EMU Allrounder

The multifunctional 5 module (90 mm) width, 3-phase energy and power meter, EMU Allrounder for direct connection up to 75 A, or current transformer /1 or /5 A with S0 Impulse output for active energy. The key measurement values can be read on the display.
The Allrounder collects active energy (kWh), with an accuracy of 1 %. This conforms to accuracy class B, as per MiD.

- MiD B + D approval for billing purposes ex-factory
- 1 or 5 A current transformer connection for up to 20’000/5 or 4’000/1 A
- Direct connection up to 75 A
- Control input for high and low tariff, double tariff
- Optional up to 4 tariffs
- High performance Opto Power MOSFET S0 Impulse output, 5–400V AC or V DC, max. 90 mA
- Graphic LC-display (60x30 mm) with background lighting
- 8-digit display with one decimal place 0000000.0 kWh
- Mounting on 35 mm DIN rails
- Own consumption just 0.8W/phase
- Accuracy class B (+/-1 %) for active energy EN50470-1, -3
- Can be read remotely via different interfaces

75 A
.../5 A
.../1 A
MiD B+D approval
kWh
DT
SOLAR

S0 Impulse output

Standard configuration S0 Impulse output
- Active energy import

Adjustable pulse rate and length

Pulse rate per kWh:	0.001, 0.01, 0.1, 1, 10, 100, 1’000 or 10’000
Pulse duration in milliseconds:	4 to 250 ms, adjustable in 2 ms-stages

Factory set configuration in energy meters for:

Direct connection:	1’000 Impulses/40 ms
Transformer connection:	10 Impulses/120 ms

Optional read-out interface

M-Bus

MiD-approval

MiD B+D approval

As per MiD modules B + D for billing purposes ex-factory.

Examples of use

- Cost centre billing
- Ventilation and heating facilities
- Building services management system
- Energy management

Display data

	Total 3 phases	Per phase	Per tariff
Active energy import (kWh)	•		•
Active energy import (kWh) resettable	•		•
Active power (kW)	•	•	
Current (A)	•	•	
Voltage (V) L-N		•	
Number of power failures	•		

Part No.	Description		
	Direct connection		
A0200000	EMU Allrounder 3/75	3x230 / 400V AC	MiD B+D
A020000M	EMU Allrounder 3/75 M-Bus	3x230 / 400V AC	MiD B+D
	Current transformer connection		
A1200000	EMU Allrounder 3/5	3x230 / 400V AC	MiD B+D
A120000M	EMU Allrounder 3/5 M-Bus	3x230 / 400V AC	MiD B+D

Energy meters with 0.5 % accuracy, for deviating operating voltages or with other display data, for instance apparent power, can be supplied on request.

EMU Professional and EMU Allrounder

With the EMU Professional and the EMU Allrounder we are setting new benchmarks in the DIN-rail energy meter sector. Via a wide variety of read-out interfaces different measurement readings can be communicated. Via your Internet browser and IP address you can conveniently analyse the load profile and up to 245'000 stored measurement readings.

The EMU Professional and the EMU Allrounder are excellently suited for use in industrial facilities, for cost centre billing and sub-measurements, as well as performance monitoring and energy management.

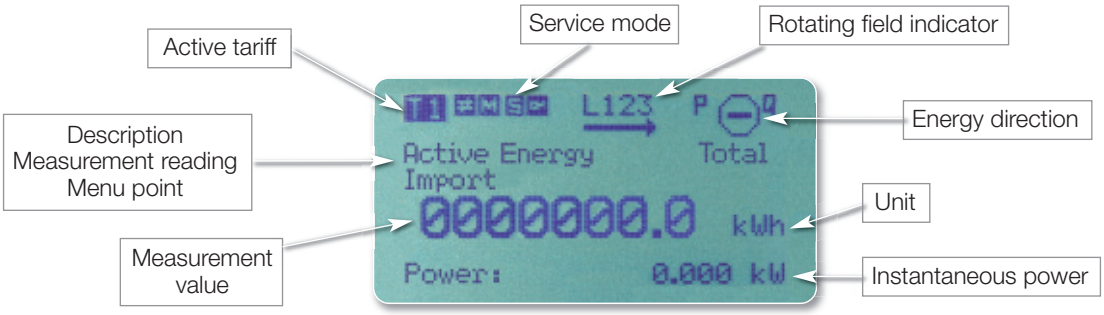
As with all EMU products this latest generation of energy meters has been designed for maximum performance, longevity, functionality and sophisticated measurement tasks. «Quality that counts – Made in Switzerland».

