MV260 Series Universal Drive

Simple Manual

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Foreword

Thank you for choosing the MV260 series universal drive of Shenzhen Megmeet Electrical Co., Ltd.

MV260 adopts unique control mode to achieve high performance, high torque, wide range of speed regulation. The product has perfect anti-trip control design, easy to use, good adaptability, in the harsh power grid, dust and other complex environment to ensure continuous and reliable operation. According to general customer requirements, the product provides a series of rich functions such as practical process closed-loop control, multifunctional input-output terminals, pulse frequency setting, master/auxiliary given control, etc. It is of great value to reduce the system cost and improve the system reliability to meet the customer's professional and personalized needs.

MV260 through the electromagnetic compatibility of the overall design, and the use of optimized PWM control technology, to meet the user to the application of low noise, low electromagnetic interference environmental requirements.

This document provides precautions for installation and cabling, parameter setting, fault diagnosis and troubleshooting, and routine maintenance.

Precautions for unpacking inspection

Please check carefully when unpacking the product:

- Whether the product has the damage signs;
- Whether the rated value in the nameplate is consistent with your order requirement.

We have implemented strict inspection on the manufacturing, package and delivery of the product. If there is any error, please contact us or your distributor immediately.

We are engaged in the continuous improvement of drive. The relevant manuals provided by us are subject to change without prior notice.

Safety Precautions

DANGER

Operation without following instructions can cause death or severe personal injury.

NOTE

Operation without following instructions can cause medium or slight personal injury or damage to the product and other equipment.

DANGER

- Please install the product on the incombustible materials (e.g. metal), Do not place any combustible material near the product, otherwise, fire may be caused.
- Do not install the product in the environment with explosive gas, otherwise, explosion may be

caused.

• Only qualified personal can wire the drive, Never wire the drive unless the input AC supply is completely disconnected, otherwise, electric shock may be caused.

• The grounding terminal of the must be reliably grounded, otherwise, electric shock may be caused.

• Do not operate the drive with wet hands, otherwise, electric shock may be caused.

• Do not touch the terminals when the product is powered up, otherwise, electric shock may be caused.

• Maintaince operation can not be conducted until 10 minutes has passed after disconnecting the power supply. Meanwhile, be sure to confirm that the charge LED is completely off and the DC bus voltage is below 36V, otherwise, electric shock may be caused.

• The bare parts of the terminal lugs in the main circuit must be wrapped with insulation tape, otherwise, electric shock may be caused.

• When powering up the drive that has been stored for over 2 years, the input voltage must be gradually increased with the voltage regulator, otherwise, electric shock and explosion may be caused.

• The cover must be properly closed before power-up, otherwise, electric shock and explosion may be caused.

• Only qualified personal can replace the components. Do not leave any wire or metal parts inside the drive, otherwise, fire may be caused.

• After changing the control board, the parameters must be properly set before operating the drive, otherwise, property damage may be caused.

NOTE

• Do not install and operate the drive if it is damaged or its components or not complete, otherwise, fire and human injury may be caused.

• Do not short circuit terminal P/B1 and terminal -DC, otherwise, fire and property damage may be caused.

• Take care not to drop any foreign objects, such as the screws, gaskets and metal bars, into the drive, otherwise, fire and property damage may be caused.

• Please install the drive on the place that can withstand the weight of the drive, otherwise, the drive may drop and cause human injury or property damage.

• When carrying the drive, protect the operation panel and the cover against any stress, otherwise, the drive may drop and cause human injury or property damage.

• Do not install the product in the place exposed to direct sunlight, otherwise, property damage may be caused.

• Cable lugs must be firmly connected to the terminals of main circuit, otherwise, property damage may be caused.

• Do not connect AC 220V input to the control terminals other than terminal TA, TB, TC, otherwise, property damage may be caused.

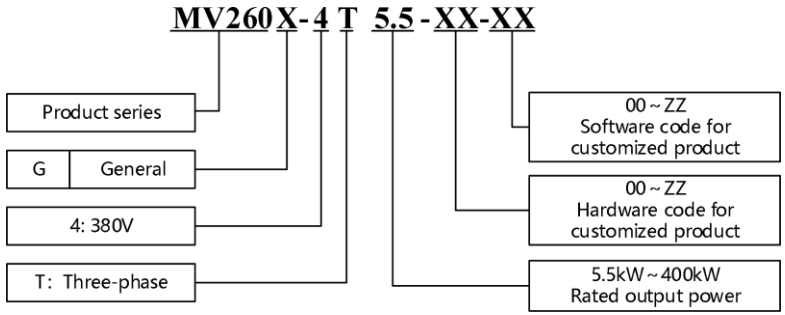
• Do not install the drive in the environment with water splash (e.g., near the water pipe), otherwise, you may suffer the property loss.

Contents

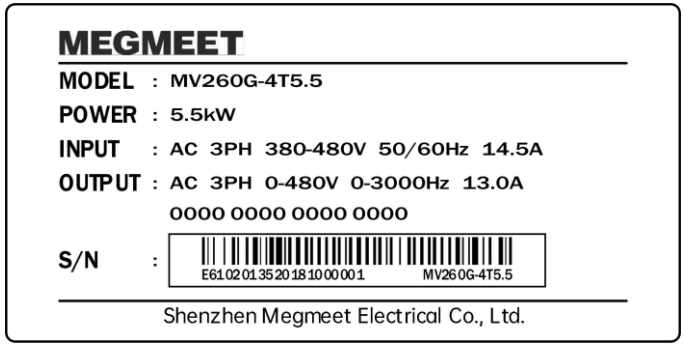
Chapter 1 Introduction of MV260 Series Drive

1.1 Product Model

The description of the drive model on the nameplate indicates the information of the product, such as product series, voltage class of power supply, power class, the software/hardware code of customized product,etc.



1.2 Product Nameplate



1.3 Product series

Table 1-1 MV260G series models and specifications

Enclosure model	Product model	Rated capacity (kVA)	Rated input current (A)	Rated output current (A)	Rated output power (kW)
R3	MV260G-4T5.5	8.5	14.5	13.0	5.5
	MV260G-4T7.5	11.0	20.5	17.0	7.5
	MV260G-4T11	17.0	26.0	25.0	11
R4	MV260G-4T15	21.0	35.0	32.0	15
	MV260G-4T18.5	24.0	38.5	37.0	18.5
	MV260G-4T22	30.0	46.5	45.0	22
R5D	MV260G-4T30	40.0	62.0	60.0	30
	MV260G-4T37	50.0	76.0	75.0	37
R6	MV260G-4T45	60.0	92.0	90.0	45
	MV260G-4T55	72.0	113.0	110.0	55
R7	MV260G-4T75	100.0	157.0	152.0	75
R7D	MV260G-4T75-S	100.0	157.0	152.0	75
	MV260G-4T90-S	116.0	180.0	176.0	90
R8	MV260G-4T90	116.0	180.0	176.0	90
	MV260G-4T110	138.0	214.0	210.0	110
	MV260G-4T132	167.0	256.0	253.0	132
R9	MV260G-4T160	200.0	307.0	304.0	160
	MV260G-4T200	250.0	385.0	380.0	200
R10	MV260G-4T220	280.0	430.0	426.0	220
	MV260G-4T250	355.0	468.0	465.0	250
	MV260G-4T280	396.0	525.0	520.0	280
	MV260G-4T315	445.0	590.0	585.0	315
R11	MV260G-4T355	500.0	665.0	650.0	355
	MV260G-4T400	565.0	785.0	725.0	400

1.4 Technical specifications of product

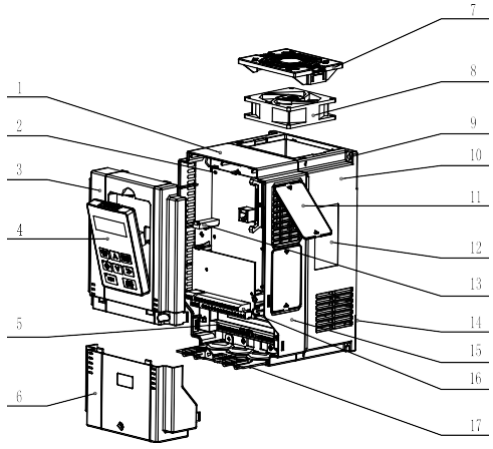
Table 1-2 Technical specifications of drive

Input power	
Rated voltage (V)	Three-phase: 380V～480V; Continuous fluctuation of voltage: ±10%, Transient fluctuation of voltage: +15%~+10%; Voltage unbalance rate: <3%, the distortion rate complies with IEC61800-2
Rated input current (A)	Please refer to table 1-1

Rated frequency (Hz)	50Hz/60Hz, fluctuation range: ±5%
Output power	
Standard applicative motor (kW)	Please refer to table 1-1
Rated capacity (kVA)	
Rated current (A)	
Output voltage (V)	Output with Three-phase under rated input conditions, 0~rated input voltage, The error is less than ±3%
Output frequency (Hz)	0.00~200.0Hz, Min. Unit: 0.01Hz
Overload capacity	1 min for 150% rated current, 0.5s for 200% rated current
Operation control features	
Control mode	High performance flux vector control
Max. Output frequency	200Hz (The max. Output frequency 2000.00Hz should be achieved by non-standard software)
Speed adjusting range	1：100
Product functions	
Key functions	Multi-stage speed operation, Multiple acceleration/deceleration time switching, Auto-tuning, Slip compensation, Fan speed control, Skip frequency operation, Energy saving operation, PID adjustment (sleep function), Non-stop upon instantaneous power interruption, MODBUS communication, Field bus communication, Drooping control, Automatic restart, DC braking, Dynamic braking; Dwell function,
Basic frequency	0.01Hz～200.0Hz
Startup frequency	0.00Hz～60.00Hz
Frequency setting mode	Digital panel setting, Terminal UP/DN setting, Host device communication setting, Analog setting (AI1/AI2), Terminal pulse setting, Fieldbus communication setting
Acc/Dec time	0.1～3600.0 (Units: 0.1s、s、min)
Dynamic braking capacity	Models of 18.5kW and below have built-in braking unit as standard, 22kW~75kW can be customized built-in brake unit, and the braking rate is 0.0~100.0%
DC braking capacity	Initial frequency: 0.00Hz～60.00Hz; Braking time: 0.1s～30.0s; Braking current: 0%～100% according to the nominal rated current of the drive
Terminal functions	Please refer to the introduction of terminal functions for details
Protection function	
Refer to “Protection function” section for details	
Others	
Efficiency	≥93% (7.5kW and below); ≥95% (45kW and below); ≥98% (55kW and above)
Installation method	Wall-mounted
Protection degree	IP20

Cooling mode	Air cooling with fan control
Environment	
Operating site	Indoor, away from direct sunlight, free from corrosive gas, combustible gas, oil mist, water vapor, water dripping or salt.
Altitude	Used at the place lower than 1000m, (Derated at the place above 1000m, derated 1% for every increase of 100m)
Ambient temperature	-10℃～+40℃ (Derated when used in the ambient temperature of 40℃ 50℃)
Humidity	5%～95%RH, non-condensing
Vibration	Less than 5.9m/s² (0.6g)
Storage temperature	-40℃～+70℃

1.5 Drive structure



1. Mid-enclosure 2. Main control board 3. Upper cover 4. Operation panel
5. Main circuit wiring terminal 6. Lower cover 7. Fan guard 8. Fan
9. Mounting holes for complete unit 10. Bottom enclosure 11. Dustproof plate
12. Nameplate 13. Connector 14. Bottom plate 15. Mid-enclosure
16. Control terminal 17. Wiring plate

Fig.1-1 Drive structure (Talking R4 as an example)

1.6 Outline, mounting dimensions and gross weight of drive

There are four types of outlines as shown in Fig.1-2, Fig.1-3, Fig.1-4 and Fig.1-5. The outline, mounting dimensions and gross weight are as shown in Table 1-3.

(1) Enclosure R3~R4 (5.5kW~18.5kW)

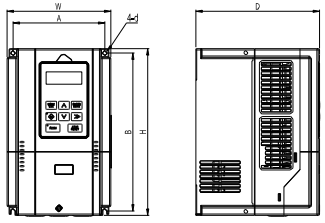


Fig.1-2 Outline, mounting dimensions for products of R3~R4

(2) Enclosure R5~R8 (22kW~132kW)

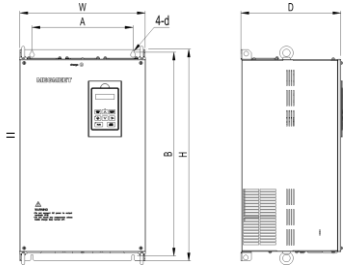


Fig.1-3 Outline, mounting dimensions for products of R5~R8

(3) Enclosure R9~R10 (160kW~315kW)

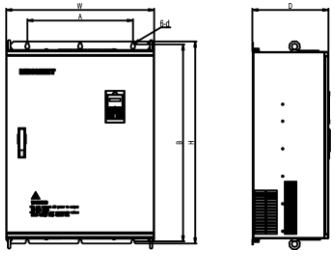


Fig.1-4 Outline, mounting dimensions for products of R9~R10

(4) Enclosure R11 (355kW~400kW)

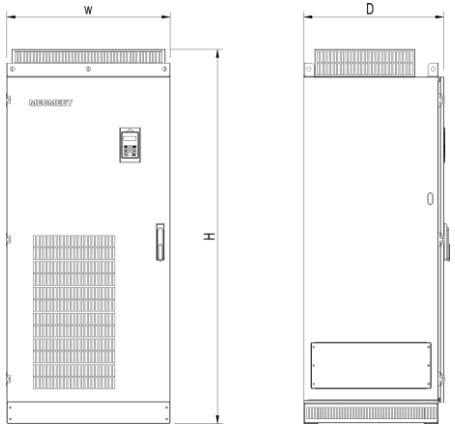


Fig.1-5 Outline, mounting dimensions for products of R11

Table 1-3 Outline, mounting dimensions and gross weight

Enclosure model	Drive model	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Diameter of mounting aperture (mm)	Gross weight ±0.5(kg)
R3	MV260G-4T5.5	137	236	249	155	198	5.5	4
	MV260G-4T7.5							
	MV260G-4T11							
R4	MV260G-4T15	186	314.5	330	209	206	6.5	9
	MV260G-4T18.5							
	MV260G-4T22							
R5D	MV260G-4T30	220	437.5	451.5	284.5	213	6.5	19
	MV260G-4T37							
R6	MV260G-4T45	270	549	570	335	267	7	41
	MV260G-4T55							
R7	MV260G-4T75	270	579	600	335	292	7	49
R7D	MV260G-4T75-S	220	601.3	621.8	313	258	7	35
	MV260G-4T90-S							
R8	MV260G-4T90	350	705	726.5	452	328.5	12	87
	MV260G-4T110							
	MV260G-4T132							
R9	MV260G-4T160	350	827.5	849.5	500	350	12	154
	MV260G-4T200							
R10	MV260G-4T220	500	932	956	700	361.5	14	216
	MV260G-4T250							
	MV260G-4T280							
	MV260G-4T315							

R11	MV260G-4T355	-	-	1624	710	610	-	250
	MV260G-4T400							

Note: For 75kW~280kW frequency converter, DC reactor is an optional accessory, The weight of DC reactor is not included in the gross weight of the table 1-3. For the drive of 355kW and above, DC reactor is included in its standard configuration. Outline and dimensions of DC reactor are shown below.

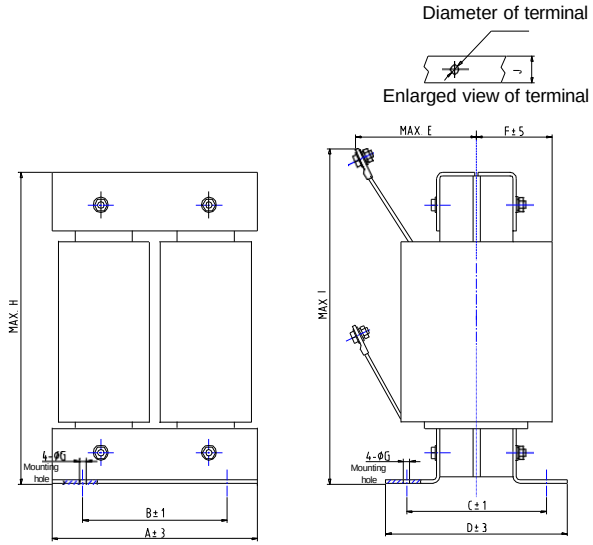


Fig.1-6 Outline and dimensions of DC reactor

Table 1-4 Mechanical Parameters of DC Reactor

Applicable drive (kW)	Model of DC reactor	Recommended size of copper (mm^2)	Size (mm)											Gross weight (kg)
			A	B	C	D	E	F	G	H	I	J	Diameter of terminal	
75	BC-C00190A/ HXC00342A-00	60	160	100	98	130	95	65	9	215	/	20	Φ8	14.5
90	BC-C00194A/ DCL-0180-UIDH-EM33												Φ10	16
110	BC-C00051B/ DCL-0250-UIDH-EM26	100	210	176	115	150	125	84	11	255		30	Φ12	25.5

132	BC-C00051B/ DCL-0250-UIDH-E M26	150	200	170	135	171	120	85	10	260	280	30	Φ12	28
160	JSY-3674/ BC-C00185A		210	180			130		12	280	320			32
200	JSY-3066-1/ BC-C00186A	200	220	190	135	171	150	90	12	315	340	40	Φ15	40
220		250												
250	JSY-3067-1/ BC-C00195A	325			145	181	160	95						45
280														
315														

NOTE

(1)Columns B and C in Table 1-4 are the sizes of mounting holes of DC reactor.

(2) For the drive of 75kW~132kW, the DC reactor is packed separately with a wooden box, so the gross weight includes the weight of the DC reactor and the wooden box.

(3) DC reactor should be installed at the bottom of the cabinet if it is to be installed inside a cabinet. The clearance between reactor and the drive should be at least 35cm, and the reactor should be as far away from the air inlet port of the drive as possible; if ventilation is poor in the cabinet, it is recommended to increase fan forced air cooling for the reactor to avoid high ambient temperature.

1.7 Outline and mounting dimensions of operation panel

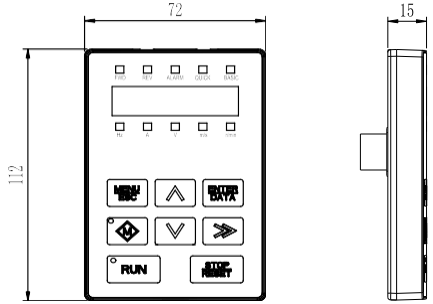


Fig.1-7 Outline and mounting dimensions of operation panel

1.8 Outline and mounting dimensions of operation panel box

The outline dimensions of the box used for mounting operation panel is as shown in Fig.1-8

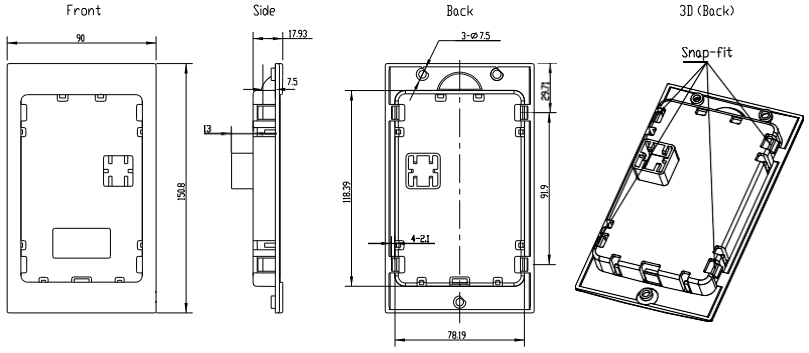


Fig.1-8 Outline dimensions of operation panel box

The mounting dimensions of the operation panel box are as shown in Fig.1-9

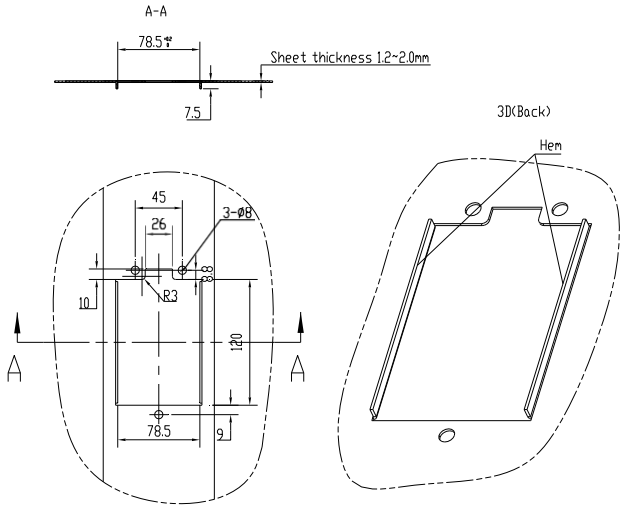


Fig.1-9 Mounting dimensions of operation panel box

9. Options

1. LCD operation panel (Reserved)

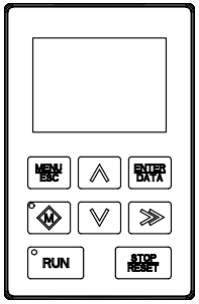


Fig.1-10 LCD operation panel

1.9.2 Braking components

The configuration information of the braking unit is different for the frequency converters of different power levels, as shown in Table 1-5.

If energy consumption braking is required, select an internal or external dynamic unit based on Table 1-5.

The frequency converter with built-in braking unit is standard, and only external braking resistance is needed when braking energy consumption；

Non-standard customized inverter with built-in brake unit needs to be customized through non-standard process；

For the inverter with external moving unit, please refer to Appendix Ⅱ or contact our company to configure the braking unit.

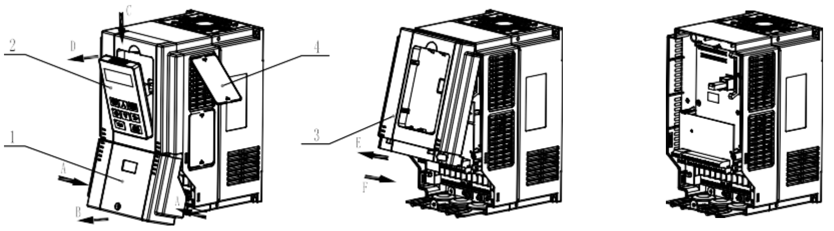
For the selection of brake resistance, please refer to Appendix Ⅱ.

Table 1-5 Brake unit configuration information table

Product series	Power rating	Brake unit configuration information
MV260G	18.5kW or lower power	Standard, Built-in
	22kW～75kW	Non-standard custom, built-in
	90kW or higher power	External matching, see appendix Ⅱ

Chapter 2 Drive Installation

2.1 Removal and installation of drive components



1. Lower cover 2. Operation panel 3. Upper cover 4. Dustproof plate

Fig.2-1 Removal and installation of drive components (Taking R4 as an example)

1 Removal and installation of lower cover

Removal: Loosen the fixing bolts of the lower cover with the screwdriver, press the snap-fits on both sides in direction A, make snap-fits off with the mid-enclosure and then lift the lower cover in direction B. Now, the lower cover is removed.

Installation: Insert the insertion piece at the top of the lower cover into the upper cover, press both sides of the lower cover with both hands in direction A so that the snap-fits can enter into the mid-enclosure, then tighten the fixing bolts of the lower cover with the screwdriver. Now, the lower cover is installed.

2 Removal and installation of operation panel

Removal: Insert your finger into the square hole above the operation panel, press the clip in direction C and then separate the upper section of the operation panel with the upper cover in direction D, then separate the connector with the operation panel. Now, the operation panel is removed.

Installation: Ensure the display of the operation panel face upwards, press the operation panel into its box while keeping them parallel. Now, the operation panel is installed.

3 Removal and installation of upper cover

Removal: Loosen the fixing bolts of the upper cover with the screwdriver, pull in direction E to separate the upper cover from the mid-enclosure (If necessary, press the snap-fits of the upper cover from its side with the straight screwdriver). Now, the upper cover is removed.

Note: Do not directly remove the upper cover with the operation panel on it. The operation panel should be removed before removing the upper cover to avoid damages to the connecting base between the operation panel and control board, which may cause unreliable contact between the operation panel and the control board.

Installation: Press the lower part of the upper cover in direction F so that its snap-fits can enter into the mid-enclosure, and then tighten the fixing bolts of the upper cover with the screwdriver. Now, the upper cover is installed.

(4) Removal and installation of dustproof plate

Removal: It is recommended to push both snap-fits of the dustproof plate from the inside of the enclosure with tools, so that the snap-fits can be separated from the mid-enclosure. Now, the dustproof plate is removed.

Note: Removing the dustproof plate from the outside of the enclosure directly may damage it or the mid-enclosure.

Installation: Place the snap-fit on one end of the dustproof plate into the mid-enclosure, move the dustproof plate to another end while pressing it till the snap-fit on another end also enters into the mid-enclosure. Now, the dustproof plate is installed.

Note: Do not press the dustproof plate forcibly if it is deformed, otherwise, it may be damaged.

