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
29184	7200	01	11	Three-phase Electric Protection	73 03	10	01 01
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	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÷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 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.

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Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [bit]	Description	Note	Read Function Codes (Dec)	Data Storing
16385	**16384**	**4000**	**3**	**State of Breaker**			
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	
16387	16386	4002	1	Tripped	The information reported here "self-resets" when the condition that generated it ends.	2	
29185	**29184**	**7200**	**9**	**Three-phase Electric Protection**			
29185	29184	7200	1	Overload pre-alarm (threshold I1)	The information reported here "self-resets" when the condition that generated it ends.	2	
29186	29185	7201	1	Overload pre-alarm (>threshold I2)	The information reported here "self-resets" when the condition that generated it ends.	2	
29187	29186	7202	1	Over-temperature alarm (>threshold T)	The information reported here "self-resets" when the condition that generated it ends.	2	
29188	29187	7203	1	*RESERVED (returns "0")*		2	
29189	29188	7204	1	Overload P. Relay Tripped (no phase indication)	The information reported here is maintained even when the condition that generated it ends. The "restore" conditions can be (equivalent, in alternative): • the detection of the device in Closed state • the detection of a minimum current value on the phases. The presence of Switch State Functionality is therefore NOT binding (Example: if the switch goes back to Open => the Tripped Relay signal must be maintained up until the reset condition intervenes)	2	Y
29190	29189	7205	1	Short circuit P. Relay Tripped (no phase indication)	The information reported here is maintained even when the condition that generated it ends. The "restore" conditions can be (equivalent, in alternative): • the detection of the device in Closed state • the detection of a minimum current value on the phases. The presence of Switch State Functionality is therefore NOT binding (Example: if the switch goes back to Open => the Tripped Relay signal must be maintained up until the reset condition intervenes)	2	Y
29191	29190	7206	1	Device Protection Relay Tripped ("III element", no phase indications)	The information reported here is maintained even when the condition that generated it ends. The "restore" conditions can be (equivalent, in alternative): • the detection of the device in Closed state • the detection of a minimum current value on the phases. The presence of Switch State Functionality is therefore NOT binding (Example: if the switch goes back to Open => the Tripped Relay signal must be maintained up until the reset condition intervenes)	2	Y
29192	29191	7207	1	*RESERVED (returns "0")*		2	Y
29193	29192	7208	1	Over-temperature P. Relay tripped	The information reported here is maintained even when the condition that generated it ends. The "restore" conditions can be (equivalent, in alternative): • the detection of the device in Closed state • the detection of a minimum current value on the phases. The presence of Switch State Functionality is therefore NOT binding (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 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
16385	16384	4000	6		**State of Breaker**							
16385	16384	4000	1	State of Breaker	*RESERVED (returns error 84h)*						4	Y
16386	16385	4001	1		Operations counter					Total value, may not be zeroed	4	Y
16387	16386	4002	1		Maximum Number of Operations					Not configurable	4	Y
16388	16387	4003	1		Breaker Features - Rated Current		1	A			4	Y
16389	16388	4004	1		Breaker Features - Device Type and number of Poles						4	Y
				3÷0	Poles: number				1÷4		4	Y
				4	Poles: neutral position (left(1)/right(0))						4	Y
				7÷5	*RESERVED (returns"0")*						4	Y
				8	Type of device: Isolating switch (0)/ Automatic (1)						4	Y
				9	Type of device: Repulsive Breaker (0)/Non Repulsive Breaker (1)						4	Y