Read-out interfaces

The EMU Professional can be equipped with a variety of read-out modules. All read-out modules are integrated in the EMU Professional where they are protected from contamination and manipulation.
A variety of measurement readings are transferred via the Bus system, for instance active and reactive power, current, voltage, active, reactive and apparent power, power factor, power frequency, minimum and maximum values.

Operation and Display

A 60x30 mm graphic LC-display with LED background lighting makes it possible for parameters and settings to be read, and the figures are very visible. The desired menu language can be selected via the keys.
The clear and intuitive operation makes start-up and daily use of the energy meters easier.



Starting current and measurement system
Two currents are listed on the dial of every electricity meter. Nominal current I_N and limit current. 5(80)A, 5 = Nominal current, 80 = limit current.
According to EN50470-3 the maximum starting current for accuracy class B is 0.4 % of I_N.
One crucial detail: The starting current provides information regarding how much power can be consumed without the energy meter starting a measurement.

An example for accuracy class B with a nominal current of 5 and 10 amperes:

5(80) A		10(80)A	
I_N =	5 A	I_N =	10A
I_{tr} =	5/10 = 0.5 A	I_{tr} =	10/10 = 1 A
$I_{Initial\ current}$ =	0.04 * I_{tr}	$I_{Initial\ current}$ =	0.04 * I_{tr}
$I_{Initial\ current}$ =	0.04 * 0.5 A	$I_{Initial\ current}$ =	0.04 * 1 A
$I_{Initial\ current}$ =	20 mA/Phase	$I_{Initial\ current}$ =	40 mA/Phase

Starting current EMU direct connection energy meter: 9 mA/Phase
Starting current EMU transformer connection energy meter: 1 mA/Phase

Nominal current I_N
The nominal current provides information about the internal measurement system and has an impact on the approval on the starting current of the electricity meter.

Limit current I_{max}
The limit current is the highest current with which the electricity meter fulfils the precision requirements as per the European EN50470-1 standard. Exceeding of the limit current increases errors in measurement. Our electricity meters are designed for steady load with limit current.

Accuracy class
The following deviations recently apply for accuracy classes according to MiD:
Accuracy class A: +/–2 %
Accuracy class B: +/–1 %
Accuracy class C: +/–0.5 %

MiD approval B + D and ISO9001
EMU Professional and EMU Allrounder have been checked and approved in accordance with MiD modules B + D (Measurement Instrument Directive).
With additional certification according to module D, QM system for manufacture and final inspection, all EMU Professional and EMU Allrounder can be utilised ex factory for billing purposes within the European Union. EMU Electronic AG is ISO9001 certified and external audits are carried out annually. An official ISO audit takes place every 3 years.

M-Bus Interface

The M-Bus interface is integrated into the energy meter, as per EN13757-2, -3 (formerly EN1434-3) and provides protection against contamination and manipulation.

Read-out data and configuration

There is a variety of read-out data available on the M-Bus such as active power and reactive power, current, voltage, form factor and net frequency.
The control keys on the energy meter allow primary and secondary addresses and baud rate to be set.
The read-out data can be parametrised with our free EMU MB-Connect software. This means you can put together your own individual M-Bus protocol.
The M-Bus load of the EMU Allrounder and EMU Professional is 1.5 mA or a standard load.

