

Modular Converter MFC 050/MFC 051

for OPTIMASS 3000, 5000, 7000, 8000 and 9000
Coriolis mass flowmeters



- Easy on-site upgrade, repair or modification
- Intuitive user interface
- Advanced functions, such as sensor diagnostics, concentration measurement

Subject to change without notice.

Variable area flowmeters

Vortex flowmeters

Flow controllers

Electromagnetic flowmeters

Ultrasonic flowmeters

Mass flowmeters

Level measuring instruments

Communications technology

Engineering systems & solutions

Switches, counters, displays and recorders

Heat metering

Pressure and temperature

One tube

No limits



OPTIMASS stands for simplicity. It cuts down all previous limitation in Coriolis mass metering. Even the new converters, MFC 050 and MFC 051 (intrinsically safe) fit on all current and future models.

No limits through Intuitive user interface software

- Easy to program with intuitive software
- Simple to commission; zero calibration and output configuration

No limits with serviceability

- “Intelligent” digital link with front end will update sensor calibration data if converter is exchanged
- Common converters for all sensor designs, reduces spare parts stockholding
- Sensor diagnostics
- Concentration measurement options

No limits with installation

- Compact or remote installation: easy to convert meter on-site with conversion kit

OPTIMASS

Discover the difference

OPTIMASS MFC 050 & 051 – Technical data

Power Supply

	MFC 050	MFC 051
Operating voltage	100 ... 230 V AC (+10%/-15%) 24 V DC (±30%)	100 ... 230 V AC (+10%/-15%) 24 V AC (+10%/-15%) 24 V DC (+30%/-25%)
Power consumption	V AC 18 VA	V DC 10 W

User interface

Input devices	Via 3 push keys (front cover removed) Via 3 Hall effect magnetic switches (front cover in place)
Local display	3 line LCD backlight display for measurement function and value in engineering units
Languages supported	English, German, French, and Spanish

Measurement functions

Mass flow rate	g, kg, t, oz, lb per second, minute, hour, day
Density	g, kg, t, oz, lb per cm ³ , litre, m ³ , ft ³ , US gallon specific gravity (SG), referred density.
Volume flow rate	cm ³ , litre, m ³ , ft ³ , US gallon per second, minute, hour, day
Totaliser	Mass, volume
Temperature	°C, °F
Concentration	°Brix, °Baume, °Plato, NaOH, Dry solids
Velocity	m/s, ft/s

Low flow cut-off

User programmable	0 ... 10% of nominal flow rate for each sensor size
-------------------	---

Time constant for flow measurement

User programmable	0.2 ... 20 seconds (damping function for mA output only)
-------------------	--

System control

User assignable output	High or low temperature, high or low fluid density, reverse flow
User assignable input	Zero calibration, Totaliser reset, sensor standby

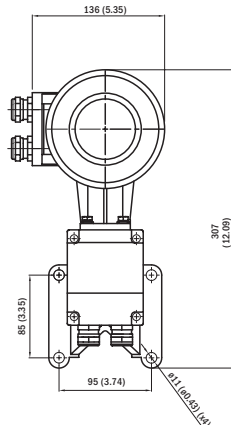
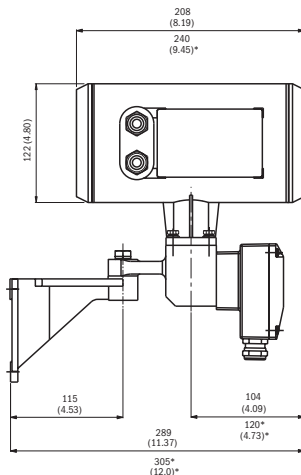
Converter housing

Construction	Die cast Aluminium with Polyurethane finish
--------------	---

Environmental

	°C	°F	
Ambient temperature	-40 ... +55	-40 ... +130	for compact (integral) mount to sensor
	-40 ... +60	-40 ... +140	for remote (field) mount to sensor

Dimensions and Weights



Weights:

Standard: 4 kg (8.8 lb)
Exd: 5 kg (11 lb)

* Dimensions for Exd housing

Dimensions in mm (inches)

Input and output functional specifications

MFC 050

Provides the user with a choice of multiple outputs (up to 4) in hazardous and non-hazardous designs. The outputs are galvanically isolated from the power supply, but not from each other, and use a common ground.

The first current output is fitted with HART® as standard, except in the case where a serial communication is fitted e.g. Modbus.

The current (mA) output is active (converter powered). Pulse and control inputs are passive (externally powered). The status output is either active or passive, depending on output options fitted.