				15÷10	*RESERVED (returns "0")*						4	Y
16390	16389	4005	1		Tripping Features - Breaking capacity		0,01	kA			4	Y
29185	29184	7200	30		**Three-phase Electric Protection**							
29185	29184	7200	1		Overload P. relay (total) Tripped Counter (no phase indication)						4	Y
29186	29185	7201	1		Short circuit P. relay (total) Tripped Counter (no phase indication)						4	Y
29187	29186	7202	1		Device Protection Relay (total) Tripped Counter ("III element", no phase indications)						4	Y
29188	29187	7203	1		*RESERVED (returns "8000h")*						4	Y
29189	29188	7204	1		Over-temperature P. Relay (total) Tripped Counter						4	Y
29190	29189	7205	1		Last Release data Buffer: "Tripped" type reading only bit reply						4	
				0	Overload P. Relay Tripped Reply						4	
				1	Short-circuit P. Relay Tripped Reply						4	
				2	Device Protection Relay Tripped Reply ("III element")						4	
				3	Earth Fault P. Relay Tripped Reply						4	
				4	Over-temperature P. Relay Tripped Reply						4	
				5	Differential Tripped Reply						4	
				15÷6	*RESERVED (returns "0")*						4	
29191	29190	7206	2		Last Release data Buffer: Interrupted current or temperature			mA, °C		Expressed in "numeric coding"	4	
29193	29192	7208	1		G1 – overload: levels			A/%		Expressed in "numeric coding"	4	Y
29194	29193	7209	1		G1 – overload: times			msec		Expressed in "numeric coding"	4	Y
29195	29194	720A	1		G1 – overload: options						4	Y
				0	disabled(1)/active(0)						4	Y
				1	absolute value(1)/%In(0)						4	Y
				4÷2	I2t=k MEM OFF(001)/I2t=k MEM ON(000)						4	Y
				7÷5	*RESERVED (returns "0")*						4	Y
				15÷8	point of work, Ir multiple						4	Y
29196	29195	720B	2		G1 – short circuit which may be delayed: levels			A/%		Expressed in "numeric coding"	4	Y
29198	29197	720D	1		G1 – short circuit which may be delayed: times			msec		Expressed in "numeric coding"	4	Y
29199	29198	720E	1		G1 – short circuit which may be delayed: options						4	Y
				0	Bit0=disabled(1)/active(0)						4	Y
				1	absolute value(1)/%Ir(0)						4	Y
				4÷2	curve t=k(001)/I2t=k(000)						4	Y
				7÷5	*RESERVED (returns "0")*						4	Y
				15÷8	Point of work for I2t curve, multiple of Ir)						4	Y
29200	29199	720F	4		*RESERVED (returns "80000000h","8000h","8000h")*			A/%		Expressed in "numeric coding"	4	Y
29204	29203	7213	2		G1 – device protection: levels			A/%		Expressed in "numeric coding"	4	Y
29206	29205	7215	1		G1 – device protection: times			msec		Expressed in "numeric coding"	4	Y
29207	29206	7216	1		G1 – device protection: options						4	Y
				0	disabled(1)/active(0)						4	Y
				1	absolute value(1)/%In(0)						4	Y
				15÷2	*RESERVED (returns "0")*						4	Y
29208	29207	7217	3		*RESERVED (returns "8000h","8000h","8000h")*			A/%		Expressed in "numeric coding"	4	Y
29211	29210	721A	1		G1 – neutral protection: levels			%		Expressed in "numeric coding"	4	Y
29212	29211	721B	1		G1 – neutral protection: options						4	Y
				0	disabled(1)/active(0)						4	Y
				1	"0" (%phase), valid for Overload protection, may be delayed and Instant Short Circuit						4	Y
				4÷2	"0" (phase curve)						4	Y
				15÷5	*RESERVED (returns "0")*						4	Y
29213	29212	721C	1		G1 – over-temperature protection: levels			°C		Expressed in "numeric coding"	4	Y
29214	29213	721D	1		G1 – over-temperature protection: times			msec		Expressed in "numeric coding"	4	Y
20481	20480	5000	4		**Three-phase Electric Measurement**							
20481	20480	5000	1		Phase 1 Current Value (R)	unsigned integer		A		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	

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20482	20481	5001	1		Phase 2 Current Value (S)	unsigned integer		A		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20483	20482	5002	1		Phase 3 Current Value (T)	unsigned integer		A		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20484	20483	5003	1		Neutral Current Value	unsigned integer		A		Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
32769	**32768**	**8000**	**1**		**Single-channel Thermal Measurement**							
32769	32768	8000	1		Sensor 1 Temperature Value	signed integer		°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
					(no HOLDING REGISTERS availables)								