SEIKOM ELECTRONIC

User manual

FlowGuard® FS400 EX (SIL1)

24 V DC

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1. UNIT DESCRIPTION

The FS400 EX (SIL1) flow switches are designed for liquid media and they are based on the calorimetric measurement principle according to which the flow velocity of the measured medium is proportional to the heat transferred from the sensor to the ambient environment. Basic advantages include quick and simple installation and a lower price due to simple construction.

The sensors are not limited by the electrical conductivity of media. Due to the calorimetric principle of the measurement method used, the measurement is dependent on the thermal conductivity of media. The device can reach its highest sensitivity within the measuring range of 15 ... 150 cm/s when used with water. The measuring range for media with different thermal conductivities is different. The measuring range can be modified by user to some extent, but it holds true that the lower thermal conductivity of the medium, the higher flow rates can be measured.

1.1 Scope of delivery

The device is delivered separately without any other add-on elements and it is ready for installation with the process connection by means of fitting onto the cutting ring according to EN ISO 8434-1 (DIN 2353) with the 24° sealing cone.

1.2 Process connection

It is possible to use direct connections in various designs and made with special treatment. The heavy “S” connections have M18x1.5 nuts; the light connections have M16x1.5 nuts. The stainless steel cutting ring or the PTFE ring are standard for 10 mm diameter. After installation of the stainless steel cutting ring onto the sensor, the insertion length of the sensor inside the piping cannot be changed, it is only possible to do so when the PTFE ring is used.

The FS400 EX (SIL1) flow switches are delivered with stainless steel M16x1.5 sleeve nuts with cutting rings fitted in the position providing the maximum insertion length of the sensor inside the piping.

When a different position of the cutting ring or the use of PTFE ring is required, this must be agreed with the manufacturer

The accessories for flow sensor may include various connections (adapters) used for process installation and the M12 (4-pin) connector for electrical connection. However, these are not part of delivery owing to standard solution of individual elements and thus the possibility of deliveries also from other manufacturers of these parts.

2. STORAGE CONDITIONS

Temperatures for shipment and storage must be within the range of -10 °C to 80 °C.

3. WARRANTY

Unprofessional installation or using the flow rate sensors (devices) may result in a loss of warranty as well as failure to comply with installation or operating conditions according to this manual.

Repairs are not possible. The warranty becomes null and void by repairs or intervention in the device by a person other than the manufacturer.

4. INSTALLATION IN PIPING

4.1 Important information for selection of placement

Outdoor conditions

It is necessary to ensure that the sensor is not exposed to weather effects and that the measured medium cannot freeze round the flow sensor as it would damage the sensor itself.

In case of outdoor location, the manufacturer recommends using a protective roof to avoid direct solar exposure so that the evaluation electronics cannot get overheated.

Vibration

Levels and range of vibrations must be under 2.2 in the frequency range of 20 ... 50 Hz according to IEC 068-2-34.

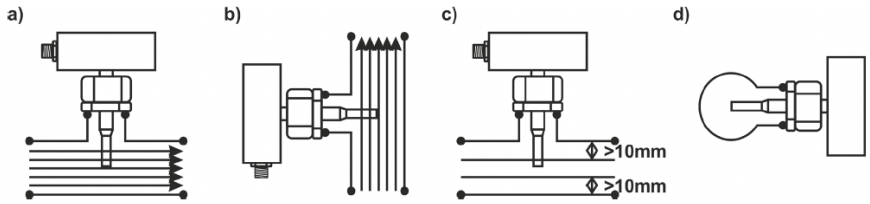
Actual Placement

The flow sensor (sensing element) or its tip must be fully immersed (see Fig. a). On this account, it is not recommended to install it at the top of the pipeline which may get aerated, or even in the horizontal pipeline with an open end into which air may enter, but conversely, in the ascending pipeline (see Fig. b).

Furthermore, the distance of the sensor tip from the pipeline should be greater than 11 mm (see Fig. c).

When measuring at very low flow rates (Q < 0.1 m/s) for a long time, impurities may settle down. In this case, install the sensor for horizontal pipeline edgeways (see Fig. d).

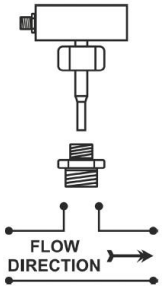
Installation examples



The flow of liquids in the flow rate sensor should be steady and with no turbulence. Sources of disturbances may reduce the accuracy substantially. On this account, the location of the sensor is selected in such a way that straight pipe sections are found upstream and downstream of the sensor. The minimum length of straight pipe sections is (5 ... 10)×d upstream and (3 ... 5)×d downstream of the flow rate sensor where d is pipeline diameter. In the specified straight pipeline sections, no sources of disturbances affecting the steady flow are allowed. These must be positioned in the pipeline downstream of the flow-rate sensor or at a maximum upstream distance of it.

