EMU Professional

If the person in charge of the welding facility does not switch off machinery at closing time, if your Chief Financial Officer constantly takes the elevator, instead of using the stairs and the owner leaves his new wide-screen TV on all day, then your business is wasting energy. This is where we come into play. With our new energy meter EMU Professional energy usage and savings potentials can be seen at a glance.

EMU Professional is a multifunctional energy and power meter, just 90 mm (5TE) width, with outstanding flexibility and accuracy. Via direct or current transformer connection it helps to analyse and monitor a variety of parameters in the most exacting applications in the residential, business and industrial sectors. It combines the functions of a multi-meter, a power and energy meter and a data logger.

With the TCP/IP module you can see all the parameters via a password-protected website. Or, even simpler – when defined measurement readings are exceeded or fall below thresholds, the module sends an e-mail or SMS.
EMU Professional is manufactured in accuracy class B (+/-1 %), with class C (+/-0.5 %) available upon request by the client.

- Peak demand optimisation
- Maximum-Alert
- Contact for energy direction
- 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

Examples of use

- Cost centre billing
- Load optimisation
- Power monitoring with alerting
- Ventilation and heating facilities
- Central building control system
- Energy management

Display data

	Sum total 3 phases	Per phase	Min. measured value	Max. measured value	Per Tariff
Active energy import (kWh)	•	•			•
Active energy export (kWh)	•				•
Reactive energy inductive (kvarh)	•	•			•
Reactive energy capacitive (kvarh)	•				•
Active power (kW)	•	•	•	•	
Reactive power (kvar)	•	•			
Apparent power (kVA)	•	•			
Current (A)	•	•	•	•	
Voltage (V) L-N		•	•	•	
Voltage (V) L-L		•			
Performance factor (Cos Phi)		•			
Power frequency (Hz)	•				
Number of power outages	•				
Instantaneous x Min. Maximum *					•
x Min. effective power maximum					•
Date/Time	•				

*Measurement period 1, 5, 15, 30 or 60 minutes.

Optional read-out interfaces:

LAN TCP/IP · Web browser · MODBUS TCP · SMTP · BACnet · M-Bus · KNX · LON · MODBUS RTU-ASCII

Additional information available on request.

MiD-approval

MiD B+D approval

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

Peak Control and energy direction contact

An energy provider desires plannable and consistent energy consumption. In order to meet short-term peak demand, power tariffs have been introduced. These are based on the highest monthly quarter-hour active power peak. Peak values cause massively increased energy costs in hotels, hospitals and in industry. This is where EMU Professional steps in and reduces the power of the selected consumer. Peak values are immediately optimised and energy costs are lowered.

Applications

- Lowers energy costs by avoiding active power peaks
- Alerts upon impending exceedance, maximum-alert
- Energy direction contact
- Prevents overloads and interruption in production process
- Photovoltaic facilities, industry, food sector, energy intensive consumer

Functionality

S0 Impulse outputs (Opto Power MOSFET, 5–400V AC or V DC, 90 mA) can be used as switch contacts. If a specific threshold value is exceeded for a set time, the switch contact is activated for a specific time.

Exceedance duration

Indicates how long a threshold value must be exceeded until the switch contact responds. 1–9999 seconds.

Discharge time

Indicates how long the switch contact is active after exceedance. 1–9999 seconds.

Threshold value

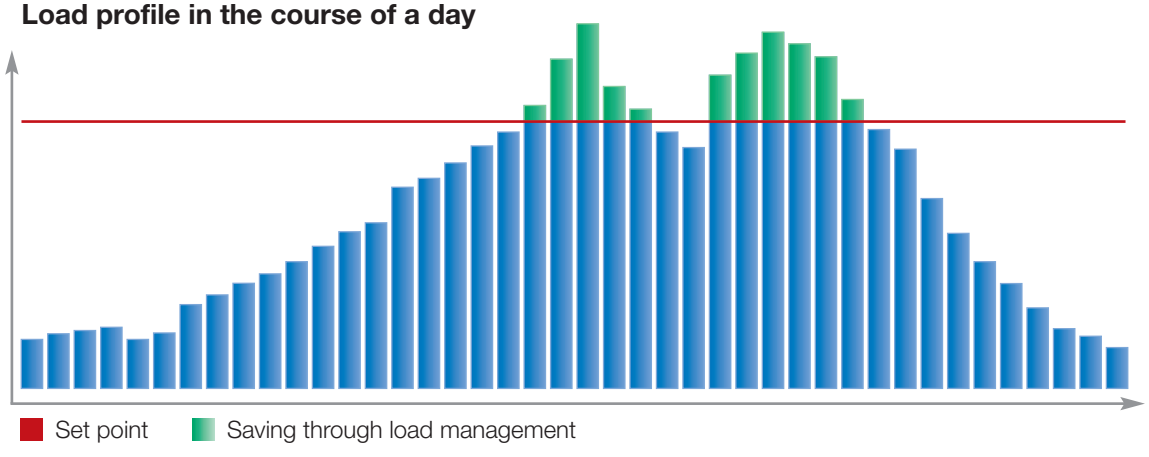
Defines which measured value is to be exceeded. Possible threshold values:

Active power total	Current total
Reactive power total	Current L1
Apparent power total	Current L2
	Current L3

Measurement period

Via digital input on the EMU Professional the measurement is synchronised with the utility. If the external control signal is absent, the internal clock begins a new measurement period.

