

Data Sheet

1. General information

Elektronikon Mk5 main controller

Printed Matter Number	: 2946 1788 00
Applicable to	: Mk5 controlled units
Preliminary Operations	: -
Safety Instructions	: General
Persons Required	: 1
Special Tools	: -
Consumables	: -

2. Document overview

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3. Safety first

SAFETY = THINK BEFORE YOU ACT



1. STOP
EVALUATE RISKS



3. THINK
SEEK PROPER SOLUTION



2. ACT
CARRY OUT SOLUTION



PERSONAL PROTECTION KEEPS YOU SAFE



LOCK OUT / TAG OUT
TAKE AWAY THE RISKS

4. Document Information and History

Edition	Date	Description	Author
00	03/12/2013	First Edition	CTS
01	13/09/2017	update	Wouter Cattoor

5. Environmental conditions

The controller is designed to work in following conditions:

- Minimum operating temperature: -10°C
- Maximum operating temperature: +60°C
- Maximum humidity: 90% RH, 95%RH no condensation
- Maximum altitude of 2000 m (if altitude is higher than 2000m a temperature derating of 5%/1000m is required)

The controller should be mounted in an IP54 enclosure which guarantees a pollution degree 2. (only non-conductive pollution, occasionally temporary condensation may be expected)



The controller shall be protected against direct sunlight. Direct sunlight may affect the visual appearance of the controller.

6. Mounting and installation

6.1. Mechanical mounting

1. Use a mounting plate of suitable stiffness, with following excisions:

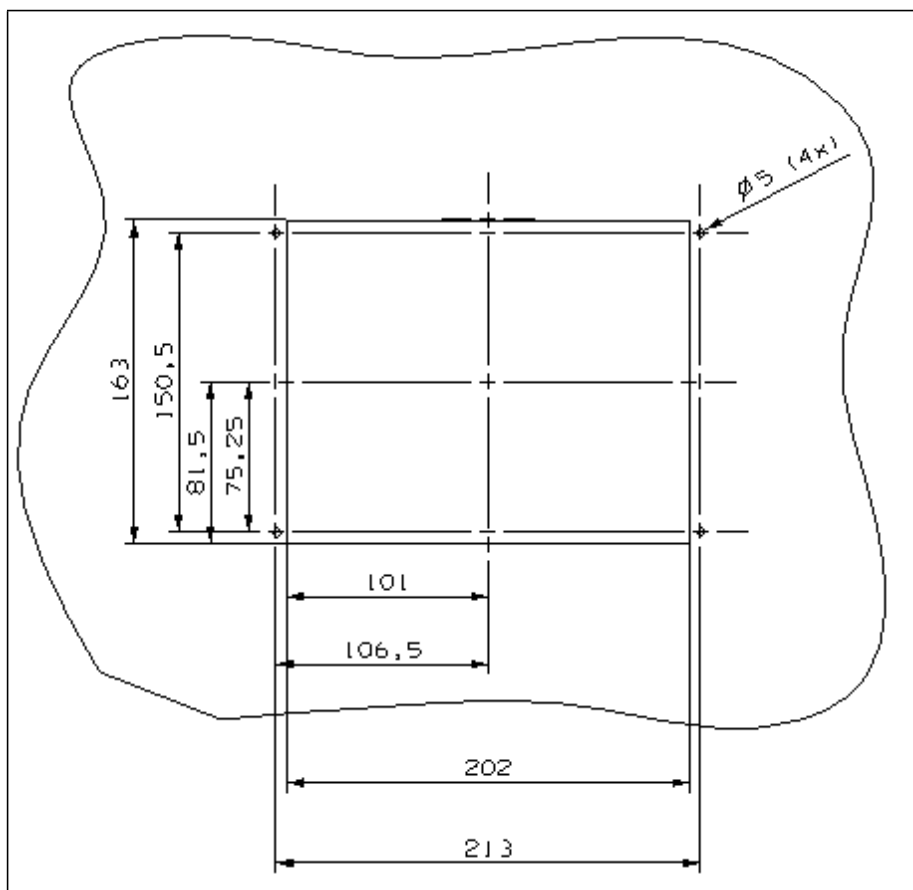


Figure 1: Excisions of the panel where the controller is designed to mount in.

2. Mount the controller vertically and upright.
3. Mount the seal in a correct manner, to guarantee the IP54 dust and water tightness.
4. Fix the controller with 4 screws (M4), tighten with a torque of 3Nm. Max.

The screws should be of suitable length conform Figure 2.

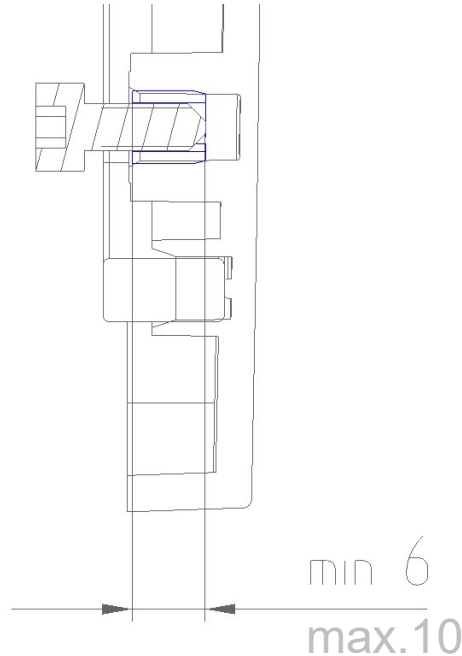


Figure 2: Screw length for mounting the controller in the panel.

5. Make sure that the control box in which the controller is mounted contains following label:



This enclosure contains electrical equipment

It may only be opened by key or special tool.

6. Make sure that the ventilation openings are free, with sufficient free area around the module to have ventilation, in order not reach the max operating temperature (see [§ 4](#))

6.2. Electrical installation

5.2.1 Supply requirements

- The device has **no** fuse in the 24VAC power supply line. A fuse **2A slow** has to be provided **externally**.
- The power supply conductor shall have a disconnecting device.
- The secondary circuits and earthing of the supplying transfo should be separated from the primary circuit by at least reinforced insulation.
- The supply voltage is 24V +40%, -30%, frequency of 50/60Hz, 16VA. A supply drop-out of maximum 40ms is permitted.

5.2.2 Earth terminations



Do not operate the machine with grounding wire disconnected!

Bonding between conduit connections is not automatic and must be provided as part of the installation!

1. Make a low resistance connection between the earth terminal of the controller and the chassis of the enclosure. This connection is a function earth connection, with a maximum wire length of 20cm.
2. Connect cables and shielding to the grounding termination with M4 eye-terminals or use FASTON type receptacle 6,3-1,5mm, as recommended. Otherwise, the connection shall be such that a low resistance connection shall be guaranteed.
3. Make sure that the screw to connect to the grounding connection terminals is an M4 screw, with a length suitable for connection and conform Figure 3.

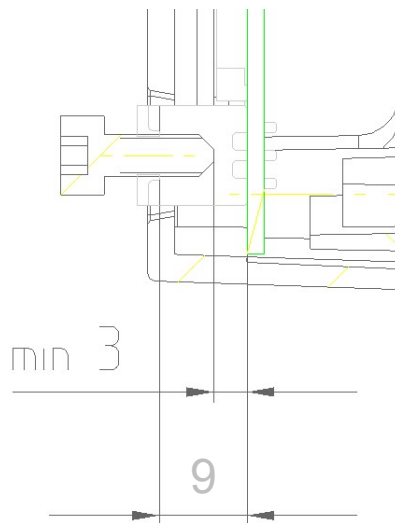


Figure 3: screw length for mounting shielding, PE's, ... to the earth terminal connection.

5.2.3 FCC user information

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules.

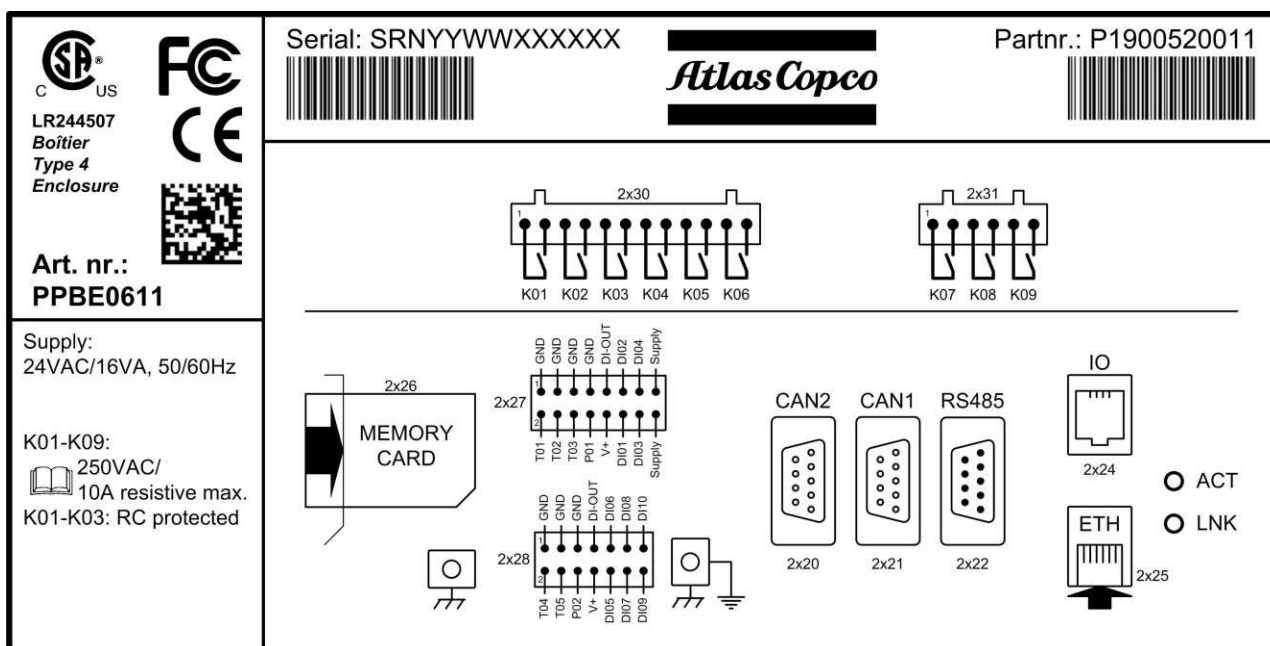


Figure 4: overview of connections to be made

7. Maintenance during service

7.1. Front panel

The front panel can be cleaned with a wet soft cloth and mild soap only.



The front part of the controller is scratch sensitive. Other products are not allowed and may damage the surface!

