

**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)	Object Code
20480	5000	01	16	Single-phase Electric Measurement	71 03	30	01 00	0x5004
20480	5000	01	16	Measure configuration	71 03	30	01 00	0x5004

**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	Transmission Modes	Device Addressing	Baud Rates (bit/s)	Data Bits	Data bits transmission sequence	Parity	Stop Bits
standard EIA/TIA 485 (RS-485) two-wire configuration	RTU	1÷247	programmable (1200, 2400, 4800, 9600, 19200, 38400)	8	Least significant bit first	NONE	1

**MASTER/SLAVE COMMUNICATION TIMING**

Timer Description	Timer Value (msec)
Inter-character time-out	< 1,5 character times
Response delay (from master request)	-
Delay Time (between two master transmissions)	-

REFER ALSO TO: [www.modbus.org](http://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
(no DISCRETE INPUTS available)							



COMMUNICATION PROTOCOL

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



Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing
<b>20481</b>	<b>20480</b>	<b>5000</b>	<b>123</b>		<b>Single-phase Electric Measurement</b>							
20481	20480	5000	1		Phase 1 Current Value (R)	unsigned integer	1	A		See Note 14	4	
20482	20481	5001	13		RESERVED (all return "8000h")							
20495	20494	500E	1		1-N Voltage	unsigned integer	1	V		See Note 15	4	
20496	20495	500F	17		RESERVED (all return "8000h")							
20513	20512	5020	1		Phase 1 (R) phase current THD vs. fundamental	unsigned integer	1	%		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20514	20513	5021	3		RESERVED (all return "8000h")							
20517	20516	5024	1		1-N Voltage THD vs. fundamental	unsigned integer	1	%		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20518	20517	5025	5		RESERVED (all return "8000h")							
20523	20522	502A	1		Three-phase Active Power	signed integer	1	kW		See Note 16	4	
20524	20523	502B	1		Three-phase Reactive power	signed integer	1	kvar		See Note 16	4	
20525	20524	502C	2		RESERVED (all return "8000h")							
20527	20526	502E	1		Three-phase Apparent Power	signed integer	1	kVA		See Note 16	4	
20528	20527	502F	1		Three-phase Power Factor (PF)	signed integer	0,01	-		Expressed in "numeric coding"; with mark (more significant bit = mark)	4	
20529	20528	5030	1		RESERVED (returns "8000h")							
20530	20529	5031	1		Three-phase frequency	signed integer	0,01	Hz		Expressed in "numeric coding"; with mark (more significant bit = mark)	4	
20531	20530	5032	2		RESERVED (returns "8000000h")							
20533	20532	5034	2		Positive Three-phase Active Energy	unsigned integer	1	kWh		See Note 17	4	Y