2. Installation environment

When selecting the installation environment, the following issues should be taken into account：

- The ambient temperature should be within -10℃~40℃. If the temperature is between 40℃ ~50℃, derating is required.
- The humidity should be within 5%~95% RH, non-condensing.
- The vibration at the installation place should be less than 5.9m/s² (0.6g).
- The device should be protected from the direct sunlight.
- The device should be mounted in the location free of dust and metal powder.
- Do not install the device in the place with corrosive gas and explosive gas.

If there is any special installation requirement, please consult our company.

2.3 Mounting direction and space

In general, the drive shall be installed vertically to avoid poor heat dissipation.

For the installation spacing and distance requirement, please refer to Fig.2-2 and Fig.2-3.

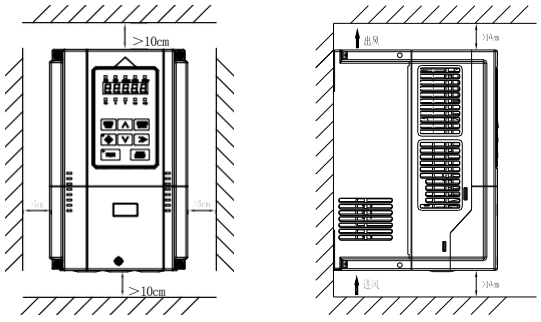


Fig.2-2 Installation spacing for models of 55kW and below

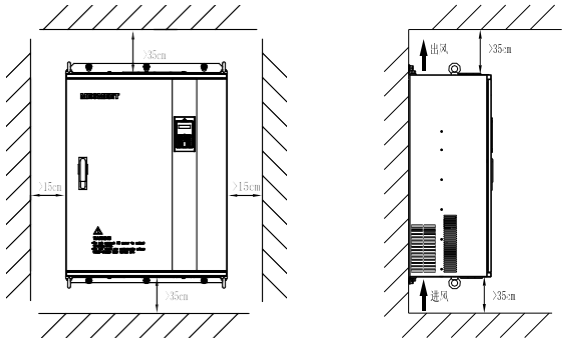


Fig.2-3 Installation spacing for models of 75kW and above

When more than two drives are mounted in the up-down installation mode, the partition plate should be installed between them, so as to avoid the influence of the heat dissipation from the bottom drive on the top one, as shown in Fig.2-4

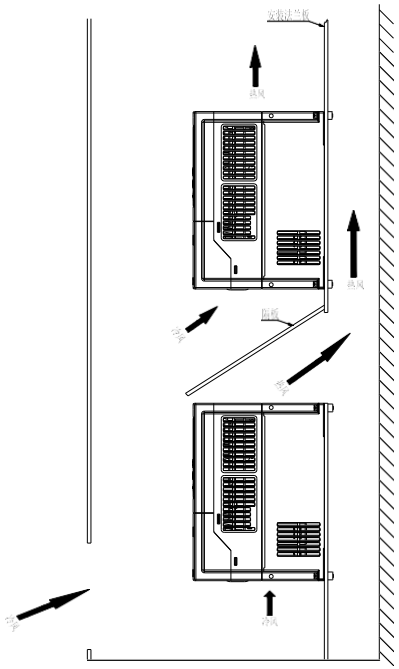


Fig.2-4 Installation of multiple drives

Chapter 3　Wiring of Drive

This chapter introduces the wiring and cable connection of drive, as well as the issues needing attention.

DANGER

- Do not open the cover until the power supply of the drive is completely disconnected for at least 10 minutes.
- Make sure that the internal wiring be conducted only when the charge LED inside the drive is off and the voltage between the main circuit terminals +DC and -DC is below 36V.
- Only the well-trained and authorized personals are allowed to perform the internal wiring of the drive.
- Check the wiring carefully when connecting the emergency stop or safety circuit.
- Check the voltage level of the drive before power-on, otherwise, human injury and death or equipment damage may be caused.

NOTE

- Check carefully whether the rated input voltage of the drive is consistent with the AC power voltage before power-on.
- The drive has passed the dielectric strength test before delivery. Do not conduct this test again.
- When connecting the external braking resistor or braking unit, please refer to chapter 1.
- Do not connect the AC supply cables to the output terminals U, V and W.
- The diameter of copper cable used as grounding wire should be bigger than 3.5mm and the grounding resistance should be less than 10Ω.
- There is leakage current inside the drive and the value of the leakage current depends on the operating conditions. To ensure the safety, the drive and the motor must be grounded and a Residual Current Detector (i.e. RCD) is required. The type B RCD is recommended. The set value of the leakage current is 300mA.
- To provide the over-current protection for the input side and facilitate the power-off maintenance, the drive should be connected to the AC supply through a circuit breaker or a fuse.

Please refer the wiring diagram shown in Fig.3-1 when commissioning.

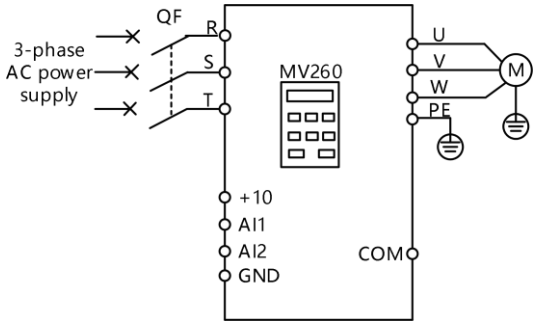


Fig.3-1 Simple wiring diagram for main circuit

1. Wiring and configuration of main circuit terminals

1. Types of main circuit Input/Output terminals

The main loop terminals have the following types according to the type of frequency converter.

Terminal type 1

Applicable models: MV260G-4T5.5~MV260G-4T22

Terminal	Function
R/L1、S/L2、T/L3	Three-phase AC 380V input terminal
+DC、 P/B1	Reserved for eternal DC reactor, connected with copper bus upon delivery
P/B1、B2	Reserved for external braking resistor (For details about the configuration of the built-in brake unit, see table 1-5)
-DC	DC negative bus output terminals
U/T1、V/T2、W/T3	Three-phase AC output terminals

Terminal type 2

Applicable models: MV260G-4T30~MV260G-4T37

Terminal	Function

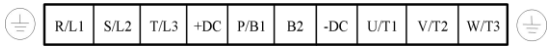
R/L1、S/L2、T/L3	Three-phase AC 380V input terminals
+DC、B2	Reserved for external braking resistor
-DC	DC negative bus output terminals
U/T1、V/T2、W/T3	Three-phase AC output terminals

Note

MV260G-4T30 and MV260G-4T37 cannot be used with a common DC bus.

Terminal type 3

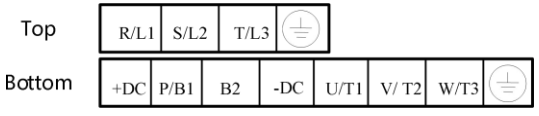
Applicable models: MV260G-4T45~MV260G-4T55



Terminal	Function
R/L1、S/L2、T/L3	Three-phase AC 380V input terminals
+DC、 P/B1	Reserved for external DC reactor, connected with copper bus upon delivery
P/B1、B2	Reserved for external braking resistor (For details about the configuration of the built-in brake unit, see table 1-5)
-DC	DC negative bus output terminals
U/T1、V/T2、W/T3	Three-phase AC output terminals

Terminal type 4

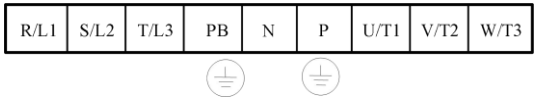
Applicable models: MV260G-4T75



Terminal	Function
R/L1、S/L2、T/L3	Three-phase AC 380V input terminals
+DC、 P/B1	Reserved for external DC reactor, connected with copper bus upon delivery
P/B1、B2	Reserved for external braking resistor (For details about the configuration of the built-in brake unit, see table 1-5)
-DC	DC negative bus output terminals
U/T1、V/T2、W/T3	Three-phase AC output terminals

Terminal type 5

Applicable models: MV260G-4T75-S~MV260G-4T90-S



Terminal	Function
R/L1、S/L2、T/L3	Three-phase AC 380V input terminals
P、 PB	Reserved for external DC reactor
N	Negative output terminal of bus capacitor
U/T1、V/T2、W/T3	Three-phase AC output terminals

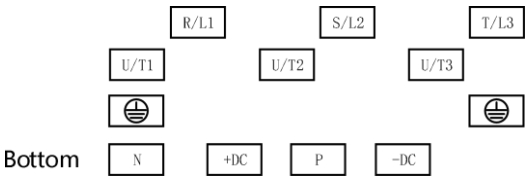
Terminal type 6

Applicable models: MV260G-4T90~MV260G-4T315

Terminal	Function
R/L1、S/L2、T/L3	Three-phase AC 380V input terminals
P、+DC	Reserved for external DC reactor, connected with copper bus upon delivery
P、-DC	Reserved for external braking unit
-DC	DC negative bus output terminals
U/T1、V/T2、W/T3	Three-phase AC output terminals

Terminal type 7

Applicable models: MV260G-4T355~MV260G-4T400



Terminal	Function
R/L1、S/L2、T/L3	Three-phase AC 380V input terminals
+DC	If the common DC bus is used, an external positive bus terminal is reserved
P、N	Reserved for external braking unit

-DC	If the common DC bus is used, an external positive bus terminal is reserved
U/T1、V/T2、W/T3	Three-phase AC output terminals

Note

In the common DC bus application, the positive pole and the negative pole of the DC input should be connected to the terminals +DC and -DC respectively, and then the limiting current resistor used for protecting the rectifier inside drive will be valid when powering on.

3.1.2 Connecting drive and options

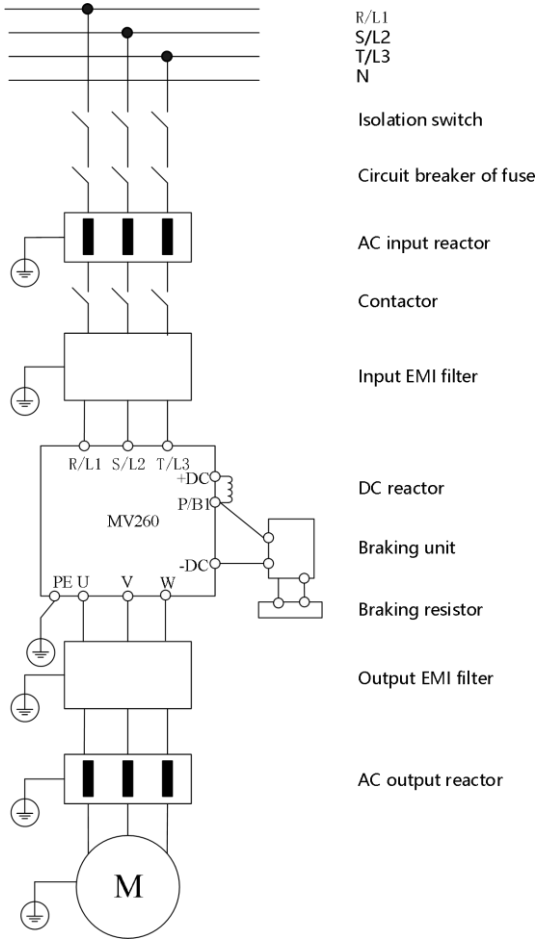


Fig.3-2 Connection of drive and options

(1) Isolation device (e.g., isolation switch) must be installed between the AC supply and the drive to ensure the personal safety during the equipment maintenance.

(2) In North America, the delay type fuse (the current rated value of which should be 225% of the maximum full load output current value) should be used before the drive to isolate the faults caused by other equipments. For the selection of the fuse, please refer to table 3-1.

Table 3-1 Recommended fuse capacity and cross section area of the copper-cored insulation wire

Power (KW)	Incoming line protection	Main circuit (mm^2)		Control circuit (mm^2)
	Fuse (A)	Input wire	Output wire	Control terminal wire
5.5	20	4	4	1
7.5	32	6	6	1
11	35	6	6	1
15/18.5	50	6	6	1
22	80	16	16	1
30/37	100	25	25	1
45/55	125	35	35	1
75	200	70	70	1
90	250	70	70	1
110/132	315	95	95	1
160	450	185	185	1
200	560	240	240	1
220	630	150×2	150×2	1
280/315	800	150×2	150×2	1
355	800	150×2	150×2	1
400	1000	150×2	150×2	1
Note: The parameters listed in this table are recommended values.				

(3) When the contactor is used to control the AC supply, do not power ON/OFF the drive through the contactor.

(4) DC reactor

To prevent the influence of the AC supply on the drive, protect the drive and suppress the high-order harmonics, DC reactor should be configured in the following situations.

- If a capacitor tank used for reactive power compensation or a SCR load shares the same AC supply with the drive, the harmonics caused by the SCR load or the capacitor tank when it is switched on or off may damage the drive's input rectifying circuit.
- The unbalance of the three-phase power supply for the drive exceeds 3%.
- It is required to increase the drive input power factor factor to more than 0.93
- When the drive is connected to a large-capacity transformer, the current in the input power circuit of the drive may damage the rectifying circuit. In general, when the power supply capacity of the drive is larger than 550kVA, or 10 times higher than the drive capacity, the drive needs to be configured with the DC reactor.

(5) AC input reactor

An AC input reactor should be used if the distortion of the power grid is severe or the input current harmonic level is high even after a DC reactor has been connected to the drive. It can also be used to improve the AC input power factor of the drive.

(6) AC output reactor

If the cable between drive and motor exceeds 80m, multi-stranded cables and an AC output reactor should be used to suppress the high frequency harmonics. Thus, the motor insulation is protected against heat due to harmonics, leakage current is reduced and the drive will not trip frequency.

(7) Input EMI filter

Optional EMI filter may be installed to suppress the high-frequency noise interference from the drive power cable.

(8) Output EMI filter

Optional EMI filter may be installed to suppress the high-frequency noise interference and leakage current at the drive output side.

(9) Safe grounding wire

The drive has leakage current inside. To ensure the safety, the drive and motor must be grounded, and the grounding resistance shall be less than 10Ω. The grounding wire shall be as short as possible and its cross section area (CSA) should meed the requirements in Table 3-2.

Note: The values in the table apply only when the two conductors adopt the same metal. If not, the cross section area of the protective conductor shall be determined according to the equivalent conducting factor.

Table 3-2 Cross section area of grounding wire

CSA of phase cable S (mm^2)	Min CSA of grounding wire Sp (mm^2)
S≤16	S
16＜S≤35	16
35＜S	S/2

🕮 Note

The input/output EMI filter shall be installed as close to the drive as possible.

3.1.3 Wiring for basic operation

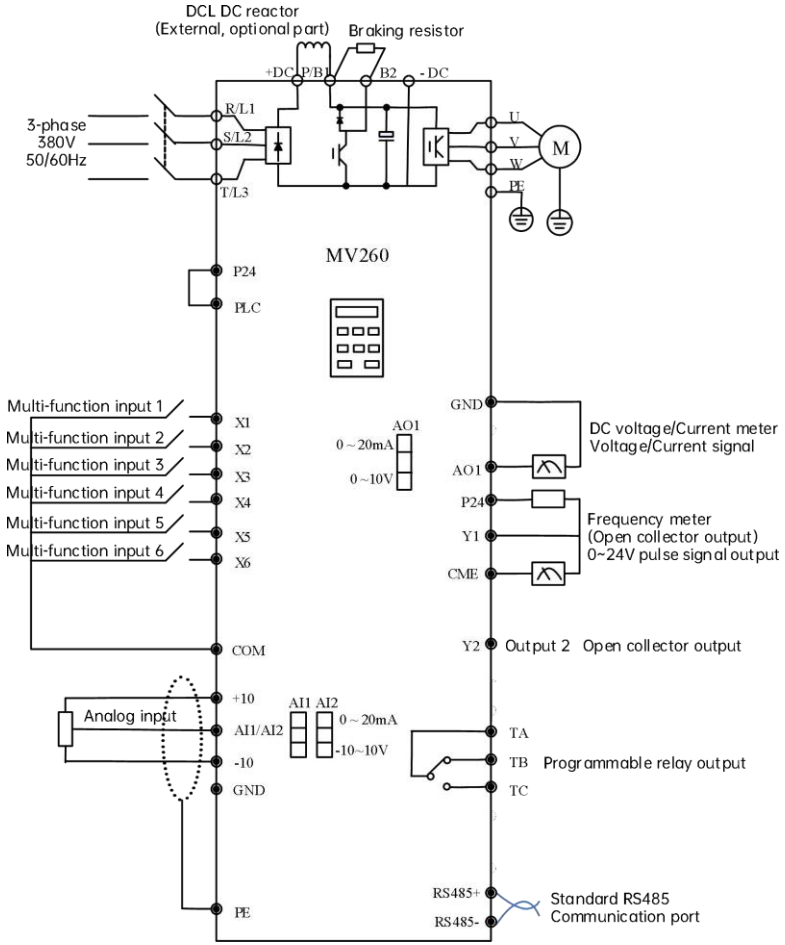


Fig.3-3 Basic wiring diagram 1

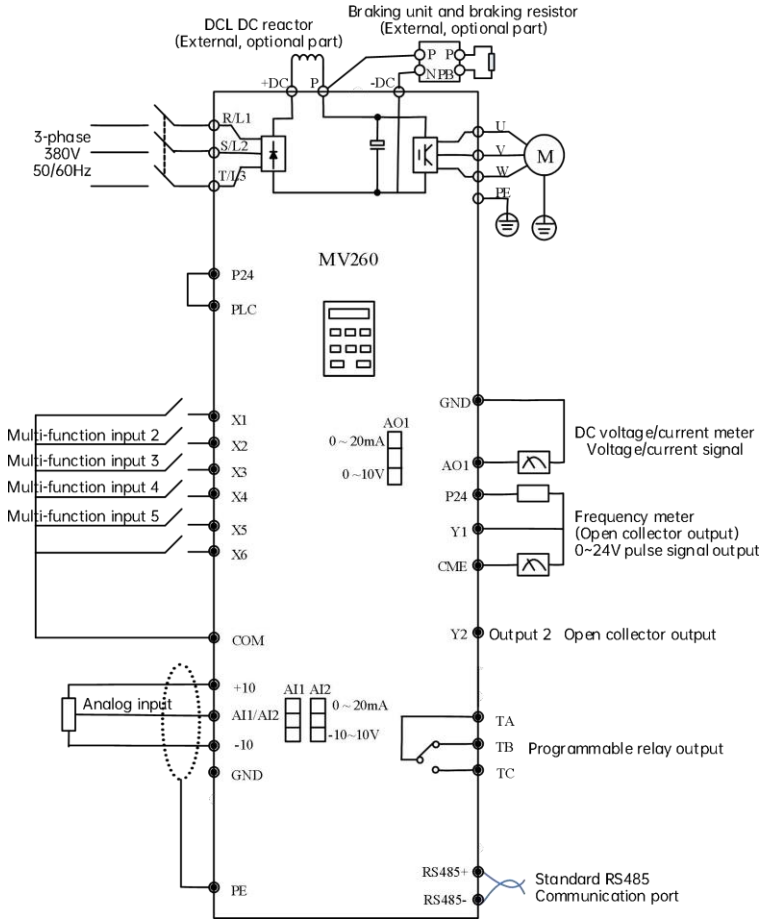


Fig.3-4 Basic wiring diagram 2

Note:

(1) For AI1 and AI2, the input voltage signal or the current signal can be selected via the jumper. The function code P10.00 shall be change after the hardware jumper finished selection to ensure the correct input signal.

(2) AO1 can select the output voltage signal or current signal by jumper, and the output range is determined by function code P10.22.

(3) If external braking components need to be configured, the braking unit and braking resistor shall be used. Please pay attention to the positive and negative polarity when connecting the braking unit.

✍ "○" in the figure is main circuit terminal and "◉" in the figure is control circuit terminal.

(5) For the usage of the control circuit terminal, please refer to section 3.2.

(6) Fig.3-3 is the wiring diagram for basic operation of model 75kW and below, Models include models with standard built-in brake unit and models with non-standard customized built-in brake unit. For details, please refer to Table 1-5. Fig.3-4 is the wiring diagram for basic operation of model 90kW and above. Special attention should be paid to these models: 355kW, 400kW, the main circuit terminal of external braking unit is P, N.

2. Wiring and configuration of control circuit

1.The arrangement sequence diagram of the control circuit terminals

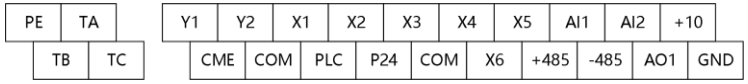


Fig.3-5 The arrangement sequence diagram of the control terminals

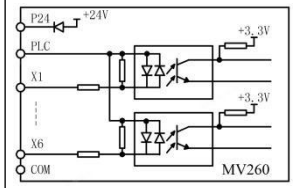
3.2.2 Wiring of control circuit terminals

🕮 Note

It is suggested to use the wire with cross section area over 1mm² as the connecting wire of the control circuit terminals.

Table 3-3 Table for the functions of interface board terminal

Type	Terminal	Name	Function	Specification
Shield	PE	Shield grounding	Used for the grounding of the shielded layer of the wire. The shielded layer of the analog signal wire, 485 communication wire and motor power wire can be connected to this terminal.	Connected to the main circuit wiring terminal ⏚ internally
Power supply	+10	+10V power supply	To provide +10V reference power for external load	Allowable max. output current: 10mA
	-10	-10V power supply	To provide -10V reference power for external load	Allowable max. output current: 10mA
	GND	+10V、-10V power GND	The reference ground for analog signal and +10V/-10V power	Internal isolated with COM

Type	Terminal	Name	Function	Specification
Analog input	AI1	Analog single-end input AI1	To receive the single-end analog voltage or current input with the analog input Voltage/Current selected via the jumper and the corresponding input type selected by the function code P10.00 (Reference grounding: GND)	Input voltage range: -10V~10V (Input resistance: 20KΩ), resolution: 1/4000 Input current range: 0mA~20mA (Input resistance: 246Ω), resolution: 1/2000
	AI2	Analog single-end input AI2		
Analog output	AO1	Analog output 1	When providing the analog voltage/current output, it can represent 27 values. The analog output of the voltage/current is selected via the jumper, and the output range of the analog voltage/current is selected in the function code P10.22 (Reference grounding: GND)	Voltage output range: 0/2~10V Current output range: 0/4~20mA
Communication	RS485+	RS485 communication interface	Positive end of 485 differential signal (Reference grounding: GND)	Standard RS485 communication interface. Please use twisted pair wire or shielded wire.
	RS485-		Negative end of 485 differential signal (Reference grounding: GND)	
Multi-functional input terminal	X1	Multi-functional input terminal 1	It can be set as the digital input terminal with multiple functions. The factory default settings for X1 and X2 are FWD (forward running command terminal) and REV (reverse running command terminal) respectively. The running command terminals can be set with other input terminals and can realize the "three-wire control" function with the third input terminal. (Common terminal: PLC or COM)	Opto-isolated input, please refer to the introduction to the multifunctional input/output terminal wiring Input resistance: R=3.1kΩ; Max. Input frequency: 200Hz Input voltage range: 10～30V 
	X2	Multi-functional input terminal 2		
	X3	Multi-functional input terminal 3		
	X4	Multi-functional input terminal 4		
	X5	Multi-functional input terminal 5		
	X6	Multi-functional input 6	In addition to acting as an ordinary multi-functional terminals (same as X1~X5), X6 can also be set as the	The equivalent diagram for the opto-isolated input is shown as above, please refer to the introduction to wiring for the

Type	Terminal	Name	Function	Specification
			high-speed pulse input terminal. (Common terminal: PLC or COM)	multi-functional input/output terminals. Input resistance: R=2kΩ Max. Input frequency: 100kHz Input voltage range: 20～30V
Multi-functional output terminal	Y1	Output collector output terminal 1	It can be set as the digital output terminal with multiple functions (Common terminal: COM)	Opto-isolated output Max. Operating voltage: 30V Max. Output current: 50mA
	Y2	Output collector output terminal 2/ DO pulse output terminal	It can be set as the digital output terminal with multiple functions and also can be reused as DO pulse output terminal, which is selected by the function code P09.13. (Common terminal: COM)	Opto-isolated output Max. Operating voltage: 30V Max. Operating current: 50mA The DO pulse output frequency range depends on P09.23 and the Max. value is 50kHz.
Power supply	P24	＋24V power supply	To provide +24V power for external load	Max. Output current: 200mA
Common terminal	PLC	Multi-functio nal input common terminal	Common terminal of Multi-functional input terminal (Short circuited with P24 upon delivery)	Common terminal of X1~X6, PLC is interally isolated with P24
	CME	Multi-functio nal output common terminal	Used in conjunction with other multi-function output terminals	Internal is internally isolated with COM, PLC, GND
	COM	＋24V power common terminal	2 common terminals in total, used together with other terminals	COM is internally isolated with GND
Relay output terminal	TA	Relay output	It can be set as the relay output terminal with multiple functions. (Common terminal: COM)	TA-TB: Normally closed; TA-TC: Normally open Contact capacity: AC250V/2A (COS Φ=1) AC250V/1A (COS Φ=0.4) DC30V/1A For operating method, please refer to the description of P09. The over-voltage class for the input voltage of the relay output terminal is Class Ⅱ
	TB			
	TC			

Analog input terminal wiring

When AI1 and AI2 terminals receive the single-end analog voltage or current input, with the voltage/ current input selected via jumper and function code P10.00, the wiring mode is as shown in Fig.3-6.

