Industrial gas meter with M-Bus for compressed air, natural gas, biogas...

Compressed air and natural gas meters with M-Bus now also directly from the manufacturer.

CS Instruments GmbH & Co. KG was the OEM-manufacturer of the ENDYS AIR compressed air meter with M-Bus from 2010 to the end of 2017.

The ENDYS AIR products have been marketed exclusively through Hochhut GmbH, which now works with another manufacturer.

The CS Instruments GmbH & Co. KG now offers the products themselves.

The successor product of ENDYS AIR now offers all the possibilities of digitization and is the ideal consumption meter for Industry 4.0.

The successor products of the well-known ENDYS AIR company Hochhuth have been metrologically improved and completely revised and in addition to the M-Bus interface also have the following additional outputs or bus systems:

- Modbus RTU
- Modbus TCP or TCP PoE
- Profibus, Profinet
- 4..20 mA and pulse
- Hard (in preparation)

The VA 520, VA 500, VA 550 and VA 570 industrial gas meters with M-Bus are the ideal compressed air meters or consumption meters for natural gas, biogas, methane, nitrogen, argon, carbon dioxide for consumption measurement and flow measurement.

VA 520, VA 500, VA 550, VA 570 with M-Bus are ideal for conversion or retrofitting and for new installations of gas meters, compressed air meters, flow meters, etc. to existing or new energy management software according to DIN ISO 50001 and DIN ISO 16247 and building management systems.

Advantages:

- Direct display in Nm3/h, or Nl/min and temperature in °C
- Calorimetric measuring principle - no additional pressure and temperature measurement necessary
- High measurement accuracy ¼ to 3 inches
- VA 500 and VA 550 insert version from ¼ inch to DN 400 / DN 500

www.cs-instruments.com
VA 520 Compressed air meter with M-Bus

4...20 mA output for actual flow
Pulse output for total flow (counter reading), galvanically isolated or M-Bus (optionally)
Measuring device removable: Dismounting of the whole measuring section is not necessary, no bypass required

Easy installation into the existing pipeline due to integrated measuring section and welding neck according to (EN 1092-1 PN 40)
High measuring accuracy due to defined measuring section (inlet and outlet section)

Intelligent solutions for accurate flow measurement for compressed air and gases
The new affordable flow sensors VA 520 work according to the approved calorimetric measuring principle. An additional pressure and temperature compensation is not necessary. Contrary to the previously used bridge circuit the newly developed evaluation electronics records all measured values digitally. This enables very precise and fast measurements. Due to the new evaluation electronics all VA 520 have an integrated Modbus output as a standard. So all parameters can be transferred via Modbus.

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 3 inch) with the new affordable flow sensor VA 520.
VA 500 flow sensors are available for larger pipe diameters from DN 50 to DN 1000. Apart from compressed air also other gases like e.g. nitrogen, oxygen and CO2 can be measured.

Display shows two values at the same time:
• Actual flow in m³/h, l/min...
• Total consumption (counter reading) in m³, l
• resp. temperature measurement

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

At the touch of a button
• Reset of counter reading
• selection of units
• zero-point adjustment, leak flow volume suppression

Application range of VA 520:
• 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, CO2, oxygen, argon, nitrous oxide
• Flow measurement at nitrogen generators

Due to the new evaluation electronics all VA 520 have an integrated Modbus output as a standard. So all parameters can be transferred via Modbus. 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 3 inch) with the new affordable flow sensor VA 520.
VA 520 with M-Bus

Flow measuring ranges VA 520 for compressed air (ISO 1217:1000 mbar, 20 °C)

