. Nm³/h, NI/min (1013 mbar, 0°C) in case of gases
Adjustable via keypad:	m³/h, m³/min, l/min, l/s, ft/min, cfm, m/s, kg/h, kg/min
Meas. principle:	calorimetric measurement
Sensor:	2 x silicium chip
Meas. medium:	air, gases
Gas types adjustable via software:	air, nitrogen, argon, nitrous oxide, CO2, oxygen
Meas. range:	see table at the left
Accuracy:	± 1.5% of m.v., ± 0.05% of f.s. On request: Special calibration via 5 point ISO calibration certificate
Operating temp.:	-30...80 °C
Operating press.:	up to 16 bar Optional up to PN 40
Analogue output:	4...20 mA for m³/h resp. l/min
Pulse output:	1 pulse per m³ resp. per liter galvanically separated
PC connection:	SDI interface
Power supply:	24 VDC smoothed ± 15 %
Burden:	< 500 Ω
Housing:	polycarbonate
Meas. section:	stainless steel, 1.4301 or 1.4404
Mounting thread meas. section:	R 1/4", R 1/2", R 3/4", R 1", R 1 1/4", R 1 1/2", R 2" external thread

Description	Order No. Stainless steel 1.4404	Order No. Stainless steel 1.4301
VA 420 flow meter with integrated 1/4" measuring section	0695 1420	0695 0420
VA 420 flow meter with integrated 1/2" measuring section	0695 1421	0695 0421
VA 420 flow meter with integrated 3/4" measuring section	0695 1422	0695 0422
VA 420 flow meter with integrated 1" measuring section	0695 1423	0695 0423
VA 420 flow meter with integrated 1 1/4" measuring section	0695 1426	0695 0426
VA 420 flow meter with integrated 1 1/2" measuring section	0695 1424	0695 0424
VA 420 flow meter with integrated 2" measuring section	0695 1425	0695 0425
Option High-pressure version PN 40		Z695 0411
Special measuring range VA 420 according to customer's requirements		Z695 4006
Connection cables:		
Connection cable 5 m (power supply, analogue output)		0553 0104
Connection cable 10 m (power supply, analogue output)		0553 0105
Pulse cable for flow sensors with M12 plug, length 5 m		0553 0106
Pulse cable for flow sensors with M12 plug, length 10 m		0553 0107
Further accessories:		
Closing cap for meas. section VA 420 (Material: Aluminium)		0190 0001
Closing cap for meas. section VA 420 (Material: Stainless steel 1.4404)		0190 0002
CS Service Software for FA/VA 400 sensors incl. PC connection set, USB interface and interface adapter to the sensor		0554 2005
Mains unit in wall housing 100-240 V, 10 VA, 50-60 Hz/24 VDC, 0.35 A		0554 0108
Mains unit 100-240 VAC / 24 VDC, 0.35 A for VA/FA 400 Series, 2 m cable		0554 0107
5 point precision calibration with ISO certificate		3200 0001



VA 420 - The advantages at a glance



4...20 mA output for actual flow

Pulse output for total flow (counter reading)

Measuring device removable:
Dismounting of the whole measuring section is not necessary, no bypass required.

Display twistable by 180°

Display shows 2 values:
Actual flow in m³/h, l/min,...
Total consumption (counter reading) in m³, l

Values indicated in the display turnable by 180 °, e.g. in case of overhead installation

Easy installation into the existing pipeline due to integrated measuring section and weld neck flange (according to EN 1092-1 PN 40)

High measuring accuracy due to defined measuring section (inlet and outlet section)

At the touch of a button:

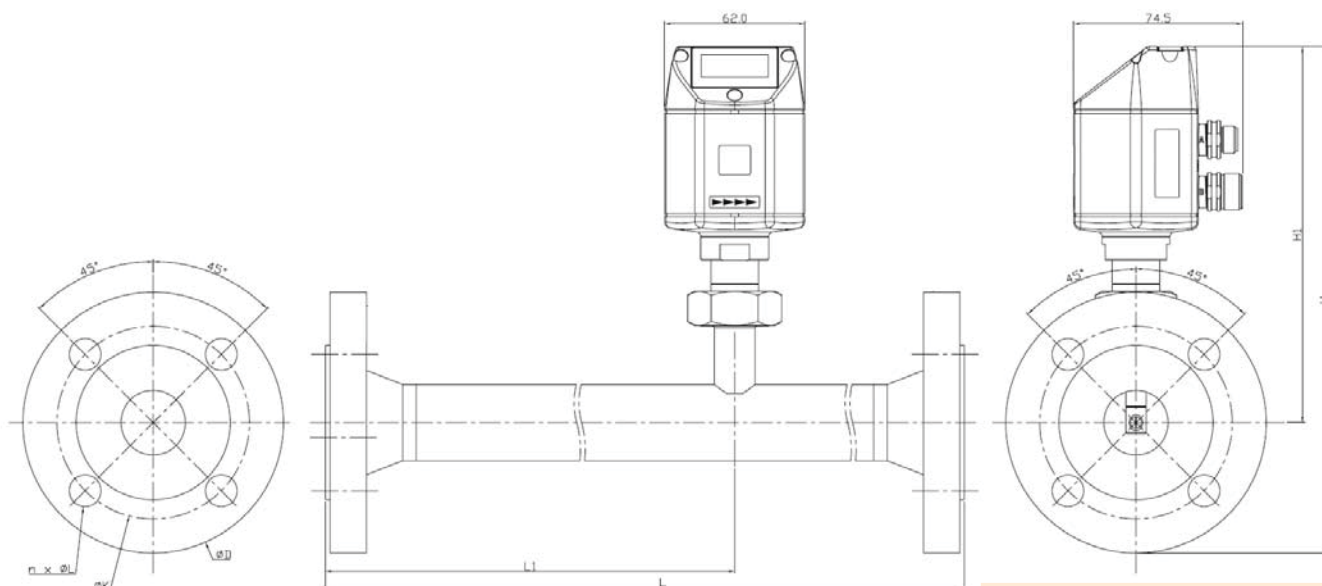
- reset of counter reading
- selection of units

Application-technological features of the flow meters VA 420:

- Easy and affordable installation
- Units freely selectable via keypad m³/h, m³/min, l/min, l/s, kg/h, kg/min, kg/s, cfm
- Compressed air counter up to 1,999,999,999 m³, Resettable to „zero“ via keypad
- Analogue output 4...20 mA, pulse output (galvanically separated)
- High measuring accuracy also in the lower measuring range (ideal for leakage measurement)
- Negligibly small loss of pressure
- Calorimetric measuring principle, no additional pressure and temperature measurement necessary, no mechanically moved parts
- Gas types adjustable via software (nitrogen, oxygen, CO2, nitrous oxide, argon)

