MODBUS TABLE ORGANIZATION

Starting Address of the Group Registers (Dec)	Starting Address of the Group Registers (Hex)	System Version (Release)	System Version (Build)	Group Name (Text)	Group Code (Hex)	Group Complexity (Hex)	Group Version (Hex)
0	0	01	19	Modbus settings	00 01	10	01 00
4096	1000	01	19	External input	10 00	10	01 00
20480	5000	01	19	Three-phase Electric Measurement	71 03	40	01 00
20480	5000	01	19	Measure configuration	71 03	40	01 00

MODBUS PROTOCOL DETAILS

Function Code (Dec)	Exception Codes (Dec)	Data Encoding
2 (Read Discrete Inputs)	1, 2, 3	"Big Endian" (most significant byte first)
1 (Read Coils)	1, 2, 3	"Big Endian" (most significant byte first)
5/15 (Write Single/Multiple Coils)	1, 2, 3	"Big Endian" (most significant byte first)
4 (Read Input Registers)	1, 2, 3	"Big Endian" (most significant byte first)
3 (Read Holding register)	1, 2, 3	"Big Endian" (most significant byte first)
6/16 (Write Single/Multiple Holding register)	1, 2, 3, 4	"Big Endian" (most significant byte first)

MODBUS OVER SERIAL DETAILS

Physical Layer	Trasmission Modes	Device Addressing	Baud Rates (bit/s)	Data Bits	Data bits trasmission sequence	Parity	Stop Bits
standard EIA/TIA 485 (RS-485) two-wire configuration	RTU	1÷255	programmable (4800, 9600, 19200, 38400)	8	Least significant bit first	programmable (NONE, EVEN, ODD)	1

MASTER/SLAVE COMMUNICATION TIMING

Timer Description	Timer Value (msec)
Inter-character time-out	< 1,5 character times
Response delay (from master request)	programmable (0 ÷ 99 ms)
Delay Time (between two master trasmissions)	-

REFER ALSO TO: www.modbus.org
- MODBUS over serial line specification and implementation guide V1.02
- MODBUS APPLICATION PROTOCOL SPECIFICATION V1.1b

NOTE: File and printed copies of this document are not subject to document change control.

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [bit]	Description	Note	Read Function Codes (Dec)	Data Storing
4097	**4096**	**1000**	**1**	**External input**			
4097	4096	1000	1	Current active tariff	*See Note 1*	2	

Note 1
0: Tariff 1 1: Tariff 2

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [bit]	Description	Note	Read Function Codes (Dec)	Write Function Codes (Dec)	Data Storing
(no COILS availables)								

