

VHS, LABO-VHS-S, LABO-VHS-I, LABO VHS-U, LABO-VHS-F, LABO-VHS-C, FLEX-VHS, OMNI-VHZ

Винтовые датчики расхода

GHM MESSTECHNIK



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Flow Transmitter / Switch Screw Volumeter FLEX-VHS



- Measures and monitors viscous media (oil) 1.4..2500 l/min
- Connection G 1..G 2¹/₂
- Very low dependence on viscosity
- Can be used up to 40,000 mm²/s (cSt)
- Switching output and analog output (4..20 mA / 0..10 V)
- Light and compact device (aluminium housing)
- Operation and measurement possible with forwards and reverse flow
- For cost-sensitive applications
- Simple to use
- Cable outlet infinitely rotatable

Characteristics

The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also be measured, as long as they have sufficient lubricity. Because of the volumetric functioning principle, the device is almost completely independent of viscosity.

The VHS system consists of two interlacing screws which run in opposite directions, driven by the flowing medium. A magnetically pre-tensioned Hall sensor positioned outside the flow space detects the screw flanks, and creates a frequency signal proportional to the flow. Here, every pulse corresponds to a specific measured volume. There are no magnets in the flow space.

The FLEX transducer on the sensor has an analog output (4..20 mA or 0..10 V) and one switching output, which can be configured as a limit switch for monitoring minima or maxima, or as a frequency output.

The switching output is designed as a push-pull driver, and can therefore be used both as a PNP or an NPN output. The state of the switching output is signalled with a yellow LED in the switching outlet; the LED has all-round visibility.

The sensor is configured in the factory, or alternatively this can be done with the aid of the optionally available ECI-1 device configurator (USB interface for PC). A selectable parameter can be modified on the device, with the aid of the magnet clip provided. In this case, the current measured value is saved as the parameter value. Examples of these parameters are the switching value or the metering range end value. The stainless steel electronics housing is rotatable, so it is possible to orient the cable outlet after installation.

Technical data

Sensor	screw volumeter		
Nominal width	DN 25..65		
Process connection	female thread G 1..G 2 ¹ / ₂		
Metering ranges	see table "Ranges and weights"		
Measurement accuracy	±1 % of the measured value (at 20 mm ² /s, (cSt) of 1 %..100 % nominal working range (see also diagram in upstream pages)		
Repeatability	±0,25 %		
Pressure resistance	Connection	SAE flange	PN bar
	Construction material		
	aluminium	without	160
	aluminium	with	350
	steel	without	350
	steel	with	350
	others available on request		
Pressure loss	see diagram in upstream pages		
Medium	oil or non-aggressive self-lubricating fluids		
Medium temperature	-25..+80 °C (150 °C available on request)		
Materials medium-contact	(special materials available on request):		
1. Body	Aluminium 6082 anodised		
2. Connections:	Aluminium 6082 anodised or steel		
3. Main screw	Steel 35SMnPb10 UNI 4838-80		
4. Subsidiary screw	GHISA GJL-250 EN1561		
5. Ball bearing	Steel		
6. Ball bearing	Steel		
7. screws	Galvanised steel		
8. O-ring	NBR		
9. Seeger ring	Steel		
10. Seeger ring	Steel		
11. O-ring	NBR		
12. SAE connection	ASTM A216WCB		
13. SAE flange	ASTM A216WCB		
14. O-ring	NBR		
15. screws	Galvanised steel		
16. Sensor spacer	Aluminium 6082 anodised		
Material electronics housing	stainless steel 1.4305		
Supply voltage	18..30 V DC		
Power consumption	<1 W		

Product Information

FLEX-VHS

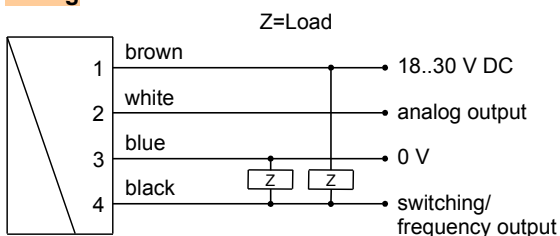
Analog output	4..20 mA / load 500 Ohm max. or 0..10 V / load min. 1 kOhm
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) $I_{out} = 100 \text{ mA max.}$
Switching hysteresis	adjustable (please state when ordering) Standard setting: 2 % F.S., for Min-switch, position of the hysteresis above the limit value, and for Max-switch, below the limit value
Display	yellow LED (On = Normal / Off = Alarm)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	see table "Ranges and weights"
Conformity	CE

Ranges and weights

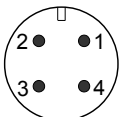
● = Standard ○ = Option

G	DN	● / ○	Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm ³	Types	Q_{max} recommended l/min	weights		
							Body with aluminium connections kg	Body with steel connections kg	SAE Flanges (Weight per pair) kg
G 1	DN 25	●	1.4.. 140	13.10	FLEX-VHS-025.....0140	200	3.44	4.76	5.76
G 1 ^{1/4}	DN 32	●	3.5.. 350	29.00	FLEX-VHS-032.....0350	500	6.35	8.50	9.55
G 1 ^{1/2}	DN 40	○	5.5.. 550	48.58	FLEX-VHS-040.....0550	800	10.50	13.60	15.10
		●	8.0.. 800	72.00	FLEX-VHS-040.....0800	1200	14.20	18.50	18.80
G 2	DN 50	○	10.0..1000	103.63	FLEX-VHS-050.....1000	1600	20.70	27.70	30.30
		●	15.0..1500	133.00	FLEX-VHS-050.....1500	2200	25.00	33.20	34.60
G 2 ^{1/2}	DN 65	●	25.0..2500	238.82	FLEX-VHS-065.....2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN

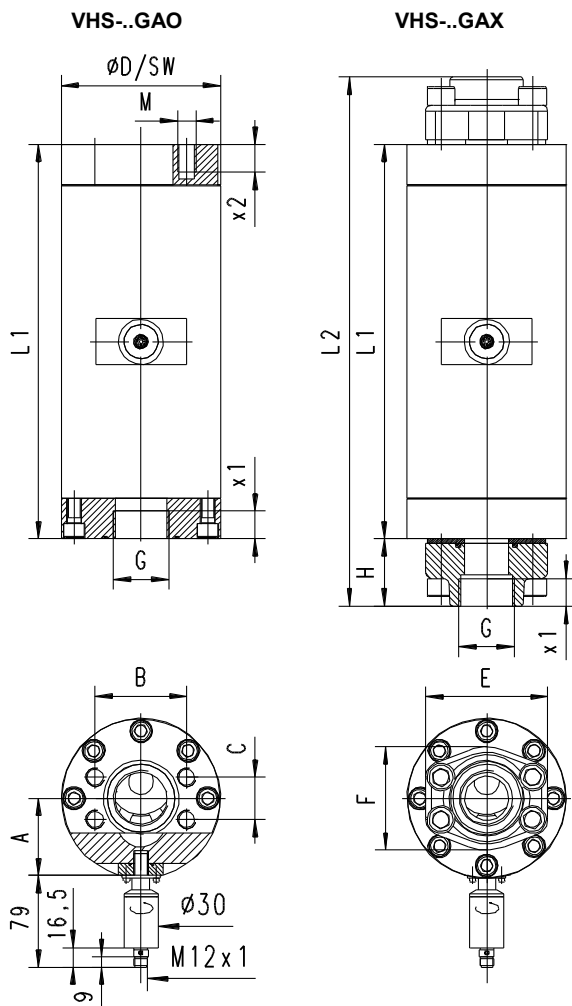


Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.
The use of shielded cabling is recommended.

Dimensions

● = Standard ○ = Option

G	DN...ranges	x1	L1	ØD	SW	A	VHS...GAO...				VHS...GAX...			
							M	x2	B	C	L2	H	E	F
G 1	025...0140	● 20	220	88	78	49.0	12	20	57.1	27.8	324	52	80	69
G 1 ¹ / ₄	032...0350	● 22	285	103	-	55.0	14	22	66.7	31.6	381	48	94	77
G 1 ¹ / ₂	040...0550	○ 24	332	122	-	58.8	16	24	79.4	36.5	448	58	106	89
	040...0800	● 340	138	-	66.5	456								
G 2	050...1000	○ 33	396	155	-	71.0	20	35	96.8	44.4	544	74	135	116
	050...1500	● 405	168	-	77.3	553								
G 2 ¹ / ₂	065...2500	● 35	475	203	-	86.0	24	42	123.8	58.7	633	79	166	150



SAE adapter for convenient installation and for increased stability to pressure! (350 bar)

Handling and operation

Installation

Any flow direction is possible during installation. Ensure that pipework is clean. Flush before installation. A 30 µm mesh filter should be used.

The use of SAE flanges enables the sensor to be installed and removed more easily, and increases the stability to pressure to 350 bar for every connection material.

It is possible to replace the electronics during operation, and this presents no danger to the fitter. The sensor does not go into the flow space. After installation, the electronic head can be turned to align the cable outlet.

Product Information

Programming

The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).



After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.

The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

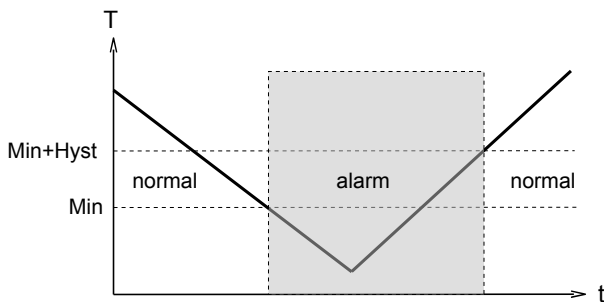
In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

Example: The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".

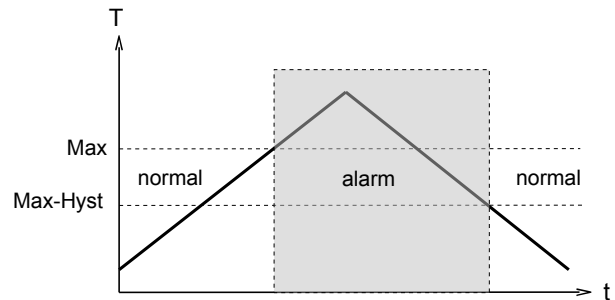
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minima or maxima.

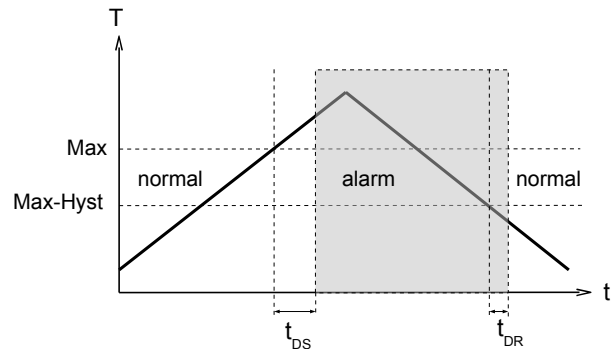
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

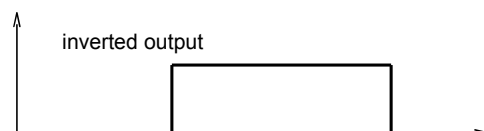
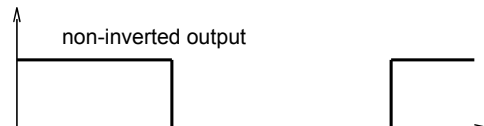
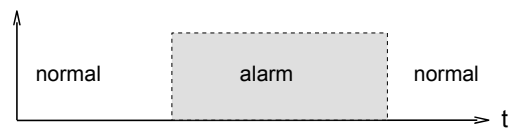


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Product Information

Ordering code

VHS - 1. 2. G 3. 4. 5. A 6. 7. 8. E

FLEX - VHS - 9. 10. 11. 12. S 13.

