

Transmitter MASS 6000 IP67 compact/remote

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 multiparameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

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/MC2 and FC300 sensors.

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 troubleshooting 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 a 5th-order algorithm matching all applications.
- USM II platform enables fitting of add-on bus modules without loss of functionality.
 - All modules can be fitted through true "plug & play"
 - Module and transmitter are automatically configured through the SENSORPROM.
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

Application

SITRANS F C mass flowmeters 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 both liquid and gas flow.

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

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

Design

The transmitter is designed in an 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 1½") and remote mounted for the entire sensor series.

The MASS 6000 IP67 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 individually 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 adjustable
- Error system consisting of error-log, error pending menu
- Display of 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 troubleshooting

Flow Measurement

SITRANS F C

Transmitter MASS 6000 IP67 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)]	Enclosure	
Current output		Material	Fibre glass reinforced polyamide
Current	0 ... 20 mA or 4 ... 20 mA	Rating	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH ₂ O for 30 min.)
Load	< 800 Ω	Mechanical load	18 ... 1000 Hz random, 3.17 Grms, in all directions, to IEC 68-2-36
Time constant	0 ... 99.9 s adjustable	Supply voltage	
Digital output		24 V version	
Frequency	0 ... 10 kHz, 50% duty cycle	• Supply	24 V DC/AC, 50 ... 60 Hz
Time constant	0 ... 99.9 s adjustable	• Fluctuation	18 ... 30 V DC 20 ... 30 V AC
Active	24 V DC, 30 mA, 1 KΩ ≤ R _{load} ≤ 10 KΩ, short-circuit-protected	• Power consumption	10 W
Passive	3 ... 30 V DC, max. 110 mA, 1 KΩ ≤ R _{load} ≤ 10 KΩ	230 V version	
Relay		• Supply	87 ... 253 V AC, 50 ... 60 Hz
Type	Change-over relay	• Power consumption	26 VA
Load	42 V/2 A peak	Fuse	
Functions	Error level, error number, limit, flow direction	• 230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
Digital input		• 24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
Functionality	11 ... 30 V DC (R _i = 13.6 kΩ) Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output	EMC performance	
Galvanic isolation		Emission	EN/IEC 61000-6-4 (Industry)
	All inputs and outputs are galva- nically isolated, isolation voltage 500 V.	Immunity	EN/IEC 61000-6-2 (Industry)
Cut-off		NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Low-flow	0 ... 9.9 % of maximum flow	Environment	
Limit function		Environmental conditions acc. to IEC/EN/UL 61010-1:	• Altitude up to 2000 m • POLLUTION DEGREE 2
	Mass flow, volume flow, fraction, density, sensor temperature	Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Totalizer		Cable glands	Two types of cable gland are available in polyamide in the fol- lowing dimensions: M20 or ½" NPT
	Two eight-digit counters for for- ward, net or reverse flow		
Display			
	• Background illumination with al- phanumerical text, 3 × 20 cha- racters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1 • Reverse flow indicated by nega- tive sign		
Zero point adjustment			
	Via keypad or remote via digital input		
Ambient temperature			
Operation	-20 ... +50 °C (-4 ... +122 °F), max. rel. humidity 80 % at 31 °C (87.8 °F) decreasing to 50 % at 40 °C (104 °F) according to IEC/EN/UL 61010-1		
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95%)		
Communication			
	Add-on modules: HART, PROFIBUS PA and DP, MODBUS RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1		

Flow Measurement SITRANS F C



Transmitter MASS 6000 IP67 compact/remote

Selection and Ordering data	Order No.
SITRANS F C MASS 6000 transmitter Transmitter for wall mounting with wall mounting bracket, fibre glass reinforced polyamide (1 current output, 1 frq./pulse output, 1 relay output and connection board/PCB)	7ME4110 - AA0 - A
Version Remote IP67/NEMA 4X enclosure	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 Profile 3 PROFIBUS DP Profile 3 MODBUS RTU RS 485 DeviceNet FOUNDATION Fieldbus H1	A B F G E H J
Cable glands M20 ½" NPT	1 2

Please also see www.siemens.com/SITRANSforordering for practical examples of ordering


Accessories


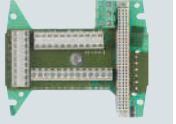



Cable glands

Description	Order No.	
Cable glands, screwed entries type in polyamide (100 °C (212 °F)) black, 2-off • M20 • ½" NPT	A5E00822490 A5E00822501	
Display and keypad • Siemens Front	FDK-085U1039	

Note: The operating instructions should be ordered as a separate line on the order.

Spare parts for compact or remote IP67 version

Description	Order No.	
MASS 6000 transmitter IP67/NEMA 4X Fibre glass reinforced polyamide and without connection board 1 current output 1 frq./pulse output 1 relay output • 115/230 V AC, 50/60 Hz • 24 V AC/DC	7ME4110-1AA10-1AA0 7ME4110-1AA20-1AA0	

Description	Order No.	
Wall mounting unit for IP67/NEMA 4X version with wall bracket, without connection board but with • 4 x M20 cable glands • 4 x ½" NPT cable glands	FDK-085U1018 A5E01164211	
Connection board/PCB Supply voltage: 115/230 V/24 V AC/DC	FDK-083H4260	
Terminal box kit with • M20 cable glands • ½" NPT cable glands Change from remote to compact mounting of MASS 6000 IP67/NEMA 4X with MASS 2100. The kit consists of a terminal box in polyamide incl. connection board, cable and connector between PCB and sensor pedestal, PCB, seal and screws (4 pcs.) for mounting on sensor	A5E00832338 ^{F)} A5E00832342 ^{F)}	
Terminal box with • M20 cable glands • ½" NPT cable glands	FDK-085U1050 A5E01164206	
Terminal box – lid in polyamide	FDK-085U1003	
Sun lid for MASS 6000 transmitter (Frame and lid)	A5E02328485	


Operating instructions for SITRANS F C MASS 6000 IP67

Description	Order No.
Operating instructions for SITRANS F C MASS 6000 IP67 • English	A5E03071936

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
<http://www.siemens.com/flowdocumentation>