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing
20481	**20480**	**5000**	**257**		**Three-phase Electric Measurement**							
20481	20480	5000	2		Phase 1 Current Value (R)	unsigned integer	1	mA		*See Note 1*	4	
20483	20482	5002	2		Phase 2 Current Value (S)	unsigned integer	1	mA		*See Note 1*	4	
20485	20484	5004	2		Phase 3 Current Value (T)	unsigned integer	1	mA		*See Note 1*	4	
20487	20486	5006	23		*RESERVED (all return "8000h")*							
20510	20509	501D	2		1-N Voltage	unsigned integer	1	mV		*See Note 1*	4	
20512	20511	501F	2		2-N Voltage	unsigned integer	1	mV		*See Note 1*	4	
20514	20513	5021	2		3-N Voltage	unsigned integer	1	mV		*See Note 1*	4	
20516	20515	5023	2		1-2 Voltage	unsigned integer	1	mV		*See Note 1*	4	
20518	20517	5025	2		2-3 Voltage	unsigned integer	1	mV		*See Note 1*	4	
20520	20519	5027	2		3-1 Voltage	unsigned integer	1	mV		*See Note 1*	4	
20522	20521	5029	16		*RESERVED (all return "8000h")*							
20538	20537	5039	1		Three-phase frequency	unsigned integer	0,01	Hz		*See Note 1*	4	
20539	20538	503A	2		Three-phase Active Power	signed integer	0,01	kW		*See Note 2*	4	
20541	20540	503C	2		Three-phase reactive power	signed integer	0,01	kvar		*See Note 2*	4	
20543	20542	503E	2		*RESERVED (all return "8000h")*							
20545	20544	5040	2		Threee-Phase Apparent Power	signed integer	0,01	kVA		*See Note 1*	4	
20547	20546	5042	2		*RESERVED (all return "8000h")*							
20549	20548	5044	1		Three-phase Power Factor (PF)	signed integer	0,01			*See Note 2*	4	
20550	20549	5045	1		*RESERVED (returns "8000h")*							
20551	20550	5046	1		Power Factor (PF) sector	unsigned integer				*See Note 5*	4	
20552	20551	5047	2		Phase 1 Active Power	signed integer	0,01	kW		*See Note 2*	4	
20554	20553	5049	2		Phase 2 Active Power	signed integer	0,01	kW		*See Note 2*	4	
20556	20555	504B	2		Phase 3 Active Power	signed integer	0,01	kW		*See Note 2*	4	
20558	20557	504D	2		Phase 1 Reactive power	signed integer	0,01	kvar		*See Note 2*	4	
20560	20559	504F	2		Phase 2 Reactive power	signed integer	0,01	kvar		*See Note 2*	4	
20562	20561	5051	2		Phase 3 Reactive power	signed integer	0,01	kvar		*See Note 2*	4	
20564	20563	5053	6		*RESERVED (returns "8000h")*							
20570	20569	5059	2		Phase 1 Apparent Power	unsigned integer	0,01	kVA		*See Note 1*	4	
20572	20571	505B	2		Phase 2 Apparent Power	unsigned integer	0,01	kVA		*See Note 1*	4	
20574	20573	505D	2		Phase 3 Apparent Power	unsigned integer	0,01	kVA		*See Note 1*	4	
20576	20575	505F	17		*RESERVED (returns "8000h")*							
20593	20592	5070	2		Positive Three-phase Active Energy	unsigned integer	0,01	kWh		*See Note 1*	4	Y
20595	20594	5072	2		Negative Three-phase Active Energy	unsigned integer	0,01	kWh		*See Note 1*	4	Y
20597	20596	5074	2		*RESERVED (returns "80000000h")*							
20599	20598	5076	2		Positive Three-phase Reactive Energy	unsigned integer	0,01	kVarh		*See Note 1*	4	Y
20601	20600	5078	2		Negative Three-phase Reactive Energy	unsigned integer	0,01	kVarh		*See Note 1*	4	Y
20603	20602	507A	2		*RESERVED (returns "80000000h")*							
20605	20604	507C	2		Positive Three-phase Active Energy (Tariff 1)	unsigned integer	0,01	kWh		*See Note 1*	4	Y
20607	20606	507E	2		Negative Three-phase Active Energy (Tariff 1)	unsigned integer	0,01	kWh		*See Note 1*	4	Y
20609	20608	5080	2		Positive Three-phase Reactive Energy (Tariff 1)	unsigned integer	0,01	kVarh		*See Note 1*	4	Y
20611	20610	5082	2		Negative Three-phase Reactive Energy (Tariff 1)	unsigned integer	0,01	kVarh		*See Note 1*	4	Y
20613	20612	5084	2		Positive Three-phase Active Energy (Tariff 2)	unsigned integer	0,01	kWh		*See Note 1*	4	Y
20615	20614	5086	2		Negative Three-phase Active Energy (Tariff 2)	unsigned integer	0,01	kWh		*See Note 1*	4	Y
20617	20616	5088	2		Positive Three-phase Reactive Energy (Tariff 2)	unsigned integer	0,01	kVarh		*See Note 1*	4	Y

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing
20619	20618	508A	2		Negative Three-phase Reactive Energy (Tariff 2)	unsigned integer	0,01	kVarh		*See Note 1*	4	Y
20621	20620	508C	105		*RESERVED (returns "8000h")*							
20726	20725	50F5	1		Phase shift between V1 - V2	unsigned integer	0,1	°		*See Note 3*	4	
20727	20726	50F6	1		Phase shift between V2 - V3	unsigned integer	0,1	°		*See Note 3*	4	
20728	20727	50F7	1		Phase shift between V3 - V1	unsigned integer	0,1	°		*See Note 3*	4	
20729	20728	50F8	1		Phase shift between U12 - U23	unsigned integer	0,1	°		*See Note 4*	4	
20730	20729	50F9	1		Phase shift between U23 - U31	unsigned integer	0,1	°		*See Note 4*	4	
20731	20730	50FA	1		Phase shift between U31 - U12	unsigned integer	0,1	°		*See Note 4*	4	
20732	20731	50FB	1		Phase shift between I1 - I2	unsigned integer	0,1	°		*See Note 1*	4	
20733	20732	50FC	1		Phase shift between I2 - I3	unsigned integer	0,1	°		*See Note 1*	4	
20734	20733	50FD	1		Phase shift between I3 - I1	unsigned integer	0,1	°		*See Note 1*	4	
20735	20734	50FE	1		Phase shift between V1 - I1	unsigned integer	0,1	°		*See Note 1*	4	
20736	20735	50FF	1		Phase shift between V2 - I2	unsigned integer	0,1	°		*See Note 1*	4	
20737	20736	5100	1		Phase shift between V3 - I3	unsigned integer	0,1	°		*See Note 1*	4	