Application range of VA 420:

- Compressed air balancing, compressed air consumption measurement
- Leakage air / leak rate determination
- Flow measurement of process gases like e.g. nitrogen, CO2, oxygen, argon, nitrous oxide
- Flow measurement at nitrogen generators



Technical data VA 420

Parameters: m³/h, l/min (1000 mbar, 20°C) in case of compressed air resp. Nm³/h, NI/min (1013 mbar, 0°C) in case of gases

Adjustable via keypad: m³/h, m³/min, l/min, l/s, ft/min, cfm, m/s, kg/h, kg/min

Meas. principle: calorimetric measurement

Sensor: 2 x silicium chip

Meas. medium: air, gases

Gas types adjustable via software: air, nitrogen, argon, nitrous oxide, CO₂, oxygen

Meas. range: see table at the left

Accuracy: ± 1.5% of m.v., ± 0.05% of f.s. On request: Special calibration via 5 point ISO calibration certificate

Operating temp.: -30...80 °C

Operating press.: up to 16 bar
Optional up to PN 40

Analogue output: 4...20 mA for m³/h resp. l/min

Pulse output: 1 pulse per m³ resp. per liter galvanically separated

PC connection: SDI interface

Power supply: 24 VDC smoothed ± 15 %

Burden: < 500 Ω

Housing: polycarbonate

Meas. section: stainless steel, 1.4301 or 1.4404

Flanges: Weld neck flange according to DIN EN 1092-1, Groove-faced and tongue-faced on request

Flow measuring ranges VA 420 for compressed air (ISO 1217:1000 mbar, 20 °C)					Flange DIN EN 1092-1					
Measuring section	Outer pipe dia. mm	Inner pipe dia. mm	Measuring range from to		L mm	L1 mm	H mm	H1 mm	ØD	ØK n x ØL
DN 15	21.3	16.1	0.2	90 m ³ /h	300	210	213.2	165.7	95	65 4 x 14
DN 20	26.9	21.7	0.3	170 m ³ /h	475	275	218.2	165.7	105	75 4 x 14
DN 25	33.7	27.3	0.5	290 m ³ /h	475	275	223.2	165.7	115	85 4 x 14
DN 32	42.4	36.0	0.7	480 m ³ /h	475	275	235.7	165.7	140	100 4 x 18
DN 40	48.3	41.9	1.0	550 m ³ /h	475*	275	240.7	165.7	150	110 4 x 18
DN 50	60.3	53.1	2.0	900 m ³ /h	475*	275	248.2	165.7	165	125 4 x 18

*Attention: Shortened inlet section! Please observe the recommended minimum inlet section (length=10xinner diameter) on site

Description	Order No.
VA 420 flow meter with integrated DN 15 measuring section with weld neck flange	0695 2421
VA 420 flow meter with integrated DN 20 measuring section with weld neck flange	0695 2422
VA 420 flow meter with integrated DN 25 measuring section with weld neck flange	0695 2423
VA 420 flow meter with integrated DN 32 measuring section with weld neck flange	0695 2426
VA 420 flow meter with integrated DN 40 measuring section with weld neck flange	0695 2424
VA 420 flow meter with integrated DN 50 measuring section with weld neck flange	0695 2425
Option High-pressure version PN 40	Z695 0411
Special measuring range VA 420 according to customer's requirements	Z695 4006
Connection cables:	
Connection cable 5 m (power supply, analogue output)	0553 0104
Connection cable 10 m (power supply, analogue output)	0553 0105
Pulse cable for flow sensors with M12 plug, length 5 m	0553 0106
Pulse cable for flow sensors with M12 plug, length 10 m	0553 0107
Further accessories:	
Closing cap for meas. section VA 420 (Material: Aluminium)	0190 0001
Closing cap for meas. section VA 420 (Material: Stainless steel 1.4404)	0190 0002
CS Service Software for FA/VA 400 sensors incl. PC connection set, USB interface and interface adapter to the sensor	0554 2005
Mains unit in wall housing 100-240 V, 10 VA, 50-60 Hz/24 VDC, 0.35 A	0554 0108
Mains unit 100-240 VAC / 24 VDC, 0.35 A for VA/FA 400 Series, 2 m cable	0554 0107
5 point precision calibration with ISO certificate	3200 0001

VA 420

consumption counter with display, 4 ... 20 mA and pulse output (galvanically isolated)

Stationary

Flow and consumption measurement for compressed air and gases



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INTRODUCTION

Dear customer,

Thousands of customers buy our high standard products every year. There are a few good reasons for doing so:

- The cost-performance ratio - reliable quality at a fair price.
- We have the ideal solutions for your measuring tasks based on our expert experience gained over 20 years.
- Our high quality standard.
- Of course, our instruments carry the CE symbol required by the EU.
- We issue calibration certificates and hold seminars.

Our service guarantees fast help.



Measuring instrument conform to **DIN EN 61326-1** and **DIN EN 61010-1**

**Please read carefully before starting the device!**

Warning: Do not exceed the pressure range of 16 bar!

Observe the measuring range of the sensor!

Always observe the direction of flow when positioning the sensor!

The screwed fixture must be pressure tight.

It is absolutely necessary to avoid condensation on the sensor element or water drops in the measuring air as they may cause faulty measuring results.

The manufacturer cannot be held liable for any damage which occurs as a result of non-observance or non-compliance with these instructions. Should the device be tampered with in any manner other than a procedure which is described and specified in the manual, the warranty is cancelled and the manufacturer is exempt from liability.

The device is destined exclusively for the described application.

We offer no guarantee for the suitability for any other purpose and are not liable for errors which may have slipped into this operation manual. We are also not liable for consequential damage resulting from the delivery, capability or use of this device.

We offer you to take back the instruments of the instruments family VA 420 which you would like to dispose of.

Adjustments and calibrations should only be carried out by qualified employees from the measurement and control technology branch.



The consumption sensor VA 420 works according to the calorimetric measuring procedure.

Flammable gases

If this consumption sensor is used for measurement of flammable gases (e. g. natural gas and so on) we expressly would like to point out that the sensor has no DVGW admission, however, it can be used for measurements in natural gas. A DVGW admission is not mandatory.

The consumption sensor corresponds with the current state of technology and basically it can be used in any flammable and non-flammable gases.

If the sensor is used e.g. in the medium natural gas, the sensor will be adjusted for natural gas. The calibration protocol (inspection certificate) will be included in the scope of delivery.

The area outside the pipeline (ambient area of the sensor) must not be an explosive area.

The installation has to be carried out by authorized professionals.

VA 420 is a compact consumption counter for compressed air and gases.

