**MODBUS RTU REGISTER MAP FOR VACON 100 DRIVES**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Register Address (Dec) | Parameter Name | Function Code (Read/Write) | Data Type | Scaling/Unit | Description |
| Coils (Function 01/05/15) | | | | | |
| 0000 | RUN/STOP | Read/Write | 1-bit | - | Control Word, bit 0. 0=Stop, 1=Run. |
| 0001 | Direction | Read/Write | 1-bit | - | Control Word, bit 1. 0=Forward, 1=Reverse. |
| 0002 | Fault reset | Read/Write | 1-bit | - | Control Word, bit 2. Rising edge (0->1) resets faults. |
| 0010 | Reset Op Days | Write | 1-bit | - | Write 1 to clear the resettable operation day counter. |
| 0011 | Reset Energy | Write | 1-bit | - | Write 1 to clear the resettable energy counter. |
| Discrete Inputs (Function 02) | | | | | |
| 10000 | Ready | Read | 1-bit | - | Status Word, bit 0. Drive is ready to run. |
| 10001 | Run | Read | 1-bit | - | Status Word, bit 1. Motor is running. |
| 10002 | Direction | Read | 1-bit | - | Status Word, bit 2. 0=Clockwise, 1=Counterclockwise. |
| 10003 | Fault | Read | 1-bit | - | Status Word, bit 3. Drive has an active fault. |
| 10004 | Alarm | Read | 1-bit | - | Status Word, bit 4. Drive has an active alarm. |
| 10005 | At reference | Read | 1-bit | - | Status Word, bit 5. Motor is running at reference speed. |
| 10006 | Zero speed | Read | 1-bit | - | Status Word, bit 6. Motor is at zero speed. |
| 10007 | Flux ready | Read | 1-bit | - | Status Word, bit 7. Motor is magnetized. |
| Input Registers (Function 04) | | | | | |
| Process Data Out (Slave -> Master) | | | | | |
| 2101 | FB Status Word (Low) | Read | 16-bit | - | Low 16 bits of the 32-bit Status Word. |
| 2102 | FB General Status Word | Read | 16-bit | - | High 16 bits of the 32-bit Status Word. |
| 2103 | FB Actual Speed | Read | 16-bit | 0.01 % | 0...10000 (100.00%). Scaled output. |
| 2104 | Process Data Out 1 | Read | 16-bit | Varies | Default: Output Frequency (ID 1), 0.01 Hz |
| 2105 | Process Data Out 2 | Read | 16-bit | Varies | Default: Motor Speed (ID 2), 1 RPM |
| 2106 | Process Data Out 3 | Read | 16-bit | Varies | Default: Motor Current (ID 3 or 45), 0.1 A |
| 2107 | Process Data Out 4 | Read | 16-bit | Varies | Default: Motor Torque (ID 4), 0.1 % |
| 2108 | Process Data Out 5 | Read | 16-bit | Varies | Default: Motor Power (ID 5), 0.1 % |
| 2109 | Process Data Out 6 | Read | 16-bit | Varies | Default: Motor Voltage (ID 6), 0.1 V |
| 2110 | Process Data Out 7 | Read | 16-bit | Varies | Default: DC Link Voltage (ID 7), 1 V |
| 2111 | Process Data Out 8 | Read | 16-bit | Varies | Default: Active Fault Code (ID 37), - |
| Holding Registers (Function 03/06/16) | | | | | |
| Process Data In (Master -> Slave) | | | | | |
| 2001 | FB Control Word (Low) | Read/Write | 16-bit | - | Low 16 bits of the 32-bit Control Word. |
| 2002 | FB General Control Word | Read/Write | 16-bit | - | High 16 bits of the 32-bit Control Word. |
| 2003 | FB Speed Reference | Read/Write | 16-bit | 0.01 % | 0...10000 (100.00%). Main frequency command. |
| 2004 | Process Data In 1 | Read/Write | 16-bit | Varies | Application-specific control data. |
| 2011 | Process Data In 8 | Read/Write | 16-bit | Varies | Application-specific control data. |
| Application Parameters (16-bit) | | | | | |
| 0001-2000 | Application Parameter | Read/Write | 16-bit | Parameter-specific | Direct access to parameter by its ID number. |
| 2200-10000 | Application Parameter | Read/Write | 16-bit | Parameter-specific | Direct access to parameter by its ID number. |
| ID Map |  |  |  |  |  |
| 10501-10530 | IDMap IDs | Read/Write | 16-bit | - | Write a parameter ID here to map it. |
| 10601-10630 | IDMap Values (16-bit) | Read/Write | 16-bit | Parameter-specific | Read/Write the value for the parameter mapped in 10501-10530. |
| Counters & Faults | | | | | |
| 40401-40429 | Fault History | Read | 16-bit | - | Upper byte: fault code, Lower byte: subcode. |
| 40511-40568 | Fault History (16-bit) | Read | 16-bit | - | 16-bit fault code and 16-bit subcode pairs. |

