

# FM-2D/K

## Frequency Converter Flow-totalization of 2 water meters



### Description

The FM-2D/K is a  $\mu$ P-controlled frequency converter with two pulse inputs. It can be applied in linking the signals of two input pulses with flow direction signals.

### Application

- Flow accumulation
- Forward and reverse totalization
- Flowrate indicator
- Monitoring of limit values
- Remote reading
- Remote transmission
- Dosing
- Automation
- For single or compound meters

### Special Features

- Two freely programmable pulse outputs with flow direction processing
- Variable pulse provider types connectable
- Current output freely scaleable and separated for forward and reverse flow
- Output for current type with direction identification (-20 mA...+20 mA)
- Separate relay outputs for forward and reverse volumes
- 2 Opto-coupler outputs used for pulses and direction signals or limit value 1 and limit value 2
- Pulse divisor for pulse output, adjustable
- Integrated LC-Display for the display of volume, momentary flowrate and programming data
- M-Bus/Minibus-Data connection for reading of instant values
- Programmed data is retained after power failure
- Galvanic isolation from supply, entry and output
- Programmable on site by 5 buttons
- Test mode as installation help
- Housing equipped for wall or top hat railing

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# Description of Symbols

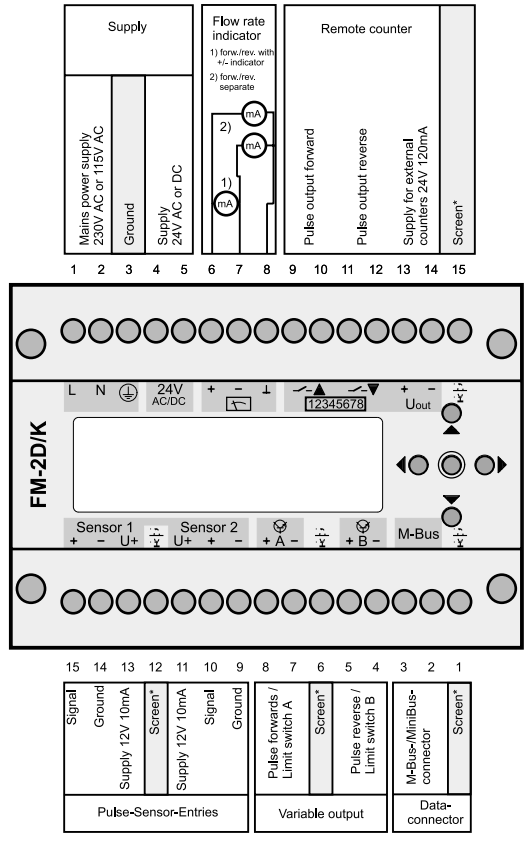
## Symbols

- 100 Loop programming
- 100 Loop reading of programming values
- Loop reading of meter values
- Loop reading of statistics values

