Manual
EMU Professional II Modbus

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Version	Revision Date	Token	Changes
V1.0	23.03.2021	met	Creation of Document
V1.1	04.04.2021	met, mro	Matching of unit and resolution
V1.2	04.05.2022	fbo,sha	Matching of unit and resolution
V1.3	10.05.2022	fbo	Sort order changed
V1.4	11.05.2022	met	Rework of Doc.Ref numbers. Same document in different language no longer has a different Doc.Ref number
V1.5	03.08.2022	fbo	Added new min/max registers, fixed unit/value of data logger
V1.6	01.09.2022	met, fbo	Fixed modpoll examples
V2.0	30.11.2022	met	Rework of document structure
V2.1	14.04.2023	met	Added register 5026 as writable
V2.2	21.06.2023	met	Description of Modbus Test Registers
V2.3	12.07.2023	met	Slave address change explanation
V2.4	18.01.2024	met	Endianness clarified, tables expanded
V2.5	07.03.2024	met	Fix on Modbus testregisters
V2.6	29.04.2024	met	Added info for Modbus-TCP requests in ”General”
V2.7	15.07.2024	met	Readout data logger via index added
V2.8	28.10.2024	met	Modpoll examples updated to version 3.15

General

All registers available for Modbus RTU and TCP read-out are listed in this document. The registers are read-only apart from specifically mentioned registers (5026 and 11000+). The function code is <<Read Holding Registers - 03>>. In case you are integrating the EMU Professional II into an existing EMU Professional / Allrounder Modbus installation you can find the old register no. in the chapter ËMU Professional Compatible Read-Out”

The EMU Professional II supplies its values in Big-Endian byte order. One register is one 16-bit word as defined in the official Modbus specifications.

You can make 4 simultaneous Modbus-TCP requests on an EMU Professional II TCP/IP meter. The registers are the same for Modbus TCP and Modbus RTU.

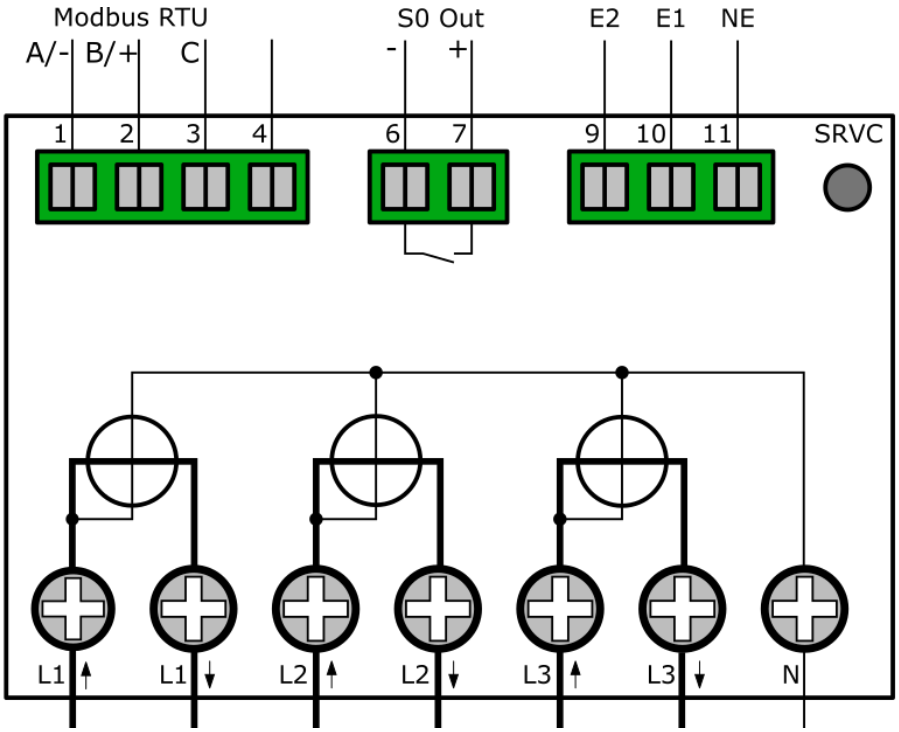
You can find a few examples of Modbus read-out with modpoll at the end of this document.

Note: This document assumes 1 as the starting point for the registers. If your Modbus client starts its read-out at register 0 a subtraction of 1 is needed for all register numbers in this document. Example: If you want to read out register 5000 with a Modbus client that starts its readout at 0, you need to enter register 4999.

Connection Diagram Modbus

Note: The Modbus interface is the same for both the EMU Professional II 3/100 Modbus and the EMU Professional II 3/5 Modbus.

Note: The Modbus interface of the EMU Professional II requires a correct GND connection on C (Pin 3). Without it the Modbus communication is not guaranteed.



Settings ex-Factory

Setting	Slave Address	Baud Rate	Parity	Stop Bits	Data Bits
Value	1	19200	Even	1	8

Configuration of the Slave Address on the Device

- “Arrow right” to settings
- “Arrow down” to Modbus Slave Adr.
- Press “SRVC” button (<2 seconds)
- “Arrow right” chooses the digit, “Arrow down” increments the digit
- Save: Press “SRVC” button (>2 seconds) until the LCD flashes

Data Types

Description	Data Type	Value Facet	No. of Register
Integer, 16bit, signed	sInt16	-32’768 .. 32’767	1
Integer, 32bit, unsigned	uInt32	0 .. 4’294’967’295	2
float, 32bit, single precision	float	-3.4 * 10^38 .. 3.4 * 10^38	2
Integer, 64bit, unsigned	uInt64	0 .. 18’446’744’073’709’551’615	4

Modbus Test Registers

The following registers may be used to control the Modbus read out. The values in these registers are constant. If your readout values differ from these, please check the following readout settings:

- Endianness (EMU Professional II uses Big-Endian)
- Word order (EMU Professional II uses MSB -> LSB)
- Command (output register data type)
- Multiple register for one value (64bit values require 4 registers)

Description	Register	Data Type	No. of Register	Expected
Unsigned Int 32bit	4000	uInt32	2	4042260735
Unsigned Int 32bit Minimum	4002	uInt32	2	0
Unsigned Int 32bit Maximum	4004	uInt32	2	4294967295
Signed Int 32bit	4006	sInt32	2	-42260735
Signed Int 32bit Minimum	4008	sInt32	2	-2147483648
Signed Int 32bit Maximum	4010	sInt32	2	2147483647
Unsigned Int 64bit	4012	uInt64	4	17361393123323912609
Unsigned Int 64bit Minimum	4016	uInt64	4	0
Unsigned Int 64bit Maximum	4020	uInt64	4	18446744073709551615
Signed Int 64bit	4024	sInt64	4	1220492058828054945
Signed Int 64bit Minimum	4028	sInt64	4	-9223372036854775808
Signed Int 64bit Maximum	4032	sInt64	4	9223372036854775807
Signed Float32	4036	float	2	1.234567
Signed Float32	4038	float	2	8/2.01
Signed Float32	4040	float	2	-1234567.89
Signed Float32	4042	float	2	1.26999998092651
Signed Float32	4044	float	2	0
Signed Float32	4046	float	2	-1.27999997138977
Signed Float32	4048	float	2	2.54999995231628
Signed Float32	4050	float	2	0
Signed Float32	4052	float	2	1.23000001907348

Description	Register	Data Type	No. of Register	Expected
Signed Float32	4054	float	2	2.53999996185302

Read-Out of Meter Information

Description	Register	Data Type	No. of Register
Serial No.	5000	uInt32	2
Factory No.	5002	uInt32	2
Current System-time	5026	uInt64	4

Definitions

This document uses both Active Energy Consumption and Active Energy Import. These notations are synonyms. The same applies to:
Active Energy Production and Active Energy Export
Reactive Energy Import and Reactive Energy Capacitive
Reactive Energy Export and Reactive Energy Inductive and Reactive.

