



Flow Sensor



▶ Company Profile

GSEE-TECH specializes in research, manufacture of industrial automation products and system solutions. Our business is divided into three parts: industrial communication, industrial connection and industrial components.

▶ Industrial communication

- Industrial Ethernet solutions
- Fieldbus modules: meet different fieldbus protocols such as PROFIBUS, CanOpen, DeviceNet, EtherCat, EtherNet/IP and PROFINET.



▶ Industrial connection

- Round connectors
- Rectangle connectors
- Servo connectors
- Customized solutions

▶ Industrial components

- LED lighting
- Position detection sensors : Such as inductive, photoelectric, capacitive, magnetic induction and travel sensors, and encoders
- Process control sensors : Such as flow sensors, pressure sensors, temperature sensors, and level sensors
- Interface products : Such as isolated barriers, isolators, power units, relays and surge protectors



Our products have been widely used in vehicle, metallurgy, machine tool, elevator, textile, wind power, solar energy, electric power, petroleum chemical, packaging, printing, food and beverage, engineering machinery, rail transportation, weather equipment, infrastructure construction and other industries.

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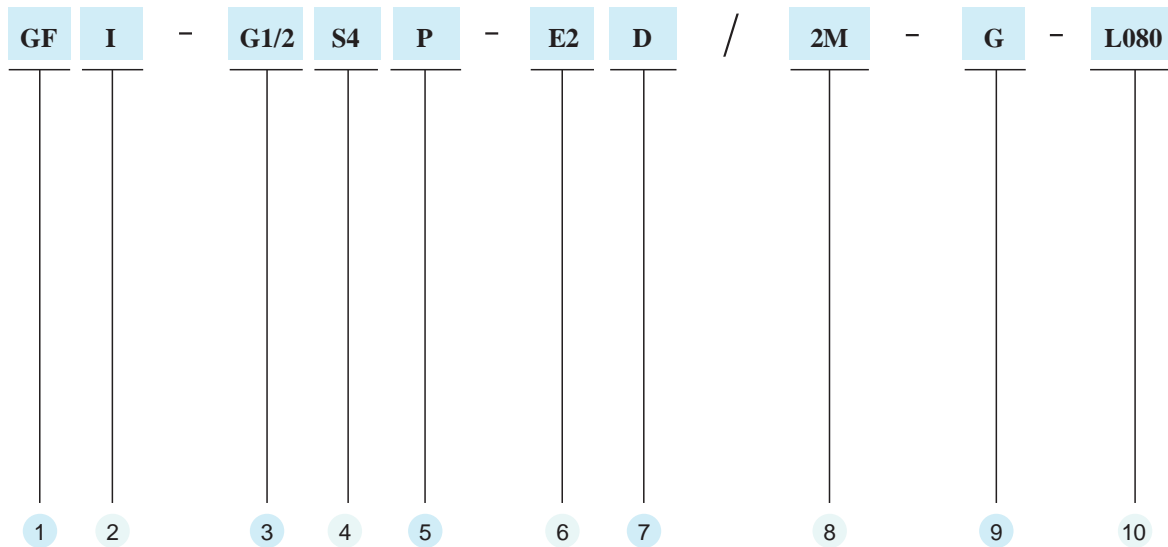
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Flow sensors-Type codes



1 GF-Flow sensors

2 Function principle
I insertion sensor
O inline sensor
E economic mode

3 Mechanical connection
G1/4 thread G1/4
G1/2 thread G1/2
GL1/2 thread G1/2, long
GL3/4 thread G3/4, long
DN25 flange DN25/PN40
DN50 flange DN50/PN40
M18 chromed brass tube, not continuous thread M18 x 1
K20 smooth plastic tube, Ø 20 mm
M18I With Compression Fittings inside thread M18X1,5
D04 tubing inside-Ø, 4 mm
D06 tubing inside-Ø, 6 mm
D010 tubing inside-Ø, 9 mm
TC hose connection
34 Tri-clamp, DN10, 34 mm
50 Tri-clamp, DN25-40, 50,5 mm
68 Varivent, 68 mm

4 Sensor material
S2 stainless steel 1.4305
S4 stainless steel 1.4571/1.4404
T PTFE Teflon
CT Ceramic,PTFE Teflon
TN titanium 3.7035
NB2 Hastelloy B2 2.4617
NC4 Hastelloy C4 2.4610
NC22 Hastelloy C22 2.4602
DY Dyflor

5 Housing material
P plastik PBT
S stainless steel

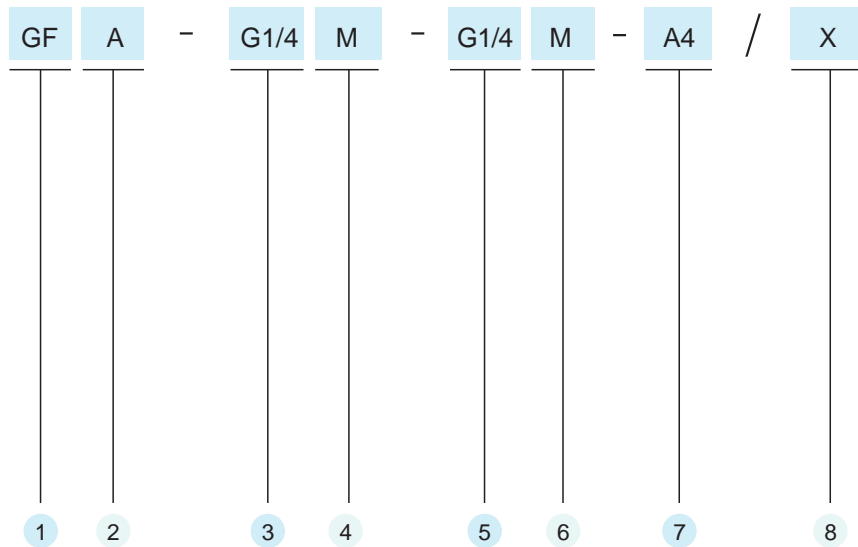
6 Electrical output
D0 4-wire,DC,NPN,NO+NC
D2 4-wire,DC,PNP,NO+NC
E0 3-wire,DC,NPN,NO
E1 3-wire,DC,NPN,NC
E2 3-wire,DC,PNP,NO
E3 3-wire,DC,PNP,NC
NA without evaluation electronics
NEX without evaluation electronics
EEx ib, should use with processors
NEX0 without evaluation electronics
EEx ia, should use with processors
R0 relay output, NO, 24VDC
R1 relay output, NC, 24VDC
R4 relay output, NO+NC, 24 VDC
R5 relay output, NO+NC, 230 VAC
I1 analogue output, current 4...20 mA
U0 analogue output, voltage 0...10 V
IU analogue output, current+voltage

7 Function display
D LED

8 Electrical connection
Blank M12x1 connector
*M Cable directly (unit: m)

9 Special option code
G for gas
CH Varivent
APV APV connection
CT Tri-Clamp connection
IM with mounting block
T High temperature version up to 100°C
HP High pressure version up to 500 bar
*M cable directly, cable length (unit: m)
K Micro multi-digital display flow sensors, stainless steel housing

10 Probe length mm (without thread)
Lxxx Probe length xxx mm
Standard length*: 13, 20, 25, 30 mm
*Other probe length can be customized e.g.: L080, probe length: 80 mm



1 GF Flow sensors

2 A Accessories

3 Mechanical connection 1
 G1/8 G1/8" BSP thread
 G1/4 G1/4" BSP thread
 G1/2 G1/2" BSP thread-15mm
 GL1/2 G1/2" BSP thread-30mm
 N1/8 1/8"-27 NPT thread
 N1/4 1/4"-18 NPT thread
 N1/2 1/2"-14 NPT thread
 M20X1.5 M20x1.5 thread

4 Kind of thread 1
 M Outside thread
 F Inside thread

5 Mechanical connection 2
 Blank Mounting casing
 DN** DN15/20/25/32...
 For tee of flow sensors only
 G1/8 G1/8" BSP thread
 G1/4 G1/4" BSP thread
 G1/2 G1/2" BSP thread
 N1/8 1/8"-27 NPT thread
 N1/4 1/4"-18 NPT thread
 N1/2 1/2"-14 NPT thread
 M20X1.5 M20x1.5 thread

6 Kind of thread 2
 Blank Tee
 M Outside thread
 F Inside thread

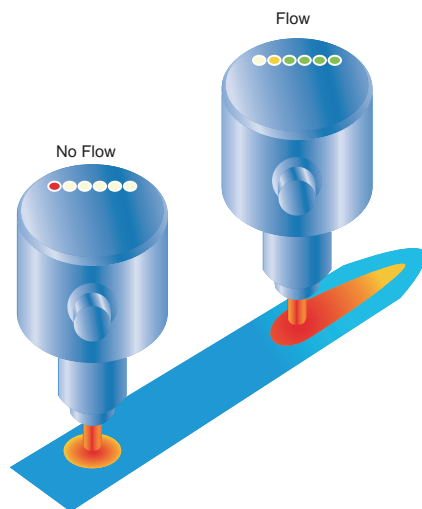
7 Material
 A4 Stainless steel-316
 A2 Stainless steel-304

8 Special option code
 Blank Standard types
 Customized Code-X

Operating principle

Function

The function of the flow controller is based on the thermo-dynamic principle. The sensor is heated internally a few degrees C compared to the medium into which it projects. When the medium flows, the heat generated in the sensor is conducted away by the medium, i. e. the sensor cools down. The temperature within the sensor is measured and compared to the temperature of the medium. The state of flow can be derived for each medium by the temperature difference attained.



Function of thermodynamic flow controllers

On the basis of this functional principle GSEE manufactures flow monitors for liquid and gaseous media.

Areas of application for flow monitors

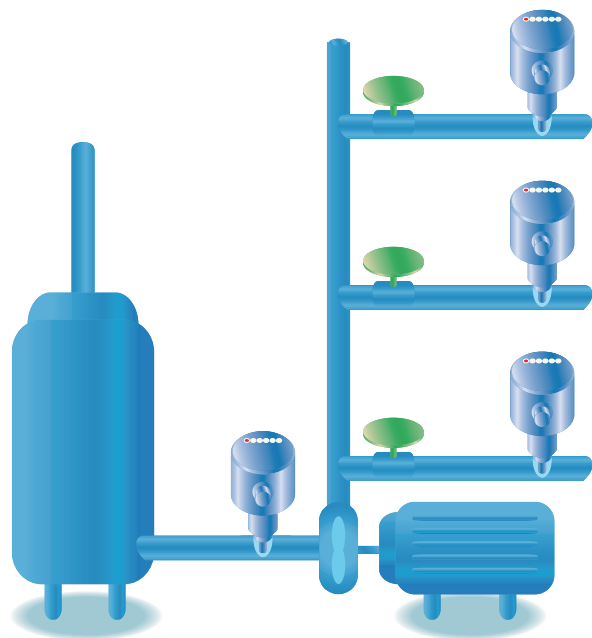
Thermodynamic flow monitors function without any moving parts, therefore they are not subject to failure due to corroded bearings, torn impellers or deflector deformation. This reliability is highly valued in many industries. Today, flow monitors are used both in liquids and in air, and are employed even in explosive environments.

