

Overview



MASS 6000 is based on the latest developments within digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multi parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction flow.

The MASS 6000 IP67 transmitter can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 40, and can be used in remote version for all types of MASS 2100/MC1.

Benefits

- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a patented DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn down ratio on flow and density accuracy
- Advanced diagnosis and service menu enhances trouble shooting and meter verification
- Built in batch controller with compensation and monitoring comprising 2 built in totalizers
- Multi parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as °BRIX or °PLATO
- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes
- User configurable operation menu with password protection
 - 3 lines, 20 characters display in 11 languages
 - Self explaining error handling/log in text format
 - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start up providing:
 - Factory pre-programming with calibration data, pipe size, sensor type, output settings
 - Any values or settings changed by users are stored automatically
 - Automatically re-programming any new transmitter without loss of accuracy
 - Transmitter replacement in less than 5 minutes. True plug & play
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Fraction flow computation based on 5 order algorithm matching all applications

- USMII platform enables fitting of add-on bus modules without loss of functionality.
 - All modules can be fitted as true "plug & play"
 - Module and transmitter automatically configured through the SENSORPROM
- Installation of the transmitter to the sensor is simple plug & play via the sensor pedestal

Application

SITRANS F C MASSFLO mass flow meters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter is capable of measuring on liquids and on gases as well.

The main applications for the MASS 6000 IP67 transmitter can be found in:

- Food and beverage industries
- Pharmaceutical industries
- Automotive
- Oil and gas
- Power generation and utility
- Water and waste water

Design

The transmitter is designed in a IP67/NEMA 4X compact polyamide enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 40 (1/8" to 1 1/2"), and be remote mounted for the entire sensor series.

The MASS 6000 IP67/NEMA 4X is available as standard with 1 current-, 1 frequency/pulse- and 1 relay output and can be fitted with add-on modules for bus communication.

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individual configured with mass, volume, density etc.
- 2 built in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter trouble shooting

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MASSFLO MASS 6000
IP67/NEMA 4X compact/remote

Technical specifications

Measurement of	Mass flow [kg/s (lbs/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m ³ , lbs/ft ³], temperature [°C (°F)]
Current output	
• Current	0 ... 20 mA or 4 ... 20 mA
• Load	< 800 Ω
• Time constant	0 ... 30 s adjustable
Digital output	
• Frequency	0 ... 10 kHz, 50% duty cycle
• Time constant	0 ... 30 s adjustable
• Active	24 V DC, 30 mA, 1 KΩ ≤ R _{load} ≤ 10 KΩ, short-circuit-protected
• Passive	3 ... 30 V DC, max. 110 mA, 1 KΩ ≤ R _{load} ≤ 10 KΩ
Relay	
• Type	Change-over relay
• Load	42 V / 2 A peak
• Functions	Error level, error number, limit, direction
Digital input	11 ... 30 V DC (R _i = 13.6 KΩ)
• Functionality	Start/hold/continue batch, zero-point adjust, reset totalizer 1/2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V
Cut-off	
• Low-flow	0 ... 9.9% of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	<ul style="list-style-type: none"> • Background illumination with alphanumeric text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1 • Reverse flow indicated by negative sign
Zero-point adjustment	Manual via keypad or remote via digital input
Ambient temperature	
• Operation	-20 ... +50°C (-4 ... +122 °F), max. rel. humidity 80% to 31 °C (86 °F) decreasing to 50% at 40 °C (104 °F) according to UL 3101
• Storage	-40 ... +70°C (-4 ... +158 °F) (Humidity max. 95%)
Communication	Prepared for client mounted add-on modules
Enclosure	
• Material	Fibre glass-reinforced polyamide
• Rating	IP67 NEMA 4X to IEC 529 and DIN 40050 (1 m w.g. for 30 min.)
• Mechanical load	18 ... 1000 Hz random, 3.17G rms, in all directions, to IEC 68-2-36

Supply voltage

24 V version	
• Supply	24 V DC/AC, 50 ... 60 Hz
• Fluctuation	24 V DC, -25% ... 25% 24 V AC, -16% ... 25%
• Power consumption	10 W
230 V version	
• Supply	115/230 V AC, 50 ... 60 Hz
• Fluctuation	+10% ... -10%
• Power consumption	26 VA
Fuse	
• 230 V version	T400 mA, T 250 V (IEC 127) - Not to be changed by user
• 24 V version	T1 A, T 250 V (IEC 127) - Not to be changed by user