When a mixture of substances is blended, the flow meter should be installed upstream of the blending position or at a sufficient downstream distance of it (30xd min.), alternatively the measurement may be unstable.

Mounting procedure



Before starting the actual assembly, make sure that the system is depressurized or discharged. After that, install a suitable adapter in the T-piece or welded-on piece or right in the pipeline wall using the appropriate thread seal. Finally, install the flow switch in the adapter. In the case of the stainless steel cutting ring, the length of sensor insertion inside the adapter is given by installation of the ring pressed-in and it cannot be changed. The sensor insertion length can only be changed when using the PTFE ring. Tighten the stainless-steel sleeve nut to 70 Nm torque max. (for PTFE ring, 50 Nm max.).

When installed in piping and for the most precise flow rate evaluation, adhere to the orientation of the unit so that the M12 connector for electrical connection can form an upstream edge. The medium should run from the same side where this connector is found.

4.2 Potential sources of disturbances

The following items rank among the most frequent sources of disturbances to the steady flow of liquid:

- Pumps and pipe bends or elbows located closely one after another at different levels. These elements should be found at a distance of 20×d at least (where d is the internal diameter of the pipe) upstream of the flow rate sensor.
- Abrupt changes in pipeline cross-section if not made as a cone at an angle $\alpha \leq 16°$ (where α is the angle made by skewed walls of the pipe reduction).
- Anything interfering with the flow of liquid, e.g. thermometer wells.
- Branch pipes, T-pieces, pipe bends, elbows, slide valves, cocks, throttles. Closing, control, throttling and check valves. Pipe outlets from tanks, heat exchangers and filters.

5. OUTPUTS

5.1 Configuration of FS400Ex/-/R, FS400Ex/SIL1/R, FS400Ex/-/1N and FS400Ex/SIL1/1N

5.1.1. Start-up

When the sensor is powered on it conducts a self-diagnostic and switches to measuring mode after completing it.

The appliance is set to standard parameters by the manufacturer (see table below). The operator can make changes using the two buttons on the sensor.

Factory settings for water flow measurement:

Minimum flow speed	<8cm/sec (2% Qmax)	First LED flashing
Switching point	40cm/sec (10% Qmax)	Red/amber LED
Maximum flow speed	>400cm/sec (100% Qmax)	Last LED flashing

Note: The value of the switching point in the table is only informative and depends on the fact if the flow rate increases or decreases with time, i.e. this switching point has a hysteresis, which is set by the manufacturer.

First LED flashing:
Flow below the measuring range

Last LED flashing:
Flow above the measuring range

Flow within the measuring range

The number of green illuminated LEDs roughly indicates the flow rate within the set range. If none of the LEDs is lit or flashing, the device is most likely disconnected from the supply voltage.

The following flow velocities as percentage of the maximum set measuring range are signaled by the LEDs depending on the set measuring range (factory setting 400 cmsec.)

Display		Flow velocity, in % of the max. measuring range
1.	LED flashes	<2
1.	LED lighting	2 ... 5
2.	LED lighting	5 ... 10
3.	LED lighting	10 ... 15
4.	LED lighting	15 ...20
5.	LED lighting	20 ... 25
6.	LED lighting	25 ... 35
7.	LED lighting	35 ... 47,5
8.	LED lighting	47,5 ... 62,5
9.	LED lighting	62,5 ... 80
10.	LED lighting	80 ... 100
10.	LED flashes	>100

5.1.2. NO/NC contact

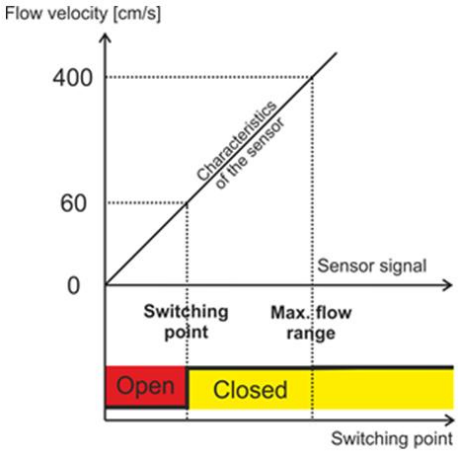
The manufacturer delivers the sensor with the switching point set as a contact maker unit. If the flow rate is above the switching point, relay contact on pin 2 and pin 4 is closed (eventually is closed NPN contact on pin 4). If the flow rate falls below the switching point, the relay contact remains open.

The typical response time of the sensor ranges from 1 to 6 seconds and depends on how quickly the flow rate changes:

- A gradual change near the switching point results in a slower response.
- A sudden change that crosses the switching point results in a faster response.