8. Technical Data

8.1. CPU-Core

Parameter	Value
CPU	Analog Devices BF536
CPU-Bus configuration	16 Bit
Internal RAM	100 kByte
Flash EPROM	16 MByte
SDRAM	16 MByte
Backup RAM Functionality	5 kByte

8.2. Real Time Clock

Parameter	Value
Type	ST Thomson 41T00SM6
Counter	seconds, minutes, hours, day, months, years, century
Leap Year handling	automatic
Summertime handling	by software
Tolerance $T_{amb}=25^{\circ}\text{C}$	typ. ± 100 ppm
Aging first year	typ. ± 10 ppm
Tolerance $T_{amb}=-10^{\circ}\text{C} \dots 70^{\circ}\text{C}$	typ. ± 100 ppm
Life Time Battery: $T_{amb}=25^{\circ}\text{C}$ only RTC supplied compressor always power off	min. 10 years

8.3. LCD-Display

Parameter	Value
Type	3.5" QVGA
LCD-Controller	BF536 internal
Technology	TFT
Backlight	LED
Backlight Lifetime	10k hours @ 25°C (brightness 50%)
Character Set	customer specific
Foil Material	PolyCarbonate
LED	4 (Gr,Y,R,Blue)
Keys	8

8.4. Digital Outputs 10A

Parameter	Value
Number of Outputs	9
Identifications	K01-K03 (RC protected) K04-K09
Type	relay (voltage free contacts)
Rated Voltage AC	250V
Rated Current	10 A
Peak Current	20 A
Switching Voltage AC	max. 400V
Switching Power	max. 2500VA
Pick-Up Time	typ. 15ms
Drop-Out Time	typ. 20ms
Switching Frequency (max. load)	max. 30 / minute
Contact Life (max. load)	8×10^4 2.5×10^5 cycles
Mechanical Life (no load)	typ. 1×10^7 cycles

NOTE: Maximum DC load: 30V DC - 10A resistive Minimum current: 5mA

8.5. Digital Inputs

Parameter	Value
Number	10
Identification	DI01-DI10 DI-OUT (24VDC supply)
Input Voltage Low High	-3..... 5.0V DC 15.....26.0V DC
Input Current Low High	0....15mA 5....15mA
Isolated	no
Impedance	4800 Ohm
Supply by Controller	24.0V +/- 10%DC
Supply Current	max. 100 mA (dissipation for all DI together)
Supply Protection	short circuit protected to ground

8.6. Analog Inputs

7.6.1 Pt1000

Parameter	Value
Number	5
Identification	T01-T05 (return terminal: GND)
Temperature Range	-50°C.....+300°C
Resolution	<0.2°C
Error	+/- 1°C (0-100°C range) +/- 2°C (full range) (2% accuracy under extreme EMC stress)
Current	typ. 2mA
Protection	short circuit protected to ground
Resolution A/D Converter	12 Bit
Sensor Type	2 wire
Isolated	No

7.6.2 Pressure

Parameter	Value
Number	2
Identification	P01 (5V supply: V+ ; GND)
Input Voltage	0.2....4.8V
Resolution	12 Bit
Error	max. +/- 6LSB
Input Resistance	typ. 100kΩ
Supply Current (each sensor)	max. 5mA
Supply for Pressure Sensor Vref	5V +/-5%
Reference for A/D- Converter	Supply for Sensor
Supply for Pressure Sensor	short circuit protected to ground
Sensor Type	2 wire single ended
Isolated	No

8.7. Ethernet

Parameter	Value
Controller	Integrated in CPU
Specification	IEEE 802.3
Baudrate	10/100 Mbit
Isolated	yes
Connector Type	RJ45

8.8. CAN-Bus (internal CAN)

Parameter	Value
Controller	Integrated in CPU
Type	Full CAN / BASIC CAN
Number of nodes	max.32
Specification	V2.0 Part B
Physical Layer	ISO11898
Baudrate	Programmable (max. 1 Mbaud)
Common Mode Rejection	-2.....+7V
Isolated	no
Connector Type	Sub-D 9 pole male

8.9. CAN-Bus (LAN)

Parameter	Value
Controller	MCP2515
Type	Full CAN / BASIC CAN
Number of nodes	max.32
Specification	V2.0 Part B
Physical Layer	ISO11898
Baudrate	Programmable (max.125 kbaud)
Common Mode Rejection	-2.....+7V
Isolated	no
Connector Type	Sub-D 9 pole male

8.10. RS-485

Parameter	Value
Controller	MCP2515
Type	Full CAN / BASIC CAN
Number of nodes	max.32
Specification	V2.0 Part B
Physical Layer	ISO11898
Baudrate	Programmable (max.125 kbaud)
Common Mode Rejection	-2.....+7V
Isolated	no

8.11. IO-bus

Parameter	Value
Controller	integrated in CPU
Type	RS-485 (proprietary)
Number of nodes	max.10
Configuration	half duplex
Baudrate	200 kbaud
Differential Output Voltage	min. 1.5V
Differential Input Voltage	min. 200mV
Common Mode Voltage	-7....+12V
Receiver Input Impedance	12k Ω
Cable length	max. 4m (unterminated)
Isolated	no
Connector Type	RJ11

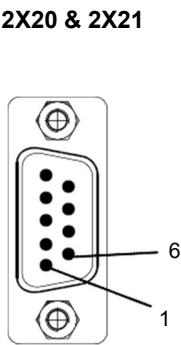
8.12. General

Parameter	Value
Supply Voltage	24VAC +40%/-30% 50/60Hz
Type of Protection	IP54 front IP21 back
Temperature Range Operating Storage	-10°C.....+60°C -30°C.....+70°C
Permissible Humidity	Relative humidity 95% no condensation
Noise emission	EN 55022 class B: 1998 EN 50081-2: 1993
Noise immunity	EN 50082-2: 1995 EN 61000-6-2: 1999
Weight	950g
Dimension	240x190x80 mm
Housing	PCABS-V0
Mounting	cabinet door

9. Pin assignment

9.1. Pin Assignment CAN1 & CAN2 –Bus

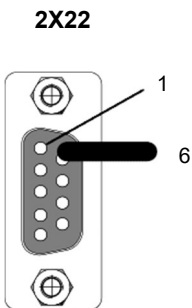
Sub-D 9 pole male



Pin	Function
1	Reserved
2	CAN_LOW
3	CAN_GND
4	Reserved
5	Reserved
6	CAN_GND
7	CAN_HIGH
8	Reserved
9	Reserved

9.2. Pin Assignment RS485

Sub-D 9 pole female

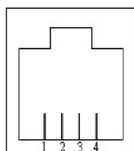


Pin	Function
1	GND
2	Reserved
3	TxD/RxD+
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	TxD/RxD-
9	Reserved

9.3. Pin Remote IO

RJ11

2X24



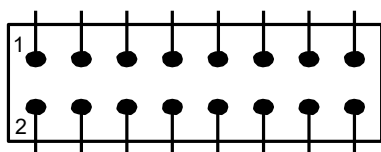
Pin	Function
1	GND
2	TxD/RxD+
3	TxD/RxD-
4	REM ID line

9.4. Pin Assignment power supply, analog en digital inputs

Male connector, straight, 16-way,
pitch 3.5mm.

Model: Wago 713-116

2X27

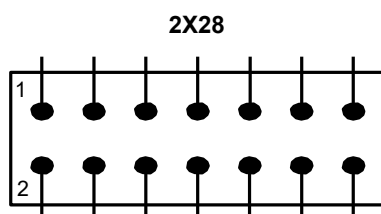


Pin	Function
1	GND
2	Temperature Input 01
3	GND
4	Temperature Input 02
5	GND
6	Temperature Input 03
7	GND
8	Pressure Input 01
9	Digital Input Supply
10	V+ 5V Supply for Pressure Sensor
11	Digital Input 02
12	Digital Input 01
13	Digital Input 04
14	Digital Input 03
15	24VAC Supply
16	24VAC Supply

9.5. Pin Assignment analog en digital inputs

Male connector, straight, 14-way,
pitch 3.5mm.

Model: Wago 713-114

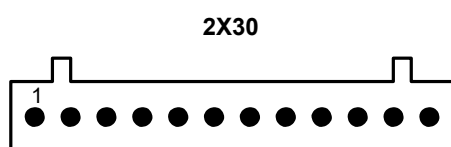


Pin	Function
1	GND
2	Temperature Input 04
3	GND
4	Temperature Input 05
5	GND
6	Pressure Input 02
7	Digital Input Supply
8	V+ 5V Supply for Pressure Sensor
9	Digital Input 06
10	Digital Input 05
11	Digital Input 08
12	Digital Input 07
13	Digital Input 10
14	Digital Input 09

9.6. Pin Assignment Digital Output

Male connector, straight, 12-way,
pitch 5mm.

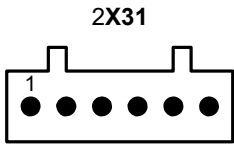
Model: Wago 721-142/001-000



Pin	Function
1	K01 Relay Output brake contact
2	K01 Relay Output transfer contact
3	K02 Relay Output brake contact
4	K02 Relay Output transfer contact
5	K03 Relay Output brake contact
6	K03 Relay Output transfer contact
7	K04 Relay Output brake contact
8	K04 Relay Output transfer contact
9	K05 Relay Output brake contact
10	K05 Relay Output transfer contact
11	K06 Relay Output brake contact
12	K06 Relay Output transfer contact

9.7. Pin Assignment Digital Output

Male connector, straight, 6-way,
pitch 5mm.
Model: Wago 721-136/001-000

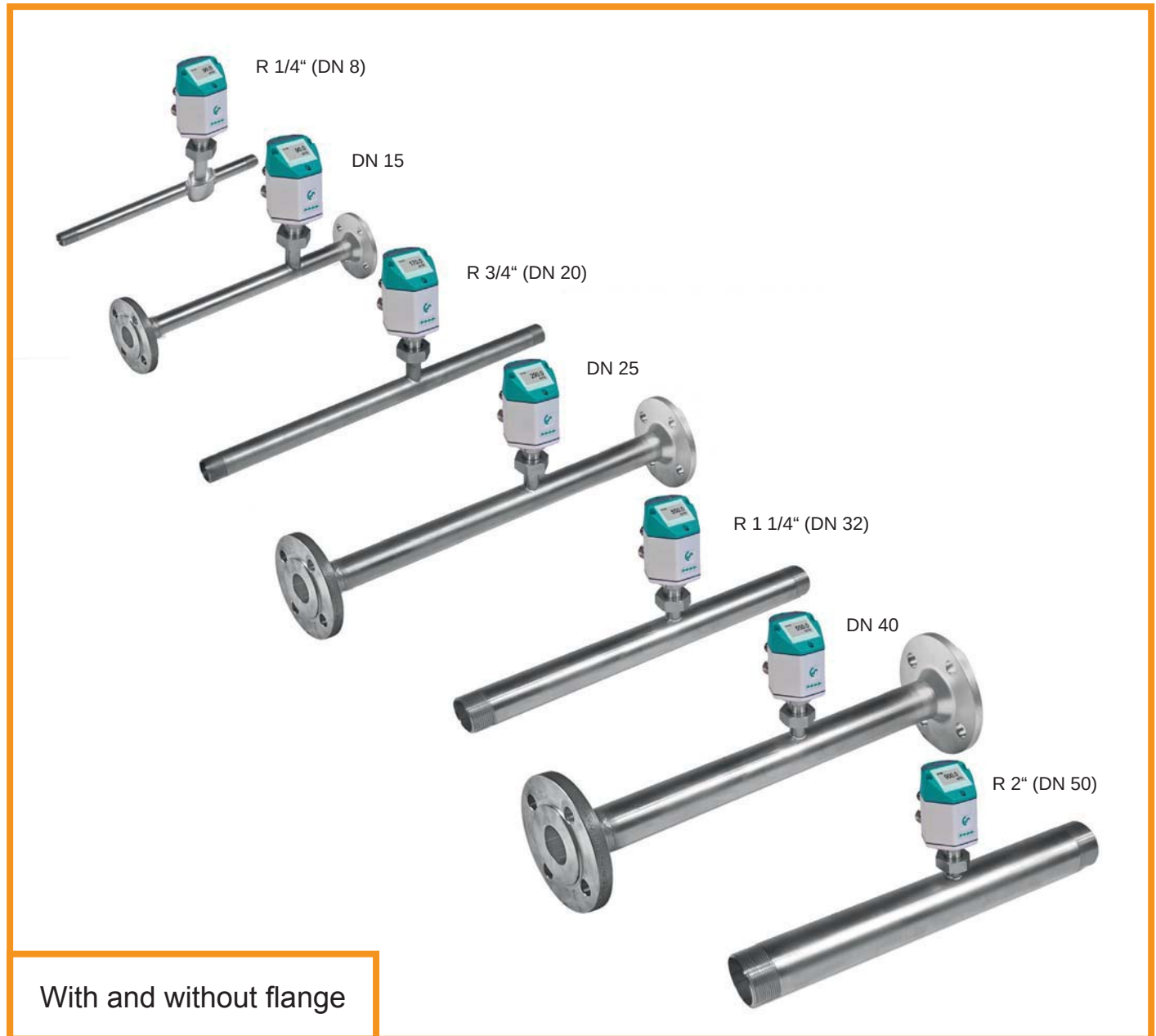


Pin	Function
1	K07 Relay Output brake contact
2	K07 Relay Output transfer contact
3	K08 Relay Output brake contact
4	K08 Relay Output transfer contact
5	K09 Relay Output brake contact
6	K09 Relay Output transfer contact



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.

