OCTOGON

MANUAL

FSMC

LEVEL SENSOR WITH FLOAT

Operating manual



Document	Version	Date	Applies to
Operating manual	V00x	10/2026	FSMC, current and voltage output, all connector types

This English version is a translation of the German version (FSMC Manual V00x DE.pdf) by octogon. The German version is authoritative; markings and approval data apply as worded in the respective certificate.

This operating manual describes the Ex safety instructions, transport, mounting, electrical connection, fault recovery, maintenance and configuration of the FSMC level sensor with float for hazardous areas.

Contents

1 General ... 2
1.1 Information ... 2
1.2 Signs and abbreviations ... 3
1.3 Device ... 3
2 Transport, packaging, storage ... 3
2.1 Transport ... 3
2.2 Packaging ... 3
2.3 Storage ... 3
3 Safety instructions ... 4
3.1 Intended use ... 4
3.2 Personnel qualification ... 4
3.3 Special hazards ... 4
4 Ex safety instructions ... 5
4.1 For your safety ... 5
4.2 ATEX approvals ... 5
4.3 Special conditions for use in hazardous areas ... 5
4.4 Electrical characteristics ... 6
4.5 Ambient conditions ... 6
5 Start-up, operation ... 7
5.1 Function ... 7
5.2 Before mounting ... 7
5.3 Product label (example) ... 7
5.4 Mounting ... 7
5.5 Electrical connection ... 7
5.6 Pin assignment ... 8
5.7 Connection example ... 8
5.8 Functional test ... 8
5.9 Error detection / error current ... 9
6 Fault recovery ... 9
7 Maintenance, dismounting, return, cleaning, disposal ... 9
7.1 Maintenance ... 9
7.2 Dismounting ... 9
7.3 Return ... 10
7.4 Cleaning ... 10
7.5 Disposal ... 10
8 Technical data ... 10
8.1 Mechanics ... 11
9 Dimensions ... 12
10 Configuration ... 12

1 General

1.1 Information

– This operating manual gives important information on handling the level sensor. Working safely requires that all safety instructions and work instructions given are observed.

– Skilled personnel must have read and understood this operating manual before mounting and commissioning the level sensor.

– This operating manual is part of the product. Keep it close to the place of use, where it is accessible to all users at any time.

– Observe the local regulations and safety rules applicable to the level sensor's range of use.

– If the serial number on the product label is no longer legible (e.g. due to mechanical damage), traceability is no longer ensured.

– The level sensors described in this operating manual are designed and manufactured according to the latest findings. All components are subject to strict quality and environmental criteria during manufacture.

– The manufacturer's liability is void in the case of any damage caused by using the product contrary to its intended use, non-compliance with these operating instructions, unauthorised modifications to the level sensor or assignment of insufficiently qualified skilled personnel.

1.2 Signs and abbreviations

Sign	Meaning
Warning	Non-compliance can cause injuries to persons and/or the destruction of the device. There can be danger to life.
Attention	Non-compliance can cause a faulty operation of the device or lead to property damage.
Information	Non-compliance can have influence on the operation of the device or cause unintentional reactions of the device.
Danger	When not observing the safety instructions, there is a risk of serious or fatal injuries caused by electrical power.
Warning (hot surfaces)	Occurrence of a dangerous situation is possible, which can result in burns because of hot surfaces or liquids, if not avoided.

Abbreviation	Meaning
U+	Positive supply connection
U–	Negative supply connection

1.3 Device

Feature	Version
Output	4 ... 20 mA, 2-wire, or voltage 0 ... 10 V, 0.5 ... 10 V, 2 ... 10 V, 3-wire
Configuration	via software TrComm (section 10)
Explosion protection	ATEX and IECEx, Ex ia IIC T6..T1 (section 4)
Manufacturer type	MELS-FTEx

2 Transport, packaging, storage

2.1 Transport

Check the device for any transport damage. Report obvious damage immediately.

2.2 Packaging

Do not remove packaging until just before mounting. Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending back).

2.3 Storage

For longer term storage avoid the following influences:

– Direct sunlight or proximity to hot objects
– Mechanical vibration, mechanical shock (putting it hard down)
– Soot, vapour, dust and corrosive gases

If possible store the device in its original package or an equivalent one.

3 Safety instructions

Warning Select the correct level sensor with regard to measuring range, design, suitable wetted material (corrosion) and specific measuring conditions before mounting, commissioning and operation.

