Solar-Log™

EN Modbus TCP PM V.2.8

Solar-Log™

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1 Solar-Log™ Modbus TCP PM

Note!

A description of the initially used version 1.0 of the Modbus TCP PM interface can be found in the document „Modbus TCP PM V. 2.7“ on our homepage.
From firmware version 6.xx at the latest, version 1 of the interface can no longer be used.

The purpose of this interface is to communicate with external control devices or communication devices in PV plants. Active- and Reactive Power commands can be sent to the system via the interface. In the other direction, plant values can be transmitted to the, for example, energy supplier.
The interface requires a license (Modbus TCP PM, Item no. 255511) and must be configured in the PM area of the Solar-Log™.

ModbusTCP port:

- 502

Slave ID:

- 1

Implemented Modbus functions (only this functioncodes are allowed):

- 04 (ReadNInputRegister) to read one or multiple 16 bit words
- 06 (Write1Register) to write one 16 bit word
- 16 (WriteNRegister) to write multiple 16 bit words

The functions of the Modbus TCP PM interface have been redesigned in firmware version 3.3.0.
To ensure compatibility of existing applications, the existing functions / register (V1 Power Control and Data Confirmation) were left as they were designed before. The new functionality is available in a separate register area
(Power Control V2).
Power Control V2 provides you with all available functions for new developments - the use of the V1 register is no longer supported.

The Solar-Log™ Modbus implementation uses different byte and word orders. The Modbus protocol byte order follows the big-endian Modbus specification and is thus compatible with standard Modbus implementations. Therefore, the higher byte in value is transferred first.

The proprietary-specific register order for 32-bit values uses a little-endian word order. For a 32-bit value, the lower value word is stored in the first register and the higher value word in the second register.

2 Power Management

The Modbus registers for Power Management are divided into two regions. First region is for specifying the power commands like required power reduction or reactive power, second is the return information of current measurement.
Please note, that for most return information in addition a Utility Meter device is necessary. Refresh interval with Utility Meter is ca. 200 ms. Power commands typically will be executed within less tan a second, depending on number of inverters and brand.

2.1 PM – Power Control

Data	Unit	Value-Range	Adress	Number Reg.	Func Code	since Firmware	Description
PLimit_Type	-	16bit unsigned	10200	1	4/6	3.3.0	Mode of active power limit 0=No limitation via Power Control V2 1=No limitation (100%) 2=Fixed limit in % 4=Limit in %, considering self-consumption
PLimitPerc	%	16bit unsigned	10201	1	4/6	3.3.0	Active power limit; 100=No limit
Reactive_Type	-	16bit unsigned	10204	1	4/6	3.3.0	Mode of reactive power control 0=No control via Power Control V2 1=No reactive power; cos(phi)=1,0 2=Fixed cos(phi) 4=Fixed reactive power in %*10 of Pn 5=Characteristic curve cos(phi) of P over Pn 6=Characteristic curve Q(U) 7= Characteristic curve Q(U) with Voltage dead band 8= Characteristic curve Q(U) with Voltage limitation 9= Characteristic curve Q(P/Pn) 10= Characteristic curve CosPhi/U
CosPhi_Fix	-	32bit float	10205	2	4/6	3.3.0	Fixed cos(phi) (Reactive_Type=2) >0 inductive (Bsp.: +0,97) <0 capacitive (Bsp.: -0,97)
QPerc	-	16bit signed	10209	1	4/6	3.3.0	Fixed reactive power Q in % of Pn (Reactive_ Type=4); 125=12,5% of Pn

WatchDog_Tag	-	32 bit unsigned	10211	2	4/6	3.3.0	Watchdog register to indicate valid power limit settings
WatchDog_Time*	sec	32 bit unsigned	10213	2	4/6	3.3.0	Watchdog timeout 0=deactivated
WatchDog_Limit*	%	16bit unsigned	10215	1	4/6	3.3.0 - 5.x	Active power limit in % in case of watchdog timeout
Utility_connect_good	-	16bit unsigned	10216	1	4/6	3.3.0	External utility data validity indicator 1=use data from register 10218 to 10214 as utility meter data
Utility_fUacRS	V	32 bit float	10218	2	4/6	3.3.0	External utility voltage (phase 1 to 2)
Utility_fUacST	V	32 bit float	10220	2	4/6	3.3.0	External utility voltage (phase 2 to 3)
Utility_fUacTR	V	32 bit float	10222	2	4/6	3.3.0	External utility voltage (phase 3 to 1)
Utility_fPacR	W	32 bit float	10224	2	4/6	3.3.0	External utility active power (phase 1)
Utility_fPacS	W	32 bit float	10226	2	4/6	3.3.0	External utility active
Utility_fPacT	W	32 bit float	10228	2	4/6	3.3.0	External utility active power (phase 3)
Utility_fQacR	VAR	32 bit float	10230	2	4/6	3.3.0	External utility reactive power (phase 1)
Utility_fQacS	VAR	32 bit float	10232	2	4/6	3.3.0	External utility reactive power (phase 2)
Utility_fQacT	VAR	32 bit float	10234	2	4/6	3.3.0	External utility reactive power (phase 3)
Uq0/Uc	-	32 bit float	10242	2	4/6	6.x	Reference voltage via Modbus U/Uref Value U/Uc => 1,0 =no shift of the characteristic curve only with Modus 7 (Charastic curve Q(U) with Voltage Dead Band) - in Register 10204. Range: 0,7 - 1,3
Qref/Pbinst	%	32 bit float	10244	2	4/6	6.x	Switch to Q with voltage limiting function % Pbinst with sign ind/kap. Range defined by curve