The switching point is indicated on the LED scale using two colours, which also show the status of the switching contact:

- Red LED – open contact
- Amber LED – closed contact



Adjusting the switching point

Press and hold the button ◁ until the green LEDs start flashing. After releasing the button, the red LED starts to flash, indicating the switching or circuit opening point. Use the buttons ◁ ▷ to move this switching point to the positions of LEDs 2 to 9. After completing the setting, wait until the automatic saving process is finished and the measuring device switches to measuring mode.

5.2 Configuration of FS400Ex/-/NT and FS400Ex/SIL1/NT outputs

5.2.1. Start-up

When the sensor is powered on it conducts a self-diagnostic and switches to measuring mode after completing it.

The appliance is set to standard parameters by the manufacturer (see table below). The operator can make changes using the two buttons on the sensor.

Factory settings for water flow measurement:

Minimum flow speed	<8cm/sec (2% Qmax)	First LED flashing
Switching point	40cm/sec (10% Qmax)	Red/amber LED
Maximum flow speed	>400cm/sec (100% Qmax)	Last LED flashing
Temperature switch point	45 °C	Red LED between the two buttons

Note: The value of the switching point in the table is only informative and depends on the fact if the flow rate increases or decreases with time, i.e. this switching point has a hysteresis, which is set by the manufacturer.

First LED flashing:
Flow below the measuring range
Temperature is below the switch point

Last LED flashing:
Flow above the measuring range
Temperature is below the switch point

Flow within the measuring range
Temperature is above the switch point

The number of green illuminated LEDs roughly indicates the flow rate within the set range. If none of the LEDs is lit or flashing, the device is most likely disconnected from the supply voltage.

The following flow velocities as percentage of the maximum set measuring range are signaled by the LEDs depending on the set measuring range (factory setting 400 cm/sec.)

Display		**Flow velocity, in % of the max. measuring range**
1.	LED flashes	<2
1.	LED lighting	2 ... 5
2.	LED lighting	5 ... 10
3.	LED lighting	10 ... 15
4.	LED lighting	15 ...20
5.	LED lighting	20 ... 25
6.	LED lighting	25 ... 35
7.	LED lighting	35 ... 47,5
8.	LED lighting	47,5 ... 62,5
9.	LED lighting	62,5 ... 80
10.	LED lighting	80 ... 100
10.	LED flashes	>100

5.2.2. NO/NC contact

The manufacturer delivers the sensor with the flow switch point set as switch and the temperature switch point set as a break contact. If the flow rate is above the switching point, the NPN contact on PIN4 is closed. If the flow rate is below the switching point, it is opened.

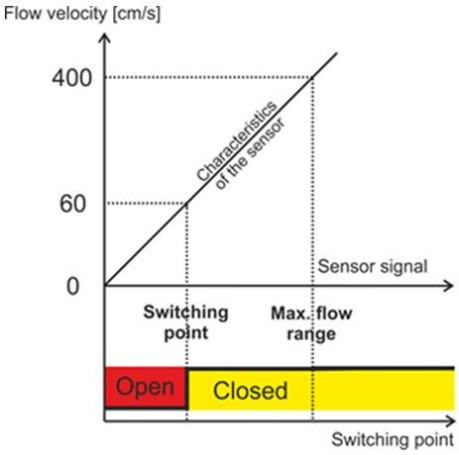
If the temperature is below the switching point, the PNP/NPN contact on PIN2 is closed and when it is exceeded, it is open.

The typical response time of the sensor ranges from 1 to 6 seconds and depends on how quickly the flow rate changes:

- A gradual change near the switching point results in a slower response.
- A sudden change that crosses the switching point results in a faster response.

The switching point is indicated on the LED scale using two colours, which also show the status of the switching contact:

- Red LED – open contact
- Amber LED – closed contact



Adjusting the flow velocity switching point

Press and hold the button ◁ until the green LEDs start flashing. After releasing the button, the red LED starts to flash, indicating the first switching or circuit opening point. Use the buttons ◁ ▷ to move this switching point to the positions of LEDs 2 to 9. After completing the setting, wait until the automatic saving process is finished and the measuring device switches to measuring mode.

Adjusting the temperature switching point

Press and hold the button ▷ until the green LEDs start flashing. After releasing the button, the red LED starts to flash, indicating the second switching or circuit opening point. Use the buttons ◁ ▷ to move this switching point to the positions of LEDs 2 to 9. After completing the setting, wait until the automatic saving process is finished and the measuring device switches to measuring mode.

If you decide not to use the second switching point, it is possible to turn off this LED by pressing down the button ▷ in position LED 9 and red LED (and second switching point too) will be hidden. To reactivate the second switching point you can use the ◁ button again.

