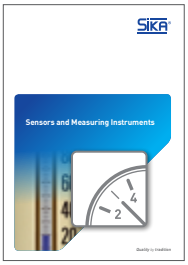
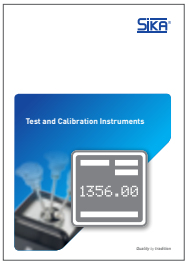
Flow Measuring Instruments

Quality by tradition





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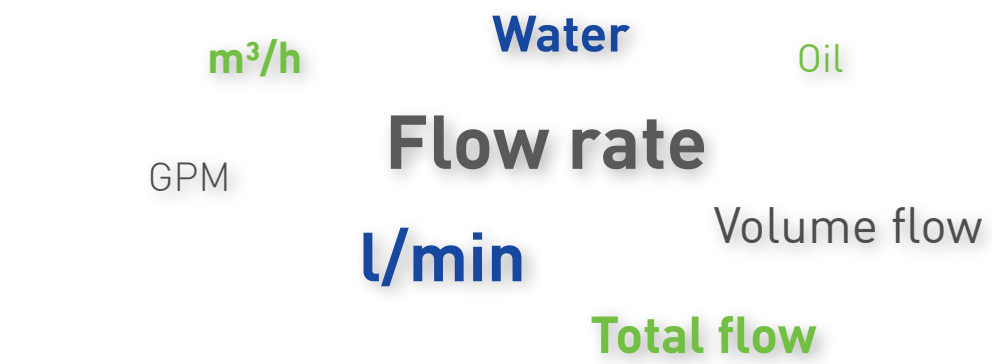
Flow Measuring Instruments

SIKA has been developing and manufacturing sensors for flow measurement and monitoring at the Kaufungen site for more than 40 years. For everything from paddle flow switches to turbine flow sensors and flow meters with no moving parts like magnetic inductive or Vortex, we have the optimal device for your application.

For customised solutions tailored to customer-specific measurement tasks, we have ten different types of sensors in our sensor product line. The high number of measuring principles and many years of experience enable us to serve our customers as a powerful partner.



Flow switches

Vortex flow sensors

Magnetic inductive flow sensors

Turbine flow sensors

Positive displacement flow sensors

Oval gear flow meters

Variable area flow meters

Electronic flow monitors and sensors

Piston types flow switches

Flow regulators

Displays and transducers

Level switches

- → With pipe tees (inline)
- → Direct installation (insertion)
- → For HVAC applications
- → With interchangeable paddles
- → For air flow

FLOW SWITCHES →

Flow switches

SIKA has over 45 years of experience in the manufacture of flow switches for liquids. Our expertise in this field, which distinguishes us from other manufacturers, enables us to manufacture highly innovative products based on a modular concept. We offer flow switches to suit many applications and processes. SIKA is not only a market leader in this field, it has also pioneered the springless design concept. Numerous continuous and qualification tests over periods of up to 16 years testify to the quality of our products.

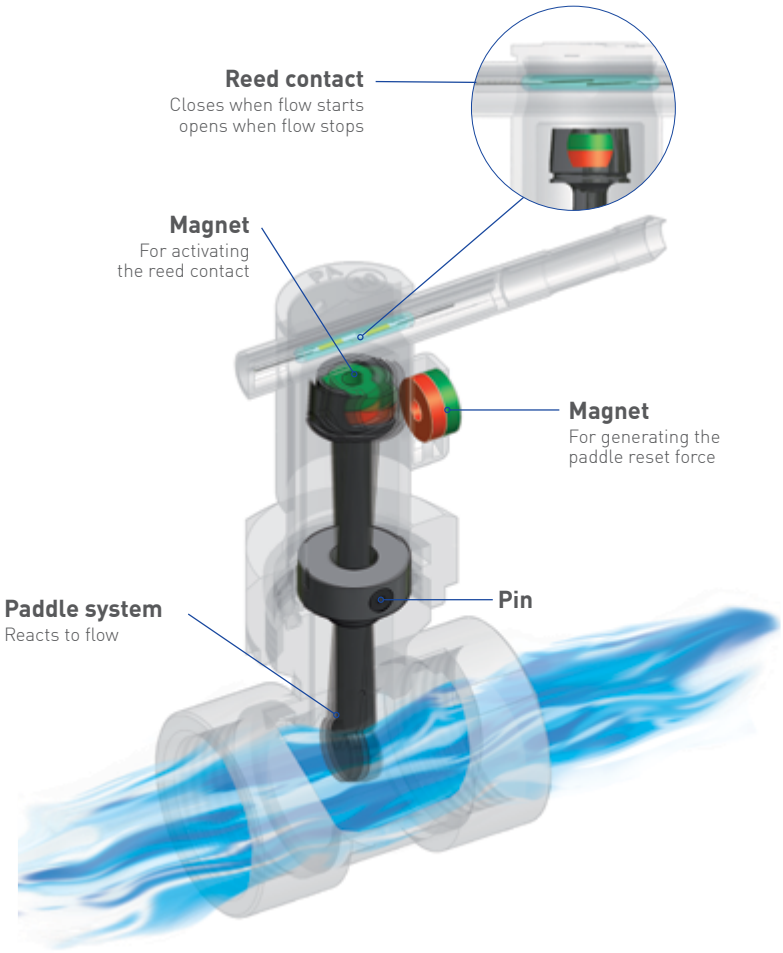
Our range includes six standard series that can be co-engineered and tailored to suit specific customer requirements. Our extensive modular concept also includes a wide range of process connections with diverse pipe tees (inline) or different threads for direct installation (insertion). Our push-in version is the most innovative variant in our range. We modify our switches to suit all requirements regardless of the type of connection required. We also have a wide range of electrical connections – with either non-detachable cable or connector.

Principle of operation

The flow switch comprises of a unique paddle system, the one piece design has a paddle at the flow end which is centrally pivoted and a magnet at the opposing end. Above this magnet is a reed switch contact, isolated outside the flow chamber. A second magnet creates the force necessary to reset the paddle back to the zero flow position.

When the flow being monitored pushes against the paddle system, the paddle swings away. This changes the position of the magnet in relation to the reed contact and actuates the switch.

As soon as the flow is interrupted, the paddle moves back to its starting position, reversing the position of the reed contact. The force necessary to push the magnet back is provided by the two magnets repelling each other. Using magnetic force instead of the usual leaf spring means that the switch is considerably more stable in the long term and much less sensitive to pressure peaks.



We offer flow switches in different materials to suit specific applications and demands. Whether highly rugged and sturdy of stainless steel for industrial applications or cost-optimised of glass fibre reinforced plastic for OEM applications – our product specialists will be happy to help in finding a solution that best suits your application, both technically and economically. Customised serial versions can be provided with special factory-adjusted switching points.

Advantages

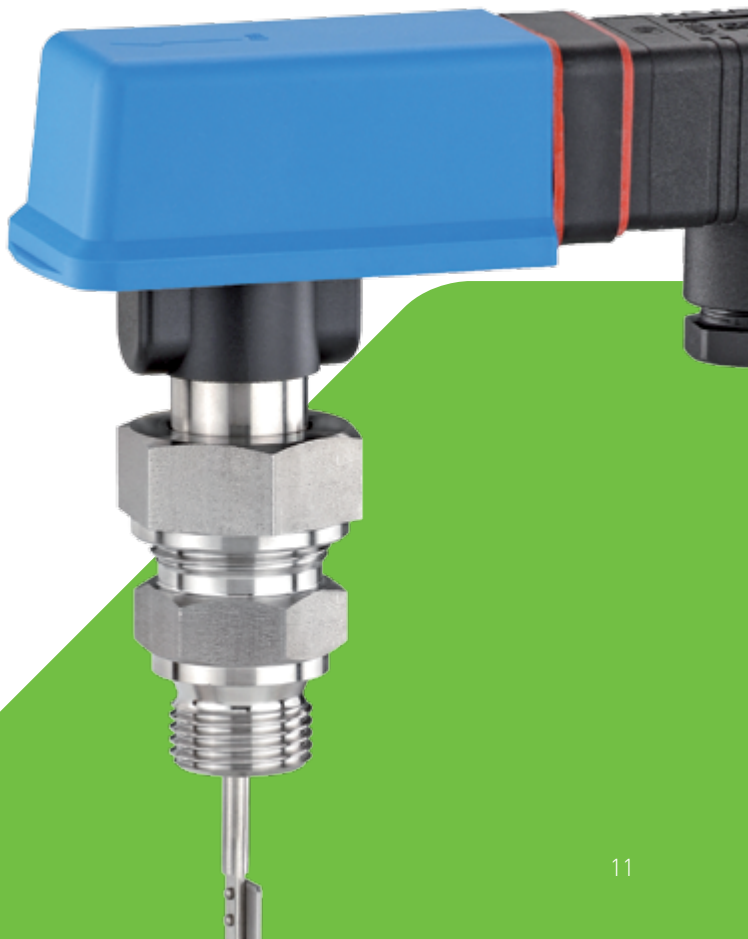
- Low pressure drop
- Immediate response
- High repeatability
- Setpoint only dependent on flow, not on pressure or temperature
- Long-term stable setpoints as there is no spring fatigue

Electrical connections

- Plug connector DIN EN 175301-803-A incl. cable socket (❶)
- Plug connector DIN EN 175301-803-A incl. cable socket, with two LEDs for optical flow and power indication for switching voltages 24 V...230 V AC/DC (❷)
- 4-pin plug connector M12 x 1 acc. IEC 947-5-2 (❸)
- Connection cable 1.5 m (❹)

Versions for use in potentially explosive atmospheres

VH...X flow switches are intended for use in potentially explosive atmospheres with an ignition energy of >60 µJ. These flow switches have been ignition hazard assessed according to DIN EN 60079-11 and have no potential ignition sources. They are therefore not subject to the directive 94/9/EC.



Flow switches made of metal

With threaded pipe tee

Type VHS / VH3

Technical data	
Switching function	Contact → closes at increasing flow → opens at decreasing flow Reversing possible
Pressure rating	PN 25
Temperature ranges	
Medium	-25...110 °C
Ambient	-25...80 °C
Electrical data	
Electrical connection → VHS → VH3	 Plug connector DIN EN 175301-803-A incl. cable socket 1.5 m PVC jacket cable
Switching current	Max. 1 A
Switching voltage	Max. 230 VAC, 48 VDC
Rating	Max. 26 VA, 20 W
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class II
Approvals	

Advantages

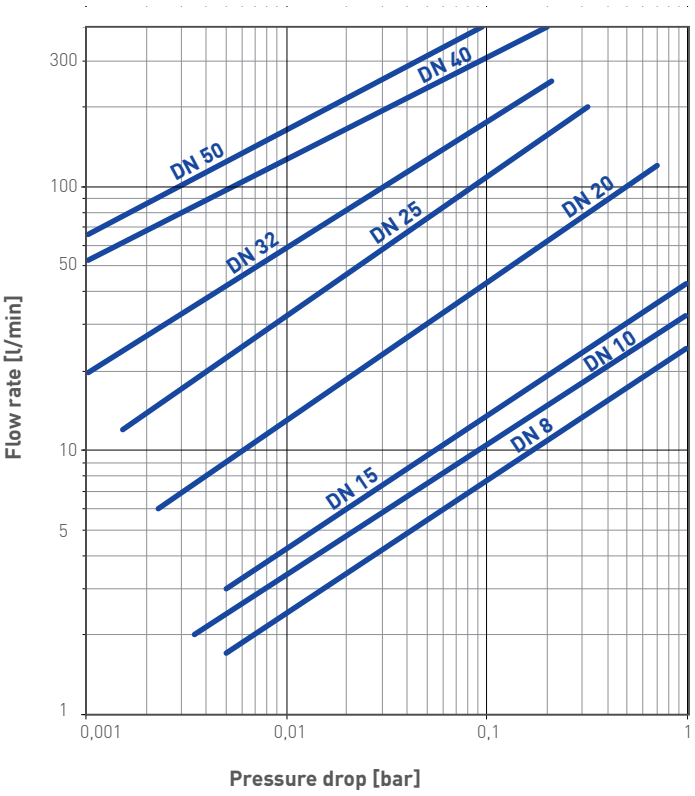
- Flow switches with pipe tees DN 8...50
- Brass or stainless steel
- Various connectors or 1.5 m jacket cable

Options	
For type	**See order code**
VHS	→ Plug connector DIN EN 175301-803-A incl. cable socket with two LED for switching voltages 24 V...230 V AC/DC ±20 %, ambient temperature -20...70 °C → or 4-pin-sensor plug M12 x 1
VHS / VH3	→ For use in potentially explosive atmospheres (Version VH...X) max. media temperature 100 °C

Nominal diameter	Thread connection D_1	Setpoint ranges [l/min]*				Max. flow rate [l/min]
		VHS		VH3		
		Increasing flow ON	Decreasing flow OFF	Increasing flow ON	Decreasing flow OFF	
DN 8	G¼	2.1...2.7	1.8...2.4	1.9...2.5	1.7...2.3	45
DN 10	G⅜	2.5...3.2	2.2...2.9	2.4...3.0	2.1...2.8	60
DN 15	G½	3.4...4.2	3.0...3.8	3.2...4.0	3.0...3.8	67
DN 15	G½ male**	2.5...3.2	2.2...2.9	2.4...3.0	2.1...2.8	60
DN 15	G¾ male**	2.5...3.2	2.2...2.9	2.4...3.0	2.1...2.8	60
DN 20	G¾	7.0...9.1	6.4...8.2	6.6...8.2	6.3...7.8	120
DN 25	G 1	13.5...17.0	12.0...15.5	13.0...15.5	12.5...15.0	195
DN 32	G 1¼	15.5...20.5	14.5...19.0	14.5...18.0	13.5...17.0	240
DN 40	G 1½	26.5...34.5	25.5...32.5	25.0...31.0	24.0...30.0	400
DN 50	G 2	39.5...51.0	39.0...50.0	37.5...47.5	36.5...46.5	400

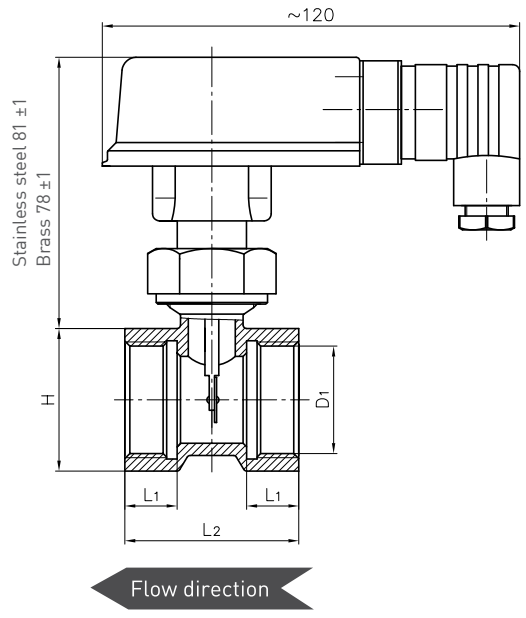
* Water, 20 °C, horizontal pipe, tolerance ±15 %
** Only available as brass version

Typical pressure drop

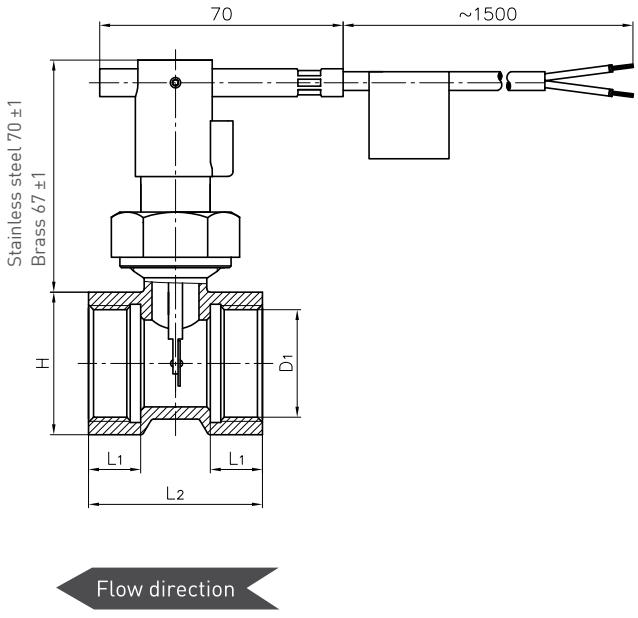


Dimensions [mm]						
Thread connection D_1	**L_1**	**L_2**	**H**	**L_1**	**L_2**	**H**
	Brass version			**Stainless steel version**		
G¼	11	50	27	11	50	27
G⅜	11	50	27	11	50	27
G½	11	50	27	11	50	27
G½ (male)	10	60				
G¾ (male)	11	50				
G¾	15	50	32	15	50	32
G 1	15	50	41	15	50	41
G 1¼	15	50	48	15	50	46
G 1½	15	50	55	15	50	55
G 2	22	64	70	15	50	70

VHS



VH3



Materials in contact with fluid		
	Brass version	**Stainless steel version**
Body, Paddle	Brass CW614N	Stainless steel 1.4571
Pipe tee	Brass CW617N	Stainless steel 1.4571
Bushing	PPO Noryl GFN 3	PVDF
Rivet	Brass CW508L	Stainless steel 1.4303
Pin	Stainless steel 1.4571	
Magnet	Hard ferrite	
O-ring	NBR	

Order code	Example → VHS	08	M011	7	1	I1	1	
Type								
VHS								
Plug connector incl. cable socket (standard)	VHS			7				
Plug connector incl. cable socket with LED (option)	VHS			9				
4-pin-sensor plug M12 x 1 (option)	VHS			8				
VH3								
1.5 m PVC jacket cable	VH3			1				
1.5 m PVC blue jacket cable (only for option „for use in potentially explosive atmospheres“)	VH3			3				
Nominal diameter	**Thread connection**							
DN 8	G¼	08				I1		
DN 10	G⅜	10				I2		
DN 15	G½	15				I3		
DN 15	G½ male (only brass version)	15				A3		
DN 15	G¾ male (only brass version)	15				A4		
DN 20	G¾	20				I4		
DN 25	G 1	25				I5		
DN 32	G 1¼	32				I6		
DN 40	G 1½	40				I7		
DN 50	G 2	50				I8		
Material								
Brass			M011		1		1	
Stainless steel			M031		3		3	
Version								
Standard								( )*
For use in potentially explosive atmospheres (Option)**								X

* No character

** Only available with blue jacket cable or with plug connector incl. cable socket. Max. media temperature 100 °C.

Flow switches made of plastic

With threaded brass pipe tee

Type VK3

Technical data	
Switching function	Contact → closes at increasing flow → opens at decreasing flow Reversing possible
Pressure rating	PN 10
Temperature ranges	
Medium	-25...100 °C
Ambient	-25...70 °C
Electrical data	
Electrical connection	1.5 m PVC jacket cable
Switching current	Max. 1 A
Switching voltage	Max. 230 VAC, 48 VDC
Rating	Max. 26 VA, 20 W
Degree of protection EN 60529	Max. IP65
Protection class EN 60730-1	Class II
Approvals	

Advantages

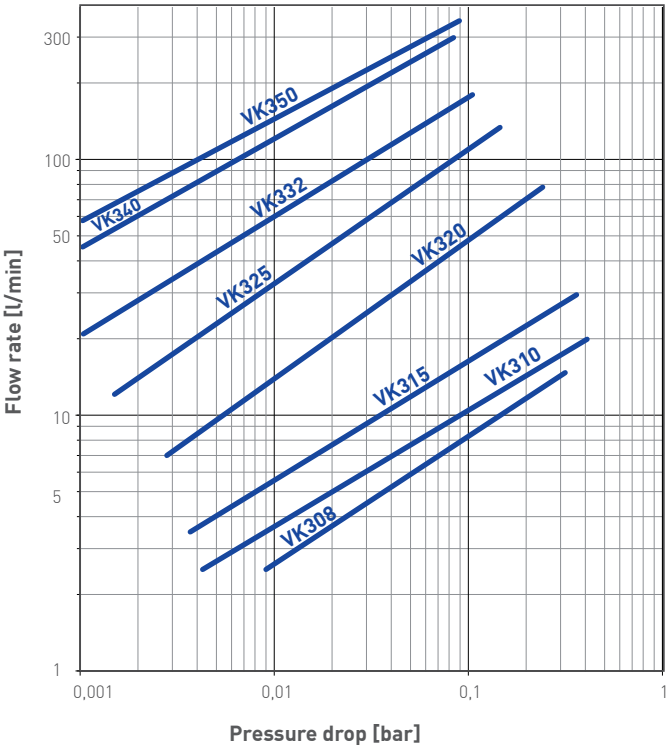
- Flow switches made of glass fibre reinforced plastic
- With threaded brass tee DN 8...50
- Factory set special set points for series applications
- 1.5 m jacket cable or according to customer specification

Optionen	
For type	**On request**
VK3	→ Special setpoints → 4 different colours of the union nut for distinction → Recognized component ETL according to UL & CSA standards

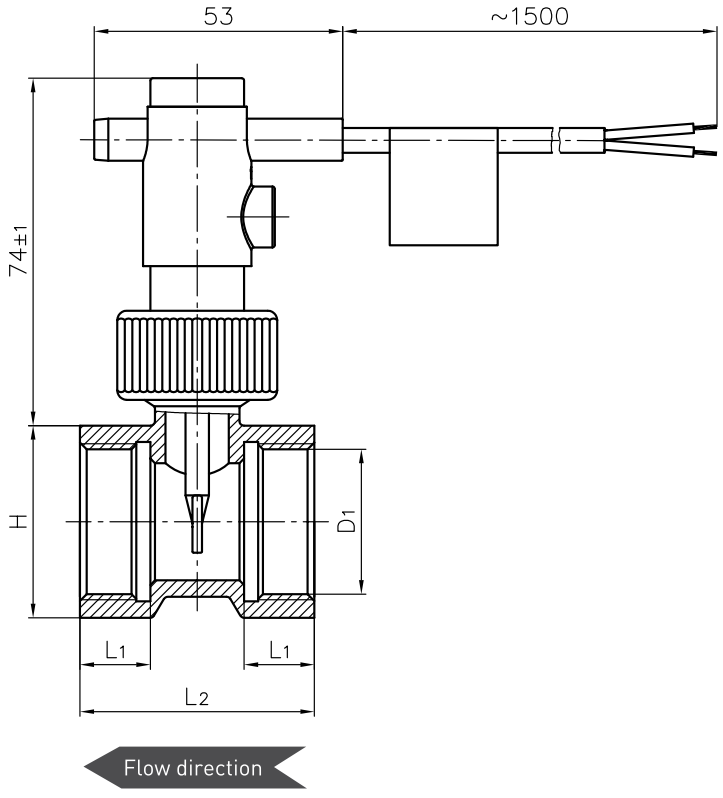
Order code	Nominal diameter	Thread connection D_1	Setpoint ranges [l/min]*		Max. flow rate [l/min]
			Increasing flow ON	Decreasing flow OFF	
VK308M0P10PI11	DN 8	G¼	2.7...3.0	2.6...2.9	15
VK310M0P10PI21	DN 10	G⅜	3.0...3.8	2.8...3.7	20
VK315M0P10PI31	DN 15	G½	3.8...5.1	3.6...4.9	30
VK315M0P10PA31	DN 15	G½ male	3.0...3.8	2.8...3.7	20
VK315M0P10PA41	DN 15	G¾ male	3.0...3.8	2.8...3.7	20
VK320M0P10PI41	DN 20	G¾	7.2...9.0	6.9...8.7	80
VK325M0P10PI51	DN 25	G 1	13.0...16.5	12.3...15.9	130
VK332M0P10PI61	DN 32	G 1¼	16.5...21.0	16.0...20.5	180
VK340M0P10PI71	DN 40	G 1½	27.0...33.5	25.5...32.5	300
VK350M0P10PI81	DN 50	G 2	41.5...53.5	40.6...52.8	350

* Water, 20 °C, horizontal pipe, tolerance ±15 %

Typical pressure drop



Dimensions [mm]			
Thread connection D_1	**L_1**	**L_2**	**H**
G¼	11	50	27
G⅜	11	50	27
G½	11	50	27
G½ male	10	60	
G¾ male	11	50	
G¾	15	50	32
G 1	15	50	41
G 1¼	15	50	48
G 1½	15	50	55
G 2	22	64	70



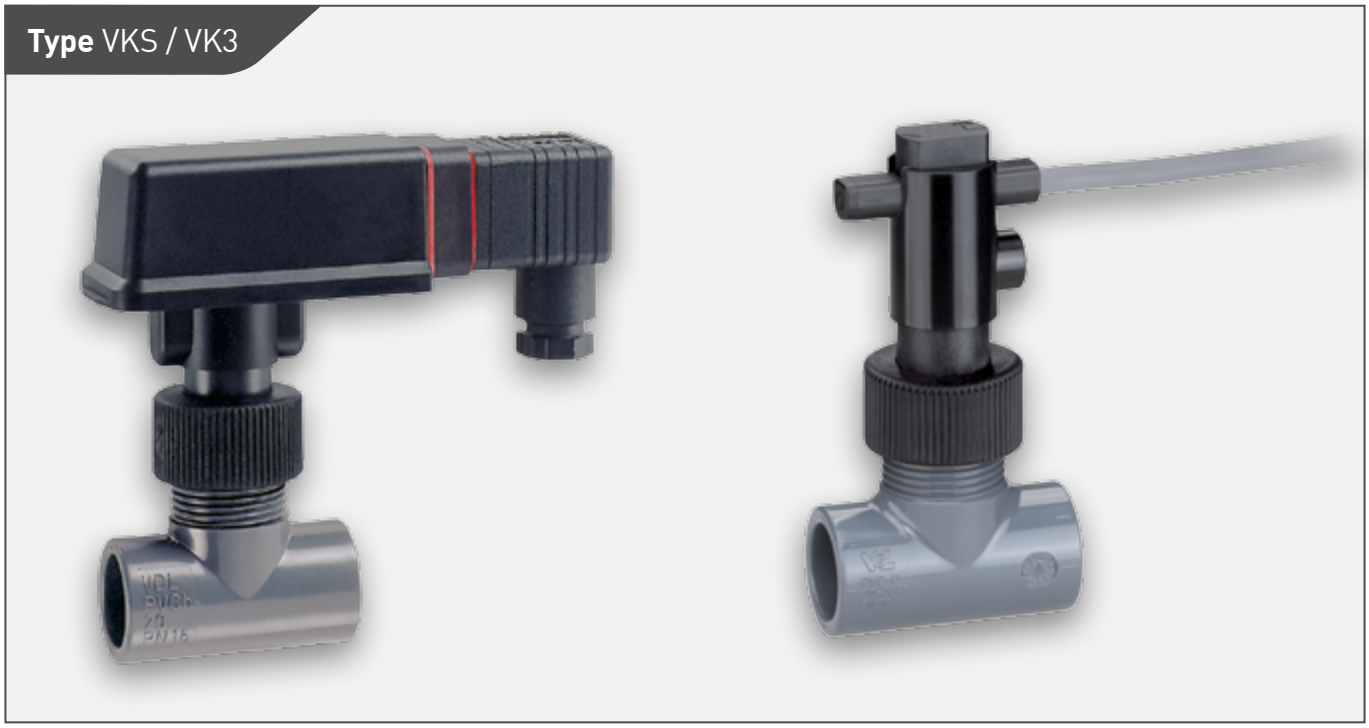
Materials in contact with fluid	
Body, Paddle	PPO Noryl GFN 3
Pipe tee	Brass CW617N
Pin*	Stainless steel 1.4571
Magnet	Hard ferrite
O-ring	NBR

* only VK340 and VK350

Flow switches made of plastic

With PVC tee

Type VKS / VK3



Technical data	
Switching function	Contact → closes at increasing flow → opens at decreasing flow Reversing possible
Pressure rating	PN 10
Temperature ranges	
Medium	0...20 °C (PN 10) 0...60 °C (PN 2.5)
Ambient	0...60 °C
Electrical data	
Electrical connection → VKS → VK3	 Plug connector DIN EN 175301-803-A incl. cable socket 1.5 m PVC jacket cable
Switching current	Max. 1 A
Switching voltage	Max. 230 VAC, 48 VDC
Rating	Max. 26 VA, 20 W
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class II
Approvals	

Advantages

- Flow switches made of glass fibre reinforced plastic
- With PVC tees DN 15...50
- Various connectors or 1.5 m jacket cable

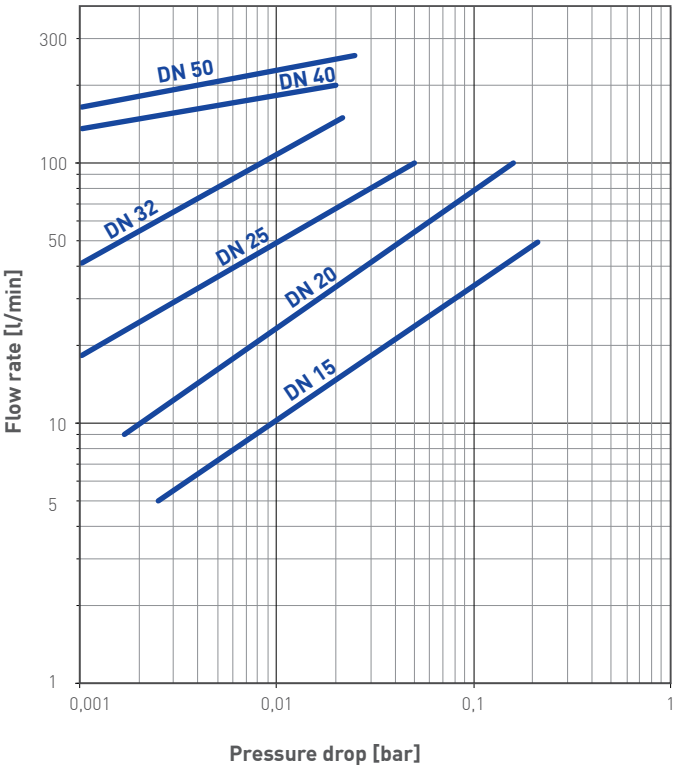
Options	
For type	**See oder code**
VKS	→ Plug connector DIN EN 175301-803-A incl.cable socket with two LED for switching voltages 24 V...230 V AC/DC ±20 %, ambient temperature -20...70 °C → or 4-pin-sensor plug M12 x 1
For type	**On request**
VKS / VK3	→ Special setpoints → 4 different colours of the union nut for distinction
VK3	→ Recognized component ETL according to UL & CSA standards

Nominal diameter	Setpoint ranges [l/min]*		Max. flow rate [l/min]
	Increasing flow ON	Decreasing flow OFF	
DN 15	5.1...6.9	4.9...6.5	50
DN 20	9.4...12.3	9.1...11.9	100
DN 25	10.7...15.2	10.4...14.8	100
DN 32	17.0...22.6	16.8...22.5	150
DN 40	21.8...30.1 (29.6...41.4)**	21.6...29.9 (29.4...40.8)**	200 (260)**
DN 50	29.0...40.0 (37.6...50.0)**	28.6...39.9 (37.4...49.8)**	260 (350)**

* Water, 20 °C, horizontal pipe, tolerance ±15 %

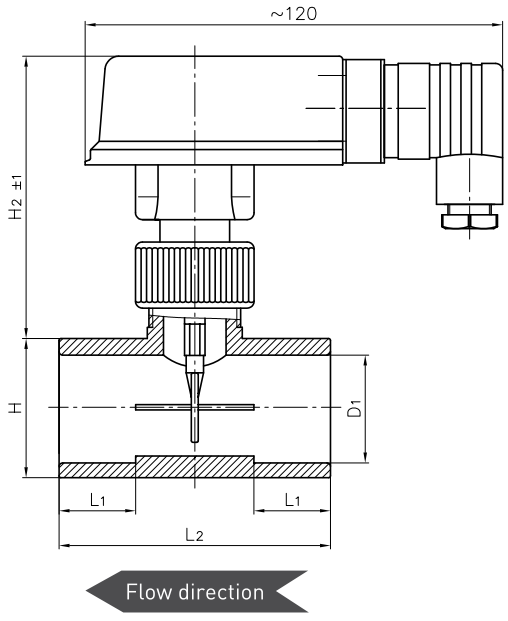
** The values in brackets are valid for shortened paddles

Typical pressure drop

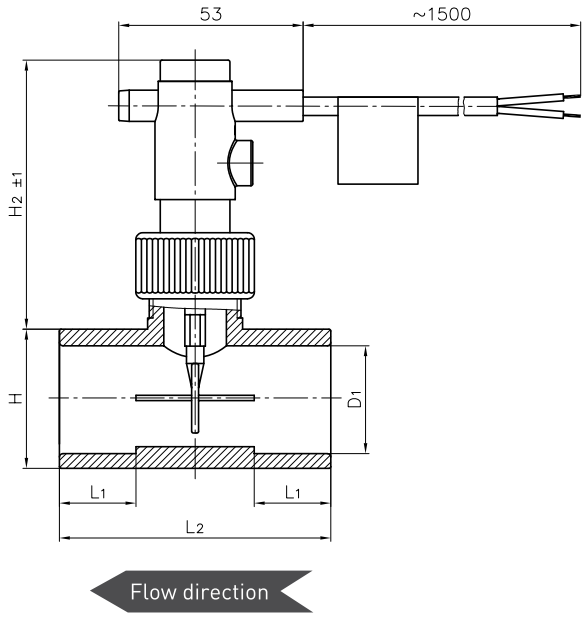


Dimensions [mm]						
Nominal diameter	**D_1**	**L_1**	**L_2**	**H_1**	**H_2 VKS**	**H_2 VK3**
DN 15	20	16	54	28	84	80
DN 20	25	19	66	34	86	82
DN 25	32	22	78	40	86	82
DN 32	40	26	98	50	104	100
DN 40	50	31	118	62	103	99
DN 50	63	38	144	77	101	97

VKS



VK3



Materials in contact with fluid	
Body, Paddle	PPO Noryl GFN 3
Pipe tee	PVC
Pin*	Stainless steel 1.4571
Magnet	Hard ferrite
Gasket	EPDM

* only VKS25, VKS40, VKS50, VK325, VK340 and VKS350

Order code	Example → VKS	15	M0P17	PK3K
Type				
VKS				
Plug connector incl. cable socket (standard)	VKS		M0P17	
Plug connector incl. cable socket with LED (option)	VKS		M0P19	
4-pin-sensor plug M12 x 1 (option)	VKS		M0P18	
VK3				
1.5 m PVC jacket cable	VK3		M0P10	
Nominal Diameter				
DN 15		15		PK3K
DN 20		20		PK4K
DN 25		25		PK5K
DN 32		32		PK6K
DN 40		40		PK7K
DN 50		50		PK8K

Flow switches made of metal

With micro switch

Type VH0

Technical data	
Switching function	Changeover contact
Switching hysteresis	10...30 %
Pressure rating	PN 25
Temperature ranges	
Medium	-20...110 °C
Ambient	-20...70 °C
Electrical data	
Electrical connection	Plug connector DIN EN 175301-803-A incl. cable socket
Switching current	Max. 5 A
Switching voltage	Max. 250 VAC
Rating	Max. 1250 VA
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class II

Advantages

- Microswitch is used as switching element
- For higher switching currents
- For direct switching of devices, without relay or controller
- With brass pipe section DN 10...50

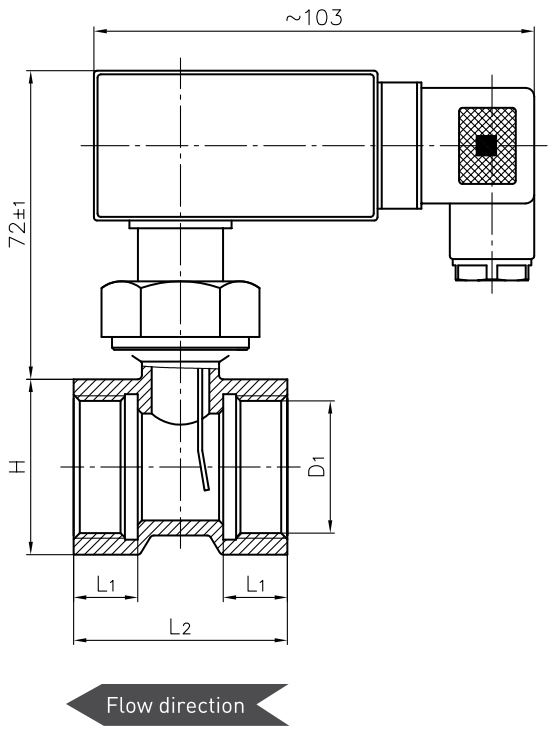
Options	
For type	**On request**
VH0	→ Insertion installation using soldering adapter

A micro switch used as switching element allows a higher electrical switching capacity than a reed switch. The resetting force required by the paddle system is produced by a leaf spring.

Order code	Nominal diameter	Thread connection D_1	Setpoint range [l/min]* Decreasing flow OFF	Max. flow rate [l/min]
VH010F0747NI21	DN 10	G⅜	4.0...5.0	10
VH015F0747NI31	DN 15	G½	5.0...6.0	20
VH015F0747NA31	DN 15	G½ male	4.0...5.0	10
VH015F0747NA41	DN 15	G¾ male	4.0...5.0	10
VH020F0747NI41	DN 20	G¾	8.0...10.0	40
VH025F0747NI51	DN 25	G 1	17.0...20.0	60
VH032F0747NI61	DN 32	G 1¼	24.0...28.0	80
VH040F0747NI71	DN 40	G 1½	43.0...50.0	100
VH050F0747NI81	DN 50	G 2	69.0...83.0	150

* Water, 20 °C, horizontal pipe, tolerance ±15 %

Dimensions [mm]			
Thread connection D_1	**L_1**	**L_2**	**H**
G⅜	11	50	27
G½	11	50	27
G½ male	10	60	
G¾ male	11	50	
G¾	15	50	32
G 1	15	50	41
G 1¼	15	50	48
G 1½	15	50	55
G 2	22	64	70



Materials in contact with fluid	
Body	Brass CW614N, nickel-plated
Pipe tee	Brass CW617N
Paddle	Stainless steel 1.4310, 1.4301
Magnet	Hard ferrite
O-ring	NBR

Flow switches made of metal

For insertion installation

Type VHS / VH3

Technical data	
Switching function	Contact → closes at increasing flow → opens at decreasing flow Reversing possible
Pressure rating	PN 25
Temperature ranges	
Medium	-25...110 °C
Ambient	-25...80 °C
Electrical data	
Electrical connection → VHS → VH3	 Plug connector DIN EN 175301-803-A incl. cable socket 1.5 m PVC jacket cable
Switching current	Max. 1 A
Switching voltage	Max. 230 VAC, 48 VDC
Rating	Max. 26 VA, 20 W
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class II
Approvals	

Advantages

- Direct installation into pipe lines DN 50...150
- Threaded adapters for tees and direct insertion into pipes
- Alternatively soldering adapter or welding adapter
- Easy installation due to union nut
- Various connectors or 1.5 m jacket cable

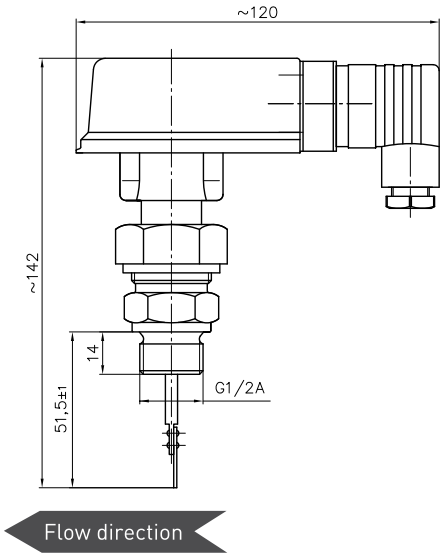
Options	
For type	**See oder code**
VHS	→ Plug connector DIN EN 175301-803-A incl.cable socket with two LED for switching voltages 24 V...230 V AC/DC ±20 %, ambient temperature -20...70 °C → or 4-pin-sensor plug M12 x 1
VHS / VH3	→ For use in potentially explosive atmospheres (Version VH...X) max. media temperature 100 °C

Type	Process connection	Insert in Nominal diameter	Setpoint ranges [m³/h]*		Max. flow rate [m³/h]
			Increasing flow ON	Decreasing flow OFF	
VH305 / VHS05	Threaded adapter G½**	DN 50	1.9...2.7	1.8...2.6	30
		DN 80	5.0...8.0	4.9...7.9	80
		DN 100	8.3...12.5	8.2...12.4	150
		DN 150	17.5...25.0	17.4...24.9	200
VHS01	Soldering adapter / welding adapter	DN 50	3.8...4.9	3.7...4.8	30
		DN 80	9.0...14.3	8.9...14.2	100
		DN 100	13.0...18.8	12.7...18.4	150
		DN 150	33.0...46.0	32.9...45.9	200

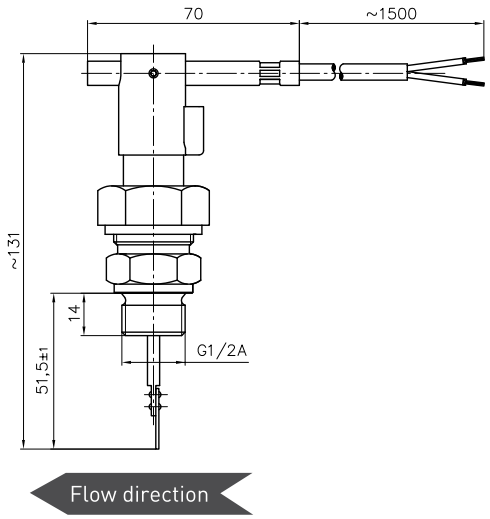
* Water, 20 °C, horizontal pipe, tolerance ±15 %

** Installation into welded socket according to EN 10241, G½ female, length 15 mm

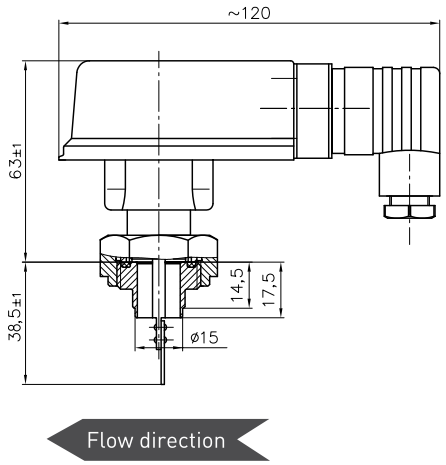
VHS05



VH305



VHS01



Materials in contact with fluid		
	Brass version	**Stainless steel version**
Body, Paddle	CW614N	1.4571
Process connection	VHS05: CW614N VH305: CW614N VHS01: CW617N	1.4571
Bushing	PPO Noryl GFN 3	PVDF
Rivet	CW508L	1.4303
Pin	1.4571	
Magnet	Hard ferrite	
O-ring	NBR	

Order code	Example → VHS	05M0	1	17	1	R2	1	
Type								
VHS								
Plug connector incl. cable socket (Standard)	VHS			17				
Plug connector incl. cable socket with LED (option)	VHS			19				
4-pin-sensor plug M12 x 1 (option)	VHS			18				
Process connection								
Threaded Adapter G½		05M0				R2		
Soldering adapter (brass) or welding adapter (stainless steel)		01M0				D1		
Material								
Brass			1		1		1	
Stainless steel			3		3		3	
Version								
Standard								( )*
For use in potentially explosive atmospheres (option)**								X

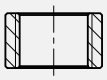
* No character

** Only available with plug connector incl. cable socket

Order code	Example → VH305M0	1	11	1	R2	1	
Type							
VH3							
1.5 m PVC jacket cable	VH305M0		11		R2		
1.5 m PVC blue jacket cable (only for option „for use in potentially explosive atmospheres“)	VH305M0		13		R2		
Material							
Brass		1		1		1	
Stainless steel		3		3		3	
Version							
Standard							( )*
For use in potentially explosive atmospheres (option)**							X

* No character

** Only available with blue jacket cable

Accessories for VHS05 / VH305	Order code	
Welding socket according to EN 10241 G½ female thread, length 15 mm Steel S 235 JR	XVH1470	

Flow switches for insertion installation

Threaded adapter with trimmable paddle

Type VHS06

Type VK306

Technical data	VHS06	VK306
Switching function	Contact → closes at increasing flow → opens at decreasing flow Reversing possible	Contact → closes at increasing flow → opens at decreasing flow
Pressure rating	PN 25	PN 10
Temperature ranges		
Medium	-25...110 °C	-25...100 °C
Ambient	-25...80 °C	-25...70 °C
Electrical data		
Electrical connection	Plug connector DIN EN 175301-803-A incl. cable socket	1.5 m PVC jacket cable
Switching current	Max. 1 A	
Switching voltage	Max. 230 VAC, 48 VDC	
Rating	Max. 26 VA, 20 W	
Degree of protection EN 60529	IP65	
Protection class EN 60730-1	Class II	
Approvals*		

* Only for flow switches with plastic paddle

Advantages

- Universal Flow switches for DN 20...200
- Fully adjustable for pipe size and setpoint by trimming the paddle
- Glass fibre reinforced plastic paddle or stainless steel paddle for higher flow rates
- Threaded adapters for tees or for direct insertion into pipes
- Easy installation due to union nut

Options	
For type	**See oder code**
VHS06	→ Plug connector DIN EN 175301-803-A incl.cable socket with two LED for switching voltages 24 V...230 V AC/DC ±20 %, ambient temperature -20...70 °C → or 4-pin-sensor plug M12 x 1
For type	**On request**
VK306	→ Reversed switching function
VK306 with plastic paddle	→ Recognized component ETL according to UL & CSA standards

VHS06 / VK306 with plastic paddle, installation into pipe tees according to EN 10242						
Paddle to be trimmed to						
	Paddle mark	9	15	20	30	40
	Installation length L_1 [mm]	40	46	51	61	71
Setpoints* / Max. flow rate [m³/h]						
DN 20	Increasing flow ON**	1.1				
	Decreasing flow OFF	0.9				
	Max. flow rate	4				
DN 25	Increasing flow ON**	1.7	1,3			
	Decreasing flow OFF	1.5	1.1			
	Max. flow rate	8.5	5			
DN 32	Increasing flow ON**	2.9	2.2	1.9		
	Decreasing flow OFF	2.6	1.9	1.6		
	Max. flow rate	15	10	8		
DN 40	Increasing flow ON**	4.2	3.2	2.8	2.1	
	Decreasing flow OFF	3.8	2.8	2.4	1.8	
	Max. flow rate	25	18	14	10	
DN 50	Increasing flow ON**	6.5	4.9	4.4	3.3	2.7
	Decreasing flow OFF	6	4.5	4	3	2.4
	Max. flow rate	41	29	24	17	13

VHS06 / VK306 with plastic paddle, installation by welded socket according to EN 10241, G½ female, length 15 mm									
Paddle to be trimmed to									
	Paddle mark	15	20	30	40	50	60	70	80
	Installation length L_1 [mm]	46	51	61	71	81	91	101	111
Setpoints* / Max. flow rate [m³/h]									
DN 65	Increasing flow ON**	8.8	7.4	5.6	4.5	3.8	3.2		
	Decreasing flow OFF	8.5	7	5.2	4.2	3.4	3		
	Max. flow rate	50	45	34	27	22	18		
DN 80	Increasing flow ON**	13.8	11.7	9.2	7.5	6.5	5.1		
	Decreasing flow OFF	11.3	9.6	7.7	6.3	5.3	4.7		
	Max. flow rate	80	65	50	40	33	28		
DN 100	Increasing flow ON**		18.8	14.6	12.3	10.2	8	6.9	6.2
	Decreasing flow OFF		16.3	12	10	8	7.1	6.3	5.9
	Max. flow rate		110	80	65	55	50	40	36
DN 150	Increasing flow ON**				27	22.8	19.5	18	15.7
	Decreasing flow OFF				25	19.8	17.8	16	14.3
	Max. flow rate				150	130	110	100	90
DN 200	Increasing flow ON**					45	38	33.5	30
	Decreasing flow OFF					43.5	36	32	29
	Max. flow rate					230	200	175	160

* Water, 20 °C, horizontal pipe, tolerance ±15 %

** Typical value

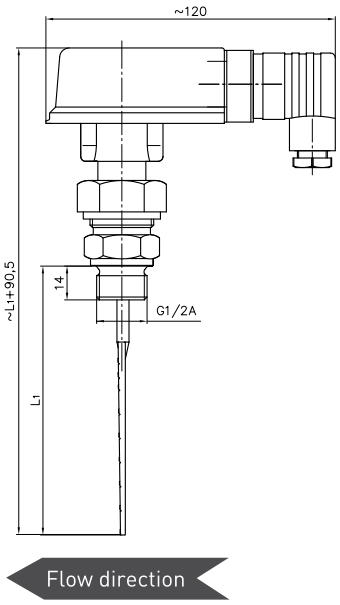
VHS06 / VK306 with stainless steel paddle, installation into pipe tees according to EN 10242					
Paddle to be trimmed to					
	Paddle mark	15	20	30	40
	Installation length L_1 [mm]	46	51	61	71
Setpoints* / Max. flow rate [m³/h]					
DN 25	Increasing flow ON**	1,2	1		
	Decreasing flow OFF	1	0,9		
	Max. flow rate	10	6		
DN 32	Increasing flow ON**	2	1,7		
	Decreasing flow OFF	1,7	1,5		
	Max. flow rate	20	15		
DN 40	Increasing flow ON**	3,3	2,7	2	
	Decreasing flow OFF	3	2,5	1,8	
	Max. flow rate	34	26	18	
DN 50	Increasing flow ON**	4,8	4	3,2	2,6
	Decreasing flow OFF	4,6	3,8	2,9	2,4
	Max. flow rate	55	45	32	24

