

**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)
768	300			Device identifier			
4096	1000			Measures			
4608	1200			Settings			
5424	1530			Average Measured values - Scaled			
5440	1540			Wrap around			
5888	1700			Max. & Min.			
8192	2000			Standard Setup parameters (write 16 byte at once)			
8704	2200			Output option Setup parameters (write 24 byte at once)			
5888	1700			Max. & Min.			

**MODBUS PROTOCOL DETAILS**

Function Code (Dec)	Exception Codes (Dec)	Data Encoding
3	1, 2, 3	"Big Endian" (most significant byte first)
16	1, 2, 3	

**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	8	Least significant bit first	programmable	1

**MASTER/SLAVE COMMUNICATION TIMING**

Timer Description	Timer Value (msec)
Inter-character time-out	Max. 20
Response delay (from master request)	20÷300
Delay Time (between two master transmissions)	< 20

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 (2)
				(no DISCRETE INPUTS availables)			

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [bit]	Description	Note	Read Function Codes (Dec)	Write Function Codes (Dec)	Data Storing (2)
				(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 (2)
769	768	300	1		Device identifier							
769	768	300	1		Device identifier	unsigned integer	0,01	-		The device returns 1010h	3	
4097	4096	1000	126		Measures							
4097	4096	1000	2		Phase 1 : phase voltage	unsigned integer	1	mV			3	
4099	4098	1002	2		Phase 2 : phase voltage	unsigned integer	1	mV			3	
4101	4100	1004	2		Phase 3 : phase voltage	unsigned integer	1	mV			3	
4103	4102	1006	2		Phase 1 : current	unsigned integer	1	mA			3	
4105	4104	1008	2		Phase 2 : current	unsigned integer	1	mA			3	
4107	4106	100A	2		Phase 3 : current	unsigned integer	1	mA			3	
4109	4108	100C	2		Neutral current	unsigned integer	1	mA			3	
4111	4110	100E	2		Chained voltage : L1-L2	unsigned integer	1	mV			3	
4113	4112	1010	2		Chained voltage : L2-L3	unsigned integer	1	mV			3	
4115	4114	1012	2		Chained voltage : L3-L1	unsigned integer	1	mV			3	
4117	4116	1014	2		3-phase : active power	unsigned integer	1, 0.01	W		See Note 1	3	
4119	4118	1016	2		3-phase : reactive power	unsigned integer	1, 0.01	var		See Note 1	3	
4121	4120	1018	2		3-phase : apparent power	unsigned integer	1, 0.01	VA		See Note 1	3	
4123	4122	101A	1		3-phase : sign of active power	unsigned integer	1	-	0, 1	0=positive, 1=negative	3	
4124	4123	101B	1		3-phase : sign of reactive power	unsigned integer	1	-	0, 1	0=positive, 1=negative	3	
4125	4124	101C	2		3-phase : positive active energy	unsigned integer	1, 10, 100, 1.000, 10.000, 100.000	Wh		See Note 2	3	Y
4127	4126	101E	2		3-phase : positive reactive energy	unsigned integer	1, 10, 100, 1.000, 10.000, 100.000	varh		See Note 2	3	Y
4129	4128	1020	2		3-phase : negative active energy	unsigned integer	1, 10, 100, 1.000, 10.000, 100.000	Wh		See Note 2	3	Y
4131	4130	1022	2		3-phase : negative reactive energy	unsigned integer	1, 10, 100, 1.000, 10.000, 100.000	varh		See Note 2	3	Y
4133	4132	1024	1		3-phase : power factor	signed integer	0,01	-			3	
4134	4133	1025	1		3-phase : sector of power factor (cap or ind)	unsigned integer	1	-	0, 1, 2	0="PF=1", 1="ind" (L), 2="cap" (C)	3	
4135	4134	1026	1		Frequency	unsigned integer	0,1	Hz			3	
4136	4135	1027	2		3-phase : average power	unsigned integer	1, 0.01	W		See Note 1	3	
4138	4137	1029	2		3-phase : peak maximum demand	unsigned integer	1, 0.01	W		See Note 1	3	Y
4140	4139	102B	1		Time counter for average power	unsigned integer	1	min			3	
4141	4140	102C	2		Phase 1 : active power	unsigned integer	1, 0.01	W		See Note 1	3	
4143	4142	102E	2		Phase 2 : active power	unsigned integer	1, 0.01	W		See Note 1	3	
4145	4144	1030	2		Phase 3 : active power	unsigned integer	1, 0.01	W		See Note 1	3	
4147	4146	1032	1		Phase 1 : sign of active power	unsigned integer		-	0, 1	0=positive, 1=negative	3	
4148	4147	1033	1		Phase 2 : sign of active power	unsigned integer		-	0, 1	0=positive, 1=negative	3	
4149	4148	1034	1		Phase 3 : sign of active power	unsigned integer		-	0, 1	0=positive, 1=negative	3	
4150	4149	1035	2		Phase 1 : reactive power	unsigned integer	1, 0.01	var		See Note 1	3	

