

VA 410 with display

Stationary and mobile
flow and consumption measurement for compressed air and gases




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INTRODUCTION

Dear CS customer,

You have made the right decision by choosing a measuring instrument from CS Instruments GmbH. 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.
- Also after the purchase we do not leave you out in the cold - we offer a good after sales service.

 Our service guarantees fast help.

Measuring instrument conforms with **DIN EN 61326**

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.

CS Instruments GmbH offers no guarantee for the suitability for any other purpose and is not liable for errors which may have slipped into this operation manual. CS Instruments GmbH is 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 410 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.

INSTRUMENTS DESCRIPTION

VA 410 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
- Indication of the current value in l/min, m³/h, m³/min, l/s, ft/min, cfm and of the counter in m³ resp. l

Programming via SFA software.

- Analogue output 4...20 mA scalable
- Switching of the units between m³/h, m³/min, ft/min, l/min, l/s, cfm, m/s
- Reading out the service data

INSTALLATION DESCRIPTON

The following table shows the additionally required inlet and outlet sections depending on the existing flow

Table of additionally required inlet and outlet sections

Flow obstruction in front of the measuring section	Minimum length inlet section (L1)	Minimum length outlet section (L2)
2 90 ° bends on one level	20 x D	5 x D
2 90° bends 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.

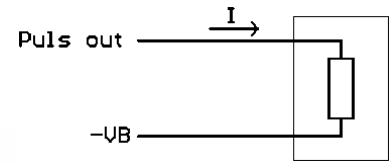
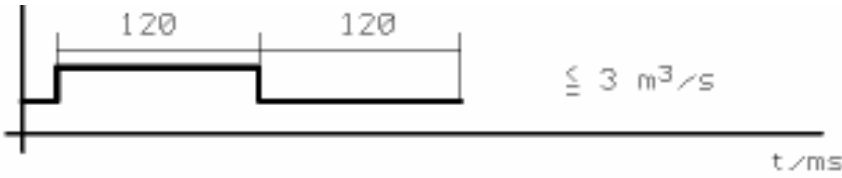
Measured variables:	l/min m³/h (standard: DIN 1945, ISO 1217 bei 20°C and 1000 mbar) mass flow rate on request (kg/s, kg/min, kg/h)
Principle of measurement:	calorimetric measurement
Sensor:	Pt45, Pt1000
Measuring medium:	air, gases
Operating temperature:	-30 ... 140°C probe tube -30 ... 80 °C housing
Operating pressure:	up to 16 bar
Analogue output:	4 ... 20 mA (please see table in the following) max. burden < 500 Ohm

order no	description	analogue output
0695.0410	VA 410 with integrated 1/4" meas. section	4... 20 mA = 0 ... 90 l/min
0695.0411	VA 410 with integrated 1/2" meas. section	4... 20 mA = 0 ... 80 m ³ /h
0695.0412	VA 410 with integrated 3/4" meas. section	4... 20 mA = 0 ... 140 m ³ /h
0695.0413	VA 410 with integrated 1" meas. section	4... 20 mA = 0 ... 240 m ³ /h
0695.0414	VA 410 with integrated 1 1/2" meas. section	4... 20 mA = 0 ... 400 m ³ /h

Pulse output:	1 pulse per m³ resp. l (see pulse diagram on page 6),
Power supply:	12 to 30 VDC smoothed ± 15%
Power input:	max. 80 mA at 24 VDC
Accuracy:	± 3% m. v. ± 2% m. v. (option via 5 point ISO precision calibration)
Display:	Flow in m³/h (1/2" bis 1 1/2"), l/min (1/4") Counter in m³ (1/2" bis 1 1/2"), resp. l (1/4") Measured values max. 6 digits, counter max. up to 99,999,999 l resp. m³, then drops back to 0
Units:	m³/h resp. l/min (standard factory settings) Further units selectable via software: m³/min, l/s, ft/min, cfm
Mounting thread:	1/4", 1/2", 3/4", 1", 1 1/2"
Material	Measuring section: Stainless steel 1,4301

