

**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)
16384	4000	01	11	State of Breaker	51 02	10	01 00
28672	7000	01	11	Differential Electric Protection	73 05	10	01 00
20480	5000	01	11	Three-phase Electric Measurement	71 03	30	01 00
32768	8000	01	11	Single-channel Thermal Measurement	81 00	10	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)
4 (Read Input Registers)	1, 2, 3	"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
<b>16385</b>	<b>16384</b>	<b>4000</b>	<b>2</b>	<b>State of Breaker</b>			
16385	16384	4000	1	Open	The information reported here "self-resets" when the condition that generated it ends.	2	
16386	16385	4001	1	Closed	The information reported here "self-resets" when the condition that generated it ends.	2	
<b>28673</b>	<b>28672</b>	<b>7000</b>	<b>6</b>	<b>Differential Electric Protection</b>			
28673	28672	7000	1	Differential pre-alarm (>threshold IΔ1)	The information reported here "self-resets" when the condition that generated it ends.	2	
28674	28673	7001	1	Differential alarm (>threshold IΔ2)	The information reported here "self-resets" when the condition that generated it ends.	2	
28675	28674	7002	1	Overtemperature alarm (>threshold T)	The information reported here "self-resets" when the condition that generated it ends.	2	
28676	28675	7003	1	RESERVED			
28677	28676	7004	1	P. differential relay tripped	The information reported here is maintained even when the condition that generated it ends. The "reset" condition can ONLY be the detection of the device in Closed state. It is therefore necessary that the switch state function is present; in case of the contrary, the relay Trip information MUST NOT BE IMPLEMENTED (Example: if the switch goes back to Open => the Tripped Relay signal must be maintained up until the reset condition intervenes)	2	Y
28678	28677	7005	1	Over-temperature P. Relay tripped	The information reported here is maintained even when the condition that generated it ends. The "reset" condition can ONLY be the detection of the device in Closed state. It is therefore necessary that the switch state function is present; in case of the contrary, the relay Trip information MUST NOT BE IMPLEMENTED (Example: if the switch goes back to Open => the Tripped Relay signal must be maintained up until the reset condition intervenes)	2	Y

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>28673</b>	<b>28672</b>	<b>7000</b>	<b>9</b>		<b>Differential Electric Protection</b>							
28673	28672	7000	1		Differential P. Relay (total) Tripped Counter		-				4	Y
28674	28673	7001	1		Overtemperature P. Relay (total) Tripped Counter		-				4	Y
28675	28674	7002	1		Last Release data Buffer: "Tripped" type reading only bit reply		-				4	Y
				0	Differential Tripped Reply		-					
				1	Over-temperature P. Relay Tripped Reply		-					
				15÷2	<i>RESERVED (all return "0")</i>							
28676	28675	7003	2		Last Release data Buffer: Interrupted current or temperature		-				4	Y
28678	28677	7005	1		G1 "main setting"- differential: levels		1	mA		Expressed as "numeric coding"	4	Y
28679	28678	7006	1		G1 - differential: times		1	msec		Expressed as "numeric coding"	4	Y
28680	28679	7007	1		G1 - over-temperature protection: levels		1	°C		Expressed in "numeric coding"	4	Y
28681	28680	7008	1		G1 - over-temperature protection: times		1	msec		Expressed in "numeric coding"	4	Y
<b>20481</b>	<b>20480</b>	<b>5000</b>	<b>62</b>		<b>Three-phase Electric Measurement</b>							
20481	20480	5000	1		Phase 1 Current Value (R)	unsigned integer	1	A		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20482	20481	5001	1		Phase 2 Current Value (S)	unsigned integer	1	A		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20483	20482	5002	1		Phase 3 Current Value (T)	unsigned integer	1	A		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20484	20483	5003	1		Neutral Current Value	unsigned integer	1	A		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20485	20484	5004	1		<i>RESERVED (returns "8000h")</i>							
20486	20485	5005	1		Differential Current Value	unsigned integer	1	mA		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20487	20486	5006	8		<i>RESERVED (all return "8000h")</i>							
20495	20494	500E	1		1-N Voltage	unsigned integer	1	V		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20496	20495	500F	1		2-N Voltage	unsigned integer	1	V		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20497	20496	5010	1		3-N Voltage	unsigned integer	1	V		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20498	20497	5011	1		1-2 Voltage	unsigned integer	1	V		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20499	20498	5012	1		1-3 Voltage	unsigned integer	1	V		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20500	20499	5013	1		2-3 Voltage	unsigned integer	1	V		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20501	20500	5014	12		<i>RESERVED (all return "8000h")</i>							
20513	20512	5020	1		Phase 1 (R) THD Current vs. fundamental	unsigned integer	1	%		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20514	20513	5021	1		Phase 2 (S) THD Current vs. fundamental	unsigned integer	1	%		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20515	20514	5022	1		Phase 3 (T) THD Current vs. fundamental	unsigned integer	1	%		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20516	20515	5023	1		Neutral THD Current vs. fundamental	unsigned integer	1	%		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
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	1		2-N Voltage THD vs. fundamental	unsigned integer	1	%		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20519	20518	5026	1		3-N Voltage THD vs. fundamental	unsigned integer	1	%		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20520	20519	5027	3		<i>RESERVED (all return "8000h")</i>							
20523	20522	502A	1		Three-phase Active Power	signed integer	1	kW		Expressed in "numeric coding"; with mark (more significant bit = mark)	4	
20524	20523	502B	1		Three-phase Reactive power	signed integer	1	kvar		Expressed in "numeric coding"; with mark (more significant bit = mark)	4	
20525	20524	502C	3		<i>RESERVED (all return "8000h")</i>							
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		<i>RESERVED (all return "8000h")</i>							
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		<i>RESERVED (returns "8000h")</i>							

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing
20533	20532	5034	2		Positive Three-phase Active Energy	unsigned integer	1	kWh		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	Y
20535	20534	5036	2		Negative Three-phase Active Energy	unsigned integer	1	kWh		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	Y
20537	20536	5038	2		RESERVED (returns "8000 0000h")							
20539	20538	503A	2		Positive Three-phase Reactive Energy	unsigned integer	1	kvarh		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	Y
20541	20540	503C	2		Negative Three-phase Reactive Energy	unsigned integer	1	kvarh		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	Y
<b>32769</b>	<b>32768</b>	<b>8000</b>	<b>1</b>		<b>Single-channel Thermal Measurement</b>							
32769	32768	8000	1		Sensor 1 Temperature Value	signed integer	1	°C		Expressed in "numeric coding"	4	

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
<i>(no HOLDING REGISTERS availables)</i>													