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing (2)
4152	4151	1037	2		Phase 2 : reactive power	unsigned integer	1, 0.01	var		See Note 1	3	
4154	4153	1039	2		Phase 3 : reactive power	unsigned integer	1, 0.01	var		See Note 1	3	
4156	4155	103B	1		Phase 1 : sign of reactive power	unsigned integer		-	0, 1	0=positive, 1=negative	3	
4157	4156	103C	1		Phase 2 : sign of reactive power	unsigned integer		-	0, 1	0=positive, 1=negative	3	
4158	4157	103D	1		Phase 3 : sign of reactive power	unsigned integer		-	0, 1	0=positive, 1=negative	3	
4159	4158	103E	2		Phase 1 : apparent power	unsigned integer	1, 0.01	VA		See Note 1	3	
4161	4160	1040	2		Phase 2 : apparent power	unsigned integer	1, 0.01	VA		See Note 1	3	
4163	4162	1042	2		Phase 3 : apparent power	unsigned integer	1, 0.01	VA		See Note 1	3	
4165	4164	1044	1		Phase 1 : power factor	signed integer	0,01	-			3	
4166	4165	1045	1		Phase 2 : power factor	signed integer	0,01	-			3	
4167	4166	1046	1		Phase 3 : power factor	signed integer	0,01	-			3	
4168	4167	1047	1		Phase 1 : sector of power factor (cap or ind)	unsigned integer	1	-	0, 1, 2	0="PF=1", 1="ind" (L), 2="cap" (C)	3	
4169	4168	1048	1		Phase 2 : sector of power factor (cap or ind)	unsigned integer	1	-	0, 1, 2	0="PF=1", 1="ind" (L), 2="cap" (C)	3	
4170	4169	1049	1		Phase 3 : sector of power factor (cap or ind)	unsigned integer	1	-	0, 1, 2	0="PF=1", 1="ind" (L), 2="cap" (C)	3	
4171	4170	104A	1		Phase 1 : THD V1	unsigned integer	0,1	%		See Note 3	3	
4172	4171	104B	1		Phase 2 : THD V2	unsigned integer	0,1	%		See Note 3	3	
4173	4172	104C	1		Phase 3 : THD V3	unsigned integer	0,1	%		See Note 3	3	
4174	4173	104D	1		Phase 1 : THD I1	unsigned integer	0,1	%			3	
4175	4174	104E	1		Phase 2 : THD I2	unsigned integer	0,1	%			3	
4176	4175	104F	1		Phase 3 : THD I3	unsigned integer	0,1	%			3	
4177	4176	1050	2		Phase 1 : I1 average	unsigned integer	1	mA			3	
4179	4178	1052	2		Phase 2 : I2 average	unsigned integer	1	mA			3	
4181	4180	1054	2		Phase 3 : I3 average	unsigned integer	1	mA			3	
4183	4182	1056	2		Phase 1 : I1 peak Max.	unsigned integer	1	mA			3	
4185	4184	1058	2		Phase 2 : I2 peak Max.	unsigned integer	1	mA			3	
4187	4186	105A	2		Phase 3 : I3 peak Max.	unsigned integer	1	mA			3	
4189	4188	105C	2		3-phase : I average	unsigned integer	1	mA		(I1+I2+I3)/3	3	
4191	4190	105E	2		Phase 1 : V1 min.	unsigned integer	1	mV		See Note 3	3	
4193	4192	1060	2		Phase 2 : V2 min.	unsigned integer	1	mV		See Note 3	3	
4195	4194	1062	2		Phase 3 : V3 min.	unsigned integer	1	mV		See Note 3	3	
4197	4196	1064	2		Phase 1 : V1 Max.	unsigned integer	1	mV		See Note 3	3	
4199	4198	1066	2		Phase 2 : V2 Max.	unsigned integer	1	mV		See Note 3	3	
4201	4200	1068	2		Phase 3 : V3 Max.	unsigned integer	1	mV		See Note 3	3	
4203	4202	106A	2		3-phase : partial active energy	unsigned integer	1, 10, 100, 1000, 10.000, 100.000	Wh		See Note 2	3	
4205	4204	106C	2		3-phase : partial reactive energy	unsigned integer	1, 10, 100, 1000, 10.000, 100.000	varh		See Note 2	3	

