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MV800 Modbus TCP Communication Option User Manual

1 Product information

1.1 Designation rule

MV810 - TCP 01

| Hardware version |
| Modbus TCP option |
| Option for MV800 drive series |
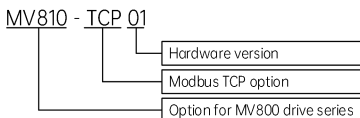
1.2 Functions and specifications

MV810-TCP01 option provides communication expansion for the MV800 drive series. Its functions and specifications are explained below:

1.2.1 Function features

(1) Read slave parameters (0x03)
(2) Change single slave parameter (0x06)
(3) Change multiple slave parameters (0x10)
(4) Simultaneously read/write multiple slave parameters (0x17)
(5) Mutable mapping of address (use the P30 function code group for configuration)

1.2.2 Technical specifications

Modbus TCP connector	Interface	Two RJ45 ports
	Transmission mode	High-speed bus
	Transmission media	CAT5 shielded twisted pair cables
	Galvanic isolation	500 V DC
Communication	Network standard	Modbus TCP
	Transmission protocol	100 BASE-TX (IEEE 802.3)
	Transmission distance	100 m
	Bus transmission speed	100 Mbps, auto-defect
	Module name	MV810-TCP01

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Electrical specifications	Power voltage	3.3 V DC (provided by the drive)
	Insulation voltage	500 V DC
	Power consumption	1 W
	Weight	25 g
Environment specifications	Noise immunity	ESD (IEC 61800-5-1, IEC 6100-4-2) EFT (IEC 61800-5-1, IEC 6100-4-4) Surge Test (IEC 61800-5-1, IEC 6100-4-5) Conducted Susceptibility Test (IEC 61800-5-1, IEC 6100-4-6)
	Operating/Storage environment	Operating: -10 to 50℃ (temperature), 90% (humidity) Storage: -25 to 70℃ (temperature), 95% (humidity)
	Vibration/Shock resistance	GB 4798.3-2007, GB 12668.501-2013 / IEC 61800-5-1 (IEC 60068-2-6)

1.3 Terminal description

1.3.1 Layout

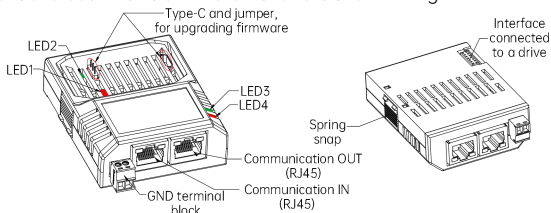The front and back views of MV810-TCP01 are shown in Fig. 1.

Fig. 1

The option has GND, two RJ45 ports and the interface connected to a drive.

1.3.2 Pin definitions

Modbus TCP adopts the standard RJ45 port. MV810-TCP01 option has two RJ45 ports as shown in Fig. 2. Their pin definitions are listed below:

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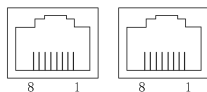| Pin	Name	Description
1	TX+	Transmit Data+
2	TX-	Transmit Data-
3	RX+	Receive Data+
4	N/C	NOT CONNECTED
5	N/C	NOT CONNECTED
6	RX-	Receive Data-
7	N/C	NOT CONNECTED
8	N/C	NOT CONNECTED

Fig. 2

1.3.3 Parameter settings for Modbus TCP network connection

To operate the MV800 drive using MV810-TCP01, you need to set the operation command channel and frequency source of MV800 to the bus communication card, as shown in the following table.

Drive parameter	Value	Function description
P02.02	2	Set the operation command channel to communication control
P02.03	0	Set the communication command channel to Modbus TCP
P02.05	7	Set the main frequency source to Modbus TCP

Settings of IP address, subnet mask, and gateway are shown in the table below:

Drive parameter	Value	Function description
P40.02	0 - 255	IP address 1
P40.03	0 - 255	IP address 2
P40.04	0 - 255	IP address 3
P40.05	0 - 255	IP address 4
P40.06	0 - 255	Subnet mask 1
P40.07	0 - 255	Subnet mask 2
P40.08	0 - 255	Subnet mask 3
P40.09	0 - 255	Subnet mask 4
P40.10	0 - 255	Gateway 1
P40.11	0 - 255	Gateway 2
P40.12	0 - 255	Gateway 3
P40.13	0 - 255	Gateway 4

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1.3.4 Network topology

Modbus TCP network is generally composed of a master station and multiple slave stations. The network can be structured into a bus type, star type, tree type, etc., or a combination of several types, enabling flexible device connection and wiring. The bus-type network topology is shown in the figure below.