20535	20534	5036	2		Negative Three-phase Active Energy	unsigned integer	1	kWh		See Note 17	4	Y
20537	20536	5038	2		RESERVED (returns "8000000h")							
20539	20538	503A	2		Positive Three-phase Reactive Energy	unsigned integer	1	kvarh		See Note 17	4	Y
20541	20540	503C	2		Negative Three-phase Reactive Energy	unsigned integer	1	kvarh		See Note 17	4	Y
20543	20542	503E	2		RESERVED (returns "8000000h")							
20545	20544	5040	1		Phase 1 Active Power	signed integer	1	kW		See Note 18	4	
20546	20545	5041	2		RESERVED (returns "8000h")							
20548	20547	5043	1		Phase 1 Reactive power	signed integer	1	kvar		See Note 18	4	
20549	20548	5044	8		RESERVED (returns "8000h")							
20557	20556	504C	1		Phase 1 Apparent Power	signed integer	1	kVA		See Note 18	4	
20558	20557	504D	8		RESERVED (returns "8000h")							
20566	20565	5055	2		Phase 1 Positive Active Energy	unsigned integer	1	kWh		See Note 19	4	
20568	20567	5057	4		RESERVED (returns "8000000h")							
20572	20571	505B	2		Phase 1 Negative Active Energy	unsigned integer	1	kWh		See Note 19	4	
20574	20573	505D	4		RESERVED (returns "8000000h")							
20578	20577	5061	2		Phase 1 Positive Reactive Energy	unsigned integer	1	kvarh		See Note 19	4	
20580	20579	5063	4		RESERVED (returns "8000000h")							
20584	20583	5067	2		Phase 1 Negative Reactive Energy	unsigned integer	1	kvarh		See Note 19	4	
20586	20585	5069	18		RESERVED (returns "8000h", "8000000h")							
<b>20604</b>	<b>20603</b>	<b>507B</b>	<b>81</b>		<b>Measure - Harmonic I : harmonic order</b>							
20604	20603	507B	1		harmonic I1 row 3	unsigned word	0,1	%			4	
20605	20604	507C	3		RESERVED (returns "8000h")							
20608	20607	507F	1		harmonic I1 row 5	unsigned word	0,1	%			4	
20609	20608	5080	3		RESERVED (returns "8000h")							
20612	20611	5083	1		harmonic I1 row 7	unsigned word	0,1	%			4	
20613	20612	5084	3		RESERVED (returns "8000h")							
20616	20615	5087	1		harmonic I1 row 9	unsigned word	0,1	%			4	
20617	20616	5088	3		RESERVED (returns "8000h")							
20620	20619	508B	1		harmonic I1 row 11	unsigned word	0,1	%			4	
20621	20620	508C	3		RESERVED (returns "8000h")							
20624	20623	508F	1		harmonic I1 row 13	unsigned word	0,1	%			4	
20625	20624	5090	59		RESERVED (returns "8000h")							
20684	20683	50CB	1		harmonic I1 row 15	unsigned word	0,1	%			4	
<b>20684</b>	<b>20683</b>	<b>50CB</b>	<b>19</b>		<b>Measure - Harmonic V PH/N : harmonic order</b>							
20684	20683	50CB	1		harmonic V1 row 3	unsigned word	0,1	%			4	
20685	20684	50CC	2		RESERVED (returns "8000h")	unsigned word	0,1	%			4	