Add-on module

Description	Order No.	
HART	FDK-085U0226	
PROFIBUS PA Profile 3	FDK-085U0236	
PROFIBUS DP Profile 3	FDK-085U0237	
MODBUS RTU RS 485	FDK-085U0234	
FOUNDATION Fieldbus H1	A5E02054250	
DeviceNet	FDK-085U0229	

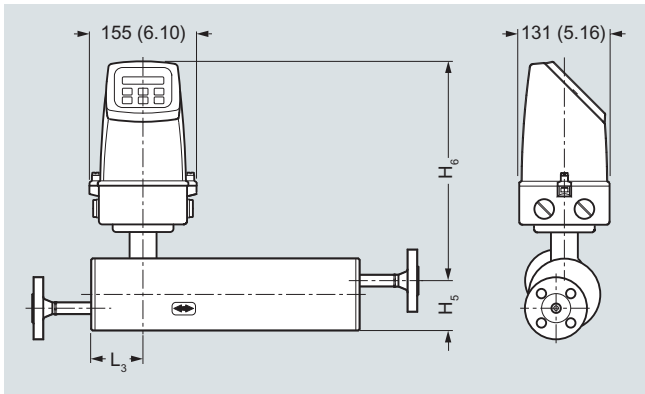
F) Subject to export regulations AL: 91999, ECCN: N.

Flow Measurement SITRANS F C

Transmitter MASS 6000 IP67 compact/remote

Dimensional drawings

Compact

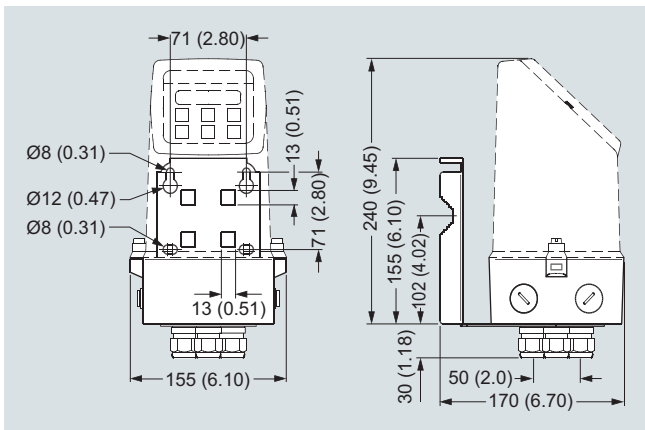


Dimensions in mm (inch)

MASS 2100

Sensor size [Di (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)	306 (12.04)	388 (15.28)
6 (1/4)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (1/2)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)
25 (1)	75 (2.95)	173 (6.81)	330 (13.00)	503 (19.80)
40 (1 1/2)	75 (2.95)	227 (8.94)	330 (13.00)	557 (21.93)

Transmitter wall mounted



Dimensions in mm (inch)

Schematics

Electrical connection

Grounding

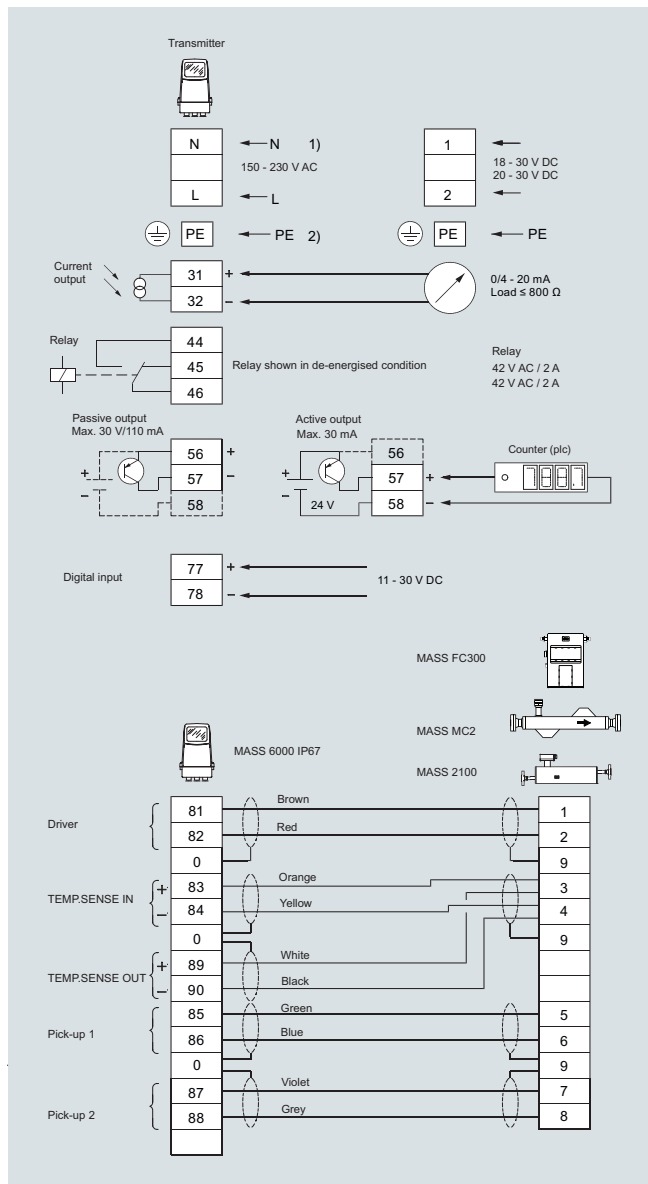
PE must be connected due to safety class 1 power supply.

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 are used in a noisy environment, it is recommended to use shielded cables.



Flow Measurement

SITRANS F C

Transmitter MASS 6000 for 19" insert/19" wall mounting

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.

The MASS 6000 19" transmitter can be connected to all sensors of types MASS 2100/MC2/FC300 and are available in different versions depending of number of output facilities, Ex protection and grade of enclosure.

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 troubleshooting 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
- Many output capacities, up to 3 current, 2 frequency/pulse and 2 relay outputs (excludes the possibility of an add-on module)
- 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 a 5th-order algorithm matching all applications
- USM II 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.
- Transmitter available with ATEX and UL approval
- All electrical connections are easily accessible on the large back plane PCB

Application

SITRANS F C Coriolis mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter can measure both liquids and gases.