Info More important safety instructions can be found in the individual chapters.

3.1 Intended use

The level sensor FSMC is used for measuring levels up to 2000 mm in liquid, non-aggressive media. It can be used up to a pressure of 25 bar.

The sensor has been designed and built solely for the intended use described here and may only be used accordingly.

The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the instrument outside of its technical specifications requires the instrument to be taken out of service immediately and an inspection by the manufacturer.

When the instrument is transported from a cold into a warm environment, the formation of condensation may result in the instrument malfunctioning. Before putting it back into operation, wait for the instrument temperature and the room temperature to equalise.

Claims of any kind are excluded in the case of use other than the intended use.

3.2 Personnel qualification

Warning Risk of injury if qualification is insufficient. Improper handling can result in considerable injury and damage to equipment. The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below. Keep unqualified personnel away from hazardous areas.

For installation and starting of the level sensor the personnel has to be familiar with the relevant regulations and directives of the country and must have the qualification required. They must have knowledge on measurement and control technology, have to be acquainted with electric circuits, are capable of carrying out the work described and can independently recognise potential hazards. Depending on the operation conditions of the application they have to have the corresponding knowledge, e.g. of aggressive media.

3.3 Special hazards

Warning Observe the national regulations (e.g. standards) and, for special applications, the applicable standards and directives (e.g. for hazardous media such as acetylene, flammable or toxic substances, and for refrigeration plants and compressors). If the corresponding regulations are not observed, serious injuries and damage to property can occur!

Warning A protection from electrostatic discharge (ESD) is required. The proper use of grounded work surfaces and personal wrist straps is required when working with exposed circuitry (PCB, printed circuit boards), in order to prevent static discharge from damaging sensitive electronic components.

Danger There is a danger of death caused by electric current. Upon contact with live parts, there is a direct danger of death. Electrical instruments may only be installed and connected by skilled electrical personnel. Operation using a defective power supply unit (e.g. short circuit from the mains voltage to the voltage output) can result in life-threatening voltages at the instrument.

Warning Residual media in dismounted instruments can result in a risk to personnel, the environment and equipment. Take sufficient precautionary measures. Do not use this instrument in safety or Emergency Stop devices. Incorrect use of the instrument can result in injury. Should a failure occur, corrosive media with extremely high temperature and under high pressure or vacuum may be present at the instrument.

4 Ex safety instructions

4.1 For your safety

Danger Danger to life due to loss of explosion protection. Non-observance of these contents and instructions can lead to the loss of explosion protection.

ATEX European explosion protection directive (Atmosphère = AT, Explosion = EX). The product complies with the requirements of the European directive 2014/34/EU (ATEX) on explosion protection.

Installation and commissioning may only be carried out by skilled personnel with knowledge of types of protection and of the rules and regulations of explosion protection. National regulations on installation and use in hazardous areas must be observed. The classification of the device must be suitable for the application (see "ATEX approvals" and the marking on the product label).

4.2 ATEX approvals

II 1 G Ex ia IIC T6..T1 Ga
II 1/2 G Ex ia IIC T6..T1 Ga/Gb
II 2 G Ex ia IIC T6..T1 Gb

Approval properties: for gases; installation in zone 0, zone 1 and zone 2.

Approval	Certificate
ATEX	TÜV 21 ATEX 201293 X
IECEx	IECEx TUN 21.0005X

The complete certificates are available on request.

4.3 Special conditions for use in hazardous areas

Arrangement: evaluation unit (e.g. PLC, controller, recorder) and auxiliary power in the non-Ex area, the device in the Ex area.

- The individual wires and the free cable ends must comply with the requirements of section 9 of EN 60079-14.
- For EPL Ga/Gb applications, heat flowing back from the process beyond the permissible ambient temperature is not permitted and must be avoided by suitable thermal insulation or a suitable neck length of the sensor tube.
- For EPL Ga/Gb applications and where there are hazards from swinging or vibration, the corresponding parts must be effectively secured against these hazards.
- For EPL Ga/Gb applications, ignition hazards due to impact or friction must be excluded.
- The permissible ambient temperature range depending on the temperature class is given in the operating manual.
- The wetted materials must be resistant to these media.
- For EPL Ga/Gb applications, the complete device must be mounted in such a way that installation results in a sufficiently tight gap (IP66 or IP67) or a flameproof gap (IEC 60079-1) towards the less hazardous area.
- Installation in the partition wall between areas with EPL Ga/Gb requirements must be carried out in such a way that all metal parts are conductively connected to the metallic tank wall or, in the case of plastic tanks, all insulated metal parts are included in the equipotential bonding.
- For EPL Ga, EPL Ga/Gb and EPL Gb applications, the temperature sensor MELS-FTEx must be installed and used in such a way that electrostatic charging due to operation, maintenance and cleaning is excluded.

