

Translation of the original operating instructions

EN

VC 600

| FLOW |



The completeness and accuracy of this documentation have been carefully checked. We reserve the right to make technical changes at any time. These changes may result in deviations from the information provided in this documentation.

The original document was published in the manufacturer's national language (German). All translations are copies of the original document and are only valid in conjunction with the original.

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1 General information

For the sake of simplicity, this documentation refers to the product "VC 600" simply as the **product**.

1.1 Documentation

This documentation provides important warnings, safety precautions, and instructions for the safe and proper operation of the product.

- ▷ Before operating the product, read this documentation carefully and ensure that you fully understand its contents.
- ▷ Always keep this documentation readily available for reference purposes.

1.2 Symbols and labels used

The following markings and symbols are used in this documentation:

Labeling/symbol	Usage
Text	Important text passages are highlighted
Text	Label in the user interface
Text > Text > Text	Navigation path in the user interface
 2 Security	Cross-reference to text passage, figure, or chapter
•	Bulleted list, list item
▷	Call to action as part of a set of instructions.
✓	Final or intermediate result of a set of instructions
✗	Final or intermediate result of a set of instructions that was not achieved
ⓘ	Note regarding an intermediate result

Table 1: Symbols and labels used

1.3 Safety instructions and notes

	DANGER Indicates an imminent danger. Death or very serious injuries may result.
	WARNING Indicates a potentially dangerous situation. Death or serious injury may result.
	CAUTION Indicates a potentially dangerous situation. Slight or minor injuries may result.
	NOTICE Indicates a potentially dangerous situation. Material or environmental damage may result.
	NOTE Indicates important information, application tips, and useful information for proper working.

2 Security

The product has been designed, manufactured, and functionally tested in accordance with applicable safety regulations.

To ensure operational safety, please observe the following:

- Chapter "Intended use"
- Chapter "Organizational measures to be taken by the operator"
- Chapter "Residual hazards"

Regardless of the instructions provided in this manual, all applicable country-specific occupational health and safety regulations must be observed.

2.1 Intended use

The operational safety of the product supplied is only guaranteed if it is used as intended.

The product enables continuous flow measurement using the transit-time method.

This product is intended for the continuous measurement of the flow rate and consumption of gases in industrial applications. It is used in closed piping systems and serves to monitor, analyze, and optimize gas consumption. The product is designed to measure the gases and gas mixtures specified in the technical data.

The product is considered to be used as intended, in particular, when

- it is installed in horizontal pipes (recommended) or in vertical risers,
- the product is correctly positioned and the installation conditions specified for the respective product model are observed,
- the product is connected correctly,
- the technical specifications and permissible environmental conditions are observed,
- zero-point adjustment is performed properly, the relevant measurement parameters and the measured medium are specified, and
- calibration and maintenance are performed regularly by qualified personnel.

Any use outside these conditions is considered improper and may result in malfunctions or irreversible damage. This applies in particular if pressure or temperature limits are exceeded or if liquids or hazardous substances are introduced.

Any use beyond or contrary to these instructions is considered improper. The manufacturer assumes no liability for any resulting damage.

Intended use also includes:

- Adherence to the supplied documentation
- Compliance with all inspection and maintenance requirements specified by the manufacturer

Reasonably foreseeable misuse includes, in particular:

- Overheating the product
- Contact with unsuitable media, e.g., aggressive, corrosive, or contaminated media
- Use as a climbing aid
- Operation outside the technical specifications
- Any modifications to the product that do not correspond to the intended and described procedures
- Continuous, unprotected outdoor operation in wet conditions or when directly exposed to the elements
- Use in areas at risk of explosion



2.2 Organizational measures of the operator

The product may only be used if it is in perfect technical condition. It may no longer be used if it has been technically modified or damaged.

Instructions

The information on commissioning, operation, and maintenance provided in these instructions must be followed. These instructions should always be kept accessible with the product.

Personnel

Persons assigned to work on the product must read these instructions before beginning work. This also applies to persons who work on the product only occasionally.

2.3 Residual risks



DANGER

Risk of injury due to insufficiently qualified personnel

Improper handling of the product can lead to serious personal injury and damage to property. All work described in these instructions may only be carried out by qualified specialists.

Qualified personnel are persons with appropriate training and in-depth knowledge of measurement, control, regulation and compressed air technology. They must also be familiar with the applicable national regulations, standards and directives and be able to assess risks independently.



WARNING

Danger during operation outside the specified limit values

Exceeding or falling below the permissible operating, storage or transportation limits can endanger people and property. There is a risk of malfunctions and operating faults as well as falsified measurement results.

- ▷ Only operate the product within the limit values specified on the rating plate and in the technical data.
- ▷ Observe the permissible storage and transportation conditions.



WARNING

Risk of injury due to unauthorized modifications

Unauthorized modifications to the product may cause injury and result in the loss of the approval. The product may only be operated using original components.

- ▷ Unauthorized modifications are not permitted and lead to the exclusion of any warranty and liability by the manufacturer (CS INSTRUMENTS).



CAUTION

Danger due to malfunction of the product

Incorrect installation or inadequate maintenance can lead to malfunctions that impair the function of the product and can lead to dangerous misinterpretations.

- ▷ Observe all applicable national regulations and safety regulations during installation and operation.



CAUTION

Risk of burns from hot surfaces

Hot process media can cause pipes, measuring sections, and connected components to become very hot.

- ▷ Allow the components to cool before touching them.
- ▷ Wear appropriate protective gloves if necessary.

3 Cybersecurity

To ensure safe use throughout the product's entire service life, the cybersecurity measures described in this chapter must be followed.

Security features

The product supports security measures for operation in controlled IT networks. These include, in particular:

- Restriction of access to authorized users and systems
- Device software updates
- Secure communication via supported interfaces

Secure network integration and integration into higher-level systems

The product is intended for integration into closed and controlled networks. Operation in publicly accessible or unsecured networks may result in unauthorized access to the product or to measurement data.

- ▷ Integrate the product exclusively into trusted networks.
- ▷ Protect the network with appropriate security measures, such as a firewall, VLAN, or VPN.
- ▷ Restrict access to authorized users and systems.
- ▷ Use encrypted or otherwise protected communication channels for security-sensitive data and functions.
- ▷ Enable only the communication interfaces and services that are necessary.

Update device software

Device software updates may include security-related improvements and bug fixes.

- ▷ When first conducting the commissioning of the device, and then regularly thereafter, check the manufacturer's website to see if a current version of the device software is available.
- ▷ Install security-related updates promptly.
 - ❗ The product does not support automatic installation of security updates.
- ▷ Use only update files provided by the manufacturer.
 - ❗ Further information can be found in chapter " 10.5 Update device software".

Remote access and support

Remote maintenance connections may only be activated as needed and only for the duration of the support session.

- ▷ Activate remote maintenance connections only for the duration of the support session and terminate them afterward.
- ▷ Grant remote access only to authorized individuals and do not share the associated access credentials.

Impact of changes on data security

Changes to network, user, or communication settings can compromise the product's data security. Inadequate access restrictions, unnecessary enabled services, or insecure communication settings increase the attack surface and raise the risk of unauthorized access to the product, stored data, or connected corporate networks. Incorrect settings can also expose vulnerabilities or bypass security-related protection mechanisms.

- ▷ Carefully review security-related settings before applying them.
- ▷ Enable only the communication interfaces and services that are necessary.
- ▷ Restrict access to authorized users and systems.
- ▷ Secure network access to the product using appropriate protective measures.
- ▷ Avoid unsecured connections to corporate networks or production IT systems.
- ▷ Document security-related changes.



Handling log files

- ▷ Check log files for confidential information before sharing them, and transmit them only to authorized recipients.

Reporting security-related incidents

- ▷ Report suspected security issues or vulnerabilities to security@cs-instruments.com.
- ▷ For information on reporting security-related vulnerabilities and the Coordinated Vulnerability Disclosure (CVD) process, visit the manufacturer's website under the "Product Security" section.

Product lifecycle and support

Security updates and technical support are available for five years from the product's release date. Fixes for security-related vulnerabilities are only guaranteed within the time interval.

Remove user data before transferring the product

- ▷ Before transferring, disposing of, or decommissioning the product, remove all stored measurement, log, configuration, network, and access data.
- ▷ If necessary, reset the product to its factory settings. For more information, see the chapter "[📄 10.6.2 Restore factory settings](#)".
- ▷ Then check whether any personal or confidential data remains.