Special features:

- Optimum accuracy due to compact design
- Integrated in- and outlet section
- Less flow due to measuring section
- Integrated display for Nm³/h and Nm³

Programming via Service Software SFA 300

- Analogue output 4...20 mA scalable
- Selection of gas type (air, nitrogen, argon, nitrous oxide, CO₂, oxygen, natural gas)
- Read-out the service data

INSTALLATION DESCRIPTION

The following table shows the required inlet sections depending on the existing disturbance / flow disturbance.

Table of additionally required inlet sections

Flow obstruction in front of the measuring section	Minimum length inlet section (L1)	Minimum length outlet section (L2)
Slight curve (bend < 90°)	12 x D	5 x D
Reduction (pipe narrows towards the meas. section)	15 x D	5 x D
Expansion (pipe expands towards the meas. section)	15 x D	5 x D
90° bend or T-piece	15 x D	5 x D
2 bends á 90° on one level	20 x D	5 x D
2 bends á 90° 3-dimensional change of direction	35 x D	5 x D
Shut-off valve	45 x D	5 x D

The respective minimum values required are indicated here. If it is not possible to observe the stipulated equalising sections, considerable deviations in the measuring results must be expected.

Attention:

The measuring sections of VA 420 consumption counters with 1 1/2" and 2" measuring section have reduced inlet and outlet sections. Please take into consideration the recommended inlet and outlet sections. Dimensions please see page 7 and 8.

TECHNICAL DATA

Parameters:	flow and consumption (Standard: DIN 1945, ISO 1217 at 20°C and 1000 mbar)
Selectable units for flow:	m ³ /h (standard - factory setting), m ³ /min, l/min, l/s, kg/s, kg/min, kg/h, cfm
Measuring principle:	calorimetric measurement
Sensor:	Pt45, Pt1000
Measuring medium:	air, gases
Operating temperature:	-30 ... 80°C
Operating pressure:	up to 16 bar, special version PN 40 (40 bar)
Power supply:	12 to 30 VDC smoothed ± 15%
Power input:	max. 80 mA at 24 VDC
Analogue output:	4...20 mA (see table below), max. burden < 500 Ohm

Order no. stainless steel 1.4404	Order no. stainless steel 1.4301	Description	Analogue output
0695.1420	0695.0420	VA 420 with integrated 1/4" meas. section	4... 20 mA = 0...90 l/min
0695.1421	0695.0421	VA 420 with integrated 1/2" meas. section	4... 20 mA = 0...90 m ³ /h
0695.1422	0695.0422	VA 420 with integrated 3/4" meas. section	4... 20 mA = 0...170 m ³ /h
0695.1423	0695.0423	VA 420 with integrated 1" meas. section	4... 20 mA = 0...290 m ³ /h
0695.1426	0695.0426	VA 420 with integrated 1 1/4" meas. section	4... 20 mA = 0...480 m ³ /h
0695.1424	0695.0424	VA 420 with integrated 1 1/2" meas. section	4... 20 mA = 0...550 m ³ /h
0695.1425	0695.0425	VA 420 with integrated 2" meas. section	4... 20 mA = 0...900 m ³ /h

Pulse output:	1 pulse per m ³ resp. per l, pulse output potential-free max. 30 VDC, 20 mA (pulse length see page 10)
Accuracy:	± 1.5 % m. v., ± 0.05 % f. s.
Display:	Flow in m ³ /h, counter in m ³ Other units selectable via display Flow values max. 6 digits, counter max. 1,999,999,999 m ³ then it drops back to 0

Display operation please see pages 12-15

Mounting thread:	R 1/4", R1/2", R3/4", R1", R 1 1/4", R 1 1/2", R 2" DIN EN 10226 (ISO 7-1)
Material:	Stainless steel 1.4301 / 1.4404 Version with flange DIN EN 1092-1: Stainless steel 1.4404

Flow measuring ranges

Pipe size	Inner pipe Ø	Pipe size	VA 420	Consumption
Inch	mm		Meas. ranges from ... to	Standard setting
1/4"	8.5	DN 8	0,8 ... 90 l/min	l
1/2"	16.1	DN 15	0,2 ... 90 m³/h	m³
3/4"	21.7	DN 20	0,3 ... 170 m³/h	m³
1"	27.3	DN 25	0,5 ... 290 m³/h	m³
1 1/4"	36.8	DN 32	0,7 ... 480 m³/h	m³
1 1/2"	41.8	DN 40	1 ... 550 m³/h	m³
2"	53.1	DN 50	2 ... 900 m³/h	m³

Reference DIN 1945/ ISO 1217: 1000mbar /20°C; Air

MEASURING ENDRANGES FOR DIFFERENT GASES

		1/4"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
		Analogue– output 20mA	Analogue– output 20mA	Analogue– output 20mA	Analogue– output 20mA	Analogue– output 20mA	Analogue– output 20mA	Analogue– output 20mA
		l/min	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]
Reference DIN1945/ ISO 1217: 20°C, 1000 mbar (Reference during calibration)								
Air		90	90	170	290	480	550	900
Adjustment to DIN 1343: 0°C, 1013,25 mbar								
Air		80	80	155	265	440	505	825
Argon	Ar	140	140	265	450	750	855	1400
Carbon dioxide	CO ₂	85	85	165	285	470	540	890
Nitrogen	N ₂	80	80	150	255	425	485	800
Oxygen	O ₂	85	85	160	275	455	520	855
Nitrous oxide	N ₂ O	85	85	165	280	470	535	880
Natural gas	NG	50	50	100	170	280	325	530