1. Monitoring of cooling

- The cooling water on welding machinery is monitored using compact stainless steel devices. This ensures sufficient cooling even for rapid cycles, otherwise the welding robot will be switched off.
- The cooling lubricant flow is monitored continuously in processing centres. The tools are protected and have a greater service life.
- In metal processing, e.g. rolling mills and wire drawing machines, the rolls and coils will be cooled continually. This is monitored by thermodynamic sensors. Even work as the rough environmental conditions, the sensors can be used smoothly and reliability on-site due to the special unique operating principle.

2. Monitoring of flow medium

- The run-dry protection of pumps is a frequent application, which often uses compact sensors with time delay.
- In dosing technology the aggregate, usually small flow quantities, is measured exactly by means of inline sensors. These sensors are inserted like a pipe into the line.
- Monitoring of filters and sieves can be ensured by medium flow control; if the flow is progressively reduced, the filter must be renewed. Where this is not carried out, the pump is switched off in a second stage should the medium flow drop further. This uses a sensor with two switching points.



Run-dry protection of a feed pump

3. Sensors for explosive hazard environments

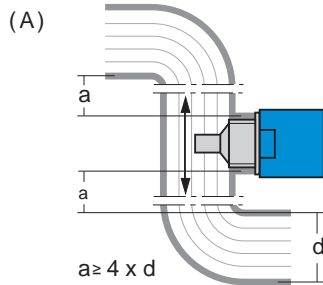
- The monitoring of cleaning processes using aggressive media at times is often only possible with special materials, e.g. hastelloy or tantalum.
- Extraction systems for hazardous vapours at laboratory workstations as well as the hall ventilation in the hexane processing industry are monitored using airflow sensors.
- CIP/SIP processes can be monitored and documented with flow monitors.

Flow sensors with GSEE brand can be used as below situation

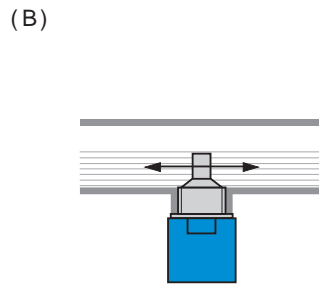
- Medium flow/velocity decrease
- Medium exist/not exist
- Medium flow/static

Mounting instruction

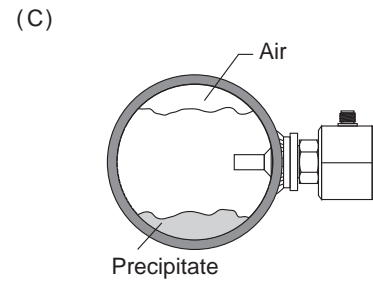
Insert flow sensors-
Should be installed with sleeves or tees



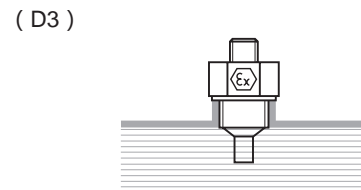
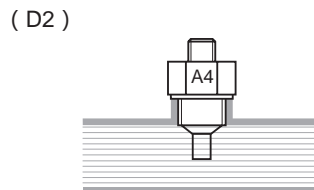
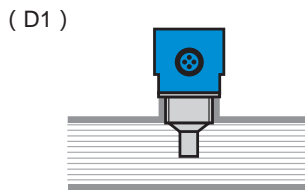
Pay special attention to the minimum distance ($a \geq 4 \times d$) to tube bends and intersections!



Sensor must be mounted from below in applications where the medium does not completely fill the pipe.

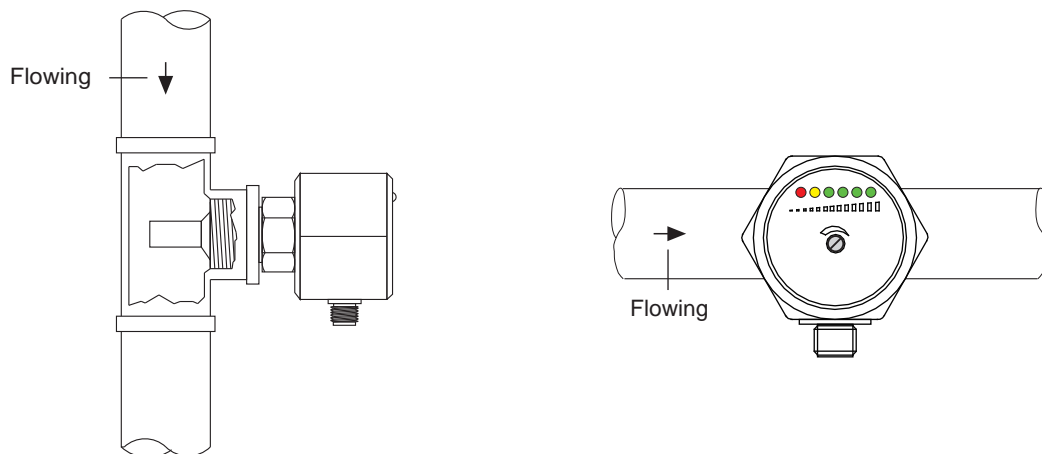


If the possibility of deposit build-up exists, mount the sensor horizontally. Please assure that there are no air pockets near the sensing probes, when installing the sensor.



When monitoring media with a low thermal conductivity (e. g. some kinds of oils, liquids with a high fat content) and in processes where rapid changes of temperature occur, the sensor position with regard to the flow direction must be observed:
With self-contained devices the connector, cable connector or A4/Ex sign on probe must be positioned in right angles to the flow direction.

(D4) When installing analogue flow sensors, a certain mounting position must be observed.



(D5) Notice for installing on pipes of different direction

Horizontal pipeline installation

- Should be installed on the sidewalls of the straight pipe to avoid contact precipitate and air
- The best insert length of probe should be half of pipe diameter;
At least 10mm contact with medium can ensure normal work

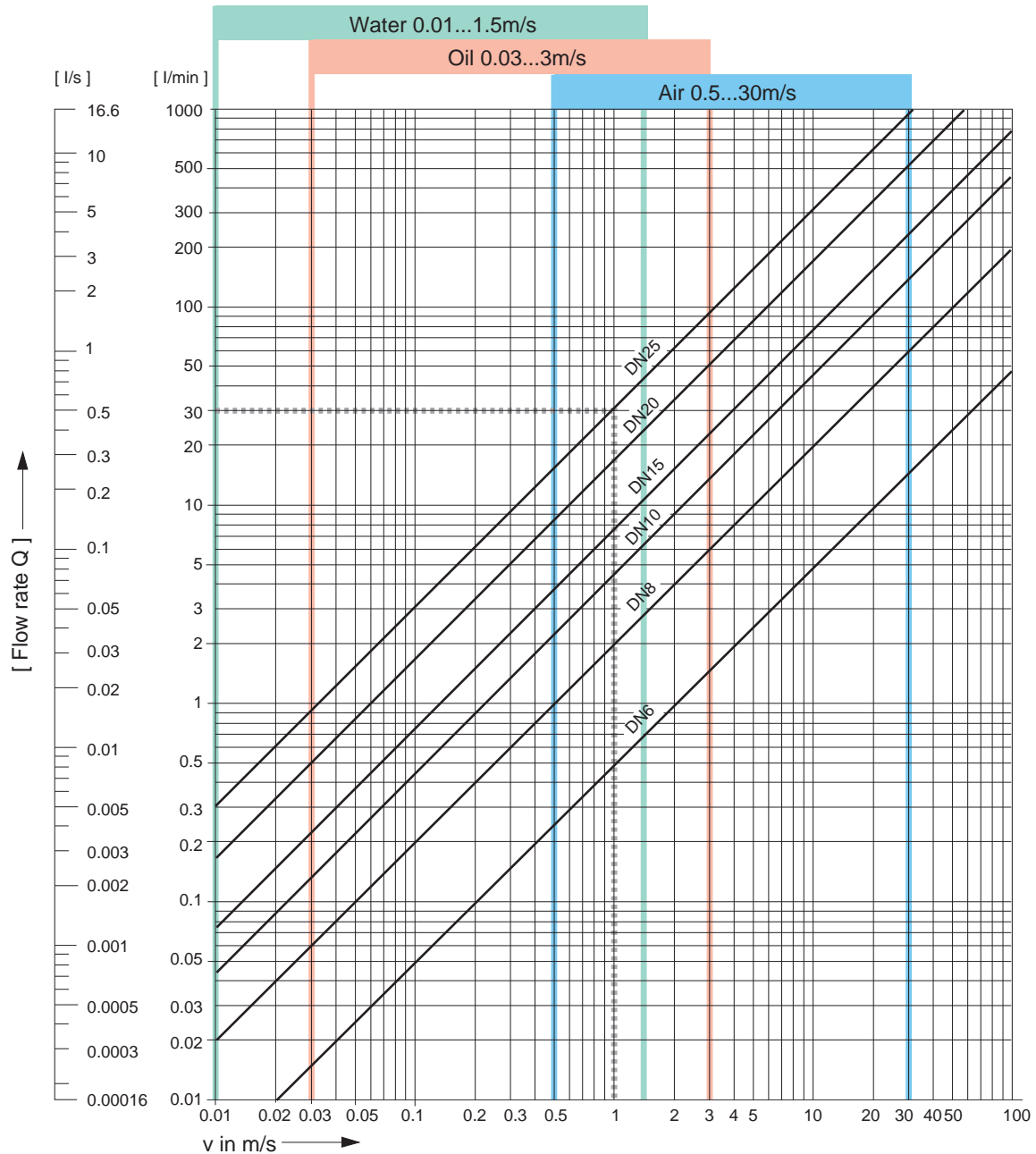
Vertical pipeline installation

- Should be installed on pipe where flowing bottom-up
- The best insert length of probe should be half of pipe diameter;
At least 10mm contact with medium can ensure normal work

Nomograph (Tube cross section DN 6...25)

The nomograph serves the conversion of flow rates (l/min.) in flow rate (m/s), as a function of the tubing cross section (DN). The specified example illustrates the relationship.

If the flow rate lies outside of detection range of the sensor, the flow rate can be increased or reduced, in order to ensure a safe function with a change of the tubing cross section.



