



Operating manual (Translation)

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## Turbine Flow Sensor

Series VTY

Types VTY10MA • VTY10K5 • VTY20MA



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## 0 About this operating manual

- The operating manual is aimed at specialists and semi-skilled personnel.
- Before each step, read through the relevant advice carefully and keep to the specified order.
- Thoroughly read and understand the information in the section "Safety instructions".
- The figures in the operating manual are examples and apply to all types of the VTY.
- Sections or descriptions that do not apply to all types of the VTY are marked accordingly.

If you have any problems or questions, please contact your supplier or contact us directly at:



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### Hazard signs and other symbols used:



CAUTION! Electric current!  
This sign indicates dangers which could arise from handling of electric current.



WARNING! / CAUTION! Risk of injury!  
This sign indicates dangers that cause personal injuries that can lead to health defects or cause considerable damage to property.



CAUTION! Material damage!  
This sign indicates actions which could lead to possible damage to material or environmental damage.



ADHERE TO OPERATING MANUAL!



NOTICE!  
This symbol indicates important notices, tips or information.



NO DOMESTIC WASTE!  
The device must not be disposed of together with domestic waste.



Pay attention to and comply with information that is marked with this symbol.



Follow the specified instructions and steps.  
Adhere to the given order.



Check the specified points or notices.



Reference to another section, document or source.



Item.

## 1 Device description

The SIKA flow sensors of the series VTY are transducers for flow rate and total flow measurement.

It has an almost unlimited application by means of its exceptionally compact design, its very wide measurement range and its convincing measurement accuracy, particularly in mass applications.

### Versions\*:

The VTY is available in nominal sizes DN 10 and DN 20.

The individual versions differ in material, process and electrical connection.

Further information about that can be found in our catalogues at [catalogues.sika.net](http://catalogues.sika.net).



### Type plate:

You can find the sticker of the type plate at the connecting cable of the VTY.

It contains the most important data and the connection diagram for the electrical connection (Example → Fig.).



### 1.1 Delivery, unpacking and accessories

All units have been carefully checked for their operational reliability before shipment.

- ☐ Immediately after receipt, please check the outer packaging for damages or any signs of improper handling.
- ☐ Report any possible damages to the forwarder and your responsible sales representative. In such a case, state a description of the defect, the type and the serial number of the device.  
Report any in-transit damage immediately. Damage reported at a later date shall not be recognized.

### Unpacking:

- Carefully unpack the unit to prevent any damage.
- Check the completeness of the delivery based on the delivery note.

### Scope of delivery:

- ☐ VTY according to the order data.
- ☐ 1x Operating manual.
- ☐ 1x Packaging.



\* Customised versions available on request.

**IMPORTANT!**

- ↪ Use the type plate to check if the delivered unit corresponds to your order.
- ↪ In particular, for devices with electrical components, check to see if the correct power supply voltage is specified.

## 1.2 Intended use

The flow sensors of the series VTY may only be used for flow rate measurements or dosing of liquids. Never use them for gas measurements.

**WARNING! No safety component!**

The flow sensors of the series VTY are not safety components in accordance with Directive 2006/42/EC (Machine Directive).

- ↪ Never use the VTY as a safety component.

The operational safety of the device supplied is only guaranteed by intended use. The specified limits (→ § 9 "Technical Data") may under no circumstances be exceeded.

Before ordering and installation, check that the material of the turbine flow sensor is suitable for the medium to be measured and the application (→ § 9.2 "Materials table").

## 1.3 Exclusion of liability

We accept no liability for any damage or malfunctions resulting from incorrect installation, in-appropriate use of the device or failure to follow the instructions in this operating manual.



## 2 Safety instructions



Before you install the VTY, read through this operating manual carefully. If the instructions contained within it are not followed, in particular the safety guidelines, this could result in danger for people, the environment, and the device and the system it is connected to.

The VTY corresponds to the state-of-the-art technology. This concerns the accuracy, the operating mode and the safe operation of the device.

In order to guarantee that the device operates safely, the operator must act competently and be conscious of safety issues.

SIKA provides support for the use of its products either personally or via relevant literature. The customer verifies that our product is fit for purpose based on our technical information. The customer performs customer- and application-specific tests to ensure that the product is suitable for the intended use. With this verification all hazards and risks are transferred to our customers; our warranty is not valid.

### Qualified personnel:

- ⚠ The personnel who are charged for the installation and maintenance of the VTY must hold a relevant qualification. This can be based on training or relevant tuition.  
The personnel must be aware of this operating manual and have access to it at all times.
- ⚠ The electrical connection should only be carried out by a fully qualified electrician.

### General safety instructions:

- ⚠ In all work, the existing national regulations for accident prevention and safety in the workplace must be complied with. Any internal regulations of the operator must also be complied with, even if these are not mentioned in this manual.
- ⚠ Degree of protection according to EN 60529:  
Ensure that the ambient conditions at the site of use does not exceed the requirements for the stated protection rating (→ § 9 "Technical Data")
- ⚠ Suitable measures should be taken to prevent the medium from freezing.
- ⚠ Only use the VTY if it is in perfect condition. Damaged or faulty devices must be checked without delay and, if necessary, replaced.
- ⚠ When fitting, connecting and removing the VTY use only suitable appropriate tools.
- ⚠ Do not remove or obliterate type plates or other markings on the device, as otherwise the warranty is rendered null and void.

### Special safety instructions:

- ⚠ CAUTION! Material damage!  
Due to the material used, the devices are **not suitable** for monitoring oils. The strength of the used plastic parts would be considerably reduced.
- ⚠ CAUTION! Material damage!  
The Bearings of the VTY can be damaged when blowing out.  
🚫 Never blow out the VTY with compressed air!

Warnings that are specifically relevant to individual operating procedures or activities can be found at the beginning of the relevant sections of this operating manual.

### 3 Construction and Function

#### Construction:

- ① Turbine body with process connection.
- ② Connecting cable.

Internal components:

- ③ Hall sensor.
- ④ DN 10: Perforated disc in inlet and outlet.  
DN 20: Turbine cage with perforated disc in inlet.
- ⑤ Rotor with magnet and bearings.  
Shaft (no reference).

