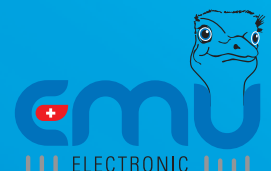


3-phase Energy and Power Meters
S0 Impulse-Logger
M-Bus Logger



Quality that counts.

Made in Switzerland





EMU Electronic AG

The Australian ratite bird emu has one specific feature. On account of its special anatomy of its legs it can never go backwards. EMU Electronic AG can't do that either. Instead, we take giant steps, like an emu, towards a new era where energy efficiency is the key to the survival of our culture.

A 2'000 Watt society is no utopia for us. The first step in any power optimisation is measurement. For over 23 years we have been developing the world's first digital energy meter. At a glance it shows the energy used by your company, your house or your holiday home in Spain, and reveals where you could save energy and costs.

Incidentally, just like the grounded emu, who cannot fly away from its habitat, we too are anchored in our homeland. That is why we develop and produce our energy and power meters, data loggers and software in Switzerland.

EMU Electronic AG was established in 1989 as a spin-off of Landis & Gyr. The founders Eberli and Muntwyler developed the world's first digital energy and power meters.

Our strengths

- Our motivated teams are efficiently organised, which makes us fast and flexible.
- EMU Professional and EMU Allrounder are Swiss made. Thanks to high-quality components you stand to benefit from the long service life of our high-quality energy meters.
- We have a large storage of parts and products and guarantee a very short delivery time.



Our aim: Orders received by 3.00 p.m. will be dispatched the same day.



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Tomorrow's world begins today

Remote surveillance via mobile phone

You have a holiday home in Valais which has a sauna and underfloor heating. During the year your friends and acquaintances want to use the house for free. However, you don't want to foot the bill for electricity alone. The solution: with our EMU Professional or S0 Impulse-Logger you can call up the energy consumption in your holiday home at any time via your mobile phone and web browser. At the end of the holidays you simply send your friend an e-mail with the energy costs. You can also subsequently check to see if your friends really have turned off the underfloor heating. If you want to use the holiday home yourself over Christmas, then you can switch on the heating prior to your arrival using your Smartphone.



The intelligent home

We install a nerve system in your home which makes it intelligent. Sensors and actuators which have a KNX interface communicate with one another and regulate almost everything for you.

This means the stereo system is capable of switching itself off when there is no longer anyone in the living room. Want to watch a film? By simply clicking the control panel the shutters are positioned correctly, depending on the sun's rays and temperature, and the lights are dimmed.

Success stories

Energy guzzlers

Thanks to our energy meters one businessman unmasked compressors which were using too much energy. This electricity guzzler was replaced there and then with the new equipment; the business man then followed the suggestions from an EMU customer adviser and was able to cut his energy use by 45 %.

Goodbye standby

Thanks to our meters quite a few private individuals have determined that they have a standby consumption of 500 watts. This came about through TV equipment, stereo systems, freezers and laser printers being on standby mode. Alarmed by these high values they began to optimise, for instance by installing bus-bars, which can be completely shut off so no more electricity flows to the machines.

Hallway

Another business man no longer heats his hallway thanks to our S0 Impulse-Logger. He now saves 500 litres of heating oil every year. In monetary terms this equates to a saving of CHF 480.– and also a saving for the environment. In contrast, the cost of the S0 Impulse-Logger, including energy meter and temperature sensor, was only a few hundred Swiss Francs.

Our services

Advice

Need support with a project? We provide you with a personal advisor who, together with you, will develop a professional measurement and evaluation system. Whether it is a brand new product, the latest trend or a cleverly devised project – you receive a tool from us so that you get the maximum from your electricity.

Development and Production

Since we manufacture our energy meters in-house ourselves in Switzerland, we know all the ins-and-outs and are able to cater to our client's specific requirements. Tell us what you have in mind and we will develop a practical solution, for you.

Quality guarantee

With EMU energy- and powermeters you are choosing the highest quality. In production we emphasise state-of-the-art manufacturing technology and competent suppliers. All energy meters are subject to stringent test procedures and accuracy measurements.

Individual configuration

We configure all our products as per your requests and requirements, whether it is M-Bus addresses, IP addresses or current transformer ratios. We archive the configuration and will make it available, as required, to project managers, electrical designers or local fitters.

Training

On a training day we provide you with our specialist knowledge of measuring techniques and evaluation systems. You get comprehensive background knowledge about the construction and the functionalities of energy meters. Together we talk over examples of usage in practice.



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.

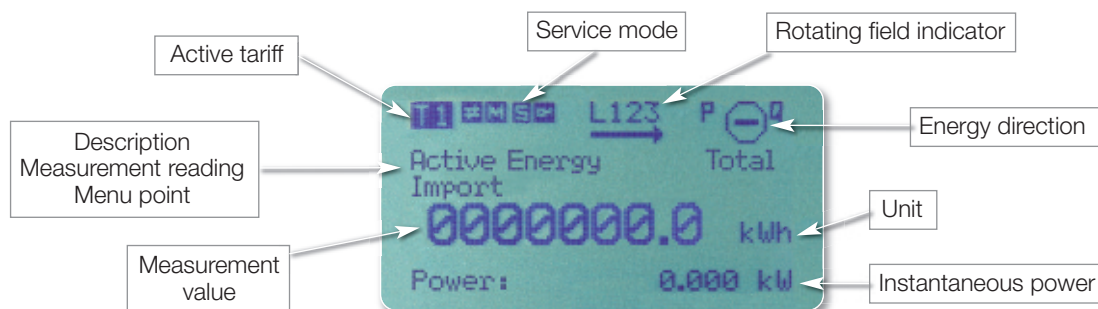
A variety of measurement readings are transferred via the Bus system, for instance active and reactive power, current, voltage, active, reactive and apparent power, power factor, power frequency, minimum and maximum values.



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

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: $\pm 2 \%$

Accuracy class B: $\pm 1 \%$

Accuracy class C: $\pm 0.5 \%$

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.

Calibration and Load LED

On the front of EMU Professional and EMU Allrounder there are two red calibration and load LEDs. They flash depending on the instantaneous active and reactive power.

The pulse valency is 10 pulses per Wh/varh.

Adjustable current transformer factor

The current transformer ratio can be set on the EMU Professional and the EMU Allrounder with MiD-approval via buttons, from 5/5 to 20'000/5 A or 1/1 to 4'000/1 A. The set-up button is sealed, preventing manipulation.

The EMU team is happy to provide assistance to prevent a S0-continuous pulse.

Accuracy in photovoltaic installations



EMU Professional and EMU Allrounder have been specifically tested for use with inverters in photovoltaic installations.