The main applications for the MASS 6000 19" transmitter can be found in:

- Chemical and pharmaceutical industries
- Food and beverage industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry
- Water and waste water industry

Design

The transmitter is designed as a 19" insert as base to be used in:

- 19" rack system
- Panel mounting IP66/NEMA 4
- Back of panel mounting IP20/NEMA 1
- Wall mounting IP66/NEMA 4

The MASS 6000 19" is available as standard or as ATEX-approved transmitter which is to be mounted in the safe area.

Flow Measurement

SITRANS F C

Transmitter MASS 6000 for 19" insert/19" wall mounting

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 2 output versions available as standard:
 - 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
 - 3 current outputs, 2 frequency/pulse outputs, 2 relay outputs, 1 digital input
- All outputs can be individually 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 troubleshooting

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 ... 99.9 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
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 • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA and DP, MODBUS RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1
Enclosure 19"	
Material	Aluminium/steel (DIN 41494)
Rating	IP20/NEMA 1 to IEC 529 and DIN 40050 (1 mH ₂ O for 30 min.)
Mechanical load	18 ... 1000 Hz random, 3.17G rms, in all directions, to IEC 68-2-36
Supply voltage	<ul style="list-style-type: none"> • 87 ... 253 V AC +10 % ... -10 %, 50 ... 60 Hz • 18 ... 30 V DC or 20 ... 30 V AC
Power consumption	
230 V AC	9 VA max.
24 V DC	6 W I _N = 250 mA, I _{ST} = 2 A (30 ms)
EMC performance	
Emission	EN/IEC 61000-6-4 (Industry)
Immunity	EN/IEC 61000-6-2 (Industry)
Ex approval	[EEx ia] IIC, DEMKO 03 ATEX 135251X
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Fuse	T 400 mA, T 250 V (IEC 127), not replaceable by operator
Cable	<ul style="list-style-type: none"> • Max. 300 m • C: max. 300 [pF/m]; L_C/R_C: max. 100 [μH/Ω] • The total cable capacity must be max. 200 nF.
Cable glands	The cable gland is available in polyamide, in dimension: PG 13.5

Flow Measurement SITRANS F C

Transmitter MASS 6000 for 19" insert/19" wall mounting

Selection and Ordering data	Order No.
SITRANS F C MASS 6000 transmitter Transmitter for rack and wall mounting, incl. connection board	7 ME 4 1 1 0 - 2 ■■■■ - ■■ A 0
Enclosure 19 inch insert IP20/NEMA 1 (rack) 19 inch insert in IP66/NEMA 4 (wall mounting)	C E
Output configuration 1 current, 1 frequency, 1 relay 3 current, 2 frequency, 2 relay	A C
Supply voltage 115/230 V AC, 50/60 Hz 24 V AC/DC	1 2
Ex Approvals Standard (No Ex-approval) ATEX UL Class 1, Div. 2 (only IP66/NEMA 4 version)	0 1 5
Display/Keypad With display	1
Serial communication (Only possible to connect to MASS 6000 version with 1 current output) No communication	A B F G E H J

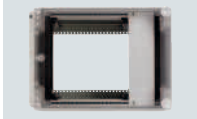

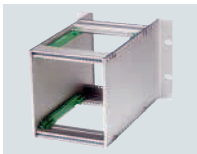
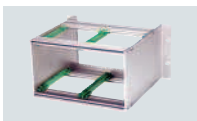
Attention (Ex applications)!

MC2 Ex version sensors must only be connected to MASS 6000 standard. The MASS 6000 connection board must be replaced by a connection board approved FDK-083H4294 or FDK-083H4295 (see connection boards/PCB for MASS 6000 and MC2 sensors).


Please also see www.siemens.com/SITRANSForordering for practical examples of ordering

Accessories

Enclosure

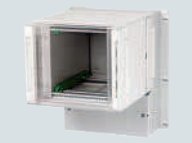

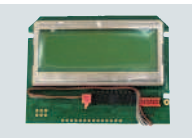
Description	Order No.	
Enclosure in ABS plastic for front panel mounting IP66/NEMA 4, for one 19" transmitter insert (21 TE)	FDK-083F5030	
Enclosure in ABS plastic for front panel mounting IP66/NEMA 4, for two 19" transmitter inserts (42 TE)	FDK-083F5031	
Enclosure in aluminium for back of panel mounting IP20/NEMA 1, for one 19" transmitter insert (21 TE)	FDK-083F5032	
Enclosure in aluminium for back of panel mounting IP20/NEMA 1, for two 19" transmitter inserts (42 TE)	FDK-083F5033	
Front cover (7 TE)	FDK-083F4525	

Cable glands

Description	Order No.	
Cable glands, screwed entries type PG 13.5 in nickel-plated brass, 2 pcs.	FDK-083G3140	
Cable glands, screwed entries type PG 13.5 in polyamide (100 °C (212 °F)) black, 2 pcs.	FDK-083G0228	

Spare parts 19" versions

Enclosure (without PCB, connection board)

Description	Order No.	
Enclosure in ABS plastic for wall mounting IP66/NEMA 4, for one 19" transmitter insert (21 TE), connection board not included	FDK-083F5037	
Enclosure in ABS plastic for wall mounting IP66/NEMA 4, for two 19" transmitter inserts (42 TE), connection board not included	FDK-083F5038	
Display only	FDK-085U3349	

Operating instructions for SITRANS F C MASS 6000 19"


Description	Order No.
Operating instructions for SITRANS F C MASS 6000 19" • English	A5E02944875

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
<http://www.siemens.com/flowdocumentation>

Add-on module

Note:
Only possible to connect to MASS 6000 versions with 1 current output

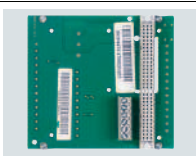
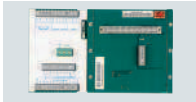
Description	Order No.	
HART	FDK-085U0226	
PROFIBUS PA Profile 3	FDK-085U0236	
PROFIBUS DP Profile 3	FDK-085U0237	
MODBUS RTU RS 485	FDK-085U0234	
FOUNDATION Fieldbus H1	A5E02054250	
DeviceNet	FDK-085U0229	