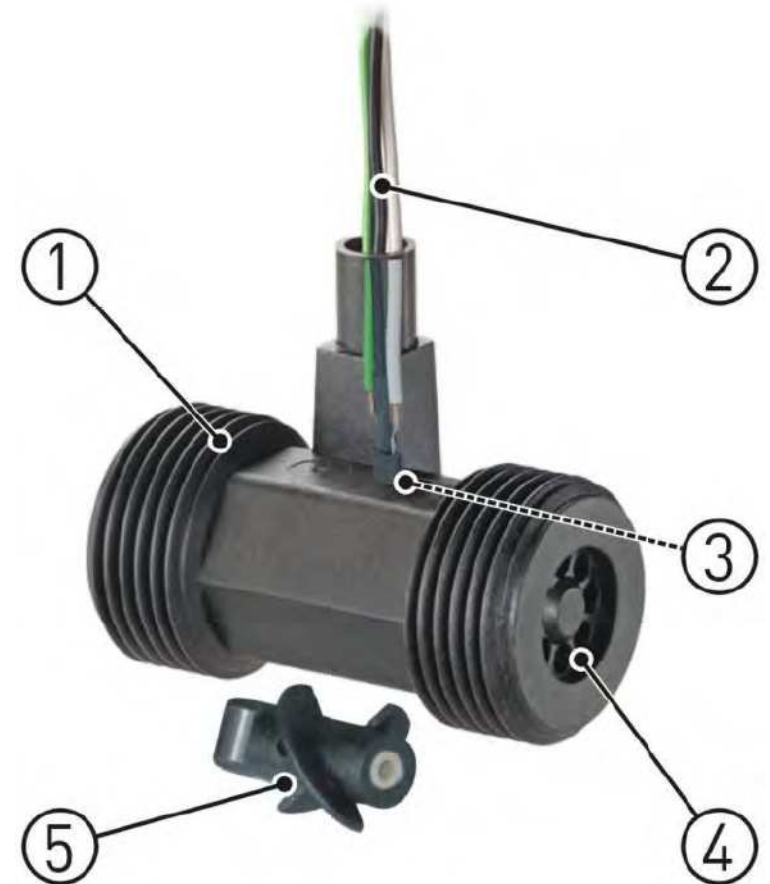
#### Function:

The liquid flowing into the VTY sets the rotor ⑤ in rotation.

The resulting forces from the rotation are mostly cancelled out due to the symmetrical shape of the rotor and the wear is reduced to a minimum.

The rotor ⑤ des VTY is equipped with a magnet. A Hall sensor ③ detects the rotation of the rotor and converts the rotation into a flow proportional frequency signal (square wave signal).

The extreme hard bearing materials, sapphire and hard metal, guarantee additionally an extraordinary life.



## 4 Installation of VTY

Before installing the VTY, check that

- ☐ the wetted materials of the device are suitable for the media being used (→ § 9.2 "Materials table").
- ☐ the equipment is switched off and is in a safe and de-energised state.
- ☐ the equipment is depressurised and has cooled down.



SUITABLE TOOLS:

➤ Use only suitable tools of the correct size.

### 4.1 Installation instructions

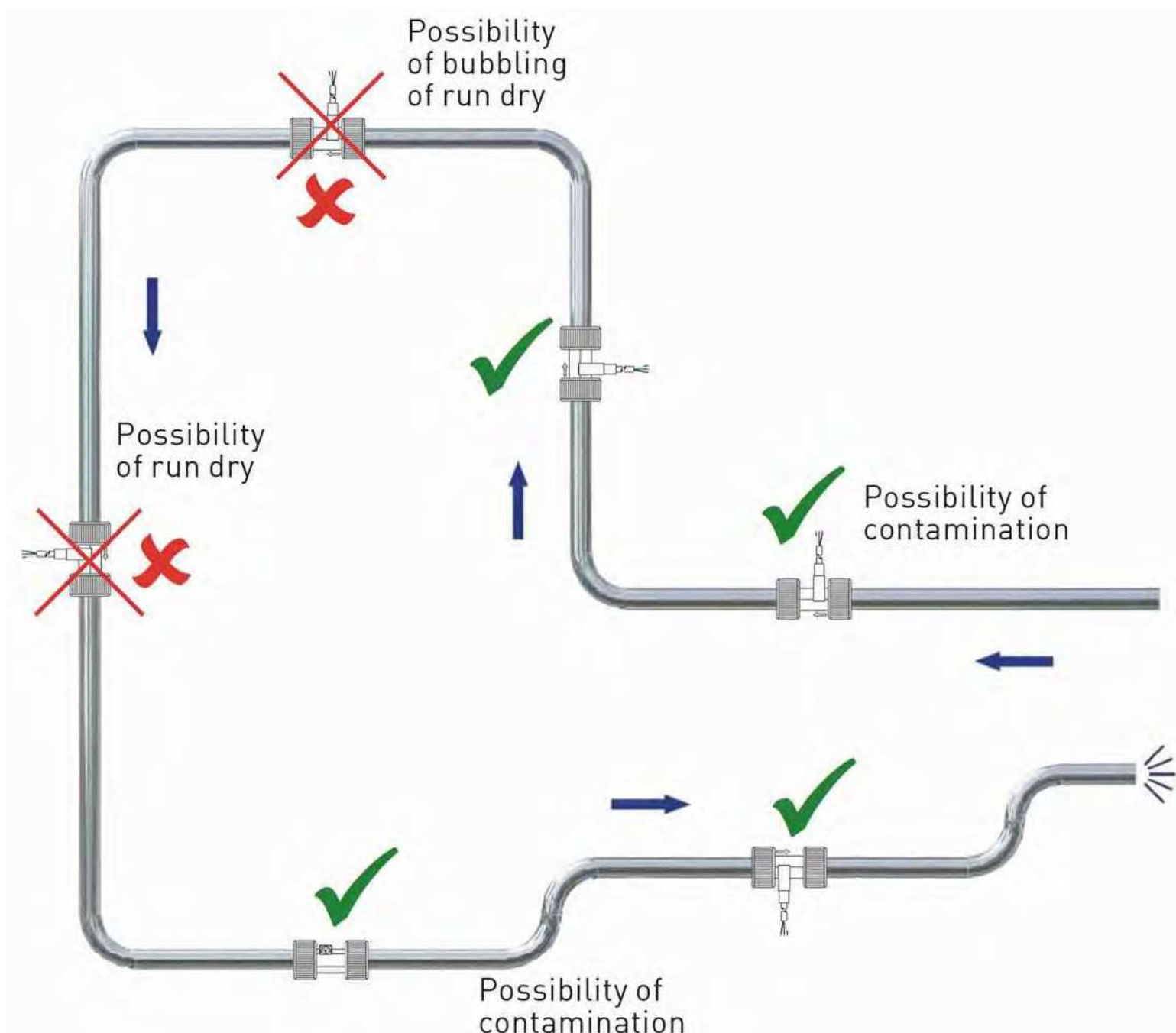
#### CAUTION! Malfunction due to bubbles!