An additional inspection ensures that EMU energy meters in the not officially regulated frequency range between 2 kHz and 150 kHz provide a precise measurement.

With regard to this problem, renowned specialist journals have reported that measurement errors of up to 18 % may occur.

Additional information can be found on our website and in the instruction manual.

EMU S0 Impulse-Logger

You are sitting in your office in Zurich and want to know how high the current energy use in your branches in Lucerne and London is. You are faced with the choice of a two-day trip or a dozen telephone calls. Both are laborious and take up a lot of your time. But it doesn't have to be like that.

With the EMU S0 Impulse-Logger you have access on your computer screen to all the relevant data, at any time. The S0 Impulse-Logger is a S0 Impulse log system with which energy use can be monitored and analysed via remote access.

Via your IP address and web browser you can call-up the measurement data and load profile and compare them easily and conveniently. This makes efficient and cost-effective evaluation possible. A variety of energy meters can be connected to the EMU S0 Impulse-Logger using the S0 Impulse output. This means you can also conveniently compare energies such as gas, water, heat and electricity. Most energy meters have already been equipped with an S0 Impulse output. As a result we can integrate energy meters which are already available in the EMU S0 Impulse-Logger without any trouble. This means you can retain any investments you have already made. 9 energy meters with S0 Impulse output and two temperature sensors can be connected to the EMU S0 Impulse-Logger.



Inputs

9x S0 Impulse inputs, 2x temperature sensors.

Data storage

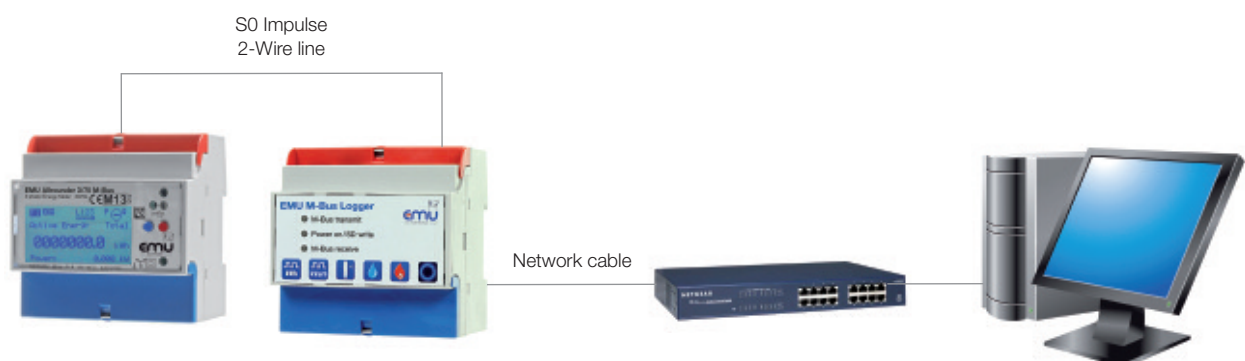
Micro SD-Card, removable, memory capacity of 8 million log entries, 20 years on 2GB.

Power supply

EMU S0 Impulse-Logger requires a 230V AC supply.

The supply voltage (13V DC) for the S0 Impulse is processed internally.

Part no.	Description
LS920000	EMU S0 Impulse-Logger with webserver
LT000000	EMU Temperature sensor



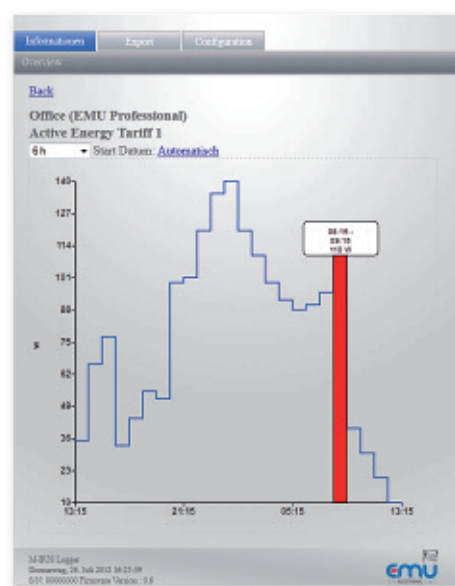
EMU M-Bus Logger

The EMU M-Bus Logger automatically reads out all M-Bus slaves and displays these readings including load profile on the website. The energy data can be accessed and analysed via IP address and web browser. Saved data can be exported from the website to CSV file or automatically saved to FTP server. The EMU M-Bus Logger supports all meters with M-Bus interface.



Features:

- M-Bus data logger for up to 60 slaves
- Data logging to micro-SD card
- Built-in M-Bus level converter/master
- Supports all M-Bus devices per EN13757-2, -3 (previously EN1434-3)
- Shows monthly energy consumption
- Automatic M-Bus device scan
- Website integrated via IP address
- Load profiles for all energy values
- Data export to CSV file
- FTP upload of readings (CSV file)
- Multiuser compatible
- Firmware update via TCP/IP
- Communication to smart-me
- Converts M-Bus to SML



 A screenshot of the EMU M-Bus Logger web interface showing a table of energy consumption data. The page title is 'Production 1 (EMU Professional)'. The table has columns for 'Primary Address', 'Secondary Address', 'Medium', and 'Manufacturer'. Below the table, there is a section for 'Monthly consumption' with a table of 10 rows showing various energy and power values.

Primary Address	Secondary Address	Medium	Manufacturer
1	55555555	Electricity	(BML)

Last readout: Sonntag, 15. Juli 2012 16:10:00

Position	Name	Value
1	Fabrication No.	33333335
2	Active Energy Import Tariff 1	8485581 kWh
3	Active Energy Import Tariff 2	0 kWh
4	Reactive Energy Inductive Tariff 1	737 varh
5	Reactive Energy Inductive Tariff 2	0 varh
6	Active Power Phase L1	12 W
7	Active Power Phase L2	12 W
8	Active Power Phase L3	12 W
9	Active Power	37 W
10	Reactive Power Phase L1	-85 var

Plug & Play – Easy to configure

The automatic scan automatically detects and lists all connected M-Bus meters. The meters can then be configured. Customer specific labels can be assigned to each meter and reading.

Integrated webserver

The integrated webserver is accessed via IP address and web browser. The EMU M-Bus Logger website lists all connected M-Bus users. It also displays all available readings and load profiles.

Energy meters/M-Bus slaves

Supports all energy meter / M-Bus slaves with M-Bus interface per EN13757-2, -3 (previously EN1434-3). No device-specific driver required.

Export

Any readings stored to the website can be exported to a CSV file.

FTP upload

The CSV files are automatically uploaded to an FTP server. The EMU M-Bus Logger website then allows you to select and configure your FTP server.



