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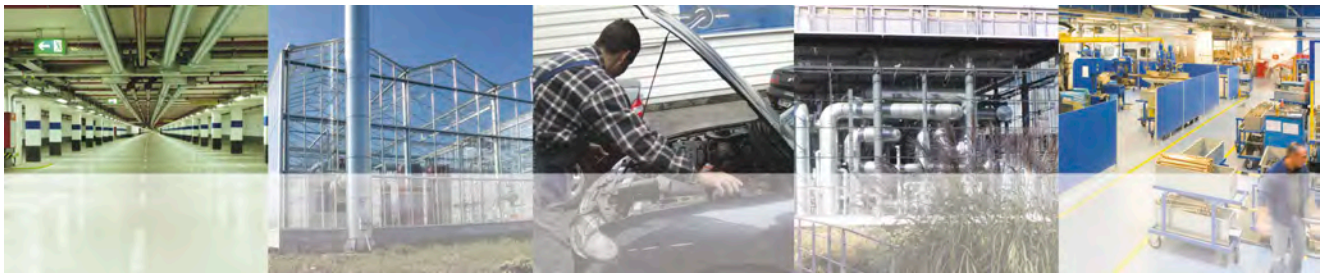
Specialists by Competence.

Product information

Flow - spindle (screw)



Merkmale

System
- Volumetric metering system for self-lubricating fluids (oils, ..), excellent viscosity independence.

Evaluation
- Display, Switching, Measuring, Counting

Nominal width
- DN 25..65

Range
- 1,5..2500 l/min

Pressure resistance
- max. 350 bar

Medium temp.
- -25..+150 °C

Material
- Al anodized, Steel

Einsatzgebiete

- **Lubrication applications**
- **Filling applications**
- **Hydraulics**
- **Position monitoring (via hydraulics)**
- **Consumption metering**
- **Dry-run protection**

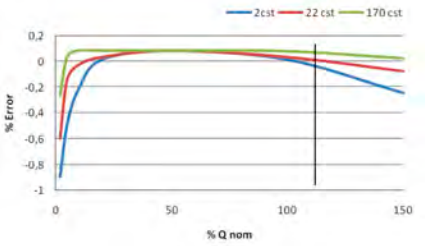
Function and benefits

Die Flüssigkeit füllt den definierten Zwischenraum zwischen den Schrauben und der Wandung und wird durch die eigene Fließenergie weitertransportiert. Ein magnetisch vorgespannter Hall-Sensor detektiert dabei, je transportierten Schraubenzwischenvolumen, einen Puls. Das Volumen ist proportional zur detektierten Frequenz.

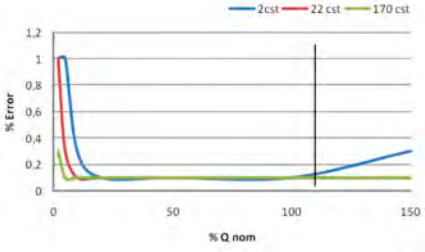
- Ranges from 1.5..2500 l/min (G 1..G 2 1/2)
- Largely independent of viscosity because of volumetric measuring process (fluid, oils, paints, pastes having a selflubricating character).
- Accuracy better than 1 % (max. 0.25 %) of the measured value (better at higher viscosities)
- Lower ΔP than gear-wheel measurement - Therefore better for larger nominal widths
- Operation independent of location (direction of flow to right or left).
- Intrinsically safe behaviour (operational failure creates error message)
- No magnets in the flow area (detection by
- external pre-tensioned Hall sensor)
- Operating pressure (up to 350 bar), and temperature range (up to 150 °C)
- Frequency output in a wide range linear (metering range 1:50)
- Analog transducer possible by means of bolt-on electronics or via external converter (then also available with display and switching points)
- LABO, FLEX, OMNI compatible

With oils, for example, different viscosities arise as operating temperatures vary. Here, in addition to the Coriolis principle, the volumetric principle offers the best measurement results. The diagram shows good independence from viscosity. The higherthe viscosity, the smaller the leakage error.

Linearity



Accuracy

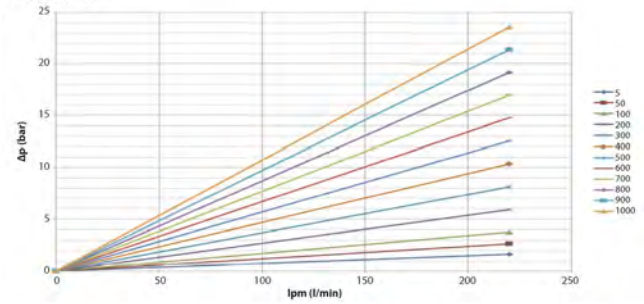


Diagrams

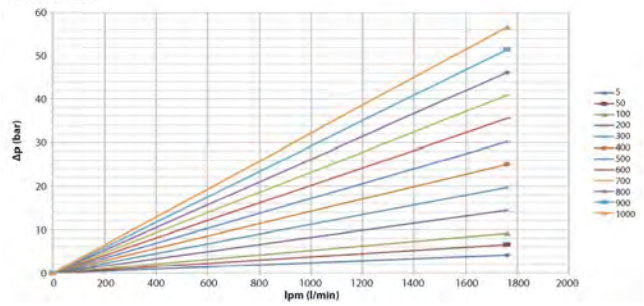
Pressure loss / Viscosity / Flow rate
The pressure loss results from the flow rate and the viscosity of the fluid being measured. Larger viscosities create larger pressure losses.

Higher viscosities than those listed here are easily possible, but require a higher pump capacity.

