MANUAL
EMU ALLROUNDER
EMU PROFESSIONAL
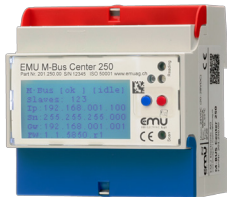
EMU PRODUCTS – ALL FROM ONE SOURCE

EMU provides everything from the energy meter
to a complete energy-monitoring system.

Data logger

M-Bus data Logger

- Integrated web server
- Access via web browser
- Plug and Play
- Designed for gas, water, head, and electricity
- M-Bus to BACnet IP
- M-Bus to OPC UA

Web-based energy monitoring

Suitable to the data logger EMU Electronic offers a
Web-based energy monitoring solution.

Your benefits:

- Various locations monitored centrally
- Web-based software
- User-friendly operation
- Worldwide access

MENU NAVIGATION

Blue key	Go to next unit Active energy, active power etc.
Red key	More information of unit E.g. phase L1, L2, L3, total, Min. / Max values
Yellow key	Service key, on the right side bellow the red terminal cover. To save a configuration, push the service key for 5 seconds.

VIDEO ANIMATION

You can find a video about the configuration and menu navigation on www.emuag.ch.

COMMISSIONING / CHECK-UP

To check for operation:

- Phase rotation
- Current per phase
  Negative energy direction
- Sequence of phase (L1 L2 L3)
- Current Transformer ratio
- Terminal tightening torque
- Read-out interface: Correct address

TECHNICAL DATA

Nominal voltage U_n	3x230/400V (+/- 20%)
Accuracy class	B (1%)
Nominal frequency f_n	50Hz, 60 Hz on request
Operating temperature	-25° C...+55° C
Storage temperature	-30° C...+70° C
Protection class	Clamps: IP20 Case: IP51
Environmental class	Mechanical: M1 Electro-magnetic: E1
Safety class	2
Description	3-phase static Energy and Power Meter
EC-type examination	CH-MI003-13022
Maximal air humidity	Annual average 75%, Short-term 95%, Non-condensing

Direct connection

Current (I_{st}, I_{min}, I_{tr}, I_{ref}, I_{max})

0.02 A / 0.25 A / 0.5 A / 5 A / 75 A (5(75))

Current transformer /5 und /1A

Current /5A (I_{st}, I_{min}, I_{tr}, I_{ref}, I_{max})

0.01 A / 0.05 A / 0.25 A / 5 A / 6 A (5(6))

Current /1A (I_{st}, I_{min}, I_{tr}, I_{ref}, I_{max})

0.002 A / 0.01 A / 0.05 A / 1 A / 1.2 A (1(1.2))

Installation instruction

Torque Connection

Flexible wire	Direct max. 35mm^2 strand	Current transformer max. 6mm^2 strand
Input lead L1/L2/L3	2-3 Nm	1.3 - 1.6 Nm
Neutral conductor	2-3 Nm	1.3 - 1.6 Nm

S0 pulse output   0,4 Nm (max 2.5mm^2 strand)
Tariff control   0,4 Nm (max. 2.5mm^2 strand)

Cable requirement >65A

Type:	Wire (Cu)
Cross-section:	35mm²
Outside-Ø:	9,55 mm
Example:	E-Number 105502800, available from Swiss electrical wholesale

DISPLAY LANGUAGE

Display language can be selected between English and German (Deutsch).

Configure of display language

1. Blue key to Adjustments
2. Red key to Language (Sprache)
3. Push Service-Key briefly
4. Adjust Language by blue key
5. Saving: Push Service key for 5 seconds, until digits are not blinking

TARIFF CONTROL

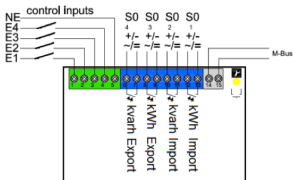Tariff changeover takes place by 230V to corresponding terminal.