Load profile

A load profile is automatically created for each energy value. The load profile is visualised on the EMU M-Bus Logger website. The time interval and start date can be set to your preferences: 6, 12 hours, 1, 2, 7, 30 days, 6 months or 1 year.

User management

Access to the EMU M-Bus Logger website can be protected with user name and password. Any number of users can be added and the users granted the respective access rights.

Admin: the administrator can change configurations and view all readings.

User: a standard user has read-only rights. He can view all readings but not change configurations.

User-defined user: has read-only rights and can only see the readings and load profile for his meter.

Monthly energy consumption

Monthly energy consumption (or supply) is shown on the website.

Monthly consumption: Production 1 (EMU Professional)	
Active Energy Import Tariff 1	
Month	Value
July 2012	26461 Wh
June 2012	36000 Wh
May 2012	46593 Wh
Active Energy Import Tariff 2	
Month	Value
July 2012	6100 Wh
June 2012	8307 Wh
May 2012	11234 Wh

Security

Website access and data can be secured with a user name and password. Authentication is based on approved cryptographic techniques. In M-Bus monitoring- and gateway mode data is AES 128 (Advanced Encryption Standard) encoded.

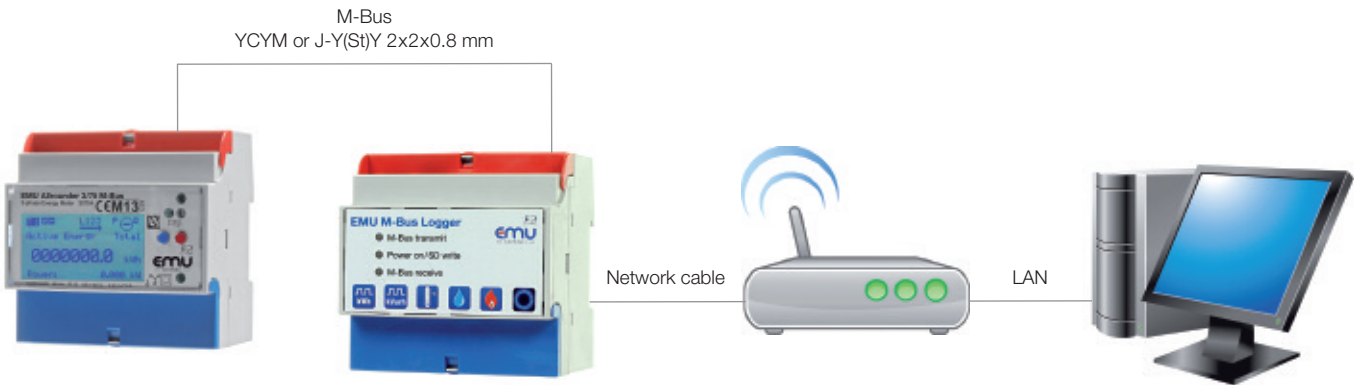
Time sync

Time is automatically synced with the mains frequency. The time can also be automatically synced with a time server (NTP).

Input

The EMU M-Bus Logger requires an 100–240 V AC input. The supply voltage for the M-Bus is converted internally. Built-in M-Bus level converter.

Part no.	Description
LM620000	EMU M-Bus Logger 60 TCP/IP



M-Bus Monitoring- and Gateway Mode

To ensure easy M-Bus meter installation the EMU M-Bus Logger supports monitoring- and gateway mode.

- **Monitoring Mode**

In Monitoring Mode all M-Bus traffic (all incoming and outgoing M-Bus frames) can be viewed with external software.

- **Gateway Mode**

In Gateway Mode the M-Bus Logger is operated as TCP/IP M-Bus master. Using external PC software, e.g. EMU MB-Connect, the M-Bus Logger can send telegrams directly to the M-Bus meter.

Conversion to SML (Smart Metering Language)

The EMU M-Bus logger converts M-Bus data automatically to the SML format and can upload these SML files to an FTP server. By this way, it's possible to integrate M-Bus devices to a SML-system.

Encrypted M-Bus telegrams

For highest data security the EMU M-Bus Logger supports encrypted M-Bus telegrams. The key can be defined individually for each device.

Technical Data

Operating voltage	100–240 VAC, 47–65 Hz
Own consumption	<10 W
Dimensions WxHxD	90 x 90 x 70 mm, 5 modules (90 mm)
Installation	35 mm DIN-rail
Ports	Ethernet RJ45, M-Bus (master)
Data storage	2 GB Micro SD card, removable, ~ 5 million telegrams
Electrical isolation	Yes
Differential- and overload protection	Yes
Log interval	10 seconds, 1, 5, 15, 30 and 60 minutes
M-Bus transfer rate	300, 1'200, 2'400, 4'800 and 9'600 baud
Protection class	IP 20
Screw terminals	M-Bus and power supply

EMU Bill & Report

The user-friendly EMU Bill and Report Software generates customer-specific bills and reports at the touch of a button.



System configuration

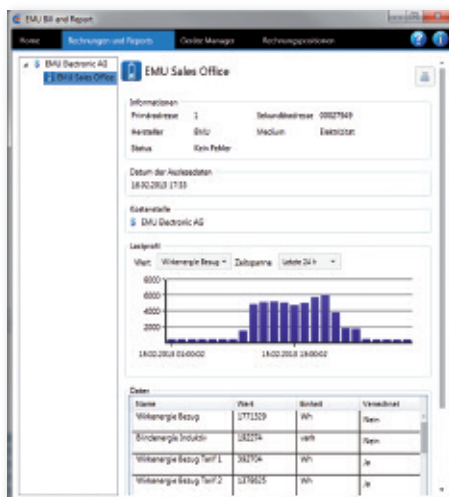
The EMU M-Bus Logger automatically reads out the connected M-Bus energy meter. The Bill and Report downloads the stored user data via TCP/IP network connection from the EMU M-Bus Logger and processes them. The Bill and Report can manage several EMU M-Bus Loggers.

Functions

- Displays all measured data from the connected energy meter
- Supports all energy meters (electricity, gas, water, heating, etc.)
- Creates evaluations (reports) and bills with just one click
- Loads profile for all energy values, bar chart
- Creates virtual meters, sum of other meters
- Creates a consumption overview per meter, freely selectable time period
- Assigns meters and virtual meters to cost centres
- Creates bills for cost centre, freely selectable time period
- Can be installed on any Windows PC
- Several PCs can access the same EMU M-Bus Logger
- No online (24 hours/7 days) operation necessary

Part. No. Description

SW1M000020	EMU Bill and Report 20 for 20 energy meters
SW1M000060	EMU Bill and Report 60 for 60 energy meters
SW1M000120	EMU Bill and Report 120 for 120 energy meters
SW1M000180	EMU Bill and Report 180 for 180 energy meters
SW1M000240	EMU Bill and Report 240 for 240 energy meters
SW1M000300	EMU Bill and Report 300 for 300 energy meters
SW1M000400	EMU Bill and Report 400 for 400 energy meters
SW1M000500	EMU Bill and Report 500 for 500 energy meters
SW1M000999	EMU Bill and Report unlimited



smart-me

smart-me is a free web application that evaluates and monitors consumption data online. Whether it's electricity, water, gas or heating, with smart-me you have control of your energy consumption.