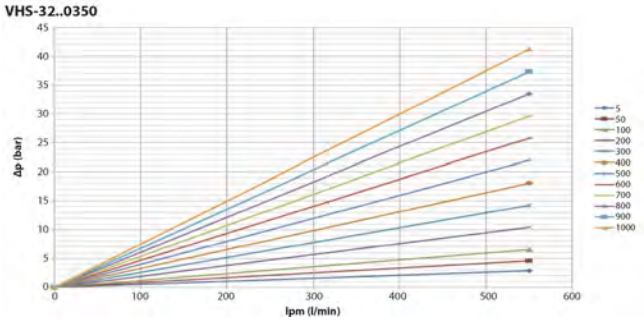
VHS-25..0140



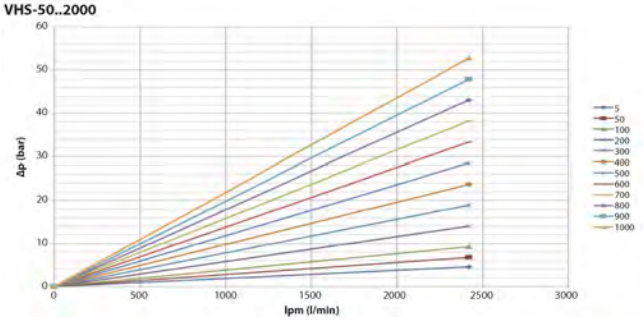
VHS-50..1500



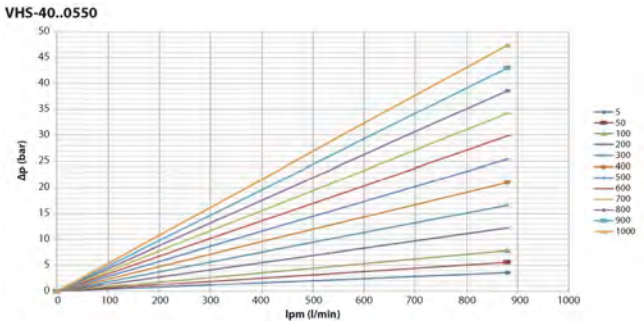
VHS-32..0350



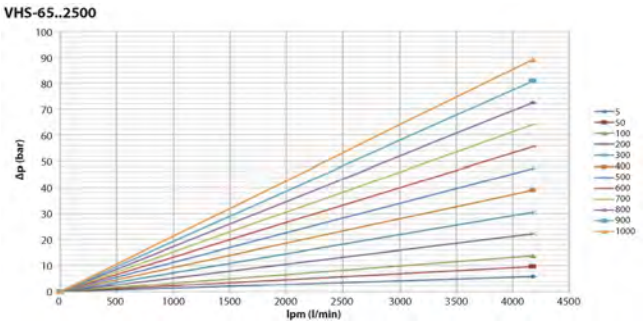
VHS-50..2000



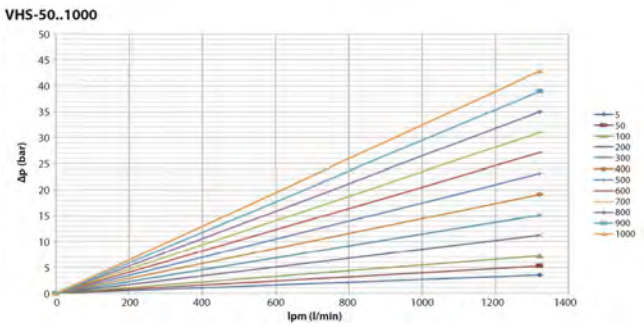
VHS-40..0550



VHS-65..2500



VHS-50..1000

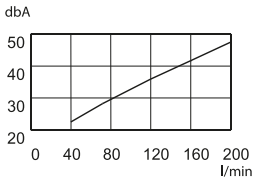


Test viscosities were 2 / 22 / 170 mm²/s

If the flow rate ranges are restricted to 20..80 % FS, the transmitters function to tighter tolerances. If the viscosity is > 170 mm²/s is, the accuracy is also improved.

Noise level and flow rate

One of the main development aims was to build a quiet screw volumeter. The noise level remains permanently < 50 dB (A). The test viscosity was 2 mm²/s. If the viscosity is greater, the noise level is lower.



Sample curve

Combinations

Because the sensors are always installed at the same installation depth and the screw volumeters are very uniform, it is possible to exchange the sensor electronics from one to another at will. That makes it easy to change the electronics if desired.

Comments

Filters of 30 µm mesh size should be used.
If there is a possibility of ferritic abrasion, magnetic filters should be installed in the line upstream of the transmitter.

Installation downstream of a rapidly switching valve should be avoided because of the possible pulses in flow rate. Always install measuring equipment on the pressure side.

On the spot programming options

LABO- VHS..-I / U / F / C / S

Pulse programming on pin 2:
Apply the supply voltage level for 1 second and save the current value as the full scale value (for analog outputs) or as a switching value (for limit switches).

OMNI-VHS

Programming with magnet ring:
With the aid of the display and of the movable ring, numerous parameters can be conveniently set on the spot.

FLEX-VHS

Programming with magnet clip:
Hold the magnet to the marking for 1 second and save the present value as the full scale value (for analog outputs) or as a switching value (for limit switches).

ECI-1

If required, all parameters can be set at any time on all intelligent sensors, using the ECI-1 device configurator.

Device overview

Device	Range	Pressure resistance in bar	Medium temperature	Supply voltage	Display	Output signal		Page
						Switching	Measuring	
VHS	1,5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30V DC	For M12x1 Signal LED	-	Pulse / volume, (push-pull or 2-wire)	6
LABO-VHS-S	1,5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30V DC	Signal LED	1 x Push-Pull	-	10
LABO-VHS-I	1,5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30V DC	Signal LED	-	4..20 mA	15
LABO-VHS-U	1,5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	15..30V DC	Signal LED	-	0..10 V	15
LABO-VHS-F	1,5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30V DC	Signal LED	-	Programmable F / F Transducer 0..2 kHz Push-pull	15
LABO-VHS-C	1,5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	10..30V DC	Signal LED	-	1 pulse per defined quantity Push-Pull	15
FLEX-VHS	1,5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	18..30V DC	Signal LED	1 x Push-Pull	0/4..20 mA or 0..10 V or Frequency 0..2 kHz	19
OMNI-VHS	1,5..2500 l/min	PN 160..350	-25..+80 °C (150 °C)	18..30V DC	Graphics LCD illuminated transflective and signal LED	2 x Push-Pull	0/4..20 mA or 0..10 V	24
OMNI-Counter-OPTION-C	Preset Counter with external reset facility, anti-complementary switching outputs and actual value display.							29
OMNI-Counter-OPTION-C	Instantaneous value display with analog output, pulse output and volume totalizer.							32
ECI-1	All LABO, FLEX, and OMNI parameters can be set or modified using the ECI-1 configurator.							35
Options	○ LABO transmitter – Temperature up to 150 ° ○ OMNI – Tropical model							36
Accessories	○ SAE Flange ○ Type ZV / ZE (Filter) ○ KB.... (Round plug connector 4/5-pin) ○ OMNI-TA (Panel meter) ○ OMNI-remote							36 36 37 38 38

Errors and technical modifications reserved.

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

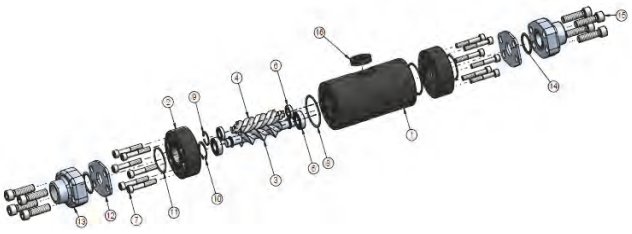
The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also 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 mm²/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.

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

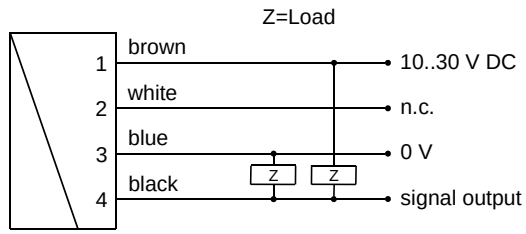
G	DN		Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm³	pulses / litre	Output frequency at Q_{nom} Hz	Output frequency at Q_{max} Hz	Types	Q_{max} recommended l/min
G 1	DN 25	●	1.4.. 140	13.10	76.340	178.1	254.5	VHS-025...0140	200
G 1¼	DN 32	●	3.5.. 350	29.00	34.480	201.1	287.4	VHS-032...0350	500
G 1½	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 2½	DN 65	●	25.0..2500	238.82	4.187	174.5	265.2	VHS-065...2500	3800

G	DN...range		Body with aluminium connections kg	Body with steel connections kg	SAE Flanges (Weight per pair) kg
G 1	025...0140	●	3.44	4.76	5.76
G 1¼	032...0350	●	6.35	8.50	9.55
G 1½	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 2½	065...2500	●	42.70	56.10	60.70

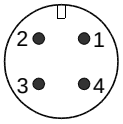
Wiring

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

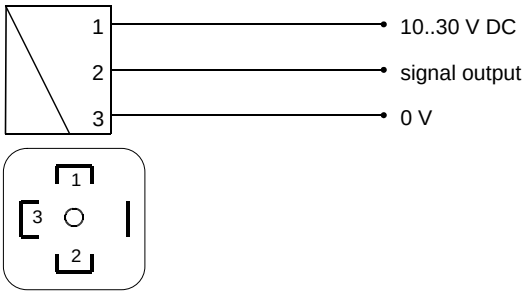
Push-pull output
with 4-pole round plug connector