Bus connection and cable type

The M-Bus cable is connected to a 2-pole terminal for flexible and rigid cables. The best cable available must be selected for each unit.
M-Bus cabling should be as short as possible and be located a few centimetres away from the power supply system.
Recommended cable type: telephone cable, twisted pair, shrouded,
Type: JY(St)Y 2x0.5 to 1.5 mm^2

Cable lengths and cable type as per EN13757-2:

Total cable length (capacitive length)	Distance between bus participants (resistive length)	Wire cross-section	Number of M-Bus slaves (standard-loads)	Max. Baud rate
1'000 m	350 m	0.5 mm^2	250 64	9'600 Baud 38'400 Baud
4'000 m	350 m	0.5 mm^2	250 64	2'400 Baud 9'600 Baud
5'000 m	3'000 m	1.5 mm^2	64	2'400 Baud
7'000 m	5'000 m	1.5 mm^2	16	300 Baud
10'000 m	10'000 m	1.5 mm^2	1	300 Baud

Data transmission rate

Via M-Bus the EMU Professional and EMU Allrounder communicate on 300, 600, 1'200, 2'400, 4'800 and 9'600 Baud.

Technical data EMU Professional and EMU Allrounder

Measurement accuracy

Active energy	Class B (1 %) as per EN50470-3
Active energy transformer connected meter	Class C (0.5 %) as per EN50470-3 Optional
Reactive power	Class 2 (2 %) as per EN62053

Operating voltage

3x400/230 VAC	+/-20 %

Additional voltage ranges available on request.

Maximum current

Direct-metering meters	75 A
Transformer-connected meter	10 A

Starting current

Direct-metering meters	<9 mA at cosϕ 1
Transformer-connected meter	<1 mA at cosϕ 1

Own consumption

Voltage circuit	0.8 VA / 0.8W per phase
Current path transformer-connected meter	0.03 VA per phase

Network frequency

Nominal frequency	50Hz / 60 Hz
Limiting frequency	40–65Hz

Back-up fuse

Direct-metering meters	max. 75 A
Transformer-connected meter	max. 10 A

Current and voltage connector

Current path – cable cross section	1–25 mm^2
Recommended torque	2 Nm, max. 3 Nm
Transformer connected meter	
Cable cross section	0.5–16 mm^2
Recommended torque	1 Nm, max. 2 Nm

Adjustable transformer ratios

Current transformer /5 A	5/5 A to 20’000/5 A in 5 A-stages
Current transformer /1 A	1/1 A to 4’000/1 A in 1 A-stages

Display

LCD display	8-digit with one decimal place 9999 999.9
Details	White backlight, LCD graphics
Dimension (WxH)	60x30 mm
Red calibration LED	10 pulses per Wh/10 pulses per varh

S0 Impulse output

Standard specifications	EN62053-31
Switching voltage/current	5 to 400 V DC and V DC, max. 90 mA
Output	Potential-free
Pulse rate per kWh/kvarh	0.001, 0.1, 1, 10, 100, 1’000, 10’000 pulses
Pulse length	4 to 250 ms, adjustable in 2 ms-stages Impulse rate and length can be adjusted on the meter
Connection	
Connection cross-section	0.5–2.5 mm^2
Torque	0.5 Nm, max. 1 Nm

Casing

Casing material	Polycarbonate, halogen-free, recyclable
Case protection type	IP20
Protection class	II
Dimensions (LxWxD)	90x90x60 mm

Environmental conditions

Operating temperature	-25 °C … + 60 °C
Threshold temperature	-40 °C … + 70 °C
Relative humidity:	≤80 % bei 40 °C, non-condensing

Assembly

Location	Irrespective
Assembly	On 35 mm DIN-rails or with front installation structure
Weigh	Approx. 400 g

Tariff control

Switch-over voltage	230V AC, others on request

Data retention

Without voltage Minimum 10 years	In Up Flash or Eeprom

Optical D0 (IR) interface

Standard specifications	EN62056-21

Optional data interfaces

M-Bus	EN13757-2, -3
BACnet IP	ISO/IEC 16484-5
KNX	ISO/IEC 14543-3

M-Bus

Standard specifications	EN13757-2, -3
Power consumption	1.5 mA, standard load
Cable cross-section	0.5–2.5 mm^2
Secondary address	8-digit 00000000–99999999
Primary address	0 to 250
Baud rate	300, 600, 1’200, 2’400, 4’800 and 9’600 Baud
Configuration	Via buttons or EMU MB-Connect Software
Read-out data	Configurable via EMU MB-Connect Software

Safety information

Current transformer meter	Current transformers should not be operated open, since high voltages may occur. This may cause damage to people and materials.

February 2014. Subject to modifications and amendments.