<table>
<thead>
<tr>
<th>Anschlussgewinde</th>
<th>AD Rohr mm</th>
<th>ID Rohr mm</th>
<th>Messbereich von bis</th>
<th>L mm</th>
<th>L1 mm</th>
<th>H mm</th>
<th>H1 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>R 1/4&quot;</td>
<td>13,7</td>
<td>8,9</td>
<td>0,8</td>
<td>90 m³/h</td>
<td>194</td>
<td>137</td>
<td>174,7</td>
</tr>
<tr>
<td>R 1/2&quot;</td>
<td>21,3</td>
<td>16,1</td>
<td>0,2</td>
<td>90 m³/h</td>
<td>300</td>
<td>210</td>
<td>176,4</td>
</tr>
<tr>
<td>R 3/4&quot;</td>
<td>26,9</td>
<td>21,7</td>
<td>0,3</td>
<td>170 m³/h</td>
<td>475</td>
<td>275</td>
<td>179,2</td>
</tr>
<tr>
<td>R 1&quot;</td>
<td>33,7</td>
<td>27,3</td>
<td>0,5</td>
<td>290 m³/h</td>
<td>475</td>
<td>275</td>
<td>182,6</td>
</tr>
<tr>
<td>R 1 1/4&quot;</td>
<td>42,4</td>
<td>36,0</td>
<td>0,7</td>
<td>530 m³/h</td>
<td>475</td>
<td>275</td>
<td>186,9</td>
</tr>
<tr>
<td>R 1 1/2&quot;</td>
<td>48,3</td>
<td>41,9</td>
<td>1,0</td>
<td>730 m³/h</td>
<td>475*</td>
<td>275</td>
<td>186,9</td>
</tr>
<tr>
<td>R 2&quot;</td>
<td>60,3</td>
<td>53,1</td>
<td>2,0</td>
<td>1195 m³/h</td>
<td>475*</td>
<td>275</td>
<td>195,9</td>
</tr>
<tr>
<td>DN 65</td>
<td>76,1</td>
<td>68,9</td>
<td>4,0</td>
<td>2050 m³/h</td>
<td>475*</td>
<td>275</td>
<td>268,2</td>
</tr>
<tr>
<td>DN 80</td>
<td>88,9</td>
<td>80,9</td>
<td>5,0</td>
<td>2840 m³/h</td>
<td>475*</td>
<td>275</td>
<td>275</td>
</tr>
</tbody>
</table>

*Attention: Shorted inlet section! Please observe the recommended minimum inlet section (length = 15 x inner diameter) on site.

Technical data VA 520

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

Units:
m³/h, m³/min, l/min, l/s, ft³/min, cfm, m/s, kg/h, kg/min

Accuracy:
- ± 1.5 % of m.v. ± 0.3 % of f.s. on request
- ± 1.0 % of m.v. ± 0.3 % of f.s.

Meas. principle:
calorimetric measurement

Sensor:
Thermal mass flow sensor

Meas. medium:
air, gases

Gas types:
air, nitrogen, argon, nitrous oxide, CO₂, oxygen

Meas. range:
see table at the left

Operating temp.:
-30...80 °C

Operating pressure:
up to 16 bar optional up to PN 40

Power supply:
18...36 VDC, 5 W

Digital output:
RS 485 interface, Modbus-RTU, M-Bus (optionally)

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

Pulse output:
1 pulse per m² resp. per liter galvanically separated Pulse value on Display adjustable

Further accessories:

Closing cap for VA 520 (Material: Aluminium) 0190 0001
Closing cap for VA 520 (Material: Stainless steel 1.404) 0190 0002
CS Service Software for FA/VA sensors incl. PC connection set, USB interface and interface adapter to the sensor 0554 2007
Mains unit in wall housing for maximum 2 sensors of the series VA/FA 5xx, 100-240 V, 23 VA, 50-60 Hz / 24 VDC, 0,35 A 0554 0110
AC adapter plug 100-240 V AC/ 24 V for VA/FA 5xx 0554 0109
5 point precision calibration with ISO certificate 3200 0001
M12 – T plug for VA 500/520 to connect several sensors to a M-Bus network or Modbus network 020000823

www.cs-instruments.com
VA 570 is supplied with an integrated measuring section. The measuring sections are available in flanged version or with R resp. NPT thread.

A special feature is the removable measuring head. So the measuring unit can be removed easily and quickly for calibration or cleaning purposes without having to dismount the measuring section intricately. During this period the measuring section is sealed by a closing cap (accessory).

If you want to measure the flow of a special gas mixture please contact us. On request we are quite pleased to offer a real gas calibration under process conditions.