EMC performance

• Emission	EN 50081-1 (Light industry)
• Immunity	EN 50082-2 (Industry)

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Within the value limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE 21

Environment

• Environmental conditions acc. to UL 3101:	<ul style="list-style-type: none"> • Altitude up to 2000 m • POLLUTION DEGREE 2
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Maintenance

The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis

Cable glands

Two types of cable gland are available in polyamide and brass in the following dimensions: Pg 13.5 and M20-11-15 mm

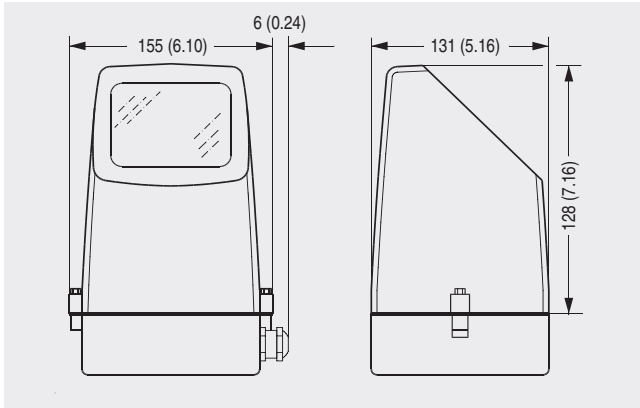
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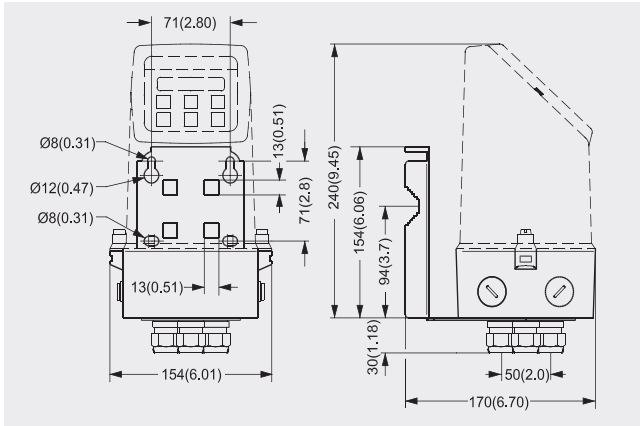
MASSFLO MASS 6000
IP67/NEMA 4X compact/remote

Dimensional drawings

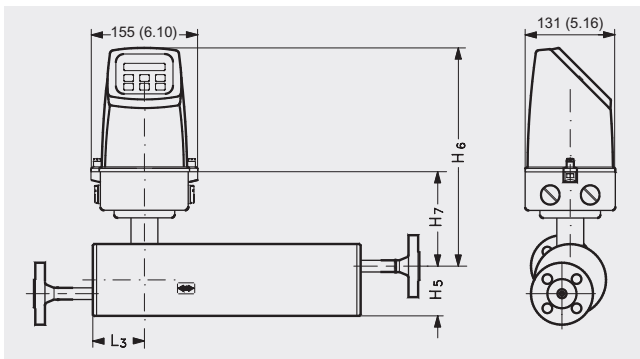
Transmitter IP67/NEMA 4X compact polyamide



Transmitter integral mounted



Transmitter wall mounted
IP67/NEMA 4X compact version



Sensor size [DN (inch)]	L ₃ [mm (inch)]	H ₅ [mm (inch)]	H ₆ [mm (inch)]	H ₅ + H ₆ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	246 (9.69)	328 (12.91)
6 (1/4)	62 (2.44)	72 (2.83)	256 (10.08)	328 (12.91)
15 (1/2)	75 (2.95)	87 (3.43)	267 (10.51)	353 (13.90)
25 (1)	75 (2.95)	173 (6.81)	271 (10.67)	443 (17.44)
40 (1 1/2)	75 (2.95)	227 (8.94)	271 (10.67)	497 (19.57)