Gas bubbles which are also formed by cavitation in the medium can cause a malfunction of the sensor and must be prevented.

➤ The system pressure must be three times the pressure drop at maximum flow (→ "Pressure drop").

- The VTY can always be installed anywhere along the pipeline. However, straight sections of piping are preferable.





- The unit can be installed in both horizontal as well as vertical pipelines. The flow sensor is only suitable for use in fully filled piping. You must avoid a free outlet.
- The arrow which is placed on the flow monitor (➔) shows the only permitted flow direction.
- To achieve the highest possible accuracy, the VTY must be used with straight in- and outlet sections of the respective nominal diameter (DN). The inlet section has to be at least 10 x DN; the outlet section 5 x DN in order to achieve the specified accuracy.
- The inlet and outlet sections and the gaskets must have the same or a slightly larger inside diameter than the one of the VTY in order to achieve the specified accuracy. Before and behind the stabilization tubes, the line may be contracted or enlarged.
- The pipeline of the screw connection must have a collar at the connection point. The face of the collar serves as sealing area. The collar is pressed against the gasket and the VTY by the screw connection.
- The flow medium to be monitored should preferably contain as few solid particles as possible. Present particles must not exceed a diameter of 0.4 mm (VTY10) or 1.0 mm (VTY20). If necessary, install a screen filter!



**IMPORTANT!** In case of shorter in- and outlet sections!

If the given lengths of the inlet and outlet sections cannot be met in practice, this has a direct influence on the specified pulse rate and the accuracy of the device.

## 4.2 Mounting

### **CAUTION! High temperature!**



The exposed surfaces of the device may be hot during operation.

⚡ Never touch the VTY when it contains a hot medium (> 80 °C).

⚡ Ensure the VTY or the pipe to which it is connected is fitted with a high temperature warning sign if it is used with a hot medium (> 80 °C).

The VTY is installed directly into the pipeline. The compact design and light weight of the unit make wall-mounting unnecessary.



**IMPORTANT!** Flush the pipe!

Before installing the turbine flow monitor flush the pipe carefully. In this way you avoid a blocking of the turbine caused by particles from the pipe installation.

### 4.2.1 Mounting with thread (DN 10 + DN 20)

#### CAUTION! Malfunction due to fibrous sealants!

If fibrous sealants (e.g. Hemp or Teflon tape) enter the flow, the rotor can be blocked or obstructed. This leads to a malfunction of the VTY.



➤ During sealing the male thread with fibrous sealants, make sure that no residues of the sealant gets into the flow.

➤ Use gaskets of the correct size (recommended).

Now you can install the flow sensor in the piping system which was prepared according to § 4.1.

#### IMPORTANT NOTICES:



- Only use suitable gaskets during mounting.
- Observe the flow direction indicated on the device.
- Observe the mounting dimensions (→ § 9.4.1).

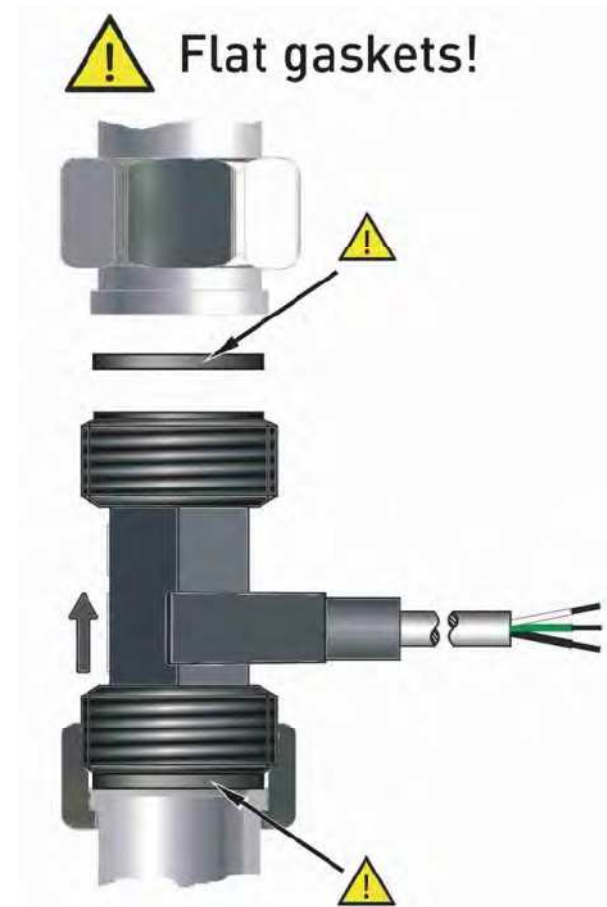
➤ Select an appropriate location for installation (→ § 4.1).  
To ensure the best possible measuring accuracy, a vertical installation position with increasing flow is preferable (no collecting of dirt deposits).

➤ Install the appropriate screwed connections at the installation location.

➤ Insert the VTY together with the gaskets.

⚠ Pay attention to the correct position of the gaskets!

➤ Screw the union nuts of the screwed connection onto the process connections of the VTY.



#### CAUTION! Material damage!

##### Pay attention to maximum torque.



While tightening, counter the union nut on the turbine body of the process connection!

If you do not counter it, the VTY can be damaged.



#### Maximum torque / Width across flats

VTY10MA • G 1/2	VTY10K5 • G 3/4	VTY20MA • G 1
20 Nm	8 Nm	20 Nm
AF 19	AF 19	AF 30

➤ Tighten both union nuts.

When tightening, use a spanner (AF 19 / AF 30) to counter the process connection on the turbine body in place.

## 5 Electrical connection

The electrical connection is made by 3 single wires with Molex Mini-Fit® plug. Optionally, the electrical connection is also available with a 3-wire PVC cable. The VTY 10 is additionally also available with 3 single wires.