### Flow measuring ranges VA 570

<table>
<thead>
<tr>
<th>Inch</th>
<th>Inner pipe diameter (mm)</th>
<th>DN</th>
<th>Air</th>
<th>N2</th>
<th>Ar</th>
<th>O2</th>
<th>CO2</th>
<th>Methane natural gas (CH4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R 1/2”</td>
<td>16.1</td>
<td>DN 15</td>
<td>0.2...90</td>
<td>0.2...80</td>
<td>0.2...140</td>
<td>0.2...85</td>
<td>0.2...90</td>
<td>0.2...50</td>
</tr>
<tr>
<td>R 3/4”</td>
<td>21.7</td>
<td>DN 20</td>
<td>0.3...170</td>
<td>0.3...155</td>
<td>0.3...275</td>
<td>0.3...165</td>
<td>0.3...175</td>
<td>0.3...105</td>
</tr>
<tr>
<td>R 1”</td>
<td>27.3</td>
<td>DN 25</td>
<td>0.5...200</td>
<td>0.5...260</td>
<td>0.5...460</td>
<td>0.5...290</td>
<td>0.5...290</td>
<td>0.5...170</td>
</tr>
<tr>
<td>R 1 1/4”</td>
<td>36.0</td>
<td>DN 32</td>
<td>0.7...530</td>
<td>0.7...485</td>
<td>0.7...830</td>
<td>0.7...505</td>
<td>0.7...525</td>
<td>0.7...310</td>
</tr>
<tr>
<td>R 1 1/2”</td>
<td>41.9</td>
<td>DN 40</td>
<td>1.0...730</td>
<td>1.0...650</td>
<td>1.0...1140</td>
<td>1.0...695</td>
<td>1.0...720</td>
<td>1.0...430</td>
</tr>
<tr>
<td>R 2”</td>
<td>53.1</td>
<td>DN 50</td>
<td>2.0...1195</td>
<td>2.0...1060</td>
<td>2.0...1870</td>
<td>2.0...1140</td>
<td>2.0...1185</td>
<td>2.0...705</td>
</tr>
<tr>
<td>68.9</td>
<td>DN 65</td>
<td>4.0...2050</td>
<td>3.0...1820</td>
<td>6.0...3205</td>
<td>6.0...1955</td>
<td>4.0...2030</td>
<td>2.0...1210</td>
<td></td>
</tr>
<tr>
<td>80.9</td>
<td>DN 80</td>
<td>5.0...2840</td>
<td>5.0...2610</td>
<td>9.0...4440</td>
<td>5.0...2710</td>
<td>5.0...2810</td>
<td>3.0...1680</td>
<td></td>
</tr>
</tbody>
</table>

**Measuring ranges of further gases like:** Nitrous oxide (N2O), helium (He), propane (C3H8), biogas* (CH4/CO2 60/40) on request!
VA 570 with M-Bus
Präzise Verbrauchs-/Durchflussmessung für Druckluft und Gase

The new flow sensors VA 550/570 work according to the calorimetric measuring principle. Therefore an additional temperature and pressure compensation is not necessary.

Due to its robust design, the aluminum die cast housing, the robust sensor tip made from stainless steel 1.4571, the new VA 550/570 are suitable for demanding industrial applications. An ATEX version is available for applications in explosive areas.

For flow measurement e. g. of natural gas there is a version with a DVGW admission.

Application range:
- Ideal also for the outdoor area
- Compressed air measurement and distribution
- Leakage measurement of compressed air and gases
- Flow measurement of gases like e. g. nitrogen, argon, carbon dioxide, oxygen and so on
- Flow measurement in vacuum systems
- Flow measurement of explosive gases like natural gas, methane, propane, hydrogen with ATEX approval
- Flow measurement of corrosive, acid gases like e. g. biogas with different gas mixtures
- Measurement of oxygen and natural gas at gas burners
- Flow measurement of gas mixtures like e. g. forming gas

### Application in all sectors like e. g.:
- Chemistry, petro chemistry
- Natural gas, methane...
- Pharmaceutical industry
- Food production
- Breweries
- Diaries
- Power plants
- Semiconductor/ electronics
- Automotive industry