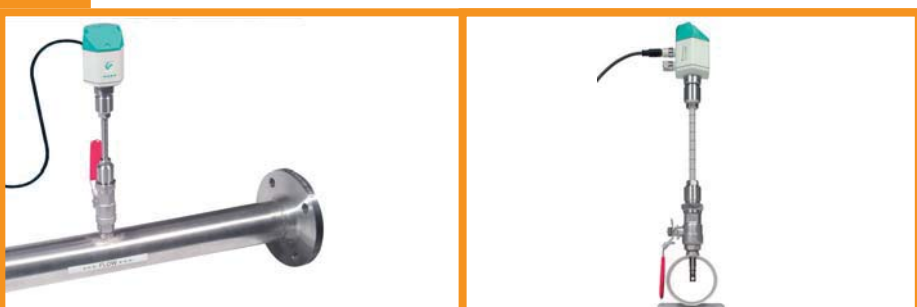
Pulse output (galvanically separated) for the total consumption.

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

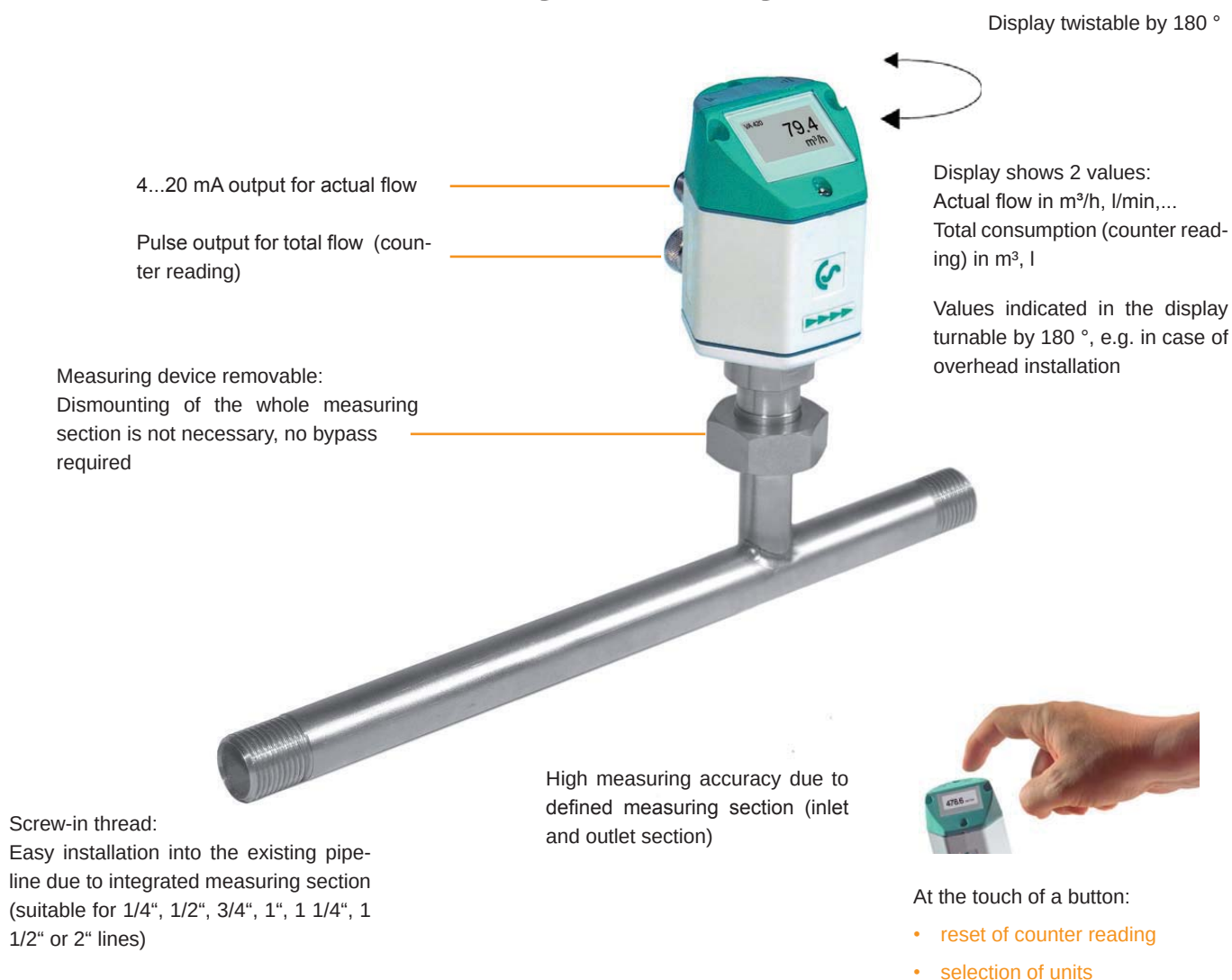
4 Solution for large pipe diameters



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

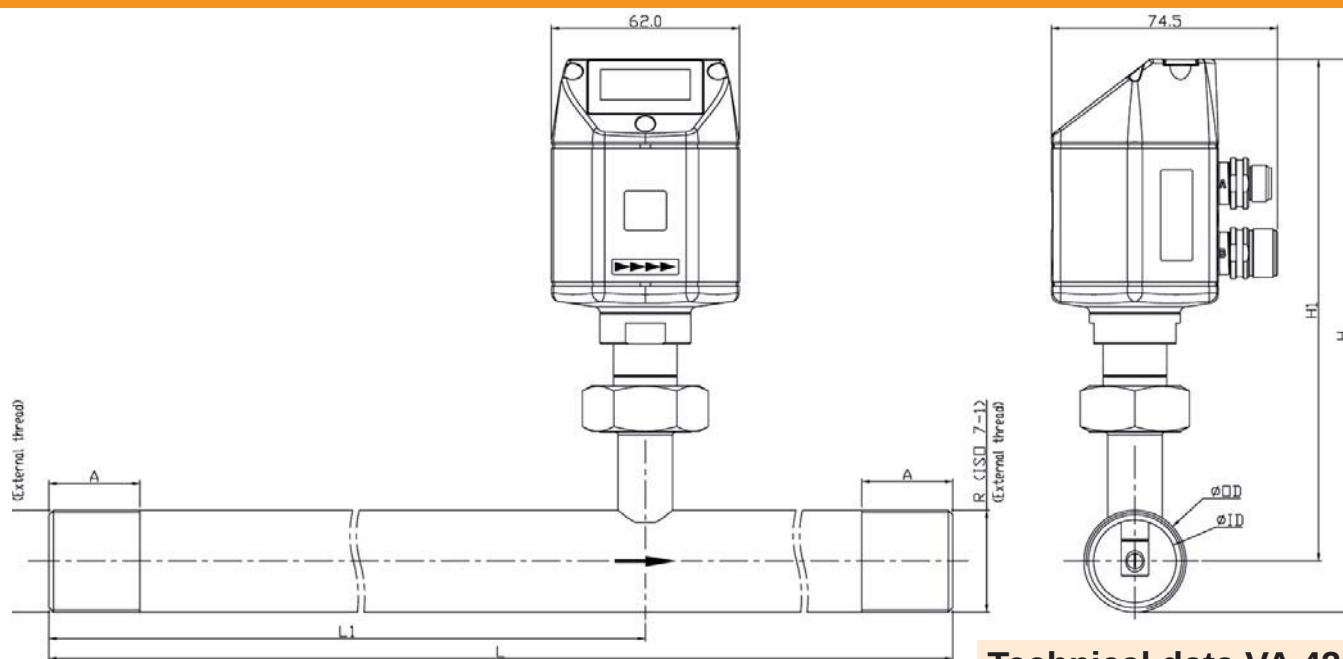


Application-technological features of the flow meters VA 420:

- 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

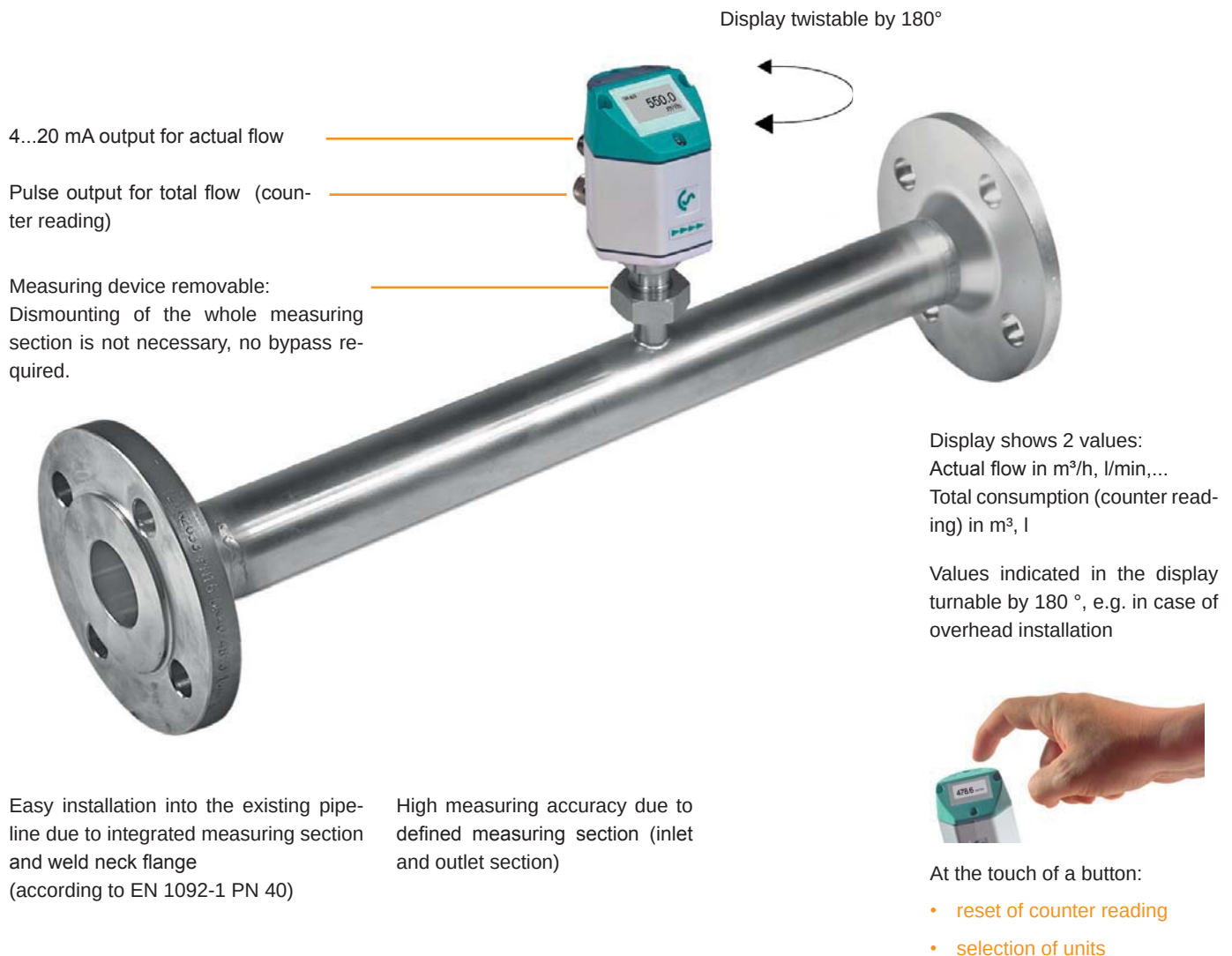
Description	Order No. Stainless steel 1.4404	Order No. Stainless steel 1.4301
VA 420 flow meter with integrated 1/4" measuring section	0695 1420	0695 0420
VA 420 flow meter with integrated 1/2" measuring section	0695 1421	0695 0421
VA 420 flow meter with integrated 3/4" measuring section	0695 1422	0695 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

