MV810A Series AC Drive for Air Compressors

User Manual (Simplified)

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Shenzhen Megmeet Electrical Co., Ltd. provides comprehensive technical support for our valued customers. Please contact your nearest Megmeet office or service center, or connect directly with Megmeet headquarters if any assistance is needed.

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Foreword

Thank you for choosing Megmeet MV810A Series AC Drive for Air Compressors.

MV810A Series AC Drive for Air Compressors is specially engineered for the air compression application based upon the MV800 new-generation general-purpose vector control platform, which integrates the air-compressor-specific control logic, signal interface, power supply phase-sequence detection, and phase loss protection in one model, ensuring the overall safety and reliability of the air compression system operations.

Bearing the MV800 legacy of high vector-control performance and structural design excellence, this industry-specific MV810A series delivers superb compatibility in synchronous/asynchronous compressor control, and provides wide-ranging functionality, such as two-channel temperature detection of the air compression system, two-channel heat dissipation fan current detection via the current transformer, external 24 V DC power supply, electromagnetic valve control, multi-function terminals, and 485 communication signal. This series also provides a built-in air-compressor control logic which simplifies the electrical system design and optimizes the system cost efficiency by eliminating the necessity of PLC units, greatly elevating the robustness and reliability of the air compression system.

MV810A AC drive offers preset logic signal functions, configured before leaving the factory, to facilitate the on-site commissioning. To enable the functions, the user can perform compressor motor parameter tuning via the host device software and the USB Type-C port of the drive.

Unboxing inspection

When unboxing the product, please make sure to check the following:

- whether there is any damage;
- whether the rated values on the nameplate are the same with the requirements of the order.

Our company has implemented strict inspection on the product's manufacturing and packaging. If there is still any error, please contact us or the local distributor.

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

Safety precautions

Indicates that failure to comply with the notice can result in death or severe personal injuries.

WARNING

Indicates that failure to comply with the notice may result in moderate or minor personal injuries, or property damages.

DANGER

- Install the product on incombustible materials such as metal. Failure to comply will result in a fire
- Do not install the product near combustible objects. Failure to comply will result in a fire.
- Do not install the product in places with explosive gases. Failure to comply will result in explosion.
- The wiring work must be carried out by sufficiently qualified personnel. Otherwise, there is a risk of electric shock.
- Before wiring, make sure that the power supply input is completely cut off. Otherwise, there is a risk of electric shock.
- Make sure to reliably ground the drive. Otherwise, there is a risk of electric shock.
- Properly install the covers of the drive enclosure before power on. Otherwise, there is a risk of electric shock or explosion.
- When powering on a drive product that has been idle/stored for more than 2 years, employ a voltage regulator to gradually turn up the input voltage to the required level. Otherwise, there is a risk of electric shock or explosion.
- Do not touch any terminals with bare hands when the drive is powered on. Otherwise, there is a risk of electric shock.
- Do not operate the drive with wet hands. Otherwise, there is a risk of electric shock.
- Before maintenance, make sure the drive has been powered off for at least 10 minutes, and that the charging indicator is completely off or the bus negative/positive voltage is below 36 V. Failure to comply will result in an electric shock.
- Parts/Components replacement must be carried out by sufficiently qualified personnel. Do not leave any wire residue or foreign metal inside the drive. Failure to comply will result in a fire.
- In case any control board of the drive product is replaced, make sure to reset the parameters properly before restarting the drive. Otherwise, there is a risk of equipment/property damage.
- The bare parts of the terminal lugs in the main circuit must be properly wrapped with insulation tapes. Otherwise, electric shock may occur.

WARNING

- When handling the drive product, protect the operating panel and the covers against any stress to avoid falling off. Failure to comply may result in personal injuries or property damage.

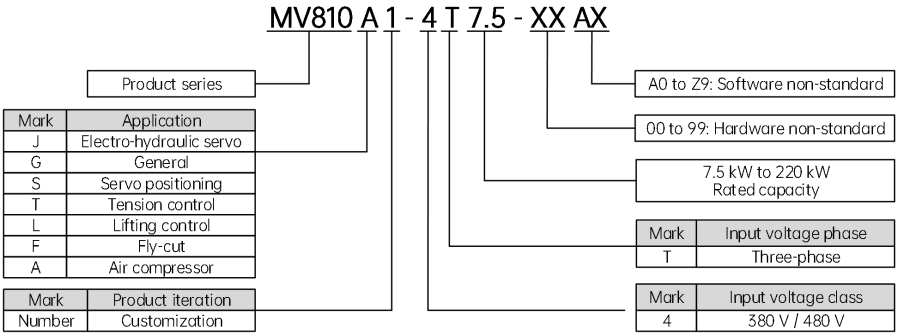
- Install the product on the place that can bear its weight. Failure to comply will result in personal injuries or equipment damage
- Do not install the drive near water pipes or other places capable of water splashing. Otherwise, there is a risk of property damage.
- Do not allow screws, gaskets, metal bars, and the like to fall into the drive. Failure to comply may result in a fire or property damage.
- If the drive is damaged or lack of components, do not install or run the drive. Failure to comply may result in a fire or personal injuries.
- Do not install the product in places with direct sunlight exposure. Otherwise, there is a risk of property damage.
- Do not short +/DC+ and -/DC- terminals. Failure to comply may result in a fire or property damage.
- Cable lugs must be firmly connected to the main circuit terminals. Otherwise, there is risk of property damage.
- Do not connect 220 V AC signal input to the control terminals other than RA/RA2, RB/RB2, and RC/RC2. Otherwise, there is a risk of property damage.

Content

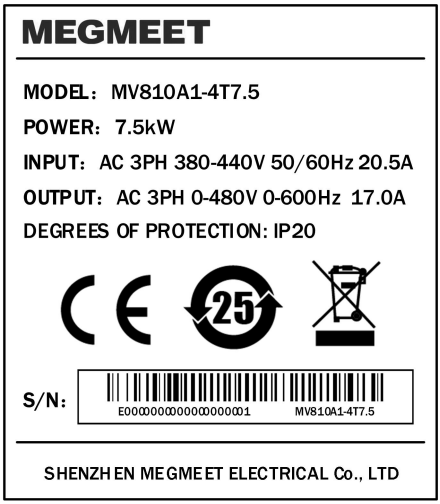
Chapter 1 Introduction of MV810A

1.1 Product model

The model name on the drive nameplate indicates the product series, the voltage class, the power rating, and the product version.



1.2 Product nameplate



1.3 Product series and models

Table 1-1 Product series and models

Enclosure	Model	Rated input current (A)	Rated output current (A)	Rated output power (kW)	Fan air volume (m³/min)
C	MV810A1-4T7.5	23.0	17.0	7.5	0.8
D	MV810A1-4T11	26.0	25.0	11.0	1.8
	MV810A1-4T15	35.0	32.0	15.0	
E	MV810A1-4T18.5	49.0	37.0	18.5	4.0
	MV810A1-4T22	58.0	45.0	22.0	
F	MV810A1-4T30	62.0	60.0	30.0	5.8
	MV810A1-4T37	76.0	75.0	37.0	
G	MV810A1-4T45	92.0	90.0	45.0	14.42
	MV810A1-4T55	113.0	110.0	55.0	21.48
	MV810A1-4T75	157.0	152.0	75.0	0.8
H	MV810A1-4T90	180.0	176.0	90.0	1.8
	MV810A1-4T110	214.0	210.0	110.0	4.0
I	MV810A1-4T132	256.0	253.0	132.0	5.8
	MV810A1-4T160	307.0	304.0	160.0	14.42
J	MV810A1-4T185	330.0	340.0	185.0	21.48
	MV810A1-4T200	368.0	380.0	200.0	0.8
	MV810A1-4T220	410.0	426.0	220.0	1.8

1.4 Technical specifications

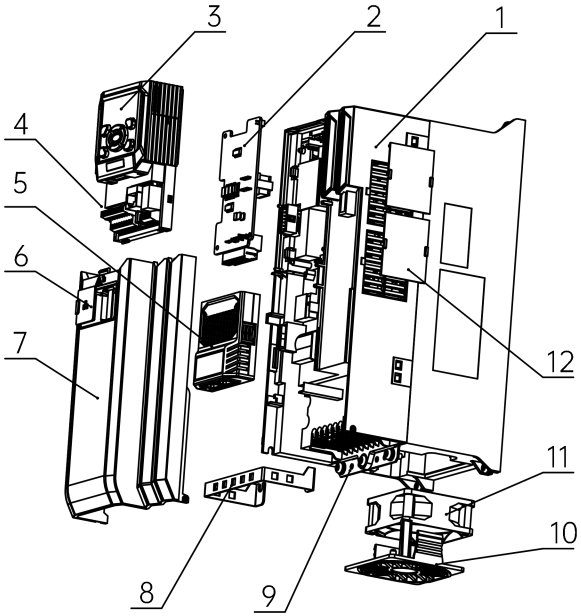
Table 1-2 Technical specifications

Power input	Rated voltage (V)	4T models: Three-phase 380 V to 480 V; continuous voltage fluctuation ±10%, transient voltage fluctuation -15% to +10% (323 V to 528 V); voltage unbalance rate < 3%, distortion rate compliant with IEC 61800-2.

	Rated input current (A)	Refer to Table 1-1.
	Rated frequency (Hz)	50/60 Hz. Fluctuation range: ±2 Hz.
Power output	Rated output Power (kW)	Refer to Table 1-1.
	Rated output current (A)	
	Output voltage (V)	Three-phase output under rated input conditions; 0 to rated input voltage; deviation less than ±3%.
	Output frequency (Hz)	V/F: 0.00 to 599.00 Hz. Unit: 0.01 Hz. Vector control: 0 to 599.00 Hz.
	Overload capacity	1 min for 150% rated current; 3 s for 180% rated current; 1 s for 200% rated current.
Drive control	Control mode	Flux vector control without PG, V/F control
	Maximum output frequency	V/F control: 599 Hz. Other control methods: 599 Hz.
Function	Key functions	Fast tracking, over-torque/under-torque detection, torque limit, multi-speed reference, multiple acceleration/deceleration time switchover, auto-tuning, S curve acceleration/deceleration, slip compensation, fan speed control, frequency hopping, energy saving operation, PID adjustment, hibernation function, power dip ride-through, Modbus, torque control, torque control and speed control switchover, automatic restart, DC braking, dynamic braking, simple PLC, AVR, switchover between 2 sets of motor parameters; Dedicated control functions for air compressors.
	Basic frequency	0.01 Hz to 599.00 Hz
	Startup frequency	0.00 Hz to 50.00 Hz
	Frequency setting mode	Analog setting AI1/AI2, terminal pulse HDI setting, simple PLC reference, multiple PLC reference, host device communication setting, PID control reference.
	Acceleration/ Deceleration time	0.1 to 6000.0 (unit: 0.1 s)
	DC braking	Startup frequency: 0.00 Hz to 599.00 Hz; braking time: 0.1 s to 50.0

	capacity	s Braking current: 0% to 100%, based on the nominal rated current of the drive.
	Terminal functions	Refer to the terminal function section for details.
Protection	Refer to the fault protection section for details.	
Others	Efficiency	≧ 93% for 7.5 kW; ≧ 95% for 15 kW or below.
	Installation method	Wall-mounted, vertically mounted on a solid base indoors, with at least 100 mm spacing for air inlet and outlet, and at least 10 mm spacing for both the left side and the right side, air cooling.
	IP rating	IP20
	Cooling method	Air cooling
Environment	Working conditions	Indoors with no direct sunlight exposure, dust, corrosive gas, combustible gas, oil mist, water vapour/dripping, or salt.
	Altitude	≤ 1000 m: normal use. 1000 m < altitude < 3000 m: derated by 1% for every 100 m higher. Maximum altitude: 3000 m.
	Ambient temperature	-10℃ to +50℃, air temperature change < 0.5℃/min (derated use required if the ambient temperature is above 40℃).
	Humidity	5% to 95%RH; non-condensing; no rain, snow, or hail; solar radiation < 700 W/m^2; air pressure 70 to 106 kPa.
	Vibration	Displacement 1.5 mm when sine vibration is 2 to 9 Hz; 5.9 m/s^2 (0.6 g) for 9 to 200 Hz.
	Storage temperature	-30℃ to +70℃, air temperature change < 1℃/min; maximum 60℃ for long-time storage, 60℃ to 70℃ for short-time storage only.