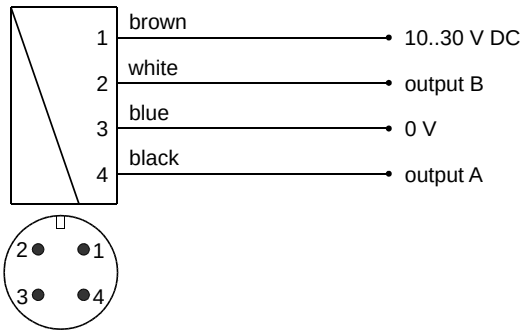
Connection example: PNP NPN



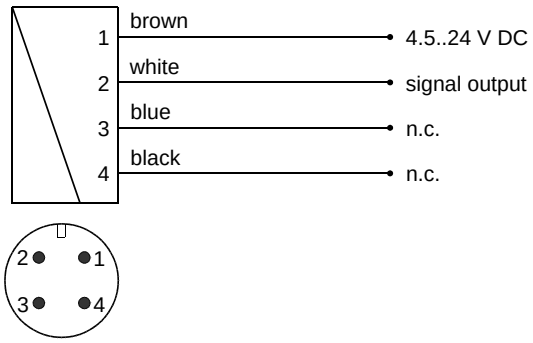
with plug as per DIN 43650-A / ISO 4400



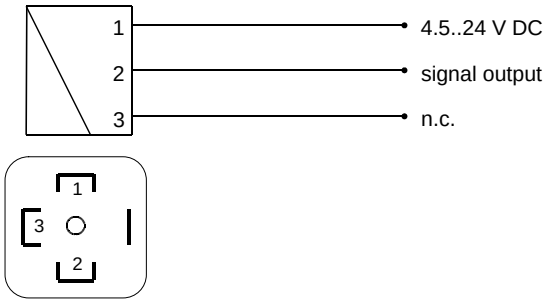
A / B output
only with 4-pole round plug connector



2 wire model
with 4-pole round plug connector



with plug as per DIN 43650-A / ISO 4400

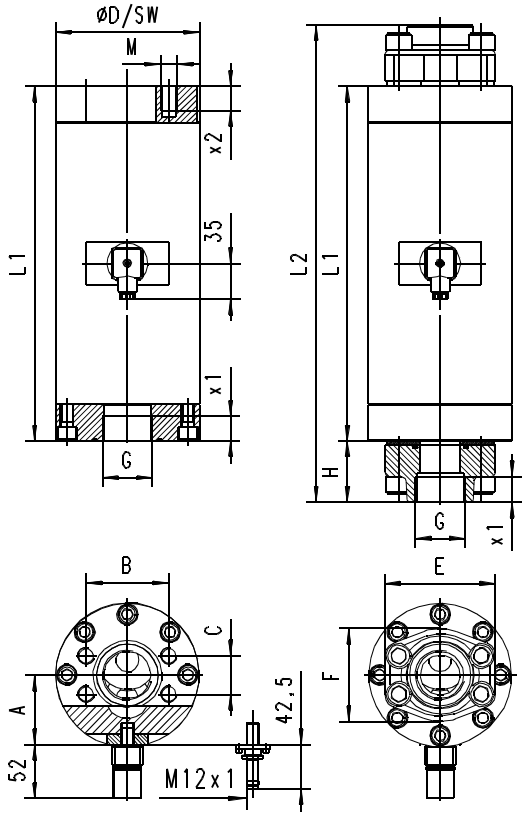


Dimensions

● = Standard ❍ = Option

								VHS-…GAO….				VHS-…GAX….			
G	DN...range		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					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

VHS-..GAO **VHS-..GAX**



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.

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

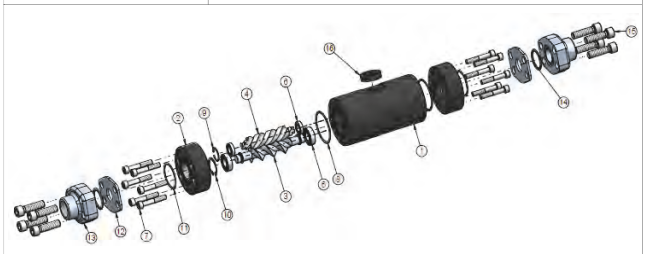
The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also 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 mm²/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
	Adhesive:	epoxy resin
	Flange bolts:	stainless steel
Supply voltage	10..30 V DC	
Power consumption	< 1 W (for no-load outputs)	

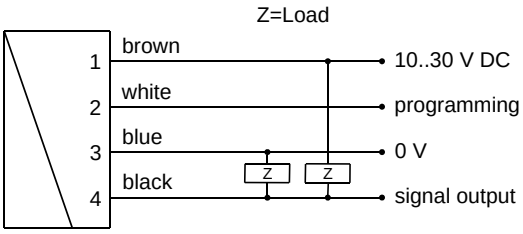
Switching output	transistor output "push-pull" (resistant to short circuits and reversed polarity protected) I_{out} = 100 mA max.
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight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

Ranges and weights

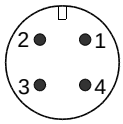
● = Standard ❍ = Option

G	DN		Metering range 1..100 % Q_{nom}	Volume / pulse	Types	Q_{max} recommended	Weights		
							Body with aluminium connections	Body with steel connections	SAE Flanges (Weight per pair)
			l/min	cm³		l/min	kg	kg	kg
G 1	DN 25	●	1.4.. 140	13.10	LABO-VHS-025...0140	200	3.44	4.76	5.76
G 1¼	DN 32	●	3.5.. 350	29.00	LABO-VHS-032...0350	500	6.35	8.50	9.55
G 1½	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 2½	DN 65	●	25.0..2500	238.82	LABO-VHS-065...2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN



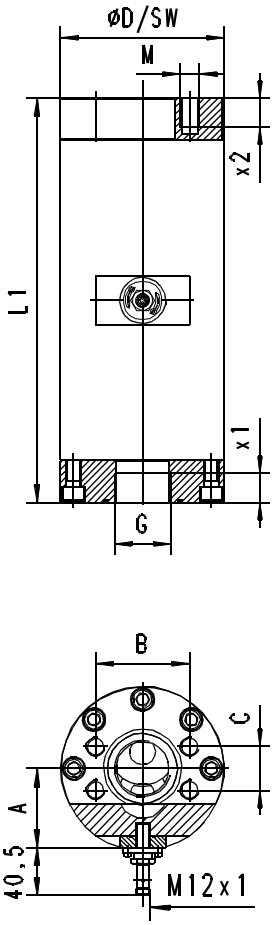
Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.
It is recommended to use shielded wiring.
The push-pull output) can as desired be switched as a PNP or an NPN output.

Dimensions

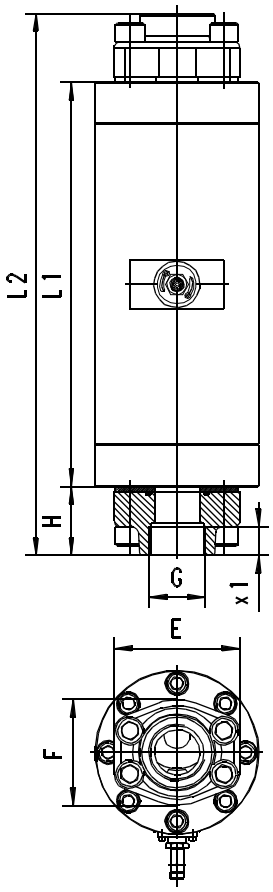
● = Standard ❍ = Option

								VHS-…GAO….				VHS-…GAX….			
G	DN		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					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

VHS-..GAO



VHS-..GAX



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.

Operation and programming

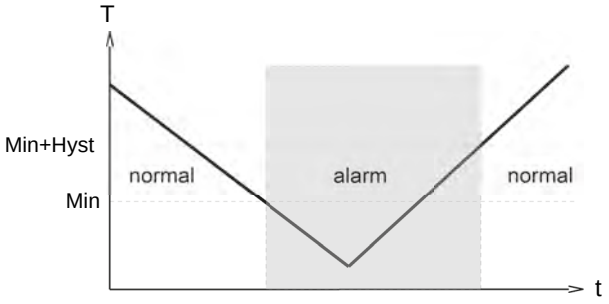
The switching value is set as follows:

- 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.