Read-Out of Data logger

The data logger saves energy and power values at the end of the load profile interval. While the current log interval is not completed (e.g. 15 minute load profile interval) the values in these Registers are those of the previous load profile. After a startup of the meter these registers will send the value “0” until the first load profile after startup is completed.

Description	Unit	Resolution	Register	Data Type	No. of Register
Time Stamp of Entry	Epoch	Seconds	5900	uInt32	2
Active Energy Import L123 T1	Wh	1 Wh	5902	uInt64	4
Active Energy Import L123 T2	Wh	1 Wh	5906	uInt64	4
Active Energy Export L123 T1	Wh	1 Wh	5910	uInt64	4
Active Energy Export L123 T2	Wh	1 Wh	5914	uInt64	4
Reactive Energy Import L123 T1	varh	1 varh	5918	uInt64	4
Reactive Energy Import L123 T2	varh	1 varh	5922	uInt64	4
Reactive Energy Export L123 T1	varh	1 varh	5926	uInt64	4
Reactive Energy Export L123 T2	varh	1 varh	5930	uInt64	4
Active Power L123	W	1 W	5934	float	2
Active Power L1	W	1 W	5936	float	2
Active Power L2	W	1 W	5938	float	2
Active Power L3	W	1 W	5940	float	2
Current L123	A	0.001 A	5942	float	2
Current L1	A	0.001 A	5944	float	2
Current L2	A	0.001 A	5946	float	2
Current L3	A	0.001 A	5948	float	2
Current L4	A	0.001 A	5950	float	2
Voltage L1-N	V	0.1 V	5952	float	2
Voltage L2-N	V	0.1 V	5954	float	2
Voltage L3-N	V	0.1 V	5956	float	2
Power Factor L1	-	0.01	5958	float	2
Power Factor L2	-	0.01	5960	float	2
Power Factor L3	-	0.01	5962	float	2
Frequency	Hz	0.1 Hz	5964	float	2

Readout of Data Logger via Index

The historical data can be read out via the register 11098.

1. Write the desired data logger index as a 32bit integer into the register 11098. Writing to these registers requires the function code <<Write Multiple Registers - 16>>.
2. The meter requires up to one second to fill the registers with the desired data logger entry.
3. Once you can read back the desired data logger index from the register 11098 the data logger entry is ready for readout.
4. Read out the desired data logger entry via the following register.

Note: This feature is only available on Modbus meters with a serial number greater than 24000000.

Note: The index 0 gives the newest/highest data logger entry back. An index greater than the newest/highest entry returns the newest/highest entry.

Description	Unit	Resolution	Register	Data Type	No. of Register
Index	-	-	11098	uInt32	2
Time Stamp of Entry	Epoch	Seconds	11100	uInt32	2
Active Energy Import L123 T1	Wh	1 Wh	11102	uInt64	4
Active Energy Import L123 T2	Wh	1 Wh	11106	uInt64	4
Active Energy Export L123 T1	Wh	1 Wh	11110	uInt64	4
Active Energy Export L123 T2	Wh	1 Wh	11114	uInt64	4
Reactive Energy Import L123 T1	varh	1 varh	11118	uInt64	4
Reactive Energy Import L123 T2	varh	1 varh	11122	uInt64	4
Reactive Energy Export L123 T1	varh	1 varh	11126	uInt64	4
Reactive Energy Export L123 T2	varh	1 varh	11130	uInt64	4
Active Power L123	W	1 W	11134	float	4
Active Power L1	W	1 W	11136	float	4
Active Power L2	W	1 W	11138	float	4
Active Power L3	W	1 W	11140	float	4
Current L123	A	0.001 A	11142	float	4
Current L1	A	0.001 A	11144	float	4
Current L2	A	0.001 A	11146	float	4
Current L3	A	0.001 A	11148	float	4
Current L4	A	0.001 A	11150	float	4
Voltage L1-N	V	0.1 V	11152	float	4
Voltage L2-N	V	0.1 V	11154	float	4
Voltage L3-N	V	0.1 V	11156	float	4
Power Factor L1	-	0.01	11158	float	4
Power Factor L2	-	0.01	11160	float	4
Power Factor L3	-	0.01	11162	float	4
Frequency	Hz	0.1 Hz	11164	float	

Register Read-Out EMU Professional II

Energy Register 64bit, Wh/varh Resolution

Active Energy

Description	Unit	Resolution	Register	Data Type	No. of Register
		Phase L123			
Active Energy Import L123 Total	Wh	1 Wh	6000	uInt64	4
Active Energy Import L123 T1	Wh	1 Wh	6004	uInt64	4
Active Energy Import L123 T2	Wh	1 Wh	6008	uInt64	4
Active Energy Import L123 T3	Wh	1 Wh	6012	uInt64	4
Active Energy Import L123 T4	Wh	1 Wh	6016	uInt64	4
Active Energy Export L123 Total	Wh	1 Wh	6020	uInt64	4
Active Energy Export L123 T1	Wh	1 Wh	6024	uInt64	4
Active Energy Export L123 T2	Wh	1 Wh	6028	uInt64	4
Active Energy Export L123 T3	Wh	1 Wh	6032	uInt64	4
Active Energy Export L123 T4	Wh	1 Wh	6036	uInt64	4
		Phase L1			
Active Energy Import L1 Total	Wh	1 Wh	6100	uInt64	4
Active Energy Import L1 T1	Wh	1 Wh	6104	uInt64	4
Active Energy Import L1 T2	Wh	1 Wh	6108	uInt64	4
Active Energy Import L1 T3	Wh	1 Wh	6112	uInt64	4
Active Energy Import L1 T4	Wh	1 Wh	6116	uInt64	4
Active Energy Export L1 Total	Wh	1 Wh	6120	uInt64	4
Active Energy Export L1 T1	Wh	1 Wh	6124	uInt64	4
Active Energy Export L1 T2	Wh	1 Wh	6128	uInt64	4
Active Energy Export L1 T3	Wh	1 Wh	6132	uInt64	4
Active Energy Export L1 T4	Wh	1 Wh	6136	uInt64	4
		Phase L2			
Active Energy Import L2 Total	Wh	1 Wh	6140	uInt64	4
Active Energy Import L2 T1	Wh	1 Wh	6144	uInt64	4
Active Energy Import L2 T2	Wh	1 Wh	6148	uInt64	4
Active Energy Import L2 T3	Wh	1 Wh	6152	uInt64	4
Active Energy Import L2 T4	Wh	1 Wh	6156	uInt64	4
Active Energy Export L2 Total	Wh	1 Wh	6160	uInt64	4
Active Energy Export L2 T1	Wh	1 Wh	6164	uInt64	4
Active Energy Export L2 T2	Wh	1 Wh	6168	uInt64	4
Active Energy Export L2 T3	Wh	1 Wh	6172	uInt64	4
Active Energy Export L2 T4	Wh	1 Wh	6176	uInt64	4
		Phase L3			
Active Energy Import L3 Total	Wh	1 Wh	6180	uInt64	4
Active Energy Import L3 T1	Wh	1 Wh	6184	uInt64	4
Active Energy Import L3 T2	Wh	1 Wh	6188	uInt64	4
Active Energy Import L3 T3	Wh	1 Wh	6192	uInt64	4
Active Energy Import L3 T4	Wh	1 Wh	6196	uInt64	4
Active Energy Export L3 Total	Wh	1 Wh	6200	uInt64	4
Active Energy Export L3 T1	Wh	1 Wh	6204	uInt64	4
Active Energy Export L3 T2	Wh	1 Wh	6208	uInt64	4
Active Energy Export L3 T3	Wh	1 Wh	6212	uInt64	4
Active Energy Export L3 T4	Wh	1 Wh	6216	uInt64	4