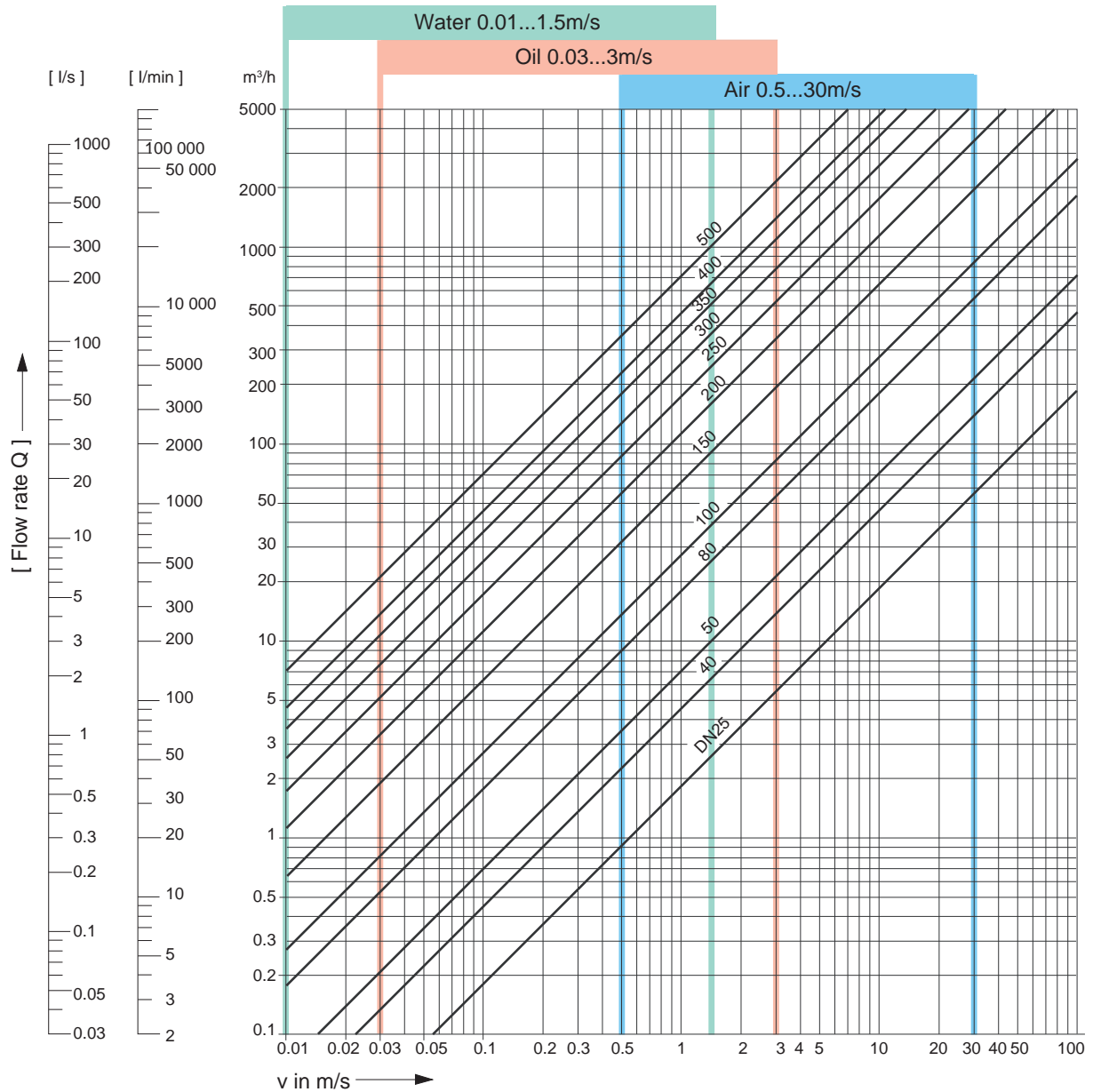
Example: A flow of 30 l/min. with a nominal size of DN25 results in a flow rate of 1 m/s.
Conversion units: 1 imp.gallon = 4.546 litres 1 US gallon = 3.785 litres.

Notice: Variable pipe diameter will usually lead to fluid pressure loss, thus will affect the normal velocity detection, ask relative PM if necessary.

Nomograph (Tube cross section DN 25...500)

The nomograph serves the conversion of flow rates (l/min.) in flow rate (m/s), as a function of the tubing cross section (DN). The specified example illustrates the relationship.

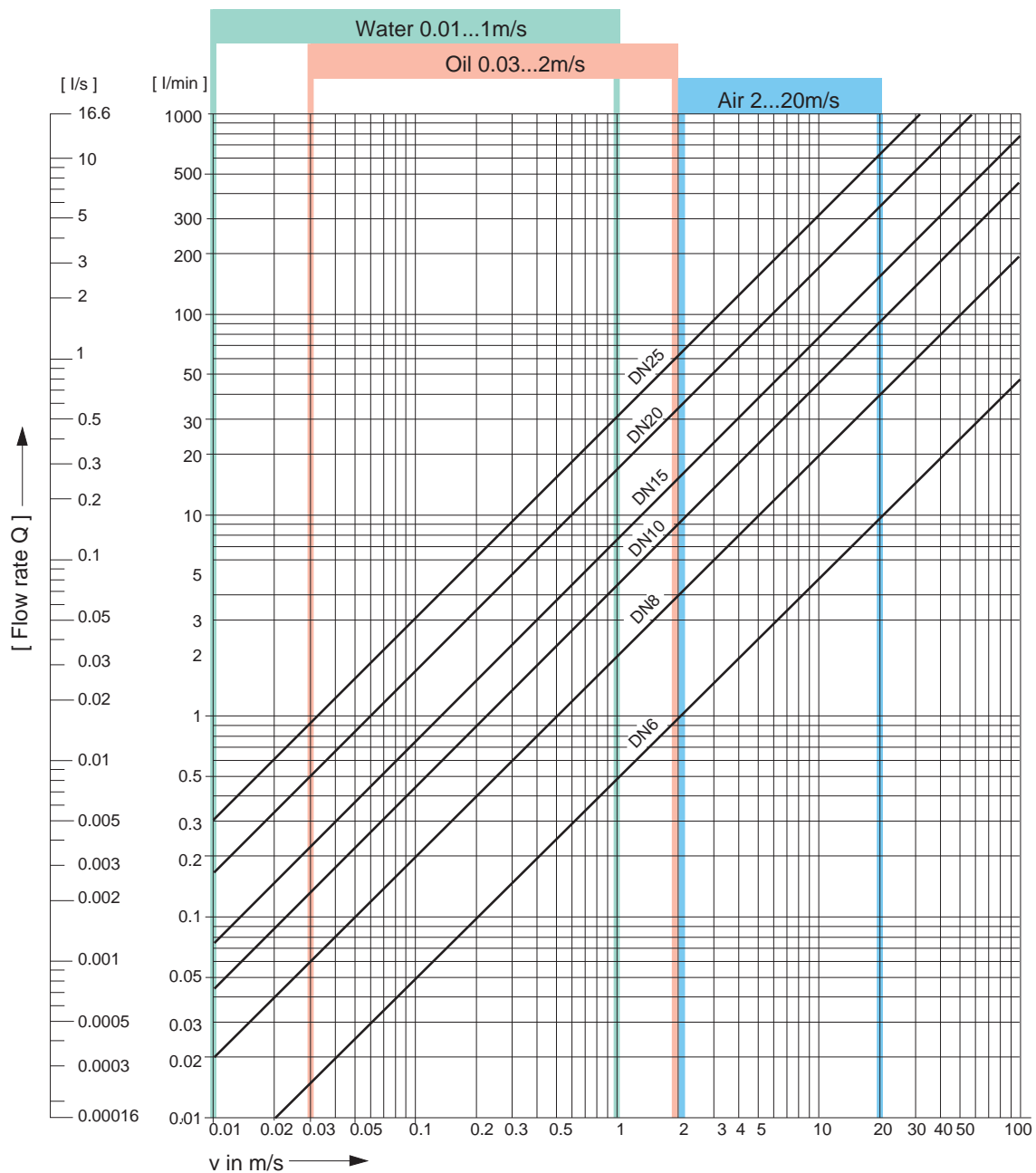
If the flow rate lies outside of detection range of the sensor, the flow rate can be increased or reduced, in order to ensure a safe function with a change of the tubing cross section.



Nomograph for Ex-Flow sensors (Tube cross section DN 6...25)

The nomograph serves the conversion of flow rates (l/min.) in flow rate (m/s), as a function of the tubing cross section (DN). The specified example illustrates the relationship.

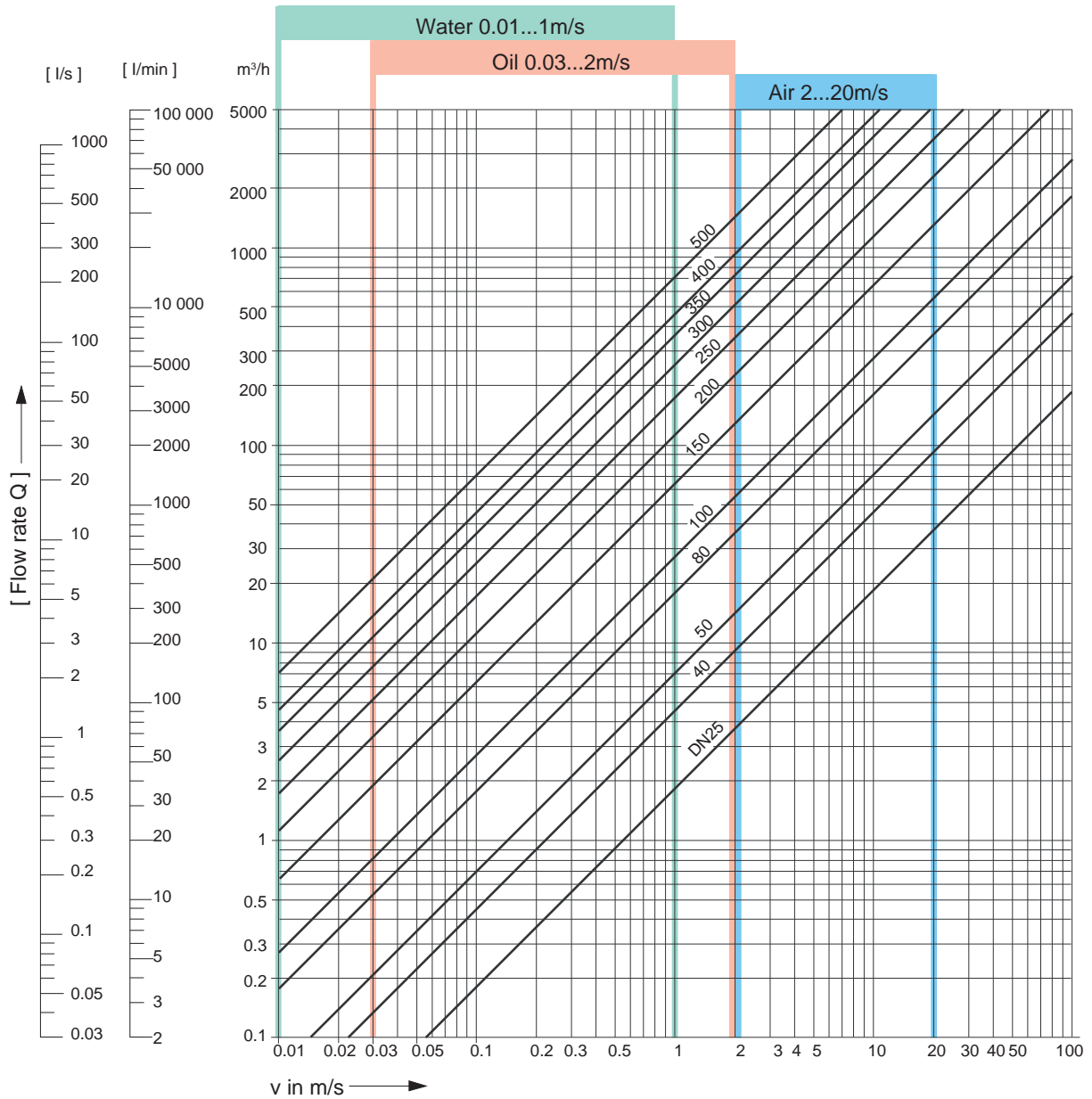
If the flow rate lies outside of detection range of the sensor, the flow rate can be increased or reduced, in order to ensure a safe function with a change of the tubing cross section.





