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"

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.
## Technical specifications

<table>
<thead>
<tr>
<th>Measurement of</th>
<th>Mass flow [kg/s (lbs/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m³ (lbs/ft³)], temperature [°C (°F)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output</td>
<td>Current 0 ... 20 mA or 4 ... 20 mA, Time constant 0 ... 99.9 s adjustable</td>
</tr>
<tr>
<td>Digital output</td>
<td>Frequency 0 ... 10 kHz, 50% duty cycle, Time constant 0 ... 99.9 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</td>
</tr>
<tr>
<td>Relay</td>
<td>Type Change-over relay, Load 42 V/2 A peak, Functions Error level, error number, limit, flow direction</td>
</tr>
<tr>
<td>Digital input</td>
<td>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</td>
</tr>
<tr>
<td>Enclosure</td>
<td>Material Fibre glass reinforced polyamide, Rating IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH₂O for 30 min.), Mechanical load 18 ... 1000 Hz random, 3.17 Grms, in all directions, to IEC 88-2-36</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 V version Supply 24 V DC/AC, 50 ... 60 Hz, Fluctuation 18 ... 30 V DC, 20 ... 30 V AC, Power consumption 10 W, 230 V version Supply 87 ... 253 V AC, 50 ... 60 Hz, Power consumption 26 VA, Fuse 230 V version T 400 mA, T 250 V (IEC 127) - not replaceable by operator, 24 V version T 1 A, T 250 V (IEC 127) - not replaceable by operator</td>
</tr>
<tr>
<td>EMC performance</td>
<td>Emission EN/IEC 61000-6-4 (Industry), Immunity EN/IEC 61000-6-2 (Industry), NAMUR Within the value limits according to “General requirements” with error criteria A in accordance with NE 21</td>
</tr>
<tr>
<td>Environment</td>
<td>Environmental conditions acc. to IEC/EN/UL 61010-1: Altitude up to 2000 m, POLLUTION DEGREE 2</td>
</tr>
<tr>
<td>Maintenance</td>
<td>The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.</td>
</tr>
<tr>
<td>Cable glands</td>
<td>Two types of cable gland are available in polyamide in the following dimensions: M20 or ½” NPT</td>
</tr>
<tr>
<td>Limit function</td>
<td>Mass flow, volume flow, fraction, density, sensor temperature</td>
</tr>
<tr>
<td>Totalizer</td>
<td>Two eight-digit counters for forward, net or reverse flow</td>
</tr>
<tr>
<td>Display</td>
<td>• Background illumination with alphanumerical text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1, • Reverse flow indicated by negative sign</td>
</tr>
<tr>
<td>Zero point adjustment</td>
<td>Via keypad or remote via digital input</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>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%)</td>
</tr>
<tr>
<td>Communication</td>
<td>Add-on modules: HART, PROFI/BUS PA and DP, MODBUS RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1</td>
</tr>
</tbody>
</table>

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Flow Measurement

SITRANS F C

Transmitter MASS 6000 IP67 compact/remote

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall mounting unit for IP67/NEMA 4X version with wall bracket, without connection board but with</td>
<td>FDK-085U1018</td>
</tr>
<tr>
<td>4 x M20 cable glands</td>
<td>A5E01164211</td>
</tr>
<tr>
<td>4 x ½” NPT cable glands</td>
<td></td>
</tr>
<tr>
<td>Connection board/PCB</td>
<td>FDK-083H4260</td>
</tr>
<tr>
<td>Supply voltage: 115/230 V/24 V AC/DC</td>
<td></td>
</tr>
<tr>
<td>Terminal box with</td>
<td>FDK-085U1050</td>
</tr>
<tr>
<td>M20 cable glands</td>
<td>A5E01164206</td>
</tr>
<tr>
<td>½” NPT cable glands</td>
<td></td>
</tr>
<tr>
<td>Terminal box – lid in polyamide</td>
<td>FDK-085U1003</td>
</tr>
<tr>
<td>Sun lid for MASS 6000 transmitter (Frame and lid)</td>
<td>A5E02328485</td>
</tr>
</tbody>
</table>

Operating instructions for SITRANS F C MASS 6000 IP67

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating instructions for SITRANS F C MASS 6000 IP67</td>
<td>A5E03071936</td>
</tr>
<tr>
<td>English</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART</td>
<td>FDK-085U0226</td>
</tr>
<tr>
<td>PROFIBUS PA Profile 3</td>
<td>FDK-085U0236</td>
</tr>
<tr>
<td>PROFIBUS DP Profile 3</td>
<td>FDK-085U0237</td>
</tr>
<tr>
<td>MODBUS RTU RS 485</td>
<td>FDK-085U0234</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td>A5E02054250</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>FDK-085U0229</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td></td>
</tr>
</tbody>
</table>

F) Subject to export regulations AL: 9I999, ECCN: N.