Reactive Energy

Description	Unit	Resolution	Register	Data Type	No. of Register
		Phase L123			
Reactive Energy Import L123 Total	varh	1 varh	6300	uInt64	4
Reactive Energy Import L123 T1	varh	1 varh	6304	uInt64	4
Reactive Energy Import L123 T2	varh	1 varh	6308	uInt64	4
Reactive Energy Import L123 T3	varh	1 varh	6312	uInt64	4
Reactive Energy Import L123 T4	varh	1 varh	6316	uInt64	4
Reactive Energy Export L123 Total	varh	1 varh	6320	uInt64	4
Reactive Energy Export L123 T1	varh	1 varh	6324	uInt64	4
Reactive Energy Export L123 T2	varh	1 varh	6328	uInt64	4
Reactive Energy Export L123 T3	varh	1 varh	6332	uInt64	4
Reactive Energy Export L123 T4	varh	1 varh	6336	uInt64	4
		Phase L1			
Reactive Energy Import L1 Total	varh	1 varh	6400	uInt64	4
Reactive Energy Import L1 T1	varh	1 varh	6404	uInt64	4
Reactive Energy Import L1 T2	varh	1 varh	6408	uInt64	4
Reactive Energy Import L1 T3	varh	1 varh	6412	uInt64	4
Reactive Energy Import L1 T4	varh	1 varh	6416	uInt64	4
Reactive Energy Export L1 Total	varh	1 varh	6420	uInt64	4
Reactive Energy Export L1 T1	varh	1 varh	6424	uInt64	4
Reactive Energy Export L1 T2	varh	1 varh	6428	uInt64	4
Reactive Energy Export L1 T3	varh	1 varh	6432	uInt64	4
Reactive Energy Export L1 T4	varh	1 varh	6436	uInt64	4
		Phase L2			
Reactive Energy Import L2 Total	varh	1 varh	6440	uInt64	4
Reactive Energy Import L2 T1	varh	1 varh	6444	uInt64	4
Reactive Energy Import L2 T2	varh	1 varh	6448	uInt64	4
Reactive Energy Import L2 T3	varh	1 varh	6452	uInt64	4
Reactive Energy Import L2 T4	varh	1 varh	6456	uInt64	4
Reactive Energy Export L2 Total	varh	1 varh	6460	uInt64	4
Reactive Energy Export L2 T1	varh	1 varh	6464	uInt64	4
Reactive Energy Export L2 T2	varh	1 varh	6468	uInt64	4
Reactive Energy Export L2 T3	varh	1 varh	6472	uInt64	4
Reactive Energy Export L2 T4	varh	1 varh	6476	uInt64	4
		Phase L3			
Reactive Energy Import L3 Total	varh	1 varh	6480	uInt64	4
Reactive Energy Import L3 T1	varh	1 varh	6484	uInt64	4
Reactive Energy Import L3 T2	varh	1 varh	6488	uInt64	4
Reactive Energy Import L3 T3	varh	1 varh	6492	uInt64	4
Reactive Energy Import L3 T4	varh	1 varh	6496	uInt64	4
Reactive Energy Export L3 Total	varh	1 varh	6500	uInt64	4
Reactive Energy Export L3 T1	varh	1 varh	6504	uInt64	4
Reactive Energy Export L3 T2	varh	1 varh	6508	uInt64	4
Reactive Energy Export L3 T3	varh	1 varh	6512	uInt64	4
Reactive Energy Export L3 T4	varh	1 varh	6516	uInt64	4

Energy Register 64bit, kWh/kvarh Resolution

Active Energy

Description	Unit	Resolution	Register	Data Type	No. of Register
		Phase L123			
Active Energy Import L123 Total	kWh	1 kWh	7000	uInt64	4
Active Energy Import L123 T1	kWh	1 kWh	7004	uInt64	4
Active Energy Import L123 T2	kWh	1 kWh	7008	uInt64	4
Active Energy Import L123 T3	kWh	1 kWh	7012	uInt64	4
Active Energy Import L123 T4	kWh	1 kWh	7016	uInt64	4
Active Energy Export L123 Total	kWh	1 kWh	7020	uInt64	4
Active Energy Export L123 T1	kWh	1 kWh	7024	uInt64	4
Active Energy Export L123 T2	kWh	1 kWh	7028	uInt64	4
Active Energy Export L123 T3	kWh	1 kWh	7032	uInt64	4
Active Energy Export L123 T4	kWh	1 kWh	7036	uInt64	4
		Phase L1			
Active Energy Import L1 Total	kWh	1 kWh	7100	uInt64	4
Active Energy Import L1 T1	kWh	1 kWh	7104	uInt64	4
Active Energy Import L1 T2	kWh	1 kWh	7108	uInt64	4
Active Energy Import L1 T3	kWh	1 kWh	7112	uInt64	4
Active Energy Import L1 T4	kWh	1 kWh	7116	uInt64	4
Active Energy Export L1 Total	kWh	1 kWh	7120	uInt64	4
Active Energy Export L1 T1	kWh	1 kWh	7124	uInt64	4
Active Energy Export L1 T2	kWh	1 kWh	7128	uInt64	4
Active Energy Export L1 T3	kWh	1 kWh	7132	uInt64	4
Active Energy Export L1 T4	kWh	1 kWh	7136	uInt64	4
		Phase L2			
Active Energy Import L2 Total	kWh	1 kWh	7140	uInt64	4
Active Energy Import L2 T1	kWh	1 kWh	7144	uInt64	4
Active Energy Import L2 T3	kWh	1 kWh	7152	uInt64	4
Active Energy Import L2 T2	kWh	1 kWh	7148	uInt64	4
Active Energy Import L2 T4	kWh	1 kWh	7156	uInt64	4
Active Energy Export L2 Total	kWh	1 kWh	7160	uInt64	4
Active Energy Export L2 T1	kWh	1 kWh	7164	uInt64	4
Active Energy Export L2 T2	kWh	1 kWh	7168	uInt64	4
Active Energy Export L2 T3	kWh	1 kWh	7172	uInt64	4
Active Energy Export L2 T4	kWh	1 kWh	7176	uInt64	4
		Phase L3			
Active Energy Import L3 Total	kWh	1 kWh	7180	uInt64	4
Active Energy Import L3 T1	kWh	1 kWh	7184	uInt64	4
Active Energy Import L3 T2	kWh	1 kWh	7188	uInt64	4
Active Energy Import L3 T3	kWh	1 kWh	7192	uInt64	4
Active Energy Import L3 T4	kWh	1 kWh	7196	uInt64	4
Active Energy Export L3 Total	kWh	1 kWh	7200	uInt64	4
Active Energy Export L3 T1	kWh	1 kWh	7204	uInt64	4
Active Energy Export L3 T2	kWh	1 kWh	7208	uInt64	4
Active Energy Export L3 T3	kWh	1 kWh	7212	uInt64	4
Active Energy Export L3 T4	kWh	1 kWh	7216	uInt64	4