VHS06 / VK306 with stainless steel paddle, installation by welded socket according to EN 10241, G½ female, length 15 mm									
Paddle to be trimmed to									
	Paddle mark	15	20	30	40	50	60	70	80
	Installation length L_1 [mm]	46	51	61	71	81	91	101	111
Setpoints* / Max. flow rate [m³/h]									
DN 80	Increasing flow ON**	11,7	10	7,7	6,4	5,3	4,6		
	Decreasing flow OFF	11,4	9,6	7,5	6	4,9	4,2		
	Max. flow rate	150	125	95	75	60	50		
DN 100	Increasing flow ON**		16	12,4	10,3	8,7	7,7	6,7	6,1
	Decreasing flow OFF		15,9	11,9	9,8	8,1	7,1	6,3	5,6
	Max. flow rate		200	150	120	105	90	75	70
DN 150	Increasing flow ON**				24	20,3	18	16,3	14,7
	Decreasing flow OFF				22,7	19	17,3	15,3	13,8
	Max. flow rate				290	250	210	190	170
DN 200	Increasing flow ON**					41	35,7	31,7	26,7
	Decreasing flow OFF					38,7	34	29,7	23,3
	Max. flow rate					450	390	350	310

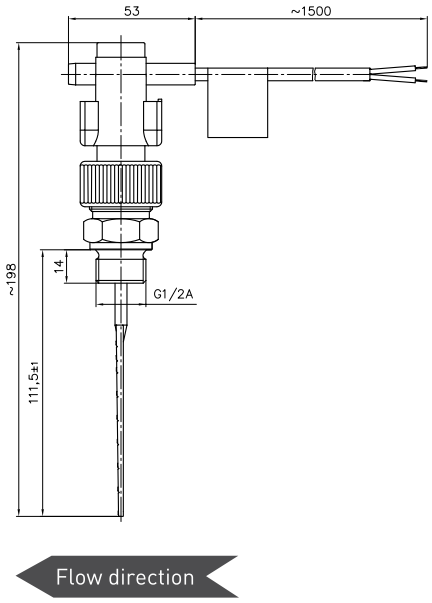
* Water, 20 °C, horizontal pipe, tolerance ±15 %

** Typical value

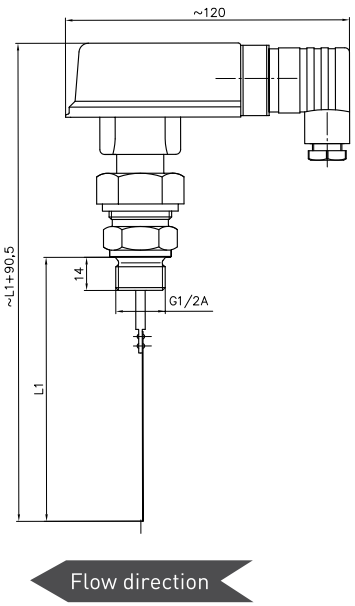
VHS06 with plastic paddle



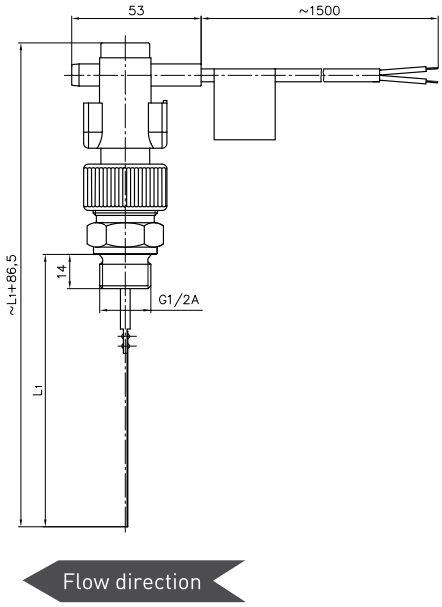
VK306 with plastic paddle



VHS06 with stainless steel paddle

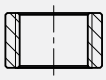


VK306 with stainless steel paddle



Materials in contact with fluid		
Type	**VHS06**	**VK306**
Body	Brass CW614N	Noryl PPO GFN3
Paddle	Plastic paddle: Noryl PPO GFN3 / stainless steel Stainless steel paddle: Stainless steel 1.4310 / brass	
Pin	Stainless steel 1.4571	
Process connection	Brass CW614N	
Magnet	Hard ferrite	
O-ring	NBR	

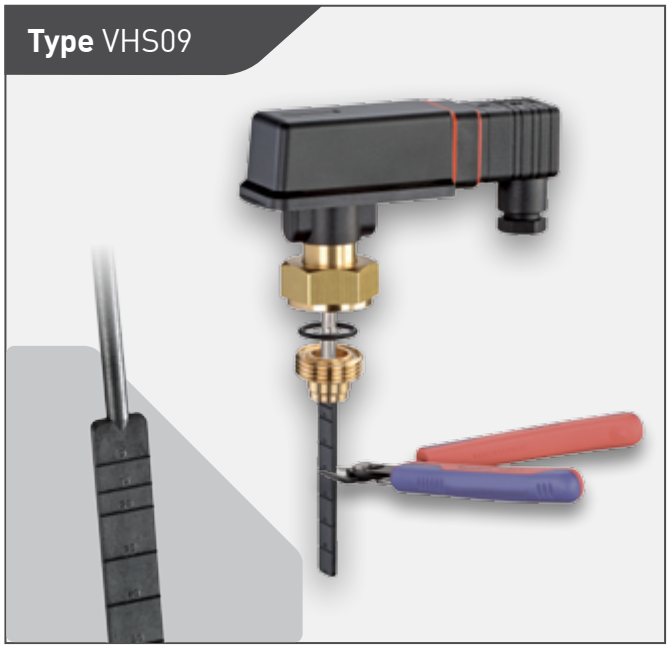
Order code	Example → VHS06M2	P	171R21
Type			
VHS06			
Plug connector incl. cable socket (standard)	VHS06M2		171R21
Plug connector incl. cable socket with LED (option)	VHS06M2		191R21
4-pin-sensor plug M12 x 1 (option)	VHS06M2		181R21
VK306			
1.5 m PVC jacket cable	VK306M2		10PR21
Paddle			
Plastic		P	
Stainless steel		5	

Accessories for VHS06 / VK306	Order code	
Welding socket according to EN 10241 **G½ female thread, lenght 15 mm** **Steel S 235 JR**	XVH1470	

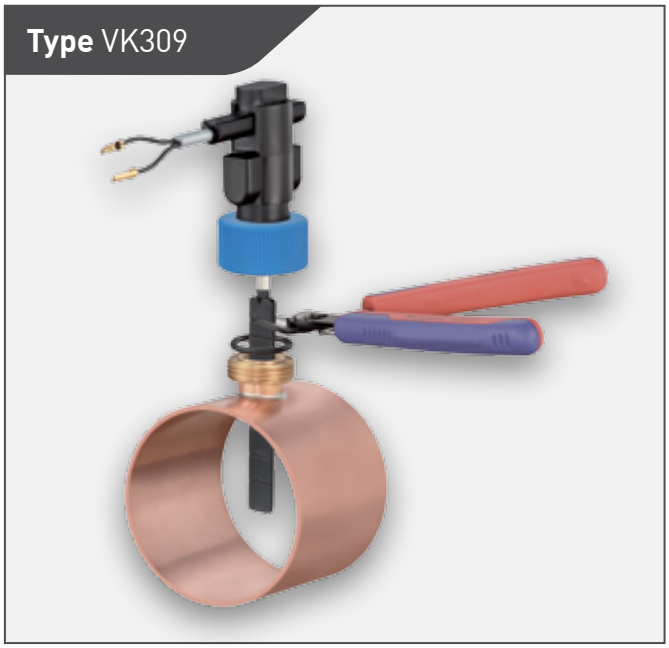
Flow switches for insertion installation

Soldering adapter with trimmable paddle

Type VHS09



Type VK309



Technical data	VHS09	VK309
Switching function	Contact → closes at increasing flow → opens at decreasing flow Reversing possible	Contact → closes at increasing flow → opens at decreasing flow
Pressure rating	PN 25	PN 10
Temperature ranges		
Medium	-25...110 °C	-25...100 °C
Ambient	-25...80 °C	-25...70 °C
Electrical data		
Electrical connection	Plug connector DIN EN 175301-803-A incl. cable socket	1.5 m PVC jacket cable
Switching current	Max. 1 A	
Switching voltage	Max. 230 VAC, 48 VDC	
Rating	Max. 26 VA, 20 W	
Degree of protection EN 60529	IP65	
Protection class EN 60730-1	Class II	
Approvals		

Advantages

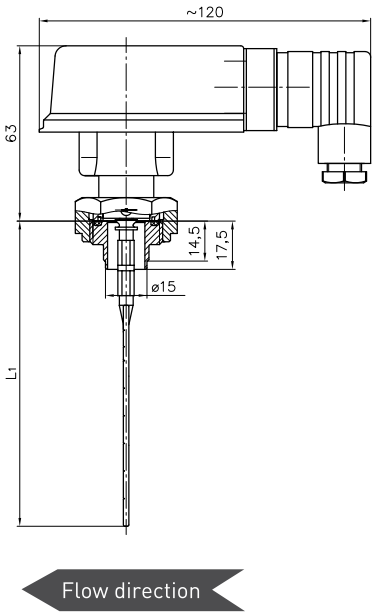
- Universal Flow switches for copper pipes Ø 32...88.9
- Fully adjustable for pipe size and setpoint by trimming the paddle
- Glass fibre reinforced paddle
- Soldering adapter for copper pipes
- Easy installation due to union nut

Options	
For type	**See oder code**
VHS09	→ Plug connector DIN EN 175301-803-A incl.cable socket with two LED for switching voltages 24 V...230 V AC/DC ±20 %, ambient temperature -20...70 °C → or 4-pin-sensor plug M12 x 1
For type	**On request**
VK309	→ Reversed switching function
VK309	→ Recognized component ETL according to UL & CSA standards

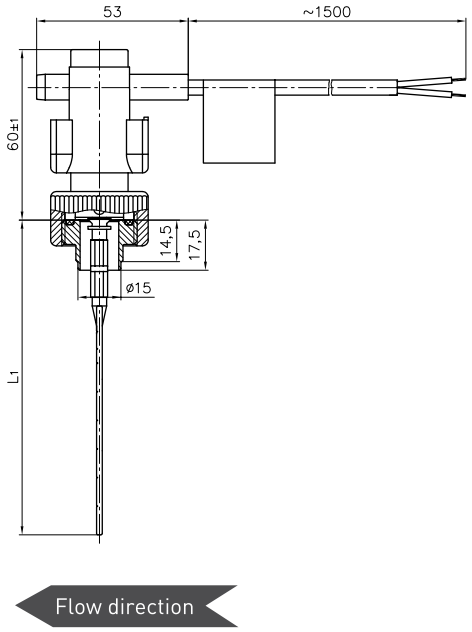
Set point ranges								
Paddle to be trimmed to								
	Paddle mark	9	15	20	30	40	50	60
	Installation length L_1 [mm]	39	45	50	60	70	80	90
Setpoints* / Max. flow rate [m³/h]								
Ø 32 x 1	Increasing flow ON**	2						
	Decreasing flow OFF	1.9						
	Max. flow rate	10						
Ø 35 x 1	Increasing flow ON**	2.6	1.8					
	Decreasing flow OFF	2.4	1.6					
	Max. flow rate	20	13					
Ø 35 x 1.5	Increasing flow ON**	2.5	1.7					
	Decreasing flow OFF	2.2	1.6					
	Max. flow rate	18	12					
Ø 42 x 1.5	Increasing flow ON**	3.9	2.8	2.2				
	Decreasing flow OFF	3.7	2.7	2.1				
	Max. flow rate	30	20	15				
Ø 54 x 1.5	Increasing flow ON**				3.2			
	Decreasing flow OFF				3			
	Max. flow rate				21			
Ø 54 x 2	Increasing flow ON**				3			
	Decreasing flow OFF				2.9			
	Max. flow rate				20			
Ø 64 x 2	Increasing flow ON**		8.6	7.2	5.2	4		
	Decreasing flow OFF		7.9	6.6	4,.7	3.7		
	Max. flow rate		53	42	30	24		
Ø 76,1 x 2	Increasing flow ON**		13.6	10.8	8	6.4	5,2	
	Decreasing flow OFF		12.1	10	7.4	5.8	4.7	
	Max. flow rate		80	65	46	35	31	
Ø 88,9 x 2	Increasing flow ON**				10.9	9	7.3	6.1
	Decreasing flow OFF				10.7	8.4	6.9	5.9
	Max. flow rate				67	52	42	39

* Water, 20 °C, horizontal pipe, tolerance ±15 %
** Typical value

VHS09



VK309



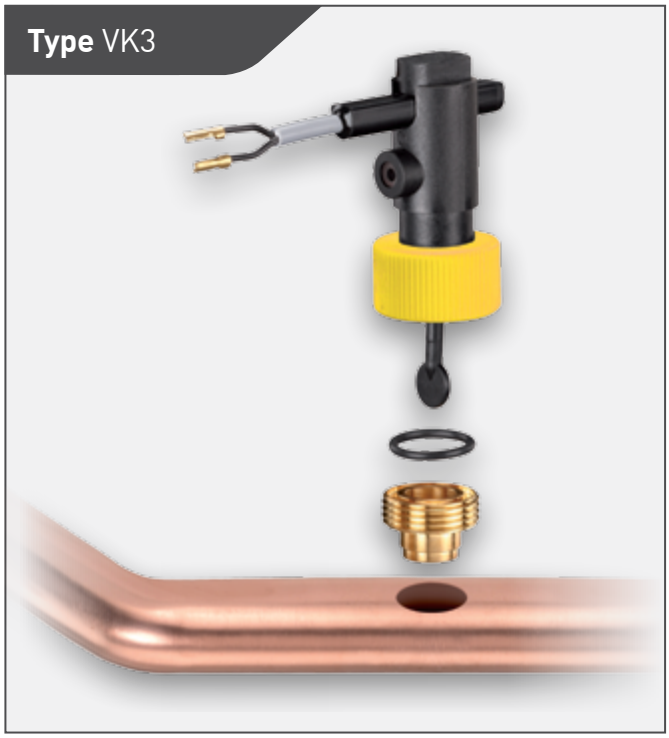
Materials in contact with fluid		
Type	**VHS09**	**VK309**
Body	Brass CW614N	Noryl PPO GFN3
Paddle	Noryl PPO GFN3 / Stainless steel	
Process connection	Brass CW614N	
Pin	Stainless steel 1.4571	
Magnet	Hard ferrite	
O-ring	NBR	

Order code	
Type	
VHS09	
Plug connector incl. cable socket (standard)	VHS09M2P171D11
Plug connector incl. cable socket with LED (option)	VHS09M2P191D11
4-pin-sensor plug M12 x 1 (option)	VHS09M2P181D11
VK309	
1.5 m PVC jacket cable	VK309M2P10PD11

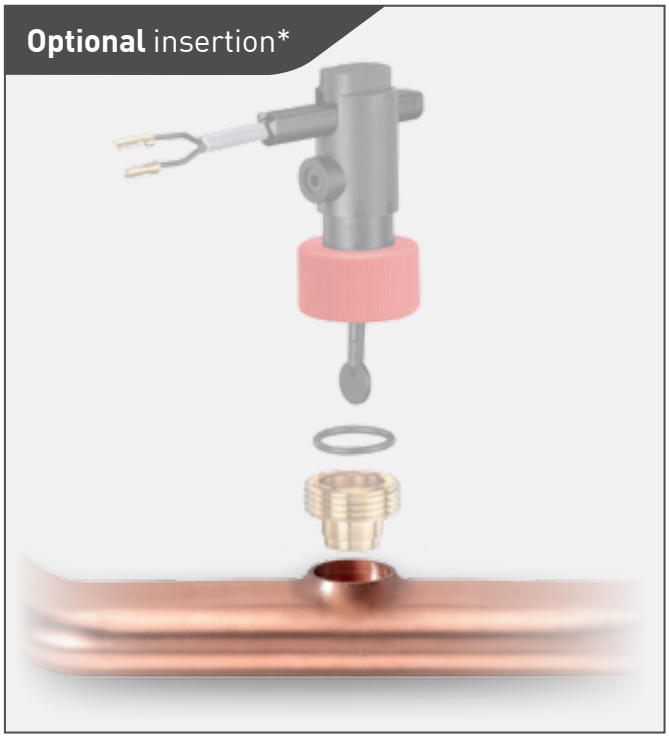
Flow switches for insertion installation

Made of plastic, with soldering adapter for copper pipes

Type VK3



Optional insertion*



Technical data	
Switching function	Contact → closes at increasing flow → opens at decreasing flow
Pressure rating	PN 10
Temperature ranges	
Medium	-25...100 °C
Ambient	-25...70 °C
Electrical data	
Electrical connection	1.5 m PVC jacket cable
Switching current	Max. 1 A
Switching voltage	Max. 230 VAC, 48 VDC
Rating	Max. 26 VA, 20 W
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class II
Approvals	

WRAS APPROVED PRODUCT

TÜV Rheinland Produkt Safety BAUART GEPRÜFT TYPE APPROVED

* Insertion into collared copper pipes
Set points can differ

Advantages

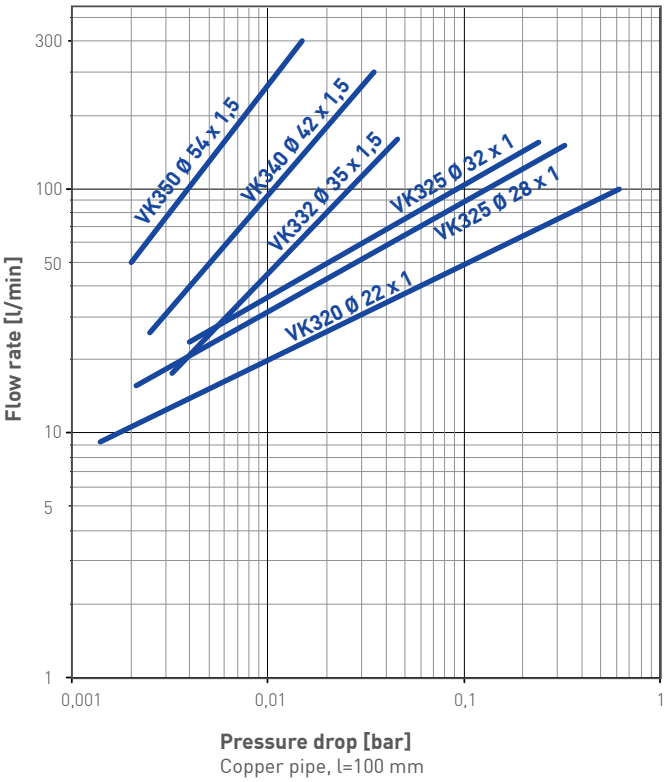
- Direct installation into copper pipes
- Easy installation:
  → Solder the adapter
  → Install the O-ring
  → Tighten the union nut
- Delivery incl. flow switch, O-ring and soldering adapter
- Paddle lengths for copper pipes Ø 22...54
- Different colours of the union nut for an easy distinction

Options	
For type	**On request**
VK3	→ Special setpoints → Reversed switching function → Insertion into collared copper pipes → Recognized component ETL according to UL & CSA standards

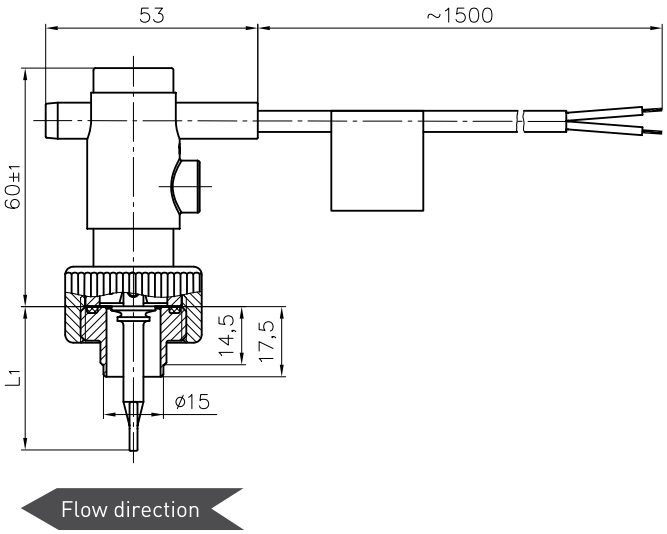
Order code	Color union nut	For copper pipes	Setpoints [l/min]*		Max. flow rate [l/min]
			Increasing flow** ON	Decreasing flow OFF	
VK320M0P10PD11	●	Ø 22x1	10.5	9.2	100
VK325M0P10PD11	●	Ø 28x1	17.6	15.7	150
		Ø 32x1	25.7	23.6	155
VK332M0P10PD11	●	Ø 35x1,5	20.0	17.5	160
VK340M0P10PD11	●	Ø 42x1.5	28.0	25.8	300
VK350M2P10PD11	●	Ø 54x1.5	58.3	50.2	400

* Water, 20 °C, horizontal pipe, tolerance ±15 %
** Typical value

Typical pressure drop



Pressure drop [bar]
Copper pipe, l=100 mm



Dimensions [mm]	
Order code	**Paddle length L_1**
VK320M0P10PD11	33.5
VK325M0P10PD11	36.0
VK332M0P10PD11	44.5
VK340M0P10PD11	47.5
VK350M2P10PD11	56.5

Materials in contact with fluid	
Body	Noryl PPO GFN3
Paddle	Noryl PPO GFN3
Soldering adapter	Brass CW614N
Pin*	Stainless steel 1.4571
Magnet	Hard ferrite
O-ring	NBR

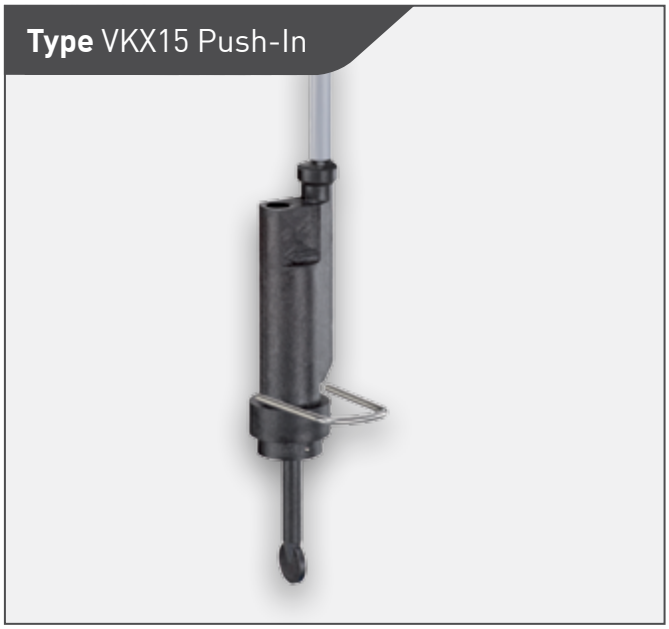
* only VK325, VK340 and VK350

Flow switches for HVAC applications

For potable water applications

Type VKX15

Type VKX15 Push-In



Technical data		
Switching function	Contact closes at increasing flow	
Setpoint (others on request)	2.5 ±0.5 l/min*	
Flow rate	Max. 15 l/min	
Nominal diameter	DN 15	
Pressure rating	PN 10	
Temperature ranges		
Medium → VKX15 → VKX15 Push-In	 -20...100 °C -20...70 °C	
Ambient	-20...70 °C	
Electrical data		
Electrical connection	0.5 m PVC jacket cable	
Degree of protection EN 60529	IP65	
Switching current	Max. 1 A	
Rating	Max. 26 VA, 20 W	
Switching voltage	Max. 230 VAC, 48 VDC	Max. 24 VAC, 42 VDC
Protection class EN 60730-1	Class II	Class III
Approvals **		

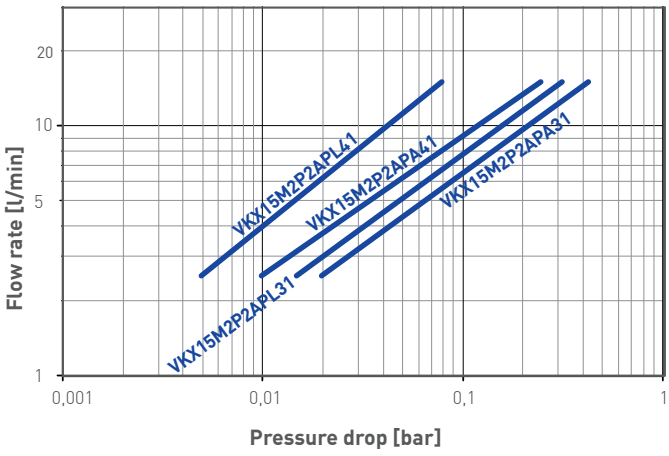
* Water, 20 °C, horizontal pipe

** Not for VKX15 Push-In

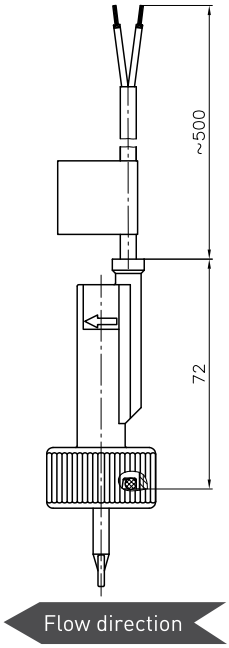
Advantages

- Flow switches for tap water detection
- Pipe tees with threaded or soldering ends
- Push-in installation into manifolds or armatures
- OEM flow switches, delivery lots from 100 units

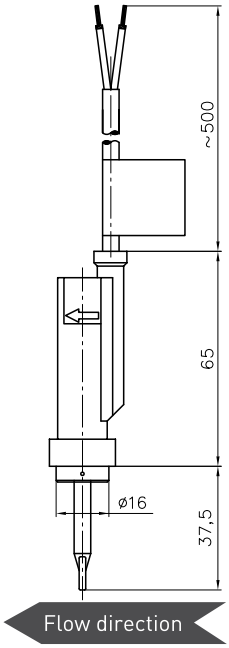
Typical pressure drop



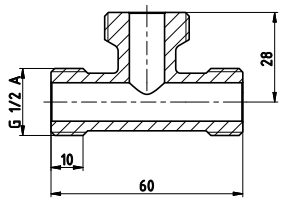
VKX15

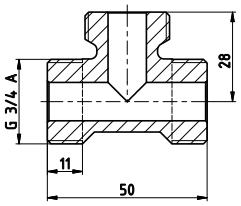


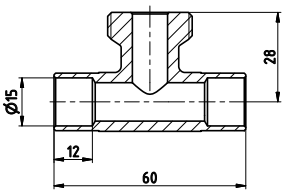
VKX15 Push-In

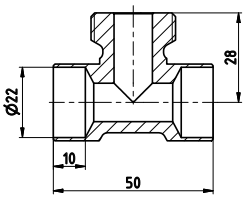


Female socket design









Materials in contact with fluid		
Type	**VKX15**	**VKX15 Push-In**
Body	Noryl PPO GFN3	
Paddle	Noryl PPO GFN3	
Pin	Stainless steel 1.4571	
Magnet	Hard ferrite	
O-ring	EPDM	
Pipe tee	Brass CW617N	

Order code	**Example → VKX15M2P2**	**AP**	**A31**
Type			
VKX15	VKX15M2P2		
Switching voltage			
230 VAC, 48 VDC		AP	
24 VAC, 42 VDC		BP	
Process connection			
Pipe tee G½ male			A31
Pipe tee G¾ male			A41
Pipe tee 15 mm soldering connection			L31
Pipe tee 22 mm soldering connection			L41
Push-In for manifold mounting			H10

Flow switches for HVAC applications

For pool applications

Type VKX05

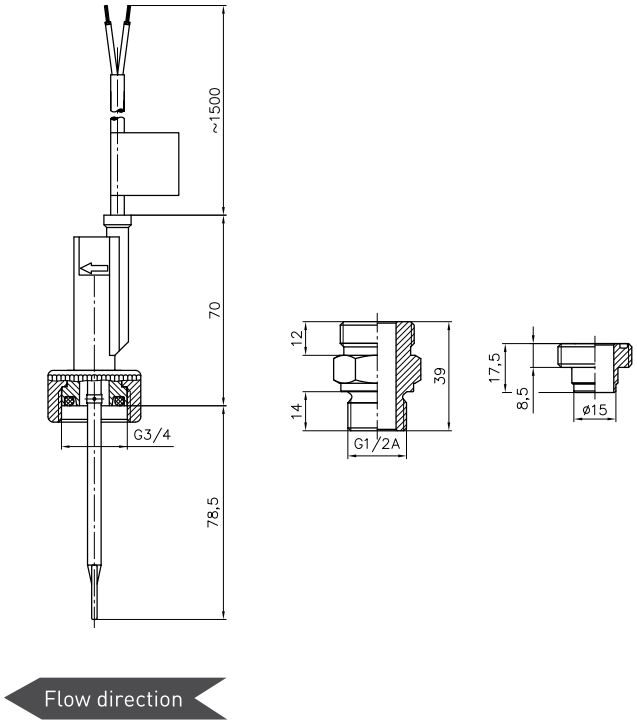
Type VKL05 Push-In

Advantages

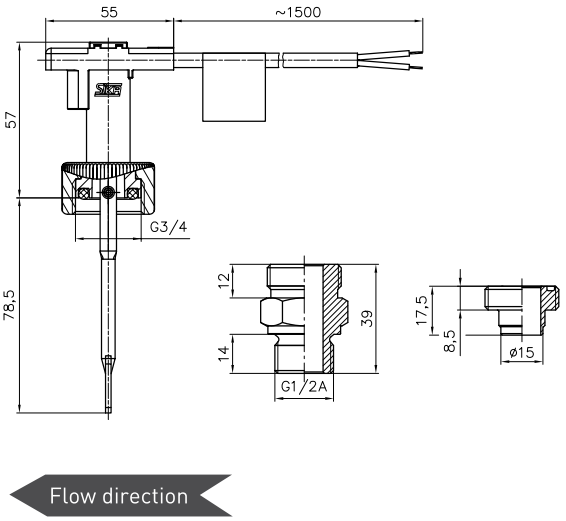
- Flow switches for pool applications
- Insertion installation into pipelines DN 50...150
- Installation with union nut or Push-In
- With integrated O-ring
- VKL - pin made of plastic
- OEM flow switches, delivery lots from 100 units

Technical data	VKX05		VKL05 / VKL05 Push-In
Switching function	Contact closes at increasing flow		
Nominal diameter range	Applicable in DN 50...150		
Pressure rating	PN 10		
Temperature ranges			
Medium	-20...100 °C		-20...70 °C
Ambient	-20...70 °C		
Electrical data			
Electrical connection	1.5 m PVC jacket cable		
Degree of protection EN 60529	IP65		
Switching current	Max. 1 A		
Rating	Max. 26 VA, 20 W		
Switching voltage	Max. 230 VAC, 48 VDC	Max. 24 VAC, 42 VDC	Max. 230 VAC, 48 VDC
Protection class EN 60730-1	Class II	Class III	Class II
Approvals			
	WRAS APPROVED PRODUCT; TÜV Rheinland Produkt Safety BAUART GEPRÜFT TYPE APPROVED		

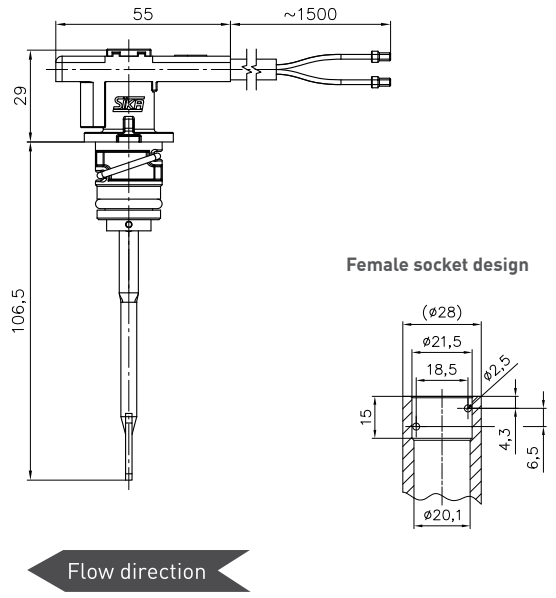
VKX05



VKL05



VKL05 Push-In



Materials in contact with fluid			
Type	**VKX05**	**VKL05**	**VKL05 Push-In**
Body	Noryl PPO GFN3	Noryl PPO GFN 1630V	
Paddle	Noryl PPO GFN3	Noryl PPO GFN 1630V	
Pin	Stainless steel 1.4571	Noryl PPO GFN 1630V	
Magnet	Hard ferrite		
O-ring	EPDM		
Soldering adapter	Brass CW614N		
Process connection	Brass CW614N or stainless steel 1.4571		

Order code	Example → VKX05M2P2	AP	U10
Type			
VKX05	VKX05M2P2		
Switching voltage			
230 VAC, 48 VDC		AP	
24 VAC, 42 VDC		BP	
Process connection			
Union nut G¾			U10
Threaded adapter G½ brass			R21
Threaded adapter G½ stainless steel			R23
Soldering adapter			D11

Order code	Example → VKL05M1P2BP	U10
Type		
VKL05	VKL05M1P2BP	
Process connection		
Union nut G¾		U10
Threaded adapter G½ brass		R21
Threaded adapter G½ stainless steel		R23
Soldering adapter		D11
Push-In for manifold mounting		H20

Flow switches for insertion installation

Paddles interchangeable, for marine applications

Type VH500

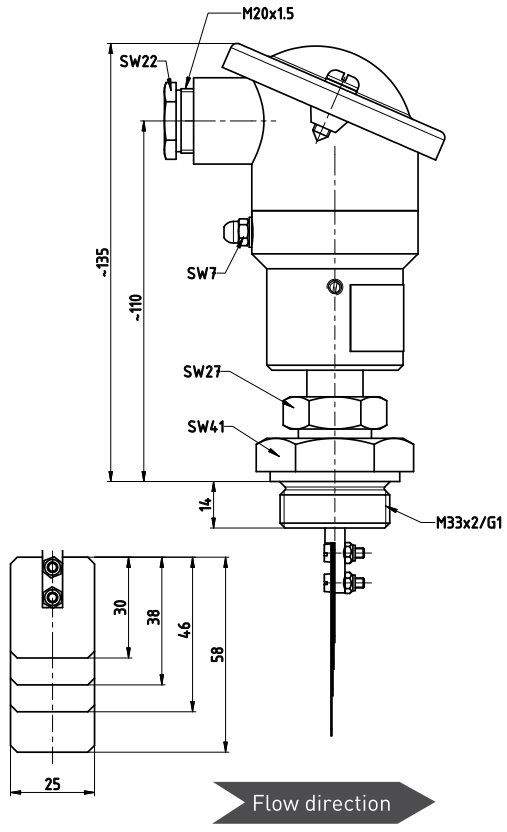
Technical data	
Switching function	Change over contact
Pressure rating (Test pressure)	Max. 6 bar (10 bar) or max. 10 bar (15 bar)
Temperatures	
Medium	Max. 100 °C
Ambient	Max. 85 °C
Electrical data	
Max. contact rating	24 VDC, 5 A resistive load 4 A inductive load 60 VDC, 1 A resistive load 0.5 A inductive load 250 VAC, 10 A resistive load 10 A inductive load
Degree of protection EN 60529	IP54
Protection class EN 60730-1	Class I
Approvals	
GL	Germanischer Lloyd, Type Approval Certificate No. 89824-94HH and 94970-10HH

Advantages

- Germanischer Lloyd Type Approval
- Suitable for water, oil, etc.
- Insertion installation into pipes or pipe tees DN 25...DN 50 or bigger
- Easy installation and alignment due to screw in connection
- Four paddles in different sizes included, selection in accordance to the pipe size
- Set point adjustment by paddle size selection and by adjustment screw
- Micro switch with high contact rating
- Robust, vibration-resistant up to 4 g

Size of pipe tee	Paddle to select**	Set point ranges [m³/h]*	
		Increasing flow ON	Decreasing flow OFF
DN 25	25 x 30 mm	1.0...1.25	1.05...1.2
DN 32	25 x 38 mm	1.7...2.05	1.6...1.95
DN 40	25 x 46 mm	2.2...2.55	2.1...2.45
DN 50	25 x 58 mm	3.25...3.85	3.15...3.75

* Water, 20 °C, horizontal pipe, tolerance ±15 %
** Higher set points selectable by use of smaller paddle sizes
Set points for bigger pipe sizes on request



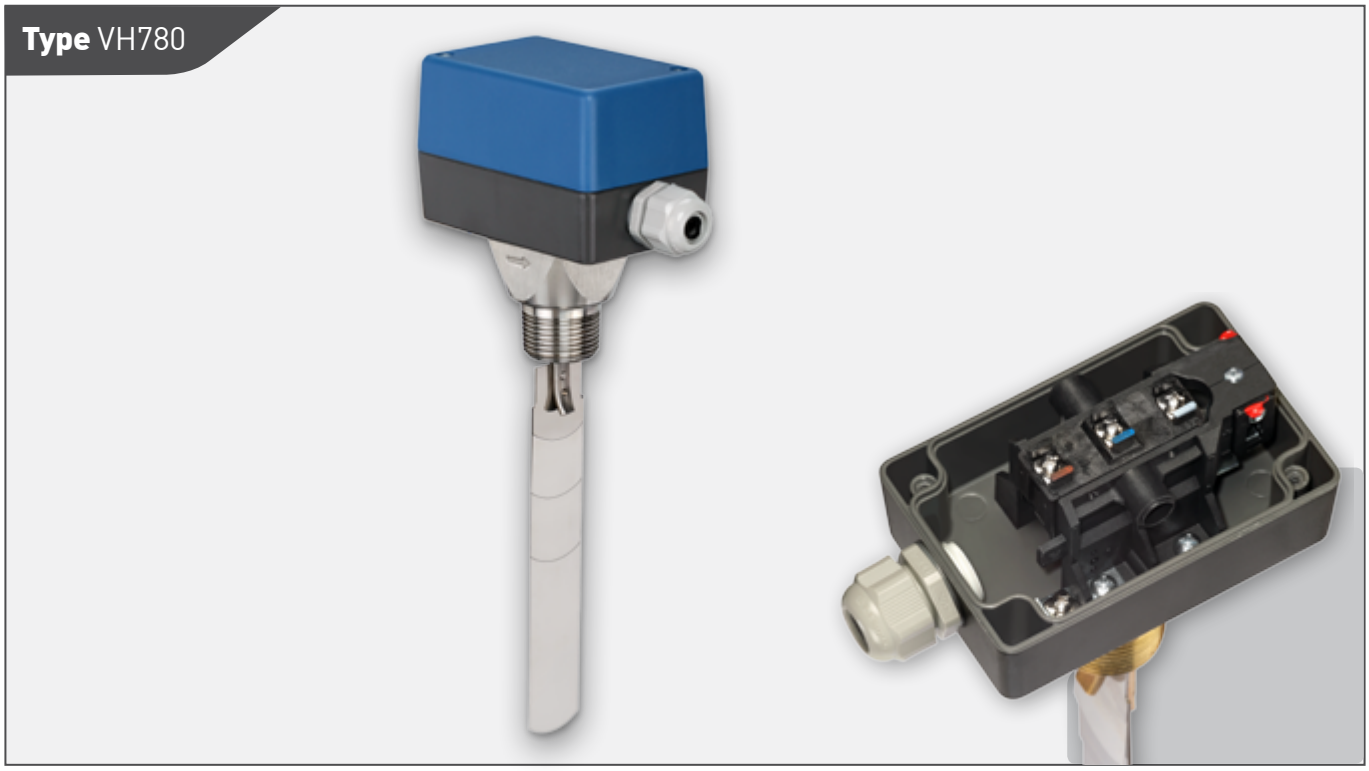
Materials in contact with fluid	
Body, process connection	Brass 2.0401
Bellow system	Stainless steel 1.4571
Paddles	Stainless steel 1.4310
Flat gasket	HD 300
O-ring	NBR

Order code	Example → VH500	N	I3451R41
Type			
VH500	VH500		
Pressure rating			
6 bar		N	
10 bar		R	
Process connection			
G1			I3451R41
M33 x 2			M3451M41

Flow switches for insertion installation

Paddles interchangeable

Type VH780



Technical data	
Switching function	Change over contact
Pressure rating	Max. 11 bar (brass) Max. 30 bar (stainless steel)
Temperature ranges	
Medium	-40...120 °C
Ambient	-40...85 °C (10...90 % rH)
Storage and Transportation	-40...85 °C, < 95 % rH
Electrical data	
Change over contact max. contact rating	250 VAC, 15 A, 8 A inductive load
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class I

Advantages

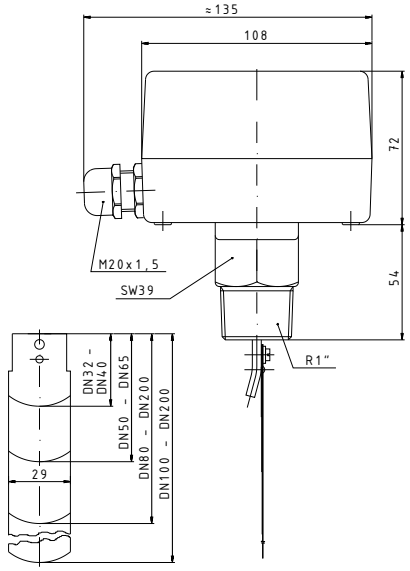
- Insertion installation into existing pipes
- One unit covers a wide range of pipe sizes (DN 32...200)
- Two versions (set point ranges)
- Adjustable setpoint
- Micro switch for high contact rating

Nominal diameter	Paddle to select**	Setpoint ranges [m³/h]*				Max. flow rate [m³/h]
		Standard Setpoint		Low Setpoint		
		Increasing flow ON	Decreasing flow OFF	Increasing flow ON	Decreasing flow OFF	
DN 32	29 x 34 mm	1.3...3.0	0.8...2.8	0.9...1.6	0.25...1.4	3.6
DN 40	29 x 34 mm	1.7...4.0	1.1...3.7	1.2...2.2	0.5...1.6	4.8
DN 50	29 x 60 mm	3.1...6.1	2.2...5.7	2.3...4.1	0.9...3.6	7.3
DN 65	29 x 60 mm	4.0...7.0	2.7...6.5	3.1...5.5	1.2...4.9	8.4
DN 80	29 x 89 mm	6.2...11.4	4.3...10.7	4.9...8.2	2.1...7.4	13.7
DN 100	29 x 167 mm***[1]	8.0...18.4	6.1...17.3	7.7...13.0	3.3...11.6	22.1
DN 125	29 x 167 mm***[2]	12.9...26.8	9.3...25.2	11.5...19.6	5.0...17.5	32.2
DN 150	29 x 167 mm***[3]	16.8...32.7	12.3...30.6	14.1...23.9	6.1...21.4	39.2
DN 200	29 x 167 mm	46.5...94.2	38.6...90.8	36.5...61.8	21.7...55.3	113

* Water, 20 °C, horizontal pipe, tolerance ±15 %

** Higher setpoints selectable by use of smaller paddle sizes.

***[1]shortened to 29 x 91 mm, ***[2]shortened to 29 x 117 mm, ***[3]shortened to 29 x 144 mm



Flow direction

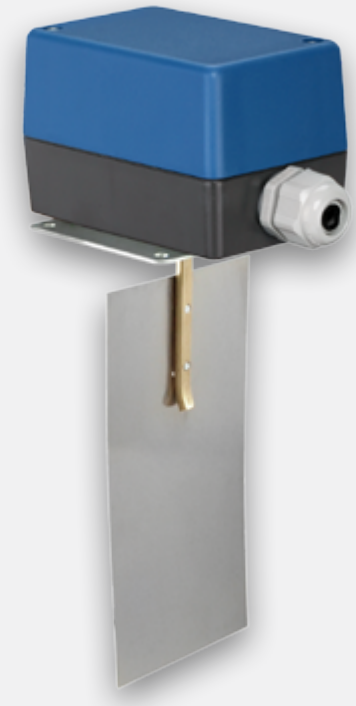
Materials in contact with fluid		
	Brass version	**Stainless steel version**
Body	Brass CW617N	Stainless steel 1.4404
Paddle	Stainless steel 1.4404	
Lever	Brass CW617N	Stainless steel 1.4404
Teeth lock washer	Stainless steel 1.4301	
Fastening screw	Stainless steel 1.4301	
Bellow	Bronze CW453	Stainless steel 1.4404

Flow direction

Order code	Example → VH780J4	1	1LS10110
Type			
VH780	VH780J4		
Material			
Brass		1	
Stainless steel		3	
Setpoint			
Standard			1LS10110
Low			2LS10110

Flow switches for air flow

Type VH780

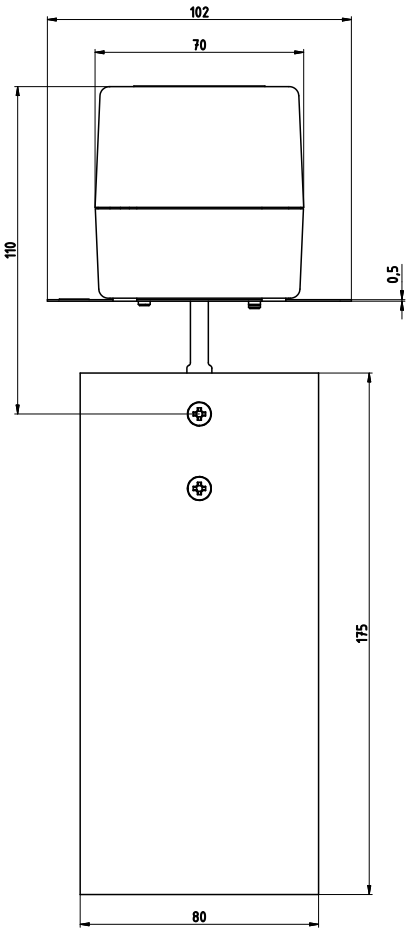


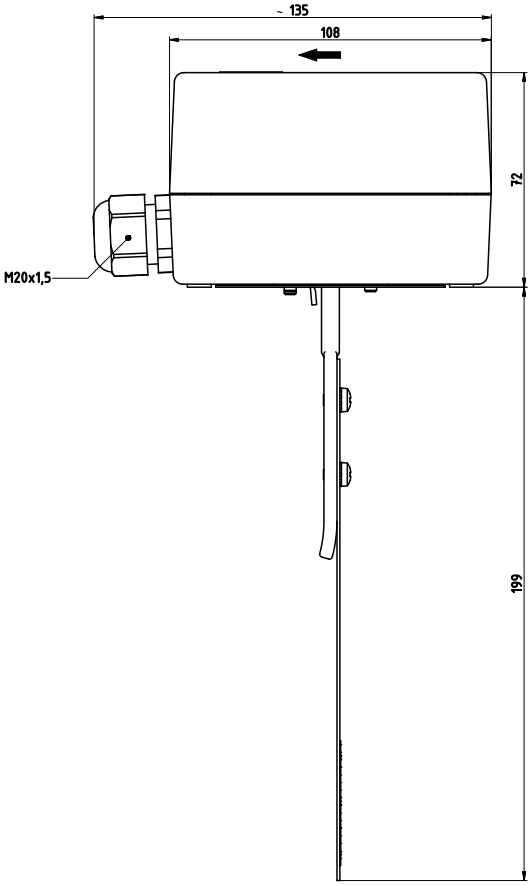
Technical data	
Switching function	Change over contact
Pressure rating	Atmospheric pressure
Temperature ranges	
Medium	-10...85 °C
Ambient	-35...65 °C
Storage and Transportation	-40...85 °C
Electrical data	
Max. contact rating	250 VAC, 15 A, 8 A inductive load
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class I

Advantages

- Flange connection for square air ducts
- Adjustable setpoint
- Micro switch for high contact rating

Setpoint ranges [m/s]			
Paddle size	**Increasing velocity ON**	**Decreasing velocity OFF**	**Max. velocity**
175 x 80 mm	2...5	1...4	7
Cut to 175 x 45 mm	2.5...9.2	2...8	10

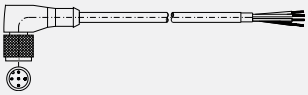


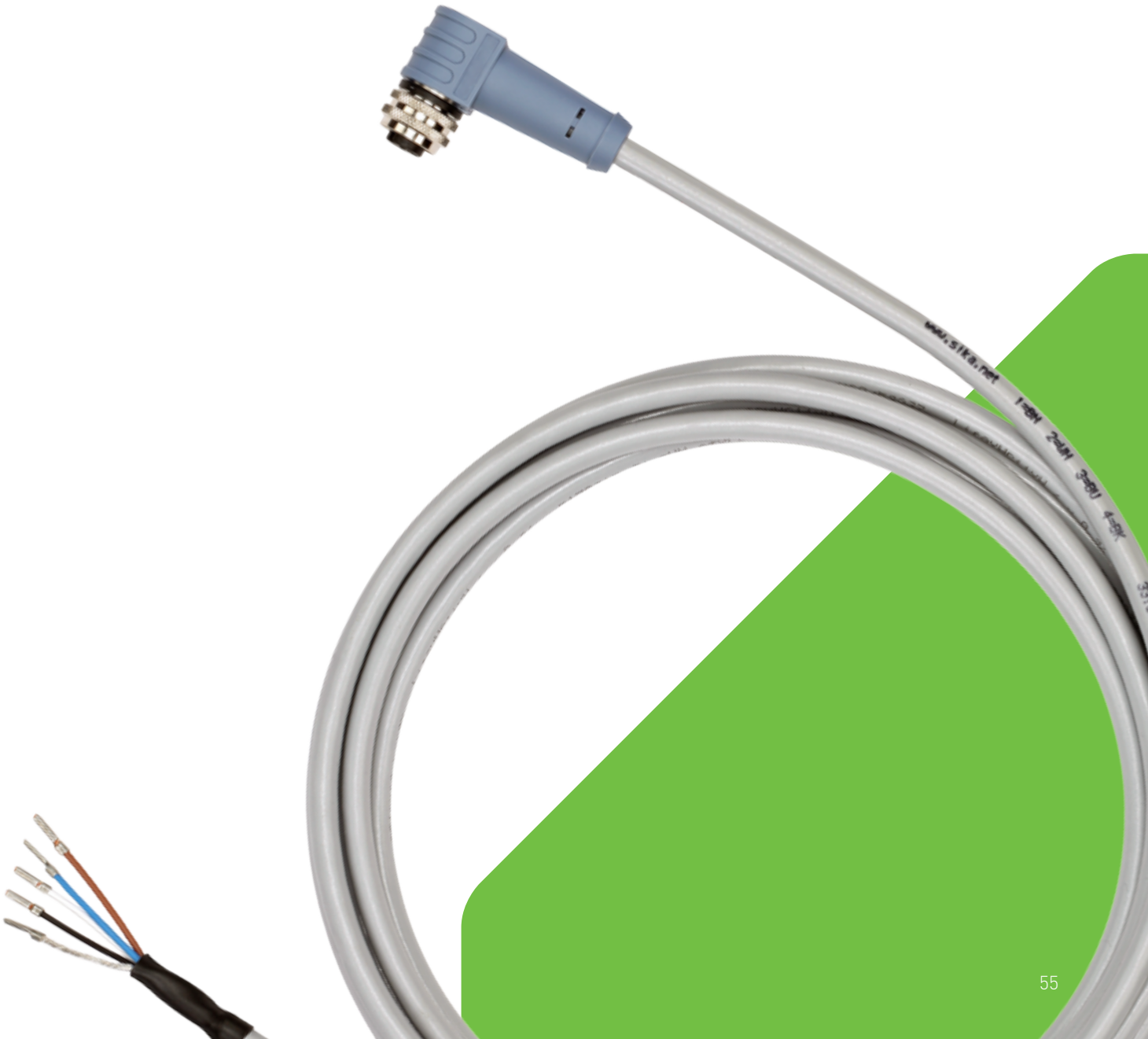


Flow direction

Materials	
Paddle	Stainless steel 1.4404
Lever	Brass CW607N
Flange	Zink coated steel
Case	ABS / PC
Flange gasket	Betaflex® 77

Order code
VH780V1S1AS13130

Accessories	Länge	Bestellcode	
Connection cable with 4-pin cable socket M12 x 1, angle type moulded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) - UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4-pin cable socket M12 x 1 angle type, unassembled		VT1331	
Cable socket with two LEDs Switching voltage 24...230 V AC/DC ±20 % Ambient temperature -20...70 °C for retrofit / replacement of cable socket without LED		XVH958	



→ Thread connections

→ QuickFasten

VORTEX FLOW SENSORS →

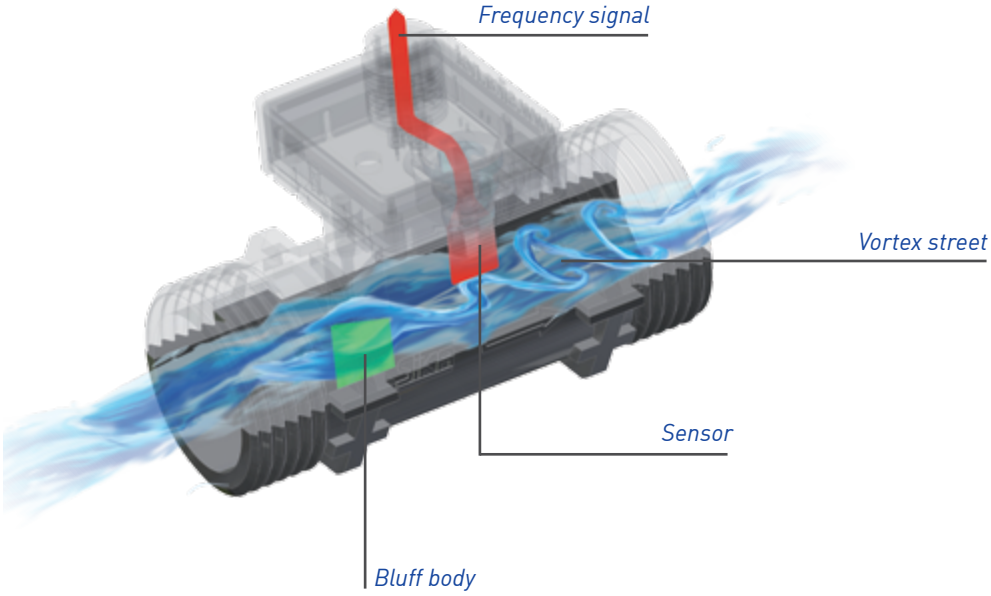
Vortex flow sensors

Principle of operation

Alternate vortices rotating in opposite directions are generated behind a bluff body immersed in a flow. The vortices detach from the edges of the bluff body and form a Kármán vortex street in the fluid stream. The distance between the single vortices is constant. The frequency of the vortices flowing past a sensor depends on the flow rate and is proportional to the flow. The sensor detects these vortices which are then converted to an electrical frequency signal.