Functions

- Automated data processing
- Individual user account
- Fast and simple start up
- Supports all M-Bus energy meters
- Worldwide access
- Detailed evaluations and reports
- Export of measured data
- smart-me Basic is free

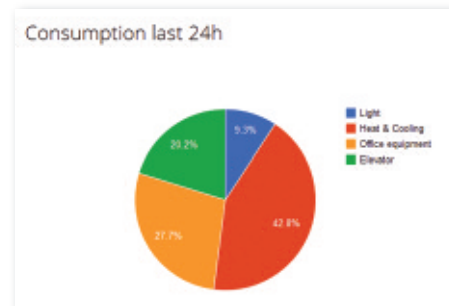
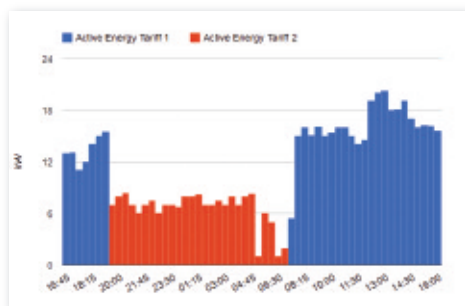
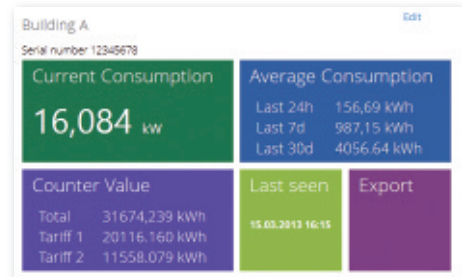
Your benefits

With smart-me you can manage all your metering stations worldwide and generate reports, comparisons and analyses.

You have worldwide access to your measured data and reports using your PC, tablet or smartphone.

How it works

Measured data are communicated to the smart-me server via SML (Smart Meter Language) by the EMU M-Bus Logger and the EMU Professional TCP/IP.



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:



Additional information available on request.

MiD-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

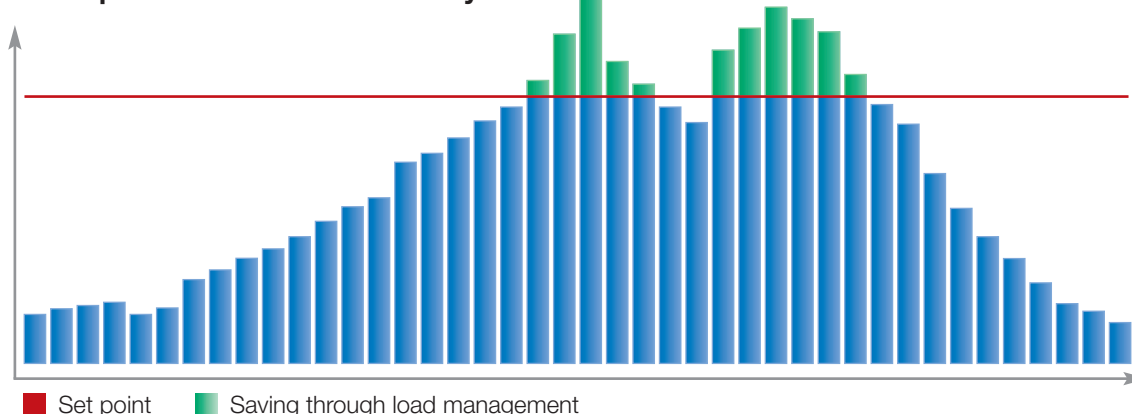
Defines which measured value is to be exceeded. Possible threshold values:

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.