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

Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable glands, screwed entries type in polyamide (100 °C (212 °F)) black, 2-off</td>
<td>A5E00822490</td>
</tr>
<tr>
<td>• M20</td>
<td>A5E00822501</td>
</tr>
<tr>
<td>• ½” NPT</td>
<td></td>
</tr>
<tr>
<td>Display and keypad</td>
<td>FDK-085U1039</td>
</tr>
<tr>
<td>• Siemens Front</td>
<td></td>
</tr>
</tbody>
</table>

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

Spare parts for compact or remote IP67 version

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASS 6000 transmitter IP67/NEMA 4X</td>
<td>7ME4110-1AA10-1AA0</td>
</tr>
<tr>
<td>Fibre glass reinforced polyamide and without connection board</td>
<td>7ME4110-1AA20-1AA0</td>
</tr>
<tr>
<td>1 current output</td>
<td></td>
</tr>
<tr>
<td>1 freq./pulse output</td>
<td></td>
</tr>
<tr>
<td>1 relay output</td>
<td></td>
</tr>
<tr>
<td>115/230 V AC, 50/60 Hz</td>
<td></td>
</tr>
<tr>
<td>24 V AC/DC</td>
<td></td>
</tr>
</tbody>
</table>

Subject to export regulations AL: 9I999, ECCN: N.
Flow Measurement
SITRANS FC
Transmitter MASS 6000 IP67 compact/remote

**Dimensional drawings**

**Compact**

Dimensions in mm (inch)

**MASS 2100**

<table>
<thead>
<tr>
<th>Sensor size (Di [inch])</th>
<th>L₀ [mm (inch)]</th>
<th>H₀ [mm (inch)]</th>
<th>H₀ [mm (inch)]</th>
<th>H₀ + H₀ [mm (inch)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (1/8)</td>
<td>75 (2.95)</td>
<td>82 (3.23)</td>
<td>306 (12.04)</td>
<td>388 (15.28)</td>
</tr>
<tr>
<td>6 (3/4)</td>
<td>62 (2.44)</td>
<td>72 (2.83)</td>
<td>316 (12.44)</td>
<td>388 (15.28)</td>
</tr>
<tr>
<td>15 (5/8)</td>
<td>75 (2.95)</td>
<td>87 (3.43)</td>
<td>326 (12.83)</td>
<td>413 (16.26)</td>
</tr>
<tr>
<td>25 (1)</td>
<td>75 (2.95)</td>
<td>173 (6.81)</td>
<td>330 (13.00)</td>
<td>503 (19.80)</td>
</tr>
<tr>
<td>40 (11/2)</td>
<td>75 (2.95)</td>
<td>227 (8.94)</td>
<td>330 (13.00)</td>
<td>557 (21.93)</td>
</tr>
</tbody>
</table>

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

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
- Low flow cut-off
- 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/m³ (lbs/ft³)], temperature [°C (°F)] |
| Current output | 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 |
| Load constant | 0 ... 30 s adjustable |
| Active | 24 V DC, 30 mA, 1 KΩ ≤ Rload ≤ 10 KΩ, short-circuit-protected |
| Passive | 3 ... 30 V DC, max. 110 mA, 1 KΩ ≤ Rload ≤ 10 KΩ |

| Relay | Type | Change-over relay |
| | Load | 42 V/2 A peak |
| | Functions | Error level, error number, limit, direction |

| Digital input | Functionality | 11 ... 30 V DC |
| | 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 |

| Limit function | Mass flow, volume flow, fraction, density, sensor temperature |
| Totalizer | Two eight-digit counters for forward, net or reverse flow |
| Display | • Background illumination with alphanumerical text, 3 x 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 for 30 min.) |
| Mechanical load | 18 ... 1000 Hz random, 3.17G rms, in all directions, to IEC 68-2-36 |

| Supply voltage | Power consumption |
| 230 V AC | 9 VA max. |
| 24 V DC | 6 W |
| | \( I_N = 250 \text{ mA}, \ I_ST = 2 \text{ A (30 ms)} \) |

| EMI performance | Emission | EN/IEC 61000-6-4 (Industry) |
| Immunity | EN/IEC 61000-6-2 (Industry) |
| Ex approval | [Ex 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 | 1400 mA, T 250 V (IEC 127), not replaceable by operator |

| Cable | • 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 |

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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 0 0 0 0 0 0
Enclosure
19 inch insert IP20/NEMA 1 (rack)
19 inch insert in IP66/NEMA 4 (wall mounting)
Enclosure (without PCB, connection board)