Nomograph for Ex-Flow sensors (Tube cross section DN 25...500)

The nomograph serves the conversion of flow rates (l/min.) in flow rate (m/s), as a function of the tubing cross section (DN). The specified example illustrates the relationship.



If the flow rate lies outside of detection range of the sensor, the flow rate can be increased or reduced, in order to ensure a safe function with a change of the tubing cross section.



Flow sensors selection guide

Series		Insertion Compact Devices-Stainless steel housing	Insertion Compact Devices-Plastic housing
Standard Flow Sensors			
Sensors series type		GFI-...S4S-...	GFI-...S4P-...
Page number		Page 012	Page 014
Medium & Measuring range (1)	Liquid	Water	1 ~ 150 cm/s
		Oil	3 ~ 300 cm/s
	Gas	Air	20 ~ 2000 cm/s
Temperature gradient		4 °C/S	4 °C/S
Repeatability		± 2 % FS	± 2 % FS
Adjustment		Potentiometer	Potentiometer
Switching state		6 LEDs with 3 color (red / yellow / green)	6 LEDs with 3 color (red / yellow / green)
Mechanical connection		G1/2" or G1/4" outside thread M18X1.5 With Compression Fittings inside thread	G1/2" or G1/4" outside thread M18X1.5 With Compression Fittings inside thread
Pressure resistance		100 bar	100 bar
Sensor material		Stainless steel 316L	Stainless steel 316L
Housing material		Stainless steel 316L	PBT, industrial level
Protection class		IP67	IP67
Operating voltage		19.2 - 28.8 VDC	19.2 - 28.8 VDC 195.5 - 264.5 VAC-For relay output only
Electrical connection	Cable	■	■
	Connector	■	■
	Terminal chamber		
Output function	PNP(SPDT)	■	■
	NPN(SPDT)	■	■
	Relay(DC, SPDT)	■	■
	Relay(AC, SPDT)		■
	Analogue	■	■
Features description		Full stainless steel housing, Certain ability to resist corrosion Without moving parts, long service life, easy installation Good repeatability and compression performance Easy adjustment, setting switch point via potentiometer Suitable for medium like: water, oil, gas etc. Highlight 6 LEDs with 3 color display switch state	Industrial level PBT housing, compact and durable Certain ability to resist corrosion Without moving parts, long service life, easy installation Good repeatability and compression performance Easy adjustment, setting switch point via potentiometer Suitable for medium like: water, oil, gas etc. Highlight 6 LEDs with 3 color display switch state
Certification		CE	CE

(1)For special higher measuring range, must be customized, ask relative PM if necessary;

Series		Micro multi-digital display-Stainless steel housing	
New micro flow sensors			
Sensors series type		GFI-...S4S-...-K.	
Page number		Page 017	
Medium & Measuring range (1)	Liquid	Water	1 ~ 150 cm/s
		Oil	3 ~ 300 cm/s
	Gas	Air	20 ~ 2000 cm/s
Temperature gradient		4 °C/S	
Repeatability		± 2 % FS	
Adjustment		Magnetic bar	
Switching state		8 LEDs with 3 color (red / yellow / green)	
Mechanical connection		G1/4" or G1/2" outside thread	
Pressure resistance		100 bar	
Sensor material		Stainless steel 316L	
Housing material		Stainless steel 316L	
Protection class		IP67	
Operating voltage		19.2 - 28.8 VDC	
Electrical connection	Cable		
	Connector		■
	Terminal chamber		
Output function	PNP(SPDT)		■
	NPN(SPDT)		■
	Relay(DC, SPDT)		■
	Relay(AC, SPDT)		
	Analogue		
Features description		<p>Without moving parts, long service life, easy installation Good repeatability and compression performance Innovation switching point setting with magnet bar, more reliability Full stainless steel housing, certain ability to resist corrosion Suitable for medium such as: water, oil, gas etc. Highlight 8 LEDs with 3 color display, higher accuracy New digital processing circuit, improve the response speed greatly</p>	
Certification			

(1)For special higher measuring range, must be customized, ask relative PM if necessary;

GFI-...S4S-...

- Without moving parts, long service life, easy installation
- Good repeatability and compression performance
- Easy adjustment, setting switch point via potentiometer
- Full stainless steel housing, certain ability to resist corrosion
- Suitable for medium like: water, oil, gas etc.
- Highlight 6 LEDs with 3 color display switch state
- Mechanical connection & Probe length can be customized (1)
- Certification:

- Connectors: Page 021
- Mounting accessories: Page 022
- Dimension drawings: Page 019
- Wiring diagrams: Page 018
- ----

(1) Stand probe length see page 19 in details, for other special probe length, pls ask relative PM if necessary

Flow sensors, insertion Compact Devices-Stainless steel housing, operating voltage: 19.2 ... 28.8 VDC

Types	Mechanical connection	Electrical connection	Measuring range			Output function	Operating voltage	ID. NO.
			Water	Oil	Air			
GFI-G1/2S4S-D2D/2M	Standard G1/2" outside thread	2m cable	1 ... 150 cm/s	3 ... 300 cm/s	20 ... 2000 cm/s	PNP NO+NC	19.2 ... 28.8 VDC	A4000000
GFI-G1/2S4S-D2D		4-pin M12 connector				PNP NO+NC	19.2 ... 28.8 VDC	A4001000
GFI-G1/2S4S-D0D/2M		2m cable				NPN NO+NC	19.2 ... 28.8 VDC	A4000100
GFI-G1/2S4S-D0D		4-pin M12 connector				NPN NO+NC	19.2 ... 28.8 VDC	A4001100
GFI-G1/2S4S-R4D/2M		2m cable				SPDT relay	19.2 ... 28.8 VDC	A4000300
GFI-G1/2S4S-R4D		4-pin M12 connector				SPDT relay	19.2 ... 28.8 VDC	A4001300
GFI-G1/2S4S-I1D/2M		2m cable				4 ...20 mA	19.2 ... 28.8 VDC	A4000200
GFI-G1/2S4S-I1D		4-pin M12 connector				4 ...20 mA	19.2 ... 28.8 VDC	A4001200
GFI-G1/4S4S-D2D/2M		Standard G1/4" outside thread				2m cable	1 ... 150 cm/s	3 ... 300 cm/s
GFI-G1/4S4S-D2D	4-pin M12 connector		PNP NO+NC	19.2 ... 28.8 VDC	A4101000			
GFI-G1/4S4S-D0D/2M	2m cable		NPN NO+NC	19.2 ... 28.8 VDC	A4100100			
GFI-G1/4S4S-D0D	4-pin M12 connector		NPN NO+NC	19.2 ... 28.8 VDC	A4101100			
GFI-G1/4S4S-R4D/2M	2m cable		SPDT relay	19.2 ... 28.8 VDC	A4100300			
GFI-G1/4S4S-R4D	4-pin M12 connector		SPDT relay	19.2 ... 28.8 VDC	A4101300			
GFI-G1/4S4S-I1D/2M	2m cable		4 ...20 mA	19.2 ... 28.8 VDC	A4100200			
GFI-G1/4S4S-I1D	4-pin M12 connector		4 ...20 mA	19.2 ... 28.8 VDC	A4101200			
GFI-M18IS4S-D2D/2M	M18X1.5 inside thread With Compression Fittings		2m cable	1 ... 150 cm/s	3 ... 300 cm/s	20 ... 2000 cm/s		
GFI-M18IS4S-D2D		4-pin M12 connector	PNP NO+NC				19.2 ... 28.8 VDC	A4301000
GFI-M18IS4S-D0D/2M		2m cable	NPN NO+NC				19.2 ... 28.8 VDC	A4300100
GFI-M18IS4S-D0D		4-pin M12 connector	NPN NO+NC				19.2 ... 28.8 VDC	A4301100
GFI-M18IS4S-R4D/2M		2m cable	SPDT relay				19.2 ... 28.8 VDC	A4300300
GFI-M18IS4S-R4D		4-pin M12 connector	SPDT relay				19.2 ... 28.8 VDC	A4301300
GFI-M18IS4S-I1D/2M		2m cable	4 ...20 mA				19.2 ... 28.8 VDC	A4300200
GFI-M18IS4S-I1D		4-pin M12 connector	4 ...20 mA				19.2 ... 28.8 VDC	A4301200

GFI-...S4S-...