PULSE SIGNALS/PULSE LENGTHS

Pulse output signal indication

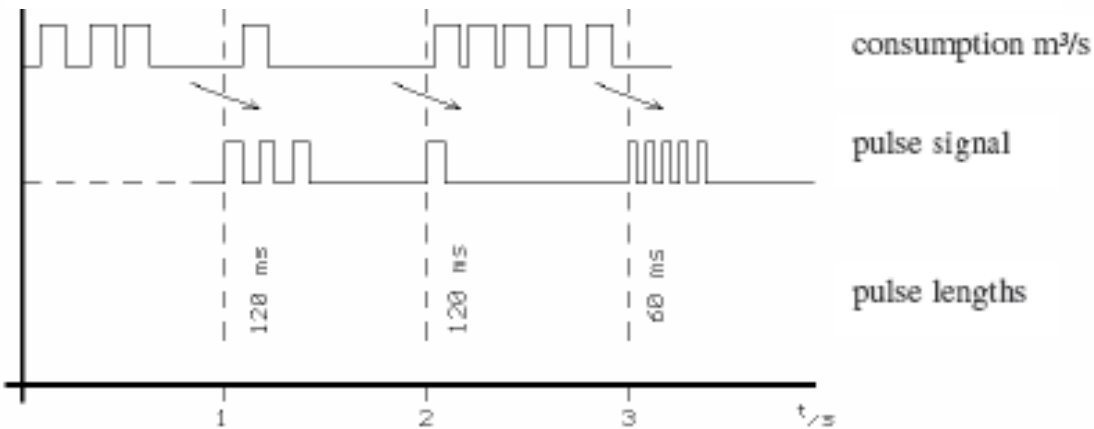


Pulse output:

max. voltage
pulse +P = +VB (12 .. 30 VDC),
active signal
max. current I = 10 mA

Internal pulse receiver:

The numbers of m^3 per second are summed up and indicated after one second.



Consumption-depending pulse lengths

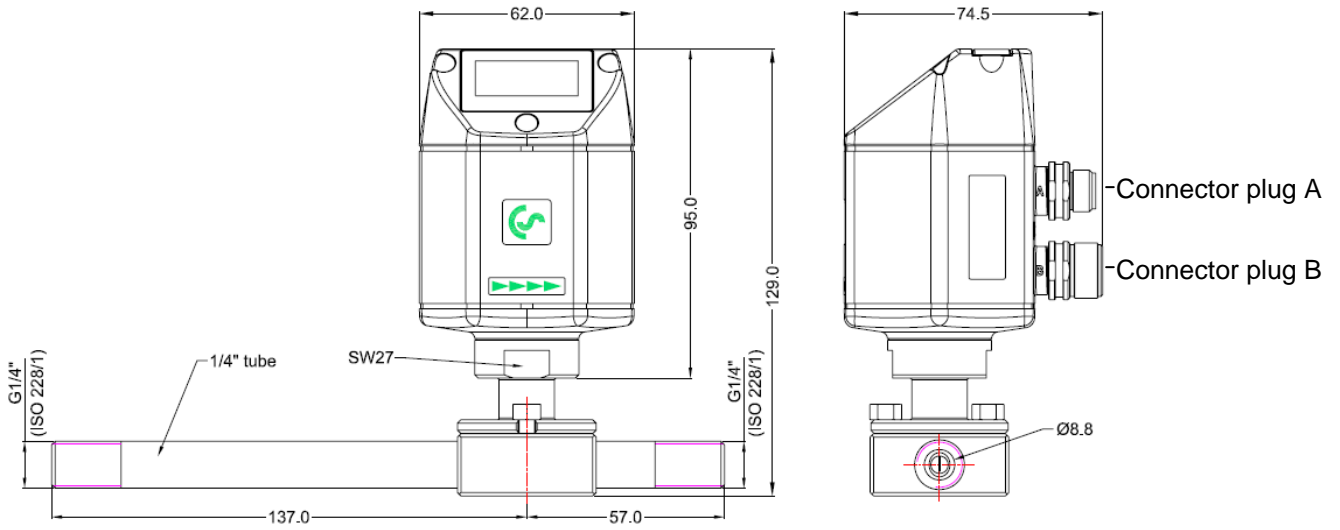
flow [m^3/sec]	pulse length [msec]	max. consumption [m^3/min]	max. consumption [m^3/h]
up to 3	120	180	10800
from 3	60	480	28800
from 8	30	960	57600