1.5 Parts and components



1: Enclosure 2: PG card 3: Keypad 4: Control board 5: Expansion box
6: Rubber plug 7: Upper cover 8: Cable fixation bracket 9: Grounding board
10: Fan cover 11: Fan 12: Dust-proof plate

Figure 1-1 Diagram of parts and components (example based on enclosure C)

1.6 Appearance and dimensions

There are eight enclosure types, as shown in the figures below. The data of the outline dimensions, mounting dimensions, and gross weight are shown in Table 1-3.

(1) Enclosure C (4T7.5 kW)

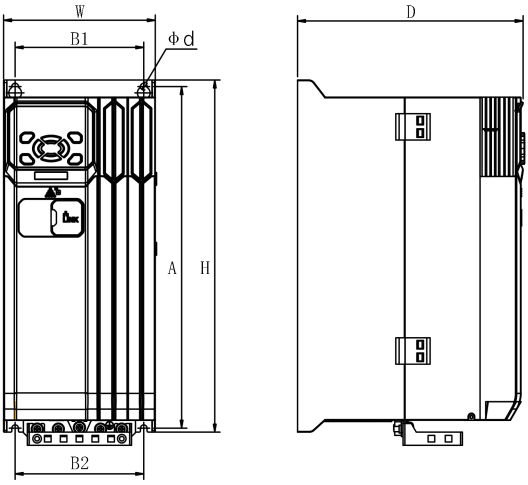


Figure 1-2 Enclosure C

(2) Enclosure D (4T11/15 kW)

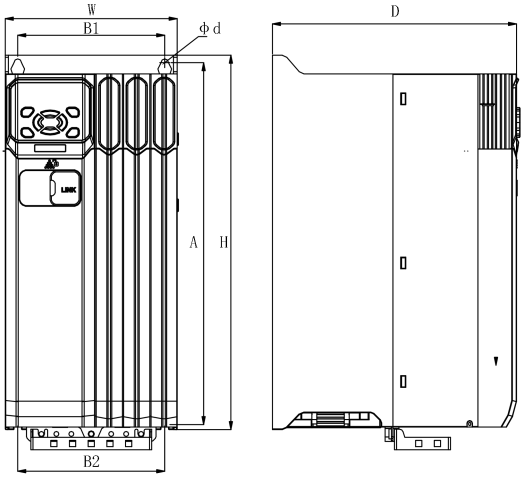


Figure 1-3 Enclosure D

(3) Enclosure E (4T18.5/22 kW)

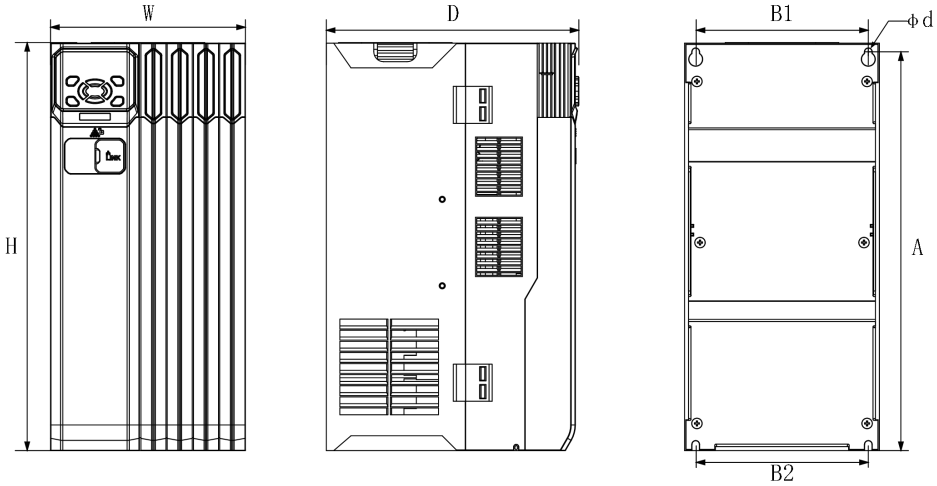


Figure 1-4 Enclosure E

(4) Enclosure F (4T30/37 kW)

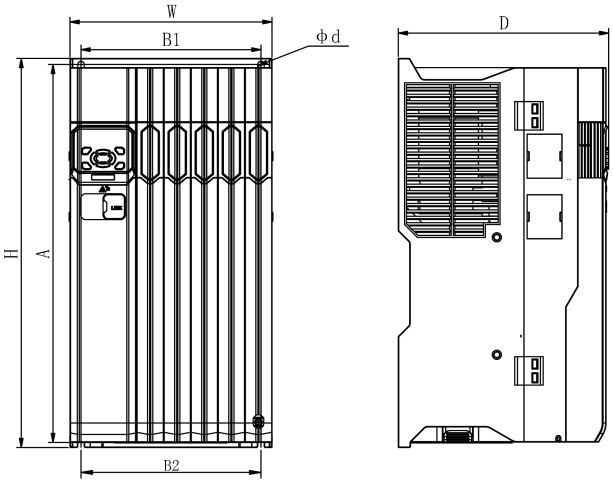


Figure 1-5 Enclosure F

(5) Enclosure G (4T45/55/75 kW)

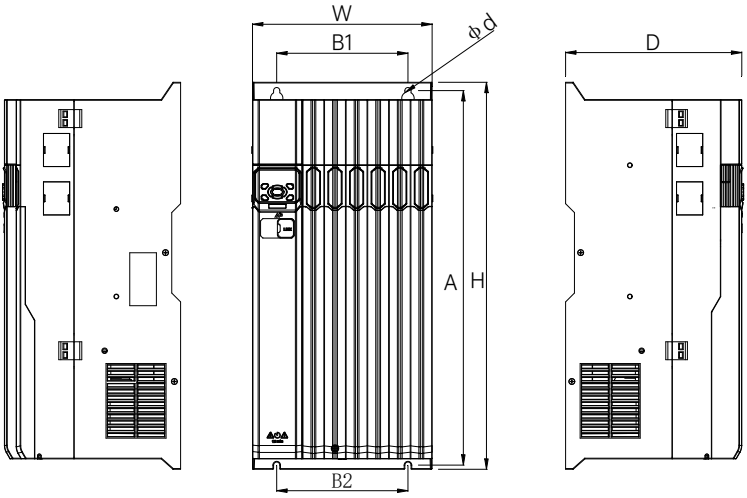


Figure 1-6 Enclosure G

(6) Enclosure H (4T90/110 kW)

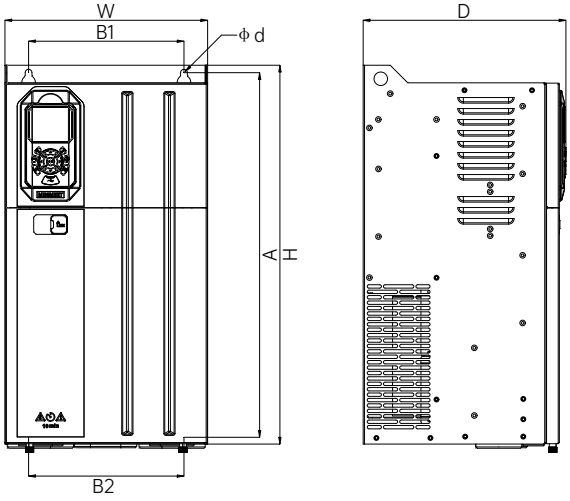


Figure 1-7 Enclosure H

(7) Enclosure I (4T132/160 kW)

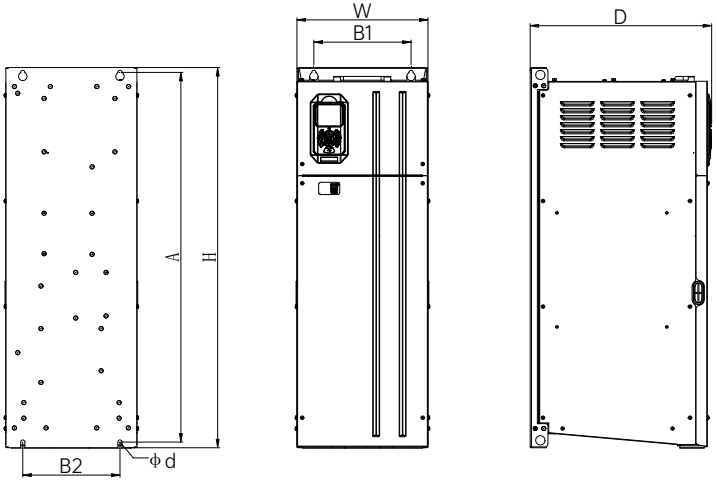


Figure 1-8 Enclosure I

(8) Enclosure J (4T185/200/220 kW)

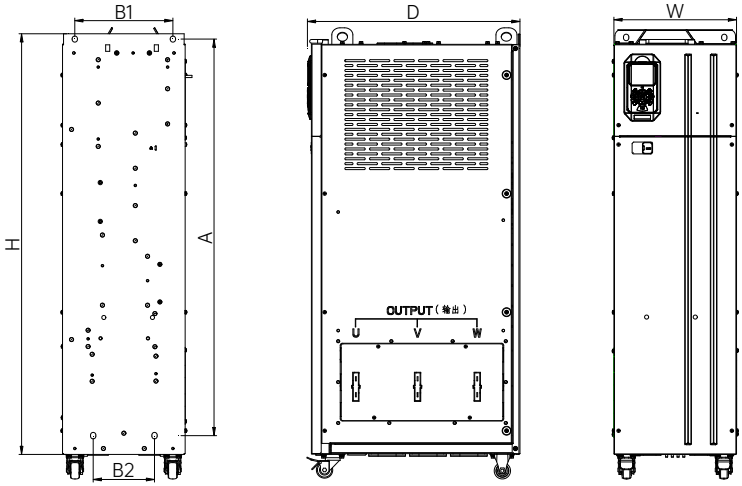


Figure 1-9 Enclosure J

Table 1-3 Outline dimensions, mounting dimensions, and gross weight

Enclosure	Drive	A (mm)	B1 (mm)	B2 (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter (mm)	Gross weight ±0.5 (kg)
Enclosure C	MV810A1-4T7.5	259	97.5	97.5	267	115	171	5	2.5
Enclosure D	MV810A1-4T11	290	118	118	300	138	195.92	6	4.1
	MV810A1-4T15								
Enclosure E	MV810A1-4T18.5	318	140	140	330	158	204.8	6	6.5
	MV810A1-4T22								
Enclosure F	MV810A1-4T30	412	196	196	424	220	229	7	15
	MV810A1-4T37								
Enclosure G	MV810G1-4T45	542	190	190	560	260	255	9	21.5
	MV810A1-4T55								
	MV810A1-4T75								
Enclosure H	MV810A1-4T90	539	230	230	560	300	300	10	30
	MV810A1-4T110								
Enclosure I	MV810A1-4T132	875	230	230	900	310	429	10	100
	MV810A1-4T160								
Enclosure J	MV810A1-4T185	970	240	150	1029	300	520	-	120
	MV810A1-4T200								
	MV810A1-4T220								

1.7 Appearance and dimensions of operating panels

(1) Standard operating panel for AC Drives with a power rating of 75 kW or less.