**Complete Modbus Fault Registers**

**Fault History Registers (Function 04 - Input Registers)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Register Address (Dec) | Register Address (Hex) | Name | Data Type | R/W | Description |
| 40401 | 0x9DE1 | Fault History 1 | 16-bit | R | **Byte Format:** Upper byte = Fault Code, Lower byte = Sub Code. Latest fault is first. |
| 40402 | 0x9DE2 | Fault History 2 | 16-bit | R | Upper byte = Fault Code, Lower byte = Sub Code. |
| 40403 | 0x9DE3 | Fault History 3 | 16-bit | R | Upper byte = Fault Code, Lower byte = Sub Code. |
| ... | **...** | **...** | **...** | **...** | **... (Holds 29 faults)** |
| 40429 | 0x9DFD | Fault History 29 | 16-bit | R | Upper byte = Fault Code, Lower byte = Sub Code. |
| 40511 | 0x9E3F | Fault Code 1 | 16-bit | R | **16-bit fault code** for the latest (most recent) fault. |
| 40512 | 0x9E40 | Sub Code 1 | 16-bit | R | **16-bit sub code** for the fault in index 1. |
| 40513 | 0x9E41 | Fault Code 2 | 16-bit | R | 16-bit fault code for the second most recent fault. |
| 40514 | 0x9E42 | Sub Code 2 | 16-bit | R | 16-bit sub code for the fault in index 2. |
| ... | **...** | **...** | **...** | **...** | **(Holds 29 faults with full 16-bit codes)** |
| 40567 | 0x9E87 | Fault Code 29 | 16-bit | R | 16-bit fault code for the oldest fault in history. |
| 40568 | 0x9E88 | Sub Code 29 | 16-bit | R | 16-bit sub code for the fault in index 29. |

**Important Note on Reading Fault History:** The manual states that "Reading the fault history items is slow. Reading all 30 items at once might take up to 600 milliseconds." It is better to read only the first few registers (e.g., 40401 or 40511/40512) to check for the most recent active fault.

**Prioritized Search for Key Registers**

The most efficient and high-performance method to read these values is via the dedicated Process Data registers. These are designed for fast, cyclic communication. The addresses below are for Input Registers (Function Code 04).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Priority | Parameter | Register Address (Dec) | Register Address (Hex) | Data Type | Scaling/Unit | Notes |
| 1 | **Output Frequency** | 2104 | 0x0833 | 16-bit | 0.01 Hz | **Process Data Out 1**. Default mapping is Parameter ID 1. |
| 2 | **Output Current** | 2106 | 0x0835 | 16-bit | 0.1 A | **Process Data Out 3**. Default mapping is Parameter ID 3. |
| 3 | **DC Bus Voltage** | 2110 | 0x0839 | 16-bit | 1 V | **Process Data Out 7**. Default mapping is Parameter ID 7. |
| 4 | **Output Power** | 2108 | 0x0837 | 16-bit | 0.1 % | **Process Data Out 5**. Default mapping is Parameter ID 5. |
| 5 | **Output Torque** | 2107 | 0x0836 | 16-bit | 0.1 % | **Process Data Out 4**. Default mapping is Parameter ID 4. |
| 6 | **Reference Frequency** | 2103 | 0x0832 | 16-bit | 0.01 % | **FB Actual Speed**. This is the reference as a % of max frequency (0-10000 = 0.00-100.00%). To get Hz, calculate: (Value / 10000) \* Max Frequency. |