The VTY is also available with a customer specific cable and with or without connector.



### CAUTION! Electric current!

The electrical connection should only be carried out by a fully qualified electrician.

➔ De-energize the electrical system before connecting the VTY.



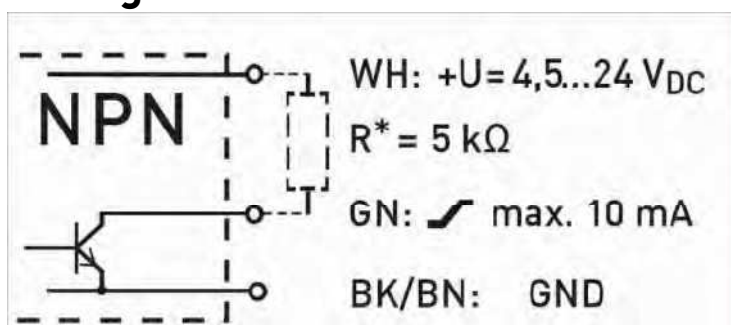
IMPORTANT! Pay attention to the type plate!

Depending on the version of the VTY, the wiring differs from the information in this operating manual.

➔ Always pay attention to the pin assignment on the type plate!

➔ Connect the VTY according to the following connection diagrams.

### Wiring:



### Colour code:

WH = white

GN = green

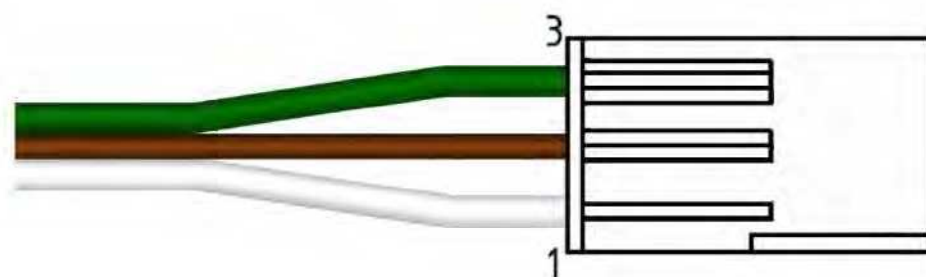
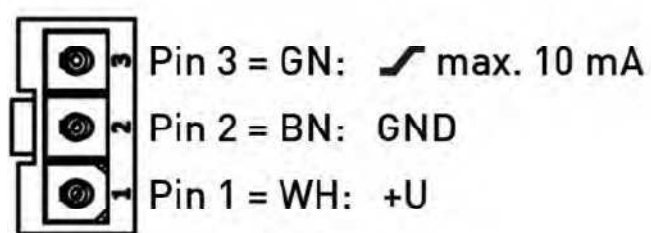
BK = black (single wire)

BN = brown (PVC cable / Molex)

R = resistance

\* Recommended pull-up resistance  $R \sim 5 \text{ k}\Omega$ .

### Pin assignment Molex Mini-Fit® plug:



## 6 Commissioning and operating

### 6.1 Commissioning

Check that

- ☐ the VTY has been installed correctly and that all screw connections are sealed.
- ☐ the electrical wiring has been connected properly.
- ☐ the measuring system is vented by flushing.

### 6.2 Switching on and off

The VTY has no switch and cannot be switched on or off on its own. Switching on and off is carried out by the applied supply voltage.

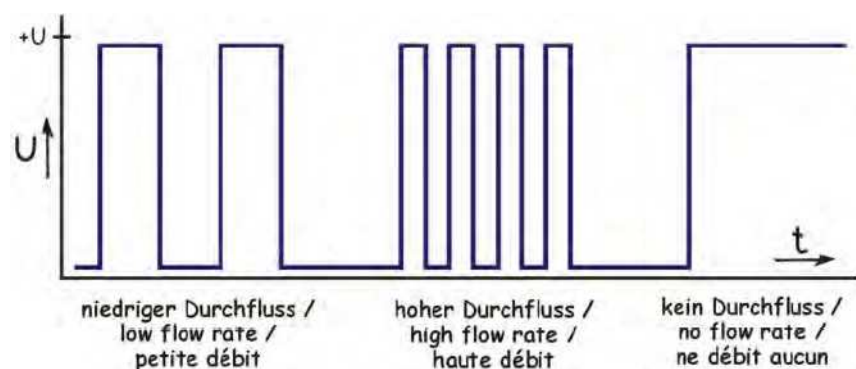
🔌 Switch on the supply voltage.

➤ The VTY is ready for use and goes into measuring operation.

### 6.3 Measuring operation

The VTY provides a flow proportional NPN square wave signal in the measuring mode.

The frequency of the output signal changes according to the flow (→ Fig.).





## 7 Maintenance and cleaning

### Maintenance:

The VTY is maintenance-free and cannot be repaired by the user. In case of a defect, the device must be replaced or sent back the manufacturer for repair.



### CAUTION! Material damage!

When opening the device, critical parts or components can be damaged.

➡ Never open the device and perform any repair yourself.

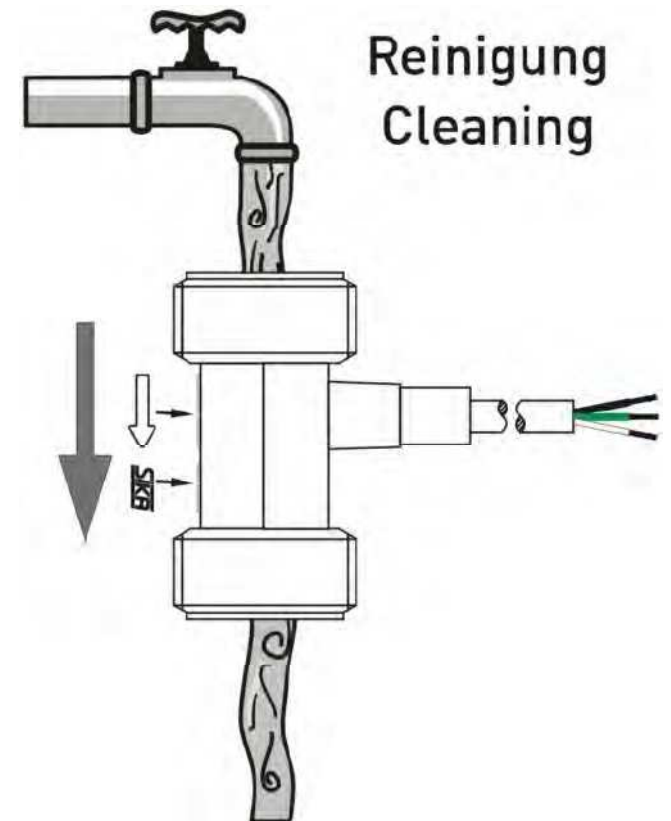
### External cleaning:

Clean the VTY with a dry or slightly damp lint-free cloth. Do not use sharp objects or aggressive agents for cleaning.