General technical information

Medium		Liquid and gas
Measuring range	Water	1 ... 150 cm/s
	Oil (1)	1 ... 300 cm/s
	Air	20 ... 2000 cm/s
Operating voltage (2)		19.2 ... 28.8 VDC
No-load current		≤ 80 mA
Protection class		IP67
Temperature features	Medium temperature	-20 ... +85 °C
	Ambient temperature	-20 ... +80 °C
	Storage temperature	-20 ... +100 °C
Rated operational current /Relay contact capacity	PNP or NPN output	≤ 400 mA
	SPDT relay dry contact output	≤ 4 A (250 VAC / 30 VDC)
Response time	Stand-by time	typ. 8 s
	Switch-on/off time	1 ... 12 s , typ. 2 s
Temperature gradient		4 °C/s
Electrical protection		Reverse polarity / short circuit / over-load protection Limit protection voltage can be reached max voltage of operating voltage
Output function	Digital output	PNP or NPN transistor active output / Relay SPDT dry contact output
	Analog output	4 ... 20 mA current output
Repeatability		≤ ± 2 % of full scale
Adjustment		Potentiometer
Switching state		6 LEDs with 3 color (red / yellow / green)
Pressure resistance		100 bar
Vibration resistance		50 g (11ms half sine wave), according to DIN IEC 68-2-27
Shock resistance		20 g (55 ... 2000 Hz), according to DIN EN 60068-2-6
Electrical connection (3)		M12X1 connector, metal thread / 2m cable
Mechanical connection (4)		G1/2" outside thread / G1/4" outside thread / M18X1.5 inside thread (With Compression Fittings)
Material	Sensor (Probe)	Stainless steel, AISI 316Ti
	Housing	Stainless steel, AISI 316Ti

(1) For oil medium application, if involves the medium viscosity, ask PM firstly

(2) For full stainless steel housing sensors, supply DC operating voltage types only

(3) For sensors with analog output, supply M12 electrical connection type only

(4) For other mechanical connections, can be customized, ask relative PM if necessary

GFI-...S4P-...

- Without moving parts, long service life, easy installation
 - Good repeatability and compression performance
 - Easy adjustment, setting switch point via potentiometer
 - Industrial PBT housing, compact and durable, certain ability to resist corrosion
 - Suitable for medium like: water, oil, gas etc.
 - Highlight 6 LEDs with 3 color display switch state
 - Mechanical connection & Probe length can be customized (1)
 - Certification:
- Connectors: Page 021
 - Mounting accessories: Page 022
 - Dimension drawings: Page 019
 - Wiring diagrams: Page 018
 - ----

(1) Stand probe length see page 19 in details, for other special probe length, pls ask relative PM if necessary

Flow sensors, insertion Compact Devices-Plastic housing, operating voltage: 19.2 ... 28.8 VDC / 195.5 - 264.5 VAC-For relay output only

Types	Mechanical connection	Electrical connection	Measuring range			Output function	Operating Voltage	ID. NO.
			Water	Oil	Air			
GFI-G1/2S4P-D2D/2M	Standard G1/2" outside thread	2m cable	1 ... 150 cm/s	3 ... 300 cm/s	20 ... 2000 cm/s	PNP NO+NC	19.2 ... 28.8 VDC	A4010000
GFI-G1/2S4P-D2D		4-pin M12 connector				PNP NO+NC	19.2 ... 28.8 VDC	A4011000
GFI-G1/2S4P-D0D/2M		2m cable				NPN NO+NC	19.2 ... 28.8 VDC	A4010100
GFI-G1/2S4P-D0D		4-pin M12 connector				NPN NO+NC	19.2 ... 28.8 VDC	A4011100
GFI-G1/2S4P-R4D/2M		2m cable				SPDT relay	19.2 ... 28.8 VDC	A4010300
GFI-G1/2S4P-R4D		4-pin M12 connector				SPDT relay	19.2 ... 28.8 VDC	A4011300
GFI-G1/2S4P-I1D/2M		2m cable				4 ...20 mA	19.2 ... 28.8 VDC	A4010200
GFI-G1/2S4P-I1D		4-pin M12 connector				4 ...20 mA	19.2 ... 28.8 VDC	A4011200
GFI-G1/4S4P-D2D/2M		Standard G1/4" outside thread				2m cable	1 ... 150 cm/s	3 ... 300 cm/s
GFI-G1/4S4P-D2D	4-pin M12 connector		PNP NO+NC	19.2 ... 28.8 VDC	A4111000			
GFI-G1/4S4P-D0D/2M	2m cable		NPN NO+NC	19.2 ... 28.8 VDC	A4110100			
GFI-G1/4S4P-D0D	4-pin M12 connector		NPN NO+NC	19.2 ... 28.8 VDC	A4111100			
GFI-G1/4S4P-R4D/2M	2m cable		SPDT relay	19.2 ... 28.8 VDC	A4110300			
GFI-G1/4S4P-R4D	4-pin M12 connector		SPDT relay	19.2 ... 28.8 VDC	A4111300			
GFI-G1/4S4P-I1D/2M	2m cable		4 ...20 mA	19.2 ... 28.8 VDC	A4110200			
GFI-G1/4S4P-I1D	4-pin M12 connector		4 ...20 mA	19.2 ... 28.8 VDC	A4111200			
GFI-M18IS4P-D2D/2M	M18X1.5 inside thread With Compression Fittings		2m cable	1 ... 150 cm/s	3 ... 300 cm/s	20 ... 2000 cm/s		
GFI-M18IS4P-D2D		4-pin M12 connector	PNP NO+NC				19.2 ... 28.8 VDC	A4311000
GFI-M18IS4P-D0D/2M		2m cable	NPN NO+NC				19.2 ... 28.8 VDC	A4310100
GFI-M18IS4P-D0D		4-pin M12 connector	NPN NO+NC				19.2 ... 28.8 VDC	A4311100
GFI-M18IS4P-R4D/2M		2m cable	SPDT relay				19.2 ... 28.8 VDC	A4310300
GFI-M18IS4P-R4D		4-pin M12 connector	SPDT relay				19.2 ... 28.8 VDC	A4311300
GFI-M18IS4P-I1D/2M		2m cable	4 ...20 mA				19.2 ... 28.8 VDC	A4310200
GFI-M18IS4P-I1D		4-pin M12 Connector	4 ...20 mA				19.2 ... 28.8 VDC	A4311200
GFI-G1/2S4P-R5D/2M		Standard G1/4" outside thread	2m cable				1 ... 150 cm/s	3 ... 300 cm/s
GFI-G1/4S4P-R5D/2M	Standard G1/4" outside thread	2m cable	SPDT relay	195.5 - 264.5 VAC	A4111400			
GFI-M18IS4P-R5D/2M	M18X1.5 inside thread With Compression Fittings	2m cable	SPDT relay	195.5 - 264.5 VAC	A4311400			

GFI-...S4P-...




General technical information

Medium		Liquid and gas
Measuring range	Water	1 ... 150 cm/s
	Oil ⁽¹⁾	1 ... 300 cm/s
	Air	20 ... 2000 cm/s
Operating voltage ⁽²⁾		19.2 ... 28.8 VDC / 195.5 - 264.5 VAC (For relay output only)
No-load current		DC version: ≤ 80 mA; AC version: ≤ 30 mA
Protection class		IP67
Temperature features	Medium temperature	-20 ... +85 °C
	Ambient temperature	-20 ... +80 °C
	Storage temperature	-20 ... +100 °C
Rated operational current /Relay contact capacity	PNP or NPN output	≤ 400 mA
	SPDT relay dry contact output	≤ 4 A (250 VAC / 30 VDC)
Response time	Stand-by time	Typ. 8 s
	Switch-on/off time	1 ... 12 s , Typ. 2 s
Temperature gradient		4 °C/s
Electrical protection		Reverse polarity / short circuit / over-load protection Limit protection voltage can be reached max voltage of operating voltage
Output function	Digital output	PNP or NPN transistor active output / Relay SPDT dry contact output
	Analog output	4 ... 20 mA current output
Repeatability		≤ ± 2 % of full scale
Adjustment		Potentiometer
Switching state		6 LEDs with 3 color (red / yellow / green)
Pressure resistance		100 bar
Vibration resistance		50 g (11ms half sine wave), according to DIN IEC 68-2-27
Shock resistance		20 g (55 ... 2000 Hz), according to DIN EN 60068-2-6
Electrical connection ⁽³⁾		M12X1 connector, metal thread / 2m cable
Mechanical connection ⁽⁴⁾		G1/2" outside thread / G1/4" outside thread / M18X1.5 inside thread (With Compression Fittings)
Material	Sensor (Probe)	Stainless steel, AISI 316Ti
	Housing	PBT , Industrial level

(1) For oil medium application, if involves the medium viscosity, ask PM firstly
(3) For sensors with analog output, supply M12 electrical connection type only,
For AC operating voltage sensors, supply 2m cable connection only

(2) For plastic housing sensors, supply both DC & AC operating voltage types
(4) For other mechanical connections, can be customized, ask relative PM if necessary

GFI-...S4S-...-K...

- Without moving parts, long service life, easy installation
- Good repeatability and compression performance
- Innovation switching point setting with magnet bar, more reliability
- Full stainless steel housing, certain ability to resist corrosion
- Suitable for medium such as: water, oil, gas etc.
- Highlight 8 LEDs with 3 color display, higher accuracy
- New digital processing circuit, improve the response speed greatly
- Certification: 
- Connectors: Page 021
- Mounting accessories: Page 022
- Dimension drawings: Page 020
- Wiring diagrams: Page 018
- ----

Flow sensors, Micro multi-digital display-Stainless steel housing, operating voltage: 19.2 ... 28.8 VDC

Types	Mechanical connection	Electrical connection	Measuring Range			Output function	Operating voltage	ID. NO.
			Water	Oil	Air			
GFI-G1/2S4S-D2D/2M-K	Standard G1/2" outside thread	2m cable	1 ... 150 cm/s	3 ... 300 cm/s	20 ... 2000 cm/s	PNP NO+NC	19.2 ... 28.8 VDC	A4020000
GFI-G1/2S4S-D2D-K		4-pin M12 connector				PNP NO+NC	19.2 ... 28.8 VDC	A4021000
GFI-G1/2S4S-D0D/2M-K		2m cable				NPN NO+NC	19.2 ... 28.8 VDC	A4020100
GFI-G1/2S4S-D0D-K		4-pin M12 connector				NPN NO+NC	19.2 ... 28.8 VDC	A4021100
GFI-G1/2S4S-R4D/2M-K		2m cable				SPDT relay	19.2 ... 28.8 VDC	A4020300
GFI-G1/2S4S-R4D-K		4-pin M12 connector				SPDT relay	19.2 ... 28.8 VDC	A4021300
GFI-G1/4S4S-D2D/2M-K	Standard G1/4" outside thread	2m cable	1 ... 150 cm/s	3 ... 300 cm/s	20 ... 2000 cm/s	PNP NO+NC	19.2 ... 28.8 VDC	A4120000
GFI-G1/4S4S-D2D-K		4-pin M12 connector				PNP NO+NC	19.2 ... 28.8 VDC	A4121000
GFI-G1/4S4S-D0D/2M-K		2m cable				NPN NO+NC	19.2 ... 28.8 VDC	A4120100
GFI-G1/4S4S-D0D-K		4-pin M12 connector				NPN NO+NC	19.2 ... 28.8 VDC	A4121100
GFI-G1/4S4S-R4D/2M-K		2m cable				SPDT relay	19.2 ... 28.8 VDC	A4120300
GFI-G1/4S4S-R4D-K		4-pin M12 connector				SPDT relay	19.2 ... 28.8 VDC	A4121300

(1) Standard types all with PNP or SPDT output, others must ask PM before order them; (2) For special higher measuring range, must be customized, ask relative PM if necessary
 (3)---- (4)----

GFI-...S4S-...-K...



