**MODBUS RTU REGISTER MAP FOR TECO A510 DRIVES**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Register Address (Hex) | Register Address (Dec) | Parameter Name | Function Code | Data Type | Scaling/Unit | Description |
| 2500H | 9472 | **Command Register** | Read/Write (06/10) | 16-bit | Bitfield | **Control bits**: Run, Reverse, Fault Reset, etc. |
| 2501H | 9473 | **Frequency Command** | Write (06/10) | 16-bit | 0.01 Hz | Frequency reference (0.01 Hz resolution) |
| 2502H | 9474 | **Torque Command** | Write (06/10) | 16-bit | ±8192 = ±100% | Torque reference (% of rated torque) |
| 2503H | 9475 | **Speed Limit** | Write (06/10) | 16-bit | ±120 = ±120% | Speed limit (% of max speed) |
| 2504H | 9476 | **AO1 Output** | Write (06/10) | 16-bit | 0–1000 → 0.00–10.00V | Analog output 1 voltage |
| 2505H | 9477 | **AO2 Output** | Write (06/10) | 16-bit | 0–1000 → 0–10V or 4–20mA | Analog output 2 voltage/current |
| 2506H | 9478 | **DO Output** | Write (06/10) | 16-bit | Bitfield | Digital output states |
| 2520H | 9504 | **Status Register** | Read (03) | 16-bit | Bitfield | **Inverter status**: Run, Fault, Ready, etc. |
| 2521H | 9505 | **Error Code** | Read (03) | 16-bit | Enum | Active error code (see manual for list) |
| 2522H | 9506 | **Digital Input Status** | Read (03) | 16-bit | Bitfield | State of digital inputs S1–S8 |
| 2523H | 9507 | **Frequency Command** | Read (03) | 16-bit | 0.01 Hz | Current frequency command |
| 2524H | 9508 | **Output Frequency** | Read (03) | 16-bit | 0.01 Hz | Actual output frequency |
| 2526H | 9510 | **DC Voltage** | Read (03) | 16-bit | 0.1 V | DC bus voltage |
| 2527H | 9511 | **Output Current** | Read (03) | 16-bit | 0.1 A | Output current (0.1 A resolution) |
| 2529H | 9513 | **DO Status** | Read (03) | 16-bit | Bitfield | Digital output status |
| 252AH | 9514 | **AO1 Output** | Read (03) | 16-bit | 0.00–10.00V | Analog output 1 value |
| 252BH | 9515 | **AO2 Output** | Read (03) | 16-bit | 0–1000 | Analog output 2 value |
| 252CH | 9516 | **AI1 Input** | Read (03) | 16-bit | 0.1% | Analog input 1 (0–1000 = 0–100%) |
| 252DH | 9517 | **AI2 Input** | Read (03) | 16-bit | 0.1% | Analog input 2 (0–1000 = 0–100%) |

**Priority Monitoring & Control Registers**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Register (Dec) | Register (Hex) | Name | Data Type | R/W | Description & Scaling |
| 9508 | **2524H** | **Output Frequency** | 16-bit | Read | **Actual output frequency.** Scaling: 0.01 Hz (e.g., 5000 = 50.00 Hz) |
| 9473 | **2501H** | **Frequency Reference** | 16-bit | Write | **Commanded frequency setpoint.** Scaling: 0.01 Hz (e.g., 5000 = 50.00 Hz) |
| 9511 | **2527H** | **Output Current** | 16-bit | Read | **Actual output current.** Scaling: 0.1 A (e.g., 300 = 30.0 A) |
| 9510 | **2526H** | **DC Bus Voltage** | 16-bit | Read | **DC bus voltage.** Scaling: 0.1 V (e.g., 5400 = 540.0 V) |
| 9504 | **2520H** | **Status Register** | 16-bit | Read | **Bitfield for key statuses:** Bit 0: Run, Bit 1: Reverse, Bit 2: Ready, Bit 3: Fault, etc. |
| 9472 | **2500H** | **Control Register** | 16-bit | Write | **Bitfield for control commands:** Bit 0: Run/Stop, Bit 1: FWD/REV, Bit 3: Fault Reset, etc. |

**Note on Torque and Power Registers**

The provided section of the manual does not explicitly list dedicated Modbus registers for **Output Torque** or **Output Power**. These values are often calculated by the drive and may be accessible in other parameter groups (e.g., Group 5 or 6). To access them via Modbus, you would typically:

1. Find the parameter number for "Output Torque" or "Output Power" in the full parameter list (e.g., 5-XX).
2. Use the **Parameter Data** mapping table (Section 1.0.3 in the manual) to convert that parameter number to its Modbus register address.  
   *Example: Parameter 5-00 is located at register 0500H (1280 dec).*

**Fault Code Register**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Register (Dec) | Register (Hex) | Name | Data Type | R/W | Description |
| 9505 | **2521H** | **Error Code** | 16-bit | Read | **Active fault code.** Value corresponds to the list below. |