### Flushing:

Soiling in the inside can be removed by flushing with clean water.

- ➡ Remove the device from the pipe section.
- ➡ Only flush the VTY in flow direction with water.
- ➡ Observe the maximum flow of the device.



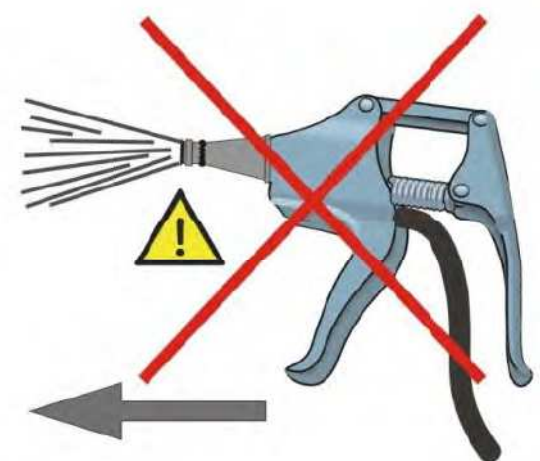
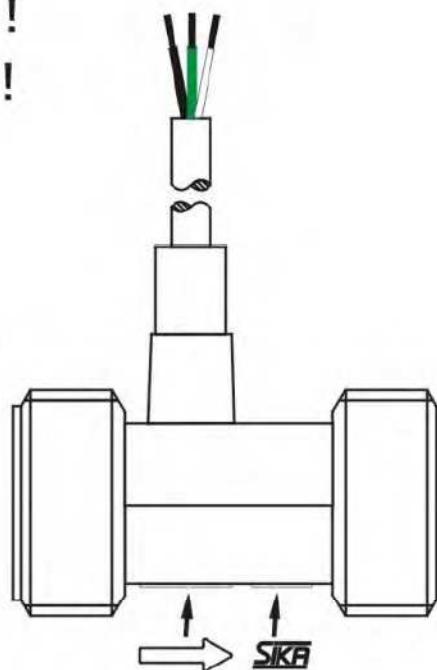
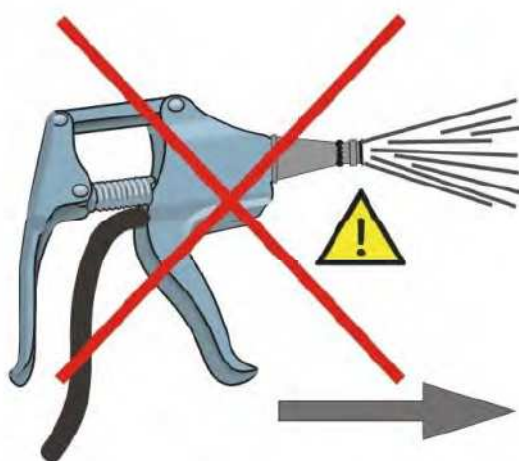
### CAUTION! Material damage!

The Bearings of the VTY can be damaged when blowing out.

➡ Never blow out the VTY with compressed air!



**Nicht Ausblasen !**  
**Do not blow out !**



## 7.1 Return shipment to the manufacturer

Due to legal requirements placed on environmental protection and occupational safety and health and to maintain the health and safety of our employees, all units returned to SIKA for repair must be free of toxins and hazardous substances. That also applies to cavities in the devices. If necessary, the customer must neutralise or purge the unit before return to SIKA.

Costs incurred due to inadequate cleaning of the device and possible costs for disposal and/or personal injuries will be billed to the operating company.

### **WARNING! Risk of injury due to insufficient cleaning!**



The operating company is responsible for all damages and harm of any kind, in particular physical injuries (e.g. caustic burns or toxic contaminations), decontamination measures, disposal etc. that can be attributed to insufficient cleaning of the measuring instrument.

⇒ Comply with the instructions below before returning the unit.

The following measures must be taken before you send the unit to SIKA for repair:

- ⇒ Clean the device thoroughly. This is of extreme importance if the medium is hazardous to health, i.e. caustic, toxic, carcinogenic or radioactive etc.
- ⇒ Remove all residues of the media and pay special attention to sealing grooves and slits.
- ⇒ Attach a note describing the malfunction, state the application field and the chemical/physical properties of the media.
- ⇒ Please follow the instructions on the procedure for sending returns which are on our website ([www.sika.net/en/services/return-of-products-rma.html](http://www.sika.net/en/services/return-of-products-rma.html)) and please specify a point of contact in case our service department has any questions.

The customer must confirm that the measures were taken by filling out the declaration of decontamination. It can be found on our website as a download:

[www.sika.net/images/RMA/Formular\\_Warenruecksendung.pdf](http://www.sika.net/images/RMA/Formular_Warenruecksendung.pdf)

## 8 Disassembly and disposal

**CAUTION! Risk of injury!**

Never remove the device from a plant in operation.

➞ Make sure that the plant is shut down professionally.

**Before disassembly:**

Prior to disassembly, ensure that

- ☐ the equipment is switched off and is in a safe and de-energised state.
- ☐ the equipment is depressurised and has cooled down.

**Disassembly:**

- ➞ Remove the electrical connectors.
- ➞ Remove the VTY using suitable tools.

**Disposal:**

Compliant with the Directives 2011/65/EU (RoHS) and 2012/19/EU (WEEE)\*, the device must be disposed of separately as electrical and electronic waste.