Tarif 2 = 230V on terminal E4 and E5 (N)

Double-tariff	
	E4
T1	0
T2	1

Four-tariff		
	E4	E3
T1	0	0
T2	1	0
T3	0	0
T4	1	0

0 = No voltage
1 = Voltage

CURRENT TRANSFORMER RATIO

Current transformer ratio can be adjusted from 5/5 to 20'000/5A and 1/1 to 4'000/1A

Left (blue) key = Change of digit / number

Right (red) key = Go to next digit / number

Current transformer /5A

AABCC : 5A
AA   adjustable in steps of 1
B   adjustable in steps of 1
CC   adjustable in steps of 5

Current transformer /1A

YYYY : 1A
Y   adjustable in steps of 1

Configuration of current transformer ratio

1. Blue key to Transformer ratio
2. Push service key briefly
3. Adjust secondary current by blue key
4. Go to primary current by red key
5. Adjust first two digits by blue key
6. Go to next digit by red key
7. Adjust digit by blue key
8. Go to next digit by red key.
9. Adjust next two digits by blue key.
10. Saving: Push Service key for 5 seconds, until digits are not blinking

S0 PULSE-OUTPUT

The four S0 pulse-outputs are designed according to EN62053-31 (DIN 83864).

Pulse rate and pulse lengths can be configured by the keys.

Default settings ex-factory

1. S0 Output = Active Energy Import   (12+13)
2. S0 Output = Reactive Energy Import   (10 + 11)
3. S0 Output = Active Energy Export   (8 + 9)
4. S0 Output = Reactive Energy Export   (6 + 7)

Current transformer meter   10 Impulse / kWh
Direct meter   1000 Impulse / kWh

EMU Allrounder

The EMU Allrounder only has one pulse-output for active energy import.

Configuration of pulse rate

1. Blue key to Adjustments
2. Red key to S0 Pulse Rate
3. Push service key briefly
4. Move decimal place by blue key
5. Example 1000.000 = 1000 Impulse
6. Saving: Push Service key for 5 seconds, until digits are not blinking

Configuration of pulse length

1. Blue key to Adjustments
2. Red key to S0 Pulse Duration
3. Push service key briefly
4. Adjust pulse length by blue key
5. Saving: Push Service key for 5 seconds, until digits are not blinking
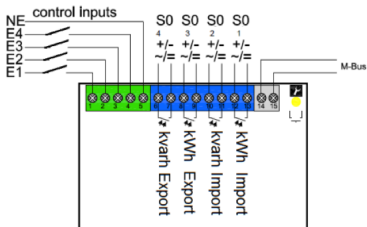
S0 pulse-output

Opto Power MOSFEET

5 – 230 VAC or VDC, max. 90mA

Rate per kWh / kvarh

0.001, 0.01, 0.1, 1, 10, 100, 1000, 10'000

Length

Adjustable from 4 to 250 milliseconds in steps of 2 ms

M-BUS ADDRESS / CONFIGURATION

Recommended cable

Twisted pair, shielded, cross-section depending on cable length. Type: JY(St)Y 2x0.8 to 1.5 mm2

Default settings ex-factory

Secondary address   = Serial number
Primary address   = 0
Baud rate   = 2400

Configuration via M-Bus

Primary and secondary address, baud rate and read-out data can be configured by the free EMU MB-Connect software or by the keys. The M-Bus interface is designed according to EN 13757-2,-3 (formerly EN1434-3).

Configuration of primary / secondary address

1. Blue key to Adjustments
2. Red key to MBUS Primary address (or Sec.)
3. Push service key briefly
4. Adjust first digit by blue key
5. Go to next digit by red key
6. Saving: Push Service key for 5 seconds, until digit is not blinking.

Configuration of baud rate

1. Blue key to Adjustments
2. Red key to MBUS Baud rate
3. Push service key briefly
4. Adjust baud rate by blue key
5. Saving: Push Service key for 5 seconds, until digits are not blinking

TCP/IP INTERFACE

Default settings ex-factory

IP-Adresse   = 192.168.1.100
Subnet   = 255.255.255.0
Gateway   = 0.0.0.0

Configuration of IP address

1. Blue key to Adjustments
2. Red key to IP Address
3. Push service key briefly
4. Adjust first digit by blue key
5. Go to next digit by red key
6. Saving: Push Service key for 5 seconds, until digits are not blinking

Configuration of Subnet

1. Blue key to Adjustments
2. Red key to Subnet
3. Push service key briefly
4. Adjust first digit by blue key
5. Go to next digit by red key
6. Saving: Push Service key for 5 seconds, until digits are not blinking

Update interval

Values on the TCP/IP module are updated in the following interval:

Current per phase and total:	1	second
Active power per phase / total:	1	second
Reactive power per phase / total:	1	second
Apparent power per phase / total:	1	second
All other values:	10	seconds

Factory reset

By factory reset (menu point Adjustments) the TCP / IP module is set to the default settings.