Intended use from a cybersecurity perspective

From a cybersecurity perspective, intended use requires the following:

- Operation in an industrial environment with restricted access
- Access and modifications only by authorized users and systems
- Disabling of unnecessary communication interfaces and services
- Use of approved device software only
- Protection through appropriate network and access control measures

Reasonably foreseeable cybersecurity-related misuse

Reasonably foreseeable cybersecurity-related misuse includes, in particular:

- Operation on publicly accessible or unsecured networks
 - Connection to untrusted devices or networks
 - Disabling, bypassing, or manipulating security features
 - Using outdated device software despite available security updates
 - Using insecure login credentials or sharing login credentials
 - Unauthorized changes to network or security settings
- ❗ These misuse scenarios can compromise the confidentiality, integrity, and availability of the product and connected systems and lead to unauthorized access, data loss, tampering, or malfunctions.
 - ❗ The EU Declaration of Conformity can be found in the appendix or on the manufacturer's website.

4 VC 600

The product is a clamp-on flow sensor for the continuous measurement of flow rate and gas consumption in pipes. Tool-free installation is achieved using a mounting clamp with quick-release clamps, without requiring any modifications to the pipe. The product is suitable for compressed air and industrial gases. Depending on the version, temperature and pressure effects are accounted for via fixed parameters or external sensors.

4.1 Product overview

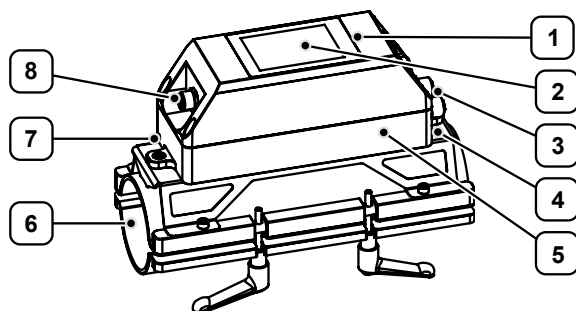


Figure 1: VC 600 (example)

- | | | | |
|---|------------------------|---|--|
| 1 | Housing | 5 | Measuring unit |
| 2 | Display | 6 | Mounting clamp with quick-release clamps |
| 3 | External sensor inputs | 7 | Equipotential bonding |
| 4 | Mounting bracket | 8 | Sensor cable inputs |

4.2 Type plate



Figure 2: Type plate (example)

- | | | | |
|---|-----------------------------------|---|--------------------------|
| 1 | Manufacturer information | 4 | Technical specifications |
| 2 | Electrical connection data | 5 | Material/serial number |
| 3 | Conformity/certification markings | 6 | Product name |

4.3 Scope of delivery

Depending on the version ordered, the scope of delivery includes:

- VC 600
- Mounting clamp with quick-release clamps, with additional damping mats if applicable
- Access data for initial commissioning
- Calibration certificate
- Translation of the original operating instructions

4.4 Applicable documents

Depending on the product model, please also refer to the following documents:

Document	Contents
User Manual - Service App	Installation, updates, and operation
User Manual - Modbus Installation	Information on additional Modbus registers

Table 2: Related documentation



5 Transportation and storage



NOTE

Improper transport, improper storage, or improper commissioning may cause damage to or malfunctions in the product, for which the manufacturer, (CS INSTRUMENTS), assumes no liability and provides no warranty.

5.1 Delivery

Transport damage

- ▷ Check the delivered components for any visible transportation damage.
- ▷ Report any transportation damage to the following parties immediately:
 - the carrier
 - the manufacturer's customer service (CS INSTRUMENTS)
- ▷ Ensure that the product is handled properly during transportation.

Packaging

- ▷ Keep the original packaging for any future transportation or storage.

5.2 Storage

To prevent damage caused by environmental factors, the product must be stored properly when not in use.

- ▷ If possible, store the product in its original packaging.
- ▷ Store the product in dry, dust-free rooms.
- ▷ Keep the product away from direct sunlight, heat sources, and corrosive or aggressive chemicals.

6 Installation and commissioning



CAUTION

Risk of burns from hot surfaces

Hot process media can cause pipes, measuring sections, and connected components to become very hot.

- ▷ Allow the components to cool before touching them.
- ▷ Wear appropriate protective gloves if necessary.



CAUTION

Danger from commissioning a damaged product

If a damaged product is installed or put into operation, it may result in functional failures, electrical hazards, or mechanical risks.

- ▷ Before each commissioning, inspect the product, accessories, and all supply lines for visible damage, loose parts, or missing components.
- ▷ Immediately take any defective product out of operation immediately.

6.1 General installation instructions

Follow the installation instructions

- ▷ Avoid installation positions where liquid or solid contaminants can accumulate in the product.
- ▷ When using the product with gases containing water droplets, oil vapors, dust, or similar contaminants, install it on a vertical pipe.
- ▷ Avoid using the product with gases that contain high levels of water or that attenuate ultrasonic waves, as well as in environments with extreme temperature fluctuations, insufficient pressure, or low gas density. These conditions can impair signal detection and measurement precision.
- ▷ Install the product exclusively on pipes made of aluminium, steel, or stainless steel.



NOTICE

Measurement errors and product damage caused by contaminated measured medium

Contaminants or harmful substances in the measured medium - such as condensate, oils, oil vapors, and acid- or base-forming substances - can cause deposits, corrosion, malfunctions, and measurement errors.

- ▷ Use only measuring media approved for the specific product model and ensure the required purity.
- ▷ Establish appropriate cleaning and maintenance intervals.

Select installation location

Choose the installation location so that reliable signal detection and stable measured values are ensured.

- ▷ Avoid installation locations where water can accumulate.
- ▷ Install the product in a location where the operating pressure is at least 3 bar(rel) at all times.
- ▷ Ensure that the pipe in the vicinity of the point of measurement is sufficiently secured in the event of strong vibrations.
- ▷ Maintain as much distance as possible from other ultrasonic sensors on the same pipe.
- ▷ Do not install the product immediately downstream of mixing points for different gases.
- ▷ Maintain a sufficient distance from compressors and similar equipment.
- ▷ If pressure pulsations occur, use appropriate countermeasures, such as a buffer tank or a pulsation damper.
- ▷ Maintain as much distance as possible from connection points, branches, valves, and pressure regulators.



- ⚠ Pay particular attention to this with pressure-reducing valves when the ratio of secondary pressure to primary pressure - both expressed as absolute pressure - is at least 0.7.
- ▷ Install control valves and similar flow regulators preferably downstream of the product.
- ▷ Use flow-optimized valves whenever possible, such as ball valves.

Ensure proper flow conditions

Flow disturbances can cause measurement errors.

- ▷ Select a suitable installation location on a straight section of pipe.
- ▷ Observe the required inlet and outlet straight runs.
- ⚠ Shortened inlet and outlet runs increase measurement errors.

	Flow obstacle	Inlet section (L1)	Outlet section (L2)
1	Low curvature (bend < 90°)	12 x DN	5 x DN
2	Reduction (pipe narrows towards the measuring section)	15 x DN	5 x DN
3	Expansion (pipe expands towards the measuring section)	15 x DN	5 x DN
4	90° bend / T-piece	15 x DN	5 x DN
5	2 x bend (90°) 1-dimensional change of direction	20 x DN	5 x DN
6	2 x bends (90°) 3-dimensional change of direction	35 x DN	5 x DN
7	Shut-off valve	45 x DN	5 x DN

Table 3: Required minimum lengths

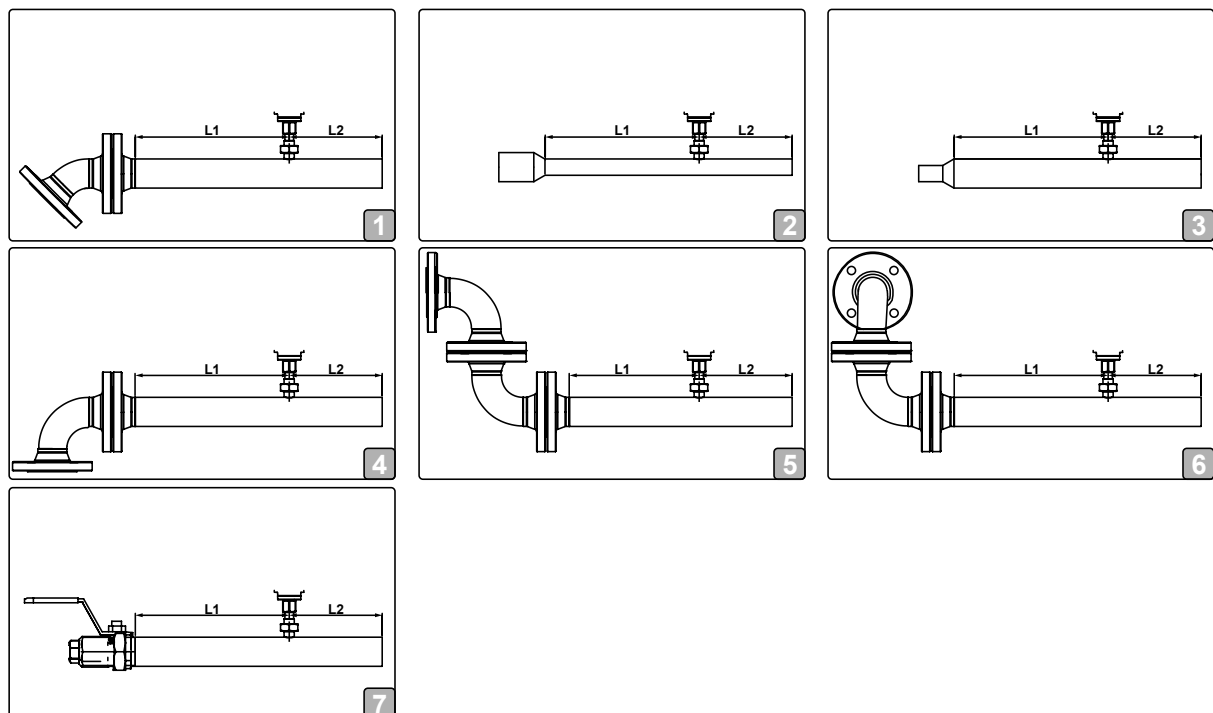


Figure 3: Flow obstacles in front of the measuring section (example)