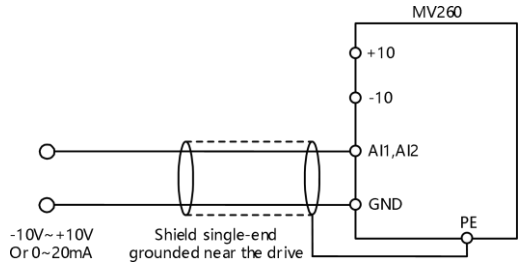


Fig.3-6 Wiring diagram for AI1 and AI2 terminals

Analog output terminal wiring

The external analog meter of the analog output terminals AO1 can indicate various parameters. The analog output of the voltage/current is selected via the jumper, and the output range of the analog voltage/current is selected in the function code P10.19. The terminal wiring mode is as shown in Fig.3-7.

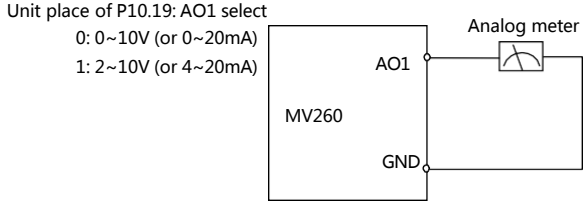


Fig.3-7 Analog output terminal wiring

Note

(1) When using analog input, filter capacitor or common mode inductor can be installed between the input signal and GND.

(2) The voltage of the analog input signal shall not exceed 12V.

(3) The analog input/output signal is vulnerable to external interference. Shielded cable shall be used and reliably grounded, and the wiring length shall be as short as possible.

(4) The analog output terminal can withstand the voltage no more than 12V.

Communication interface wiring

MV260 drive provides the RS485 serial communication interface for the users. A control system of single Host/Single slave or single Host/Multiple slaves can be created through the following wiring

methods. With the host device (PC or PLC) software, real time monitoring, remote control, auto control and more complicated running control (e.g., infinite multi-stage PLC running) can be realized on the drive within the network.

(1) Connection of the drive and the host device with RS485 interface:

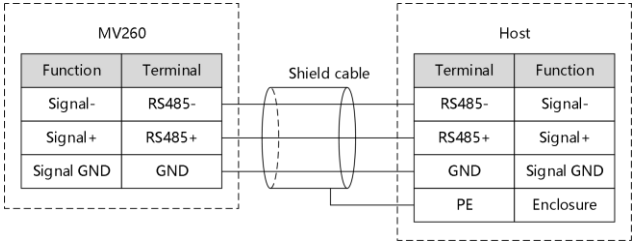


Fig.3-8 RS485-RS485 communication wiring

(2) Connection of the drive and the host device with RS232 interface：

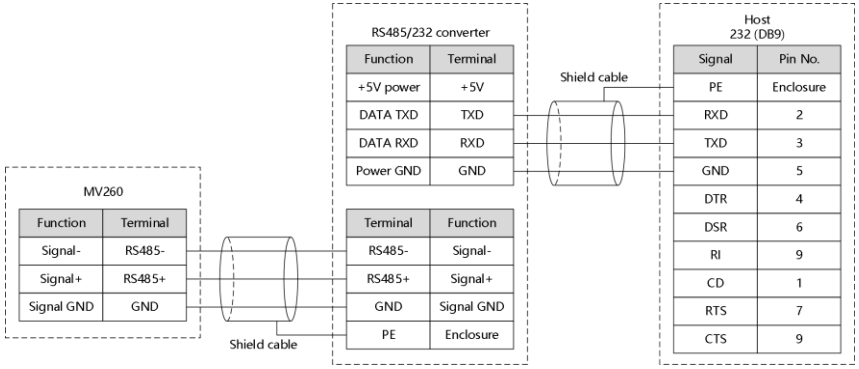


Fig.3-9 RS485-(RS485/232)-RS232 communication wiring

(3) Wiring for connecting several drives in the same RS485 system:

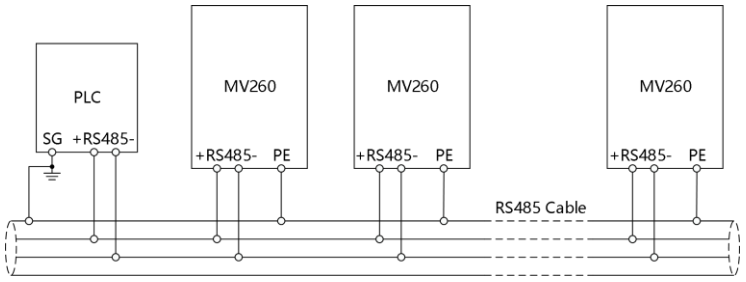


Fig.3-10 Recommended wiring diagram for the communication between PLC and several drives (The drives and motors are reliably grounded)

If normal communication still cannot be realized through the above wiring, take the following measures to correct it:

(1) Provide separate power supply to the PLC (or host device) or isolate its power supply. In case the external interference is severe, to protect the PLC (or host device) from interference, isolate the communication wire.

(2) If the RS485/RS232 converter is used, provide separate power supply to the converter.

(3) Use magnetic ring on the communication wire.

(4) If the field conditions permit, reduce the drive carrier frequency.

🕮 Note

(1) In the applications with large interference, the RS485 converter with isolation shall be used.

(2) The RS485 cannot withstand the voltage higher than 30V.

Wiring for Multi-functional Input/Output terminals

The Multi-functional input terminals of MV260 include X1~X6, using an opto-isolated circuits, as shown in the following figure. PLC is the common terminal for X1~X6, The typical wiring methods are as below:

(1) Dry contact mode (X1~X6)

① When using the internal +24V power supply of the drive, the wiring mode is as shown in Fig.3-11.

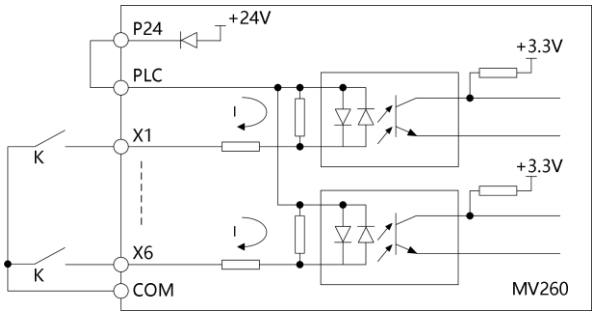


Fig.3-11 The wiring mode when using the internal +24V power supply of the drive

② When using the external power supply (Which shall meet the UL CLASS 2 standard, and 4A fuse shall be installed between the power supply and the interface), the wiring mode is as shown in Fig.3-12 (be sure to remove the short circuit plate between PLC and P24).

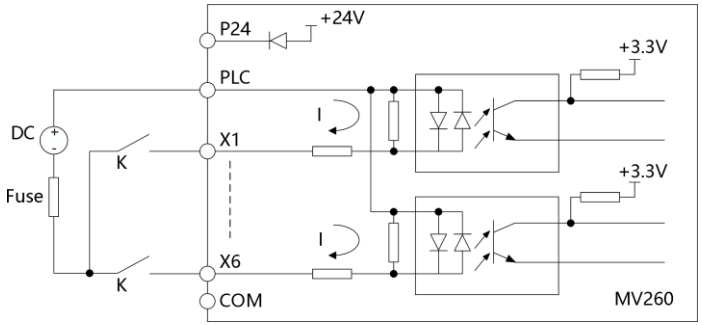


Fig.3-12 The wiring mode when using the external power supply

(2) Source (drain) mode

① When the internal +24V power supply is used and the external controller is the NPN common emitter output, the wiring mode is as shown in Fig.3-13.

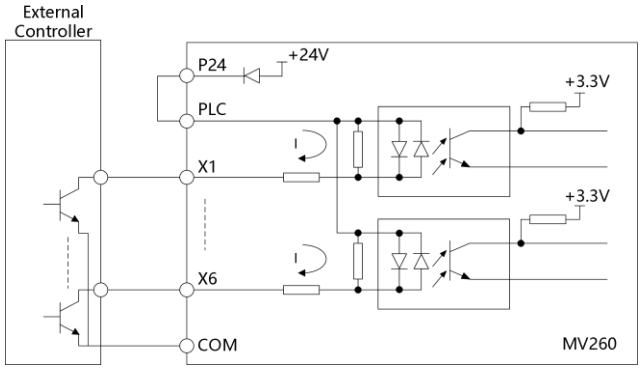


Fig.3-13 The source connecting mode when using the internal +24V power supply of the drive

② When the internal +24V power supply is used and the external controller is the PNP common emitter output (Note: be sure to remove the short circuit plate between the user terminal PLC and P24 first, then connect it between PLC and COM terminals firmly), the wiring mode is as shown in Fig.3-14.

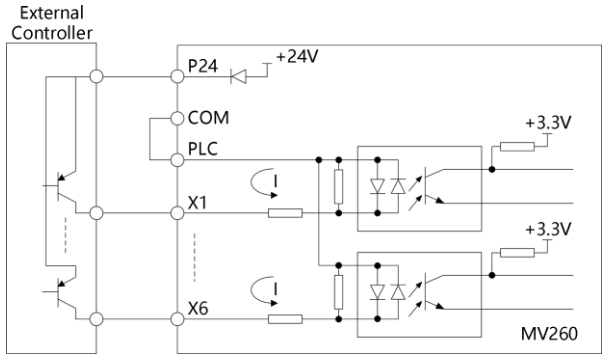


Fig.3-14 The drain connecting mode when using the internal +24V power supply of the drive

③ The source connecting mode when using the external power supply (Note: be sure to remove the short circuit plate between the user terminal PLC and P24) is as shown in Fig.3-15.

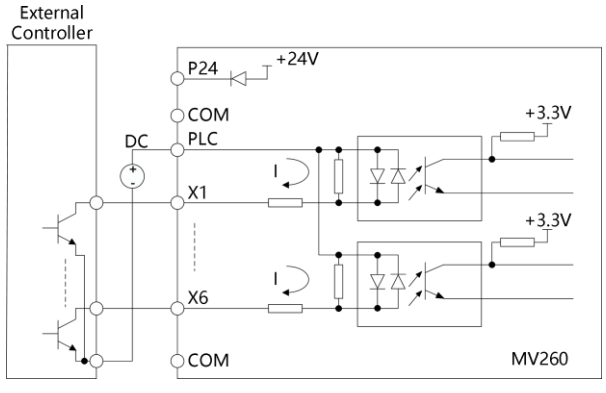


Fig.3-15 The source connecting mode when using the external power supply

④ The drain connecting mode when using the external power supply (Note: be sure to remove the short circuit plate between the user terminal PLC and P24) is as shown in Fig.3-16.

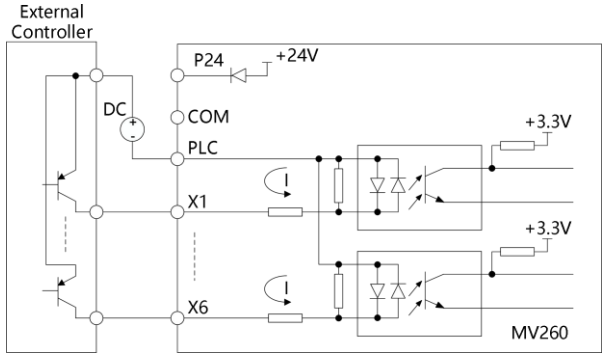


Fig.3-16 The drain connecting mode when using the external power supply

Wiring for Multi-functional output terminals

(1) When the Multi-functional output terminals Y1 and Y2 use the internal 24V power supply of the drive, the wiring mode is as shown in Fig.3-17.

Warning: The inductive load (such as relay) shall be anti-parallel with the fly-wheel diode!

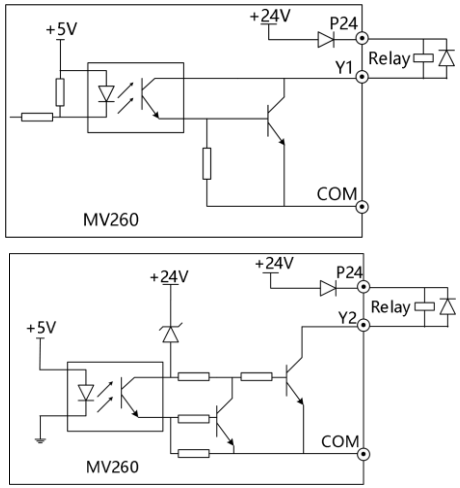


Fig.3-17 Wiring mode 1 of Multi-functional output terminal

(2) When the Multi-functional output terminals Y1 and Y2 use the external power supply, the wiring mode is as shown in Fig.3-18.

Warning: The inductive load (such as relay) shall be anti-parallel with the fly-wheel diode!

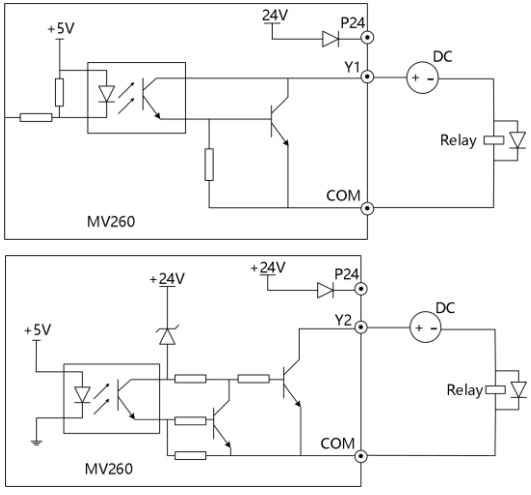


Fig.3-18 Wiring mode 2 of multi-functional output terminal

(3) When the digital pulse frequency output DO (Y2 terminal used as DO) uses the internal 24V power supply of the drive, the wiring mode is as shown in Fig.3-19.

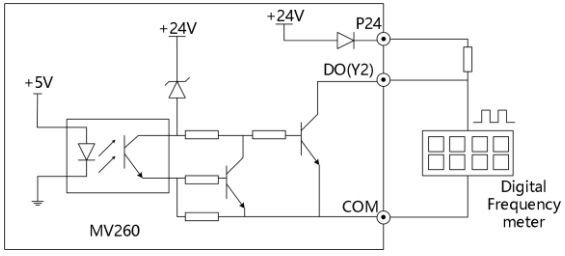


Fig.3-19 Connecting mode 1 of output terminal DO

(4) When the digital pulse frequency output DO (Y2 terminal used as DO) uses the external power supply, the wiring mode is as shown in Fig.3-20.

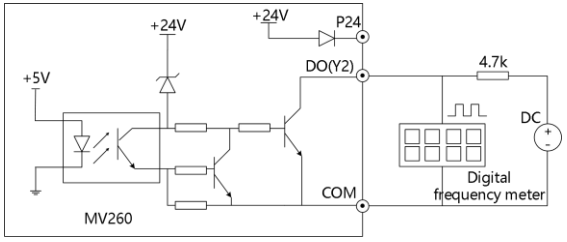


Fig.3-20 Connecting mode 2 of output terminal DO

Wiring for relay output terminals TA, TB and TC

In the case of drive inductive load (e.g., electromagnetic relay, contactor), the surge absorption circuit shall be installed, such as the RC absorption circuit (whose leakage current shall be less than the holding current of the controlled contactor or realy), piezoresistor or fly-wheel diode (used in DC electromagnetic circuit, and correct polarity shall be ensured during the installation). The components of the absorption circuit shall be installed near the two ends of the windings of the relay or contactor.

🕮 Note

(1) Do not short circuit the P24 terminal and COM terminal, otherwise, the control board may be damaged.

(2) Please use the multi-core shielded cable or twist cable (cross section area: above 1mm^2) to connect the control terminals.

(3) When using the shielded cable, the near and of the shielded layer (the end near the drive) shall be connected to the grounding terminal PE of the drive.

(4) The control cables shall be kept away from the main circuit and strong current lines (including power cable, motor cable, relay cable, contactor connecting cable, etc.) for at least 20cm, and they shall not be laid in parallel pattern. It is suggested to adopt vertical wiring to avoid the drive mis-operation caused by interference.

(5) For the non-24V relay, appropriate resistor shall be selected according to the relay parameters and connected in series to the realy circuit.

(6) The digital output terminal cannot withstand the voltage higher higher than 30V.

3.2.3 Schematic diagram of control board

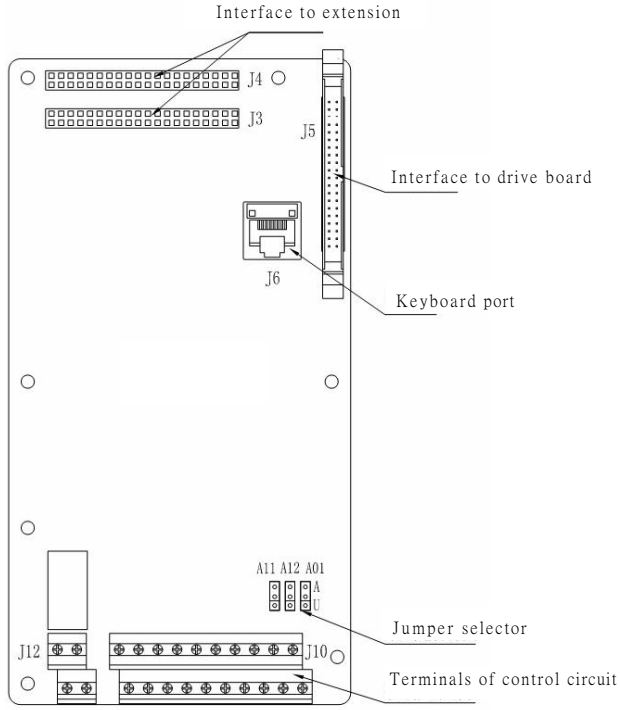


Fig.3-21 Schematic diagram of control board

3. Installation method for EMC requirements

Because of the working principle of the drive, it is unavoidable to produce certain noise and cause EMC problems. To reduce the interference of the drive to the external world, the installation method will be detailed in this section for field installation reference, including the noise suppression, field wiring, grounding, leakage current, use of power filter etc.

1. Noise suppression

The noise generated by the drive may affect the instrument and equipment nearby, and the influence is determined by various factors, including the noise immunity of the drive control system and the equipment, the wiring, the installation distance, the grounding method, etc.

Noise type

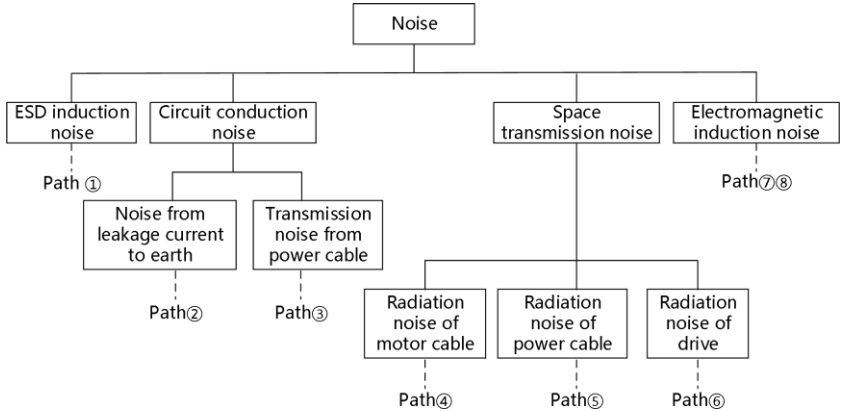


Fig.3-22 Schematic diagram for noise classification

Noise transmission path:

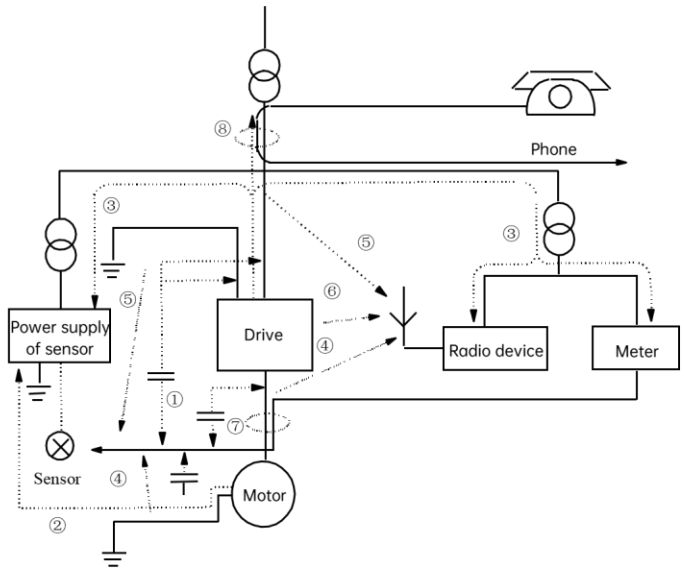


Fig.3-23 Schematic diagram for noise transmission path

Basic policies for noise suppression

Table 3-4 Table for noise suppression measures

Noise transmission path	Measure for reducing influence
②	If the external devices form a closed loop through the drive wiring, the drive grounding cable will have leakage current, which will cause the relevant device to mis-operate. The mis-operation can be reduced by removing the grounding.
③	When the external devices and drive share the same power system, the noise generated by the drive will transmit along the power cable in a reverse direction, causing all the other devices in the same system to mis-operate. The following measures can be taken to prevent it; installing the noise filter at the input end of the drive, isolating the noise for other devices with the isolation transformer or power filter.
④⑤⑥	If the devices for processing the weak signals of the measuring instruments, radio devices and sensors and their signal cables are installed in the same cabinet with the drive, and the wirings are close to each other, mis-operation may be caused due to the space noise influence. To deal with this problem, the following measures shall be taken: (1)The equipment and signal cables vulnerable to influence shall be kept far away from the drive. The signal cable adopt shielded wire, with the shielded layer grounded. Besides, the shielded cable shall be sleeved with metal tube and kept far away from the drive and its input/output wire. If the signal cable must pass the power cable, they shall adopt orthogonal layout. (2)Install the radio noise filter and linear noise filter (ferrite common mode choke) at the input and output ends of the drive to suppress the radiation noise of the power cable. (3)The motor cable shall be placed in the thick shelter, such as the pipe with large thickness (more than 2mm), or bured into the cement trough. The power cable shall be sleeved with metal pipe and grounded using shielded cable (the motor cable shall adopt 4-core cable, with one piece grounded at the drive side, and the other end connected to the motor enclosure)
①⑦⑧	If the signal cables are laid in parallel with the power cables or bundled together with the power cables, because of electromagnetic induction noise and static induction noise, the noise will transmit in the noise cable, causing mis-operation of the relevant equipment. Such wiring mode shall be avoided, the vulnerable equipment shall be kept far away from the drive, and vulnerable signal cables shall be kept far away from the drive input/output cable. The signal cable and power cable shall adopt shielded cable and be sleeved with metal tube respectively. The distance between the metal tubes shall be at least 20cm.

3.3.2 Field wiring requirements

To avoid the interference coupling, the control cable, power cable and motor cable shall be separately installed and kept away from each other, especially when the cables are parallel and extend for a long distance. If the signal cable must cross the power cable, make the crossing perpendicular.

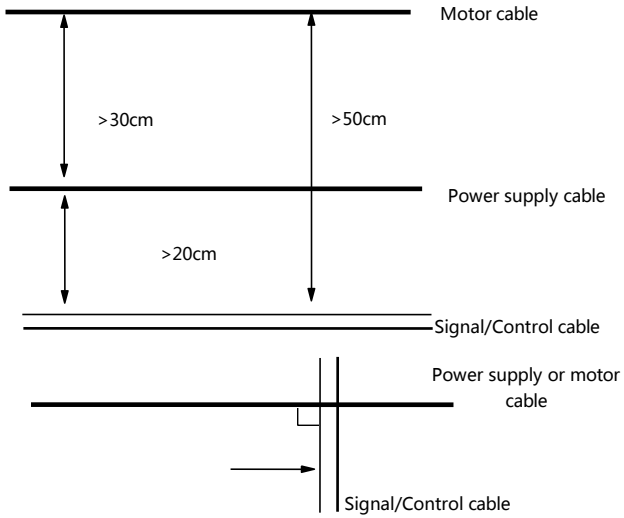


Fig.3-24 System wiring requirement

If the motor cable is too long or the cross section area of the motor cable is too large, it shall be derated. The larger the cross section area is, the larger the ground capacitance and ground leakage current will be, If the cable with large cross section area is used, the output current should be reduced. Note that the current should be reduced by 5% for every increasing grade of the area.

Shielded/armoured cable: High-frequency low-impedance shielded cable shall be used, such as woven copper mesh, aluminum mesh or iron mesh.

Generally, the control cable should be shielded cable. The shielded metal mesh must be connected to the metal enclosure of the drive through the cable clamps on both ends.