TCP/IP interface connected directly to computer

For a successful connection between an EMU Professional TCP / IP (not connected to network) and a computer, please consider the following points:

Counter and computer must be in the same subnet.

E.g. Subnet mask: 255.255.255.0
Network cable type: Cross

Computer requires a fixed IP address

Please contact your local / internal IT support for any questions regarding the TCP/IP connection.

RELAY OUTPUT

The S0 pulse-outputs can be configured as a relay-output and can be switched via TCP/IP module or special M-Bus protocol.

Configuration of relay-output

1. Blue key to Adjustments
2. Red key to Assignment output X
3. Push service key briefly
4. Adjust to Relay Output by blue key
5. Saving: Push Service key for 5 seconds, until digits are not blinking

PEAK-CONTROL / THRESHOLD

Threshold

The following values can be chooses as a threshold:

Active Power, Reactive power, Apparent power
Current total   Current per phase L1 / L2 / L3

Default settings ex-factory

Threshold: 5.000 kW
Status: Not active

Response time / release time

The response and release time is adjustable between 0 and 9999 seconds.

Response time: Time, until contact switches
Release time: Time, until contact switches after th-
                  reshold is not exceeded anymore.

The threshold function can be assigned to any output S0.

Configuration of threshold

1. Blue key to Adjustments
2. Red key to Assignment Output X
3. Push service key briefly
4. Adjust to Threshold by blue key
5. Saving: Push Service key for 5 seconds, until digits are not blinking
6. Red key to Unit Threshold
7. Select desired unit by blue key
8. Next by red key
9. Adjust Threshold by blue key
10. Go to next digit by red key
11. Saving: Push Service key for 5 seconds, until digits are not blinking
12. Red key to Threshold Time till ON
13. Push service key briefly
14. Adjust digit by blue key
15. Go to next digit by red key
16. Saving: Push Service key for 5 seconds, until digits are not blinking
17. Red key to Threshold Time till OFF
18. Push service key briefly

19. Adjust digit by blue key
20. Go to next digit by red key
21. Saving: Push Service key for 5 seconds, until digits are not blinking

DATE / TIME

Configuration of date

1. Blue key to Date
2. Push service key briefly
3. Adjust first digit by blue key
4. Go to next digit by red key
5. Saving: Push service key for 5 seconds

Configuration of time

1. Blue key to Date
2. Red key to Time
3. Push service key briefly
4. Adjust first digit by red key
5. Go to next digit by red key
6. Saving: Push service key for 5 seconds

MAXIMUM ACTIVE POWER: MEASUREMENT PERIOD

Configuration of measurement period

1. Blue key to Adjustments
2. Red key to Measurement period
3. Push service key briefly
4. Adjust time by blue key
5. Saving: Push service key for 5 seconds

Reset of maximum active power

1. Blue key to Reset Register
2. Red key to Max. Active Power
3. Push service key briefly
4. Set to RESET by blue key
5. Perform reset: Push service key for 5 seconds

Start / synchronization measurement period

- Synchronization takes place by using a 230VAC control signal.
- In normal operation mode, voltage is connected to input E1, input E2 is dead (without voltage).
- To start a new measurement period, disconnect voltage from E1 and connect voltage to E2.
- For security reasons a voltage change has to take place at both inputs E1 and E2

Normal mode		Start new measurement	
E1	E2	E1	E2
1	0	0	1

0 = No voltage / 1 = Voltage

RESET MINIMUM AND MAXIMUM VALUES

1. Blue key to Reset Register
2. Red key to Min/Max Register
3. Push service key briefly
4. Set to RESET by blue key
5. Perform reset: Push service key for 5 seconds

Reset power outages

1. Blue key to Reset
2. Red key to Power outages
3. Push service key briefly
4. Set to RESET by blue key
5. Perform reset: Push service key for 5 seconds

RESET OF TARIFF REGISTER
EMU ALLROUNDER

The EMU Allrounder has a resettable tariff register.
The resettable register is indicated by and arrow above the unit (kWh).