○=Option

1. Nominal width								
025	DN 25 - G 1							
032	DN 32 - G 1 ¹ / ₄							
040	DN 40 - G 1 ¹ / ₂							
050	DN 50 - G 2							
065	DN 65 - G 2 ¹ / ₂							
2. Process connection								
G	female thread							
3. Connection material								
A	AL connection, anodised (160 bar, in combination with SAE flange: 350 bar)							
S	○ Connection, steel (350 bar)							
4. Additional flange								
X	SAE flange, steel (350 bar)							
O	no SAE flange (pressure resistance depends on the connection material)							
5. Body material								
A	anodised aluminium							
6. Metering range								
0140	1.4.. 140 l/min							●
0350	3.5.. 350 l/min							●
0550	○ 5.5.. 550 l/min							●
0800	8.0.. 800 l/min							●
1000	○ 10.0..1000 l/min							●
1500	15.0..1500 l/min							●
2500	25.0..2500 l/min							●
7. Seal material								
N	NBR							
V	○ FKM							
8. Connection for								
E	electronics							
9. For nominal width								
025	DN 25 - G 1							●
032	DN 32 - G 1 ¹ / ₄							●
040	DN 40 - G 1 ¹ / ₂							●
050	DN 50 - G 2							●
065	DN 65 - G 2 ¹ / ₂							●
10. Analog output								
I	current output 4..20 mA							
U	voltage output 0..10 V							
11. Switching function								
L	minimum-switch							
H	maximum-switch							
R	frequency output							
12. Switching signal								
O	standard							
I	○ inverted							
13. Optional								
H	○ 150 °C version (with 300 mm cable)							

Options

Special range for analog output: l/min
 <= metering range
 (standard = metering range)

Special range for frequency output: l/min
 <= metering range
 (standard = metering range)

End frequency (max. 2000 Hz) Hz

Switching delay s
 (from Normal to Alarm)

Switchback delay s
 (from Alarm to Normal)

Power-On delay period (0..99 s) s
 (time after power on, during which the
 outputs are not actuated)

Switching output fixed l/min

Special hysteresis %
 (standard = 2 % of end value)

If the fields are not completed, the standard setting is selected automatically.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- Device configurator ECI-1

Accessories

External display OMNI-TA (panel-mounting IP 67)

Flow Transmitter / Screw Volumeter LABO-VHS-I / U / F / C



- Measures and monitors viscous media (oil) 1.4..2500 l/min
- Connection G 1..G 2 1/2
- Very low dependence on viscosity
- Can be used up to 40,000 mm²/s (cSt)
- 0..10 V, 4..20 mA, frequency/pulse output, completely configurable
- Light and compact device (aluminium housing)
- Operation and measurement possible with forward and reverse flow
- For cost-sensitive applications

Characteristics

The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also be measured, as long as they have sufficient lubricity. Because of the volumetric functioning principle, the device is almost completely independent of viscosity.

The VHS system consists of two interlacing screws which run in opposite directions, driven by the flowing medium. A magnetically pre-tensioned Hall sensor positioned outside the flow space detects the screw flanks, and creates a frequency signal proportional to the flow. Here, every pulse corresponds to a specific measured volume. There are no magnets in the flow space.

The LABO-XXX-I/U/F/C electronics make various output signals available:

- Analog signal 0/4...200 mA (LABO-XF-I)
- Analog signal 0/2...10 V (LABO-XF-U)
- Frequency signal (LABO-XF-F) or
- Value signal Pulse / x Litres (LABO-XF-C)

A model with switching output is also available (see separate datasheet). If desired, the range end value can be set to the currently existing flow using "teaching".

Technical data

Sensor	screw volumeter		
Nominal width	DN 25..65		
Process connection	female thread G 1..G 2 1/2		
Metering ranges	see table "Ranges and weights"		
Measurement accuracy	±1 % of the measured value (at 20 mm ² /s, (cSt) of 1 %..100 % nominal working range (see also diagrams in upstream pages)		
Repeatability	±0,25 %		
Pressure resistance	Connection	SAE flange	PN bar
	Construction material		
	Aluminium	without	160
	Aluminium	with	350
	Steel	without	350
	Steel	with	350
	others available on request		
Pressure loss	see diagram in upstream pages		
Medium	oil or non-aggressive, self-lubricating fluids		
Medium temperature	-25..+80 °C (150 °C available on request)		
Materials medium-contact	(special materials available on request):		
1. Body	Aluminium 6082 anodised		
2. Connections:	Aluminium 6082 anodised or steel		
3. Main screw	Stahl 35SMnPb10 UNI 4838-80		
4. Subsidiary screw	GHISA GJL-250 EN1561		
5. Ball bearing	Steel		
6. Ball bearing	Steel		
7. Screws	Galvanised steel		
8. O-ring	NBR		
9. Seeger ring	Steel		
10. Seeger ring	Steel		
11. O-ring	NBR		
12. SAE connection	ASTM A216WCB		
13. SAE flange	ASTM A216WCB		
14. O-ring	NBR		
15. Screws	Galvanised steel		
16. Sensor spacer	Aluminium 6082 anodised		
Materials, non-medium-contact	Sensor tube:	CW614N nickelled	
	Adhesive:	epoxy resin	
	Flange bolts:	stainless steel	
Supply voltage	10..30 V DC at voltage output 10 V: 15..30 V DC		
Power consumption	< 1 W (for no-load outputs)		

Product Information

LABO-VHS-I / U / F / C

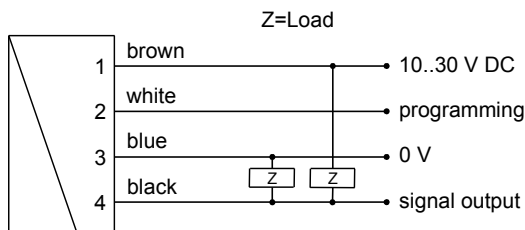
Output data:	all outputs are resistant to short circuits and reversal polarity protected
Current output:	4..20 mA (0..20 mA available on request)
Voltage output:	0..10 V (2..10 V available on request)
Frequency output:	output current max. 20 mA
Pulse output:	transistor output "push-pull" $I_{out} = 100$ mA max.
	transistor output "push-pull" $I_{out} = 100$ mA max. Pulse width 50 ms Pulse per volume is to be stated
Display	yellow LCD shows operating voltage (LABO-XF-I / U) or output status (LABO-XF-F / C) or (rapid flashing = programming)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	see table "Ranges and weights"
Conformity	CE

Ranges and weights

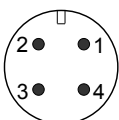
● = Standard ○ = Option

G	DN	●	Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm ³	Types	Q_{max} recommended l/min	Weights		
							Body with aluminium connections kg	Body with steel connections kg	SAE Flanges (Weight per pair) kg
G 1	DN 25	●	1.4.. 140	13.10	LABO-VHS-025...0140	200	3.44	4.76	5.76
G 1 ¹ / ₄	DN 32	●	3.5.. 350	29.00	LABO-VHS-032...0350	500	6.35	8.50	9.55
G 1 ¹ / ₂	DN 40	○	5.5.. 550	48.58	LABO-VHS-040...0550	800	10.50	13.60	15.10
		●	8.0.. 800	72.00	LABO-VHS-040...0800	1200	14.20	18.50	18.80
G 2	DN 50	○	10.0..1000	103.63	LABO-VHS-050...1000	1600	20.70	27.70	30.30
		●	15.0..1500	133.00	LABO-VHS-050...1500	2200	25.00	33.20	34.60
G 2 ¹ / ₂	DN 65	●	25.0..2500	238.82	LABO-VHS-065...2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN



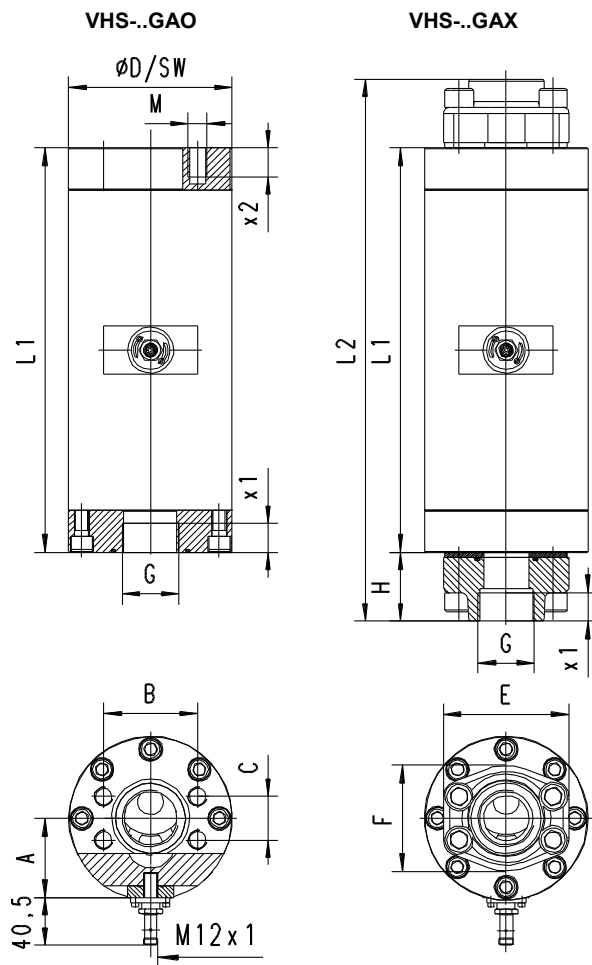
Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring. The push-pull output of the frequency or pulse output version can as desired be switched as a PNP or an NPN output.

Dimensions

● = Standard ○ = Option

G	DN...range	x1	L1	ØD	SW	A	VHS-...GAO....				VHS-...GAX....			
							M	x2	B	C	L2	H	E	F
G 1	025...0140	●	220	88	78	49.0	12	20	57.1	27.8	324	52	80	69
G 1¼	032...0350	●	285	103	-	55.0	14	22	66.7	31.6	381	48	94	77
G 1½	040...0550	○	332	122	-	58.8	16	24	79.4	36.5	448	58	106	89
	040...0800	●	340	138	-	66.5					456			
G 2	050...1000	○	396	155	-	71.0	20	35	96.8	44.4	544	74	135	116
	050...1500	●	405	168	-	77.3					553			
G 2½	065...2500	●	475	203	-	86.0	24	42	123.8	58.7	633	79	166	150



SAE adapter for convenient installation and for increased stability to pressure! (350 bar)

Handling and operation

Installation

Any flow direction is possible during installation. Ensure that pipework is clean. Flush before installation. A 30 µm mesh filter should be used.