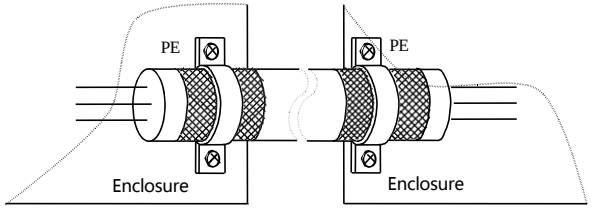


Fig.3-25 Correct grounding method of shielding

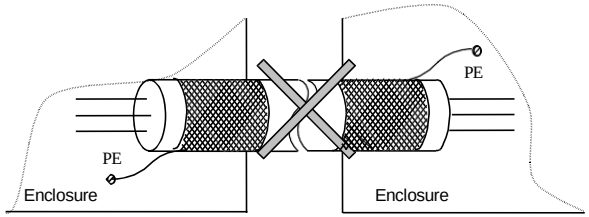


Fig.3-26 Incorrect grounding method of shielding

3.3.3 Grounding

Dedicated grounding pole (The best)

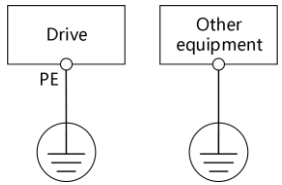


Fig.3-27 Grounding diagram 1

Shared grounding pole (acceptable)

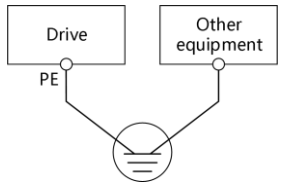


Fig.3-28 Grounding diagram 2

Shared grounding cable (unacceptable)

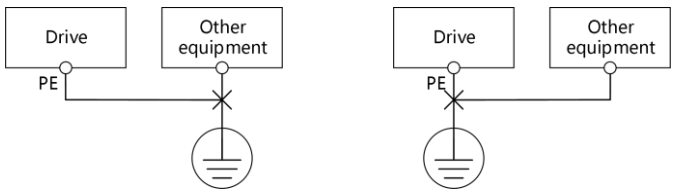


Fig.3-29 Grounding diagram 3

In addition, please pay attention to the following points:

• To minimize the impedance of different grounding systems, the standard grounding cable of largest size shall be adopted. The flat cable is preferred, because the high-frequency resistance of the flat cable is smaller than the round cable of the same cross section area.

• For the 4-core motor cables, one piece of cables should be grounded at the drive side, with the other end connected to the motor grounding end. It would be better if the motor and drive have dedicated grounding pole.

• If the grounding ends of the system components are connected together, the leakage current will become a noise source and affect the equipment in the system. Therefore, the grounding end of the drive shall be kept away from the grounding ends of the audio equipment, sensor and computer.

• To reduce the high-frequency impedance, the fixing bolt of the equipment can be used as the high-frequency terminal for connecting to the back plate of cabinet. Note to scratch off the insulation paint of the fixing point.

• The grounding cable should be as short as possible, that is, the grounding point shall be as close to the drive as possible.

The grounding cable should be kept away from the I/O cables of the noise-sensitive equipment and be as short as possible.

3.3.4 Installation requirement for relay, contactor and electromagnetic braking unit

For the devices that will generate large noise, such as the relay, contactor and electromagnetic braking unit, even when they are installed outside the drive enclosure, surge suppressor must be installed.

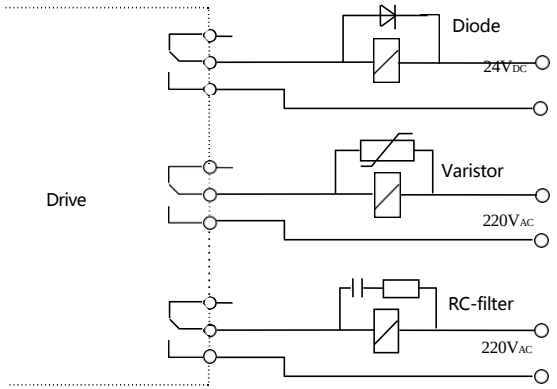


Fig.3-30 Installation requirement for relay, contactor and electromagnetic braking unit

3.3.5 Leakage current and countermeasures

The leakage current will pass the line capacitor and motor capacitor at the input and output ends of the drive. Its magnitude depends on the distribution capacitor and carrier frequency. The leakage includes the ground leakage current and line-to-line leakage current.

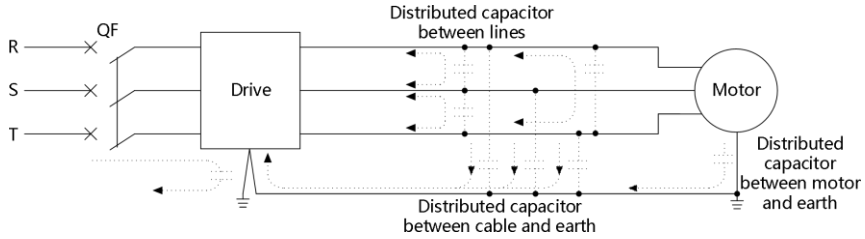


Fig.3-31 Leakage current path

Grounding leakage current

The leakage current will not only pass the drive system, but also pass other equipment through the grounding wire, causing the mis-operation of the leakage circuit breaker, relay or other equipment. The higher the drive carrier frequency, or the longer the motor cable is, the larger the leakage current will be.

Suppression measures:

- Reduce the carrier frequency, but the motor noise will increase.
- Shorten the motor cable.
- Adopt the leakage circuit breaker designed for the leakage current of higher harmonics/surge in the drive system and other system.

Line-to-line leakage current

The higher harmonics of the leakage current that passes the distribution capacitors between the output cables of the drive may cause the mis-operation of the external thermal relay. Especially the drives with small capacity (7.5kW and below), when the wires are very long (over 50m), the leakage current will increased relatively, which is easy to cause the mis-operation of the external thermal relay.

Suppression measures:

- Reduce the carrier frequency, but the motor noise will increase.
- Install reactor at the output end.

To reliably protect the motor, it is recommended to monitor the motor temperature with the temperature sensor, and use the overload protection function (electronic thermal relay) of the drive instead of the external thermal relay.

3.3.6 Proper EMC installation of drive

Partition principle

In the drive system formed by the drive and motor, the drive, control unit and sensor are installed in the same cabinet. The noise is mainly suppressed at the main connection points,

therefore, radio noise filter and incoming reactor shall be installed in the cabinet. The cabinet shall also meet the EMC requirement.

To isolate the noise source and noise receiver through physical space in the mechanical/system stage is the most effective but most expensive measure to reduce the interference. In the drive system formed by the drive and motor, the noise source includes the drive, braking unit and contactor. The noise receiver includes the automation device, encoder, and sensor.

Different EMC zones are divided according to the electric characteristics in the mechanical/system design. It is recommended to install the device in the zone as shown in Fig.3-32.

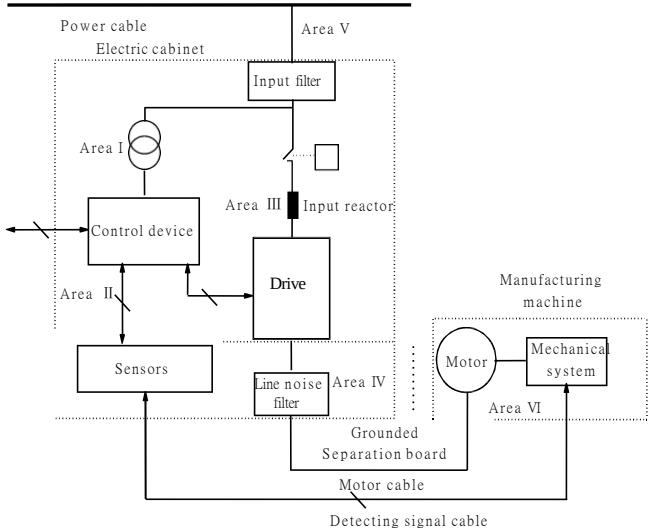


Fig.3-32 Schematic diagram for the recommended partition for drive EMC installation

Note:

Area Ⅰ: The control power transformer, control system, sensor, etc.

Area Ⅱ: The interface for the signal and control cables, which shall have certain immunity.

Area Ⅲ: Incoming reactor, drive, braking unit, contactor, and other noise source.

Area Ⅳ: Output noise filter and its wiring.

Area Ⅴ: Power supply (Including the radio noise filter wiring)

Area Ⅵ: Motor and its cable

- There shall be space isolation between the zones to realize electromagnetic decoupling.
- The minimum spacing between the zones shall be 20cm.
- The zones shall be decoupled via the grounding plate. Cables of different zones shall be laid in different cabling troughs.
- The filters shall be installed at the interfaces between the zones.
- All the communication cables (e.g., RS485) and signal cables leading out from the cabinet must be shielded.

Electric installation diagram for the drive

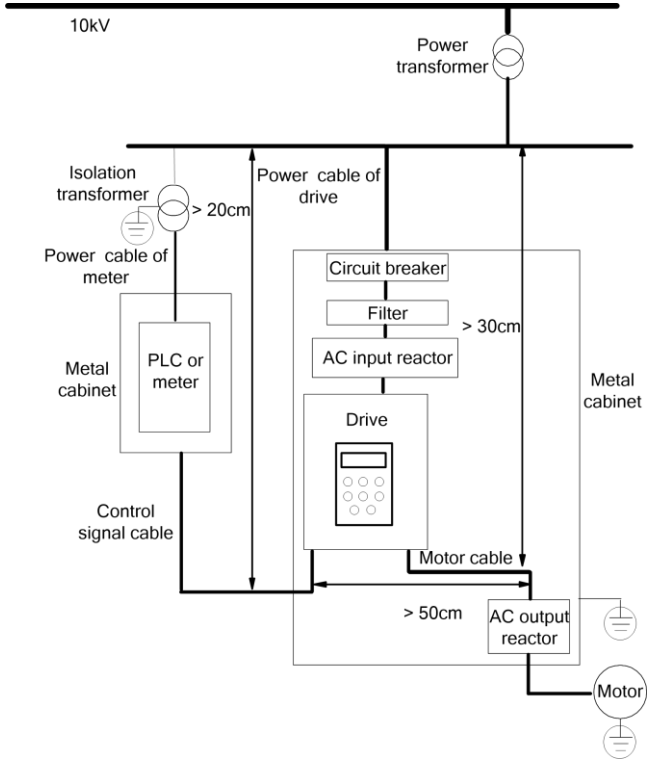


Fig.3-33 Installation diagram for the drive

The grounding wire of the motor shall be grounded at the drive side. The motor and the drive shall be separately grounded.

The motor cable and control cable should use shielded/armoured cable. The shielding metal mesh shall be connected to the both ends of the grounding cable through cable clamps to avoid the twisting of the ends of the metal mesh, because in this case, the shielding effect will be affected in the high-frequency conditions.

The conductivity between the mounting plate, the mounting screws and the drive metal enclosure shall be ensured. Teeth paint scraping and conductive mounting plate shall be used.

If there is any sensitive device, separate power filter can be installed at the sensitive device side to reduce the cost.

7. Operation instructions for power filter

Power filter shall be used for the device that can generate strong interference and the device sensitive to external interference. The power line filter is a two-way low-pass filter. It allows the DC or 50Hz industrial frequency current to pass, bus does not allow the high-frequency electromagnetic current to pass.

Role of the power line filter

It can help the device meet the EMC requirement on conduction emission and conduction sensitivity and contribute to suppressing the radiation emission of the device.

It can prevent the electromagnetic interference of the device from entering the power line, and the interference of the power line from entering the device.

Common errors in the power line filter installation

(1)Too long power input line

The filter shall be installed close to the power cable inlet of the cabinet, and the power input cable of the filter shall be as short as possible in the cabinet.

(2) The input cable and output cable of the power cable filter are too close to each other

If the input cable and output cable of the filter are too close to each other, the high-frequency interference signal will be directly coupled through the input and output cables of the filter and bypass the filter, making the filter useless.

(3) Poor filter grounding

The filter enclosure must be reliably connected to the metal enclosure. There is a dedicated grounding terminal on the filter enclosure. However, if the filter is connected to the metal enclosure through a cable, it is useless for the high-frequency interference signal, because the resistance of the long cable (which is not the resistance of the resistor) is very large, making the bypass ineffective. The correct installation method is to directly install the filter enclosure against the conducting surface of the equipment metal enclosure, with the relevant insulating paint removed.

8. Drive radiation emission

Because of the working principle of the drive, is unavoidable for the drive to emit radiation. The drive is generally installed in the metal enclosure, and thus has little radiation influence on the instruments and equipments outside the metal enclosure. The external connecting cable is the main source for radiation emission. If the relevant cable is connected according to the requirement in this section, the cable radiation emission can be effectively suppressed.

If the drive and other control devices are installed in the same metal enclosure, the above-mentioned partition principle shall be considered when designing the cabinet. The partition isolation, wiring, shielding and connecting of the cables shall also be considered.

Chapter 4 Quick Operation Guide for Drive

1. Drive operation panel

1. Introduction to drive operation panel

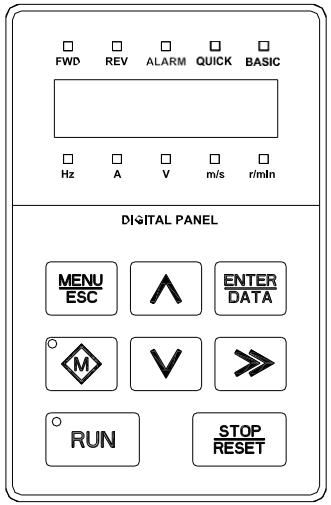


Fig.4-1 Schematic diagram of operation panel

4.1.1.1 LED description

Table 4-1 LED description

LED symbol		Name	Meaning	Color
Unit LED	Hz	Frequency LED	ON: Current parameter displayed represents the running frequency Flash: Current parameter displayed represents the frequency set	Green
	A	Current LED	ON: Current parameter displayed represents the current	Green
	V	Voltage LED	ON: Current parameter displayed represents the voltage	Green
	m/s	Line speed LED	ON: Current parameter displayed represents the line speed	Green
	r/min	Rotating speed LED	ON: Current parameter displayed represents the rotating speed	Green

Status LED	FWD	Forward running LED	ON: In the stop status, it means the drive has forward running command In the running status, it means the drive is running forward Flash: The drive is switching from REV to FWD	Green
	REV	Reverse running LED	ON: In the stop status, it means the drive has reverse running command In the running status, it means the drive is running reversely Flash: The drive is switching from REV to FED	Green
	ALARM	Alarm LED	ON: The drive enters the alarm status	Red
	QUICK	Menu mode LED	QUCIK LED ON / BASIC LED OFF / Menu mode: Quick menu	Green
	BASIC		QUCIK LED OFF / BASIC LED ON / Menu mode: Basic menu QUCIK LED OFF / BASIC LED OFF / Menu mode: Verification menu	Green

The running status LED is above the RUN key and the running command channel LED is above the Multi-functional key (M key). Their indication meanings are as shown in Table 4-2.

Table 4-2 Status LED description

LED	Display status	The indicated status of the drive
Running status LED	OFF	Stop status
	ON	Running status
Running command channel LED	ON	Operation panel control status
	OFF	Terminal control status
	Flash	Serial port control status

4.1.1.2 Introduction to operation panel keys

Table 4-3 Operation panel function table

Key	Name	Function
MENU/ESC	Program/Exit key	To enter or exit the programming state
ENTER/DATA	Function/Data key	To enter the lower level menu or confirm data
∧	Increase key	To increase the data or function code
∨	Decrease key	To decrease the data or function code
≫	Shift key	To select the bit for change in the data in editing state, or switch the display of status parameters in other state
M	Multi-functional key	Please refer to Table 4-4 for the useage of the Multi-functional key
RUN	Run key	When pressing this key in the operation panel mode, the drive will start to run
STOP/RESET	Stop/Reset key	Stop or fault reset

Table 4-4 Useage of the Multi-Functional key

Multi-functiona l key (M key)	Function	Function meaning
0	No function	The M key is disabled.
1	JOG	The M key is used as JOG key, In the operation panel running command channel, press this key and hold, the drive will run in real time JOG mode. Release this key, it will stop running in JOG mode.
2	FWD/REV running direction	The M key is used as the direction switching key FWD/REV, In the operation panel running command channel, it can be used to switch the output frequency direction on line.
3	Command channel switching 1	The M key is used as the running command channel switching key, which is enabled only in the stop status. The running command channel switching order is as follows: Operation panel running command channel (LED of M key on) →terminal running command channel (LED of M key OFF)→ serial port running command channel (LED of M key flash)→ operation panel running command channel (LED of M key on)
4	Command channel switching 2	Using the M key as the running command channel switching key, which is enabled in both stop and running statuses. The switching order is as above.
5	Keyboard locking function	The M key is used as the multi-functional keyboard locking key. Now, press the M key and press the "∧" key three times at the same time to lock the keyboard. The locking mode of the keyboard depends on the thousands place of the function code. To unlock the keyboard, set the thousands place as 5, press the M key and press the "∨" key three times at the same time, then the keyboard will be unlocked. Set the thousands place as 0, there is no keyboard locking function.
6	Emergency stop	Using the M key as the emergency stop key. When it is used in this way, once it is pressed, the drive will stop according to the setting time of P08.23 in any running mode
7	Coast to stop	The M key is used to coast to stop. When it is used in this way, once it is pressed, the drive will coast to stop in any running mode.

4.1.1.3 Status display of operation panel

The display status of the MV260 operation panel includes stop status parameter display, run status parameter display, function code parameter editing status display and fault alarm status display.

(l) Stop parameter display status

When the drive is in stop, the operation panel displays the stop status parameter, as shown in Fig.4-2a. The lower unit LED show the parameter units, while the upper QUICK and BASIC combination indicates the current menu mode.

When the verification menu is selected, only the function codes whose parameter value is different from the leave-factory value will be displayed. You can press the "∨" or "∧" key to browse all the function codes whose parameter set value is different from the leave-factory value, and check which parameters have been changed.

Different stop status parameters can be cyclically displayed by pressing the "≫" key (Defined by function code P00.07)

(2) Run parameter display status

When the drive receives the valid running command, it will enter the run state, the operation panel will display the running status parameter, and "RUN" on the panel will be on, and "ON/OFF" of the "FWD" and "REV" depend on the current running direction. As shown in Fig.4-2b, the lower unit LED display the parameter units.

When the "≫" key is pressed, the running status parameters will be cyclically displayed. The running status parameters that can be viewed are defined by the function codes P00.05 and P00.06.

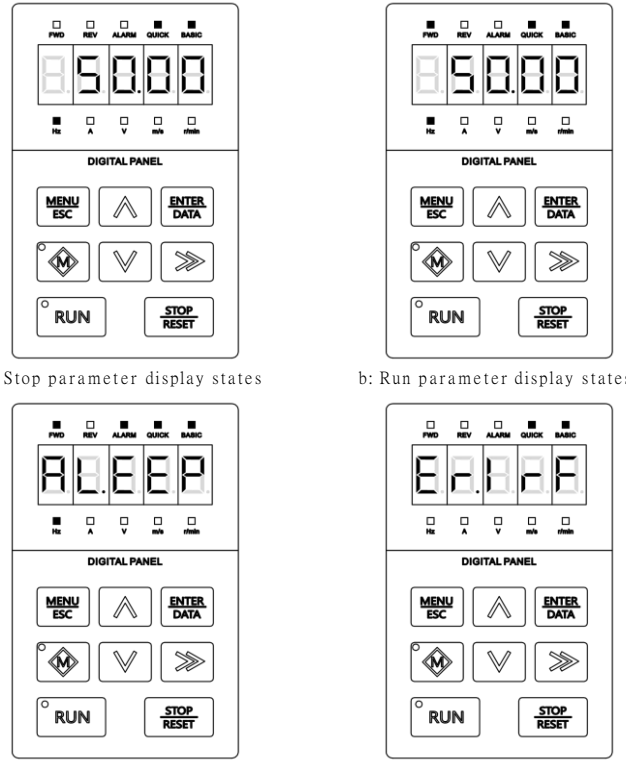
(3) Alarm display status

When the drive detects abnormal conditions during running but it can still continue to run, it will enter the alarm display status. The upper Alarm LED will be on, and the corresponding alarm code will be displayed on the operation panel, as shown in Fig.4-2c.

When the "≫" key is pressed, the running status parameters and alarm code will be cyclically displayed. When there are several alarms, the operation panel will cyclically display each alarm code at preset intervals.

To continue running, you can disable the fault alarm and stop by setting the protection action P97.00 and P97.01. The alarm will disappear during running, and the system enters the normal running parameter display status. If the alarm still exists before stop, the corresponding fault code will be automatically displayed upon stop.

The alarm status can be treated as a special fault status. Same as the fault status, you cannot adjust the frequency parameters through the "∨" or "∧" key in the alarm state. You must switch to the run parameter display status by pressing the "≫" key before you can use the "∨" or "∧" key to adjust the set frequency parameters.



a: Stop parameter display states

b: Run parameter display states

c: Alarm display states

d: Fault display states

Fig.4-2 The stop, run, alarm and fault display of the drive

(4) Fault display status

When the drive detects a fault signal, it will immediately enter the fault alarm display status (as shown in Fig.4-2d), and the fault code will be displayed in flashing mode.

The stop parameters and fault code will be cyclically displayed by pressing the "≫" key. The fault reset operation can be conducted through the "STOP/RESET" key on the operation panel, the control terminal or the communication command. If the fault still persists, the display of the fault code will be maintained.

(5) Function code editing status

Press the MENU/ESC key in stop, run or fault alarm state, you can enter the editing state (If there is any user password, please refer to the description of P00.01). The editing status will be displayed in two-level menu mode, shown as below: function code group or function code → function code parameter. Press the ENTER/DATA key to enter the function parameter display status. In the

function parameter display status, press the ENTER/DATA key to save the parameter, press MENU/ESC to exit.

4.1.2 Indentification of LED display symbols

The correspondence relation between the LED display symbols and the character/figure is as shown below:

LED display	Meaning	LED display	Meaning	LED display	Meaning	LED display	Meaning
0	0	A	A	I	I	S	S
1	1	b	b	J	J	T	T
2	2	C	C	L	L	t	t
3	3	c	c	N	N	U	U
4	4	d	d	n	n	V	V
5	5	E	E	O	O	y	y
6	6	F	F	o	o	-	-
7	7	G	G	P	P	.	.
8	8	H	H	q	q		
9	9	h	h	r	r		

3. Operation example

In the below example, the stop display parameter is the set frequency and its leave-factory value is 50.00Hz. The black part in the figure indicates the current editing status.

1. Operation of password

To protect the parameters, the drive has the password protection function. After setting the user password, only when you have entered the correct user password you can enter the function code editing status after pressing the MENU/ESC key. To enter the manufacturer set parameter zone, correct manufacturer password shall be input.

Note

It is recommended the user not change the manufacturer set parameters. Improper parameter setting will cause abnormal operation or even damage of the drive.

Function code P00.00 can be used to set the user password.

Assuming that the valid user password is "1368", the drive is locked at this time, and no operation can be performed. You can unlock the drive by entering the user password through the following steps:

(1) Press the MENU/ESC key in the drive locked status, and then the LED will enter the password verification status 00000;

(2) Change 00000 to 01368;

(3) Press the ENTER/DATA key to confirm and pass the password verification, and then the LED displays the P00.01.

The above operation steps are shown in the Fig.4-3

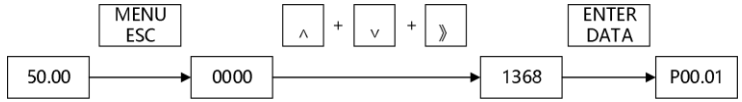


Fig.4-3 Operation example for unlocking user password

You can conduct various operations on the drive after passing the password verification.

🕮 Note

If there is no key-pressing operation in 5 minutes after the correct user password is entered, the password protection will again be triggered to lock the drive.

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2. Key locking and unlocking

Key locking

The operation panel can be locked through the function code P00.04.

(1) In the stop parameter display state, press MENU/ESC key to enter the first level menu P00.00;

(2) Press the "∧" key to select function code P00.04;

(3) Press the ENTER/DATA key to enter the second level menu;

(4) Press the 》 key to switch to the thousands place;

(5) Press the "∧" key to set the thousands place to be 0 (lock all), 1 (lock all the keys except the STOP key), 2 (lock all the keys except the SHIFT key) or 3 (lock all the keys except the RUN and STOP key);

(6) Press the ENTER/DATA key to confirm and return to the first level menu;

(7) Press the MENU/ESC key to return to the stop parameter display status;

(8) Press and hold the M key, and then press the "∧" key three times again to lock the operation panel.

The above operation steps are shown in the Fig.4-4.

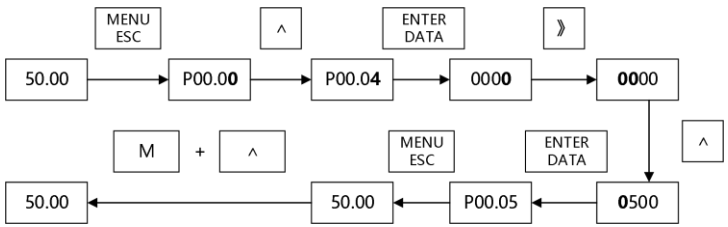

Fig.4-4 Operation example for locking the operation panel keys

Key unlocking

When all the keys on the operation panel are locked, they can be unlocked through the following operation: Press and hold the M key, and then press the "∨" key for 3 times.

