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	20	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	Trasmission Modes	Device Addressing	Baud Rates (bit/s)	Data Bits	Data bits trasmission	Parity	Stop Bits
standard EIA/TIA 485 (RS-485) two- wire configuration	RTU	1÷247	programmable (1200, 2400, 4800, 9600, 19200, 38400)		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.

GENERAL

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [bit]	Description	Note					
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	14	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		Overload alarm (>threshold I2)	The information reported here "self-resets" when the condition that generated it ends.	2				
29187	29186	7202	2	RESERVED (returns "0")						
29189	29188	7204	1	Over-temperature alarm (>threshold T)	The information reported here "self-resets" when the condition that generated it ends.	2				
29190	29189	7205		RESERVED (returns "0")						
29194	29193	7209	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 	2	Y			
29195	29194	720A	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	2	Y			
29196	29195	720B	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	2	Ŷ			
29197	29196	720C	1	RESERVED (returns "0")						
29198	29197	720D		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 Paleway events and the presence of the state and the phases. 	2	Y			

DISCRETE INPUT - Bits (R)

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

COILS - Bits (R&W)

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Interpretation Interp	Register Number	Register Address	Register Address		Bit Position	Description	Туре	Scale	Unit	Range	Note		
Index Solid Solid <th< th=""><th>16295</th><th></th><th></th><th>6</th><th></th><th>State of Buscher</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th<>	16295			6		State of Buscher							
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Image: Construction of the second					13	Short circuit which may be delayed P. Relay Tripped Reply phase 1							\square
292102920972191Last Release data Buffer (Last Trip): "Tripped" type reading only bit reply - part II reply - part II $\begin{tabular}{c} reply - part IIreply - part II\begin{tabular}{c} reply - part IIreply - part IIlement")\begin{tabular}{c} reply - part IIreply - part IIreply - part IIlement")\begin{tabular}{c} reply - part IIreply - part IIreply - part IIreply - part IIlement")\begin{tabular}{c} reply - part IIreply - part IIr$					14	Short circuit which may be delayed P. Relay Tripped which Reply phase							1 1
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Image: style styl					5	Relay Tripped in mode "Main Setting"					<u> </u>		
Image: Selectivity of the selectivity o					7	Overload Relay Tripped in mode "MFM=OFF"							
9 Short circuit which may be delayed Relay Tripped in mode "Logical Selectivity" (with delay Tm) Image: Comparison of the compariso					8			1	1	1			
Selectivity" (with delay Tm) Short circuit which may be delayed Relay Tripped in mode "Logical					٩	Short circuit which may be delayed Relay Tripped in mode "Logical							
				ļ	3	Selectivity" (with delay Tm)							↓]
					10	Short circuit which may be delayed Relay Tripped in mode "Logical Selectivity" (with delay SEL=High)							1 1

INPUT REGISTERS - Words (R)

