EM-416 Mbus

Single Phase 2 module energy meter [direct connect]

KEY FEATURES

Single phase metering

The EM-416 is single phase kWh MBus meter with a LCD display in a 2 module (36mm) casing, ensuring a high accuracy class (Class1)

Low starting current which makes it exceptionally suited for photovoltaic energy

Excellent long-term stability which is designed for DIN, IEN and EN standards and 1 year warranty.

MID B & D approval which ensures the meter is produced to the highest European and International standards and the meter is legally suited for all applications

For connection rate of up to 80A

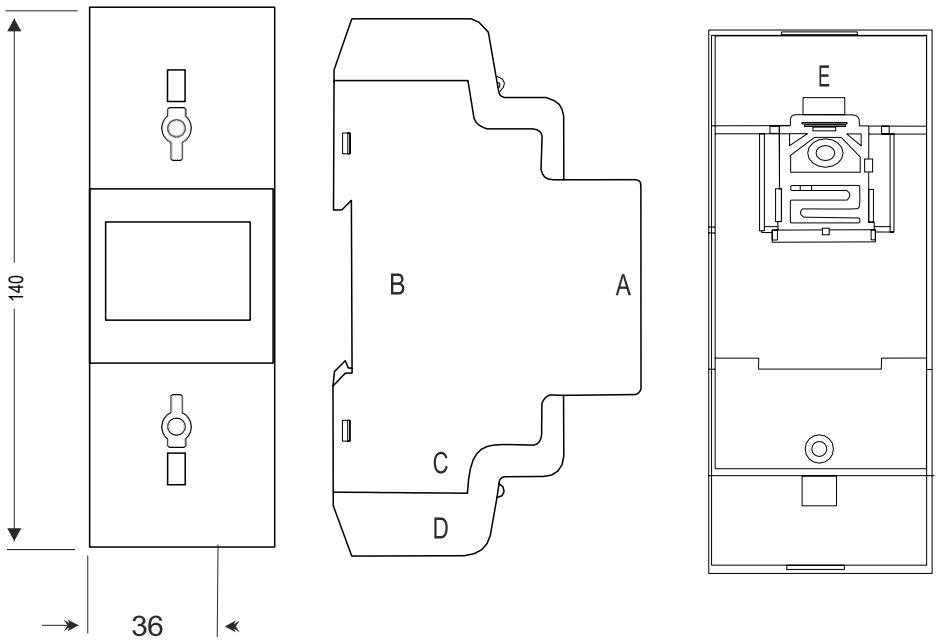
MBus Communication

METER SPECIFICATION

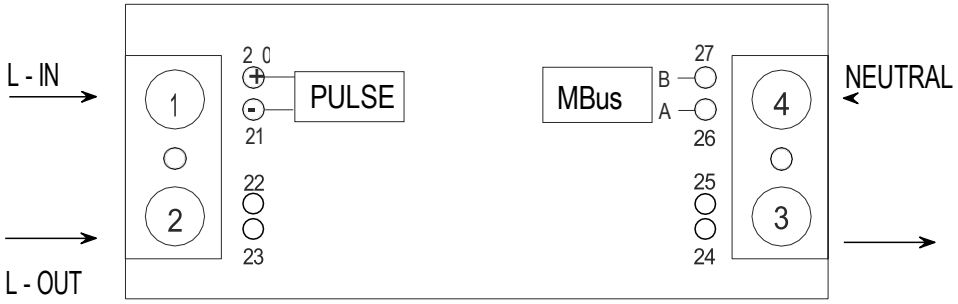
Performance Criteria	
Operating Humidity	≤ 75%
Storage Humidity	≤ 95%
Operating Temperature	-25°C to +55°C
Storage Temperature	-30°C to +70°C
International Standard	EN50470-3
Accuracy Class	1
Ingress Protection rating	IP51
Insulating encased meter of protective class	II

Specifications			
Nominal Voltage (Un)	230V AC	**Operational frequency range**	50Hz ±10%
Operational Voltage	195-253V AC	**Internal power consumption**	≤2W /10VA
AC voltage withstand	4KV for 1 minute	**Test output flash rate (RED LED)**	1000imp/kWh
Impulse voltage withstand	4KV - 1.2µ S waveform	**Pulse output rate (pins 20&21)**	1000imp/kWh
Basic Current (Ib)	5A	**Consumption indicator (RED LED)**	Flashing at load running
Max. rated current (Imax)	80A		
Operational Current range	0.4% Ib-Imax	**Dimensions**	
Over current withstand	30Imax for 0.01s	**L x W x H (mm)**	140 x 36 x 70