General technical information

Medium		Liquid and gas
Measuring range (1)	Water	1 ... 150 cm/s
	Oil (2)	1 ... 300 cm/s
	Air	20 ... 2000 cm/s
Operating voltage (3)		19.2 ... 28.8 VDC
No-load current		≤ 80 mA
Protection class		IP67
Temperature features	Medium temperature	-20 ... +85 °C
	Ambient temperature	-20 ... +80 °C
	Storage temperature	-20 ... +100 °C
Rated operational current /Relay contact capacity	PNP or NPN output	≤ 400 mA
	SPDT relay dry contact output	≤ 4 A (250 VAC / 30 VDC)
Response time	Stand-by time	3 ... 5 s
	Switch-on/off time	1 ... 12 s , Typ. 2 s
Temperature gradient		4 °C/s
Electrical protection		Reverse polarity / short circuit / over-load protection Limit protection voltage can be reached max voltage of operating voltage
Output function	Digital output	PNP or NPN transistor active output
	Analog output	Relay SPDT dry contact output
Repeatability		≤ ± 2 % of full scale
Adjustment		Magnetic bar
Switching state		8 LEDs with 3 color (red / yellow / green)
Pressure resistance		100 bar
Vibration resistance		50 g (11ms half sine wave), according to DIN IEC 68-2-27
Shock resistance		20 g (55 ... 2000 Hz), according to DIN EN 60068-2-6
Electrical connection		M12X1 connector, metal thread / 2m cable
Mechanical connection (4)		G1/2" outside thread / G1/4" outside thread
Material	Sensor (Probe)	Stainless steel, AISI 316Ti
	Housing	Stainless steel, AISI 316Ti

(1) For special higher measuring range, must be customized, ask relative PM if necessary (2) For oil medium application, if involves the medium viscosity, ask PM firstly

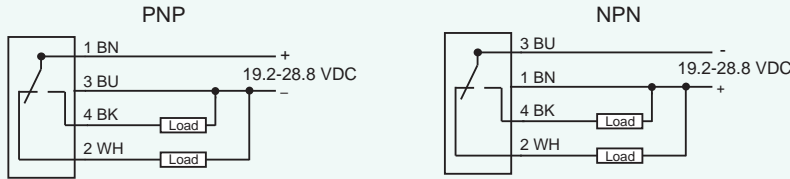
(3) For full stainless steel housing sensors, supply DC operating voltage types only

(4) For other mechanical connections, can be customized, ask relative PM if necessary

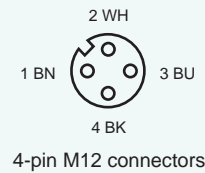
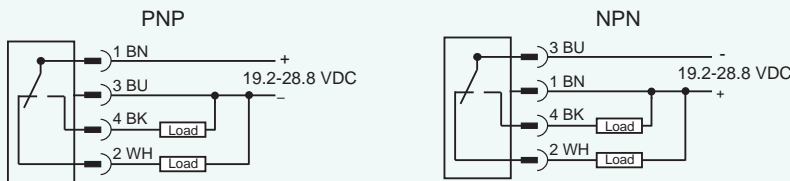
Wiring diagrams

1、 NPN or PNP NO+NC output:

Cable types

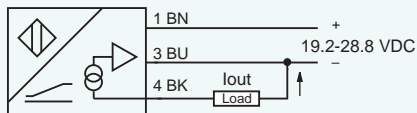


Connector types

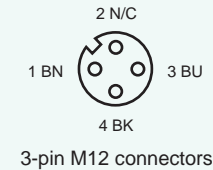
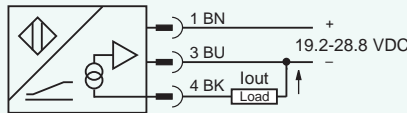


2、 Analog current output:

Cable types

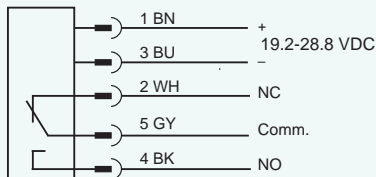


Connectors

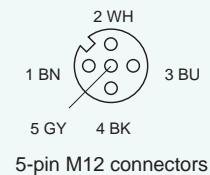
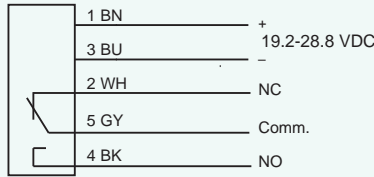


3、 Relay SPDT dry contact output:

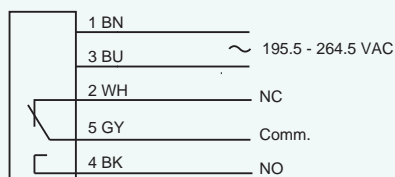
DC operating voltage, connector types



DC operating voltage, cable types

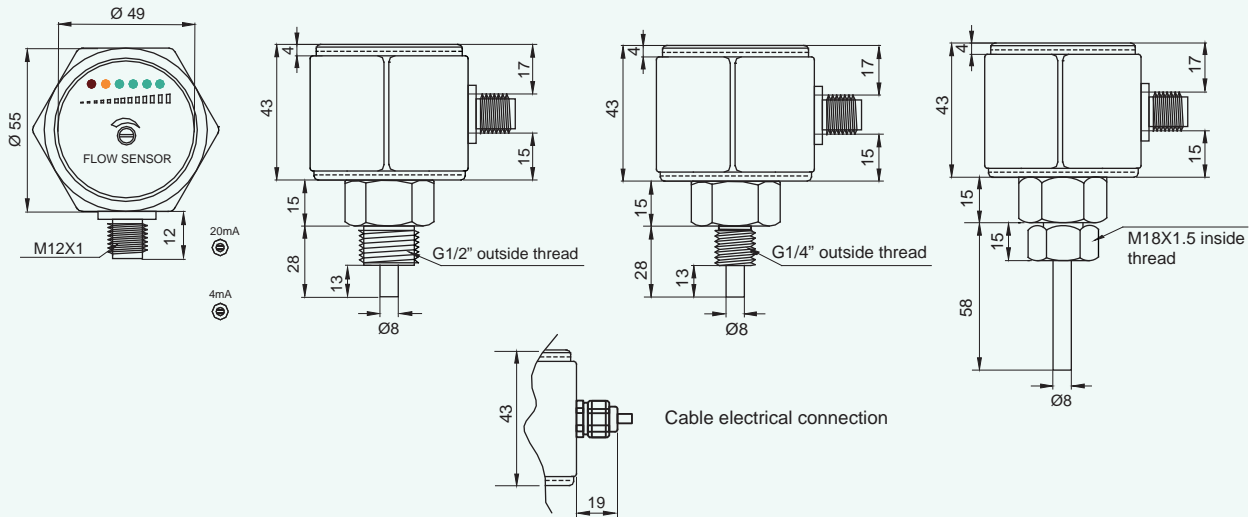


AC operating voltage, cable types

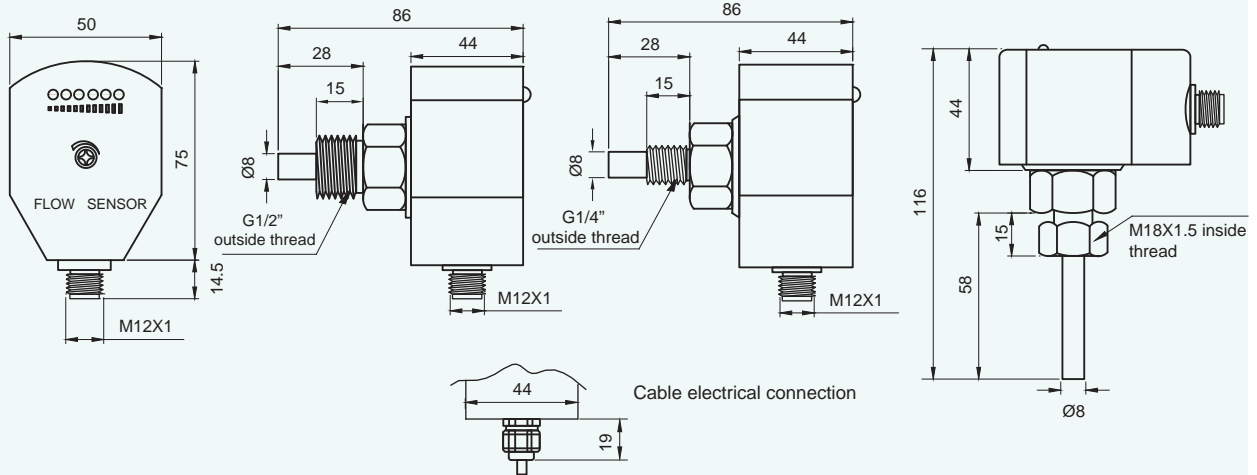


Dimension drawings

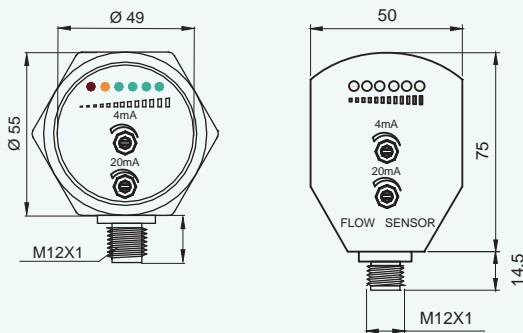
1、 Full metal stainless housing:



2、 Plastic housing:

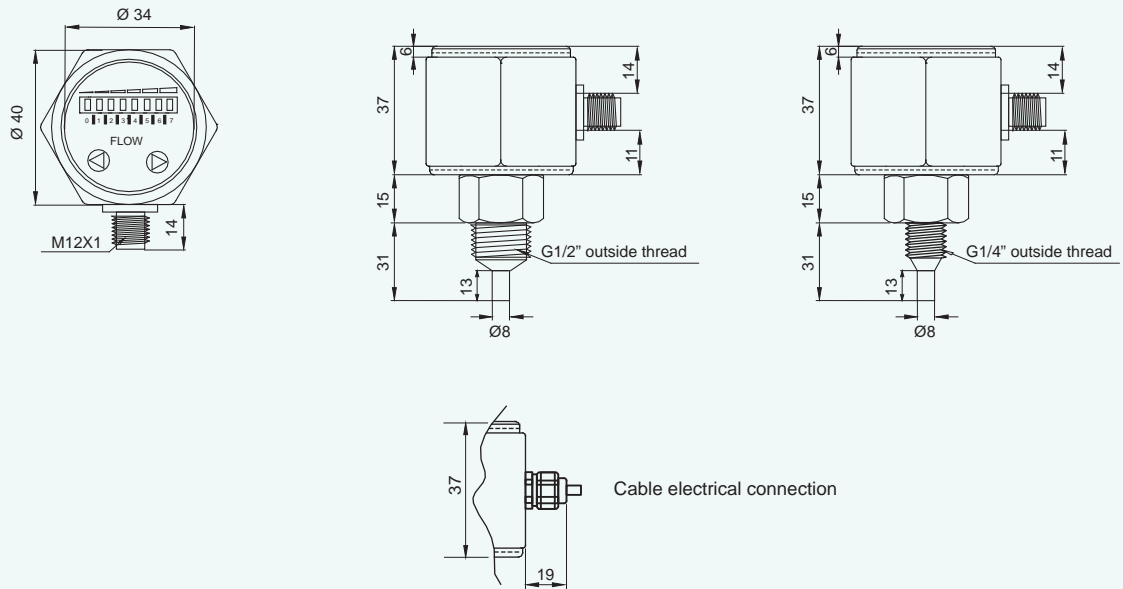


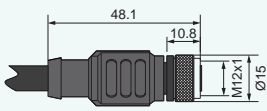
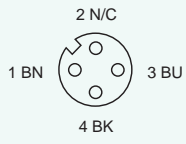
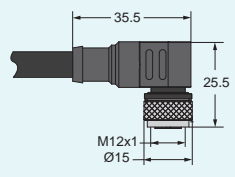
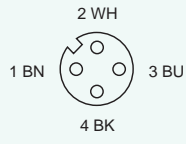
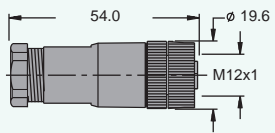
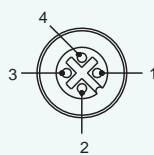
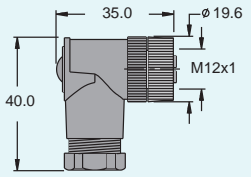
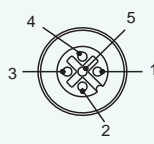
3、 Display board schematic diagram of analog output sensors:



Dimension drawings

4、 Micro multi-digital display-Stainless steel housing:



Connectors (1)		(1) Other connector types please ask connector product manager				
Pre-cast cable		Pin Number	Cable Length	Order code	Type	
M12x1 straight female connector 		3	2m	10011000	EK3-2M/P00	
			5m	10011001	EK3-5M/P00	
			10m	10011002	EK3-10M/P00	
		4	2m	10011010	EK4-2M/P00	
			5m	10011011	EK4-5M/P00	
			10m	10011012	EK4-10M/P00	
M12x1 angle female connector 		3	2m	10011030	ELK3-2M/P00	
			5m	10011031	ELK3-5M/P00	
			10m	10011032	ELK3-10M/P00	
		4	2m	10011040	ELK4-2M/P00	
			5m	10011041	ELK4-5M/P00	
			10m	10011042	ELK4-10M/P00	
		PVC, Black cable 4-pin: 4x22AWG 5-pin: 5x22AWG Ø5.2mm	5	2m	10011020	EK4.5-2M/P00
				5m	10011021	EK4.5-5M/P00
				10m	10011022	EK4.5-10M/P00
				2m	10011050	ELK4.5-2M/P00
				5m	10011051	ELK4.5-5M/P00
				10m	10011052	ELK4.5-10M/P00
Field-wireable connectors		Pin Number	Cable Length	Order code	Type	
M12x1 straight female connector 		4	4-6 mm	PG7 10091000	EK4112-0/7	
			6-8 mm	PG9 10091001	EK4112-0/9	
		5	4-6 mm	PG7 10091002	EK5112-0/7	
			6-8 mm	PG9 10091003	EK5112-0/9	
M12x1 straight female connector 		4	4-6 mm	PG7 10091010	ELK4112-0/7	
			6-8 mm	PG9 10091011	ELK4112-0/9	
		5	4-6 mm	PG7 10091013	ELK5112-0/7	
			6-8 mm	PG9 10091012	ELK5112-0/9	
PBT, Black / Brass nickel plated, Spring-type terminals 85°C, 250 V, 4 A						

Flow sensors-Mounting accessories selection list in details				
Type (1)	Description	Application	Ident NO.	Dimension (mm)
GFA-G1/2F-A4	<p>Installation sleeve - welding: Standard material: 316 L stainless steel</p> <p>Installation: Welding on some position of the pipe Function: Insert tighten mounting for flow sensors.</p> <p>Suitable for pipe diameter is greater than DN32 application</p>	<p>Suitable for: Standard insert flow sensors, mechanical connection is G1/2" outside thread</p>	B4200130	
GFA-G1/4F-A4	<p>Installation sleeve - welding: Standard material: 316 L stainless steel</p> <p>Installation: Welding on some position of the pipe Function: Insert tighten mounting for flow sensors.</p> <p>Suitable for pipe diameter is greater than DN32 application</p>	<p>Suitable for: Standard insert flow sensors, mechanical connection is G1/4" outside thread</p>	B4100130	
GFA-M18X1.5M-G1/4M-A4	<p>Threaded adapter: Standard material: 316 L stainless steel</p> <p>Function: Used to change M18X1.5 inside adaptive thread into other needed thread as the requirement from customer side;</p> <p>For application on-site, must use this adapter with relative sleeve according to requirement in the field.</p>	<p>Suitable for: Standard insert flow sensors, mechanical connection is M18X1.5 inside thread;</p> <p>Used to change M18X1.5 inside thread into G1/4"outside thread.</p>	B4830010	
GFA-M18X1.5M-G1/2M-A4	<p>Threaded adapter: Standard material: 316 L stainless steel</p> <p>Function: Used to change M18X1.5 inside adaptive thread into other needed thread as the requirement from customer side;</p> <p>For application on-site, must use this adapter with relative sleeve according to requirement in the field.</p>	<p>Suitable for: Standard insert flow sensors, mechanical connection is M18X1.5 inside thread;</p> <p>Used to change M18X1.5 inside thread into G1/2"outside thread.</p>	B4840010	

(1)There are only standard types on this page, others please see type codes and ask PM before order them (2)----

(3)----

(4)----

Flow sensors-Mounting accessories selection list in details

Type (1)	Description	Application	Ident NO.	Dimension (mm)
GFA-G1/2F-DN20-A4	<p>Installation tee - welding: Standard material: 316 L stainless steel Optional material: Carbon steel after antioxidant boiled black processing;</p> <p>Installation: Double side welding on the pipe Function: Insert tighten mounting for flow sensors.</p> <p>Suitable for DN20 pipe diameter application</p>	Suitable for: Standard insert flow sensors, mechanical connection is G1/2" outside thread	B4210100	
GFA-G1/2F-DN25-A4	<p>Installation tee - welding: Standard material: 316 L stainless steel Optional material: Carbon steel after antioxidant boiled black processing;</p> <p>Installation: Double side welding on the pipe Function: Insert tighten mounting for flow sensors.</p> <p>Suitable for DN25 pipe diameter application</p>	Suitable for: Standard insert flow sensors, mechanical connection is G1/2" outside thread	B4210101	
GFA-G1/2F-DN32-A4	<p>Installation tee - welding: Standard material: 316 L stainless steel Optional material: Carbon steel after antioxidant boiled black processing;</p> <p>Installation: Double side welding on the pipe Function: Tighten mounting for flow sensors.</p> <p>Suitable for DN32 pipe diameter application</p>	Suitable for: Standard insert flow sensors, mechanical connection is G1/2" outside thread	B4210102	

(1)Thers are only standard types on this page, others please see type codes and ask PM before order them (2)----

(3)----

(4)----

Operation manual

Switching output adjustment: LED function with switching devices

- | | | | |
|---|----------|----------|----------|
| · Install flow sensor on the pipe on-site and check sealing to avoid leakage | | | |
| · Connect the cable and check whether there has fault or missing | | | |
| · Open the valve, make the pipe full of medium, then close the valve | | | |
| · Connect flow sensor to power supply, wait some second for initialization, stand-by time will be 8~15 s, finally the red LED indicator will light (as shown in figure 1) | | | |
| · Open the valve, make the flow speed of medium in pipes reached switch point value | | | |
| · Unscrew dust-proof screw on flow switch, insert special screwdriver in screw holes | | | |
| · Adjust potentiometer clockwise or counterclockwise, make the yellow LED indicator light (as shown in figure 2) | | | |
| · After switch point has been set, then screw the dust-proof screw in the holes | Figure 1 | Figure 2 | Figure 3 |

All above steps are setting for switching point

Test: The flow has stopped or the predefined setpoint value has not been reached. The switch output is not switched, red LED light (as shown in Figure 1)

The set setpoint value is reached. The switch output is switched, yellow LED light (as shown in Figure 2)

The set setpoint value has been exceeded. The number of LEDs which light is an indication of the relative level of the setpoint value overshoot. The switch output is switched, yellow and green LEDs light (as shown in Figure 3)

Analogue output adjustment: LED function with analogue devices

- | | | | |
|---|----------|----------|----------|
| · Analog output flow sensor, output: 4 ... 20 mA is proportional to the velocity, but the output is nonlinear | | | |
| · Every sensor has two different potentiometers to set output range, one is for upper limit (20 mA), the other is for lower limit (4 mA) | | | |
| · Install flow sensor on the pipe on-site and check sealing to avoid leakage | | | |
| · Connect the cable and check whether there has fault or leakage | | | |
| · Open the valve, make the pipe full of medium, then close the valve | | | |
| · Connect flow sensor to power supply, wait some second for initialization, stand-by time will be 8~15 s, finally the red LED indicator will light (as shown in figure 1) | | | |
| · Open the valve, make the flow velocity of medium in pipes reached needed lower limit | | | |
| · Adjust lower limit (4 mA) potentiometer, insert special screwdriver in screw holes | | | |
| · Adjust potentiometer clockwise or counterclockwise, make the first green LED indicator light (as shown in figure 2) | | | |
| · Then adjust the valve, make the flow velocity of medium in pipes reached needed upper limit | Figure 1 | Figure 2 | Figure 3 |
| · Adjust upper limit (4 mA) potentiometer, insert special screwdriver in screw holes | | | |
| · Adjust potentiometer clockwise or counterclockwise, make all five green LED indicators light (as shown in figure 3) | | | |

All above steps are setting for analog measuring range

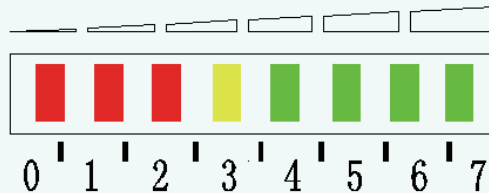
· After complete all setting steps, output analog signals will be proportional to flow speed between upper limit and lower limit; in other words, 4 mA corresponding to the lower velocity, 20 mA, corresponding to maximum velocity