Visualization for setting the temperature (the temperature can only be set in steps of 5°C):

LED	Temperature limit in °C
Flashing LED 1	5
Lighting LED 1	10
Flashing LED 2	15
Lighting LED 2	20
Flashing LED 3	25
Lighting LED 3	30
Flashing LED 4	35
Lighting LED 4	40
Flashing LED 5	45
Lighting LED 5	50
Flashing LED 6	55
Lighting LED 6	60
Flashing LED 7	65
Lighting LED 7	70
Flashing LED 8	75
Lighting LED 8	80
Flashing LED 9	85
Lighting LED 9	90
Flashing LED 10	95
Lighting LED 10	100

5.3 Configuration of FS400Ex/-/A and FS400Ex/SIL1/A outputs

5.3.1. Start-up

When the sensor is powered on it conducts a self-diagnostic and switches to measuring mode after completing it.

The appliance is set to standard parameters by the manufacturer (see table below). The operator can make changes using the two buttons on the sensor.

Factory settings for water flow measurement:

Minimum flow speed	<8cm/sec (2% Qmax)	First LED flashing
Switching point	40cm/sec (10% Qmax)	Red/amber LED
Maximum flow speed	>400cm/sec (100% Qmax)	Last LED flashing

Note: The value of the switching point in the table is only informative and depends on the fact if the flow rate increases or decreases with time, i.e. this switching point has a hysteresis, which is set by the manufacturer.

First LED flashing:
Flow below the
measuring range

Last LED flashing:
Flow above the
measuring range

Flow within the
measuring range

The number of green illuminated LEDs roughly indicates the flow rate within the set range. If none of the LEDs is lit or flashing, the device is most likely disconnected from the supply voltage.

The following flow velocities as percentage of the maximum set measuring range are signaled by the LEDs depending on the set measuring range (factory setting 400 cm/sec.)

Display		**Flow velocity, in % of the max. measuring range**
1.	LED flashes	<2
1.	LED lighting	2 ... 5
2.	LED lighting	5 ... 10
3.	LED lighting	10 ... 15
4.	LED lighting	15 ...20
5.	LED lighting	20 ... 25
6.	LED lighting	25 ... 35
7.	LED lighting	35 ... 47,5
8.	LED lighting	47,5 ... 62,5
9.	LED lighting	62,5 ... 80
10.	LED lighting	80 ... 100
10.	LED flashes	>100

5.3.2. NO/NC contact

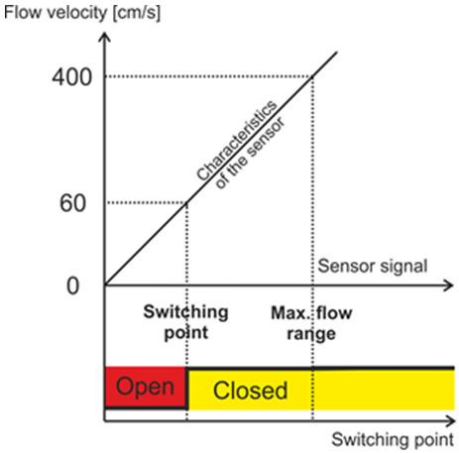
The manufacturer delivers the sensor with the switching point set as a contact maker unit. If the flow rate is above the switching point, relay contact on pin 2 and pin 4 is closed (eventually is closed PNP/NPN contact on pin 4). If the flow rate falls below the switching point, the relay contact remains open.

The typical response time of the sensor ranges from 1 to 6 seconds and depends on how quickly the flow rate changes:

- A gradual change near the switching point results in a slower response.
- A sudden change that crosses the switching point results in a faster response.

The switching point is indicated on the LED scale using two colours, which also show the status of the switching contact:

- Red LED – open contact
- Amber LED – closed contact



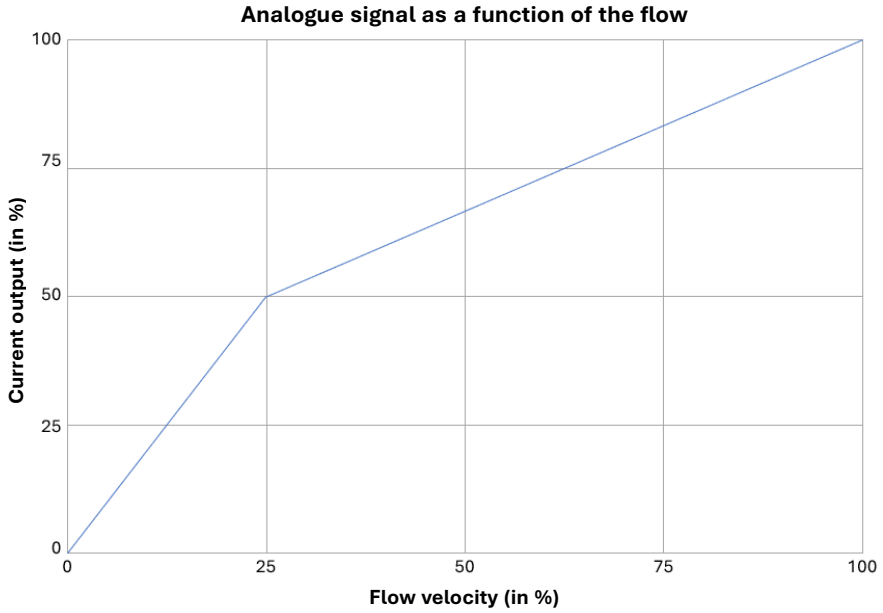
Adjusting the switching point

Press and hold the button ◁ until the green LEDs start flashing. After releasing the button, the red LED starts to flash, indicating the switching or circuit opening point. Use the buttons ◁ ▷ to move this switching point to the positions of LEDs 2 to 9. After completing the setting, wait until the automatic saving process is finished and the measuring device switches to measuring mode.

5.3.3. Current output (4 ... 20 mA)

The FlowGuard® FS400EX/-/A and FS400EX/SIL1/A are supplied with a 4 ... 20 mA output, with a standard setting of 4 mA at zero flow velocity and 20 mA at 4 m/s.

The dependence of the output on the flow velocity is not linear:



5.4 Configuration of FS400Ex/-/2N and FS400Ex/SIL1/2N outputs

5.4.1. Start-up

When the sensor is powered on it conducts a self-diagnostic and switches to measuring mode after completing it.

The appliance is set to standard parameters by the manufacturer (see table below). The operator can make changes using the two buttons on the sensor.

Factory settings for water flow measurement:

Minimum flow speed	<8cm/sec (2% Qmax)	First LED flashing
First switching point (lower limit)	40cm/sec (10% Qmax)	First red/amber LED
Second switching point (upper limit)	190cm/sec (47,5% Qmax)	Second red/amber LED
Maximum flow speed	>400cm/sec (100% Qmax)	Last LED flashing

Note: The value of the switching point in the table is only informative and depends on the fact if the flow rate increases or decreases with time, i.e. this switching point has a hysteresis, which is set by the manufacturer.

First LED flashing:
Flow below the measuring range

Last LED flashing:
Flow above the measuring range

Flow within the measuring range

The number of green illuminated LEDs roughly indicates the flow rate within the set range. If none of the LEDs is lit or flashing, the device is most likely disconnected from the supply voltage.

The following flow velocities as percentage of the maximum set measuring range are signaled by the LEDs depending on the set measuring range (factory setting 400 cm/sec.)

Display		**Flow velocity, in % of the max. measuring range**
1.	LED flashes	<2
1.	LED lighting	2 ... 5
2.	LED lighting	5 ... 10
3.	LED lighting	10 ... 15
4.	LED lighting	15 ...20
5.	LED lighting	20 ... 25
6.	LED lighting	25 ... 35
7.	LED lighting	35 ... 47,5
8.	LED lighting	47,5 ... 62,5
9.	LED lighting	62,5 ... 80
10.	LED lighting	80 ... 100
10.	LED flashes	>100

5.4.2. NO/NC contact

The manufacturer delivers the sensor with the first switching point (lower switching point) set as a contact maker unit and second switching point (upper switching point) set as a contact breaker.

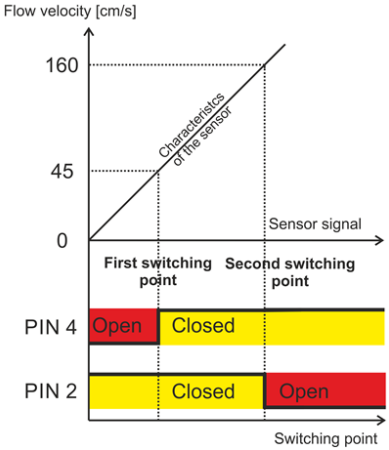
If the flow rate is above the first switching point, then the NPN contact on PIN 4 is closed. If the flow rate is above the second switching point, then the NPN contact on PIN 2 is opened. If the flow rate is between both switching points (higher than lower switching point and lower than upper switching point), both contacts are closed.

The typical response time of the sensor ranges from 1 to 6 seconds and depends on how quickly the flow rate changes:

- A gradual change near the switching point results in a slower response.
- A sudden change that crosses the switching point results in a faster response.

The switching point is indicated on the LED scale using two colours, which also show the status of the switching contact:

- Red LED – open contact
- Amber LED – closed contact



Adjusting the lower switching point

Press and hold the button ◁ until the green LEDs start flashing. After releasing the button, the red LED starts to flash, indicating the switching or circuit opening point. Use the buttons ◁ ▷ to move this switching point to the positions of LEDs 2 to 9. After completing the setting, wait until the automatic saving process is finished and the measuring device switches to measuring mode.