DIMENSIONS AND INSTALLATION



A	LCD
B	Terminal block
C	Case
D	Protection Cover
E	Security Clasp



1 & 2	Phase Line IN & OUT
3 & 4	Neutral IN/OUT
20 & 21	Pulse output contact
26 [A]	M-Bus A
27 [B]	M-Bus B

TECHNICAL DESCRIPTION

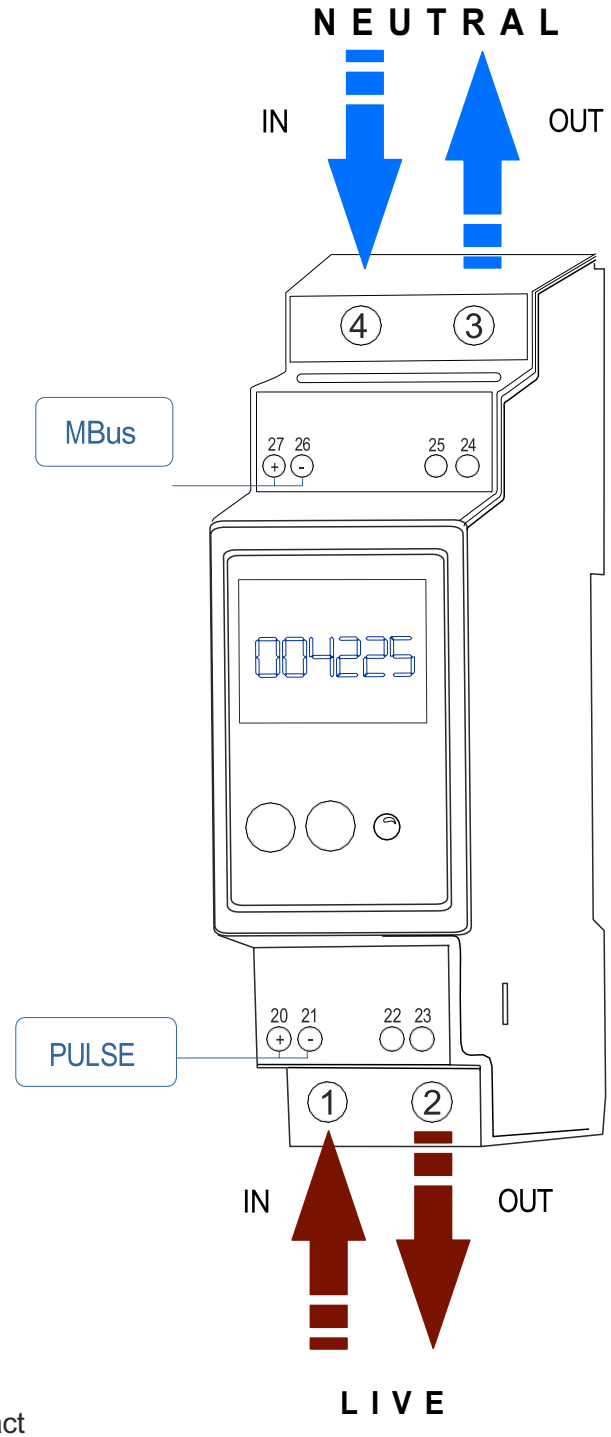
Energy Use indicator

There is a red LED on the front panel which indicates power consumption. When power is consumed, the LED will flash. The faster the LED flashes, the more power is consumed. For this meter, the LED will flash 1000 times per kWh.

Reading the meter

The energy meter is equipped with a 5+1-digit LCD which is used to record consumption and cannot be reset to zero. The display has 5 digits before and 1 decimal after the dot on the display. The reading resolution is 1/10 kWh. For this meter, the LED will flash 1000 times per kWh.