NOTICE

Measurement errors caused by disturbed flow patterns

Edges, seams, bends, and changes in diameter can affect the flow profile.

- ▷ Avoid diameter changes of more than 1 mm at pipe joints.

6.2 Set up measuring point

Prepare the mounting surface

To ensure accurate measurement results, the point of measurement must be set up properly.

- ▷ Select a suitable installation location for the point of measurement.
- ▷ Select contact surfaces that are free of welds, rust, and other irregularities.
 - ❗ Do not install the product on or directly opposite a weld.
- ▷ Check the surface of the pipe for contaminants and perform cleaning if necessary.
 - ❗ For painted pipes, remove the paint from the contact surfaces to ensure reliable signal transmission.
- ▷ Observe the requirements for minimum clearances from joints.
- ▷ Ensure that the requirements for installation location, surface, minimum clearances, and pipe material are met.

Maintain minimum distances from joints

To ensure reliable detection of ultrasonic signals, a minimum distance must be maintained between the product and the nearest joint.

- ▷ Install additional damping clamps before and after the joint if the required minimum distance cannot be maintained.
 - ❗ Joints include flanges, bolted or welded connections, and branch points. U-bolts, pipe clamps, or U-bracket clamps, as well as similar fasteners that do not make direct contact with the pipe, are not considered joints.

Pipe size	Minimum distance L
up to DN 40	40 × inner diameter
DN 50 and above	25 × inner diameter

Table 4: Minimum distance to the nearest connection point

6.3 Assemble product

Installing the mounting clamp

To ensure a permanently stable point of measurement, the mounting clamp must be installed correctly on the pipe.

- ▷ Select the appropriate mounting clamp based on the pipe's outer diameter.
- ▷ Position the mounting clamp in the center of the pipe.
 - ❗ Make sure that the damping mat on the underside of the mounting clamp is in full contact with the pipe.
 - ❗ Make sure no dirt particles get between the damping mat and the pipe.
- ▷ Insert the quick-release clamps into the designated slots.
- ▷ Tighten the quick-release clamps alternately and evenly.
 - ❗ Keep your fingers away from the hinge and locking areas of the quick-release clamps.
 - ❗ Ensure that the mounting clamp remains properly aligned during the tightening process.

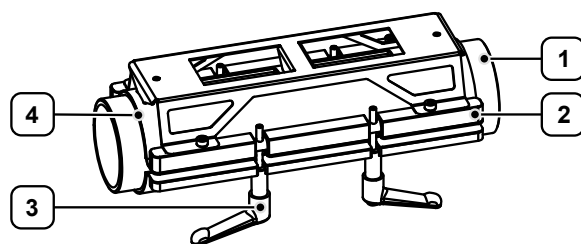


Figure 4: Installing the mounting clamp (example)

- | | |
|------------------|-----------------------------|
| 1 Pipe | 3 Quick-release clamps (4x) |
| 2 Mounting clamp | 4 Damping mat |

Pipe outer diameter [mm]	
Ø 25...30	Ø 57–62
Ø 32–36	Ø 63–70

Pipe outer diameter [mm]	
Ø 38–43	Ø 72–78
Ø 45–50	Ø 84–90
Ø 50–55	

Table 5: Selection range for mounting clamps

Install the damping mat

- ▷ Check that the mounting clamp is securely fastened.
 - ✓ After tightening the quick-release clamps, the mounting clamp must be free of tension and in full contact with the pipe.
 - ✗ If the mounting clamp does not make full contact with the pipe: Place a damping mat between the mounting clamp and the pipe.
 - ⓘ The additional damping mat improves contact and the detection of ultrasonic signals.

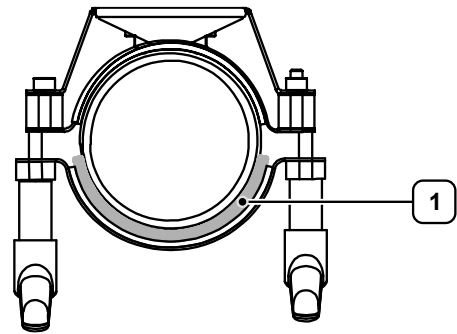


Figure 5: Installing the damping mat (example)

1 Damping mat

Install the product

The measuring unit must be mounted on the mounting bracket of the mounting clamp.

Prerequisite

- The mounting clamp is installed correctly.

Materials

- Screwdriver (M4)
- Torque wrench

- ▷ Loosen the screws on the mounting bracket without removing them completely.
- ▷ Insert the sensors into the sensor openings of the mounting bracket.
- ▷ Observe the flow direction indicated on the product (direction arrow).
 - ⓘ If necessary, the display orientation can be rotated via the software. Further information can be found in chapter "8.1 Configure general settings".
- ▷ Secure the measuring unit by fully tightening the screws.
- ▷ Tighten the screws.
 - ⓘ Tightening torque: 1 Nm
- ▷ Check that the installation is secure.

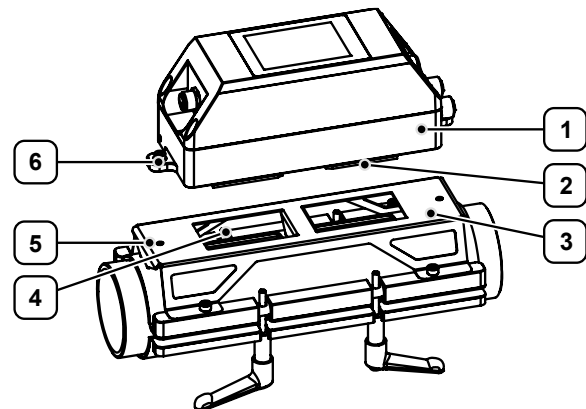


Figure 6: Installing the product (example)

- | | |
|--------------------|-----------------------|
| 1 Measuring unit | 4 Sensor opening (2x) |
| 2 Sensor (2x) | 5 Mounting hole (2x) |
| 3 Mounting bracket | 6 Screw (2x) |

Install the damping clamp

Prerequisite

- The pipe has been cleaned and is easily accessible.
- ▷ Position the vibration-damping clamp no more than 50 mm in front of the mounting clamp.
- ▷ Install the vibration-damping clamp as described in the section “Installing the mounting clamp.”
- ▷ Check that the damping clamp is securely and fully seated.
- ▷ If necessary, install an additional damping clamp downstream of the sensor.

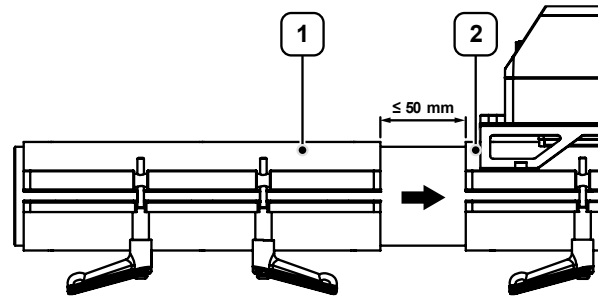


Figure 7: Installing the damping clamp (example)

1 Damping clamp

2 Mounting clamp

6.4 Connect product



DANGER

Danger to life due to electrical voltage

During installation, maintenance, or in the event of a malfunction, conductive parts that can be touched may carry dangerous voltages. Contact with live parts can result in serious injury or death.

- ▷ Perform work on electrical connections only when the power supply is turned off.
- ▷ Secure the product against accidental restarting.
- ▷ Work on electrical systems or equipment may only be performed by qualified electricians or by trained personnel under the direction and supervision of a qualified electrician.
- ▷ Check all electrical connections before commissioning and regularly during operation.