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing (2)
4207	4206	106E	1		Operating timer counter	unsigned integer	1	h			3	
4208	4207	106F	1		RESERVED (returns 0000h)						3	
4209	4208	1070	2		3-phase : average active power	unsigned integer	1, 0.01	W		See Note 1	3	
4211	4210	1072	2		3-phase : average reactive power	unsigned integer	1, 0.01	var		See Note 1	3	
4213	4212	1074	2		3-phase : average apparent power	unsigned integer	1, 0.01	VA		See Note 1	3	
4215	4214	1076	2		3-phase : active PMD power	unsigned integer	1, 0.01	W		See Note 1	3	
4217	4216	1078	2		3-phase : reactive PMD power	unsigned integer	1, 0.01	var		See Note 1	3	
4219	4218	107A	2		3-phase : apparent PMD power	unsigned integer	1, 0.01	VA		See Note 1	3	
4221	4220	107C	2		Operating timer counter	unsigned integer	1	minutes			3	
4609	4608	1200	7		Settings							
4609	4608	1200	1		Current transformer ratio (CT)	unsigned integer	1	-			3	
4610	4609	1201	1		RESERVED (returns 0064h)						3	
4611	4610	1202	2		RESERVED (returns 0000 0000h)						3	
4613	4612	1204	1		Device identifier	unsigned integer	0,01	-		The device returns 1010h	3	
4614	4613	1205	1		RESERVED (returns 0000h)						3	
4615	4614	1206	1		RESERVED (returns 0000h)						3	
5425	5424	1530	38		Average Measured values - Scaled							
5401	5400	1518	2		Signed Total active power	signed integer	1	W			3	
5403	5402	151A	2		Signed Total reactive power	signed integer	1	var			3	
5405	5404	151C	2		Signed phase1 active power	signed integer	1	W			3	
5407	5406	151E	2		Signed phase2 active power	signed integer	1	W			3	
5409	5408	1520	2		Signed phase3 active power	signed integer	1	W			3	
5411	5410	1522	2		Signed phase1 reactive power	signed integer	1	Var			3	
5413	5412	1524	2		Signed phase2 reactive power	signed integer	1	Var			3	
5415	5414	1526	2		Signed phase3 reactive power	signed integer	1	var			3	
5417	5416	1528	2		Signed total Power Factor	signed integer	0,001	-			3	
5419	5418	152A	2		Signed phase1 Power Factor	signed integer	0,001	-			3	
5421	5420	152C	2		Signed phase2 Power Factor	signed integer	0,001	-			3	
5423	5422	152E	2		Signed phase3 Power Factor	signed integer	0,001	-			3	
5425	5424	1530	2		Total Apparent power	unsigned integer	1	VA			3	
5427	5426	1532	2		3-phase : average active power	unsigned integer	1	W			3	
5429	5428	1534	2		3-phase : average reactive power	unsigned integer	1	var			3	
5431	5430	1536	2		3-phase : average apparent power	unsigned integer	1	VA			3	
5433	5432	1538	2		3-phase : max active power	unsigned integer	1	W			3	
5435	5434	153A	2		3-phase : max reactive power	unsigned integer	1	var			3	
5437	5436	153C	2		3-phase : max apparent power	unsigned integer	1	VA			3	
1	0	1540	4		Wrap around							