🕮 Note

No matter how P00.04 is set before, the operation panel is in unlocking status upon the power-up of the drive.

3. Operation panel self-detection

Before using the operation panel, you can check if the digital tube, LED and key functions are normal through the self-detection function of the MV260 operation panel. Operate according to the following steps:

(1) Press and hold the "ENTER/DATA" key in the stop status, and then press the "STOP/RESET" key to enter the self-detection status.

During the self-detection, the 5 LED digital tubes on the operation panel will turn on one by one, and then all the LED will turn on, with the LED displaying "00000".

(2) Press the "∧" key, "ENTER/DATA" key, "M" key, "∨" key, ≫key, RUN key and "STOP/RESET" key in turn. In normal situation, when the "∧" key is pressed, the LED display will change from "00000" to "11111", and change correspondingly following the key pressing, until it displays "77777" when the "STOP/RESET" key is pressed.

(3) Press the "MENU/ESC" key, and the LED will return to the stop parameter display status. The Self-detection is completed.

The above operation steps are shown in Fig.4-5.

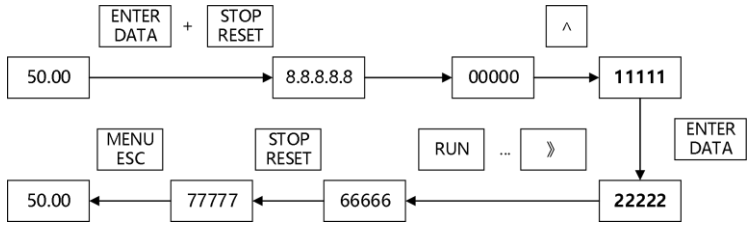

Fig.4-5 Self-detection example of LED operation panel

4. Restore to leave-factory values

For example, set P00.02=2, the parameters will restore to the leave-factory values. The leave-factory value setting will make the drive parameters restore to the leave-factory values.

(1) In the stop parameter display status, press "MEN/ESC" key to enter the first level menu P00.00;

(2) Press "∧" key to change P00.00 to P00.02;

(3) Press the "ENTER/DATA" key to enter the menu;

(4) Press the "∧" key to change 0 to 2;

(5) Press the "ENTER/DATA" key to confirm the change and return the first level menu. The change is successfully completed.

The above operation steps are shown in Fig.4-6:

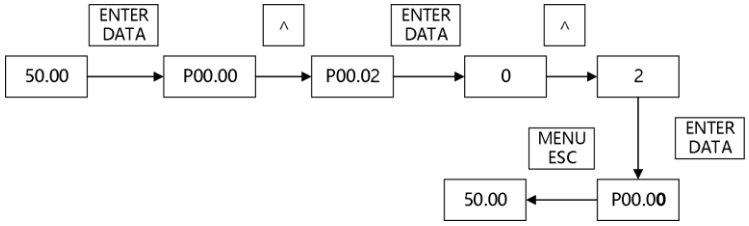

Fig.4-6 Operation example of restoring leave-factory values

5. Setting the set frequency

For example, set P02.04=25.00Hz.

Example: To change the setting of function code P02.04 from 50.00Hz to 25.00Hz.

(1) In the stop parameter display status, press "MENU/ESC" key to enter the first level menu P00.00;

(2) Press the "》" key to select the second highest bit;

(3) Press "∧" key to change P00.00 to P02.00;

(4) Press the "》" key to select the unit place;

(5) Press "∧" key to change P02.00 to P02.04;

(6) Press the "ENTER/DATA" key to enter the second level menu;

(7) Press the "∨" key to change 50.00 to 25.00;

(8) Press the "ENTER/DATA" key to confirm the change and return the first level menu. The change is successfully completed.

The above operation steps are shown in Fig.4-7.

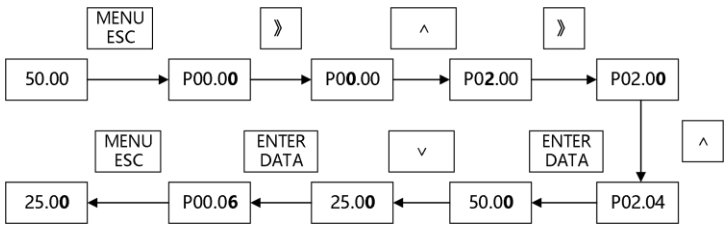

Fig.4-7 设置设定频率操作示例

4.1.3.6 Switching status display parameters

The drive parameters displayed on the operation panel when the drive is stopped can be set through function code P00.07, such as the frequency, bus voltage, etc. (For details, please refer to the description of function codes of Group P07). These status parameters can be viewed by pressing the "》" key on the operation panel when they have been set. The example for the status parameter display in the drive stop status when P00.07 is FFF as shown in Fig.4-8.

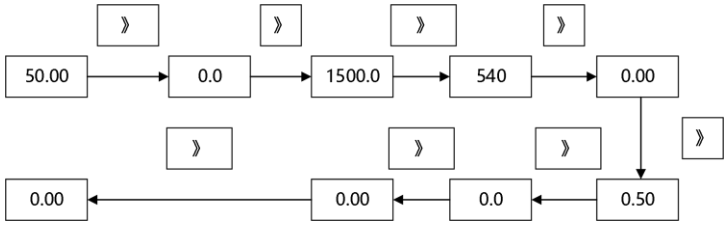

Fig.4-8 Operation example for switching status parameter display

2. Drive running mode

The terms describing the drive control, running and status will appear in the following chapters. Please read carefully this chapter. It will help you understand and properly use the functions described in the following chapters.

1. Drive running command channel

The drive running command channel refers to the physical channel for the drive to receive the running command: start, stop, jog, etc. There are four types of running command channels:

(1) Operation panel: To control through the RUN, STOP and M (When set as the JOG function) keys on the operation panel.

(2) Control terminal: To control through the control terminals X1, X2 (Default, other digital input terminals can be set as FWD and REV input control terminals as well), COM (two-wire system) and Xi (three-wire system).

(3) Serial port: To control the start and stop through the host device.

The command channel can be selected by function code P02.01、operation panel "M" multi-function key and "ENTER/DATA" key、multi-function input terminal selection. (Functions No.38, 39 and 40 are selected through P09.00~P09.04)

Note

Before switching the channels, be sure to conduct the switching trial operation first, otherwise, equipment damage or human injury may be caused.

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2. Operating status of the drive

The operating states of the MV260 include the stop status, running status and motor parameter auto-tuning status.

(1) Stop status: If there is no running command input when the drive is started and initialized, or the stop command is executed during the operation, the drive will enter the stop status immediately.

(2) Running status: The drive will enter the running status after receiving the running command.

(3) Motor parameter auto-tuning status: If there is any running command after the function code P03.12 is set as 1 or 2, the drive will enter the motor parameter identifying status. It will enter the stop status after the parameter identification is completed.

3. Drive control mode

Control mode

High performance open-loop flux vector: No need to install PG, at the same time has a very high control performance, can accurately control the speed of the motor, with low frequency, high torque, speed stability and high precision.

4. Drive frequency channel

There are five running modes for the MV260 drive under the speed control mode, including: Jog running, process closed loop running, PLC running, multi-stage speed running and common running, The jog running has the top priority, other modes low priority. If there is no jog running command, select the mode according to P02.03 channel. The priority is as shown in Fig.4-9.

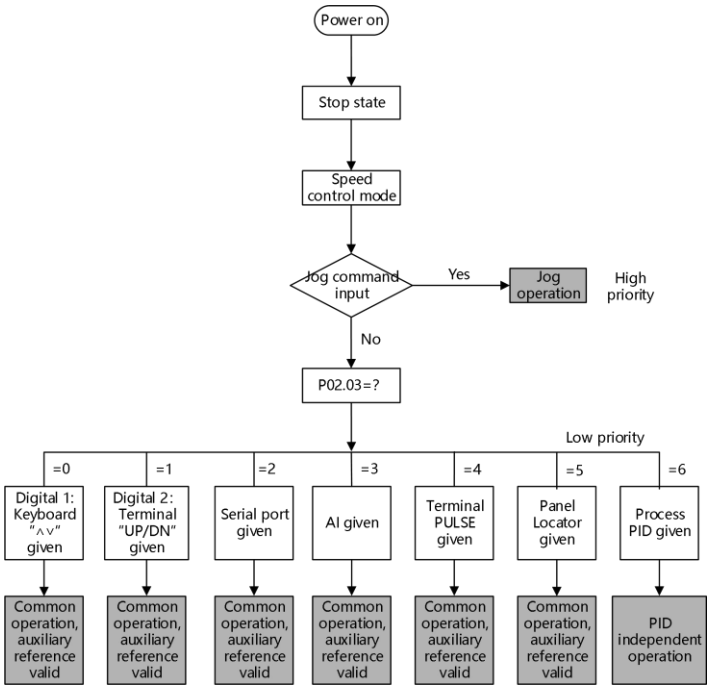


Fig.4-9 Running mode selection

The five running modes provide five basic frequency sources. Except that the auxiliary frequency superimposition, frequency adjustment can be performed for common running frequency, "Jog running", "PLC running", "Multi-stage running" or "Process closed loop running" can be served as an independent running channel, among which, "PLC running" has various frequency source reference channel. For details, please refer to "PLC running" frequency reference selection function code. The running modes are described below:

(1) Jog running: When the drive receives the jog running command in stopping state, it will run according to the jog frequency (refer to function codes P02.17~P02.19).

(2) Process closed loop running: When the process closed loop selection function is enabled (P02.03=6), The drive will adopt the process closed loop running mode, that is, it will conduct closed loop adjustment according to the reference and feedback (refer to function code of Group P14). The process closed loop running mode can be disabled via the multi-functional terminal (Function No.29). If there is a running command at that moment, it will run at zero frequency.

(3) Multi-speed running: The multi-speed function is effective. Through the ON/OFF combination of the multi-function terminal (Function 6, 7, 8, 9), the multi-speed operation is performed by selecting the multi-speed frequency from 1 to 15. The multi-stage frequency setting is the maximum frequency percentage, if it is negative, then the frequency will run reversely, If all the three terminals are in OFF status or fail to meet the above conditions, the multi-speed will run at the main reference frequency digital set value (P02.04).

3. Initial Power-up

1. Inspection before power-up

Conduct wiring connection according to the technical requirements specified in chapter 3 wiring of drive.

2. Initial power-up operation

When the drive passes the wiring and power supply inspection, turn on the circuit breaker of the AC power supply at the drive input side to apply power to the drive. The operation panel of the drive will first display "8.8.8.8.8", and then the contactor will normally engage. When the characters displayed in the digital tube change into the set frequency, it indicates that the drive initialization is finished.

If the LED above the M key on the operation panel is ON, It indicates that it is in the operation panel control status.

The initial power-up process is as shown in Fig.4-10.

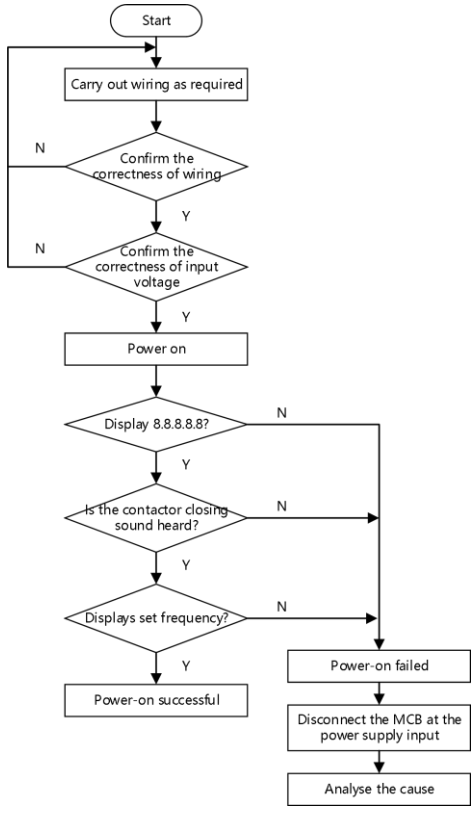


Fig.4-10 Initial power-up operation process for drive

Chapter 5 Parameter List

Explanation to the terms in the function code parameter table

Table field	Explanation
Function code	Representing
Parameter name	Name of the function code, explaining it
Leave-factory value	The value of the function code after restoring the leave-factory settings
Set range	Function code Specifies the range of parameters that can be set
Unit	V: Voltage; A: Current; ℃: Temperature; Ω: Resistance; mH: Inductance; rpm: Rotate speed; %: Percentage; bps: Baud rate; Hz/kHz: Frequency; ms/s/min/h/kh: Time; kW: Power.
Change attribute	○: Means the function code can be change during running; ×: Means the function code can be changed in the stop state; *: Means the function code can be read only, can not be changed.

Basic menu function code parameter table

Function code	Parameter name	Setting range	Default value
P00: Management parameters			
P00.00	User password	0: No password Other: Password protection	0
P00.01	Parameter protection	0: All the data can be changed; 1: Except for the main given frequency digit set P02.04 and this function code, it is forbidden to rewrite 2: Only this function code can be changed	0
P00.02	Parameter initialization	0: Parameter changing status 1: Clear fault memory information 2: Restore to leave-factory value 3: Restore the quick start function group only	0
P00.03	Parameter copy	0: Disabled 1: Uploading parameter 2: Downloading parameters 3: Downloading parameters (Except the motor parameters) Note: The drive parameters will not be Uploaded/Downloaded	0
P00.04	Selection of key functions	Reserved	0100H

P00.05	LED display parameter selection 1 when running	Binary setting: 0: No display; 1: Display Unit place of LED: Bit0: Output frequency (Hz) Bit1: Preset frequency (Hz, flashing) Bit2: Output current (A) Tens place of LED: Bit0: Running rotating speed (r/min) Bit1: Preset rotating speed (r/min, flashing) Bit2: Running line speed (m/s) Bit3: Preset line speed (m/s, flashing) Hundreds place of LED: Bit0: Output power Bit1: Output toque (%) Note: The default display shall be output frequency when all the parameters are 0	007H
P00.06	LED display parameter selection 2 when running	Binary setting: 0: No display; 1: Display Unit place of LED: Bit0: Output voltage (V) Bit1: AI1 (V) Bit2: AI2 (V) Bit3: Reserved Tens place of LED: Bit0: Analog closed loop feedback (%) Bit1: Analog closed loop reference (%, flashing) Bit2: Terminal status (Without unit) Bit3: DC bus voltage	00H
P00.07	LED display parameter selection when stop	Binary setting: 0: No display; 1: Display Unit place of LED: Bit0: Preset frequency (Hz) Bit1: Running speed (r/min) Bit2: Preset speed (r/min) Bit3: DC bus voltage Tens place of LED: Bit0: Running line speed (m/s) Bit1: Preset line speed (m/s) Bit2: Analog closed loop feedback (%) Bit3: Analog closed reference (%) Hundreds place of LED: Bit0: AI1 (V) Bit1: AI2 (V) Bit2: Reserved Bit3: Terminal closed reference (without unit) Note: The default display shall be set frequency when all the parameters are 0	009H

P01: Status display parameters			
P01.00	Main reference frequency channel	0: Disabled 1: Digital reference 1: Keyboard ∧∨ reference 2: Digital reference 2: Terminal UP/DN reference 3: Digital reference 3: Communication setting 4: AI analog reference 5: Terminal PULSE reference (Set only for X6, non-standard customization is required) 6: Panel potentiometer set 7: Process closed-loop PID	0
P01.01	Main reference set frequency	-2000.00～2000.00Hz	0.0
P01.02	Auxiliary reference set frequency	-2000.00～2000.00Hz	0.0
P01.03	Set frequency	-2000.00～2000.00Hz	0.0
P01.04	Output frequency	-2000.00～2000.00Hz	0.0
P01.05	Output voltage	0～480V	0
P01.06	Output current	0.0～3Ie	0.0
P01.07	Output torque	-300.0～+300.0%	0.0
P01.08	Motor power	0.0～200.0% (Relative to the rated power of the motor)	0.0
P01.09	Bus voltage	0～800V	0
P01.10	Operation state of the drive	0~7FFFH Bit0: Run/Stop Bit1: Rev/Fwd Bit2: Running at zero speed Bit3: Accelerating Bit4: Decelerating Bit5: Running at constant speed Bit6: Reserved Bit7: Tuning Bit8: Over-current limiting Bit9: DC over-voltage limiting Bit10: Torque limiting Bit11: Speed limiting Bit12: Drive in fault Bit13: Speed control	0
P01.11	State of digital input terminal	0～FFH, 0: OFF; 1: ON (The high-speed pulse reference will not be refreshed synchronously)	00
P01.12	State of digital output terminal	0～FH, 0: Open, 1: Close (The high-speed pulse output will not be refreshed synchronously)	0
P01.13	AI1 input voltage	0.00～10.00V	0.00
P01.14	AI2 input voltage	0.00～10.00V	0.00

P01.15	AO1 output	0.0～100.0% (Percentage relative to the full range)	0.0
P01.16	Reserved		0.0
P01.17	Reserved		0.0
P01.18	X6 terminal pulse frequency reference	0.0～100.0kHz	0.0
P01.19	Radiator 1 temperature	-40.0～100.0℃	0.0
P01.20	Accumulated power-on hours	0～Max. 65535 hours	0
P01.21	Accumulated running hours	0～Max. 65535 hours	0
P02: Basic parameters			
P02.00	Control mode	Control mode selection of Asynchronous motor 0: Reserved 1: Reserved 2: V/F control without PG	2
P02.01	Running command channel selection	0: Keyboard control 1: Terminal control 2: Communication control	0
P02.02	Running direction setting	0: Forward running 1: Reverse running	0
P02.03	Main reference frequency source selection	0: Digital reference 1: Keyboard ∧∨ reference 1: Digital reference 2: Terminal UP/DN reference 2: Digital reference 3: Communication reference 3: AI analog reference 4: Terminal PULSE reference 5: Panel potentiometer reference 6: Process closed loop PID	0
P02.04	Digital setting of main reference frequency	P02.13～P02.12	50.00
P02.05	Main & Auxiliary reference digital frequency control	Unit place of LED: 0: Main frequency power off storage 1: The main frequency is powered off and not stored Tens place of LED: 0: Stop master frequency hold 1: The main frequency of shutdown is restored (P02.04) Hundreds place of LED: Reserved Hundreds place of LED: 0: Downtime auxiliary frequency hold 1: Shutdown auxiliary frequency reset Note: The unit and tens places are only applicable for P02.03=0, 1, 2 The hundreds and thousands place are only applicable for P02.06=1, 2, 3	0000H

P02.06	Auxiliary reference frequency source selection	0: No auxiliary reference 1: Digital reference 1: Keyboard ∧∨ reference 2: Digital reference 2: Terminal UP/DN reference 3: Digital reference 3: Communication reference 4: AI analog reference 5: Terminal PULSE reference 6: Panel potentiometer reference 7: Process closed loop PID	0
P02.07	Auxiliary reference coefficient	0.00～9.99	1.00
P02.08	Main/Auxiliary reference calculation	0：+ 1：-	0
P02.09	Acceleration time	0.0～3600.0	6.0
P02.10	Deceleration time	0.0～3600.0	6.0
P02.11	Unit of Acceleration/Deceleration time	0：0.1s 1：s 2 ：min	1
P02.12	Max. Output frequency	P02.13～2000.00Hz	50.00
P02.13	Upper limit frequency	P02.14～P02.12	50.00
P02.14	Lower limit frequency	0.0～P02.13	0.0
P02.15	Upper limit of skip frequency	P02.16～P02.13	0.0
P02.16	Lower limit of skip frequency	0.00～P02.15	0.0
P02.17	Jog Acceleration/Deceleration time	0.1～60.0s	6.0
P02.18	Reserved		
P02.19	Frequency of jog running	0.1～50.00Hz	5.00
P03: Motor parameters			
P03.00	Rated power of motor	0.1～999.9kW	Depending of model
P03.01	Rated voltage of motor	0～Rated voltage of drive (P98.04)	Depending of model
P03.02	Rated current of motor	0.1～999.9A	Depending of model
P03.03	Rated frequency of motor	1.0～2000.00Hz	Depending of model
P03.04	Rated rotating speed of motor	0～60000rpm	Depending of

			model
P03.05	Motor power factor	0.001～1.000 It shall be used when calculating the motor parameters with the nameplates	Depending of model
P03.06	Stator resistance of motor (R1)	0.00%～50.00%	Depending of model
P03.07	Leakage inductance of motor % (X)	0.00%～50.00%	Depending of model
P03.08	Rotator resistance of motor (R2)	0.00%～50.00%	Depending of model
P03.09	Mutual inductance of motor (Xm)	0.0%～2000.0%	Depending of model
P03.10	No-load current of motor (IO)	0.1～999.9A	Depending of model
P03.11	Overload protection factor of motor	20.0%～110.0% Set action level (%) = Motor rated current/Drive rated current × 100 low speed compensation actual action level = Set action level × (Output frequency/30Hz ×45+55) Actual converted current of overload protection = sampling current/overload protection action level	100.0
P03.12	Motor parameter auto-tuning	0: Disabled 1: Enabled (Motor in static status) 2: Enabled (Motor in rotate status) 3: Reserved (According to the nameplate setting)	0
P03.13～P03.15	Reserve		
P05: Vector and torque control parameters			
P05.00	Speed loop low-speed proportional gain (ASR1-P)	0.1～200.0	10.0
P05.01	Speed loop low-speed integral time (ASR1-I)	0.000～10.000S	0.200s
P05.02	ASR switching frequency 1	0.0%～50.0%	10.0%
P05.03	Speed loop high-speed proportional gain (ASR2-P)	0.1～200.0	10.0
P05.04	Speed loop high-speed integral time (ASR2-I)	0.000～10.000S	0.600s
P05.05	ASR switching	0.0%～100.0%	20.0%

	frequency 2		
P05.06	Speed/Torque control mode	0: Speed control mode 1: Torque control mode	0
P05.07	Torque reference selection	0: Digital reference 1: AI reference 2: Terminal PULSE reference 3: Communication reference 4: Closed loop output 5: PLC card or bus reference (Reserved)	0
P05.08	Digital reference of torque	-300.0%～300.0%	0.0%
P05.09	Electric torque limit value	0.0%～+300.0%	180.0%
P05.10	Braking torque limit value	0.0%～+300.0%	180.0%
P05.11	FWD speed limit value	0.0%～+100.0%	100.0%
P05.12	REV speed limit value	0.0%～+100.0%	100.0%
P07: VF control parameters			
P07.00	Motor V/F curve setting	0: User-customized V/F curve 1: 2 times power curve 2: 1.8 times power curve 3: 1.2 times power curve	0
P07.01	Motor V/F frequency 3	P07.03～P02.12	0.0
P07.02	Motor V/F voltage 3	P07.04～100.0%	0.0
P07.03	Motor V/F frequency 2	P07.05～P07.01	0.0
P07.04	Motor V/F voltage 2	P07.06～P07.02	0.0
P07.05	Motor V/F frequency 1	0.0～P07.03	0.0
P07.06	Motor V/F voltage 1	0.0～P07.04	0.0
P07.07	Motor torque increase	0.0%～30.0%	0.1
P07.08	Motor torque increase cut-off point	0.0%～50.0% (Corresponds to P03.03)	10.0
P07.09	Motor stable factor	0~255	10
P07.10	AVR function	0: Disabled 1: Always enabled 2: Disabled only in deceleration situation	2
P07.11	Drooping control value	0～30.00Hz	0.00
P08: Start and stop control parameters			
P08.00	Startup mode	0: Start from the startup frequency 1: Start from the startup frequency after braking	0
P08.01	Startup delay time	0.00～30.00s	0.0
P08.02	Startup frequency	0.0～MIN (P02.13, 60.00)	0.0
P08.03	Startup frequency retention time	0.00～10.00s	0.00

P08.04	Startup DC braking current	5.0%～100.0% of the rated current of the drive	0.0
P08.05	Startup DC braking time	0.00 (Disabled) 0.01~30.00s	0.00
P08.06	Stop mode	0: Decelerate to stop 1: Coast to stop 2: Decelerate to stop+DC braking	0
P08.07	Stop frequency detection	0.0～150.0Hz	0.5
P08.08	Stop frequency detection retention time	0.00～10.00s	0.00
P08.09	Stop speed detection mode	0: Speed set value (The only one detection mode under the V/F mode) 1: Speed detection value	1
P08.10	Stop (Dwell) frequency	0.00～150.00Hz	2.00Hz
P08.11	Stop (Dwell) frequency retention time	0.00～10.00s	0.00s
P08.12	Initial frequency for stop DC braking	0.0～MIN（P02.13，60.0）	0.0
P08.13	Waiting time for stop DC braking	0.00～10.00s	0.00
P08.14	Stop DC braking current	20.0%～100.0% of the rated current of the drive	0.0
P08.15	Stop DC braking time	0.0 (Disabled) 0.01～30.00s	0.00
P08.16	Selecting restart function upon power fault	0: Disabled 1: Enabled	0
P08.17	Waiting time for restart upon power fault	0.0～3600.0s	0.0
P08.18	Anti-reverse selection	0: Reverse operation is allowed 1: Reverse operation is prohibited (Run at zero frequency upon reverse running command)	0
P08.19	FWD/REV dead-time	0.00～360.00s	0.00s
P08.20	FWD/REV switching mode	0: Switch once over the zero frequency 1: Switch once over the startup frequency	0
P08.21	User ratio of dynamic braking	0.0～100.0%	0.0
P08.22	Braking startup voltage	380V Model: 700~780V	690
		220V Model: 330~370V	350
P08.23	Deceleration time for emergency stop	0.00~100.00s	0.00s
P09: Switching quantity output parameter			
P09.00	X1 Function selection of input terminals	0: No function 1: Forward running (FWD)	1