Prepare the electrical connection

- ▷ Use shielded connection cables with a conductor cross-section of at least 0.25 mm².
- ▷ Keep the stripped lengths as short as possible.
- ▷ Seal unused cable entries with end caps.
- ▷ Tighten the cap nuts on the cable glands to 9 Nm.



NOTICE

Damage caused by improper loads and voltages

Improper loads or stresses can damage connections and cause malfunctions.

- ▷ Observe the load and voltage limits specified in the technical data.

Connecting the product to a power source



NOTICE

Malfunctions caused by incorrectly connected wires

- ▷ Insulate unused wires individually and do not connect them to either the potential or ground.



NOTICE

Communication errors or data transmission failure

If the product is used at the end of a Modbus system, termination is required.

- ▷ Enable the terminator using the DIP switch.

Set termination

Prerequisite

- The product must be de-energized and secured against accidental re-energization.



NOTICE

Malfunctions caused by loose or swapped connectors

Disconnected or swapped internal cables can cause malfunctions.

- Do not disconnect any internal cables or connectors.
- Reconnect loosened plug connections only in their original position.

- Remove the housing cover.
 - The DIP switch is located on the printed circuit board inside the housing cover.
- Set the internal DIP switch to "ON".
- Reinstall the housing cover.
- Ensure that the gaskets are seated correctly to prevent leaks and malfunctions.

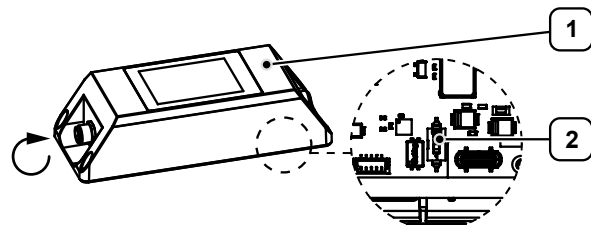


Figure 8: Set terminal configuration (example)

1 Housing cover

2 DIP switch

Electrical connection

All connections required for operation are located on the side of the housing.

- Make all necessary electrical connections to the product.
 - If no connecting cable was ordered, the product is shipped with M12 connectors.
- Observe the country-specific electrical safety regulations.

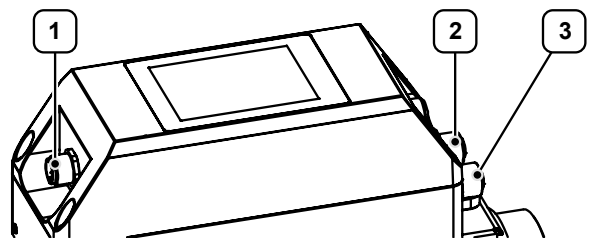


Figure 9: Connecting the product to the power supply (example)

1 Connector A

3 Connector P

2 Connector T

Designation	Assignment	Wire color	Plug
A Power supply	Pin 1 (VB+ (positive power supply))	brown	
	Pin 2 (Modbus (A))	white	
	Pin 3 (VB- (negative power supply GND))	blue	
	Pin 4 (Modbus (B))	black	
	Pin 5 (I+ (analogue output))	gray	
T Temperature sensor connection (optional)	Pin 1 (VB+ (positive power supply))	Depends on the sensor	
	Pin 2 (PT+ (OUT))		
	Pin 3 (PT+ (IN))		
	Pin 4 (PT- (IN))		
	Pin 5 (PT- (OUT) and I+ (analogue output))		
P Pressure sensor connection (optional)	Pin 1 (VB+ (positive power supply))	Depends on the sensor	
	Pin 2 (Modbus (A))		
	Pin 3 (VB- (negative power supply, GND))		
	Pin 4 (Modbus (B))		



Designation	Assignment	Wire color	Plug
	Pin 5 (I+ (analogue output))		

Table 6: Pin assignment ¹**Ethernet interface (Modbus TCP, optional)**

- Connector: M12, 8-pin, X-coded
- Connecting cable: Cat 6
- Wiring standard: T568B

Pin	Function	Wiring diagram
1–2	Data line	
3–4	Data line	
5–6	PoE line	
7–8	PoE line	

Table 7: Modbus TCP interface (Ethernet pin assignment)

6.5 Initial commissioning

**NOTICE****Display damage caused by electrostatic discharge**

When removing the protective film, the display may become electrostatically charged. Electrostatic discharge can damage electronic components.

- ▷ Wait until immediately before first use to slowly and completely remove the protective film from the display.
- ▷ Protect the product from electrostatic discharge while doing so.
- ▷ Do not reapply the protective film after removing it.

Putting the product into service for the first time

During initial commissioning, the required parameters are set and the measured values are checked.

Prerequisite

- The product is properly installed and electrically connected.
 - The approval-approved operating conditions are met.
 - The service app is installed on the end device.
- ▷ Connect the product to the power supply and wait until initialization is complete.
 - ▷ Check the signal quality in the product's user interface.
 - ❗ For more information, see the "Checking Signal Quality" section.
 - ▷ Connect the service app to the product.
 - ❗ For information on establishing a connection, see the "User Manual - Service App."
 - ▷ Set up a user password when connecting for the first time.
 - ❗ First, authenticate via Bluetooth using the provided master password. For information on setting, changing, and resetting the user password, see the "User Manual - Service App."

¹ The wire colors of optional temperature and pressure sensors depend on the sensor used and the connecting cable. Connect the sensor according to the accompanying documentation.



- ▷ Set the gas type, units, reference temperature, reference pressure, and system pressure.
 - ❗ Further information can be found in the following chapters "8.2 Set gas type and units" and "8.3 Configure process parameters".
- ▷ Check the measured values for plausibility.
 - ✓ The product is ready for operation.

Check signal quality using the setup wizard

Use the Setup Wizard to enter the pipe parameters and check the signal quality.

- ▷ On the product, select **Main menu** > **Settings** > **Advanced** > **Setup**.
 - ✓ The setup wizard opens.
 - ❗ After each entry, use the arrow key to proceed to the next step.
- ▷ Under **Pipe Option**, select the pipe dimensions you are using.
 - ❗ Enter two of the three values: inner pipe diameter, outer pipe diameter, and wall thickness. The third value is calculated automatically.
- ▷ Enter the required pipe dimensions.
- ▷ Select the pipe material.
- ▷ Select automatic mode or enter a custom sound velocity.
- ▷ Use the arrow key to proceed to the next test step.
 - ✓ The product checks the contact quality.
 - ✗ If the test is unsuccessful, perform cleaning on the pipe surface, check the tightening torque of the screws on the measuring unit, and apply ultrasonic gel.
 - ❗ Tightening torque: 1 Nm
- ▷ Use the arrow key to proceed to the next test step.
 - ✓ The product checks for any interference signals.
 - ✗ If the test fails, use a shielded connecting cable and reduce vibrations.
- ▷ Use the arrow key to proceed to the next test step.
 - ✓ The result of the signal quality test is displayed.

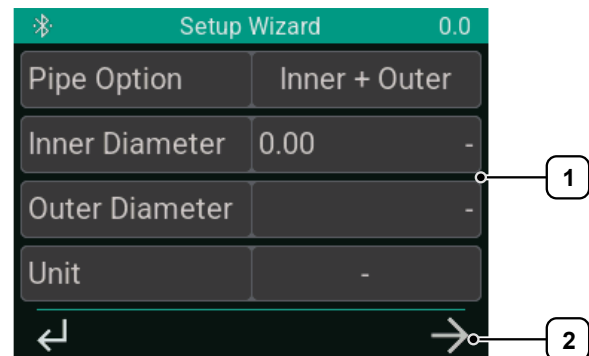


Figure 10: Start the setup wizard (example)

- 1 Parameter field
- 2 Arrow key to the next step



- ▷ Check the result:
 - ✓ Green: Good signal quality. The measured value is valid.
 - ⓘ Yellow: Limited signal quality. Check the measurement conditions.
 - ✗ Red: Insufficient signal quality. The measured value is invalid.
- ▷ If the signal-to-noise ratio is low, tighten the quick-release clamps or install additional damping mats as needed.
- ▷ If the signal strength is low, ensure an operating pressure of at least 3 bar(rel).

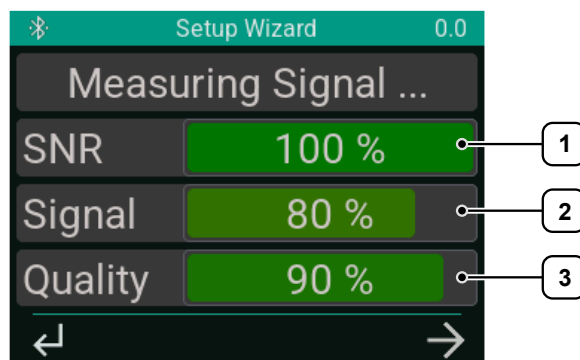


Figure 11: Checking signal quality (example)

- 1 Signal-to-noise ratio
- 2 Signal strength
- 3 Signal quality

6.6 Switching on and off

Turning the product on and off

- ▷ To turn on the product, connect it to the power supply.
- ▷ To turn off the product, disconnect it from the power supply.