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing (2)
5441	5440	1540	1		Wrap round positive active energy	unsigned integer	1	-		Wrap around means: when the main register of the energy value increases over 100 000 000, the register is then reset to 0 and the wrap around value is incremented by 1	3	
5442	5441	1541	1		Wrap round positive reactive energy	unsigned integer	1	-	3			
5443	5442	1542	1		Wrap round negative active energy	unsigned integer	1	-	3			
5444	5443	1543	1		Wrap round negative reactive energy	unsigned integer	1	-	3			
5889	5888	1700	32		Max. & Min.							
5889	5888	1700	2		Low Positive Active Energy	unsigned integer	1	Wh			3	
5891	5890	1702	2		High Positive Active Energy	unsigned integer	1	MWh			3	
5893	5892	1704	2		Low Positive Reactive Energy	unsigned integer	1	varh			3	
5895	5894	1706	2		High Positive Reactive Energy	unsigned integer	1	Mvarh			3	
5897	5896	1708	2		Low Negative Active Energy	unsigned integer	1	Wh			3	
5899	5898	170A	2		High Negative Active Energy	unsigned integer	1	MWh			3	
5901	5900	170C	2		Low Negative Reactive Energy	unsigned integer	1	varh			3	
5903	5902	170E	2		High Negative Reactive Energy	unsigned integer	1	Mvarh			3	
5905	5904	1710	2		Low Partial Active Energy	unsigned integer	1	Wh			3	
5907	5906	1712	2		High Partial Active Energy	unsigned integer	1	MWh			3	
5909	5908	1714	2		Low Partial Reactive Energy	unsigned integer	1	varh			3	
5911	5910	1716	2		High Partial Reactive Energy	unsigned integer	1	Mvarh			3	
5913	5912	1718	2		Low Negative Partial Active Energy	unsigned integer	1	Wh			3	
5915	5914	171A	2		High Negative Partial Active Energy	unsigned integer	1	MWh			3	
5917	5916	171C	2		Low Negative Partial Reactive Energy	unsigned integer	1	varh			3	
5919	5918	171E	2		High Negative Partial Reactive Energy	unsigned integer	1	Mvarh			3	

DETAILS						
Note 1	Type	Scale	Unit	Range	Condition	
			0,01	W, var, VA		CT < 5.000
			1	W, var, VA		CT ≥ 5.000
Note 2	Type	Scale	Unit	Range	Condition	
			1.000.000	Wh, varh	100.000 ≤ CT < 1.000.000	
			100.000	Wh, varh	10.000 ≤ CT < 100.000	
			10.000	Wh, varh	1.000 ≤ CT < 10.000	
			1.000	Wh, varh	100 ≤ CT < 1.000	
			100	Wh, varh	10 ≤ CT < 100	
		10	Wh, varh	1 ≤ CT < 10		

VOLTAGE THD AND STATISTICS	
Network Type	



Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing (2)
					<b>Note 3</b>	With Neutral			data related to phase voltages			
						Without Neutral			data related to chained voltages			



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 (Hex)	Data Storing (2)
257	256	100	1		Current & Voltage Transf. Ratio								
257	256	100	1		Write Current transformer ratio - CT	unsigned integer	1	-	1 ÷ 9999	CT = I prim / I sec ex: 500 A / 5 A → CT = 100	3	10	
8193	8192	2000	16		Standard Setup parameters (write 16 byte at once)								
8193	8192	2000	1		RESERVED (returns 0000h)								
8194	8193	2001	1		RESERVED (returns 0000h)								
8195	8194	2002	1		RESERVED (returns 0000h)								
8196	8195	2003	1		RESERVED (returns 0000h)								
8197	8196	2004	1		Percentage of rated 3phase active power run hour meter	unsigned integer	0,01	%	50 ÷ 5000	50 ÷ 5000 means (0.5% ÷ 50.00%)	3	10	
8198	8197	2005	1		Run hour meter active on	unsigned integer	-	-	0, 1	0: Voltages, 1 Power	3	10	
8199	8198	2006	1		RESERVED (returns 0000h)								
8200	8199	2007	1		RESERVED (returns 0000h)								
8201	8200	2008	1		RESERVED (returns EB70h)								
8202	8201	2009	1		RESERVED (returns 0000h)								
8203	8202	200A	1		Power Averaging time	unsigned integer	-	-	0, 1, 2, 3, 4, 5, 6	0: 5min 1: 8min 2: 10min 3: 15min 4: 20min 5: 30min 6: 60min	3	10	
8204	8203	200B	1		Insertion type	unsigned integer	-	-	0, 1, 2, 3	0: 3N-3E 1: 3-3E 2: 3-2E 3: 1N-1E	3	10	
8205	8204	200C	1		Measure on line 1 of custom page	unsigned integer	-	-	0 ÷ 10	0:V1 1:V12 2:I1 3:In 4:P 5:Q 6:S 7:P1 8:Q1 9:S1 10:PF 3-phase	3	10	
8206	8205	200D	1		Measure on line 2 of custom page	unsigned integer	-	-	0 ÷ 10	0:V2 1:V23 2:I2 3:P 4:Q 5:S 6:P2 7:Q2 8:S2 9:Freq 10:I1	3	10	
8207	8206	200E	1		Measure on line 3 of custom page	unsigned integer	-	-	0 ÷ 10	0:V3 1:V31 2:I3 3:P 4:Q 5:S 6:P3 7:Q3 8:S3 9:P1 10:I1	3	10	
8208	8207	200F	1		RESERVED (returns 0000h)								
8705	8704	2200	24		Output option Setup parameters (write 24 byte at once)								
8705	8704	2200	1	W0	RESERVED (returns 0000h)								
8706	8705	2201	1	W1	RESERVED (returns 0000h)								
8707	8706	2202	1	W2	RESERVED (returns 0000h)								
8708	8707	2203	1	W3	RESERVED (returns 0000h)								
8709	8708	2204	1	W4	RESERVED (returns 0000h)								