Flow Measurement

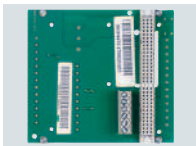

SITRANS F C

Transmitter MASS 6000 for 19" insert/19" wall mounting

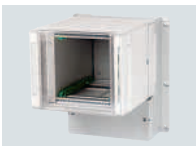
Connection boards/PCB for MASS 6000 and MASS 2100 sensors

Description	Version	Order No.	
Connection board MASS 6000 for 19" IP20 rack mounting version	24 V 115/230 V	FDK-083H4272	
Connection board MASS 6000 EEx [ia] IIC for 19" IP20 rack mounting version	24 V 115/230 V	FDK-083H4273	
Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK-083F5037/FDK-083F5038	24 V 115/230 V	FDK-083H4274	
Connection board MASS 6000 EEx [ia] IIC for 19" wall mounting version, for enclosure FDK-083F5037/FDK-083F5038	24 V 115/230 V	FDK-083H4275	

Connection boards/PCB for MASS 6000 and MC2 sensors

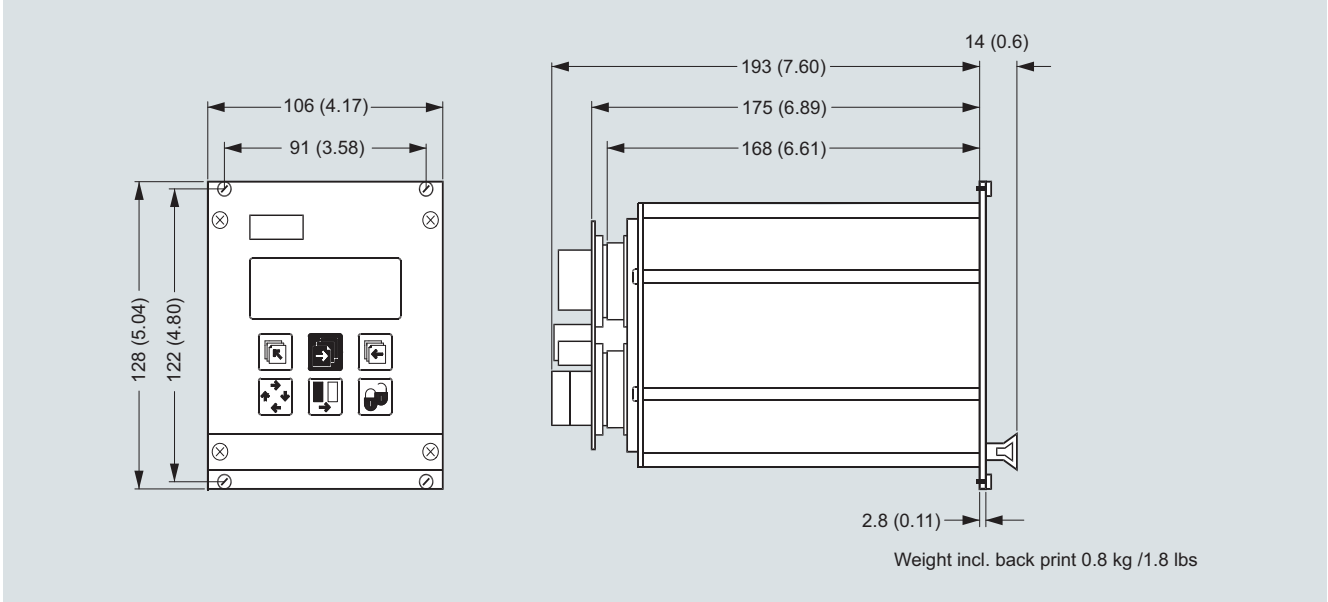
Description	Version	Order No.	
Connection board MASS 6000 for 19" IP20 rack mounting version	24 V 115/230 V	FDK-083H4272	
Connection board MASS 6000 for Ex application ¹⁾ and 19" IP20 rack mounting version (connection board MASS 6000 to MC2 sensors Ex-approved)	24 V 115/230 V	FDK-083H4294	
Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK-083F5037/FDK-083F5038	24 V 115/230 V	FDK-083H4274	
Connection board MASS 6000 for Ex application ¹⁾ and 19" wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved), for enclosure FDK-083F5037/FDK-083F5038	24 V 115/230 V	FDK-083H4295	

¹⁾ Attention (Ex application): MC2 Ex version sensors must only be connected to connection board FDK-083H4294 or FDK-083H4295.

Description	Order No.	
Wall mounting enclosure for MASS 6000 19" version IP66/NEMA 4 (21 TE) with connection board/PCB for Ex application connected to MC2 Ex sensors	FDK-083H4296	