4.4 Electrical characteristics

Parameter	Current output (2-wire)	Voltage output (3-wire)
Connections	+ / – (Iout)	+ / –
Voltage Ui	30 VDC	30 VDC
Current Ii	110 mA	110 mA
Power Pi	1 W	1 W
Effective internal capacitance Ci	capacitance of the 330 m cable = 66 nF	capacitance of the 330 m cable = 66 nF
Effective internal inductance Li	inductance of the 330 m cable = 330 µH	inductance of the 330 m cable = 330 µH
Connections	...	Uout
Voltage U0	...	= 12.6 V
Current I0	...	= 48 mA
Power P0	...	= 148 mW
Characteristic	...	linear
Effective internal capacitance Ci	...	negligibly small
Effective internal inductance Li	...	negligibly small

4.5 Ambient conditions

Current output (2-wire)

Temperature class	Ambient temperature	Medium temperature
T1	–20 °C ... +75 °C	0 °C ... +100 °C
T2	–20 °C ... +75 °C	0 °C ... +100 °C
T3	–20 °C ... +75 °C	0 °C ... +100 °C
T4	–20 °C ... +75 °C	0 °C ... +100 °C
T5	–20 °C ... +(95 °C – Pi x 45 K/W), max. 75 °C	0 °C ... +85 °C
T6	–20 °C ... +(80 °C – Pi x 45 K/W), max. 75 °C	0 °C ... +70 °C

Voltage output (3-wire)

Temperature class	Ambient temperature	Medium temperature
T1	–20 °C ... +50 °C	0 °C ... +100 °C
T2	–20 °C ... +50 °C	0 °C ... +100 °C
T3	–20 °C ... +50 °C	0 °C ... +100 °C
T4	–20 °C ... +50 °C	0 °C ... +100 °C
T5	–20 °C ... +(95 °C – Pi x 55 K/W), max. 50 °C	0 °C ... +85 °C
T6	–20 °C ... +(80 °C – Pi x 55 K/W), max. 50 °C	0 °C ... +70 °C

5 Start-up, operation

5.1 Function

The FSMC is screwed directly into the process via a process connection. The float has a built-in ring magnet which acts on a measurement chain inside the tube. A resistance signal proportional to the height is then available as the input for the measuring amplifier.

5.2 Before mounting

Info Check if a completely assembled level sensor is supplied. Inspect the level sensor for possible damage during transportation. Should there be any obvious damage, inform the transport company and supplier without delay. Keep the packaging, as it offers optimal protection during transportation. Ensure that the process connection thread and the connection contacts will not be damaged.

5.3 Product label (example)

Field	Meaning
Typ	Product code
SN	Serial number
Art.Nr.	Part number
Hergest.	Year of manufacture

The product label also carries the Ex marking (section 4.2).

5.4 Mounting

Tool: open-end wrench A/F 27

The level sensors are designed for screw fitting directly into the process.

- The insertion length may reduce the maximum loading on the protecting tube.
- The medium may not have heavy pollution and not tend to crystallization.
- When mounting, take care of a proper vertical fitting position.
- Seal the process connection with a suitable gasket.
- Strong mechanical loads must be avoided.
- Avoid the proximity of strong electromagnetic fields (malfunction).
- Long connection cables can cause malfunction by voltage peaks.
- It is recommended to use shielded connection cables (earthed on one side).

Use a gasket suitable for the application. Exceptions may be self-sealing threads (e.g. NPT thread). When mounting, ensure that the sealing faces on the sensor and the measuring point are clean and undamaged.

Screw the sensor in or out only via the flats, using a suitable tool and the prescribed torque. The correct torque depends on the size of the process connection and on the gasket used (shape/material). Do not use the housing as a working surface for screwing in or out. When screwing in, make sure that the threads are not jammed.

Note: observe the information on tapped holes and welding sockets.