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

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



MiD-approval



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

75 A

.../5 A

.../1 A

MiD B+D approval



DT



Examples of use

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

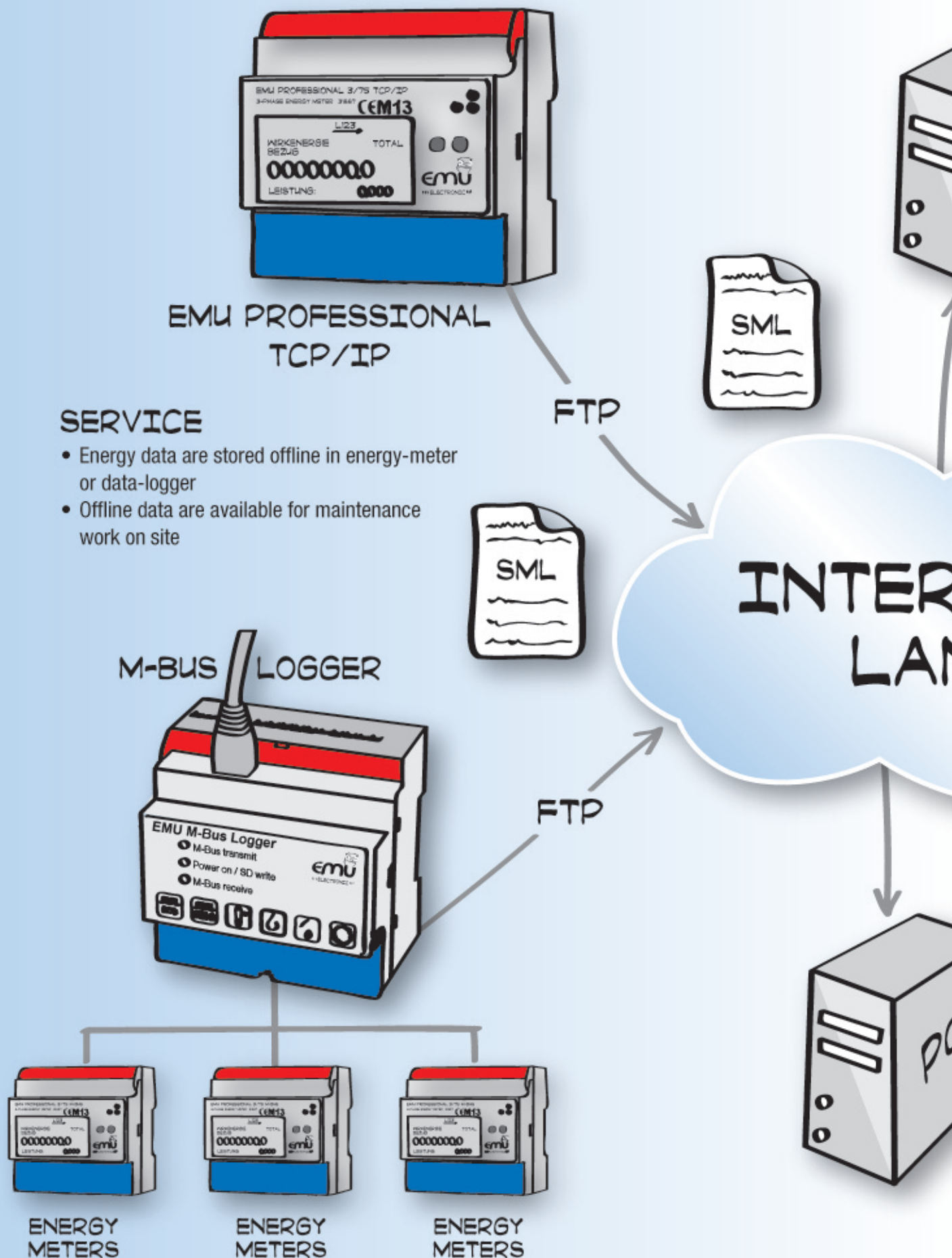
Display data

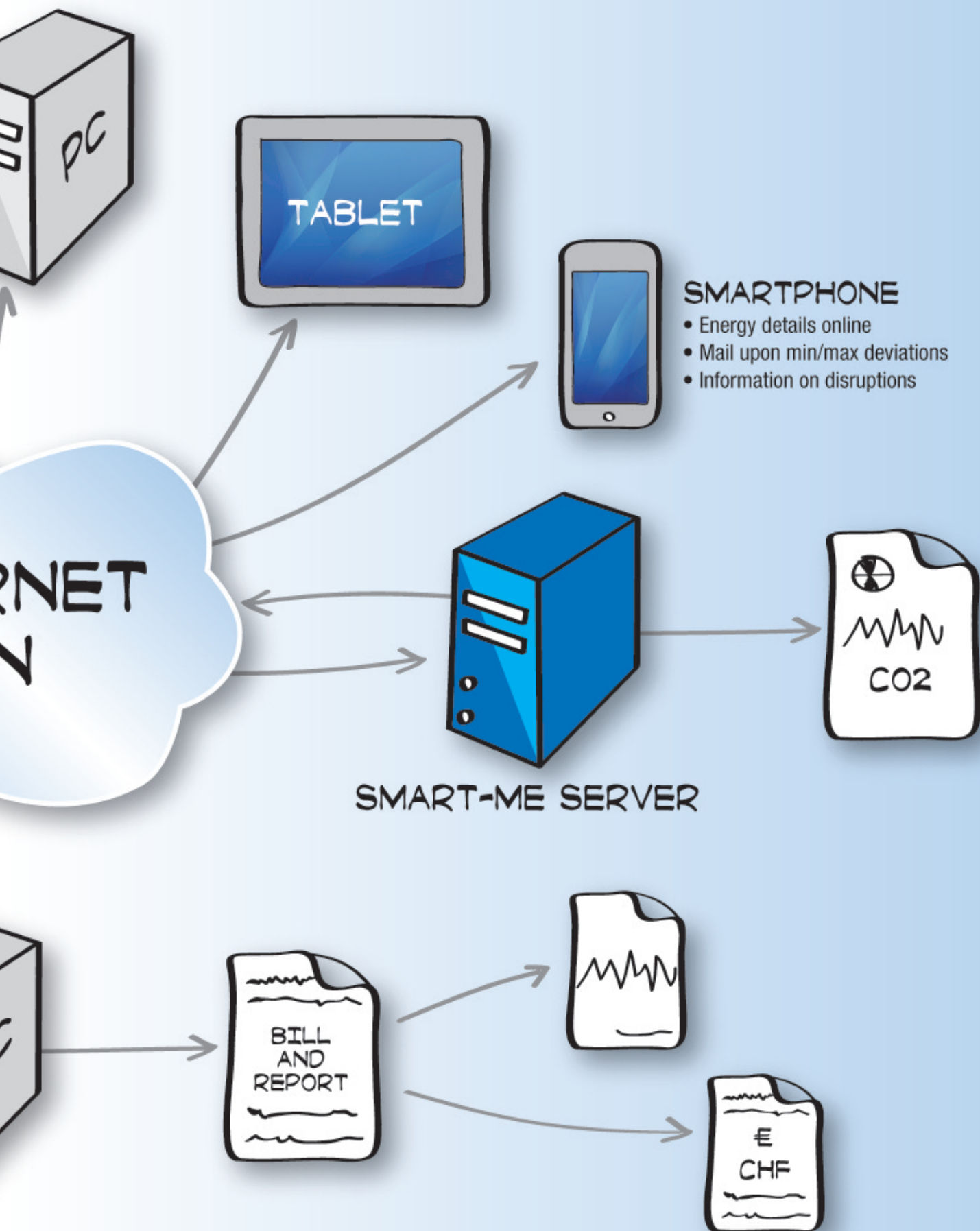
	Total 3 phases	Per phase	Per tariff
Active energy import (kWh)	•		•
Active energy import (kWh) resettable	•		•
Active power (kW)	•	•	
Current (A)	•	•	
Voltage (V) L-N		•	
Number of power failures	•		

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 Energy Monitoring





TCP/IP Module

With the TCP/IP module you can analyse different measurement readings and load profile can be analysed via your web browser and IP address in a LAN or WAN. The module logs measurement values in a configurable interval and exports it to a CSV file (Comma-Separated Values).

The integrated warning system provides reliable alerts about the exceedance or under-limits of the defined measurement value via e-mail (or e-mail to SMS gateway).

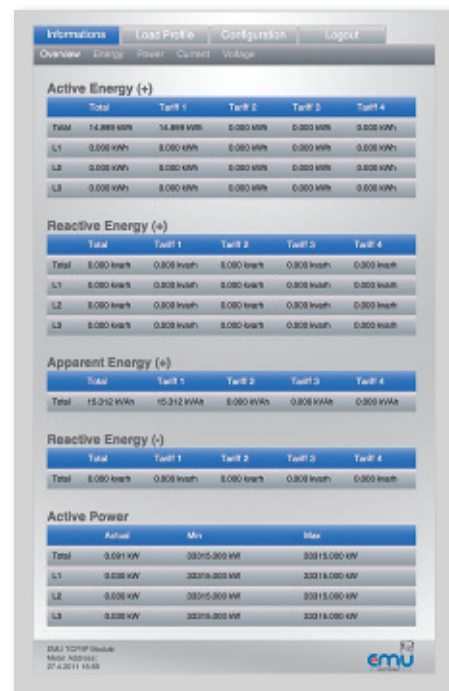
The S0 Impulse outputs (Opto Power MOSFET, 400V AC or V DC, 90 mA) are convertible as a switch and are able, for instance, to control a relay in order to activate heating in a holiday home. Network parameters as well as user-specific parameters are easy to configure via the website.