Schematics

Electrical connection

Grounding

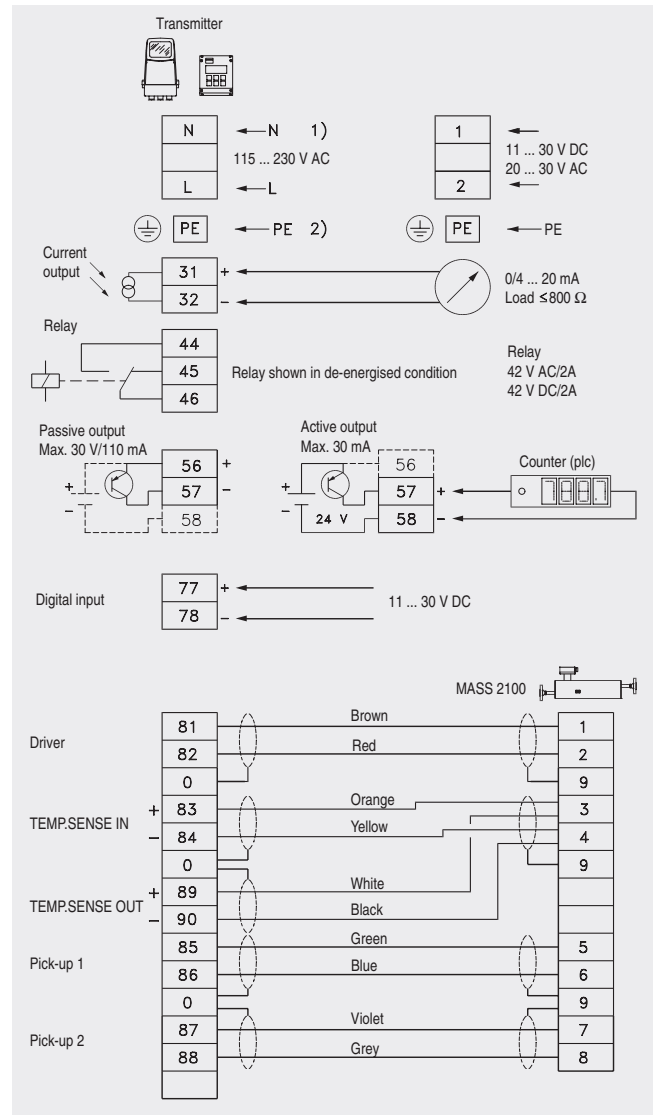
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If long cables in noise environment, we recommend to use screened cable.



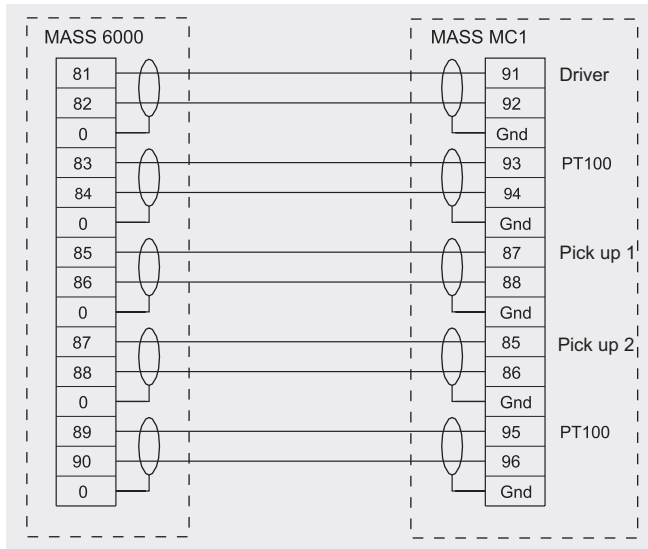
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IP67/NEMA 4X compact/remote

Electrical connection

Transmitter MASS 6000 and sensor MASS MC1



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MASS 6000 IP67/NEMA 4X, MASS 6000 19" insert/19" wall mounting

MASS 6000 and MC1-Ex in hazardous applications

All the MASSFLO MC1 sensors are suitable for all applications within the entire Process Industry, where there is a demand for accurate and reliable measurements in hazardous areas. The MC1 sensor has all the necessary approvals like ATEX/FM approvals as well as the PED (European pressure directive) approval. Due to the increased safety concept used on the bigger sized sensors, the MASS 6000 19" or MASS 6000 IP67 standard versions can be connected but has to be remote mounted in the safe area. For all non hazardous applications the complete MASS 6000 transmitter program can be used.



