M+F Technologies GmbH

MFX_4 CONTROLLER EX V4

The high-performance MFX_4 system-based flow computer meets the highest standards for flexible and reliable Office of Weights and Measures testing, for mixing and for the control of processes in liquid handling, particularly for petroleum products. With more than 30 years of operational experience and 18,000 installations, the fourth generation combines long-standing industry experience with state-of-the-art technology and uses communication standards that have never before been applied to industrial flow computers.

Because of the wide variety of different protocols and communication standards they support, all MFX_4 systems can be easily integrated, quickly configured and serviced remotely while in operation. In order to substantially expand the range of application options, the MFX_4 system-based flow computer sets itself apart with its distributed architecture consisting of centralised processing units and decentralised control units.

MFX_4 CONTROLLER

The MFX_4 Controller is the flow computer for custody transfer in an explosion-proof housing type.

The MFX_4 Controller is also available as DIN rail version.

The MFX_4 Controller offers a two-line display, which remains in operation in case of power outage [OIML requirement].

The first line always shows the measured quantity; the second line can show several configurable values, e.g. density, temperature, net volume and others.

MFX_4 Controller Ex V4

MFX_4 CONTROLLER EX V4

TECHNICAL DATA / FEATURES

Approvals	• ATEX 2014/34/EU • OIML R117-1 2007 • MID Type-Examination Certificate • PTB type approval [W&M approved] • Various other national approvals
Housing	• W 220 mm x H 200 mm D 200 mm, IP 65
Device identification	• Ⓔx II 2 G Ex d IIB T5 Gb
Weight	• 9.500 g (with cable glands)
Operating temperature	• -20 °C ... +40 °C • -25 °C ... +60 °C (Option extended temperature range)
Storage temperature	• -25 °C to +75 °C
Supply voltage	• 24 VDC ±10 % P_{typ} = 8 W P_{max} = 15 W (without using the analogue output) P_{max} = 40 W (using the analogue output 0…400 mA) Or • 110 VAC … 240 VAC P_{typ} = 8 W P_{max} = 15 W (without using the analogue output ausgangs)
Display	• Alphanumeric display; 2x16 characters LED backlight Automatic contrast tracking 5 minute display buffer in case of power outage [OIML requirement]
Interfaces	• CAN-Bus (with electrical isolation) • RS232 or RS485 (with electrical isolation)
Protocols	• CANopen • MODBUS RTU • TCP/IP via MFX_4 EDI or MFX_4 Terminal • MODBUS TCP via MFX_4 EDI
DIP switch	• For termination resistors RS485
LED (Controller)	• Power (green) • Connect (green) • CAN_T (yellow) • CAN_R (yellow) • Pulse (yellow) • Loading (yellow) • Error (red)

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SINGLE METER VERSION

Pulse input

- 1x pulse input (double pulse) (2 KHz)
- 1x pulse input (single pulse) (2 KHz)
- 4x pulse input (single pulse) (200Hz)
  when using the digital inputs 1-4

Temperature measurement

- 1x resistance thermometer PT100 4 wire

Density measurement

- 1x direct density input [frequency]
- 1x resistance thermometer PT100 4 wire
  or via 20 mA input (not calibratable)

Analogue inputs

- 2x analogue inputs 0/4 ...20 mA
  e.g.: Pressure, density measurement etc.

Analogue outputs

- 2x analogue outputs 0/4 ...20 mA
  e.g.: Flow control, blending

Load outputs

- 7x AC switching outputs (230 V)
- 8x DC switching outputs (24 V)
  If required: relay output, solid state, optocoupler

Digital inputs

- 12x digital inputs
  The digital inputs 1 to 4 can also be used as pulse inputs (max. 200 Hz).