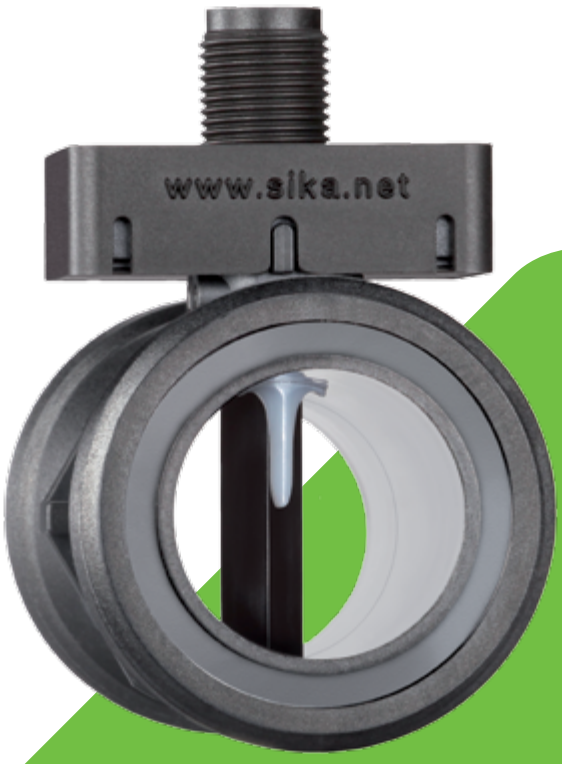
Some of the advantages of this measuring principle

- Minimal flow obstruction → low pressure drop
- Wide range of applications in terms of pressure, temperature and density
- Independent of the conductivity of the medium
- High long-term stability / no zero drift



Advantages

- Solid state flow sensor for liquids with no moving parts
  → no mechanical wear
- Rugged glass fibre reinforced plastic ensures highest strength and performance
- Completely encapsulated piezoceramic sensor to detect the vortices
  → thus no direct contact with the medium
- Wide measuring span (1:20)
- Temperature sensor integrated
- Output signals: an analogue voltage signal and / or frequency signal is available for the flow, and a resistance or analogue signal is available for the temperature.
- High interference resistance
- Wetted parts metal-free
- 100 % final test with six test points (flow rates)
- Traceability by serial number
- Thread connection or QuickFasten



Vortex flow sensors

Series VVX

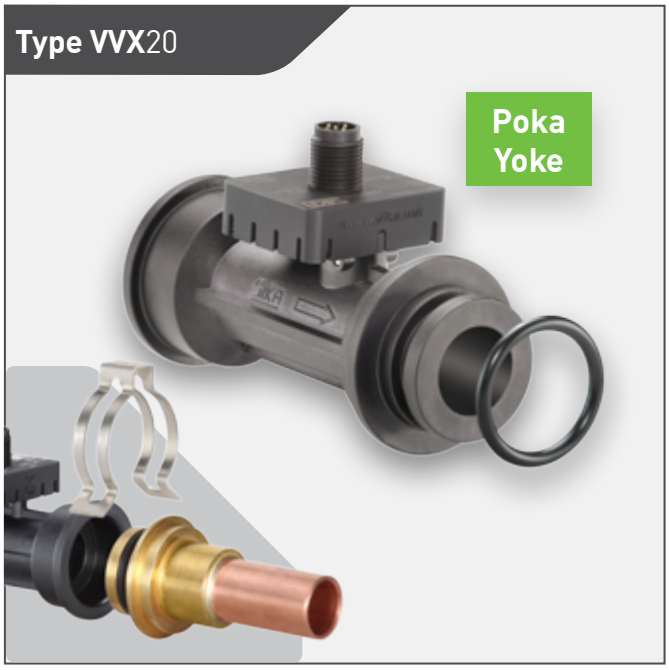
Encapsulated piezoceramic sensor

Type VVX15

Technical data	VVX15	VVX20	VVX25
Nominal diameter	DN 15	DN 20	DN 25
Process connection	G¾-ISO 228 male, incl. O-rings optional G½	QuickFasten	G 1¼-ISO 228 male, incl. O-rings optional G 1
Inner diameter	Ø 13 mm	Ø 19 mm	Ø 25 mm
Flow range	2...40 l/min	5...80 l/min	7...150 l/min
Accuracy	±2 % of range*		
Repeatability	±0,5 % or ±1 %, see temperature ranges ambient		
Medium	Water and aqueous lotion, deviations with high viscous media		
Pressure rating	PN10		
Temperature ranges			
Medium	5...90 °C, -20...90 °C**		
Ambient	5...70 °C → Repeatability ±0,5 %, -20...70 °C → Repeatability ±1 %		
Degree of protection EN 60529	5-pin plug M12 x 1 → IP65*** 5-pin RAST 2.5 → IP20***		
Electrical data			
Electrical connection	5-pin plug connector M12 x 1 or 5-pin RAST 2.5		
Power supply	8...30 V DC or 5 V DC (±5 %)		
Current consumption	< 15 mA		
Approvals			
	WRAS APPROVED PRODUCT		WRAS APPROVED PRODUCT
Option			
	Recognized component ETL according to UL und CSA Standards		Recognized component ETL according to UL und CSA Standards

Type VVX25

Type VVX20



Two different versions available:
- *Frequency output*
- *Analogue and frequency output*

Frequency output	VVX15	VVX20	VVX25
Output signal flow	Frequency signal, square wave, pulse duty ratio 50:50, signal current max. 20 mA		
Pulse rate	500 1/l (optional 3...1000 1/l)	200 1/l (optional 2...800 1/l)	100 1/l (optional 1...500 1/l)
Output signal temperature	Pt1000 2 wire, class B or NTC 10,74k, B 0/100 3450 or none		

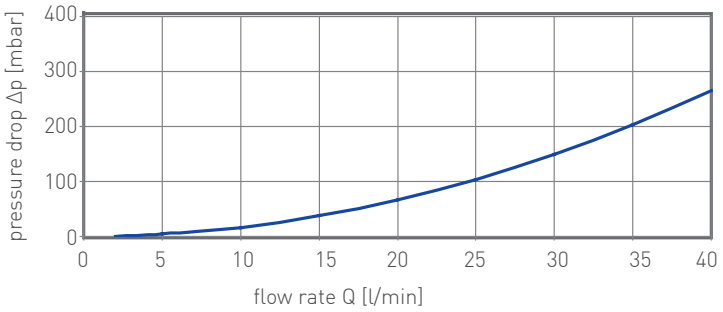
Analogue output	VVX15	VVX20	VVX25
Output signal flow	Voltage signal 0,5...3,5 V		
Scaling	2...40 l/min	5...80 l/min	7...150 l/min
Voltage rate	0.07895 V / l/min	0.04000 V / l/min	0.02098 V / l/min
Output signal temperature	Voltage signal 0,5...3,5 V corresponds to 0...90 °C or Pt1000 2 wire, class B or NTC 10.74k, B 0/100 3450 or none		

* Test conditions:
→ Test medium water
→ Media temperature 20...30 °C
→ Inlet pressure 7...10 bar
→ Defined inlet and outlet pipes (see operating manual)

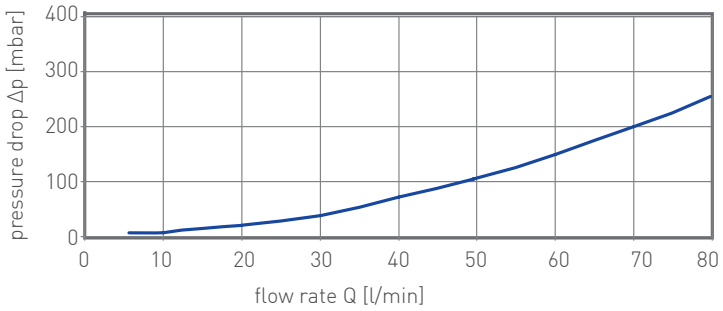
** Temperature cycle test: -20 °C / 70 °C, 0 % rH, cycle time 1.5 h, temperature gradient approx. 2.5 K/min, hold time at -20 °C and 70 °C 10 min each, 90 cycles: no failures

*** With attached cable socket

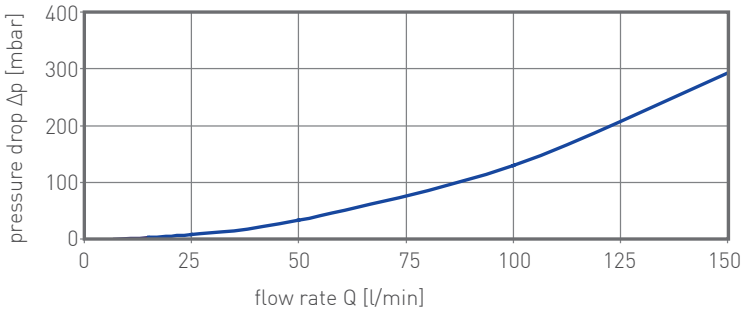
Typical pressure drop VVX15



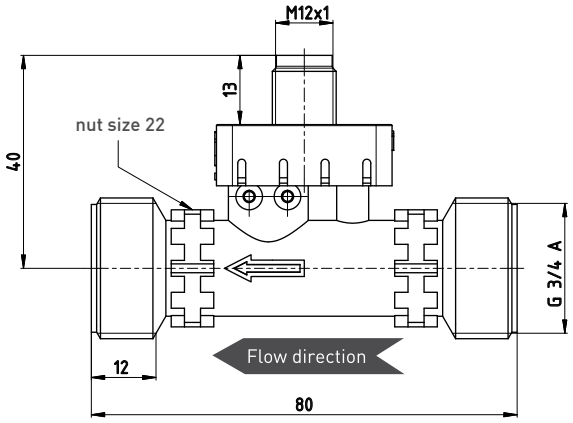
Typical pressure drop VVX20



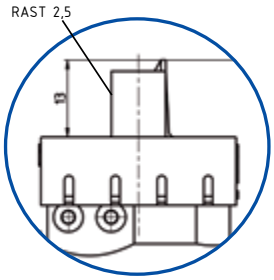
Typical pressure drop VVX25



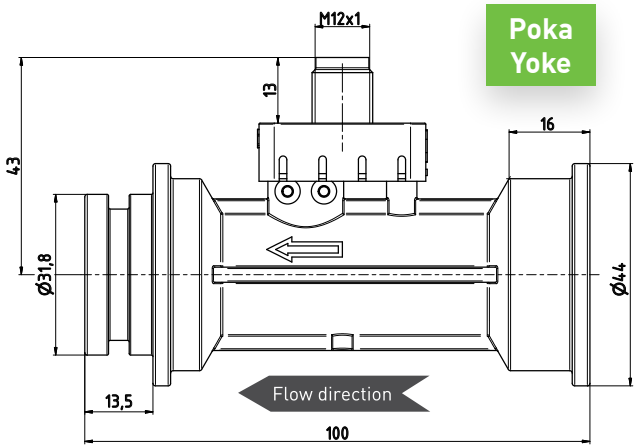
VVX15



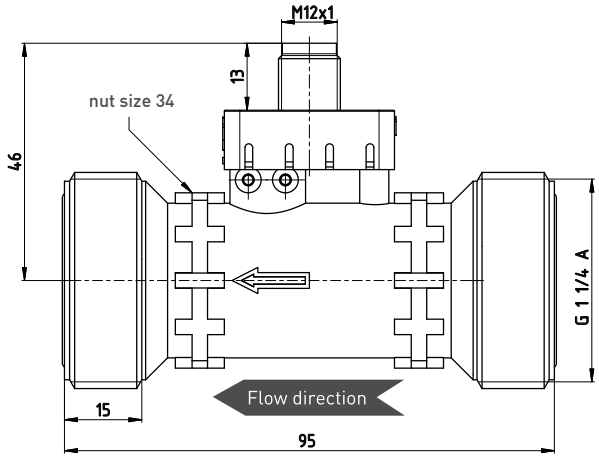
Alternative electrical connection



VVX20



VVX25



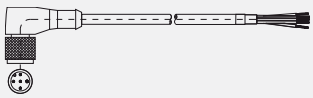
Materials in contact with media	
Body / tube	PPS Fortron® 40 % GF
Sensor	ETFE Tefzel®
O-rings	EPDM

Version frequency output

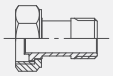
Order code	Example → VVXA1S	G	A	RRRP	1	5	14
Nominal diameter							
DN 15	VVXA1S		A				14
DN 20	VVXC9S		B				2P
DN 25	VVXB2S		B				16
Power supply							
8...30 V DC		G			1		
5 V DC		P			2		
Output signal temperature							
Pt1000				RRRP			
NTC 10.74K				RRRN			
none				0000			
Electrical connection							
5 pin plug M12 x 1						5	
RAST 2.5 plug						2	

Version analogue output and frequency output

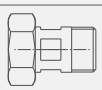
Order code	Example → VVXA1SNAU1	RP	1	5	14
Nominal diameter					
DN 15	VVXA1SNAU1				14
DN 20	VVXC9SNBUC				2P
DN 25	VVXB2SNBU2				16
Output signal temperature					
0.5...3.5 V		U1			
Pt1000		RP			
NTC 10.74K		RN			
none		00			
Power supply					
8...30 V DC			1		
5 V DC			2		
Electrical connection					
5 pin plug M12 x 1				5	
RAST 2.5 plug				2	

Accessories	Length	Order code	
Connection cable with 5 pin cable socket M12 x 1, angle type molded lead 5 x 0.34 mm², sheathing material PVC (T_{max} = 80 °C)*	1 m 2 m 3 m 5 m 10 m	XVVX040 XVVX051 XVVX039 XVVX041 XVVX042	
Connection cable with 5 pin cable socket M12 x 1, molded lead 5 x 0.34 mm², sheathing material PVC, 4 pin Molex MicroBlade wire-to-board housing, (T_{max} = 80 °C)	1.5 m	XVVX065	
PVC-Ribbon cable 5 x AWG24 with RAST 2.5 duomodul	1 m 2 m	XVVX031 XVVX021	

* Connection cable with UL approval on request

Accessories VVX15	Order code**	
Screw coupling G½, brass	BVVX1007	
Soldering coupling Ø 15 mm, brass	BVVX1008	

Accessories VVX20	Order code**	
O-ring for QuickFasten, EPDM	XVVX061	
Joint clip QuickFasten, stainless steel	XVVX052	

Accessories VVX25	Order code**	
Screw coupling R1, brass	BVVX1003	
Soldering coupling Ø 28 mm, brass	BVVX1004	
Bonding coupling Ø 25 mm, PVC	BVVX1005	
Screw coupling G 1, stainless steel 1.4571	BVVX1006	

** Supplied piecewise

- → Series **induQ®** VMM
- → Series **induQ®** VMI
- → Series **induQ®** VMZ

MAGNETIC INDUCTIVE FLOW SENSORS

Magnetic inductive flow sensors

Principle of operation

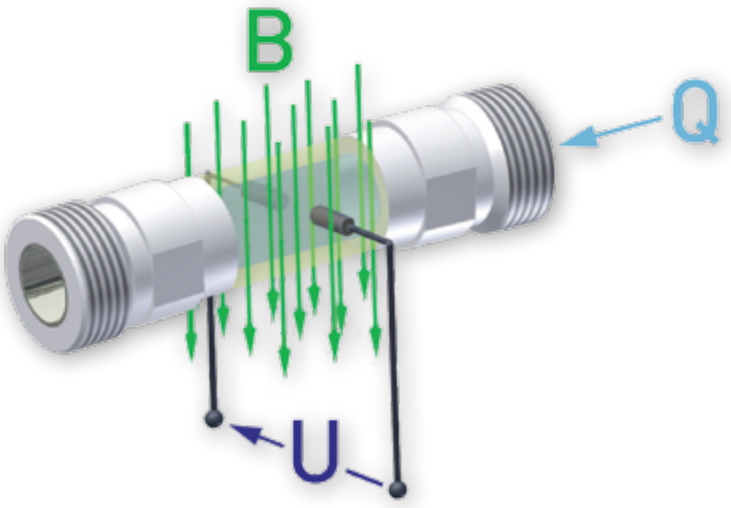
The smart flow sensors of the **induQ®** series operate according to the principle of induction: The measuring pipe is in a magnetic field (**B**). If an electrically conductive medium, with the flow (**Q**) to be measured, flows through the measuring pipe and thereby at a right-angle to the magnetic field, a voltage (**U**) is induced in the medium. This voltage is proportional to the average flow velocity and is picked up by two electrodes.

Regarding flow proportional output signals two versions are available depending on the model:

- Frequency output signal
- Analogue and frequency output signal

The pulse rate can be configured at the factory or on-site.

The **induQ®** sensors enable the flow measurement/volume flow measurement or dosing of electrically conductive liquids without any moving parts. They are the ideal flow sensors when accuracy and reliability are a must.



Three product lines to meet every requirement

From robust field devices to cost-effective plastic devices for series applications, the magnetic inductive **induQ®** flow sensors offer a suitable device for each application. The time-tested measurement method - deployed for decades in the field of process engineering - can now also be used in mechanical engineering and plant construction. Changes to the temperature, density, viscosity, concentration or electrical conductivity of the medium do not affect the output signal. The advantages of the **induQ®** series will convince you:

- No moving parts
- No mechanical wear*
- Free pipe cross-section → no additional pressure drop
- Maintenance-free
- Fast response (< 500 ms or < 100 ms)
- Minimum inlet section requirements

* For aqueous media without solid fractions

Overview			
Product line	**VMM**	**VMI**	**VMZ**
Version / Application	Standard, process	Single and series applications	Cost-optimised, plastic
Nominal diameter	DN 15...DN 200	DN 07...DN 20	DN 03...DN 25
Housing	Metal	Metal	Plastic
Process connection	Flanges	Metal thread	Plastic thread
Max. medium temperature	Up to 180 °C	90 °C	60 °C
Pressure rating	According to flange specification	PN 16	PN 10
Signal outputs	Analogue and Frequency	Frequency / Analogue and Frequency	Frequency
Local display	✓		
Electrical connection	Connection terminals	Plug connector M12 x 1	Plug connector M12 x 1

Magnetic inductive flow sensors

Series induQ® VMM

Advantages

- Rapid signal processing with a 16-bit microcontroller
- Password protection
- Self-test
- Language selection: German, English
- Low-flow suppression
- Empty pipe detection
- Easy menu-driven operation and programming (e.g. measuring range, pulse rate) by the user by means of a two-line alphanumeric display
- Delivery inlcuding works calibration certificate

Outputs

- Analogue output (0)4...20 mA
- Frequency or Impulse output
- 2 alarm / status outputs

Displays

- Flow rate, several total flows
- Flow velocity
- Relative flow rate [%]
- Mass and mass flow (enter density)

Units

- Divers, e.g. m³/h, l/s, USG/min, kg/h (density programmed)

Compact type

Separate type

Type	VMM15	VMM25	VMM32	VMM40	VMM50	VMM65	VMM80	VMM100	VMM125	VMM150	VMM200
Characteristics											
Nominal diameter	DN 15	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200
Process connection	Flange connection in accordance with EN 1092-1, JIS B2220 10K or ANSI B16.5										
Flow range											
→ Flow velocity [m/s]	0...10										
→ Volumetric flow [m³/h]	0...6.3	0...17.6	0...28.9	0...45.2	0...70.6	0...119.4	0...180.9	0...282.7	0...441.7	0...636.1	0...1130
Accuracy*											
v = 1...10 m/s	±0.5 % of reading										
v < 1 m/s	±0.4 % of reading ±1 mm/s										
additionally											
Frequency output	±0.05 % per 10 K										
Analogue output	±0.1 % per 10 K										
Repeatability	±0.15 %										
Response time	< 100 ms**										
Signal output starting from	> 0 m/s										
Medium / min. conductivity of medium	Water and other conductive liquids / 50 µS/cm										
Medium temperature											
→ Hard rubber	0...90 °C										
→ PTFE	-20...100 °C at 40 bar -20...150 °C at 25 bar -20...180 °C at 16 bar										
→ Process connections	Min. -10 °C (steel)										
→ Process connections	Min. -20 °C (stainless steel)										
Ambient temperature											
→ Hard rubber	0...80 °C										
→ PTFE	-20...100 °C										
→ Process connections	Min. -10 °C (steel)										
→ Process connections	Min. -20 °C (stainless steel)										
→ Display	-20...50 °C***										
Storage and transport temperature	-20...60 °C										
Pressure rating											
→ EN1092-1	PN 40	PN 40	PN 40	PN 40	PN 40	PN 16**** PN 40	PN 16 PN 40	PN 16 PN 40	PN 16 PN 40	PN 16 PN 40	PN 10 PN 16 PN 25 PN 40
→ JIS B2220 10K	9.8 bar										
→ ANSI B16.5 150 RF	19.6 bar (Process connection, steel) 15.9 bar (Process connection, stainless steel)										
Display	LCD two-line, backlight										
Operation	6 keys, menu-driven										
Degree of protection EN 60529	IP67										

* Reference conditions: Media temperature 10...30 °C; Ambient temperature 20...30 °C; warm-up period 30 min.; straight pipe lengths; inlet 5 x DN, outlet 2 x DN, regularly centered and earthed

** Depending on the electronics settings

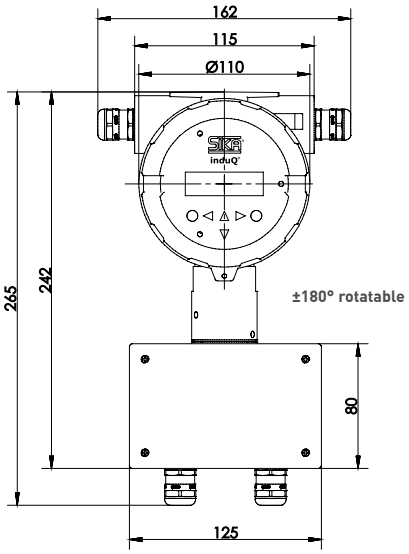
*** The readability of the LCD display is restricted below 0 °C

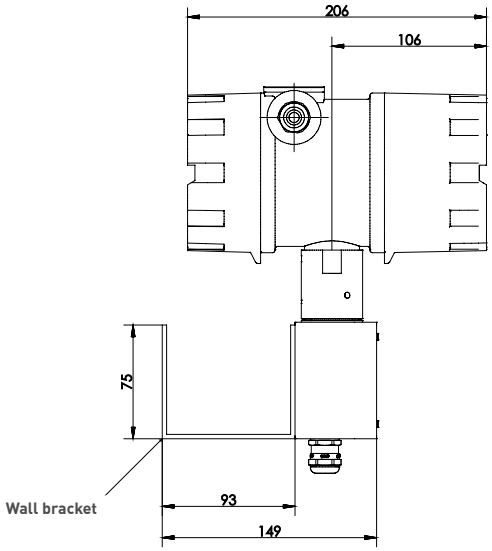
**** 8 bolt flanges

Output signals											
Type	**VMM15**	**VMM25**	**VMM32**	**VMM40**	**VMM50**	**VMM65**	**VMM80**	**VMM100**	**VMM125**	**VMM150**	**VMM200**
Pulse / frequency output											
→ Configuration	Pulse signal or frequency signal selectable										
Pulse output											
→ Pulse rate (factory-set) [pulses/m³]	1000	1000	1000	1000	1000	1000	1000	1000	100	100	100
→ Pulses/Time	⩽ 1000 Pulses/s										
→ Pulse width	⩾ 0.1 ms (max. 2 s), adjustable										
→ Signal shape	Squarewave signal										
Frequency output											
→ Factory-scaled measuring range corresponds to 0...1 kHz [m³/h]	0...3	0...10	0...10	0...10	0...20	0...50	0...50	0...70	0...100	0...150	0...250
→ Frequency	0...1 kHz										
→ Signal shape	Squarewave signal										
Analogue output											
→ Factory-scaled measuring range corresponds to 4...20 mA [m³/h]	0...3	0...10	0...10	0...10	0...20	0...50	0...50	0...70	0...100	0...150	0...250
→ Operating range	0 ... 20 mA / 4 ... 20 mA, selectable										
→ Current limitation	21.6 mA										
→ Max. burden	600 Ω										
→ Short-circuit proof	Permanent										
Alarm output											
→ Quantity	2										
→ Version	Optocoupler										
→ Function	Status output: Preflow, backflow, MIN flow rate, MAX flow rate, alarm (adjustable)										
→ Switching values	U_{max}: 30 V; I_{max}: 60 mA; P_{max}: 1,8 W										

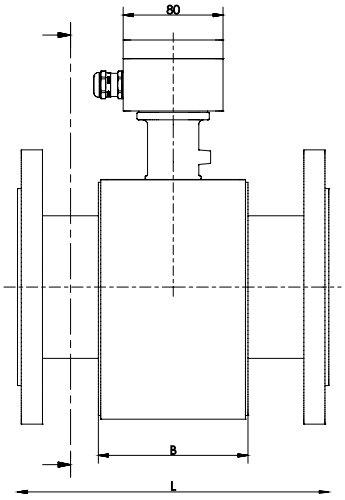
Electrical data	
Electrical connection	Cable gland M20 x 1.5
Power supply	230 VAC (-15 % / +10 %), 50/60 Hz or 115 VAC (-15 % / +10 %), 50/60 Hz or 19...36 VDC
Current consumption	15 VA

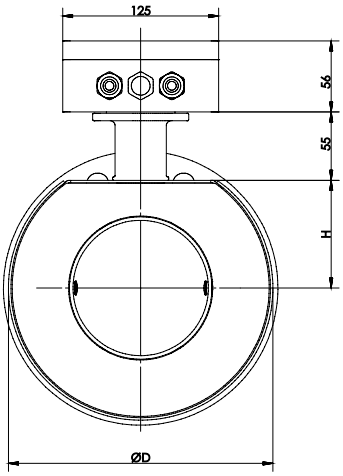
Separate type (Display)





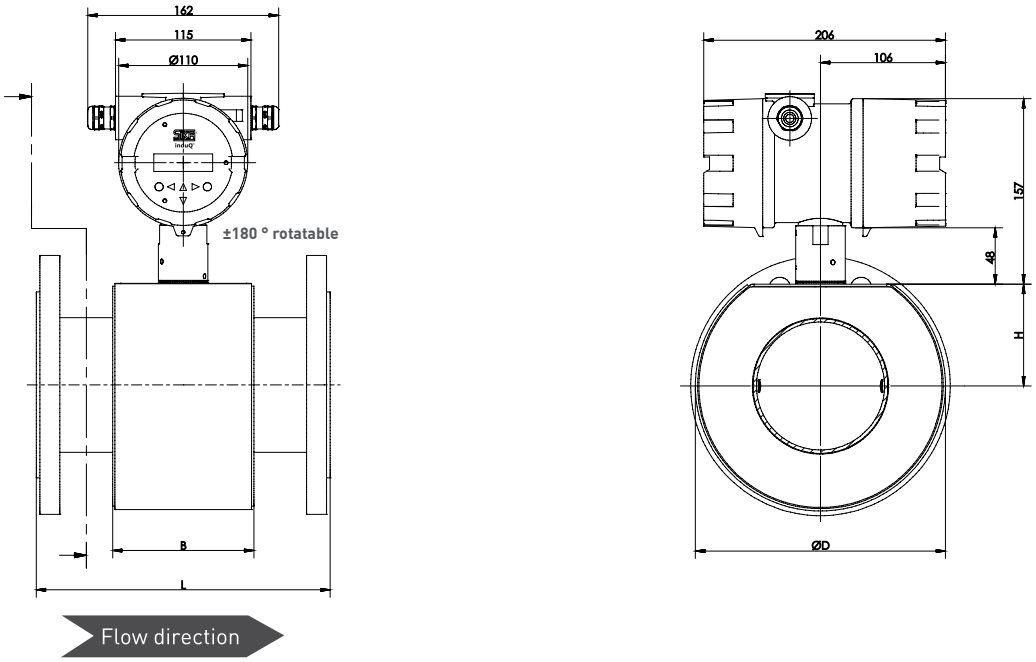
Separate type (Sensor)





Flow direction

Compact type



Dimensions [mm]										
Process connection		**Installation length L**							**Weight EN 1092-1 [kg]***	
EN 1092-1 JIS B2220 10K	ANSI B16.5	Hard rubber	PTFE		Tolerance	B	D	H	Sensor	Compact type
			Without protection rings	With protection rings						
DN 15	½"	200	200	206	+0 / -3	80	130	53	5	8
DN 25	1"	200	200	206	+0 / -3	80	130	53	6	9
DN 32	1¼"	200	200	206	+0 / -3	80	130	53	7	10
DN 40	1½"	200	200	206	+0 / -3	80	130	53	7.5	10.5
DN 50	2"	200	200	206	+0 / -3	80	140	57	9	12
DN 65	2½"	200	200	206	+0 / -3	80	155	63	10	13
DN 80	3"	200	200	206	+0 / -3	80	170	70	13	16
DN 100	4"	250	250	256	+0 / -3	120	210	86	15	18
DN 125	5"	250	250	256	+0 / -3	120	240	98	19	22
DN 150	6"	300	300	306	+0 / -3	120	285	117	23	26
DN 200	8"	350	350	360	+0 / -3	200	350	143	36	39

* valid for DN 15...DN 50 (PN 40), DN 65...DN 150 (PN 16), DN 200 (PN 10)

Materials	
Not in contact with fluid	
Display housing	Casted aluminium
Sensor housing	Steel
Measuring pipe	Stainless steel
Process connection	Steel 1.0460 or stainless steel 1.4404
In contact with fluid	
Electrodes	Stainless steel 1.4571 or Hastelloy C276
Measuring pipe lining	PTFE or Hard rubber

Order code	Example → VMM32	A	1	0	1	0	KAMA	20
Nominal diameter								
DN 15 / ½"	VMM15							
DN 25 / 1"	VMM25							
DN 32 / 1¼"	VMM32							
DN 40 / 1½"	VMM40							
DN 50 / 2"	VMM50							
DN 65 / 2½"	VMM65							
DN 80 / 3"	VMM80							
DN 100 / 4"	VMM1C							
DN 125 / 5"	VMMV3							
DN 150 / 6"	VMM3L							
DN 200 / 8"	VMM2C							
Process connection								
EN 1092-1 PN 10 starting from DN 200		A						
EN 1092-1 PN 16 starting from DN 65		B						
EN 1092-1 PN 25 starting from DN 200		C						
EN 1092-1 PN 40 starting from DN 15		D						
JIS B2220 10K		J						
ANSI B16.5 150 RF		I						
Material process connection								
Steel 1.0460			1					
Stainless steel 1.4571			2					
Lining								
PTFE				0				
Hard rubber				1				
Material electrodes								
Stainless steel 1.4571					1			
Hastelloy C276					2			
Earth electrode								
Without						0		
One						1		
Two						2		
Type								
Compact type with display							KAMA	
Separate type with display							GAMA	
Power supply								
230 VAC, 50/60 Hz								20
115 VAC, 50/60 Hz								40
19...36 VDC								30

Accessories

Earthing ring VMM

Earthing ring

An earthing ring is used for the electrical reference and earthing of the medium being measured. It is necessary if the pipes are not electrically conductive or lined (plastic or concrete pipes, etc.). The earthing ring must be connected to the provided earthing screw of the sensor. Retrofitting is possible. Material stainless steel 1.4571.

Sensor cable set

Sensor cable between sensor and display unit (separate design) consisting of magnetic power cable and electrode cable for configuration of M16 x 1.5 screw connection.

Protection rings VMM

Pair of protection rings

Protection rings protect the inlet and outlet edges of the sensor against mechanical damage, in particular when abrasive media such as gravel, sand, etc. are concerned. At the same time, they also serve as earthing rings. The protection rings are firmly screwed to the sensor. Material stainless steel 1.4571.

Order example	VMMZEW	32	A	1
Type				
Earthing ring	VMMZEW			
Protection rings (pair)	VMMZPR			
Nominal diameter				
DN 15 / ½"		15		
DN 25 / 1"		25		
DN 32 / 1¼"		32		
DN 40 / 1½"		40		
DN 50 / 2"		50		
DN 65 / 2½"		65		
DN 80 / 3"		80		
DN 100 / 4"		1C		
DN 125 / 5"		V3		
DN 150 / 6"		3L		
DN 200 / 8"		2C		
Process connection				
EN 1092-1			E	
JIS B2220 10K			J	
ANSI B16.5 150 RF			A	
Lining				
PTFE				0
Hard rubber				1

Sensor cable set - length of cable	Order code
5 m	VMMZSC000Z0005
10 m	VMMZSC000Z0010

Magnetic inductive flow sensors

Series induQ® VMI

Advantages

- Robust metal housing
- Nominal diameter DN 7, DN 10 and DN 20
- Wide measuring range 1:60 (1:50)
- Frequency or analogue and frequency output
- Delivery inlcuding works calibration certificate

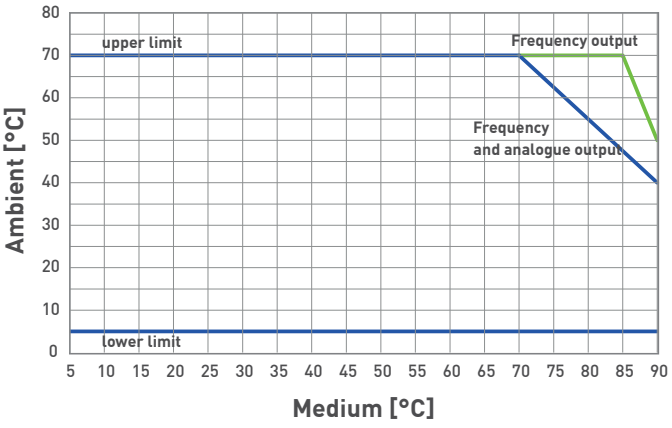
Type VMI20 / VMI10

Free pipe cross-section

Type	VMI07	VMI10	VMI20
Characteristics			
Nominal diameter	DN 7	DN 10	DN 20
Process connection	G½-ISO 228 male	G½-ISO 228 male or G¾-ISO 228 male	G 1-ISO 228 male
Inner diameter	4 x 10 mm	10 mm	20 mm
Flow range	0.5...30 l/min	1...60 l/min	5...250 l/min
Accuracy*	±1.5 % of reading ±0.3 % of range		
Repeatability*	1 %		
Response time	<500 ms		
Signal output starting from	0.4 l/min	0.9 l/min	4 l/min
Medium / min. conductivity of medium	Water and other conductive liquids / 50 µS/cm		
Medium temperature	5...90 °C		
Ambient temperature	Min. 5 °C, max. see figure temperature limits		
Pressure rating	PN 16		
Flow indication	LED green, flow proportional flashing		
Degree of protection EN 60529	IP65 (with attached cable socket)		
Electrical data			
Electrical connection	Plug connector M12 x 1		
Power supply	24 VDC (±10 %)		
Current consumption	⩽ 150 mA		

* Test conditions: Water 23 °C at 150 ±100 µS/cm; standard pulse rate

Temperature limits



Three different versions available:

- *Frequency output*
- *Analogue output 4...20 mA and frequency output*
- *Analogue output 0...10 V and frequency output*

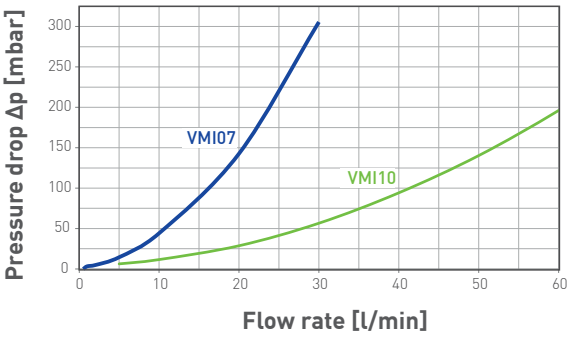
Frequency output	VMI07	VMI10	VMI20
Pulse rate **→ Optional***	1000 pulses/l 1...2000 pulses/l	500 pulses/l 1...1000 pulses/l	100 pulses/l 1...200 pulses/l
Resolution **→ Optional***	1.0 ml/pulse 1000...0.5 ml/pulse	2.0 ml/pulse 1000...1 ml/pulse	10 ml/pulse 1000...5 ml/pulse
Signal shape	Square wave signal, pulse duty ratio 50:50, Push-Pull		
Signal current	⩽ 100 mA, current limited		

Analogue output 4...20 mA	VMI07	VMI10	VMI20
Corresponds to flow rate**	0..20 l/min or 0...30 l/min	0..40 l/min or 0...60 l/min	0...200 l/min or 0...250 l/min
Max. burden	250 Ω against GND		

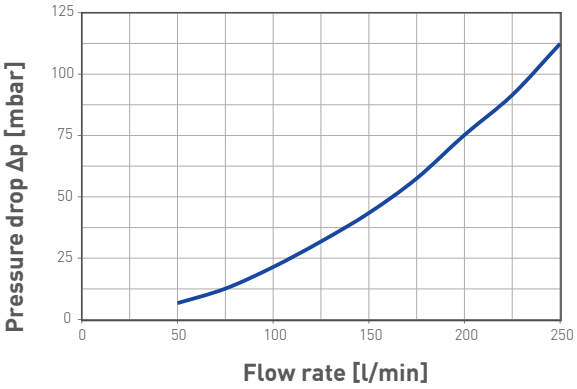
Analogue output 0...10 V	VMI07	VMI10	VMI20
Corresponds to flow rate**	0..20 l/min or 0...30 l/min	0..40 l/min or 0...60 l/min	0...200 l/min or 0...250 l/min

* Factory configurable
** Other ranges available on request

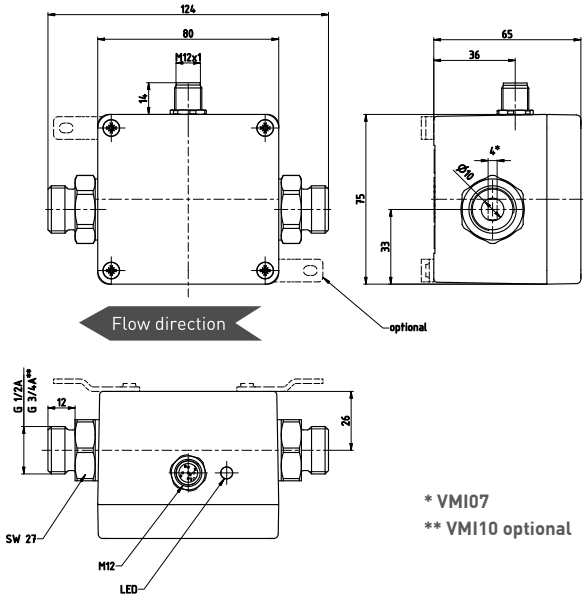
Typical pressure drop VMI07 / VMI10



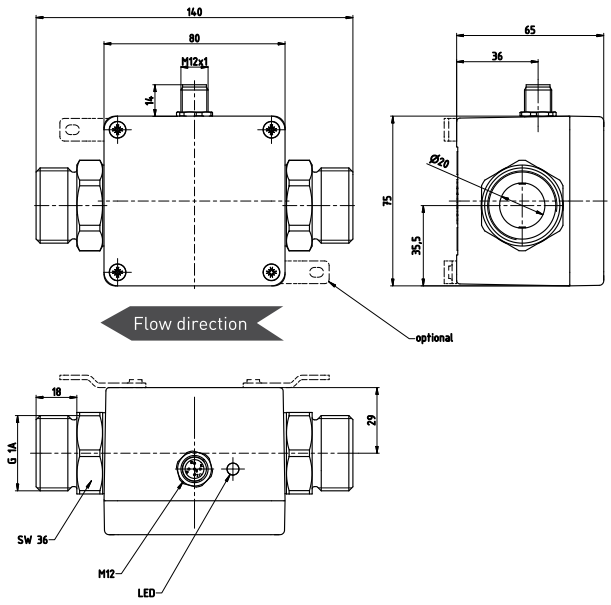
Typical pressure drop VMI20



VMI07 / VMI10

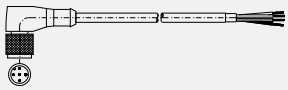


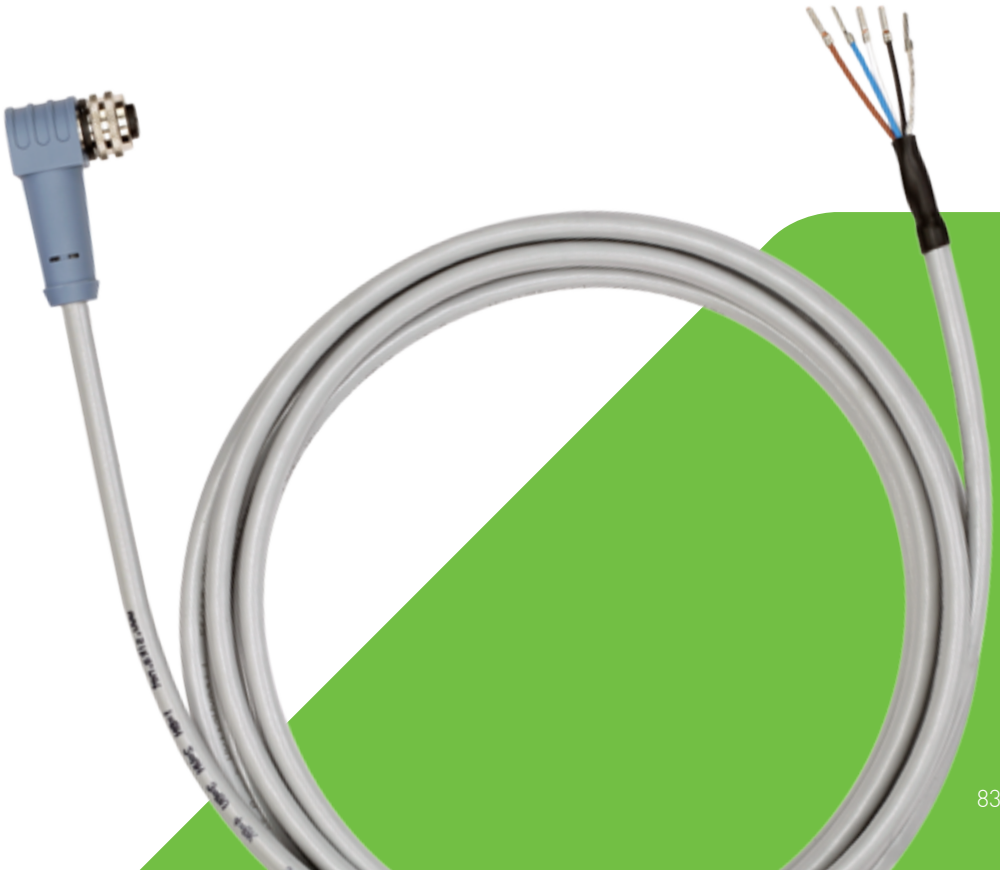
VMI20



Materials	
Electrodes	Stainless steel 1.4571
Process connections	Stainless steel 1.4571
Measuring pipe	PEEK-GF30
O-rings	EPDM / FKM optional
Housing	Casted aluminium