Operation manual

LED function and setting: with switching devices (Micro multi-digital display, magnetic bar setting, switch output)

- Install flow sensor on the pipe on-site and check sealing to avoid leakage
- Connect the cable and check whether there has fault or missing
- Open the valve, make the pipe full of medium, then adjust the valve to right flow speed as regulating valve to normal operation
- Connect flow sensor to power supply, wait some second for initialization, put magnetic bar on top of the right key 3s above, till all LED indicators put out, then all LED indicators light from the left to the right till all 8 LED indicators light, the initialization is completed, stand-by time will be 5~8 s, then current flow speed corresponding to the 8th LED indicator
- If need current flow speed corresponding to other LED, then use magnetic bar to click left key or right key;
When double-click left key, LED indicator which current flow speed corresponding to will move to the left one;
When double-click left key, LED indicator which current flow speed corresponding to will move to the left one;
- Normally open status is default to the flow sensor, if want to change switching status (change NO into NC), put and hold magnetic bar on left key ≥ 10 s, till all LED indicators alternately flash, then release button, switching status is changed;
- After finish all setting of flow sensor, pack up the magnetic bar to save it avoid lost, in order to use in the next setting or maintain;

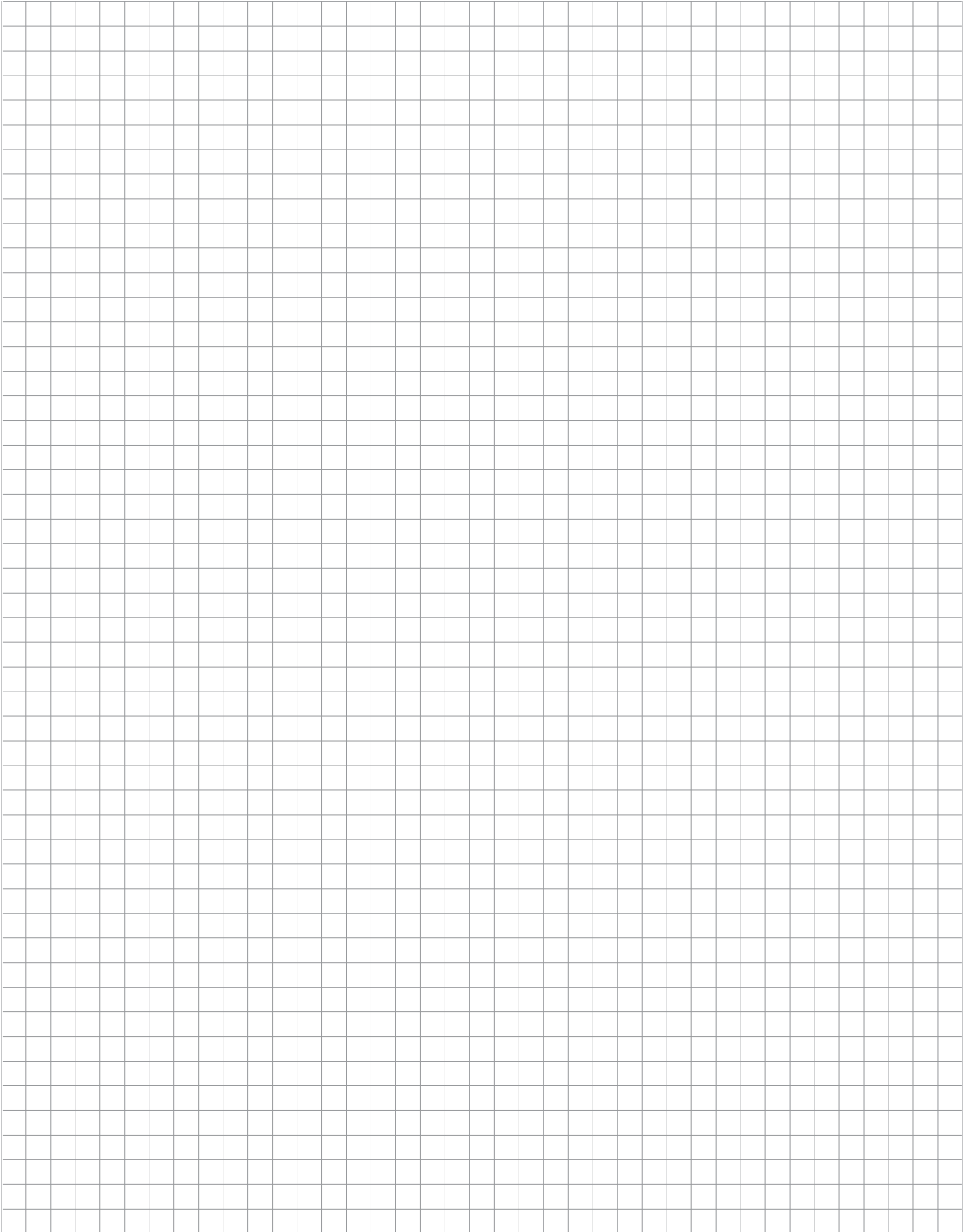
All above steps are setting for switching point



- Test: The flow has stopped or the predefined setpoint value has not been reached. The switch output is not switched, red LEDs light (The 1st to 3rd LED indicators);
 The set setpoint value is reached. The switch output is switched, yellow LED light (The 4th LED indicator);
 The set setpoint value has been exceeded. The number of LEDs which light is an indication of the relative level of the setpoint value overshoot. The switch output is switched, green LEDs light (The 5th to 8th LED indicators)
 Notice: The faster the flow speed, the more LED indicators light

Type index

Type	ID. NO.	Page	Type	ID. NO.	Page
EK3-10M/P00	10011002	021	GFI-G1/4S4P-R5D/2M	A4111400	014
EK3-2M/P00	10011000	021	GFI-G1/4S4S-D0D	A4101100	012
EK3-5M/P00	10011001	021	GFI-G1/4S4S-D0D-K	A4121100	016
EK4.5-10M/P00	10011022	021	GFI-G1/4S4S-D0D/2M	A4100100	012
EK4.5-2M/P00	10011020	021	GFI-G1/4S4S-D0D/2M-K	A4120100	016
EK4.5-5M/P00	10011021	021	GFI-G1/4S4S-D2D	A4101000	012
EK4-10M/P00	10011012	021	GFI-G1/4S4S-D2D-K	A4121000	016
EK4112-0/7	10091000	021	GFI-G1/4S4S-D2D/2M	A4100000	012
EK4112-0/9	10091001	021	GFI-G1/4S4S-D2D/2M-K	A4120000	016
EK4-2M/P00	10011010	021	GFI-G1/4S4S-I1D	A4101200	012
EK4-5M/P00	10011011	021	GFI-G1/4S4S-I1D/2M	A4100200	012
EK5112-0/7	10091002	021	GFI-G1/4S4S-R4D	A4101300	012
EK5112-0/9	10091003	021	GFI-G1/4S4S-R4D-K	A4121300	016
ELK3-10M/P00	10011032	021	GFI-G1/4S4S-R4D/2M	A4100300	012
ELK3-2M/P00	10011030	021	GFI-G1/4S4S-R4D/2M-K	A4120300	016
ELK3-5M/P00	10011031	021	GFI-M18IS4P-D0D	A4311100	014
ELK4.5-10M/P00	10011052	021	GFI-M18IS4P-D0D/2M	A4310100	014
ELK4.5-2M/P00	10011050	021	GFI-M18IS4P-D2D	A4311000	014
ELK4.5-5M/P00	10011051	021	GFI-M18IS4P-D2D/2M	A4310000	014
ELK4-10M/P00	10011042	021	GFI-M18IS4P-I1D	A4311200	014
ELK4112-0/7	10091010	021	GFI-M18IS4P-I1D/2M	A4310200	014
ELK4112-0/9	10091011	021	GFI-M18IS4P-R4D	A4311300	014
ELK4-2M/P00	10011040	021	GFI-M18IS4P-R4D/2M	A4310300	014
ELK4-5M/P00	10011041	021	GFI-M18IS4P-R5D/2M	A4311400	014
ELK5112-0/7	10091013	021	GFI-M18IS4S-D0D	A4301100	012
ELK5112-0/9	10091012	021	GFI-M18IS4S-D0D/2M	A4300100	012
GFA-G1/2F-A4	B4200130	022	GFI-M18IS4S-D2D	A4301000	012
GFA-G1/2F-DN20-A4	B4210100	023	GFI-M18IS4S-D2D/2M	A4300000	012
GFA-G1/2F-DN25-A4	B4210101	023	GFI-M18IS4S-I1D	A4301200	012
GFA-G1/2F-DN32-A4	B4210102	023	GFI-M18IS4S-I1D/2M	A4300200	012
GFA-G1/4F-A4	B4100131	022	GFI-M18IS4S-R4D	A4301300	012
GFA-M18X1.5M-G1/2M-A4	B4840010	022	GFI-M18IS4S-R4D/2M	A4300300	012
GFA-M18X1.5M-G1/4M-A4	B4830010	022			
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GFI-G1/2S4P-D2D	A4011000	014			
GFI-G1/2S4P-D2D/2M	A4010000	014			
GFI-G1/2S4P-I1D	A4011200	014			
GFI-G1/2S4P-I1D/2M	A4010200	014			
GFI-G1/2S4P-R4D	A4011300	014			
GFI-G1/2S4P-R4D/2M	A4010300	014			
GFI-G1/2S4P-R5D/2M	A4010400	014			
GFI-G1/2S4S-D0D	A4001100	012			
GFI-G1/2S4S-D0D/2M	A4000100	012			
GFI-G1/2S4S-D0D/2M-K	A4020100	016			
GFI-G1/2S4S-D0D-K	A4021100	016			
GFI-G1/2S4S-D2D	A4001000	012			
GFI-G1/2S4S-D2D/2M	A4000000	012			
GFI-G1/2S4S-D2D/2M-K	A4020000	016			
GFI-G1/2S4S-D2D-K	A4021000	016			
GFI-G1/2S4S-I1D	A4001200	012			
GFI-G1/2S4S-I1D/2M	A4000200	012			
GFI-G1/2S4S-R4D	A4001300	012			
GFI-G1/2S4S-R4D/2M	A4000300	012			
GFI-G1/2S4S-R4D/2M-K	A4020300	016			
GFI-G1/2S4S-R4D-K	A4021300	016			
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GFI-G1/4S4P-D2D	A4111000	014			
GFI-G1/4S4P-D2D/2M	A4110000	014			
GFI-G1/4S4P-I1D	A4111200	014			
GFI-G1/4S4P-I1D/2M	A4110200	014			
GFI-G1/4S4P-R4D	A4111300	014			
GFI-G1/4S4P-R4D/2M	A4110300	014			





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