Hazardous area
 Zone 1 + 2



Safe area

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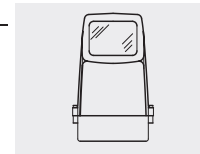
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MASSFLO MASS 6000
IP67/NEMA 4X compact/remote

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Selection and Ordering data	Order-No.
SITRANS F C Transmitter MASSFLO MASS 6000 Transmitter for wall mounting IP67/NEMA 4X, fibre-glass reinforced polyamide	7ME4110 - AA0 - A0
Version Remote	2
Supply voltage 115/230 V AC, 50...60 Hz 24 V AC/DC	1 2
Display/Keypad with display	1
Serial communication No communication HART PROFIBUS PA PROFIBUS DP MODBUS DeviceNet CANopen	A B C D E F G

Description	Version	Supply voltage	Order No.
MASS 6000 transmitter inclusive wall mounting enclosure IP67/NEMA 4X, fibreglass reinforced polyamide	1 current output	115/230 V AC, 50/60 Hz	7ME4110-2AA10-1AA0
	1 frq./pulse output 1 relay output	24 V AC/DC	7ME4110-2AA20-1AA0



Accessories

Add-on module

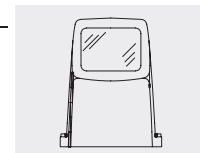
Description	Order No.	Symbol
HART	FDK:085U0226	
PROFIBUS PA	FDK:085U0232	
CANopen	FDK:085U0228	
DeviceNet	FDK:085U0229	
PROFIBUS DP	FDK:085U0230	
MODBUS	FDK:085U0234	

Cable glands

Description	Order No.	Symbol
Cable glands, screwed entries type Pg 13.5 in nickel-plated brass, 2-off	FDK:083G3140	
Cable glands, screwed entries type Pg 13.5 in polyamide (100 °C (212 °F)) black, 2-off	FDK:083G0228	
Cable glands, screwed entries type in nickel-plated brass 1-off M20-11-15 mm	FDK:087L4157	

Spare parts

Description	Version	Supply voltage	Order No.
MASS 6000 transmitter IP67/NEMA 4X, fibreglass reinforced polyamide	1 current output	115/230 V AC, 50/60 Hz	7ME4110-1AA10-1AA0
	1 frq./pulse output 1 relay output	24 V AC/DC	7ME4110-1AA20-1AA0

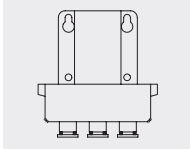
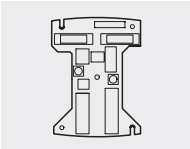
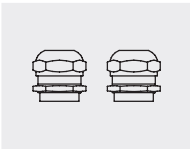
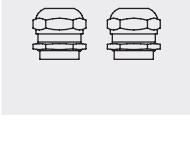
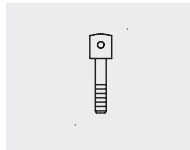


SITRANS F flowmeters

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MASSFLO MASS 6000
IP67/NEMA 4X compact/remote

Spare parts for compact or remote IP67

Description	Order No.	Symbol
Wall mounting unit for IP67/NEMA 4X version in wall bracket, 4 Pg 13.5 cable glands	FDK:085U1001	
Connection board/PCB Supply voltage: 115/230 V / 24 V AC/DC	FDK:083H4260	
Terminal box kit With this kit you are able to mount the MASS 6000 IP67/NEMA 4X transmitter on the MASS 2100 sensor and make it to a compact system. (The kit consisting of a terminal box in polyamide, cable and connector between PCB and sensor pedestal, PCB, seal and screws (4 pcs.) for mounting on sensor)	FDK:083H3060	
Cable glands, screwed entries type Pg 13.5 in nickel – plated brass, 2-off	FDK:083G3140	
Cable glands, screwed entries type Pg 13.5 in polyamide (100 °C (212 °F)) black, 2-off	FDK:083G0228	
Cable glands, screwed entries type in nickel-plated brass 1-off M20-11-15 mm	FDK:087L4157	
Sealing screws for sensor/transmitter	FDK:085U0221	
Terminal box – in stainless steel AISI 316 with lid	FDK:085U1000	
Terminal box – in polyamide exclusive lid	FDK:085U1002	
Terminal box – lid in polyamide	FDK:085U1003	