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



VA 420 - The advantages at a glance

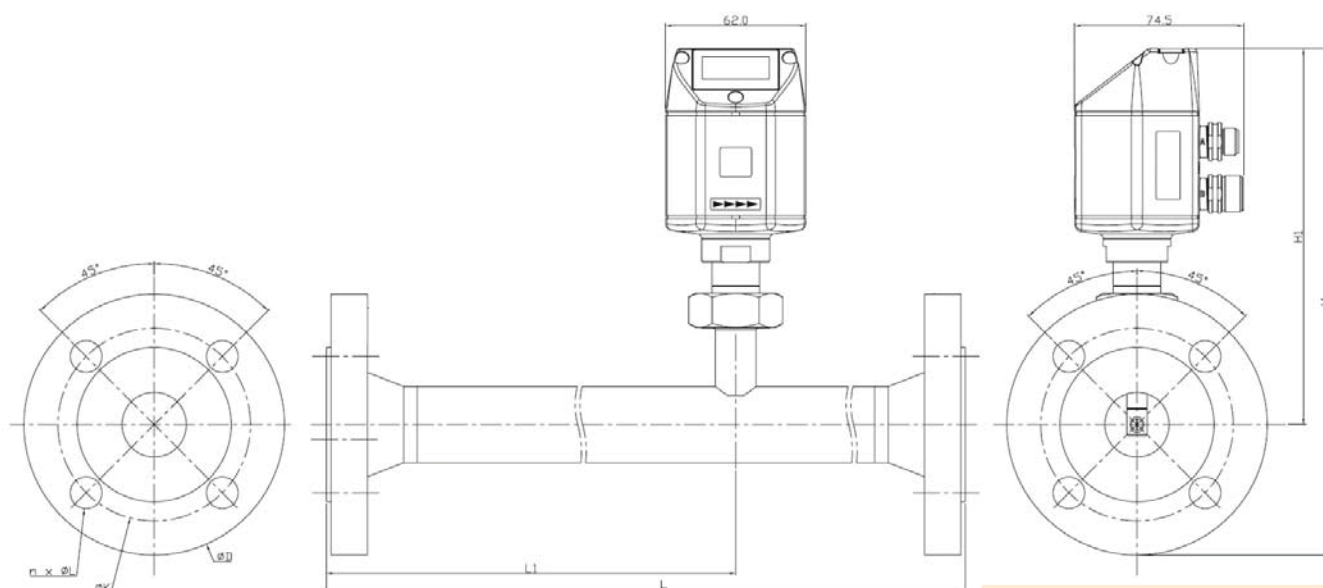


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Technical data VA 420

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)

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

EWD

ATLAS COPCO QUALITY AIR SOLUTIONS

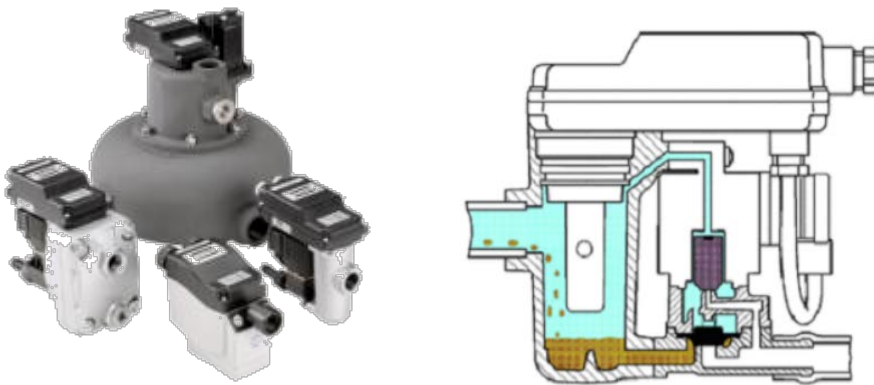
General Description

Atlas Copco's range of EWD electronically controlled condensate drains is synonymous with safe, dependable and economical condensate management.

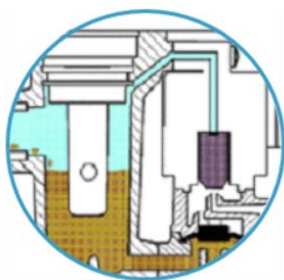
The intelligent drain function monitors condensate build-up with liquid level sensors and evacuates the condensate only when necessary, thereby avoiding compressed air waste and providing for considerable energy savings.

The EWD drain device offers security and confidence, enabling you to solve all condensate discharge problems even in heavily contaminated systems.

A wide range of EWD drains is available for oil-contaminated condensate and may be provided with additional hard coating for use with oil-free and aggressive condensate.



Working Principle



Condensate enters the drain and collects in sump. The diaphragm valve is closed due to the solenoid valve allowing pressure compensation through the pilot supply line. The pressurised space above the diaphragm is larger than that below it, ensuring an absolutely leak proof seal. As the condensate drains away, the level probe monitors the speed at which the level drops, calculating exactly when to shut the diaphragm, so that no air escapes. If there should be a blockage on the outlet or faulty diaphragm, the drain switches to "fault mode". Both the flashing alarm light and the volt free contact are activated. The drain switches to a "timer mode" until the situation is solved.

Scope of Supply

- Led Display
- Alarm
- Electronics component
- Flexible pipe inlet
- Non wearing capacitive sensor
- IP 64 Nema 13 protection

Features & Benefits

Energy Savings

- Energy efficient
 - Absolutely no waste of compressed air

Reliable operation

- Proven durable design
 - No moving parts
 - Wide drain way passage

Easy set-up and use

- Operational ease
 - LED display and alarms work together to make daily operations as hands off as possible
 - Electronic control ensures reliable performance
 - Plug and play set up

VA 420

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

Stationary

Flow and consumption measurement for compressed air and gases



	Page
Safety instructions/ flammable gases	3
Instruments description	4
Installation details	4
Technical data	5
Measuring ranges air	6
Measuring endranges for different gases	6
Instrument dimensions, VA 420 with mounting thread	7
Instrument dimensions, VA 420 with weld neck flange	8
Drawing of the instrument/electronic wiring	9
Pulse length/	10
Service information	11
Display operation	12-15
Calibration / adjustment / warranty	16
Ordering data	17
EC conformity declaration	18-19
Contact	20

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", R 1/2", R 3/4", R 1", 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

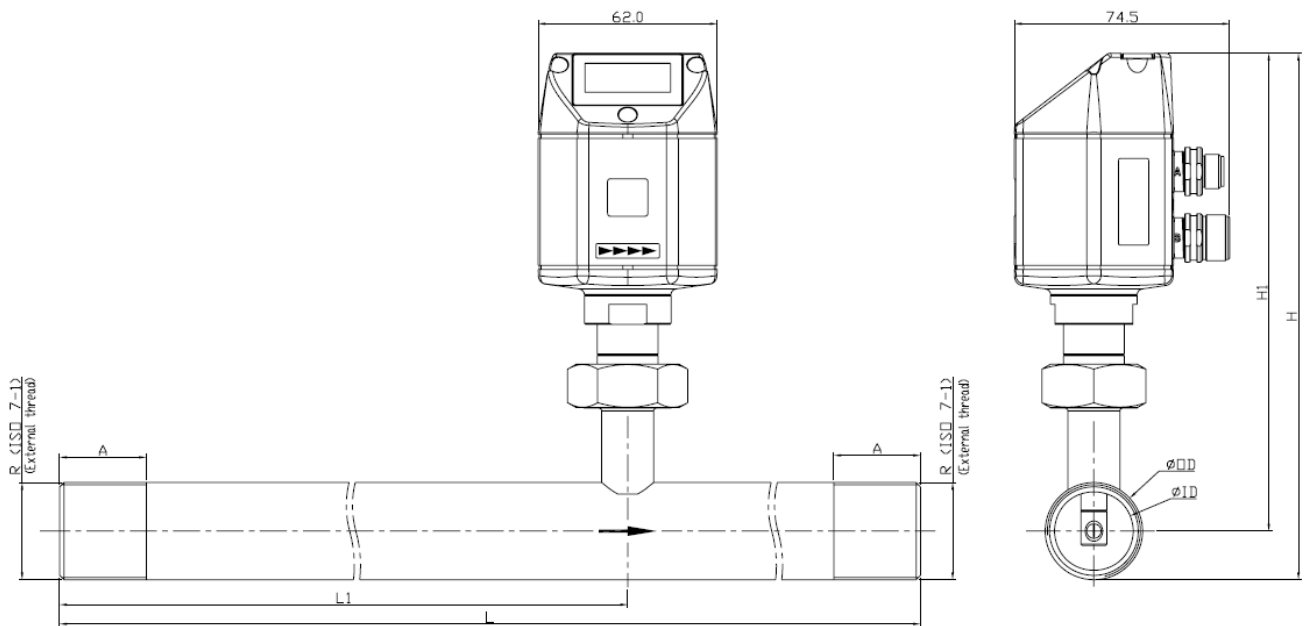
Please note:

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.

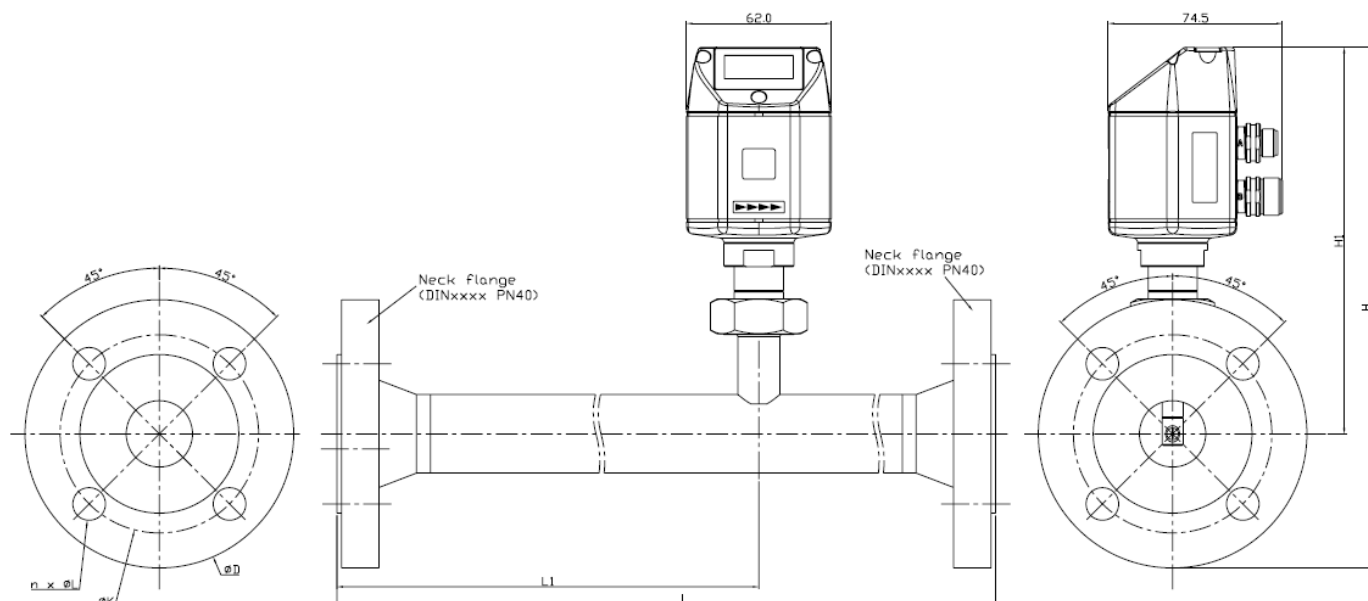
The area outside the pipeline (ambient area of the sensor) must not be an explosive area.