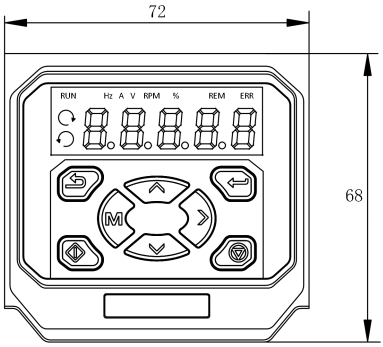


Figure 1-10 Operating panel for models with a power rating ⩽ 75 kW

(2) Standard operating panel MV820-DP03 for models with a power rating ⩾ 90 kW

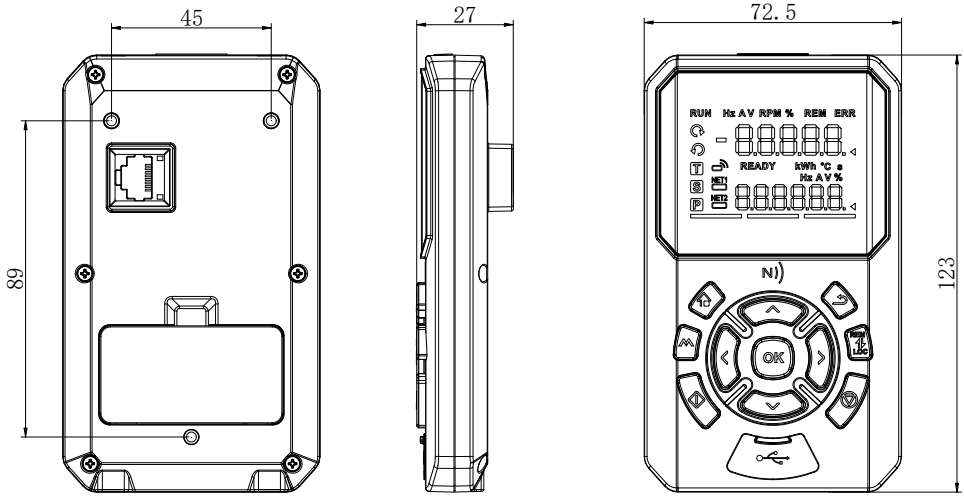


Figure 1-11 Operating panel for models with a power rating ⩽ 75 kW

WARNING

① Each AC drive model incorporates a detachable LED operating panel as its standard configuration, and the panel size (being either large or small) is determined by the power rating. The operating panel can be also used as expansion. If additional options of remote LCD operating panels are needed, please refer to section 2.6 in the full version of the MV810A Series operating manual.

② This AC drive model incorporates a single net port for expansion connection.

Chapter 2 Drive Wiring & Commissioning

This chapter provides the instructions for the wiring and connection of the drive, and the logic and commissioning of the air compressor.

DANGER

- Before opening the drive cover, make sure to completely cut off the power supply and wait for at least 10 minutes.
- Before wiring, make sure that the indicator on the drive panel is completely off, and the voltage between +/DC+ and -/DC- terminals of the main circuit is below 36 V DC.
- Only professionals who are sufficiently trained and qualified are allowed to wire the drive product.
- When connecting the emergency stop circuit or the safety circuit, check the wiring carefully before and after the operation.
- Check the voltage class of the drive before power on. Otherwise, personal injuries and property damage may occur.

WARNING

- Before use, check carefully whether the rated input voltage of the drive is consistent with the voltage of the AC power supply.
- The drive has passed the withstand voltage test before leaving the factory. Please do not perform the withstand voltage test again.
- Do not connect the power supply cable to U, V and W phases.
- The grounding cable generally comprises a copper wire with a diameter no less than 3.5 mm, and the grounding resistance shall be less than 10 Ω.
- Leakage current exists inside the drive product, the value of which is determined by actual use. To ensure safety, the drive and the motor must be grounded. A residual current device (RCD) is required. It is recommended to use the B type RCD with a leakage current limit of 300 mA.
- To facilitate the input overcurrent protection and the power-off maintenance, it is required to use an air switch or a fuse cutout in the connection between the drive and the power supply.

The electrical diagram in Figure 2-1 below is for the drive trial use.

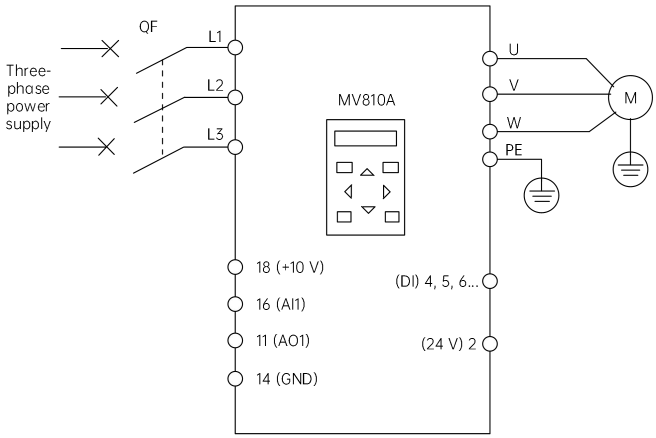


Figure 2-1 Simplified wiring of the main circuit

Recommended cables for the drive using Euroblock are shown in the following table:

Table 2-1 Recommended cables

Type	Cable	Image	Type	Cable	Image
Main circuit cable	Power cable (pipe-type terminal connector)		Control circuit cable	Signal cable (pipe-type terminal connector)	
	Grounding cable (OT terminal connector)			Ethernet cable	

Recommended pipe-type terminal diameters of the drive using Euroblock are shown in the following table:

Table 2-2 Recommended pipe-type terminal diameter

MV810A model	Main circuit (mm^2)		Control circuit (mm^2)	Recommended pipe-type terminal diameter Φ (mm)		
	Input cable	Output cable	Control terminal cable	Input cable	Output cable	Control terminal cable
MV810A1-4T7.5	6	6	0.5	3.9	3.9	1.3
MV810A1-4T11	6	6	0.5	3.9	3.9	1.3

MV810A model	Main circuit (mm^2)		Control circuit (mm^2)	Recommended pipe-type terminal diameter Φ (mm)		
	Input cable	Output cable	Control terminal cable	Input cable	Output cable	Control terminal cable
MV810A1-4T15	6	6	0.5	3.9	3.9	1.3

Recommended fastening screw torque values for wiring are shown in the following table:

Table 2-3 Recommended fastening screw torque

Enclosure	MV810A model	Main circuit terminal			Control circuit terminal
		L1, L2, L3, N	U, V, W, ⏚	+, -, BR	1 to 18
C	MV810A1-4T7.5	0.5 N·m	0.5 N·m	0.5 N·m	0.2 N·m
D	MV810A1-4T11	1.5 N·m	1.5 N·m	1.5 N·m	0.2 N·m
	MV810A1-4T15				
E	MV810A1-4T18.5	2.8 N·m	2.8 N·m	2.8 N·m	0.2 N·m
	MV810A1-4T22				
F	MV810A1-4T30	3.5 N·m	3.5 N·m	3.5 N·m	0.2 N·m
	MV810A1-4T37				
G	MV810A1-4T45	4.5 N·m	4.5 N·m	4.5 N·m	0.2 N·m
	MV810A1-4T55				
	MV810A1-4T75				
H	MV810A1-4T90	20 N·m	20 N·m	20 N·m	0.5 N·m
	MV810A1-4T110				
I	MV810A1-4T132	20 N·m	20 N·m	20 N·m	0.5 N·m
	MV810A1-4T160				
J	MV810A1-4T185	35 N·m	35 N·m	35 N·m	0.5 N·m
	MV810A1-4T200				
	MV810A1-4T220				

2.1 Main circuit terminal description and wiring

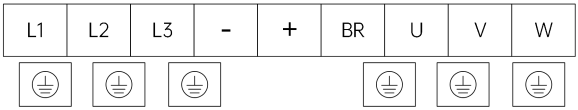
2.1.1 Main circuit input/output terminal types

The main circuit terminals can be divided into different types depending on the enclosure types and drive models.

(1) Terminal type 1

Enclosure type:

Enclosure C (applicable power: 4T7.5); Enclosure D (applicable power: 4T11/15)

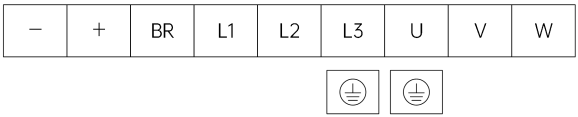


Terminal name	Function
L1, L2, L3	Three-phase 380 V AC input terminal
+, BR	Reserved
+, -	DC bus terminals
U, V, W	Three-phase AC output terminals
⏚	PE connection terminal, screws used to fix the cable fixation bracket

(2) Terminal type 2

Enclosure type:

Enclosure E (applicable power: 4T18.5/22)



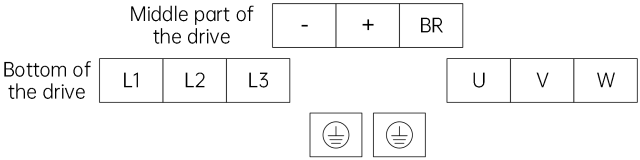
Terminal name	Function
L1, L2, L3	Three-phase 380 V AC input terminal
+, BR	Reserved
+, -	DC bus terminals
U, V, W	Three-phase AC output terminals

Terminal name	Function
⏚	PE connection terminal

(3) Terminal type 3

Enclosure type:

Enclosure F (applicable power: 4T30/37)

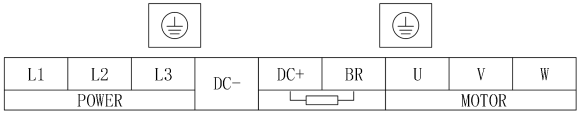


Terminal name	Function
L1, L2, L3	Three-phase 380 V AC input terminal
+, BR	Reserved
+, -	DC bus terminals
U, V, W	Three-phase AC output terminals
⏚	PE connection terminal

(4) Terminal type 4

Enclosure type:

Enclosure G (applicable power: 4T45/55/75)