## Symbols of status line (bottom line)

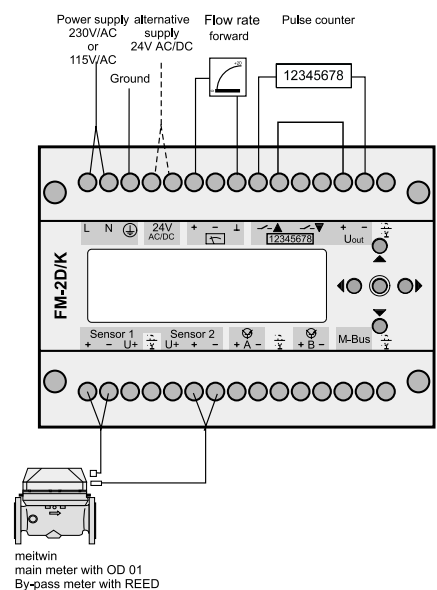
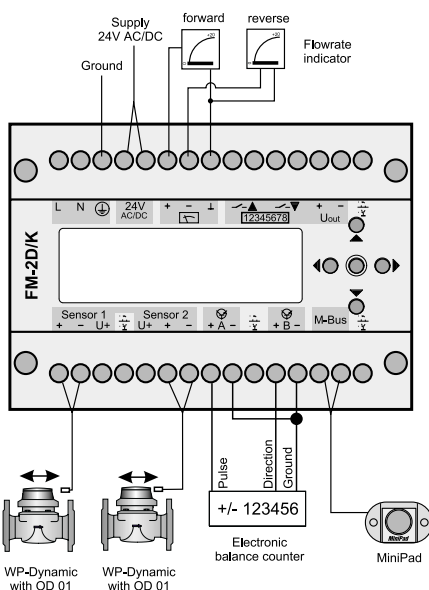
- A Loop programming
- B Loop reading programming data
- C Loop reading meter values
- D Loop statistics values
- Programming data stored
- Programming data can be changed
- $\Sigma$  Summation of pulse inputs
- $\Delta$  Subtraction of pulse inputs
- E  $\Pi$  Choice of sensor type
- E1= $\Pi$  Pulse value sensor 1
- E2= $\Pi$  Pulse value sensor 2
- + - 100 Qmax (corresponds to 20mA)
- + -  $\dots$  Current output and damping
- $\wedge$   $\nabla$   $\square$   $\square$  Limit switches and hysteresis
- =  $\Pi$  Pulse value Optocoupler output
- 0= Start index
- $\sim$  =  $\Pi$  Pulse value and status of relays output
- K=? Optocoupler output
- Test Test mode
- + - Reading balanced volume and current flowrate
- Reading balanced volume
- + - Reading current flowrate
- R Reading reverse volume
- + -  $\uparrow$  Extreme value Maximum (resetable)
- + -  $\downarrow$  Extreme value Minimum (resetable)
- + -  $\uparrow$  1 Extreme value Maximum 3 hour value
- + -  $\downarrow$  1 Extreme value Minimum 3 hour value
- \* upper limit is passed
- \* lower limit is passed
- \* \* current value is within the limits
- + Display of active buttons

# Connection Diagram



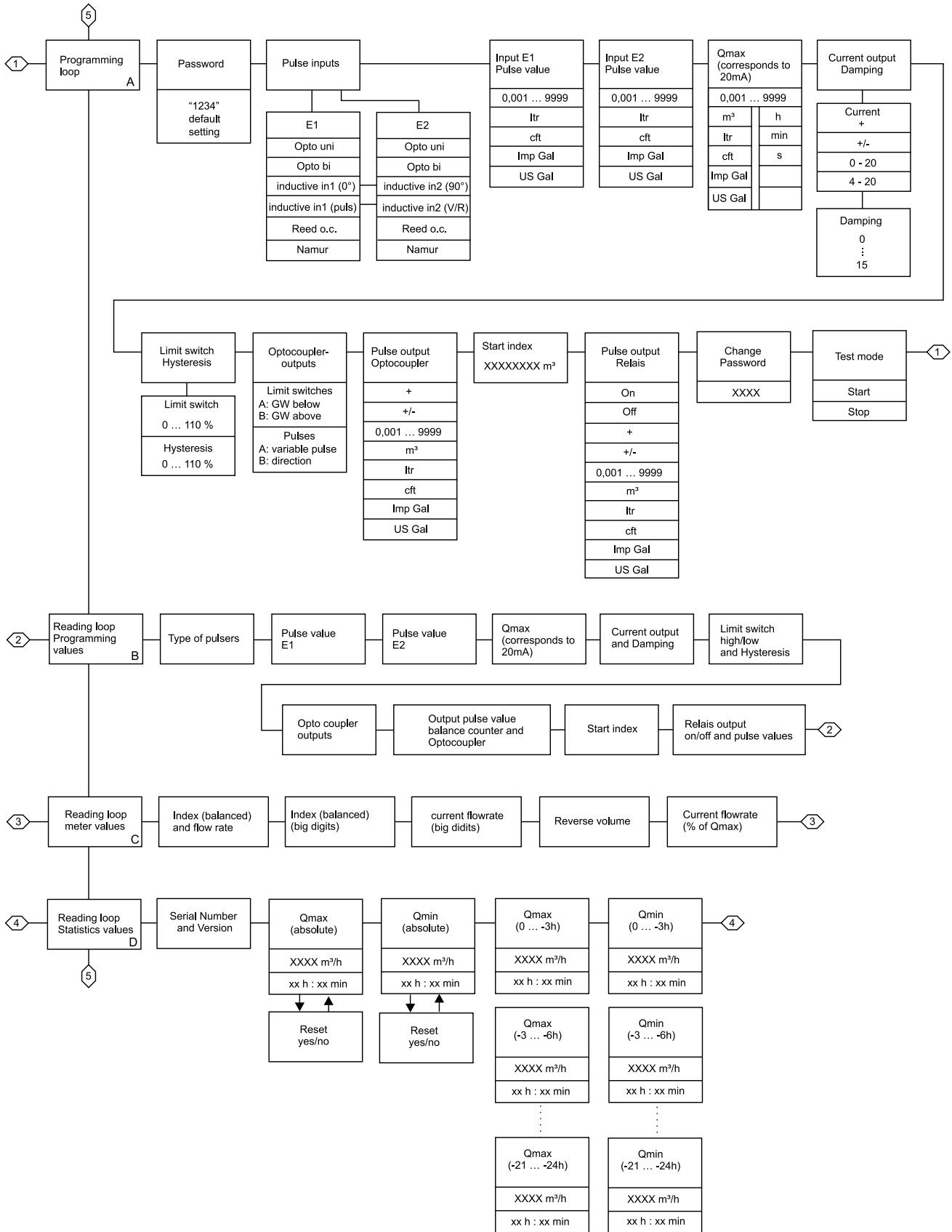
For cable length's more than 3 m we propose to use screened cable for all inputs and outputs