Output configuration
1 current, 1 frequency, 1 relay
3 current, 2 frequency, 2 relay

Supply voltage
115/230 V AC, 50/60 Hz
24 V AC/DC

Ex Approvals
Standard (No Ex-approval)
ATEX
UL Class 1, Div. 2 (only IP66/NEMA 4 version)

Display/Keypad
With display

Serial communication
(Only possible to connect to MASS 6000 version with 1 current output)
No communication
HART
PROFIBUS PA Profile 3
PROFIBUS DP Profile 3
MODBUS RTU RS 485
DeviceNet
FOUNDATION Fieldbus H1

Operating instructions for SITRANS F C MASS 6000 19"

Order No.
Order.
A5E02944875
There 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

Accessories
Enclosure

Description
Order No.
Enclosure in ABS plastic for front panel mounting
IP20/NEMA 1, for one 19" transmitter insert (21 TE)
FDK-083F5030
Enclosure in ABS plastic for front panel mounting
IP66/NEMA 4, for one 19" transmitter insert (21 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

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

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

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/SITRANSFordering for practical examples of ordering.

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

Description
Order No.
Enclosure in ABS plastic for front panel mounting
IP20/NEMA 1, for one 19" transmitter insert (21 TE)
FDK-083F5030
Enclosure in ABS plastic for front panel mounting
IP66/NEMA 4, for one 19" transmitter insert (21 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

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## Flow Measurement

**SITRANS F C**

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

#### Connection boards/PCB for MASS 6000 and MASS 2100 sensors

<table>
<thead>
<tr>
<th>Description</th>
<th>Version</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection board MASS 6000 for 19&quot; IP20 rack mounting version</td>
<td>24 V</td>
<td>FDK-083H4272</td>
</tr>
<tr>
<td>Connection board MASS 6000 EEx [ia] IIC for 19&quot; IP20 rack mounting version</td>
<td>24 V, 115/230 V</td>
<td>FDK-083H4273</td>
</tr>
<tr>
<td>Connection board MASS 6000 for 19&quot; wall mounting version, for enclosure FDK-083F5037/FDK-083F5038</td>
<td>24 V, 115/230 V</td>
<td>FDK-083H4274</td>
</tr>
<tr>
<td>Connection board MASS 6000 EEx [ia] IIC for 19&quot; wall mounting version, for enclosure FDK-083F5037/FDK-083F5038</td>
<td>24 V, 115/230 V</td>
<td>FDK-083H4275</td>
</tr>
</tbody>
</table>

#### Connection boards/PCB for MASS 6000 and MC2 sensors

<table>
<thead>
<tr>
<th>Description</th>
<th>Version</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection board MASS 6000 for 19&quot; IP20 rack mounting version</td>
<td>24 V</td>
<td>FDK-083H4272</td>
</tr>
<tr>
<td>Connection board MASS 6000 for Ex application and 19&quot; IP20 rack mounting version (connection board MASS 6000 to MC2 sensors Ex-approved)</td>
<td>24 V, 115/230 V</td>
<td>FDK-083H4294</td>
</tr>
<tr>
<td>Connection board MASS 6000 for 19&quot; wall mounting version</td>
<td>24 V</td>
<td>FDK-083H4274</td>
</tr>
<tr>
<td>Connection board MASS 6000 for Ex application and 19&quot; wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved), for enclosure FDK-083F5037/FDK-083F5038</td>
<td>24 V, 115/230 V</td>
<td>FDK-083H4295</td>
</tr>
</tbody>
</table>

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

#### Wall mounting enclosure for MASS 6000 19" version

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall mounting enclosure for MASS 6000 19&quot; version IP66/NEMA 4 (21 TE) with connection board/PCB for Ex application connected to MC2 Ex sensors</td>
<td>FDK-083H4296</td>
</tr>
</tbody>
</table>
Dimensional drawings

Transmitter 19" insert

Dimensions in mm (inch)

Transmitter 19" wall mounting

Dimensions in mm (inch)