### VA 570 with M-Bus

<table>
<thead>
<tr>
<th>Measuring section</th>
<th>Outer pipe diam. mm</th>
<th>Inner pipe diam. mm</th>
<th>L mm</th>
<th>L1 mm</th>
<th>H mm</th>
<th>H1 mm</th>
<th>Ø D</th>
<th>Ø K</th>
<th>n x Ø L</th>
<th>A mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 15</td>
<td>21,3</td>
<td>16,1</td>
<td>300</td>
<td>210</td>
<td>213,2</td>
<td>165,7</td>
<td>95</td>
<td>65</td>
<td>4 x 14</td>
<td>20</td>
</tr>
<tr>
<td>DN 20</td>
<td>26,9</td>
<td>21,7</td>
<td>475</td>
<td>275</td>
<td>218,2</td>
<td>165,7</td>
<td>105</td>
<td>75</td>
<td>4 x 14</td>
<td>20</td>
</tr>
<tr>
<td>DN 25</td>
<td>33,7</td>
<td>27,3</td>
<td>475</td>
<td>275</td>
<td>223,2</td>
<td>165,7</td>
<td>115</td>
<td>85</td>
<td>4 x 14</td>
<td>25</td>
</tr>
<tr>
<td>DN 32</td>
<td>42,4</td>
<td>36,0</td>
<td>475</td>
<td>275</td>
<td>235,7</td>
<td>165,7</td>
<td>140</td>
<td>100</td>
<td>4 x 18</td>
<td>25</td>
</tr>
<tr>
<td>DN 40</td>
<td>48,3</td>
<td>41,9</td>
<td>475*</td>
<td>275</td>
<td>240,7</td>
<td>165,7</td>
<td>150</td>
<td>110</td>
<td>4 x 18</td>
<td>25</td>
</tr>
<tr>
<td>DN 50</td>
<td>60,3</td>
<td>53,1</td>
<td>475*</td>
<td>275</td>
<td>248,2</td>
<td>165,7</td>
<td>165</td>
<td>125</td>
<td>4 x 18</td>
<td>30</td>
</tr>
<tr>
<td>DN 65</td>
<td>76,1</td>
<td>68,9</td>
<td>475*</td>
<td>275</td>
<td>268,2</td>
<td>175,7</td>
<td>185</td>
<td>145</td>
<td>8 x 18</td>
<td>-</td>
</tr>
<tr>
<td>DN 80</td>
<td>86,9</td>
<td>80,9</td>
<td>475*</td>
<td>275</td>
<td>275,7</td>
<td>175,7</td>
<td>200</td>
<td>160</td>
<td>8 x 10</td>
<td>-</td>
</tr>
</tbody>
</table>

*Attention: Shortened inlet section! Please observe the recommended minimum inlet section (length = 15x inner diameter)

### Thread Flange DIN EN 1092-1

<table>
<thead>
<tr>
<th>Description</th>
<th>Order no.</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA 570 flow sensor with integrated DN 15 measuring section</td>
<td>0695 2570</td>
<td>0695 0570</td>
</tr>
<tr>
<td>VA 570 flow sensor with integrated DN 20 measuring section</td>
<td>0695 2571</td>
<td>0695 0571</td>
</tr>
<tr>
<td>VA 570 flow sensor with integrated DN 25 measuring section</td>
<td>0695 2572</td>
<td>0695 0572</td>
</tr>
<tr>
<td>VA 570 flow sensor with integrated DN 32 measuring section</td>
<td>0695 2573</td>
<td>0695 0573</td>
</tr>
<tr>
<td>VA 570 flow sensor with integrated DN 40 measuring section</td>
<td>0695 2574</td>
<td>0695 0574</td>
</tr>
<tr>
<td>VA 570 flow sensor with integrated DN 50 measuring section</td>
<td>0695 2575</td>
<td>0695 0575</td>
</tr>
<tr>
<td>VA 570 flow sensor with integrated DN 65 measuring section</td>
<td>0695 2576</td>
<td>0695 0576</td>
</tr>
<tr>
<td>VA 570 flow sensor with integrated DN 80 measuring section</td>
<td>0695 2577</td>
<td>0695 0577</td>
</tr>
</tbody>
</table>

Request detailed order code

*Technical data see VA 500
What are the advantages of our flow measuring technology?

1) Even under pressure, the flow sensor VA 500 is mounted by means of a standard 1/2” ball valve. During mounting and dismounting the safety ring avoids an uncontrolled ejection of the probe which may be caused by the operating pressure.

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

So the flow sensors are being mounted into existing pipelines with inner diameters of 1/2” upwards.

The exact positioning of the sensor in the middle of the pipe is granted by means of the engraved depth scale. The maximum mounting depth corresponds with the respective probe length. Example: VA 500 with probe length 220 mm has a maximum mounting depth of 220 mm.