The use of SAE flanges enables the sensor to be installed and removed more easily, and increases the stability to pressure to 350 bar for every connection material.

It is possible to replace the electronics during operation, and this presents no danger to the fitter. The sensor does not go into the flow space.

Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment. The teaching option is not available for the pulse output version.

Product Information

LABO-VHS-I / U / F / C

Required ordering information

For LABO-VHS-F:

Output frequency at full scale

 Hz

Maximum value: 2.000 Hz

For LABO-VHS-C:

For the pulse output version, the volume (with numerical value and unit) which will correspond to one pulse must be stated.

Volume per pulse (numerical value)

Volume per pulse (unit)

Options

Special range for analog output:

<= metering range (standard=metering range)

 l/min

Special range for frequency output:

<= metering range (standard=metering range)

 l/min

Power-On delay period (0..99 s)

(time after applying power during which the outputs are not activated or set to defined values)

 s

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- converter / counter OMNI-TA
- Device configurator ECI-1

Flow Transmitter / Screw Volumeter LABO-VHS-I / U / F / C



- Measures and monitors viscous media (oil) 1.4..2500 l/min
- Connection G 1..G 2 1/2
- Very low dependence on viscosity
- Can be used up to 40,000 mm²/s (cSt)
- 0..10 V, 4..20 mA, frequency/pulse output, completely configurable
- Light and compact device (aluminium housing)
- Operation and measurement possible with forward and reverse flow
- For cost-sensitive applications

Characteristics

The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also be measured, as long as they have sufficient lubricity. Because of the volumetric functioning principle, the device is almost completely independent of viscosity.

The VHS system consists of two interlacing screws which run in opposite directions, driven by the flowing medium. A magnetically pre-tensioned Hall sensor positioned outside the flow space detects the screw flanks, and creates a frequency signal proportional to the flow. Here, every pulse corresponds to a specific measured volume. There are no magnets in the flow space.

The LABO-XXX-I/U/F/C electronics make various output signals available:

- Analog signal 0/4...200 mA (LABO-XF-I)
- Analog signal 0/2...10 V (LABO-XF-U)
- Frequency signal (LABO-XF-F) or
- Value signal Pulse / x Litres (LABO-XF-C)

A model with switching output is also available (see separate datasheet). If desired, the range end value can be set to the currently existing flow using "teaching".

Technical data

Sensor	screw volumeter		
Nominal width	DN 25..65		
Process connection	female thread G 1..G 2 1/2		
Metering ranges	see table "Ranges and weights"		
Measurement accuracy	±1 % of the measured value (at 20 mm ² /s, (cSt) of 1 %..100 % nominal working range (see also diagrams in upstream pages)		
Repeatability	±0,25 %		
Pressure resistance	Connection	SAE flange	PN bar
	Construction material		
	Aluminium	without	160
	Aluminium	with	350
	Steel	without	350
	Steel	with	350
	others available on request		
Pressure loss	see diagram in upstream pages		
Medium	oil or non-aggressive, self-lubricating fluids		
Medium temperature	-25..+80 °C (150 °C available on request)		
Materials medium-contact	(special materials available on request):		
1. Body	Aluminium 6082 anodised		
2. Connections:	Aluminium 6082 anodised or steel		
3. Main screw	Stahl 35SMnPb10 UNI 4838-80		
4. Subsidiary screw	GHISA GJL-250 EN1561		
5. Ball bearing	Steel		
6. Ball bearing	Steel		
7. Screws	Galvanised steel		
8. O-ring	NBR		
9. Seeger ring	Steel		
10. Seeger ring	Steel		
11. O-ring	NBR		
12. SAE connection	ASTM A216WCB		
13. SAE flange	ASTM A216WCB		
14. O-ring	NBR		
15. Screws	Galvanised steel		
16. Sensor spacer	Aluminium 6082 anodised		
Materials, non-medium-contact	Sensor tube:	CW614N nickelled	
	Adhesive:	epoxy resin	
	Flange bolts:	stainless steel	
Supply voltage	10..30 V DC at voltage output 10 V: 15..30 V DC		
Power consumption	< 1 W (for no-load outputs)		

Product Information

LABO-VHS-I / U / F / C

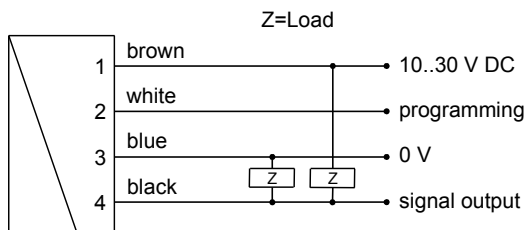
Output data:	all outputs are resistant to short circuits and reversal polarity protected
Current output:	4..20 mA (0..20 mA available on request)
Voltage output:	0..10 V (2..10 V available on request)
Frequency output:	output current max. 20 mA
Pulse output:	transistor output "push-pull" $I_{out} = 100$ mA max.
	transistor output "push-pull" $I_{out} = 100$ mA max. Pulse width 50 ms Pulse per volume is to be stated
Display	yellow LCD shows operating voltage (LABO-XF-I / U) or output status (LABO-XF-F / C) or (rapid flashing = programming)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	see table "Ranges and weights"
Conformity	CE

Ranges and weights

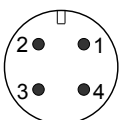
● = Standard ○ = Option

G	DN	●	Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm ³	Types	Q_{max} recommended l/min	Weights		
							Body with aluminium connections kg	Body with steel connections kg	SAE Flanges (Weight per pair) kg
G 1	DN 25	●	1.4.. 140	13.10	LABO-VHS-025...0140	200	3.44	4.76	5.76
G 1 ¹ / ₄	DN 32	●	3.5.. 350	29.00	LABO-VHS-032...0350	500	6.35	8.50	9.55
G 1 ¹ / ₂	DN 40	○	5.5.. 550	48.58	LABO-VHS-040...0550	800	10.50	13.60	15.10
		●	8.0.. 800	72.00	LABO-VHS-040...0800	1200	14.20	18.50	18.80
G 2	DN 50	○	10.0..1000	103.63	LABO-VHS-050...1000	1600	20.70	27.70	30.30
		●	15.0..1500	133.00	LABO-VHS-050...1500	2200	25.00	33.20	34.60
G 2 ¹ / ₂	DN 65	●	25.0..2500	238.82	LABO-VHS-065...2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN



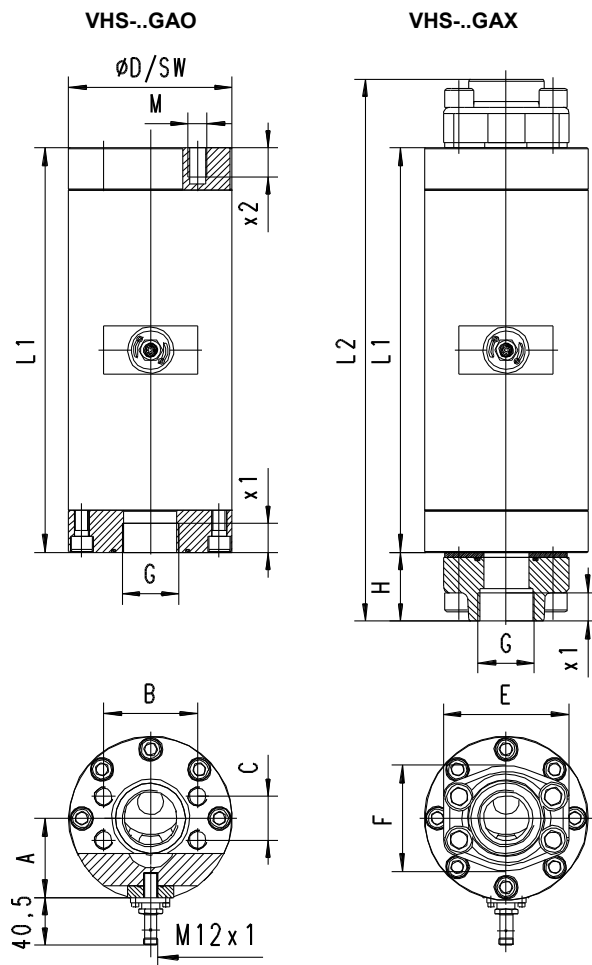
Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring. The push-pull output of the frequency or pulse output version can as desired be switched as a PNP or an NPN output.

Dimensions

● = Standard ○ = Option

G	DN...range	x1	L1	ØD	SW	A	VHS-...GAO....				VHS-...GAX....			
							M	x2	B	C	L2	H	E	F
G 1	025...0140	●	220	88	78	49.0	12	20	57.1	27.8	324	52	80	69
G 1¼	032...0350	●	285	103	-	55.0	14	22	66.7	31.6	381	48	94	77
G 1½	040...0550	○	332	122	-	58.8	16	24	79.4	36.5	448	58	106	89
	040...0800	●	340	138	-	66.5					456			
G 2	050...1000	○	396	155	-	71.0	20	35	96.8	44.4	544	74	135	116
	050...1500	●	405	168	-	77.3					553			
G 2½	065...2500	●	475	203	-	86.0	24	42	123.8	58.7	633	79	166	150



SAE adapter for convenient installation and for increased stability to pressure! (350 bar)

Handling and operation

Installation

Any flow direction is possible during installation. Ensure that pipework is clean. Flush before installation. A 30 µm mesh filter should be used.

The use of SAE flanges enables the sensor to be installed and removed more easily, and increases the stability to pressure to 350 bar for every connection material.

It is possible to replace the electronics during operation, and this presents no danger to the fitter. The sensor does not go into the flow space.

Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment. The teaching option is not available for the pulse output version.

Product Information

LABO-VHS-I / U / F / C

Required ordering information

For LABO-VHS-F:

Output frequency at full scale

 Hz

Maximum value: 2.000 Hz

For LABO-VHS-C:

For the pulse output version, the volume (with numerical value and unit) which will correspond to one pulse must be stated.

Volume per pulse (numerical value)

Volume per pulse (unit)

Options

Special range for analog output:

<= metering range (standard=metering range)

 l/min

Special range for frequency output:

<= metering range (standard=metering range)

 l/min

Power-On delay period (0..99 s)

(time after applying power during which the outputs are not activated or set to defined values)

 s

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- converter / counter OMNI-TA
- Device configurator ECI-1

Flow Transmitter / Screw Volumeter LABO-VHS-I / U / F / C



- Measures and monitors viscous media (oil) 1.4..2500 l/min
- Connection G 1..G 2 1/2
- Very low dependence on viscosity
- Can be used up to 40,000 mm²/s (cSt)
- 0..10 V, 4..20 mA, frequency/pulse output, completely configurable
- Light and compact device (aluminium housing)
- Operation and measurement possible with forward and reverse flow
- For cost-sensitive applications

Characteristics

The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also be measured, as long as they have sufficient lubricity. Because of the volumetric functioning principle, the device is almost completely independent of viscosity.

