# Description of Modbus protocol registers in new ORBIT MERRET devices

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Introduction
This document describes the Modbus protocol registers for the following ORBIT MERRET devices:
OMX 333i, OMX 380i
OM 353, OM 653, OM 403, OM 503, OM 603
OMU 406

Register addresses are uniform for all devices. 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 new device 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, 2 bytes, number from the list of possible values
float32 4 bytes

| Command | Registry 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 registers** | |
| | **0x0000** | list | measurement rate of the 1st input | **0x0003** 1 measurement/s<br>**0x0004** 2 measurements/s<br>**0x0005** 5 measurements/s<br>**0x0006** 10 measur./s<br>**0x0007** 20 measur./s<br>**0x0008** 50 measur./s<br>**0x0009** 100 measur./s<br>**0x000A** 200 measur./s<br>**0x000B** 400 measur./s<br>**0x000C** 500 measur./s<br>**0x000D** 800 measur./s<br>**0x000E** 1000 measur./s<br>**0x000F** 2.5 measur./s<br>**0x0010** 16.6 measur./s<br>**0x0011** 60 measur./s<br>**0x0012** 1200 measur./s<br>**0x0013** 2400 measur./s<br>**0x0014** 4800 measur./s<br>**0X0021** 7200 measur./s |
| | **0x0001** | list | measurement rate of the 2nd input | see registry 0x0000 |
| | **0x0002** | list | type of the 1st input | **0x0000** DC |

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| | | | **0x1000** PM<br>**0x2000** Resistor<br>**0x3000** Temperature<br>**0x4000** Potentiometer<br>**0x5000** AC<br>**0x6000** UQC<br>**0x7000** Strain gauge |
| **0x0003** | list | type of the 2nd input | see registry 0x0002 |
| **0x0004** | list | range of the 1st input | **0x0020** DC 60mV<br>**0x00C8** DC 75mV<br>**0x0030** DC 100mV<br>**0x0040** DC 150mV<br>**0x0058** DC 300mV<br>**0x0060** DC 1000mV<br>**0x0088** DC 20V<br>**0x0098** DC 40V<br>**0x00D0** DC 100mA<br>**0x1008** PM 2V<br>**0x1010** PM 5V<br>**0x1018** PM 10V<br>**0x1030** PM 0-5mA<br>**0x1038** PM 0-20mA<br>**0x1040** PM 4-20mA<br>**0x2018** Resistor 100R<br>**0x2020** Resistor 300R<br>**0x2028** Resistor 1k<br>**0x2030** Resistor 3k<br>**0x2038** Resistor 10k<br>**0x2040** Resistor 30k<br>**0x2048** Resistor 100k<br>**0x2050** Resistor 300k<br>**0x4008** Potentiometer<br>**0x7008** 10V 2mV/V<br>**0x7010** Strain 10V 4mV/V<br>**0x7018** Strain 10V 8mV/V<br>**0x7020** Strain 10V 16mV/V<br>**0x7028** Strain 5V 2mV/V<br>**0x7030** Strain 5V 4mV/V<br>**0x7038** Strain 5V 8mV/V<br>**0x7040** Strain 5V 16mV/V |
| **0x0005** | list | range of the 2nd input | see registry 0x0004 |
| **0x0006** | list | temperature measurement type of 1st input | **0x0000** Pt<br>**0x0020** Ni<br>**0x0040** Cu<br>**0x0060** Thermocouple<br>**0x0080** NTC<br>**0x00A0** PTC |
| **0x0007** | list | temperature measurement type of 2nd input | see registry 0x0006 |
| **0x0008** | list | 1st input temperature measurement mode | **0x3008** Pt100 3850<br>**0x3010** Pt500 3850<br>**0x3018** Pt1000 3850<br>**0x3028** Pt100 3920<br>**0x3038** Pt50 3910<br>**0x3040** Pt100 3910<br>**0x3108** Ni1000 5000<br>**0x3118** Ni1000 6180 |