MEASURING RANGES

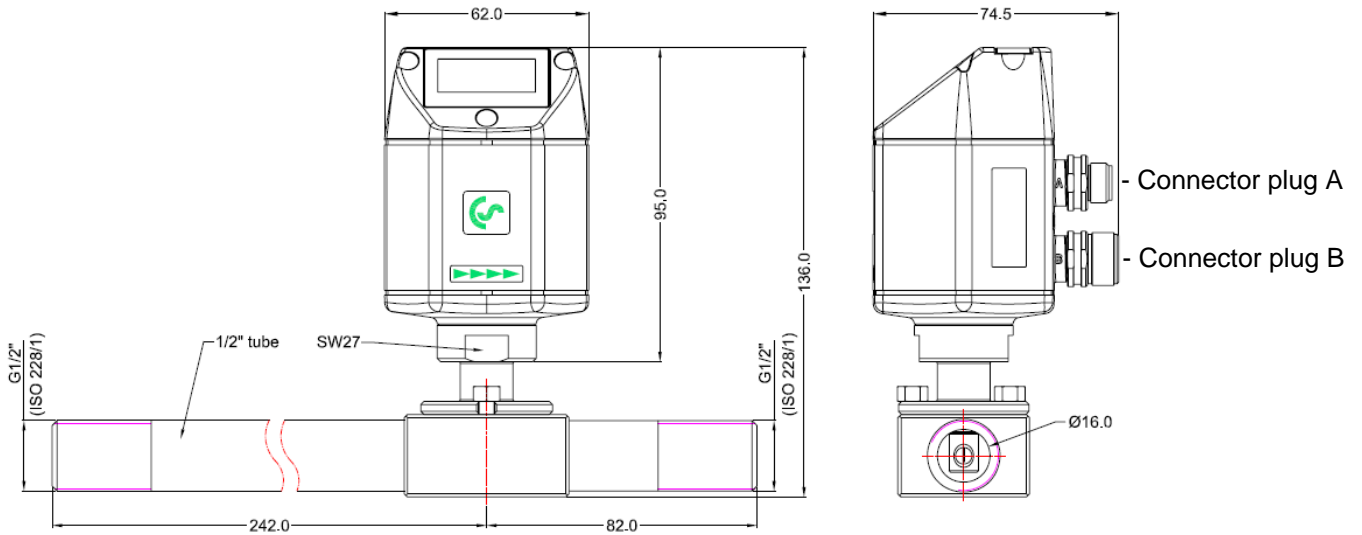
Flow measuring ranges

inner diameter			VA 410	Consumption
inch	mm		meas. ranges from...to	Standard setting
1/4"	8,8	DN 10	0.8 ... 90 l/min	l
1/2"	16.1	DN 15	0.2 ... 80 m^3/h	m^3
3/4"	21.7	DN 20	0.2 ... 140 m^3/h	m^3
1"	27.3	DN 25	0.2 ... 240 m^3/h	m^3
1 1/2"	41.8	DN 40	1.8 ... 400 m^3/h	m^3