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing
20687	20686	50CE	1		harmonic V1 row 5	unsigned word	0,1	%			4	
20688	20687	50CF	2		RESERVED (returns "8000h")	unsigned word	0,1	%			4	
20690	20689	50D1	1		harmonic V1 row 7	unsigned word	0,1	%			4	
20691	20690	50D2	2		RESERVED (returns "8000h")	unsigned word	0,1	%			4	
20693	20692	50D4	1		harmonic V1 row 9	unsigned word	0,1	%			4	
20694	20693	50D5	2		RESERVED (returns "8000h")	unsigned word	0,1	%			4	
20696	20695	50D7	1		harmonic V1 row 11	unsigned word	0,1	%			4	
20697	20696	50D8	2		RESERVED (returns "8000h")	unsigned word	0,1	%			4	
20699	20698	50DA	1		harmonic V1 row 13	unsigned word	0,1	%			4	
20700	20699	50DB	2		RESERVED (returns "8000h")	unsigned word	0,1	%			4	
20702	20701	50DD	1		harmonic V1 row 15	unsigned word	0,1	%			4	

<p><b>Note 14</b></p> <p>Expressed on "numeric coding"; without mark (fixed more significant bit = 0);                  To obtain the real value, the contents of this register must be <b>divided</b> by the factor in <b>holding</b> register 0x5008.</p>
<p><b>Note 15</b></p> <p>Expressed on "numeric coding"; without mark (fixed more significant bit = 0);                  To obtain the real value, the contents of this register must be <b>divided</b> by the factor in <b>holding</b> register 0x5007.</p>
<p><b>Note 16</b></p> <p>Expressed in "numeric coding"; with mark (more significant bit = mark);                  To obtain the real value, the contents of this register must be <b>divided</b> by the factor in <b>holding</b> register 0x5009.</p>
<p><b>Note 17</b></p> <p>Expressed on "numeric coding"; without mark (fixed more significant bit = 0);                  To obtain the real value, the contents of this register must be <b>divided</b> by the factor in <b>holding</b> register 0x500B.</p>
<p><b>Note 18</b></p> <p>Expressed in "numeric coding"; with mark (more significant bit = mark);                  To obtain the real value, the contents of this register must be <b>divided</b> by the factor in <b>holding</b> register 0x500A.</p>
<p><b>Note 19</b></p> <p>Expressed in "numeric coding"; with mark (more significant bit = mark);                  To obtain the real value, the contents of this register must be <b>divided</b> by the factor in <b>holding</b> register 0x500C.</p>

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
<b>20481</b>	<b>20480</b>	<b>5000</b>	<b>19</b>		<b>Measure configuration</b>								
20481	20480	5000	1		Measure Type Configuration		1	-		See Note 8	3	6,16	
20482	20481	5001	1		CT Ratio		1	-		See Note 9	3	6,16	
20483	20482	5002	5		Reserved								
20488	20487	5007	1		Voltage multiplier factor		1	-		See Notes 10 and 14	3	-	
20489	20488	5008	1		Current multiplier factor		1	-		See Notes 10 and 14	3	-	
20490	20489	5009	1		Total power multiplier factor		1	-		See Notes 10 and 14	3	-	
20491	20490	500A	1		Phase power multiplier factor		1	-		See Notes 10 and 14	3	-	
20492	20491	500B	1		Total energy multiplier factor		1	-		See Notes 10 and 14	3	-	
20493	20492	500C	1		Phase energy multiplier factor		1	-		See Notes 10 and 14	3	-	
20494	20493	500D	1		Alarm/event 1 value		1	-		See Note 12	3	6,16	
20495	20494	500E	2		Alarm/event 1 threshold		1	-		See Notes 10 and 11	3	6,16	
20497	20496	5010	1		Alarm/event 1 delay		1	s		See Note 10	3	6,16	
20498	20497	5011	1		Alarm/event 1 Hysteresis		0,1	%		See Note 10	3	6,16	
20499	20498	5012	1		Event type		1	-		See Note 13	3	6,16	

<p><b>Note 8</b></p> <p>BYTE1 (MSB):                      "11": Single phase system 1N-1E;                      "33": Three-phase system without neutral 3-3E;                      "34": Three-phase system with neutral 3N-3E.</p> <p>BYTE0 (LSB):                      "00" <b>[default]</b>: if the active power flows in the normal/indicated direction ("upstream to downstream" or depending on the polarity indicated for the connection );                      "01": if the active power flows in reverse direction ("downstream to upstream" or on opposite direction compared to the connection polarity indicated)</p>
<p><b>Note 9</b></p> <p>Expressed as a "numeric coding" with sign (always positive value, most significant bit = 0)</p>
<p><b>Note 10</b></p> <p>Expressed as a "numeric coding" (most significant bit = sign)</p>
<p><b>Note 11</b></p> <p>Measurement unit compatible with the value configured in the previous register, <b>divided</b> by the factor concerning that value.</p>
<p><b>Note 12</b></p> <p>Register address (absolute value) of the desired value</p>
<p><b>Note 13</b></p> <p>BIT 0:                      "1" = The event generates an alarm,                      "0" = The event doesn't generate an alarm</p> <p>BIT 1:                      "1" = The event generates a Link functionality action,                      "0" = The event doesn't generate a Link functionality action</p>
<p><b>Note 14</b></p> <p>The value read in the register containing the measurement data is divided by the corresponding factor indicated in this register, if the register is not present, a factor 1 has to be considered.</p> <p>Example: <math>I1 [A] = \text{Phase 1 current value ( R )} / \text{Current multiplier factor} = 1023 / 100 = 10,23 \text{ A}</math></p> <p><b>The value can not be changed by the user</b></p>