Note 1
Expressed on "numeric coding"; without mark (fixed more significant bit = 0);
Note 2
Expressed in "numeric coding"; with mark (more significant bit = mark);
Note 3
Expressed on "numeric coding"; without mark (fixed more significant bit = 0); Only with 3N-3E
Note 4
Expressed on "numeric coding"; without mark (fixed more significant bit = 0); Only with 3-3E
Note 5
0: power factor = 1 1: inductive 2: capacitive

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Codes (Dec)	Write Function Codes (Dec)	Data Storing
1	**0**	**0**	**1**		**Modbus settings**								
1	0	0	1		Protocol type					*See Note 1*	3	16	Y
20481	**20480**	**5000**	**223**		**Measure configuration**								
20481	20480	5000	1		Measurement System Features					*See Note 3*	3	16	Y
20482	20481	5001	4		*RESERVED (all return "8000h")*								
20486	20485	5005	2		Calculation Settings Requirement					*See Note 4*	3	16	Y
20488	20487	5007	71		*RESERVED (all return "8000h")*								
20559	20558	504E	2		Partial Positive Three-phase Active Energy		0,01	kWh		*See Note 5*	3	16	Y
20561	20560	5050	2		Partial Negative Three-phase Active Energy		0,01	kWh		*See Note 5*	3	16	Y
20563	20562	5052	2		*RESERVED (all return "8000h")*								
20565	20564	5054	2		Partial Positive Three-phase Reactive Energy		0,01	kvarh		*See Note 5*	3	16	Y
20567	20566	5056	2		Partial Negative Three-phase Reactive Energy		0,01	kvarh		*See Note 5*	3	16	Y
20569	20568	5058	68		*RESERVED (all return "8000h")*								
20637	20636	509C	2		Total Active Power Requirement (MD)		0,01	kW		*See Note 7*	3	16	
20639	20638	509E	2		Maximum Total Active Power Requirement (PMD)		0,01	kW		*See Note 5*	3	16	Y
20641	20640	50A0	32		*RESERVED (all return "8000h")*								
20673	20672	50C0	2		Maximum Total Active Power Requirement Tariff 1 (PMD T1)		0,01	kW		*See Note 5*	3	16	Y
20675	20674	50C2	4		*RESERVED (all return "8000h")*								
20679	20678	50C6	2		Maximum Total Active Power Requirement Tariff 2 (PMD T2)		0,01	kW		*See Note 5*	3	16	Y
20681	20680	50C8	16		*RESERVED (all return "8000h")*								
20697	20696	50D8	1		Run hour meter threshold		0,01	%	0 ÷ 5000		3	16	Y
20698	20697	50D9	2		Run hour meter (TOT)			s		*See Note 6*	3	16	Y
20700	20699	50DB	2		Run hour meter (Tariff 1)			s		*See Note 7*	3	16	Y
20702	20701	50DD	2		Run hour meter (Tariff 2)			s		*See Note 7*	3	16	Y

Note 1

0: Standard MAP;
1: Basic MAP.

Note 3

BYTE1 (MSB):
"33": Three-pahse system without neutral 3-3E;
"34": Three-pahse system with neutral 3N-3E.

BYTE0 (LSB):
"00" ***[default]*** : if the active power flows in the normal/indicated direction (“upstream to downstream” or depending on the polarity indicated for the connection);

Note 4

WORD0 (LSW): calculation method
1: "sliding block interval"

WORD1 (MSW): calculation window (value in [min] (5, 8, 10, 15, 20, 30, 60), “default”=15)

Note 5

This register is writable, but only with zero

Note 6

This register is writable, but only with zero. Writing this register you will delete also the two tariffs values.

Note 7

Writing this register has no effect.