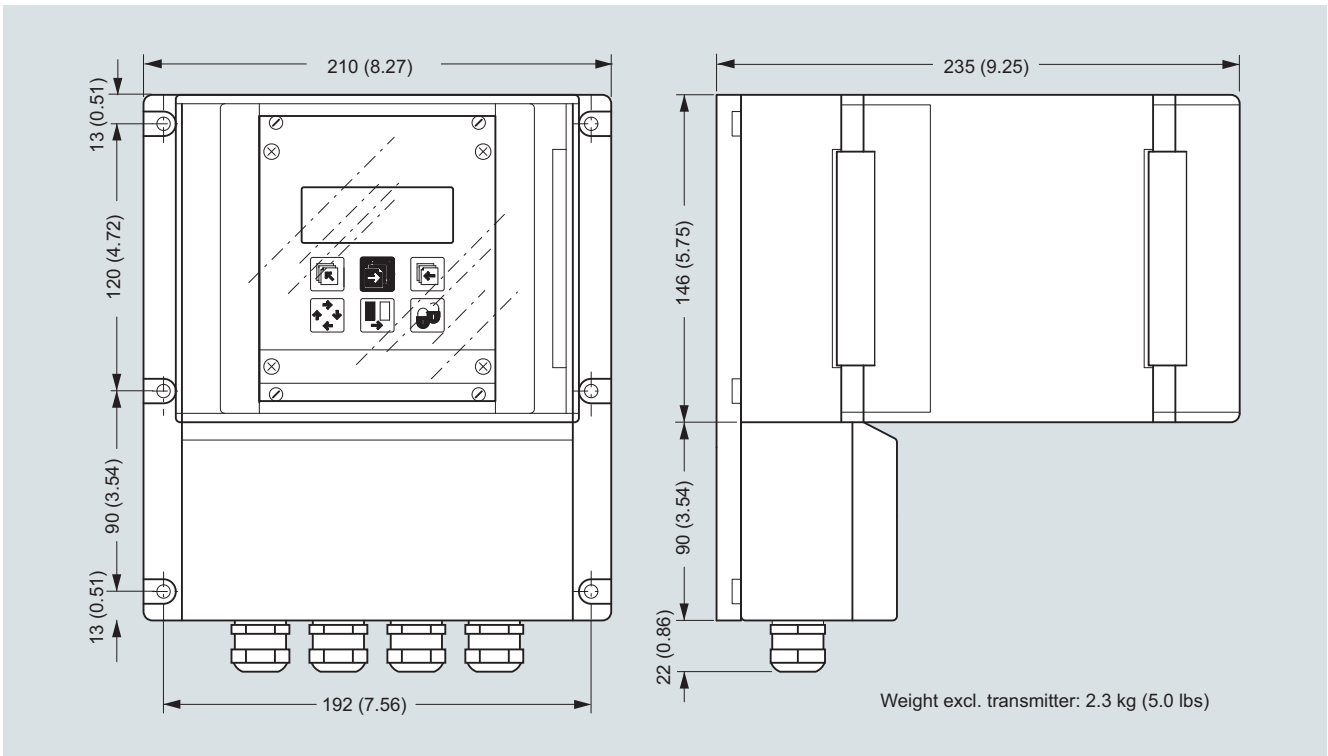
Dimensional drawings

Transmitter 19" insert



Dimensions in mm (inch)

Transmitter 19" wall mounting

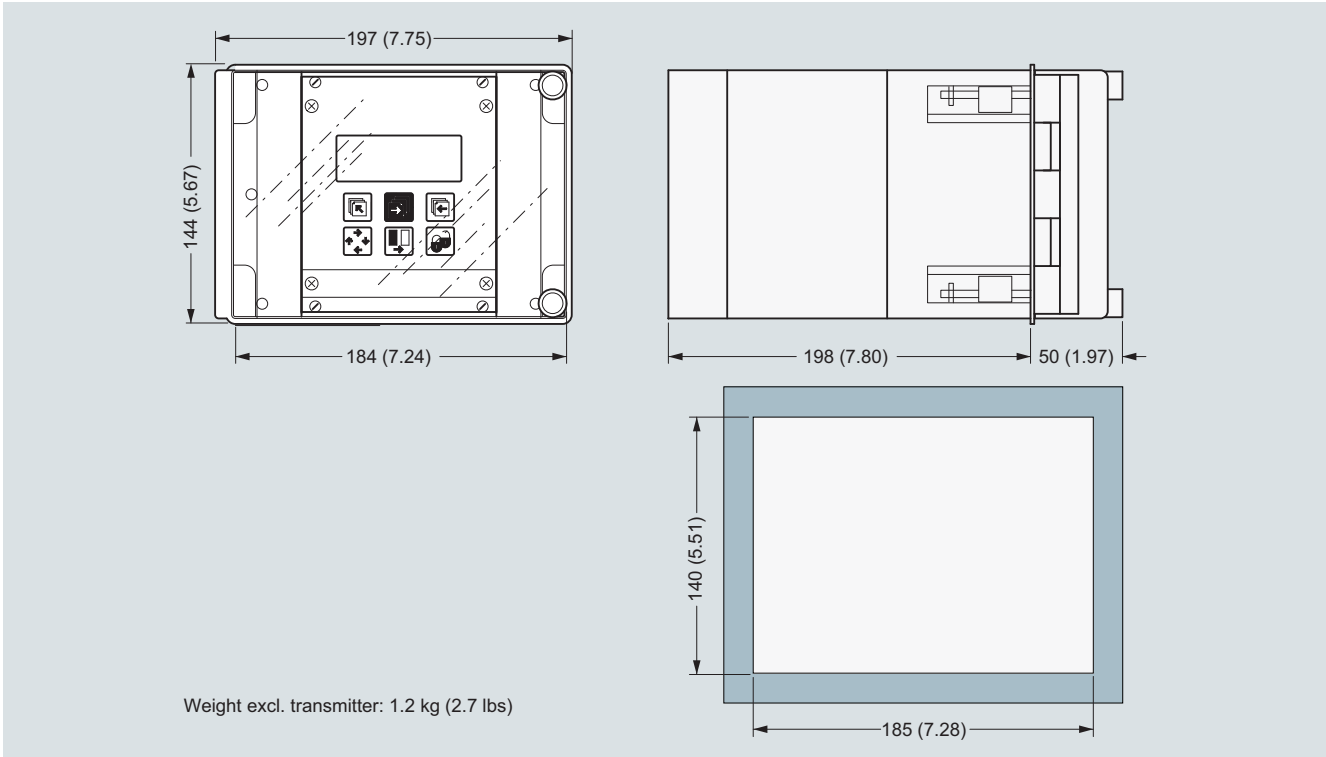


Dimensions in mm (inch)