Reactive Energy

Description	Unit	Resolution	Register	Data Type	No. of Register
		Phase L123			
Reactive Energy Import L123 Total	kvarh	1 kvarh	7300	uInt64	4
Reactive Energy Import L123 T1	kvarh	1 kvarh	7304	uInt64	4
Reactive Energy Import L123 T2	kvarh	1 kvarh	7308	uInt64	4
Reactive Energy Import L123 T3	kvarh	1 kvarh	7312	uInt64	4
Reactive Energy Import L123 T4	kvarh	1 kvarh	7316	uInt64	4
Reactive Energy Export L123 Total	kvarh	1 kvarh	7320	uInt64	4
Reactive Energy Export L123 T1	kvarh	1 kvarh	7324	uInt64	4
Reactive Energy Export L123 T2	kvarh	1 kvarh	7328	uInt64	4
Reactive Energy Export L123 T3	kvarh	1 kvarh	7332	uInt64	4
Reactive Energy Export L123 T4	kvarh	1 kvarh	7336	uInt64	4
		Phase L1			
Reactive Energy Import L1 Total	kvarh	1 kvarh	7340	uInt64	4
Reactive Energy Import L1 T1	kvarh	1 kvarh	7344	uInt64	4
Reactive Energy Import L1 T2	kvarh	1 kvarh	7348	uInt64	4
Reactive Energy Import L1 T3	kvarh	1 kvarh	7352	uInt64	4
Reactive Energy Import L1 T4	kvarh	1 kvarh	7356	uInt64	4
Reactive Energy Export L1 Total	kvarh	1 kvarh	7360	uInt64	4
Reactive Energy Export L1 T1	kvarh	1 kvarh	7364	uInt64	4
Reactive Energy Export L1 T2	kvarh	1 kvarh	7368	uInt64	4
Reactive Energy Export L1 T3	kvarh	1 kvarh	7372	uInt64	4
Reactive Energy Export L1 T4	kvarh	1 kvarh	7376	uInt64	4
		Phase L2			
Reactive Energy Import L2 Total	kvarh	1 kvarh	7380	uInt64	4
Reactive Energy Import L2 T1	kvarh	1 kvarh	7384	uInt64	4
Reactive Energy Import L2 T2	kvarh	1 kvarh	7388	uInt64	4
Reactive Energy Import L2 T3	kvarh	1 kvarh	7392	uInt64	4
Reactive Energy Import L2 T4	kvarh	1 kvarh	7396	uInt64	4
Reactive Energy Export L2 Total	kvarh	1 kvarh	7400	uInt64	4
Reactive Energy Export L2 T1	kvarh	1 kvarh	7404	uInt64	4
Reactive Energy Export L2 T2	kvarh	1 kvarh	7408	uInt64	4
Reactive Energy Export L2 T3	kvarh	1 kvarh	7412	uInt64	4
Reactive Energy Export L2 T4	kvarh	1 kvarh	7416	uInt64	4
		Phase L3			
Reactive Energy Import L3 Total	kvarh	1 kvarh	7420	uInt64	4
Reactive Energy Import L3 T1	kvarh	1 kvarh	7424	uInt64	4
Reactive Energy Import L3 T2	kvarh	1 kvarh	7428	uInt64	4
Reactive Energy Import L3 T3	kvarh	1 kvarh	7432	uInt64	4
Reactive Energy Import L3 T4	kvarh	1 kvarh	7436	uInt64	4
Reactive Energy Export L3 Total	kvarh	1 kvarh	7440	uInt64	4
Reactive Energy Export L3 T1	kvarh	1 kvarh	7444	uInt64	4
Reactive Energy Export L3 T2	kvarh	1 kvarh	7448	uInt64	4
Reactive Energy Export L3 T3	kvarh	1 kvarh	7452	uInt64	4
Reactive Energy Export L3 T4	kvarh	1 kvarh	7456	uInt64	4