Other gases on request

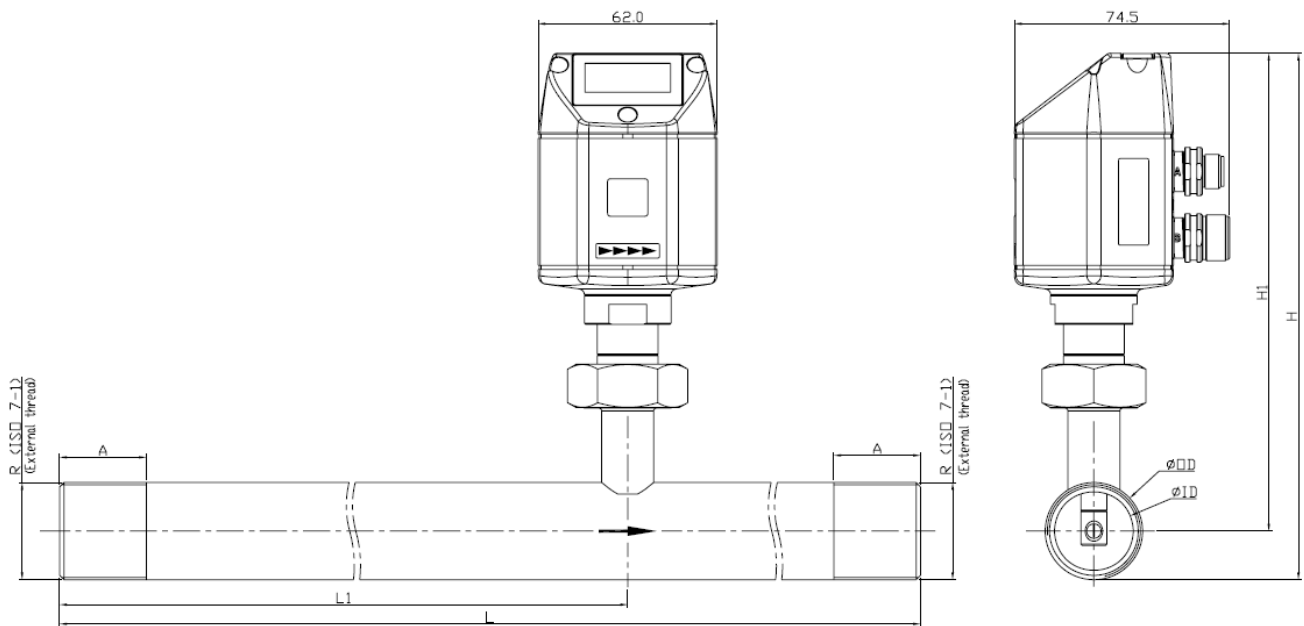
Please note:

The consumption sensor corresponds with the current state of technology and basically it can be used in any flammable and non-flammable gases.

If this consumption sensor is used for measurement of flammable gases (e.g. natural gas and so on) we expressly would like to point out that the sensor has no DVGW admission, however, it can be used for measurements in natural gas. A DVGW admission is not mandatory.

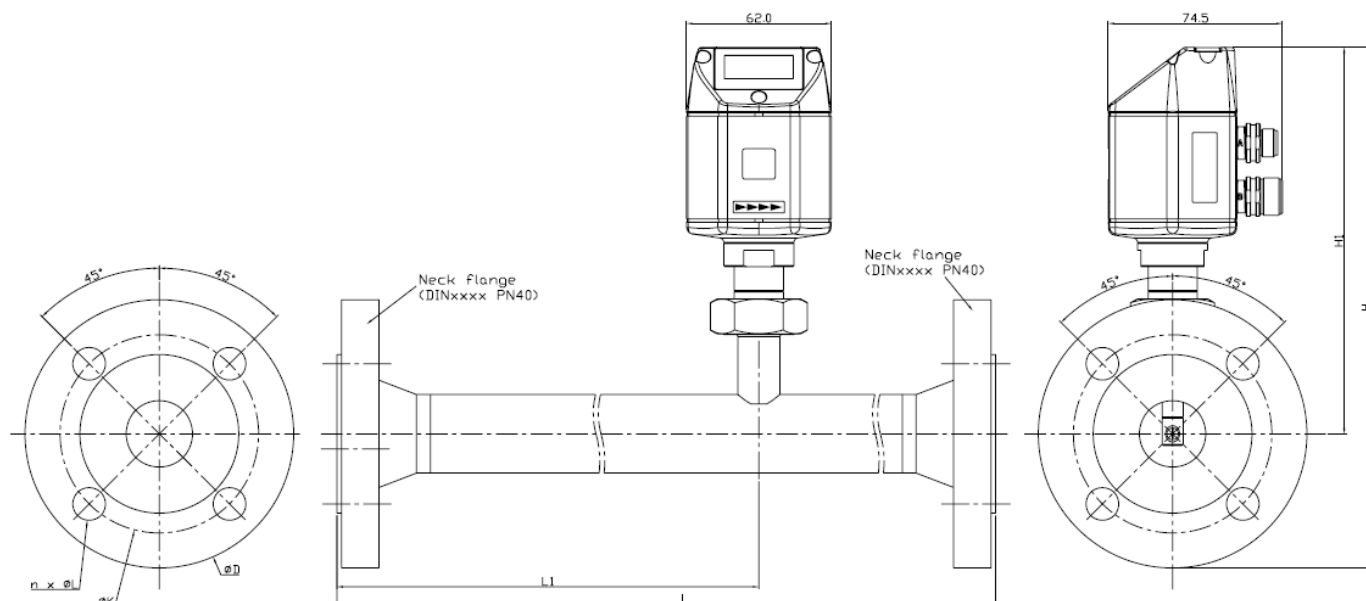
The area outside the pipeline (ambient area of the sensor) must not be an explosive area.

DRAWING OF THE INSTRUMENT / INSTRUMENTS DIMENSIONS



	Pipe size	outer diam/ inner diam (mm)	L (mm)	L1 (mm)	H (mm)	H1 (mm)	R	A (mm)
VA 420 1/4"	DN 8	13.7 / 8.5	194	137	176.0	165.7	R 1/4"	15
VA 420 1/2"	DN 15	21.3 / 16.1	300	210	176.4	165.7	R 1/2"	20
VA 420 3/4"	DN 20	26.9 / 21.7	475	275	179.2	165.7	R 3/4"	20
VA 420 1"	DN 25	33.7 / 27.3	475	275	182.6	165.7	R 1"	25
VA 420 1 1/4"	DN 32	42.4 / 36.8	475	275	186.9	165.7	R 1 1/4"	25
VA 420 1 1/2"	DN 40	48.3 / 41.9	475	275	189.9	165.7	R 1 1/2"	25
VA 420 2"	DN 50	60.3 / 53.1	475	275	195.9	165.7	R 2"	30

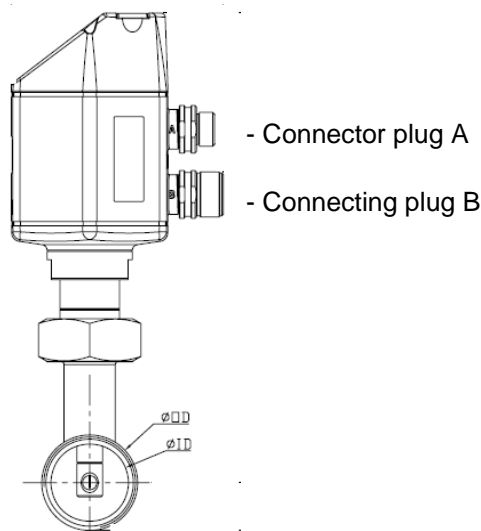
VA 420 Version with weld neck flange (material stainless steel 1.4404):