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- Analog signal 0/2...10 V (LABO-XF-U)
- Frequency signal (LABO-XF-F) or
- Value signal Pulse / x Litres (LABO-XF-C)

A model with switching output is also available (see separate datasheet). If desired, the range end value can be set to the currently existing flow using "teaching".

Technical data

Sensor	screw volumeter		
Nominal width	DN 25..65		
Process connection	female thread G 1..G 2 1/2		
Metering ranges	see table "Ranges and weights"		
Measurement accuracy	±1 % of the measured value (at 20 mm ² /s, (cSt) of 1 %..100 % nominal working range (see also diagrams in upstream pages)		
Repeatability	±0,25 %		
Pressure resistance	Connection	SAE flange	PN bar
	Construction material		
	Aluminium	without	160
	Aluminium	with	350
	Steel	without	350
	Steel	with	350
	others available on request		
Pressure loss	see diagram in upstream pages		
Medium	oil or non-aggressive, self-lubricating fluids		
Medium temperature	-25..+80 °C (150 °C available on request)		
Materials medium-contact	(special materials available on request):		
1. Body	Aluminium 6082 anodised		
2. Connections:	Aluminium 6082 anodised or steel		
3. Main screw	Stahl 35SMnPb10 UNI 4838-80		
4. Subsidiary screw	GHISA GJL-250 EN1561		
5. Ball bearing	Steel		
6. Ball bearing	Steel		
7. Screws	Galvanised steel		
8. O-ring	NBR		
9. Seeger ring	Steel		
10. Seeger ring	Steel		
11. O-ring	NBR		
12. SAE connection	ASTM A216WCB		
13. SAE flange	ASTM A216WCB		
14. O-ring	NBR		
15. Screws	Galvanised steel		
16. Sensor spacer	Aluminium 6082 anodised		
Materials, non-medium-contact	Sensor tube:	CW614N nickelled	
	Adhesive:	epoxy resin	
	Flange bolts:	stainless steel	
Supply voltage	10..30 V DC at voltage output 10 V: 15..30 V DC		
Power consumption	< 1 W (for no-load outputs)		

Product Information

LABO-VHS-I / U / F / C

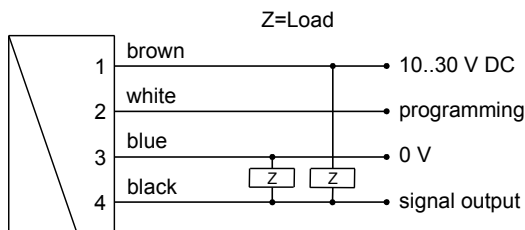
Output data:	all outputs are resistant to short circuits and reversal polarity protected
Current output:	4..20 mA (0..20 mA available on request)
Voltage output:	0..10 V (2..10 V available on request)
Frequency output:	output current max. 20 mA
Pulse output:	transistor output "push-pull" $I_{out} = 100$ mA max.
	transistor output "push-pull" $I_{out} = 100$ mA max. Pulse width 50 ms Pulse per volume is to be stated
Display	yellow LCD shows operating voltage (LABO-XF-I / U) or output status (LABO-XF-F / C) or (rapid flashing = programming)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	see table "Ranges and weights"
Conformity	CE

Ranges and weights

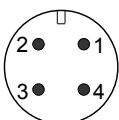
● = Standard ○ = Option

G	DN	●	Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm ³	Types	Q_{max} recommended l/min	Weights		
							Body with aluminium connections kg	Body with steel connections kg	SAE Flanges (Weight per pair) kg
G 1	DN 25	●	1.4.. 140	13.10	LABO-VHS-025...0140	200	3.44	4.76	5.76
G 1 ^{1/4}	DN 32	●	3.5.. 350	29.00	LABO-VHS-032...0350	500	6.35	8.50	9.55
G 1 ^{1/2}	DN 40	○	5.5.. 550	48.58	LABO-VHS-040...0550	800	10.50	13.60	15.10
		●	8.0.. 800	72.00	LABO-VHS-040...0800	1200	14.20	18.50	18.80
G 2	DN 50	○	10.0..1000	103.63	LABO-VHS-050...1000	1600	20.70	27.70	30.30
		●	15.0..1500	133.00	LABO-VHS-050...1500	2200	25.00	33.20	34.60
G 2 ^{1/2}	DN 65	●	25.0..2500	238.82	LABO-VHS-065...2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN



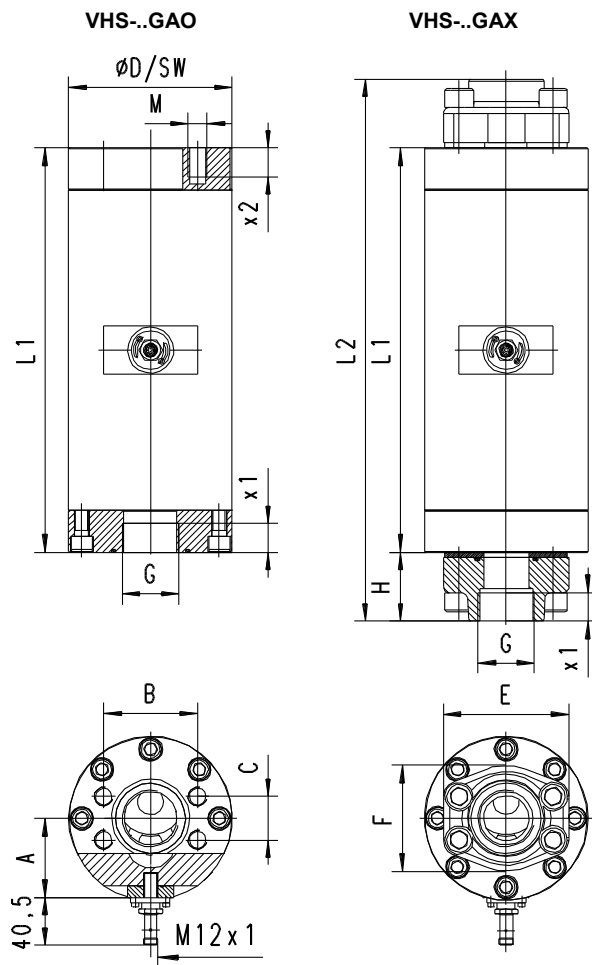
Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring. The push-pull output) of the frequency or pulse output version can as desired be switched as a PNP or an NPN output.

Dimensions

● = Standard ○ = Option

G	DN...range	x1	L1	ØD	SW	A	VHS-...GAO....				VHS-...GAX....			
							M	x2	B	C	L2	H	E	F
G 1	025...0140	●	220	88	78	49.0	12	20	57.1	27.8	324	52	80	69
G 1¼	032...0350	●	285	103	-	55.0	14	22	66.7	31.6	381	48	94	77
G 1½	040...0550	○	332	122	-	58.8	16	24	79.4	36.5	448	58	106	89
	040...0800	●	340	138	-	66.5					456			
G 2	050...1000	○	396	155	-	71.0	20	35	96.8	44.4	544	74	135	116
	050...1500	●	405	168	-	77.3					553			
G 2½	065...2500	●	475	203	-	86.0	24	42	123.8	58.7	633	79	166	150



Handling and operation

Installation

Any flow direction is possible during installation. Ensure that pipework is clean. Flush before installation. A 30 µm mesh filter should be used.

The use of SAE flanges enables the sensor to be installed and removed more easily, and increases the stability to pressure to 350 bar for every connection material.

It is possible to replace the electronics during operation, and this presents no danger to the fitter. The sensor does not go into the flow space.

Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment. The teaching option is not available for the pulse output version.

SAE adapter for convenient installation and for increased stability to pressure! (350 bar)

Product Information

LABO-VHS-I / U / F / C

Required ordering information

For LABO-VHS-F:

Output frequency at full scale

 Hz

Maximum value: 2.000 Hz

For LABO-VHS-C:

For the pulse output version, the volume (with numerical value and unit) which will correspond to one pulse must be stated.

Volume per pulse (numerical value)

Volume per pulse (unit)

Options

Special range for analog output:

<= metering range (standard=metering range)

 l/min

Special range for frequency output:

<= metering range (standard=metering range)

 l/min

Power-On delay period (0..99 s)

(time after applying power during which the outputs are not activated or set to defined values)

 s

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- converter / counter OMNI-TA
- Device configurator ECI-1

Flow Transmitter / Screw Volumeter LABO-VHS-I / U / F / C



- Measures and monitors viscous media (oil) 1.4..2500 l/min
- Connection G 1..G 2 1/2
- Very low dependence on viscosity
- Can be used up to 40,000 mm²/s (cSt)
- 0..10 V, 4..20 mA, frequency/pulse output, completely configurable
- Light and compact device (aluminium housing)
- Operation and measurement possible with forward and reverse flow
- For cost-sensitive applications

Characteristics

The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also be measured, as long as they have sufficient lubricity. Because of the volumetric functioning principle, the device is almost completely independent of viscosity.

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The LABO-XXX-I/U/F/C electronics make various output signals available:

- Analog signal 0/4...200 mA (LABO-XF-I)
- Analog signal 0/2...10 V (LABO-XF-U)
- Frequency signal (LABO-XF-F) or
- Value signal Pulse / x Litres (LABO-XF-C)

A model with switching output is also available (see separate datasheet). If desired, the range end value can be set to the currently existing flow using "teaching".