Features

- Display of instantaneous measurement reading
- Graphical load profile
- Logging of different measurement values
- Display of minimum and maximum values
- Alerts via e-mail upon measurement values falling below or exceeding set values
- Turning on/off of S0 impulse output
- Access protection with password
- Remote reading via Modbus TCP and BACnet IP

Integrated warning system

A warning system alerts you reliably, even when you are on the go, about your company's energy use. If a set measured value is exceeded you receive a message via e-mail or SMS. For instance you will receive an alert if the heating's power consumption falls below a set value.



Data logger

The TCP/IP module stores four configurable measurement readings in intervals of 10 seconds, 5, 15, 30 or 60 minutes.

The following measurement values can be selected:

- Total active power
- Active power per tariff
- Reactive power per tariff
- Reactive power for each phase
- Total current
- Current L1, L2, L3
- Voltage L1-N, L2-N, L3-N

In the TCP/IP module up to 245'000 readings can be stored. All readings are recorded and remain stored, even if the EMU Professional is not connected to the LAN network. For this reason the EMU Professional is excellently suited as a mobile data logger.

BACnet IP

BACnet is a communication protocol for Building Automation and Control Networks. It is suitable for management and automation levels in equally measure, in particular for HVAC, light control, safety and fire reporting technology. BACnet has been worked out by ASHRAE together with end customers and planners and is acknowledged as ANSI and CEN standards.

Modbus TCP

Modbus TCP is very similar to Modbus RTU, but TCP/IP packages are used to transfer data. TCP-Port 502 is reserved for Modbus TCP.

Direct-http

With Direct-http any measured values can be integrated into a client-specific website. This means for instance that an industrial building can be shown on a website. In the Intranet employees can immediately see current energy use in their department.

Example:

EMU Professional and its IP address 192.168.1.101

With URL <http://192.168.1.101/4474> the current active power of Phase L1 is shown on the website.

Application fields:

- Industrial buildings
- Cost centres
- Camp grounds

Measurement readings can be called upon as follows:

http://IP_MODULE/ID

IP_Modul = IP address of EMU Professional

ID = Modbus TCP Register-ID

Security

The website and data of the TCP/IP module can be protected with a password and user name.

The following concept only applies if the security has been activated for the websites.

If a user would like to access a website on the module, they are automatically forwarded to a log-in page. On the log-in page they are asked to log-in with a user name and the password that goes with it.

Two users are set:

Admin: the module administrator can make adjustments and see all measurement readings.

User: the standard user only has read authorisation. They can see all the measurement values but cannot make any adjustments.

Password and log-in protection

If a user has successfully logged in, their temporary password is stored in a cookie in a browser and each site called up is transferred to the TCP/IP module.

For each site called up the module checks the validity of the temporary password. If the password is incorrect or has expired, the user has to log-in to the start page again. The temporary password is calculated on the basis of the tried and tested and recognised SHA1 algorithm.

Read-out data and configuration

On the EMU Professional website all the measurement values can be read. BACnet IP and Modbus TCP configuration can be both deactivated and activated.

The factory settings of the network parameters, IP address, subnet mask and gateway can be changed easily via keys on the EMU Professional or via the website (web-based configuration).

Read-out via BACnet IP and Modbus TCP

EMU Professional with TCP/IP module supports BACnet IP (Analog Input Objects) and Modbus TCP protocol.

Data transmission rate

The TCP/IP module communicates in the 10/100 Mbit/s area. With a transmission rate of 100 Mbit/s maximum segment lengths of 100 metres as well as four repeaters are permitted. This means that two stations at a distance of up to 500 metres can be directly connected.

Bus connection and cable type

RJ45 Twisted-Pair.

External power supply

The TCP/IP module requires an external 24V DC or 24V AC power supply. Connection is made via a screw terminal.

KNX Interface

The KNX interface is integrated into the EMU Professional and provides protection against contamination and manipulation. With KNX a variety of devices can be connected to one another. Each manufacturer keeps to a set standard so all KNX-devices understand one another. This simplifies planning and implementation and makes much greater functionality and increased comfort possible without additional expenditure.

What does a KNX system comprise?

Fundamentally a KNX system comprises:

- Sensors (e.g. EMU Professional, temperature sensor etc.), which generate commands.
- Actuators (e.g. switch relay for lights, blinds etc.), which turn commands into actions.
- A Bus connection which links all sensors and actuators to one another.

This means a control centre is not required. Each device has its own micro-processor. With the relevant parametrization, which can be altered at any time, the device learns what its task is. This means that KNX is very flexible and adapts to new requirements at any time.

Read-out data and configuration

Via KNX a wide variety of measurement readings such as active power, reactive power, current and voltage incl. min./max. Values, form factor and network frequency can be read. Configuration is carried out via ETS software.

Bus connection and cable type

The KNX is linked to the standard-KNX clamp on the EMU Professional. Data transmission ensues via twisted cable, which provides the Bus devices with power. Recommended cable type: YCYM 2×2×0.8 and J-H(ST) H 2×2×0.8 halogen-free.

Data transmission rate

Via KNX the EMU Professional communicates at 9'600 Baud.

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 mm²

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.