Energy Register 32bit, kWh/kvarh Resolution

Active Energy

Description	Unit	Resolution	Register	Data Type	No. of Register
		Phase L123			
Active Energy Import L123 Total	kWh	1 kWh	8000	uInt32	2
Active Energy Import L123 T1	kWh	1 kWh	8002	uInt32	2
Active Energy Import L123 T2	kWh	1 kWh	8004	uInt32	2
Active Energy Import L123 T3	kWh	1 kWh	8006	uInt32	2
Active Energy Import L123 T4	kWh	1 kWh	8008	uInt32	2
Active Energy Export L123 Total	kWh	1 kWh	8010	uInt32	2
Active Energy Export L123 T1	kWh	1 kWh	8012	uInt32	2
Active Energy Export L123 T2	kWh	1 kWh	8014	uInt32	2
Active Energy Export L123 T3	kWh	1 kWh	8016	uInt32	2
Active Energy Export L123 T4	kWh	1 kWh	8018	uInt32	2
		Phase L1			
Active Energy Import L1 Total	kWh	1 kWh	8100	uInt32	2
Active Energy Import L1 T1	kWh	1 kWh	8102	uInt32	2
Active Energy Import L1 T2	kWh	1 kWh	8104	uInt32	2
Active Energy Import L1 T3	kWh	1 kWh	8106	uInt32	2
Active Energy Import L1 T4	kWh	1 kWh	8108	uInt32	2
Active Energy Export L1 Total	kWh	1 kWh	8110	uInt32	2
Active Energy Export L1 T1	kWh	1 kWh	8112	uInt32	2
Active Energy Export L1 T2	kWh	1 kWh	8114	uInt32	2
Active Energy Export L1 T3	kWh	1 kWh	8116	uInt32	2
Active Energy Export L1 T4	kWh	1 kWh	8118	uInt32	2
		Phase L2			
Active Energy Import L2 Total	kWh	1 kWh	8120	uInt32	2
Active Energy Import L2 T1	kWh	1 kWh	8122	uInt32	2
Active Energy Import L2 T2	kWh	1 kWh	8124	uInt32	2
Active Energy Import L2 T3	kWh	1 kWh	8126	uInt32	2
Active Energy Import L2 T4	kWh	1 kWh	8128	uInt32	2
Active Energy Export L2 Total	kWh	1 kWh	8130	uInt32	2
Active Energy Export L2 T1	kWh	1 kWh	8132	uInt32	2
Active Energy Export L2 T2	kWh	1 kWh	8134	uInt32	2
Active Energy Export L2 T3	kWh	1 kWh	8136	uInt32	2
Active Energy Export L2 T4	kWh	1 kWh	8138	uInt32	2
		Phase L3			
Active Energy Import L3 Total	kWh	1 kWh	8140	uInt32	2
Active Energy Import L3 T1	kWh	1 kWh	8142	uInt32	2
Active Energy Import L3 T2	kWh	1 kWh	8144	uInt32	2
Active Energy Import L3 T3	kWh	1 kWh	8146	uInt32	2
Active Energy Import L3 T4	kWh	1 kWh	8148	uInt32	2
Active Energy Export L3 Total	kWh	1 kWh	8150	uInt32	2
Active Energy Export L3 T1	kWh	1 kWh	8152	uInt32	2
Active Energy Export L3 T2	kWh	1 kWh	8154	uInt32	2
Active Energy Export L3 T3	kWh	1 kWh	8156	uInt32	2
Active Energy Export L3 T4	kWh	1 kWh	8158	uInt32	2

Reactive Energy

Description	Unit	Resolution	Register	Data Type	No. of Register
		Phase L123			
Reactive Energy Import L123 Total	kvarh	1 kvarh	8200	uInt32	2
Reactive Energy Import L123 T1	kvarh	1 kvarh	8202	uInt32	2
Reactive Energy Import L123 T2	kvarh	1 kvarh	8204	uInt32	2
Reactive Energy Import L123 T3	kvarh	1 kvarh	8206	uInt32	2
Reactive Energy Import L123 T4	kvarh	1 kvarh	8208	uInt32	2
Reactive Energy Export L123 Total	kvarh	1 kvarh	8210	uInt32	2
Reactive Energy Export L123 T1	kvarh	1 kvarh	8212	uInt32	2
Reactive Energy Export L123 T2	kvarh	1 kvarh	8214	uInt32	2
Reactive Energy Export L123 T3	kvarh	1 kvarh	8216	uInt32	2
Reactive Energy Export L123 T4	kvarh	1 kvarh	8218	uInt32	2
		Phase L1			
Reactive Energy Import L1 Total	kvarh	1 kvarh	8300	uInt32	2
Reactive Energy Import L1 T1	kvarh	1 kvarh	8302	uInt32	2
Reactive Energy Import L1 T2	kvarh	1 kvarh	8304	uInt32	2
Reactive Energy Import L1 T3	kvarh	1 kvarh	8306	uInt32	2
Reactive Energy Import L1 T4	kvarh	1 kvarh	8308	uInt32	2
Reactive Energy Export L1 Total	kvarh	1 kvarh	8310	uInt32	2
Reactive Energy Export L1 T1	kvarh	1 kvarh	8312	uInt32	2
Reactive Energy Export L1 T2	kvarh	1 kvarh	8314	uInt32	2
Reactive Energy Export L1 T3	kvarh	1 kvarh	8316	uInt32	2
Reactive Energy Export L1 T4	kvarh	1 kvarh	8318	uInt32	2
		Phase L2			
Reactive Energy Import L2 Total	kvarh	1 kvarh	8320	uInt32	2
Reactive Energy Import L2 T1	kvarh	1 kvarh	8322	uInt32	2
Reactive Energy Import L2 T2	kvarh	1 kvarh	8324	uInt32	2
Reactive Energy Import L2 T3	kvarh	1 kvarh	8326	uInt32	2
Reactive Energy Import L2 T4	kvarh	1 kvarh	8328	uInt32	2
Reactive Energy Export L2 Total	kvarh	1 kvarh	8330	uInt32	2
Reactive Energy Export L2 T1	kvarh	1 kvarh	8332	uInt32	2
Reactive Energy Export L2 T2	kvarh	1 kvarh	8334	uInt32	2
Reactive Energy Export L2 T3	kvarh	1 kvarh	8336	uInt32	2
Reactive Energy Export L2 T4	kvarh	1 kvarh	8338	uInt32	2
		Phase L3			
Reactive Energy Import L3 Total	kvarh	1 kvarh	8340	uInt32	2
Reactive Energy Import L3 T1	kvarh	1 kvarh	8342	uInt32	2
Reactive Energy Import L3 T2	kvarh	1 kvarh	8344	uInt32	2
Reactive Energy Import L3 T3	kvarh	1 kvarh	8346	uInt32	2
Reactive Energy Import L3 T4	kvarh	1 kvarh	8348	uInt32	2
Reactive Energy Export L3 Total	kvarh	1 kvarh	8350	uInt32	2
Reactive Energy Export L3 T1	kvarh	1 kvarh	8352	uInt32	2
Reactive Energy Export L3 T2	kvarh	1 kvarh	8354	uInt32	2
Reactive Energy Export L3 T3	kvarh	1 kvarh	8356	uInt32	2
Reactive Energy Export L3 T4	kvarh	1 kvarh	8358	uInt32	2

Momentary Values

Power

Description	Unit	Resolution	Register	Data Type	No. of Register
Active Power L123	W	1 W	9000	float	2
Active Power L1	W	1 W	9002	float	2
Active Power L2	W	1 W	9004	float	2
Active Power L3	W	1 W	9006	float	2
Reactive Power L123	var	1 var	9010	float	2
Reactive Power L1	var	1 var	9012	float	2
Reactive Power L2	var	1 var	9014	float	2
Reactive Power L3	var	1 var	9016	float	2
Apparent Power L123	VA	1 VA	9020	float	2
Apparent Power L1	VA	1 VA	9022	float	2
Apparent Power L2	VA	1 VA	9024	float	2
Apparent Power L3	VA	1 VA	9026	float	2

Current

Description	Unit	Resolution	Register	Data Type	No. of Register
Current L123	A	1 A	9100	float	2
Current L1	A	1 A	9102	float	2
Current L2	A	1 A	9104	float	2
Current L3	A	1 A	9106	float	2

Voltage

Description	Unit	Resolution	Register	Data Type	No. of Register
Voltage L2-N	V	0.1 V	9202	float	2
Voltage L1-N	V	0.1 V	9200	float	2
Voltage L3-N	V	0.1 V	9204	float	2
Voltage L1-L2	V	0.1 V	9206	float	2
Voltage L2-L3	V	0.1 V	9208	float	2
Voltage L3-L1	V	0.1 V	9210	float	2

Power Factor and Frequency

Description	Unit	Resolution	Register	Data Type	No. of Register
Power Factor L1	-	1	9300	float	2
Power Factor L2	-	1	9302	float	2
Power Factor L3	-	1	9304	float	2
Frequency	Hz	1 Hz	9310	float	2

Minimum and Maximum Values

Note: These values are only available to meters with a serial number greater than 22350000.