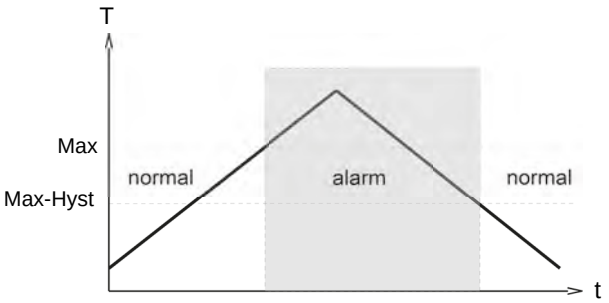
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output. In order to avoid the need to transit to an undesired operating status during the teach-in, the device can be provided ex-works with a teach-offset. The 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 minimal or maximal.

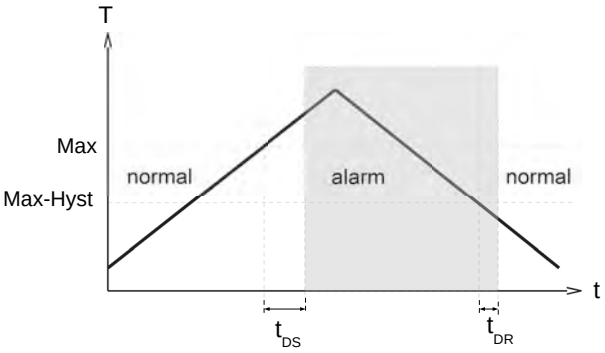
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



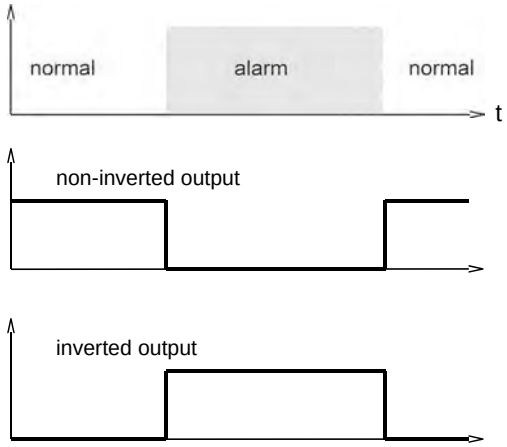
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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

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

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

❍=Option

1.	**Nominal width**									
	025	DN 25 - G 1								
	032	DN 32 - G 1¼								
	040	DN 40 - G 1½								
	050	DN 50 - G 2								
	065	DN 65 - G 2½								
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								
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 1¼							●	
	040	DN 40 - G 1½						●		
	050	DN 50 - G 2					●			
	065	DN 65 - G 2½				●				
10.	**Switching output (Limit switch)**									
	S	push-pull (compatible with PNP and NPN)								
11.	**Programming**									
	P	programmable (teaching possible)								
	N ❍	cannot be programmed (no teaching)								
12.	**Switching function**									
	L	minimum switch								
	H	maximum switch								
13.	**Switching signal**									
	O	standard								
	I ❍	inverted								
14.	**Electrical connection**									
	S	for round plug connector M12x1, 4-pole								
15.	**Optional**									
	H ❍	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 / 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.

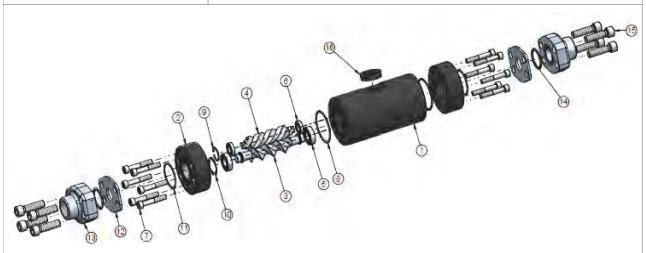
The LABO-XXX-I/U/F/C electronics make various output signals available:

- Analog signal 0/4...200 mA (LABO-VHS-I)
- Analog signal 0/2..10 V (LABO-VHS-U)
- Frequency signal (LABO-VHS-F) or
- Value signal Pulse / x Litres (LABO-VHS-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 mm²/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):



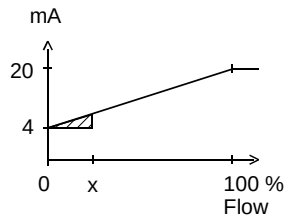
1. Body	Aluminium 6082 anodised
2. Connections:	Aluminium 6082 anodised or steel
3. Main screw	Stahl 35SMnPb10 UNI 4838-80
4. Subsidiary screw	GHISA GJL-250 EN1561
5. Ball bearing	Steel
6. Ball bearing	Steel
7. Screws	Galvanised steel
8. O-ring	NBR
9. Seeger ring	Steel
10. Seeger ring	Steel
11. O-ring	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)

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) output current max. 20 mA
Frequency output:	transistor output "push-pull" I_{out} = 100 mA max.
Pulse output:	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-VHS-I / U) or output status (LABO-VHS-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

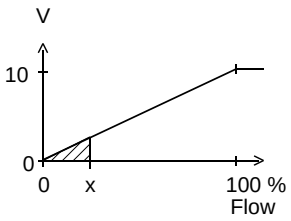
Signal output curves

Value x = Begin of the specified range
= not specified range

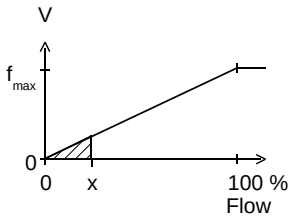
Current output



Voltage output



Frequency output



f_{max} selectable in the range of up to 2000 Hz

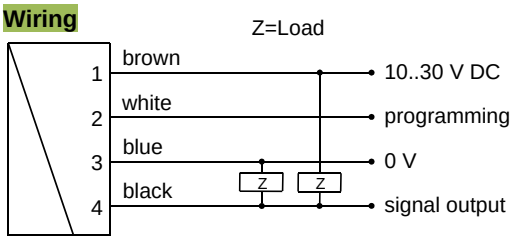
Other characters on request.

Ranges and weights

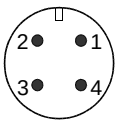
● = Standard ❍ = Option

G	DN		Metering range 1..100 % Q_{nom}	Volume / pulse	Types	Q_{max} recommended	Weights		
							Body with aluminium connections	Body with steel connections	SAE Flanges (Weight per pair)
			l/min	cm³		l/min	kg	kg	kg
G 1	DN 25	●	1.4.. 140	13.10	LABO-VHS-025...0140	200	3.44	4.76	5.76
G 1¼	DN 32	●	3.5.. 350	29.00	LABO-VHS-032...0350	500	6.35	8.50	9.55
G 1½	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 2½	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.

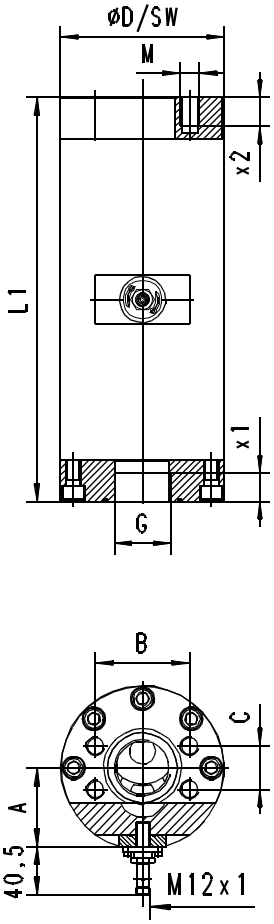
It is recommended to use shielded wiring. The push-pull output) of the frequency or pulse output version can as desired be switched as a PNP or an NPN output.