# Connection Examples



## FM-2D/K

# Menu Structure FM-2D/K



# Technical Data

## Power supply

230 V AC (209...253 V), 115 V AC (105...126V),  
24 V DC (20...27 V), 24 V AC (17...27 V)

## Power consumption

8 VA

## Dimensions

100 x 73 x 124 mm (W x H x D)

## Weight

approx. 650 g

## Protection class

Housing IP 40; Terminals IP 20

## Temperature range

operation: 0 ... +50 °C  
storage: -10 ... +80 °C

## Input

Universal sensor input for Opto-pulser (Namur EN 50227), Reed- and open-collector-pulser  
8.2 V, approx. 1kOhm

Auxiliary voltage for feeding 3-wire sensor  
12 V, 10 mA

## Input frequency range

0 ... 300 Hz  
(0 ... 150 Hz Flow direction identification)

## Maximum cable length

approx. 6 km  
(depending on cable quality and pulser type)

## Contact bounce suppression

automatic  
(depending on the input frequency and sensor type)

## Output

### Current output

0 ... 20 mA or 4 ... 20 mA (selectable)

### Load

max. 1000 Ohm (at nominal supply voltage)  
(max. 700 Ohm with connected 3-wire pulser)

### Response time

16 step selectable (no damping = 0, max. damping = 15)

### Max. transmission distance

approx. 14 km at 500 Ohm-load with a cable cross section of 1 mm<sup>2</sup>

### Relay-pulse output

Relay closed, max. 48 V AC/DC, 1 A voltage free, closure time 400 ms, max. 1 Hz, pulse value free selectable

### Max transmission distance

approx. 500 m with direct connection  
approx. 12 km with transistor relay

### Opto-coupler outputs

max. 30 V, 30 mA, 150 mW, digit pulse 500 µs transmitted  
Direction and limiting value continuous contact

### M-Bus output:

in compliance with IEC 870

## Display

### Liquid crystal display(LCD):

- Momentary flowrate
- Counter reading
- 8 Maximum-values (3 hour interval of the last 24 hrs); resettable
- 8 Minimum-values (3 hour interval of the last 24 hrs); resettable

### Programming data:

- Flowrate range
- Input pulse validity
- Output pulse validity
- Standardized current range 0/4 ... 20 mA
- Response time(16-levels)
- Limit value

## Calibration

5-input keys used in conjunction with LCD, configurable program protection

## Lightning protection

To protect the device from voltage surges caused by lightning, installation of lightning protection devices is recommended.

## Intrinsic safety

If the water meter / pulser is to be installed in a hazardous area the FM-2D/K must be installed in a safe area with the pulser inputs isolated by means of suitable transistor relays.