VEDA MC

MCD5.
Modbus Communication manual

Classified as Business

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1. Parameters

1.1.1 General

The all parameters of MCD5 soft starter can be set by the panel and by RS485 communication.

1.1.2 Main parameter

Parameter	MODBUS address (DEC)	Setting range	Default
F-34: Motor current FLA	0x0034	1 - 9999	Rated current of softstarter According to lectotype. Factory setting 11A.

1.1.3 Protection parameter

Parameter	MODBUS address (DEC)	Setting range	Default
F-11: Over current protection value	0x0011	0 - 400%	150% Factory setting
The soft starter detects that the running current exceeds the set value of F11 during the running process. After reaching the duration of time T, the system stops the operation of the soft-start device for over current protection and shows an over current signal on the display. If the value is set to 0, the over current protection will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-12: Overload protection	0x0012	0 - 4	3 Factory setting
For a full description, see the user manual			

Parameter	MODBUS address (DEC)	Setting range	Default
F-13: Overload mode	0x0013	0 - 1	0 Factory setting
If the value is set to 0, overload mode protection is active during soft start and operation of the soft start device. If the value is set to 1, overload mode protection is active only during operation of the soft starter.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-16: Overvoltage protection	0x0016	1000 B	480 B Factory setting
If the voltage in the three-phase system is exceeded, the soft starter determines the actual voltage and compares it with the F-16 setpoint. If the F-16 value is exceeded, the soft starter will give an alarm signal. If the value is set to 0, the Overvoltage protection will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-17: Undervoltage protection	0x0017	1000 B	280 B Factory setting
When the voltage in the three-phase system is decreased, the soft starter determines the actual voltage and compares it with the F-17 setpoint. When the voltage value is below the setpoint in F-17, the soft starter gives an alarm signal. If the value is set to 0, the Undervoltage protection will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-18: Output phase loss	0x0018	0 - 30	5 Factory setting
If the current value (%Ie) in any of the phases is less than the F-18 setpoint, the soft starter will consider this as a phase loss and gives an alarm signal. If the value is set to 0, the Output phase loss protection will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-19: SCR Over Temperature	0x0019	0 - 90 °C	85 Factory setting
If the temperature of the SCR module exceeds the value of the F-19 setpoint, the soft starter gives an alarm signal. If the value is set to 0, the SCR Over Temperature protection will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-20: Timeout protection	0x0020	0 - 120c	20 c Factory setting
If the soft-start time exceeds the F-20 setpoint, the soft starter gives an alarm signal. If the value is set to 0, the Timeout protection will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-21: Imbalanced	0x0021	0 - 100%	50% Factory setting
If the difference between the maximum and minimum operating current reaches the F-21 setpoint (% of the rated current of the soft starter), he soft starter gives an alarm signal. If the value is set to 0, the Imbalanced protection will be disabled.			

1.1.4 Start/Stop parameters

Parameter	MODBUS address (DEC)	Setting range	Default
F-00: Start Mode	0x0000	0 - 2	0 Factory setting
0: Current ramp 1: Current limit 2: Voltage ramp For a full description, see the user manual.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-01: Soft start time	0x0001	0 - 120c	10 c Factory setting

Parameter	MODBUS address (DEC)	Setting range	Default
F-02: Soft stop time	0x0002	0 - 120c	0 c Factory setting

Parameter	MODBUS address (DEC)	Setting range	Default
F-03: Start-stop vollage	0x0003	20 - 75%	25% Factory setting
Determines the start voltage generated by the motor when the start command is first applied.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-04: Current limit	0x0004	150 - 600%	350% Factory setting
The current limit should be set so that the motor accelerates easily to full speed.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-07: Kick start voltage	0x0007	20 - 100%	100% Factory setting
Kick-start is the mode of the initial short-term voltage pulse, which is fed at the beginning of the start to form an elevated moment and is used together with the current limitation mode.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-08: Kick start time	0x0008	0 - 500T	0 Factory setting
Kick start time is the time for one Kick. Unit: period (grid frequency) If the value is set to 0, the Kick start time will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-09: Kick start interval	0x0009	0 - 50T	0 Factory setting
Kick start interval is the time between two Kick. If the value is set to 0, the Kick start interval will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-10: Kick start times	0x0009	0 - 100	0 Factory setting
How many times the device will work in kickstarter mode. If the value is set to 0, the Kick start time will be disabled.			