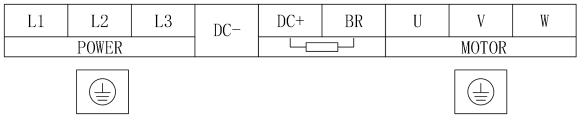


Terminal name	Function
L1, L2, L3	Three-phase 380 V AC input terminal
DC+, BR	External braking resistor terminal
DC+, DC-	DC bus terminals
U, V, W	Three-phase AC output terminals
⏚	PE connection terminal

(5) Terminal type 5

Enclosure type:

Enclosure H (applicable power: 4T90/110)

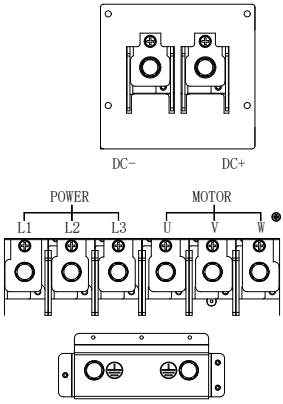


Terminal name	Function
L1, L2, L3	Three-phase 380 V AC input terminal
DC+, BR	External braking resistor terminal
DC+, DC-	DC bus terminals
U, V, W	Three-phase AC output terminals
⏚	PE connection terminal

(6) Terminal type 6

Enclosure type:

Enclosure I (applicable power: 4T132/160)

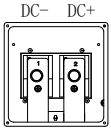


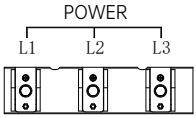
Terminal name	Function
L1, L2, L3	Three-phase 380 V AC input terminal
DC+, DC-	DC bus terminals
U, V, W	Three-phase AC output terminals
⏚	PE connection terminal

(7) Terminal type 7

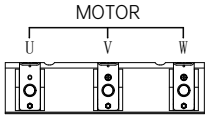
Enclosure type:

Enclosure J (applicable power: 4T185/200/220)





Left of the enclosure



Right of the enclosure

Terminal name	Function
L1, L2, L3	Three-phase 380 V AC input terminal
DC+, DC-	DC bus terminals
U, V, W	Three-phase AC output terminals

WARNING

① In a common DC bus application, the positive and negative terminals of the DC input must be connected to the +/DC+ and -/DC- terminals respectively to enable the power-up buffering function for the internal DC bus capacitor of the AC drive.

② The cable fixation bracket is fixed to the grounding plate through two PE terminals.

2.2 Control circuit description and wiring

2.2.1 Control circuit terminal layout

(1) Models with a power rating ⩽ 75 kW

1	3	5	7	9	11	13	15	17
2	4	6	8	10	12	14	16	18

RA	RB	RC

Figure 2-2 Control circuit terminal layout 1

(2) Models with a power rating ⩾ 90 kW

1	3	5	7	9	11	13	15	17
2	4	6	8	10	12	14	16	18

RA	RB	RC	RA2	RB2	RC2

Figure 2-3 Control circuit terminal layout 2

(3) Terminal layout of the phase loss and sequence detection board

R	Not connected	S	Not connected	T

(4) I/O expansion box terminal layout

+24 V	GND	PT1+	PT1-	PT2+	PT2-	1L	1H	2L	2H	TA	TC

Figure 2-4 Control circuit terminal layout

2.2.2 Control circuit terminal wiring

WARNING

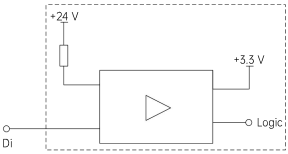
It is recommended to employ wires exceeding 0.5 mm^2 for the connection of the control circuit terminals.

The terminal functions are explained in Table 2-4.

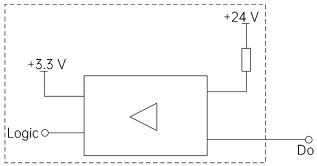
Table 2-4 Control box terminal functions

Type	Mark	Name	Function	Specifications
Communication	1	RS485	485 differential signal positive (reference ground: GND)	Standard RS485 communication interface; Use twisted pair cables or shielded cables.
	3		485 differential signal negative (reference ground: GND)	
Power supply	2/9	+24 V power supply	+24 V reference power output	Maximum allowable output current: 200 mA (the total current with all digital outputs included).
	18	+10 V power	+10 V reference power	Maximum allowable output

Type	Mark	Name	Function	Specifications
		supply	output	current: 10 mA.
	14/17	+24 V, +10 V power ground	Reference ground of +24 V and +10 V power supplies	Reference 0 V for digital input/output, analog input/output, and communication signals.
Analog input	16	Analog single-ended input AI1	It receives analog voltage/current single-ended input. Select the input via the setting of function code P09.01 (reference ground: GND).	Input voltage: 0 V to 10 V (input impedance: 100 kΩ). Resolution: 1/4000; Input current: 0 mA to 20 mA (input impedance: 165 Ω). Resolution: 1/4000.
	13	Analog single-ended input AI2 or analog current differential input AI2	It receives analog voltage/current single-ended input, or current differential input. Select the analog voltage/current input via the setting of function code P09.02 (reference ground: GND).	Input voltage: -10 V to 10 V (input impedance: 100 kΩ). Resolution: 1/4000; Input current: 0 mA to 20 mA (input impedance: 10 Ω). Resolution: 1/4000; supporting differential input.
	15	Differential input current return terminal AI2_RE	Used as the current return terminal during analog current differential input. If the analog current input is single-ended, it is required to connect this terminal to GND.	Input current: 0 mA to 20 mA (input impedance: 10 Ω). Resolution: 1/4000; supporting differential input.
Analog output	11	Analog output AO1	It serves as the analog voltage/current output, with 28 types of outputs allowed. Select the analog voltage/current output via the setting of function code P09.02 (reference ground: GND).	Output voltage: 0 to 10 V, ±5% Output current: 0 to 20 mA
Multi-function	4	Multi-function	Select the terminal	For input circuit function

<table>
<tr><th>Type</th><th>Mark</th><th>Name</th><th>Function</th><th>Specifications</th></tr>
<tr><td rowspan="6">input terminals</td><td></td><td>DI1</td><td rowspan="6">function from multi-function DI, HDI, and thermistor signal input via the setting of function codes P09.00 and P09.01.
For details, refer to the input functions of P09.03 to P09.10 and the two/three-wire control functions of P09.14 in 7.10 (Group P09 terminal input parameters) in the full version of the MV810A Series operating manual.</td><td rowspan="2">selection, refer to the multi-function input/output terminal wiring as shown in the diagram below:
 

Example:
<table>
<tr><th>P09.00</th><th>Terminal 5</th><th>Terminal 4</th></tr>
<tr><td>Ox00</td><td>DI2</td><td>DI1</td></tr>
<tr><td>Ox21</td><td>HDO2</td><td>DO1</td></tr>
<tr><td>...</td><td>...</td><td>...</td></tr>
</table></td></tr>
<tr><td>5</td><td>Multi-function DI2</td></tr>
<tr><td>6</td><td>Multi-function DI3</td><td rowspan="2">These two terminals serve respectively as the digital inputs DI3 and DI4 only, and can not be set to other signal input/output functions via the setting of function codes.</td></tr>
<tr><td>8</td><td>Multi-function DI4</td></tr>
<tr><td>7</td><td>Multi-function DI5 or thermistor signal</td><td>This terminal can be used as the digital input DI5 via the setting of function code P09.01; it can also be used as the thermistor signal input (PT1000 and KTY84-130) via the setting of function code P97.26.</td></tr>
<tr><td>10</td><td>Multi-function DI6 or HDI</td><td>This terminal can be used as the digital input DI6 or the digital pulse input HDI (pulse range: 0 to 50 kHz) via the setting of function code P09.01.</td></tr>
<tr><td>12</td><td>Multi-function DI7</td><td>This terminal serves as the digital input DI7 only, and can not be set to other signal input/output</td></tr>
</table>

<table>
<tr><th>Type</th><th>Mark</th><th>Name</th><th>Function</th><th>Specifications</th></tr>
<tr><td></td><td></td><td></td><td></td><td>functions via the setting of function codes.</td></tr>
<tr><td></td><td>16</td><td>Multi-function AI1</td><td></td><td>This terminal can be used as the digital input DI8 or the analog input AI1 via the setting of function code P09.01.</td></tr>
<tr><td rowspan="3">Multi-function output terminals</td><td>4</td><td>Open-collector output terminal Y1;
DO1 output terminal;
HDO1 pulse output terminal</td><td rowspan="2">Terminals 4 and 5 serve as the general-purpose multi-functional terminals (same as terminals 6, 8, 7, 10, 12, and 16). In addition, these two can also be used as DO/HDO via the setting of function codes (reference ground: GND).
For details, refer to the input functions of P09.00 to P09.02 in 7.10 (Group P09 terminal input parameters) in the full version of the MV810A Series operating manual.</td><td rowspan="2">For input circuit function selection, refer to the multi-function input/output terminal wiring as shown in the diagram below:
 

Example:
<table>
<tr><td>P09.00</td><td>Terminal 5</td><td>Terminal 4</td></tr>
<tr><td>0x21</td><td>HDO2</td><td>DO1</td></tr>
<tr><td>0x22</td><td>HDO2</td><td>HDO1</td></tr>
<tr><td>...</td><td>...</td><td>...</td></tr>
</table>
Maximum working voltage: 30 V
Maximum output current: 50 mA</td></tr>
<tr><td>5</td><td>Open-collector output terminal Y2;
DO2 output terminal;
HDO2 pulse output terminal</td></tr>
<tr><td></td><td>11</td><td>DO3 output terminal</td><td>This terminal can be used as multi-function DO/AO via the setting of function codes (reference ground: GND).
For details, refer to the functions of P09.02 in 7.10 (Group P09 terminal input parameters) in the full version of the MV810A Series operating manual.</td><td>This terminal is set to function DO3 for models of 75 kW or less.
This terminal can be used as DO3 via the setting of function code P09.02.
Maximum output current: 50 mA

This terminal is set to function RO2 for models of 90 kW or above.</td></tr>
</table>

Type	Mark	Name	Function	Specifications
Relay output terminal RO1	RA	Relay output	These terminals can be used as multi-function relay outputs via the setting of function codes. Refer to the output functions of P10.03 in 7.11 (Group P10 terminal output parameters) in the full version of the MV810A Series operating manual.	RA - RB: NC. RA - RC: NO Contact capacity: 250 V AC / 2 A (COSΦ = 1); 250 V AC / 1 A (COSΦ = 0.4); 30 V DC / 1 A. Refer to the description of P10 for usage instructions. The overvoltage category of the input voltage of the relay output terminal is category II.
	RB			
	RC			
Relay output terminal RO	RA2	Relay output	These terminals can be used as multi-function relay outputs via the setting of function codes. Refer to the output functions of P10.02 in 7.11 (Group P10 terminal output parameters) in the full version of the MV810A Series operating manual.	RA - RB: NC. RA - RC: NO Contact capacity: 250 V AC / 2 A (COSΦ = 1); 250 V AC / 1 A (COSΦ = 0.4); 30 V DC / 1 A. Refer to the description of P10 for usage instructions. The overvoltage category of the input voltage of the relay output terminal is category II.
	RB2			
	RC2			

WARNING

(1) Most of the multi-function terminals can be used as input/output of multiple types, including DI, DO, HDI, HDO, AI, AO, and thermocouple input.