Flow Measurement SITRANS F C

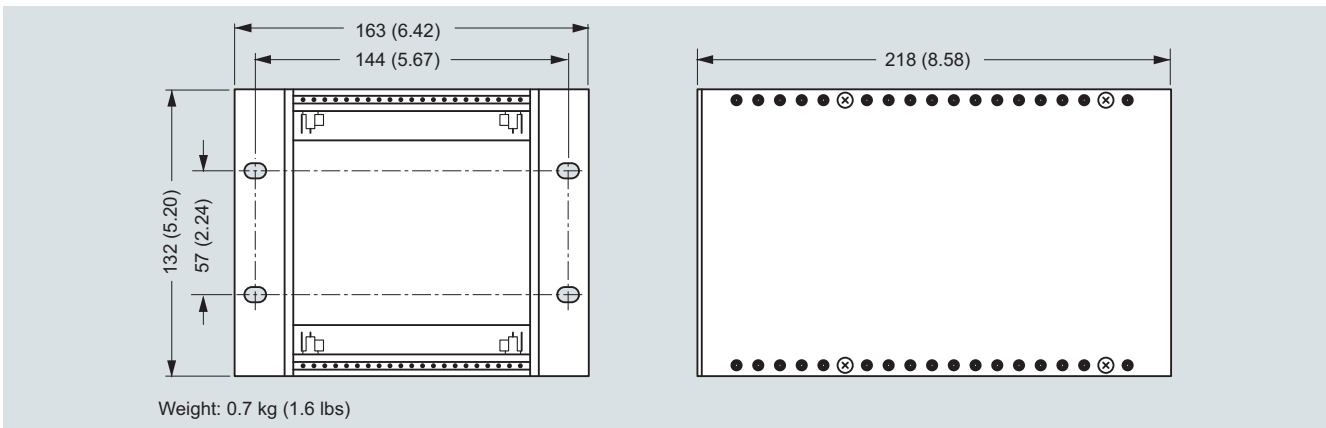
Transmitter MASS 6000 for 19" insert/19" wall mounting

Transmitter 19" front of panel



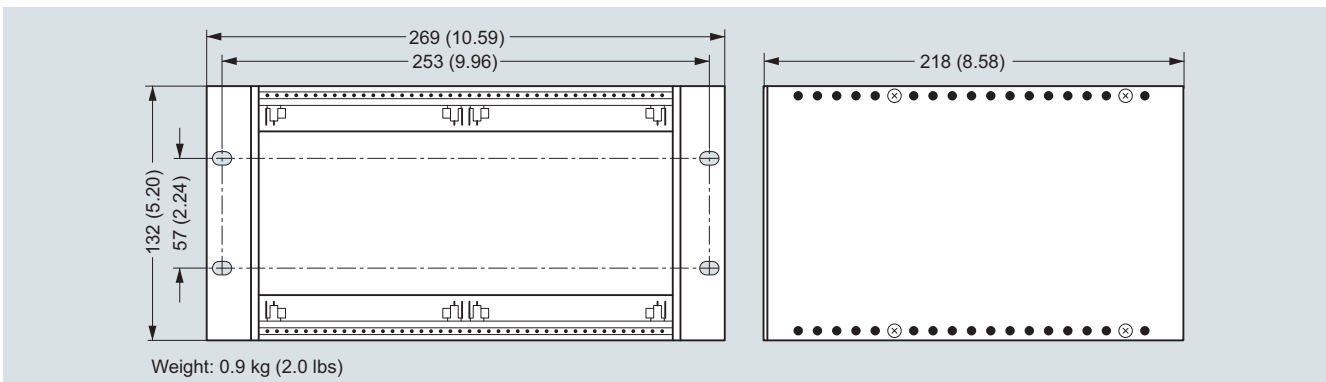
Dimensions in mm (inch)

Transmitter back of panel



Dimensions in mm (inch)

Transmitter back of panel, 42 TE



Dimensions in mm (inch)

Flow Measurement SITRANS F C

Transmitter MASS 6000
for 19" insert/19" wall mounting

Schematics

Electrical connection

Grounding

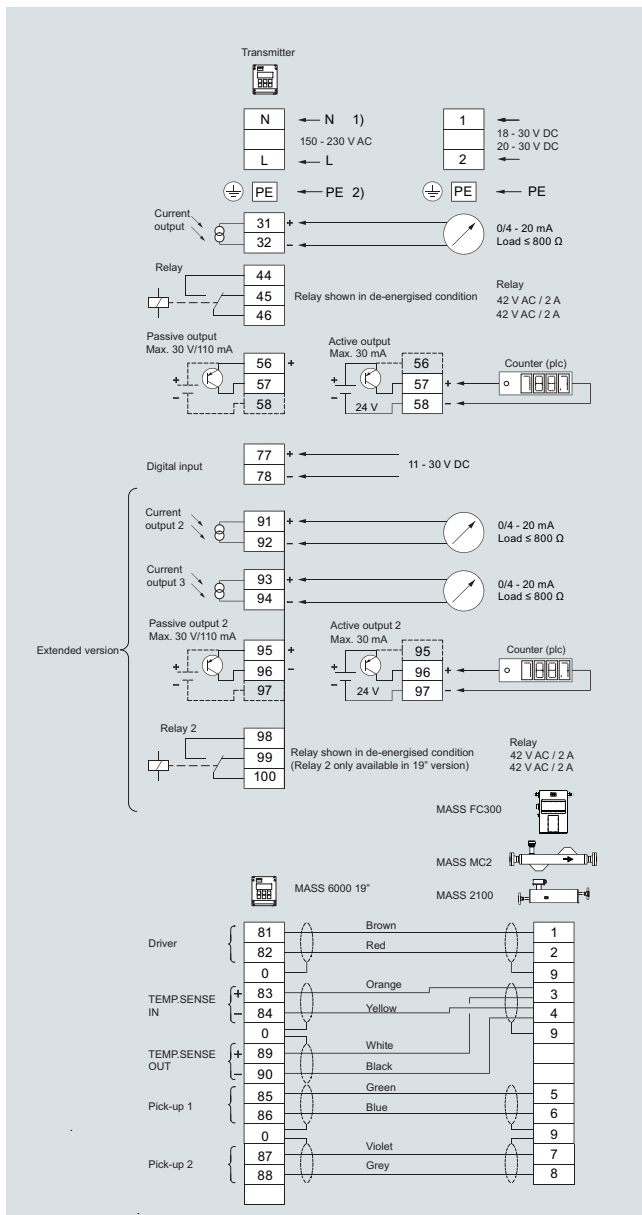
PE must be connected due to safety class 1 power supply.