Parameter	MODBUS address (DEC)	Setting range	Default
F-27: X1 program	0x0027	0 - 2	0 Factory setting
0: Stop 1: Reset 2: Emergency stop			

Parameter	MODBUS address (DEC)	Setting range	Default
F-30: Analog output	0x0030	0 - 9999A	0 Factory setting
4mA - 0% motor rated current 20mA - 100% motor rated current			

Parameter	MODBUS address (DEC)	Setting range	Default
F-32: Initialization	0x0032	0 - 2	0 Factory setting
0: Invalid 1: Reset to factory settings 2: Clear alarm records			

1.1.5 Communication parameters

Parameter	MODBUS address (DEC)	Setting range	Default
F-23: Delayed start	0x0023	0 - 60c	0 Factory setting

Parameter	MODBUS address (DEC)	Setting range	Default
F-24: Communication addresst	0x0024	0 - 255	1 Factory setting

Parameter	MODBUS address (DEC)	Setting range	Default
F-25: Baud rate	0x0025	0 - 2	0 Factory setting
0:4800 bps 1:9600 bps 2:19200 bps			

Parameter	MODBUS address (DEC)	Setting range	Default
F-26: Parity	0x0026	0 - 2	0 Factory setting
0: None 1: ODD 2: EVEN			

Parameter	MODBUS address (DEC)	Setting range	Default
F-33: Language	0x0033	0 - 1	0 Factory setting
0 : Chinese 1 : English			

Parameter	MODBUS address (DEC)	Setting range	Default
F-35: Factory password	0x0035	0 - 9999	**** Factory setting

2. Communication

MCD5 use **RS-485** line.

2.1 RS-485 technical characteristics:

Asynchronous serial communication

Half duplex

Communication protocol : **Modbus RTU**

2.1.1 Baud rate

MCD5 supports **4800/9600/19200 BPS.**

More detail : 1.1.5 Communication parameters.

2.1.2 Data bit

The **data bit** of MCD5 is **8**.

2.1.3 Parity bit

Parity bit can be set : **None/ODD/EVEN.**

More detail : 1.1.5 Communication parameters.

2.1.4 Stop bit

When **Parity** bit is **none, Stop bit is 2;**

When **Parity** bit is **EVEN or ODD, Stop bit is 1.**

2.2 Response time

Normal response **time: 30mSec.**

Long response time: **100mSec.**

!	**Notes:** Frequent query will cause longer response time of MCD5; When set the parameter by communication, the interval time of query should be 1000mSec. MCD5 doesn't support broadcast communication. When MCD5 is communication bus terminal, 120Ω Termination resistor is recommended. When MCD5 peer-to-peer communicate with PC, Termination resistor is no needed. The maximum number of terminals connected with MCD5 is 32. The transmission distance should <1.5KM (the relay is needed if distance>1.5KM).

2.3 MODBUS Message RTU Framing

Start	Slave Address 1Byte	Function Code 1Byte	Data 1	……	Data n	CRC-Hi 1Byte	CRC-Lo 1Byte	Stop

Start: Separated by a silent interval of at least 3.5 character times.

Slave Address: Slave Address from 1 to 255.

Function Code: Function Code

Data 1…Data n: Data transmitted.

CRC-Hi: The CRC high–order byte from slave address to Data n.

CRC-Lo: The CRC low–order byte from slave address to Data n.

Stop: Separated by a silent interval of at least 3.5 character times.

2.3.1 Interval time

In RTU mode, **message frames** are separated by a **silent interval** of at least **3.5 character times**. In the following sections, this time interval is called **t 3,5**.

$$interval\ time = \frac{3.5*11}{baud\ rate}\ (Sec)$$

Example:

When Baud rate is 9600BPS, the interval time =3.5*11/9600=4mSec. So the interval time≥4mSec.

2.3.2 Slave Address

The number of slaves can be set from 1 to 255. (The default number is 1)

2.3.3 Function Code

Function Code	Modbus instruction	MCD5 function
03	read holding registers	read MCD5 parameter setting
06	write single register	write single MCD5 parameter