P09.01	X2 Function selection of input terminals	2: Reverse running (REV) 3: External jog forward running control input 4: External jog reverse running control input 5: Three-wire operation control 6: Multi-stage reference terminal 1 7: Multi-stage reference terminal 2 8: Multi-stage reference terminal 3 9: Multi-stage reference terminal 4 10, 11: Reserved 12: Main reference frequency pulse input (Only set for X6, need non-standard customization) 13: Auxiliary reference frequency pulse input (Only set for X6, need non-standard customization) 14: Frequency increase command (UP) 15: Frequency decrease command (DN) 16: External fault normally open 17: External fault normally closed input 18: External interrupt normally open contact input 19: External interrupt normally closed contact input 20, 21: Reserved 22: External reset (RESET) input 23: Coast to stop input (FRS) 24: Reserved 25: Stop DC braking input command 26~28: Reserved 29: Closed loop prohibition 30~33: Reserved 34: Main reference frequency source selection 1 35: Main reference frequency source selection 2 36: Main reference frequency source selection 3 37: Switching main reference frequency to AI 38: Command source selection 1 39: Command source selection 2 40: Switching command to terminal 41: FWD disabled 42: REV disabled 43: Drive running disabled 44: External stop command (It is valid for all the control modes, the device will be stopped in accordance with the current stop mode) 45: Auxiliary reference frequency reset 46~59: Reserved 60: Emergency stop 61~73: Reserve 74: PID set pulse input (Only set for X6, need non-standard customization) 75: PID feedback pulse input (Only set for X6, need	2
P09.02	X3 Function selection of input terminals		0
P09.03	X4 Function selection of input terminals		0

		non-standard customization)	
P09.04	Reserve		
P09.05	FWD/REV running mode setting	0: Two-wire control mode 1 1: Two-wire control mode 2	0
P09.06	Terminal UP/DN acceleration/deceleration rate	0.01~99.99Hz/s	1.00
P09.07	Terminal filtering time	0~500ms	10
P09.08	Maximum input pulse frequency	0.1~100.0kHz	10.0
P09.09	Pulse reference central point selection	0: Without central point 1: With central point, it is (P09.08)/2, It is positive when the frequency is less than the central point frequency 2: With central point, it is (P09.08)/2, It is positive when the frequency is larger than the central point frequency	0
P09.10	Pulse set filtering time	0.00~10.00s	0.05
P09.11	Input terminal enabled status setting	Binary setting: 0: Normal logical, enabled upon connection 1: Inverted logical, enabled upon disconnection Unit place of LED: Bit0~Bit3: X1~X4 Tens place of LED: Bit0: X5	00H
P09.12	Virtual input terminal setting	Binary setting: 0: Disabled 1: Enabled Unit place of LED: Bit0~Bit3: X1~X4 Tens place of LED: Bit0: X5	00H
P09.13	Output selection of Multi-functional output terminal Y2	0: Open collector output terminal Y2 1: DO terminal output	0
P09.14	Open collector output terminal Y1	0: Drive in running state signal (RUN) 1: Frequency arrival signal (FAR) 2: Reserved 3: Frequency level detection signal (FDT)	0
P09.15	Open collector output terminal Y2		1

P09.16	Relay R1 output function selection	4: Reserved 5: Overload detection signal (OL) 6: Lockout for under-voltage (LU) 7: External fault stop (EXT) 8: Frequency upper limit (FHL) 9: Frequency lower limit (FLL) 10: Drive running at zero-speed 11~14: Reserved 15: Drive ready for running (RDY) 16: Drive fault 17: Host device switch signal 18, 19: Reserved 20: Drive FWD/REV indication terminal 21~24: Reserved	15
P09.17	Output terminal enabled status setting	Binary setting: 0: Enabled upon connection 1: Enabled upon disconnection Unit place of LED: Bit0~Bit3: Y1, Y2, R1	0
P09.18	Relay R output delay	0.1~10.0s	0.1
P09.19	Frequency arrival (FAR) detection width	0.0~P02.13	2.5
P09.20	FDT level upper limit	P09.21～P02.13	50.0
P09.21	FDT level lower limit	0.0～P09.20	49.0
P09.22	DO terminal output	0: No function 1: Output frequency 2: Set frequency (0~Maximum output frequency) 3: Output current Iei (0~2*Iei) 4: Output current Iem (0~2*Iem) 5: Output torque (0~3*Tem) 6: Output torque current (0~3*Item) 7: Motor rotating speed (0~Maximum output frequency) 8: Output voltage (0~1.5*Ve) 9: AI1 (0~10V/4~20mA) 10: AI2 (0~10V/4~20mA) 11: Reserved 12: Output power (0~2*Pe) 13: Electric torque limit value (0~3Tem) 14: Braking torque limit value (0~3Tem) 15, 16: Reserved 17: Percentage of host device (0~65535) 18, 19: Reserved	0
P09.23	Maximum output pulse frequency	0.1~50.0	10.0
P09.24	Pulse output central	0: Without central point	0

	point selection	1: With central point, It is (P09.23)/2, It is positive when the frequency is less than the central point frequency. 2: With central point, It is (P09.23/2), It is positive when the frequency is larger than the central point frequency.	
P09.25	Pulse output filtering time	0.00~10.00s	0.05
P10: Analog Input/Output parameters			
P10.00	Analog input properties	Unit place: AI1 0: Voltage input 1: Current input Tens place: AI2 0: Voltage input 1: Current input	00H
P10.01	AI function selection	Unit place: AI1 function selection 0: No function 1: Main reference frequency setting 2: Auxiliary reference frequency setting 3~7: Reserved 8: Torque command (Reference) Tens place: AI2 function selection 0: No function 1: Main reference frequency setting 2: Auxiliary reference frequency setting 3~7: Reserved 8: Torque command (Reference)	00H
P10.02	AI1 zero offset correction	-1.00~1.00V	0.0
P10.03	Reserved		
P10.04	AI1 filtering	0.000～10.000s	0.010
P10.05	Reserved		
P10.06	AI2 zero offset correction	-1.00～1.00V	0.0
P10.07	Reserved		
P10.08	AI2 filtering	0.000～10.000s	0.010
P10.09	Reserved		
P10.10	Curve selection	Unit place of LED: AI1 curve selection 0: Curve 1 1: Curve 2 Tens place of LED: AI2 curve selection 0: Curve 1 1: Curve 2 Hundreds place of LED: Pulse input curve selection 0: Curve 1	000H

		1: Curve 2	
P10.11	Maximum reference of curve 1	P10.13～100.0%	100.0
P10.12	Actual value corresponds to the maximum reference of curve 1	Frequency reference: 0.0~100.0% Fmax Process closed loop reference: 0.0~100.0% maximum frequency (ie., the corresponding analog input of 0~10V)	100.0
P10.13	Minimum reference of curve 1	0.0%~P10.11	0.0
P10.14	Actual value corresponds to the minimum reference of curve 1	The same as P10.12	0.0
P10.15	Maximum reference of curve 2	P10.17~100.0%	100.0
P10.16	Actual value corresponds to the maximum reference of curve 2	The same as P10.12	100.0
P10.17	Minimum reference of curve 2	0.0%~P10.15	0. 0
P10.18	Actual value corresponds to the minimum reference of curve 2	The same as P10.12	0. 0
P10.19	Types of analog output	Unit place of LED: AO1 selection 0: 0~10V or 0~20mA 1: 2~10V or 4~20mA	0H
P10.20	Analog output terminal AO1 functions	0: Output frequency (0~Maximum frequency) 1: Set frequency (0~Maximum frequency) 2: Set frequency (After Acc/Dec) (0~Maximum frequency) 3: Motor rotating speed (0~Max. rotating speed) 4: Output current (0~2*Iei) 5: Output current (0~2*Iem) 6: Output torque (0~3*Tem) 7: Reserved 8: Output voltage (0~1.2*Ve) 9: Bus voltage (0~800V) 10: AI1 after adjustment 11: AI2 after adjustment 12: Reserved 13: Output power (0~2*Pe) 14: Percentage of host device (0~4095)	0
P10.21	AO1 filtering	Reserved	
P10.22	AO1 gain	0.0%~200.0%	100.0%

P10.23	AO1 zero offset correction	-100.0%~100.0%	
P10.24	Analog output terminal AO2 functions	Reserved	
P10.25	AO2 filtering	Reserved	
P10.26	AO2 gain	Reserved	
P10.27	AO2 zero offset correction	Reserved	
Group P12: Advanced function parameters			
P12.00	Energy-saving running	0: Disabled 1: Enabled	0
P12.01	Carrier wave frequency	0.7~15.0kHz	6.0
P12.02	PWM mode optimization	Unit place: Enable the over modulation 0: Disabled 1: Enabled Tens place: Automatic adjustment selection for carrier wave frequency 0: No automatic adjustment 1: Automatic adjustment Hundreds place: Modulation mode 0: Two-phase/Three-phase switching 1: Three-phase modulation Thousands place: Low frequency carrier limit 0: Disabled 1: Enabled	1101H
P12.03	Current loop proportional gain ACR-P	1~5000	600
P12.04	Current loop integral time ACR-I	0.5~100.0ms	8.0
P12.05	Anti-trip function enabling	0~1	0
P12.06	Frequency reduction rate upon voltage compensation	0.00~99.99Hz/s	10.00
P12.07	Pre-magnetizing time	0.0~10.0s	0.0
P12.08	Minimum flux reference value	10%~150%	10
P12.09	Flux-weakening adjustment coefficient 1	0~30000	0
P12.10	Flux-weakening adjustment coefficient 2	0~30000	1000
P12.11	Flux-weakening control mode	0~1	1
P12.12	Fan control	0: Operate automatically 1: Fan operates continually during power-up	2

		2: Fan operates based on command	
P12.13	Pre-exciting current reference	0～100%	10%
P12.14	Two-phase modulation switching point	0～50.00Hz	15.00Hz
P12.15	Three-phase modulation switching point	0～50.00Hz	10.00Hz
P13: Multi-speed parameters			
P13.00	Multi-stage frequency 1	P02.13～P02.12	5.00
P13.01	Multi-stage frequency 2		10.00
P13.02	Multi-stage frequency 3		20.00
P13.03	Multi-stage frequency 4		30.00
P13.04	Multi-stage frequency 5		40.00
P13.05	Multi-stage frequency 6		45.00
P13.06	Multi-stage frequency 7		50.00
P13.07	Multi-stage frequency 8		5.00
P13.08	Multi-stage frequency 9		10.00
P13.09	Multi-stage frequency 10		20.00
P13.10	Multi-stage frequency 11		30.00
P13.11	Multi-stage frequency 12		40.00
P13.12	Multi-stage frequency 13		45.00
P13.13	Multi-stage frequency 14		50.00
P13.14	Multi-stage frequency 15		50.00
Group P14: Process PID parameters			
P14.00	Reference channel selection	0: Digital reference 1: Reserved 2: Reserved 3: Terminal PULSE reference 4: Serial port communication reference	0
P14.01	Feedback channel selection	0: AI1 analog reference 1~5: Reserved 6: Terminal PULSE reference	0
P14.02	PID digital reference	-100.0%～100.0%	0.0
P14.03	PID command Acceleration/Decelerati on time	0～3600.0s	0.0
P14.04	PID adjustment feature selection	0: Positive interaction 1: Reverse interaction	0

P14.05	Proportional gain KP	0.000~10.000	0.500
P14.06	Integral gain Ki	0.000~10.000	0.008
P14.07	Differential gain Kd	0.000~10.000	0.000
P14.08	Integral separation threshold	0.0~100.0%	30.0%
P14.09	Integral amplitude limit	0.0~100.0%	100.0%
P14.10	Differential control selection	0: Apply differential control to deviation 1: Apply differential control to feedback value	0
P14.11	Differential amplitude limit	0.0~100.0%	10.0%
P14.12	Sampling cycle	0.001~50.000s	0.010s
P14.13	Deviation limit	0.0~20.0%	2.0%
P14.14	PID upper limit channel	0: P14.16 digital reference 1: AI1 2, 3: Reserved	0.0
P14.15	PID lower limit channel	0: P14.17 digital reference 1: AI1 2, 3: Reserved	0
P14.16	PID upper limit digital setting	P14.17~100.0%	100.0%
P14.17	PID lower limit digital setting	0.0%~P14.16	0.0%
P14.18	Output filtering time	0.000~10.000s	0.010
P14.19	PID output feature selection	0: PID output is positive 1: PID output is negative	0
P14.20	PID offset value	-100.0~100.0%	0.0%
P14.21	PID output gain	0.0~250.0	1.0
P14.22	REV selection of PID output	0: When the PID output is a negative value, there is no limit 1: When the PID output is a negative value, the output is negative	1
P14.23	PID pre-set frequency	0.00~3000.00Hz	0.00
P14.24	PID pre-set frequency retention time	0.0~3600.0s	0.0
P14.25	PID fault detection selection	Unit place: PID feedbacks the fault detection selection 0: Continue to run, no alarm 1: Continue to run and display "AL.FbL" (feedback lost) or "AL.Fbo" (feedback exceeding limit) 2: Coast to stop and display "Er.FbL" (feedback lost) or "Er.Fbo" (feedback exceeding limit) Tens place: PID limit setting error processing selection 0: Continue to run, no alarm	00

		1: Continue to run and display "AL.PIL" 2: Coast to stop and display "Er.PIL"	
P14.26	PID feedback lost detection value	0.0~100.0%	0.0%
P14.27	PID feedback lost detection time	0.0s~25.0s	1.0
P14.28	PID feedback exceeding limit detection value	0.0~100.0%	100.0%
P14.29	PID feedback exceeding limit detection time	0.0s~25.0s	1.0
Group P15: Communication parameters			
P15.00	Protocol selection	0: MODBUS 1: Reserved	0
P15.01	Communication configuration	Unit place of LED: Baud rate selection 0: 4800bps 1: 9600bps 2: 19200bps 3: 38400bps Tens place of LED: Data format 0: 1-8-2-N format, RTU 1: 1-8-1-E format, RTU 2: 1-8-1-O format, RTU 3: 1-8-1-N format, RTU Hundreds place of LED: Wiring mode 0: Direct cabling (232/485) 1: Modem	001H
P15.02	Local address	0~247, 0 is the broadcast address	5
P15.03	Communication timeout detection time	0.0~1000.0s	0.0
P15.04	Response delay of the drive	0~1000ms	5
Group P97: Protection and fault parameters			
P97.00	Fault protection and alarm property setting 1	Unit place of LED: Action upon communication fault 0: Activate protection and coast to stop 1: Alarm and keep running 2: Alarm and stop in the stop mode (Only in serial port control mode) 3: Alarm and stop in the stop mode (in all control modes) Tens place of LED: Action upon contactor abnormality 0: Activate protection and coast to stop 1: Alarm and keep running Hundreds place of LED: Action upon EEPROM abnormality 0: Activate protection and coast to stop	0000H

		1: Alarm and keep running Thousands place of LED: Action upon 24V/10V short circuit 0: Activate protection and coast to stop 1: Alarm and keep running	
P97.01	Fault protection and alarm property setting 2	Unit place of LED: Action upon phase loss 0: Activate protection upon input and output phase loss 1: No protection upon input phase loss 2: No protection upon output phase loss 3: No protection upon input and output phase loss Tens place of LED: Action upon analog input (AI1, AI2) fault 0: Activate protection and decelerate to stop 1: Activate protection and coast to stop 2: Alarm and keep running	00H
P97.02	Fault indication selection 1	Unit place of LED: Action upon temperature sampling disconnection 1 : Activate temperature protection upon inverter and rectifier module and stop in the stop mode 1 : Activate temperature protection upon inverter and rectifier module and coast to stop 2 : Temperature alarm upon inverter and rectifier module and keep running 3 : No action to rectifier, activate temperature protection upon inverter and stop in the stop mode Tens place of LED: Reserved Hundreds place of LED: Reserved Thousands place of LED: Fault lockup function selection 0: Prohibited 1: Open (without fault output) 2: Open (with fault output)	000H
P97.03	Overload protection setting for motor	Unit place of LED: Overload compensation mode selection 0: No action 1: Common motor (With low-speed compensation) 2: Variable-frequency motor (Without low-speed compensation) Tens place of LED: Overload pre-alarm detection selection 0: Always detect 1: Detect only at constant speed Hundreds place of LED: Overload pre-alarm action	0001H

		selection 0: Alarm and keep running 1: Activate protection and coast to stop Thousands place of LED: Overload detection level selection 0: Relative to rated current of the motor (Er.oL2) 1: Relative to rated current of the drive (Er.oL1)	
P97.04	Overload pre-alarm detection level	20.0%～200.0%	130.0
P97.05	Overload pre-alarm detection time	0.0～60.0s	5.0
P97.06	Over-voltage stall selection	Reserved	
P97.07	Over-voltage point at stall	Reserved	
P97.08	Auto current limiting action selection	Reserved	
P97.09	Auto current limiting level	20.0%～200.0%Ie	150.0
P97.10	Frequency reduction rate upon current limiting	Reserved	
P97.11～P97.12	Reserved		
P97.13	The first fault type	0: No abnormal record 1: Over-current during the drive acceleration (Er.oC1) 2: Over-current during the drive deceleration (Er.oC2) 3: Over-current when the drive is running with constant speed (Er.oC3) 4: Over-voltage during the drive acceleration (Er.oU1) 5: Over-voltage during the drive deceleration (Er.oU2) 6: Over-voltage when the drive is running with constant speed (Er.oU3) 7: Reserved 8: Input side phase loss (Er.IrF) 9: Output side phase loss (Er.odF) 10: Power module protection (Er.drv) 11: Inverter bridge over-temperature (Er.oH1) 12: Reserved 13: Drive overload (Er.oL1) 14: Motor overload (Er.oL2)	0

		15: External fault (Er.EFT) 16: EEPROM read-write error (Er.EEP) 17: Abnormal serial port communication (Er.SC1) 18: Abnormal Contactor (Er.rLy1) 19: Abnormal current detection circuit (Er.CUr) 20: Reserved 21: PID feedback lost (Er.FbL) 22: Reserved 23: Keyboard parameter copy error (Er.CoP) 24: Poor auto-tuning (Er.TUn) 25~27: Reserved 28: Parameter setting error (Er.PST) 30~40: Reserved 41: Abnormal AI analog input fault (Er.AIF) 42: Inverter module temperature sampling disconnection protection (Er.THI) 43: Reserved 44: Reserved Others: Reserved Note: ① Er.drv fault can not be reset until 10s later; ② For continuous over-current less than 3 times (Including 3 times), it can not be reset until 6s later; if it is more than 3 times, it can not be reset until 200s later; ③ The keyboard displays AL.xxx in case of any fault (e.g. in case of the contactor fault, keyboard displays Er.xxx if there is protection action, and displays AL.xxx if continuing running with alarm)	
P97.14	The second fault type	The same as P97.13	0
P97.15	The third fault type	The same as P97.13	0
P97.16	DC bus voltage at the 3rd fault	0～999V	0V
P97.17	Actual current at the 3rd fault	0.0～999.9A	0.0
P97.18	Running frequency at the 3rd fault	0.0～2000.0Hz	0.0
P97.19	Drive running status at the 3rd fault	0～FFFFH	0000
Group P98: Drive parameters			
P98.00	Series No.	0～FFFFH	Manufacturer setting
P98.01	MCU software version No.	0.00～99.99	Manufacturer setting

P98.02	User-customized version No.	0～9999	Manufacturer setting
P98.03	Rated capacity	Output power, 0~999.9KVA (Depending on model)	Manufacturer setting
P98.04	Rated voltage	0～999V (Depending on model)	Manufacturer setting
P98.05	Rated current	0～999.9A (Depending on model)	Manufacturer setting
P98.06	Drive series selection	0: 220V 1: 380V	Manufacturer setting

Chapter 6 Troubleshooting

6.1 Displaying exception and solutions

All possible fault types for MV260 are summarized as shown in table 6-1. The number of the fault code is 36. Before consulting the service department, the user can perform self-check according to the hints of the table and record the fault symptoms in detail. To seek for service support, please contact the sales person.

Table 6-1 Fault record table

Fault code	Fault type	Possible fault cause	Solutions
Er.oC1	Acceleration over-current of the drive	The acceleration time is too short	Lengthen the acceleration time
		The motor parameters are incorrect	Perform the parameter auto-tuning of the motor
		The drive power is too low	Adopt the drive with high power class
		V/F curve is improper	Adjust the V/F curve setting and the manual torque increase
Er.oC2	Deceleration over-current of the drive	The deceleration time is too short	Lengthen the deceleration time
		There is potential energy load or the load inertial torque is large	Use additionally appropriate dynamic braking components
		The drive power is low	Adopt the drive with high power class
Er.oC3	Constant speed over-current of the drive	The acceleration/deceleration time is too short	Lengthen the acceleration/deceleration time appropriately
		Sudden load change or abnormal load	Check the load
		Low grid voltage	Check the input power supply
		The drive power is low	Adopt the drive with high power class
Er.oU1	Acceleration over-voltage of the drive	Abnormal input voltage	Check the input power supply
		Acceleration time is too short	Lengthen the acceleration time appropriately
Er.oU2	Deceleration over-voltage of the drive	The deceleration time too short (Compared with regeneration energy)	Lengthen the deceleration time
		There is potential energy load or the load inertial torque is large	Select appropriate dynamic braking components
Er.oU3	Constant speed over-voltage of	The acceleration/deceleration time is too short	Lengthen the acceleration/deceleration time appropriately

Fault code	Fault type	Possible fault cause	Solutions
	the drive	Abnormal input voltage	Check the input power supply
		The input voltage fluctuates abnormally	Install the input rector
		Large load inertia	Adopt dynamic braking components
Er.IrF	Input side phase loss	There is phase loss in input R,S,T	Check the installation wiring Check the input voltage
Er.odF	Output side phase loss	There is phase loss in output U,V,W	Check the output wiring Check the motor and the cables
Er.drv	Power module protection	There is inter phase short circuit or grounding short circuit in output three phases	Rewiring and check if the motor insulation is good
		Instantaneous over-current of the drive	See the over-current solutions
		The duct is blocked or the fan is damaged	Unblock the duct or replace the fan
		The ambient temperature is too high	Lower the ambient temperature
		The wirings or the plug-in units of the control board loosens	Check them and rewiring
		Abnormal current waveform caused by output phase loss and so on	Check the wiring
		The auxiliary power supply is damaged; the drive voltage is insufficient	Seek for service support
		Inverter module bridging conduction	Seek for service support
		Abnormal control board	Seek for service support
		Braking pipe damaged	Seek for service support
Er.oH1	Inverter module heatsink over-temperature	The ambient temperature is too high	Lower the ambient temperature
		The duct is blocked	Clean the duct
		The fan is damaged	Replace the fan
		The inverter module is abnormal	Seek for service support
Er.oH2	Rectifier heatsink over-temperature	The ambient temperature is too high	Lower the ambient temperature
		The duct is blocked	Clean the duct
		The fan is damaged	Replace the fan
Er.oL1	Drive overload	The motor parameters are incorrect	Perform the parameter auto-tuning of the motor
		The load is too large	Adopt the drive with higher power

Fault code	Fault type	Possible fault cause	Solutions
		The DC braking amount is too large	Reduce the DC braking current and lengthen the braking time
		The acceleration time is too short	Lengthen the acceleration time
		The grid voltage is too low	Check the grid voltage
		V/F curve is improper	Adjust V/F curve and torque increase
Er.oL2	Motor overload	The motor overload protection factor setting is incorrect	Set the overload protection factor of motor correctly
		The motor is blocked or the sudden change of load is too large	Check the load
		The universal motor runs at low speed for a long time, with heavy load	If long-term low-speed running is required, special motor should be used.
		The grid voltage is too low	Check the grid voltage
		V/F curve is improper	Set V/F curve and torque increase correctly
Er.EFT	Emergency stop or external device fault	Stop suddenly by pressing the "STOP" key	See the function definition of the "STOP" key in P00.04
		External fault emergency-stop terminal is enabled	After the external fault is revoked, release the external fault terminal
Er.EEP	EEPROM Read/Write fault	The read/write error of the control parameters occurs	Reset by pressing the STOP/RESET key, seek for service support
Er.SC1	Abnormal remote serial port communication	The baud rate is set improperly	Set the baud rate properly
		Serial port communication error	Reset by pressing the STOP/RESET key, seek for service support
		The fault alarm parameters are set improperly	Modify the P15.03 and P97.00 settings
		The host device does not work	Check if the host device is working and if the wiring is correct
Er.rLy	Abnormal contactor	The grid voltage is too low	Check the grid voltage
		The contactor is damaged	Replace the contactor of the main circuit, seek for service support
		The power-up buffer resistance is damaged	Replace the buffer resistance, seek for service support
		The control circuit is damaged	Seek for service support
		Input phase loss	Check the input R,S,T wiring