Output Options

The MFC 050 has up to 4 outputs available as follows:

Option	Output 1	Output 2	Output 3	Output 4
1	mA HART®	Pulse	Control input	Status output
2	mA	Modbus	-	-
3	mA HART®	Dual phase frequency output	-	Control input
4	mA HART®	mA	Pulse	Control input
5	mA HART®	mA	Control input	Status output
6	mA HART®	mA	mA	Pulse
7	mA HART®	mA	mA	Control input
8	mA HART®	mA	mA	Status output

Inputs and outputs

Current (mA) output

Function	Active (converter powered)
Level	0/4 ... 20 mA; with alarm levels 3.5 or 22 mA
Maximum load	< 500 Ohm

Pulse / Frequency output

Function	Passive (externally powered) open collector transistor switch
Frequency	0 ... 1300 Hz
Pulse	0 ... 10 kHz
Pulse width	0.05 ... 500 ms (depending on setting)
External power supply	< 24 V DC
Maximum circuit current	< 150 mA

Control input

Function	Passive (externally powered)
Input signal state high	4 ... 24 V DC
Input signal state low	< 2 V DC or open circuit

Status output

Function	Active (converter powered) or passive (externally powered) depending on output options fitted
Active configuration	
Output signal state high	24 V DC
Output maximum current	20 mA
Passive configuration	
External circuit voltage	< 24 V DC
Maximum circuit current	20 mA

Input and output functional specifications

MFC 051

This converter has passive outputs and provides intrinsically safe signals for the hazardous area version. There is also available a safe area version with passive output signals. The outputs are galvanically isolated from the power supply and from each other.

In this design only two inputs or outputs are available at any time.

This converter also provides the possibility of utilising multi-drop HART®.

Profibus PA and Foundation Fieldbus (pending) are also available on this converter.

Output Options

The MFC 051 is available with the following 2 inputs or output, either EEx approved or non-EEx.

Option	Output 1	Output 2
1	mA HART®	mA
2	mA HART®	Pulse
3	mA HART®	Control input
4	mA HART®	Status output
5	mA	Profibus PA

Inputs and outputs

Current (mA) output

Function	Passive (externally powered)
Level	4 ... 20 mA
External power supply	8 ... 30 V DC

Pulse / Frequency output

Function	Passive (externally powered) open collector transistor switch
Frequency	0 ... 1300 Hz
Pulse	0 ... 10 kHz
Pulse width	0.05 ... 500 ms (depending on setting)
External power supply	6 ... 30 V DC
Maximum circuit current	< 110 mA

Control input

Function	Passive (externally powered)
Input signal state high	7 ... 30 V DC
Input signal state low	< 2 V DC or open circuit
Maximum circuit current	< 110 mA

Status output

Function	Passive (externally powered)
External circuit voltage	6 ... 30 V DC
Maximum circuit current	< 110 mA

Profibus PA

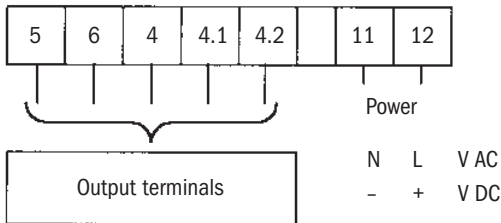
Hardware	According to IEC 61158-2 and FISCO model
External circuit voltage	9 ... 30 V DC
Maximum circuit current	< 300 mA

Electrical connection

MFC 050

input and output connection options

Power and signal connection terminals



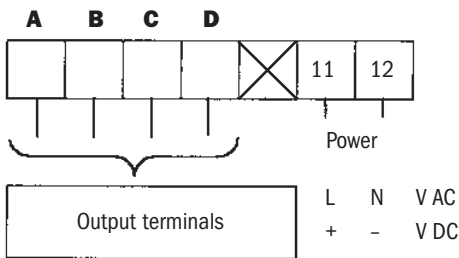
Option details

Option	Terminal 5	Terminal 6	Terminal 4	Terminal 4.1	Terminal 4.2
1	Common (-)	I 1(+)	HART control in	P (+)	status out
2	Common (-)	I 1(+)	TX/RX	TX/RX	+ 5V
3	Common (-)	I 1(+)	HART control in	P 0° (+)	P 90° (+)
4	Common (-)	I 1(+)	HART I 2 (+)	control in	P(+)
5	Common (-)	I 1(+)	HART I 2 (+)	control in	status out
6	Common (-)	I 1(+)	HART I 2 (+)	I 3 (+)	P (+)
7	Common (-)	I 1(+)	HART I 2 (+)	I 3 (+)	control in
8	Common (-)	I 1(+)	HART I 2 (+)	I 3 (+)	status out