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 are used in noisy environment, it is recommended to use shielded cables.



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Flow Measurement

SITRANS F C

Transmitter MASS 6000 Ex d compact/remote

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 multiparameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction flow.

The MASS 6000 Ex d transmitter is manufactured in stainless steel (AISI 316L) and able to withstand harsh installation conditions in hazardous applications within the process and chemical industry. The conservative choice of material guarantees the user a low cost of ownership and a long trouble-free life-time. The Ex d 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.

Benefits

- Fully stainless steel flameproof EEx d enclosure, ensuring optimum cost of ownership
- Intrinsically safe keypad and display directly programmable in hazardous area
- ATEX-approved transmitter which can be mounted in hazardous area Zone 1 or Zone 2.
- Sensor and transmitter interface intrinsically safe EEx ia IIC
- Exchange of transmitter directly in hazardous area without shut-down of process pipe line due to ia IIC sensor/transmitter interface.
- 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 troubleshooting 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
- 1 current output, 1 frequency/pulse and 1 relay as standard output
- Current output can be selected as passive or active output

- 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 a 5th-order algorithm matching all applications
- USM II 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 mass flowmeters are suitable for all applications within the entire process industry where there is a demand for accurate flow measurement in hazardous area. The meter can measure both liquids and gases.

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

- Chemical process industry
- Pharmaceutical industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry

Design

The transmitter is designed in an Ex d compact stainless steel enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 40, and remote mounted for the entire sensor series.

The MASS 6000 Ex d 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.

- Flameproof „d“ enclosure
- Enclosure stainless steel, IP67/NEMA 4X as compact and IP66/NEMA 4 as remote
- Supply voltage 24 V AC/DC
- MASS 6000 Ex d is ATEX approved together with all MASS 2100 sensors, but can **not** be used together with MC2 Ex versions

Transmitter MASS 6000 Ex d compact/remote

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 individually 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 troubleshooting

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	Classified EEx ia, selectable as active or passive outputs. Default setting is active mode.
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 350 Ω
Time constant	0 ... 99.9 s adjustable
Current characteristics	
Active mode	$U_o = 24 \text{ V}$, $I_o = 82 \text{ mA}$, $P_o = 0.5 \text{ W}$, $C_o = 125 \text{ nF}$, $L_o = 2.5 \text{ mH}$
Passive mode (max input from external barrier)	$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 0.75 \text{ W}$, $C_i = 52 \text{ nF}$, $L_i = 100 \text{ μH}$
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0.1 ... 30 s adjustable
Passive	6 ... 30 V DC, max. 110 mA, $1 \text{ k}\Omega \leq R_{load} \leq 10 \text{ k}\Omega$
Output characteristics	
Active mode	Not available
Passive mode (max input from external barrier)	$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 0.75 \text{ W}$, $C_i = 52 \text{ nF}$, $L_i = 100 \text{ μH}$
Relay	
Type	Change-over relay
Load	30 V/100 mA
Functionality	Error level, error number, limit, direction
Output characteristics	$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 0.75 \text{ W}$, $C_i = 0 \text{ nF}$, $L_i = 0 \text{ mH}$

Digital input	11 ... 30 V DC ($R_i = 13.6 \text{ k}\Omega$)
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Output characteristics	$U_i = 30 \text{ V}$, $I_i = 3.45 \text{ mA}$, $P_i = 0.10 \text{ W}$, $C_i = 0 \text{ nF}$, $L_i = 0 \text{ mH}$
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V.
Cut-off	
Low-flow	0 ... 9.9% of maximum flow
Empty pipe	Detection of empty sensor
Density	0 ... 2.9 g/cm ³
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 • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA, FOUNDATION Fieldbus H1
HART	
Active mode	$U_o = 6.88 \text{ V}$, $I_o = 330 \text{ mA}$, $P_o = 0.57 \text{ W}$, $C_o = 20 \text{ nF}$, $L_o = 100 \text{ μH}$
Passive mode (max input from external barrier)	$U_i = 10 \text{ V}$, $I_i = 200 \text{ mA}$, $P_i = 0.5 \text{ W}$, $C_i = 0 \text{ nF}$, $L_i = 0 \text{ μH}$
PROFIBUS PA	
Active mode	Not available
Passive mode	$U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ W}$, $C_i = 5 \text{ nF}$, $L_i = 10 \text{ μH}$
FOUNDATION Fieldbus H1	
Active mode	Not available
Passive mode	$U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$
Enclosure	
Material	Stainless steel AISI 316 mat. no. 1.4435
Rating	<ul style="list-style-type: none"> • Compact mounted on sensor: IP67/NEMA 4X to IEC 529 and DIN 40050 • Remote mounted: IP66/NEMA 4 to IEC 529 and DIN 40050
Load	18 ... 1000 Hz random, 1.14 G rms, in all directions, to IEC 68-2-36, Curve E

Flow Measurement

SITRANS F C

Transmitter MASS 6000 Ex d compact/remote

Supply voltage

24 V AC

- Range 20 ... 30 V AC
- Power consumption 6 VA $I_N = 250$ mA, $I_{ST} = 2$ A (30 ms)
- Power supply The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm²

24 V DC

- Range 18 ... 30 V DC
- Power consumption 6 VA $I_N = 250$ mA, $I_{ST} = 2$ A (30 ms)
- Power supply The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm².

EMC performance

Emission EN/IEC 61000-6-4 (Industry)
Immunity EN/IEC 61000-6-2 (Industry)

NAMUR

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

Ex approval

EEx de [ia/ib] IIC T6, DEMKO 03 ATEX 135253X

Temperature class:

- T6 Process liquid temperature:
 - $T < 85$ °C (185 °F)
- T5
 - 85 °C $< T < 100$ °C (185 °F $< T < 212$ °F)
- T4
 - 100 °C $< T < 135$ °C (212 °F $< T < 275$ °F)
- T3
 - 135 °C $< T < 180$ °C (275 °F $< T < 356$ °F)

Selection and Ordering data

Order No.