(2) The internal circuit of the drive is not illustrated in the multi-function DI/DO wiring diagram, but represented by a symbol (▷) instead.

Terminal functions of the phase loss and sequence detection board are described in Table 2-5.

Table 2-5 Phase loss and sequence detection board terminal functions

Type	Mark	Name	Function	Specifications
Phase loss and sequence detection	R	Power supply phase A signal	Power supply phase A signal input terminal	Maximum input voltage: 528 V
	S	Power supply phase B signal	Power supply phase B signal input terminal	

board	T	Power supply phase C signal	Power supply phase C signal input terminal	

I/O expansion box terminal function are described in Table 2-6.

Table 2-6 I/O expansion box terminal functions

Type	Mark	Name	Function	Specifications
I/O expansion box	+24 V	24 V DC output terminal	24 V DC power supply output	Maximum allowable output current: 400 mA
	GND	24 V DC output terminal GND	GND of 24 V DC power supply output	
	PT1+	Temperature sampling input 1+	Temperature sampling input 1+	PT100 temperature detection unit
	PT1-	Temperature sampling input 1-	Temperature sampling input 1-	
	PT2+	Temperature sampling input 2+	Temperature sampling input 2+	
	PT2-	Temperature sampling input 2-	Temperature sampling input 2-	
	1L	Current transformer sampling input 1 common end	Fan current transformer secondary current detection	Maximum allowable input current: 4 A
	1H	Current transformer sampling input 1		
	2L	Current transformer sampling input 2 common end		
	2H	Current transformer sampling input 2		
	TA	Electromagnetic valve relay output	Electromagnetic valve On/Off control	NO. Contact capacity: 250 V AC / 2 A (COSΦ = 1); 250 V AC / 1 A (COSΦ = 0.4); 30 V DC / 1 A.
	TC	Electromagnetic valve relay output		

2.2.2.1 Multi-function input terminal wiring

MV810A offers multi-function input terminals 4, 5, 6, 7, 8, 10, 12, and 16, which can be set respectively as digital inputs DI1 to DI8 via the setting of P09.00 and P09.01. Multiple wiring methods are available via the setting of terminal open-circuit voltage selection P09.11. Typical wiring methods are illustrated below:

(1) P09.11 = 0 (set the digital terminal open-circuit voltage to 0 V)

① Dry contact mode, as shown in Figure 2-5.

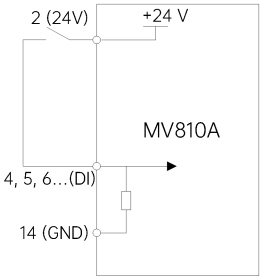


Figure 2-5 Wiring when using the internal +24 V power supply of the drive

② Wiring when the internal power supply of the drive is used and the external controller adopts the PNP common emitter output, as shown in Figure 2-6.

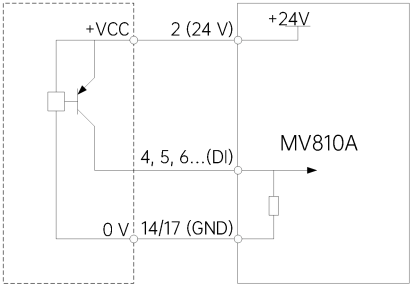


Figure 2-6 Wiring when using the internal power supply and the PNP type external controller

③ Wiring when the external power supply is used and the external controller adopts the PNP common emitter output, as shown in Figure 2-7.

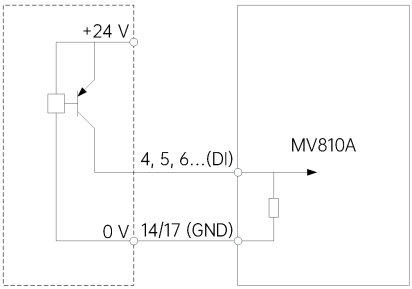


Figure 2-7 Wiring when using the external power supply and the PNP type external controller

(2) P09.11 = 1 (set the digital terminal open-circuit voltage to 24 V)

① Dry contact mode, as shown in Figure 2-8.

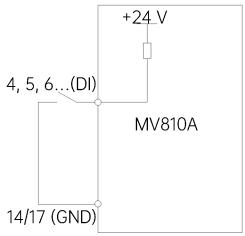


Figure 2-8 Wiring when using the internal +24 V power supply of the drive

② Wiring when the external controller adopts the NPN common emitter output, as shown in Figure 2-9.

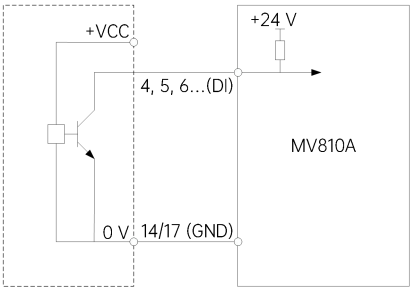


Figure 2-9 Wiring when using the NPN type external controller

2.3 Air compressor commissioning

To quickly complete the air compressor drive commissioning, instructions on the wiring for basic operations, control logic, and the commissioning steps of the drive are provided in this section.

2.3.1 Wiring for basic operations

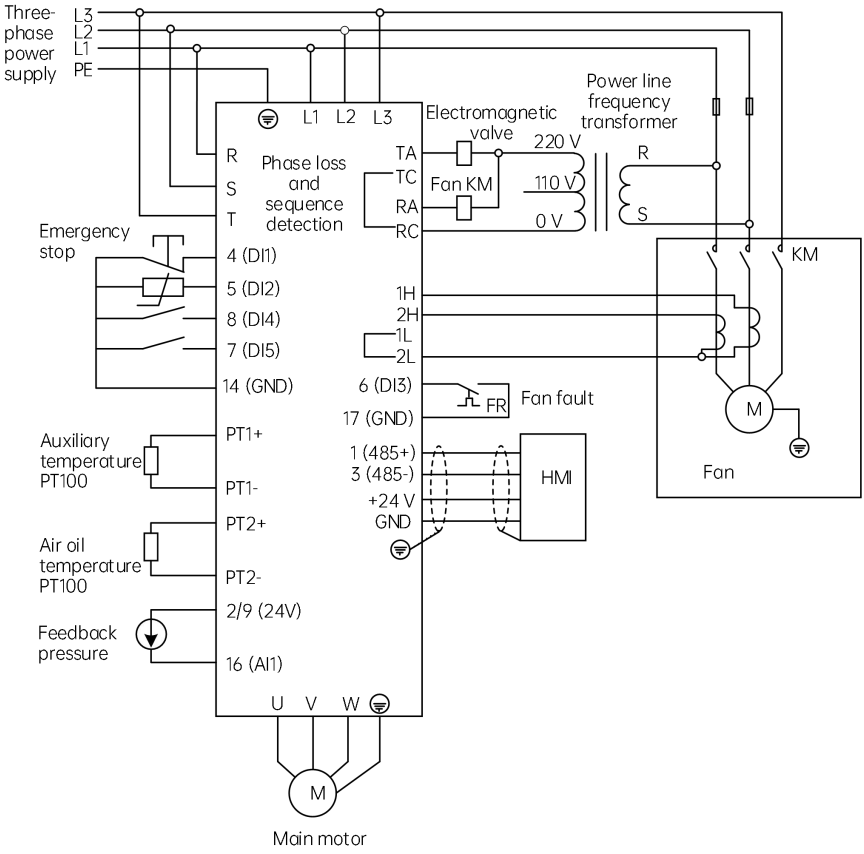


Figure 2-10 Basic wiring diagram 1

Note:

(1) Terminals AI1 and AI2 can set to voltage signal input or current signal input by function codes P09.01 and P09.02.

(2) Terminal AO1 can be set to voltage signal output or current signal output by function code P09.02.

(3) For instructions on control circuit terminals, refer to section 4.2.

2.3.2 Air compressor control logic

(1) The control logic of the air compressor is illustrated below:

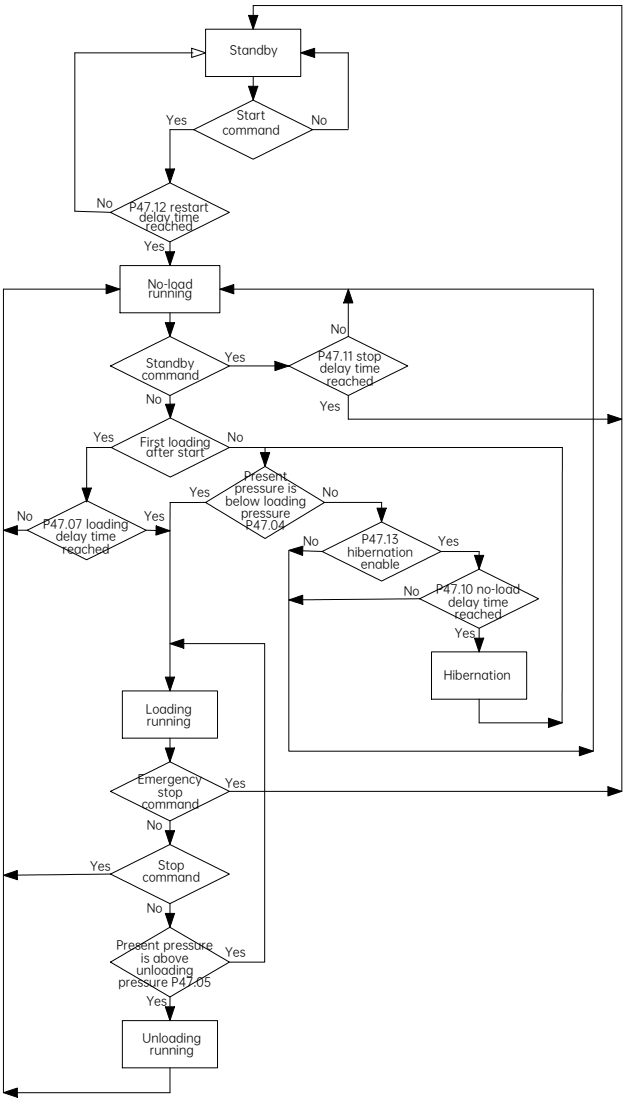


Figure 2-11 Air compressor control logic

(2) Control of the running pressure/frequency during air compressor operations is shown in Figure 2-12:

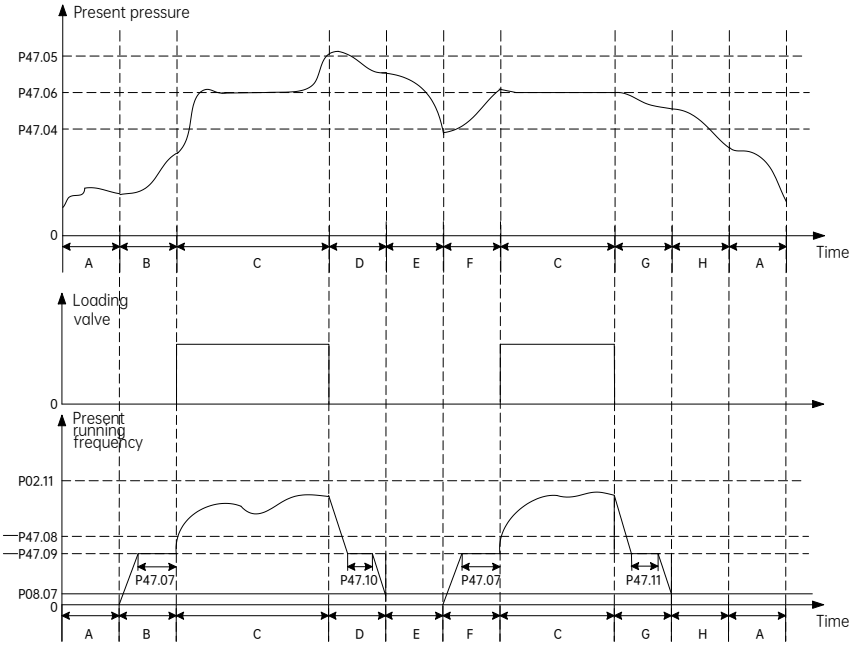


Figure 2-12 Running pressure/frequency control of the air compressor

In the above figure, P47.05 refers to the unloading pressure, P47.04 refers to the loading pressure, P47.06 refers to the pressure reference, P02.11 refers to the frequency upper limit, P47.08 refers to the loading running frequency lower limit, P47.09 refers to the no-load running frequency, and P08.07 refers to the stop frequency.