Adjusting the upper switching point

Press and hold the button ▷ until the green LEDs start flashing. After releasing the button, the red LED starts to flash, indicating the switching or circuit opening point. Use the buttons ◁ ▷ to move

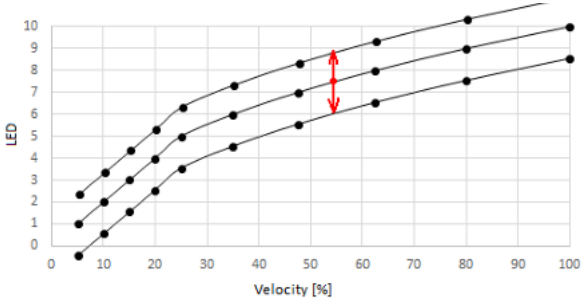
this switching point to the positions of LEDs 2 to 9. After completing the setting, wait until the automatic saving process is finished and the measuring device switches to measuring mode.

If you decide not to use the second switching point, it is possible to turn off this LED by pressing down the button ⊳ in position LED 9 and red LED (and second switching point too) will be hidden. To reactivate the second switching point you can use the ⊲ button again.

6. GENERAL ADAPTATION AND CONTROL

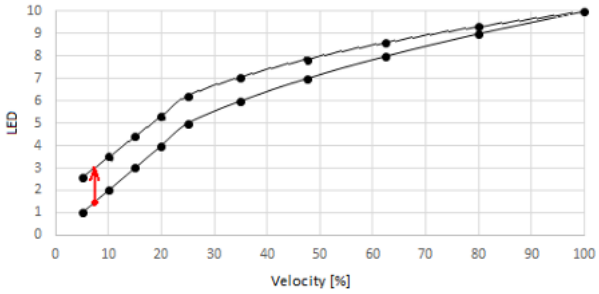
6.1 Adaptation to a medium other than water (oil, glycol mixtures, etc.)

For liquids with a thermal conductivity other than water, the sensor must be adjusted (curve shift) to the medium in question. At zero flow and with the sensor being inserted, simultaneously press the buttons ⊲⊳ on the cover and hold them down until the green LEDs start to flash. After releasing the buttons, the adjustment to the relevant liquid is complete.



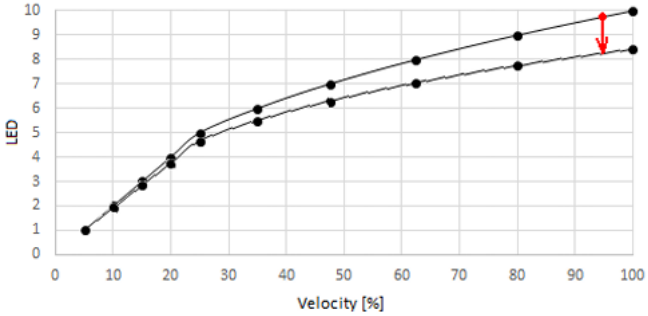
6.2 Calibrating the minimum flow of the sensor

To calibrate the minimum flow rate, press and hold the ⊲ button until the red LEDs start flashing. After releasing the button, the minimum flow rate is automatically registered and the sensor returns to measuring mode. The minimum calibration is now complete. Only carry out this setting if necessary (usually after use with a medium containing oil, etc.). The factory setting applies to water, hence if the sensor is used in water the factory setting is sufficient.



6.3 Calibrating the maximum flow of the sensor

To calibrate the maximum flow rate, press and hold the ▷ button until the red LEDs start flashing. After releasing the button, the maximum flow rate is automatically registered and the sensor returns to measuring mode. The maximum calibration is now complete. Only carry out this setting if necessary (usually after use with a medium containing oil, etc.). The factory setting applies to water, hence if the sensor is used in water the factory setting is sufficient.



6.4 Restoring parameters to factory settings

Press down simultaneously the ◁ ▷ buttons on the sensor cover and hold them until the red LEDs start flashing (red REDs flashing precedes green LEDs flashing, serving for changing the polarity of NC/NO contact). After releasing both buttons, RESET is applied and factory defaults are restored.

7. WIRING SYSTEM

Any installation or manipulation with the device must always be carried out after disconnection of supply voltage! Unprofessional implementation of the below-mentioned operations results in expiration of warranty claims for failures that may occur as a result.

All assembly operations and installation of the device in potentially explosive atmospheres must be carried out conformable to applicable undermentioned standards and regulations by skilled workers. It is necessary to respect the provisions of the undermentioned standards and other devices connected to this meter must meet the requirements of the undermentioned safety specifications according to applicable classification for the environment in question. It must be noted that safety specifications of the meter are different, depending on whether the device belongs to "I" or "IIC" groups.