2) If there is no suitable measuring site with a 1/2” ball valve present there are two simple possibilities to set up a measuring point:

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

By means of the drilling jig it is possible to drill under pressure through the 1/2” ball valve into the existing pipeline. The drilling chips are collected in a filter. Then the probe can be mounted as described under point 1.)

3) Due to the large measuring range of the probe even extreme requirements to the consumption measurement (high volume flow in small pipe diameters) can be met. The measuring range is depending on the pipe diameter - see table on the right hand side.
VA 500 - with M-Bus
Flow sensor for compressed air and gases

The new VA 500 for flow measurement of compressed air and gases, optionally with display for flow in m³/h and total flow in m³. Contrary to the previously used bridge circuit the newly developed evaluation electronics records all measured values digitally. This leads to a better accuracy also in case of large measuring spans of 1:1000.

Special features:

- RS 485 interface, Modbus-RTU as a standard
- Incl. temperature measurement
- Integrated display for m³/h and m³
- Usable from 1/2” to DN 1000
- Easy installation under pressure
- 4...20 mA analogue output for m³/h resp. m³/min
- Pulse output for m³ or M-Bus (optionally)
- Inner diameter adjustable via keypad
- Consumption counter resetable
- Adjustable via keys at the display: Reference conditions, “C and mbar, 4...20 mA scaling, pulse weight

Technical data VA 500

<table>
<thead>
<tr>
<th>Parameters</th>
<th>m³/h, l/min (1000 mbar, 20°C) in case of compressed air resp. Nm³/h, Nl/min (1013 mbar, 0°C) in case of gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units</td>
<td>m³/h, m³/min, l/min, l/s, ft³/min, cfm, m³/s, kg/h, kg/min</td>
</tr>
<tr>
<td>Meas.</td>
<td>diameter for volume flow calculation, counter resettable</td>
</tr>
<tr>
<td>principle:</td>
<td>calorimetric measurement</td>
</tr>
<tr>
<td>Sensor:</td>
<td>Thermal mass flow sensor</td>
</tr>
<tr>
<td>Meas.</td>
<td>air, gases</td>
</tr>
<tr>
<td>medium:</td>
<td>air, nitrogen, argon, nitrous oxide, CO₂, oxygen</td>
</tr>
<tr>
<td>Gas types</td>
<td>adjustable via external devices DS 400, DS 500, PI 500</td>
</tr>
<tr>
<td>adjustable</td>
<td>m/v: ± 1.5 % of m/v ± 0.3 % of f/s. on request ± 1.0 % of m/v ± 0.3 % of f/s.</td>
</tr>
<tr>
<td>via external</td>
<td>devices DS 400, DS 500, PI 500</td>
</tr>
<tr>
<td>Meas. range</td>
<td>see table measuring ranges page 80</td>
</tr>
<tr>
<td>Operating</td>
<td>-30...110 °C probe tube</td>
</tr>
<tr>
<td>temp.:</td>
<td>-30...80 °C housing</td>
</tr>
<tr>
<td>Operating</td>
<td>up to 50 bar</td>
</tr>
<tr>
<td>pressure:</td>
<td></td>
</tr>
<tr>
<td>Digital output:</td>
<td>RS 485 interface, Modbus RTU, M-Bus (optionally)</td>
</tr>
<tr>
<td>Analogue output:</td>
<td>4...20 mA for m³/h resp. l/min; on request: scaling for cfm,m³/min, l/min, l/s, ft³/min, m³/s</td>
</tr>
<tr>
<td>Pulse output:</td>
<td>1 pulse per m³ resp. per liter galvanically separated</td>
</tr>
<tr>
<td>Power supply:</td>
<td>18...36 VDC, 5 W</td>
</tr>
<tr>
<td>Burden:</td>
<td>&lt; 500 Q</td>
</tr>
<tr>
<td>Housing:</td>
<td>polycarbonate (IP 65)</td>
</tr>
<tr>
<td>Probe tube:</td>
<td>stainless steel, 1.4301</td>
</tr>
<tr>
<td>Mounting thread:</td>
<td>G 1/2</td>
</tr>
<tr>
<td>Ø Casing:</td>
<td>65 mm</td>
</tr>
</tbody>
</table>