Dimensions

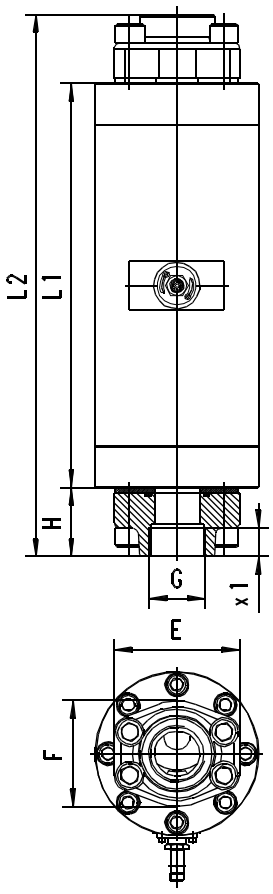
● = Standard ❍ = Option

G	DN...range		x1	L1	ØD	SW	A	VHS-…GAO.... M	x2	B	C	VHS-…GAX.... 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

VHS-..GAO



VHS-..GAX



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.

Operation and programming

The teaching process can be carried out by the user as follows:

- The flow rate to be set is applied 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 teaching has been successfully completed, pin 2 should be connected to 0 V,
  so as to prevent unintended programming.

The devices have a yellow LED which flashes during the programming pulse. During operation, the LED serves as an display for operating voltage (for analog output) or of switching status (for frequency or pulse 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 end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20°%..*
At 60 % in the process, a value of 80 % would then be stored during "teaching". If necessary, a far greater number of parameters can also be programmed using the ECI-1 device configurator.

Ordering code

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

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

❍=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.	**Signal output**														
	I		current output 4..20 mA												
	U		voltage output 0..10 V												
	F		frequency output												
	C		pulse output												
11.	**Programming**														
	N		cannot be programmed (no teaching)												
	P	❍	programmable (teaching possible)												
12.	**Electrical connection**														
	S		for round plug connector M12x1, 4-pole												
13.	**Optional**														
	H	❍	150 °C with electronics separated by 30 cm												

Flow Transmitter / Switch Screw Volumeter FLEX-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)**
- **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

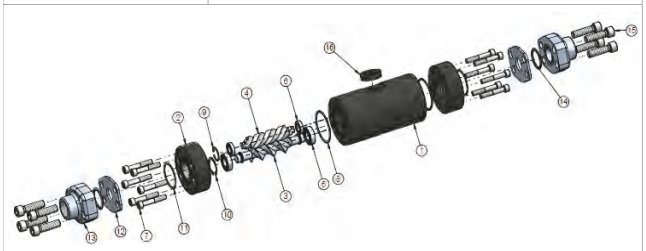
The VHS flow transmitter measures the flow using the volumetric principle, and is suitable for fluid, viscous, lubricant media (e.g. lubricating oil). If the material for the VHS is selected appropriately, aqueous fluids such as soaps, pastes, and emulsions with non-abrasive characteristics can also 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 minimal or maximal, or as a frequency output or pulse 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 mm²/s, (cSt) of 1 %..100 % nominal working range (see also diagram 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	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

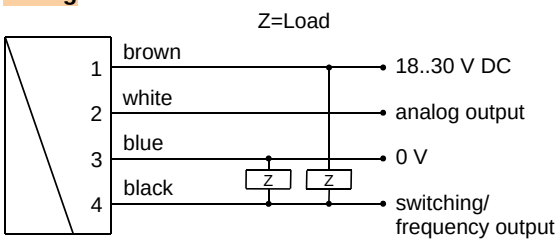
Analog output	4..20 mA / load 500 Ohm max. or 0..10 V / load min. 1 kOhm
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Switching hysteresis	adjustable (please state when ordering) Standard setting: 2 % F.S., for Min-switch, position of the hysteresis above the limit value, and for Max-switch, below the limit value
Pulse output	pulse width 50 ms → max. output frequency < 20 Hz
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

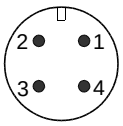
● = Standard ❍ = Option

G	DN		Metering range 1..100 % Q_{nom}	Volume / pulse	Types	Q_{max} recommended	weights		
							Body with aluminium connections	Body with steel connections	SAE Flanges (Weight per pair)
			l/min	cm³		l/min	kg	kg	kg
G 1	DN 25	●	1.4.. 140	13.10	FLEX-VHS-025.....0140	200	3.44	4.76	5.76
G 1¼	DN 32	●	3.5.. 350	29.00	FLEX-VHS-032.....0350	500	6.35	8.50	9.55
G 1½	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 2½	DN 65	●	25.0..2500	238.82	FLEX-VHS-065.....2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN



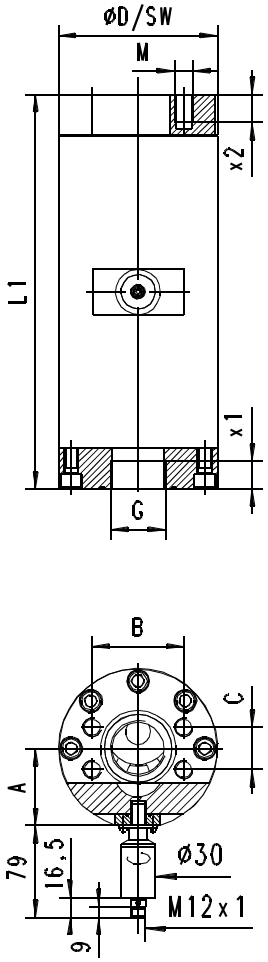
Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.
The use of shielded cabling is recommended.

Dimensions

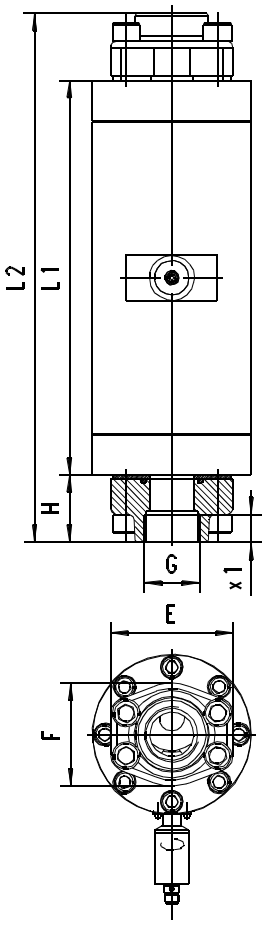
● = Standard ❍ = Option

G	DN...ranges		x1	L1	ØD	SW	A	VHS-…GAO.... M	x2	B	C	VHS-…GAX.... 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

VHS-..GAO



VHS-..GAX



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.

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).

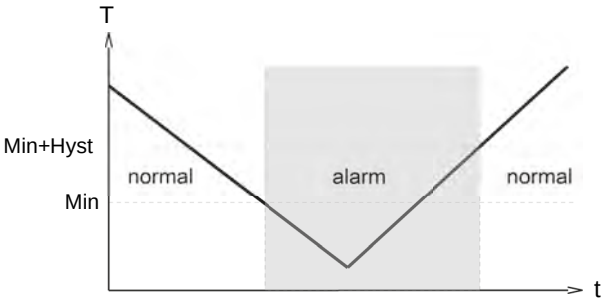
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an 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".

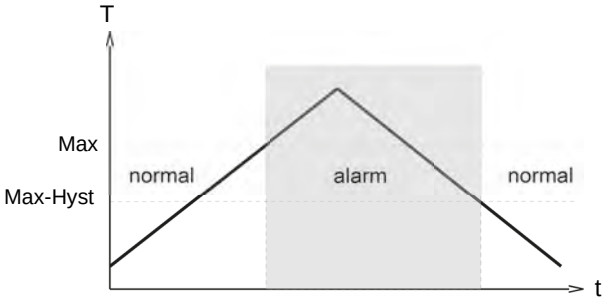
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minimal or maximal.