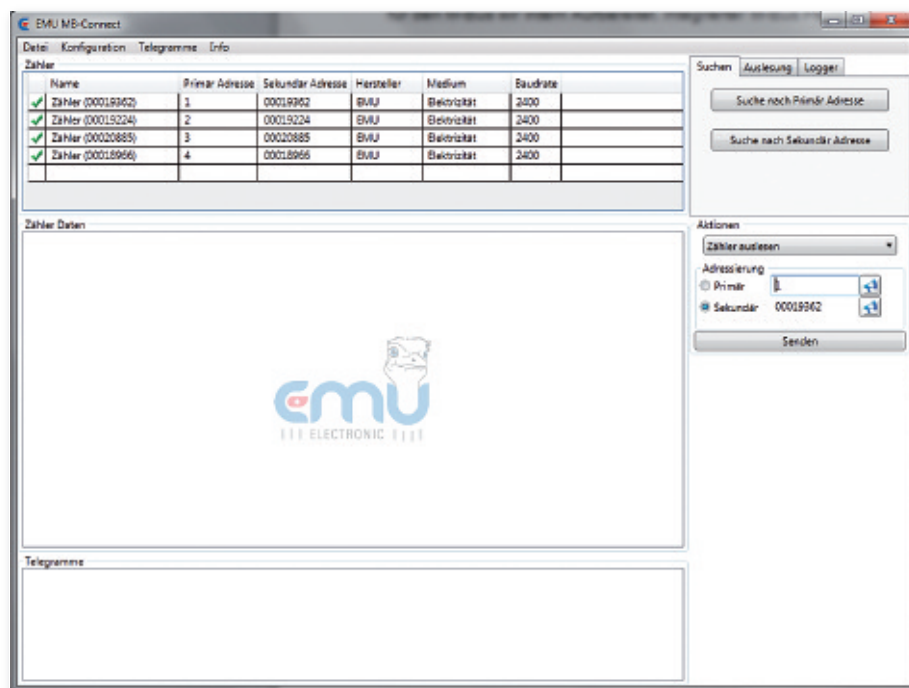
All energy meters with an M-Bus interface according EN13757 can be configured and read by our MB-Connect. Read-out occurs manually or periodically in an adjustable interval. The selected readings can be exported to a CSV file (Comma Separated Values) and processed in Excel for instance.

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



Modbus RTU and ASCII Interface

The Modbus RTU and ASCII interface is integrated into the energy meter and protected against contamination and manipulation.

Modbus RTU (Remote Terminal Unit) transfers data in binary form. Modbus ASCII transfers data in ASCII-Code.

Read-out data and configuration

Via Modbus RTU and ASCII a variety of measurement readings, such as active and reactive power, current and voltage incl. min./max. readings, form factor and network frequency, can be selected. Modbus RTU and ASCII conversion can be done on the energy meter or via software command.

Bus connection and cable type

The Modbus RS-485 cable is connected to a 2-pole terminal for flexible and rigid cables. Up to 32 units can be connected in one segment to a Bus cable. Several segments can be linked via repeaters.

Repeaters

Repeaters are used to link Bus segments and refresh data signals. Repeaters also enable the maximum permitted cable lengths to be extended. By using repeaters signal running times are increased. This means that a maximum of four repeaters are permitted between two stations.

Trunk cable (Stem)

The length of the trunk cable from one end to the other is limited to a maximum of 1'000m. By using repeaters the Bus length can be increased (maximum four repeaters connected in series).

Drop cable (Stitch)

Spur lines should be avoided as much as possible to prevent reflections and therefore disruptions to communication. It is recommended that repeaters and active junctions be used.

Line termination

The Modbus network requires a terminating resistor at the ends.

Data transmission rate

Via Modbus the EMU Professional communicates at 9'600, 19'200, 38'400, 57'600 and 115'200 Baud.

LON Interface

The LON interface, as per CEA-709 – TP/FT10, is integrated into the energy meter and protects it from contamination and manipulation.

LON (Local Operation Network) is predominantly used in building automation and interlinks various LON units (or nodes) sensors and actuators with one another.

Bus participants all have their own intelligence and are able to exchange data with one another in an event-driven manner. They measure, control, regulate and communicate. This yields an extremely flexible network of functions with almost any network and complexity level.

Read-out data and configuration

Via LON a variety of measurement readings, such as active power and reactive power, current and voltage incl. min./max. readings, form factor and net frequency can be read.

Bus connection and cable type

The maximum cable length per segment is determined by the network topology and cable type. Up to 64 nodes can be linked per segment, using a repeater this can be up to 128.

Recommended cable type: shielded twisted pair cable, type: JY(St)Y 2x0.8 mm².

The values listed indicate the entire cable length and apply to the FTT-10A transceiver.

Cable type	Bus-shaped wiring Dual Bus connection	Free wiring Unidirectional bus connection
JY (St) Y 2x2x0.8 mm	900 m	500 m
Level IV, 22AWG	1'400 m	500 m
Belden 8471	2'700 m	500 m
Belden 85102	2'700 m	500 m

Channel: a channel is a physical transmission medium, to which serial data is transmitted.

Subnet: a subnet is a logical integration of a maximum of 127 nodes within one domain. 255 subnets can exist within one domain. A channel can administer several subnets.

Node: Each one of the 127 LON nodes within a subnet is addressable via a seven Bit long node number. This means that for each domain a maximum number of addressable LON-nodes which can be calculated is 32'385 (127 nodes x 255 subnets).

Data transmission rate

Via LON the EMU Professional communicates at 78 kBit/s.

S0 Impulse Output

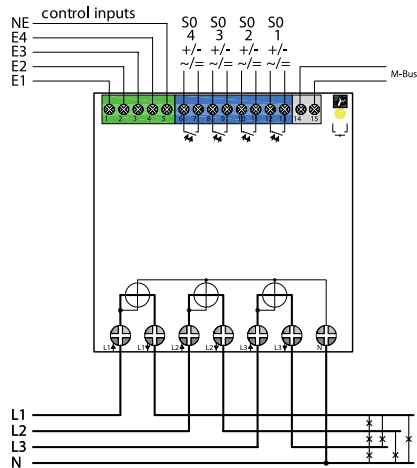
The S0 Impulse output is potential-free and makes the transmission of power possible. Impulse output is a polarity dependent, passive transistor output and to operate requires an external auxiliary voltage of between 5 and 400 V AC, or V DC. In transformer meters which have set current transformer ratios, 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

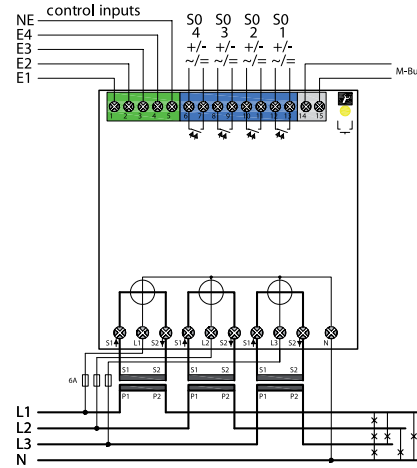
EMU Professional and EMU Allrounder have a optical (IR) D0-read-out interface as per EN62056-21. The measurement readings are transmitted on the basis of standard OBIS codes.

