



PowerFlex® 40 Custom Firmware

“AF” Option - Modbus Function 16

The peripheral interface (DSI) used on the PowerFlex 40 drive supports some of the Modbus function codes, such as:

Modbus Function Code	Command
03	Read Holding Registers
06	Preset (Write) Single Register

This custom firmware option adds support for Modbus function code 16, Write Multiple Registers. With this firmware option, Modbus function 16 can be used to write up to 32 parameter registers or up to 4 control registers with one message per the Modbus specification.



ATTENTION: The Custom Firmware supplied is designed for a specific application and load condition. It differs from the standard PowerFlex 40 product offering and must be installed and run only under this custom application. Attempting to run this Custom Firmware under any other type of application, could result in unpredictable and/or hazardous conditions.



ATTENTION: This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference A-B publication 8000-4.5.2, “Guarding Against Electrostatic Damage” or any other applicable ESD protection handbook.

16 (0x10) Write Multiple Registers

Table A Request Protocol Data Unit (PDU)

Field Name	Length	Range
Function Code	1 Byte	0x10
Starting Address	2 Bytes	0x0000 to 0xFFFF
Quantity of Registers	2 Bytes	0x0001 to 0x0078
Byte Count	1 Byte	2 x N ⁽¹⁾
Register Values	N ⁽¹⁾ x 2 Bytes	values

⁽¹⁾ N = quantity of registers

Table A Response PDU

Field Name	Length	Range
Function Code	1 Byte	0x10
Starting Address	2 Bytes	0x0000 to 0xFFFF
Quantity of Registers	2 Bytes	1 to 123 (0x7B)

Table B Error PDU

Field Name	Length	Range
Error Code	1 Byte	0x90
Exception Code	1 Byte	0x01 through 0x04

Examples

Writing Drive Parameters

Write Parameters 38 through 40

- Parameter P038 [Speed Reference] = 3, “4-20mA Input”
- Parameter P039 [Accel Time 1] = 5.0 Sec
- Parameter P040 [Decel Time 1] = 15.0 Sec

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
Function	10	Function	10
Starting Address Hi	00	Starting Address Hi	00
Starting Address Lo	26	Starting Address Lo	26
Quantity of Registers Hi	00	Quantity of Registers Hi	00
Quantity of Registers Lo	03	Quantity of Registers Lo	03
Byte Count	06		
Registers Value Hi	00		
Registers Value Lo	03		
Registers Value Hi	00		
Registers Value Lo	32		
Registers Value hi	00		
Registers Value Lo	96		

Writing Control Registers

In the PowerFlex 40 drive the logic command can be accessed at address 0x2000 and the frequency reference can be accessed at address 0x2001. These addresses can be written sequentially using Modbus function 16 (0x10). To set the following values:

- Logic Command = 0x1234
- RS485 Frequency Reference = 57.3 Hz

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
Function	10	Function	10
Starting Address Hi	20	Starting Address Hi	20
Starting Address Lo	00	Starting Address Lo	00
Quantity of Registers Hi	00	Quantity of Registers Hi	00
Quantity of Registers Lo	02	Quantity of Registers Lo	02
Byte Count	04		
Registers Value hi	12		
Registers Value Lo	34		
Registers Value hi	02		
Registers Value Lo	3D		

Important: For bit descriptions, see *Writing (06) Logic Command Data* in Appendix C of the PowerFlex 40 User Manual.

Error Responses

Table A Exception Code Table

Code	Meaning
1	Illegal Function Code: The function code received in the query message is not available for the receiving device.
2	Illegal Data Address: The data address received in the query message is not available for the receiving device.
3	Illegal Data Value: The data value received in the query message is not available for the receiving device.
4	Service Failure: The receiving device is unable to perform the requested action.

If an attempt is made to write a sequence of parameters that includes non-writable parameters, the message will continue to write all writable values, but will return an error code. If any of the parameters in the sequence is read only, or run write inhibited, an error code of “4” will be returned. If the value to be written is out of range or some other illegal value, an error code of “3” will be returned. The returned error code does not identify which of the parameters were not written.

Only a maximum of four control registers can be written beginning at address 0x2000. If the starting address of the message is 0x2000 then the length of the message must be 4 or less. If the starting register range and the size of the intended write will reach beyond register 0x2003, an error code of “2” will be returned and values will not be written to any of the intended registers.

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www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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