7 Operation

7.1 Display and control concept



NOTICE

Damage to the display

- ▷ Avoid letting the display come into contact with pointed or sharp objects.

Touchscreen

The touchscreen is used to display measured values and status information, as well as to navigate between display pages. The product configuration is performed using the service app.

- ▷ Select menu items by tapping them with your finger or a soft, round stylus.

- ❗ For information on installing the Service App and establishing a connection, see the "User Manual - Service App."

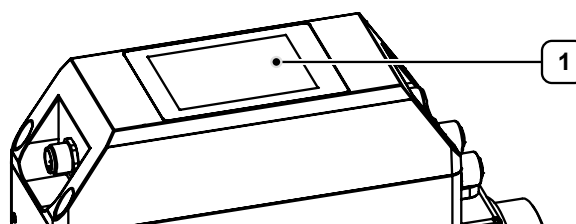


Figure 12: Touchscreen (example)

1 Touchscreen

7.2 User interface

The following user interface is displayed each time the product is started.

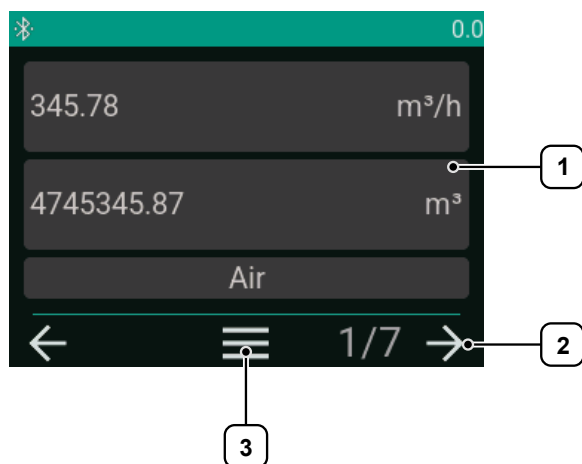


Figure 13: User interface | Main view (example)

1 Measured values

3 Main menu button

2 Page navigation with page display



NOTE

The main view (Dashboard) consists of several pages. The page indicator shows the current page and the total number of available pages. Use the arrow buttons to switch between pages.

8 Configuration



NOTICE

Deviations in measured values due to incorrect calibration

Improper changes to calibration parameters can lead to significant deviations in measured values.

- ▷ Changes to calibration parameters may only be made by qualified personnel with expert knowledge of the system and the monitored application.

8.1 Configure general settings

Adjust the sensor location and consumption counter

In the **General** menu item, you can adjust the sensor location and the consumption counter.

- ▷ In the Service App, select **Main menu > Configuration**.
 - ✓ The configuration menu opens.
- ▷ Select the **Settings** tab in the navigation bar.
- ▷ Open the **General** menu item.
- ▷ Enter the sensor location.
- ▷ If necessary, enter the desired reading of the consumption counter.
 - ❗ The consumption counter reading can be adjusted and, if necessary, manually reset to zero. When the maximum value of 1,000,000,000 in the set consumption unit is reached, the consumption counter is automatically reset to zero.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.

Adjust the display



NOTICE

Display burn-in due to consistently high brightness

Constantly high display brightness can cause visible image retention.

- ▷ Reduce the display brightness and set the screen timeout to the shortest possible duration.

A lower display brightness setting and a short display sleep timer help minimize energy consumption.

- ▷ Select **Main menu > Configuration**.
 - ✓ The configuration menu opens.
- ▷ Select the **Interface** tab in the navigation bar.
- ▷ Open the **Display Settings** menu item.
 - ❗ When the **Rotate** function is enabled, the display rotates 180°.
 - ❗ When the **Keys Locked** function is enabled, operation of the display is locked. Operation can be reactivated via the **Main menu** within 10 seconds after a restart.
- ▷ Select the desired settings.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.

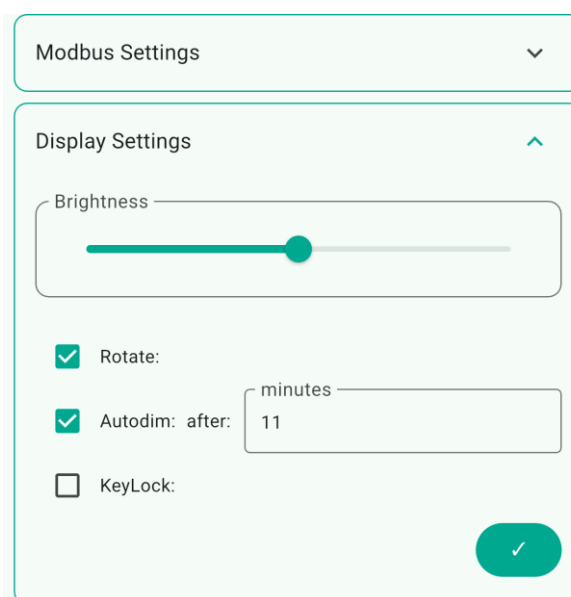


Figure 14: Adjusting the display (example)



8.2 Set gas type and units

Set gas type

To ensure accurate measurements, you must enter the gas type.

- ▷ Select **Main menu** > **Configuration**.
 - ✓ The configuration menu opens.
- ▷ Select the **Settings** tab in the navigation bar.
- ▷ Open the **Gas** menu item.
- ▷ Select the desired setting.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.

Set units

The unit system and measurement parameters can be adapted to country-specific regulations or individual requirements.

- ▷ Select **Main menu** > **Configuration**.
 - ✓ The configuration menu opens.
- ▷ Select the **Settings** tab in the navigation bar.
- ▷ Open the **Units** menu item.
- ▷ Select the desired settings.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.
 - ✓ The display units are applied according to the selection and displayed correctly in all relevant areas.

8.3 Configure process parameters

Set process parameters

In the **Parameters** menu item, you can define process-related parameters - such as reference temperature and system pressure - for the calculation and display of the measured values.

- ▷ Select **Main menu** > **Configuration**.
 - ✓ The configuration menu opens.
- ▷ Select the **Settings** tab in the navigation bar.
- ▷ Open the **Parameters** menu item.
- ▷ Select the desired settings.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.

The screenshot shows a 'Parameter' configuration screen with three rows of settings. Each row consists of a text input field, a unit indicator, a confirmation button with a plus sign, and a green confirmation button with a checkmark.

Parameter	Value	Unit	Confirmation
RefTemp	20.00	°C	✓
RefPressure	1000.00	mbar	✓
SysPressure	8000.00	mbar	✓

Figure 15: Setting process parameters (example)



NOTICE

Inaccurate measured values due to incorrect pipe dimensions

Incorrectly entered pipe dimensions will result in inaccurate volume flow calculations.

- ▷ Enter two of the three values - outside diameter, wall thickness, and inner diameter - with as much accuracy as possible.
- ▷ Determine the values from the manufacturer's specifications or by measurement.

Parameter	Description
Inner diameter / Outside diameter / Wall thickness	Defines pipe dimensions for the volumetric flow calculation For a correct measurement, the pipe dimensions must be entered according to the product model.



Parameter	Description
	To perform the pipe cross-section calculation, two of the three parameters - pipe inner diameter, pipe outer diameter, and wall thickness - must be specified. The third value is calculated automatically.
Reference temperature / Reference pressure	Defines reference conditions To ensure accurate calculation of flow rate and consumption values, the desired reference conditions for pressure and temperature must be defined. The displayed normalized volume flow and consumption values are based on the selected reference conditions. Factory setting: 20 °C and 1000 hPa in accordance with ISO 1217. Alternatively, values such as 0 °C and 1013 hPa can be set. Operating pressure or medium temperature must not be entered as reference conditions.
System pressure	Defines the system pressure of the installation The system pressure must be entered to perform the calculation of the volume flow and consumption values. The entered value serves as a calculation parameter.

Table 8: Configuration parameters

8.4 Configure external sensor values

Configure external pressure sensor

The pressure value is used to perform the calculation of the normalized volume flow and consumption. If the operating pressure fluctuates, the use of an external pressure sensor is recommended.

Prerequisite

- Depending on the selected source, a suitable external sensor must be connected or a value must be provided via Modbus.
- ▷ Select Main menu > Configuration.
 - ✓ The configuration menu opens.
 - ▷ Select the Settings tab in the navigation bar.
 - ▷ Open the External Pressure Sensor menu item.
 - ▷ Select the desired settings.
 - ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.