Technical data

Sensor	screw volumeter		
Nominal width	DN 25..65		
Process connection	female thread G 1..G 2 1/2		
Metering ranges	see table "Ranges and weights"		
Measurement accuracy	±1 % of the measured value (at 20 mm ² /s, (cSt) of 1 %..100 % nominal working range (see also diagrams in upstream pages)		
Repeatability	±0,25 %		
Pressure resistance	Connection Construction material	SAE flange	PN bar
	Aluminium	without	160
	Aluminium	with	350
	Steel	without	350
	Steel	with	350
	others available on request		
Pressure loss	see diagram in upstream pages		
Medium	oil or non-aggressive, self-lubricating fluids		
Medium temperature	-25..+80 °C (150 °C available on request)		
Materials medium-contact	(special materials available on request):		
1. Body	Aluminium 6082 anodised		
2. Connections:	Aluminium 6082 anodised or steel		
3. Main screw	Stahl 35SMnPb10 UNI 4838-80		
4. Subsidiary screw	GHISA GJL-250 EN1561		
5. Ball bearing	Steel		
6. Ball bearing	Steel		
7. Screws	Galvanised steel		
8. O-ring	NBR		
9. Seeger ring	Steel		
10. Seeger ring	Steel		
11. O-ring	NBR		
12. SAE connection	ASTM A216WCB		
13. SAE flange	ASTM A216WCB		
14. O-ring	NBR		
15. Screws	Galvanised steel		
16. Sensor spacer	Aluminium 6082 anodised		
Materials, non-medium-contact	Sensor tube:	CW614N nickelled	
	Adhesive:	epoxy resin	
	Flange bolts:	stainless steel	
Supply voltage	10..30 V DC at voltage output 10 V: 15..30 V DC		
Power consumption	< 1 W (for no-load outputs)		

Product Information

LABO-VHS-I / U / F / C

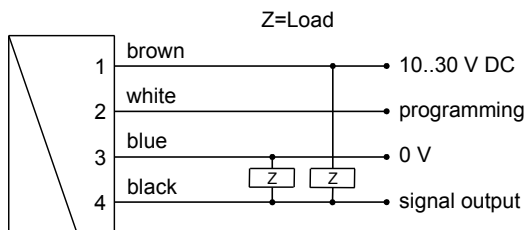
Output data:	all outputs are resistant to short circuits and reversal polarity protected
Current output:	4..20 mA (0..20 mA available on request)
Voltage output:	0..10 V (2..10 V available on request)
Frequency output:	output current max. 20 mA
Pulse output:	transistor output "push-pull"
	$I_{out} = 100$ mA max.
	transistor output "push-pull"
	$I_{out} = 100$ mA max.
	Pulse width 50 ms
	Pulse per volume is to be stated
Display	yellow LCD shows operating voltage (LABO-XF-I / U) or output status (LABO-XF-F / C) or (rapid flashing = programming)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	see table "Ranges and weights"
Conformity	CE

Ranges and weights

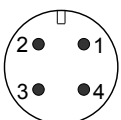
● = Standard ○ = Option

G	DN	●	Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm ³	Types	Q_{max} recommended l/min	Weights		
							Body with aluminium connections kg	Body with steel connections kg	SAE Flanges (Weight per pair) kg
G 1	DN 25	●	1.4.. 140	13.10	LABO-VHS-025...0140	200	3.44	4.76	5.76
G 1 ¹ / ₄	DN 32	●	3.5.. 350	29.00	LABO-VHS-032...0350	500	6.35	8.50	9.55
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G 2	DN 50	○	10.0..1000	103.63	LABO-VHS-050...1000	1600	20.70	27.70	30.30
		●	15.0..1500	133.00	LABO-VHS-050...1500	2200	25.00	33.20	34.60
G 2 ¹ / ₂	DN 65	●	25.0..2500	238.82	LABO-VHS-065...2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN



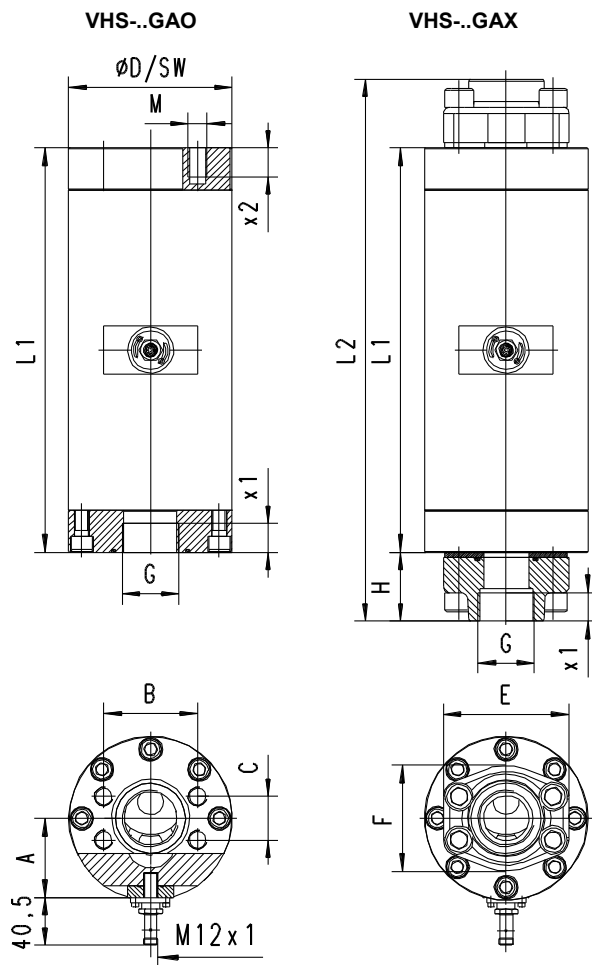
Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring. The push-pull output of the frequency or pulse output version can as desired be switched as a PNP or an NPN output.

Dimensions

● = Standard ○ = Option

G	DN...range	x1	L1	ØD	SW	A	VHS-...GAO....				VHS-...GAX....			
							M	x2	B	C	L2	H	E	F
G 1	025...0140	●	220	88	78	49.0	12	20	57.1	27.8	324	52	80	69
G 1¼	032...0350	●	285	103	-	55.0	14	22	66.7	31.6	381	48	94	77
G 1½	040...0550	○	332	122	-	58.8	16	24	79.4	36.5	448	58	106	89
	040...0800	●	340	138	-	66.5					456			
G 2	050...1000	○	396	155	-	71.0	20	35	96.8	44.4	544	74	135	116
	050...1500	●	405	168	-	77.3					553			
G 2½	065...2500	●	475	203	-	86.0	24	42	123.8	58.7	633	79	166	150



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Handling and operation

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Product Information

LABO-VHS-I / U / F / C

Required ordering information

For LABO-VHS-F:

Output frequency at full scale

 Hz

Maximum value: 2.000 Hz

For LABO-VHS-C:

For the pulse output version, the volume (with numerical value and unit) which will correspond to one pulse must be stated.

Volume per pulse (numerical value)

Volume per pulse (unit)

Options

Special range for analog output:

<= metering range (standard=metering range)

 l/min

Special range for frequency output:

<= metering range (standard=metering range)

 l/min

Power-On delay period (0..99 s)

(time after applying power during which the outputs are not activated or set to defined values)

 s

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- converter / counter OMNI-TA
- Device configurator ECI-1

Flow Transmitter / Screw Volumeter LABO-VHS-S



- Monitors viscous media (oil) 1.4..2500 l/min
- Connection G 1..G 2 1/2
- Very low dependence on viscosity
- Can be used up to 40,000 mm²/s (cSt)
- Versatile configurable limit switch (push-pull)
- Light and compact device (aluminium housing)
- Operation and measurement possible with forward and reverse flow
- For cost-sensitive applications

Characteristics

The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also be measured, as long as they have sufficient lubricity. Because of the volumetric functioning principle, the device is almost completely independent of viscosity.

The VHS system consists of two interlacing screws which run in opposite directions, driven by the flowing medium. A magnetically pre-tensioned Hall sensor positioned outside the flow space detects the screw flanks, and creates a frequency signal proportional to the flow. Here, every pulse corresponds to a specific measured volume. There are no magnets in the flow space.

The LABO-xxx-s electronics fitted to the device make available an electronic switching output (push-pull) with adjustable characteristics (minimum/maximum) and hysteresis, which responds when an adjustable limit is fallen short of or exceeded. If desired, the switching value can be set to the currently existing flow using "teaching". Models with analog or pulse output are also available (see separate data sheets).

Technical data

Sensor	screw volumeter		
Nominal width	DN 25..65		
Process connection	female thread G 1..G 2 1/2		
Switching ranges	see table "Ranges and weights"		
Measurement accuracy	±1 % of the measured value (at 20 mm ² /s, (cSt) of 1 %..100 % nominal working range (see also diagram in upstream pages)		
Repeatability	±0,25 %		
Pressure resistance	Connection material	SAE flange	PN bar
	Aluminium	without	160
	Aluminium	with	350
	Steel	without	350
	Steel	with	350
	others available on request		
Pressure loss	see diagram in upstream pages		
Medium	oil or non-aggressive self-lubricating fluids		
Medium temperature	-25..+80 °C (150 °C available on request)		
Materials medium-contact	(special materials available on request):		
1. Body	Aluminium 6082 anodised		
2. Connections:	Aluminium 6082 anodised or steel		
3. Main screw	Steel 35SMnPb10 UNI 4838-80		
4. Subsidiary screw	GHISA GJL-250 EN1561		
5. Ball bearing	Steel		
6. Ball bearing	Steel		
7. Screws	Galvanised steel		
8. O-ring	NBR		
9. Seeger ring	Steel		
10. Seeger ring	Steel		
11. O-ring	NBR		
12. SAE connection	ASTM A216WCB		
13. SAE flange	ASTM A216WCB		
14. O-ring	NBR		
15. Screws	Galvanised steel		
16. Sensor spacer	Aluminium 6082 anodised		
Materials, non-medium-contact	Sensor tube:	CW614N nickelled epoxy resin	
	Adhesive:	stainless steel	
	Flange bolts:		
Supply voltage	10..30 V DC		
Power consumption	< 1 W (for no-load outputs)		

Product Information

LABO-VHS-S

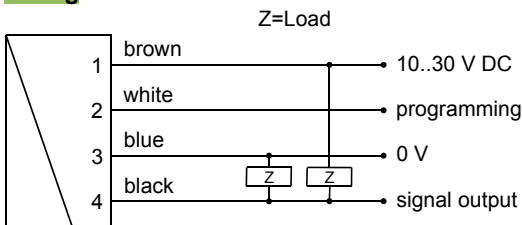
Switching output	transistor output "push-pull" (resistant to short circuits and reversed polarity protected) $I_{out} = 100$ mA max.
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	see table "Ranges and weights"
Conformity	CE

Ranges and weights

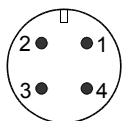
● = Standard ○ = Option

G	DN	● / ○	Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm ³	Types	Q_{max} recommended l/min	Weights		
							Body with aluminium connections kg	Body with steel connections kg	SAE Flanges (Weight per pair) kg
G 1	DN 25	●	1.4.. 140	13.10	LABO-VHS-025...0140	200	3.44	4.76	5.76
G 1 1/4	DN 32	●	3.5.. 350	29.00	LABO-VHS-032...0350	500	6.35	8.50	9.55
G 1 1/2	DN 40	○	5.5.. 550	48.58	LABO-VHS-040...0550	800	10.50	13.60	15.10
		●	8.0.. 800	72.00	LABO-VHS-040...0800	1200	14.20	18.50	18.80
G 2	DN 50	○	10.0..1000	103.63	LABO-VHS-050...1000	1600	20.70	27.70	30.30
		●	15.0..1500	133.00	LABO-VHS-050...1500	2200	25.00	33.20	34.60
G 2 1/2	DN 65	●	25.0..2500	238.82	LABO-VHS-065...2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN

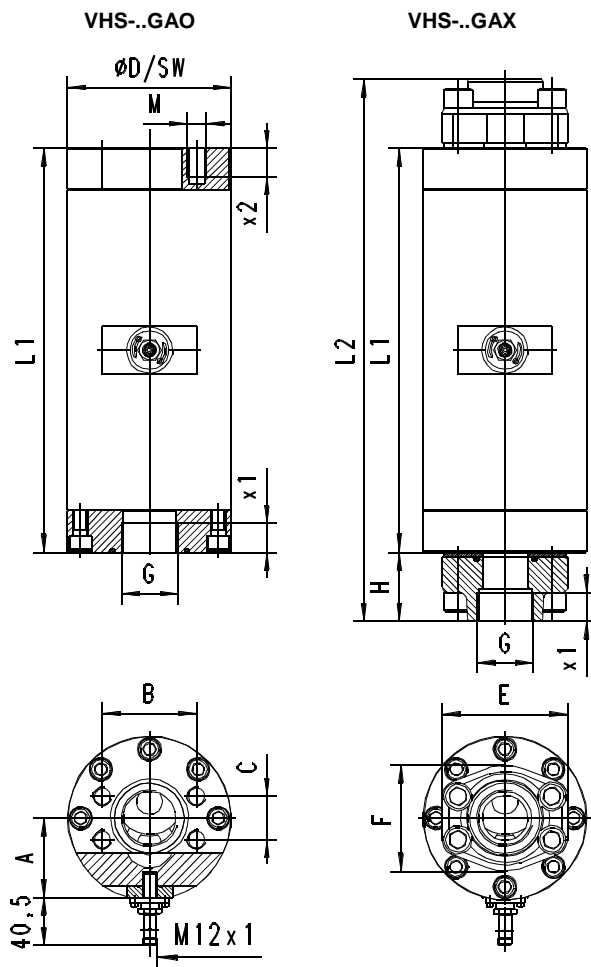


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.
It is recommended to use shielded wiring.
The push-pull output) can as desired be switched as a PNP or an NPN output.