Description

- VA 500 flow sensor in basic version: Standard (92.7 m/s), probe length 220 mm, without display
- Options for VA 500:
  - Display
  - Max. version (185 m/s)
  - High Speed version (224 m/s)
  - 1 % Accuracy of m. v. ± 0.3 % of f.s.
  - Ethernet-Interface for VA500/520 and FA500
  - Ethernet-Interface PoE for VA500/520 and FA500
  - M-Bus board for VA500/520 and FA500
  - Probe length 120 mm
  - Probe length 160 mm
  - Probe length 300 mm
  - Probe length 400 mm
  - Probe length 500 mm
  - Probe length 600 mm
- Connection cables:
  - Connection cable, 5 m
  - Connection cable, 10 m
- Further accessories:
  - CS Service Software for FA/VA 500 sensors incl. PC connection set, USB interface and interface adapter to the sensor
  - Mains unit in wall housing for maximum 2 sensors of the series VA/FA 5xx, 100-240 V, 23 VA, 50-60 Hz / 24 VDC, 0.35 A
  - AC adapter plug 100-240 V AC/ 24 V for VA/FA 500/520
  - External wall display chart recorder DS 400
  - 5 point precision calibration with ISO certificate
  - M12 – T plug for VA500/520 to connect several sensors to a M-Bus network or Modbus network.

Order No.

- 0695 5001
- 2685 5000
- 2685 5003
- 2685 5002
- 2685 5005
- 2685 5006
- 2685 5007
- 2685 5004
- ZSL 0120
- ZSL 0160
- ZSL 0300
- ZSL 0400
- ZSL 0500
- ZSL 0600
- 0553 0104
- 0553 0105
- 0554 2007
- 0554 0110
- 0554 0109
- 0554 0001
- 020000823

www.cs-instruments.com
VA 550 - with M-Bus

Flow sensor for heavy duty industrial applications incl. temperature measurement

Housing IP 67
Aluminum compressed gas for outdoor use

 Outputs: 4...20 mA, pulse, Modbus, M-Bus, Profibus, Ethernet, HART

Housing twist able, display twist able by 180°

Engraved depth scale for accurate mounting

All medium-touching parts are made from stainless steel 1.4571

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**Flow measuring values VA 550 - immersion sensor**

<table>
<thead>
<tr>
<th>Inner diameter of pipe</th>
<th>Standard version (92.7 m/s)</th>
<th>Max. version (185.0 m/s)</th>
<th>High-Speed version (224.9 m/s)</th>
<th>Recommended sensor length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Air** N2 Ar O2 CO2</td>
<td>Air** N2 Ar O2 CO2</td>
<td>Air** N2 Ar O2 CO2</td>
<td>mm</td>
</tr>
<tr>
<td>1/2“</td>
<td>16.1 DN 15</td>
<td>45 40 71 43 45 26</td>
<td>90 80 142 86 90 53</td>
<td>100</td>
</tr>
<tr>
<td>3/4“</td>
<td>21.7 DN 20</td>
<td>89 79 139 85 88 52</td>
<td>177 158 278 169 176 105</td>
<td>120</td>
</tr>
<tr>
<td>1“</td>
<td>27.3 DN 25</td>
<td>122 108 191 116 120 72</td>
<td>243 216 381 232 241 144</td>
<td>150</td>
</tr>
<tr>
<td>1 1/4“</td>
<td>30.0 DN 32</td>
<td>266 236 416 254 263 157</td>
<td>531 472 830 506 526 314</td>
<td>180</td>
</tr>
<tr>
<td>1 1/2“</td>
<td>41.9 DN 40</td>
<td>386 324 370 348 361 215</td>
<td>726 647 1138 694 720 430</td>
<td>210</td>
</tr>
<tr>
<td>2“</td>
<td>53.1 DN 50</td>
<td>600 533 938 572 693 354</td>
<td>1197 1064 1872 1141 1185 708</td>
<td>240</td>
</tr>
<tr>
<td>2 1/2“</td>
<td>71.1 DN 65</td>
<td>1095 974 1712 1044 1083 847</td>
<td>2186 1944 3418 2085 2164 1293</td>
<td>270</td>
</tr>
<tr>
<td>3“</td>
<td>84.9 DN 80</td>
<td>1569 1396 2454 1497 1553</td>
<td>928 3133 2786 4897 2987 3101</td>
<td>300</td>
</tr>
<tr>
<td>4“</td>
<td>110.0 DN 100</td>
<td>2644 2351 4134 2522 2616 1563</td>
<td>5278 4693 8251 5033 5224 3121</td>
<td>390</td>
</tr>
<tr>
<td>5“</td>
<td>133.7 DN 125</td>
<td>3921 3477 6115 3730 3870 2312</td>
<td>7807 6942 12205 7444 7727 4617</td>
<td>520</td>
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<tr>
<td>6“</td>
<td>159.3 DN 150</td>
<td>5379 4942 6991 5302 5000 2687 11056 9867 17347 10581 10682 5656</td>
<td>13438 11948 21036 12812 13292 7947</td>
<td>650</td>
</tr>
<tr>
<td>8“</td>
<td>200.0 DN 200</td>
<td>8816 7809 13733 8378 8990 5193 17533 15590 27409 16718 17353 10368</td>
<td>21229 18879 33190 20244 21002 12557</td>
<td>850</td>
</tr>
<tr>
<td>10“</td>
<td>250.0 DN 250</td>
<td>13742 12216 21483 13106 13955 8124 27428 24389 42877 26153 27147 16220</td>
<td>33211 29534 51921 31669 32855 19644</td>
<td>1050</td>
</tr>
<tr>
<td>12“</td>
<td>300.0 DN 300</td>
<td>19836 17613 30972 18895 19601 11713 39544 35162 61817 37706 39138 23384</td>
<td>47880 42579 74856 45657 47837 28322</td>
<td>1250</td>
</tr>
</tbody>
</table>
Application range:
- Ideal also for the outdoor area
- Compressed air measurement and distribution
- Leakage measurement of compressed air and gases
- Flow measurement of gases like e.g. nitrogen, argon, carbon dioxide, oxygen and so on
- Flow measurement in vacuum systems
- Flow measurement of explosive gases like natural gas, methane, propane, hydrogen with ATEX approval
- Flow measurement of corrosive, acid gases like e.g. biogas with different gas mixtures
- Measurement of oxygen and natural gas at gas burners
- Flow measurement of gas mixtures like e.g. forming gas

