Description of Modbus protocol registers used in ORBIT MERRET devices

OM 403 / OM 503

Ing. Jan Veverka

Introduction
This document describes the Modbus protocol registers for ORBIT MERRET devices of the OM 403 and OM 503 product range.

Register addresses are uniform for all devices of the OM 502 and 503 product family. A particular device supports the register addresses and values that are available in that device.
Reading registers that are not supported by a particular device returns a value of 0.
Writing to registers that are not supported by a particular device or writing invalid values to a particular register returns an error.
The OM 403/503 protocol supports reading and writing multiple registers simultaneously

Each register is 2 bytes in size. Values of type float32 are stored in two registers (4 bytes).

Types of values in registers:
uint16 … unsigned integer, 2 bytes, number in the range 0 – 65536
bitmap … 2 bytes, bitmap
list … unsigned integer, number from the list of possible values
float32 4 bytes

Command	Register address	Format	Description	The range of values
0x01			**reading the binary values of the outputs**	
	0x0000	bitmap	relay status bitmap	
0x02			**reading the binary values of the inputs**	
	0x0000	bitmap	bitmap of external inputs	
0x03			**reading of setup registries**	
	0x0000	list	measurement rate of the 1st input	**0x0003** 1 measur./s **0x0004** 2 measur./s **0x0005** 5 measur./s **0x0006** 10 measur./s **0x0007** 20 measur./s **0x0008** 50 measur./s **0x0009** 100 measur./s **0x000A** 200 measur./s **0x000B** 400 measur./s **0x000C** 500 measur./s **0x000D** 800 measur./s **0x000E** 1000 measur./s **0x000F** 2.5 measur./s **0x0010** 16.6 measur./s **0x0011** 60 measur./s **0x0012** 1200 measur./s **0x0013** 2400 measur./s **0x0014** 4800 measur./s **0X0021** 7200 measur./s
	0x0001	list	measurement rate of the 2nd input	see register 0x0000
	0x0002	list	type of the 1st input	**0x0000** DC

Description of Modbus protocol registers used in ORBIT MERRET devices OM 403 / OM 503

Ing. Jan Veverka

			0x1000 PM (Process) **0x2000** Resistor **0x3000** Temperature **0x4000** Potentiometer **0x5000** AC **0x6000** UQC (Counter) **0x7000** Strain gauge
0x0003	list	type of the 2nd input	see register 0x0002
0x0004	list	range of the 1st input	**0x0020** DC 60mV **0x00C8** DC 75mV **0x0030** DC 100mV **0x0040** DC 150mV **0x0058** DC 300mV **0x0060** DC 1000mV **0x0088** DC 20V **0x0098** DC 40V **0x00D0** DC 100mA **0x1008** PM 2V **0x1010** PM 5V **0x1018** PM 10V **0x1030** PM 0-5mA **0x1038** PM 0-20mA **0x1040** PM 4-20mA **0x2018** Resistor 100R **0x2020** Resistor 300R **0x2028** Resistor 1k **0x2030** Resistor 3k **0x2038** Resistor 10k **0x2040** Resistor 30k **0x2048** Resistor 100k **0x2050** Resistor 300k **0x4008** Potentiometer **0x5008** PWR AC 30V **0x5010** PWR AC 150V **0x5018** PWR AC 250V **0x5020** PWR AC 450V **0x5028** PWR AC 700V **0x5030** PWR AC 1A **0x5038** PWR AC 5A **0x5040** PWR AC 10A **0x5048** PWR AC Frequency **0x5050** PWR AC Power ACTIVE **0x5058** PWR AC Power REACTIVE **0x5060** PWR AC Power APPARENT **0x5068** PWR AC cos fi **0x7008** Strain 10V 2mV/V **0x7010** Strain 10V 4mV/V **0x7018** Strain 10V 8mV/V **0x7020** Strain 10V 16mV/V **0x7028** Strain 5V 2mV/V **0x7030** Strain 5V 4mV/V **0x7038** Strain 5V 8mV/V

Description of Modbus protocol registers used in ORBIT MERRET devices OM 403 / OM 503

Ing. Jan Veverka

			0x7040 Strain 5V 16mV/V **0x8008** PWR DC 200V **0x8010** PWR DC 350V **0x8018** PWR DC 600V **0x8020** PWR DC 1000V **0x8028** PWR DC 1A **0x8030** PWR DC 5A **0x8038** PWR DC 10A
0x0005	list	range of the 2nd input	see register 0x0004
0x0006	list	temperature measurement type of 1st input	**0x0000** Pt **0x0020** Ni **0x0040** Cu **0x0060** Thermocouple **0x0080** NTC **0x00A0** PTC
0x0008	list	1st input temperature measurement mode	**0x3008** Pt100 3850 **0x3010** Pt500 3850 **0x3018** Pt1000 3850 **0x3028** Pt100 3920 **0x3038** Pt50 3910 **0x3040** Pt100 3910 **0x3108** Ni1000 5000 **0x3118** Ni1000 6180 **0x3110** Ni10000 5000 **0x3120** Ni10000 6180 **0x3208** Cu50 4260 **0x3218** Cu50 4280 **0x3210** Cu100 4260 **0x3220** Cu100 4280 **0x3408** NTC 1 **0x3410** NTC 2 **0x3418** NTC 3 **0x3420** NTC 4 **0x3428** NTC 5 **0x3430** NTC 6 **0x3508** PTC KTY81.2 **0x330C** TC B **0x3314** TC E **0x331C** TC J **0x3324** TC K **0x332C** TC L **0x3334** TC N **0x333C** TC R **0x3344** TC S **0x334C** TC T **0x3354** TC XK
0x000A	list	1st input connection type	**0x0000** 2W **0x0001** 3W **0x0002** 4W **0x0004** 1TC, extern. comp. **0x0005** 1TC, extern. comp.