Parameter	Description
Unit	Defines the unit.
Source	Defines whether the pressure value is provided as a fixed value, via Modbus, or via a 4...20 mA signal.
Type	Defines whether the pressure value is evaluated as relative pressure or absolute pressure. • Relative: Pressure relative to ambient pressure • Absolute: Pressure relative to absolute vacuum
Minimum/Maximum Scaling	Defines the value corresponding to the minimum/maximum input signal. This parameter is used for scaling of external pressure values.
Fixed Value	Defines a constant value for the calculation. This value is used when "Fixed Value" is selected as the source.

Table 9: Parameters for the external pressure value



Configuring an external temperature sensor

An external temperature sensor enables the measurement of the medium temperature to compensate for temperature-dependent effects and to perform the calculation of standardized values for volume flow and consumption.

Prerequisite

- Depending on the selected source, a suitable external sensor must be connected or a value must be provided via Modbus.
- ▷ Select Main menu > Configuration.
 - ✓ The configuration menu opens.
- ▷ Select the Settings tab in the navigation bar.
- ▷ Open the External Temperature Sensor menu item.
- ▷ Select the desired settings.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.

Parameter	Description
Unit	Defines the unit.
Source	Defines whether the temperature value is provided as a fixed value, via Modbus, from a Pt100/Pt1000 sensor, or as a 4...20 mA signal.
Minimum/Maximum Scaling	Defines the value corresponding to the minimum/maximum input signal. This parameter is used for scaling of external temperature values.
Fixed Value	Defines a constant value for the calculation. This value is used when "Fixed Value" is selected as the source.

Table 10: Parameters for the external temperature value

8.5 Set output parameters

Configure analogue output

In the Analog menu item, you can configure the analogue outputs for the channels, as well as the 4–20 mA output and the error behavior.

- ▷ Select Main menu > Configuration.
 - ✓ The configuration menu opens.
- ▷ Select the Output tab in the navigation bar.
- ▷ Open the Analog menu item.
- ▷ Open the Configuration menu item to configure the measured value and scaling.
- ▷ Select the measured value for the analogue output.
- ▷ Select the desired scaling.
 - ⓘ Scaling can be performed automatically or manually. With automatic scaling, the value is calculated based on the product calibration data. In this case, 4 mA corresponds to the lower measured value and 20 mA to the upper measured value.
- ▷ In the Error Behavior dropdown list, select the value to be output at the analogue output in the event of an error.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.
 - ✓ The output parameters are applied.

The screenshot shows the 'Analog' configuration menu. Inside, there's a 'Configuration' section. Under 'Channel 1', the 'Value' is set to 'Flow' and the 'Unit' is 'm³/h'. The 'Autoscale' checkbox is checked. Below it, 'Scale 4mA [m³/h]' is set to '0.00' and 'Scale 20mA [m³/h]' is set to '500.00'. 'Channel 2' is currently collapsed. At the bottom, 'Error Behavior' is set to 'actual value above 3.8 or below 20.5 mA'.

Figure 16: Configuring the analogue output (example)

Output	Factory setting
Channel 1	0... maximum flow rate [m³/h] (For maximum volume flow, see the chapter "12.1 Technical data")
Channel 2 ¹	-20...+100 °C

Table 11: Factory settings for analogue output

Setting	Meaning
2 mA	Sensor error / System error
22 mA	Sensor error / System error
None	Output according to NAMUR (3.8 mA – 20.5 mA) • 3.8 to < 4.0 mA: Below measurement range • 20.0 to 20.5 mA: Measurement range exceeded

Table 12: Output values for error current

¹ Available only in conjunction with the "Analog Output Board" option.

8.6 Set interface parameters

Setting Modbus parameters (RTU)

For communication via the RS-485 interface (Modbus RTU), the communication parameters must be configured before commissioning.

- ▷ Select **Main menu** > **Configuration**.
 - ✓ The configuration menu opens.
- ▷ Select the **Interface** tab in the navigation bar.
- ▷ Open the **Modbus Settings** menu item.
- ▷ Select the desired settings.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.
- ▷ Select the **Default** button to restore the factory settings.

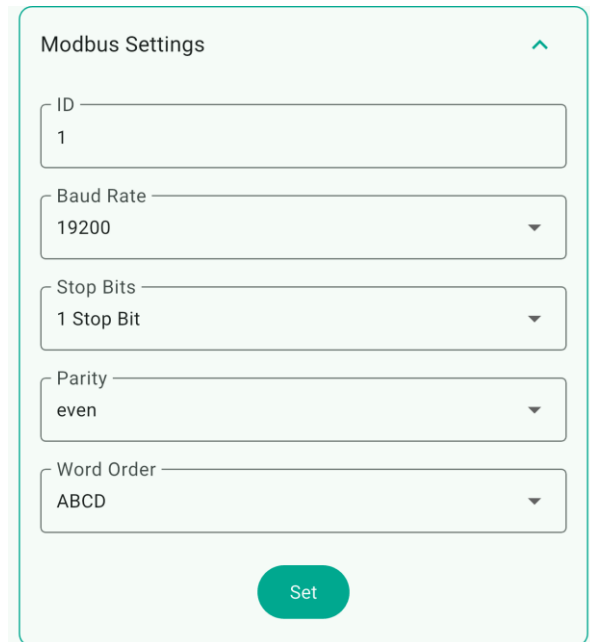


Figure 17: Setting Modbus parameters (example)

Parameter	Factory setting
ID	1
Baud rate	19200
Stop bit	1
Parity	even
Data format	ABCD (Big Endian)

Table 13: Modbus factory settings

8.7 Configure advanced sensor parameters

Configure advanced sensor parameters

In the **Parameters** menu item, you can set advanced sensor parameters to customize measurement value processing and energy calculation.

- ▷ Select **Main menu** > **Configuration**.
 - ✓ The configuration menu opens.
- ▷ Select the **Expert** tab in the navigation bar.
- ▷ Open the **Parameters** menu item.
- ▷ Select the desired settings.
- ▷ Confirm the settings.
 - ✓ The settings will be applied to the product.

Parameter	Description
Flow Offset	Defines the correction value for the measured volume flow. The entered value is added to or subtracted from the measured value.
Flow Factor	Defines the scaling factor for the measured volume flow. The measured value is multiplied by the entered factor.
Temperature Offset +/-	Defines the correction value for the measured temperature.



Parameter	Description
	The entered value is added to or subtracted from the measured value.
Filter Time	Defines the filter time used to smooth the measurement signal. A longer filter time results in a smoother but delayed display of the measured value.
Heating Value	Defines the heating value of the measured gas. This value is used to perform the calculation of the energy content, e.g., for natural gas. This parameter is relevant only for sensors that measure flammable gases.
Pressure Offset +/-	Defines the correction value for the measured pressure. The entered value is added to or subtracted from the measured value.
Pressure Type	Defines whether the pressure is evaluated as relative pressure or absolute pressure. Relative pressure refers to ambient pressure; absolute pressure refers to absolute vacuum.

Table 14: Advanced sensor parameters



9 Measured values

View measured values using the service app

Prerequisite

- The product is connected to the service app.

The service app displays the available measured values and product information for the connected product. Depending on the product model, values such as volume flow, consumption, gas temperature, system pressure, and humidity are displayed. In addition, minimum, maximum, and average values for the available measurement parameters can be displayed.

▷ Select **Main menu** > **Measured values**.

- ✓ The measured values and product information are displayed.
- ! For more information on using the measured value, statistics, graph, and analysis views, see the "User Manual - Service App."

10 Maintenance and servicing



CAUTION

Danger due to improper maintenance

Improper maintenance can lead to damage and malfunctions.

- ▷ The product must only be serviced by a qualified technician.
- ▷ Work on the product's electrical components may only be performed by qualified electricians or by trained personnel under the direction and supervision of a qualified electrician in accordance with electrical safety regulations.
- ▷ Use only replacement parts that meet the manufacturer's technical requirements.



NOTE

Unless expressly described otherwise, only begin maintenance and servicing work after

- the product has been disconnected from the power supply,
- the product has been switched off and secured against being switched on again.

10.1 Clean product

Cleaning the housing

If the housing becomes dirty, perform cleaning with solvent-free cleaning agents.

- ▷ Use a slightly damp, lint-free cloth to clean the housing regularly.
- ▷ Check the product for damage and corrosion.

Cleaning the display

If the display becomes dirty, perform cleaning with solvent-free cleaning agents.

- ▷ Use a slightly damp, lint-free cloth to perform regular cleaning of the display.

10.2 Check electrical wires and connections



DANGER

Danger to life due to electrical voltage

During installation, maintenance, or in the event of a malfunction, conductive parts that can be touched may carry dangerous voltages. Contact with live parts can result in serious injury or death.