Order code	Example → VMI	07A	SS	0	0YGX000
Type					
VMI	VMI				
Nominal diameter / Process connection					
DN 07 / G½ male thread					
Output signals	**corresponds to flow rate**				
Frequency signal		07A			0YGX000
Frequency signal and analogue signal 4...20 mA	0...20 l/min	07A			0YGI005
	0...30 l/min	07A			0YGI000
Frequency signal and analogue signal 0...10 V	0...20 l/min	07A			0YGU005
	0...30 l/min	07A			0YGU000
DN 10 / G½ male thread					
Output signals	**corresponds to flow rate**				
Frequency signal		10A			0YGX000
Frequency signal and analogue signal 4...20 mA	0...40 l/min	10A			0YGI005
	0...60 l/min	10A			0YGI000
Frequency signal and analogue signal 0...10 V	0...40 l/min	10A			0YGU005
	0...60 l/min	10A			0YGU000
DN 10 / G¾ male thread					
Output signals	**corresponds to flow rate**				
Frequency signal		10E			0YGX000
Frequency signal and analogue signal 4...20 mA	0...40 l/min	10E			0YGI005
	0...60 l/min	10E			0YGI000
Frequency signal and analogue signal 0...10 V	0...40 l/min	10E			0YGU005
	0...60 l/min	10E			0YGU000
DN 20 / G1 male thread					
Output signals	**corresponds to flow rate**				
Frequency signal		20A			0YGX000
Frequency signal and analogue signal 4...20 mA	0...200 l/min	20A			0YGI005
	0...250 l/min	20A			0YGI000
Frequency signal and analogue signal 0...10 V	0...200 l/min	20A			0YGU005
	0...250 l/min	20A			0YGU000
Mounting straps					
Without (standard)			SS		
With mounting straps			LS		
Material O-rings					
EPDM (Standard)				0	
FKM (Option)				1	

Accessories	Length	Order code	
Connection cable with 4-pin cable socket M12 x 1, angle type moulded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	



Magnetic inductive flow sensors

Series induQ® VMZ

Advantages

- Cost-optimised plastic version
- Specially for series applications
- Compact lightweight design, low space requirement
- Nominal sizes DN 3...DN 25
- Delivery inlcuding works calibration certificate

Type VMZ15 / VMZ03

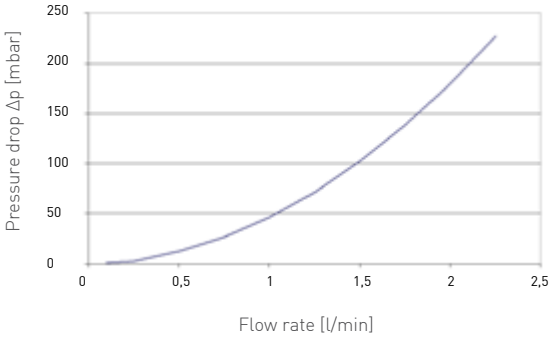
Free pipe cross-section

Type	VMZ030	VMZ081	VMZ082	VMZ153	VMZ204	VMZ205	VMZ256
Characteristics							
Nominal diameter	DN 3	DN 8	DN 8	DN 15	DN 20	DN 20	DN 25
Process connection	G⅜ B male	G½ B male	G½ B male	G¾ B male	G 1 B male	G 1 B male	G 1¼ B male
Inner diameter	3 mm	8 mm	8 mm	14 mm	18 mm	18 mm	25 mm
Flow range	0.1...2 l/min	0.25...5 l/min	1...20 l/min	2.5...50 l/min	5...100 l/min	10...200 l/min	12.5...250 l/min
Accuracy*	±1 % of reading						
Repeatability	±1 %						
Response time	<100 ms						
Signal output starting from	0.05 l/min	0.1 l/min	0.25 l/min	1 l/min	2 l/min	4 l/min	5 l/min
Max. Flow rate	2.5 l/min	6 l/min	25 l/min	60 l/min	120 l/min	240 l/min	300 l/min
Medium / min. conductivity of medium	Water and other conductive liquids / 20 µS/cm						
Medium temperature	-10...60 °C (non-freezing)						
Ambient temperature	5...60 °C						
Max. pressure rating	10 bar at 20 °C, 8 bar at 40 °C, 6 bar at 60 °C						
Indications	Red LED = power, green LED = flow rate						
Degree of protection EN 60529	IP65 (with attached cable socket)						
Output signals							
→ Pulse rate**	10 000 pulses/l	4000 pulses/l	1000 pulses/l	400 pulses/l	200 pulses/l	100 pulses/l	80 pulses/l
→ Resolution**	0.1 ml/pulse	0.25 ml/pulse	1 ml/pulse	2.5 ml/pulse	5 ml/pulse	10 ml/pulse	12.5 ml/pulse
→ Signal shape	Frequency signal, square wave, can be connected as PNP or NPN open collector pulse duty ratio 50:50						
→ Signal current	Max. 25 mA						
Electrical data							
Electrical connection	4 pin plug connector M12 x 1						
Power supply	24 VDC (±15 %) or 12 VDC (±15 %)						
Power consumption	0.6 W						
Electrical protection measures	Short-circuit proof and polarity protection						

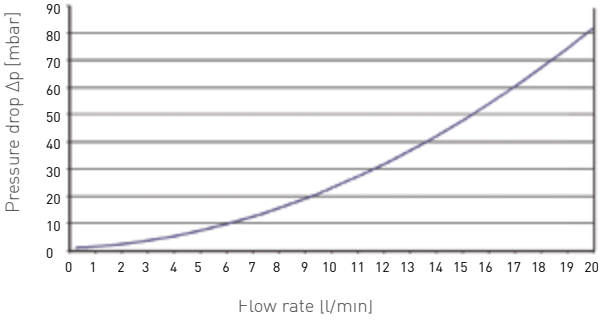
* Test conditions: Water 23 °C

** Other pulse rates / resolutions available on request
optional output signal with lower frequency, designed specifically for connection to digital PLC inputs

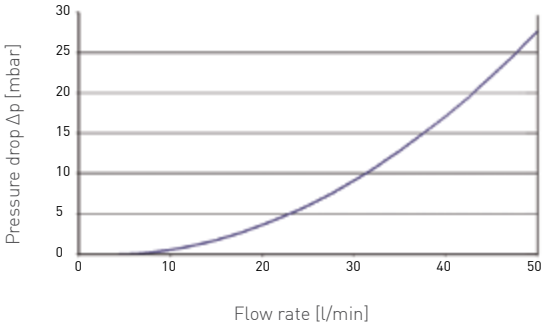
Typical pressure drop VMZ030



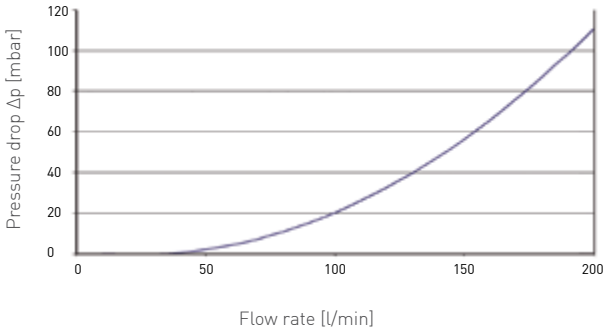
Typical pressure drop VMZ081 / VMZ082



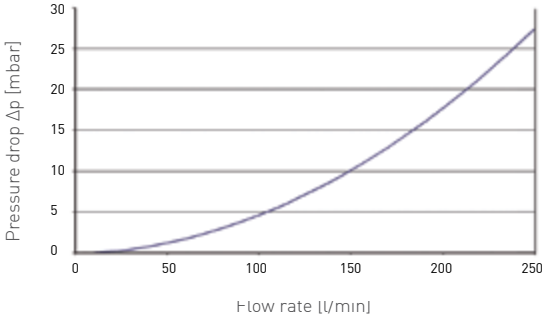
Typical pressure drop VMZ153



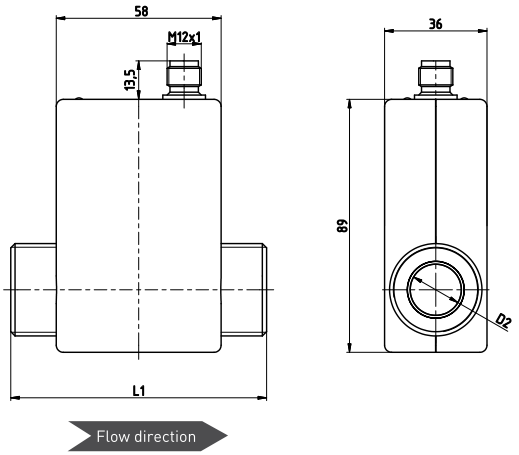
Typical pressure drop VMZ204 / VMZ205

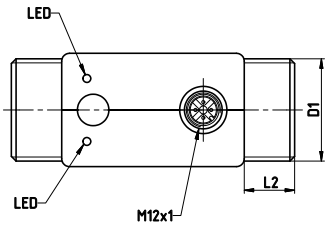


Typical pressure drop VMZ256

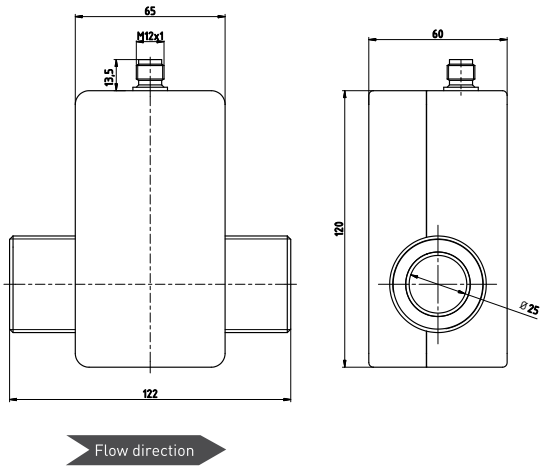


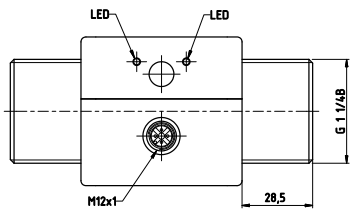
VMZ03 / VMZ08 / VMZ15 / VMZ20





VMZ25





Dimensions [mm]				
Type	**L1**	**L2**	**D1**	**D2**
VMZ030	85	13.3	G⅜ B	Ø 3
VMZ081	85	13.3	G½ B	Ø 8
VMZ082	85	13.3	G½ B	Ø 8
VMZ153	90	16	G¾ B	Ø 14
VMZ204	90	16	G 1 B	Ø 18
VMZ205	90	16	G 1 B	Ø 18

Materials	
Electrodes and earthing rings	Stainless steel 316L
Measuring pipe and process connections	POM or PVDF
O-rings	EPDM
Housing	ABS

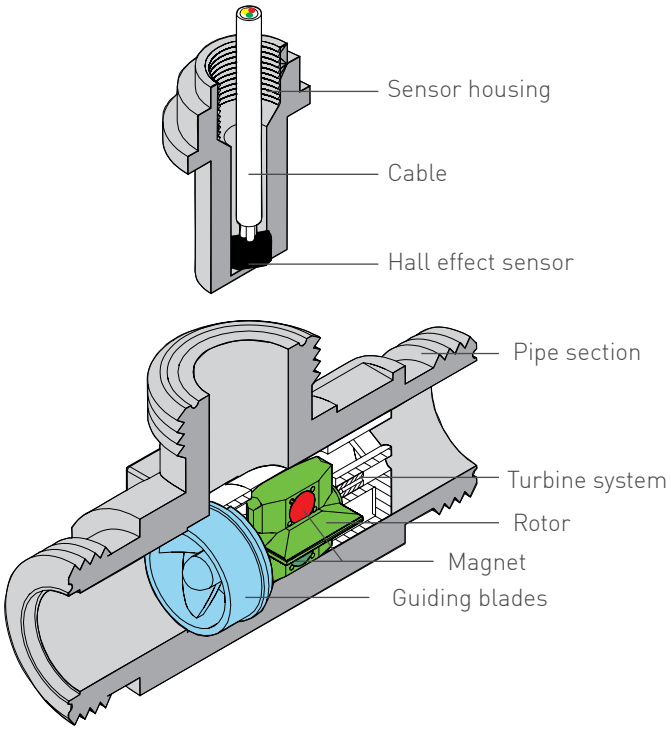
Order code	Example → VMZ030S1	DE	G14	211
Flow range				
0.1...2 l/min	VMZ030S1			211
0.25...5 l/min	VMZ081S1			310
1...20 l/min	VMZ082S1			320
2.5...50 l/min	VMZ153S1			430
5...100 l/min	VMZ204S1			540
10...200 l/min	VMZ205S1			550
12.5...250 l/min	VMZ256S2			660
Measuring pipe				
POM		DE		
PVDF		PE		
Power supply				
12 VDC			G14	
24 VDC			G24	

Accessories	Length	Order code	
Connection cable with 4-pin cable socket M12 x 1, angle type moulded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) - UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4 pin cable socket M12 x 1 angle type, unassembled		VT1331	

- → Series Turbotron
- → Series VTR
- → Series VTY
- → Push-in flow sensors

TURBINE FLOW SENSORS

Turbine flow sensors



Operating principle

The liquid flowing into the turbine flow sensor is split into individual jets by the guiding blade. These jets hit the rotor evenly from different directions, setting the rotor in motion. The rotation speed of the rotor is then converted to an electrical pulse signal (frequency): The rotors are fitted with magnets and a Hall effect sensor detects the rotation of the rotor. The VTI series has stainless steel pins in the rotor. An inductive proximity switch detects the rotor rotation.

In both cases, a flow-proportional frequency signal (square-wave signal) is made available.

Given the uniform inflow to the bearing, the forces largely cancel themselves out and wear is reduced to a minimum. The extremely hard bearing materials - sapphire and tungsten carbide - also guarantee an exceptionally long endurance.

Series Turbotron VTH, VTM, VTP, VTI

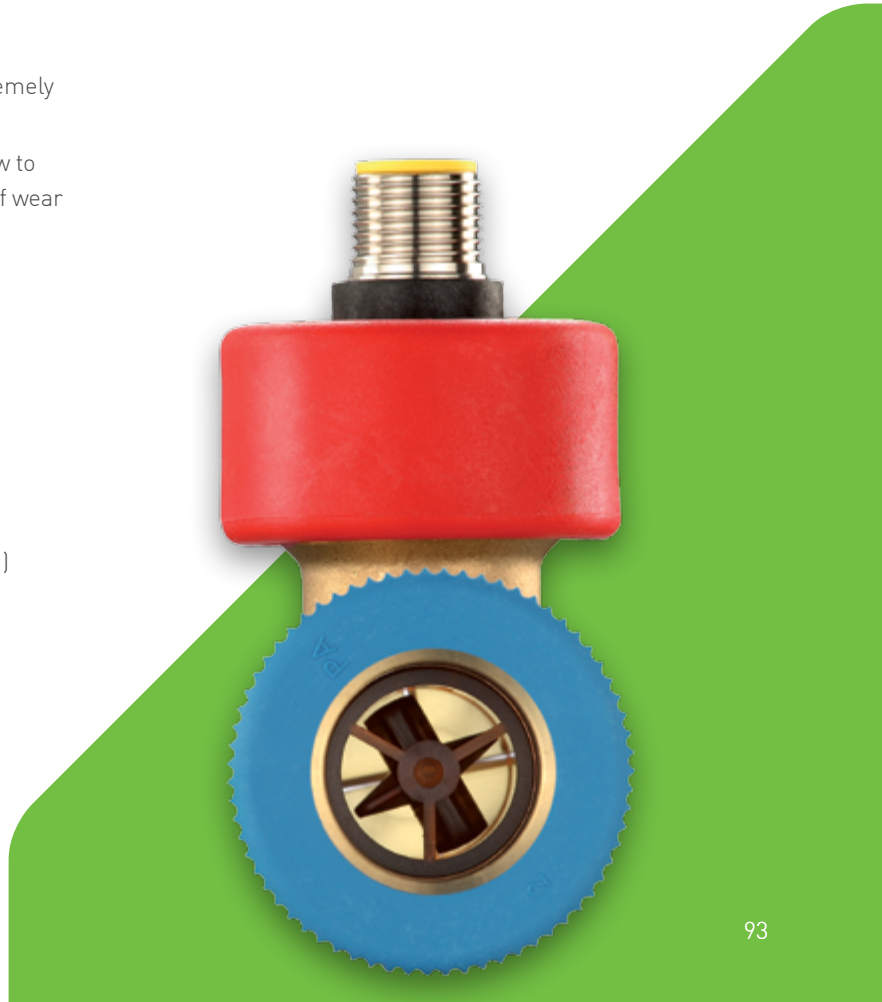
The turbine flow sensors of the series Turbotron are sensors for flow measurement or dosing applications for liquids. Because of the very compact design, the very wide measuring range and the convincing precision of measurements, the Turbotron has almost unlimited applications. Depending on the ordered version, the Turbotron is available with nominal diameters DN 15, DN 20, DN 25 and DN 40.

Advantages

- Fixed pulse rate, thus practically no serial deviation
- Wide measuring range from 1:20 to 1:42 (depends on model), therefore universally applicable
- High degree of accuracy ensures reliable measurement results
- High quality sapphire bearing, low abrasion and extremely long running period
- Specially designed guiding blades ensures uniform flow to the rotor from four sides, thus tremendous reduction of wear (depends on model)
- Any installation position, can be installed differently
- Permanent operating temperatures up to 150 °C (VTP version)
- Compact dimensions
- Proven in numerous OEM-applications
- Service-friendly
- Long endurance
- Temperature measurement can be integrated (option)

Different versions

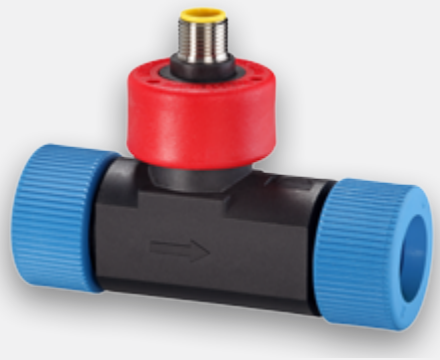
- Plastic, brass and stainless steel types
- Plug connector or fixed connecting cable



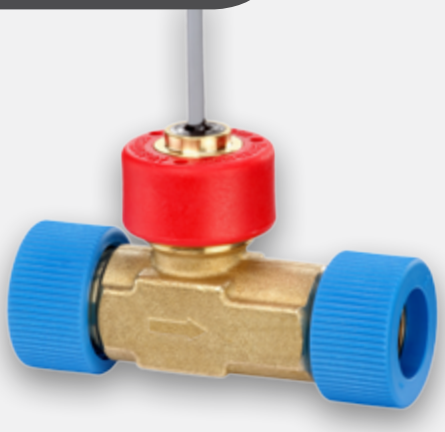
Turbine flow sensors

Series Turbotron VTH15 / VTM15

Type VTH15



Type VTM15



VTH15
Economy-priced type
for standard and serial applications

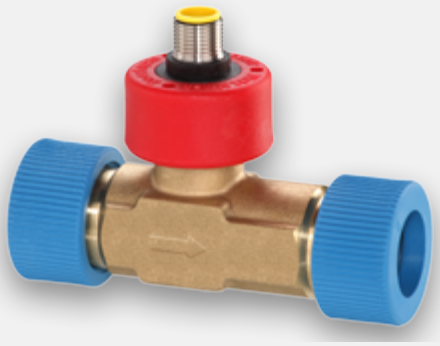
VTM15
For medium temperature up to 120 °C

Type	VTH15		VTM15
Material pipe section	Brass	Plastic PPO	Brass
Flow range	2...40 l/min - with continuous operation max. 20 l/min		2...20 l/min
Accuracy	±0.4 l/min		
Repeatability	±0.1 l/min		
Signal output	From 0.3 l/min		
Medium temperature	Max. 85 °C		Max. 120 °C
Pressure rating	PN 10		
Nominal diameter	DN 15		
Process connection	G¾ male thread with union nuts and gaskets		
Sensor	Hall effect sensor		
Output signal → Pulse rate / K-factor → Resolution → Signal shape → Signal current	 855 pulses/l 1.2 ml/pulse Square wave signal NPN open collector Max. 10 mA		 915 pulses/l 1.1 ml/pulse Square wave signal NPN open collector Max. 10 mA
Electrical connection	1.5 m PVC cable, shielded (T_{max} = 70 °C) or 4 pin plug connector M12 x 1		1.5 m PVC cable, shielded (T_{max} = 80 °C)
Power supply	4.5...24 VDC		
Degree of protection EN 60529	IP54		
Max. particle size in the medium	0.5 mm		

Series Turbotron VTP15 / VTI15

Type VTP15

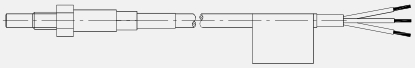
Type VTI15



VTP15
For high pressures and high temperatures

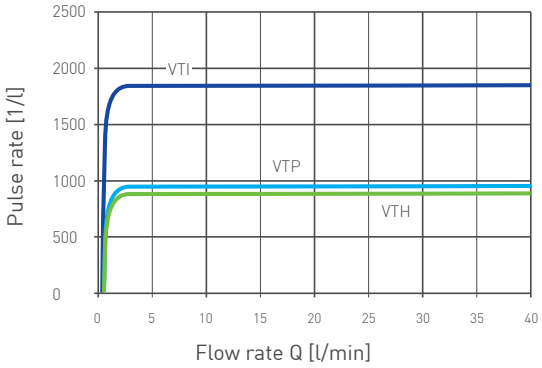
VTI15
Magnet-free rotor, for high measurement accuracy and high resolution

Type	VTP15		VTI15	
Material pipe section	Brass	Stainless steel	Plastic PPO	Brass
Flow range	2...40 l/min - with continuous operation max. 20 l/min			
Accuracy	±0.4 l/min of range at 2...20 l/min		±0.2 l/min	
Repeatability	±0.1 l/min		±0.05 l/min	
Signal output	From 0.3 l/min			
Medium temperature	Max. 150 °C		Max. 85 °C	
Pressure rating	P_{max} = 300 bar		PN 10	
Nominal diameter	DN 15			
Process connection	G¾ male thread incl. union nuts	G¾ male thread or G¾ female thread	G¾ male thread with union nuts and gaskets	
Sensor	Hall effect sensor		Inductive proximity switch	
Output signal → Pulse rate / K-factor → Resolution → Signal shape → Signal current	 915 pulses/l 1.1 ml/pulse Square wave signal NPN open collector Max. 10 mA		 1795 pulses/l 0.6 ml/pulse Square wave signal PNP or NPN open collector Max. 50 mA	
Electrical connection	1.5 m silicone cable, shielded (T_{max} = 150 °C)		2 m PVC cable, shielded (T_{max} = 70 °C) or 4 pin plug connector M12 x 1	
Power supply	4.5...24 VDC		10...30 VDC	
Degree of protection EN 60529	IP54			
Max. particle size in the medium	0.5 mm			

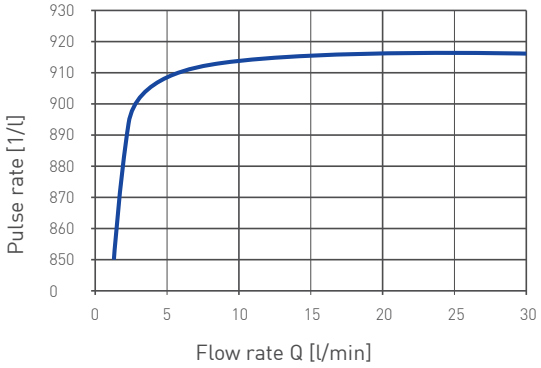
Options		VTH	VTM	VTP	VTI
See order code					
Integrated temperature sensor with plug connection M8 → Pt100, class B, 3-wire → Pt1000, class B, 3-wire **Immersion tube** → Brass → Stainless steel		✓			✓
Integrated temperature sensor with fixed cable (T_{max} = 80 °C) → Pt100, class B, 3-wire → Pt1000, class B, 2-wire **Immersion tube** → Brass → Stainless steel		✓	✓		✓
Screen filter in the inlet, hat shape **mesh size 0.5 mm** **T_{max} = 60 °C (continuous operation)** **T_{max} = 85 °C (max. 1 h)**		✓			✓
Turbine flow transmitter, analogue output 4...20 mA (T_{max} = 80 °C)	see separate chapter	✓			
Turbine flow switch, switching output (contact) (T_{max} = 80 °C)	see separate chapter	✓			
Version with connection for local display TD32500	see separate chapter	✓			✓
On request					
Optional seal materials → FKM → EPDM		✓			✓
Integrated temperature sensor with fixed cable → NTC → PTC		✓			✓

The local display TD32500 is ordered and configured separately. The specifications can be selected in the chapter Accessories for series Turbotron.

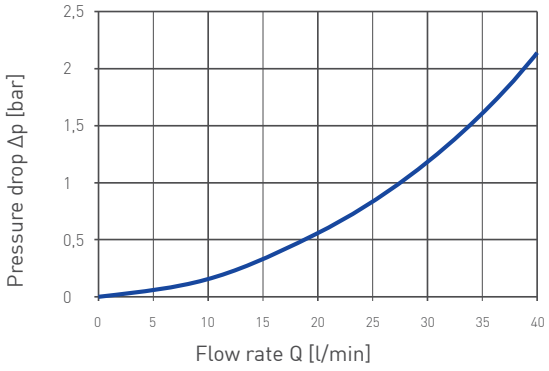
Characteristic curve VTH / VTP / VTI



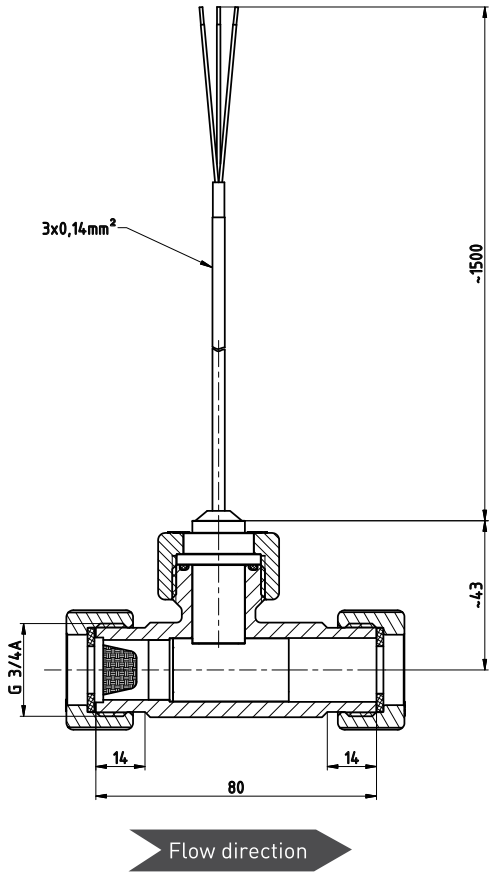
Characteristic curve VTM



Typical pressure drop VTH / VTM / VTP / VTI



VTH15 / VTI15



Materials in contact with fluid							
	VTH15 plastic PPO	**VTH15 brass**	**VTM15 brass**	**VTP15 brass**	**VTP15 stainless steel**	**VTI15 plastic PPO**	**VTI15 brass**
Pipe section	PPO Noryl GFN3	Brass			Stainless steel 1.4571	PPO Noryl GFN3	Brass
Sensor housing	PPO Noryl GFN3		Brass		Stainless steel 1.4571	PPO Noryl GFN3	
Turbine system / rotor	PEI ULTEM		PEEK Victrex			PEI ULTEM	
O-ring / gasket	NBR		FKM			NBR	
Bearing system / shaft	Shaft Arcap AP1D with hard metal pins in sapphire bearings						
Bearings support	Arcap AP1D						
Rotor assembly	Hard ferrite magnet					Stainless steel pins	
Temperature sensor (optional)	Brass or stainless steel 1.4571		Brass			Brass or stainless steel 1.4571	
Screen filter	POM / Stainless steel					POM / Stainless steel	

Order code	Example → VT1541		K5	IP	P	0A4	H	A
Type								
VTH15 / VTI15	VT1541							
Material of pipe section								
Noryl PPO			K5					
Brass			MS					
Version, output signal								
VTI15, PNP				IP				
VTI15, NPN				IN				
VTH15, NPN				HN				
Electrical connection								
Cable					P			
4 pin plug connector M12 x 1					S			
Supplementary temperature sensor								
None	None					0A4		
Pt100	3 pin plug connector M8, 3-wire	brass				BA4		
		stainless steel				CA4		
	Fixed cable, 3-wire	brass				2A4		
		stainless steel				9A4		
Pt1000	3 pin plug connector M8, 3-wire	brass				DA4		
		stainless steel				EA4		
	Fixed cable, 2-wire	brass				7A4		
		stainless steel				AA4		
Options*								
Filter								
Screen filter							H	
None							0	
Electronics								
Including transducer 4...20 mA**								
→ Corresponds 0...5 l/min								A
→ Corresponds 0...10 l/min								B
→ Corresponds 0...20 l/min								C
→ Corresponds 0...40 l/min								D
Switching output VE**								6
Switching output VE with pulse output**								7
Version with connection for local display TD32500								4

Order code	Example → VT1531MSMNP	0A4
Type		
VTM15	VT1531MSMNP	
Supplementary temperature sensor		
None		0A4
Pt100		2A4
Pt1000		7A4

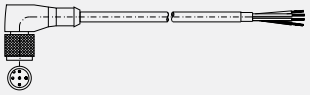
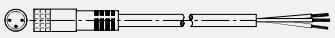
Order code	Example → VT1541	MSDNP0A4
Type		
VTP15	VT1541	
Material of pipe section, process connection		
Brass, G¾ male		MSDNP0A4
Stainless steel, G¾ male		VADNP0A4
Stainless steel, G¾ female		VADNP0I4

* If you do not require any of the options, digits of the order code do not apply.
** Only possible for VTH15

Accessories VT15

Connection adapters*		Oder code	
Hose barb Ø 10 mm, PA 6.6	T_{max} = 20 °C, PN 10 T_{max} = 60 °C, PN 2.5	VT1317	
Hose barb Ø 12 mm, PP		XVT1069	
Hose barb Ø 15 mm, PP		VT1338	
Hose barb Ø 19 mm, HDPE		VT1323	
Hose barb, angleshape Ø 13 mm, HDPE	T_{max} = 60 °C, PN 10	VT1318	
Hose barb, Ø 13 mm, Brass	T_{max} = 80 °C, PN 10	XVT1005	
Bonding socket, Ø 22 mm, PVC, for pipes outer diameter 16 mm	T_{max} = 20 °C, PN 10 T_{max} = 60 °C, PN 2.5	VT1316	
Welding adapter Ø 20 mm, PP	T_{max} = 20 °C, PN 6 T_{max} = 60 °C, PN 2.5	VT1319	
Screw coupling G⅜-ISO 228 male, Brass	T_{max} = 110 °C, PN 16	VT1320	
Screw coupling G½-ISO 228 male, Brass		VT1324	
Screw coupling G⅜-ISO 228 female, brass galvanized		VT1321	
Screw coupling G½-ISO 228 female, Brass		VT1325	
Clamping ring coupling, brass for copper tube Ø 18 mm for copper tube Ø 22 mm		 VT1326 VT1327	
Soldering coupling, brass for copper tube Ø 15 mm for copper tube Ø 18 mm	T_{max} = 90 °C, PN 16	 VT1328 VT1328	

* The use of connection adapters may result in deviations in accuracy. Supplied piecewise

Connection cables	Length	Order code	
Connection cable for turbine flow sensor with cable socket M12 x 1 moulded lead, 4-pin, shielded, sheathing material PUR (T_{max} = 70 °C) UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4 pin cable socket M12 x 1 angle type unassembled		VT1331	
Connection cable for temperature sensor with cable socket M8 moulded lead, 3 pin, sheathing material PUR (T_{max} = 90 °C) UL-approval	2 m 5 m 10 m	XVT2190 XVT2191 XVT2192	

Turbine flow sensors

Series Turbotron VTH20 / VTL20

Type VTH20

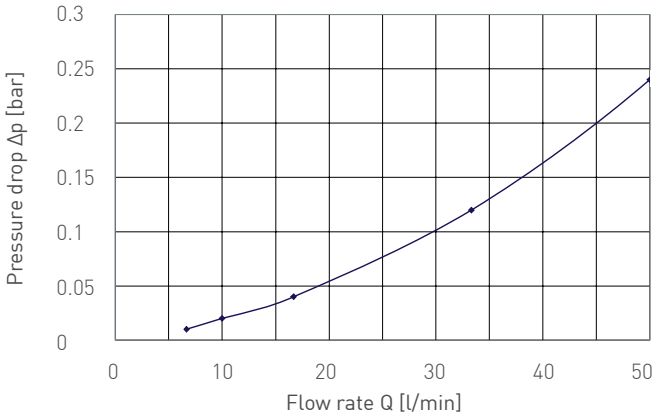
VTH20
With protection circuit

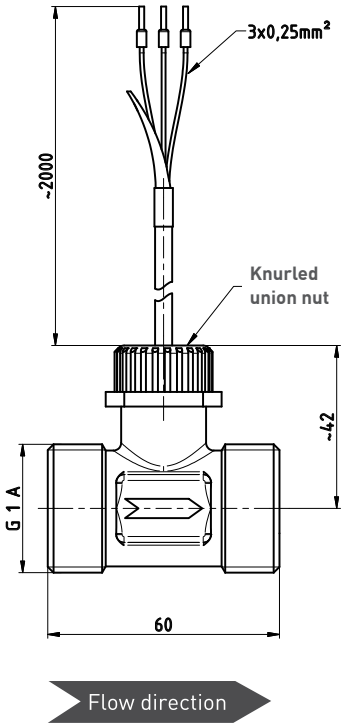
VTL20
OEM version

Type	VTH20	VTL20
Flow range	1...42 l/min - with continuous operation max. 25 l/min	
Accuracy	±1 % of range ±3 % of reading (from 15 l/min)	
Repeatability	±0.2 %	
Signal output	From 0.25 l/min	
Medium temperature	Max. 60 °C	
Pressure rating	PN 10	
Nominal diameter	DN 20	
Process connection	G 1 male thread	
Sensor	Hall effect sensor	
Output signal → Pulse rate / K-factor → Resolution → Signal shape → Signal current	 232 pulses/l 4.3 ml/pulse Square wave signal NPN open collector Max. 19 mA	 116 pulses/l 8.6 ml/pulse Square wave signal NPN open collector Pulse duty ratio 50:50 Max. 10 mA
Electrical connection	2 m PVC cable, shielded (T_{max} = 75 °C)	
Power supply	10...30 VDC optional 4.5...26.5 VDC	4.5...24 VDC
Degree of protection EN 60529	IP54	
Max. particle size in the medium	< 0.63 mm	

Option	
Screen filter in the inlet mesh size 0.4 mm	

Typical pressure drop





Materials in contact with fluid	
Pipe section	Brass CW724R
Turbine cage	PPO Noryl GFN1630V
Rotor	PC Makrolon®
Rotor assembly	Hard ferrite magnets
Shaft	Stainless steel 1.4539
Bearings	Saphire / PA
Housing for hall sensor	PPO Noryl GFN 1630V
O-ring	EPDM
Screen filter (Option)	Stainless steel, Santoprene®

Plastic parts comply with KTW-guidance of the German Federal Environmental Agency (does not apply for the optional screen filter).

Oder code		Example → VT2042MS	HNP0A5	F*
Type				
VTH20		VT2042MS		
Power supply				
Standard	10...30 VDC		HNP0A5	
Option	4.5...26.5 VDC		HKP0A5	
Option				
Screen filter				F

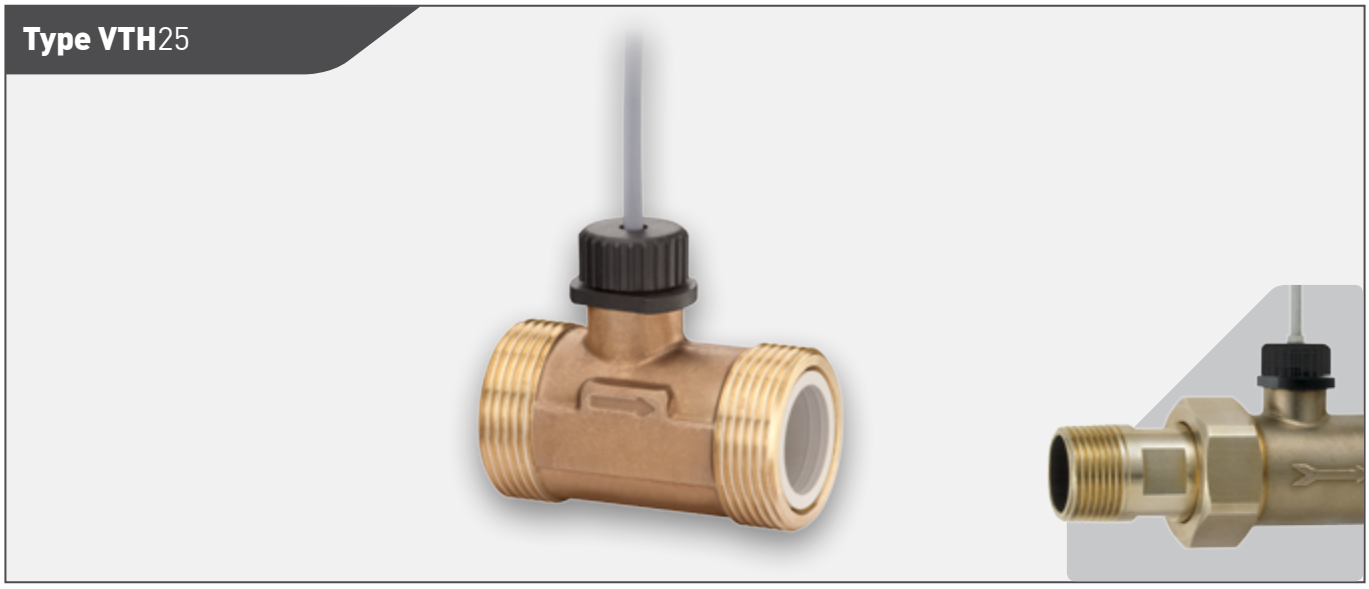
Order code	Example → VT2042MSHLP0A5	F*
Type		
VTL20	VT2042MSHLP0A5	
Option		
Screen filter		F

* If you do not require any of the options, digits of the order code do not apply

Turbine flow sensors

Series Turbotron VTH25 / VTM25

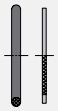
Type VTH25



VTH25
Economy-priced type for standard and serial applications, with fixed connection cable

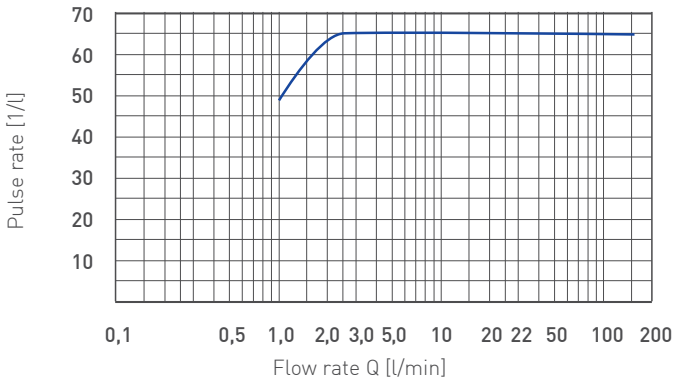
VTM25
For higher pressures with plug connection

Type	VTH25		VTM25	
Material pipe section	Brass	Plastic PP	Brass	Stainless steel
Flow range	4...160 l/min - with continuous operation max. 80 l/min			
Accuracy	±5 % of of reading (up to 5 l/min 7 % of of reading)			
Repeatability	±0.5 %			
Signal output	< 1 l/min			
Medium temperature	Max. 85 °C	Max. 80 °C / 2 bar Max. 60 °C / 5 bar Max. 30 °C / 10 bar	Max. 85 °C	
Pressure rating	PN 10		PN 50	
Nominal diameter	DN 25			
Process connection	G 1¼ male thread, supplementary screwed connection required, see accessories			
Sensor	Hall effect sensor		Hall effect sensor	
Output signal → Pulse rate / K-factor → Resolution → Signal shape → Signal current	 65 pulses/l 15 ml/pulse Square wave signal NPN open collector Max. 19 mA		 65 pulses/l 15 ml/pulse Square wave signal NPN open collector Max. 19 mA	
Electrical connection	2 m PVC cable, shielded (T_{max} = 75 °C)		4 pin plug connector M12 x 1	
Power supply	10...30 VDC optional 4.5...26.5 VDC		6.5...24 VDC short circuit proof and reverse polarity protected	
Degree of protection EN 60529	IP54			
Max. particle size in the medium	< 0.63 mm			

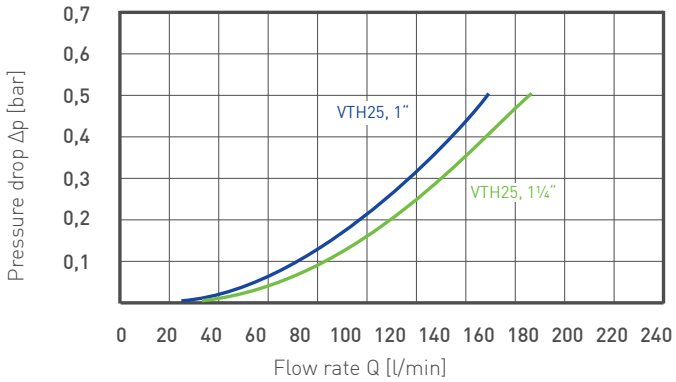
Options	
See order code	
Flat filter in the inlet, with O-ring mesh size 0.63 mm	
Turbine flow transmitter, analogue output 4...20 mA (T_{max} = 80 °C)	see separate chapter
Turbine flow switch, switching output (contact) (T_{max} = 80 °C)	see separate chapter
Version with connection for local display TD32500	see separate chapter

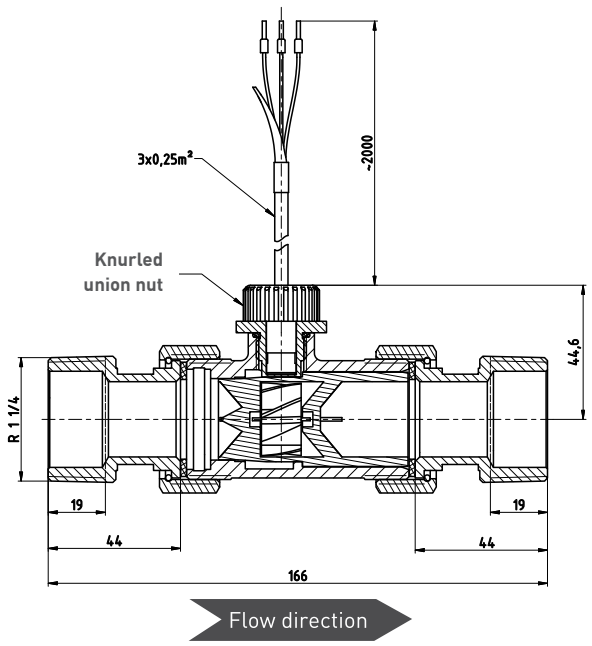
The local display TD32500 is ordered and configured separately. The specifications can be selected in the chapter „Accessories for series Turbotron".

Characteristic curve



Typical pressure drop





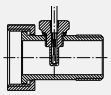
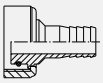
Materials in contact with fluid				
	VTH25 brass	**VTH25 plastic PP**	**VTM25 brass**	**VTM25 stainless steel**
Pipe section	Brass CW724R	PP	Brass CW724R	Stainless steel 1.4571
Turbine cage	PPO Noryl GFN1630V			
Rotor	PPO Noryl GFN1520V			
Rotor assembly	Hard ferrite magnets			
Shaft	Stainless steel 1.4539			
Bearings	Sapphire / PA			
Housing for Hall effect sensor	PPO Noryl GFN 1630V		Brass CW602N / CW614N	Stainless steel 1.4571
O-ring	EPDM			
Screen filter (option) **Associated O-ring**	Stainless steel 1.4301 EPDM		Stainless steel 1.4301 EPDM	
Spacer		PP		

The plastic parts of VTH25 brass comply with KTW-guidance of the German Federal Environmental Agency.

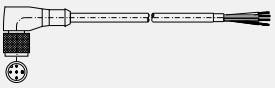
Order code	Example → VT2511	MS	HNP000	F*	E*
Type					
VTH25 / VTM25	VT2511				
Material of pipe section					
Brass		MS			
Plastic PP (only VTH)		K6			
Stainless steel (only VTM)		VA			
Version					
VTH25 Standard	10...30 VDC		HNP000		
Option	4.5...26.5 VDC		HKP000		
VTM25			MNS000		
Options*					
Filter					
Screen filter (only brass or stainless steel version)				F	
None				0	
Electronics					
Incl. transducer 4...20 mA					
→ Corresponds with 0...60 l/min					E
→ Corresponds with 0...100 l/min					F
→ Corresponds with 0...160 l/min					G
Switching output VE					6
Switching output VE with pulse output					7
Version with connection for local display TD32500					4

* If you do not require any of the options, digits of the order code do not apply.

Accessories VT25

Connection adapters*		Order code	
Brass version			
Screw coupling G 1-ISO 228 with temperature sensor Pt100 / 3-wire	**Material of gasket Centelen T_{max} = 85 °C**	VT1310	
Screw coupling R 1-DIN EN 10226-1 2004-10		VT25Z00000005	
Screw coupling R 1¼-DIN EN 10226-1 2004-10		VT25Z00000006	
Soldering coupling for copper pipes Ø 28 mm, PN 16		VT1312	
Plastic version**			
Welding coupling PP for pipes outer diameter 25 mm	**T_{max} = 20 °C, PN 10 T_{max} = 60 °C, PN 2.5**	VT1303	
Bonding coupling PVC for pipes outer diameter 25 mm		VT1304	
Hose barb PP Ø 25 mm Ø 30 mm Ø 32 mm		VT1307 VT1308 VT1309	
Stainless steel version			
Screw coupling G 1	**Material of gasket Centelen T_{max} = 85 °C**	VT1333	

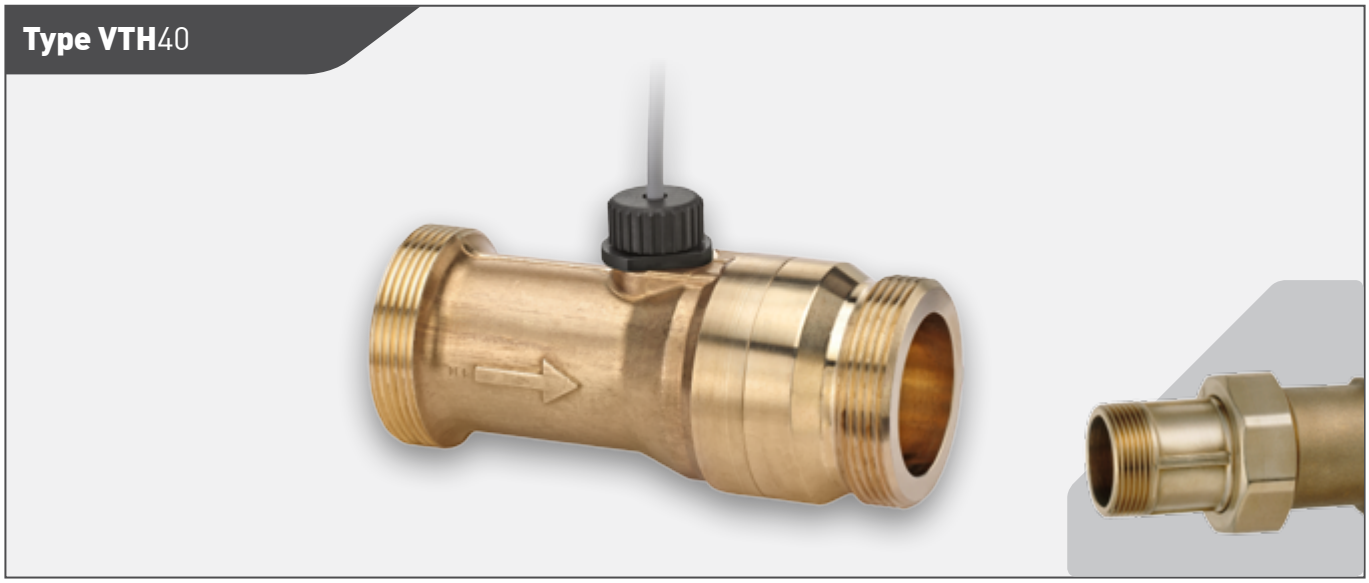
* Supplied piecewise
** The use of connection adapters may result in deviations in accuracy.