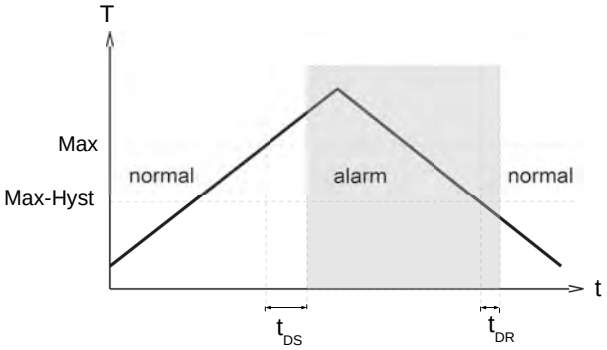
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



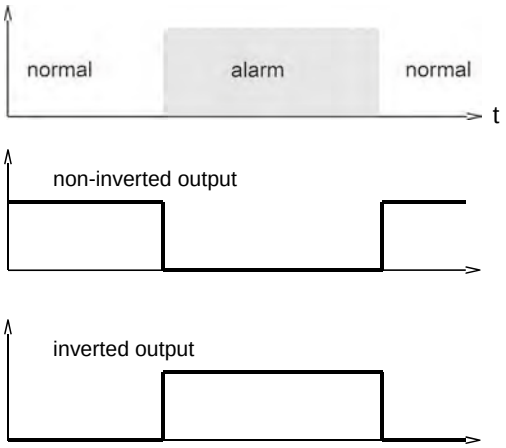
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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.

Ordering code

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

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

❍=Option

1.	**Nominal width**									
	025	DN 25 - G 1								
	032	DN 32 - G 1¼								
	040	DN 40 - G 1½								
	050	DN 50 - G 2								
	065	DN 65 - G 2½								
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 1¼							●	
	040	DN 40 - G 1½						●		
	050	DN 50 - G 2					●			
	065	DN 65 - G 2½				●				
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								
	C	Pulse output								
12.	**Switching signal**									
	O	standard								
	I ❍	inverted								
13.	**Optional**									
	H ❍	150 °C version (with 300 mm cable)								

Required ordering information

For FLEX-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)

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

Supplement

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

Flow Transmitter / Switch Screw Volumeter OMNI-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)**
- **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 minimal or maximal, 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.

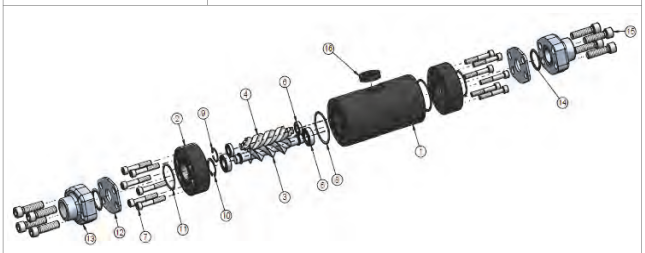
OPTION C:
Preset Counter with external reset option, complementary switching outputs and actual value display.

OPTION C1:
Instantaneous value display with analogue output, pulse-volume output and totalizer

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 mm²/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)		

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

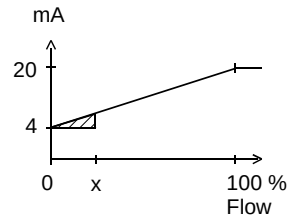
Materials non-medium-contact	Electronics housing	stainless steel 1.4305
	Glass	mineral glass hardened
	Magnet	samarium-Cobalt
	Ring	POM

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

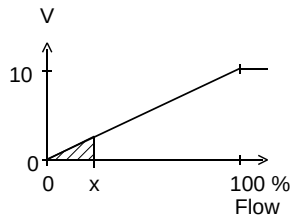
Signal output curves

Value x = Begin of the specified range
= not specified range

Current output



Voltage output



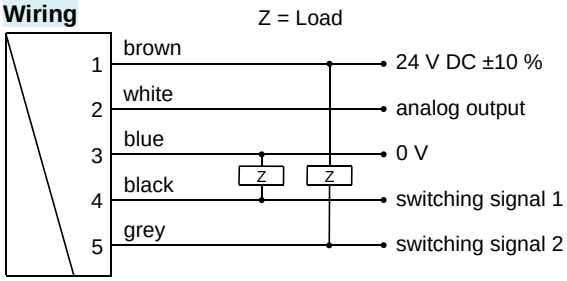
Other characters on request.

Ranges and weights

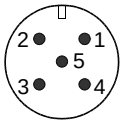
● = Standard ❍ = Option

G	DN		Metering range 1..100 % Q_{nom} l/min	Volume / pulse cm³	Types	Q_{max} recommended l/min	Weights: Body with aluminium connections kg	Weights: Body with steel connections kg	Weights: 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 1¼	DN 32	●	3.5.. 350	29.00	OMNI-VHS-032.....0350	500	6.35	8.50	9.55
G 1½	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 2½	DN 65	●	25.0..2500	238.82	OMNI-VHS-065.....2500	3800	42.70	56.10	60.70

Wiring



Connection example: PNP NPN



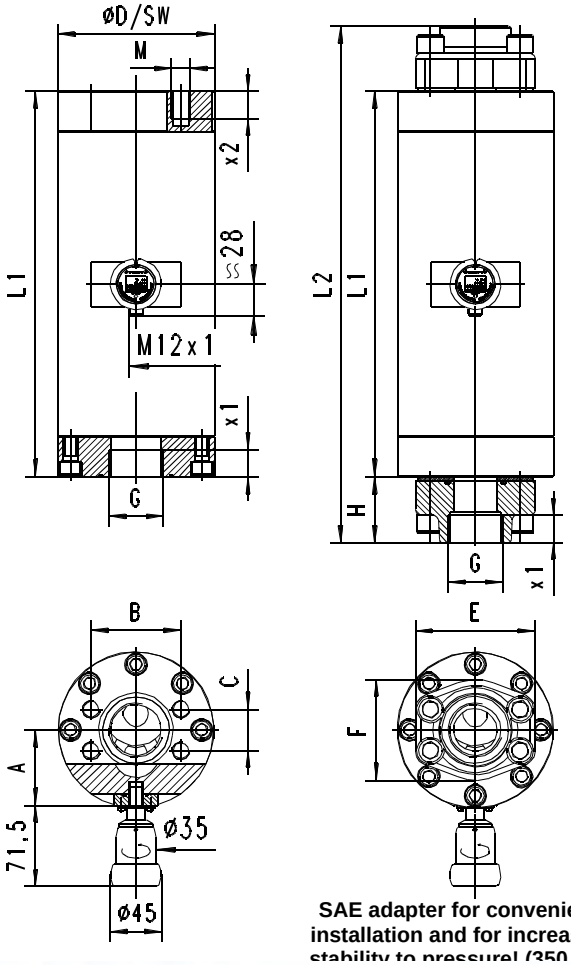
Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.
The use of shielded cabling is recommended.

Dimensions

● = Standard ❍ = Option

G	DN...ranges		x1	L1	ØD	SW	A	VHS-…GAO…. M	x2	B	C	VHS-…GAX…. 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

VHS-..GAO **VHS-..GAX**



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.

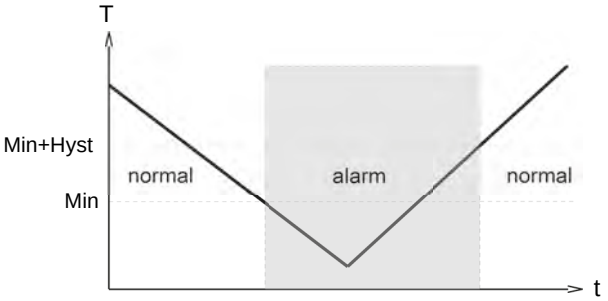
Edit, using position 2

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.

