

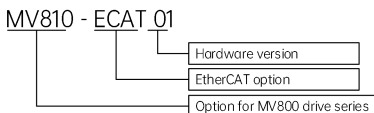
MV800 EtherCAT Communication Option

User Manual

Version: V02

1 Product Information

1.1 Designation rule



1.2 Functions and specifications

MV810-ECAT01 option provides communication expansion for the MV800 drive series. Its functions and specifications are explained below:

1.2.1 Function features

- (1) Supports PDO and SDO services
- (2) Supports access of drive parameters through SDO
- (3) Supports 100 Mbps full duplex
- (4) Supports the speed mode

1.2.2 Basic specifications

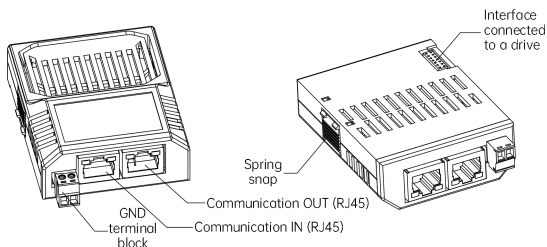
EtherCAT connector	Interface	Two RJ45 ports (IN, OUT)
	Transmission mode	High-speed bus
	Transmission media	CAT5 shielded twisted pair cables
	Galvanic isolation	500 V DC
Communication	Network standard	EtherCAT
	Transmission protocol	100 BASE-TX (IEEE 802.3)
	Transmission	100 m

	distance	
	Bus transmission speed	10/100 Mbps Auto-Defect
	Module name	MV810-ECAT01
	XML file	MV800_ECAT_CoE_9252_V1.00.xml
	SDO	SDO request, SDO response
	PDO	Variable PDO mapping
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	Noise immunity	ESD (IEC 61800-5-1, IEC 61000-4-2) EFT (IEC 61800-5-1, IEC 61000-4-4) Surge Test (IEC 61800-5-1, IEC 61000-4-5) Conducted Susceptibility Test (IEC 61800-5-1, IEC 61000-4-6)
	Operating/Storage environment	Operating: -10 to 50°C (temperature), 95% (humidity) Storage: -25 to 70°C (temperature), 95% (humidity)
	Vibration/Shock resistance	International standards 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 following figure shows the front and back views of MV810-ECAT01.



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

1.3.2 Pin definitions

EtherCAT adopts the standard RJ45 ports. This communication option has 2 RJ45 ports: IN and OUT. IN is the data input port and OUT is the data output port. The pin definitions of MV810-ECAT01 are listed below:

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



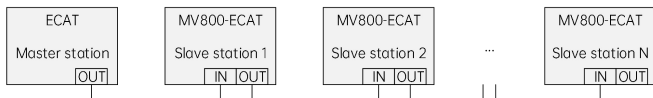
1.3.3 Parameter settings for EtherCAT network connection

Using MV810-ECAT01 to operate the MV800 series drive, you need to set the operation command channel and frequency source 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	3	Set the communication command channel to EtherCAT
P02.05	8	Set the main frequency source to bus card (EtherCAT)
P40.00	2	Set the option type to EtherCAT bus option
P50.00	2	Option type status identification, 2 is EtherCAT bus option

1.3.4 Network topology

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



1.3.5 LED indicator description and fault diagnosis

MV810-ECAT01 has three LED indicators: the LED on the PCBA of the expansion box (LED1 on the left, LED2 on the right, which can be viewed through the fence gap of the expansion box) and LED on the communication port. The LEDs on the PCBA indicate the power status and whether the state machine enters the OP mode; and the LED on the communication port indicates whether the communication status of MV810-ECAT01 is normal.

Description of LED on the PCBA of the expansion box:

LED1 status	Description	Action
Flashing	The state machine does not enter the OP mode	Check whether the ECAT option is properly connected to the host device
Solid on	The state machine already entered the OP mode	No need for actions

LED2 status	Description	Action
Solid on	Normal power supply for the ECAT option	No need for actions
Off	No power supply for the ECAT option	Check whether the ECAT option is properly connected to the drive

Description of LED on the communication port:

LED status	Description	Action
Green light flashing	Connected properly, with data transmission	No need for actions
Green light solid on	Connected properly, without data transmission	No need for actions

2 Installation

2.1 Accessory list

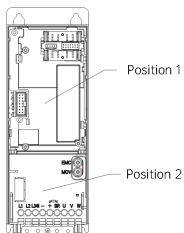
Accessory list	Specifications	Quantity
MV810-ECAT01 option (with expansion box)	75 × 60 × 24 mm	1
User manual	A4 × 1	1

2.2 Installation method

The installation position, interface and steps of MV810-ECAT01 are described below:

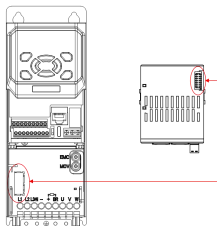
2.2.1 Installation position

MV800 drive series provides two positions for installation of accessory cards and options: position 1 and position 2 in the right figure (taking enclosure B as an example, similar for other enclosures), where position 1 is for the installation of various PG cards and position 2 is for the installation of PN options, ECAT options, I/O options and so on.



2.2.2 Installation interface

The electrical interface of the MV810 EtherCAT option is connected to the drive as shown in the right figure.