2.3.4 Address space and Commands

Definition	Address space	Read/Write Value	Function Description
Function code (03&06)	0x0000~0x0023		The soft-start function code corresponds to the Modbus RTU protocol register address. For example: F-00 corresponds to address 0x0000
Control command (06)	0x2000	0X0021	Start command
		0X0022	Stop command
		0X0023	Reset command
System status (03)	0x3001	0X00	Stop status
		0X01	Reserved
		0X02	Soft start state
		0X03	Running status
		0X04	Reserved
		0X05	Soft stop state
		0X06	Fault status: Low 8 bits: 0x06; High 8 bits: fault code** (decimal); e.g. ER01 «Running overcurrent» (0X0106)
		0X07	Test status
Operating data (03)	0x2002		Average current/A
	0x2003		A current/A
	0x2004		B Current/A
	0x2005		C current/A
	0x2006		Input voltage/V
	0x2007		Output voltage/V
	0x2008		Module temperature / degree

2.3.5 Alarm

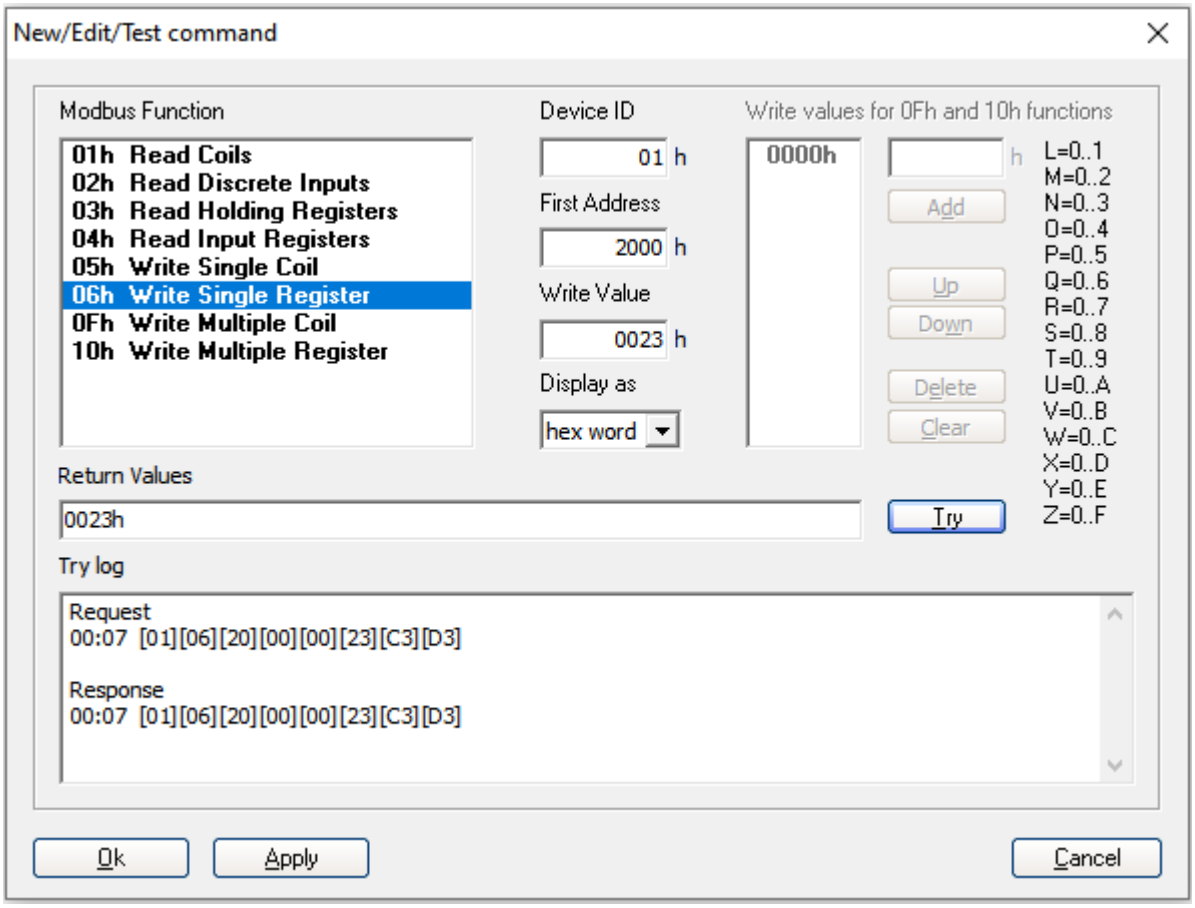
Alarm Code	Alarm Contents
Er01 (01)	«Running overcurrent»
Er02 (02)	«Module overtemperature»
Er03 (03)	«Start-up timeout»
Er04 (04)	«System phase loss»
Er05 (05)	«Power supply overvoltage»
Er06 (06)	«Power supply undervoltage»
Er07 (07)	«Overload protection»
Er08 (08)	«Imbalance»