Fig. 3

2 Installation

2.1 Accessory list

Name	Specifications	Quantity
MV810-TCP01 option (with an expansion box)	75 × 60 × 24 mm	1
User manual	A4 × 1	1

2.2 Installation method

The installation position, interface and steps of MV810-TCP01 are described below:

2.2.1 Installation position

MV800 provides two installation positions for accessory cards / options, as shown in Fig. 4 (taking enclosure B as an example, similar for other enclosures). Position 1 is for the installation of various PG cards; position 2 is for the installation of PN bus options, ECAT bus options, Modbus TCP bus options, I/O options, etc.
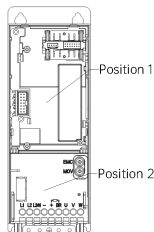

Fig. 4

2.2.2 Installation interface

The electrical interface of the Modbus TCP option for the MV810 drive and the corresponding installation interface of the MV810 drive are shown in Fig. 5.
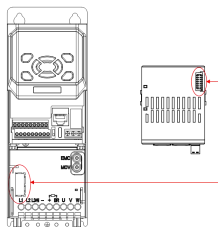

Fig. 5

2.2.3 Installation steps

Installation method: Modbus TCP option front side mounting

(1) When the drive is powered off, press the granulated area on the middle-upper part of the lower cover, slide it down with a certain amount of force to remove the lower cover, as shown in Fig. 6-a.

(2) Use a straight screwdriver to pry open the dust-proof cap, as shown in Fig. 6-b.

(3) Install the Modbus TCP option: hold the expansion box (a bus card inside) upwards (indicators up), align the expansion box with the electrical bus interface in the installation position 2, and press down horizontally to buckle the spring snap of the expansion box into the groove at the lower part of the drive, as shown in Fig. 6-c and Fig. 6-d.

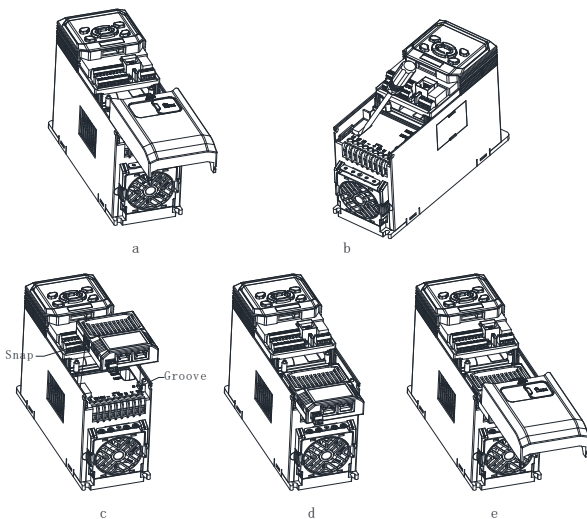(4) The bus option is successfully installed, as shown in Fig. 6-e.

Fig. 6　Modbus TCP option installation steps

(5) Grounding: MV810-TCP01 must be grounded during wiring, as shown in Fig. 7. You need to prepare and crimp the cable by yourself.
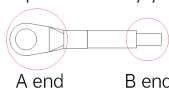

A end　　B end
Fig. 7　Grounding terminal connection

Grounding method: connect the B end of the grounding cable to the option's grounding terminal block, and you can check the grounding cable diameter and torque by referring to Table 1; connect the A end of the grounding cable to the grounding rack PE (grounding mark, circled in Fig. 8) of the drive (taking enclosure B as an example, similar for others), and you can check the grounding screw specifications and torque by referring to Table 2.