Voltage

Description	Unit	Resolution	Register	Data Type	No. of Register
Min. Voltage L1-N	V	0.1 V	10000	float	2
Min. Voltage L2-N	V	0.1 V	10002	float	2
Min. Voltage L3-N	V	0.1 V	10004	float	2
Min. Voltage L1-N Time stamp	Epoch	Seconds	10008	uInt64	4
Min. Voltage L2-N Time stamp	Epoch	Seconds	10012	uInt64	4
Min. Voltage L2-N Time stamp	Epoch	Seconds	10016	uInt64	4
Max. Voltage L1-N	V	0.1 V	10024	float	2
Max. Voltage L2-N	V	0.1 V	10026	float	2
Max. Voltage L3-N	V	0.1 V	10028	float	2
Max. Voltage L1-N Time stamp	Epoch	Seconds	10032	uInt64	4
Max. Voltage L2-N Time stamp	Epoch	Seconds	10036	uInt64	4
Max. Voltage L3-N Time stamp	Epoch	Seconds	10040	uInt64	4

Current

Description	Unit	Resolution	Register	Data Type	No. of Register
Min. Current L1	A	0.001 A	10100	float	2
Min. Current L2	A	0.001 A	10102	float	2
Min. Current L3	A	0.001 A	10104	float	2
Min. Current L123	A	0.001 A	10106	float	2
Min. Current L1 Time stamp	Epoch	Seconds	10108	uInt64	4
Min. Current L2 Time stamp	Epoch	Seconds	10112	uInt64	4
Min. Current L3 Time stamp	Epoch	Seconds	10116	uInt64	4
Min. Current L123 Time stamp	Epoch	Seconds	10120	uInt64	4
Max. Current L1	A	0.001 A	10124	float	2
Max. Current L2	A	0.001 A	10126	float	2
Max. Current L3	A	0.001 A	10128	float	2
Max. Current L123	A	0.001 A	10130	float	2
Max. Current L1 Time stamp	Epoch	Seconds	10132	uInt64	4
Max. Current L2 Time stamp	Epoch	Seconds	10136	uInt64	4
Max. Current L3 Time stamp	Epoch	Seconds	10140	uInt64	4
Max. Current L123 Time stamp	Epoch	Seconds	10144	uInt64	4

Power

Description	Unit	Resolution	Register	Data Type	No. of Register
Max. Active Energy L1	W	1 W	10200	float	2
Max. Active Energy L2	W	1 W	10202	float	2
Max. Active Energy L3	W	1 W	10204	float	2
Max. Active Energy L123	W	1 W	10206	float	2
Max. Active Energy L1 Time stamp	Epoch	Seconds	10208	uInt64	4
Max. Active Energy L2 Time stamp	Epoch	Seconds	10212	uInt64	4
Max. Active Energy L3 Time stamp	Epoch	Seconds	10216	uInt64	4
Max. Active Energy L123 Time stamp	Epoch	Seconds	10220	uInt64	4
Max. Reactive Energy L1	var	1 var	10300	float	2

Description	Unit	Resolution	Register	Data Type	No. of Register
Max. Reactive Energy L2	var	1 var	10302	float	2
Max. Reactive Energy L3	var	1 var	10304	float	2
Max. Reactive Energy L123	var	1 var	10306	float	2
Max. Reactive Energy L1 Time stamp	Epoch	Seconds	10308	uInt64	4
Max. Reactive Energy L2 Time stamp	Epoch	Seconds	10312	uInt64	4
Max. Reactive Energy L3 Time stamp	Epoch	Seconds	10316	uInt64	4
Max. Reactive Energy L123 Time stamp	Epoch	Seconds	10320	uInt64	4
Max. Apparent Energy L1	VA	1 VA	10400	float	2
Max. Apparent Energy L2	VA	1 VA	10402	float	2
Max. Apparent Energy L3	VA	1 VA	10404	float	2
Max. Apparent Energy L123	VA	1 VA	10406	float	2
Max. Apparent Energy L1 Time stamp	Epoch	Seconds	10408	uInt64	4
Max. Apparent Energy L2 Time stamp	Epoch	Seconds	10412	uInt64	4
Max. Apparent Energy L3 Time stamp	Epoch	Seconds	10416	uInt64	4
Max. Apparent Energy L123 Time stamp	Epoch	Seconds	10420	uInt64	4
Min. Active Energy L1	W	1 W	10500	float	2
Min. Active Energy L2	W	1 W	10502	float	2
Min. Active Energy L3	W	1 W	10504	float	2
Min. Active Energy L123	W	1 W	10506	float	2
Min. Active Energy L1 Time stamp	Epoch	Seconds	10508	uInt64	4
Min. Active Energy L2 Time stamp	Epoch	Seconds	10512	uInt64	4
Min. Active Energy L3 Time stamp	Epoch	Seconds	10516	uInt64	4
Min. Active Energy L123 Time stamp	Epoch	Seconds	10520	uInt64	4
Min. Reactive Energy L1	var	1 var	10600	float	2
Min. Reactive Energy L2	var	1 var	10602	float	2
Min. Reactive Energy L3	var	1 var	10604	float	2
Min. Reactive Energy L123	var	1 var	10606	float	2
Min. Reactive Energy L1 Time stamp	Epoch	Seconds	10608	uInt64	4
Min. Reactive Energy L2 Time stamp	Epoch	Seconds	10612	uInt64	4
Min. Reactive Energy L3 Time stamp	Epoch	Seconds	10616	uInt64	4
Min. Reactive Energy L123 Time stamp	Epoch	Seconds	10620	uInt64	4
Min. Apparent Energy L1	VA	1 VA	10700	float	2
Min. Apparent Energy L2	VA	1 VA	10702	float	2
Min. Apparent Energy L3	VA	1 VA	10704	float	2
Min. Apparent Energy L123	VA	1 VA	10706	float	2
Min. Apparent Energy L1 Time stamp	Epoch	Seconds	10708	uInt64	4
Min. Apparent Energy L2 Time stamp	Epoch	Seconds	10712	uInt64	4
Min. Apparent Energy L3 Time stamp	Epoch	Seconds	10716	uInt64	4
Min. Apparent Energy L123 Time stamp	Epoch	Seconds	10720	uInt64	4