Load profile in the course of a day



S0 Impulse outputs

On the EMU Professional there are 4 S0 Impulse outputs (Opto Power MOSFET, 5–400V AC or V DC, 90 mA) available.
With the TCP/IP module impulse outputs may be used as switches in order to switch a relay on or off. Pulse length and rate can be configured via buttons for optimum solution. pulse outputs are for active and reactive power.

Standard configuration S0 Impulse output

- Active energy import
- Active energy export
- Reactive energy inductive
- Reactive energy capacitive

  An S0 Impulse output can be supplied on request for apparent power.

Adjustable pulse rate and length

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

Factory set configuration in energy meters for:
Direct connection: 1’000 Impulse/40 ms
Current transformer connection: 10 Impulse/120 ms

Part No.	Description		
	Direct connection		
P0200000	EMU Professional 3/75	3x230 / 400 V AC	MiD B+D
P020000K	EMU Professional 3/75 KNX	3x230 / 400 V AC	MiD B+D
P020000M	EMU Professional 3/75 M-Bus	3x230 / 400 V AC	MiD B+D
P020000T	EMU Professional 3/75 TCP/IP	3x230 / 400 V AC	MiD B+D
P020000L	EMU Professional 3/75 LON	3x230 / 400 V AC	MiD B+D
P020000MO	EMU Professional 3/75 Modbus	3x230 / 400 V AC	MiD B+D
	Current transformer connection		
P1200000	EMU Professional 3/5	3x230 / 400 V AC	MiD B+D
P120000K	EMU Professional 3/5 KNX	3x230 / 400 V AC	MiD B+D
P120000M	EMU Professional 3/5 M-Bus	3x230 / 400 V AC	MiD B+D
P120000T	EMU Professional 3/5 TCP/IP	3x230 / 400 V AC	MiD B+D
P120000L	EMU Professional 3/5 LON	3x230 / 400 V AC	MiD B+D
P120000MO	EMU Professional 3/5 Modbus	3x230 / 400 V AC	MiD B+D

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

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.

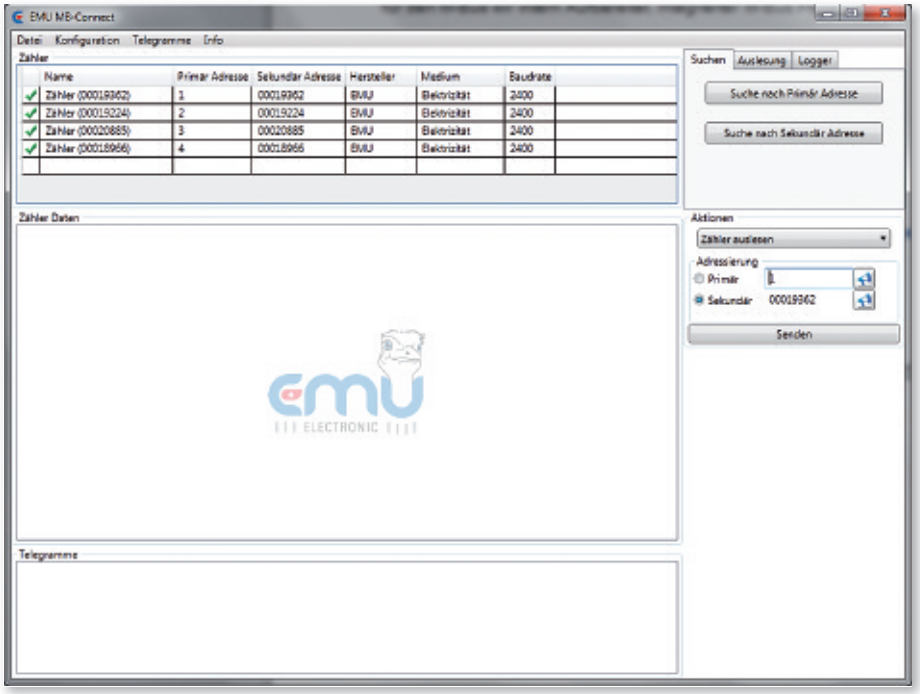
EMU MB-Connect Software

To configure the EMU energy and power meter with M-Bus interface, our free EMU MB-Connect software is available on our website.
All energy meters with an M-Bus interface according EN13757 can be configured and read by our MB-Connect. Read-out occurs manually or periodically in an adjustable interval. The selected readings can be exported to a CSV file (Comma Separated Values) and processed in Excel for instance.