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

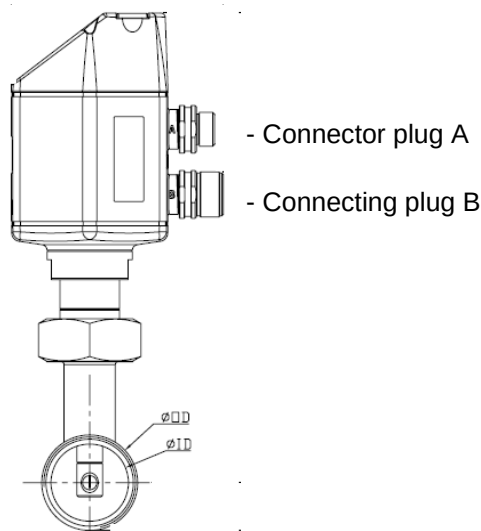
VA 420 Version with weld neck flange (material stainless steel 1.4404):



							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



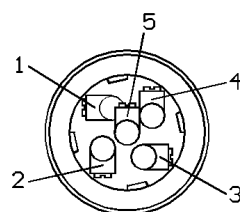
Attention: Not required connections NC must not be connected to a voltage and/or to protection earth. Cut and insulate cables.

	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:

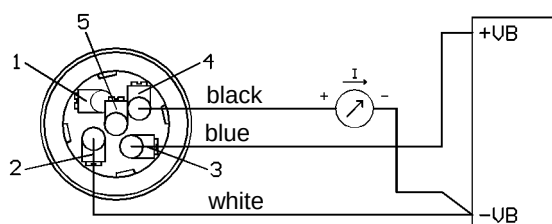
-VB	Negative supply voltage 0 V	Pulse	Pulse for consumption
+VB	Positive supply voltage 12...30 VDC smoothed	NC	Must not be connected to a voltage and/or to protection earth. Please cut and isolate cables.
I +	Current signal 4...20 mA - actual flow		

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.

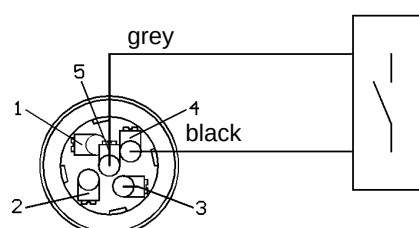


M12 Connector plug
View from back side
(terminal side)

Connector plug A



Connector plug B

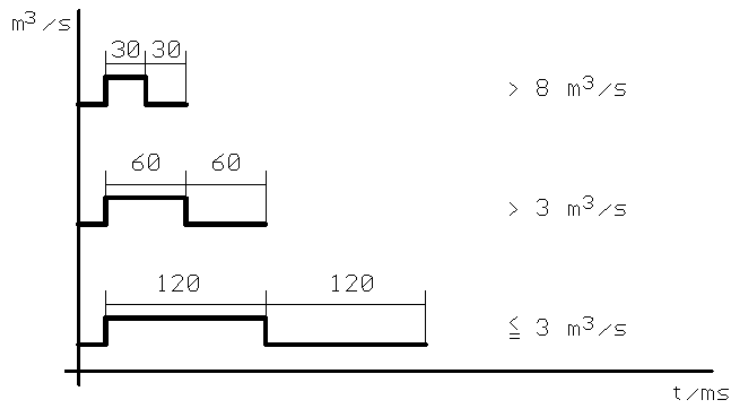


Pulse lengths are indicated consumption-relatedly.

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

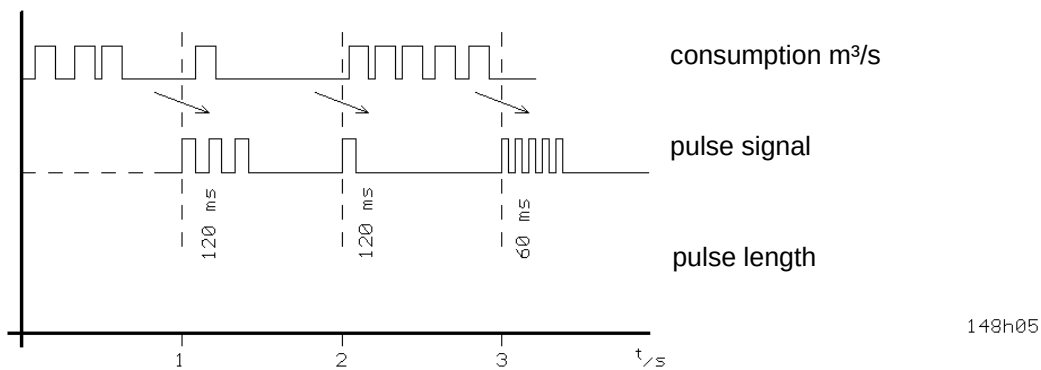
Pulse : There is an isolated contact available. This is closed for the duration of the pulse .
Max. switching capacity : 30 VDC, 20 mA (semi-conductor relay galvanically isolated by optocoupler).

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



Pulse lengths and maximum flow rates

Pulse length [ms]	[m^3/h]	[m^3/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

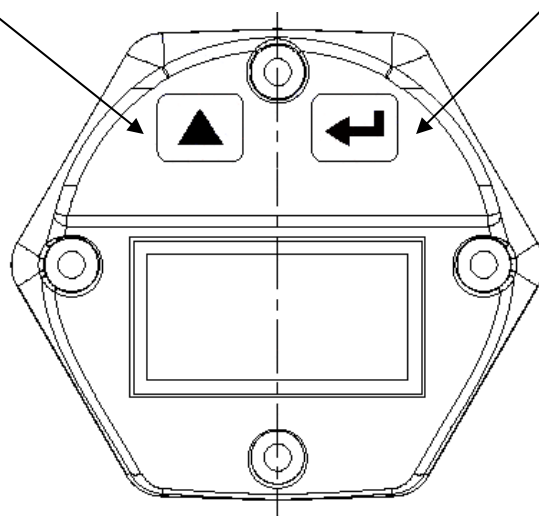
Settings ex works:

- 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.

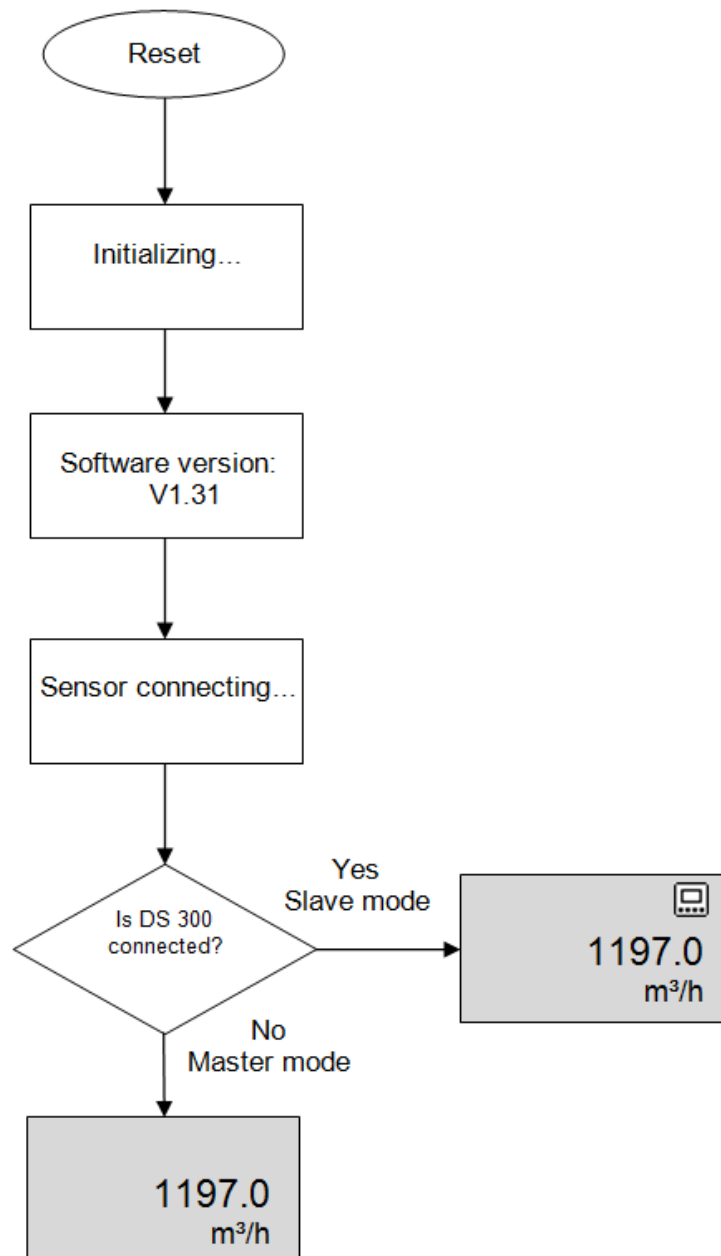
“Up“ ($\triangle$)