Weight incl. back print: 0.8 kg / 1.8 lbs

Weight excl. transmitter: 2.3 kg / 5.0 lbs
Flow Measurement

SITRANS FC

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

Weight excl. transmitter: 1.2 kg (2.7 lbs)

Weight: 0.7 kg (1.6 lbs)

Weight: 0.9 kg (2.0 lbs)

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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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**SITRANS F C**

**Transmitter MASS 6000**

for 19" insert/19" wall mounting
Flow Measurement

SITRANS FC

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 FC 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
**Flow Measurement**

**SITRANS F C**

**Transmitter MASS 6000 Ex d compact/remote**

<table>
<thead>
<tr>
<th>Digital input</th>
<th>11 ... 30 V DC (Ri = 13.6 kΩ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionality</td>
<td>Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output</td>
</tr>
<tr>
<td>Output characteristics</td>
<td>Uj = 30 V, Ij = 3.45 mA, Pj = 0.10 W, CJ = 0 nF, Li = 0 mH</td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td>All inputs and outputs are galvanically isolated, isolation voltage 500 V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cut-off</th>
<th>Low-flow</th>
<th>0 ... 9.9% of maximum flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty pipe</td>
<td>Detection of empty sensor</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>0 ... 2.9 g/cm³</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Totalizer</th>
<th>Two eight-digit counters for forward, net or reverse flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>• 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</td>
</tr>
<tr>
<td>Zero point adjustment</td>
<td>Via keypad or remote via digital input</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation</td>
</tr>
<tr>
<td></td>
<td>-20 ... +50 °C (-4 ... +122 °F)</td>
</tr>
<tr>
<td></td>
<td>Storage</td>
</tr>
<tr>
<td></td>
<td>-40 ... +70 °C (-4 ... +158 °F) (Humidity max. 95 %)</td>
</tr>
<tr>
<td>Communication</td>
<td>Add-on modules: HART, PROFIBUS PA, FOUNDATION Fieldbus H1</td>
</tr>
<tr>
<td>HART</td>
<td>Active mode</td>
</tr>
<tr>
<td></td>
<td>Uj = 6.88 V, Ij = 330 mA, PJ = 0.57 W, CJ = 20 nF, Lj = 100 µH</td>
</tr>
<tr>
<td></td>
<td>Passive mode (max input from external barrier)</td>
</tr>
<tr>
<td></td>
<td>Uj = 10 V, Ij = 200 mA, PJ = 0.5 W, CJ = 0 nF, Lj = 0 µH</td>
</tr>
<tr>
<td>PROFIBUS PA</td>
<td>Active mode</td>
</tr>
<tr>
<td></td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td>Passive mode</td>
</tr>
<tr>
<td></td>
<td>Uj = 17.5 V, Ij = 380 mA, PJ = 5.32 W, CJ = 5 nF, Lj = 10 µH</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td>Active mode</td>
</tr>
<tr>
<td></td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td>Passive mode</td>
</tr>
<tr>
<td></td>
<td>Uj = 17.5 V, Ij = 380 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enclosure</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel AISI 316 mat. no. 1.4435</td>
<td></td>
</tr>
<tr>
<td>Rating</td>
<td>• Compact mounted on sensor: IP67/NEMA 4X to IEC 529 and DIN 40050</td>
</tr>
<tr>
<td></td>
<td>• Remote mounted: IP66/NEMA 4 to IEC 529 and DIN 40050</td>
</tr>
<tr>
<td>Load</td>
<td>18 ... 1000 Hz random, 1.14 G rms, in all directions, to IEC 68-2-36, Curve E</td>
</tr>
</tbody>
</table>

### Technical specifications

**Measurement of**

- Mass flow [kg/s (lbs/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m³ (lbs/ft³)], temperature [°C (°F)]

**Current output**

- Classified Ex 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**
  - Uj = 24 V, Ij = 82 mA, Pj = 0.5 W, CJ = 125 nF, Lj = 2.5 mH
- **Passive mode (max input from external barrier)**
  - Uj = 30 V, Ij = 100 mA, Pj = 0.75 W, CJ = 52 nF, Lj = 100 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 kΩ ≤ Rs ≤ 10 kΩ

**Output characteristics**

- **Active mode**
  - Not available
- **Passive mode (max input from external barrier)**
  - Uj = 30 V, Ij = 100 mA, Pj = 0.75 W, CJ = 52 nF, Lj = 100 µH