When the opening for mounting is smaller than the diameter of the float, the float has to be removed before mounting. Mark the direction of mounting on the float. After mounting the level sensor install the float inside the tank again.

Example level sensor mounting: maximum approx. 25 mm, minimum approx. 45 mm (section 9).

Important The devices are not suitable for liquids with a permanent turbulent surface and/or on vibrating machines.

5.5 Electrical connection

Attention Connect the instrument to earth via the process connection. The ingress protection specified only applies while the level transmitter is connected with the female connectors that provide the corresponding ingress protection. Ensure that the cable diameter you select fits to the cable gland of the connector. Ensure that the cable gland of the mounted connector is positioned correctly and that the sealings are available and undamaged. Tighten the threaded connection and

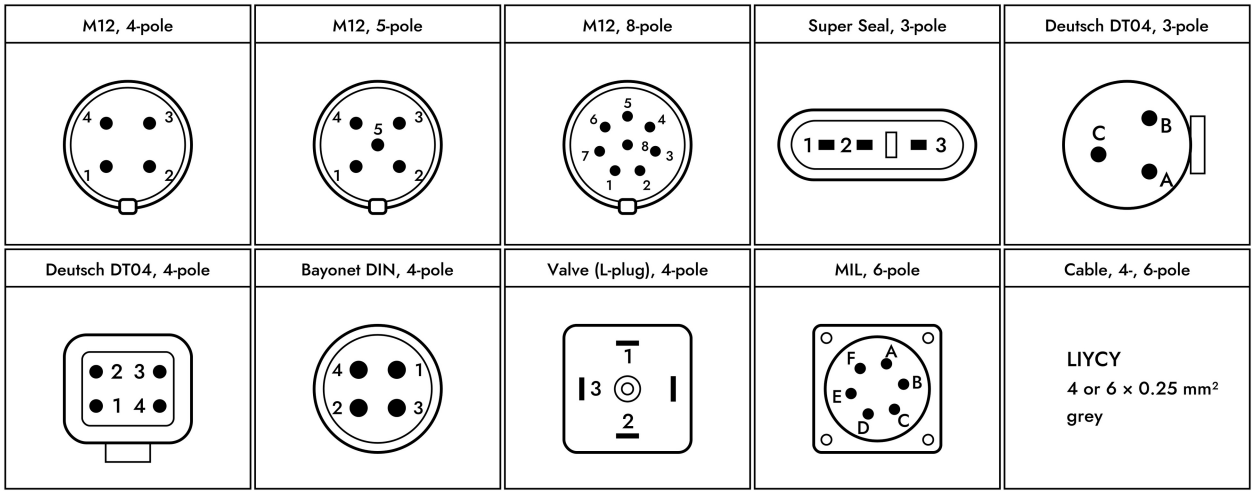
check the correct position of the sealings to ensure ingress protection. Make sure that the ends of cables with flying leads do not allow any ingress of moisture. Route the cable without applying a force or turning moment to the device.

5.6 Pin assignment

2-wire	+	OUT	–
M12, 4-, 5-pole	1	X	3
M12, 8-pole	1	X	3
Super Seal, 3-pole	1	X	3
Deutsch DT04, 3-pole	A	X	B
Deutsch DT04, 4-pole	1	X	3
Bayonet DIN, 4-pole	1	X	2
Valve (L-plug), 4-pole	1	X	2
MIL, 6-pole	A	X	C
Cable, n-pole	ye	X	wh

3-wire	+	OUT	–
M12, 4-, 5-pole	1	2	3
M12, 8-pole	1	3	8
Super Seal, 3-pole	1	2	3
Deutsch DT04, 3-pole	A	C	B
Deutsch DT04, 4-pole	1	2	3
Bayonet DIN, 4-pole	1	3	2
Valve (L-plug), 4-pole	1	3	2
MIL, 6-pole	A	E	C
Cable, n-pole	ye	gn	wh

Note: X = NC (not connected). Wire colours: ye = yellow, wh = white, gn = green. Cable: LIYCY, 4 or 6 × 0.25 mm², grey.



View: connector pins of the plug (at the device)

5.7 Connection example

Two-wire current loop 4 ... 20 mA:

From	To
FSMC terminal 1 (+)	Supply +
FSMC terminal 3 (–)	Evaluation + (e.g. PLC)
Evaluation –	Supply –

5.8 Functional test

Info The output signal must be proportional to the level. If this is not the case, it may indicate damage to the sensor. In this case refer to Fault recovery (section 6).