Power Factor and Frequency

Description	Unit	Resolution	Register	Data Type	No. of Register
Min. Power Factor L1	-	1	10900	float	2
Min. Power Factor L2	-	1	10902	float	2
Min. Power Factor L3	-	1	10904	float	2
Min. Power Factor L1 Time stamp	Epoch	Seconds	10906	uInt64	4
Min. Power Factor L2 Time stamp	Epoch	Seconds	10910	uInt64	4
Min. Power Factor L3 Time stamp	Epoch	Seconds	10914	uInt64	4
Max. Power Factor L1	-	1	10918	float	2
Max. Power Factor L2	-	1	10920	float	2
Max. Power Factor L3	-	1	10922	float	2
Max. Power Factor L1 Time stamp	Epoch	Seconds	10924	uInt64	4
Max. Power Factor L2 Time stamp	Epoch	Seconds	10928	uInt64	4
Max. Power Factor L3 Time stamp	Epoch	Seconds	10932	uInt64	4
Min. Frequency	Hz	0.1 Hz	10950	float	2

Description	Unit	Resolution	Register	Data Type	No. of Register
Min. Frequency Time stamp	Epoch	Seconds	10952	uInt64	4
Max. Frequency	Hz	0.1 Hz	10956	float	2
Max. Frequency Time stamp	Epoch	Seconds	10958	uInt64	4

Further Information

Note: These values are only available to meters with a serial number greater than 22350000.

Description	Register	Data Type	No. of Register
Power fail count on meter	11000	uInt16	1
Current Tariff	11001	uInt16	1
Current transformer ratio primary	11002	uInt16	1
Current transformer ratio secondary	11003	uInt16	1
Voltage transformer ratio primary	11004	uInt16	1
Voltage transformer ratio secondary	11005	uInt16	1

Further Functionality

To reset the Min/Max-Registers, change the current tariff or set the system time, the following registers can be written to.

Writing to these registers requires the function code <<Write Multiple Registers - 16>>.

Description	Register	Data Type	No. of Register
Data logger index	11098	uInt32	2
Switching of tariff	11001	uInt16	1
Reset of Min/Max Registers	11006	uInt16	1
Current System-time	5026	uInt64	4

To change the current tariff please write the desired tariff (1,2,3,4) into the register 11001.

To reset the min/max registers please write a 1 into the register 11006.

To set the current system-time please write the time as a 64-bit EPOCH value to the register 5026.

Note: Switching of the current tariff is only possible on the EMU Professional II Modbus RTU meters with a serial number greater than 22350000. Furthermore the meter must be produced with the function "Tariff switching via Interface".

Note: Due to security concerns the tariff switching is not available with Modbus TCP.

Note: Setting the current system-time is only possible on the EMU Professional II Modbus (RTU) meters with a serial number greater than 22350000.

Examples for Modbus Read-Out

These Examples use Modpoll (Version 3.15) to read-out the registers.

Please make sure you entered the correct IP address of your meter.

More information on Modpoll command arguments can be found at https://www.modbusdriver.com/modpoll.html.

Energy Register

Active Energy Import Tariff 1 Total:

```
modpoll.exe -1 -m tcp -t 4:i64 -u -i -f -r 5902 -c 1 10.255.255.119
```

Active Energy Export Phase L1 Tariff 2:

```
modpoll.exe -1 -m tcp -t 4:i64 -u -i -f -r 6128 -c 1 10.255.255.119
```

Reactive Energy Export Total:

```
modpoll.exe -1 -m tcp -t 4:i64 -u -i -f -r 7320 -c 1 10.255.255.119
```

Momentary Values

Active Power Total:

```
modpoll.exe -1 -m tcp -t 4:f32 -i -f -r 9000 -c 1 10.255.255.119
```

Apparent Power Phase L3:

```
modpoll.exe -1 -m tcp -t 4:f32 -i -f -r 9026 -c 1 10.255.255.119
```

Power Factor Phase L1:

```
modpoll.exe -1 -m tcp -t 4:f32 -i -f -r 9300 -c 1 10.255.255.119
```

Voltage L1-N:

```
modpoll.exe -1 -m tcp -t 4:f32 -i -f -r 9200 -c 1 10.255.255.119
```

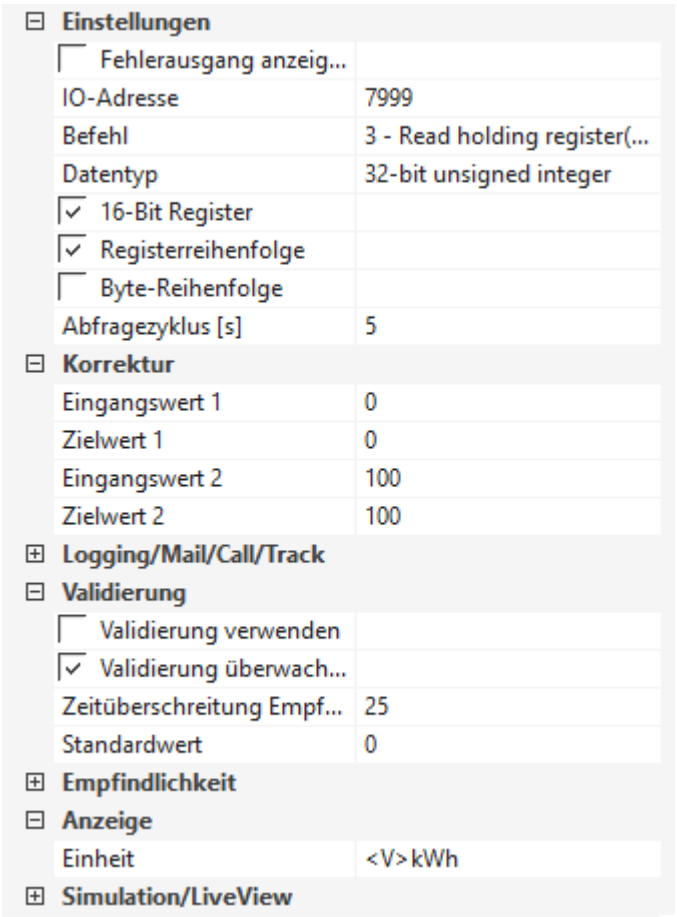
Information for Read-Out to a Loxone Mini-Server

Be aware , that contrary to the EMU Professional/Allrounder, the EMU Professional II uses unsigned integers/floats. Registers with 2 and 4 registers used (32bit, 64bit respectively) need their register order reversed.