Fault code	Fault type	Possible fault cause	Solutions
Er.CUr	Current detection circuit abnormal	The wirings or the plug-in units of the control board loosens	Check them and rewiring
		The auxiliary power supply is damaged	Seek for service support
		The Hall device is damaged	Seek for service support
		The amplifying circuit is abnormal	Seek for service support
		The AI analog input voltage is too high	Reduce the AI analog input voltage to less than 12V
Er.CPU	System interference	Severely interfered	Reset by pressing STOP/RESET key or install a power filter to the input side of the power supply
		DSP read/write error of the main control panel	Reset by pressing the STOP/RESET key, seek for service support
Er.FbL	Closed loop feedback loss	The parameters for feedback loss are set improperly	Modify the P14.26 setting
		Feedback wire-break	Rewiring
		The reference of closed loop feedback value is too low	See the P14.01 setting and increase the feedback reference
Er. EGL	External reference command lost	During the frequency main reference selection analog current reference, the analog reference signal is disconnected or too low (less than 2mA)	Check the wiring or adjust the input type of the reference signal
Er.CoP	Operation panel parameter copying error	The operation panel parameters are incomplete or the operation panel version is inconsistent with main control panel version	Refresh the operation panel data and version, use P00.03=1 for uploading the parameters firs and then use P00.03=2 or 3 for downloading
		The operation panel EEPROM is damaged	Seek for service support
Er.TUn	Poor auto-tuning	The nameplate parameters of the motor are incorrect	Set the parameters properly according to the motor nameplate
		When reverse running is prohibited, reverse rotating auto-tuning is performed	Cancel the reverse running prohibition
		Auto-tuning overtime	Check motor wiring
			Check the P02.13 (upper limit frequency) and see whether the P02.14 set value is lower than rated frequency

Fault code	Fault type	Possible fault cause	Solutions
Er.PST	Parameter setting error	Wrong analog AI function selection setting	The same function shall not be selected for different analogs simultaneously
Er.24v	Control board 24V power short circuit	Short circuit of P24 and terminal COM	Confirm whether the wiring of P24 and COM is correct
		The interface board circuit is damaged	Replace the interface board, seek for service support
Er.GdF	Grounding short circuit fault	One of the phases (The most likely one is phase U) is grounding short circuited	Check the grounding short circuit of the output three phase and troubleshoot it
Er.dEv	Too large speed deviation (DEV) fault	DEV deviation detection value setting is too low	Modify the DEV detection value setting
		Heavy load fluctuation	Eliminate the load vibration
Er.Fbo	PID feedback exceeding limit	PID feedback value out of limited range	Check whether the feedback value input voltage is normal, if normal, seek for service support
Er.oHL	Motor over-temperature	The ambient temperature is too high	Lower the ambient temperature
		The motor duct is blocked	Clean the motor duct
		The motor fan is damaged	Replace the motor fan
		The motor operates at low frequency and large load for a long time	Add a large fan for the motor to dissipate heat
Er.AIF	Abnormal AI analog input	Abnormal control circuit	Seek for service support
		The input analog is out of the range and the absolute value is greater than 11V	Check the analog input
Er.THI	Inverter module temperature sampling disconnection	Abnormal temperature sampling circuit	Seek for service support
		The inverter module temperature sampling wire is poorly connected	Check the temperature sampling wire connection
Er.THr	Rectifier module temperature sampling disconnection	Abnormal temperature sampling circuit	Seek for service support
		The temperature sampling wire is poorly connected	Check the temperature sampling wire connection
Er.10v	Control board ±10V power short circuit	±10V grounding	Confirm whether the ±10V wiring is correct
		The interface board circuit is damaged	Replace the interface board, seek for service support

Fault code	Fault type	Possible fault cause	Solutions
Er.rEF	Abnormal internal over-current reference	The control board circuit is damaged	Seek for service support
Er.PIL	Wrong PID limit value setting	The PID lower limit set value exceeds PID upper limit set value	Adjust the PID upper/lower limit set value

All the possible alarm types for MV260 are summarized as shown in table 6-2. For details, please refer to the group P97 function code setting. If the fault disappears automatically during the running process, the drive will also automatically reset to the status before the alarm (Except AL.SC1, for details, please refer to the group P97 function code description).

Table 6-2 Alarm code table

Alarm code	Alarm type	Possible alarm causers	Solutions
AL.oL1	Drive overload	The motor parameters are incorrect	Perform the parameter auto-tuning of the motor
		The load is too large	Adopt the drive with higher power
		The DC braking amount is too large	Reduce the DC braking current and lengthen the braking time
		When instantaneous stop happens, restart the rotating motor	Set the start mode P08.00 as the speed tracking restart
		The acceleration time is too short	Lengthen the acceleration time
		The grid voltage is too low	Check the grid voltage
		V/F curve is improper	Adjust V/F curve and torque increase
AL.oL2	Motor overload	The motor overload protection factor setting is incorrect	Set the overload protection factor of motor correctly
		The motor is blocked or the sudden change of load is too large	Check the load
		The universal motor runs at low speed for a long time, with heavy load	If long-term low-speed running is required, special motor should be used
		The grid voltage is too low	Check the grid voltage
		V/F curve is improper	Set V/F curve and torque increase correctly
AL.EEP	EEPROM read/write fault	The read/write error of the control parameters occurs	Reset by pressing the STOP/RESET key, seek for service support
AL.SC1	Abnormal serial port	The baud rate is set improperly	Set the baud rate properly

Alarm code	Alarm type	Possible alarm causers	Solutions
	communication	Serial port communication error	Reset by pressing the STOP/RESET key, seek for service support
		The fault alarm parameters are set improperly	Modify the P15.03 and P97.00 settings
		The host device does not work	Check if the host device is working and if the wiring is correct
AL.rLy1	Abnormal contactor	The grid voltage is too low	Check the grid voltage
		The contactor is damaged	Replace the contactor of the main circuit, seek for service support
		The power-up buffer resistance is damaged	Replace the buffer resistance, seek for service support
		The control circuit is damaged	Seek for service support
		Input phase loss	Check the input R,S,T wiring
AL.FbL	Closed loop feedback loss	The parameters for feedback loss are set improperly	Modify the P14.26 setting
		Feedback wire-break	Rewiring
		The reference of closed loop feedback value is too low	See the P14.01 setting and increase the feedback reference
AL.EGL	External reference command lost	During the frequency main reference selection analog current reference, the analog reference signal is disconnected or too low (Less than 2mA)	Check the wiring or adjust the input type of the reference signla
AL.24v	Control board 24V power short circuit	Short circuit of P24 and terminal COM	Confirm whether the wiring of P24 and COM is correct
		The interface board circuit is damaged	Replace the interface board, seek for service support
AL.Fbo	Closed loop feedback loss	The parameters for feedback loss are set improperly	Modify the P14.26 setting
AL.PIL	Wrong PID limit value setting	The PID lower limit set value exceeds PID upper limit set value	Adjust the PID upper/lower limit set value

NOTE

Please carefully choose the fault alarm function; otherwise, the accident range extension, the human injury and the property damage may be caused.

6.2 Operation exception and solutions

Table 6-3 Operation exception and solutions

Symptoms	Conditions	Possible causes	Solutions
The operation panel has no response	An individual key or each key has no response	The locking function of the operation panel takes effect	In stop or running status, press the "ENTER/DATA" key and retain pressure on it, then press the "V" key successively for three times, after that, you can unlock it.
			Completely power off the drive and then power it up
		The wires of the operation panel have poor contact	Check the wires and perform the hot plug again
		The keys of the operation panel are damaged	Replace the operation panel or seek for service support
The function code can not be modified	Can not be modified in running status	The function code can not be modified in running status	Modify it in the stop status
	A portion of function code can not be modified	The function code P00.01 is set as 1 or 2	Set the P00.01 as 0
		The function code is actual detection value	Actual parameters can not be changed by users
	There is no response when "MENU/ESC" key is pressed	The locking function of the operation panel takes effect or others	See the solutions to "the operation panel has no response"
	Can not enter the editing state after pressing the "MENU/ESC" key, the function code status display is 0000	User password is set	Input the user password correctly
			Seek for service support
The drive stops unexpectedly during operation	In the case that there is no stop command, the drive stops automatically and the run LED is off	Fault alarm occurs	Find out the fault causes and reset the fault
		There is power supply interruption	Check the power supply
		Running command channel switches	Check the relevant function code setting of the operation and running command channel
		Too large DEV	Modify the DEV detection value setting

Symptoms	Conditions	Possible causes	Solutions
		The positive/negative logic of the control terminals changes	Check if the P09.15 setting corresponds with the requirements
	In the case that there is no stop command, the motor stops automatically and the drive run indicator light is on, running at zero frequency	Fault resets automatically	Check the fault auto reset setting and find out the fault caused
		External interrupt	Check the external interrupt setting and find out the fault source
		The set frequency is 0	Check the set frequency
		The startup frequency is higher than the set frequency	Check the startup frequency
		There is something wrong with the skip frequency setting	Check the skip frequency setting
		The closed loop output is negative when the reverse running is prohibited	Check the P14.22 and the P08.18 setting
		Enable the "disabling forward run" terminal during forward run process	Check the terminal function setting
		Enable the "disabling reverse running" terminal during reverse running process	Check the terminal function setting
		Transient low-voltage compensation is applied when power-fault restart and the power supply voltage is to low	Check the power-fault restart function setting and the input voltage
The drive does not work	The drive does not work after the run key is pressed and the running LED is off	The terminal with the coast-to-stop function is enabled	Check the coast-to-stop terminal
		The "disabling run" terminal of the drive is enabled	Check the "disabling run" terminal of the drive
		The terminal with the external stop function is enabled	Check the terminal with the external stop function
		Under the three-wire control mode, the terminal with the three-wire operation control function is not closed	Set and close the three-wire operation control terminal
		Fault alarm occurs	Troubleshoot
		The virtual terminal function of the host device is set improperly	Cancel the virtual terminal function of the host device or set the function properly through the host device, or modify the P09.16 setting

Symptoms	Conditions	Possible causes	Solutions
		The forward/reverse logic of the input terminal is set improperly	Check the P09.15 setting
When the drive is started, the report -LU- runs immediately	The thyristor or the contactor disconnectes and the drive load is large	Since the thyristor or the contactor is not closed, when the drive runs with large load, the DC bus voltage of the main circuit will drop; the drive will display -LU- first and will not display Er.JCF fault	Run the drive after the thyristor or the contactor is closed completely

Chapter 7 Maintenance

The influence of the ambient temperature, humidity, dust and vibration as well as the aging devices in the drive may cause the drive faults. Thus, it is necessary to carry out daily and periodical maintenance.

7.1 Daily maintenance

🕮 Note

Before inspection and maintenance, please confirm the following items first. Otherwise, electric shock may occur.

(1) The power supply of the drive has been cut off.

(2) Ensure that the charging LED lamp is OFF.

(3) The voltage between terminals (+DC) and terminal (-DC) measured by DC high-voltmeter should be below 36V.

The drive should be working in the environments stipulated in Section 2.2. In addition, there may be some unexpected situations during the operation, so users should carry out daily maintenance according to the instructions in the following table. The effective ways to prolong the service life of the drive is to maintain a good operating environment, record daily operating data and discover the cause of abnormity as early as possible.

Table7-1 Instructions for daily inspection

Inspection items	Inspection essentials			Judgment standard
	Inspection contents	Cycle	Inspection means	
Operating environment	1. Temperature and humidity	Anytime	1. Temperature meter and hygrometer	1. -10℃~+40℃, derating is required at 40℃~50℃
	2. Dust, water and drop leak		2. Visual detection	2. No signs of drop of water and drop leak
	3. Odor		3. Smell	3. No strange smell
Drive	1. Vibration and heat generation	Anytime	1. Touch	1. The vibration is normal and stable. The temperature of the enclosure and the operating of the fan is normal
	2. Noise		2. Hear	2. No abnormal sound
Motor	1. Heat generation	Anytime	1. Touch by hand	1. Generating heat without any exception
	2. Noise		2. Hear	2. Low and regular noise
Running status	1. Output current	Anytime	1. Current meter	1. Within the rated range and three-phase equilibrium
	2. Output voltage		2. Voltmeter	2. Within the rated range and three-phase equilibrium

	3. Internal temperature		3. Thermometer	3. The difference with the ambient temperature is less than 35℃

2. Periodical maintenance

The users may carry out periodical maintenance of the drive once every 3 or 6 months according to the operating environment.

🕮 Note

(1) Only the specially trained professionals are allowed to dismantle, maintain and replace parts of the device.

(2) Do not leave any screws or washers in the machine, otherwise, device damage may be caused.

General inspection details:

(1)Check if the screws of the control terminal are loose. If so, use the screwdriver to fasten them.

(2) Check if the main circuit terminals are properly connected and the connection part of copper bus is over heated.

(3) Check if there are any damage to the power cables and the control cables and check particularly whether there are any wear on the cable sheath.

(4) Check if the insulating tapes around the power cable lugs are stripped.

(5) Clean out the dust on the circuit board and the duct. It is better to use the dust collector.

(6) Before testing the grounding insulating performance of the drive, please short circuit all the input and output terminals (R/L1, S/L2, T/L3, U/T1, V/T2, W/T3, P/B1, +DC, -DC) of its main circuit terminals first and then conduct the grounding test. It is prohibited to conduct the grounding test for a single terminal; otherwise, the drive may be damage. Please use 500V Mega-Ohm-Meter in the test.

(7) To test the insulating performance of the motor, please test the motor independently after disconnecting the input terminals U/T1, V/T2 and W/T3 of the motor from the drive, otherwise, the drive may be damaged.

🕮 Note

(1) The drive has passed the dielectric strength test before delivery. Thus, you should not conduct the test again, improper test may damage the drive.

(2) Be sure to replace the original components in the drive with the same model and same electric parameters, otherwise, the drive may be damaged!

7.3 Replacing wearing parts

The wearing parts of the drive include cooling fan and filter electrolytic capacitor, whose service life depends on the operating environment and maintenance status. The common service life is listed in the table below.

Table7-2 Component life

Part name	Service life
Fan	30,000~40,000 hours
Electrolytic capacitor	40,000~50,000 hours
Relay	About 100,000 times

Users can determine the replacement time according to the running time.

(1) Cooling fan

Possible damage causes: wear of the bearing, aging of the vanes.

Judgment standard: whether there is crack on the blade and whether there is any abnormal vibration or noise.

(2) Electrolytic capacitor

Possible damage causes: high ambient temperature, increased pulsating current caused by rapid changing load, electrolyte aging.

Judgment standard: whether there is liquid leakage, whether the safety valve has protruded, measure the static capacitance, measure the insulating resistance.

(3) Relay

Possible damage caused: Erosion, frequent actions.

Judgment standard: whether it can be opened and closed properly.

4. Storage of drive

Note the following for the temporary and long-term storage of the drive:

(1) The drive should be stored in the places away from high temperature, dampness, dust and metal powder. There should be good ventilation there.

(2) Long-term storage will degrade the electrolytic capacitor. The drive should be powered on once within 2 years at least for 5 hours. The input voltage should be raised slowly to the rated value with the regulator upon power-up.

Appendix 1 Modbus Communication Protocol

1.Networking mode

The drive has two networking modes: single host/multiple salves mode and single host/single slave mode.

2. Interface mode

RS485 interface: Asynchronous and half-duplex. Default: 1-8-N-2, 9600bps, RTU. Refer to Group P15 function code for the parameter setting.

3. Communication mode

(1) The communication protocol of the drive is Modbus protocol, which does not only support common register reading and writing, but also expands some commands to manage the drive function codes.

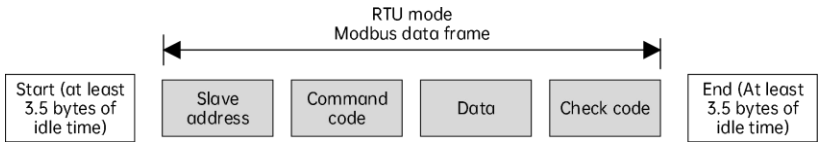
(2) The drive is slave, adopting host/salve mode P2P communication. The drive will not response to the command sent by the host via broadcast address.

(3) In multiple units communication or long-distance communication, parallel connecting the resistance of 100 to 120 ohms with the positive end and negative end of the communication signal line of the host station can enhance its immunity to interference.

(4) MV260 provides RS485 interface only. If the communication interface of the external equipment is RS232, the RS232/RS485 conversion equipment is needed.

4. Protocol format

Modbus protocol supports RTU mode, and the corresponding frame format is as shown in the attached attached Fig.1-1.



Attached Fig.1-1 Modbus protocol format

Modbus adopts the "Big Endian" encoding mode, which sends the high bytes first and then sends the low bytes.

1. RTU mode

In RTU mode, the larger value between the function code setting value and the Modbus internal convention value shall be selected as the idle time between frames. The minimum idle time value between frames under the Modbus internal convention is as follows: the idle time that the frame head and frame trail pass the bus shall not be less than that of 3.5 bytes to define the frame. The data verification adopts CRC-16 and the verify checksum includes the whole information. The high and low bytes of the checksum can only be sent after their exchanging. Please refer to the example after the protocol for the detailed CRC verification. Please note: At least 3.5 characters of the BUS idle time shall be kept between the frames and it doesn't need to accumulate the start and end idle time.

In the sample below, it is used to read the parameters of the internal register 0101 (P01.01) of No.5 slave in the RTU mode.

Request frame:

Slave address	Command code	Data				Check code	
		Register address		Number of bytes read			
0x05	0x03	0x01	0x01	0x00	0x01	0xD5	0xB2

Response frame:

Slave address	Command code	Data			Check code	
		Number of bytes responded	Register content			
0x05	0x03	0x02	0x13	0x88	0x44	0xD2

In the above table, the check code is the CRC verification value. Please refer to the following text for the computing method of the CRC verification.

5. Protocol functions

The main function of Modbus is reading/writing parameters. Different command codes determine different operation requests. The Modbus protocol of MV260 drive supports the operations as shown in the following table:

Command code	Meaning
0x03	Reading the drive parameters, including function code parameters, control parameters and status parameters.
0x06	Change the single 16-byte function code parameter or control parameter of the drive, and the parameter value will not be saved after power off.
0x08	Line diagnosis.
0x41	Change the single 16-byte function code parameter or control parameter of the drive, and the parameter value will be saved after power off.
0x42	Manage the drive function codes.

All the function code parameters, control parameters and status parameters of the drive are mapped as the read/write registers of Modbus. The read/write features and range of the function

code parameter follow the drive user manual. The group number of the drive function code is mapped as the high byte of the register address and the group internal index (i.e. the serial number of the parameter in the group) is mapped as the low byte of the register address. The control parameter and status parameter of the drive are virtual function code groups of the drive. The correspondence between the group numbers of the function codes and the high bytes of the register address mapped are as shown in the following table:

Drive parameter group	High byte of the address mapped	Drive parameter group	High byte of the address mapped
Group P00	0x00	Group PI4	0x0E
Group P01	0x01	Group PI5	0x0F
Group P02	0x02	Group PI6	0x10
Group P03	0x03	Group P40	0x28
Group P07	0x07	.....	.....
Group P08	0x08	Group P97	0x61
Group P09	0x09	Group P98	0x62
Group PI0	0x0A	Group P99	0x63
Group PI1	0x0B	Control parameter group	0x64
Group PI2	0x0C	Status parameter group	0x65
Group PI3	0x0D	.....	.....

For example, the register address of the function code parameter P03.02 of the drive is 0x0302, and the register address of the first control parameter (control word 1) is 0x6400.

As the format of the whole data frame has been detailed in the above text, the following text will focus on the format and meanings of the "command code" and "data" of Modbus protocol. These two parts constitute the Modbus application layer protocol data unit. Any reference to application layer protocol data unit to below refers to such two parts. The following introduction to the frame format is based on RTU mode.

1. Read the drive parameters

The application-layer protocol data units are as follows.

Request format:

Application-layer protocol data unit	Data length (Number of bytes)	Value or range
Command code	1	0x03
Start register address	2	0x0000~0xFFFF
Number of registers	2	0x0001~0x000A

If the operation is successful, the response frame is as follows:

Application-layer protocol data unit	Data length (Number of bytes)	Value or range
Command code	1	0x03
Number of bytes read	1	2 * Number of registers
Content read	2 * Number of registers	Parameter value

If the operation fails, it will return to the abnormal response frame. The abnormal response frame includes the error code and exception code. In which, the error code = (command code + 0x80), and the exception code indicates the error cause.

Abnormal response frame format:

Application-layer protocol data unit	Data length (Number of bytes)	Value or range
Error code	1	(Command code + 0x80)
Exception code	1	

The exception codes and their meanings are as follows:

Exception code	Meaning
0x01	Invalid command code
0x02	Invalid register address.
0x03	Data error (the data is not within the upper/lower range).
0x04	Slave operation failure (including the error caused by that the data is within the upper/lower range, but it is invalid).
0x05	The command is valid and in process (It is mainly used to save the data into the nonvolatile memory cell).
0x06	The salve is busy, please try again later. It is mainly used to save the data into the nonvolatile memory cell.
0x16	Operation not supported (mainly refer to the control parameter and status parameter, for example, do not support reading the property, leave-factory value and upper/lower limit)
0x17	The number of registers in the request frame is wrong (for example, when the operation is 32-byte, the number of bytes is odd).
0x18	Information frame error (including information length error and verification error).
0x20	Parameters cannot be changed.
0x21	Parameters cannot be changed during the drive running.
0x22	Password required for parameters.

2. Change the single 16-byte function code parameter and status parameter of the drive, and the parameter values will not be saved after power off.

When this command is used, the parameter value changed will not be saved upon power on after power off.

The application-layer protocol data units are as follows.

Request format:

Application-layer protocol data unit	Data length (number of bytes)	Value or range
Command code	1	0x06
Register address	2	0x0000~0xFFFF
Register content	2	0x0000~0xFFFF

If the operation is successful, the response frame is as follows:

Application-layer protocol data unit	Data length (number of bytes)	Value or range

Command code	1	0x06
Register address	2	0x0000~0xFFFF
Register content	2	0x0000~0xFFFF

If the operation is failed, it will return to the abnormal response frame and its format is as shown above.

3. Change single 16-byte function code parameters and status parameters of the drive, and the parameter values will be saved after power off. The command code 0x41 is used to change the single 16-byte function code parameters or control parameters of the drive, and store the value into the nonvolatile memory cell. Its command format is the same as that of 0x06. The only difference is as follows: the parameter value changed under the 0x06 command will not be saved upon power off, but the parameter value changed under the 0x41 command will be saved upon power off.

4. Manage the drive function codes

The management of the drive function codes includes reading the upper/lower limit of the parameter, reading the parameter features, reading the maximum group internal index of the function code menu, reading the next/previous function group number, reading current display status parameter index, displaying the next status parameter and reading the factory-leave value of the function code parameter.The parameter features include the read/write features, units and scaling relations of the parameter.

The application-layer protocol data units are as follows.

Request format:

Application-layer protocol data unit	Data length (Number of bytes)	Value or range
Command code	1	0x42
Sub-command code	2	0x0000~0x0008
Data	2	Depends on the drive type

If the operation is successful, the response frame is as follows:

Application-layer protocol data unit	Data length (Number of bytes)	Value or range
Command code	1	0x42
Sub-command code	2	0x0000～0x0008
Data	2 or 4	0x00000000～0xFFFFFFFF

If the operation request is failed, the response will be error code and exception code. If the operation is failed, the abnormal response will occur. Please refer to the above text for the abnormal response codes.

The values and meanings of sub-command codes supported by the function code management are as shown in the following table:

Sub-command code	Data (Request)	Data (Response)	Function
0x0000	The parameter group number and group internal index occupies the high byte and the low byte respectively	The upper limit value of the parameter (4-byte)	Read the upper limit value of the parameter (the status parameter does not support this)

Sub-command code	Data (Request)	Data (Response)	Function
0x0001	The parameter group number and group internal index occupies the high byte and the low byte respectively	The lower limit value of the parameter (4-byte)	Read the lower limit value of the parameter (the status parameter does not support this)
0x0002	The parameter group number and group internal index occupies the high byte and the low byte respectively	Parameter features (refer to the list of parameter features for their detailed meanings)	Read the features of the function code parameter (the control parameter and status parameter do not support this)
0x0003	The parameter group number occupies the high byte and the low byte is "00".	Number of parameters in this group	Read the number of parameters in this group
0x0004	The parameter group number occupies the high byte and the low byte is "00".	The high byte is the group number of next parameter group and the low byte is "00"	Read the group number of next parameter group
0x0005	The parameter group number occupies the high byte and the low byte is "00".	The high byte is the group number of previous parameter group and the low byte is "00"	Read the group number of previous parameter group
0x0006	0x6500	Current status parameter index	Read the current status parameter index (please refer to the definition of the status parameter group for its meaning)
0x0007	0x6500	Next status parameter index	Read the next status parameter (please refer to the definition of the status parameter group for its meaning)
0x0008	The parameter group number and group internal index occupies the high byte and the low byte respectively	Leave-factory value of the parameter	Read the leave-factory value of the function code parameter (the control parameter and status parameter do not support this)

In the above table, when reading the Upper/Lower limit value, the data returned is 32 bits long, i.e. 4 bytes. The status parameter does not support this operation. The Upper/Lower limit value read here is that may be reached by the corresponding function code parameter. If the value range of the parameter is limited by other function code parameters (i.e. having associated function code parameters), it needs to combine the values of associated function code parameters.