2.2.3 Installation steps

Installation method: front side mounting of ECAT

- (1) When the drive is powered off, press the granulated part on the middle-upper of the lower cover, slide it down firmly to take down the cover, as shown in Fig. 1-1 a.
- (2) Use a straight screwdriver to pry open the dustproof cap, as shown in Fig. 1-1 b.
- (3) Install the ECAT option: hold the expansion box (a bus card inside) upwards (indicators up), then align the expansion box with the electrical bus interface of 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. 1-1 c and d.
- (4) The bus card is successfully installed, as shown in Fig. 1-1 e.

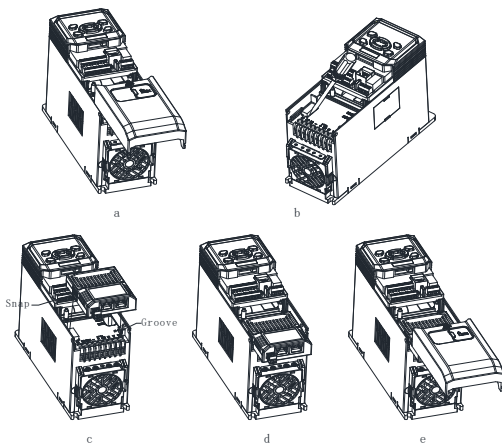


Fig. 1-1 ECAT card installation steps

(5) Grounding: MV810-ECAT01 must be grounded during wiring as shown in Fig. 1-2. You need to prepare and crimp the cable by yourself.

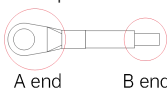


Fig. 1-2 Grounding terminal connection

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 1-1; then connect the A end of the grounding cable to the grounding rack PE (the mark for grounding, circled in Fig. 1-3) 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 1-2.



Fig. 1-3

Table 1-1 Recommended diameter and torque for the grounding cable

Option	Screw	Diameter	Stripped part	Torque ($\pm 10\%$)
MV810-ECAT01	M2.0	0.5 to 1.5 mm ² / (28 to 16 AWG)	5 to 6 mm	2 kg-cm/(1.7 lb.in)/ (0.2 N·m)

Table 1-2 Recommended grounding screw and torque

Enclosure	Screw	Torque ($\pm 10\%$)
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		

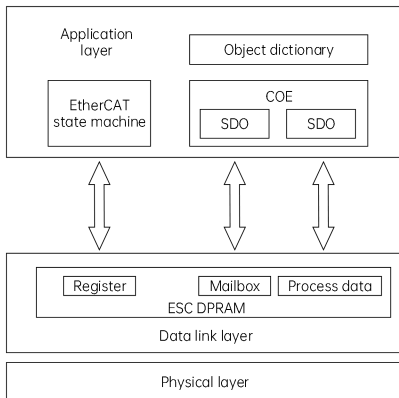
3 EtherCAT Network Reference Model

EtherCAT (CoE) network reference model consists of two parts: the data link layer and the application layer.

The data link layer is mainly responsible for the EtherCAT communication protocol, and the application layer of CoE has an object dictionary which includes communication parameters, application program data and PDO mapping information.

Process data objects (PDO) consist of objects in the object dictionary that can be PDO mapped, and the PDO data is defined by PDO mapping. The reading/writing of PDO data is cyclic without requirements to look up the object dictionary, while the reading/writing of service data objects (SDO) is non-cyclic with requirements to look up the object dictionary.

Various application layer protocols are available for EtherCAT communication. The following figure is the EtherCAT structure based on the CANopen application layer:



4 Control Word and Status Word

Index	Object code	Name	Type	Attr.
6040h	VAR	Control word	UINT16	RW
6041h	VAR	Status word	UINT16	RO

5 Bit Definitions for Control Word and Status Word

Control word bit definitions:

Bit0: Forward running	0: Disabled	1: Enabled
Bit1: Reverse running	0: Disabled	1: Enabled
Bit2: Forward jogging	0: Disabled	1: Enabled
Bit3: Reverse jogging	0: Disabled	1: Enabled
Bit4: Stop	0: Disabled	1: Enabled
Bit5: Coast to stop	0: Disabled	1: Enabled
Bit6: Fault reset	0: Disabled	1: Enabled
Bit7: Emergency stop	0: Disabled	1: Enabled

Status word bit definitions:

Bit0: Forward running	0: Invalid	1: Valid
Bit1: Reverse running	0: Invalid	1: Valid
Bit2: Stop	0: Invalid	1: Valid
Bit3: Fault	0: Invalid	1: Valid
Bit4: Power-down	0: Invalid	1: Valid
Bit5: Ready state	0: Not ready	1: Ready
Bit6: Motor number	0: Motor 1	1: Motor 2
Bit7: Motor type	0: Asynchronous	1: Synchronous
Bit8: Overload pre-warning	0: Invalid	1: Valid
Bit9-Bit10: Command channel	0: Keypad	1: Terminal 2: Communication

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Warranty bill of communication option	
Customer company:	
Detailed address:	
Contact:	Tel:
Option model:	
Option No:	
Purchase date:	
Service unit:	
Contact:	Tel:
Maintenance date:	

MEGMEET	Checker: _____ Manufacturing date: _____
SHENZHEN MEGMEET ELECTRICAL CO., LTD.	The product has been tested in line with design standards and approved for leaving the factory.
Certificate	