- ▷ Perform work on electrical connections only when the power supply is turned off.
- ▷ Secure the product against accidental restarting.
- ▷ Work on electrical systems or equipment may only be performed by qualified electricians or by trained personnel under the direction and supervision of a qualified electrician.
- ▷ Check all electrical connections before commissioning and regularly during operation.



CAUTION

Danger from commissioning a damaged product

If a damaged product is installed or put into operation, it may result in functional failures, electrical hazards, or mechanical risks.

- ▷ Before each commissioning, inspect the product, accessories, and all supply lines for visible damage, loose parts, or missing components.
- ▷ Immediately take any defective product out of operation immediately.



Check electrical wires and connections

The product's electrical wiring and connections must be inspected regularly by a qualified person. It is the operator's responsibility to determine appropriate maintenance intervals.

Prerequisite

- The product must be de-energized and freely accessible.
- ▷ Check the electrical wiring for damage.
- ▷ Check the terminal connections of the electrical installation to ensure they are secure and free of corrosion.

10.3 Testing mechanical components

Inspect mechanical components

The product's mechanical connections must be inspected for secure fit, integrity, and leak-tightness. It is the operator's responsibility to determine appropriate inspection intervals.

Prerequisite

- The product is de-energized and freely accessible.
- ▷ Check all connections and joints for tightness and visible leaks.
- ▷ Carefully tighten any loose connections.
- ▷ Check for wear, cracks or leaks.

10.4 Perform calibration

Set calibration intervals

It is the operator's responsibility to determine appropriate calibration intervals.



NOTICE

Manufacturer's recommendation

To detect measurement deviations early on, calibration is recommended every 12 months.

- ▷ Perform an initial recalibration of the product no later than 12 months after delivery - regardless of operating conditions.

A shorter calibration interval may be necessary, particularly under the following conditions:

- extreme ambient temperatures, particularly low temperatures
 - exposure to moisture or condensate use other than as intended
 - mechanical stress, e.g., from impact or overload
 - interventions for maintenance or repair purposes
 - high requirements for measurement precision
- ▷ Follow your company's guidelines for determining calibration intervals, as well as the specifications in your quality management manual.
 - ▷ When determining calibration intervals, take into account the operating conditions, the required measurement precision, and economic considerations.
 - ⓘ Rare recalibrations increase the risk of inaccurate measurement results. Frequent recalibrations can increase operating costs.
 - ▷ Always have the product calibrated after exposure to special operating conditions.
 - ▷ For more information, refer to the enclosed factory calibration certificate.

Have the factory calibration performed

- ▷ Send the product to the manufacturer.
 - ⓘ For use in mission-critical systems, a replacement product of the same design should be kept on hand.



Set the calibration date

If necessary, you can set the date for the next calibration.

- ▷ Select Main menu > Configuration.
 - ✓ The configuration menu opens.
- ▷ Select the Expert tab in the navigation bar.
- ▷ Open the General menu item.
- ▷ Set the next calibration date.
- ▷ Confirm the setting.
 - ✓ The calibration date is saved.

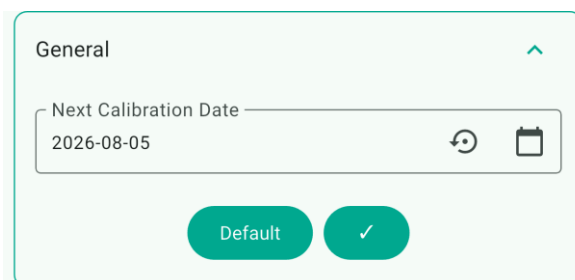


Figure 18: Setting the calibration date (example)

10.5 Update device software



NOTICE

Data loss or malfunction due to an interrupted update

An interruption in the power supply or connection may cause the update to abort and result in product malfunctions.

- ▷ Ensure an uninterrupted power supply during the update.
- ▷ Do not close the service app.
- ▷ Do not disconnect from the product.

Update device software

- ▷ Use only update packages approved for this product to update the device software.
 - ⓘ For more information on how to perform the update, see the "User Manual - Service App."

10.6 Troubleshooting and recovery

10.6.1 Correct error states

Resolving error conditions

Measurements can still be taken when warnings are displayed. Errors may prevent measurements from being taken or interrupt the output of valid measured values.

- ▷ If necessary, contact customer service.

Message	Description	Resolution
Low Voltage	Supply voltage < 18 V. The product cannot measure properly. No measured values are available for flow rate, consumption, or velocity.	▷ Check the supply voltage. ▷ Ensure that it is within the range of 18–36 V DC.
Internal Error	Internal read error, e.g., in the EEPROM or AD converter.	▷ Restart the product. ▷ If the error persists, contact customer service.
Low Voltage 4–20 mA	Supply voltage < 17.5 V. For products with a galvanically isolated 4–20 mA output, a minimum supply voltage of 17.5 V is required.	▷ Check the wiring of the 4–20 mA output.
Not Calibrated	This error message is displayed if an incorrect gas is selected in the settings. The product is calibrated for a specific application.	▷ Select the gas type for which the product is calibrated.
Ambient Temperature Error	Error message appears if the external temperature sensor is connected incorrectly or configured incorrectly.	▷ Check the connection and configuration of the external temperature sensor. ▷ If the error persists, contact customer service.
External Pressure Error	Error message indicating a faulty connection or invalid configuration of the external pressure sensor.	▷ Check the connection and configuration of the external pressure sensor. ▷ If the error persists, contact customer service.



Message	Description	Resolution
Next Calibration Period Expired	The time interval for the next calibration has been exceeded.	▷ Perform a calibration of the product.

Table 15: Error and status messages

10.6.2 Restore factory settings

Restore factory settings

If necessary, the product can be reset to its factory settings. This will reset all user-specific settings to their default values.

- ▷ Select **Main menu** > **Configuration**.
 - ✓ The configuration menu opens.
- ▷ Select the **Expert** tab in the navigation bar.
- ▷ Open the menu item **Restore factory settings**.
- ▷ Select the **Factory settings** button.
- ▷ Confirm that you want to restore the factory settings.
 - ✓ The factory settings will be restored.

10.7 Customer service

Contact customer service

To ensure prompt processing, please provide customer service with the following information:

- Part number from the type plate
 - Serial number from the type plate
 - Product model
 - Device software version
 - Error message displayed
 - Measured medium
 - Operating pressure and medium temperature
 - Time and frequency of the error
- ▷ Describe the problem as accurately as possible and list the most recent changes made to the product, its configuration, or the operating environment.



11 Decommissioning and disposal

Decommissioning

In the event of temporary or permanent decommissioning, the product must be safely disconnected from the operating system, dismantled, and, if necessary, stored.

- ❗ Further information can be found in chapter "→ 5.2 Storage."

Waste disposal

At the end of its useful life, the product must be disposed of properly in accordance with applicable national regulations. The product and its packaging contain recyclable materials that must not be disposed of as general waste.

- ▷ Before passing on or disposing of the device, delete any stored data, if present.
- ▷ Sort the components by material.
 - ❗ Follow the local disposal regulations and waste codes applicable to the product.
- ▷ Dispose of the components in an environmentally responsible manner, in accordance with local regulations or through a specialized waste disposal company.
 - ❗ For information on environmentally sound disposal, contact local authorities or specialized waste disposal companies.
- ▷ Alternatively, you can return the product to the manufacturer for proper disposal.



12 Appendix

12.1 Technical data

Parameters	Specification	Unit
Weight	~ 3.0	kg
Power supply	18... 36 via SELV	V DC
Fuse	T2.5L, 2.5 A / 125 V, slow-blow (Device protection via integrated overcurrent fuse)	
Power consumption	max. 7	W
Electrical connection	Via connector plug	
Measuring range	0...20	m/s
Measuring principle	Time-of-flight difference method	
Response time	(t ₉₀): < 1 s with additional filtering in the sensor disabled	
Measurement precision	±1.5% of the measured value, ±0.3% of the full-scale value (based on max. volume flow Q _B)	
Measured variables	• Flow • Total consumption • Pressure (in conjunction with an external pressure sensor) • Temperature (in conjunction with an external temperature sensor) • Velocity (in conjunction with an external pressure and temperature sensor)	
Operating pressure	≥ 3	bar
Display	• TFT color display • Size: 2.8" • Resolution: 320 x 240 pixels	
Communication interfaces	Depending on the version: • RS-485 (Modbus RTU), in accordance with the EIA/TIA-485 standard • Bluetooth Low Energy (BLE) • Modbus TCP interface (optional) • M-Bus (optional) • IO-Link (optional) • Wi-Fi (optional)	
Analogue output	• 1 x 4...20 mA (not galvanically isolated) _{RL} < 500 Ω	
Application range	Indoor use	
Pollution degree	2	
Ambient temperature	-20...+70	°C
Storage temperature	-30...+80	°C
Humidity	Max. 90% relative humidity, non-condensing	
Altitude rating	Up to 4,000 m above sea level (Use above 2,000 m only with an appropriately approved power supply)	
Protection class	IP65	