**NO HOUSEHOLD WASTE!**

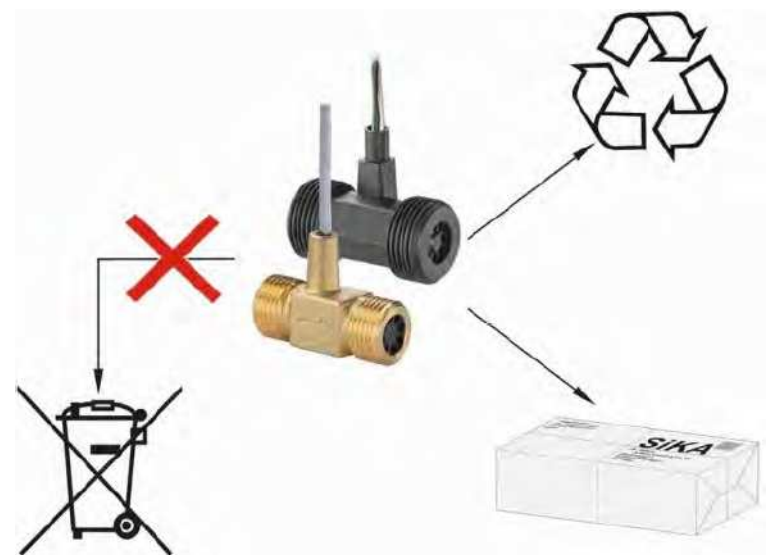
The VTY consists of various different materials. It must not be disposed of with household waste.

- ➞ Take the VTY to your local recycling plant

or

- ➞ send the VTY back to your supplier or to SIKA.




\* WEEE reg. no.: DE 25976360



## 9 Technical Data

The technical data of customised versions may differ from the data in these instructions. Please observe the information specified on the type plate.

### 9.1 Characteristics VTY

Type	VTY10MA Thread	VTY10K5 Thread	VTY20MA Thread
Characteristics measurement device			
Measuring range	1...30 l/min		1...60 l/min
Accuracy	±1 % of range		±1 % of range ±1 % of reading
Repeatability	±1 % of reading		
Signal output from	0.7 l/min	0.6 l/min	0.8 l/min
Sensor	Hall sensor		
Characteristics output signal			
Pulse rate / K factor	495 pulses/l	530 pulses/l	119 pulses/l
Resolution	2.02 ml/pulse	1.89 ml/pulse	8.40 ml/pulse
Signal shape	Square wave signal • duty cycle 50:50 • NPN open collector		
Signal current, max.	10 mA		
Pull-up resistor	5 kΩ (recommendation)		
Electrical characteristics			
Supply voltage	4.5...24 V <sub>DC</sub>		
Electrical connection - optional:	80 mm single wire with Molex Mini-Fit® Jr. plug 1.0 m PVC cable • single wire		0.5 m PVC cable
Degree of protection (EN 60529)	IP 65		
Process variables			
Medium temperature, max.	90 °C	85 °C (temporary 95 °C)	90 °C
Medium temperature, min.	0 °C (non-freezing)		
Ambient temperature	0...70 °C		
Nominal diameter	DN 10		DN 20
Nominal pressure	PN 16	PN 10	PN 16
Particle size in the medium	< 0.4 mm		< 1.0 mm
Process connection - male thread	G½1 - ISO 228	G¾ - ISO 228	G1 - ISO 228
Approvals			
WRAS, Approved Product Certificate No.: 1605300 (VTY10MA & VTY10K5) 1705302 (VTY20MA)			



9.2 Materials table

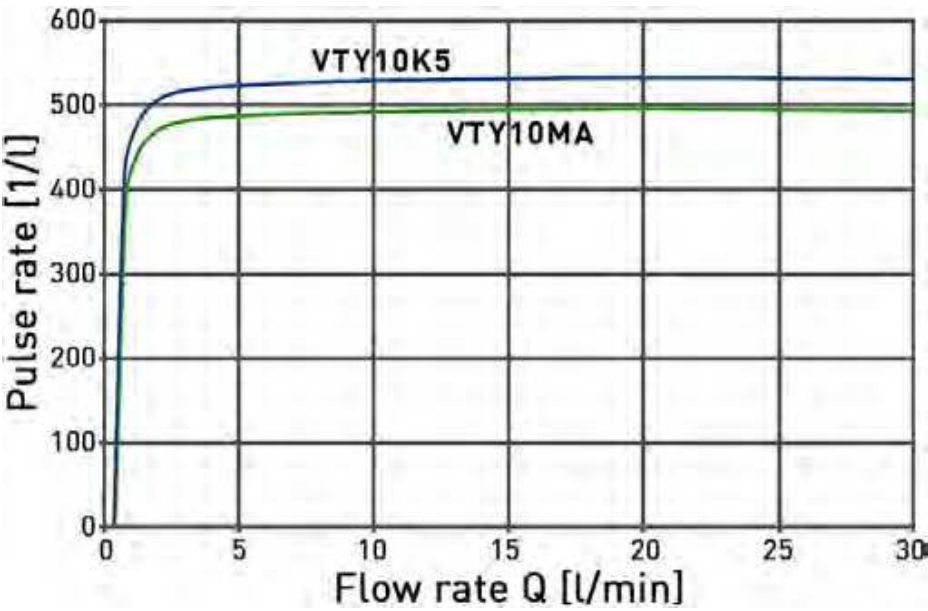
Type	VTY10MA Thread	VTY10K5 Thread	VTY20MA Thread	*1)
Pipe section	-/-	-/-	Brass CW617N	X
Turbine body	Brass CW617N	PPE+PS *2	-/-	X
Turbine cage	-/-	-/-	PPE+PS *2	X
Rotor	PPE+PS *2			X
Magnet	Hard ferrite			X
Shaft	Stainless steel / Hard metal		Stainless steel 1.4305 / Hard metal	X
Axial bearing	Sapphire			X
Radial bearing	PEEK Victrex			X

\*1) Wetted components.      \*2) PPE+PS Noryl™ 30% glass fiber reinforced.