Warning Open connections only when depressurised. Observe the operating parameters in the technical data (section 8). When touching the device, keep in mind that the surfaces of the device components may become hot during operation.

5.9 Error detection / error current

The device detects wire break and short circuit (sensor element <> measuring amplifier) as well as levels outside of the measuring range and indicates this with an error current in the current loop circuit.

The current output is proportional to the level from 3.6 to 21 mA. If the measured level would result in a current below 3.6 mA the current output is set to 21 mA (also for a wire short circuit). If the current would exceed 21 mA, the current output is set to 21 mA (also for wire break).

If the device has switching outputs, these are switched off as soon as the error persists for longer than 10 seconds. This ensures that the switching contacts change to a safe state (corresponds to the loss of the voltage supply).

6 Fault recovery

Warning Open connections only when depressurised. Take precautions for residual media on dismounted level sensors. Residual media can result in a risk to persons, the environment and equipment. Take the level sensor out of operation and protect it against accidental start-up if faults cannot be eliminated.

Fault	Possible cause	Remedy
No output signal, no indication	Cable break	Check continuity
	No supply voltage	Check wiring/supply
No/false output signal	Wiring error	Observe the pin assignment (see product label / operating manual)
Erroneous measured values	Surface of medium very turbulent	Choose a suitable installation location for the sensor
	Configuration of the sensor not correct	Check and correct the configuration
Erroneous measured values (too low)	Float hangs or does not slide properly	Clean float/tube, check the medium (polluted)
Erroneous measured values and response times too long	Wrong mounting geometry, e.g. not mounted vertically	Mount the sensor vertically
	Deposits on float/tube	Remove deposits
Measurement signal “comes and goes”	Cable break in the connecting cable or loose contact caused by mechanical overload	Replace the sensor with a suitable design, e.g. use a thicker cable
Corrosion	Composition of the medium not as assumed or changed, or wrong material of protecting tube	Sensor not suitable for this application
Signal fluctuating/inaccurate	EMC interference sources in the surroundings, e.g. frequency converters	Shield the sensor, shield the cable, remove the interference source, increase the distance to the interference source
	Earth loops	Eliminate potentials, use supply isolators or galvanically isolated measuring amplifiers

Note: Unjustified complaints may result in costs for you.

7 Maintenance, dismounting, return, cleaning, disposal

7.1 Maintenance

The level sensors FSMC require no maintenance and contain no components which could be repaired or replaced.

7.2 Dismounting

Warning Residual media in dismounted instruments can result in a risk to personnel, the environment and equipment. Take sufficient precautionary measures.

Warning (hot surfaces) There is a risk of burns. Let the sensor cool down sufficiently before dismounting. During dismounting there is a risk from escaping, dangerously hot media. Only dismount the level sensor when depressurised.

7.3 Return

Warning Before the return of an instrument see section 7.4. When returning the instrument, use the original packaging or a suitable package. To avoid damage, use for example antistatic plastic film, shock-absorbent material, a marking as highly sensitive measuring instrument.

7.4 Cleaning

Attention Before cleaning the instrument disconnect the electrical connection. Clean the instrument with a moist cloth. Electrical connections must not come into contact with moisture. Wash or clean the dismounted instrument before returning it in order to protect personnel and the environment from exposure to residual media. Residual media in dismounted instruments can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.

7.5 Disposal

Info Dispose of device components and packaging materials in an environmentally sound manner in accordance with the national waste treatment and disposal regulations.