Connection cables	Length	Order code	
Connection cable for turbine flow sensor with cable socket M12 x 1 moulded lead, 4-pin, shielded, sheathing material PUR (T_{max} = 70 °C) UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4-pin cable socket M12 x 1 angle type unassembled		VT1331	

Turbine flow sensors

Series Turbotron VTH40 / VTM40

Type VTH40



VTH40
Economy-priced type for standard and serial applications, with fixed connection cable

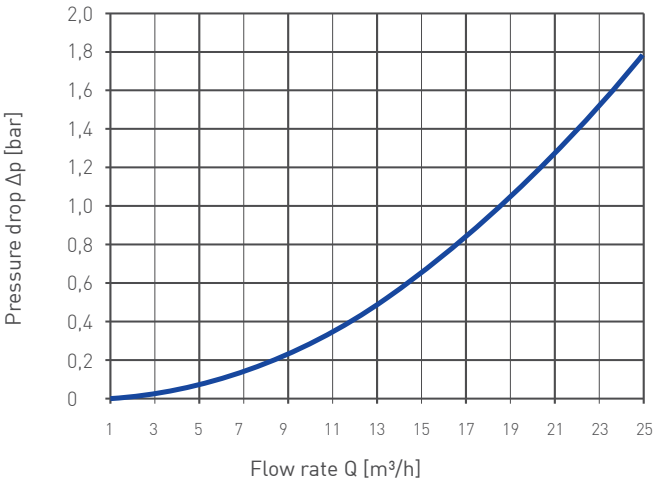
VTM40
For higher pressures with plug connection

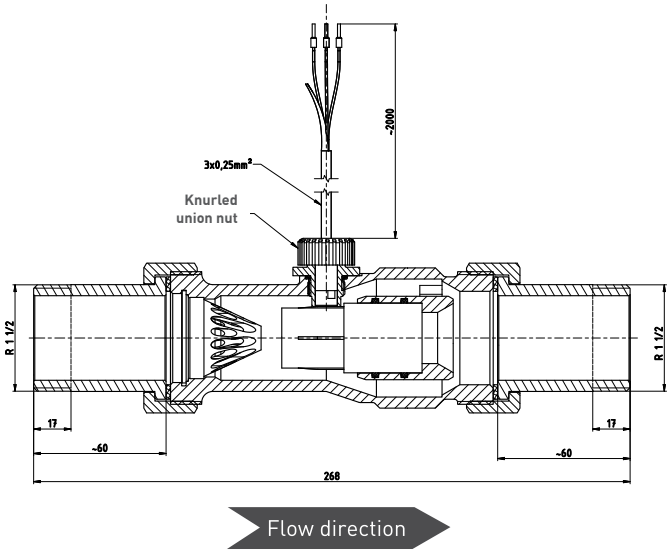
Type	VTH40	VTM40
Material pipe section	Brass	Brass
Flow range	0.4...25 m³/h (6.7...417 l/min)	
Accuracy	±7 % of the measured value between 0.4...3 m³/h ±5 % of the measured value between 3...25 m³/h	
Repeatability	±0.5 %	
Signal output	From 0.28 m³/h	
Medium temperature	Max. 85 °C	
Pressure rating	PN 10	PN 50
Nominal diameter	DN 40	
Process connection	G 2 male thread, supplementary screwed connection recommended	
Sensor	Hall effect sensor	
Output signal → Pulse rate / K-factor → Resolution → Signal shape → Signal current	 26.6 pulses/l 37.6 ml/pulse Square wave signal NPN open collector Max. 19 mA	 26.6 pulses/l 37.6 ml/pulse Square wave signal NPN open collector Max. 19 mA
Electrical connection	2 m PVC cable, shielded (T_{max} = 75 °C)	4 pin plug connector M12 x 1
Power supply	10...30 VDC optional 4.5...26.5 VDC	6.5...24 VDC short circuit proof and reverse polarity protected
Degree of protection	IP54	
Max. particle size in the medium	< 0.63 mm	
Integrated screen filter	Flat filter, mesh size 0.63 mm	

Options	
See order code	
Turbine flow transmitter, analogue output 4...20 mA (T_{max} = 80 °C)	see separate chapter
Turbine flow switch, switching output (contact) (T_{max} = 80 °C)	see separate chapter
Version with connection for local display TD32500	see separate chapter

The local display TD32500 is ordered and configured separately. The specifications can be selected in the chapter Accessories for series Turbotron.

Typical pressure drop



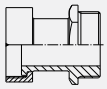


Materials in contact with fluid		
	VTH40	**VTM40**
Pipe section	Brass CW724R	
Turbine cage	PPO Noryl GFN 1630V	
Rotor	PPO Noryl GFN 1520V	
Rotor assembly	Hard ferrite magnets	
Shaft	Stainless steel 1.4539	
Bearing	Sapphire / PA	
Housing for hall sensor	PPO Noryl GFN 1630 V	Brass CW602N / CW614N
O-ring	EPDM	
Flow guiding cone	POM	
Screen filter	Stainless steel 1.4301	
Retaining ring	Bronze	

Order code			Example → VT4025MS	HNP000F	E*
Type					
VTH40 / VTM40			VT4025MS		
Version					
VTH40	Standard	10...30 VDC		HNP000F	
	Option	4.5...26.5 VDC		HKP000F	
VTM40				MNS000F	
Options*					
Electronics					
Including transducer 4...20 mA					
→ Corresponds with 0...150 l/min					E
→ Corresponds with 0...250 l/min					F
→ Corresponds with 0...400 l/min					G
Switching output VE					6
Switching output VE with pulse output					7
Version with connection for local display TD32500					4

* If you do not require any of the options, digits of the order code do not apply.

Accessories VT40

Connection adapters*		Order code	
Screw coupling G 1½-ISO 228 with integrated temperature sensor Pt100 / 3-wire	**Brass, gasket Centelen**	VT1311	
Screw coupling R 1½-DIN EN 10226-1 2004-10		VT40Z00000002	
Screw coupling G 2-ISO 228		VT40Z00000001	
Soldering coupling for copper pipe Ø 42 mm PN 16		VT1313	

* Supplied piecewise

Connection cables	Length	Order code	
Connection cable for turbine flow sensor with cable socket M12 x 1 moulded lead, 4 pin, shielded, sheathing material PUR (T_{max} = 70 °C) UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4 pin cable socket M12 x 1 angle type unassembled		VT1331	

Options for Turbotron series

Transducers, series AI

Flow transmitter

Instead of the pulse signal, an analogue current signal 4...20 mA is provided by installing an internal transducer onto the flow sensors described before.

Technical data	
Output signal	4...20 mA
Accuracy	±1.25 % of reading*
Current limit	Approx. 26 mA
Scaling	Different flow ranges, see order code flow sensor other scaling possible from 10 pieces and above
Power supply	18...30 VDC
Max. current consumption	30 mA
Max. burden	250 Ω against GND
Residual ripple	0.2 mA (peak to peak) over the entire range
Type	3 wire, galvanically not separated, common GND of power supply and output signal
Electrical connection	4 pin plug connector, M12 x 1
Degree of protection EN 60529	IP54
Max. medium temperature	Dependent on the maximum temperature of the used flow sensor, not exceeding 80 °C
Casing material	Plastic PA
Order code	See order code series VT

* Additionally to respective accuracy of turbine flow sensor

Turbine flow monitors with switching output, series VE

Turbine flow monitors of the series VE are used in different applications. They are used among others for the monitoring of cooling circuits in laser installations or HF generators.

Turbine flow sensors of the series Turbotron serve as a basis. They provide a flow-proportional frequency signal which is introduced to a microprocessor. It monitors the adjusted minimum flow and actuates a dry contact in the case of lack of flow. Even a possible blocking of the turbine system is clearly recognized and reliably signalled. The exact adjustment of the set points can be carried out by means of a 16-position rotary switch (catching).

As an option, a pulse signal is also available in addition to the switching output. In such a case, in addition to safe monitoring, a measurement of the flow rate (e.g. for adjustment jobs) can also be carried out.

Type VT15VE

Advantages

- Wide set point range
- Precise set point adjustment
- Safe monitoring of lowest flow rates
- Fail safe
- Optical signalling by 2 LEDs
  yellow = flow, red = flow lack

Alternatively the switching transmitter series TU7050 is available. The technical data are availabe on the following pages.

Technical data	
Set point range (with decreasing flow) / accuracy	**DN 15** 0.5...29.5 l/min / ±2 % of set point + accuracy of turbine flow sensor **DN 25** 3...100 l/min / ±4 % of set point + accuracy of turbine flow sensor **DN 40** 7...275 l/min / ±6 % of set point + accuracy of turbine flow sensor
Set point adjustment	16 different set points selectable by means of a 16-position rotary switch
Output / max. contact rating	**Only switching output:** Electrically insulated contact, opens in the case of lack of flow Max. contact rating 125 VAC / DC, 100 mA **Switching output and pulse output** Switching output against power supply Max. contact rating 100 mA Pulse output: flow-proportional frequency signal NPN, max. 100 mA
Switching hysteresis	0.5 l/min (DN 15) 2...5 l/min (DN 25) 3...35 l/min (DN 40)
Power supply	12...24 VDC
Current consumption	Max. 25 mA
Degree of protection	IP54 with closed sleve and connected socket
Casing	Plastic PA, transparent
Display, internal	LED yellow = ok LED red = alarm
Max. medium temperature	Dependent on the maximum temperature of the used flow sensor, not exceeding 80 °C
Electrical connection	4 pin plug connector, M12 x 1
Order code	See order code series VT

Set points VT..15..VE (DN 15)																
Switch position	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Set point decreasing flow (l/min)*	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.5	5.5	7.5	9.5	11.5	15.5	19.5	24.5	29.5
Set point increasing flow (l/min)*	0.5 l/min over the set point decreasing flow															

Set points VT..25..VE (DN 25)																
Switch position	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Set point decreasing flow (l/min)*	3	5	6	8	10	12	15	18	20	25	30	35	40	50	70	100
Set point increasing flow (l/min)*	5	7	8	10	12	14	17	20	22	27	33	38	44	55	75	105

Set points VT..40..VE (DN 40)																
Switch position	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Set point decreasing flow (l/min)*	7	10	15	20	25	30	35	40	50	65	80	100	130	160	200	275
Set point increasing flow (l/min)*	10	13	19	24	30	35	40	47	58	75	90	115	150	190	230	310

* The specified values refer to operation with water at 20 °C. Monitoring of fluids with higher viscosities is possible with the effect of deviations from the mentioned values. If you order at least 25 units, individual set point tables can be implemented.

Accessories for Turbotron series

Switching transmitters, series TU7050

From the frequency signal of the turbine flow sensors, the TU7050 generates alarm set points which are made as potential free contacts. You can adjust the switching point easily and accurately by using a rotary switch (16 increments). Since the TU 7050 is a dual channel, two operating modes are available.

Operating mode A

Two measuring points (condition: two identical flow sensors) each with a minimum alarm are monitored.

Operating mode B

One measuring point with two minimum alarms (pre-alarm and main alarm) is monitored.

The monitoring of a flow with our turbine flow sensors and the TU7050 is particularly accurate, long-term stable and secure. A possibly occurring damage to the turbine is immediately detected by the TU7050 and reported as an alarm.

Type TU7050

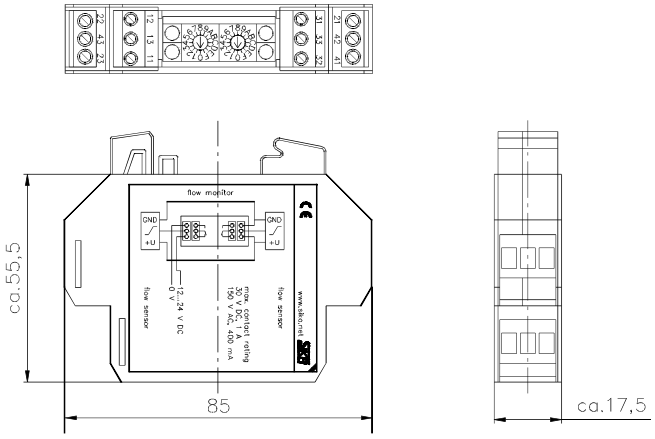
Technical data		
Signal input	Frequency signals of up to two identical flow sensors VT...15 VT...25 VT...40	
Display per channel	LED green = ok	LED red = alarm
Set point adjustment	Using two 16-position rotary switches, 16 different set points can be selected per channel	
Set point range		**Hysteresis**
→ VT...15	0.5...29.5 l/min	0.5 l/min
→ VT...25	3...100 l/min	2...10 l/min
→ VT...40	7...275 l/min	3...35 l/min
Outputs	Two independent, potential free c/o contacts	
Max. contact rating	30 VDC / 1 A	150 VAC / 400 mA
Power supply	12...24 VDC (±10 %)	
Casing	Plastic casings for assembly rail setup approx. 17.5 x 67 x 85 mm (W x D x H)	
Ambient temperature / storage temperature	0...60 °C / -10...80 °C	

For VT..15 (DN 15)																
Switch position	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Set point decreasing flow (l/min)*	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.5	5.5	7.5	9.5	11.5	15.5	19.5	24.5	29.5
Set point increasing flow (l/min)*	0,5 l/min over the set point decreasing flow															

For VT..25 (DN 25)																
Switch position	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Set point decreasing flow (l/min)*	3	5	6	8	10	12	15	18	20	25	30	35	40	50	70	100
Set point increasing flow (l/min)*	5	7	8	10	12	14	17	20	22	27	33	38	44	55	80	110

For VT..40 (DN 40)																
Switch position	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Set point decreasing flow (l/min)*	7	10	15	20	25	30	35	40	50	65	80	100	130	160	200	275
Set point increasing flow (l/min)*	10	13	19	24	30	35	40	47	58	75	90	115	150	190	230	310

* The specified values refer to operation with water at 20 °C. Monitoring of fluids with higher viscosities is possible with the effect of deviations from the mentioned values. If you order at least 25 units, individual set point tables can be implemented.



Order code	Example → EU70500	H152296
Type		
TU7050	EU70500	
For turbine flow sensors		
VTH15		H152296
VTP15		D152296
VTI15, NPN		I152296
VTI15, PNP		P152296
VTH25 / VTM25		H252296
VTH40 / VTM40		H402296

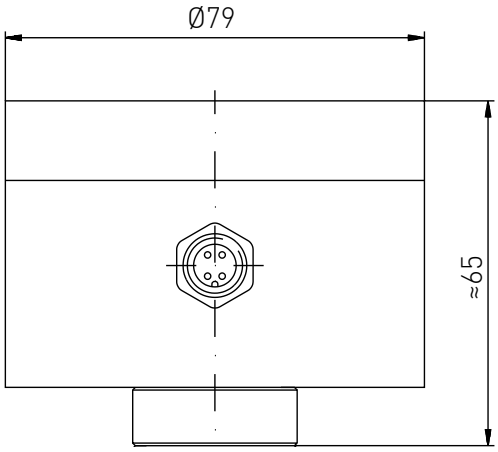
Local displays, series TD32500

Description

- Supplied fitted directly on turbine flow sensors, series Turbotron
- Display can be switched to:
  → flow rate
  → total flow (resettable)
  → total flow (non resettable)
  → optional temperature
- In addition bargraph 0...100 % to display flow rate, total flow (resettable) or optionally temperature
- Menu-driven programming via two light-reflex buttons
- Key lock for unintentional operation
- Robust stainless steel casing, with a closed glass window front
- Rotating case gives improved reading
- Language selection German, English or French
- Fixed connecting cable or plug connector M12 x 1

Type TD32500

Technical data	
Signal input	Fequency signal from flow sensor 0.5...2000 Hz, pulse rate programmable
Additional temperature input (optional)	Pt100 / 3-wire, measuring range -10...150 °C
Programming	Menu-driven with two light reflex buttons
Display	2-line LC-display with 16 characters per line, character height: 5 mm
Programmable units	l/min, l/h, m³/h, GPM (US), GPM (UK), l, m³, GAL (US), GA L(UK), °C,°F
Power supply	12...24 VDC
Power supply to sensor	12 VDC
Ambient temperature	-10...60 °C
Temperature of medium through the flow sensor	Depending on type of sensor, not exceeding -20...90 °C
Analogue output (optional)	(0)4...20 mA (max. resistance 800 Ω with 24 VDC) or 0...10 V, adjustable for flow rate, total flow (resettable) or optional temperature
Alarm outputs (optional)	Two fast-switching PNP transistor open collector outputs, programmable for min- or max alarm, hysteresis programmable, allocation of flow rate, total flow (resettable) or optional temperature holding current or working current programmable
Pulse output with frequency divider (optional)	PNP open collector, TTL-level, programmable divider-rate
Casing	Circular stainless steel casing, Ø 80 mm, height 55 mm, 350° rotating
Degree of protection EN 60529	IP65
Electrical supply	PVC-connection cable, 2 m or plug connector M12 x 1



Options

- Additional temperature display, input for resistance thermometer Pt100 / 3-wire
- Analogue output 0(4)... 20 mA or 0...10 V, freely adjustable, allocated to: flow rate, total flow (resettable) or optional temperature
- Two fast-switching alarm outputs, min or max allocation selective: flow rate, total flow (resettable) or optional temperature. A red LED clearly signals alarms
- Pulse output for flow rate, if required with frequency divider (pulse reduction)

The turbine flow sensor is ordered and configured separately. The specifications can be selected in the chapter Turbine flow sensors.

Order code	Example → ED325	6	0I000	009	1	0
Type						
TD32500	ED325					
Input						
Flow sensor		6				
Flow sensor and Pt100		7				
Outputs						
None			0I000			
Analogue output			AI000			
Pulse + frequency divider			FI000			
Analogue + frequency divider			BI000			
Alarm output						
None				009		
Two, programmable				299		
Electrical connection						
2 m cable					1	
Plug M12 x 1					2	
Number of pins / leads						
Laid down by SIKA, depending on requirements						0

Series VTR

Turbine flow sensors of the series VTR are used to measure different low viscosity media such as water and coolants. They are long-lasting and provide continuously reliable measuring results because they are made of stainless steel and equipped with a tungsten carbide supported turbine wheel.

During the design of these turbine flow sensors, versatile customisation options for special applications were in the focus of attention. Versions with flanged or threaded connection, a wide range of different sizes and application-specific sensors allow the adaption to a variety of applications. Pick-up sensors are available for example as versions with or without auxiliary energy, for high temperatures or for use with the local display TD32500.

To maintain accurate readings, the characteristic K-factor – the number of measured pulses per litre – is determined for each device in the factory and specified on the type plate. In addition, a five point calibration report for each sensor can be created on request.

Advantages

- Works calibration certificate 5 point calibration
- Wide measuring ranges (1.8...45090 l/min)
- Always reliable measuring results due to high measuring accuracy, regardless of the mounting position
- High quality tungsten carbide bearings with low wear and long durability
- Robust stainless steel body, even for difficult applications
- For variable use thanks to different pick-up sensors as well as a variety of connections and sizes

Turbine flow sensors

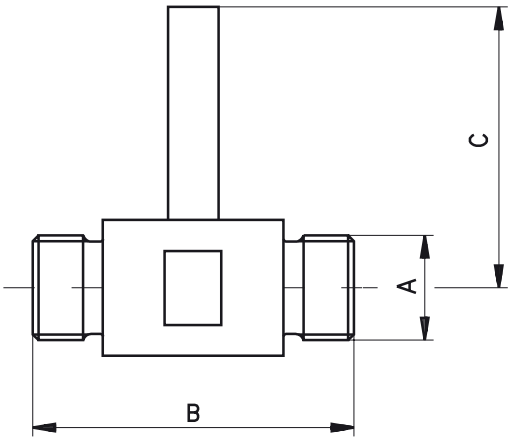
Series VTR

Type VTR1050

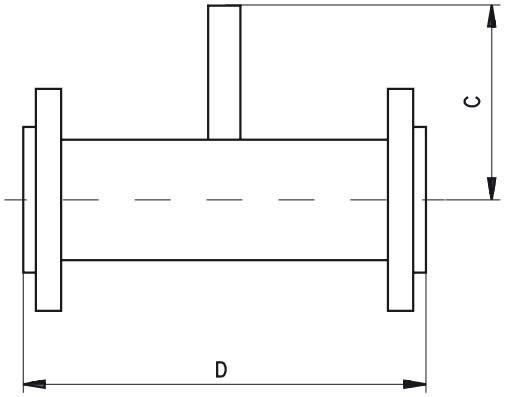
Technical data	
Accuracy	±0.5 % of reading
Repeatability	±0.05 % of reading
Response time	< 50 ms up to DN 40 > 50 ms up to DN 300
Process connections	Flange: DIN, ANSI, others on request thread (up to DN 50): BSP ISO 228 or NPT thread
Pressure drop	280 mbar at 100 % measurement range (density 1, viscosity 1 mm²/s)
Minimum pressure	2 x pressure drop of sensor
Pressure rating	Threaded connection: 250 bar Flanged connection: corresponding to flange specification
Medium temperature	Max. 150 °C
All specified values apply to viscosities up to 5 cSt. Higher viscosities on request.	
Options	
Local display TD32500	

Type	Nominal diameter	Flow range		Dimensions			
	DN	[m³/h]	[l/min]	A	B [mm]	C max [mm]	D [mm]
VTR1010	10	0.11...1.1	1.8...18.3	G½	64	150	127
VTR1015-S	15	0.22...2.2	3.7...36.7	G¾	64	150	127
VTR1015	15	0.4...4	6.7...66.7	G¾	64	150	127
VTR1020	20	0.8...8	13.3...133	G¾	83	150	140
VTR1025	25	1.6...16	26.7...267	G 1	88	200	152
VTR1040	40	3.4...34	56.7...567	G 1½	114	200	178
VTR1050	50	6.8...68	113...1133	G 2	132	200	197
VTR1075	80	13.5...135	225...2250			200	254
VTR1100	100	27...270	450...4500			300	356
VTR1150	150	55...550	917...9167			300	360
VTR1200	200	110...1100	1833...18333			350	457
VTR1250	250	190...1900	3173...31730			350	457
VTR1300	300	270...2700	4509...45090			400	457

Thread connection DN 10...DN 50



Flange connection DN 10...DN 300



Materials	
Turbine body	Stainless steel ANSI 316
Flange	Stainless steel ANSI 316
Rotor	VTR1010 - VTR1020: Stainless steel (18 % Cr, 2 % Mo) VTR1025 - VTR1300: Stainless steel (20 % Cr, 2 % Mo)
Bearing support	Stainless steel ANSI 316
Rotor bearing	Tungsten carbide sleeve bearing

Order code	Example → VS	1071VA	ISP0	A3
Type				
VTR thread connection male	VS			
Nominal size / flow range	**Process connection**			
DN 10 / 0.11...1.1 m³/h	male thread G½	1071VA		A3
DN 15 / 0.22...2.2 m³/h	male thread G¾	1572VA		A4
DN 15 / 0.4...4 m³/h	male thread G¾	1573VA		A4
DN 20 / 0.8...8 m³/h	male thread G¾	2074VA		A4
DN 25 / 1.6...16 m³/h	male thread G 1	2575VA		A5
DN 40 / 3.4...34 m³/h	male thread G 1½	4076VA		A7
DN 50 / 6.8...68 m³/h	male thread G 2	5077VA		A8
Sensor				
Inductive pick-up VISPP (included in the scope of delivery)			ISP0	
Optional pick-up according to table on the following page (separate order)			0000	

Order code	Example → VS	1071VA	ISP0	G	1
Type					
VTR flange connection	VS				
Nominal size / flow range					
DN 10 / 0.11...1.1 m³/h		1071VA			
DN 15 / 0.22...2.2 m³/h		1572VA			
DN 15 / 0.4...4 m³/h		1573VA			
DN 20 / 0.8...8 m³/h		2074VA			
DN 25 / 1.6...16 m³/h		2575VA			
DN 40 / 3.4...34 m³/h		4076VA			
DN 50 / 6.8...68 m³/h		5077VA			
DN 80 / 13.5...135 m³/h		7578VA			
DN 100 / 27...270 m³/h		1H79VA			
DN 150 / 55...550 m³/h		HF81VA			
DN 200 / 110...1100 m³/h		2H82VA			
DN 250 / 190...1900 m³/h		ZF83VA			
DN 300 / 270...2700 m³/h		3H84VA			
Sensor					
Inductive pick-up VISPP (included in the scope of delivery)			ISP0		
Optional pick-up according to table on the following page (separate order)			0000		
Process connection					
DIN flange stainless steel				G	
ANSI flange stainless steel				I	
PN 6 / #150					1
PN 16 / #300					2
PN 25 / #400					3
PN 40 / #600					4

Accessories for series VTR

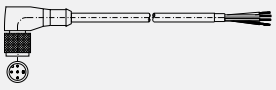
Pick-ups

Pick-ups

The local display TD32500 is ordered and configured separately. The specifications can be selected in the subchapter Accessories for series VTR.

Technical data					
Type	**VISPP Inexpensive, fitted as standard**	**VISPP-HT For high medium temperatures**	**VSAPPS* Square wave signal**	**VSAPPSHT* Square wave signal, for high medium temperatures**	**VSANTD For local display TD32500**
Output signal	Sinus wave		Square wave NPN or PNP to choose		Square wave NPN
Measuring principle	Inductive		Magnetically biased Hall effect sensor		
Temperature range	-20...120 °C	-20...230 °C**	-20...85 °C	-20...100 °C	-20...85 °C
Power supply			10...30 VDC		Via TD32500
Degree of protection EN 60529	IP54		IP67		IP65
Electrical connection	Amphenol plug connection MS 10 SL 3102		4-pin plug connection M12 x 1		
Cable socket	Inclusive		Accessory		
Material housing	Stainless steel ANSI 314	Stainless steel ANSI 316	Brass nickel-plated		

* Adapter VT1140 sold separately ** Notice the max. medium temperature of measuring turbine (150 °C).

Connection cables	Length	Order code	
Connection cable for turbine flow sensor with cable socket M12 x 1 moulded lead, 4-pin, shielded, sheathing material PUR (T_{max} = 70 °C) UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4-pin cable socket M12 x 1 angle type unassembled		VT1331	

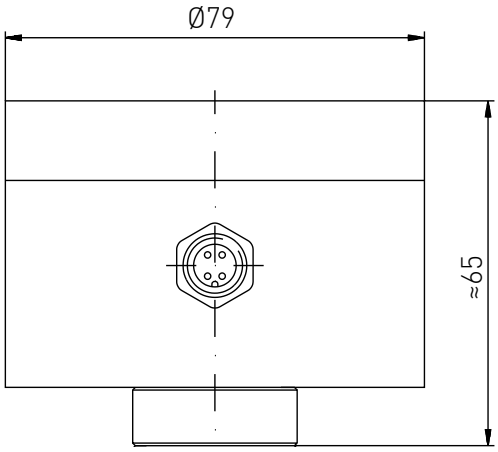
Local displays, series TD32500

Description

- Supplied fitted directly on SIKA turbine flow sensors, series VTR
- Display can be switched to:
  → flow rate
  → total flow (resettable)
  → total flow (non resettable)
  → optional temperature
- In addition bargraph 0...100 % to display flow rate, total flow (resettable) or optionally temperature
- Menu-driven programming via two light-reflex buttons
- Key lock for unintentional operation
- Robust stainless steel casing, with a closed glass window front
- Rotating case gives improved reading
- Language selection German, English or French
- Fixed connecting cable or plug connector M12 x 1

Type TD32500

Technical data	
Signal input	Fequency signal from flow sensor 0.5...2000 Hz, pulse rate programmable
Additional temperature input (optional)	Pt100 / 3-wire, measuring range -10...150 °C
Programming	Menu-driven with two light reflex buttons
Display	2-line LC-display with 16 characters per line, character height: 5 mm
Programmable units	l/min, l/h, m³/h, GPM (US), GPM (UK), l, m³, GAL (US), GA L(UK), °C,°F
Power supply	12...24 VDC
Power supply to sensor	12 VDC
Ambient temperature	-10...60 °C
Temperature of medium through the flow sensor	Depending on type of sensor, not exceeding -20...90 °C
Analogue output (optional)	(0)4...20 mA (max. resistance 800 Ω with 24 VDC) or 0...10 V, adjustable for flow rate, total flow (resettable) or optional temperature
Alarm outputs (optional)	Two fast-switching PNP transistor open collector outputs, programmable for min- or max alarm, hysteresis programmable, allocation of flow rate, total flow (resettable) or optional temperature holding current or working current programmable
Pulse output with frequency divider (optional)	PNP open collector, TTL-level, programmable divider-rate
Casing	Circular stainless steel casing, Ø 80 mm, height 55 mm, 350° rotating
Degree of protection EN 60529	IP65
Electrical supply	PVC-connection cable, 2 m or plug connector M12 x 1



Options

- Additional temperature display, input for resistance thermometer Pt100 / 3-wire
- Analogue output 0(4)... 20 mA or 0...10 V, freely adjustable, allocated to: flow rate, total flow (resettable) or optional temperature
- Two fast-switching alarm outputs, min or max allocation selective: flow rate, total flow (resettable) or optional temperature. A red LED clearly signals alarms
- Pulse output for flow rate, if required with frequency divider (pulse reduction)

The turbine flow sensor is ordered and configured separately. The specifications can be selected in the chapter Turbine flow sensors.

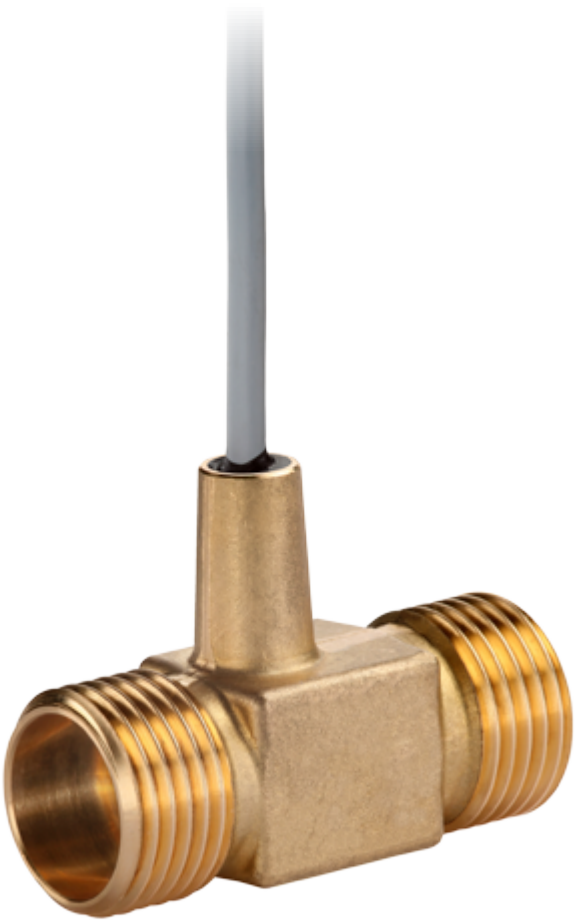
Order code	Example → ED325	6	0I000	009	1	0
Type						
TD32500	ED325					
Input						
Flow sensor		6				
Flow sensor and Pt100		7				
Outputs						
None			0I000			
Analogue output			AI000			
Pulse + frequency divider			FI000			
Analogue + frequency divider			BI000			
Alarm output						
None				009		
Two, programmable				299		
Electrical connection						
2 m cable					1	
Plug M12 x 1					2	
Number of pins / leads						
Factory preset						[ ]

Series VTY

Turbine flow sensors of the series VTY were specially developed for the use in potable water mass production applications. Flexible, customer- and application-oriented customisations to existing standards as well as a close cooperation in quality assurance always guarantee optimal results in a wide range of measuring tasks.

Sensors of the series VTY are used among others for the measurement of tap water. They are available in different versions: with turbine body made of brass or glass-fibre reinforced plastic, with threaded ends or QuickFasten process connections.

Due to their integrated flow straighteners, the turbines are practically independent of impacts from the installation situation and resistant to water hammers. In conjunction with the standard equipped sapphire bearing, long-lasting and over the complete service life precise and flexible measuring instruments are created. They all combine the advantages of a cost-effective OEM production with high quality "Made in Germany".



Advantages

- Turbine body made of brass or glass-fibre reinforced plastic, turbine internals made of glass-fibre reinforced plastic
- Sapphire-supported turbine for long durability
- Practically no deviation in mass production due to fixed pulse rate
- Wide measuring span (1:30)
- Insensitive against water hammers
- Threaded connection or QuickFasten
- Reliable measuring results due to high measuring accuracy
- Mostly independent of fitting position due to integrated flow straightener
- Proven in numerous mass production applications

Turbine flow sensors

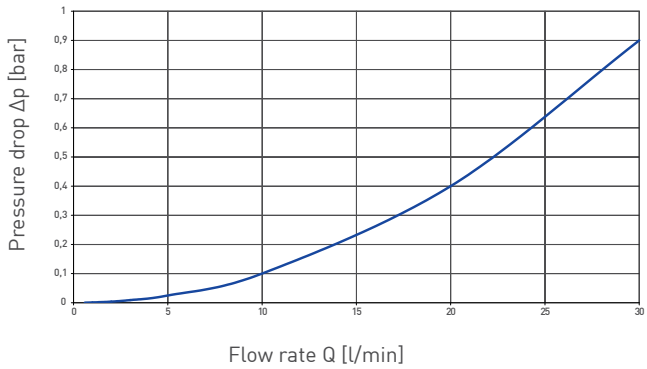
For potable water applications, series VTY

Brass threaded

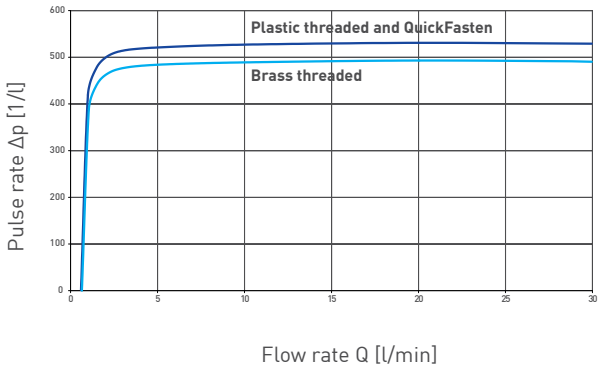
Plastic threaded/QuickFasten

Technical data			
	Brass threaded	**Plastic threaded**	**Plastic QuickFasten**
Flow range	1...30 l/min		
Accuracy	±1 % of range		
Repeatability	±1 %		
Signal output	From 0.7 l/min	From 0.6 l/min	
Nominal diameter	DN 10		
Pressure rating	PN 16	PN 10	
Medium temperature	0...70 °C (non-freezing), temporary 95 °C		
Ambient temperature	0...70 °C		
Process connection	G½ male	G¾ male	QuickFasten
Sensor	Hall effect sensor		
Output signal	Square wave frequency signal, NPN open collector		
Pulse duty ratio	50:50		
Pulse rate / K-factor	495 pulses/l	530 pulses/l	
Electrical connection	PVC-cable, double insulated (1 m), optional single wire		Single wires (145 mm)
Power supply	4.5...24 VDC		
Approval			
	Applied for WRAS approval		
Order code			
Delivering lots from 100 units	VY1030MSHN10A3	VY1030K5HN10A4	VY1030K5HNPOQ1

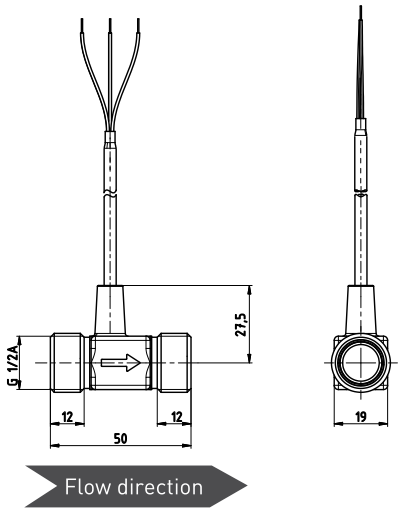
Typical pressure drop



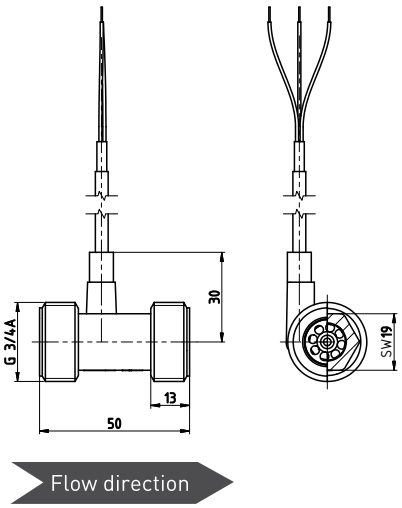
Characteristic curve



Brass threaded



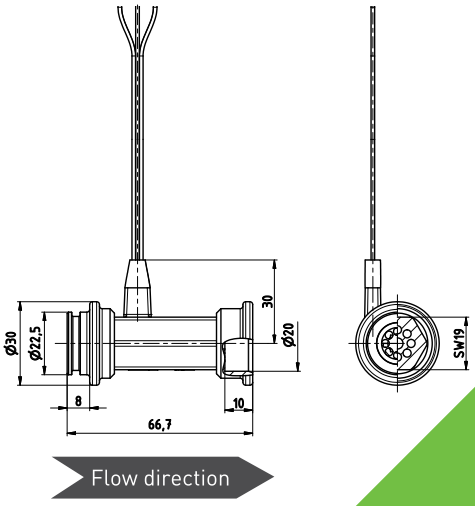
Plastic threaded



Materials in contact with fluid

Type	Brass threaded	Plastic threaded / QuickFasten
Turbine body	Brass CW617N	PPO Noryl GFN3
Rotor	PPO Noryl GFN3	
Magnet	Hard ferrite	
Shaft	Stainless steel / Hard metal	
Axial bearing	Sapphire	
Radial bearing	PEEK Victrex	

Plastic QuickFasten



Push-in flow sensors

Push-in flow sensors of the type VTY10, VTH15/20/25 were specially developed for the installation in fittings and feature an easy and space-saving system integration. Typical applications for these flow sensors are:

- Tap water detection
- Water treatment
- Leak detection

In general, push-in flow sensors consist of three components: push-in turbine, Hall effect-sensor and adapter sleeve for Hall effect sensor. This three-part construction is the key for the space-saving installation in e.g. filter heads and allows the separate installation of hydraulic and electrical components. A high quality sapphire bearing guarantees a long durability of the measuring system and allows the measurement of low flow rates from one litre per minute due to low start-up velocities.

Advantages

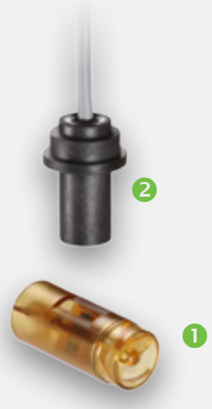
- Low deviation in mass production, fixed pulse rate
- Wide measuring ranges (1...160 l/min)
- Reliable measuring results due to high measuring accuracy
- Low wear and extremely long durability due to high quality sapphire bearing
- Compact dimensions
- Proven in numerous mass production applications
- Service-friendly

Push-in flow sensors

Series VTY10 / VTH15

Type VTY10

Type VTH15



❶ Push in turbine	VTY10	VTH15
Flow range	1...30 l/min	2...40 l/min with continous operation 20 l/m
Accuracy	±1 % of range	
Repeatability	±1 %	±0.2 %
Signal output	From 0.7 l/min	From 0.3 l/min
Medium temperature	Max. 85 °C, temporary 95 °C	Max. 85 °C
Nominal diameter	DN 10	DN 15
Approvals		
	Applied for WRAS approval	

❷ Hall effect sensor	VTY10	VTH15
Nominal pulse rate Frequency output	495 pulses / l NPN open collector	855 pulses / l NPN open collector
Power supply	4.5...24 VDC	4.5...24 VDC
Electrical connection	2 m PVC cable, shielded (T_{max} = 75 °C)	1.5 m PVC cable, shielded (T_{max} = 70 °C)
Pressure rating	see sleeve for Hall effect sensor	PN 10
Process connection	see sleeve for Hall effect sensor	Push-in sleeve Ø 15 mm
Approvals		

❸ Adapter sleeve for Hall effect sensor	VTY10	VTH15
Pressure rating	PN 10	
Process connection	G⅜ A	
Approvals		
	Plastic part and O-ring comply with the KTW-Guideline of the German Federal Environment Agency	

Stated values may vary depending on geometry of fittings.

Series VTH20 / VTH25

Type VTH20

Type VTH25

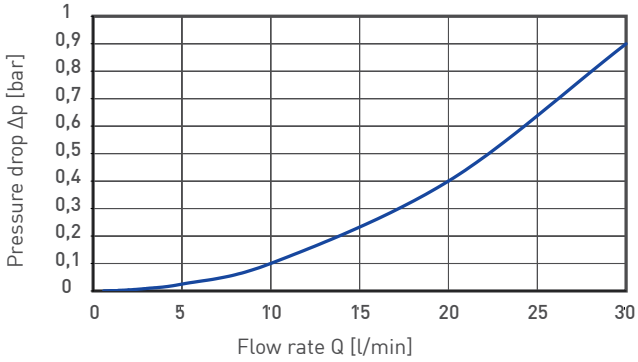
❶ Push in turbine	VTH20	VTH25
Flow range	1...42 l/min with continous operation max. 25 l/m	4...160 l/min with continous operation max. 80 l/m
Accuracy	±1 % of range ±3 % of reading (from 15 l/min)	±5 % of range (up to 5 l/min ±7 % of reading)
Repeatability	±0.2 %	±0.5 %
Signal output	From < 20 l/h	From < 1 l/min
Medium temperature	Max. 60 °C	Max. 85 °C
Nominal diameter	DN 20	DN 25
Approvals		
	Plastic part and O-ring comply with the KTW-Guideline of the German Federal Environment Agency	

❷ Hall effect sensor	VTH20	VTH25
Nominal pulse rate **Frequency output**	232 pulses / l NPN open collector	65 pulses / l NPN open collector
Power supply	10...30 VDC (optional 4.5...26.5 VDC)	
Electrical connection	2 m PVC cable, shielded (T_{max} = 75 °C)	

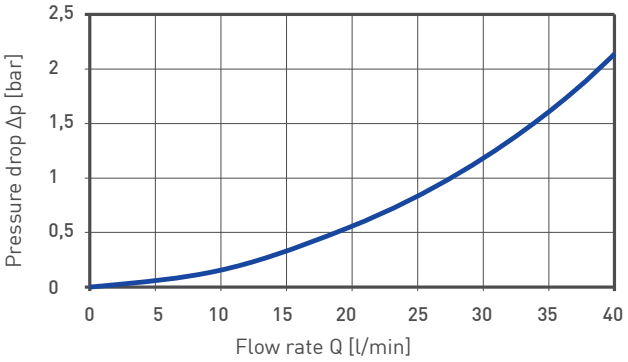
❸ Adapter sleeve for Hall effect sensor	VTH20	VTH25
Pressure rating	PN 10	
Process connection	G⅜ A	
Approvals		
	Plastic part and O-ring comply with the KTW-Guideline of the German Federal Environment Agency	

Stated values may vary depending on geometry of fittings.

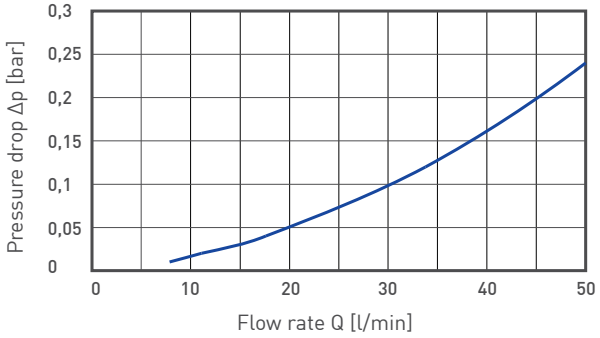
Typical pressure drop VTY10*



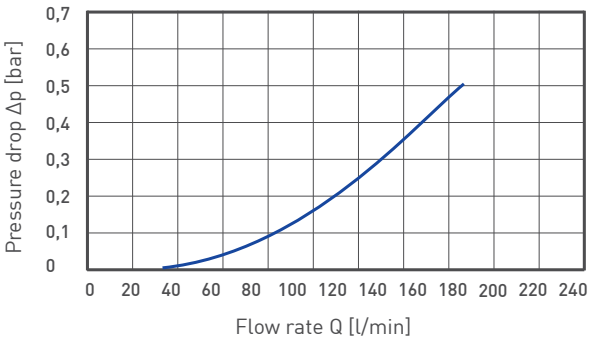
Typical pressure drop VTH15*



Typical pressure drop VTH20*

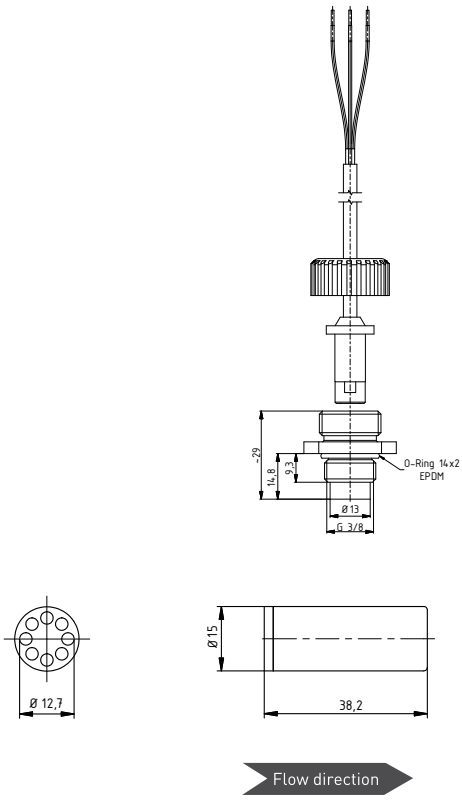


Typical pressure drop VTH25*

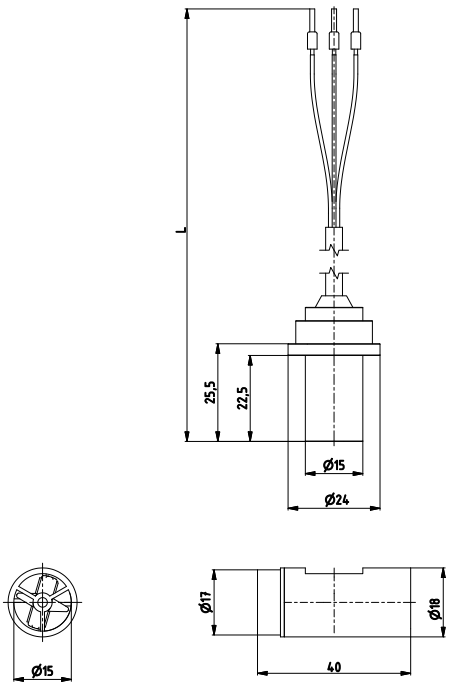


* determined in SIKA pipe tee

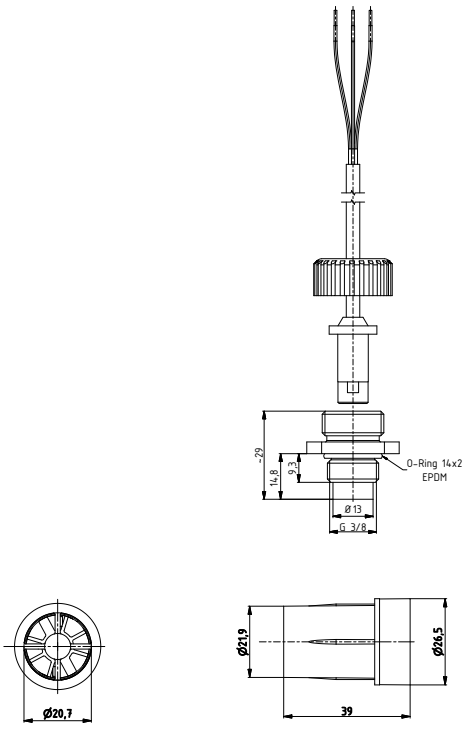
VTY10



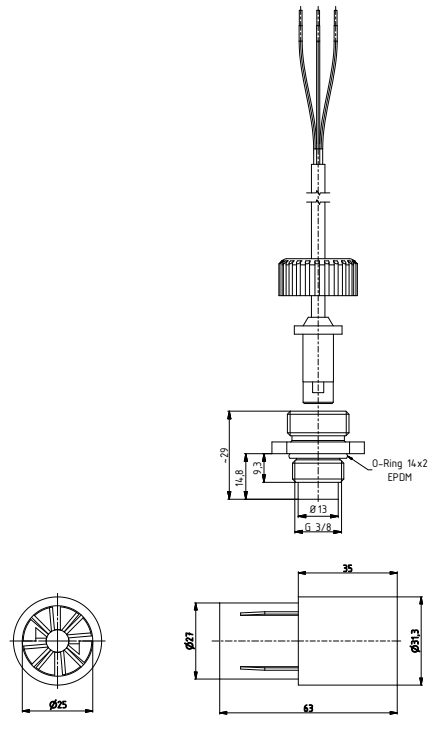
VTH15



VTH20



VTH25



Materials in contact with fluid				
Type	**VTY10**	**VTH15**	**VTH20**	**VTH25**
Push in turbine				
Turbine body	PPO Noryl GFN3	PEI ULTEM	PPO Noryl GFN 1630V	PPO Noryl GFN 1630V
Rotor	PPO Noryl GFN3	PEI ULTEM	PC Makrolon	PPO Noryl GFN 1520V
Magnet	Hard ferrite	Hard ferrite	Hard ferrite	Hard ferrite
Shaft	Stainless steel / Hard metal	Arcap / Hard metal	Stainless steel 1.4539	Stainless steel 1.4539
Axial bearing	Sapphire	Sapphire	Sapphire	Sapphire
Radial bearing	PEEK	Sapphire	PA	PA
Hall effect sensor				
Adapter sleeve		PPO Noryl GFN 3		
O-ring		NBR		
Adapter sleeve for Hall effect sensor				
Adapter sleeve	PPO Noryl GFN 1630 V		PPO Noryl GFN 1630 V	PPO Noryl GFN 1630 V
O-ring	EPDM		EPDM	EPDM

Order code				
Type	**VTY10**	**VTH15**	**VTH20**	**VTH25**
Push in turbine	VY1030K50000YY	AD3004	VT20Z000000001	VT25Z000000021
Hall effect sensor	VT2282	VT2000	VT2228	
Adapter sleeve for Hall effect sensor	VT25Z000000002		VT25Z000000002	

Minimum lot size 50 pieces.