Want specific read-out data for your project?
No problem. With MB-Connect you can compile an M-Bus parameter set and provide this when you place your order. We parametrise the desired read-out data for you during production.

Functions

- Checking the M-Bus installation
- Addressing energy meters
- Setting individual read-out data
- Changing the baud rate
- Analysing response times
- Automatic meter read-out
- Export of read-out data to a CSV file
- Switching on/off S0 outputs



S0 Impulse Output

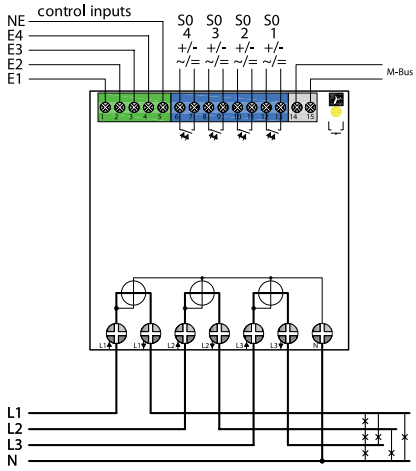
The S0 Impulse output is potential-free and makes the transmission of power possible. Impulse output is a polarity dependent, passive transistor output and to operate requires an external auxiliary voltage of between 5 and 400 V AC, or V DC. In transformer meters which have set current transformer ratios, the S0 Impulse is generated relative to effective (primary) energy consumption. The impulse rate and impulse length can be adjusted on the EMU Professional and EMU Allrounder. EMU uses an Opto Power MOSFET for S0 Impulse output. The EMU team will be happy to advise you in choosing the right pulse rate and length to prevent continuous pulse.

Optical D0 read-out interface as per EN62056-21

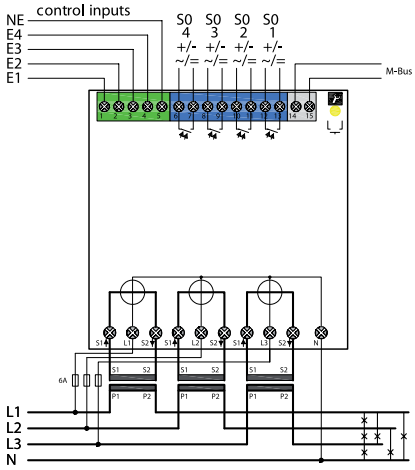
EMU Professional and EMU Allrounder have a optical (IR) D0-read-out interface as per EN62056-21. The measurement readings are transmitted on the basis of standard OBIS codes.