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| | | | **0x3110** Ni10000 5000<br>**0x3120** Ni10000 6180<br>**0x3208** Cu50 4260<br>**0x3218** Cu50 4280<br>**0x3210** Cu100 4260<br>**0x3220** Cu100 4280<br>**0x3408** NTC 1<br>**0x3410** NTC 2<br>**0x3418** NTC 3<br>**0x3420** NTC 4<br>**0x3428** NTC 5<br>**0x3430** NTC 6<br>**0x3508** PTC KTY81.2<br>**0x330C** TC B<br>**0x3314** TC E<br>**0x331C** TC J<br>**0x3324** TC K<br>**0x332C** TC L<br>**0x3334** TC N<br>**0x333C** TC R<br>**0x3344** TC S<br>**0x334C** TC T<br>**0x3354** TC XK |
| **0x0009** | list | 2nd input temperature measurement mode | see registry 0x0008 |
| **0x000A** | list | 1st input connection type | **0x0000** 2W<br>**0x0001** 3W<br>**0x0002** 4W<br>**0x0004** 1TC, extern. comp.<br>**0x0005** 1TC, intern. comp.<br>**0x0006** 2TC, extern. comp.<br>**0x0007** 2TC, intern. comp. |
| **0x000B** | list | 2nd input connection type | see registry 0x000A |
| **0x000C** | float32 | start of the converted range of the 1st input | |
| **0x000E** | float32 | start of the converted range of the 2nd input | |
| **0x0010** | float32 | end of the converted range of the 1st input | |
| **0x0012** | float32 | end of the converted range of the 2nd input | |
| **0x0014** | float32 | start of the measuring range of the 1st input | |
| **0x0016** | float32 | start of the measuring range of the 2nd input | |
| **0x0018** | float32 | end of the measuring range of the 1st input | |
| **0x001A** | float32 | start of the measuring range of the 2nd input | |
| **0x0200** | float32 | limit of the 1st digital output | |
| **0x0202** | float32 | limit 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 | |

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| **0x04** | | **reading the measured values** |
| **0x0000** | float32 | measured value of the 1st input |
| **0x0002** | float32 | measured value of the 2nd input |
| **0x0004** | float32 | minimum of the measured value of the 1st input |

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| | **0x0006** | float32 | minimum of the measured value of the 2nd input | |
| | **0x0008** | float32 | maximum of the measured value of the 1st input | |
| | **0x000A** | float32 | maximum of the measured value of the 2nd input | |
| | **0x000C** | float32 | filtered value of the 1st input | |
| | **0x000E** | float32 | filtered value of the 2nd input | |
| | **0x0010** | float32 | additional value of the 1st input | Temperature of cold junction when measuring temperatures using thermocouples, NTC resistance when measuring temperatures using NTC |
| | **0x0012** | float32 | additional value of the 2nd input | see additional value of the 1st input |
| | **0x0014** | float32 | the value of the 1st input converted by a mathematical function | |
| | **0x0016** | float32 | the value of the 2nd input converted by a mathematical function | |
| | **0x0018** | float32 | the value of the 1st input converted by a linearization table | |
| | **0x001A** | float32 | the value of the 2nd input converted by a linearization table | |
| | **0x001C** | float32 | measured value of the 1st input without conversion to the process range and without tare corrections | |
| | **0x001E** | float32 | measured value of the 2nd input without conversion to the process range and without tare corrections | |
| **0x05** | | | **Executive commands** | |
| | **0x0000** | uint16 | input taring (zeroing the display value) | 1 to a number of analog inputs<br>the input with the serial number signified by the parameter value is tared<br>value 0xFF00 tares all inputs |
| | **0x0001** | uint16 | clear input tare<br>(input tare not applied) | 1 to a number of analog inputs<br>removes the tare from the input with the serial number signified by the parameter value<br>value 0xFF00 removes the tare from all inputs |
| | **0x0002** | uint16 | zeroing the counter | 1 to a number of counter inputs<br>the counter with the serial number signified by the parameter value is reset<br>value 0xFF00 zeroes all counters |
| | **0x0003** | uint16 | Teach-In of the lower end of the input range (analog input, linear potentiometer, ...) | 1 to a number of analog inputs |

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| | | | | 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<br>the value of the upper end of the input range with the serial number signified by the parameter value is measured and stored |
| **0x06** | | | **write setting register**<br>See command 03 | |
| **0x10** | | | **multiple writing of setting registers**<br>See command 03 | |