Applicable in all sectors like e.g.:
- Chemistry, petrol chemistry
- Natural gas, methane...
- Pharmaceutical industry
- Food production
- Breweries
- Diaries
- Power plants
- Semiconductor/ electronics
- Automotive industry

<table>
<thead>
<tr>
<th>Description</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA 550 flow sensor, measuring head in robust aluminium die cast housing</td>
<td>0695 0550</td>
</tr>
</tbody>
</table>
Industrial gas meter with M-Bus interface

The M-Bus (meter bus) is a fieldbus and is used for consumption data acquisition and remote meter reading of consumption meters and gas meters for example for compressed air, natural gas, nitrogen, argon, CO2 and other gases or for water, heat, cold, etc.

The M-Bus stands for the European standard Meter-Bus for the transmission of consumption values, meter readings and measurement data.

The M-Bus was originally described in the European standard EN 1434. The M-Bus has become an independent standard in the standard series EN 13757.

The M-Bus transmits data serially on a reverse polarity protected 2-wire line.

The M-Bus has gained market importance in measuring data acquisition and transmission. Especially for low-priced consumption meters and through the simple and reverse polarity safe installation of for example compressed air meters or gas meters, the M-Bus has prevailed in many companies.

This allows the VA 520 M-Bus compressed air meter or VA 500 M-Bus gas meter to be connected to an existing one M-Bus energy monitoring software or M-Bus energy management software or connect to M-Bus master.

The VA 520 / VA 500 with M-Bus is an M-Bus slave and is polled by the M-Bus master. It may only be one master in the bus system, otherwise addressing errors may occur.

The M-Bus is mainly interesting in the context of low-cost consumption-capture measurement in a building control system as part of an energy management system according to DIN ISO 5001 and DIN ISO 16247. The M-Bus interface is designed from 300 to 9600 baud (bit / s).

The maximum total power length depends on the cable cross-section and the cable-specific properties (resistance and capacity), the maximum cable length is 4000 m.

M-Bus advantages:

• With the M-Bus, all consumption meters can be connected to a central unit via a single polarity-protected cable (bus)
• All bus participants (electricity meters, compressed air meters, gas meters, consumption meters for compressed air and gases, etc.) are supplied directly via the two-wire bus.
• Devices from different manufacturers can be connected to a building system, so that the user is not bound to a meter manufacturer.