							Flange DIN EN 1092-1		
	Pipe size	AD/ID (mm)	L (mm)	L1 (mm)	H (mm)	H1 (mm)	Ø D in mm	Ø K in mm	nxØL in mm
VA 420 1/2"	DN 15	21.3 / 16.1	300	210	213.2	165.7	95	65	4 x 14
VA 420 3/4"	DN 20	26.9 / 21.7	475	275	218.2	165.7	105	75	4 x 14
VA 420 1"	DN 25	33.7 / 27.3	475	275	223.2	165.7	115	85	4 x 14
VA 420 1 1/4"	DN 32	42.4 / 36.8	475	275	235.7	165.7	140	100	4 x 18
VA 420 1 1/2"	DN 40	48.3 / 41.8	475	275	240.7	165.7	150	110	4 x 18
VA 420 2"	DN 50	60.3 / 53.1	475	275	248.2	165.7	165	125	4 x 18

Order no.	Description	Analogue output	
0695.2421	VA 420 with integrated 1/2" meas. section with weld neck flange	4... 20 mA =	0...90 m³/h
0695.2422	VA 420 with integrated 3/4" meas. section with weld neck flange	4... 20 mA =	0...170 m³/h
0695.2423	VA 420 with integrated 1" meas. section with weld neck flange	4... 20 mA =	0...290 m³/h
0695.2426	VA 420 with integrated 1 1/4" meas. section with weld neck flange	4... 20 mA =	0...480 m³/h
0695.2424	VA 420 with integrated 1 1/2" meas. section with weld neck flange	4... 20 mA =	0...550 m³/h
0695.2425	VA 420 with integrated 2" meas. section with weld neck flange	4... 20 mA =	0...900 m³/h

ELECTRICAL WIRINGS



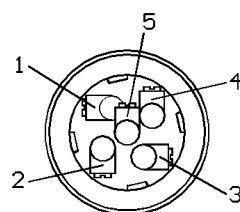
Attention: Not required connections NC must not be connected to a voltage and/or to protection earth. Cut and insulate cables.

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
Connector plug A	NC (SDI)	-VB	+VB	I+ 4...20 mA	NC
Colours connection cables 0553 0104 (5 m) 0553.0105 (10 m)	brown	white	blue	black	grey
Connector plug B	NC (SDI)	NC	NC	Isolated pulse	Isolated pulse
Colours pulse cables 0553 0106 (5 m) 0553.0107 (10 m)	brown	white	blue	black	grey

Legend:

-VB	Negative supply voltage 0 V	Pulse	Pulse for consumption
+VB	Positive supply voltage 12...30 VDC smoothed	NC	Must not be connected to a voltage and/or to protection earth. Please cut and isolate cables.
I +	Current signal 4...20 mA - actual flow		

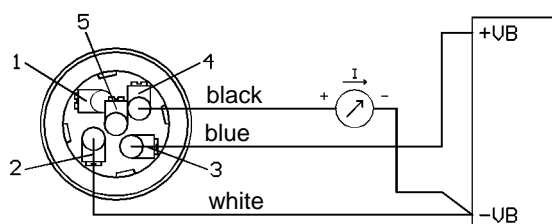
If no connection cable/ pulse cable is ordered the sensor will be supplied with a M12 connector plug. the user can connect the supply and signal cables as indicated in the connection diagram.



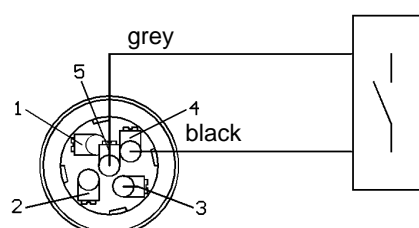
M12 Connector plug

View from back side
(terminal side)

Connector plug A



Connector plug B

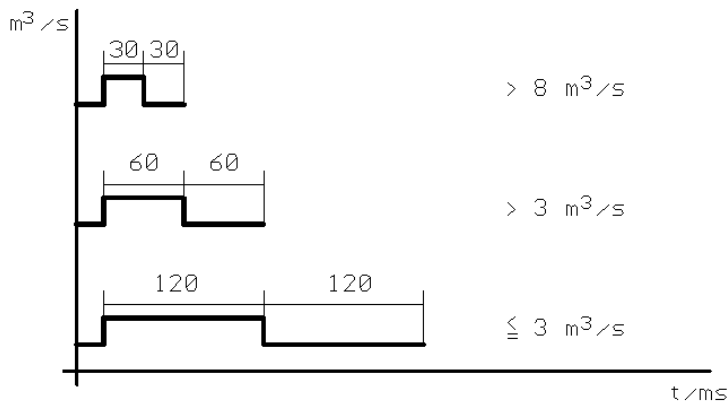


Pulse lengths are indicated consumption-relatedly.

Pulses, one pulse per set consumption unit, are summed up within the sensor and indicated in one second intervals, please see below

Pulse : There is an isolated contact available. This is closed for the duration of the pulse .
Max. switching capacity : 30 VDC, 20 mA (semi-conductor relay galvanically isolated by optocoupler).

Pulse lengths consumption-dependent

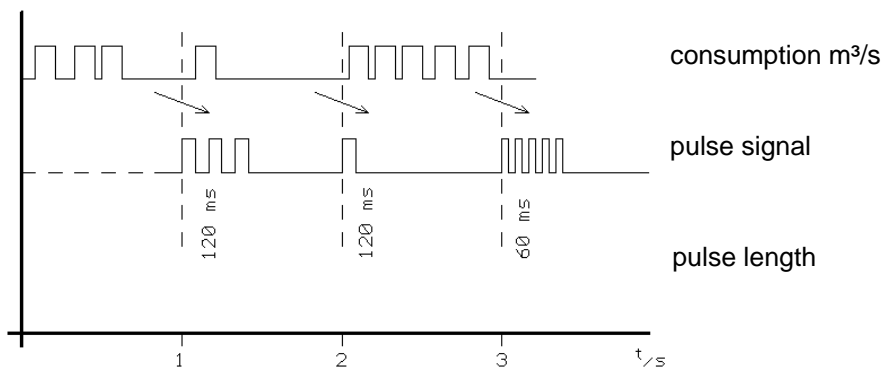


Internal pulse receiver:

The numbers of m^3 per second are summed

up and indicated after one second. Pulse lengths consumption-independent

Pulse lengths depending on consumption



148h05

Pulse lengths and maximum flow rates

Pulse length [ms]	[m³/h]	[m³/min]	[l/min]	[cfm]	[kg/h]	[kg/min]	[kg/s]
120	10,800	180	180	180	10.800	180	3
60	21,600	360	360	360	21.600	360	6
30	39,600	660	660	660	39.600	660	11
10	129,600	2,160	2,160	2,160	129,600	2,160	36
Max. flow	129,600	2,160	2,160	2,160	129,600	2,160	36

Maximum number of pulses per second: 36.