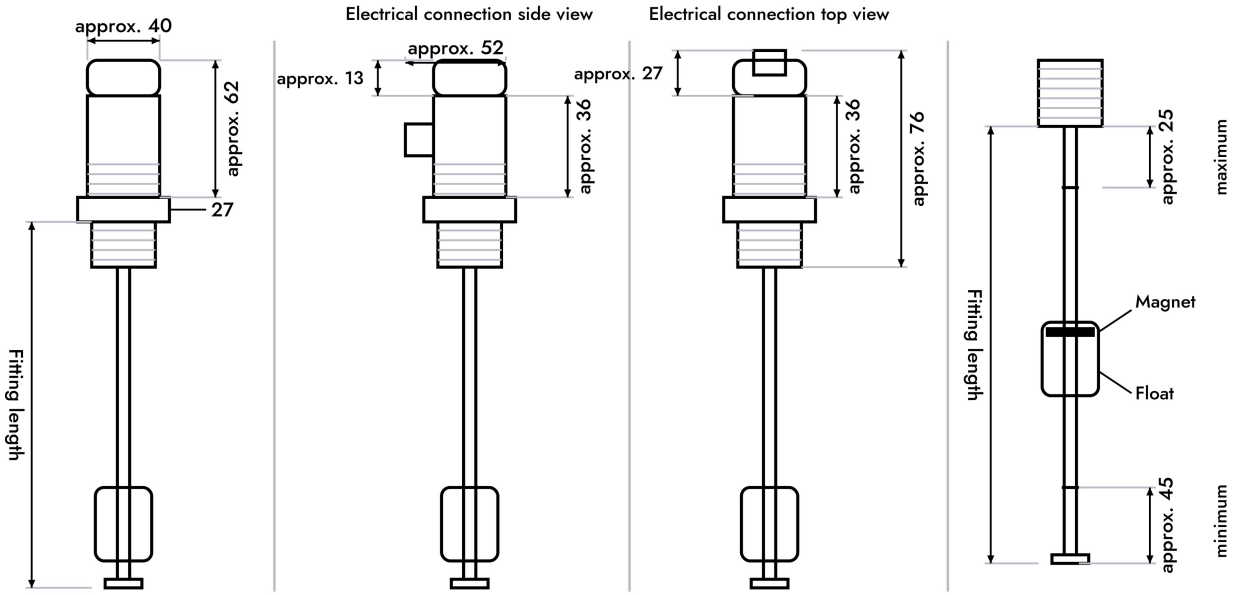
8 Technical data

Item	Value
Input	
Level	100 ... 2000 mm
Medium	non-aggressive liquids
Output	
Current signal	4 ... 20 mA, 2-wire
Current range	3.8 ... 20.5 mA
Signal on error	< 3.6 mA (sensor short circuit, underrange); > 21 mA (sensor break, sensor circuit open, overrange)
Voltage signal	0 ... 10 V, 3-wire; 0.5 ... 10 V, 3-wire; 2 ... 10 V, 3-wire
Performance	
Sensor: resolution	4.5 mm
Sensor: hysteresis	approx. 3 mm
Measuring amplifier: resolution	24 bit
Measuring amplifier: accuracy	max. 0.1 % of measuring range + sensor error
Measuring amplifier: filter setting	5 ... 5000 ms
Measuring amplifier: configuration	via software (TrComm)
Measuring amplifier: turn-on delay	< 1 s
Programmable features	
Measuring amplifier	measuring range start / measuring range end / filter
Supply	
Voltage	12 ... 30 V DC
Reverse polarity protection	available (no function, no damage)
Short-circuit proof	yes
Environmental conditions	
Operating range	–20 ... +75 °C (2-wire) / –20 ... +50 °C (3-wire)
Storage	–20 ... +85 °C
Medium	max. 0 ... +100 °C
Condensation	uncritical
CE marking	EMC directive 2014/30/EU
Approval ATEX	TÜV 21 ATEX 201293 X
Approval IECEx	IECEx TUN 21 0005X

8.1 Mechanics

Item	Value
Dimensions	see section 9
Process connection	3/4″ / 1″ / 1.5″ / 1″ NPT (adaptor)
System pressure	25 bar
Electrical connection	side; option: top
Connectors and cable	see section 5.6
Materials	
Protecting tube	stainless steel 1.4571
Float	PE Ø 24 (density of medium: 1 or more); PE Ø 29
Adapter	stainless steel 1.4571
Process connection	stainless steel 1.4571
Housing body	PBT GF30
Housing cover	PBT GF30
Other	
Weight	approx. 200 g (1″, 300 mm, M12)
Fitting position	vertical
Protection class	at least IP65 (electronics), IP68 (sensor)
PCBs	potted

9 Dimensions



Dimensions in mm. From left: the device, electrical connection at the side, electrical connection at the top, travel of the float (maximum approx. 25 mm, minimum approx. 45 mm). Drawn by octogon from the manufacturer's documentation, contour schematic.

10 Configuration

The FSMC can be programmed with the configuration and calibration software TrComm. A DEV-KMA configurator is required for programming. The TrComm software is included in the scope of delivery of the configurator, but is alternatively also available on its own on request.