- → Series VZGG
- → Series VZVA
- → Series VZAL
- → Local displays TD8250

POSITIVE DISPLACEMENT FLOW SENSORS

Positive displacement flow sensors

Gearwheel type flow sensors record volume flows of liquids with both high and changing viscosities. The high-precision sensors work according to the displacement principle. The high resolution combined with reliable measurement accuracy make the sensors especially useful for applications involving the measurement of small and very small volumes.

In principle, the measurement accuracy is increased for high viscosities. Conversely, the measurement accuracy is lower with a viscosity of less than 10 mm²/s. Due to their construction, gearwheel type flow sensors require a certain lubricity of the fluid beeing measured. Operation with non-lubricating media, e.g. water, is not possible.

Applications

- Consumption measurement
- Control of filling operations
- Dosage of oils and chemicals
- Flow measurement of paints and varnishes
- Ratio control of polyol and isocyanate

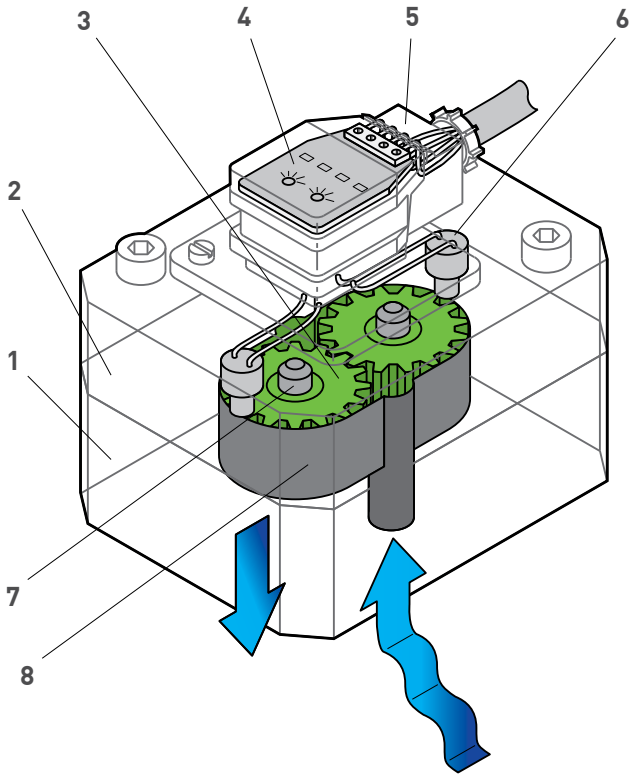
Principle of operation

A very precisely adjusted gear pair within the casing forms the measuring element. The inflowing medium causes the gear pair to rotate. The rotary motion is scanned by contactless sensors. Since each individual tooth generates a pulse, this results in a very high resolution. Consequently, even the smallest volumes can be measured or dosed precisely.

The measurement unit contains two pick-offs that are circumferentially offset by ¼ of a tooth pitch to generate a 2 channel flow-proportional frequency signal. Suitable processing of the signal provides an greater resolution and the option to identify the flow direction.

The maximum pressure drop should not exceed 16 bar. This limits the measurement range of high viscosity media (see pressure drop diagrams). Basically, the measurement accuracy increases with increase in viscosity of the media.

1 Housing bottom
2 Housing cover
3 Gear wheels
4 Pre-amplifier
5 Connection plug
6 Pick-offs
7 Bearing
8 Measurement chamber



Overview of performance features of the VZGG / VZVA / VZAL

	VZGG / VZVA	VZAL
Housing	Ductile iron or stainless steel	Aluminium
Viscosity of medium	1...100 000 mm²/s	1...4000 mm²/s (depending on the model)
Temperature of medium	-30...120 °C (standard)	-10...80 °C
Measuring accuracy	±0.3 % of reading	±1... 3 % of reading
Sizes	8	4
Process connection	Via subplate with lateral female thread connection	Direct female thread

Additional performance features of the VZGG / VZVA

- The measuring volume per pulse determines the size, e.g. 0.4 cm³/pulse for VZ 0.4...-S
- HT version for temperatures up to 150 °C with thermally insulated preamplifier (option)
- Intrinsically safe explosion-proof versions available in accordance with ATEX (max. medium temperature 80 °C)
- Variety of casing and sealing materials, meaning they can be universally used for different measurement media
- Standard process connection via connecting plates, so they can be replaced quickly without lengthy interruptions to the process
- Other bearings for special requirements on request

Additional performance features of the VZAL

- Standard process connections
- Output signal: pulse signal

Positive displacement flow sensors

Series VZGG, VZVA

Type VZGG

Type VZVA

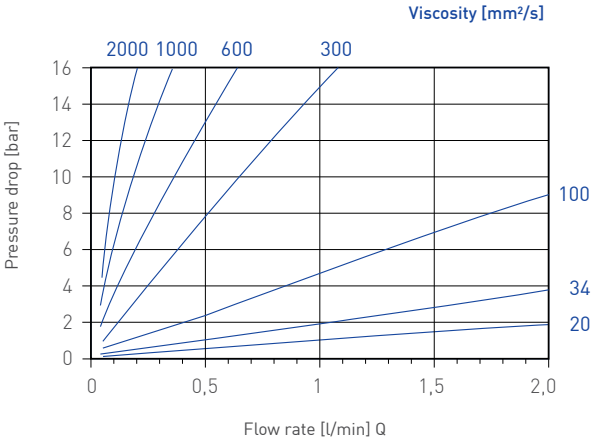
Type	VZ0.025	VZ0.04	VZ0.1	VZ0.2	VZ0.4	VZ1	VZ3	VZ5
Size	0.025	0.04	0.1	0.2	0.4	1	3	5
Start of gear wheel rotation [l/min]	0.001	0.004	0.008	0.01	0.01	0.02	0.03	0.04
Measuring range* [l/min]	0.008...2	0.02...4	0.04...8	0.16...16	0.2...40	0.4...80	0.6...160	1...250
Geometric gear volume [cm³]	0.025	0.04	0.1	0.245	0.4	1.036	3	5.222
Measuring volume [ml/Pulse]	0.025	0.04	0.1	0.245	0.4	1.036	3	5.222
Resolution [Pulse/l]	40 000	25 000	10 000	4081.63	2500	965.25	333.33	191.5

* For media with high viscosity the measuring range is reduced.
The max. pressure drop shouldn't exceeded 16 bar (see pressure drop diagrams).

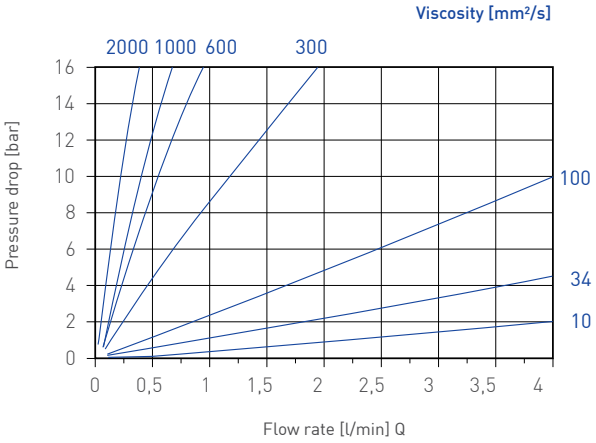
Technical data			
Measuring accuracy	±0.3 % of reading (21 mm²/s)		
Repeatability	< 0.1 % under same conditions		
Viscosity of medium	1...100 000 mm²/s		
Pressure rating	→ VZ 0.025... to VZ 1... -max. 400 bar → VZ 3... to VZ 5... -max. 315 bar → Higher pressure rating on request		
Medium temperature range (depends on sealing material) → Standard → Without preamplifier (for TD8250) → High temperature → Ex version	FKM -15...120 °C 0...60 °C -15...150 °C -15...80 °C	FEP -30...120 °C 0...60 °C -30...130 °C -30...80 °C	EPDM -30...120 °C 0...60 °C -30...130 °C -30...80 °C
Ambient temperature range (depends on sealing material)	FKM -15...80 °C	FEP -30...80 °C	EPDM -30...80 °C
Process connection	Via subplate with lateral female thread connection		
Power supply	12...30 VDC / max. 90 mA		
Electrical connection	Via standard socket		
Degree of protection EN 60529	IP65		
Output signal	2-channel, squarewave, pulse duty ratio 1:1, PNP		

Options	
For type	**On request**
VZVA	→ Direct Process connection

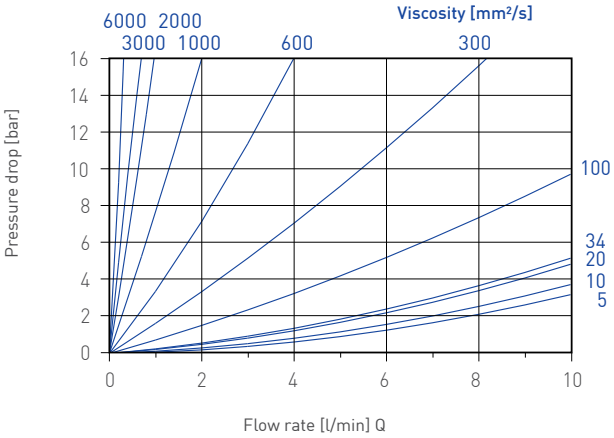
Typical pressure drop VZ0,025



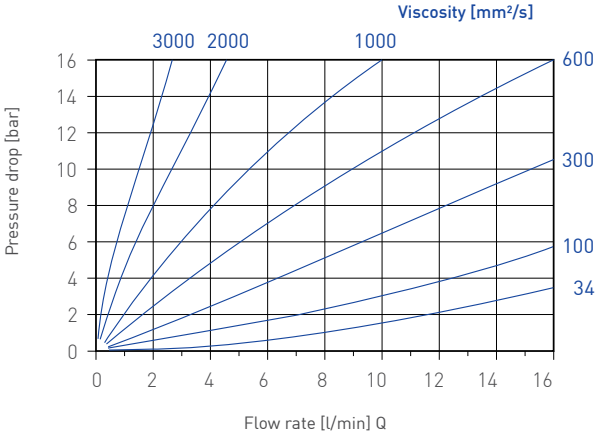
Typical pressure drop VZ0,04



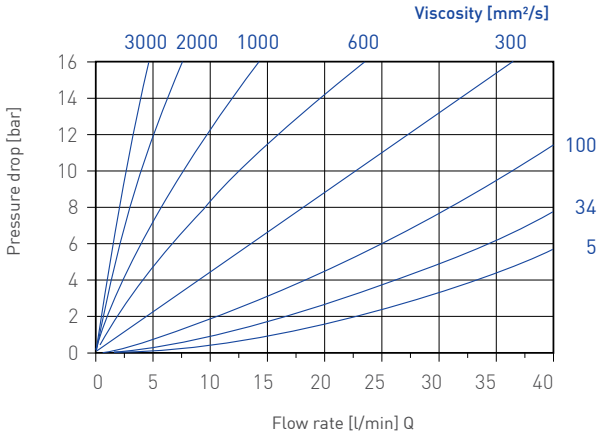
Typical pressure drop VZ0,1



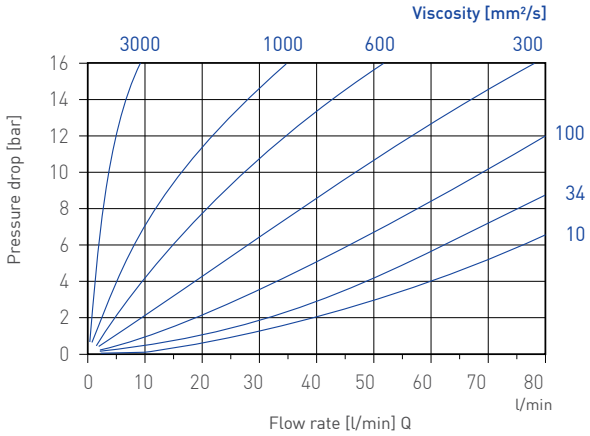
Typical pressure drop VZ0,2



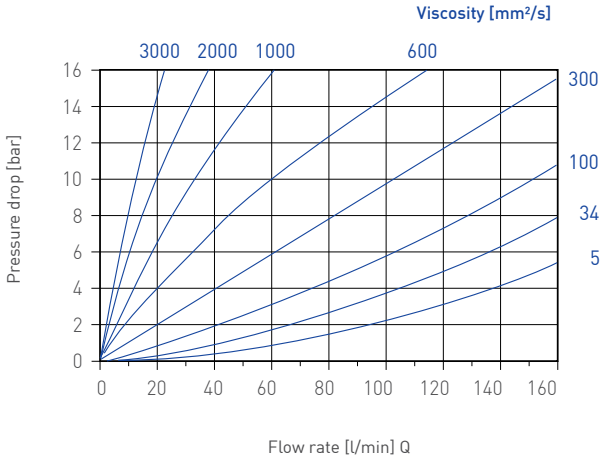
Typical pressure drop VZ0,4



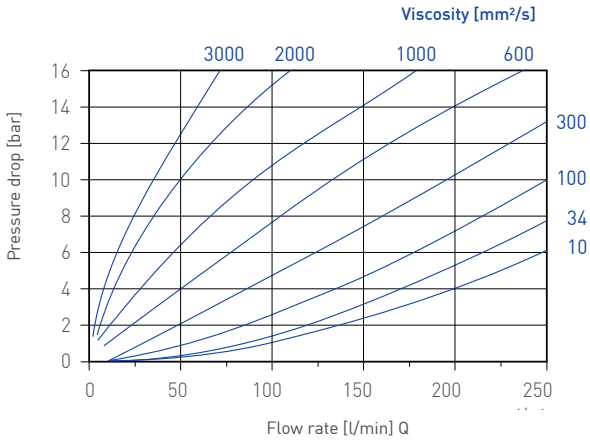
Typical pressure drop VZ1



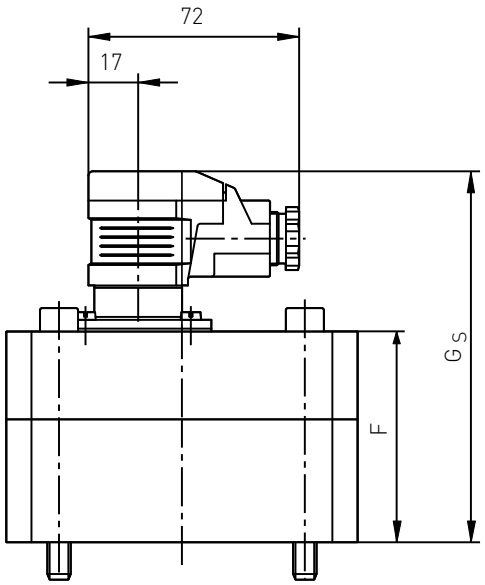
Typical pressure drop VZ3

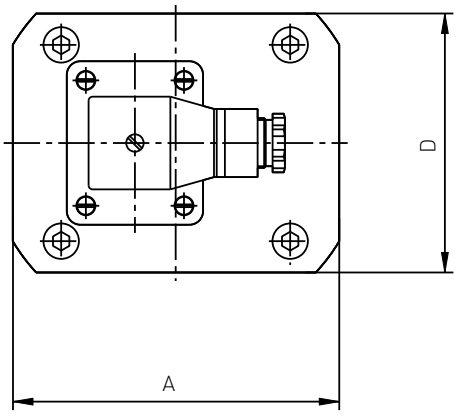


Typical pressure drop VZ5

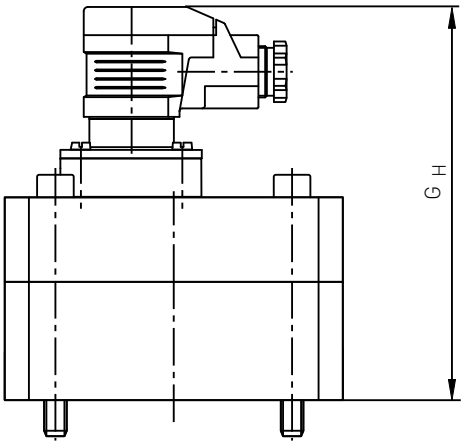


VZGG





Standard version and Ex version

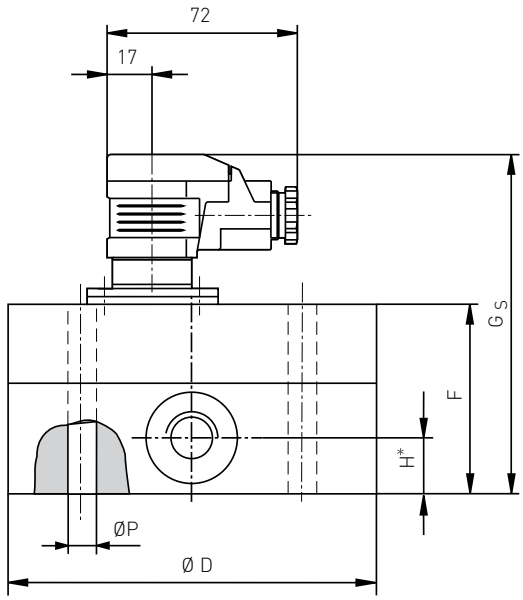


High temperature version

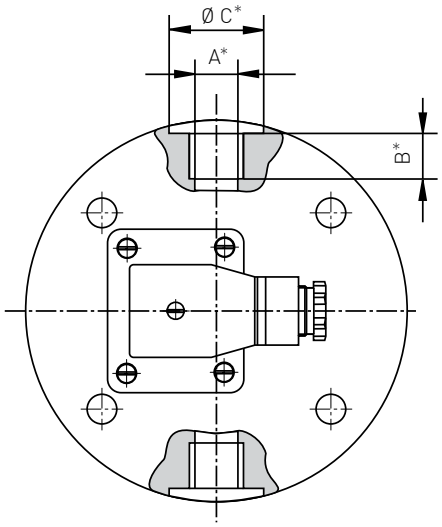
Material	
Housing	Ducitile iron EN-GJS-400-15
Gear wheels	Steel 1.7139
Bearings	Ball bearings
Seals	Standard: FKM Option: EPDM, FEP

Type	VZ0.025GG	VZ0.04GG	VZ0.1GG	VZ0.2GG	VZ0.4GG	VZ1GG	VZ3GG	VZ5GG
A [mm]	85	85	85	85	100	120	170	170
D [mm]	60	60	60	60	90	95	120	120
F [mm]	50	56	65	57	63	72	89	105
GS [mm]	101	107	116	108	114	123	140	156
GH [mm]	114	120	129	121	127	136	153	169
Weight [kg]	1.8	2	2.3	2	3.7	5.2	9	13

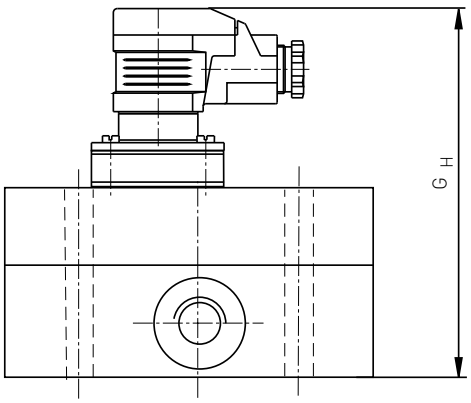
VZVA



Standard version and Ex version



* For direct porcess connection



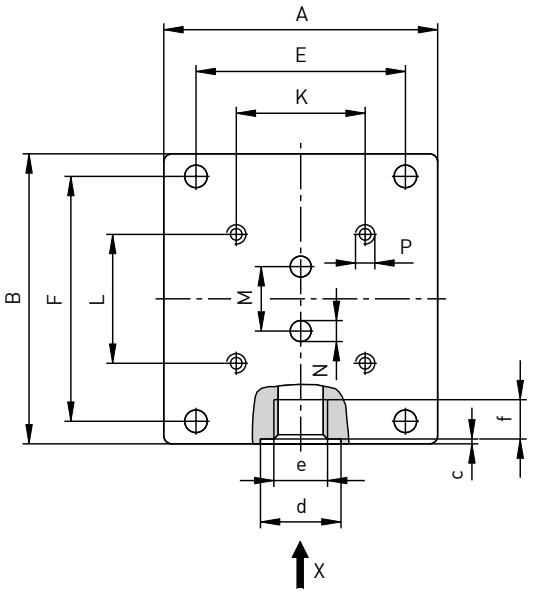
High temperature version

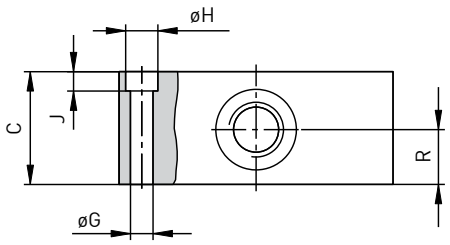
Material	
Housing	Stainless steel 1.4404
Gear wheels	Stainless steel 1.4462
Bearings	Ball bearings stainless steel
Seals	Standard: FKM Option: EPDM,FEP

Type	VZ0.025VA	VZ0.04VA	VZ0.1VA	VZ0.2VA	VZ1VA	VZ3VA	VZ5VA
D [mm]	94	94	94	94	124	170	170
F [mm]	55	56	65	57	72	89	105
GS [mm]	106	107	116	108	123	140	156
GH [mm]	119	120	129	121	136	153	169
Weight [kg]	3	3	3	3.1	7	15.9	18.7
Direct process connection							
A [mm]	G⅛	G¼	G⅜	G⅜	G½	G 1	G 1
B [mm]	9	13	13	13	15	19	19
C [mm]	17	21	25	25	29	42	42
H [mm]	15	15	20	16	22	30	30

Subplates for VZGG

For type	VZ0.025GG / VZ0.04GG / VZ0.1GG / VZ0.2GG	VZ0.4GG	VZ1GG	VZ3GG / VZ5GG
A [mm]	85	100	100	160
B [mm]	90	110	120	165
C [mm]	35	37	37	80
c [mm]	0.7	0.7	0.7	1
d [mm]	25	29	29	42
E [mm]	65	86	80	140
e	G⅜	G½	G½	G 1
F [mm]	76	96	106	145
f [mm]	13	15	15	19
G [mm]	7	7	7	9
H [mm]	11	11	11	15
J [mm]	7	7	7	9
K [mm]	70	80	84	46
L [mm]	40	38	72	95
M [mm]	20	34	35	50
N [mm]	6.5	16	12	25
P [mm]	M 6/14t	M 8/18t	M 8/18t	M 12/24t
R [mm]	17	18.5	17.5	28
Weight [kg]	1.8	2.7	2.9	14
Material	Ductile iron EN-GJL-250	Ductile iron EN-GJL-400-15		Ductile iron EN-GJL-250

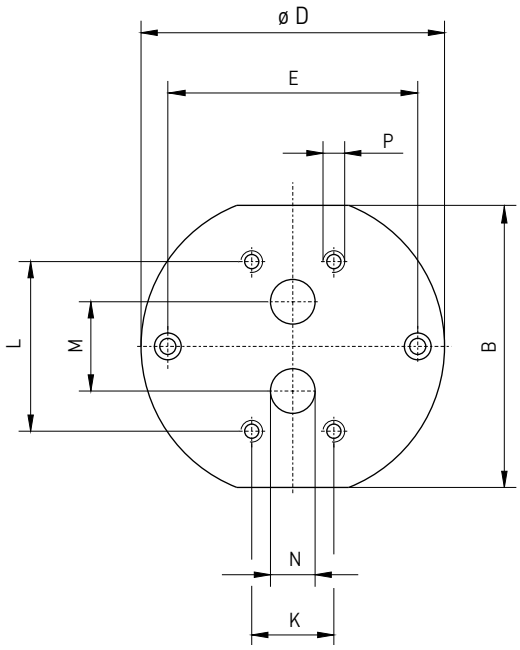


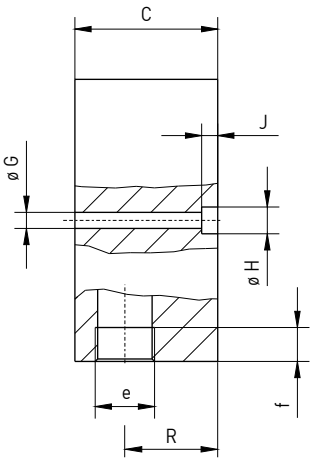


View X

Subplates for VZVA

For type	VZ0.025VA / VZ0.04VA / VZ0.1VA / VZ0.2VA	VZ1VA	VZ3VA / VZ5VA
B [mm]	85	116	158
C [mm]	35	37	80
D [mm]	94	124	170
E [mm]	75	100	140
e	G⅜	G½	G1
f [mm]	13	15	19
G [mm]	7	9	9
H [mm]	11	15	15
J [mm]	7	9	9
K [mm]	70	84	46
L [mm]	40	72	95
M [mm]	20	35	50
N [mm]	6.5	12	25
P [mm]	M 6/14t	M 8/18t	M 12/24t
R [mm]	18	19.5	52
Weight [kg]	1.7	3.2	13.9
Material	Stainless steel 1.4404		





Order code		Example → VZ0025	GG	V	3	2	I	00S
Type	**Size**							
VZ0.025	0.025	VZ0025						
VZ0.04	0.04	VZ004						
VZ0.1	0.1	VZ010						
VZ0.2	0.2	VZ020						
VZ0.4	0.4 (only ductile iron)	VZ040						
VZ1	1	VZ100						
VZ3	3	VZ300						
VZ5	5	VZ500						
Material								
Ductile iron			GG					
Stainless steel			VA					
Seals								
FKM				V				
EPDM				E				
FEP				P				
Power supply								
12...30 VDC					3			
Process connection								
Via subplates						2		
Direct (only for stainless steel)						1		
Preamplifier								
Integrated							I	
Without preamplifier, for TD8250 (not for Ex-version)							K	
Isolated for high temperature version (not for Ex-version)							E	
Version								
Standard								00S
Ex-version								10S

Order code	Example → AP004	GG	0380S
Subplates appropriate to			
VZ0.025 / VZ0.04 / VZ0.1 / VZ0.2	AP004		0380S
VZ0.4 (only ductile iron)	AP040		0120S
VZ1	AP100		0120S
VZ3 / VZ5	AP500		1000S
Material			
Ductile iron		GG	
Stainless steel		VA	

Positive displacement flow sensors

Series VZAL

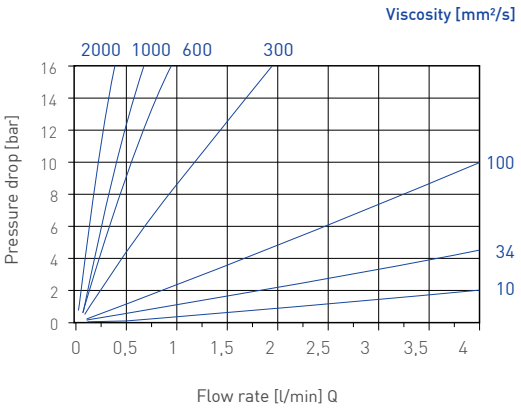
Type VZ0.2AL

Type VZ2AL

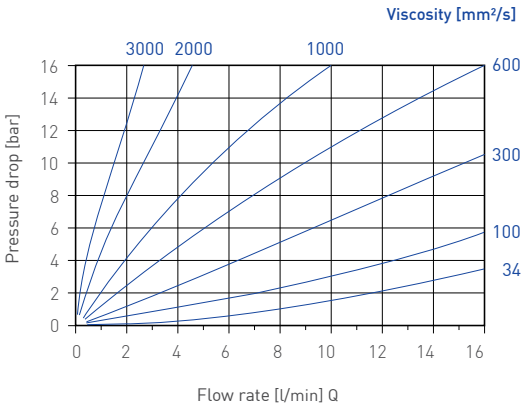
Technical data				
Type	**VZ 0.04AL**	**VZ0.2AL**	**VZ2AL**	**VZ5AL**
Size	0.04	0.2	2	5
Measuring range*	0.02...4 l/min	0.16...16 l/min	1...65 l/min	1...200 l/min
Viscosity of medium	20...4000 mm²/s	1...3000 mm²/s	20...4000 mm²/s	20...4000 mm²/s
Measuring accuracy	±2 % of reading	±1 % of reading	±2.5 % of reading	±1 % of reading
Repeatability	Up to 0.5 % under same conditions			
Pressure rating	Max. 200 bar	Max. 160 bar	Max. 160 bar	Max. 80 bar
Pressure peaks	Max. 240 bar	Max. 200 bar	Max. 200 bar	Max. 100 bar
Medium temperature range	-10...80 °C integrated preamplifier 0...60 °C without preamplifier (for TD8250)			
Thread connection	G¼	G⅜	G¾	G 1
Weight	0.5 kg	0.7 kg	1.9 kg	6 kg
Volume per pulse	0.04 cm³	0.245 cm³	2 cm³	5.222 cm³
Number of output channels	1	2	1	1
Output signal → Signal shape → Pulse rate → Resolution	 Square wave, pulse signal, PNP, pulse duty ratio 1:1 ±15 % 25000 pulses/l 0.04 ml/pulse	 Square wave, pulse signal, PNP, pulse duty ratio 1:1 ±15 % 4082 pulses/l 0.245 ml/pulse	 Square wave, pulse signal, PNP, pulse duty ratio 1:1 ±15 % 500 pulses/l 2 ml/pulse	 Square wave, pulse signal, PNP, pulse duty ratio 1:1 ±15 % 191.5 pulses/l 5.2 ml/pulse
Indication	Cable socket with one LED for pulse signal	Cable socket with two LED for pulse signal (two channels)	Cable socket with one LED for pulse signal	Cable socket with one LED for pulse signal
Electrical connection	Plug connector incl. cable socket			
Power supply	12...30 V DC reverse polarity protection			
Power input	0.6 W short circuit proof	0.9 W short circuit proof	0.6 W short circuit proof	0.6 W short circuit proof
Degree of protection EN 60529	IP65			

* For media with high viscosity the measuring range is reduced.
The max. pressure drop shouldn't exceeded 16 bar (see pressure drop diagrams).

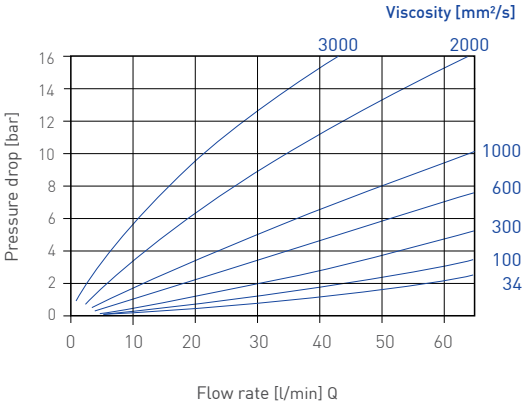
Typical pressure drop VZ0,04AL



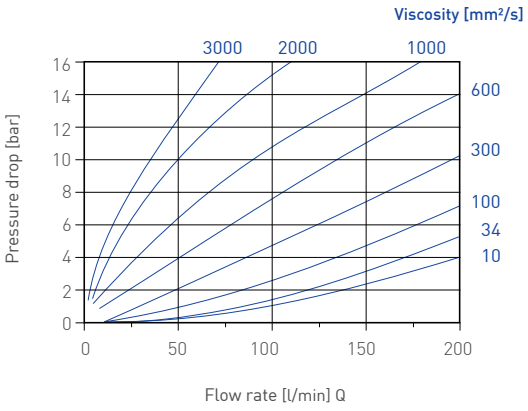
Typical pressure drop VZ0,2AL



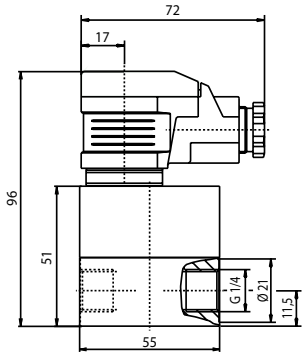
Typical pressure drop VZ2AL



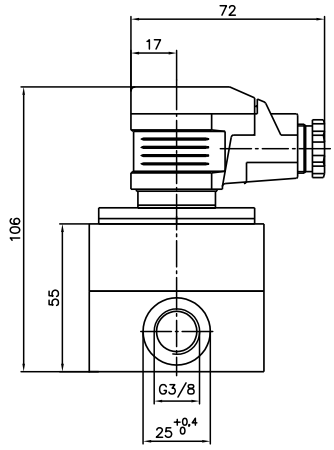
Typical pressure drop VZ5AL



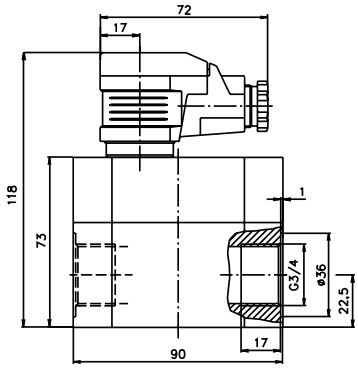
VZ0.04AL



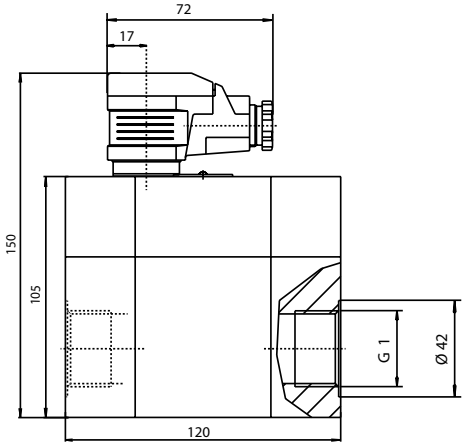
VZ0.2AL



VZ2AL



VZ5AL



Material				
Type	**VZ0.04AL**	**VZ0.2AL**	**VZ2AL**	**VZ5AL**
Housing	Aluminium, gold-colour anodised	Aluminium, gold-colour anodised	Aluminium AlMgSi F30 (hard coated)	Aluminium AlMgSi F30 (hard coated)
Gear wheels	Stainless steel 1.4462	Steel 1.7139	Steel 1.7139	Steel 1.7139
Bearings	Ball bearings	Ball bearings stainless steel	Sleeve bearings (P10)	Ball bearings
Seals	FKM	FKM	FKM	FKM

Order code		**Example → VZ004ALV31**	**I00S**
Type	**Size**		
VZ0.04AL	0,04	VZ004ALV31	
VZ0.2AL	0,2	VZ020ALV31	
VZ2AL	2	VZ200ALV31	
VZ5AL	5	VZ500ALV31	
Preamplifier			
Integrated			I00S
Without preamplifier (for TD8250)			K00S

Accessories

Local displays, series TD8250

The local display TD8250 is simply fitted between the plug connector plug and the cable socket of VZGG, VZVA or VAL positive displacement flow sensors. It is programmable via two buttons which are located behind the front panel. It can be set to display either the actual flow rate or the total volume (counter function), as required. The TD8250 is available in three different output signal versions:

- Pulse output (2-channel, depending on flow sensor)
- Analogue output 0(4)...20 mA
- Two alarm contacts

It is also easy to retrofit onto existing flow sensors. To do this, merely remove the amplifier board from the cable socket.

Type TD8250

Technical data	
Signal input	Pulse signal from flow sensor
Programming	Via 2 buttons, data retention on power off
Display	Four-digit LED display, red, 7.6 mm high
Power supply	19...28 VDC, optional 10...19 VDC
Current consumption	Max. 120 mA
Ambient temperature	0...60 °C
Storage temperature	-25...85 °C
Output signals	Pulse output (2-channel, depending on flow sensor) or analogue output 0(4)...20 mA or 2 alarm contacts max. 24 VDC / 1 A
Housing	Aluminium, 60 x 35 x 60 (W x H x D) without plug connector
Weight	Approx. 120 g
Degree of protection EN 60529	IP65
Electrical connection	Plug connector DIN EN 175301-803-A, 4 pin

Order code	**Example → ED825F**	**60**
Outpout signals		
Pulse output	ED825F	
Analogue output 0(4)...20 mA	ED825A	
Two alarm contacts	ED825R	
Power supply		
19...28 VDC (standard)		60
10...19 VDC (option)		50

Switch amplifier, series K-130

The switch amplifier K-130 serves as an interface between electrical signals of the hazardous areas to the safe areas.

The input signals of positive displacement flow sensors in in Ex-version are transmitted through transistor contacts. The input-, output- and power supply circuits are safe galvanic separated.

This unit is approved as associated apparatus.

Type K-130

Technical data	
Temperature ranges	
→ Ambient	-25...60 °C
→ Storage	-25...85 °C
Humidity	Max. 75 % RH
Housing	For assembly rail setup DIN EN 50022
Dimensions	114.5 mm x 22.5 mm x 99 mm (H x W x D)
Declaration of conformity	94/9/EG: CE 0158
Field of application	EX II (2) G D, [EEx ia] II C
EC-type examination	PTB 03 ATEX 2094 X
Electrical data	
Signal input	2 channel frequency signal of positive displacement flow sensors in Ex-version
→ Switching points	0 ⩽ 9 mA 1 ⩾ 12 mA
→ Open circuit voltage	10 V
→ Short circuit current	82 mA
Signal output	2 channel, open collector
Power supply	24 V AC/DC (±20 %)
Power consumption DC	3.6 W
Mode selection	2x switch
Displays	6x LED, each Channel power indication, switch status and wire monitoring
Order code	
	K-130-ATEX

→ Sensors

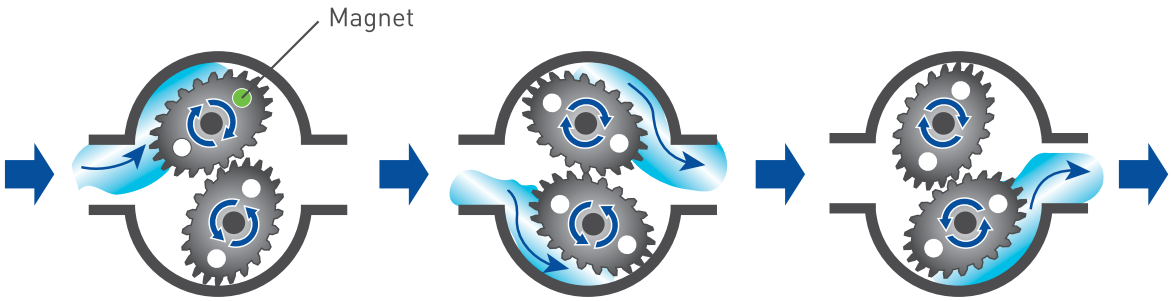
→ Sensors with display

OVAL GEAR FLOW METERS

Oval gear flow meters

Principle of operation

Oval gear meters are displacement-type volume meters that transport defined incremental volumes in individual measuring chambers. The measuring element consists of two high precision toothed oval gears, which are driven by the flow of the medium and mesh with each other. In this way, a defined volume is transported for each rotation of the pair of oval gears. The number of rotations is a measure of the amount of fluid that has passed through the meter. The rotations are detected by a sensor element.



Advantages

- Positive displacement meter for volumetric flow rate or total flow measurement
- Applicable for fluids such as lubrication oils, mineral oils, hydraulic oils, fuels, liquified gases and others
- No inlet or outlet section required
- High-quality construction for long service life and high reliability
- Long-term stability
- High measurement accuracy and repeatability
- Easy installation

Oval gear flow meters

Series VO, Sensor

Threaded Version

Flanged Version

Characteristics

- Sensor with pulse output signal, no local display
- Flow rate or total flow indication by local or remote display
- Individual calibration
- Various versions of local displays are available: battery powered (lifetime approx. 3 years) or externally powered version with analogue and pulse output
- Female threaded or flanged process connection
- O-ring material FKM, EPDM or FEP

Type	V0015	V006	V01	V02	V05	V010	V050	V0115
Measuring range [l/min]								
→ Oval gears st. steel (V0...VA)	0.03...1	0.2...5	0.4...10	1...30	2...50	4...100	15...300	35...660
→ Oval gears PEEK (V0...VP / AP)	0.03...1	0.2...7	0.4...14	1...30	2...60	3...120		
Process connection								
→ Thread	G¼	G½	G½	G¾	G 1	G 1	G 2	G 2
→ Flange (according to DIN EN 1092-1)				DN 15		DN 25	DN 50	DN 50
Nominal puls rate [1/l]	3100	333	166	100	40	20	4	1.7

Type	V0...VA	V0...VP**	V0...AP**
Accuracy*	±0.5 % of reading		
Repeatability*	< 0.05 %		
Pressure rating	PN 40 (PN 25 with FEP O-ring)		
Temperature range			
Standard	-10...70 °C		
High temperature sensor	-10...130 °C		
Materials***			
Housing	Stainless steel	Stainless steel	Aluminium
Oval gears	Stainless steel	PEEK	PEEK
O-ring	FKM (standard) or EPDM (option) or FEP (option)	FKM (standard) or EPDM (option) or FEP (option)	FKM (standard) or EPDM (option) or FEP (option)
Medium			
Allowable Viscosity	0.3...350 mPa s	0.3...50 mPa s	
Max. particle size	25...100 µm		
Electrical data			
Supply voltage			
→ Standard	10...30 VDC	10...30 VDC	10...30 VDC
→ High temperature sensor	18...30 VDC		
Electrical connection (Sensor without display)	M12 x 1 connector		
Signal output			
Standard	NPN, PNP	NPN, PNP	NPN, PNP
High temperature sensor	PNP		
Degree of protection EN 60529	IP67		

* Test conditions:
→ Viscosity >3 mPa s
→ Media temperature 20 °C
** Not availiable for V050 and V0115
*** Other material combinations on request

Series VO, Display

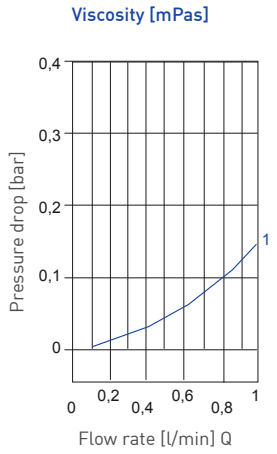
Display 1

General description – displays

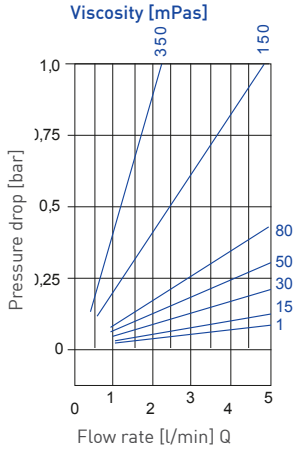
- Choice of three display models
- Actual flow rate indication
- Total flow indication, password protected counter
- Mass indication (temperature-dependent)
- Up to two VO sensors can be connected; configurable for differential measurement (Display 2 and 3)
- Impulse output (Display 2 and 3)
- Optionally available for wall mounting with bracket (for media temperatures up to 70 °C)

Type	Display 1	Display 2	Display 3
Display	8 digit		
Electrical data			
Power supply	Battery	Battery	10...30 VDC
Power consumption			100 mA, 28 V
Signal outputs		Pulse output NPN open collector	Pulse output NPN open collector Analogue output 4...20 mA / 2-wire
Degree of protection EN 60529	IP65		
Electrical connection		Terminal block / cable gland	
Cable length (remote type / wall mounting)		2000 mm	
Temperature range			
Medium temperature	-10...70 °C		
Ambient temperature	-20...70 °C		
Storage temperature	10...55 °C		
Type			
Local (meter mounted)	✓	✓	✓
Remote (wall mounting)		✓	✓

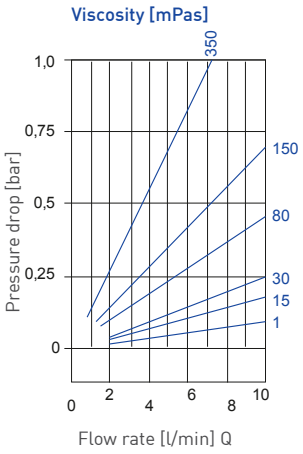
Typical pressure drop V0015



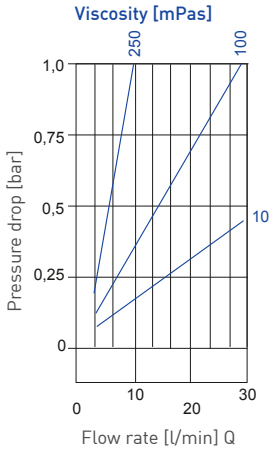
Typical pressure drop V006



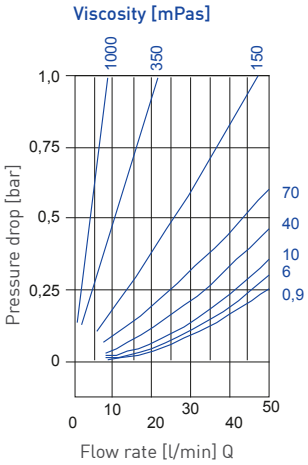
Typical pressure drop V01



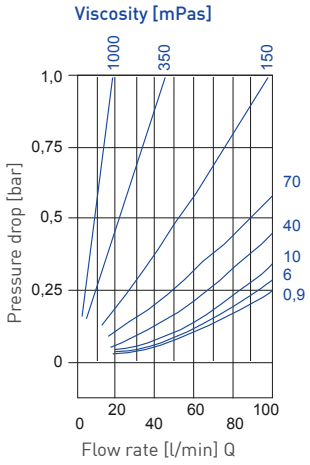
Typical pressure drop V02



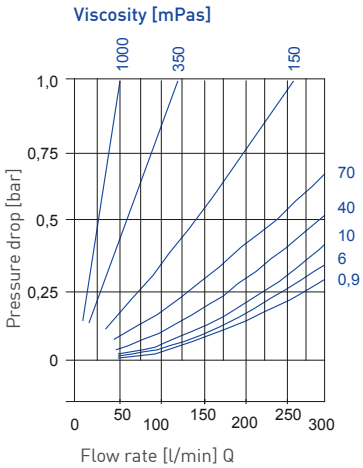
Typical pressure drop V05



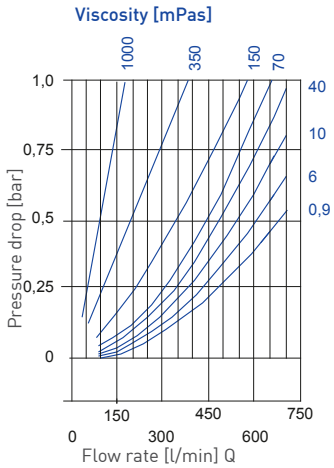
Typical pressure drop V010



Typical pressure drop V050

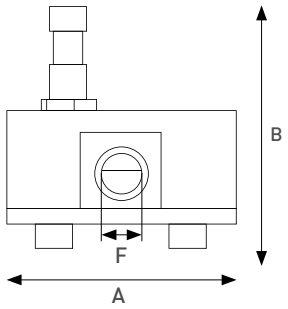


Typical pressure drop V0115

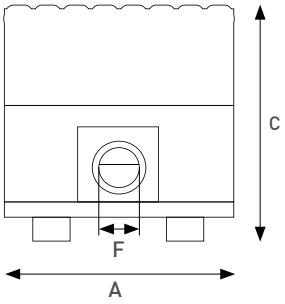


Process connection threaded

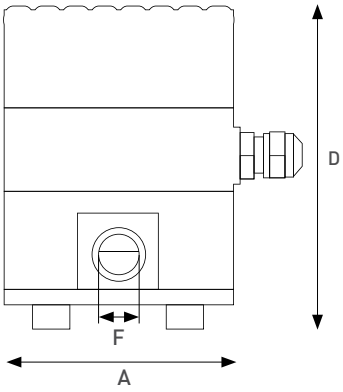
No display



Display 1



Display 2
Display 3

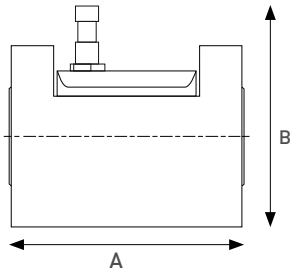


Size	V0015	V006	V01	V02	V05	V010	V050	V0115
A [mm]	78	78	78	99	112	112	220	260
C [mm]	70	75	85	93	98	125	187	245
B_{max}*, D [mm]	96	101	111	120	125	152	213	271
Installation [mm]	73	73	73	90	102	102	184	196
F / Process connection	G¼	G½	G½	G¾	G 1	G 1	G 2	G 2

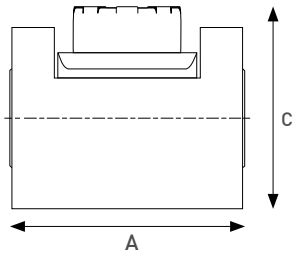
* Depends on sensor

Process connection flanged

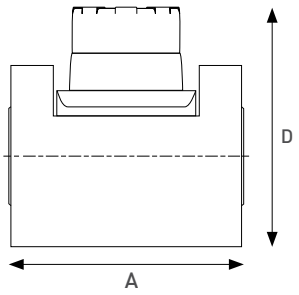
No display

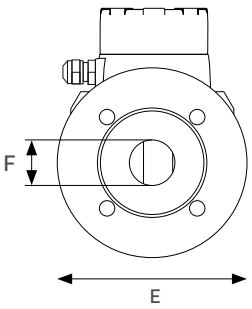


Display 1



Display 2
Display 3



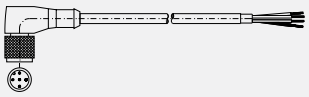


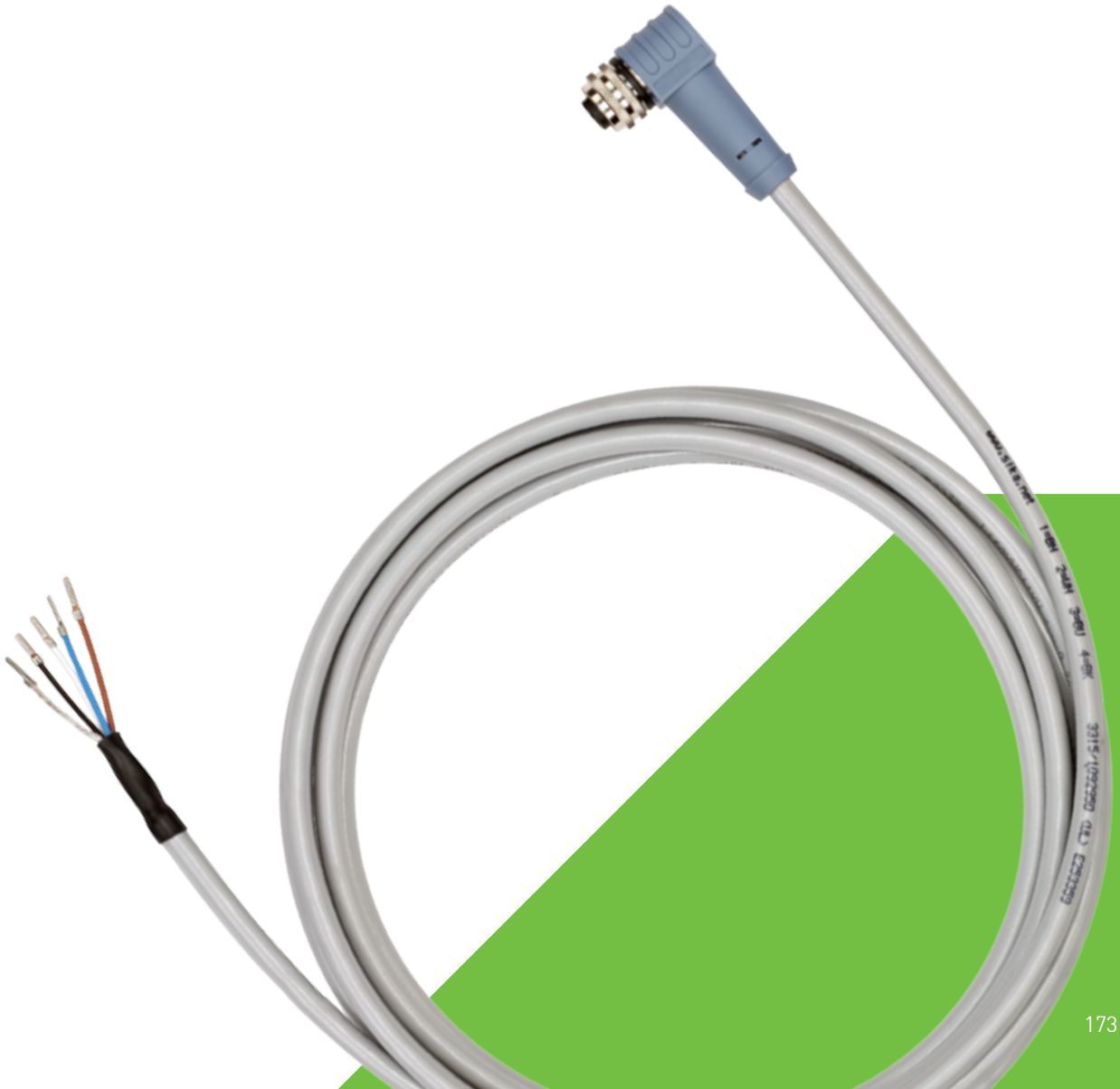
Size	VO 2	VO 10	VO 50	VO 115
A / Installation [mm]	140	170	184	196
C [mm]	108	153	165	243
B_{max}*, D [mm]	135	180	192	270
E [mm]	95	130	220	260
F / Process connection	DN 15	DN 25	DN 50	DN 50

* Depends on sensor

Order code	Example → VO	01	VA	P	N	I1K
Type						
Oval gear meters, series VO	VO					
Size	**Process connection**					
015	G¼ female	01				I1K
06	G½ female	06				I3K
1	G½ female	1A				I3K
2	G¾ female	2A				I4K
5	G 1 female	5A				I5K
10	G 1 female	10				I5K
50	G 2 female	50	[VA]*			I8K
115	G 2 female	11	[VA]*			I8K
2	DN 15 flange according to DIN EN 1092-1	2A				F3K
10	DN 25 flange according to DIN EN 1092-1	10				F5K
50	DN 50 flange according to DIN EN 1092-1	50	[VA]*			F8K
115	DN 50 flange according to DIN EN 1092-1	11	[VA]*			F8K
Materials						
Body	**Oval gears**					
Stainless steel	Stainless steel		VA			
Stainless steel	PEEK		VP			
Aluminium	PEEK		AP			
O-rings						
FKM (standard)				V		
EPDM				E		
FEP				P		
Sensor pulse output without display						
NPN					N	
PNP					P	
PNP (high temperature)					H	
Sensor with display						
Display 1						
Battery powered, local display					D	
Display 2						
Battery powered, local display and pulse output					C	
Battery powered, remote display and pulse output					B	
Display 3						
Local Display, pulse and analogue output (4...20 mA)					T	
Remote display, pulse and analogue output (4...20 mA)					A	

* Preset

Accessories	Length	Order code	
Connection cable with 4-pin cable socket M12 x 1, angle type molded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) - UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4 pin cable socket M12x1 angle type, unassembled		VT1331	
3.6 V lithium battery for Display 1 and Display 2		VO1036	



- → Series VS1
- → Series VS3
- → Limit switches

VARIABLE AREA FLOW METERS

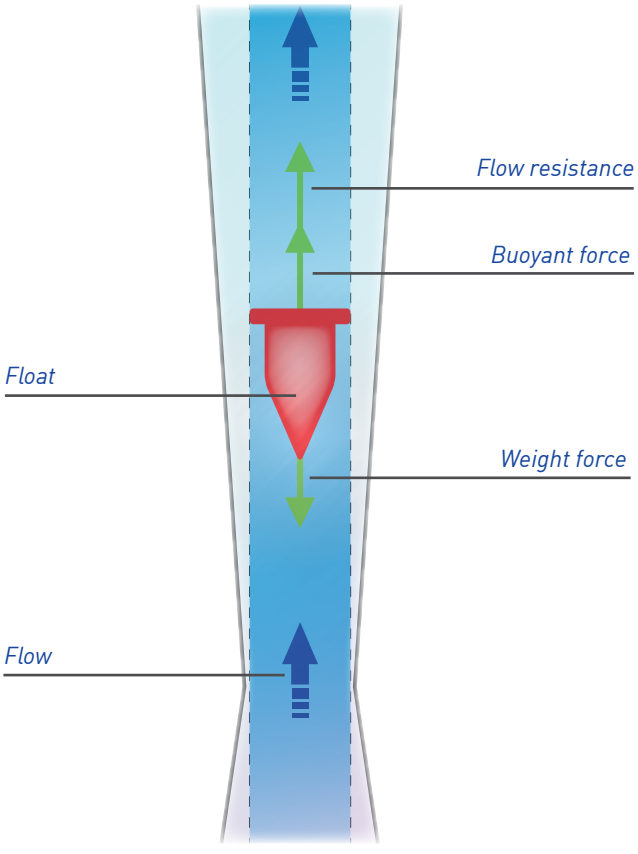
Variable area flow meters

Principle of operation

Variable area flow meters are used in pipelines and determine the volume flow of liquids or gases there. The flow meter consists of a conical measuring tube with a float inside it.