The control process of the air compressor comprises the following main stages: A to H.

Each stage is explained below:

A: Standby state.

B: Beginning stage of start; the duration is P47.07 (including part of the P02.13 acceleration time 1).

C: Constant-pressure exhaust stage during loading; pressure PID adjustment is valid.

D: Unloading stage; the duration includes P47.10 and part of the P02.14 deceleration time 1.

E: Hibernation stage; the drive does not run.

F: Wake-up and start stage; the duration is P47.07 (including part of the P02.13 acceleration time 1).

G: Beginning stage of stop; the duration includes P47.11 and part of the P02.14 deceleration time 1.

H: Restart delay stage after stop; the duration is P47.12.

In the automatic loading/unloading mode, when the air compressor control is valid and the air supply of the compressor turns normal after start, if the exhaust pressure is detected to be above P47.05, automatic unloading will be applied. If the hibernation function is enabled, the drive will enter the hibernation state. If the hibernation function is disabled, the drive will run continuously at the no-load

running frequency P47.09. When the exhaust pressure is detected to be below P47.04, automatic loading will be applied. During loading running, the rotation speed of the main motor is controlled by the pressure PID. P47.06 is the air supply pressure during the stable running of the air compressor. The drive keeps the exhaust pressure at a constant value by regulating the rotation speed of the main motor. The constant pressure control adopts the PID algorithm, and the frequency reference source of the main motor is set via P02.05 = 6. The reference source of PID is set via P14.00 = 7. The pressure reference is set by P47.06. The feedback source of PID is set via P14.01 = 10, which is acquired by detecting the pressure signal. The PID parameters P14.13, P14.14, and P14.15 adopt the system default values.

Note:

The stop mode of the drive is set by P08.06, and the default setting is "Decelerate to stop." During the unloading stage or upon a normal stop command, the drive will enter the "Decelerate to stop" mode; during any fault or upon an emergency stop command, the drive will enter the "Coast to stop" mode.

2.3.3 Air compressor commissioning instructions

For the commissioning of the MV810A air compressor drive, it is recommended to use the touch screen HMI. The steps are explained below:

Note:

The parameters displayed in the following images serve as reference only. Refer to the actual displayed data during use.

Figure 2-13 The Login interface

The touch screen displays the Login interface as shown in Figure 2-11 after power on. Click the Enter button at the bottom right to enter the main working interface.

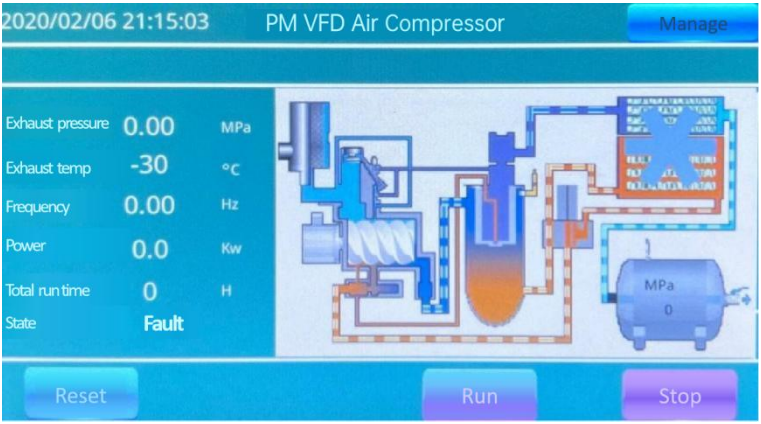


Figure 2-14 Main working interface

The left side of the main working interface displays the present data, such as the exhaust pressure and the exhaust temperature; the right side displays the dynamic diagram of the air compressor system. At the bottom of the interface sit three buttons, respectively used for fault reset, system run, and stop. Click the Manage button at the top right to enter the Manage interface.

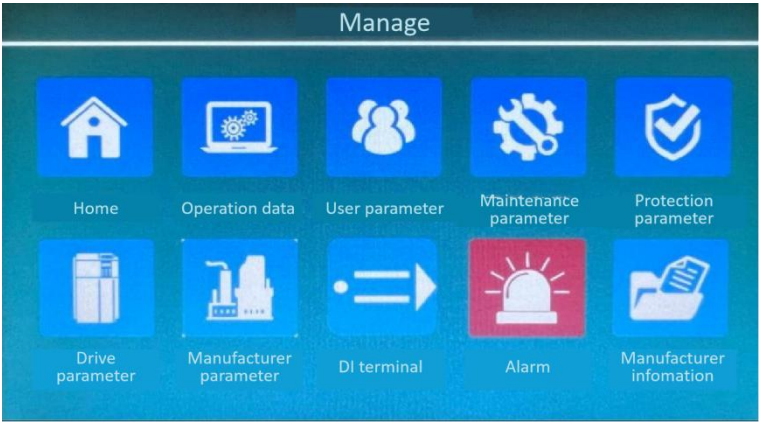


Figure 2-15 The Manage interface

The user can check system parameter when needed in the Manage interface. Each parameter group is explained below.

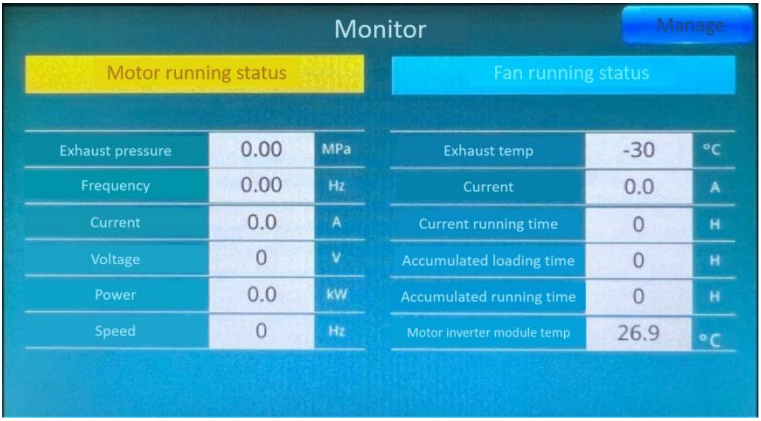


Figure 2-16 The Monitor interface

The user can check the parameters of the main motor and the fan motor in the Monitor interface, such as the exhaust pressure, the present running frequency, and the current. The displayed parameters are read-only.

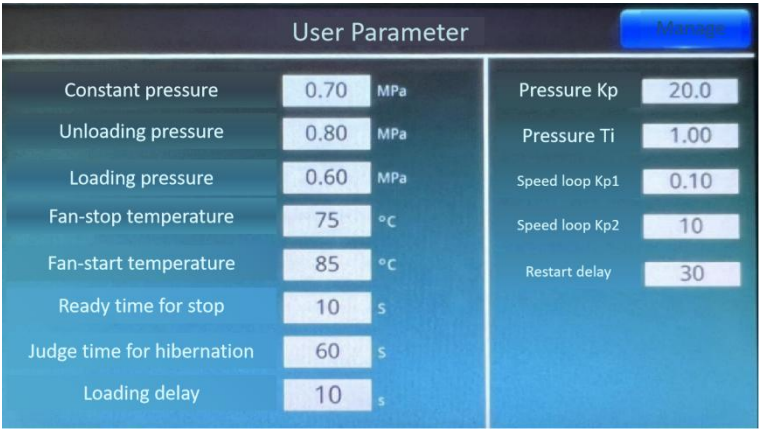


Figure 2-17 The User Parameter interface

The user can set the parameters related to the compressor loading and the constant-pressure control in the User Parameter interface.

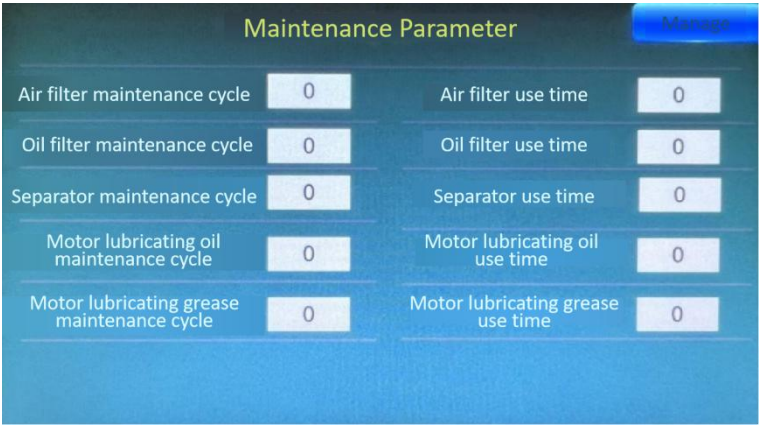


Figure 2-18 The Maintenance Parameter interface

The user can set the maintenance time and the use time of five components in the Maintenance Parameter interface. When the use time exceeds the maintenance time, the system will report to the user via an alarm (bit0 to bit4 of P48.16).

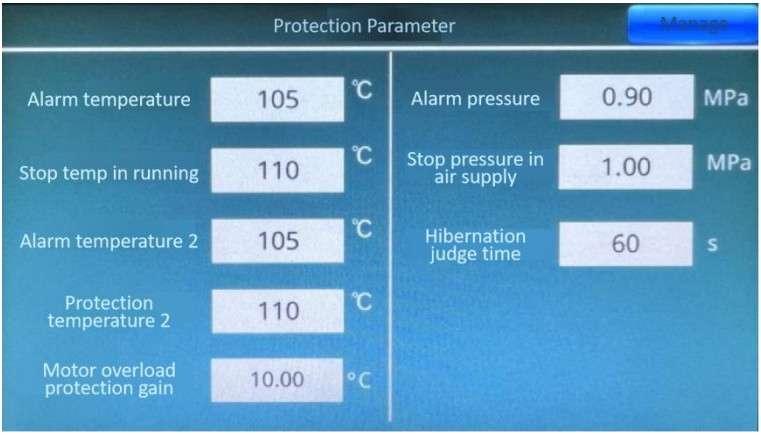


Figure 2-19 The Protection Parameter interface

The user can set the parameters related to the pressure/temperature pre-alarm and its threshold in the Protection Parameter interface.