Reset tariff register

1. Blue key to Reset Register
2. Rote Taste bis Active energy NO RESET
3. Push service key briefly
4. Set to RESET by blue key
5. Perform reset: Push service key for 5 seconds

ERROR MESSAGES

If an internal error appears, an error message is displayed.

F.F.0(00000000)   No error, meter ok
F.F.0(xxxxxxx0)   Meter calibrated
F.F.0(xxxxxxx1)   Meter not calibrated
F.F.0(xxxxxxx8)   Calibration release, meter is calibrated and can be re-calibrated.
F.F.0(xxxxxxx9)   Calibration release, meter is not calibrated and can be calibrated now.

DATA BACKUP / POWER FAILURE

- To prevent data loss in case of power failure, all relevant data are stored in non-volatile EEPROM.
- This takes place if voltage is falling below a defined level.
- Also automatically every 24 hours to save all relevant data in non-volatile EEPROM.

CALIBRATION PULSE / CALIBRATION CONSTANT

- The red LED on the front is proportional to the active power.
- The pulse constant is 10 Imp. / Wh
- The pulse duration is 2msec.
- Pulses are sent for energy direction import and export

D0 INTERFACE ACCORDING TO EN 62056-21

- The D0 (optical) interface is located on the front, right next to the display.
- The EMU Allrounder / Professional have a serial D0 interface according to EN 62056-21. The D0 interface can be configured as bidirectional (Mode A or C) or as a unidirectional (D0 mode) communication interface.

SAFETY INSTRUCTION

The EMU Professional / Allrounder should only be used for measuring electrical energy and can not be operated outside the specified technical data.

When installing or replacing the meter, the conductor, to which the meter is connected, has to be dead (power / voltage off).

Touching live (voltage or power) components is dangerous! Therefore, the appropriate fuses are to remove and secure. No body shall be able to turn voltage / power on without prior notification.

Before opening / disconnect the clamps, short-circuit the secondary circuits of the current transformers. The resulting high voltage on the current transformer is extremely dangerous (dangerous to life) and could destroy the current transformer.

The usual local security and work rules must be observed. The installation of the meter must be carried out by qualified and trained personnel.

MAINTENANCE

The EMU Professional / Allrounder is maintenance free. In case of damage (for example shipping, incorrect connection or storage) repairs may only be done by EMU Electronic AG.

DISCLAIMER / LIABILITY EXCLUSION

The choice of the EMU energy meter and determination of the suitability of the meter type for particular purpose are solely to the responsibility of the buyer. EMU Electronic takes no responsibility for this.

Data / information in catalogs and data sheets do not promise special properties, but are determined by experience and measurements.

Liability for damages caused by improper operation / projecting or malfunction of the energy meter is excluded.

The operator / project engineer has to take care that improper operation / planning and malfunctions can not cause further damage.

For defects or damage caused by improper use of the EMU energy meter or by not following the manual, no warranty is given.

DECLARATION OF CONFORMITY

We, EMU Electronic AG, CH-6340 Baar, declare under our sole responsibility that the products:

- 3-phase polyphase static meter
- EMU Professional / EMU Allrounder, accuracy class B

To which this declaration relates is in conformity with the requirements of the following directives:

MID 2014 32 / EU and harmonised
EN-standards EN50470-1: 2006 and EN50470-3:2006

Number of EC-type examination certificat: CH-MI003-13022

Notified body:
METAS-Cert (Nr. 1259)
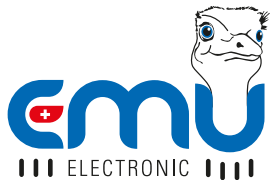Lindenweg 50, CH-3003, Bern-Wabern

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1 October 2017