The measuring principle is based on the body being vertically deflected through the flowing medium. Various forces act on the float - the flow resistance, the buoyant force, as well as the weight force of the body.
In summary, if the volume flow rises, the float is lifted. The current flow is indicated on the scale at the top of the float.

These flow meters feature a water scale in l/h and a % scale as standard. Optional air scales are also available for various operating pressures. Two adjustable reference value indicators facilitate monitoring of the rate of flow. Limit contacts are available as accessories.



Advantages

- Unbreakable and corrosion resistant
- Radially extendable
- Special self-adhesive scales for liquid and gaseous media
- Check rail for accessories (limit switches)
- Size (DN), measuring range and material marked on tube
- Floats and stops generally made of PVDF
- Measuring ranges 1.5...60 000 l/h
- Various number of nominal sizes available

Variable area flow meters

Series VS1

Type VS1

Technical data			
Type	**VS11...**	**VS12...**	**VS13...**
Accuracy	Class 4 according to VDI / VDE 3513 Page 2		
Pressure rating	PN 10		
Medium temperature	0...60 °C		
Material			
Tube	PA	PSU	PVC
Float	PVDF		
Stops/internals	PVDF		
O-Ring	EPDM		
Slip fit process connections	PVC		
Guiding bar (VS1 50 l... and larger)	PVDF/stainless steel		

Measuring accuracy										
Flow rate in %	10	20	30	40	50	60	70	80	90	100
Total error of measured value in %	13.00	8.00	6.33	5.50	5.00	4.67	4.43	4.25	4.11	4.00
Total error of range in %	1.3	1.6	1.9	2.2	2.5	2.9	3.1	3.4	3.7	4.0

Options		
For type	**On request**	**Required Information**
VS1	→ Special scale	→ Medium → Specific weight → Viskosity → Medium temperature

Measuring range water flow

Type	Nominal size	Measuring range [l/h, water)	Typical pressure drop [mbar]*
VS1_25 A... **VS1_25 B...**	DN 25	50...500 100....1000	22.84
VS1_32 C... **VS1_32 E...**	DN 32	150...1500 250...2500	22.84
VS1_40 D... **VS1_40 F...** **VS1_40 G...**	DN 40	200...2000 300...3000 600...6000	24.99
VS1_50 G... **VS1_50 H...**	DN 50	600...6000 1000...10000	24.99
VS1_50 I...		1500...15000	28.23
VS1_65 J... **VS1_65 K...**	DN 65	2000...20000 3000...30000	45.67
VS1_65 L...		8000...60000	47.24

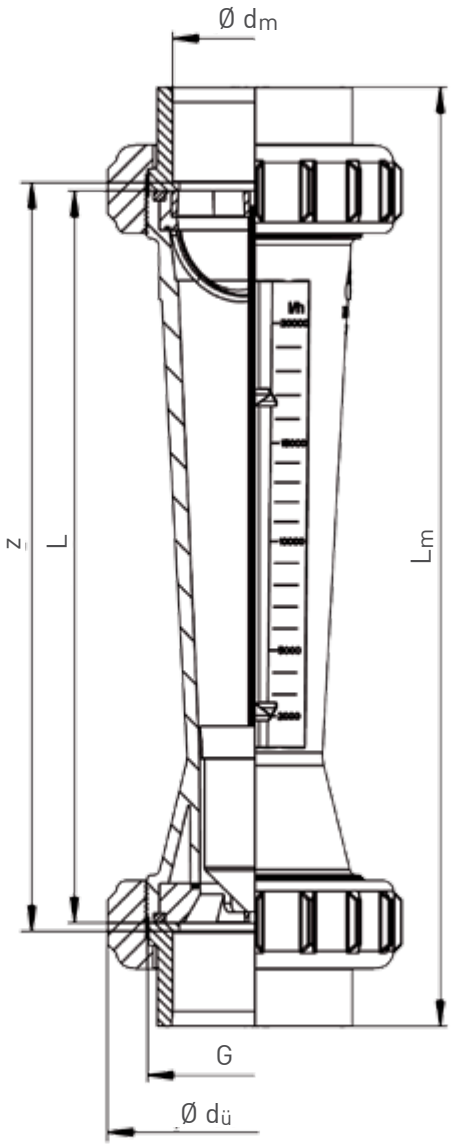
* Within entire measuring range

Measuring range air flow

Working pressure		0 bar	1 bar	2 bar	3 bar	4 bar
Type	**Nominal size**	**Measuring range [m³/h i.N.]**				
VS1_25 A... **VS1_25 B...**	DN 25	1.5...14 2.5...29	3...20 4...41	3...24 5...50	3...28 5...58	4...31 6...65
VS1_32 C... **VS1_32 E...**	DN 32	4...45 7...79	6...63 10...111	7...77 12...136	8...90 14...158	9...100 16...177
VS1_40 D... **VS1_40 F...** **VS1_40 G...**	DN 40	6...58 9...108 17...174	9...82 13...152 24...246	11...100 16...186 30...301	12...116 18...216 34...348	14...130 21...241 39...389
VS1_50 G... **VS1_50 H...** **VS1_50 I...**	DN 50	17...175 29...301 53...405	24...247 41...425 75...572	30...302 51...520 92...700	34...350 58...602 106...810	39...392 65...674 119...907
VS1_65 J... **VS1_65 K...**	DN 65	55...545 80...758	78...770 113...1072	96...942 139...1311	110...1090 160...1516	124...1220 180...1697

Measuring range air flow

Working pressure		5 bar	6 bar	7 bar	8 bar
Type	**Nominal size**	**Measuring range [m³/h i.N.]**			
VS1_25 A... **VS1_25 B...**	DN 25	4...34 7...71	5...37 7...76	5...39 8...82	4.5...42 7.5...87
VS1_32 C... **VS1_32 E...**	DN 32	10...110 18...193	11...119 19...209	12...127 20...223	12...135 21...237
VS1_40 D... **VS1_40 F...** **VS1_40 G...**	DN 40	15...142 23...264 42...426	16...153 24...286 45...461	17...164 26...305 49...492	18...174 27...324 51...522
VS1_50 G... **VS1_50 H...** **VS1_50 I...**	DN 50	42...428 72...737 130...992	45...463 77...797 141...1073	49...495 83...851 150...1146	51...525 87...903 159...1215
VS1_65 J... **VS1_65 K...**	DN 65	135...1335 197...1857	146...1444 212...2008	156...1542 227...2145	165...1635 240...2274



Dimensions [mm]

DN	G	d_m	L	z	L_m	$d_ü$
25	1 ½"	32	335	341	385	60
32	2"	40	335	341	393	72
40	2 ¼"	50	335	341	403	83
50	2 ¾"	63	335	341	417	103
65	3 ½"	75	335	341	429	122

Order code		Example → VS11	25 A	11	W0
Tube material					
PA		VS11			
PSU		VS12			
PVC		VS13			
Nominal size	**Measuring range water**				
DN 25					
	50...500 l/h		25 A		
	100...1000 l/h		25 B		
DN 32					
	150...1500 l/h		32 C		
	250...2500 l/h		32 E		
DN 40					
	200...2000 l/h		40 D		
	300...3000 l/h		40 F		
	600...6000 l/h		40 G		
DN 50					
	600...6000 l/h		50 G		
	1000...10 000 l/h		50 H		
	1500...15 000 l/h		50 I		
DN 65					
	2000...20 000 l/h		65 J		
	3000...30 000 l/h		65 K		
	8000...60 000 l/h		65 L		
Float					
Standard				11	
With magnet (for use with limit switches)				21	
Scale					
Water flow l/h and %					W0
Air flow 0 bar					00
Air flow 1 bar					10
Air flow 2 bar					20
Air flow 3 bar					30
Air flow 4 bar					40
Air flow 5 bar					50
Air flow 6 bar					60
Air flow 7 bar					70
Air flow 8 bar					80

Variable area flow meters

Series VS3

Type VS3

Technische Daten		
Type	**VS32...**	**VS33...**
Accuracy	Class 4 according to VDI / VDE 3513 Page 2	
Pressure rating	PN 10	
Medium temperature	0...60 °C	
Material		
Tube	PSU	PVC
Float	PVDF	
Stops/internals	PVDF	
O-Ring	EPDM	
Slip fit process connections	PVC	

Measuring accuracy										
Flow rate in %	10	20	30	40	50	60	70	80	90	100
Total error of measured value in %	13.00	8.00	6.33	5.50	5.00	4.67	4.43	4.25	4.11	4.00
Total error of range in %	1.3	1.6	1.9	2.2	2.5	2.9	3.1	3.4	3.7	4.0

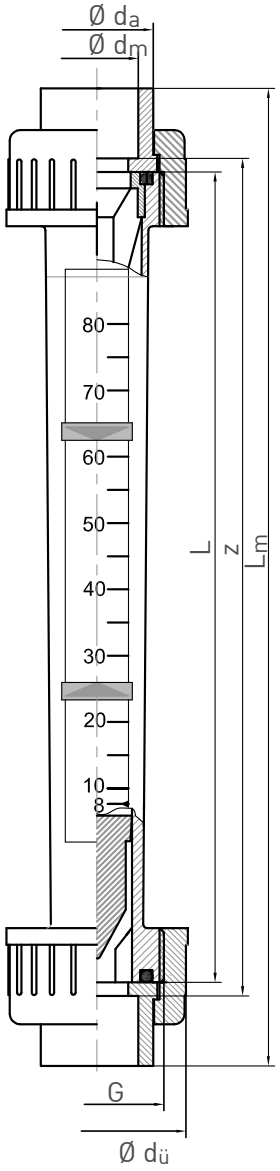
Options		
For type	**On request**	**Required Information**
VS3	→ Special scale	→ Medium → Specific weight → Viskosity → Medium temperature

Measuring range water flow			
Type	**Nominal size**	**Measuring range [l/h, water]**	**Typical pressure drop [mbar]***
VS3_10 P...	DN 10	1.5...15	4.51
VS3_10 Q...		2.5...25	
VS3_10 R...		5...50	
VS3_10 T...		10...100	
VS3_15 S...	DN 15	8...80	4.38
VS3_15 U...		15...150	
VS3_15 V...		20...200	
VS3_25 U...	DN 25	15...150	8.12
VS3_25 W...		30...300	
VS3_25 A...		50...500	
VS3_25 B...		100...1000	

* Within entire measuring range

Measuring range air flow							
Working pressure		**0 bar**	**1 bar**	**2 bar**	**3 bar**	**4 bar**	**5 bar**
Type	**Nominal size**	**Measuring range [m³/h i.N.]**					
VS3_10 P...	DN 10	0.1...0.55	0.15...0.80	0.17...0.9	0.20...1.1	0.25...1.20	0.25...1.3
VS3_10 Q...		0.2...0.95	0.25...1.3	0.3...1.6	0.4...1.9	0.4...2.1	0.5...2.4
VS3_10 R...		0.5...1.9	0.7...2.7	0.8...3.4	1.0...3.8	1.2...4.2	1.2...4.6
VS3_10 T...		0.8...3.0	1.0...4.2	1.2...5.4	1.4...6.4	1.6...7.0	1.6...7.4
VS3_15 S...	DN 15	0.6...2.8	0.8...4	1.0...5.0	1.2...5.6	1.4...6.4	1.4...7.0
VS3_15 U...		1.4...5.6	2...8	2...10	3...12	3...13	3...14
VS3_15 V...		1.5...7.0	2...10	3...13	3...15	4...17	4...18
VS3_25 U...	DN 25	1.0...6,5	1...9	1.5...11	2...13	2...14.5	2...16
VS3_25 W...		1.5...11	2...15	2.5...18	3...22	3...24	4...26
VS3_25 A...		3...18	4...25	5...30	5...35	6...40	6...44
VS3_25 B...		6...30	8...44	10...54	12...62	12...70	15...75

Measuring range air flow						
Working pressure		**6 bar**	**7 bar**	**8 bar**	**9 bar**	**10 bar**
Type	**Nominal size**	**Measuring range [m³/h i.N.]**				
VS3_10 P...	DN 10	0.26...1.45	0.30...1.5	0.3...1.6	0.3...1.7	0.35...1.8
VS3_10 Q...		0.5...2.5	0.5...2.7	0.6...2.9	0.6...3.0	0.6...3.2
VS3_10 R...		1.2...5.0	1.4...5.4	1.4...5.8	1.6...6.0	1.6...6.4
VS3_10 T...		2.0...8.0	2.0...8.8	2.0...9.0	2.0...10	2...10
VS3_15 S...	DN 15	1.5...7.5	1.5...8.0	1.5...8.5	2.0...9.0	2.0...9.5
VS3_15 U...		3.5...15	3.5...16.5	4...17	4...18	4...19
VS3_15 V...		4...20	5...21	5...23	5...23	5...25
VS3_25 U...	DN 25	2...17	2.5...18	2.5...19.5	3...20	3...21
VS3_25 W...		4...28	4...30	4...33	5...34	5...35
VS3_25 A...		8...48	8...50	8...54	8...56	10...60
VS3_25 B...		15...80	15...85	20...90	20...95	20...100



Dimensions [mm]						
DN	**G**	**dm**	**L**	**z**	**Lm**	**dü**
10	¾ "	16	165	171	199	35
15	1 "	20	185	191	223	43
25	1 ½ "	32	200	206	250	60

Order code		Example → VS32	10 P	11	W0
Tube material					
PSU		VS32			
PVC		VS33			
Nominal size	**Measuring range water**				
DN 10					
	1.5...15		10 P		
	2.5...25		10 Q		
	5...50		10 R		
	10...100		10 T		
DN 15					
	8...80		15 S		
	15...150		15 U		
	20...200		15 V		
DN 25					
	15...150		25 U		
	30...300		25 W		
	50...500		25 A		
	100...1000		25 B		
Float					
Standard				11	
With magnet (for use with limit switches)				21	
Scale					
Water flow l/h and %					W0
Air flow 0 bar					00
Air flow 1 bar					10
Air flow 2 bar					20
Air flow 3 bar					30
Air flow 4 bar					40
Air flow 5 bar					50
Air flow 6 bar					60
Air flow 7 bar					70
Air flow 8 bar					80
Air flow 9 bar					90
Air flow 10 bar					Z0

Accessories

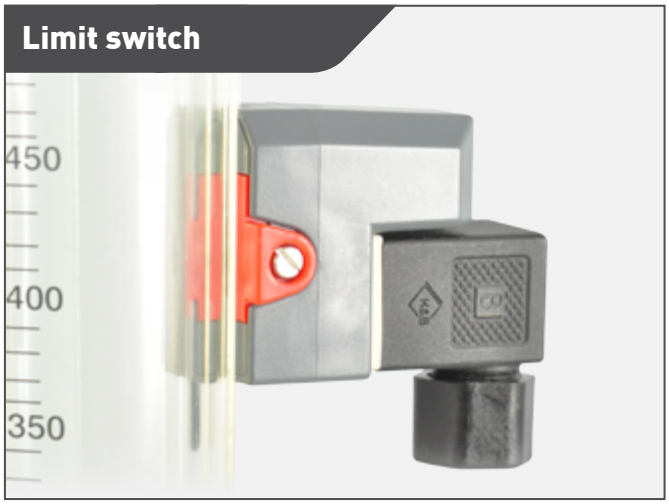
Limit switches

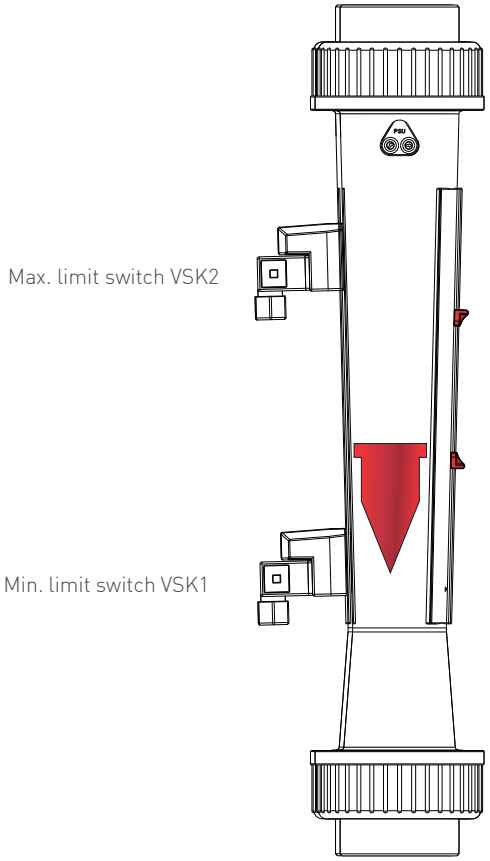
Application

The limit switches VSK1 and VSK2 serve for external monitoring of limited flow rates on our variable area flow meters. They are fitted on the check rail on the flow meter and can be adjusted to any switching point on the respective scale.

Function

The magnet in the float closes or opens a reed contact encapsulated in the limit switch. The switching function is bistable. This means that switching state is also maintained when the magnetic float is at a distance from the contact. Important to note when retrofitting limit switches is that the standard float must be replaced with a magnetic float.

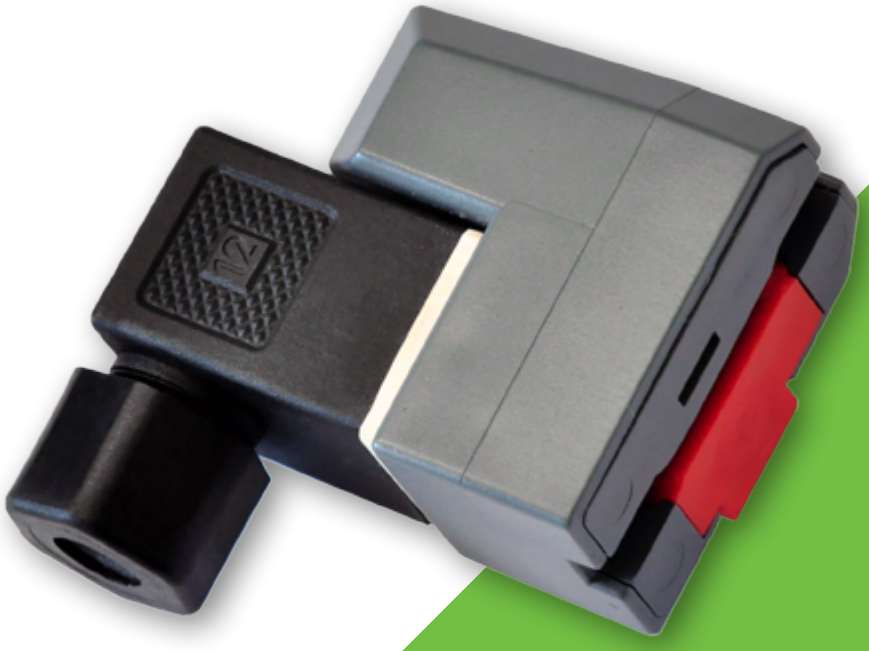




Technical datas	
Switching voltage	Max. 230 V AC / DC
Switching capacity	Max. 10 W / 12 VA
Switching current	Max. 0.5 A
Contact resistance	200 mΩ
Insulation resistance	10^{11} Ω
Ambient temperature	0...55 °C
Degree of protection DIN 40050	IP65 according to
Switching hysteresis	1 - 2 mm float travel

Switching states and order code

Limit switches	Float		Tag	Order code
	below	above		
Min. limit switch			min	VSK1
Max. limit switch			max	VSK2



→ Series VE

→ Series VL

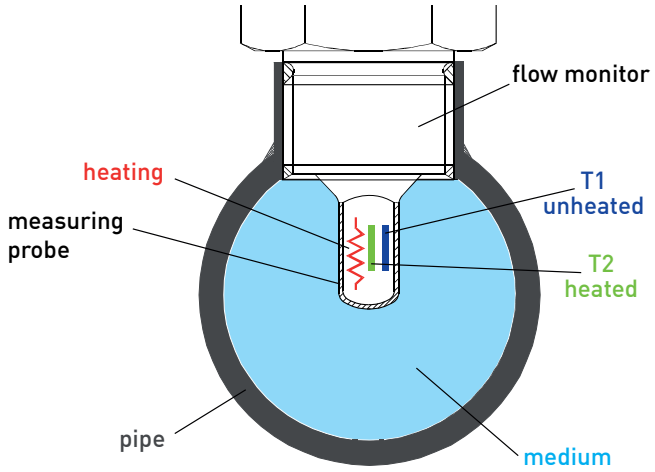
ELECTRONIC FLOW MONITORS AND SENSORS

Electronic flow monitors for liquids

Principle of operation

The electronic flow monitor works on the principle of the detection of temperature differences. The cylindrical measuring probe contains two temperature sensors. These have optimum heat conducting contact with the medium and are thermally well insulated from each other. One sensor is heated with a constant electrical power while the other sensor is not heated and thus takes on the temperature of the medium. When the medium is not in motion, the temperature difference between the two sensors stabilizes at a constant level.

The flowing medium cools down the heated sensor. The changing temperature difference between the two sensors depends on the velocity and is a parameter for monitoring the specified minimum flow rate. This signal is sent to a comparator which controls a transistor output signal. With a potentiometer the output signal is set to the requested set point. When the flow rate fails to reach this limit, the transistor activates the output signal. A six position LED array displays the proximity to the alarm point which has been specified.



Applications

- Protection for pumps against dry running
- Monitoring lubrication circuits
- Cooling and heating circuits
- Air-conditioning units
- Monitoring for pipe breaks
- Monitoring for leaks

Advantages

- No moving parts in the flow
- Switching possible at very low flow
- High pressure capability
- Can be used for a wide range of pipe sizes

VES compact version

Here the flow sensor and the corresponding switching transducer form a single unit. This means that flow can be monitored directly at the point of measurement.

VEG separate version

The flow sensor installed in the pipe is connected to the switching transducer by a connecting lead. The electronic unit has been designed for installation on a mounting rail. This means that several points of measurement can be monitored from a central location.

Electronic flow monitors for liquids

Series VE

Type VES

Type VEG

Technical data				
Sensor	**Compact version**		**Separate version**	
Type	VES08	VES09	VEG08	VEG09
Length of measuring probe L1	31 mm	48 mm	31 mm	48 mm
Thread length L2	15 mm	29 mm	15 mm	35 mm
Temperature gradient	4 °C / s			
Stand-by time	Approx. 2...15 s			
Response time	Approx. 1...13 s			
Max. pressure rating	200 bar			
Medium temperature	-20...85 °C			
Process connection	G½ male			
Degree of protection EN 60529	IP67			
Material in contact with fluid	Stainless steel 1.4571			
Electrical connection	4-pin plug connector M12 x 1			
Oder code				
	VES08	VES09	VEG08	VEG09

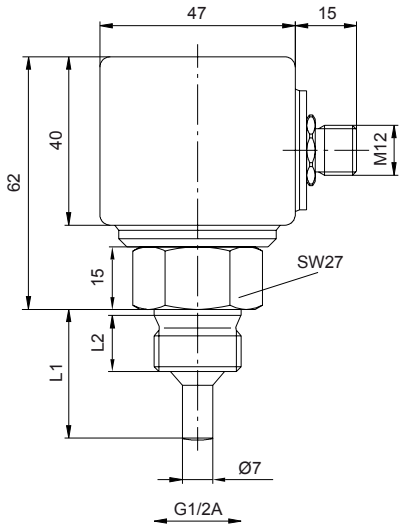
Technical data			
Switching transducer	**Integrated**	**Separate**	
Display	6 LEDs: 1 red = alarm 2 yellow = switching point 3 - 6 green = flow		
Power supply	24 VDC (±10 %)	24 VDC (±20 %) (standard)	230 VAC (+10%/-20%) (on request)
Current consumption	70 mA	80 mA	35 mA
Output signal **Max. switching voltage** **Max. output current / switching current** **Max. switching capacity**	PNP, open collector 400 mA (25 °C)	Relay, closing contact 230 VAC / 250 VDC 1 A 125 VA / 60 W	Relay, change over contact 230 VAC / 60 VDC 4 A 1000 VA / 60 W
Material housing	PBT	PC-GF	
Oder code			
		EU3011V0000126	EU3011V0000240

Working range of sensors

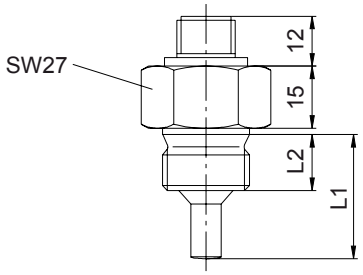
Set point range (detection range water: 1...150 cm/s; oil: 3...300 cm/s)										
Pipe size	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 150
Water [l/min]	0.1...18	0.2...33	0.3...52	0.6...91	0.8...124	1.3...199	2.2...335	3.1...462	5.2...784	11.4...1707
Oil * [l/min]	0.4...36	0.7...66	1...105	2...182	2.5...247	4...397	6.7...670	9.2...920	15.7...1568	34...3414

* Oil medium viscosity (approx. 80 mm² / s at 20 °C)

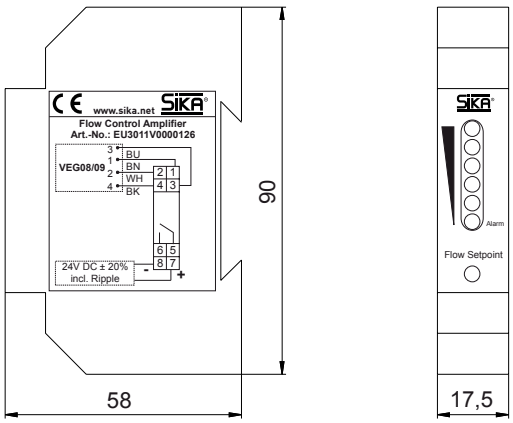
VES (compact version)



VEG (separate version)



Switching transducer EU3011V0000126



Electronic flow sensors for gases

Series VL

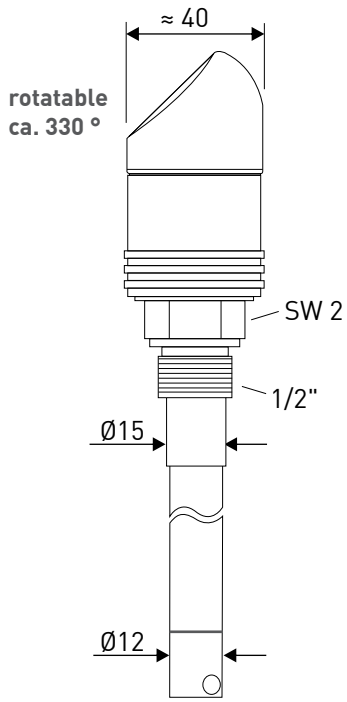
The sensors of the series VL operate on the calorimetric principle without moving parts. The operation and adjustment is done in a user-friendly manner via three capacitive buttons and the 4-digit 7 segment display. The display head on the housing body can be rotated through 330° and the display can be additionally turned through 180° for an overhead installation. The housing body can be also adjusted through 330° together with the electric connection.

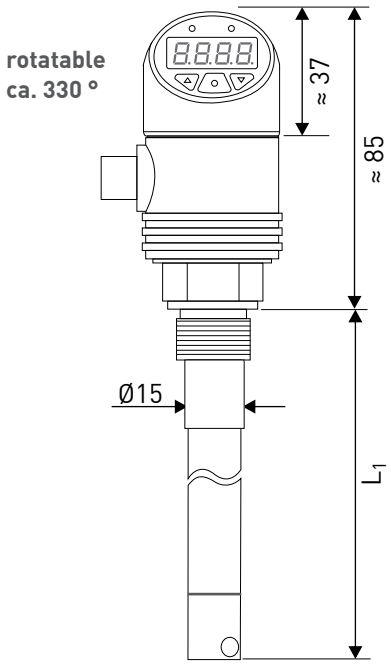
- Local display
- Analogue output: 4...20 mA
- Alarm output
- Peak value memory min/max
- Menu navigation according to VDMA 245741-4

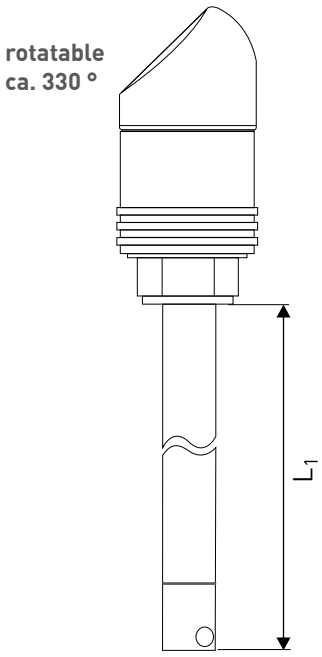
Technical data	
Probe length L_1	100...400 mm selectable, increments of 50 mm
Process connection	G½, G¾, G1, G 1½, clamp screw connection G½ or ½" NPT
Measuring range	0...10 m/s, 0...20 m/s or 0...30 m/s
Accuracy	±5 % of range* in the range 10...100 % of reading
Temperature error	±0.01 % / K
Repeatability	±2 %
Reaktionszeit	Approx. 2 s
Measured medium	Air or non-aggressive gases
Temperature ranges → Medium → Ambient → Storage	 -20...70 °C 0...60 °C -20...80 °C
Pressure rating	PN 10
Displays	4 digit 7 segment, red, height 8.5 mm, reversable Status LED for alarm output
Display error	±0.2 % of range ±1 digit
Operation	3 buttons, according to VDMA 24574-1 to 24574-4
Degree of protection EN 60529	Sensor IP67 Electronics IP65 (with mounted cable socket)

* Reference conditions 20 °C, 1013 hPa

Electrical data	
Electrical connection	4-pin cable socket M12 x 1
Power supply	24 VDC (±10 %)
Current consumption	≤21 mA
Output signals	
Analogue output	
→ Current signal	4...20 mA / 3-wire
→ Scaling	Programmable
→ Works scaling	0...100 % of measuring range
→ Max. burden	500 Ω
Alarm output	
→ Signal shape	PNP open collector
→ Max. output current / switching current	200 mA
→ Switching point	Programmable
→ Hysteresis	Programmable
→ Alarm delay	0...999.9 sec programmable

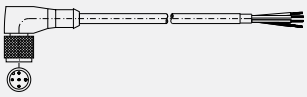


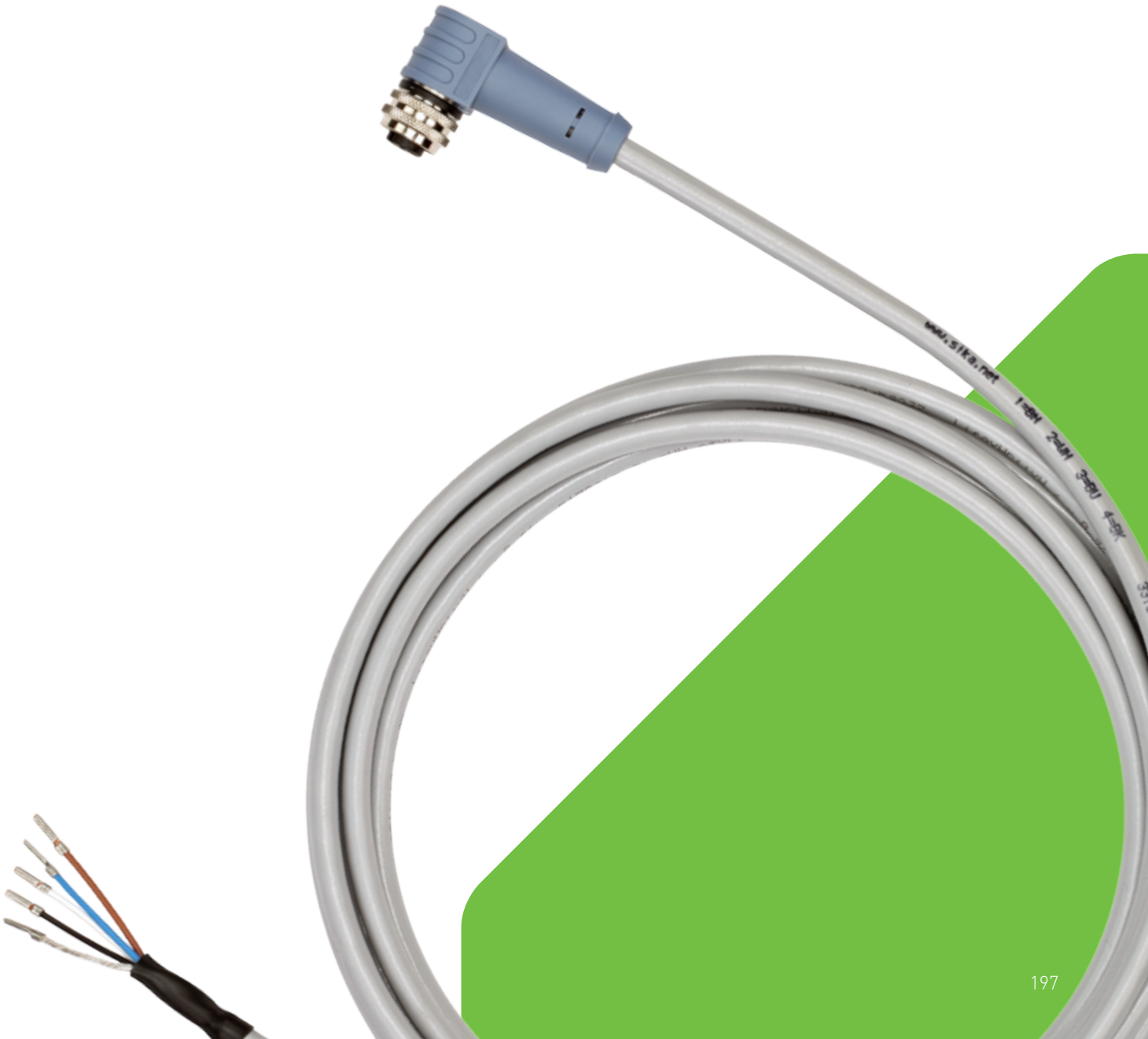




Material in contact with media	
Process connection	Stainless steel 1.4571
Sensor tube	Stainless steel 1.4571
Sensor element	Al_2O_3 with glass passivation
Sensor holder	FKM

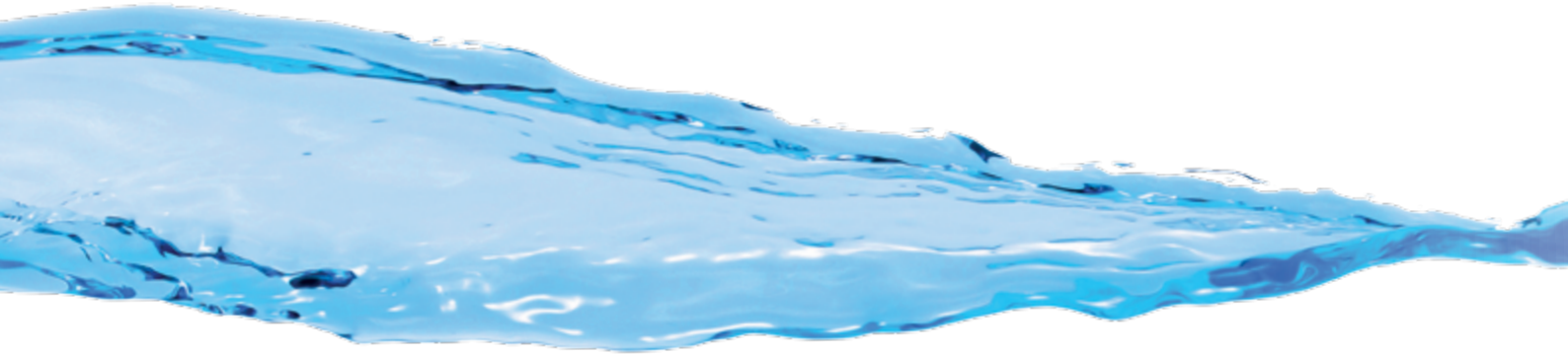
Order code	Example → VL3M	1	10	0100
Type				
VL	VL3M			
Process connection				
G½		1		
G¾		2		
G 1		4		
G 1½		5		
Clamp screw connection G½		7		
½" NPT		6		
Measuring range				
0...10 m/s			10	
0...20 m/s			20	
0...30 m/s			30	
Probe length L_1				
100 mm				0100
150 mm				0150
200 mm				0200
250 mm				0250
300 mm				0300
350 mm				0350
400 mm				0400

Accessories	Length	Order code	
Connection cable with 4-pin cable socket M12 x 1, angle type moulded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) - UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4-pin cable socket M12x1 angle type, unassembled		VT1331	



- → For industrial applications
- → For marine applications
- → With proximity switch

PISTON TYPE FLOW SWITCHES →



Piston type flow switches

Piston type flow switches monitor the flow of liquid media in pipes. They offer a reliable solution for ensuring the minimum flow rate and thereby protecting high-quality systems and installations from damages. These flow switches work on the basis of the well- established mechanical operating principles.

Principle of operation

The flowing medium lifts the piston against the force of the stainless steel spring. This causes a permanent magnet located on the piston to change position and trip a reed switch. The switch output can be used to monitor the volume flow and check whether it drops below or exceeds a certain limit.