MFC 051

input and output connection options

Power and signal connection terminals



Option details

Option	A	B	C	D
	Terminal I1 ⊥	Terminal I1	Terminal I2 ⊥	Terminal I2
1	I1 (-)	I1 (+) HART	I2 (-)	I2 (+)
Option	Terminal I1 ⊥	Terminal I1	Terminal B ⊥	Terminal B
2	I1 (-)	I1 (+) HART	P (-)	P (+)
3	I1 (-)	I1 (+) HART	control in (-)	control in (+)
4	I1 (-)	I1 (+) HART	status out (-)	status out (+)
Option	Terminal I1 ⊥	Terminal I1	Terminal D ⊥	Terminal D
5	I1 (-)	I1 (+)	bus	bus

Input and Output Options for MFC 050 and MFC 051

MFC 050

Option	Function
1	1 x current, 1 x pulse, 1 control input, 1 x status output - HART®
2	1 x current plus Modbus
3	Dual phase frequency output, 1 x current, 1 x control input - HART®
4	2 x current, 1 x pulse, 1 x control input, HART®
5	2 x current, 1 x control input, 1 x status output - HART®
6	3 x current, 1 x pulse - HART®
7	3 x current, 1 x control input - HART®
8	3 x current, 1 x status output - HART®

MFC 051

Option	Function
1	2 x current outputs - HART®
2	1 x current, 1 x pulse - HART®
3	1 x current, 1 x control input - HART®
4	1 x current, 1 x status output - HART®
5	1 x current, 1 x Profibus PA

Standards and Approvals

MFC 050

Mechanical

Protection category (acc. EN 60529)	IP 67 equivalent to NEMA 4X
Vibration limits (acc. IEC 68.2.6)	pending

Hazardous area classifications

Remote (field) mounting (/F)

ATEX (acc. 94/9/EC)	II 2 G EEx de [ib] IIC T6 with "increased safety" terminal housing II 2 G EEx d [ib] IIC T6 with "flameproof" terminal housing
Factory mutual / CSA	Class I, Div 1 groups A, B, C, D Class II, Div 1 groups E, F, G Class III, Div 1 hazardous locations Class I, Div 2 groups A, B, C, D Class II, Div 2 groups F, G Class III, Div 2 hazardous locations

Compact (integral) mounting (/K)

This approval includes the elements of the OPTIMASS sensor to which the converter is mechanically mounted

ATEX (acc. 94/9/EC)	II 2 G EEx de [ib] IIC T6 with "increased safety" terminal housing II 2 G EEx d [ib] IIC T6 with "flameproof" terminal housing
Factory mutual / CSA	Class I, Div 1 groups A, B, C, D Class II, Div 1 groups E, F, G Class III, Div 1 hazardous locations Class I, Div 2 groups A, B, C, D Class II, Div 2 groups F, G Class III, Div 2 hazardous locations

MFC 051

Mechanical

Protection category (acc. EN 60529)	IP 67, equivalent to NEMA 4X
Vibration limits (acc. IEC 68.2.6)	pending

Hazardous area classifications

Remote (field) mounting (/F)

ATEX (acc. 94/9/EC)	II (1) 2 G EEx de [ia/ib] IIC T6 with "increased safety" terminal housing II (1) 2 G EEx d [ia/ib] IIC T6 with "flameproof" terminal housing
Factory mutual (No CSA)	Class I, Div 1 groups A, B, C, D Class II, Div 1 groups E, F, G Class III, Div 1 hazardous locations Class I, Div 2 groups A, B, C, D Class II, Div 2 groups F, G Class III, Div 2 hazardous locations

Compact (integral) mounting (/K)

This approval includes the elements of the OPTIMASS sensor to which the converter is mechanically mounted

ATEX (acc. 94/9/EC)	II (1) 2 G EEx de [ia/ib] IIC T6 with "increased safety" terminal housing II (1) 2 G EEx d [ia/ib] IIC T6 with "flameproof" terminal housing
Factory mutual (No CSA)	Class I, Div 1 groups A, B, C, D Class II, Div 1 groups E, F, G Class III, Div 1 hazardous locations Class I, Div 2 groups A, B, C, D Class II, Div 2 groups F, G Class III, Div 2 hazardous locations