INSTALLATION DIAGRAM



230V

1 & 2 = LIVE IN/OUT

3 & 4 = NEUTRAL IN/OUT

20 & 21 = Test Pulse output contact

26 & 27 = A & B M-Bus1, M-Bus2 contact

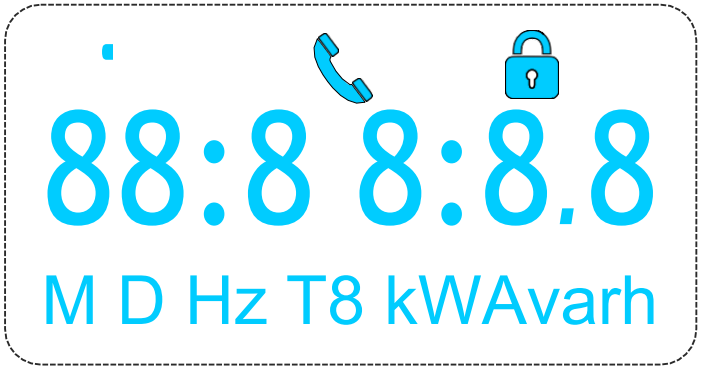
SO Output
0.001kWh/imp (default), 0.001kWh/imp, 0.01kWh/imp, 0.1kWh/imp, 5kWh/imp, 10kWh/imp

M-Bus Communication Specifications

Bus Type	Mbus
Baud Rate	2400 (default), 4800, 9600
Range	≤ 1000m 64PCS
Downlink signal	Master to slave, Voltage modulation
Uplink signal	Slave to master, Current modulation
Cable	JYSTY (n x 2 x 0.8)
Protocol	EN13757-3
Max. number of meters	64*

DISPLAY FUNCTION

Cycle display status, Display cycle can be set within 5~20 seconds, the default is 5 seconds. The display items as following:



Negative symbol. Total energy, Reverse Energy, Current, Active Power, Negative power, Apparent power

Communication symbol. This symbol will appear for 1 second when communicating through to the M-Bus

Lock symbol. Only for the Accumulated method of total energy values

M D — Only applied to specific models of the meter

Hz — Frequency symbol

T8

kWAvarh — This symbol can show the following combinations depending on the selected view.

KW
V
A
kWh
Var
VA

The following variables can be readout in the order as described below from the display (Total Σ) active energy may be positive or negative, forward active energy, reverse active energy, tariff 1 total active energy, tariff 2 total active energy, accumulated method for total active energy, pulse output rate code (table in section 11.5), Mbus baud rate, meter ID, meter serial number, Current, Voltage, Frequency, active Power, Reactive power, Apparent power, Power factor.

BACKLIGHT

You have three options to choose from:

1. The backlight is constantly on

2. The backlight is constantly off

3. The backlight turns on when you press the SET button

In order to set the backlight option, you:

1. press the program button (left button just under the meter display) for several seconds.

2. the display will show “set”

3. in order to select the right program, press the right button (just under the display), so you can go upward or downward (LED1=the backlight is constantly on,
LED2=the backlight is constantly off,
LED3= the backlight turns on when you press the SET button)

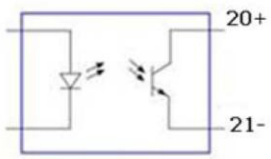
4. in order to save the option, you press the left button (just under the display). After a few seconds the word “end” will appear in the display. The button should be kept pressed until you get the measurement energy value on the display.

PULSE OUTPUT

The energy meter is equipped with a pulse output which is optically isolated from the inside circuit.

It generates pulses in proportion to the measured consumption for purpose of remote reading or accuracy testing.
The pulse output is a polarity dependent, open-collector transistor output requiring an external voltage source for correct operation.

For this external voltage source, the voltage (Ui) should be lower than 27V DC and the maximum switching current (Imax) is 27mA.
To connect the impulse output, connect 5-27V DC to connector 3+ (collector), and the signal wire (S) to connector 2- (emitter).



20+ = emitter
21- = collector

=light bundle from the LED

The pulse output is 1000 per kWh and is settable using the MBus communication protocol.
The table below outlines the possibilities.

SO pulse output can set through 485 , there are 5 possibilities

SO	the speed of pulse output (kwh/pulse)	Number of pulses per kWh
1	0.001(default)(kwh/pulse)	1000
2	0.01 (kwh/pulse)	100
3	0.1(kwh/pulse)	10
4	1 (kwh/pulse)	1
5	10 (kwh/pulse)	1 pulse per 10kWh