2.4 Debugging

2.4.1 Instruction

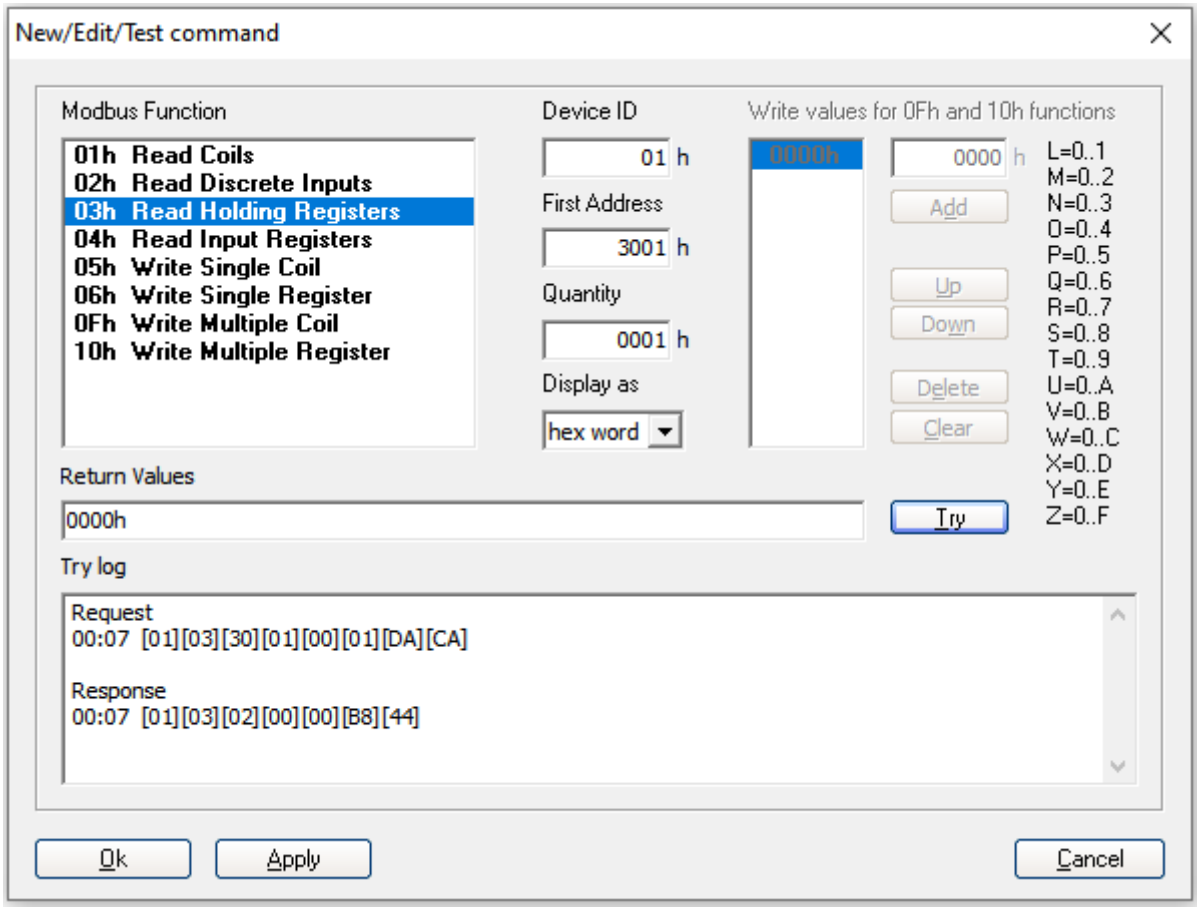
Example 1: Reset

The coil address of reset fault is 0x2000 in 2.3.4 Instruction. Write single register through function code '06' of Modbus RTU. Suppose the slave number is 1.



Caution:
The first address is 0x2000, write value 0x0023
Returned data:
[01] - Slave number (ID)
[06] - Function code
[2000] - Register address
[0023] - Register set 0023
[C3D3] - CRC

Example 2: Read System status.



Returned data:
[01] - Slave number (ID)
[03] - Function code
[02] - Number of bytes
[0000] - Register data
[B844] - CRC

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These instructions should not be used as a replacement for VF-101 operating instructions.

VEDA MC has tested and checked the information provided in these instructions.

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