Dimensions

● = Standard ○ = Option

G	DN		x1	L1	ØD	SW	A	VHS-...GAO...				VHS-...GAX...			
								M	x2	B	C	L2	H	E	F
G 1	025...0140	●	20	220	88	78	49.0	12	20	57.1	27.8	324	52	80	69
G 1¼	032...0350	●	22	285	103	-	55.0	14	22	66.7	31.6	381	48	94	77
G 1½	040...0550	○	24	332	122	-	58.8	16	24	79.4	36.5	448	58	106	89
	040...0800	●		340	138	-	66.5					456			
G 2	050...1000	○	33	396	155	-	71.0	20	35	96.8	44.4	544	74	135	116
	050...1500	●		405	168	-	77.3					553			
G 2½	065...2500	●	35	475	203	-	86.0	24	42	123.8	58.7	633	79	166	150



SAE adapter for convenient installation and for increased stability to pressure! (350 bar)

Handling and operation

Installation

Any flow direction is possible during installation. Ensure that pipework is clean. Flush before installation. A 30 µm mesh filter should be used. The use of SAE flanges enables the sensor to be installed and removed more easily, and increases the stability to pressure to 350 bar for every connection material.

It is possible to replace the electronics during operation, and this presents no danger to the fitter. The sensor does not go into the flow space.

Note

The switching value can be programmed by the user via "teaching". If desired, programmability can be blocked by the manufacturer. The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

Product Information

LABO-VHS-S

Operation and programming

The switching value is set as follows:

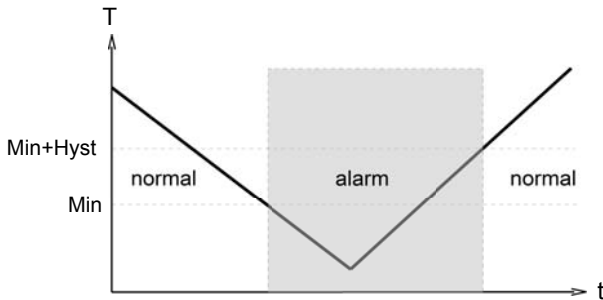
- Apply the flow rate to be set to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output. In order to avoid the need to transit to an undesired operating status during the teach-in, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving. The offset point can be positive or negative.

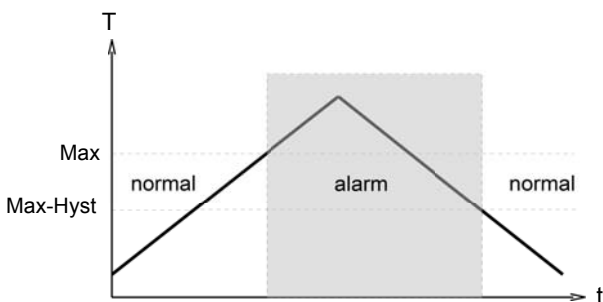
Example: The switching value should be set to 80 %. However, it is possible only to reach 60 % without problems. In this case, the device would be ordered with a "teach-offset" of +20%.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

The limit switch can be used for monitoring minima or maxima.

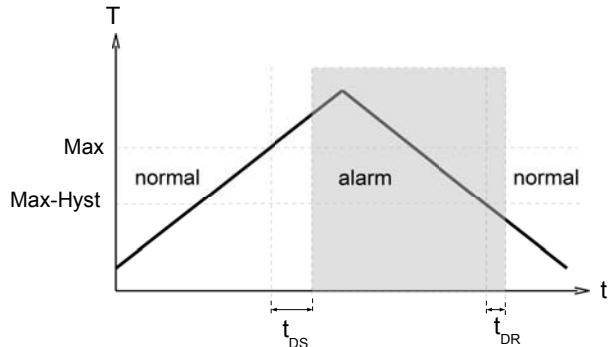
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

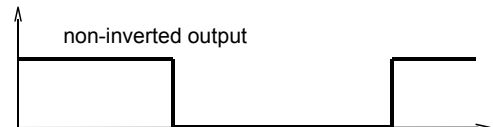


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On-Delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Ordering code

VHS - 1. 2. **G** 3. 4. 5. **A** 6. 7. 8. **E**

LABO - VHS - 9. 10. **S** 11. 12. 13. 14. **S** 15.

○=Option

1. Nominal width							
025	DN 25 - G 1						
032	DN 32 - G 1 ¹ / ₄						
040	DN 40 - G 1 ¹ / ₂						
050	DN 50 - G 2						
065	DN 65 - G 2 ¹ / ₂						
2. Process connection							
G	female thread						
3. Connection material							
A	AL connection, anodised (160 bar, in combination with SAE flange: 350 bar)						
S	<input type="radio"/> Connection, steel (350 bar)						
4. Additional flange							
X	SAE flange, steel (350 bar)						
O	no SAE flange						
5. Body material							
A	anodised aluminium						
6. Metering range							
0140	1.4.. 140 l/min						●
0350	3.5.. 350 l/min						●
0550	<input type="radio"/> 5.5.. 550 l/min						●
0800	8.0.. 800 l/min						●
1000	<input type="radio"/> 10.0..1000 l/min						●
1500	15.0..1500 l/min						●
2500	25.0..2500 l/min						●
7. Seal material							
N	NBR						
V	<input type="radio"/> FKM						
8. Connection for							
E	electronics						
9. For nominal width							
025	DN 25 - G 1						●
032	DN 32 - G 1 ¹ / ₄						●
040	DN 40 - G 1 ¹ / ₂						●
050	DN 50 - G 2						●
065	DN 65 - G 2 ¹ / ₂						●
10. Switching output (Limit switch)							
S	push-pull (compatible with PNP and NPN)						
11. Programming							
P	programmable (teaching possible)						
N	<input type="radio"/> cannot be programmed (no teaching)						
12. Switching function							
L	minimum switch						
H	maximum switch						
13. Switching signal							
O	standard						
I	<input type="radio"/> inverted						
14. Electrical connection							
S	for round plug connector M12x1, 4-pole						
15. Optional							
H	<input type="radio"/> 150 °C with electronics separated by 30 cm						

Required ordering information

For LABO-VHS-F:

Output frequency at full scale

Hz

Maximum value: 2.000 Hz

For LABO-VHS-C:

For the pulse output version, the volume (with numerical value and unit) which will correspond to one pulse must be stated.

Volume per pulse (numerical value)

Volume per pulse (unit)

Options

Special range for analog output:

l/min

<= metering range (standard=metering range)

Special range for frequency output:

l/min

<= metering range (standard=metering range)

Power-On-Delay period (0..99 s)

s

(time after applying power during which the outputs are not activated or set to defined values)

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- converter / counter OMNI-TA
- Device configurator ECI-1

Flow Transmitter / Switch Screw Volumeter OMNI-VHS



- Measures and monitors viscous media (oil) 1.4..2500 l/min
- Connection G 1..G 2¹/₂
- Very low dependence on viscosity
- Can be used up to 40,000 mm²/s (cSt)
- Light and compact device (aluminium housing)
- Operation and measurement possible with forwards and reverse flow
- For cost-sensitive applications
- Analog output 4..20 mA or 0..10 V
- Two programmable switches
- Graphical LCD display, backlit, can be read in sunlight and in the dark
- Selectable units in the display
- Programmable parameters via rotatable, removable ring (programming protection)
- Electronics housing with non-scratch, chemically resistant glass
- Rotatable electronic housing for best reading position
- Designed for industrial use
- Small, compact construction
- Simple installation

Characteristics

The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also be measured, as long as they have sufficient lubricity. Because of the volumetric functioning principle, the device is almost completely independent of viscosity.

The VHS system consists of two interlacing screws which run in opposite directions, driven by the flowing medium. A magnetically pre-tensioned Hall sensor positioned outside the flow space detects the screw flanks, and creates a frequency signal proportional to the flow. Here, every pulse corresponds to a specific measured volume. There are no magnets in the flow space.

The OMNI transducer located on the sensor has a backlit graphics LCD display which is very easy to read, both in the dark and in bright sunlight. The graphics display allows the presentation of measured values and parameters in a clearly understandable form. The measured values are displayed to 4 places, together with their

physical unit, which may also be modified by the user. The electronics have an analog output (4..20 mA or 0..10 V) and two switching outputs, which can be used as limit switches for monitoring minima or maxima, or as two-point controllers. The switching outputs are designed as push-pull drivers, and can therefore be used both as PNP and NPN outputs. Exceeding limit values is signalled by a red LED which is visible over a long distance, and by a cleartext in the display. The stainless steel case has a hardened non-scratch mineral glass pane.

It is operated by a programming ring fitted with a magnet, so there is no need to open the operating controls housing, and its leakproofness is permanently ensured.

By turning the ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 ° and replaced, or completely removed, thus acting as a key.