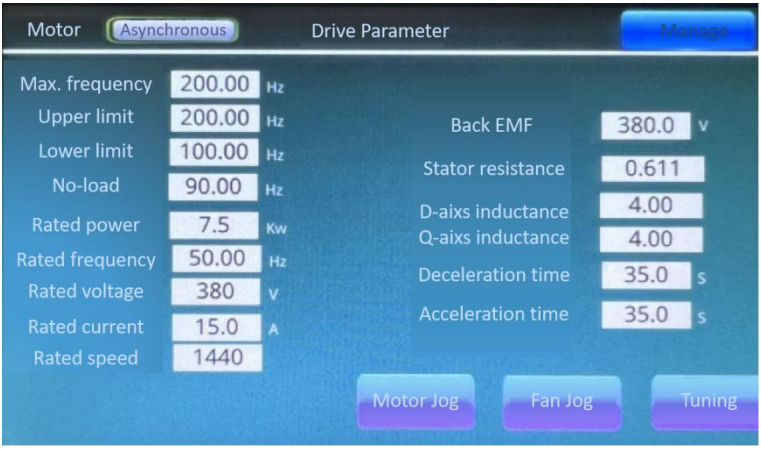


Figure 2-20 The Drive Parameter interface

The user can set the drive parameters in the Drive Parameter interface. For the first commissioning of a new drive, it is required to set the maximum frequency, the frequency upper limit, and the motor rated parameters according to the motor nameplate before clicking the Tuning button to start the static auto-tuning. This auto-tuning is capable of learning the resistance and inductance of the motor only, while the back EMF shall be set manually. After the auto-tuning, check the rotation direction by clicking the Motor Jog button and the Fan Jog button; if the direction is not correct, interchange any two phases of the motor

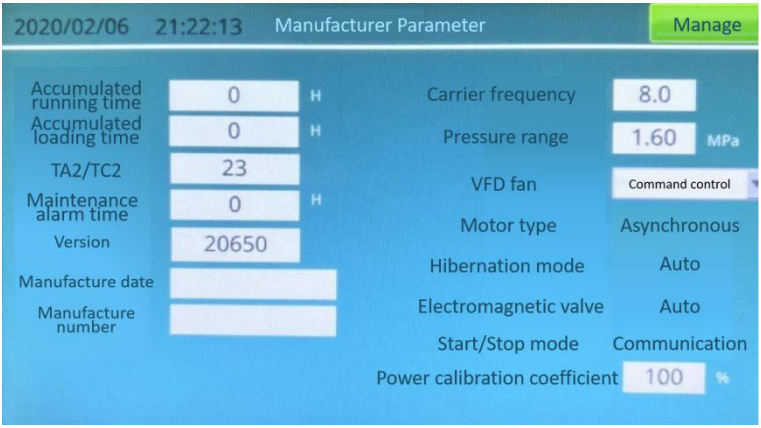


Figure 2-21 The Manufacturer Parameter

The user can set the parameters including the carrier frequency and the hibernation mode, etc., in the Manufacturer Parameter interface.

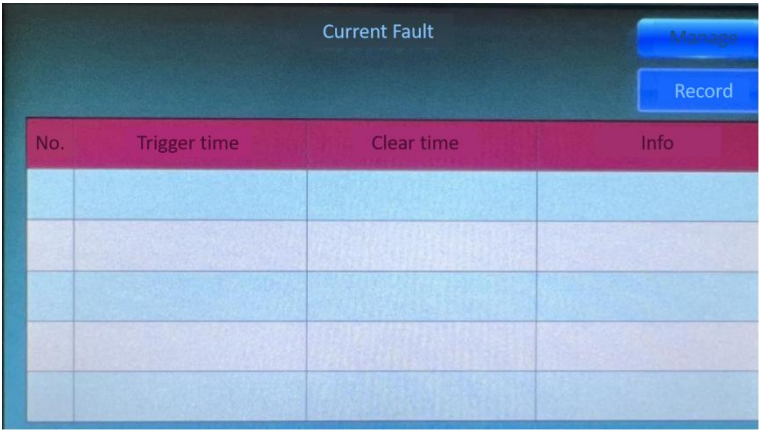


Figure 2-22 The Current Fault interface

The user can check fault information in the Current Fault interface. Click the Record button to view the fault record.

Figure 2-23 The Fault Record interface

The user can view the previous fault type and its variables in the Fault Record interface. The variables include the current, frequency, and voltage. Click the Clear Record button to remove the record off the table, and click the Clear Data button to remove the data of the corresponding variables off the table.

Chapter 3 Quick Operation Guide

3.1 Operating panel

3.1.1 Introduction of operating panel

The MV810A Series provides two types of operating panels: one is the small-size operating panel as standard configuration for models with a power rating of 75 kW or less, and the other is the multi-functional large-size operating panel (model MV820-DP03) as standard configuration for models with a power rating of 90 kW or above. The large-size operating panel can also be used as the option for other models (for installation dimensions, please refer to Section 2.5 in the full version of the MV810A Series user manual). The small-size operating panel is illustrated below.

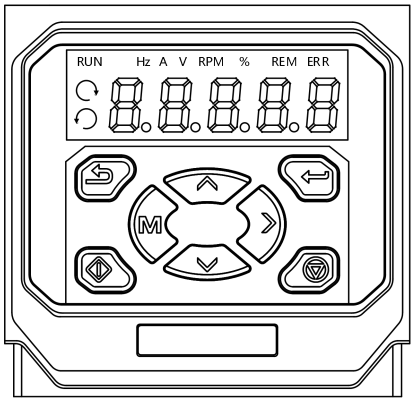


Figure 3-1 Small-size operating panel

3.1.1.1 LED indicator description of small-size operating panel

Table 3-1 LED description of small-size operating panel

LED		Name	Description	Color
Unit	Hz	Frequency indicator	Blinking: Currently on display is the running frequency; ON: Currently on display is the frequency reference.	Yellow
	A	Current indicator	ON: Currently on display is the current.	Yellow
	V	Voltage indicator	ON: Currently on display is the voltage.	Yellow

LED		Name	Description	Color
	RPM	Speed indicator	ON: Currently on display is the rotating speed.	Yellow
	%	Percentage indicator	ON: Currently on display is the percentage.	Yellow
Status	↻	FWD rotation indicator	ON in stop state: There is a FWD run command from the drive; ON in the running state: The drive is in the FWD running state. Blinking: The drive is switching from FWD run to REV run.	Green
	↺	REV rotation indicator	ON in stop state: There is a REV run command from the drive; ON in the running state: The drive is in the REV running state. Blinking: The drive is switching from REV run to FWD run.	Green
	ERR	Alarm indicator	ON: The drive is in the alarm state.	Red
	RUN	RUN indicator	ON: Running; Blinking: Stopping; OFF: Stopped	Green
	REM	Channel indicator	OFF: Local; Blinking: Communication; ON: Terminal.	Yellow

3.1.1.2 Button/Key instructions of small-size operating panel

Table 3-2 Button functions of small-size operating panel

Key	Name	Function
	Return	Press to exit from the programming state.
	Program/Confirm	Press to enter a menu or confirm setting.
	Increase	Press to increase the data value or function code number.
	Decrease	Press to decrease the data value or function code number.

Key	Name	Function
	Shift	When in the editing mode, press the key to shift the data digit for modification; When in other state, press the key to shift the display of status parameters.
	Multi-functional key	Refer to Table 5-3 for multi-functional key usage.
	RUN	When in the operating panel channel mode, press the key to run the system.
	Stop/Reset	Press to stop running or reset the fault.

3.1.1.3 Large-size operating panel

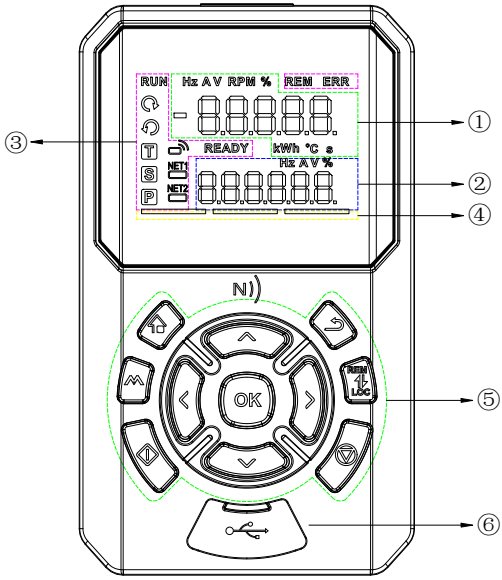


Figure 3-2 Large-size operating panel

Number	Name	Description
①	Main display zone	It displays the drive parameters, their units and positive/negative properties.
②	Auxiliary display zone	It displays the drive monitoring parameter values and their unit.

Number	Name	Description
③	Status indication zone	It indicates the following statuses of the drive: 1. Power-on status (normal or abnormal); 2. Operational status (running or stopped); 3. Rotation direction (FWD or REV); 4. Control mode (local or remote); 5. Fault/alarm status; 6. Operating mode (speed/torque/position); 7. Communication status; 8. Wireless NFC status.
④	Menu mode indication zone	It indicates the present mode of the menu (quick-commissioning menu, basic menu, modification record menu, etc.).
⑤	Key zone	It is used to input the function code and data information of the drive.
⑥	USB-Type C port	It connects the drive to the PC host device.

3.1.1.4 LED indicator description

Table 3-3 LED description of large-size operating panel

LED		Name	Description	Color
Unit	Hz	Frequency indicator	Blinking: Currently on display is the running frequency; ON: Currently on display is the frequency reference.	White
	A	Current indicator	ON: Currently on display is the current.	White
	V	Voltage indicator	ON: Currently on display is the voltage.	White
	r/min	Speed indicator	ON: Currently on display is the rotating speed.	White
	%	Percentage indicator	ON: Currently on display is the percentage.	White
	℃	Temperature indicator	ON: Currently on display is the temperature in Celsius.	White
	s	Time indicator	ON: Currently on display is the time in seconds.	White

LED		Name	Description	Color
	kWh	Power indicator	ON: Currently on display is the power.	White
Status	↻	FWD rotation indicator	ON in stop state: There is a FWD run command from the drive; ON in the running state: The drive is in the FWD running state. Blinking: The drive is switching from FWD run to REV run.	Green
	↺	REV rotation indicator	ON in stop state: There is a REV run command from the drive; ON in the running state: The drive is in the REV running state. Blinking: The drive is switching from REV run to FWD run.	Green
	ERR	Alarm indicator	ON: The drive is in the alarm state.	Red
	RUN	RUN indicator	ON: Running; Blinking: Stopping; OFF: Stopped	Green
	REM	Channel indicator	OFF: Local; Blinking: Communication; ON: Terminal.	White
	T	Torque control indicator	ON: The drive is in the torque control mode.	White
	S	Speed control indicator	ON: The drive is in the speed control mode.	White
	P	Position control indicator	ON: The drive is the position control mode.	White
		Wireless communication indicator	Blinking: Waiting to be connected; ON: Successful connection; OFF: Function disabled	White
	NET1	Communication indicator 1	Reserved	-
	NET2	Communication	Reserved	-

LED		Name	Description	Color
		indicator 2		
	READY	Standby indicator	Steady ON: In stop state	White
	▬▬▬	Menu mode indicator	ON: It displays the present menu mode (from left to right: quick-commissioning menu, full menu, and modification record menu).	White
	▬	Negative sign indicator	ON: Currently on display is a negative value; OFF: Currently on display is a positive value.	White
	◂	Main/Auxiliary zone indicator	ON: Currently in operation is the (main/auxiliary) display zone.	White

3.1.1.5 Button/Key instructions of large-size operating panel

Table 3-4 Button functions of large-size operating panel

Key	Name	Function
	Return	Press to exit from the programming state.
	Right shift	It is used to shift the data digit for modification or to switch the display of status parameters. Press to right shift the monitored variable; Press to shift the blinking digit to the right.
	Left shift	It is used to shift the data digit for modification or to switch the display of status parameters. Press to left shift the monitored variable; Press to shift the blinking digit to the left.
	RUN	When in the operating panel channel mode, press the key to run the system.
	Stop/Reset	Press to stop running or reset the fault.
	Up	Press to increase the data value or function code number.
	Down	Press to decrease the data value or function code number.
	Confirm	Press to enter the next level menu or confirm setting.
	Menu switchover	Short press to switch between menu modes (including quick-commissioning menu, full menu, and modification

Key	Name	Function
		record menu) which follow the setting of parameter P00.00. Press and hold the key to switch between the main display zone and the auxiliary display zone.
	Multi-functional key	Set the button function through the setting of parameter P00.04 (including jogging, FWD/REV switchover, etc.).
	Channel switchover	Press to switch between channels (local, terminal, and communication).