7.1 Meter wiring

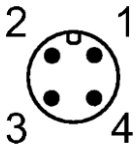
Caution: When used in potentially explosive atmospheres and in gaseous mines, it is an “intrinsically safe device” and it can only be connected to intrinsically safe devices so that its safety according to the standards is not impaired. Wiring must be carried out in accordance with DIN EN 60079-25:2011 and DIN EN 60079-14:2014.

The flow monitor is normally delivered for 24VDC±20% power supply. It must be fed from an intrinsically safe power supply with specifications compatible with our meter and with regard to the applicable classification according to the environment in which our meter will be used. Signal outputs

of the flow switch can only be connected to devices that have necessary protection degree for using in potentially explosive atmospheres and their specifications correspond to applicable safety specifications for connection to our flow switch.

The flow switch is fitted with the standard M12x1 4-pin connector.

Example of M12 connector wiring:

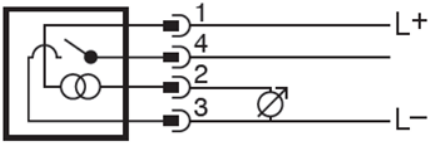


The factual M12 connector wiring, flow switch output signals, controls and settings depend on the version of meter.

As a standard, the evaluation unit is specified for a power supply of 24 V DC ±10%, 150mA power. The signal outputs of the sensor may be connected only to devices where the personal accident protection is ensured by a safe low voltage and where the generated voltages do not exceed limits specified for safe low voltage.

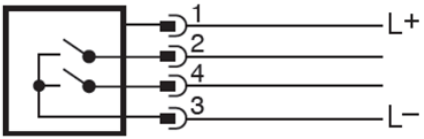
***Note**: Connector wiring is always indicated in the plate attached to the sensor housing.*

7.1.1. Meter wiring for sensors of type FS400Ex/SIL1/A and FS400Ex/-/A



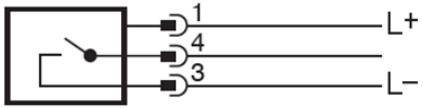
PIN 1 – supply voltage +24V
PIN 2 – output 4-20mA
PIN 3 – supply voltage GND
PIN 4 – NPN contact switch point

7.1.2. Meter wiring for sensors of type FS400Ex/SIL1/NT and FS400Ex/-/NT



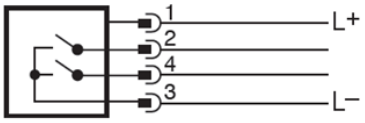
PIN 1 – supply voltage +24V
PIN 2 – NPN contact of the temperature switching point
PIN 3 – supply voltage GND
PIN 4 – NPN contact of the flow velocity switching point

7.1.3. Meter wiring for sensors of type FS400Ex/SIL1/1N and FS400Ex/-/1N



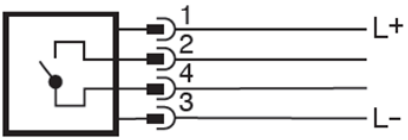
PIN 1 – supply voltage +24V
PIN 3 – supply voltage GND
PIN 4 – NPN contact switch point

7.1.4. Meter wiring for sensors of type FS400Ex/SIL1/2N and FS400Ex/-/2N



PIN 1 – supply voltage +24V
PIN 2 – NPN contact of the second switching point (above-threshold flow)
PIN 3 – supply voltage GND
PIN 4 – NPN contact of the first switching point (below-threshold flow)

7.1.5. Meter wiring for sensors of type FS400Ex/SIL1/R and FS400Ex/-/R



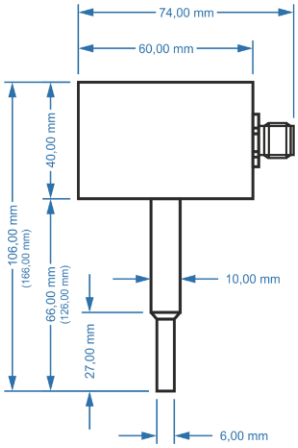
PIN 1 – supply voltage +24V
PIN 2 – relay contact switch point
PIN 3 – supply voltage GND
PIN 4 – relay contact switch point

8. BASIC SPECIFICATIONS

Type	FlowGuard® FS400 EX (SIL1)
Supply voltage	12 ... 24V ±20% DC with reverse polarity protection
Power input	2,3 W max.
Display	10 x tri-color LED
Current capacity of contacts	130 mA / 60 V / 500 mW
Response time *	1 ... 6 sec
Flow rate ranges	15 ÷ 400 cm/sec
Accuracy	±2 ... ±8 cm/sec
Hysteresis	2 ... 8 cm/sec
Control	2x flush-mounted button
Temperature of medium	-20 ... +85 °C
Ambient temperature	-20 ... +80 °C
Storage temperature	-30 ... +80 °C
Material in contact with medium	stainless steel 1.4404, PTFE (as per connection version)
Maximum pressure	63 bar
Protection	IP66/67
Ambient humidity	Up to 100 %
Dimensions (H x W x D)	106x74x60mm (the height of the long version is 166mm)
Weight:	290 g