Please note: If the maximum flow is exceeded there will be no more signals!
In this case please change the units e.g. from l/min to m^3/h .



Maintenance

The sensor head should be checked regularly for dirt and cleaned if necessary. Should dirt, dust or oil accumulate on the sensor element, a deviation will occur in the measuring value. An annual check is recommended. Should the compressed air be heavily soiled this interval must be shortened.

Cleaning of the sensor head

The sensor head can be cleaned by carefully moving it to and fro in warm water with a small amount of washing-up liquid. Avoid physical intervention on the sensor (e. g. using a sponge or brush). If soiling cannot be removed, service and maintenance must be carried out by the manufacturer.

Re-calibration

If no customer specifications are given then we recommend to carry out calibration every 12 months. For this purpose the sensor must be sent to the manufacturer.

Spare parts and repair

For reasons of measuring accuracy spare parts are not available. If parts are faulty they must be sent to the supplier for repair.

If the measuring device is used in important company installations we recommend to keep a spare measuring system ready.

Calibration certificates

Calibration certificates are issued by the manufacturer on request. This is a fee-paying service. Precision is tested with PTB (German National Metrology Institute) volume flow nozzles.

Display

VA 420 can display up to 3 measured values. This are volumetric flow/mass flow, velocity and total consumption. For better reading only one measured value is displayed. The measured values are toggled during normal operation mode every 3 seconds.

The following changes can be made :

- Unit volume flow (m^3/min , m^3/h , l/min , l/s , kg/s , kg/min , kg/h , cfm)
- Display of measured value (Volumenstrom, Geschwindigkeit, Gesamtverbrauch)
- Zero consumption
- Display contrast
- Display upside down

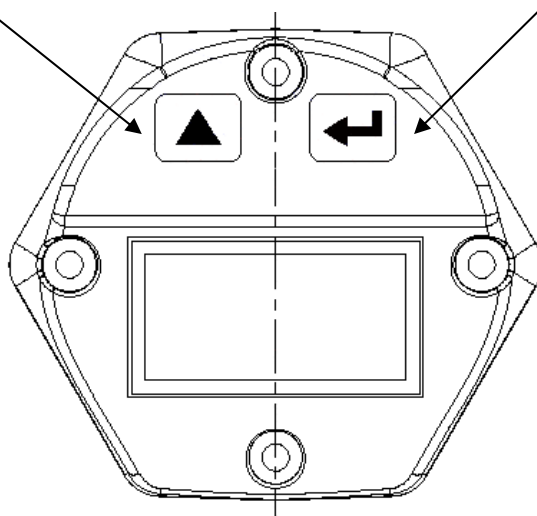
Settings ex works:

- Volume flow in m^3/h
(If the sensor is calibrated for reference DIN 1343, the unit is Nm^3/h .
This unit is only adjustable in the factory or with the CS Service Software.)
- Total consumption in m^3

On the top of the VA 420 are the capacitive key buttons to operate the display menu.

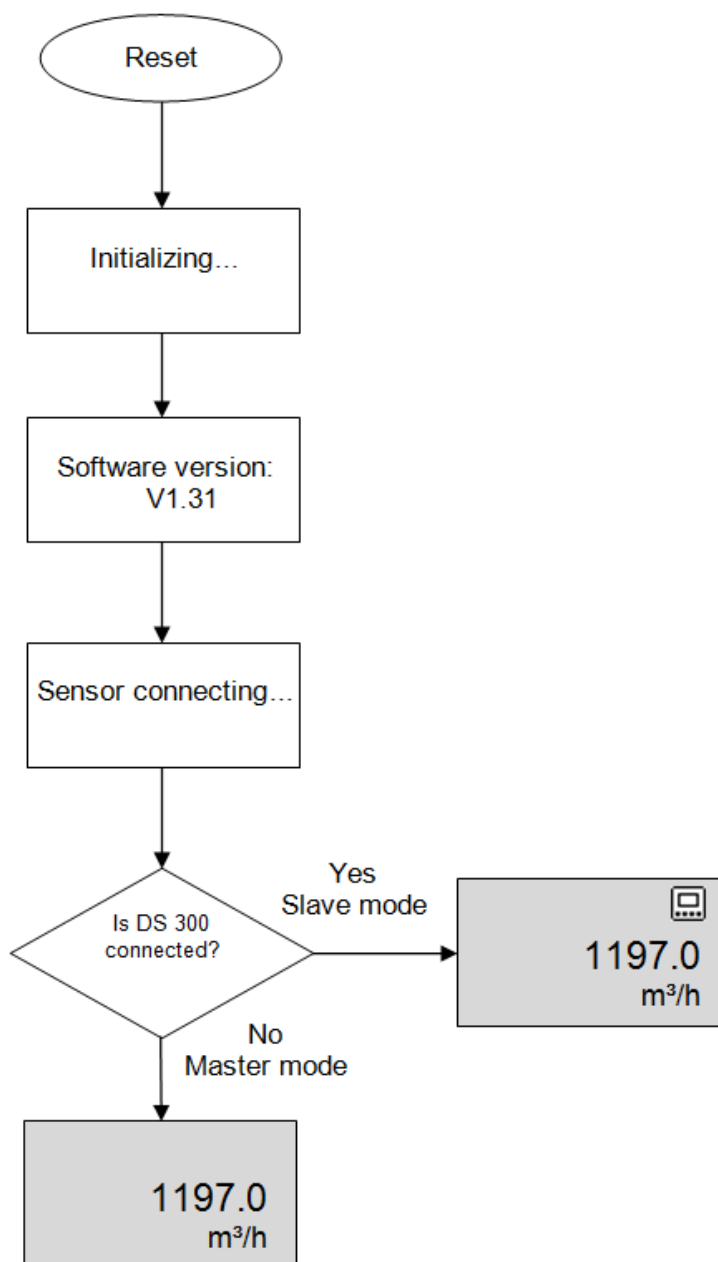
“Up“ (\triangle)

“Enter“ (\blacktriangledown)



Connection VA 420

After power on, the display will go through an initialisation procedure and will finally show the actual online values.