Table 16: Technical specifications | VC 600

Parameters	Specification	Unit
Measured medium	• Compressed air in accordance with ISO 8573-1, Class 5:6:4 or better • Technical gases	
Medium temperature	-30...+80	°C
Media humidity	Max. 95% relative humidity, non-condensing	

Table 17: Technical Data | Measured medium

12.2 Dimensions

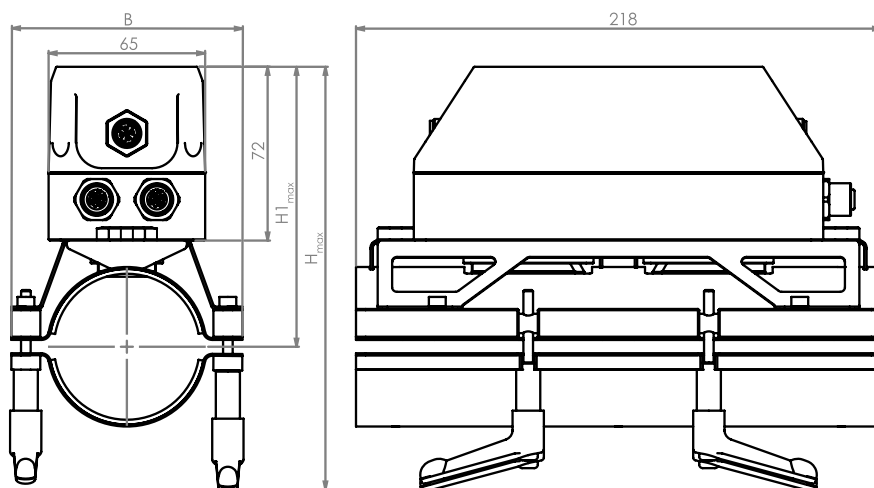


Figure 19: Dimensions

Outer pipe diameter	B	H _{max}	H1 _{max}	Unit
Ø 25...30	62	162.5	101	mm
Ø 32–36	70	165.5	104	mm
Ø 38–43	77.5	168.2	107.5	mm
Ø 45–50	83.5	172.5	111	mm
Ø 50–55	90.2	174	113.5	mm
Ø 57–62	96	177.5	117	mm
Ø 63–70	102.5	182.5	121	mm
Ø 72...78	111.5	186.5	125	mm
Ø 84...90	124.5	192	131	mm

Table 18: Dimensions depending on the outer diameter of the pipe

12.3 Measuring ranges

Inner diameter [mm]	Max. volume flow Q _B [m³/h]	Measuring range Q _N [Nm³/h] at 7 bar(rel), 20 °C ¹
21.7	26.63	0.85...213.03
27.3	42.15	1.35...337.16
36	73.29	2.35...586.3
41.9	99.28	3.18...794.22
50	141.37	4.52...1,130.97
53.1	159.45	5.1...1,275.56
60.3	205.62	6.58...1,644.93
68.9	268.45	8.59...2,147.59
80.9	370.1	11.84...2,960.8

Table 19: Measuring ranges at v_B = 20 m/s²

12.4 Register assignment

Index	Address	Bytes	Type	Meaning	Default	Access	Note
2001	2000	2	uint16	Modbus ID	1	Read-Write	Modbus ID 1–247

¹ Reference conditions: per ISO 1217 (20 °C, 1000 mbar)

² Q_B = operating volume flow; Q_N = standardized volume flow



Index	Address	Bytes	Type	Meaning	Default	Access	Note
2002	2001	2	uInt16	baud rate	4	Read-Write	0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200
2003	2002	2	uInt16	Parity	1	Read-Write	0 = none 1 = even 2 = odd
2004	2003	2	uInt16	Number of stop bits	1	Read-Write	0 = 1 stop bit 1 = 2 stop bits
2005	2004	2	uInt16	Word Order	0xABCD	Read-Write	0xABCD = Big Endian 0xCDAB = Middle Endian
2069	2068	4	float	Pressure Type (Relative / Absolute)	0	Read-Write	0 = Relative 1 = Absolute

Table 20: Configuration register | Modbus RTU

Index	Address	Bytes	Type	Meaning	Default	Access	Note
1101	1100	4	float	Flow in m³/h		Read-Only	
1109	1108	4	float	Flow in Nm³/h		Read-Only	
1117	1116	4	float	Flow in m³/min		Read-Only	
1125	1124	4	float	Flow in Nm³/min		Read-Only	
1133	1132	4	float	Flow in l/h		Read-Only	
1141	1140	4	float	Flow in NI/h		Read-Only	
1149	1148	4	float	Flow in l/min		Read-Only	
1157	1156	4	float	Flow in NI/min		Read-Only	
1165	1164	4	float	Flow in l/s		Read-Only	
1173	1172	4	float	Flow in NI/s		Read-Only	
1181	1180	4	float	Flow in cfm		Read-Only	
1189	1188	4	float	Flow in Ncfm		Read-Only	
1197	1196	4	float	Flow in kg/h		Read-Only	
1205	1204	4	float	Flow in kg/min		Read-Only	
1213	1212	4	float	Flow in kg/s		Read-Only	
1221	1220	4	float	Flow in kW		Read-Only	
1269	1268	4	uInt32	Consumption m³, integer part	x	Read-Only	
1275	1274	4	uInt32	Consumption in Nm³, integer part	x	Read-Only	
1281	1280	4	uInt32	Consumption in l, integer part	x	Read-Only	



Index	Address	Bytes	Type	Meaning	Default	Access	Note
1287	1286	4	uint32	Consumption NI, integer part	x	Read-Only	
1293	1292	4	uint32	Consumption in cf, integer part	x	Read-Only	
1299	1298	4	uint32	Consumption Ncf, integer part	x	Read-Only	
1305	1304	4	uint32	Consumption kg, integer part	x	Read-Only	
1311	1310	4	uint32	Consumption kWh, integer part	x	Read-Only	
1347	1346	4	float	Velocity m/s		Read-Only	
1355	1354	4	float	Velocity Nm/s		Read-Only	
1363	1362	4	float	Velocity Ft/min		Read-Only	
1371	1370	4	float	Velocity NFt/min		Read-Only	
1419	1418	4	float	GasTemp °C		Read-Only	
1427	1426	4	float	GasTemp °F		Read-Only	

Table 21: Measurement register | Basic

Index	Address	Bytes	Type	Meaning	Default	Access	Note
1475	1474	4	float	System pressure mbar	x	Read-Only	Value depends on the setting in the "Pressure type" register
1481	1480	4	float	System pressure (bar)		Read-Only	
1487	1486	4	float	System pressure psi		Read-Only	

Table 22: Measurement register | "Pressure" option

12.5 EU Declaration of Conformity



EU-KONFORMITÄTSERKLÄRUNG

EU-DECLARATION OF CONFORMITY

Wir
We CS INSTRUMENTS GmbH & Co.KG
Zindelsteiner Straße 15, 78052 VS-Tannheim

erklären in alleiniger Verantwortung, dass das Produkt
hereby declare, on our sole responsibility, that the product

Verbrauchs-/Durchflusssensor VC 600
Flow Sensor VC 600

den Anforderungen folgender EU-Richtlinien entspricht:
complies with the requirements of the following EU Directives:

Elektromagnetische Verträglichkeit Electromagnetic compatibility	2014/30/EU
RoHS Restriction of certain Hazardous Substances	2011/65/EC & 2015/863/EC
RED Radio Equipment Directive	2014/53/EU

Angewandte harmonisierte Normen:

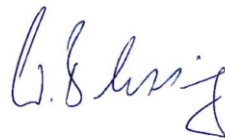
Harmonised standards applied:

Elektromagnetische Verträglichkeit, RED Art. 3.1(b) Electromagnetic compatibility, RED Art. 3.1(b)	EN 55011:2016 + A1:2017 + A11:2020 EN 61326-1:2013
Effektive Nutzung des Frequenzspektrums, RED Art. 3.2 Effective use of the frequency spectrum, RED Art. 3.2	ETSI EN 300 328:2019-07 (V2.2.2)
Cybersicherheit, RED Art. 3.3(d) Cybersecurity, RED Art. 3.3(d)	EN 18031-1:2024
RoHS Restriction of certain Hazardous Substances	EN IEC 63000:2018

Das Produkt ist mit dem abgebildeten Zeichen gekennzeichnet.
The product is labelled with the indicated mark.



Tannheim, den 04.08.2026



Wolfgang Blessing Geschäftsführer



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