Pulse output

- 1x pulse output evaluated (optocoupler)
  Configurable: Net volume, gross volume, mass
- 1x pulse output unweighted (optocoupler) (A/B pulse)
  Copy from pulse input

DUAL METER VERSION

Pulse input

- 1x pulse input (A/B) double pulse) (2 KHz)
  (Meter 1)
- 1x pulse input (C/D) double pulse) (2 KHz)
  (Meter 2)
- 4x pulse input (single pulse) (200Hz)
  when using the digital inputs 1-4

Temperature measurement

- 1x resistance thermometer PT100 4 wire (Meter 1)
- 1x resistance thermometer PT100 4 wire (Meter 2)

Density measurement

- yes, via 20 mA input (not calibratable)

Analogue inputs

- 2x analogue inputs 0/4 ...20 mA
  e.g.: Pressure, density measurement etc. .
  Analogue outputs

- 2x analogue outputs 0/4 ...20 mA
  e.g.: Flow control, blending

Load outputs

- 7x AC switching outputs (230 V)
- 8x DC switching outputs (24 V)
  If required: relay output, solid state, optocoupler

Digital inputs

- 12x digital inputs
  The digital inputs 1 to 4 can also be used as pulse inputs (max. 200 Hz).
  (The inputs/outputs can be divided between the two meters as desired).

Pulse output

- 1x pulse output evaluated (optocoupler)
  Configurable: Net volume, gross volume, mass
- 1x pulse output unweighted (optocoupler) (A/B pulse)
  Copy from pulse input

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MFX_4 CONTROLLER EX V4

STANDARD FEATURES

- Single or multi product operation
- Additive blending with flushing feature
- Flow control for digital or analogue valves
- Dual pulse security according to ISO 6551 Level A
- Configurable inputs/outputs
- Automatic temperature and pressure compensation
- Preset for batching with automatic trip correction
- Meter factor calculation
- Meter curve linearization (4 curves with up to 10 data points)
- Up to 10 products configurable
- Volume conversion according to ASTM Table 54A,B,D,X
- Volume conversion KOE calculation of up to 5 interpolation points
- Volume conversion KOE calculation via polynomial (method 3) (biofuel/mineral fuel/fuel oil mixtures)
- Pressure compensation of the volume
- Evaluated pulse output
- Display with multi-language capability
- Automatic error handling and error reporting
- Integrated logbook for selected processes
- Manual or automatic sequence
- Configurable I/O sequence control
- 5 level access authorisation
- Voucher storage of up to 200 transactions per meter
- Configurable control functions (PLC)

Remote maintenance via diagnostic interface

Interfaces

- Field bus communication CANopen
- LAN communication Ethernet TCP/IP via MFX_4 EDI
- Serial interfaces RS232/RS485
- OPC server via MFX_4 EDI, Modbus RTU, Modbus TCP via MFX_4 EDI

OPTIONAL FEATURES

- Density measurement via frequency from density transmitter
- Density measurement via 0/4 ... 20mA from density transmitter
- Inline blending -> ratio, side or sequential (with flushing feature)
- Multi-product blending [max. 4 products]
- Additive blending via integrated controller (analogue and digital) for max. 10 additives
- Pipeline applications
- Volume comparison for leak detection
- Master meter function
- PC-based functions:
  - MPC Pipeline measuring systems and prover system
  - Master meter function
  - UPC 2000 (data memory approved for custody transfer)

- PC-based service functions:
  - MFX_4 Explorer for unit configuration
  - Remote maintenance and diagnostic tool