Slave mode

Changing the settings only with DS 300

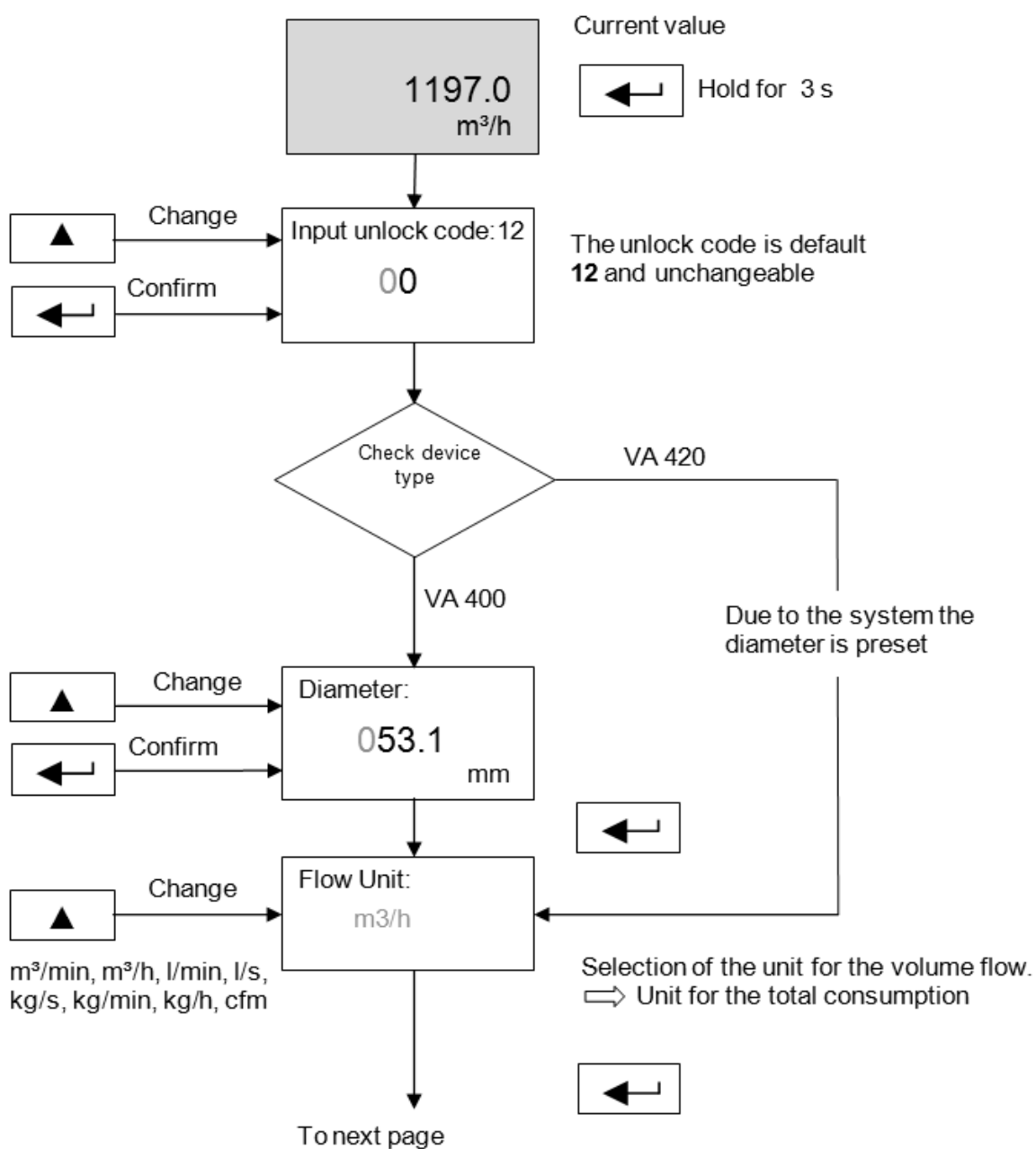
Master mode

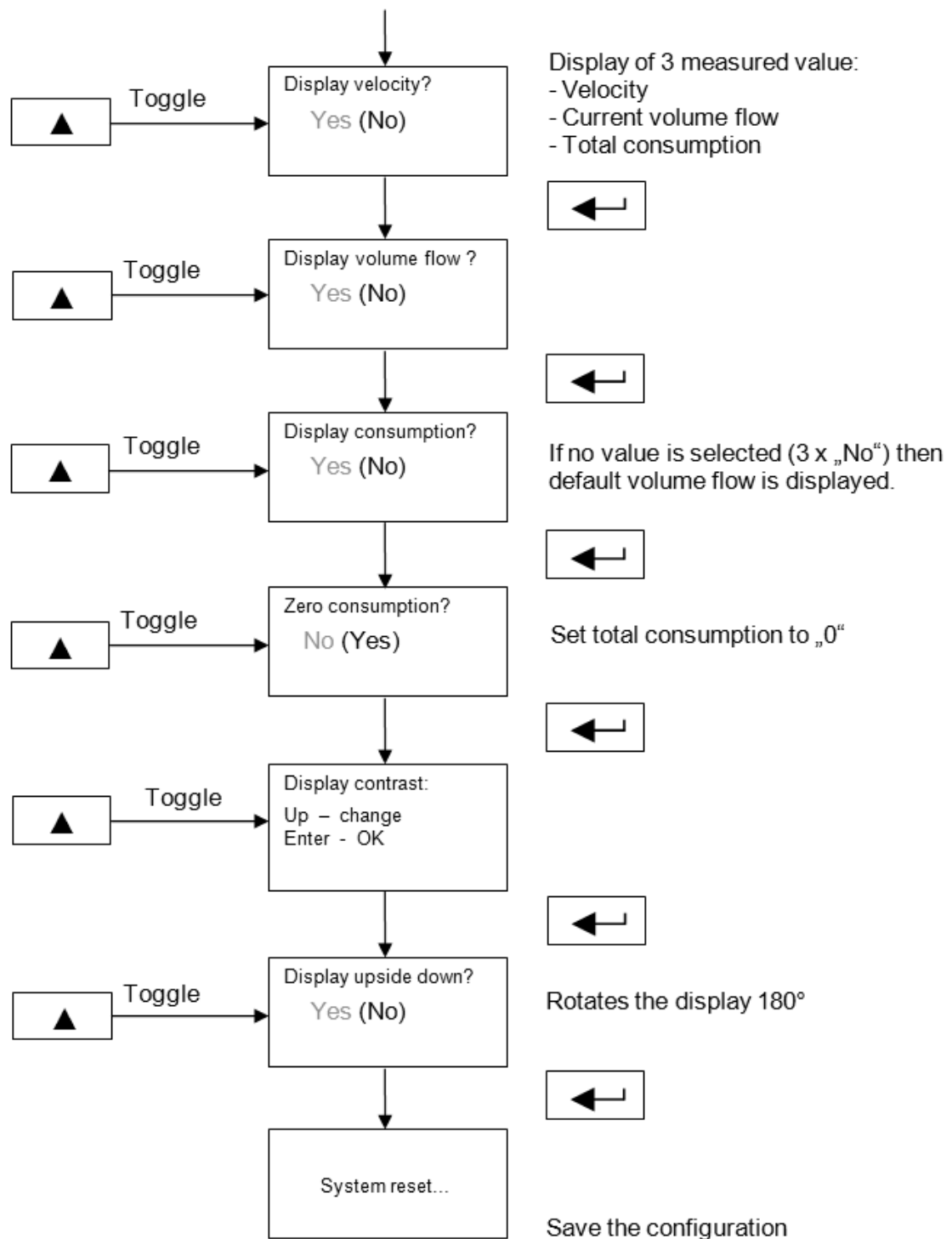
Changing the settings with pushbuttons VA 420.