Technical data

Sensor	screw volumeter		
Nominal width	DN 25..65		
Process connection	female thread G 1..G 2 ¹ / ₂		
Metering ranges	see table "Ranges and weights"		
Measurement accuracy	±1 % of the measured value (at 20 mm ² /s, (cSt) of 1 %..100 % nominal working range (see also diagram in		
Repeatability	±0,25 %		
Pressure resistance	Connection material	SAE flange	PN bar
	Aluminium	without	160
	Aluminium	with	350
	Steel	without	350
	Steel	with	350
	others available on request		
Pressure loss	see diagram in upstream pages		
Medium	oil or non-aggressive self-lubricating fluids		
Medium temperature	-25..+80 °C (150 °C available on request)		

Product Information

OMNI-VHS

Materials medium-contact	(special materials available on request):
1. Body 2. Connections: 3. Main screw 4. Subsidiary screw 5. Ball bearing 6. Ball bearing 7. Screws 8. O-ring 9. Seeger ring 10. Seeger ring 11. O-ring 12. SAE connection 13. SAE flange	Aluminium 6082 anodised Aluminium 6082 anodised or steel Stahl 35SMnPb10 UNI 4838-80 GHISA GJL-250 EN1561 Steel Steel Galvanised steel NBR Steel Steel NBR ASTM A216WCB ASTM A216WCB

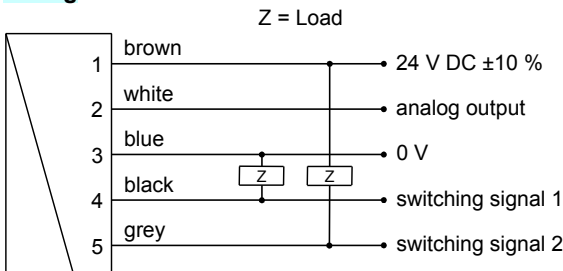
14. O-ring	NBR								
15. Screws	Galvanised steel								
16. Sensor spacer	Aluminium 6082 anodised								
Materials non-medium-contact	<table border="0"> <tr> <td>Electronics housing</td> <td>stainless steel 1.4305</td> </tr> <tr> <td>Glass</td> <td>mineral glass hardened</td> </tr> <tr> <td>Magnet</td> <td>samarium-Cobalt</td> </tr> <tr> <td>Ring</td> <td>POM</td> </tr> </table>	Electronics housing	stainless steel 1.4305	Glass	mineral glass hardened	Magnet	samarium-Cobalt	Ring	POM
Electronics housing	stainless steel 1.4305								
Glass	mineral glass hardened								
Magnet	samarium-Cobalt								
Ring	POM								
Supply voltage	18..30 V DC								
Power consumption	< 1 W								
Analog output	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ								
Switching outputs	transistor output "push-pull" (resistant to short circuits and polarity reversal) $I_{out} = 100$ mA max.								
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum								
Display	backlit graphical LCD-Display (transreflective), extended temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display.								
Electrical connection	for round plug connector M12x1, 5-pole								
Ingress protection	IP 67 / (IP 68 when oil-filled)								
Weight	see table "Weights"								
Conformity	CE								

Ranges and weights

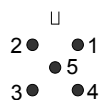
● = Standard ○ = Option

G	DN	●	Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm ³	Types	Q_{max} recommended l/min	Weights		
							Body with aluminium connections kg	Body with steel connections kg	SAE Flanges (Weight per pair) kg
G 1	DN 25	●	1.4.. 140	13.10	OMNI-VHS-025.....0140	200	3.44	4.76	5.76
G 1 ^{1/4}	DN 32	●	3.5.. 350	29.00	OMNI-VHS-032.....0350	500	6.35	8.50	9.55
G 1 ^{1/2}	DN 40	○	5.5.. 550	48.58	OMNI-VHS-040.....0550	800	10.50	13.60	15.10
		●	8.0.. 800	72.00	OMNI-VHS-040.....0800	1200	14.20	18.50	18.80
G 2	DN 50	○	10.0..1000	103.63	OMNI-VHS-050.....1000	1600	20.70	27.70	30.30
		●	15.0..1500	133.00	OMNI-VHS-050.....1500	2200	25.00	33.20	34.60
G 2 ^{1/2}	DN 65	●	25.0..2500	238.82	OMNI-VHS-065.....2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN

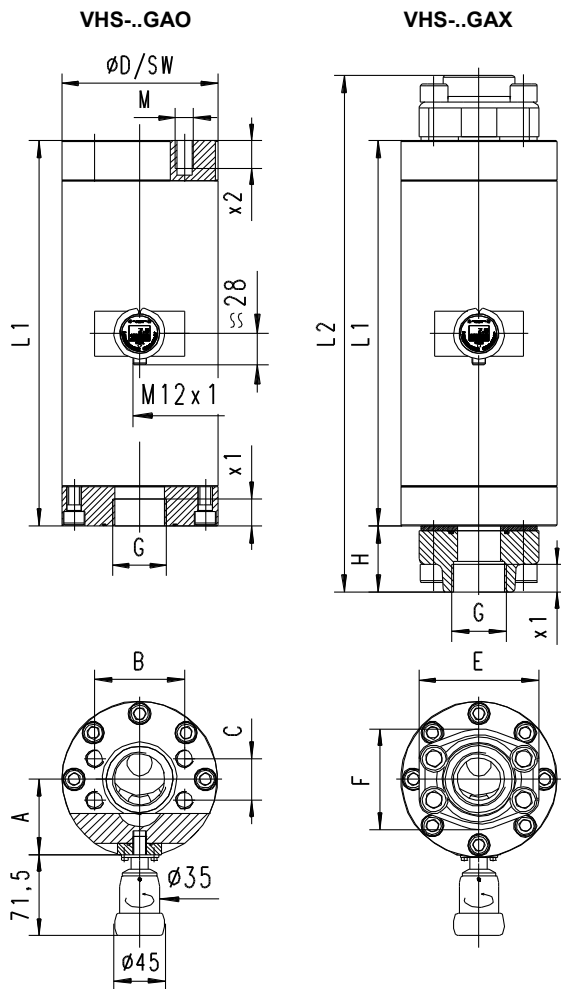


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.
The use of shielded cabling is recommended.

Dimensions

● = Standard ○ = Option

							VHS-...GAO....				VHS-...GAX....				
G	DN...ranges		x1	L1	ØD	SW	A	M	x2	B	C	L2	H	E	F
G 1	025...0140	●	20	220	88	78	49.0	12	20	57.1	27.8	324	52	80	69
G 1 ^{1/4}	032...0350	●	22	285	103	-	55.0	14	22	66.7	31.6	381	48	94	77
G 1 ^{1/2}	040...0550	○	24	332	122	-	58.8	16	24	79.4	36.5	448	58	106	89
		040...0800		●	340	138	-					66.5			
G 2	050...1000	○	33	396	155	-	71.0	20	35	96.8	44.4	544	74	135	116
		050...1500		●	405	168	-					77.3			
G 2 ^{1/2}	065...2500	●	35	475	203	-	86.0	24	42	123.8	58.7	633	79	166	150



SAE adapter for convenient installation and for increased stability to pressure! (350 bar)

Handling and operation

Installation

Any flow direction is possible during installation. Ensure that pipework is clean. Flush before installation. A 30 µm mesh filter should be used.

The use of SAE flanges enables the sensor to be installed and removed more easily, and increases the stability to pressure for every connection material at 350 bar. It is possible to replace the electronics during operation, and this presents no danger to the fitter. The sensor does not go into the flow space.

After installation, the electronic head can be turned to align the cable outlet.

Programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:



**Set to 1 = continue (STEP)
Set to 2 = modify (PROG)**

**Neutral position between
1 and 2**

The ring can be removed to act as a key, or turned through 180° and replaced to create a programming protector.

Operation is by dialog with the display messages, which makes its use very simple.

Starting from the normal display (present value and unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
- MIN = Monitoring of minimum value
- MAX = Monitoring of maximum value
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code
- After entering the code **111**, further parameters can be defined:
- Filter (settling time of the display and output)
- Physical unit (Units)
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (measured value corresponding to 0/4 mA)
- 20 mA (measured value corresponding to 20 mA)

For models with a voltage output, replace 20 mA accordingly with 10 V.

Product Information

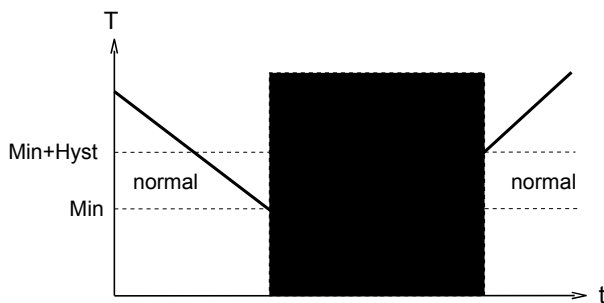
Edit, using position 2

If the currently visible parameter is to be modified:

- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

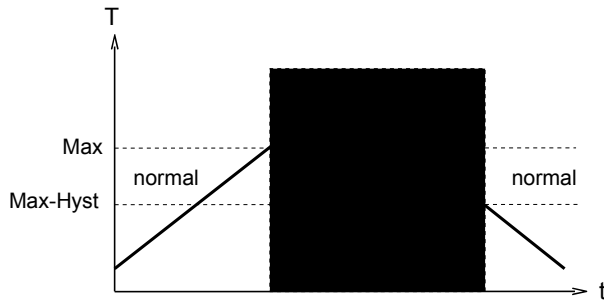
The limit switches S1 and S2 can be used to monitor minima or maxima or minima or maxima.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.



While in the normal state the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also display as an alarm state at the signal receiver.

Overload display

Overload of a switching output is detected and indicated on the display ("Check S 1 / S 2"), and the switching output is switched off.

Simulation mode

To simplify commissioning, the sensor provides a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26.0 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This mode is accessed by means of **Code 311**.

Factory settings

After modifying the configuration parameters, it is possible to reset them to the factory settings at any time using **Code 989**.

Product Information

OMNI-VHS

Ordering code

VHS - 1. 2. **G** 3. 4. 5. **A** 6. 7. 8. **E**

OMNI-VHS - 9. 10. 11. **S** 12.

○=Option

1. Nominal width								
025	DN 25 - G 1							
032	DN 32 - G 1 ^{1/4}							
040	DN 40 - G 1 ^{1/2}							
050	DN 50 - G 2							
065	DN 65 - G 2 ^{1/2}							
2. Process connection								
G	female thread							
3. Connection material								
A	AL connection, anodised (160 bar, in combination with SAE flange: 350 bar)							
S	○ Connection, steel (350 bar)							
4. Additional flange								
X	SAE flange, steel (350 bar)							
O	no SAE flange (pressure resistance depends on the connection material)							
5. Body material								
A	anodised aluminium							
6. Metering range								
0140	1.4.. 140 l/min							●
0350	3.5.. 350 l/min							●
0550	○ 5.5.. 550 l/min							●
0800	8.0.. 800 l/min							●
1000	○ 10.0..1000 l/min							●
1500	15.0..1500 l/min							●
2500	25.0..2500 l/min							●
7. Seal material								
N	NBR							
V	○ FKM							
8. Connection for								
E	electronics							
9. For nominal width								
025	DN 25 - G 1							●
032	DN 32 - G 1 ^{1/4}							●
040	DN 40 - G 1 ^{1/2}							●
050	DN 50 - G 2							●
065	DN 65 - G 2 ^{1/2}							●
10. Analog output								
I	current output 0/4..20 mA							
U	○ voltage output 0/2..10 V							
11. Electrical connection								
S	for round plug connector M12x1, 5-pole							
12. Option								
H	○ model with gooseneck							
O	○ tropical model oil-filled version for heavy duty or external use							

Further options available on request.