DRAWING OF THE INSTRUMENT/INSTRUMENTS DIMENSIONS

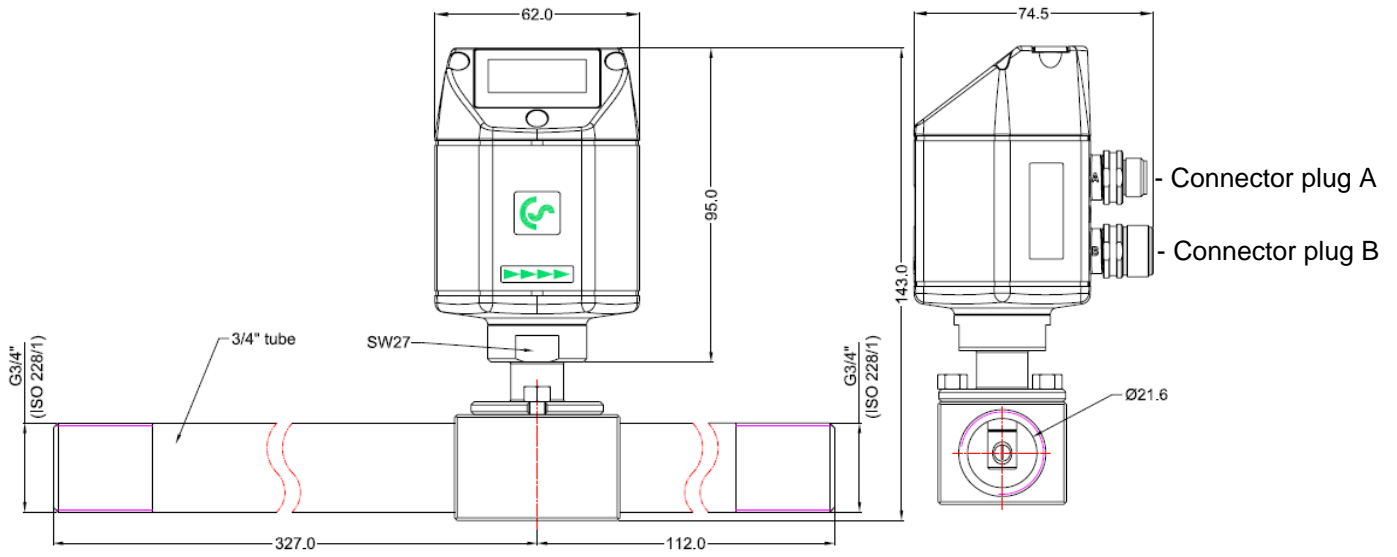


VA 410—1/4"

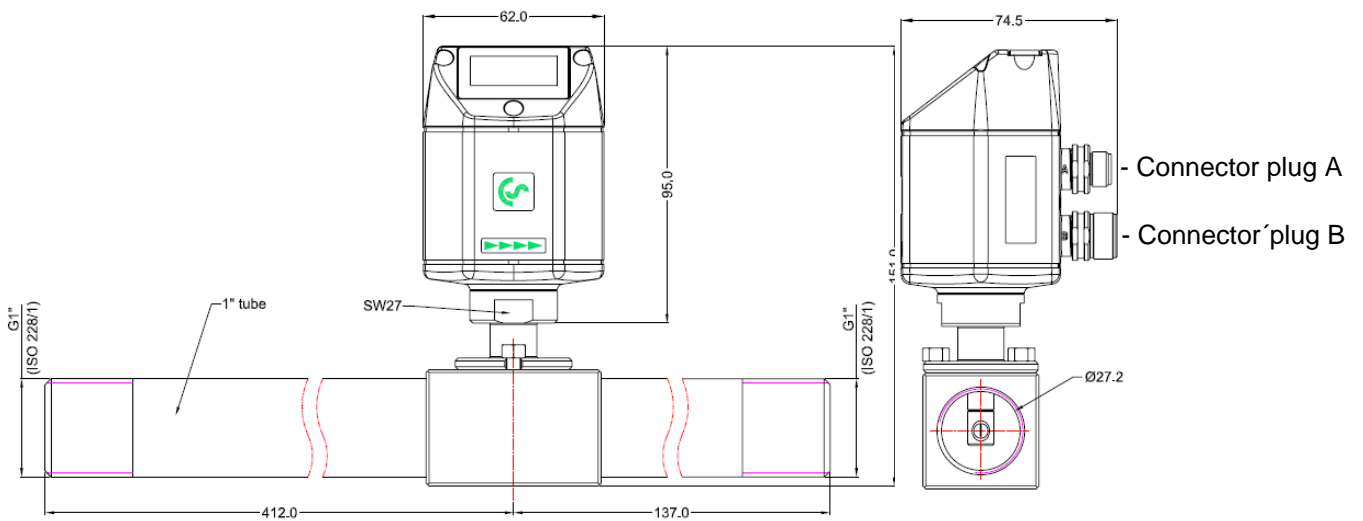


VA 410—1/2"