**Relay**

- **Type**
  - Change-over relay
- **Load**
  - 30 V/100 mA
- **Functionality**
  - Error level, error number, limit, direction
- **Output characteristics**
  - Uj = 30 V, Ij = 100 mA, Pj = 0.75 W, CJ = 0 nF, Lj = 0 mH

**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 flow
- 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
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Automatic zero adjustment menu, with zero point evaluation
- Full service menu for effective and straight forward application and meter troubleshooting

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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 $I_N = 250 \text{ mA}$, $I_{ST} = 2 \text{ A (30 ms)}$
• 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 $I_N = 250 \text{ mA}$, $I_{ST} = 2 \text{ A (30 ms)}$
• 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
Ex d [ia/b] IIC T6, DEMKO 03 ATEX 1352/3X
Process liquid temperature:
• T6
  • $T < 85 \degree \text{ C (185 \degree \text{ F)}}$
  • $85 \degree \text{ C} < T < 100 \degree \text{ C (185 \degree \text{ F} < T < 212 \degree \text{ F)}}$
• T4
  • $100 \degree \text{ C} < T < 135 \degree \text{ C (212 \degree \text{ F} < T < 275 \degree \text{ F)}}$
• T3
  • $135 \degree \text{ C} < T < 180 \degree \text{ C (275 \degree \text{ F} < T < 356 \degree \text{ F)}}$

Selection and Ordering data
Order No.
SITRANS F C MASS 6000 transmitter
Transmitter Ex d for remote mounting inclusive of wall mounting kit
7 ME 4 1 0 - 2

Enclosure
Ex d SS with 5 m (16.5 ft) cable
G
Ex d SS with 10 m (32.8 ft) cable
H
Ex d SS with 25 m (82.0 ft) cable
J

Output configuration
1 current, 1 frequency, 1 relay
A

Supply voltage
24V AC/DC
2

Ex approvals
ATEX
1

Display/Keypad
With display
A

Serial communication
No communication
B
HART
C
PROFIBUS PA Profile 3
D
FOUNDATION Fieldbus H1
F

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**

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

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART</td>
<td>FDK-085U0226</td>
</tr>
<tr>
<td>PROFIBUS PA Profile 3</td>
<td>FDK-085U0236</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1</td>
<td>A5E02054250</td>
</tr>
</tbody>
</table>
**Flow Measurement**

**SITRANS FC**

**Transmitter MASS 6000 Ex d compact/remote**

### Dimensional drawings

**MASS 6000 Ex d compact version**

![Dimensional drawings](image)

**Dimensions in mm (inch)**

<table>
<thead>
<tr>
<th>Sensor size [Di (inch)]</th>
<th>L₂ [mm (inch)]</th>
<th>H₃ [mm (inch)]</th>
<th>H₄ [mm (inch)]</th>
<th>H₅ + H₆ [mm (inch)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (1/8)</td>
<td>75 (2.95)</td>
<td>82 (3.23)</td>
<td>247 (9.72)</td>
<td>329 (12.95)</td>
</tr>
<tr>
<td>6 (¼)</td>
<td>62 (2.44)</td>
<td>72 (2.83)</td>
<td>257 (10.12)</td>
<td>329 (12.95)</td>
</tr>
<tr>
<td>15 (5/8)</td>
<td>75 (2.95)</td>
<td>87 (3.43)</td>
<td>267 (10.51)</td>
<td>354 (13.94)</td>
</tr>
<tr>
<td>25 (1)</td>
<td>75 (2.95)</td>
<td>173 (6.81)</td>
<td>271 (10.67)</td>
<td>444 (17.48)</td>
</tr>
<tr>
<td>40 (1½)</td>
<td>75 (2.95)</td>
<td>227 (8.94)</td>
<td>271 (10.67)</td>
<td>498 (19.61)</td>
</tr>
</tbody>
</table>

### Schematics

**Electrical connection compact or remote**

![Schematics](image)
MASS 6000 Ex d remote version

- **Weight:** 3 kg (6.6 lbs)
- **Dimensions in mm**
  - 150 (6.00)
  - 100 (3.94)
  - 60 (2.36)
  - 40 (1.57)
  - 9
  - 4xØ9
  - 2xØ9
  - Ø13
  - M5
- **Dimensions in inch**
  - 5.91
  - 3.94
  - 2.36
  - 1.57
  - 0.39
  - 4xØ0.35
  - 2xØ0.35
  - Ø0.51
  - M5
- **Dimensions in mm (inch)**
  - 255 (10.04)
  - 178 (7.00)
  - 130 (5.12)
  - 8 (0.31)