Wiring diagram EMU Professional and EMU Allrounder

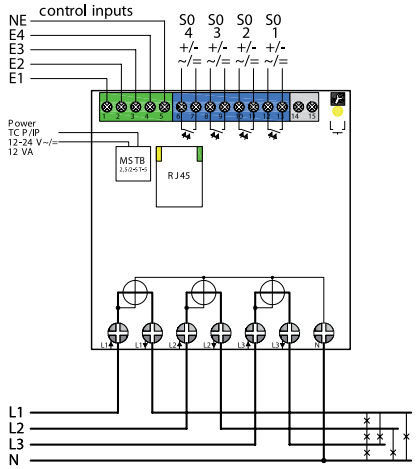
M-Bus direct connection 75 A



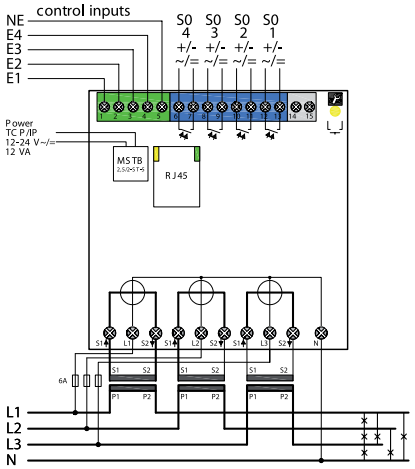
M-Bus current transformer connection



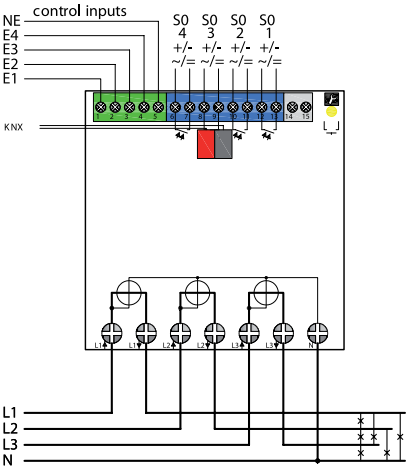
TCI/IP direct connection 75 A



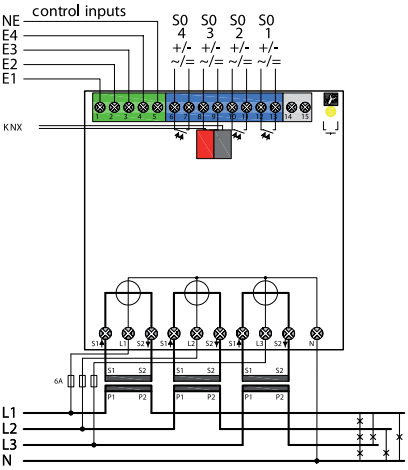
TCI/IP current transformer connection



KNX direct connection 75 A

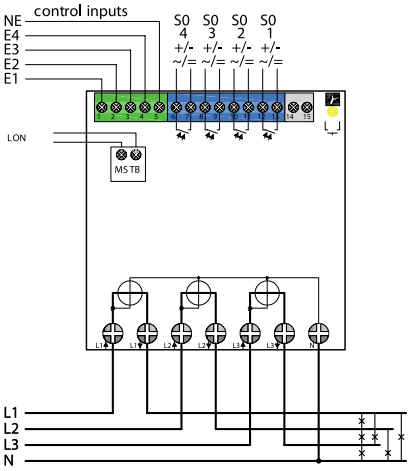


KNX current transformer connection

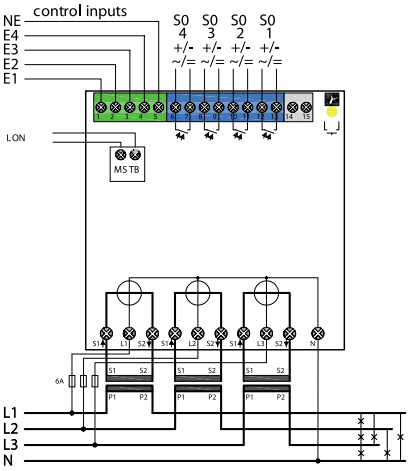


Wiring diagrams LON/Modbus

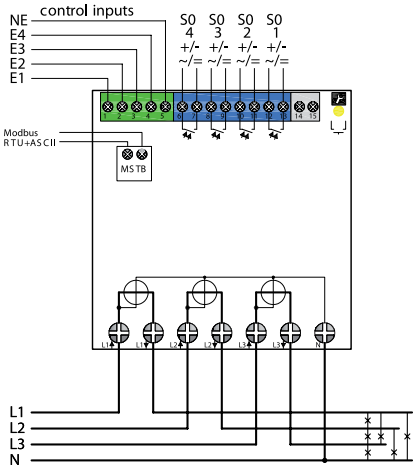
LON direct connection 75 A



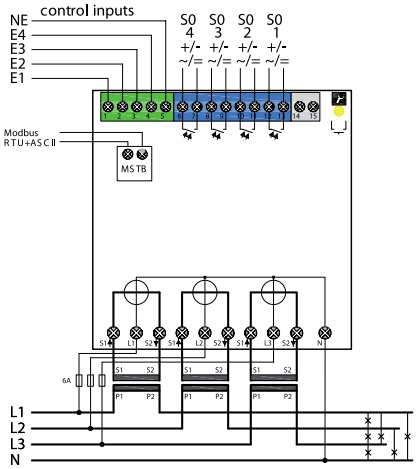
LON current transformer connection



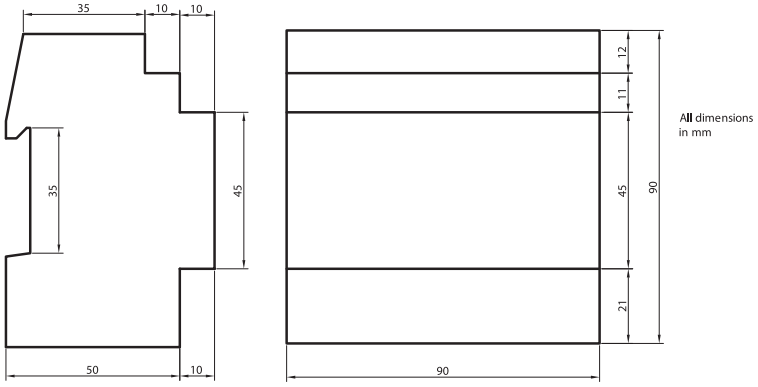
Modbus direct connection 75 A



Modbus current transformer connection



Dimension drawing



5 Module Case

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.