Wiring diagram EMU Professional and EMU Allrounder

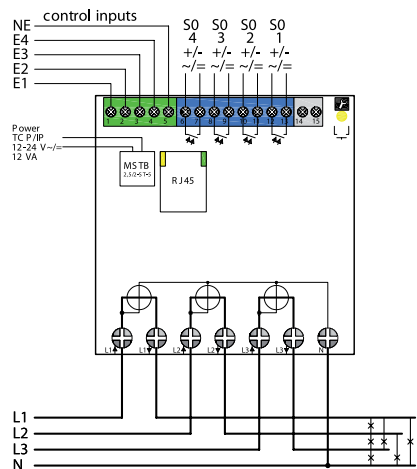
M-Bus direct connection 75 A



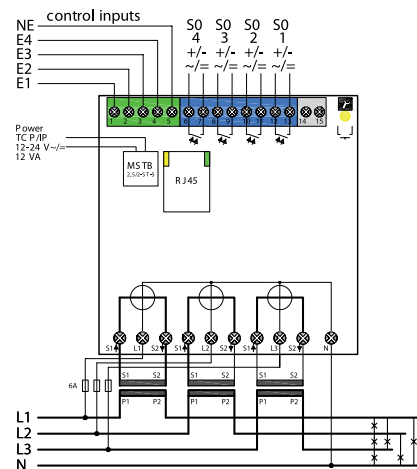
M-Bus current transformer connection



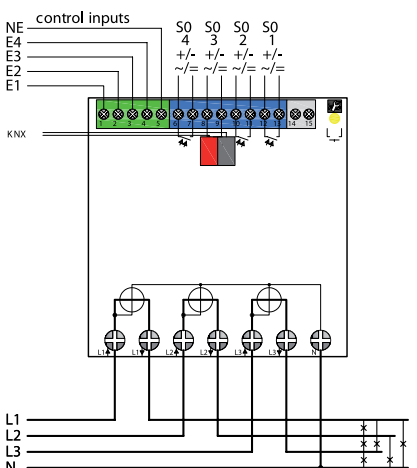
TCI/IP direct connection 75 A



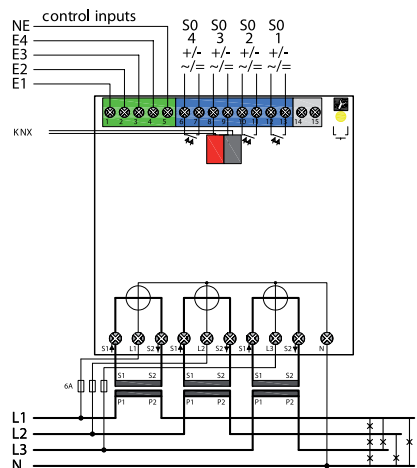
TCI/IP current transformer connection



KNX direct connection 75 A

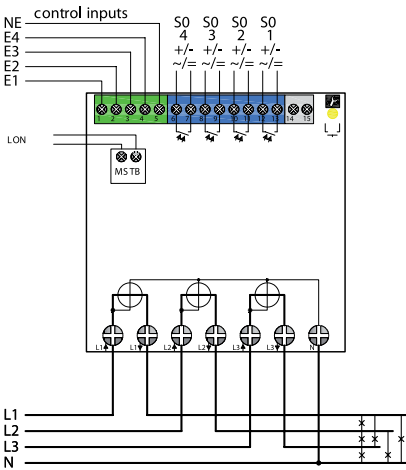


KNX current transformer connection

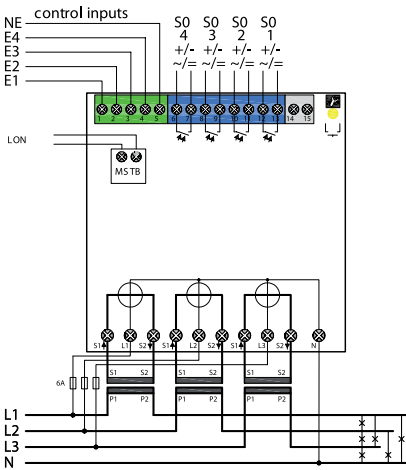


Wiring diagrams LON/Modbus

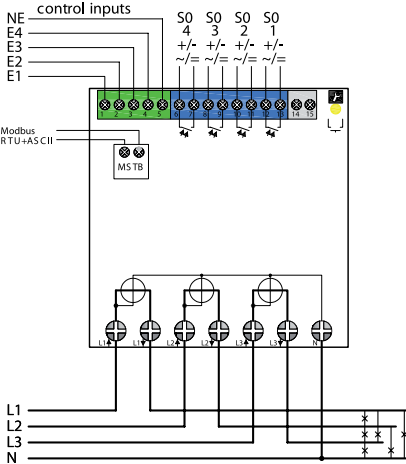
LON direct connection 75 A



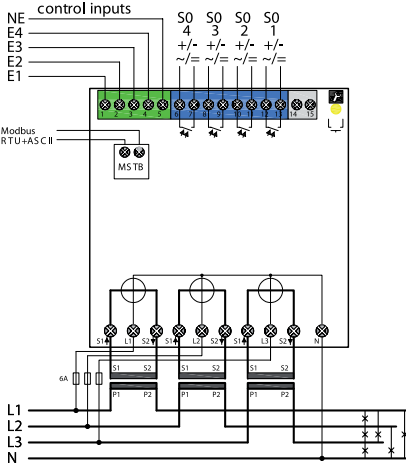
LON current transformer connection



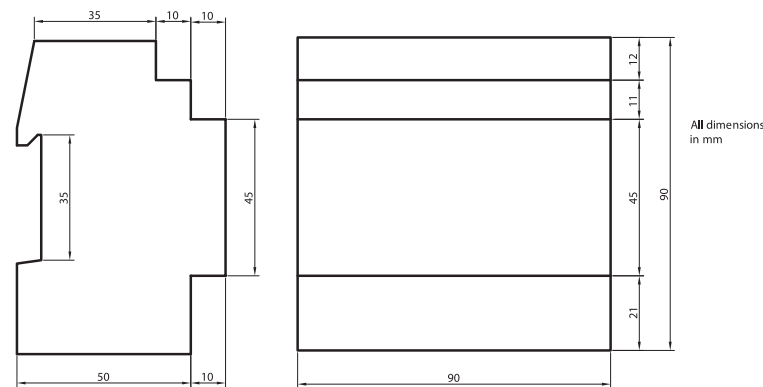
Modbus direct connection 75 A



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 $\cos\phi$ 1
Transformer-connected meter	<1 mA at $\cos\phi$ 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
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
Weight	Approx. 400 g

Tariff control

Switch-over voltage	230V AC, others on request
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Data retention

Without voltage	In Up Flash or Eeprom
Minimum 10 years	

Optical D0 (IR) interface

Standard specifications	EN62056-21
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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.
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Energy and power meters • S0 Impulse-Logger • M-Bus Logger



Quality that counts.

Made in Switzerland



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