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Fig. 8

Table 1   Recommended diameter and torque for the grounding cable

Accessory card	Screw	Diameter	Stripped part	Torque (±10%)
MV810-TCP01	M2.0	0.5 to 1.5 mm² / 28 to 16 AWG	5 to 6 mm	2 kg-cm / 1.7 lb.in / 0.2 N·m

Table 2   Recommended grounding screw and torque

Enclosure	Screw	Torque (±10%)
B	M3	7 kg-cm / 6.08 lb-in / 0.68 N·m
C	M4	15 kg-cm / 13.0 lb-in / 1.47 N·m
D		

3   Modbus TCP data frame structure

During Modbus TCP communication, only parameters in a word format can be read/written by the drive. The corresponding read command is 0x03; the write command is 0x06; the multiple write command is 0x10; the simultaneous multiple read/write command is 0x17; the read/write command in a byte/bit format is not supported. The data format is shown below:
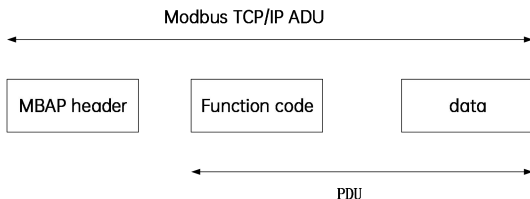

Fig. 9   Modbus TCP/IP data request/response

4 Application of mutable mapping of address

4.1 Table of mutable mapping parameters of the drive

Drive parameter	Value	Function name	Function description
P30.00	0 - 0xFFFF	Mapped address 1 of the 485 parameter	The mapped address is the actual internal parameter address in the drive. The used address is the actual parameter address used in the message. (Take PLC actual operating address as an example)
P30.01	0 - 0xFFFF	Used address 1 of the 485 parameter	
P30.02	0 - 0xFFFF	Mapped address 2 of the 485 parameter	
P30.03	0 - 0xFFFF	Used address 2 of the 485 parameter	
P30.04	0 - 0xFFFF	Mapped address 3 of the 485 parameter	
P30.05	0 - 0xFFFF	Used address 3 of the 485 parameter	
P30.06	0 - 0xFFFF	Mapped address 4 of the 485 parameter	
P30.07	0 - 0xFFFF	Used address 4 of the 485 parameter	
P30.08	0 - 0xFFFF	Mapped address 5 of the 485 parameter	
P30.09	0 - 0xFFFF	Used address 5 of the 485 parameter	

Example:
The address for P02.00 is 0x0200, and the address for P03.00 is 0x0300. Due to this discontinuity of function code addresses, when PLC continuously operates the above function codes using address 0x1000, it is required to map the address as below:
P30.00 = 0x0200, P30.01 = 0x1000
P30.02 = 0x0300, P30.03 = 0x1001

5 Fault diagnosis

5.1 LED indicator description and fault diagnosis

MV810-TCP01 has six LED indicators (see Fig. 1): LED indicators on the PCBA of the expansion box for indicating the function status and the power status, and the

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LED indicators of the communication ports for indicating whether the communication status of MV810-TCP01 is normal.

Description of LED on the PCBA of the expansion box:

LED4 (Red) status	Description	Action
Off	Normal	No need for actions
Steady on	Communication timeout between the master and the communication card	Check whether the ECAT option is properly connected to the drive

Description of LED on the communication port:

LED status	Description	Action
Yellow light flashing	Normal connection with data transmission	No need for actions
Green light steady on	Normal connection	No need for actions
Yellow light steady on	Normal connection without data transmission	Check whether there is communication between the master station and the slave station
Green light off	Disconnection	Check whether the cable is properly connected

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MEGMEET		**MEGMEET**	Checker:_____
Warranty bill of communication option			Manufacturing date:
Customer company:		Shenzhen Megmeet Electrical Co., Ltd.	_____
Detailed address:			
Contact:	Tel:		The product has been tested in line with design standards and approved for leaving the factory.
Option model:			
Option number:		Certificate	
Purchase date:			
Service unit:			
Contact:	Tel:		
Maintenance date:			