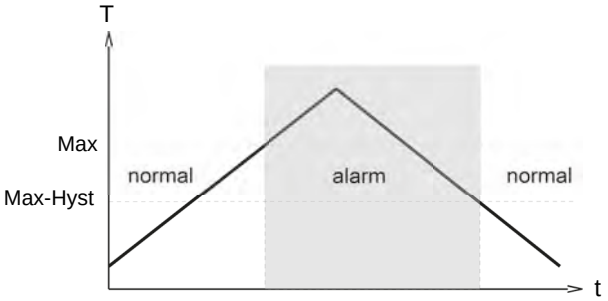
The limit switches S1 and S2 can be used to monitor minimal or maximal.

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.**

Ordering code

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

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

❍=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		●
	K		without	●	
11.	**Electrical connection**				
	S		for round plug connector M12x1, 5-pole		
12.	**Option 1**				
	H	❍	model with gooseneck		
	O	❍	tropical model oil-filled version for heavy duty or external use		
13.	**Option 2**				
	C	❍	Counter C		
	C1	❍	Counter C1		

Further options available on request.

Options

Counter C (hardware and software option):
Preset Counter with external reset option, complementary switching outputs and actual value display
(modified wiring diagram!)

Counter C1 (software option):
Instantaneous value display with analogue output, pulse-volume output and totalizer

Accessories

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

Accessories

- External display / converter OMNI-TA (panel-mounting IP 67)
- External display / converter OMNI-REMOTE
  (panel-mounting IP 67)

OMNI-C Counter

Counter for flow transmitters:
- Piston
- Dynamic diaphragm
- Rotor
- Turbine
- Gear
- Screw
- Calorimetry
- MID
- Vortex

- **Simple totalisation**
- **Simple filling counter with programmable end signal**
- **Control switchover at present value**
- **Automatic, dynamic change of display unit and decimal places in the graphics display**
- **Antivalent outputs**
- **Simple guided menu via graphics display**

Characteristics

The totaliser of the OMNI flow rate system enables a totalisation or measurement of consumption for all HONSBERG device families (for fluids and gases) with which the OMNI system is compatible; this is independent of the input signal, pulse or analogue input, and of the measurement process.

Simple filling control is also possible. Here, the counter can be set to count upwards or downwards.
When the preset point is reached, a switching signal is emitted which is available in antivalent form to two outputs.
Resetting can be carried out by means of a signal input or also by a programming ring.

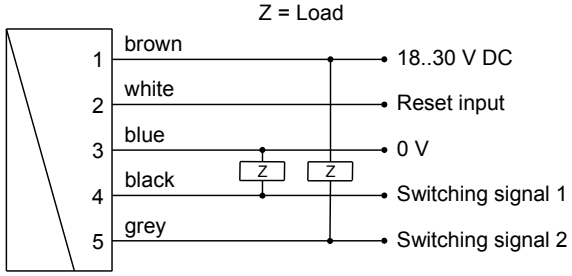
The state of the counter is indicated in an LCD display with only four digits. Here, the number of decimal places and the unit displayed is continuously matched to the current state of the counter. In this case, the smallest value which can be displayed is 0.001 ml (= 1 µl), and the largest is 9999 m³. The counter therefore has 13 places, of which the four most significant are displayed at any one time. The display resolution at all times is therefore at least 1 per thousand of the displayed value, or better, and this generally exceeds the accuracy of the connected flow transmitter. The non-displayed digits of the counter are in that case irrelevant to the accuracy of the measurement.
The automatic dynamic changeover of units in the display in relation to the state of the counter makes the value easy to read in spite of a display with only four digits. In addition, user configuration of the counter is unnecessary.

In addition to the totalised value, the present flow rate can be displayed.

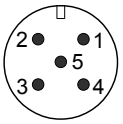
Technical data

Counter range	0.000 ml to 9999 m³ with automatic setting of the decimal places and of the applicable unit.
Switching signal outputs (Pin 4 + 5)	2 x pushpull output, max. 100 mA, resistant to short circuits and polarity reversal, antivalent states, configurable on the device as a wipe or edge signal
Counter reset signal (Pin 2)	Input 18..30 V resistant to short circuits and reversed polarity PIN 2, wiper signal, positive or negative edge can be selected locally

Wiring



Connection example: PNP NPN



Before the connecting the supply voltage, it must be ensured that this corresponds with the data sheet! The use of shielded cabling is recommended

Sensor connection to OMNI-C-TA, see dimensions.

Handling and operation

Installation

For assembly, please observe the handling instructions for the different device versions.

After assembly, it is possible to move the sensor head to the most optimal reading position opposite the sensor part using its rotating function.

Programming

On the display, the counter indicates the state of the totaliser as a value and unit. The units ml, L, m³ are set automatically.

For operation as a totaliser, no configuration by the user is necessary.

To use the other functions, configuration may be required. This is carried out using the programming ring located on the device.

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 dialogue with the display messages, which makes its use very simple.

The control display of the present flow rate depends on the metering range of the selected flow transmitter, and has already been set appropriately in the factory (ml/min, l/min, l/h, m³/h).
It is activated by turning the ring to position 1
After 10 seconds, the display automatically returns to the totaliser mode.

For operation as a preset counter, the following must be set:

1. The preset point
2. The type of output signal ("Preset has been reached"):
   Signal edge / wiper pulse
   width of the wiper pulse, if required
3. The unit of the preset point:
   (ml, litre, m³).

Starting from the normal display (total and unit), if 1 (Step) is selected repeatedly, then the counter shows the following information:

- Normal display is total and unit (e.g. litre)
- Display of present value (e.g. l/min)
- Preset point incl. type of switching output.
- Code

The code gives access to various input levels into which parameters can be entered (so that this does not occur inadvertently, the code must be entered!).

Code 111:

- Gate time (available only for sensors which transmit frequency)
- Filter time
- Direction of count (pos / neg)
- Unit for switching value reset point
- Decimal place for switching value / reset point
- Switching type for switching value (edge / wiper signal)
- Pulse duration (for wiper signal)
- Reset method (manual / via signal)

Code 100:

- Manual reset for totaliser

The detailed flow chart for operation is available in the "Operating instructions for OMNI-C".

Combination examples

Vortex CF..	
Calorimetric F.. (separate data sheet)	
Calorimetric FG.. (separate data sheet)	
Calorimetric FIN..	
Magnetic inductive FIS.. (separate data sheet)	
Piston HD.. HR.. MR..	
Magnetic inductive MID1..	
Panel mounting **OMNI-TA** (separate data sheet)	
Rotor RR..	
Turbine RT..	
Screw VHS..	

Gear VHZ..	
Dynamic diaphragm XF..	

Momentary value indicator, transmitter and meter OMNI-C1 electronics

Counter for flow transmitters:
- Piston
- Dynamic diaphragm
- Rotor
- Turbine
- Gear
- Screw
- MID
- Vortex

- **Momentary value indicator and totalisation**
- **Pulse output with adjustable pulse per volume**
- **Antivalent outputs**
- **Analogue output of the momentary value**
- **Simple guided menu via graphics display**

Characteristics

The local OMNI-C1 electronics offers a momentary value indicator and a totalisation of the flow rate quantity.

The momentary value is output at the analogue output as a 4..20 mA signal (or optionally as a 0..10 V signal).
In addition, the electronics has a pulse output, which outputs a pulse after a preset quantity with a duration of 36 ms. The pulse is available at two switching outputs in anitvalent form.

The primary displayed value is the flow rate. Using the programming ring, you can temporarily switch to the totalisation.

The state of the totalisation is indicated in an LCD display with only four digits. Here, the number of decimal places and the unit displayed is continuously matched to the current state of the counter. In this case, the smallest value which can be displayed is 0.001 ml (= 1 µl), and the largest is 9999 m³. The counter therefore has 13 places, of which the four most significant are displayed at any one time. The display resolution at all times is therefore at least 1 per thousand of the displayed value, or better, and this generally exceeds the accuracy of the connected flow transmitter. The non-displayed digits of the counter are in that case irrelevant to the accuracy of the measurement.
The automatic dynamic changeover of units in the display in relation to the state of the counter makes the value easy to read in spite of a display with only four digits. In addition, user configuration of the counter is unnecessary.