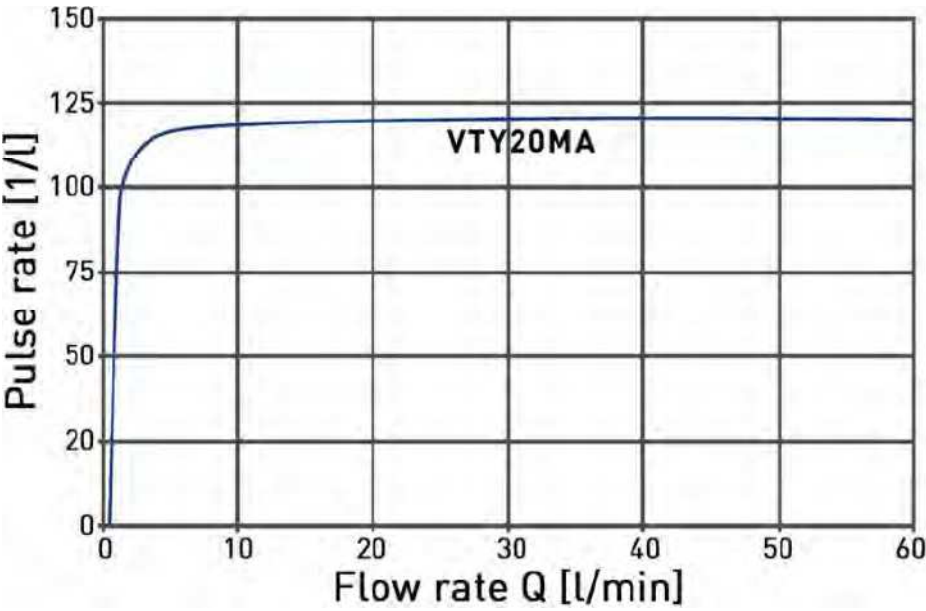
9.3 Characteristic curve, pressure drop

Characteristic curve:

DN 10

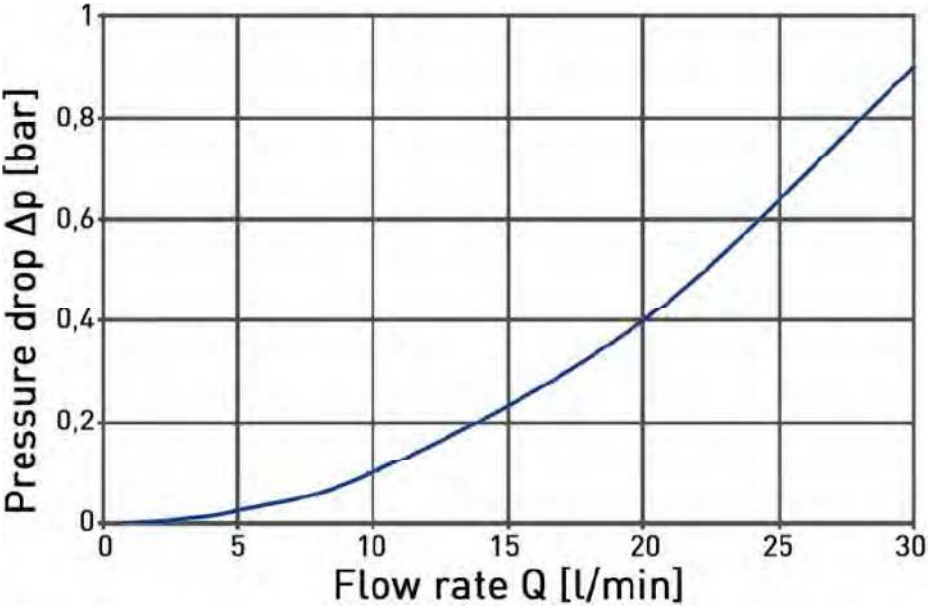


DN 20

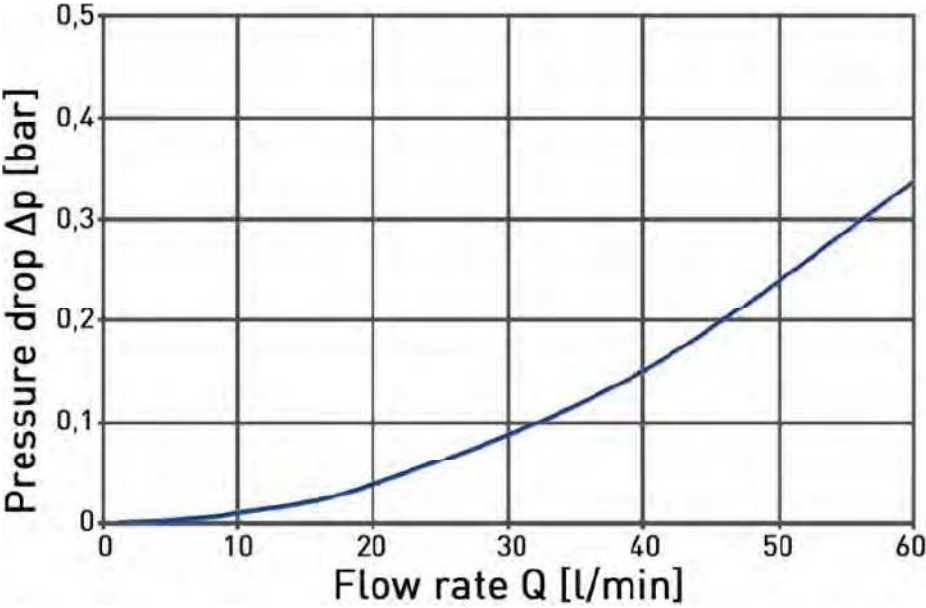


Pressure drop:

DN 10



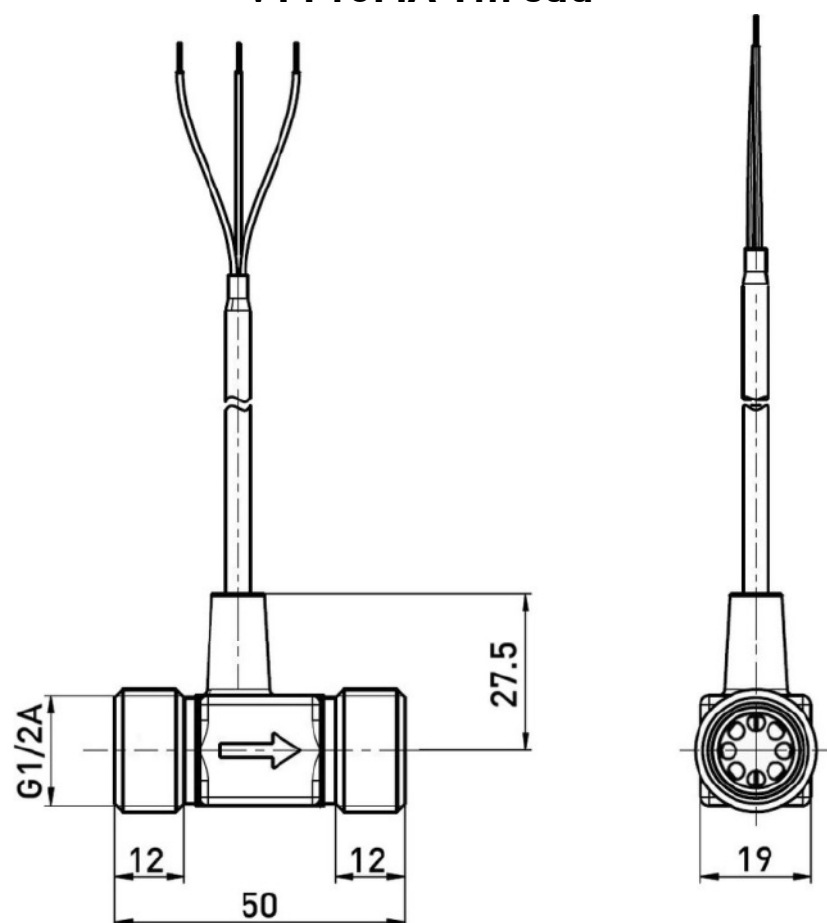
DN 20



## 9.4 Dimensions

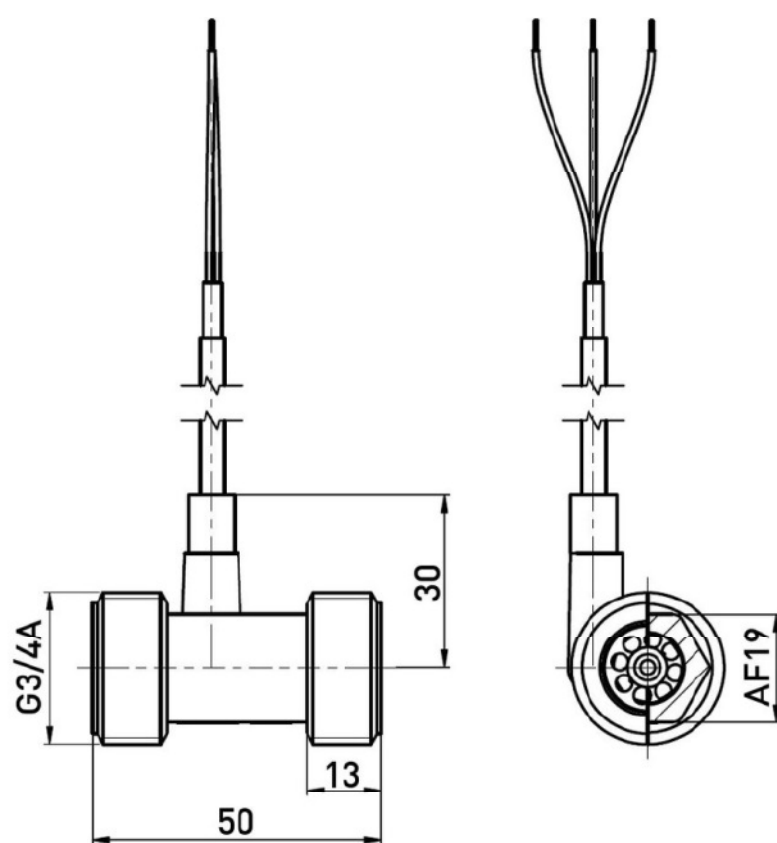
### 9.4.1 Dimensions VTY

**VTY10MA Thread**



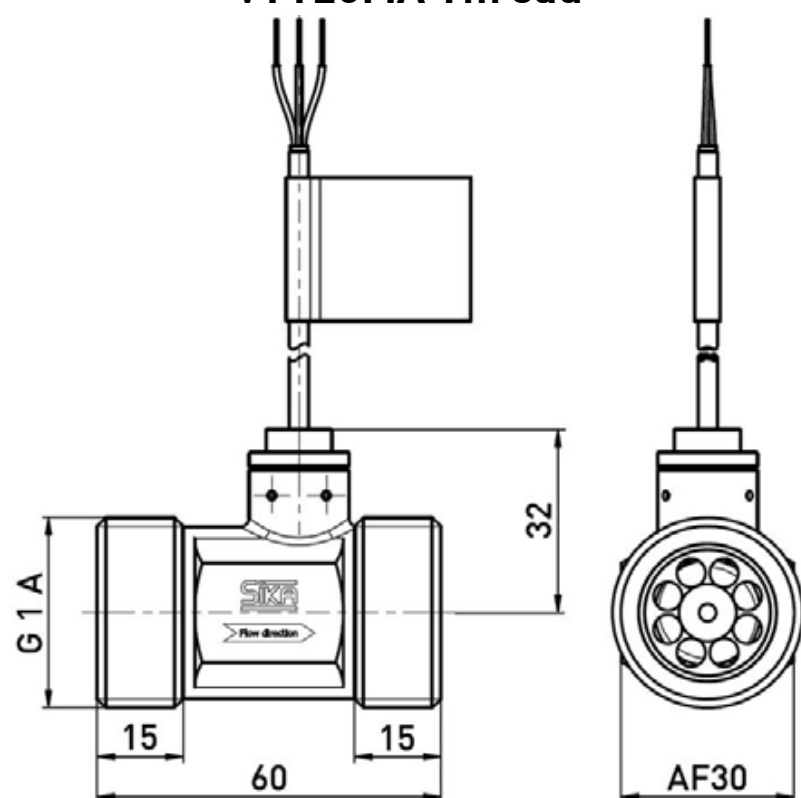
Flow direction

**VTY10K5 Thread**



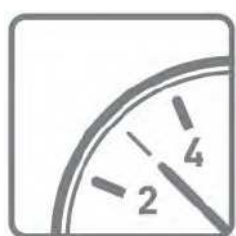
Flow direction

**VTY20MA Thread**

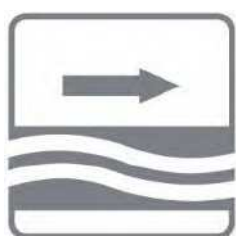


Flow direction

For your notes



Mess- und Sensortechnik  
Sensors and Measuring Instruments



Durchflussmesstechnik  
Flow Measuring Instruments



Test- und Kalibriertechnik  
Test and Calibration Instruments



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