Description of Modbus protocol registers used in ORBIT MERRET devices

OM 403 / OM 503

Ing. Jan Veverka

			0x0006 2TC, extern. comp. **0x0007** 2TC, extern. comp.
0x0010	list	measurement rate of 3rd input	see register 0x0000
0x0011	list	measurement rate of 4th input	see register 0x0000
0x0012	list	type of the 3rd input	see register 0x0002
0x0013	list	type of the 4th input	see register 0x0002
0x0014	list	range of the 3rd input	see register 0x0004
0x0015	list	range of the 4th input	see register 0x0004
0x0020	list	measurement rate of 5th input	see register 0x0000
0x0021	list	measurement rate of 6th input	see register 0x0000
0x0022	list	type of the 5th input	see register 0x0002
0x0023	list	type of the 6th input	see register 0x0002
0x0024	list	range of the 5th input	see register 0x0004
0x0025	list	range of the 6th input	see register 0x0004

0x0200	float32	setpoint of the 1st digital output
0x0202	float32	setpoint of the 2nd digital output
0x0204	float32	hysteresis of the 1st digital output
0x0206	float32	hysteresis of the 2nd digital output
0x0208	float32	start value of window of the 1st digital output
0x020A	float32	start value of window of the 2nd digital output
0x020C	float32	end value of window of the 1st digital output
0x020E	float32	end value of window of the 2nd digital output

0x0210	float32	setpoint of the 3rd digital output
0x0212	float32	setpoint of the 4th digital output
0x0214	float32	hysteresis of the 3rd digital output
0x0216	float32	hysteresis of the 4th digital output
0x0218	float32	start value of window of the 3rd digital output
0x021A	float32	start value of window of the 4th digital output
0x021C	float32	end value of window of the 3rd digital output
0x021E	float32	end value of window of the 4th digital output

0x0220	float32	setpoint of the 5th digital output
0x0222	float32	setpoint of the 6th digital output
0x0224	float32	hysteresis of the 5th digital output
0x0226	float32	hysteresis of the 6th digital output
0x0228	float32	start value of window of the 5th digital output
0x022A	float32	start value of window of the 6th digital output
0x022C	float32	end value of window of the 5th digital output
0x022E	float32	end value of window of the 6th digital output

0x04 **reading the measured values**

0x0000	float32	measured value of channel A
0x0002	float32	measured value of channel B
0x0004	float32	minimum of measured value of channel A
0x0006	float32	minimum of measured value of channel B
0x0008	float32	maximum of measured value of channel A
0x000A	float32	maximum of measured value of channel B
0x0020	float32	measured value of channel C

0x0022	float32	measured value of channel D	
0x0024	float32	minimum of measured value of channel C	
0x0026	float32	minimum of measured value of channel D	
0x0028	float32	maximum of measured value of channel C	
0x002A	float32	maximum of measured value of channel D	
0x0040	float32	measured value of channel E	
0x0042	float32	measured value of channel F	
0x0044	float32	minimum of measured value of channel E	
0x0046	float32	minimum of measured value of channel F	
0x0048	float32	maximum of measured value of channel E	
0x004A	float32	maximum of measured value of channel F	
0x0060	float32	measured value of channel Counter	
0x0062	float32	measured value of channel Frequency	

0x05			**Executive commands**	
	0x0000	uint16	input taring (zeroing the display value)	1 to a number of analog inputs the input with the serial number signified by the parameter value is tared value 0xFF00 tares all inputs
	0x0001	uint16	clear input tare (input tare not applied)	1 to a number of analog inputs removes the tare from the input with the serial number signified by the parameter value value 0xFF00 removes the tare from all inputs
	0x0002	uint16	zeroing the counter	
	0x0003	uint16	Teach-In of the lower end of the input range (analog input, linear potentiometer, …)	1 to a number of analog inputs the value of the lower end of the input range with the serial number signified by the parameter value is measured and stored
	0x0004	uint16	Teach-In of the upper end of the input range (analog input, linear potentiometer, …)	1 to a number of analog inputs the value of the upper end of the input range with the serial number signified by the parameter value is measured and stored

0x10		**Multiple writing of setting registries**	
		See command 03 It is possible to write only registries 0x0200 to 0x022E for setting the parameters of digital outputs.	

Description of Modbus protocol registers used in ORBIT MERRET devices OM 403 / OM 503

Ing. Jan Veverka

The registries must be written in pairs or in multiples of pairs; these are values of type float32.