“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

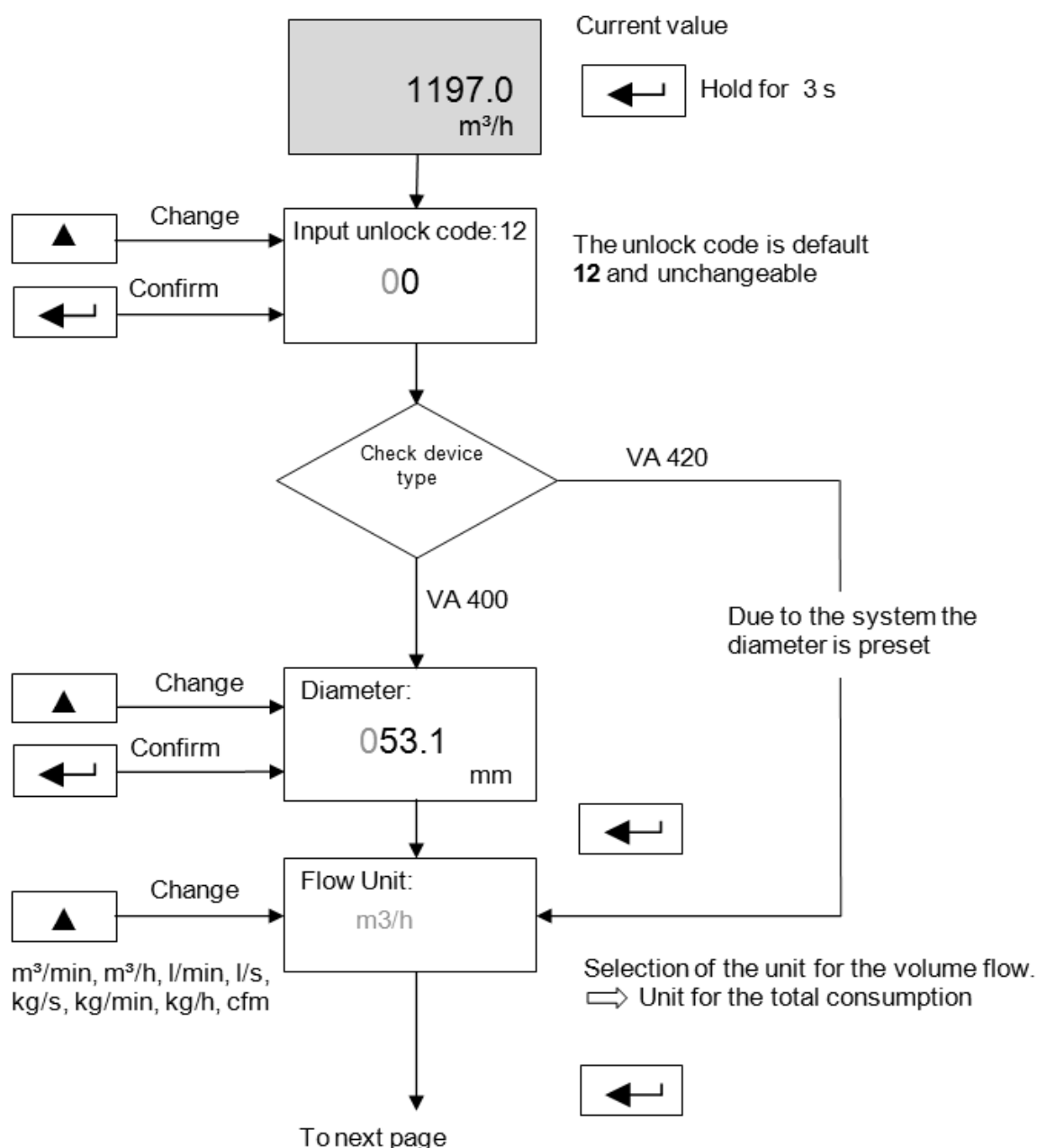
Master mode

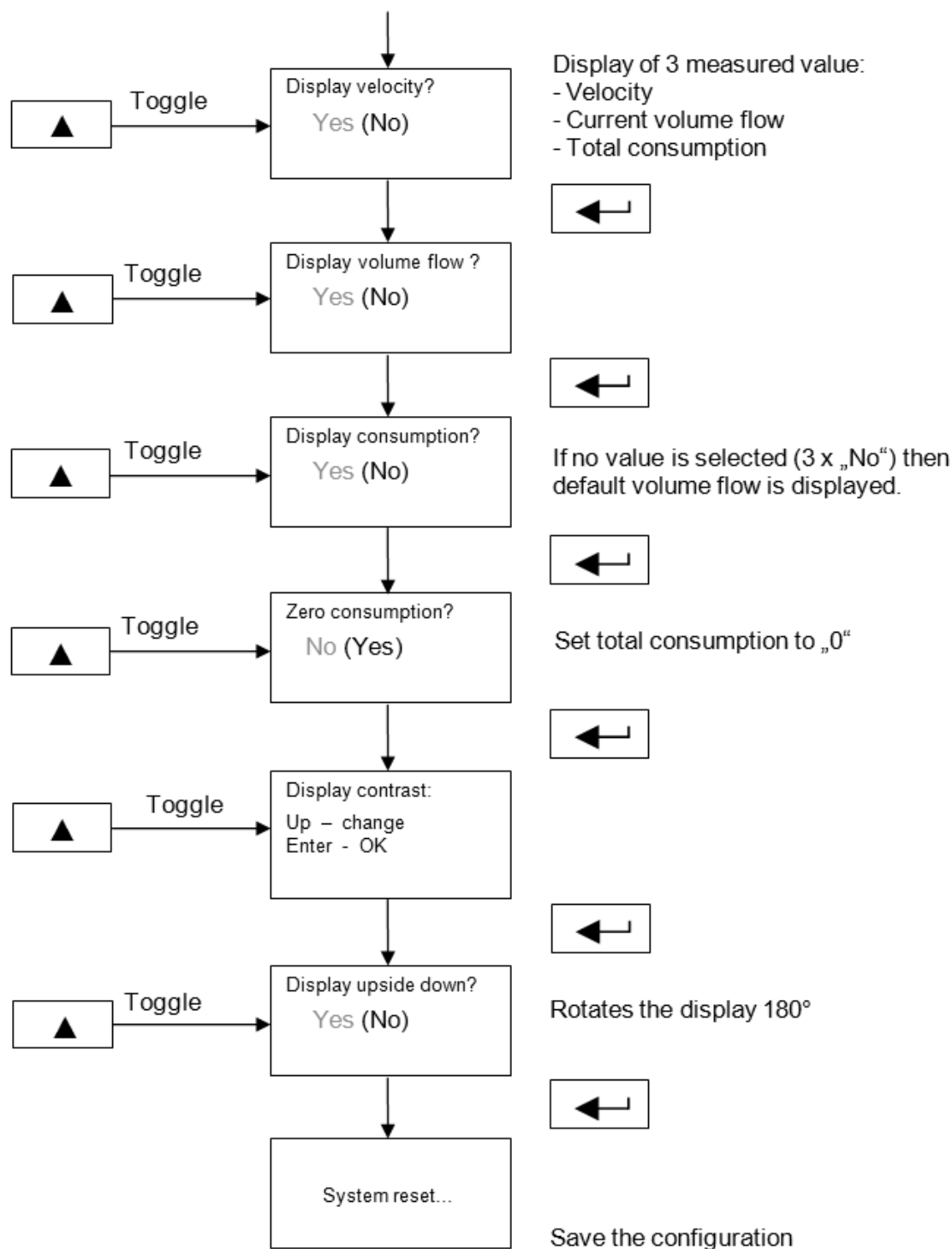
Changing the settings with pushbuttons VA 420.

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

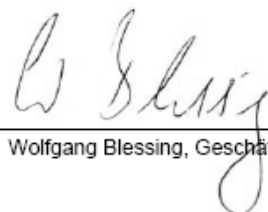
CS Instruments GmbH as the manufacturer herewith declares that the above instruments and accessories belongs to the category 9 (WEEE 2002/96/EC). Therefore the above instruments do not fall upward aforementioned directive RoHS 2002/95/EC and are not affected by the material restriction.

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



CS Instruments GmbH

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Tannheim, 19. May 2010

Wolfgang Blessing, Managing Director

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RTM 3

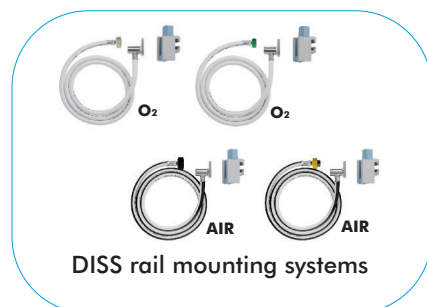
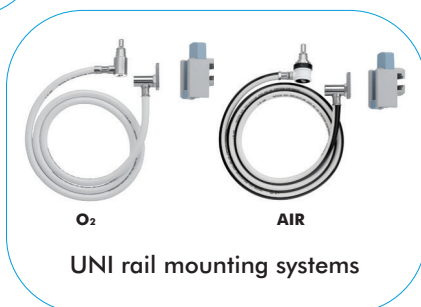
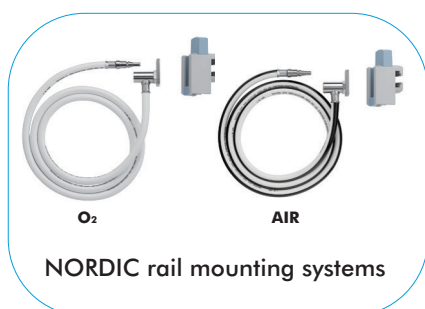
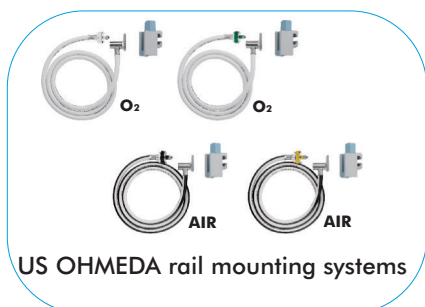
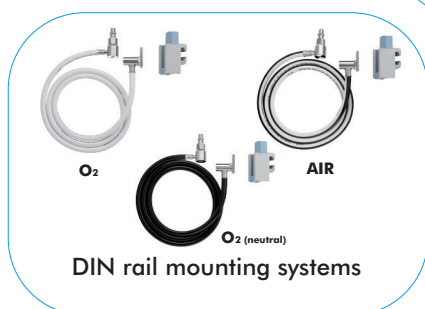
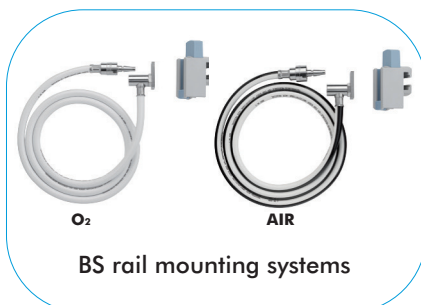
OXYGEN-THERAPY
FLOWMETERS WITH
FLOATING BALL



TECHNOLOGIE
MÉDICALE

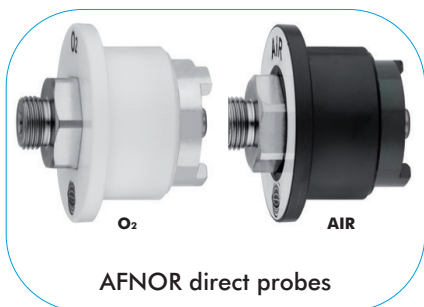


RAIL MOUNTING SYSTEMS

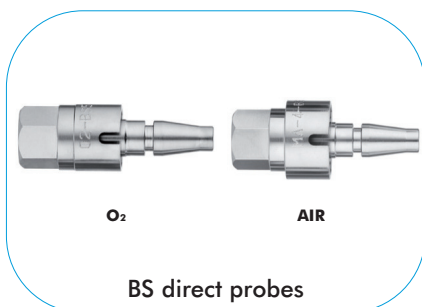


Others standards available upon request.

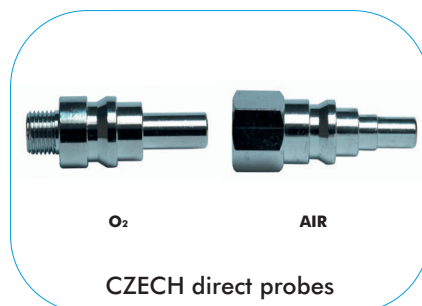
DIRECT PROBES



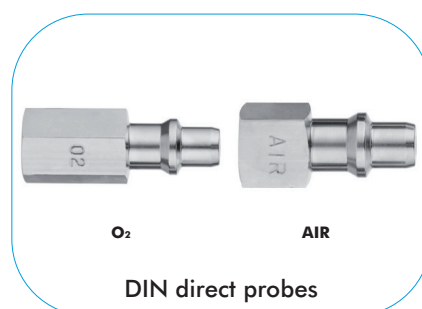
AFNOR direct probes



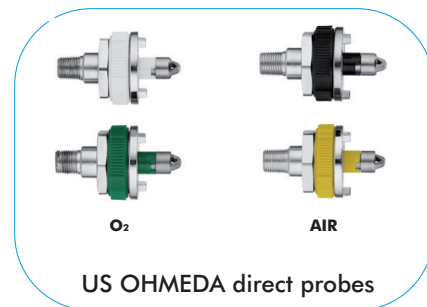
BS direct probes



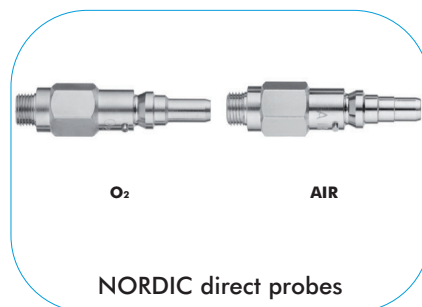
CZECH direct probes



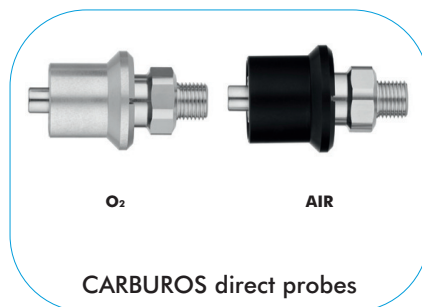
DIN direct probes



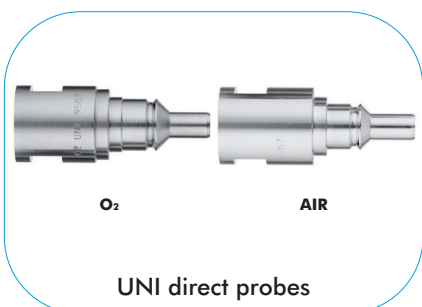
US OHMEDA direct probes



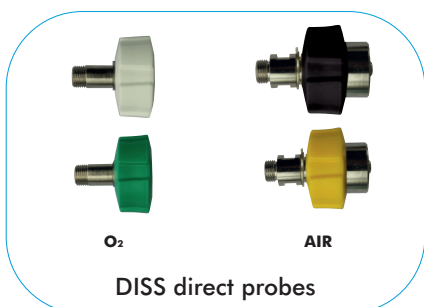
NORDIC direct probes



CARBUROS direct probes



UNI direct probes



DISS direct probes



Others standards available upon request.