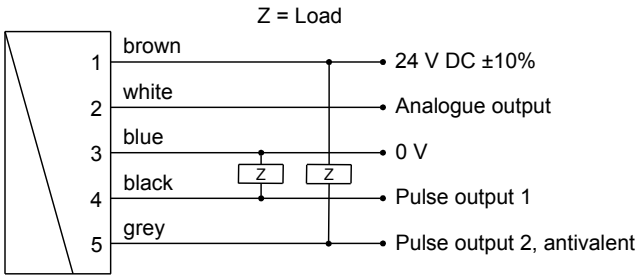
Counter C:

Instead of the counter option C1 the counter option C is available (see corresponding datasheet). It offers a totalizer with adjustable preset value and external reset. This allows to realize a filling control application for example. Additionally the actual flow rate value can be displayed, however without an analog output.

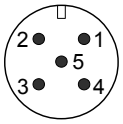
Technical data

Counter range	0.000 ml to 9999 m³ with automatic setting of the decimal places and of the applicable unit
Pulse outputs (Pin 4 + 5)	2 x pushpull output, max. 100 mA, resistant to short circuits and polarity reversal, antivalent statuses, pulse width 36 ms

Wiring



Connection example: PNP NPN



Plug connector M12x1

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

Handling and operation

Installation

For assembly, please observe the handling instructions for the different device versions.

After assembly, it is possible to move the sensor head to the most optimal reading position opposite the sensor part using its rotating function.

Programming

The resetting of the meter to zero takes place through the programming.

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.

On the display, the meter indicates the current flow rate as a value and unit. For this purpose, no adjustments by the user are necessary.

To use the other functions, configuration may be required. This is carried out using the programming ring located on the device.

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 dialogue with the display messages, which makes its use very simple.

Rotating the ring once to Pos. 1 displays the totaliser status. In the process, the unit is automatically set to the quantity already counted.
After 10 seconds, the display automatically returns to the momentary value mode.
If the ring is turned to position 1 again while the totaliser status is shown, the code input is reached.
The code gives access to various input levels into which parameters can be changed (so that this does not occur inadvertently, the code must be entered!).

Code 100:

Reset for totaliser

Code 111:

Filter	Enables the input of a filter time in multiple levels The filter time describes the time after which a volatile change in flow occurs until the display value has adopted the new value
PlsUnit	Enables the input of the unit of the pulse volume (pulse per volume), e.g. cm³, Litre, m³
PlsVal	Enables the input of the meter value of the pulse flow (0..9999)
Output	Enables switching of the analogue output between 0..20 mA and 4..20 mA (optionally (0..10 V and 2..10 V)
4 mA	Defines the momentary value at which 4 mA should be output
20 mA	Defines the momentary value at which 20 mA should be output

Combination examples

Vortex CF..	
Calorimetric F.. (separate data sheet)	
Calorimetric FG.. (separate data sheet)	
Calorimetric FIN..	
Magnetic inductive FIS.. (separate data sheet)	
Piston HD.. HR.. MR..	
Magnetic inductive MID1..	
Panel mounting **OMNI-TA** (separate data sheet)	
Rotor RR..	
Turbine RT..	
Screw VHS..	

Gear VHZ..	
Dynamic diaphragm XF..	

Device Configurator ECI-1

- **Can be used on site for:**
  - **parameter modification**
  - **firmware update**
  - **adjustment of inputs and outputs**
- **Can be connected via USB**

Characteristics

The device configurator ECI-1 is an interface which allows the connection of microcontroller-managed HONSBERG sensors to the USB port of a computer.
Together with the Windows software "HONSBERG Device Configurator" it enables

- the modification of all the sensor's configuration settings
- the reading of measured values
- the adjustment of inputs and outputs
- firmware updates

Technical data

Supply voltage	12..30 V DC (depending on the connected sensor) and via USB
Power consumption	< 1 W
Connection	
Sensor	cable bushing M12x1, 5-pole, straight length approx. 50 cm
Lead	device connector M12x1, 5-pole
USB	USB bushing type B
Operating temperature	0..50 °C
Storage temperature	-20..+80 °C
Dimensions of housing	98 mm (L) x 64 mm (W) x 38 mm (H)
Housing material	ABS
Ingress protection	IP 40

Handling and operation

Connection

The device configurator is intended for temporary connection to the application. It is connected between the the existing sensor lead and the sensor. Power supply is via the supply to the sensor and the computer's USB port. When inactive (no communication), the configurator behaves completely neutrally; all signals from the sensor remain available to the application. During communication between computer and sensor, the signal wirings are separated in the configurator, so that in this state the sensor's output signals are not available.

To connect 4-pole leads without a middle hole to the installed 5-pole device connector, adapter K04-05 is included. 4-pole leads with a middle hole can be used without an adapter.

Ordering code

Device configurator (for scope of delivery, see the diagram below)	**ECI-1**

Scope of delivery

1. Device configurator ECI-1
2. USB cable
3. Adapter K04-05
4. Plug KB05G
5. Cable K05PU-02SG
6. Carrying case

Incl. software

Accessories:

Mains connector 24 V DC (with fitted round plug connector, 5-pole, incl. international plug set)		**EPWR24-1**

Replacement parts:

M12x1 adapter 4- / 5-pole	**K04-05**
PUR cable, 5-pole, shielded with round plug connector M12x1	**K05PU-02SG**
Round plug connector M12x1, 5-pole (without cable)	**KB05G**

Option

LABO transmitter - Temperature up to 150 °C

All LABO transmitters can be used with electronics positioned in a separate area with media temperatures up to 150 °C.

OMNI - Tropical model

This OMNI electronic option should be used where temperatures change quickly, or for external installations (the device is filled with oil, and thus prevents condensate formation in the electronics housing, even under adverse circumstances)

Accessories

SAE flange

Flange

Filter

Type ZV

Type ZE

The HONSBERG filters are offered for the protection of the devices from dirt or as independent components for coarse and fine filtration of liquids.

For more information, see additional product information.

Round plug connector 4-pin

1 brown
2 white
3 blue
4 black

Ordering code

Packaged

	1.	2.	3.	4.	5.
K	**04**	**PU-**			

❍= Option

1.	**Number of pins**	
	04	4-polig
2.	**Cable material**	
	PU-	PUR
3.	**Cable length**	
	02	2 m
	05	5 m
	10	10 m
		Others on request
4.	**Shielding**	
	S	shielding applied to coupling
	U	unshielded
	N ❍	shielding not applied to coupling
5.	**Steckerabgang**	
	G	straight
	W	elbow 90 °

Round plug connector 4 / 5-pin

Ordering code

Self-assembly

	1.	2.
KB		

1.	**Number of pins**	
	04	4-polig
	05	5-polig
2.	**Steckerabgang**	
	G	gerade
	W	gewinkelt 90 °

Round plug connector 5-pin

1 brown
2 white
3 blue
4 black
5 grey

Ordering code

Packaged

	1.		2.	3.	4.	5.
K	**05**	**-**	**PU-**			

❍= Option

1.	**Number of pins**	
	05	5-polig
2.	**Cable material**	
	PU-	PUR
3.	**Cable length**	
	02	2 m
	05	5 m
	10	10 m
		Others on request
4.	**Shielding**	
	S	shielding applied to coupling
	U	unshielded
	N ❍	shielding not applied to coupling
5.	**Steckerabgang**	
	G	straight
	W	elbow 90 °

Panel meter OMNI-TA

Primary Sensors
0..10 V
4..20 mA
Frequency

Converter with the same data as the OMNI in situ electronics; but as an external panel-mounting variant with IP 67 housing.

OMNI - Remote

Primary Sensors
0/2..10 V
4/0..20 mA
Frequency

Function is identical to OMNI-in situ. Connection to the sensor is, however, made by wire, and so the measurement point and display location can be apart

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