TCP/IP

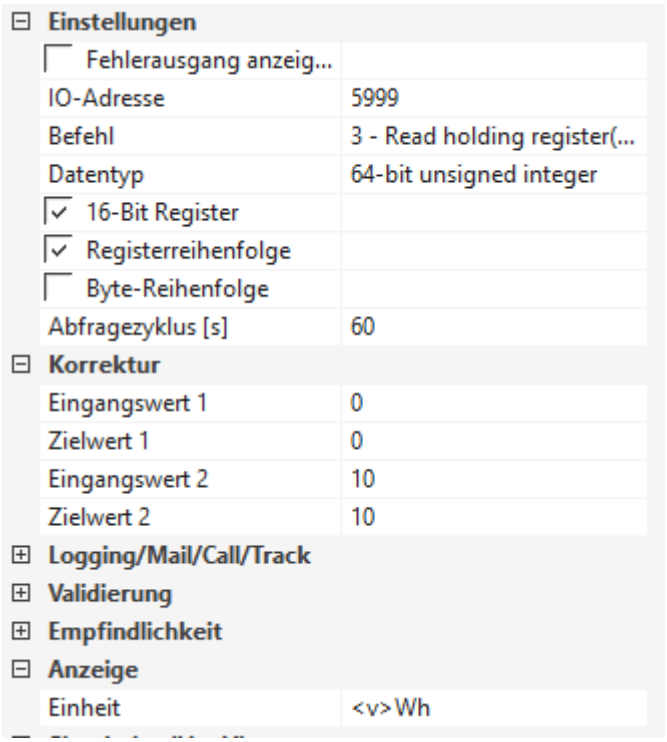
Example 32-bit Value:

Active Energy Import Total	
Register	8000
Command	3 – Read holding register(4x)
Datatype	32-bit unsigned integer
16-Bit Register	yes
Register order	yes
Byte order	no
Start value 1	0
End value 1	0
Start value 2	100
End value 2	100
Unit	kWh



Example 64-bit Value:

Active Energy Import Total	
Register	6000
Command	3 – Read holding register(4x)
Datatype	64-bit unsigned integer
16-Bit Register	yes
Register order	yes
Byte order	no
Start value 1	0
End value 1	0
Start value 2	10
End value 2	10
Unit	Wh



RTU

Example 32-bit Value:

Active Energy Import Total	
Register	8000
Command	3 – Read holding register(4x)
Datatype	32-bit unsigned integer
16-Bit Register	yes
Register order	no
Byte order	no
Start value 1	0
End value 1	0
Start value 2	100
End value 2	100
Unit	kWh

Einstellungen	
☐ Fehlerausgang anzeig...	
IO-Adresse	7999
Befehl	3 - Read holding register(...
Datentyp	32-bit unsigned integer
☑ 16-Bit Register	
☐ Registerreihenfolge	
☐ Byte-Reihenfolge	
Abfragezyklus [s]	60
Korrektur	
Eingangswert 1	0
Zielwert 1	0
Eingangswert 2	100
Zielwert 2	100
Logging/Mail/Call/Track	
Validierung	
Empfindlichkeit	
Anzeige	
Einheit	<v>kWh

EMU Professional TCP Compatible Read-Out

Note: The EMU Professional II works with unsigned data types while the EMU Professional/Allrounder works with signed data types.

Energy Register

Description	Unit	Resolution	Register	Data Type
		32 bit		
Active Energy Consumption Total	Wh	1 Wh	4631	uInt32
Active Energy Consumption Tariff 1	Wh	1 Wh	4633	uInt32
Active Energy Consumption Tariff 2	Wh	1 Wh	4635	uInt32
Active Energy Supply Total	Wh	1 Wh	4637	uInt32
Active Energy Supply Tariff 1	Wh	1 Wh	4639	uInt32
Active Energy Supply Tariff 2	Wh	1 Wh	4641	uInt32
Inductive Reactive Energy Total	varh	1 varh	4643	uInt32
Inductive Reactive Energy Tariff 1	varh	1 varh	4645	uInt32
Inductive Reactive Energy Tariff 2	varh	1 varh	4647	uInt32
Capacitive Reactive Energy Total	varh	1 varh	4649	uInt32
Capacitive Reactive Energy Tariff 1	varh	1 varh	4651	uInt32
Capacitive Reactive Energy Tariff 2	varh	1 varh	4653	uInt32
		64 bit		
Active Energy Consumption Total	Wh	1 Wh	4202	uInt64
Active Energy Consumption Tariff 1	Wh	1 Wh	4230	uInt64
Active Energy Consumption Tariff 2	Wh	1 Wh	4246	uInt64
Active Energy Supply Total	Wh	1 Wh	4282	uInt64
Active Energy Supply Tariff 1	Wh	1 Wh	4310	uInt64
Active Energy Supply Tariff 2	Wh	1 Wh	4326	uInt64
Inductive Reactive Energy Total	varh	1 varh	4362	uInt64
Inductive Reactive Energy Tariff 1	varh	1 varh	4390	uInt64
Inductive Reactive Energy Tariff 2	varh	1 varh	4406	uInt64
Capacitive Reactive Energy Total	varh	1 varh	4442	uInt64
Capacitive Reactive Energy Tariff 1	varh	1 varh	4470	uInt64
Capacitive Reactive Energy Tariff 2	varh	1 varh	4486	uInt64

Power

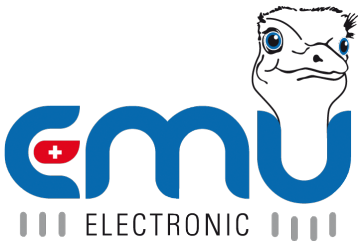
Description	Unit	Resolution	Register	Data Type	No. of Register
Active Power L123	W	1 W	4528	sInt32	2
Active Power L1	W	1 W	4522	sInt32	2
Active Power L2	W	1 W	4524	sInt32	2
Active Power L3	W	1 W	4526	sInt32	2
Reactive Power L123	var	1 var	4536	sInt32	2
Reactive Power L1	var	1 var	4530	sInt32	2
Reactive Power L2	var	1 var	4532	sInt32	2
Reactive Power L3	var	1 var	4534	sInt32	2
Apparent Power L123	VA	1 VA	4544	sInt32	2
Apparent Power L1	VA	1 VA	4538	sInt32	2
Apparent Power L2	VA	1 VA	4540	sInt32	2
Apparent Power L3	VA	1 VA	4542	sInt32	2

Current and Voltage

Description	Unit	Resolution	Register	Data Type	No. of Register
Current L123	mA	1 mA	4598	sInt32	2
Current L1	mA	1 mA	4592	sInt32	2
Current L2	mA	1 mA	4594	sInt32	2
Current L3	mA	1 mA	4596	sInt32	2
Voltage L1-N	0.1 V	0.1 V	4568	sInt16	1
Voltage L2-N	0.1 V	0.1 V	4569	sInt16	1
Voltage L3-N	0.1 V	0.1 V	4570	sInt16	1
Voltage L1-L2	0.1 V	0.1 V	4571	sInt16	1
Voltage L2-L3	0.1 V	0.1 V	4572	sInt16	1
Voltage L3-L1	0.1 V	0.1 V	4573	sInt16	1

Power Factor and Frequency

Description	Unit	Resolution	Register	Data Type	No. of Register
Power Factor L1	-	0.01	4624	sInt16	1
Power Factor L2	-	0.01	4625	sInt16	1
Power Factor L3	-	0.01	4626	sInt16	1
Frequency	0.1Hz	0.1 Hz	4627	sInt16	1



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