29211 29221 29221 29231 29241 29251 29261 29271 29281 29291	29210 29220 29230 29240 29250 29260 29270 29280 29290	721A 7224 722E 7238 7242 724C 7256 7260	10 10 10 10 10 10	15÷12	Earth Fault P. Relay Tripped in mode "I ² t=k" RESERVED (returns "0") Last Release data Buffer 1 Last Release data Buffer 2 Last Release data Buffer 3 Last Release data Buffer 4				See details in Last Release data Buffer (Last Trip) See details in Last Release data Buffer (Last Trip)		
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29281 29291	29280				Last Release data Buffer 6				See details in Last Release data Buffer (Last Trip)		
29291		7260	10		Last Release data Buffer 7				See details in Last Release data Buffer (Last Trip)		
	29290	7200	10		Last Release data Buffer 8				See details in Last Release data Buffer (Last Trip)		
└────┼──		726A	10		Last Release data Buffer 9				See details in Last Release data Buffer (Last Trip)		
29301	29300	7274	10		Last Release data Buffer 10				See details in Last Release data Buffer (Last Trip)		
29311	29310	727E	100		RESERVED (returns "8000h")						
29411	29410	72E2	1		G1 ("main setting") – overload: level		[A]/[%]				
29412	29411	72E3	1	ļ	G1 – overload: times		[msec]				┢────┘
29413 29414	29412 29413	72E4 72E5	1		G1 – overload: options G1 – short circuit which may be delayed: levels			A/%	Expressed in "numeric coding"	4	
29414	29415	72E5	1		G1 – short circuit which may be delayed: levels			msec	Expressed in "numeric coding"	4	Y
29417	29416	72E8	1		G1 – short circuit which may be delayed: options					4	Ý
				0	Bit0=disabled(1)/active(0)					4	Ý
				1	absolute value(1)/%Ir(0)					4	Y
				4÷2	curve t=k(001)/I2t=k(000)					4	Y
				7÷5	RESERVED (returns "0") Point of work for I2t curve, multiple of Ir)					4	Y
29418	29417	72E9	4	15÷8	RESERVED (returns "80000000h", "8000", "8000")					4	ř.
29422	29421	72ED	2		G1 – device protection: levels			A/%	Expressed in "numeric coding"	4	Y
29424	29423	72EF	1		G1 – device protection: times			msec	Expressed in "numeric coding"	4	Ý
29425	29424	72F0	1		G1 – device protection: options					4	Y
				0	disabled(1)/active(0)					4	Y
				1	absolute value(1)/%In(0)					4	<u> </u>
29426	29425	72F1	6	15÷2	RESERVED (returns "0") RESERVED (all return "8000h")					4	⊢_ĭ]
29432	29431	72F7	1		G1 – over-temperature protection: levels			°C	Expressed in "numeric coding"	4	Y
29433	29432	72F8	1		G1 – over-temperature protection: times			msec	Expressed in "numeric coding"	4	Y
20481	20480	5000	58		Three-phase Electric Measurement				Lyprocood on "numeric coding", without morely		
20481	20480	5000	1		Phase 1 Current Value (R)	unsigned integer		А	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20482	20481	5001	1		Phase 2 Current Value (S)	unsigned integer		А	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20483	20482	5002	1		Phase 3 Current Value (T)	unsigned integer		А	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20484	20483	5003	14		RESERVED (all return "8000h")	unsigned integer			byproceed on "numeric coding" without mark		
20498	20497	5011	1		1-2 Voltage	unsigned integer		V	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20499	20498	5012	1		1-3 Voltage	unsigned integer		V	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20500	20499	5013	1		2-3 Voltage	unsigned integer		V	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20501	20500	5014	12		RESERVED (all return "8000h")						
20513	20512	5020	1		Phase 1 (R) THD Current vs. fundamental	unsigned integer		%	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		%	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		%	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20516	20515	5023	4		RESERVED (all return "8000h")						
20520	20519	5027	1		1-2 Voltage THD vs. fundamental	unsigned integer		%	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20521	20520	5028	1		1-3 Voltage THD vs. fundamental	unsigned integer		%	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20522	20521	5029	1		2-3 Voltage THD vs. fundamental	unsigned integer		%	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	
20523	20522	502A	1		Three-phase Active Power	signed integer		kW	Expressed in "numeric coding"; with mark (more significant bit = mark)	4	
20524	20523	502B	1	1	Three-phase reactive power	signed integer		kvar	Expressed in "numeric coding"; with mark (more significant bit = mark)	4	

20525	20524	502C	3	RESERVED (all return "8000h")						
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		Hz	Expressed in "numeric coding"; with mark (more significant bit = mark)	4	
20531	20530	5032	2	RESERVED (returns "80000000h")						
20533	20532	5034	2	Positive Three-phase Active Energy	unsigned integer		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		kWh	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	Y
20537	20536	5038	2	RESERVED (returns "80000000h")						
20539	20538	503A	2	Positive Three-phase Reactive Energy	unsigned integer		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		kvarh	Expressed on "numeric coding"; without mark (fixed more significant bit = 0)	4	Y
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	Register	Register	Dimension	Bit Position	Description	Туре	Scale	Unit	Range	Note	Read	Write	Data
Number	Address	Address	[word]								Function	Function	Storing
	(Dec)	(Hex)									Codes	Codes	
											(Dec)	(Dec)	
					(no HOLDING REGISTERS availables)								

HOLDING REGISTERS - Words (R&W)