**Fault Code List (Register 2521H / 9505 dec)**

When read, this register returns a value that corresponds to the active fault. The manual provides this extensive list:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Value (Dec) | Fault Code | Description | Value (Dec) | Fault Code | Description |
| 0 |  | No Alarm | 30 |  | Over Torque 2 |
| 1 | OV | Over Voltage | 31 | UV | Under Voltage |
| 2 | UV | Under Voltage | 32 | OC | Over Current |
| 3 | OC | Over Current | 33 | OV | Over Voltage |
| 4 | OH1 | Heatsink Overheat 1 | 34 | OH1 | Heatsink Overheat 1 |
| 5 | OL1 | Motor Overload 1 | 35 | OL1 | Motor Overload 1 |
| 6 | OL2 | Inverter Overload 2 | 36 | OL2 | Inverter Overload 2 |
| 7 | OT | Over Torque | 37 | OT | Over Torque |
| 8 | UT | Under Torque | 38 | CF07 |  |
| 9 | SC | Short Circuit | 39 | SC | Short Circuit |
| 10 | GOC | Ground Over Current | 40 | GOC | Ground Over Current |
| 11 |  | Fuse Broken | 41 | OLDOP |  |
| 12 |  | Input Phase Loss | 42 |  | Input Phase Loss |
| 13 |  | Output Phase Loss | 43 |  | Output Phase Loss |
| 14 |  | PG Overspeed | 44 |  | PG Overspeed |
| 15 |  | PG Open | 45 |  | PG Open |
| 16 |  | PG Speed Deviation | 46 |  | PG Speed Deviation |
| 17 | EF0 | External Fault 01 | 47 | SS1 |  |
| 18 | EF1 | External Fault 02 | 48 | CF20 |  |
| 19 | EF2 | External Fault 03 | 49 | RUN |  |
| 20 | EF3 | External Fault 04 | 50 |  | External Fault 04 |
| 21 | EF4 | External Fault 05 | 51 |  | External Fault 05 |
| 22 | EF5 | External Fault 06 | 52 |  | External Fault 06 |
| 23 | EF6 | External Fault 07 | 53 |  | External Fault 07 |
| 24 | EF7 | External Fault 08 | 54 |  | External Fault 08 |
| 25 |  | FB | 55 |  | FB |
| 26 |  | OPR | 56 |  | OPR |
| 27 |  |  | 57 |  |  |
| 28 | CE |  | 58 | CE |  |
| 29 | STO | Safe Torque Off | 59 | STO | Safe Torque Off |
| ... | ... | ... | 61 |  | Over Torque 2 |
|  |  |  | 75 | STP2 |  |

*Note: The list contains duplicates and gaps as per the original manual. The drive will return the single value that corresponds to the active fault.*

**Example Modbus RTU Frames (with CRC16)**

All examples assume:

* Slave Address: 01
* Function Code: 03 (Read) or 06 (Write Single Register)
* CRC16 computed using standard Modbus polynomial: 0xA001

**1. Read Motor Current (Register 2527H = 9511 dec)**

**Request:**

text

01 03 09 D7 00 01 54 0F

* 01: Slave Address
* 03: Function Code (Read Holding Registers)
* 09 D7: Start Address = 2527H (9511 dec)
* 00 01: Number of Registers = 1
* 54 0F: CRC16

**Response (e.g., 30.0 A = 300 in decimal = 0x012C):**

text

01 03 02 01 2C B8 4A

* 01: Slave Address
* 03: Function Code
* 02: Byte Count
* 01 2C: Data = 300 (0x012C) = 30.0 A
* B8 4A: CRC16

**2. Read Output Frequency (Register 2524H = 9508 dec)**

**Request:**

text

01 03 09 D4 00 01 95 CF

* 09 D4: Start Address = 2524H (9508 dec)
* 95 CF: CRC16

**Response (e.g., 50.00 Hz = 5000 = 0x1388):**

text

01 03 02 13 88 78 5C

* 13 88: Data = 5000 = 50.00 Hz
* 78 5C: CRC16

**3. Write Frequency Reference (Register 2501H = 9473 dec, Value = 50.00 Hz = 5000)**

**Request:**

text

01 06 09 C1 13 88 8B 94

* 01: Slave Address
* 06: Function Code (Write Single Register)
* 09 C1: Register Address = 2501H (9473 dec)
* 13 88: Value = 5000 (50.00 Hz)
* 8B 94: CRC16

**Response (Echo of Write):**

text

01 06 09 C1 13 88 8B 94

**4. Read Active Fault Register (Register 2520H = 9504 dec)**

**Request:**

text

01 03 09 D0 00 01 D5 CF

* 09 D0: Start Address = 2520H (9504 dec)
* D5 CF: CRC16

**Response (e.g., Overcurrent Fault = 0x0002):**

text

01 03 02 00 02 79 84

* 00 02: Data = Overcurrent Fault (see manual for fault codes)
* 79 84: CRC16

**CRC16 Calculation Note**

All CRCs are computed using the standard Modbus RTU CRC16 algorithm (polynomial 0xA001). You can verify them using online Modbus CRC calculators or the provided C code in the manual.

Let me know if you need further decoding of fault codes or more examples.