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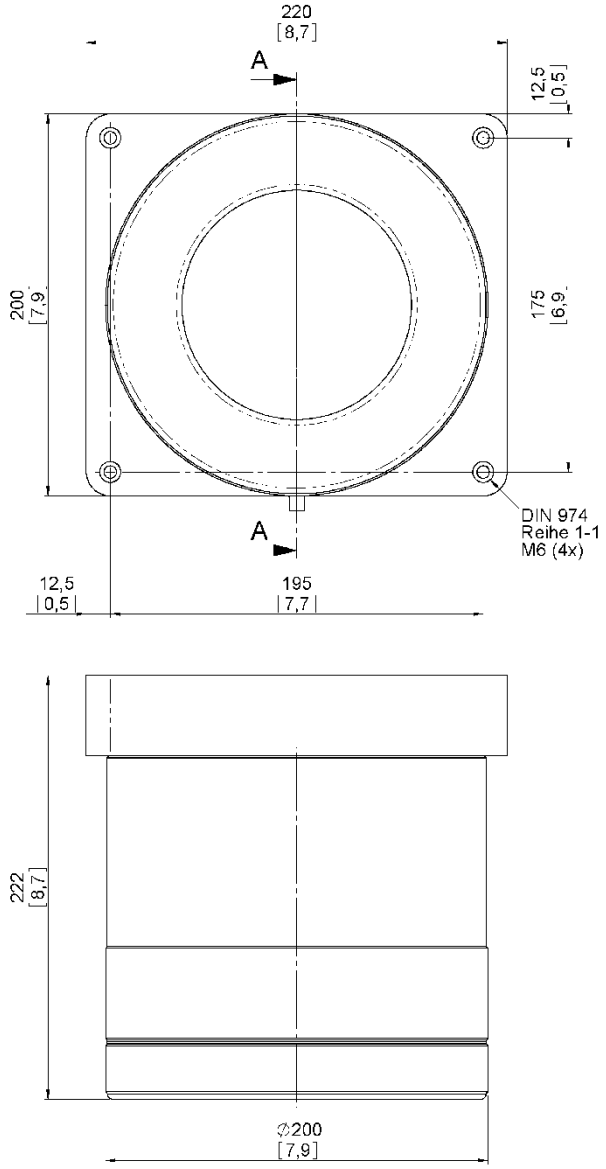
PRODUCT KEY / OPTIONS

	4000004 + [Basic device] + [Temperature range] + [Meter] + [Software] + [I/O] + [Interface] + [Approval] + [W&M switch]	
Basic device	P230 P024	Power supply 110/230 VAC ±10 % 50/60 Hz Power supply 24 VDC ±10 %
Temperature range	TR1 TR2	-20 °C ... +40 °C (Standard) -25 °C ... +60 °C (Extended)
Meter	CH1 CH2	Single Dual
Software	SW00 SW01 SW02 SW03 SW04 SW05 SW06	Meter Controller + Additive Blending Controller Density Pipeline Pipeline leakage detection Master meter Master meter (duty meter)
I/O	ADR R13 4A9 4D9 2SAC	7 AC relays + 8 DC relays 13 relays 4 Solid state (AC) + 9 relays 4 Solid state (DC) + 9 relays 2 Solid State(AC) + 11 relays
Interface	RS232 RS485	RS232 RS485
Approval	C0 C1 C2 C3 C5 NMI BEV	without extended factory pre-test OIML, MID/ OIML, MID National, under German law Preliminary test certificate Factory certification acc. to EN 10204 Approval NMI (Australia) Part Certificate (BEV)
W&M Switch	EICHSW	Externeral W&M switch

MFX_4 CONTROLLER EX V4

DIMENSIONS



* Dimensions in millimeter [inch]

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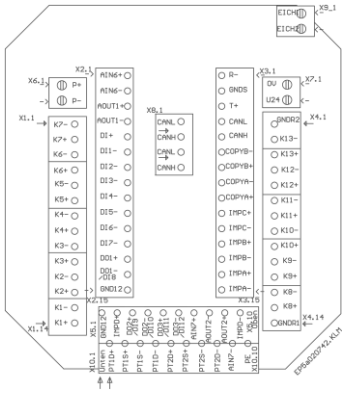
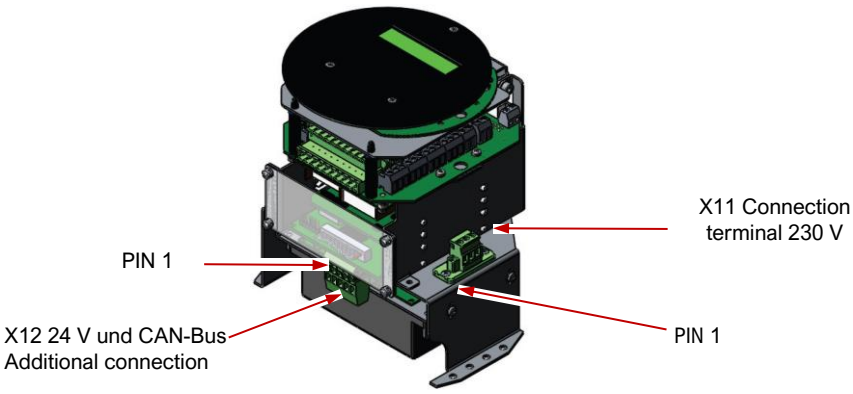
PIN CONFIGURATION