**Example Modbus RTU Frames**

**Assumptions:**

* **Slave Address:** 0x01 (default)
* **Output Frequency** is mapped to Process Data Out 1 (Register 2104).
* **Motor Current** is mapped to Process Data Out 3 (Register 2106).
* A realistic output frequency is **25.00 Hz**, represented as 2500 (0x09C4).
* A realistic motor current is **12.5 A**, represented as 125 (0x007D) for a 0.1A scaling.
* Writing a **Speed Reference** of **50.00%** (e.g., 25.00 Hz if min/max freq are 0/50Hz) is 5000 (0x1388).
* The **Active Fault Code** register is **2111** (0x083F).

**1. Read Motor Current (Register 2106)**

* *Request:* Read 1 input register at address 2105 (0x0835). \*Note: Address in frame is 0-based: 2106 - 1 = 2105
  + 01 (Slave ID)
  + 04 (Function Code: Read Input Registers)
  + 08 35 (Start Address: 2105)
  + 00 01 (Quantity: 1 register)
  + CRC Calculation on 01 04 08 35 00 01
  + CRC16 Result: 0xD2 0x1F (LSB first)

**Request:** 01 04 08 35 00 01 D2 1F  
**Response:** 01 04 02 00 7D 78 12 (Data: 0x007D = 125 -> 12.5 A)

**2. Read Output Frequency (Register 2104)**

* *Request:* Read 1 input register at address 2103 (0x0833).
  + 01 (Slave ID)
  + 04 (Function Code: Read Input Registers)
  + 08 33 (Start Address: 2103)
  + 00 01 (Quantity: 1 register)
  + CRC Calculation on 01 04 08 33 00 01
  + CRC16 Result: 0x13 0xE3 (LSB first)

**Request:** 01 04 08 33 00 01 13 E3  
**Response:** 01 04 02 09 C4 B9 F2 (Data: 0x09C4 = 2500 -> 25.00 Hz)

**3. Write Frequency Reference (Set to 50.00%)**

* *Request:* Write to holding register 2003 (0x07D1) with value 5000 (0x1388). Note: Address in frame is 0-based: 2003 - 1 = 2002 (0x07D2).
  + 01 (Slave ID)
  + 06 (Function Code: Write Single Register)
  + 07 D2 (Register Address: 2002)
  + 13 88 (Value: 5000)
  + CRC Calculation on 01 06 07 D2 13 88
  + CRC16 Result: 0x1A 0x6B (LSB first)

**Request:** 01 06 07 D2 13 88 1A 6B  
**Response:** 01 06 07 D2 13 88 1A 6B *(Echoes the request as confirmation)*

**4. Read Active Fault Code (Register 2111)**

* *Request:* Read 1 input register at address 2110 (0x083E).
  + 01 (Slave ID)
  + 04 (Function Code: Read Input Registers)
  + 08 3E (Start Address: 2110)
  + 00 01 (Quantity: 1 register)
  + CRC Calculation on 01 04 08 3E 00 01
  + CRC16 Result: 0xF1 0xC3 (LSB first)

**Request:** 01 04 08 3E 00 01 F1 C3  
**Response:** 01 04 02 00 00 B8 44 (Data: 0x0000 = 0 -> No Active Fault)