* In register 10213 a time span in seconds must be set in which the watchdog Register 10211 must be triggered. Register 10211 must be written cyclically. No signal within the WatchDog Time (10213) triggers the fallback: „Failure of the remote control“. With firmware 6.xx there is a 2nd watchdog possibility, where the write accesses in all PM registers are controlled.

2.2 PM – Data confirmation

Data	Unit	Value-Range	Adress	Number Reg.	Func Code	since Firmware	Description
lastUpdateTime	Sec	32 bit unsigned	10500	2	4		Unixtime when last register update has happened. 0=no data yet
PLimit_ Confim	%	16bit unsigned	10502	1	4		Acknowledge of PLimit set
Pac „Active Power“	W	32 bit signed	10503	2	4		Pac measured from Utility-Meter (at feedin-point) or Total Pac of all inverters and inv-type meters
Iac	A*100	32 bit unsigned	10505	2	4		Iac from Utility-Meter * 100
Uac	V	16bit signed	10507	1	4		Uac from Utility-Meter
Fac	Hz*100	16bit unsigned	10508	1	4		Frequency from Utility-Meter
CosPhi „Power Factor“	-	16bit unsigned	10509	1	4		CosPhi*1000 1000=CosPhi 1 >0 inductive, <0 capacitive
QPerc	%*10	16bit signed	10510	1	4		%*10 Var of installed Pn: E.g. Pn=320kWp 175 = 17,5% of Pn = 56kVar
Q	Var	32bit signed	10511	2	4		in Var, >0 Induktiv, <0 Capacitiv
Solar-Irradiation	W/m2	16bit unsigned	10513	1	4		Average Solar-irradiation of all sensors 65535, if none attached
Modul temp.	°C	16bit signed	10514	1	4		Average modul temp. of all sensors -273, if none attached
Ambient temp.	°C	16bit signed	10515	1	4		Average ambient temp. of all sensors -273, if none attached
Windspeed	0.1* m/s	16bit unsigned	10516	1	4		Max. Windspeed of all sensors 65535, if not attached
Uac (Phase 1-2)	V	16bit unsigned	10518	1	4		Uac (Phase1-2) from Utility-Meter
Uac (Phase 2-3)	V	16bit unsigned	10519	1	4		Uac (Phase2-3) from Utility-Meter
Uac (Phase 3-1)	V	16bit unsigned	10520	1	4		Uac (Phase3-1) from Utility-Meter
Iac (I1)	A*100	32 bit unsigned	10521	2	4		Iac (Phase1) from Utility-Meter 23,42A = 2342
Iac (I2)	A*100	32 bit unsigned	10523	2	4		Iac (Phase2) from Utility-Meter 23,42A = 2342

Iac (l3)	A*100	32 bit unsigned	10525	2	4		Iac (Phase3) from Utility-Meter 23,42A = 2342
Uac-inverter	V	16bit unsigned	10527	1	4	3.1.2	Uac from inverters
Iac-inverter	A*100	32 bit unsigned	10528	1	4	3.1.2	Iac from inverters * 100 23,42A = 2342

2.3 Change Log

V1.4:
New addresses: 10513, 10514, 10515, 10516
V1.5:
New addresses: 10006, 10517, 10518, 10519, 10520, 10521, 10523, 10525
Deleted addresses: 10000
V1.6:
Unit Error in address 10513 corrected
V1.7:
New addresses: 10527 and 10528
V2.0:
New adresses: 10200 - 10234
V2.5
New Note page 4
Description generally adjusted
Headings adjusted page 4
Implemented Modbus functions - Descriptions added page 4
10209 Number Register changed
10205 Description updated
V2.6
10503 changed to signed
V2.7
New adresses: 10242 and 10244
10204 Description updated
102015 Firmware updated
V2.8
10204 Description updated
10213 Description updated
10242 Description updated
Deleted:
Chapter 2.1 (old Version V1)
10210
10517

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