PIN	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
1		AIn6+	R-		GND12	P+	0V	CANL	EICH1	PT1D+	L	0V
2		AIn6-	GNDS		IMPD+	P-	U24	CANH	EICH2	PT1S+	PE	CANL
3		AOut1+	T+		DO2+ / DI9			CANL		PT1S-	N	SH
4		AOut1-	CANL		DO2- / DI10			CANH		PT1D-		CANH
5		DI+	CANH		DO3+ / DI11					PT2D+		24V
6		DI1-	CopyB-		DO3- / DI12					PT2S+		
7		DI2-	CopyB+		AIn7+					PT2S-		
8		DI3-	CopyA-		AOut2-					PT2D-		
9		DI4-	CopyA+		AOut2+					Ain7-		
10		DI5-	IMPC+		IMPD-					PE		
11		DI6-	IMPC-									
12		DI7-	IMPB+									
13		DO1+	IMPB-									
14		DO1- / DI8	IMPA+									
15		GND12	IMPA-									

PIN	X1			
	ADR	R13	4A9	4D9
1	GNDR	K7-	K7-	K7-
2	GNDR	K7+	K7+	K7+
3	K8-	K6-	K6-	K6-
4	K7-	K6+	K6+	K6+
5	KD+	K5-	K5-	K5-
6	K6-	K5+	K5+	K5+
7	K5-	K4-	K4-	K4-
8	KC+	K4+	K4+	K4+
9	K4-	K3-	K3-	K3-
10	K3-	K3+	K3+	K3+
11	KB+	K2-	K2-	K2-
12	K2-	K2+	K2+	K2+
13	K1-	K1-	K1-	K1-
14	KA+	K1+	K1+	K1+

X4			
ADR	R13	4A9	4D9
K9_AC	GNDR2	GNDR2	GNDR2
K9_AC	K13-	K13-	K13-
K10_AC	K13+	K13+	K13+
K10_AC	K12-	K12-	K12-
K11_AC	K12+	K12+	K12+
K11_AC	K11-	K11-	K11-
K12_AC	K11+	K11+	K11+
K12_AC	K10-	K10-	K10-
K13_AC	K10+	K10+	K10+
K13_AC	K9-	K9-	K9-
K14_AC	K9+	K9+	K9+
K14_AC	K8-	K8-	K8-
K15_AC	K8+	K8+	K8+
K15_AC	GNDR1	GNDR1	GNDR1

Options for relay print:

ADR	7 AC relays+ 8 DC relays
R13	Relay board with 13 relays
4A9	4 AC solid state relays + 9 relays
4D9	4 DC solid state relays + 9 relays

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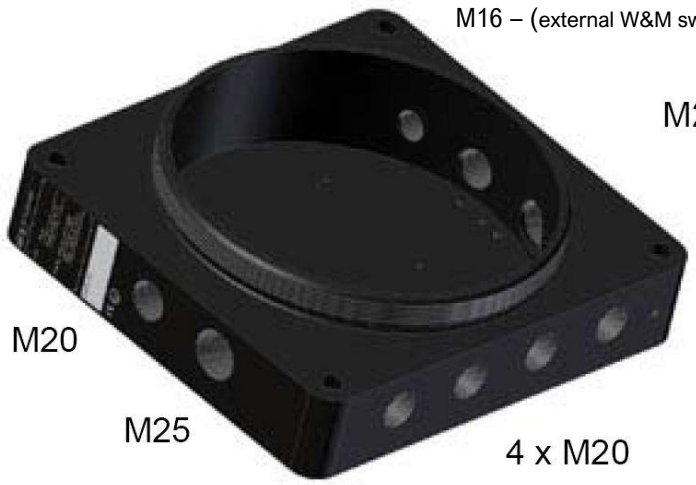
CABLE GLANDS



6 x M20
2 x M25
(1 x M16 (External W&M Switch))

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