Configuration settings

In order to change the configuration, keep the „Enter“ button pressed for 3 seconds. After input of the unlock code the menu begins with the volume flow unit setting. The first unit will start blinking and can be changed with the „Up“ key. The selected unit has to be confirmed with the „Enter“ button.

Configuration menu





Menu

You can exit the configuration process by pressing and keeping the “Enter” key for 3sec or no key event for 20sec. The configuration before this picture will be save and effected late.

At CS Instruments

According to DIN ISO certification of the measuring instruments we recommend to calibrate and if applicable to adjust the instruments regularly from the manufacturer. The calibration intervals should comply with your internal specification. According to DIN ISO we recommend a calibration interval of one year for the instrument VA 420.

WARRANTY

If you have reason for complaint we will of course repair any faults free of charge if it can be proven that they are manufacturing faults. The fault should be reported immediately after it has been found and within the warranty time guaranteed by us. Excluded from this warranty is damage caused by improper use and non adherence to the instruction manual.

The warranty is also cancelled once the instrument has been opened - as far as this has not been mentioned in the instruction manual for maintenance purposes - or if the serial number in the instrument has been changed, damaged or removed.

The warranty time for the VA 420 is 12 months. If no other definitions are given the accessory parts have a warranty time of 6 months. Warranty services do not extend the warranty time.

If in addition to the warranty service necessary repairs, adjustments or similar are carried out the warranty services are free of charge but there is a charge for other services such as transport and packaging costs. Other claims, especially those for damage occurring outside the instrument, are not included unless responsibility is legally binding.

After sales service after the warranty time has elapsed

We are of course there for you even after the warranty time has elapsed. In case of malfunctions please send us the instrument with a short-form description of the fault. Please do not forget to indicate your telephone number so that we can call you in case of any questions.

Order no. Stainless steel 1.4301	Order no. Stainless steel 1.4404	Order no. with weld neck flange Stainless steel 1.4404	Description
0695.0420	0695.1420		VA 420 consumption counter with integrated 1/4" measuring section
0695.0421	0695.1421	0695.2421	VA 420 consumption counter with integrated 1/2" measuring section
0695.0422	0695.1422	0695.2422	VA 420 consumption counter with integrated 3/4" measuring section
0695.0423	0695.1423	0695.2423	VA 420 consumption counter with integrated 1" measuring section
0695.0426	0695.1426	0695.2426	VA 420 consumption counter with integrated 1 1/4" measuring section
0695.0424	0695.1424	0695.2424	VA 420 consumption counter with integrated 1 1/4" measuring section
0695.0425	0695.1425	0695.2425	VA 420 consumption counter with integrated 2" measuring section
0553.0104			Connection cable* for VA/FA Series 400, 5 m, with M12 plug
0553.0105			Connection cable* for VA/FA Series 400, 10 m, with M12 plug
0553.0106			Pulse cable for consumption sensor with M12 plug, length 5 m
0553.0107			Pulse cable for consumption sensor with M12 plug, length 10 m
0190.0001			Closing cap for measuring section VA 420 (Material: Aluminium)
0190.0002			Closing cap for measuring section VA 420 (Material: Stainless steel 1.4404)
3200.0001			5 point precision calibration with ISO certificate
0554.2005			CS Service Software for VA/FA 400 sensors including PC con- nection set, USB connection and interface adapter as well as CS Soft Professional software for recording the measured data
0554.0108			Mains unit in wall housing 100-240V 10VA 50/60 Hz / 24 VDC 0.35 A
0554.0107			AC adapter plug 100-240 VAC / 24 VDC, 0.35 A for VA/FA 400 Series, 2 m cable
On request			External wall display

* (voltage supply, analogue output)

CS Instruments GmbH

Declaration of Conformity

for

**DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27. January 2003
on waste electrical and electronic equipment (WEEE)**

and

**DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27. January 2003
on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)**

of the down mentioned instruments from CS Instruments GmbH:

Pressure dew point meter	series FA 4xx and accessories
Flow and consumption meter	series VA 4xx and accessories
Pressure dew point meter	DP 300 and accessories
Leak detector	LD 300 and accessories
Multifunction measuring instrument	DS 300 and accessories
Multi-channel display	DS 300 mobile

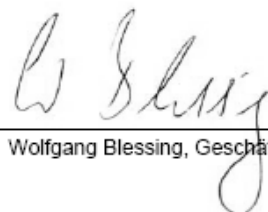
CS Instruments GmbH as the manufacturer herewith declares that the above instruments and accessories belongs to the category 9 (WEEE 2002/96/EC). Therefore the above instruments do not fall upward aforementioned directive RoHS 2002/95/EC and are not affected by the material restriction.

In accordance with directive WEEE 2002/96/EC the measuring instruments specified above are taken back from CS Instruments GmbH to the disposal.

CS Instruments GmbH
Zindelsteiner Str. 15
78052 VS-Tannheim

Tel. 07705 978 99-0
Fax 07705 978 99-20

Tannheim, 24. April 2008



Wolfgang Blessing, Geschäftsführer

CS Instruments GmbH

Declaration of Conformity

Consumption counter **VA 420**

CS Instruments GmbH as the manufacturer herewith declares that the above consumption counter complies with the following directives :

Electro-magnetic compliance	2004/108/EG
Low voltage directive	2006/95/EG

For assessing the instrument, the following standards have been referred to:

Electromagnetic compatibility

Emitted interference:	EN 61326-1: 2006-10 + EN 61326-1/Ber.1: 2008-07
Interference resistance:	EN 61326-1: 2006-10 + EN 61326-1/Ber.1: 2008-07

Low voltage directive

Reliability	EN 61010-1: 2002-08 + EN 61010-1/Ber.1:2002-11 + EN 61010-1/Ber.2:2004-01
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Year of first marking with CE label: 09

The product is labeled with the indicated mark



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Tannheim, 19. May 2010

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