DRAWING OF THE INSTRUMENT/INSTRUMENTS DIMENSIONS

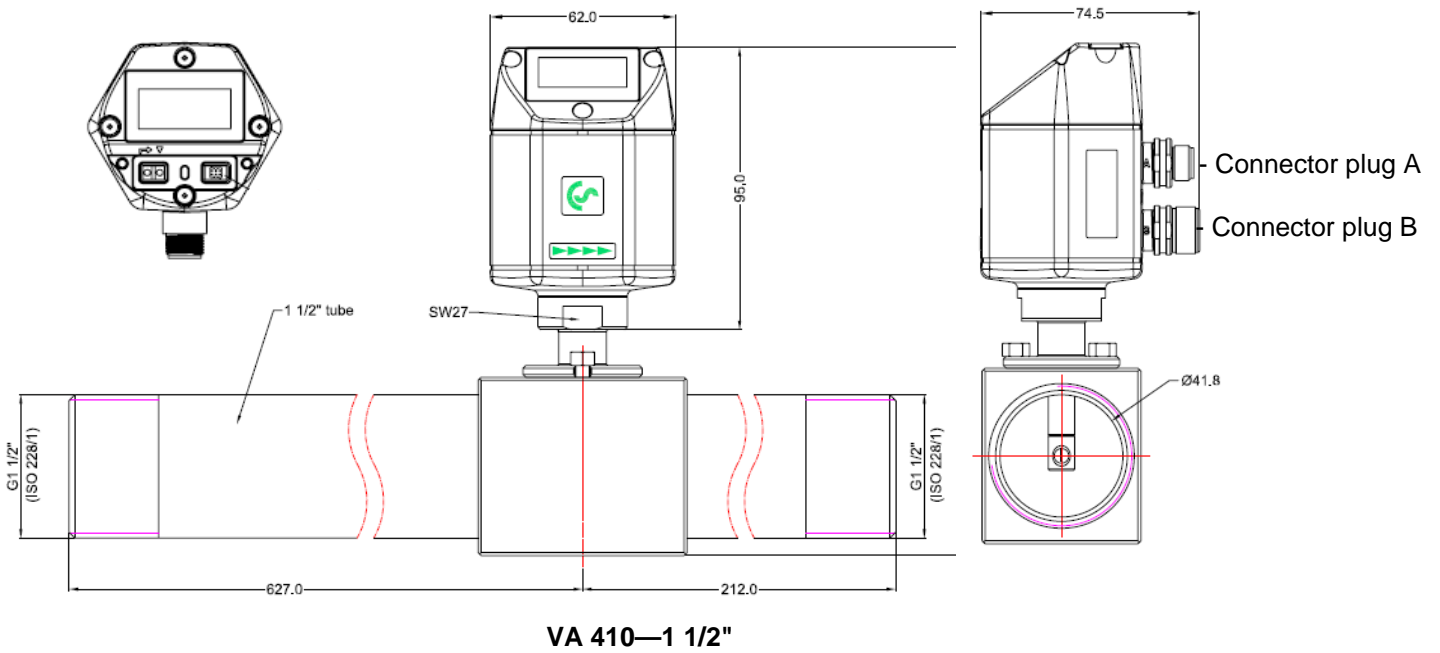


VA 410—3/4"



VA 410—1"

DRAWING OF THE INSTRUMENT/INSTRUMENTS DIMENSIONS



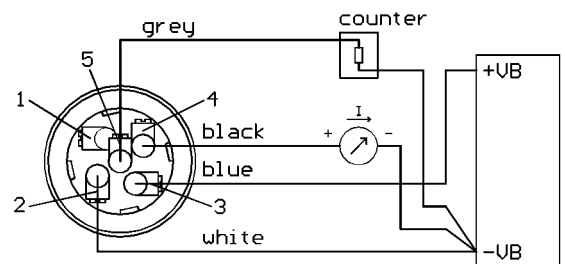
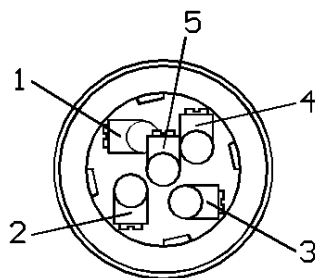
		Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
VA 410	Connector A	SDI	-VB	+VB	+I 4... 20 mA	+P Impuls
	Connection cable A 0554.0104 (5 m) 0554.0105 (10 m)	brown	white	blue	black	grey
	Connector B*	NC	NC	NC	NC	NC

SDI	Digital signal (internal data transfer)
-VB	Negative supply voltage 0 V
+VB	Positive supply voltage 12...30 VDC smoothed
+I	Positive 4...20 mA signal
+P Impuls	Pulse output +VB see page 7
NC	Not connected

*** Connector plug B without any function! Just for internal use!**

M12 connector plug

If no connection cable (0553 0104, 0553 0105) 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.



Connector plug



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.