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 (Hex)	Data Storing (2)
8710	8709	2205	1	W5	RESERVED (returns 0000h)								
8711	8710	2206	1	W6	RESERVED (returns 0000h)								
8712	8711	2207	1	W7	RESERVED (returns 0000h)								
8713	8712	2208	1	W8	RESERVED (returns 0000h)								
8714	8713	2209	1	W9	RESERVED (returns 0000h)								
8715	8714	220A	1	W10	RESERVED (returns EB70h)								
8716	8715	220B	1	W11	Pulse duration	unsigned integer	-	-	0, 1, 2, 3, 4, 5	0: 50 ms 1: 100 ms 2: 200 ms 3: 300 ms	3	10	
8717	8716	220C	1	W12	Pulse weight	unsigned integer	-	-	0, 1, 2, 3, 4, 5, 6	0: 0.01 kWh 1: 0.10 kWh 2: 1.00 kWh 3: 10.0 kWh 4: 0.10 MWh 5: 1.00 MWh 6: 10.0 MWh	3	10	
8718	8717	220D	1	W13	Pulse active on	unsigned integer	-	-	0, 1	0: Active Energy 1: Reactive Energy	3	10	
8719	8718	220E	1	W14	RESERVED (returns EB70h)								
8720	8719	220F	1	W15	RESERVED (returns EB70h)								
8721	8720	2210	1	W16	RESERVED (returns EB70h)								
8722	8721	2211	1	W17	RESERVED (returns EB70h)								
8723	8722	2212	1	W18	RESERVED (returns EB70h)								
8724	8723	2213	1	W19	RESERVED (returns EB70h)								
8725	8724	2214	1	W20	RESERVED (returns EB70h)								
8726	8725	2215	1	W21	RESERVED (returns EB70h)								
8727	8726	2216	1	W22	RESERVED (returns EB70h)								
8728	8727	2217	1	W23	RESERVED (returns EB70h)								
9217	9216	2400	1		Reset parameters								
9217	9216	2400	1		Reset Hour Meter, Maximum Powers, Maximum Voltages, Maximum Currents, Minimum Voltages, Active Partial Energy, Reactive Partial Energy	unsigned integer	-	-	-	See Note 1			
9729	9728	2600	1		Saving parameters								
9729	9728	2600	1		Saving in EEPROM parameters changed by Remote commands	unsigned integer	-	-	-	See Note 2	3	10	
9985	9984	2700	1		Enable writing								
9985	9984	2700	1		Enable Remote Writing Operation	unsigned integer	-	-	-	See Note 2 & Note 3	3	10	
10241	10240	2800	1		Restore default parameters								
10241	10240	2800	1		Restore default parameters	unsigned integer	-	-	-	See Note 3	3	10	

**Note 1 - Reset parameters**

To reset desired measurements write the following word (in binary): 0|0|0|0|0|0|0|0|0|0|0|0|0|0|b3|b2|b1|b0

b0 = 1 => Reset Hour Meter  
 b1 = 1 => Reset Peak Maximum Demand  
 b2 = 1 => Reset Maximum Voltage values  
 b3 = 1 => Reset Maximum Current values

b4 ÷ b15 = 0

**Note 2 - Configuration Procedure**

- 1) "Master Unlock Key" command (write the value = **0x5AA5** in the register 0x2700)
- 2) Write the new Configuration (one or more registers...)
- 3) "Master Unlock Key" command (write the value = **0x5AA5** in the register 0x2700)
- 4) Save/Confirm the new Configuration (writing the value **0x000A** in the register 0x2600)
- 5) The new Configuration is now available

**Note 3 - Restore default parameters**

- 1) "Master Unlock Key" command (write the value = **0x5AA5** in the register 0x2700)
- 3) Return to the Default configuration (writing the value **0x000B** in the register 0x2800)



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 (Hex)	Data Storing (2)
					4) The Default configuration has been restored								