Accessoires

- Cable/round plug connector (KB...) see additional information "Accessories"
- Device configurator ECI-1

Accessories

- External counter EEZ-904
- Counter OMNI-C-VHS (panel-mounting IP 67)
- External display / converter OMNI-TA (panel-mounting IP 67)
- External display / converter OMNI-REMOTE (panel-mounting IP 67)

Flow Transmitter / Screw Volumeter VHS



- Measures and monitors viscous media (oil) 1.4..2500 l/min
- Connection G 1..G 2 1/2
- Very low dependence on viscosity
- Can be used up to 40,000 mm²/s (cSt)
- Linear frequency output (push-pull)
- Light and compact device (aluminium housing)
- Operation and measurement possible with forwards and reverse flow
- For cost-sensitive applications

Characteristics

The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also be measured, as long as they have sufficient lubricity. Because of the volumetric functioning principle, the device is almost completely independent of viscosity. The VHS system consists of two interlacing screws which run in opposite directions, driven by the flowing medium. A magnetically pre-tensioned Hall sensor positioned outside the flow space detects the screw flanks, and creates a frequency signal proportional to the flow. Here, two pulses correspond to one revolution of the screws, and therefore to a specific measured volume (see data table) There are no magnets in the flow space. A push-pull transistor output, an A / B output or a two wire output are available as signal output. The push-pull output can as desired be switched as a PNP or an NPN output, and emits a frequency proportional to the flow rate.

The A / B output consists of two push-pull outputs, whose signals are phase-shifted by 90°. This makes it possible to determine the direction of flow using the bidirectionally driven sensor.

The 2 wire model represents the pulse as two different currents, and has the advantage of reduced wiring effort. Alternatively, it is possible to use add-on electronics with signal processing, in the series OMNI, FLEX and LABO.

The device bodies are made of aluminium, and the connections either of aluminium (achieves PN 160 bar) or steel (achieves PN 350 bar). Optionally, both process connections can be fitted with SAE flanges, which simplify the installation in the pipework, and in both cases achieve a pressure resistance of PN 350.

Technical data

Sensor	screw volumeter		
Nominal width	DN 25..65		
Process connection	female thread G 1..G 2 1/2		
Metering ranges	see table "Ranges"		
Measurement accuracy	±1 % of the measured value (at 20 mm ² /s, (cSt) of 1 %..100 % nominal working range (see also diagram in upstream pages)		
Repeatability	±0,25 %		
Pressure resistance	Connection material	SAE flange	PN bar
	aluminium	without	160
	aluminium	with	350
	steel	without	350
	steel	with	350
	others available on request		
Pressure loss	see diagrams in upstream pages		
Medium	oil or non-aggressive self-lubricating fluids		
Medium temperature	-25..+80 °C (150 °C available on request)		
Materials medium-contact	(special materials available on request):		
1. Body	Aluminium 6082 anodised		
2. Connections:	Aluminium 6082 anodised or steel		
3. Main screw	Steel 35SMnPb10 UNI 4838-80		
4. Subsidiary screw	GHISA GJL-250 EN1561		
5. Ball bearing	Steel		
6. Ball bearing	Steel		
7. Screws	Galvanised steel		
8. O-ring	NBR		
9. Seeger ring	Steel		
10. Seeger ring	Steel		
11. O-ring	NBR		
12. SAE connection	ASTM A216WCB		
13. SAE flange	ASTM A216WCB		
14. O-ring	NBR		
15. Screws	Galvanised steel		
16. Sensor spacer	Aluminium 6082 anodised		
3 wire or A / B-output	Supply voltage	10..30 V DC	
	Curr. consumpt.	approx. 20 mA without load	
	Signal output	Transistor output "push-pull" (resistant to short circuits and reversed polarity protected) I _{out} = 100 mA max.	

Product Information

2 wire	Supply voltage	4.5..24 V DC
	Signal output	Low: 7 mA High: 14 mA
	Reversed polarity protected	yes

Electrical connection	plug DIN 43650-A / ISO 4400 or for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	see table "Ranges and weights"
Conformity	CE

Ranges and weights

● = Standard ○ = Option

G	DN		Metering range	Volume /	pulses /	Output	Output	Types	Q _{max}
			1..100 % Q _{nom}	pulse	litre	frequency	frequency		recommended
			l/min	cm ³		at Q _{nom}	at Q _{max}		l/min
G 1	DN 25	●	1.4.. 140	13.10	76.340	178.1	254.5	VHS-025...0140	200
G 1 ¹ / ₄	DN 32	●	3.5.. 350	29.00	34.480	201.1	287.4	VHS-032...0350	500
G 1 ¹ / ₂	DN 40	○	5.5.. 550	48.58	20.590	188.7	274.5	VHS-040...0550	800
		●	8.0.. 800	72.00	13.890	185.2	277.8	VHS-040...0800	1200
G 2	DN 50	○	10.0..1000	103.63	9.650	160.6	257.3	VHS-050...1000	1600
		●	15.0..1500	133.00	7.519	188.0	275.7	VHS-050...1500	2200
G 2 ¹ / ₂	DN 65	●	25.0..2500	238.82	4.187	174.5	265.2	VHS-065...2500	3800

G	DN...range		Body with	Body with	SAE
			aluminium	steel	Flanges
			connections	connections	(Weight per pair)
			kg	kg	kg
G 1	025...0140	●	3.44	4.76	5.76
G 1 ¹ / ₄	032...0350	●	6.35	8.50	9.55
G 1 ¹ / ₂	040...0550	○	10.50	13.60	15.10
	040...0800	●	14.20	18.50	18.80
G 2	050...1000	○	20.70	27.70	30.30
	050...1500	●	25.00	33.20	34.60
G 2 ¹ / ₂	065...2500	●	42.70	56.10	60.70

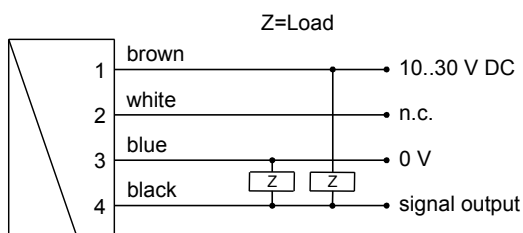
Wiring

Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.
The use of shielded cabling is recommended.

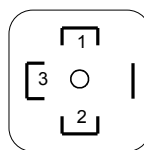
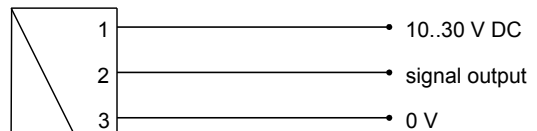
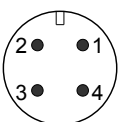
with plug as per DIN 43650-A / ISO 4400

Push-pull output

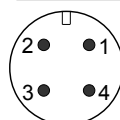
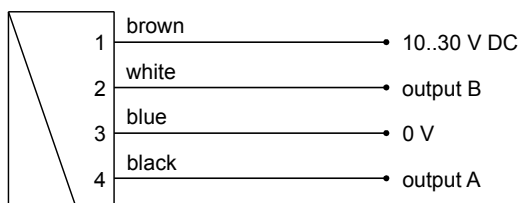
with 4-pole round plug connector



Connection example: PNP NPN


A / B output

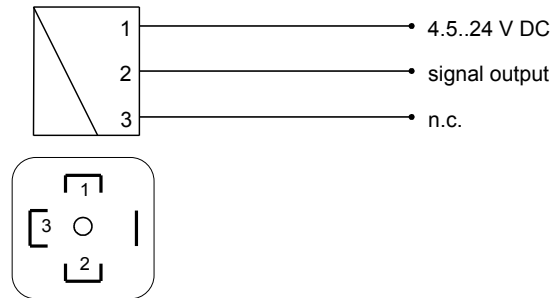
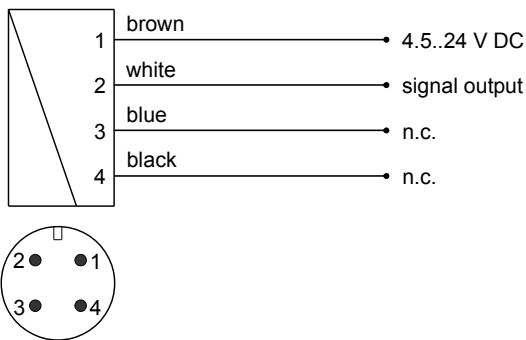
only with 4-pole round plug connector



Product Information

2 wire model
with 4-pole round plug connector

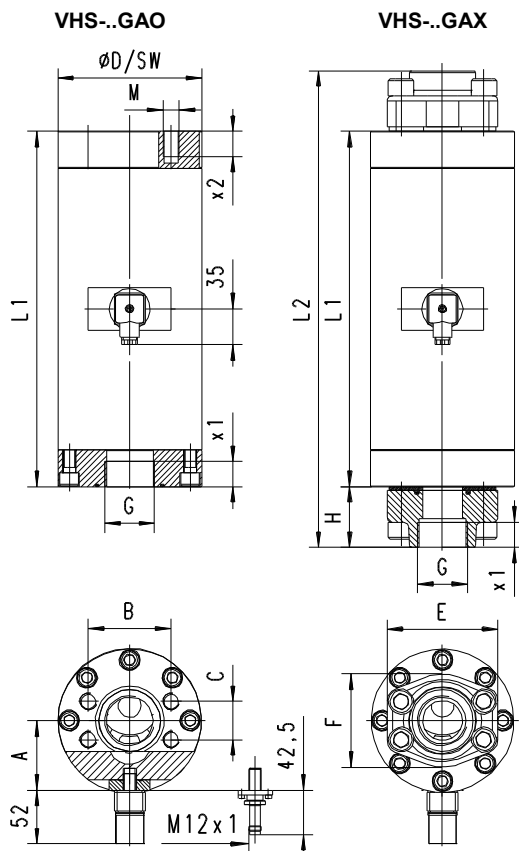
with plug as per DIN 43650-A / ISO 4400



Dimensions

● = Standard ○ = Option

G	DN...range	x1	L1	ØD	SW	A	VHS-...GAO....				VHS-...GAX....			
							M	x2	B	C	L2	H	E	F
G 1	025...0140	● 20	220	88	78	49.0	12	20	57.1	27.8	324	52	80	69
G 1¼	032...0350	● 22	285	103	-	55.0	14	22	66.7	31.6	381	48	94	77
G 1½	040...0550	○ 24	332	122	-	58.8	16	24	79.4	36.5	448	58	106	89
	040...0800	●	340	138	-	66.5					456			
G 2	050...1000	○ 33	396	155	-	71.0	20	35	96.8	44.4	544	74	135	116
	050...1500	●	405	168	-	77.3					553			
G 2½	065...2500	● 35	475	203	-	86.0	24	42	123.8	58.7	633	79	166	150



SAE adapter for convenient installation and for increased stability to pressure! (350 bar)

Handling and operation

Installation

Any flow direction is possible during installation. Ensure that pipework is clean. Flush before installation. A filter with 30 µm mesh filter should be used. The use of SAE flanges enables the sensor to be installed and removed more easily, and increases the stability to pressure to 350 bar for every connection material. It is possible to replace the electronics during operation, and this presents no danger to the fitter. The sensor does not go into the flow space.