Advantages

- Various fitting positions
- High repeatability
- Reed contact output
- Wide set point ranges
- Inline installation
- Special version for oil available

Applications

- Heating systems
- Cooling circuits
- Lubrication circuits
- Heat pumps
- Water-cooled welding equipment
- Compressors
- Chemical, pharmaceutical and food industry
- Cleaning systems and environmental protection facilities
- Cooling water monitoring
- Leakage monitoring

Piston type flow switches for industrial applications

Series V1000

- Optical flow indication by glow lamp (only at 230 VAC)
- Various fitting positions
- High repeatability
- Reed contact output
- Wide set point ranges
- Inline installation
- Special version for oil available (on request)

Type V1000

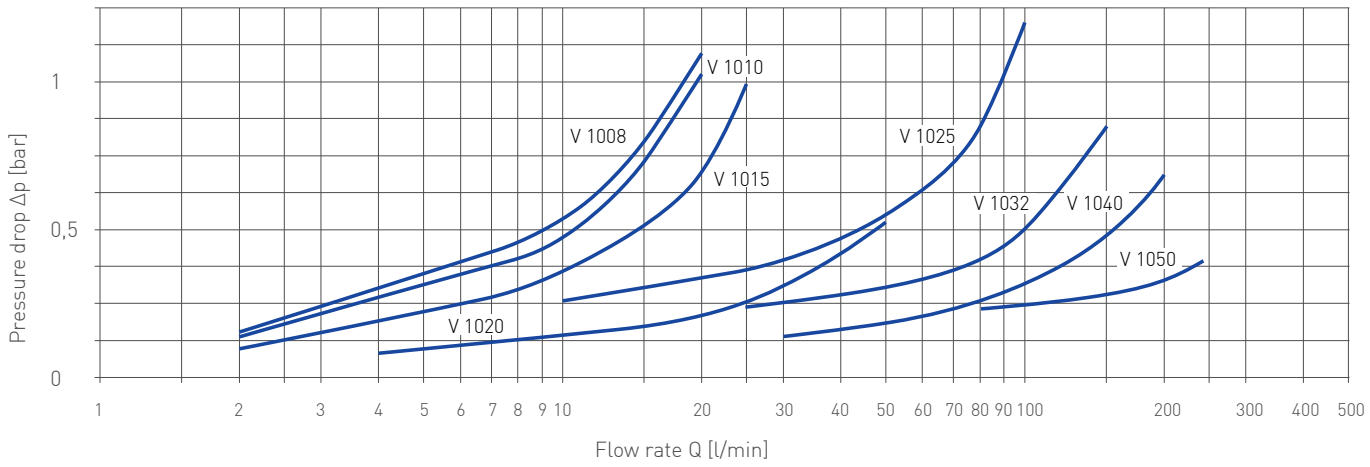
Technical data	
Pressure rating	PN 16
Medium temperature	Max. 100 °C
Change over contact **max. contact rating**	230 V AC / DC; 1 A 25 W , 36 VA
Degree of protection EN 60529	IP54
Hysteresis	< 10 % of set point range
Accuracy	< 2 % of set point range

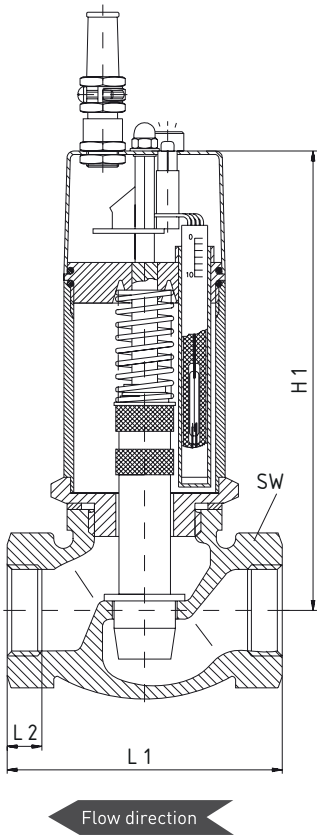
Order code	Pipe size	Thread connection	Set point ranges [l/min]** decreasing flow OFF	Dimensions [mm]				Weight [kg]
				SW	L1	L2	H1	
V1008S01351G1R	DN 08	G¼	2...10	27 / 22*	81	10	136	1.0
V1010S01351G2R	DN 10	G⅜	2...10	27 / 22*	81	11	136	1.0
V1015S01351G3R	DN 15	G½	2...13	27	67	11	140	0.9
V1020S01351G4R	DN 20	G¾	5...28	33	80	14	143	1.1
V1025S01351G5R	DN 25	G 1	20...110	41	95	17	150	1.3
V1032S01351G6R	DN 32	G 1¼	23...140	52	98	14	150	1.7
V1040S01351G7R	DN 40	G 1½	50...220	58	130	17	144	2.2
V1050S01351G8R	DN 50	G 2	130...400	72	137	20	150	3.3

* Nut size of thread reductions (included)

** Water, 20 °C

Typical pressure drop





Materials in contact with fluid	
Pipe section	Gun metal RG5
Body	Brass
Piston	PPN (Hostalen)
Magnet	Hard ferrite

Piston type flow switches for marine applications

Series VM100

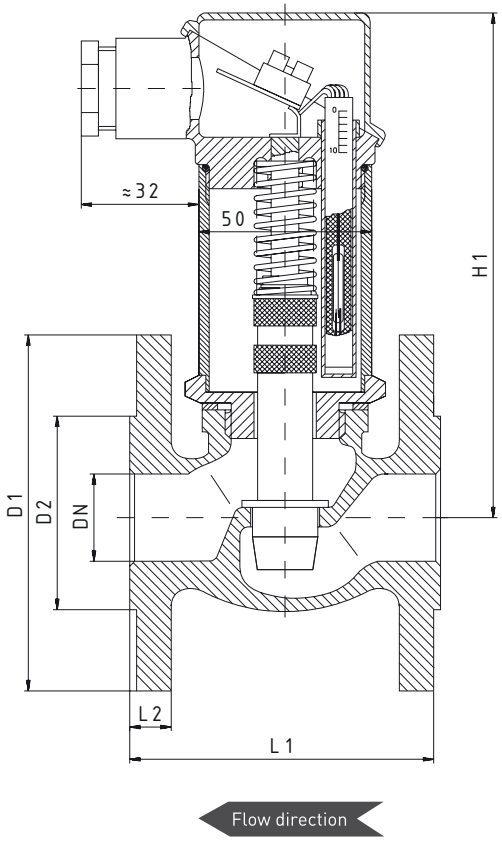
- Germanischer Lloyd Type Approval
- Inline installation,
  DN 15...DN 20 female threaded, DN 25...DN 80 flanged
- Wide set point range
- Various fitting positions
- High repeatability
- Reed contact output
- Special version for oil available (on request)

Type VM100

Technical data	
Pressure rating	PN 16
Medium temperature	Max. 100 °C
Change over contact **max. contact rating**	24 V DC; 230 V AC 0,5 A DC; 1 A AC 25 W; 36 VA
Cable gland	M24 x 1,5 acc.to DIN 89280
Degree of protection EN 60529	IP44
Hysteresis	< 15 % of set point range
Accuracy	< 2 % of set point range
Approvals	
GL Germanischer Lloyd, Type Approval Certificate No. 54627-71HH	

Order code	Pipe size	Process connection	Set point ranges [l/min]* decreasing flow OFF	Dimensions [mm]				
				D1	D2	L1	L2	H1
VM115--1351G3R	DN 15	G½	2...13			81		136
VM120--1351G4R	DN 20	G¾	5...28			80		136
VM125--1351G5R	DN 25	Flange acc. to EN 1092-1	15...75	115	68	90	12	151
VM132--1351G6R	DN 32		20...125	140	78	95	13	161
VM140--1351G7R	DN 40		30...200	150	88	110	14	165
VM150--1351G8R	DN 50		85...280	165	102	125	14	165
VM165--1351G9R	DN 65		65...410	185	122	150	15	179
VM180--1351G0R	DN 80		150...550	200	138	170	16	185

* Water, 20 °C



Materials in contact with fluid	
Pipe section	Gun metal RG5
Body	Brass
Piston	PPN (Hostalen)
Magnet	Hard ferrite

Piston type flow switches with proximity switch

Series V3000

- Magnet free construction
- Monitoring of extremely low flow rates e.g. 0.5 l/min
- Various fitting positions
- High repeatability
- Low hysteresis ⩽ 1 %
- Wear-free proximity switches

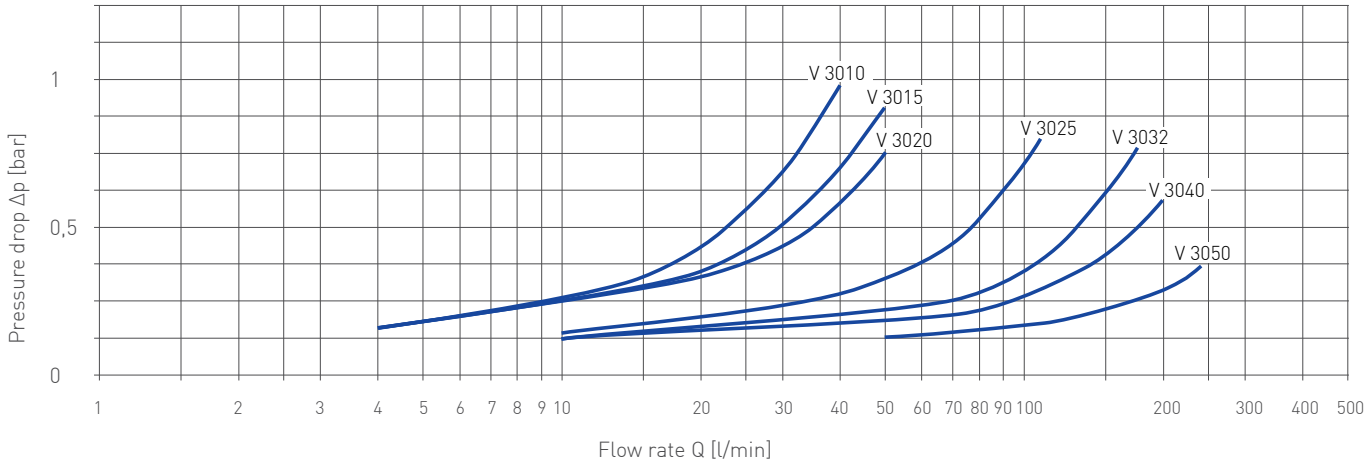
Type V3000

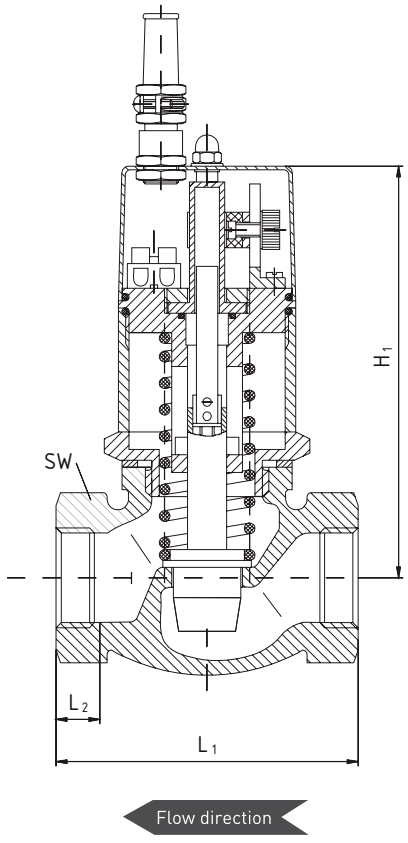
Technical data	
Pressure rating	PN 16
Medium temperature	Max. 100 °C
Output signal	NAMUR
Degree of protection EN 60529	IP54
Tolerance of set point ranges	±15 %

Order code	Pipe size	Thread connection	Set point ranges [l/min]** decreasing flow OFF	Dimensions [mm]				Weight [kg]
				SW	L1	L2	H1	
V3010S01751G2R	DN 10	G⅜	0.5...50	33/28*	96	19	113	1.1
V3015S01751G3R	DN 15	G½	0.5...50	33/28*	96	19	113	1.1
V3020S01751G4R	DN 20	G¾	0.5...50	33	80	13	113	1.0
V3025S01751G5R	DN 25	G1	2...105	41	95	14	120	1.2
V3032S01751G6R	DN 32	G1¼	2...235	52	98	14	120	1.6
V3040S01751G7R	DN 40	G1½	3.5...342	58	130	17	125	2.1
V3050S01751G8R	DN 50	G2	5...417	72	137	20	131	3.2

Bigger pipe sizes on request.
* Nut size of thread reductions (included)
** Water, 20 °C

Typical pressure drop





Materials in contact with fluid	
Pipe section	Gun metal RG5
Body	Brass
Piston	PPN (Hostalen)
Actuator guide	PEI (Ultem)

→ Series VB

FLOW REGULATORS

Flow regulators

The flow regulators type VB15 and VB20 were developed to maintain a constant specific rate of flow in water-like media. They ensure that the flow rate is maintained constant or is not exceeded even with fluctuating pressures upstream or downstream of the flow regulator.
Supplying the individual sections with the desired flow volumes, while permitting hydraulic compensation is especially important in complex pipeline systems with several consumers.

Principle of operation

The free cross-section for the flow medium in the control unit is correspondingly altered under the effects of the existing differential pressure. By increasing the gap opening with diminishing pressure or reducing it in the case of increasing pressure, a constant volume flow through the flow regulator is maintained.

Advantages

- No auxiliary power is required
- Simple construction
- Compact design
- Reliable, no wearing parts
- Easy installation

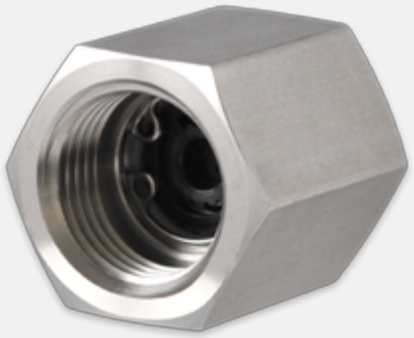
Applications

- Cooling water systems
- Water treatment systems
- Sanitary installations
- Industrial water distribution systems

Flow regulators

Series VB

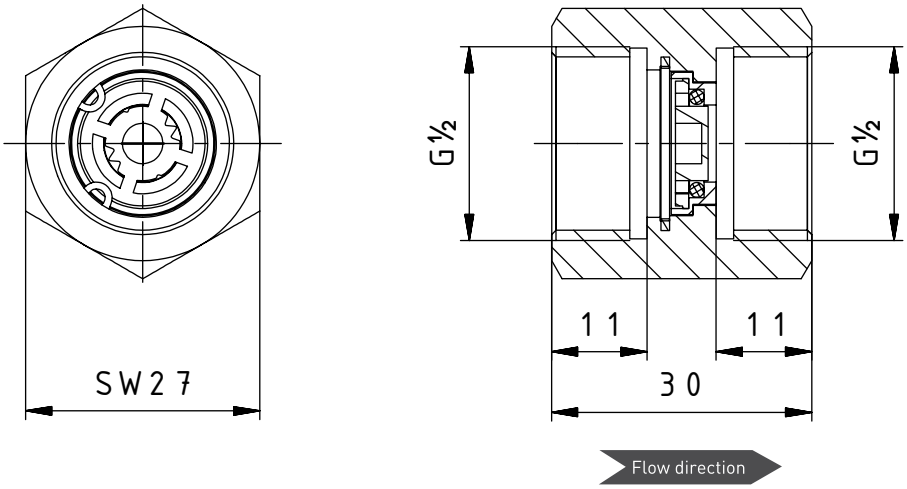
VB15 / **VB**20



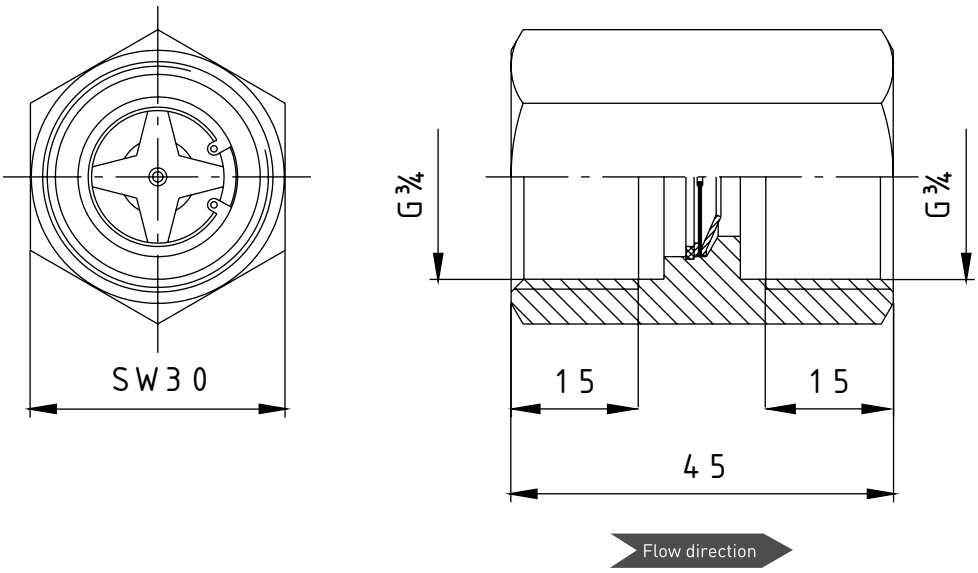
Technical data	
Type	**Set value (flow rate) [l/min], water, 20 °C**
VB1503SR...	3
VB1504SR...	4
VB1506SR...	6
VB1507SR...	7
VB1508SR...	8
VB1510SR...	10
VB1512SR...	12
Common data	
Tolerance of control	⩽ 5 l/min: ±15 % > 5 l/min: ±10 %
Operating temperature	10...60 °C
Working pressure	1...10 bar
Diameter	DN 15
Process connection	G½
Material specifications	
Pipe section	Brass 2.0401 or Stainless steel 1.4571
Inner parts	EPDM, Hostaform C POM, Stainless steel 1.4422

Technical data	
Type	**Set value (flow rate) [l/min], water, 20 °C**
VB2001ER...	1
	Set values 1...30 l/min in 1 l/min steps available
VB2030ER...	30
Common data	
Tolerance of control	< 3 l/min: ±15 % > 3 l/min: ±10 %
Operating temperature	-20...200 °C
Working pressure	2...10 bar
Diameter	DN 20 (optional DN 15)
Process connection	G¾ (optional G½) female
Material specifications	
Pipe section	Brass 2.0401 or Stainless steel 1.4305
Inner parts	Stainless steel 1.4310 / 1.4301 / A2

VB15


SW27
G½
G½
11
11
30
Flow direction

VB20


SW30
G¾
G¾
15
15
45
Flow direction

Order code	Example → VB1503SR	MS1
Set value		
3 l/min	VB1503SR	
4 l/min	VB1504SR	
6 l/min	VB1506SR	
7 l/min	VB1507SR	
8 l/min	VB1508SR	
10 l/min	VB1510SR	
12 l/min	VB1512SR	
Material		
Brass		MS1
Stainless steel		VA1

Order code	Example → VB2001ER	MS3
Set value		
1 l/min	VB2001ER	
2 l/min	VB2002ER	
Requested set value in steps of 1 l/min		
30 l/min	VB2030ER	
Material		
Brass		MS3
Stainless steel		VA3

→ Displays

→ Transducers

DISPLAYS AND TRANSDUCERS

Displays and transducers

Our electronic devices for flow and volume measurement are suitable for all SIKA flow and volume sensors. The display devices show the current flow rate and also calculate the total volume.

The signal conditioners, transducers and frequency dividers convert the output signal of the flow sensor so that it can be processed by the subsequent control system.

Transducers and frequency dividers

The TU7055 transducers convert the frequency output signal of flow sensors to analogue signals. The instruments are calibrated at the factory to the pulse rate of the desired sensor and tested. The current output delivers a flow proportional output signal of 0(4)...20 mA and the voltage output delivers a flow proportional output signal of 0...10 V.

If the output frequency of a flow sensor is too high for a subsequent evaluation device, then the TU7052 can be used. It converts a sensor's high output frequency into one low enough for the subsequent device to process. The division ratio is freely adjustable within a range of 1:1 to 1:999.
.

Displays

The universal displays of the series VA3K01 are 6-digit programmable displays for panel mounting. A transmitter supply is available for the power supply of the connected sensors. The device can display or monitor the flow rate or volume flow. The display VA3K01 is equipped with 2 relay outputs and/or a serial interface.

Displays

Panel mounting, series VA3K01

- Programmable electronic flow display for switch panel mounting
- Suitable for all Sika flow sensors equipped with a frequency/pulse output*
- Display can be programmed for flow or volume
- 14-segment LED for improved text display
- Automatic help texts
- Two relay outputs with potential-free change-over contacts
- Voltage supply for the sensor (type-dependent)
- User lock by means of lock input, e.g. for key switch
- Gate input for activating/deactivating

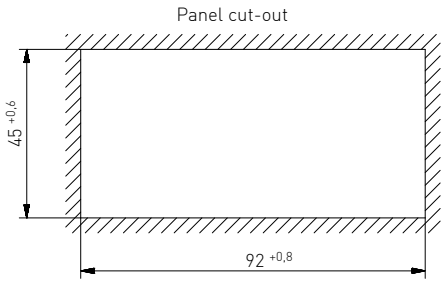
Type VA3K01

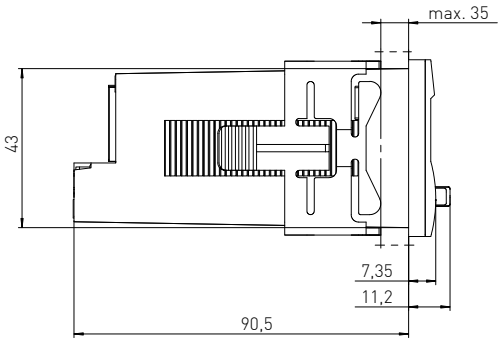
* Signal amplitude at least 7 V

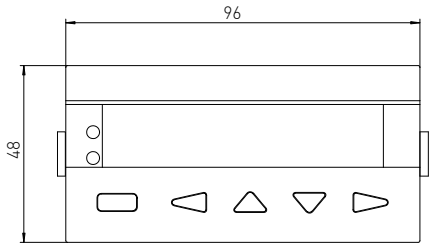
Technical data	
Display	6-digit, 14-segment LED display, red, 14 mm character height
Programming	Using front keys or by teach-in function
Signal input	Frequency signal from flow or volume sensor
Outputs	2 x relays with change-over contact
→ Switching voltage	Max. 250 VAC/150 VDC
→ Switching current	Max. 3 A AC/DC, min. 30 mA DC
→ Switching capacity	Max. 750 VA/90 W
Operating temperature	-20 °C...65 °C
Storage temperature	-25 °C...75 °C
Housing material	Polycarbonate UL94 V-2
Protection class EN 60529	IP65 (front side)
Protection class EN 60730-1	Class II
Voltage supply (sensor)	(AC version): 24 V DC (±15 %), 80 mA (DC version): Max. 80 mA, connected voltage supply is looped through
Power supply	100...240 V AC (±10 %), max. 11 VA, 50/60 HZ or 10...30 V DC, max. 5.5 W

Options

- Output interface RS 232, RS 485 for printer or large-screen display
- AC or DC voltage supply







Order code	Example → VA3K01S101SR2	0	D0
Type			
VA3K01	VA3K01S101SR2		
Output-interface			
None		0	
RS 232		2	
RS 485		4	
Power supply			
10...30 VDC			D0
90...260 VAC			A0

Transducers

Series TU7055

- Transforms the frequency-output signal of flow sensors into analogue signals
- (0)4...20 mA and 0...10 V are available simultaneously
- Casing for mounting rail installation
- Supply voltage for the connected flow sensor integrated

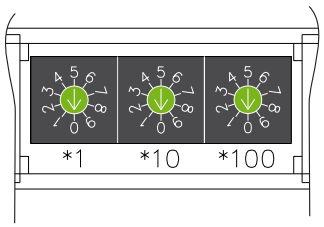
Type TU7055

Technical data	
Signal input	Frequency signal from flow sensor
2 output signals	0(4)...20 mA and 0...10 V
Power supply	12...24 VDC (±10 %) galvanically insulated
Casing dimensions (w x h x d)	17.5 x 82 x 67 mm,
Casing	Plastic casing for c-rail
Ambient temperature	0...60 °C
Storage temperature	-10...80 °C
Order code	
EU705520000006	

Frequency dividers

Series TU7052

If the output frequency of a flow sensor is too high for a present read out unit, TU7052 should be installed. It transforms a high output frequency of a sensor into a lower frequency which can be processed by the present instrument.
The divisor can simply be switched by three rotary switches. The voltage supply for the connected sensor is integrated in the device.



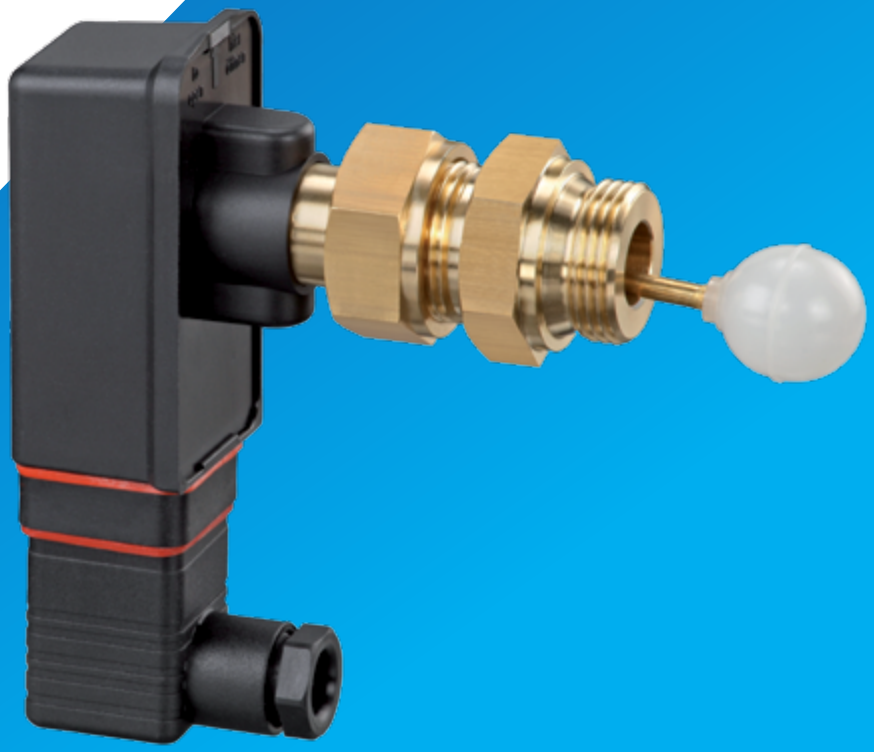
$$\text{output frequency} = \frac{\text{input frequency}}{\text{divisor}}$$

Type TU7052

Technical data	
Signal input	Frequency signal from flow sensor
Divisor	Switched by three rotary switches in the range of 1...999
Output	Square-wave signal, pulse duty ratio 1:1 → NPN with 5 kΩ internal pull-up resistance and → PNP with 5 kΩ internal pull-down resistance → Optocoupler
Power supply	12...24 VDC (±10 %)
Casing dimensions (w x h x d)	17.5 x 82 x 67 mm
Casing	Plastic casing for c-rail
Ambient temperature	0...60 °C
Storage temperature	-10...80 °C
Order code	
EU7052F0000006	

→ Series VHS / VH6

→ Series VKS / VK6



LEVEL SWITCHES

Level switches

Principle of operation

Level switches are the easy and reliable solution for monitoring fluid levels. The switches are installed at the side using G¾ or G1½ thread sizes. The time-tested float principle and a potential-free contact as the signalling transmitter guarantee a high level of operational safety.

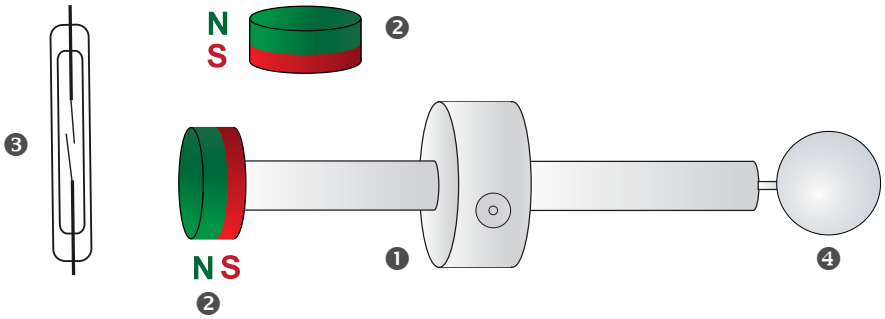
The rising level in the tank forces the float up. Via paddle system, the magnet changes its position relative to the Reed contact and actuates it. The repulsion between the two homopolar magnets supports the buoyancy (Version VK... different). As soon as the level sinks again, the float follows as well and the magnet actuates the Reed contact again.

The factory set switching function

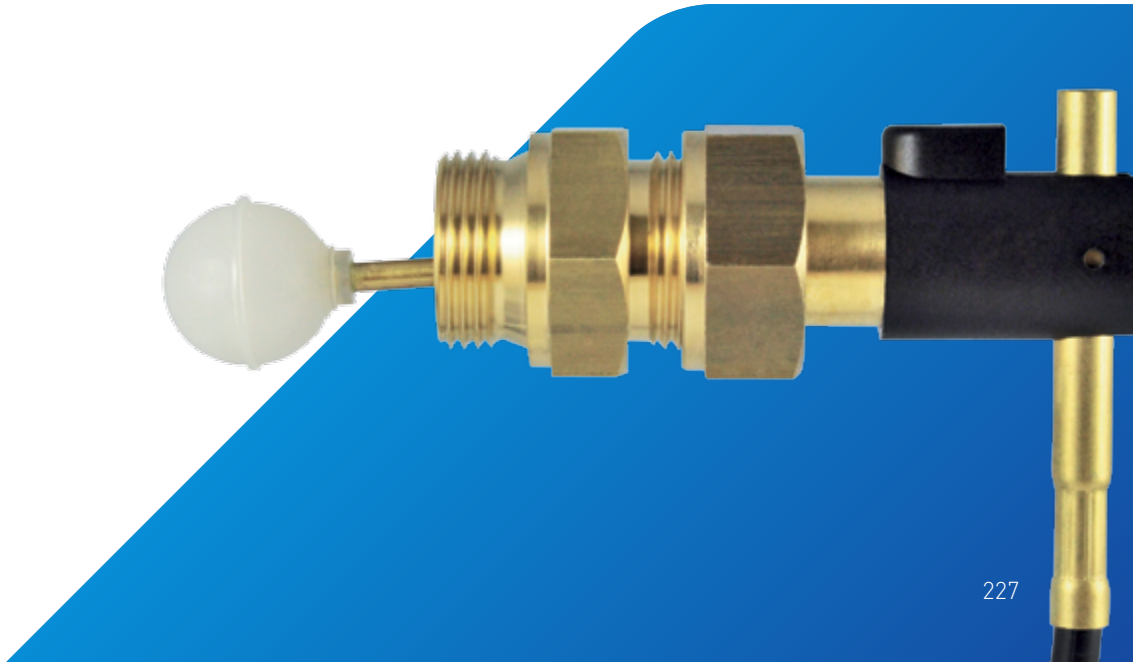
- contact closes with rising level
- contact opens with falling level

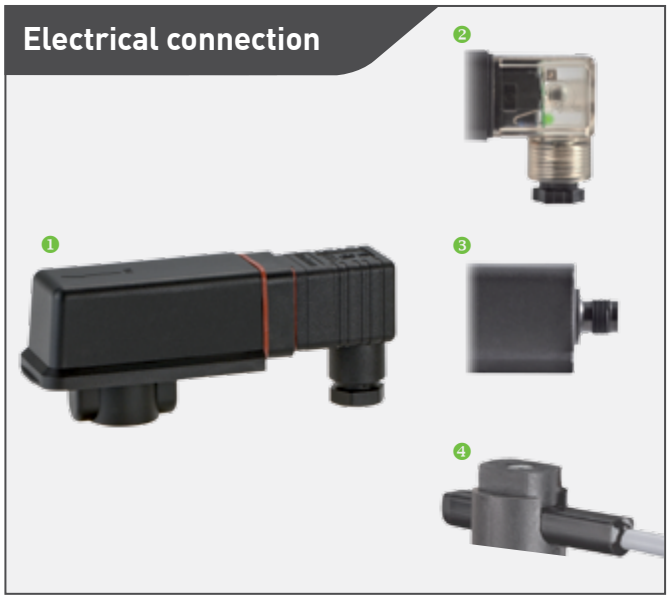
can be changed by the customer.

The Reed contact used as signalling transmitter consists of two ferromagnetic contact making tongues positioned in a shielding gas filled glass bulb. As a result, burned contacts are virtually eliminated. This construction enables a durability up to 100 000 000 switching cycles.



1. Paddle system
2. Magnet
3. Reed contact
4. Float



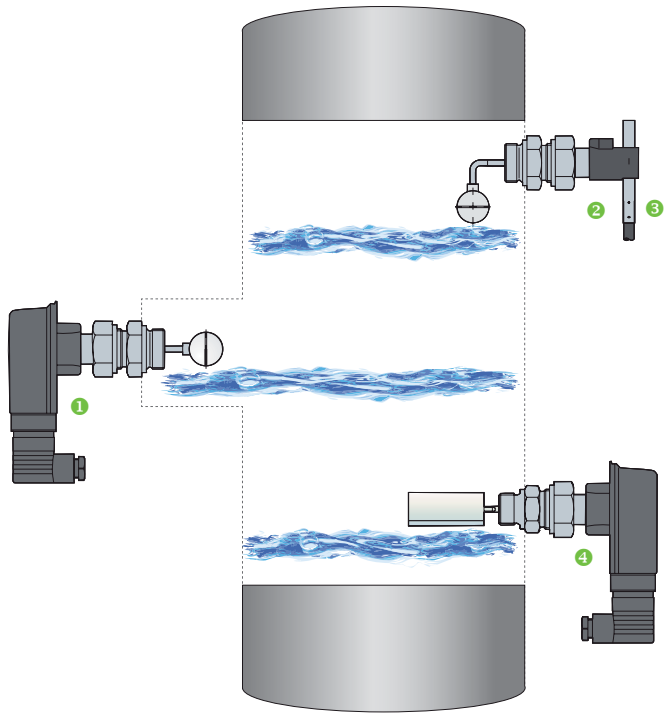


Electrical connections

- Plug connector DIN EN 175301-803-A incl. cable socket(❶)
- Plug connector DIN EN 175301-803-A incl. cable socket, with two LEDs for optical level and power indication for switching voltages 24 V...230 V AC/DC (❷)
- 4-pin plug connector M12 x 1 acc. IEC 947-5-2 (❸)
- Connection cable 1.5 m (❹)

Applications

- Run dry protection for pumps (minimum alert)
- Spill protection (maximum alert)
- Leakage monitoring
- Screwed-connection oil level monitoring gauge, e.g. at compressors
- For water (VH, VK) and oil applications (VH)



1. Assembly in the dome
2. Maximum-level monitoring with contaminated media
3. Plugless version for minimum space requirements
4. Minimum level monitoring

Level switches

Series VHS / VHS

Type VHS00

Type VH602

Technical data	
Switching function	Contact → opens with falling level → closes with rising level reversing possible
Activation point, related to middle axis (water, 20 °C)	-4...0 mm (elbow version different)
Hysteresis	Approx. 1...4 mm (elbow version different)
Pressure rating	PN 25
Minimum medium density	
PVDF-float	0.78 kg/dm³
Stainless steel cylinder float	0.83 kg/dm³
Temperature ranges	
Medium	-10...110 °C
Ambient → VHS → VH6 → VH6...X	 -25...80 °C -25...100 °C -25...80 °C
Approvals	

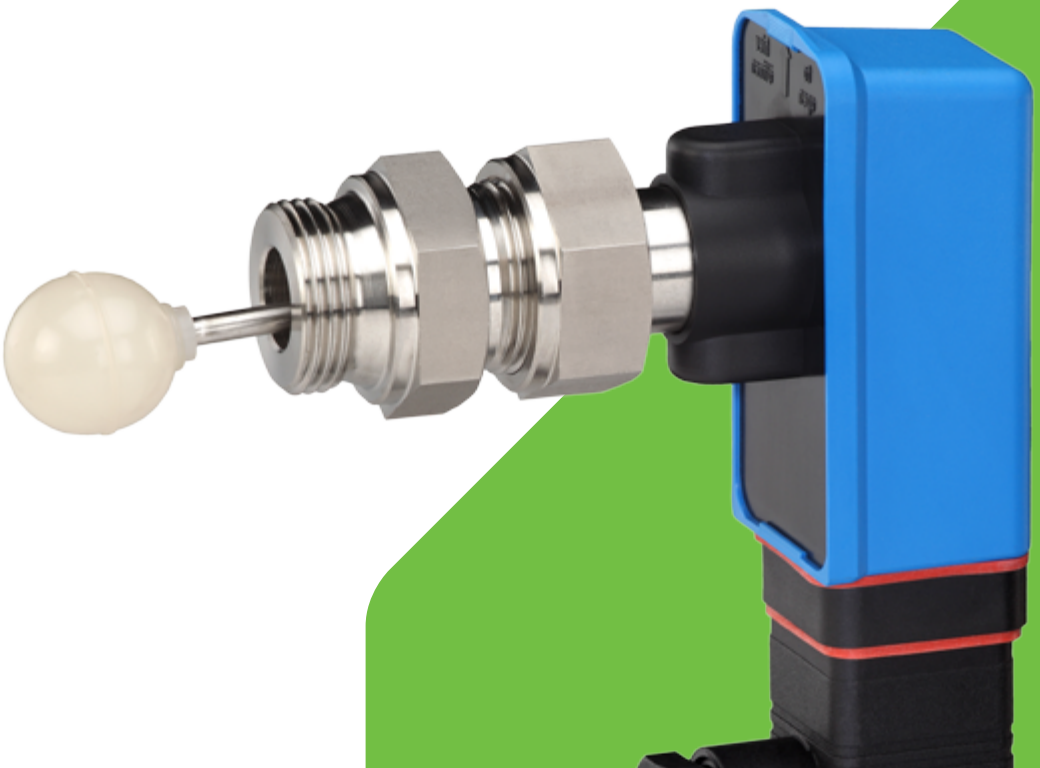
Advantages

- Lateral installation by male thread G¾ or G½
- Easy alignment due to union nut
- Brass or stainless steel
- Various connectors or 1.5 m jacket cable

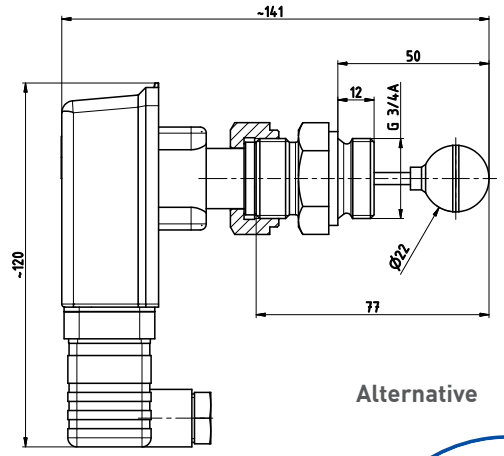
Electrical data	
Electrical connection → VHS → VH6	 Plug connector DIN EN 175301-803-A incl. cable socket 1.5 m PVC jacket cable
Max. switching current	1 A
Max. switching voltage	230 VAC, 48 VDC
Max. rating	26 VA, 20 W
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class II

Options	
For type	**See order code**
VHS	→ Plug connector DIN EN 175301-803-A incl. cable socket with 2 LEDs for switching voltages 24 V...230 V AC / DC ±20 %, ambient temperature -20...70 °C → or 4-pin sensor plug M12 x 1
	→ For use in potentially explosive atmospheres (Version VH...X)

Versions for use in potentially explosive atmospheres VH...X level switches are intended for use in potentially explosive atmospheres with an ignition energy of > 60 µJ. These level switches have been ignition hazard assessed according to DIN EN 60079-11 and have no potential ignition sources. They are therefore not subject to the Directive 94/9/EC.

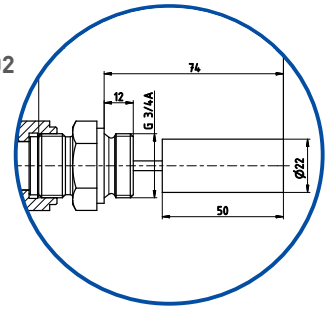


VHS00

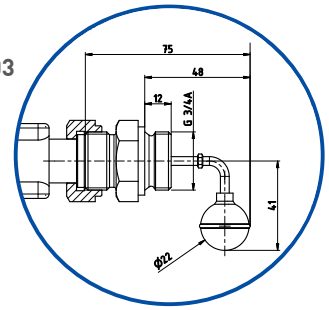


Alternative

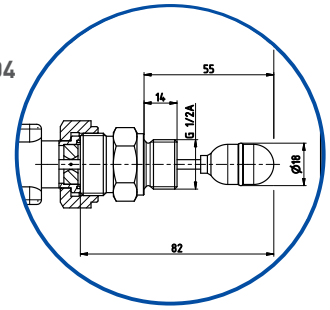
VHS02



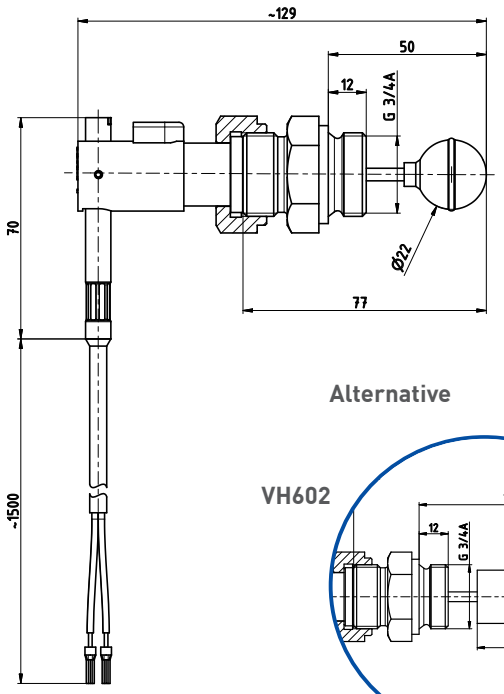
VHS03



VHS04

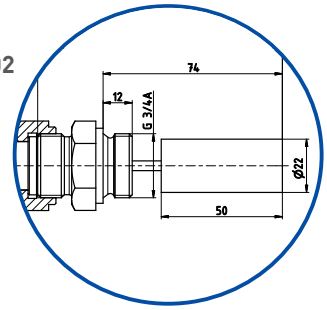


VH600

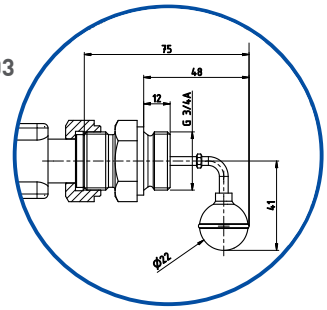


Alternative

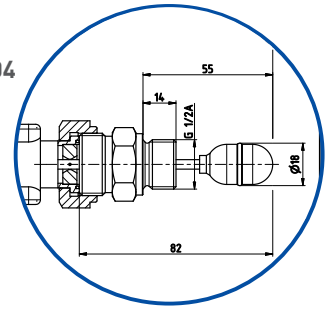
VH602



VH603



VH604



Materials in contact with fluid		
	Brass version	**Stainless steel version**
Body, Paddle	Brass CW614N	Stainless steel 1.4571
Process connection	Brass CW614N	Stainless steel 1.4571
Bushings → Standard → Type VH...X	 PVDF Stainless steel 1.4571	
Axis	Stainless steel 1.4571	
Magnet	Hard ferrite	
Float → Ball float → Cylinder float	 PVDF, Brass 2.0401 Stainless steel 1.4571	 PVDF, Stainless steel A4 Stainless steel 1.4571
Sealing	NBR	

Order code	**Example → VH60**	**0M0**	**11**	**1**	**1**	**R3**	**1**	**( )***
Type								
VHS								
Plug connector incl. cable socket (standard)	VHS0			7				
Plug connector incl. cable socket with LED (option)	VHS0			9				
4-pin plug connector M12 x 1 (option)	VHS0			8				
VH6								
Connection cable (standard)	VH60			1				
Connection cable blue (only for VH6 with Ex option)	VH60			3				
Type of float								
Ball float PVDF		0M0				R3		
Cylinder float stainless steel		2M0				R3		
Ball float PVDF - elbow float bar		3M0				R3		
Cylinder float PVDF - G½		4M0				R2		
Material								
Brass			11		1		1	
Stainless steel			31		3		3	
Version								
Standard								( )*
For use in potentially explosive atmospheres (option)								X

* No character

** Only available with connection cable blue or with plug connector incl. cable socket (standard)

Level switches

Series VKS / VK6

Type VKS00

Type VK604

Technical data	
Switching function	Contact → opens with falling level → closes with rising level reversing possible
Activation point, related to middle axis (water, 20 °C)	-4...0 mm
Hysteresis	Approx. 1...4 mm
Pressure rating	PN 10
Minimum medium density	0.78 kg / dm³
Temperature ranges	
Medium	-10...100 °C
Ambient → VKS → VK6	 -25...80 °C -25...70 °C
Approvals	

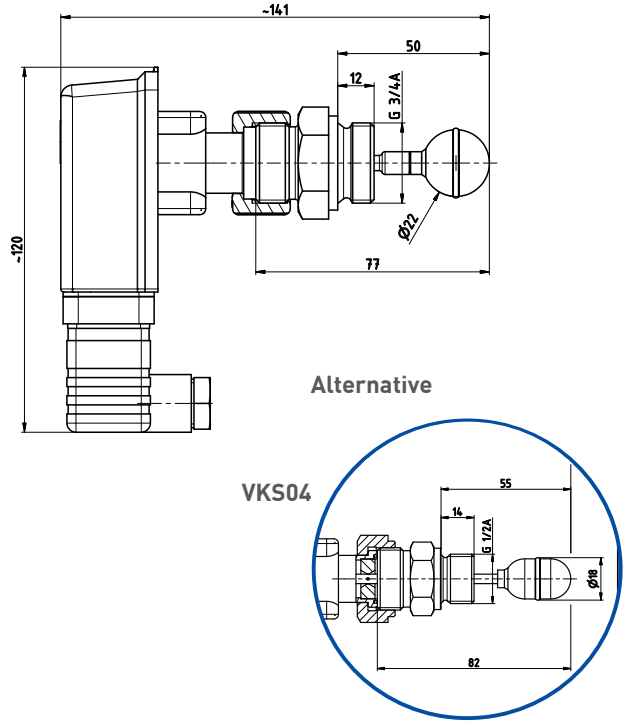
Advantages

- Level switches made of glass fibre reinforced plastic
- Stainless steel male threaded adapters
- Easy alignment due to union nut

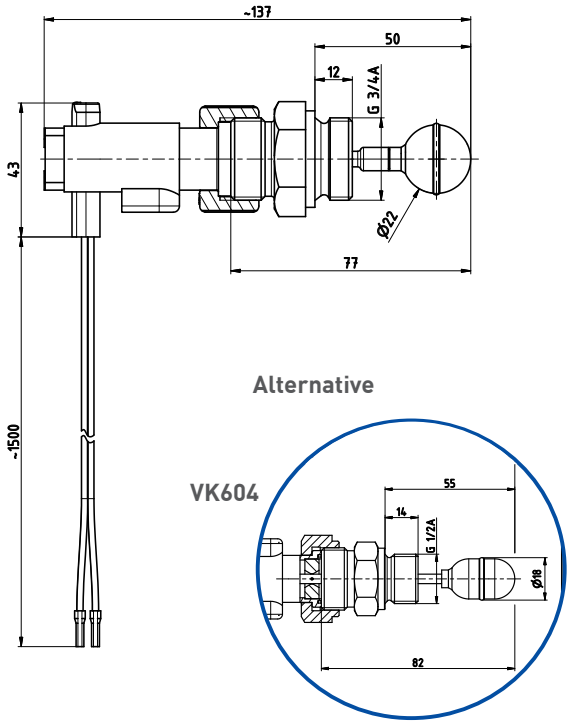
Electrical data	
Electrical connection → VKS → VK6	 Plug connector DIN EN 175301-803-A incl. cable socket 1.5 m PVC jacket cable
Max. switching current	1 A
Max. switching voltage	230 VAC, 48 VDC
Max. rating	26 VA, 20 W
Degree of protection EN 60529	IP65
Protection class EN 60730-1	Class II

Options	
For type	**See order code**
VKS	→ Plug connector DIN EN 175301-803-A incl. cable socket with 2 LEDs for switching voltages 24 V...230 V AC / DC ±20 %, ambient temperature -20...70 °C → or 4-pin sensor plug M12 x 1

VKS00

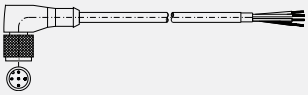


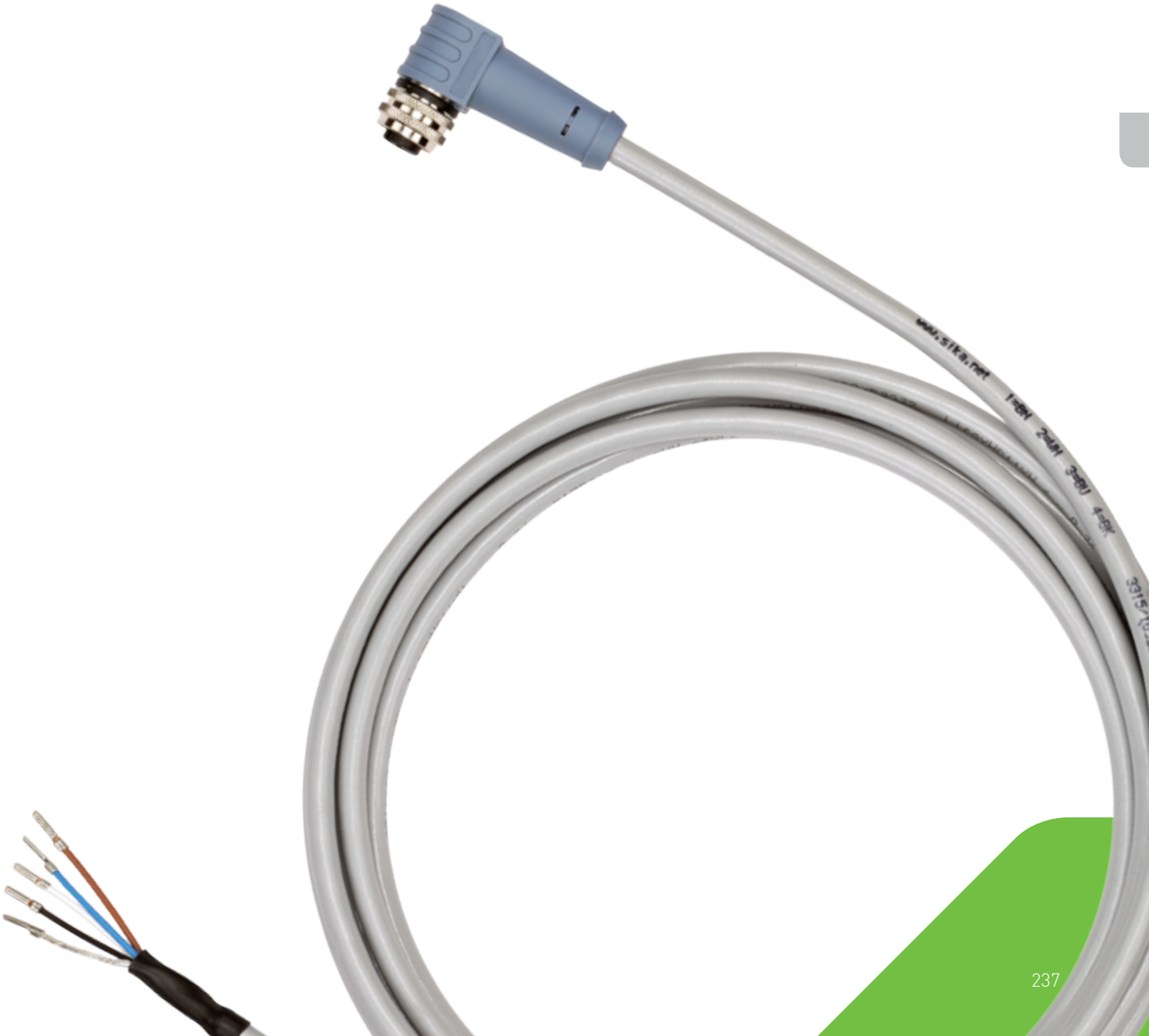
VK600



Materials in contact with fluid	
Body, Paddle	PPO Noryl GFN 3 / EPDM
Process connection	Stainless steel 1.4571
Bushings	PPO Noryl GFN 3
Axis	Stainless steel 1.4571
Magnet	Hard ferrite
Float	PVDF, Stainless steel A4
Sealing	NBR

Order code	Example → VK60	0M0P1	1	PR33
Level switches				
VKS				
Plug connector incl. cable socket (standard)	VKS0		7	
Plug connector incl. cable socket with LED (option)	VKS0		9	
4-pin plug connector M12 x 1 (option)	VKS0		8	
VK6				
Connection cable (standard)	VK60		1	
Float, process connection				
Ball float PVDF, G¾		0M0P1		PR33
Cylinder float PVDF, G1½		4M0P1		PR23

Accessories	Länge	Bestellcode	
Connection cable with 4-pin cable socket M12 x 1, angle type moulded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) - UL-approval	3 m 5 m 10 m	XVT2053 XVT2009 XVT2070	
4-pin cable socket M12 x 1 angle type, unassembled		VT1331	
Cable socket with two LEDs Switching voltage 24...230 V AC/DC ±20 % Ambient temperature -20...70 °C for retrofit / replacement of cable socket without LED		XVH958	



Sensors and Measuring Instruments

Flow Measuring Instruments

Test and Calibration Instruments

SIKA Dr. Siebert & Kühn GmbH & Co. KG
Struthweg 7-9
34260 Kaufungen / Germany
Phone +49 5605 803-0
Fax +49 5605 803-54
Email: info@sika.net
www.sika.net

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