*for water, 25°C

9. DIMENSIONS



10. SAFETY SPECIFICATIONS AND STANDARDS USED

For application in gaseous coal mines, in explosive atmosphere and where flammable dust is released into atmosphere, the following safety specifications and standards apply:

- DIN EN 50303:2000
- DIN EN 60079-0:2018
- DIN EN 60079-11:2012

Safety classification of the meter:

I M1 Ex ia I Ma

II 1G Ex ia IIC T4 ...T6 Ga

II 2D Ex ia IIIC T85°C ... T135°C Db

Power:

U_i: 28.5 V

C_i: 0

L_i: 0

Caution:

Seeing that it is “an intrinsically safe device” and all the outputs are intrinsically safe, it can only be connected to intrinsically safe devices. The relay output (pulse output) is always passive (NPN or relay).

Relay output, passive:

Group	U_i	I_i	P_i	C_i	L_i
Group I devices	Max. 28.5 V	Max. 115 mA	Max. 0.330 W	0	0
Group IIC devices	Max. 28.5 V	Max. 115 mA	Max. 0.330 W	0	0

Current loop 4 ... 20 mA active:

Group	U_0	I_0	P_0	C_0	L_0
Group I devices	Max. 10.8 V	Max. 196 mA	Max. 0.529 W	< 10 µF	< 0.2 mH
Group IIC devices	Max. 10.8 V	Max. 196 mA	Max. 0.529 W	< 1 µF	< 0.015 mH

Special conditions of use:

The conditions of use are listed in the following table and determine the relationship between the ambient temperature, the temperature class (surface temperature) and the temperature of the measured medium.

Ambient temperature:

Ambient temperature: **Ta [°C]**	**Equipment Category 1G** **Temperature class**	**Equipment Category 2D** **Surface temperature without dust layer [°C]**	**Temperature of the medium** **Tm [°C]**
-20 °C to +40 °C	T6	T85 °C	≤ +40 °C
-20 °C to +80 °C	T4	T135 °C	≤ +80 °C
-20 °C to +80 °C	Equipment Category M1		≤ +80 °C

For equipment category **1G**, temperature classes **T6** and **T4** are approved.

For equipment category **2D**, temperature classes **T85 °C** and **T135 °C** are approved, where the temperature in the individual classes T85 °C and T135 °C means the maximum permissible surface temperature without a layer of dust.

The medium temperature must not exceed the maximum ambient temperature, for **T6/T85 °C** it must not exceed **40 °C**, and for **T4/ T135 °C** it must not exceed **80 °C**.

Power supply protection:

SMD quick-acting fuse SIBA type 157000 160mA

5V barrier protection:

SMD quick-acting fuse SIBA type 157000 62mA

4 ... 20 mA output protection:

SMD quick-acting fuse SIBA type 157000 62mA

Connection terminal:

M12 4-pin

Recommended connector cables:

Lapp Cable

- Oelflex EB
- Oelflex EB CY
- Unitronic Li2YCY

11. ORDER CODE

FlowGuard® FS400 Ex (SIL1)	1286Ex/	-/	1N/	125/	1G/
SIL1					
no		-			
yes		SIL1			
Output					
1 passive contact (relay)			R		
1 active contact NPN			1N		
2 active contacts NPN			2N		
1 active contact NPN + 1 Temperature switch			NT		
1 active contact NPN + 4 ... 20 mA Analogue output			A		
Immersion depth					
65 mm				65	
125 mm				125	
175 mm				175	
ATEX certification					
I M1 Ex ia I Ma					M1
II 1G Ex ia IIC T4...T6 Ga					1G
II 2D Ex ia IIIC T85°C ... T135°C Db					2D

12. EU DECLARATION OF CONFORMITY

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EU-Declaration of Conformity

The EU declaration of conformity applies to the following unit:

FlowGuard®FS400 EX

This declaration of conformity is issued under the sole responsibility of the manufacturer.
We confirm the conformity to the essential requirements of the European directives:

2014/30/EU (EMV-Richtlinie)
2014/35/EU (Niederspannungsrichtlinie)
2011/65/EU (Beschränkung gefährlicher Stoffe)
2015/863/EU (Ergänzung RoHS 3)

The following standards were applied:

DIN EN IEC 63000: 2019-05
DIN EN IEC 61000-6-2: 2019-11
DIN EN 61000-6-3: 2021-03

Mettmann, 28th March 2023

Philipp Hein
Managing Director

Growing network of local distributors available online
www.seikom-electronic.com

Our product portfolio

Flow	Pressure	Temperature
Air quality and CO_2	Zener barriers	Universal Transmitter

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