SITRANS F C MASS 6000 transmitter

Transmitter Ex d for remote mounting inclusive of wall mounting kit

7ME4110-

2 ■ ■ ■ ■ - ■ ■ A ■

Enclosure

Ex d SS with 5 m (16.5 ft) cable
Ex d SS with 10 m (32.8 ft) cable
Ex d SS with 25 m (82.0 ft) cable

G
H
J

Output configuration

1 current, 1 frequency, 1 relay

A

Supply voltage

24V AC/DC

2

Ex approvals

ATEX

1

Display/Keypad

With display

1

Serial communication

No communication
HART
PROFIBUS PA Profile 3
FOUNDATION Fieldbus H1

A
B
F
J

Cable gland

M20

1

Operating instructions for SITRANS F C MASS 6000 Ex d

Description

Order No.

Operating instructions for SITRANS F C MASS 6000 Ex d

- English

A5E02944883

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.



All literature is also available for free at:
<http://www.siemens.com/flowdocumentation>

Note:


Only communication modules with Ex approvals are allowed.

Please also see www.siemens.com/SITRANSOrdering for practical examples of ordering

Selection and Ordering data*Spare parts for MASS 6000 Ex d*

Description	Order No.	
Wall mounting kit for remote Ex d inclusive of sensor cable of		
• 5 m	FDK-083H0231	
• 10 m	FDK-083H0232	
• 25 m	FDK-083H0233	
Ex d transmitter insert	FDK-083H3061	
Front lid	FDK-085U2373	
Screws and washers between pedestal and sensor (4 pcs.), seal (1 pc.)	FDK-085U2374	
Display and keypad	FDK-083H0235	

Add-on module for remote and compact MASS 6000 Ex d

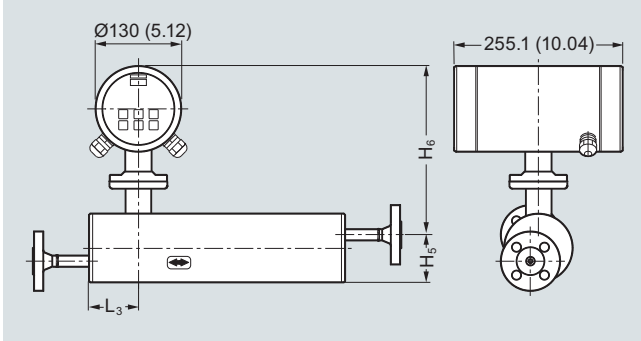
Description	Order No.	
HART	FDK-085U0226	
PROFIBUS PA Profile 3	FDK-085U0236	
FOUNDATION Fieldbus H1	A5E02054250	

Flow Measurement SITRANS F C

Transmitter MASS 6000 Ex d compact/remote

Dimensional drawings

MASS 6000 Ex d compact version



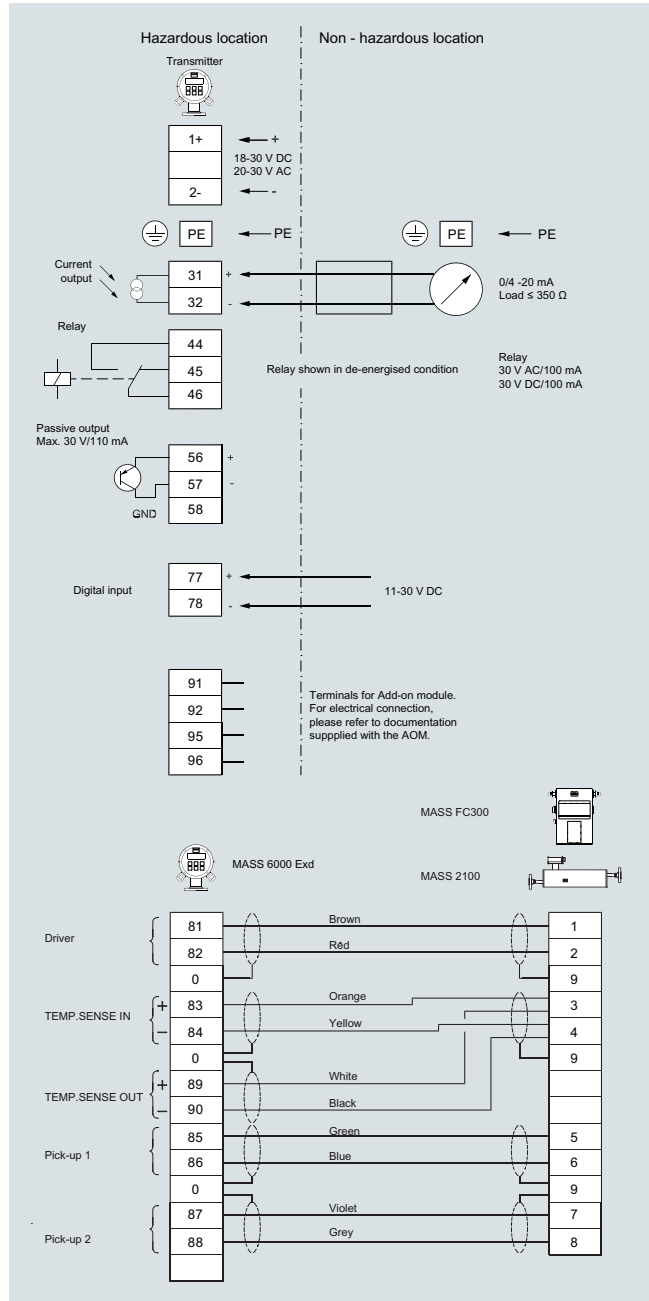
Dimensions in mm (inch)

Sensor size [Di (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)	247 (9.72)	329 (12.95)
6 (1/4)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (1/2)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)
25 (1)	75 (2.95)	173 (6.81)	271 (10.67)	444 (17.48)
40 (1 1/2)	75 (2.95)	227 (8.94)	271 (10.67)	498 (19.61)

4

Schematics

Electrical connection compact or remote



Flow Measurement SITRANS F C

Transmitter MASS 6000 Ex d compact/remote

MASS 6000 Ex d remote version

Weight: 3 kg (6.6 lbs)