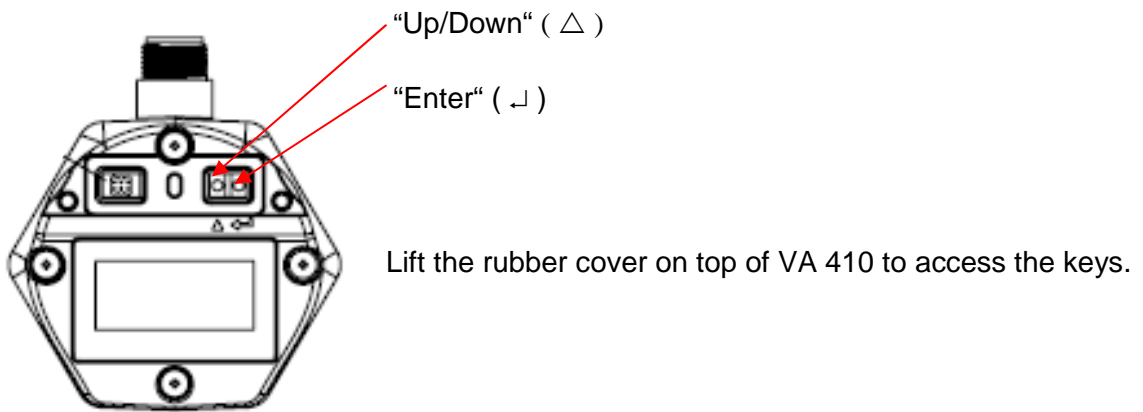
Spare parts and repair

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

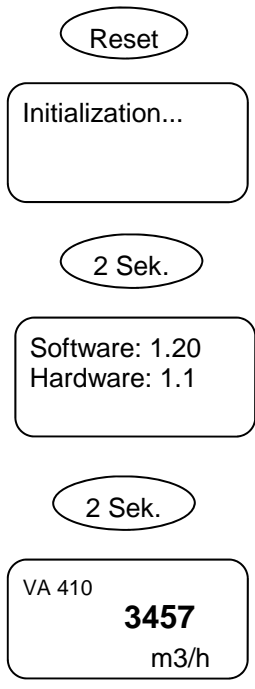
If the measuring device is used in important company installations we recommend to keep a spare measuring system ready.

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.



Normal display function



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

Ex factory VA 410 is programmed to show volume flow and total consumption. Via the configuration menu up to 3 channels can be configured for on-line display. VA 410 will toggle between the channels every 2 seconds

Configuration setting

VA 410 is usually configured ex factory according to the customer settings ordered. In case settings have to be changed, the user has to keep the Enter key (↵) pressed while powering up the device.

IS DS 300 connected?
Yes / No

Enter "Yes" if there is a DS 300 connected to the VA 410, otherwise "No". Confirm setting with Enter key (↵).

Display 1
Volume flow

VA 410 can display up to 3 channels, which are volumetric flow or mass flow, velocity and total consumption. Use the Up/down key (△) to select the desired channel. If no further channel is wanted, please select "nothing". The channels are toggled during normal operation mode every 2 seconds.

Consumption
3457

In this step the total consumption counter can be reset to zero.

Contrast setting
Up change
Enter OK

Display contrast can be adjusted.

Save changes
No Yes

Press Enter key (↵) to confirm the setting changes or press Up/down key (△) to discard all changes.

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 410.

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 410 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.

ORDERING DATA

Order no.	Description
0695.0410	VA 410 consumption counter with integrated 1/4" measuring section
0695.0411	VA 410 consumption counter with integrated 1/2" measuring section
0695.0412	VA 410 consumption counter with integrated 3/4" measuring section
0695.0413	VA 410 consumption counter with integrated 1" measuring section
0695.0414	VA 410 consumption counter with integrated 1 1/2" 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
3200.0001	5 point precision calibration with ISO certificate
0554.2005	CS Service Software for VA/FA 400 sensors including PC connection set, USB connection and interface adapter as well as CS Soft Professional software for recording the measured data
0699.3395	Mains adapter in wall housing 230 VAC/24 VDC
on request	External wall display

EC 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)**

for the following instruments of CS Instruments GmbH:

Pressure dewpoint meters: FA 400 and accessories

Flow and consumption meters: VA 400/VA 410/DS 300
and accessories

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

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

CS Instruments GmbH

Harrislee, 27 March 2007

The Management



This declaration does not guarantee any product characteristics.
Please do also adhere to the safety instructions stated in the enclosed documentation.

EC Declaration of Conformity

according to the guideline of the Board for Approximation
of Laws of the member states on the
electromagnetic compatibility (89/336/EWG)

Pressure dew point meters	FA 400, FA 410, FA 415, FA 416, FA 300-1, FA 300-2, FA 300-2 Ex, FA 200-2
Flow and consumption meters	VA 300, VA 400, VA 410, DS 300

CS Instruments GmbH as the manufacturer herewith declares that the above mentioned pressure dew point, flow and consumption meters correspond with the requirements of the following guideline:

Electromagnetic compatibility (EMV) (89/336/EWG)

The assessment of the instrument was subject to the following standards:

Emitted interference: EN 61326: 1997 + A1; 1998 + A2: 2001
Interference resistance: EN 61326: 1997 + A1: 1998 + A2: 2001

CS Instruments GmbH

Harrislee, 27 March 2007

The Management



This declaration does not guarantee any product characteristics.

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