Unless otherwise specified, the length of data of the response frame is 2 bytes.

The length of the function code parameter feature is 2 bytes and its bit definition is as follows:

Bit	Features	Value	Meaning
BIT0	Upper limit	0	Decimal system limit
		1	Hexadecimal system limit
BIT3~BIT1	Decimal point	000	No decimals
		010	One decimal
		010	Two decimals
		011	Three decimals
		100	The step length is 2.
		101	The step length is other value.
		Others	Reserved
BIT5~BIT4	Change properties	00	Actual parameter value, unchangeable
		01	Can be changed in the operation
		10	Cannot be changed in the operation or it is set by the manufacturers, cannot be changed by users
		11	Reserved
BIT8~BIT6	Display unit	000	No unit
		001	The unit is Hz
		010	The unit is A
		011	The unit is V
		100	The unit is r/min
		101	The unit is line speed (m/s)
		110	The unit is percentage (%)
		Others	Reserved
BIT9	Reserved		
BIT10	Restore to leave-factor y value	1	Quick menu
		0	Basic menu
BIT11	Quick menu	1	16-bit/32-bit parameter
		0	Reserved
BIT12	Basic menu	1	Quick menu
		0	Basic menu
BIT13	16-bit/32-bit parameter	1	16-bit/32-bit parameter
		0	Reserved
BIT15~BIT14	Reserved		

6. Control parameters and status parameters of drive

The control parameters of the drive can realize the start, stop, running frequency setting and other functions of the drive. Inquiring the status parameters of the drive can get the parameters like the running frequency, output current and output torque of the drive, etc.

1. Control parameters

The control parameters of the drive are as shown in the following table:

Register address	Parameter name	Save upon power off	Remarks
0x6400	Control word 1	No	Refer to its bit definition list
0x6401	Main reference	No	Main reference frequency; the main reference channel uses serial communication, and whether it can be saved is dependent on the setting of P02.05
0x6402	Running frequency reference	No	Same as above
0x6403	Digital process closed loop reference	Yes	Enabled when the process closed loop is enabled
0x6404	Pulse process closed loop reference (reserved)		
0x6405	Control word 1	No	Enabled when P10.20=14
0x6406	Reserved		
0x6407	Digital output DO setting	No	Enabled when P09.22=17
0x6408	Frequency proportion setting (reserved)		
0x6409	Virtual terminal control setting	No	BIT0~BIT5: X1~X6, the corresponding bit selection and channel of P09.12 is enabled BIT10~BIT12: When Y1/Y2/RO1, P09.14~P09.16=17, the corresponding terminal is enabled.
0x640A	Setting acceleration time 1	Yes	
0x640B	Setting deceleration time 1	Yes	
0x640C	Auxiliary frequency reference	No	Enabled when the auxiliary reference channel is serial port communication and the auxiliary reference is in valid bit (Controlling BIT2 of character 2)
0x640D~ 0x640E	Reserved		
0x640F	Expansion analog output ExAO setting (reserved)	No	Four expansion analog outputs: ExAO1~ExAO4, when P27.20, P27.24, P27.28, P27.22 =14, the corresponding output is enabled

Register address	Parameter name	Save upon power off	Remarks
0x6410	Expansion virtual digital input terminal (reserved)	No	BIT0~BIT5:EX1~EX6, the corresponding bit selection and channel of P28.08 is enabled
0x6411	Expansion virtual digital output terminal (Reserved)	No	BIT0~BIT1: ExRO1, ExRO2, when P26.09, P26.11=17, the corresponding terminal is enabled
0x6412	Control word 2	No	Refer to its bit definition list

🕮 Note

(1) When reading the control parameter, the value returned is the value written in the previous communication;

(2) In the control parameters, the maximum length of "main reference", "running frequency setting" and "auxiliary frequency setting" is 32 bits, and for the others, the length is 16 bits;

(3) In the control parameters, for the scaling of each reference, input/output setting range and decimal point, please refer to the corresponding function code parameter.

The bit definition of the control word 1 is as shown in the following table:

Bit	Value	Function	Remarks
BIT2~BIT0	111B	Stop for external fault	Coast to stop and the drive displays external fault
	110B	Stop in mode 1	Coast to stop
	101B	Stop in mode 0	Stop according to the deceleration time set (enabled when the jog is disabled)
	100B	Running commands	Start the drive (enabled when the jog is disabled)
	Others	No command	
BIT3	1	REV	Set the running direction when the running command is valid
	0	FWD	
BIT4	1	Enable acceleration/deceleration	BIT0~BIT3, BIT7~BIT8 of control character 1 will be enabled only when this bit is enabled
	0	Disable acceleration/deceleration	
BIT5	1	The control character 1 of the host device is valid	The select bit for the validity of the control character 1 of the host device
	0	The control character 1 of the host device is disabled	
BIT6	0	Reserved	
BIT7	1	Jog forward	When both jog forward and reversely are

Bit	Value	Function	Remarks
	0	The "Jog Forward" is disabled	valid, it does not run; when both are disabled, the jog will stop.
BIT8	1	Jog reversely	
	0	The "Jog reversely" is disabled	
BIT9	1	The fault reset is valid	The select bit for the validity of the fault reset of the host device
	0	The fault reset is disabled	
BIT15~ BIT10	0	Reserved	

Note

(1) The control command (control words 1 and 2) of the host device is valid only when the value of "running command channel selection" is "communication command"; the overall word 1 is valid only when its BIT5 is valid; BIT0~BIT3, BIT7~ BIT8 are valid only when its BIT4 is valid.

(2) The host device processes the faults and alarms as follows: when the drive meets faults, for control words 1 and 2, only the fault reset command is valid, any other commands from the host device are disabled. That is, the host device shall reset the fault first before sending any other commands. When the alarm occurs, the control character is valid.

2. Status parameters

Register address	Parameter name	Remarks
0x6500	Status word 1 of drive	
0x6501	Actual running value of current main reference	Current running frequency
0x6502	Slave model	
0x6503	Drive series number	
0x6504	Software version	
0x6505	Current running frequency	
0x6506	Output current	
0x6507	Output voltage	
0x6508	Output power	
0x6509	Rotating speed in running	
0x650A	Line speed in running	
0x650B	Analog process closed loop feedback	
0x650C	Bus voltage	
0x650D	Reserved	
0x650E	Output torque	
0x650F	Status of digital input/output terminal	BIT0~BIT5: X1~X6; BIT10~BIT12: Y1/Y2/RO1。
0x6510	Reserved	

Register address	Parameter name	Remarks
0x6511	Running frequency after compensation	
0x6512	The 1st running fault	
0x6513	The 2nd running fault	
0x6514	The 3rd (the latest one) running fault	
0x6515	Setting running frequency	
0x6516	Setting rotating speed	
0x6517	Setting analog process closed loop	
0x6518	Setting line speed	
0x6519	AI1	
0x651A	AI2	
0x651B	Setting length (reserved)	
0x651C	Setting acceleration time 1	
0x651D	Setting deceleration time 1	
0x651E	Command reference channel (the same as function code P02.01)	
0x651F	Status word 2 of drive	
0x6520	Frequency reference channel (the same as function code P02.03)	
0x6521	Accumulating length (Reserved)	
0x6522	Motor and mode selection (Reserved)	
0x6523	Bus voltage at the 3rd fault	
0x6524	Actual current at the 3rd fault	
0x6525	Operation frequency at the 3rd fault	
0x6526	Drive operation status at the 3rd fault	The bit definition is the same as that of the status word 3.
0x6527	Reserved	
0x6528	Status word 3 of drive	

🕮 Note

(1)The status parameter does not support the writing operation.

(2) The encoding rules for the slave models are as follows: for the range from 0 to 9999, the hundreds and thousands are used to identify different drive series, such as AD, MV, etc. The tens and units are used to identify drive series like 100 Series, 200 Series, 300 Series and 600 Series. For example, the slave model of ADXXX Series drive is 0*1000+0*100+XXX/10; and the slave model of MVXXX Series drive is 1*1000+0*100+XXX/10.

(3) In the status parameter, the maximum length of "actual running value of current main reference", "current running frequency", "running frequency setting" and "running frequency at the 3rd fault" is 32 bits, and for the others, the length is 16 bits.

The bit definition of the status word 1 of the drive is as shown in the following table:

Bit	Value	Function	Remarks
BIT0	1	Enable serial port control	
	0	Disable serial port control	
BIT1	1	Drive runs	
	0	Drive stops	
BIT2	1	Drive runs reversely	
	0	Drive runs forward	
BIT3	1	Enable serial port reference	
	0	Disable serial port reference	
BIT4	1	Meet the main setting	
	0	Does not meet the main setting	
BIT5	1	fault	If the value is 1, it means there is a fault. Please refer to BIT15~BIT8 of status word 1 to identify the current fault type.
	0	No fault	
BIT6	1	Alarm	If the value is 1, it means there is an alarm. Please refer to BIT15~BIT8 of status word 1 to identify the current alarm type.
	0	No alarm	
BIT7	0	Reserved	
BIT15～BIT8	0x00～0xFF	Fault or alarm code	0: No fault or alarm; Not 0: it means there is a fault or alarm, you need to consider both the status of BIT5 and BIT6 to identify if it is a fault or alarm code. Please refer to P97.15 for the fault and alarm types.

The bit definition of the status word 2 of the drive is as shown in the following table:

Bit	Value	Function	Remarks
BIT0	1	Common running	
	0	Non-common running	
BIT1	1	Jog running	
	0	Non-jog running	
BIT2	1	PLC running	
	0	Non-PLC running	
BIT3	1	Multiple frequency running	
	0	Non-multiple frequency running	
BIT4	1	Process closed loop running	

	0	Non-process closed loop running	
BIT5	1	Swing frequency (reserved)	
	0	Non-swing frequency (reserved)	
BIT6	1	Under-voltage	
	0	Normal voltage	
BIT7		Reserved	
BIT8		Reserved (servo running)	
BIT9		Reserved (customized running)	
BIT10		Reserved (synchronized speed running)	
Others		Reserved	

The bit definition of the status word 3 of the drive is as shown in the following table:

Bit	Value	Function	Remarks
BIT0～BIT1		Reserved	
BIT2		Running at zero speed	
BIT3		Accelerating	
BIT4		Decelerating	
BIT5		Running at constant speed	
BIT6		Pre-exciting	
BIT7		Setting	
BIT8		Limiting over-current	
BIT9		Limiting DC over-voltage	
BIT10～BIT11		Reserved	
BIT12		Drive fault	
BIT13～BIT15		Reserved	

3. Some internal parameters of MV260 drive are reserved, which cannot be modified through the communication setting. These parameters are as show in the following table:

Function code	Function description
P00.03	Parameter copy
P03.12	Motor parameter auto-tuning

4. The operation of the host device on the user password

(1) Managing the read/write and function codes of function code parameters of the user password protection (except for "read the address of the data displayed" and "display the data switching").

(2) If the user password is set (P00.00), the host device can access to the function code parameters only after "decryption" (write the correct user password to P00.00), but the access to the control parameters and status parameters is not restricted by the user password.

(3) The host device cannot set, change or cancel the user password and only the operation panel is able to conduct these operations. The writing operation of P00.01 will be valid only in two

situations: decrypt with the password, and write 0 without the password. In other situations, the invalid operation information will be returned.

(4) The operation of the host device and that of the operation panel on the user password are independent, even if the operation panel has decrypted already, the host device still need to decrypt to access to the function code parameters, and vice versa.

(5) When the host device gets the authority to access to parameters, it will read the user password and return to "0000" rather than the actual user password.

(6) The host device gets the authority to access to the function code after "decryption". If there is no communication within 5 minutes, the access authority is invalid. To access to this function code, please re-enter the user password.

(7) When the host device has gotten the access authority (no user password or decrypted already), if the user password is set or changed through the operation panel, the host device still has current access authority with no need to re-encrypt. If the access authority becomes invalid, it needs to re-encrypt (write new password) to get the access authority.

7. CRC verification

For the purpose of improving speed, CRC-16 is often realized through the table. The following is the C language source code for realizing CRC-16. Please note: the final results have exchanged high and low bytes, that is, the result is the CRC checksum to be sent.

```
unsigned short CRC16 (unsigned char *msg, unsigned char length)      /* The function returns the CRC as a unsigned short type */
{
    unsigned char uchCRCHi = 0xFF ;                                  /* high byte of CRC initialized */
    unsigned char uchCRCLo = 0xFF ;                                  /* low byte of CRC initialized */
    unsigned uIndex ;                                                /* index into CRC lookup table */
    while (length--)                                                 /* pass through message buffer */
    {
        uIndex = uchCRCLo ^ *msg++ ;                                 /* calculate the CRC */
        uchCRCLo = uchCRCHi ^ (crcvalue[uIndex] >>8);
        uchCRCHi =crcvalue[uIndex]&0xff;
    }
    return (uchCRCHi | uchCRCLo<<8) ;
}
/* Table of CRC values */
const unsigned int  crcvalue[ ] = {
```

0x0000,0xC1C0,0x81C1,0x4001,0x01C3,0xC003,0x8002,0x41C2,0x01C6,0xC006,0x8007,0x41C7,
0x0005,0xC1C5,0x81C4,0x4004,0x01CC,0xC00C,0x800D,0x41CD,0x000F,0xC1CF,0x81CE,0x400E,
0x000A,0xC1CA,0x81CB,0x400B,0x01C9,0xC009,0x8008,0x41C8,0x01D8,0xC018,0x8019,0x41D9,
0x001B,0xC1DB,0x81DA,0x401A,0x001E,0xC1DE,0x81DF,0x401F,0x01DD,0xC01D,0x801C,0x41DC,
0x0014,0xC1D4,0x81D5,0x4015,0x01D7,0xC017,0x8016,0x41D6,0x01D2,0xC012,0x8013,0x41D3,
0x0011,0xC1D1,0x81D0,0x4010,0x01F0,0xC030,0x8031,0x41F1,0x0033,0xC1F3,0x81F2,0x4032,
0x0036,0xC1F6,0x81F7,0x4037,0x01F5,0xC035,0x8034,0x41F4,0x003C,0xC1FC,0x81FD,0x403D,
0x01FF,0xC03F,0x803E,0x41FE,0x01FA,0xC03A,0x803B,0x41FB,0x0039,0xC1F9,0x81F8,0x4038,
0x0028,0xC1E8,0x81E9,0x4029,0x01EB,0xC02B,0x802A,0x41EA,0x01EE,0xC02E,0x802F,0x41EF,
0x002D,0xC1ED,0x81EC,0x402C,0x01E4,0xC024,0x8025,0x41E5,0x0027,0xC1E7,0x81E6,0x4026,
0x0022,0xC1E2,0x81E3,0x4023,0x01E1,0xC021,0x8020,0x41E0,0x01A0,0xC060,0x8061,0x41A1,
0x0063,0xC1A3,0x81A2,0x4062,0x0066,0xC1A6,0x81A7,0x4067,0x01A5,0xC065,0x8064,0x41A4,
0x006C,0xC1AC,0x81AD,0x406D,0x01AF,0xC06F,0x806E,0x41AE,0x01AA,0xC06A,0x806B,0x41AB,
0x0069,0xC1A9,0x81A8,0x4068,0x0078,0xC1B8,0x81B9,0x4079,0x01BB,0xC07B,0x807A,0x41BA,
0x01BE,0xC07E,0x807F,0x41BF,0x007D,0xC1BD,0x81BC,0x407C,0x01B4,0xC074,0x8075,0x41B5,
0x0077,0xC1B7,0x81B6,0x4076,0x0072,0xC1B2,0x81B3,0x4073,0x01B1,0xC071,0x8070,0x41B0,
0x0050,0xC190,0x8191,0x4051,0x0193,0xC053,0x8052,0x4192,0x0196,0xC056,0x8057,0x4197,
0x0055,0xC195,0x8194,0x4054,0x019C,0xC05C,0x805D,0x419D,0x005F,0xC19F,0x819E,0x405E,
0x005A,0xC19A,0x819B,0x405B,0x0199,0xC059,0x8058,0x4198,0x0188,0xC048,0x8049,0x4189,
0x004B,0xC18B,0x818A,0x404A,0x004E,0xC18E,0x818F,0x404F,0x018D,0xC04D,0x804C,0x418C,
0x0044,0xC184,0x8185,0x4045,0x0187,0xC047,0x8046,0x4186,0x0182,0xC042,0x8043,0x4183,
0x0041,0xC181,0x8180,0x4040}

If the CRC checksum of each byte to be sent is computed on line, it will take a longer time, but it can save the program space occupied by the table. The code for computing CRC online is as follows:

```
unsigned int crc_check(unsigned char *data,unsigned char length)
{
    int i;
    unsigned crc_result=0xffff;
    while (length--)
    {
        crc_result^=*data++;
        for (i=0;i<8;i++)
```

```
            {
                if（crc_result&0x01）
                {
                crc_result=（crc_result>>1）^0xa001;
                }
                else
                {
                        crc_result=crc_result>>1;
                }
            }
        }
        return          （crc_result=（（crc_result&0xff）<<8）|（crc_result>>8））;
}
```

8. Application example

No.5 drive coast to stop:

Data frame	Address	Command code	Register address	Register content	Check code
Request	0x05	0x06	0x6400	0x0036	0x1768
Response	0x05	0x06	0x6400	0x0036	0x1768

No.5 drive jog-forward:

Data frame	Address	Command code	Register address	Register content	Check code
Request	0x05	0x06	0x6400	0x00B0	0x96CA
Response	0x05	0x06	0x6400	0x00B0	0x96CA

No.5 drive jog-stop:

Data frame	Address	Command code	Register address	Register content	Check code
Request	0x05	0x06	0x6400	0x0130	0x96FA
Response	0x05	0x06	0x6400	0x0130	0x96FA

No.5 drive fault reset:

Data frame	Address	Command code	Register address	Register content	Check code
Request	0x05	0x06	0x6400	0x0220	0x97C6
Response	0x05	0x06	0x6400	0x0220	0x97C6

Read the running frequency of No.5 drive and the response running frequency is 50.00Hz (16 bits mode):

Data frame	Address	Command code	Register address	Number of registers or number of bytes read	Register content	Check code
Request	0x05	0x03	0x6501	0x0001	None	0xCA82
Response	0x05	0x03	None	0x02	0x1388	0x44D2

Change the acceleration time 1 (i.e. function code P02.13) of No.5 drive to be 10.0s, which cannot be saved upon power off (16 bits mode).

Data frame	Address	Command code	Register address	Register content	Check code
Request	0x05	0x06	0x020D	0x0064	0x19DE
Response	0x05	0x06	0x020D	0x0064	0x19DE

Read the output current of No.5 drive and the response output current is 30.0A (16 bits mode):

Data frame	Address	Command code	Register address	Number of registers or number of bytes read	Register content	Check code
Request	0x05	0x03	0x6506	0x0001	None	0x7B43
Response	0x05	0x03	None	0x02	0x012C	0x49C9

Read the deceleration time 1 (i.e. P02.14）) of No.5 drive and the response deceleration time is 6.0s (16 bits mode):

Data frame	Address	Command code	Register address	Number of registers or number of bytes read	Register content	Check code
Request	0x05	0x03	0x020E	0x0001	无	0xE5F5
Response	0x05	0x03	无	0x02	0x003C	0x4995

9. Scaling of drive parameters

(1)Scaling of the frequency: 1:100

To make the drive run at 50 Hz, the main setting shall be 0x1388 (5000).

(2) Scaling of time: 1:10

To make the acceleration time of the drive to be 30s, the function code shall be set as 0x012C (300).

(3) Scaling of current: 1:10

If the feedback current of the drive is 0x012C (300), the present current shall be 30A.

(4) The output power is its absolute value.

(5) For other parameters, please refer to the function parameter descriptions.

Appendix 2 Braking Components

1.Selection of built-in brake unit inverter

(1) Brake module configuration

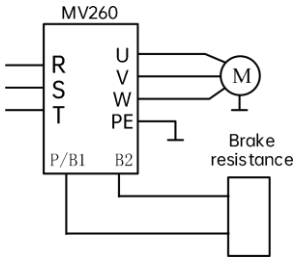
Attached Table 2-1 Brake resistor accessory

Motor rated power (kW)	Braking resistor model	Braking torque (%)
5.5	500W/100 Ω	120
7.5	500W/75 Ω	200
11	800W/50 Ω	200
15	1000W/40 Ω	200
18.5	1300W/30 Ω	200
22	1500W/25 Ω	200
30	2500W/20 Ω	150
37	3700W/20 Ω	120
45	4500W/15 Ω	200
55	5500W/10 Ω	160
75	9600W/13.6 Ω *2	120
90	9600W/13.6 Ω *2	200

🕮 Note

The frequency converter of 75kW and below can customize the built-in braking unit non-standard (Including MV260G-4T90-S). When energy consumption braking is required, the user only needs to allocate external braking resistance. Refer to Table 2-1 for braking resistance parameters. 90kW and above frequency converters require external braking units. Please follow the guidance of the external braking unit supplier for the wiring between the external braking unit and the frequency converter, as well as the selection of braking resistors.

(2) Wiring diagram of the built-in brake unit and brake resistance



Attached Fig.2-1 Connection diagram of the drive and brake unit

（3）Functions of built-in brake unit

- The braking voltage and braking rate can be adjusted through the function code；
- Short circuit protection of braking resistor; (Reminder: Some models do not have this function)
- Heatsink overheat protection;
- Abnormal alarm indication of braking IGBT module；

Attention: The wiring between the frequency converter and the braking resistor should be within 5 meters. If it exceeds 5 meters, please use twisted pair; The maximum usage length is 10 meters.

2.Selection of external braking unit

Please communicate with our company for a detailed solution.

Appendix 3 Warranty and Service

Shenzhen Megmeet Drive Technology Co., Ltd. manufactures motor drive products strictly according to the ISO9001:2008 standard. In case of any abnormal product, please contact your product provider or the headquarter of Shenzhen Megmeet Drive Technology Co., Ltd.. Our company will provide full technical support service for our customers.

1.Warranty period

The product is warranted for 18 months from the date of purchase, however, the warranty date shall not exceed 24 months after the manufacture date recorded in the nameplate.

2. Warranty scope

During the warranty period, any product abnormalities incurred due to our company can be freely repaired or replaced by our company. In case of any following situations, a certain maintenance fees for the product will also be charged even if it is in the warranty period.

① The damages are caused by fire, flood, strong lightning strike, etc.

② The artificial damages are caused by unauthorized modifications.

③ The product is damaged due to fall or in transit after purchasing.

④ The damages are caused by using beyond the standard specification requirements.

⑤ The damages are caused by operation and use failing to follow the instruction manual.

3. After-sales service

① If there are specific requirements for drive installation and trial operation, or the working status of the drive is unsatisfactory (such as unsatisfactory performance and function), please contact your product agent or Shenzhen Megmeet Drive Technology Co., Ltd..

② In case of any abnormality, please timely contact your product provider or Shenzhen Megmeet Drive Technology Co., Ltd. for help.

③ During the warranty period, our company will repair any product abnormality incurred due to product manufacturing or design free of charge.

④ If the product is out of the warranty period, our company will make paid repair according to user's requirement.

⑤ The service charge is calculated by actual costs. If there is an agreement, the agreement shall prevail.

Shenzhen Megmeet Electrical Co., Ltd.
Address: 5th Floor, Block B, Unisplendor Information Harbor, Langshan Rd., Science & Technology Park, Nanshan District, Shenzhen, 518057, China
Tel: +86-755-8660 0500
Fax: +86-755-8660 0562
Website: www.megmeet-drivetech.com

Shenzhen Megmeet Electrical Co., Ltd.

Drive Warranty Bill

Customer company:	
Detailed address:	
Postal Code:	Contact:
Tel:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Purchase date:
Service unit:	
Contact :	Tel:
Maintenance personnel:	Tel:
Maintenance date:	
Comment on service: ☐Good ☐Fair ☐So so ☐ Poor Other comment: User's signature: Date:	
Return visit record in Customer Service Center: ☐Telephone return visit ☐Letter return visit Others: Signature of the technical support engineer: Date:	

Note: This bill becomes invalid if the user can not be visited.

Shenzhen Megmeet Electrical Co., Ltd.

Drive Warranty Bill

Customer company:	
Detailed address:	
Postal Code:	Contact:
Tel:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Purchase date:
Service unit:	
Contact :	Tel:
Maintenance personnel:	Tel:
Maintenance date:	
Comment on service: ☐Good ☐Fair ☐So so ☐ Poor Other comment: User's signature: Date:	
Return visit record in Customer Service Center: ☐Telephone return visit ☐Letter return visit Others: Signature of the technical support engineer: Date:	

Note: This bill becomes invalid if the user can not be visited.

Parameter record table

Wring diagram