RTM3

The RTM3 flowmeter with floating ball is used to adjust and measure the flow of a gas that is to be delivered to patients through the respiratory tract. The RTM3 should be connected to a source of pressured gas on the wall either using a direct probe or a rail mounting system. It must be fitted at its outlet either with a humidifier/nebulizer or with an outlet tubing nipple.

Main technical features:

Medical device of glass Ila.

In compliance with the EN ISO 15002: 2008 standard.

Inlet pressure : 4.5 bar $\pm$ 0.5 bar (O₂)
4.5 bar $\pm$ 0.5 bar (Air)

- **Flowmeter with compensated pressure** ensuring perfect flowrate stability and accuracy. The scale working pressure is the same as the pressure of the network so that the scale is not affected by any counter-pressure.
- **New type of "cartridge" knob**, extremely reliable, easy-to-clean and ensuring an optimized adjustment. Perfect tightness of the knob thanks to its polyamide seat.

*The knob was tested under pressurized working conditions during more than 10,000 cycles (which corresponds to 5 openings / closings every day during more than 5 years) without showing any leakage after closing. **This allows us to guarantee the closing of the knob during 5 years without any leakage.***

- **Monoblock scale cover made of polyamide** for a higher sturdiness and a greater safety. The inopportune unscrewing of the monoblock scale cover is not possible. Patients have no access to the scale.
- **Expanded scale** providing higher reading accuracy for low flowrates (only for 05 l/min and 15 l/min RTM3 flowmeters).
- **Filter at the scale inlet** protecting the device against any gas network impurities and thus ensuring the protection of both the patient and the flowmeter.
- Body made of nickel-plated brass, very strong.
- Flowmeter MRI compatible.
- Normative information (gas name, CE marking, signs related to the use of the device) are mentioned on a self-adhesive ring for a better reading and immediate identification of a TM device. The identification ring is protected against tarnishing and wear & tear thanks to the monoblock cover.
- **A unit serial number is engraved on the body of each flowmeter** ensuring its identification and traceability. 8 digits number indicating the manufacturing year and month as well as the unit serial number of the device.

Many versions available:

Available gases & flowrates:

- OXYGEN & MEDICAL AIR: 1.5l/min, 5l/min, 15l/min, 30l/min
- CO₂: 12l/min
- CARBOGEN: 15l/min

- Inlets: 12x100F - 1/4G M - 1/8NPT F - 3/8"BSP F.
- Outlets: 12x125 M - 9/16" M - 1/2" BS F - 1/4G M.
- Available configurations: Single, Twin and DUO.
- Available connections to the wall outlet: Direct probe or Rail mounting system.
- Standards: AFNOR (French Standard) - BS (British Standard) DIN (German Standard) - US OHMEDA DIAMOND (American standard) - NORDIC (Scandinavian Standard) UNI (Italian Standard) - DISS (American Standard).
- Weight (without direct probe): 275 g.
- Dimensions (without direct probe):
Height 145 mm x width 35 mm x depth 70 mm.

Use, cleaning and maintenance:

The RTM3 flowmeter must be connected vertically. Then just open the knob and adjust the position of the floating ball according to the required flowrate (reading in the middle of the ball).

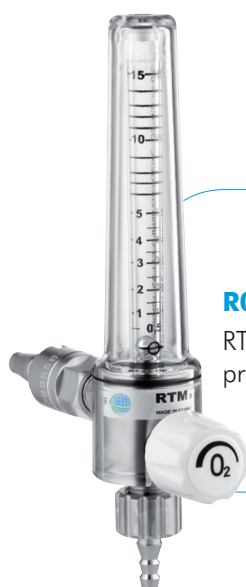
Clean the outside of the device with water and soap. Rinse and dry. If using disinfecting products please check their compatibility with plastics. Do not lay under water.

Device to be serviced every 1 to 3 years according to intensive use, if any.

Accessories:

- Tubing nipple (1 part) or tubing nipple (2 parts) ❶
- Switch or Flow-Switch ❷
- Humidifier: CCO model (250 ml) or TMS model (500ml) ❸

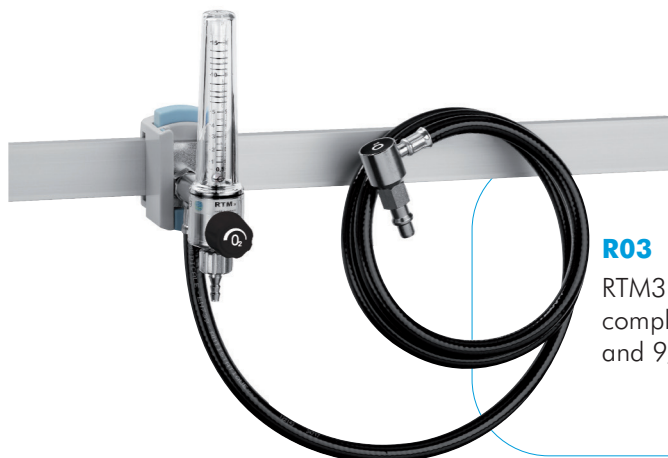


**R01**

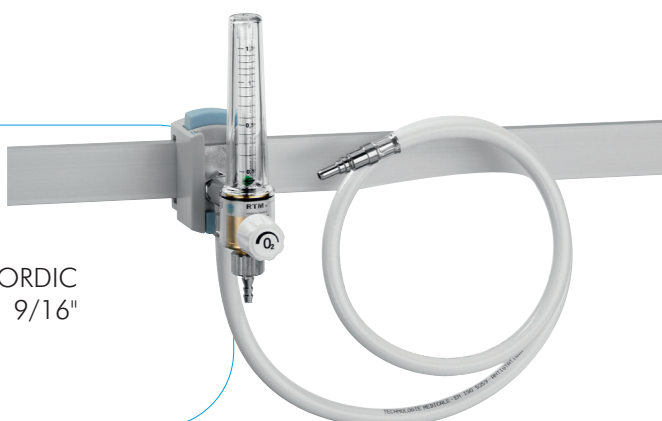
RTM3 O₂ 15 l/min mounted with BS direct probe and 9/16" outlet tubing nipple

**R02**

RTM3 O₂ 05 l/min mounted with DIN direct probe and 250 ml CCO humidifier

**R03**

RTM3 O₂ 15 l/min mounted with DIN complete rail mounting system (neutral) and 9/16" outlet tubing nipple

**R04**

RTM3 O₂ 1.5 l/min mounted with NORDIC complete rail mounting system and 9/16" outlet tubing nipple

**R05**

RTM3 O₂ 15 l/min mounted with UNI direct probe and 500 ml TMS humidifier

R06

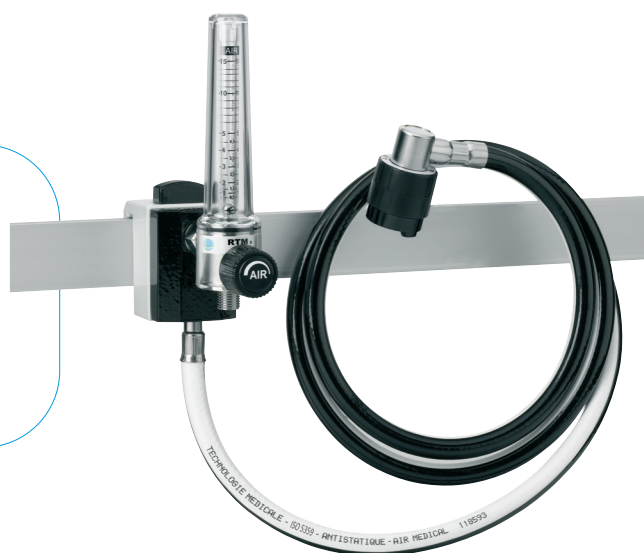
Twin RTM3 O₂ 15-30 l/min mounted with AFNOR direct probe and 12 x 125 outlet tubing nipples

**R07**

RTM3 AIR 05 l/min mounted with BS direct probe and 1/2" BS outlet tubing nipple

R08

RTM3 AIR 15 l/min mounted with AFNOR complete rail mounting system (with metal clamp)



RTM3 DUO FLOWMETER

Patented model

Double outlet integrated in the body of the flowmeter:

- ▶ One horizontal outlet tubing nipple;
- ▶ One vertical central threaded outlet to connect a humidifier (outlet thread 12x125 M and 9/16" M available).

Thanks to this DUO system there is no need to screw and unscrew the outlet tubing nipple or the humidifier.

The saving of time is really appreciated compared to a standard flowmeter and the risk of losing the nipple is avoided.

The user can choose between 3 positions and can switch from one position to another without removing the nipple or the humidifier.

- ▶ **1st position:** the gas flow is delivered through the nipple.
- ▶ **2nd position:** the gas flow is cut off. Parking position.
- ▶ **3rd position:** the gas flow goes through the vertical central outlet to which you can connect either a CCO humidifier (250 ml) or a TMS humidifier (500 ml) or any other model (single-use humidifier, nebulizer).

Also available with a complete rail mounting system.



R09

RTM3 DUO O₂ 15 l/min with AFNOR direct probe

To convert the standard RTM3 flowmeters into DUO flowmeters the solution is :

TM FLOW-SWITCH OR SWITCH

- ▶ **Flow-Switch: model with ring** (R10)
- ▶ **Switch: model with knob** (R11)

Both Flow-Switch and Switch can be screwed onto any standard flowmeter. They enable you to deliver a gas flow either through the outlet tubing nipple or through a humidifier.

Available with 12x125 or 9/16" threaded inlet and outlet.



R10

R11



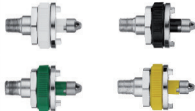


AFNOR French Standard		RTM3 FLOWMETERS WITH FLOATING BALL					
OXYGEN (O ₂)	Flowrates l/min	Single	Single	Single	Single	Twin	DUO
MEDICAL AIR		1.5	05	15	30	15-15	15
Inlet thread: 12 x 100 F	Outlet thread: 12x125M	17579	14801	14803	14805	14811	14815
		X	14696	14683	14685	14691	14693
	Outlet thread: 9/16" M	17587	14851	14855	14859	14866	14873
		X	14709	14713	14717	14724	-
Inlet thread: 1/4 G M	Outlet thread: 12x125M	17610	14800	14802	14804	14810	14814
		X	14680	14682	14684	14690	-
	Outlet thread: 9/16" M	17591	14849	14853	14857	14865	14871
		X	14707	14711	14715	14723	-
Mounted with AFNOR direct probe 	Outlet thread: 12x125M	17581	14030	14038	14046	14071	14078
		X	13883	13891	13899	13924	13928
	With nipple*: 12 x 125	17583	14032	14040	14048	14073	X
		X	13885	13893	13901	13926	X
	Outlet thread: 9/16" M	17588	14130	14134	14138	14150	14155
		X	13968	13972	13976	13988	-
	With nipple*: 9/16" M	17589	14131	14135	14139	14151	X
		X	13969	13973	13977	13989	X
Mounted with AFNOR complete rail mounting system (polycarbonate clamp) 	Outlet thread: 12x125M	17612	14026	14034	14042	14068	-
		X	13879	13887	13895	13921	-
	With nipple*: 12 x 125	17614	14028	14036	14044	14070	X
		X	13881	13889	13897	13923	X
	Outlet thread: 9/16" M	17592	14128	14132	14136	14148	-
		X	13966	13970	13974	13986	-
	With nipple*: 9/16" M	17593	14129	14133	14137	14149	X
		X	13967	13971	13975	13987	X

BS British Standard		RTM3 FLOWMETERS WITH FLOATING BALL					
OXYGEN (O ₂)	Flowrates l/min	Single	Single	Single	Single	Twin	DUO
MEDICAL AIR		1.5	05	15	30	15-15	15
Inlet thread: 1/4 G M	Outlet thread: 9/16" M	17591	14849	14853	14857	14865	14871
		X	14707	14711	14715	14723	-
	Outlet thread: 1/2" BS F	17574	14752	14754	14756	14760	X
		X	14659	14661	14663	14667	X
Mounted with BS direct probe 	Outlet thread: 9/16" M	17594	14398	14404	14410	14424	14430
		X	14278	14284	14290	14304	-
	With nipple*: 9/16" M	17595	14399	14405	14411	14425	X
		X	14279	14285	14291	14305	X
Mounted with BS complete rail mounting system (polycarbonate clamp) 	Outlet thread: 9/16" M	17596	14400	14406	14412	14426	14431
		X	14280	14286	14292	14306	-
	With nipple*: 9/16" M	17597	14401	14407	14413	14427	X
		X	14281	14287	14293	14307	X

* Outlet tubing nipple in 2 parts, metal
 - Available upon request only.
 X Not available.
 Please contact us for other flowmeter configurations.

DIN German Standard		RTM3 FLOWMETERS WITH FLOATING BALL						
OXYGEN (O ₂)		Flowrates l/min	Single	Single	Single	Single	Twin	DUO
MEDICAL AIR			1.5	05	15	30	15-15	15
Inlet thread: 1/4G M	DIN ISO	Outlet thread: 9/16" M	17591	14849	14853	14857	14865	14871
			X	14707	14711	14715	14723	-
	DIN NEUTRAL		-	-	17156	-	-	-
Mounted with DIN direct probe 	DIN ISO	Outlet thread: 9/16" M	17598	14566	14570	14574	14586	14592
			X	14494	14498	14502	14514	-
		With nipple*: 9/16"	17599	14567	14571	14575	14587	-
			X	14495	14499	14503	14515	X
	DIN NEUTRAL	Outlet thread: 9/16" M	-	18014	17154	-	17330	-
Mounted with DIN complete rail mounting system (polycarbonate clamp) 	DIN ISO	Outlet thread: 9/16" M	17600	14568	14572	14576	14588	14593
			X	14496	14500	14504	14516	-
		With nipple*: 9/16"	17601	14569	14573	14577	14589	X
			X	14497	14501	14505	14517	X
	DIN NEUTRAL	Outlet thread: 9/16" M	-	18013	18012	-	-	-
			X	-	-	-	-	-

US OHMEDA American Standard		RTM3 FLOWMETERS WITH FLOATING BALL					
OXYGEN (O ₂)							
MEDICAL AIR / ISO							
MEDICAL AIR / ISO	Flowrates l/min	Single 1.5	Single 05	Single 15	Single 30	Twin 15-15	DUO 15
MEDICAL AIR / US							
Inlet thread: 1/4G M	Outlet thread: 9/16" M	17591 X	14849 14707	14853 14711	14857 14715	14865 14723	14871 -
Inlet thread: 1/8NPT F	Outlet thread: 9/16" M	17706 X	14850 14726	14854 14730	14858 14734	17080 -	14872 -
Mounted with US OHMEDA direct probe 	Outlet thread: 9/16" M	-	14917	14921	14925	-	-
		-	17997	17999	-	-	-
		X	14893	14897	14901	-	-
		X	18001	18003	-	-	-
	With nipple*: 9/16" M	-	14918	14922	14926	-	X
		X	14894	14898	14902	-	X
Mounted with US OHMEDA complete rail mounting system (polycarbonate clamp) 	Outlet thread: 9/16" M	-	14915	14919	14923	-	-
		-	17996	17998	-	-	-
		X	14891	14895	14899	-	-
		X	18000	18002	-	-	-
	With nipple*: 9/16" M	-	14916	14920	14924	-	X
		X	14892	14896	14900	-	X



* Outlet tubing nipple in 2 parts, metal
 - Available upon request only.
X Not available.
 Please contact us for other flowmeter configurations.

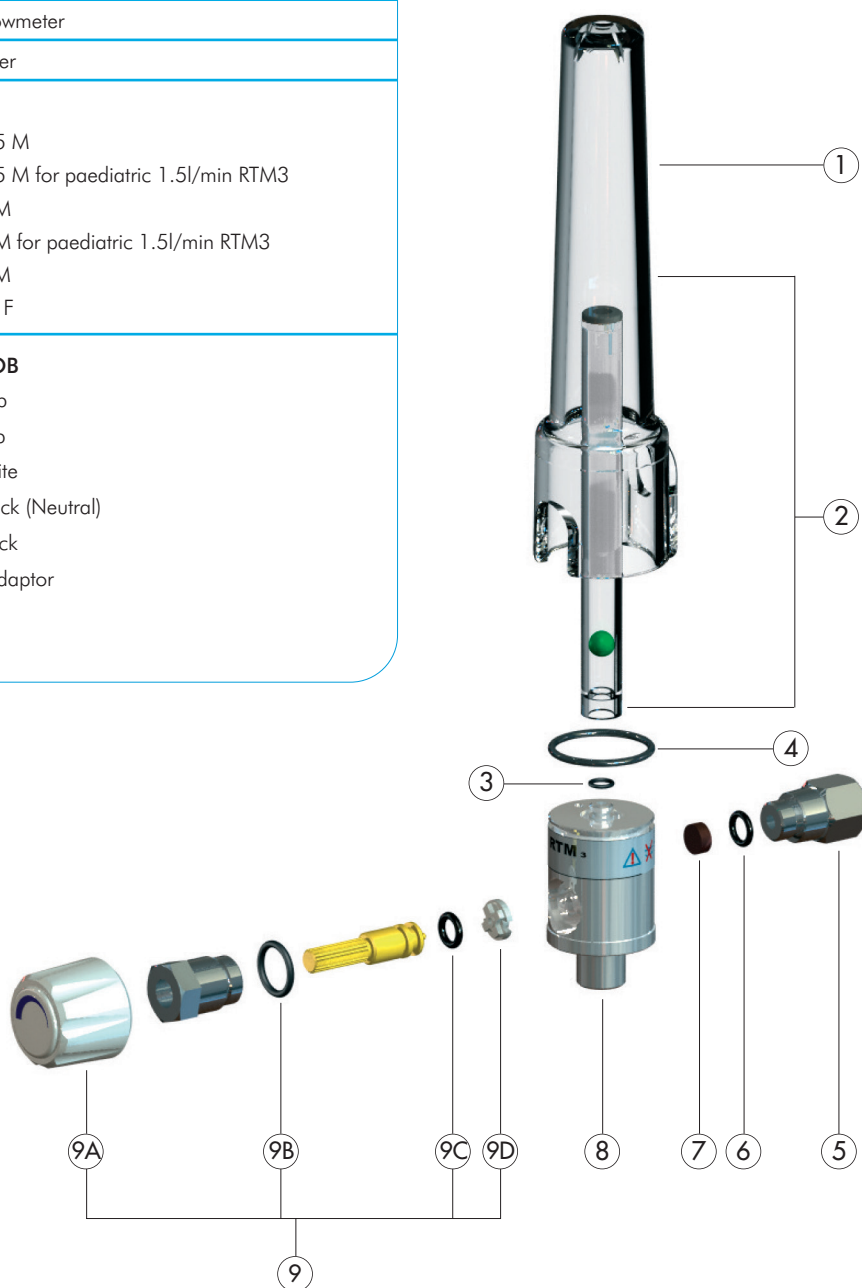


NORDIC Scandinavian Standard		RTM3 FLOWMETERS WITH FLOATING BALL					
OXYGEN (O ₂)	Flowrates l/min	Single	Single	Single	Single	Twin	DUO
MEDICAL AIR		1.5	05	15	30	15-15	15
Inlet thread: 1/4G M	Outlet thread: 9/16" M	17591	14849	14853	14857	14865	14871
		X	14707	14711	14715	14723	-
Inlet thread: 1/8NPT F	Outlet thread: 9/16" M	17607	14850	14854	14858	17080	14872
		X	14726	14730	14734	-	-
Mounted with NORDIC direct probe 	Outlet thread: 9/16" M	X	14638	14643	14648	-	-
		X	14611	14616	14621	-	-
	With nipple*: 9/16" M	17609	14639	14644	14649	-	X
		X	14612	14617	14622	-	X
Mounted with NORDIC complete rail mounting system (polycarbonate clamp) 	Outlet thread: 9/16" M	17602	14635	14640	14645	-	-
		X	14608	14613	14618	-	-
	With nipple*: 9/16" M	17603	14637	14642	14647	-	X
		X	14610	14615	14620	-	X

UNI Italian Standard		RTM3 FLOWMETERS WITH FLOATING BALL					
OXYGEN (O ₂)	Flowrates l/min	Single	Single	Single	Single	Twin	DUO
MEDICAL AIR		1.5	05	15	30	15-15	15
Inlet thread: 1/4G M	Outlet thread: 1/4G M	X	14770	14772	14774	14778	-
		X	14668	14670	14672	-	-
	Outlet thread: 9/16" M	17591	14849	14853	14857	14865	14871
		X	14707	14711	14715	14723	-
Mounted with UNI direct probe 	Outlet thread: 1/4G M	X	14945	14949	14953	17428	17431
		X	14933	14937	14941	-	17432
	With nipple*: 1/4G M	X	14946	14950	14954	-	-
		X	14934	14938	14942	-	-
	Outlet thread: 9/16" M	18005	18004	18006	18007	18008	18009
		X	-	-	-	-	-
Mounted with UNI complete rail mounting system (polycarbonate clamp) 	Outlet thread: 1/4G M	X	14947	14951	14955	-	-
		X	14935	14939	14943	-	-
	With nipple*: 1/4G M	X	14948	14952	14956	-	-
		X	14936	14940	14944	-	-
	Outlet thread: 9/16" M	X	-	18010	-	-	-
		X	-	-	-	-	-

* Outlet tubing nipple in 2 parts, metal
 - Available upon request only.
 X Not available.
 Please contact us for other flowmeter configurations.

Reference		Description
1	18783	Monobloc scale cover in polyamide
2	O ₂	COMPLETE SCALE
		17570 Complete scale 1.5 l/min (paediatric)
		16968 Complete scale 05 l/min 4.5 bar
		16969 Complete scale 15 l/min 4.5 bar
		16970 Complete scale 30 l/min 4.5 bar
	AIR	16965 Complete scale 05 l/min 4.5 bar
		16966 Complete scale 15 l/min 4.5 bar
		16967 Complete scale 30 l/min 4.5 bar
3	11131	Gasket for scale bottom
4	11408	Gasket for scale cover
5	11174	Inlet adaptorator 12 x 100F
	11178	Inlet adaptorator 1/4G M
	11176	Inlet adaptorator 1/8NPT F
	16922	Inlet adaptorator 3/8G BSP F
6	11578	Inlet gasket for flowmeter
7	11029	Inlet flowmeter filter
8	BODY ONLY	
	11201	Body only 12x125 M
	17569	Body only 12x125 M for paediatric 1.5l/min RTM3
	11205	Body only 9/16" M
	17568	Body only 9/16" M for paediatric 1.5l/min RTM3
	11211	Body only 1/4G M
	11216	Body only 1/2"BS F
9	COMPLETE KNOB	
	16954	O ₂ complete knob
	16955	Air complete knob
9A	11198	O ₂ knob only, white
	17086	O ₂ knob only, black (Neutral)
9B	11189	Air knob only, black
9B	11684	Gasket for inlet adaptor
9C	11234	Knob axis gasket
9D	11184	Knob seat





Also available



Distributed by

**OXYGEN-THERAPY
FLOWMETERS WITH
FLOATING BALL**



**TECHNOLOGIE
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