Table 3-5 Usage of multi-functional key

Multi-functional key	Function	Description
0	No function	The key serves no purpose.
1	FWD jog	The key functions as FWD jog key. The function is valid in three command channels. Press and hold to key to start FWD jogging. Release the key to stop FWD jogging.
2	REV jog	The key functions as REV jog key. The function is valid in three command channels. Press and hold to key to start REV jogging. Release the key to stop REV jogging.
3	FWD/REV switchover	The key functions as RWD/REV switchover key. The function is valid only in the operating panel command channel. The function is valid in both stop and running state.
4	Command channel switchover 1	The key functions as command channel switchover key. The function is valid only in the stop state. The switchover is in a cyclic mode, and the sequence is local, terminal, and remote.

3.1.1.6 Status of operating panel display

The display of the MV810A Series can be set to the stop state display, the running state display, the parameter editing state display, and the fault state display.

(1) Stop state display

When the drive is in the stop state, the operating panel displays the related statuses as shown in Figure 5-3a. The unit indicator shows the unit of the displayed parameter value.

If verification mode is selected, only the number of parameters whose settings differ from the default values will be displayed. Press ∨ and ∧ keys to scan over those parameters, so the user will know

which parameter has been modified.

Press key to cyclically shift the display of different status parameters in the stop state (determined by P16.03).

(2) Running state display

The drive starts running after a valid RUN command is received, and the operating panel displays the related running statuses. The RUN indicator will be ON. The FWD/REV indicator will ON/OFF according to the actual running direction. As shown in Figure 5-3b, the unit indicator shows the unit of the displayed parameter value.

Press key to cyclically shift the display of all status parameters available in the running state (determined by P16.00 and P16.01).

(3) Fault state display

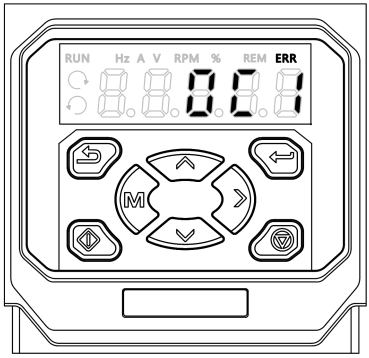
The operating panel enters the fault state display once the drive receives a fault signal. As shown in Figure 5-3c, the fault code will be on display.

Press key to cyclically shift the display of fault codes and the status parameters in the stop state. Reset the fault via the key on the operating panel, the control terminal, or the communication command. If the fault persists, so will its display.

When a fault is detected, set the stop mode or determine whether to continue running through the setting of the corresponding fault protection property (P97.15 to P97.19).

a Stop state display

b Running state display



c Fault state display

Figure 3-3 Large-size operating panel

(4) Parameter editing state display

When the drive is in the stop, running, or fault state, press key to enter the editing state (if a password is required, please refer to parameter P00.01). The editing menu display is structured in three levels, respectively the function code group or function code number → function code parameter → parameter value. Press to enter the value display mode where the user can press to save the parameter value or press to exit and re-enter the previous-level menu.

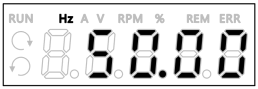
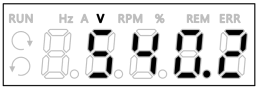
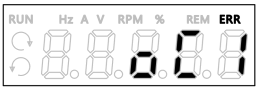
3.1.2 LED display symbols

The corresponding relationship between the display symbols and the letters/numbers is as follows.

Symbol	Meaning	Symbol	Meaning	Symbol	Meaning	Symbol	Meaning
0	0	A	A	I	I	S	S
1	1	b	b	J	J	T	T

Symbol	Meaning	Symbol	Meaning	Symbol	Meaning	Symbol	Meaning
2	2	C	C	L	L	t	t
3	3	c	c	n	N	U	U
4	4	d	d	n	n	u	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		

Examples of LED display:

LED display zone	Unit indicator	Data/Code on display	Data/Code meaning
	Steady ON	Blinking	Frequency reference
	Blinking	Steady ON	Output frequency
	Steady ON	Blinking	Bus voltage
	Steady ON	Steady ON	Bus voltage
	Steady ON	Steady ON	Fault of acceleration over-current

WARNING

The data is blinking when the drive is the stop or standby state, and steady on when the drive is in the running or fault state. For details of the parameters available for display setting in the standby or running state, please refer to P16 (Keypad display setting parameters) in Section 7.17 in the full version of the MV810A Series user manual.

3.1.3 Examples of operation

The following example is based on frequency reference setting in the stop state. The default value is 50.00 Hz. The bold number in the figures indicates an editing state.

The example is based on small-size operating panel. Same methods shall apply for large-size operating panels.

3.1.3.1 Setting of password

The password function is provided to protect the parameters. When set, the user shall enter the correct password before editing parameters. Additionally, a correct manufacturer password shall be input before entering the manufacturer parameters and the AI/AO correction group.

WARNING

Do not modify the manufacturer parameters. Incorrect modification may result in drive malfunction or even damage.

Function code P00.01 is used to set the user password.

If the user password is set to 1368 and the setting is confirmed, the drive will be locked out at the time, and all operation is denied. The user can unlock the drive by entering the password through the following processes.

(1) When the drive is locked out, press , and the LED will enter the password verification state 00000;

(2) Change 00000 to 01368;

(3) Press to confirm the setting, and the password is verified with the LED displaying P00.

The above processes are illustrated in Figure 5-4.

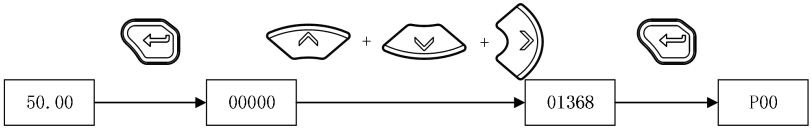


Figure 3-4 Example of password unlocking

After the password is verified, the drive is ready for further operation.

WARNING

If no operation is performed via the keys during 30 seconds after the password is verified, the drive will be locked out by password again.

3.1.3.2 Restoration to default setting

If P00.05=2, restoration to factory default setting is enabled. Such restoration operation shall restore the parameters to default values.

(1) When in the stop state display mode, press to enter the level-1 menu P00;

(2) Press to enter the level-2 menu P00.00;

(3) Press to change P00.00 to P00.05;

(4) Press to enter the level-3 menu;

(5) Press to change 0 to 2;

(6) Press to confirm the setting and re-enter the level-2 menu; modification is completed.

The above processes are illustrated in Figure 5-5.

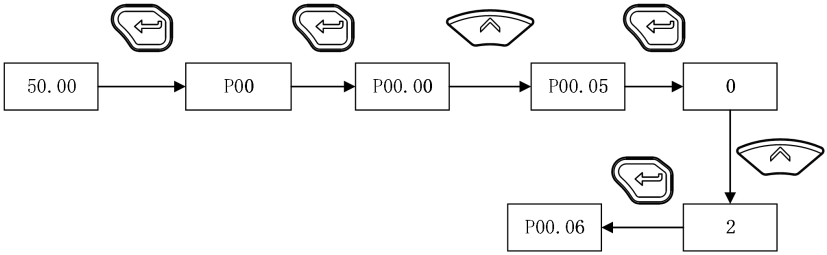


Figure 3-5 Example of restoration to factory default settings

3.1.3.3 Set the frequency reference

The following example is based on the frequency reference modification P02.09=25.00 Hz.

The processes of changing P02.09 from 50.00 Hz to 25.00 Hz.

(1) When in the stop state display mode, press to enter the level-1 menu P00;

(2) Double press ∧ to enter the level-1 menu P02;

(3) Press to enter the level-2 menu P02.00;

(4) Press nine times to enter the level-2 menu P02.09;

(5) Press to enter the level-3 menu 50.00;

(6) Press to select the thousands place or the hundreds place;

(7) Press to change 50.00 to 25.00;

(8) Press to confirm the setting and re-enter the level-2 menu; modification is completed;

(9) Double press to enter the main display view where 25.00 is displayed.

The above processes are illustrated in Figure 5-6.

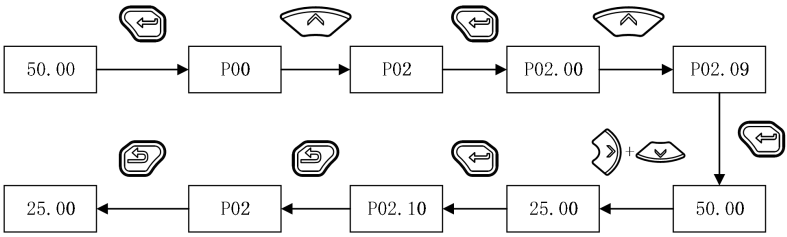


Figure 3-6 Example of frequency reference setting

3.1.3.4 Parameter monitoring

Through function codes P16.00, P16.01, and P16.02, the user can select the parameters to be displayed in the running state, including frequency reference, input frequency, bus voltage DI, Do, and AI, etc. For details, please refer to P16. When parameters are selected, the user can view them in order by pressing on the operating panel. The example in Figure 5-7 illustrates the status parameter display switchover in the running state when P16.00=0xF0, P16.01=0xF, and P16.02=4.

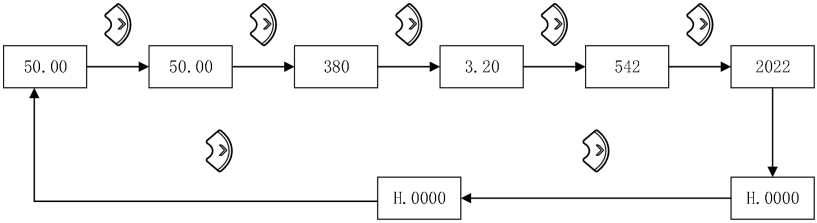


Figure 3-7 Example of status parameter monitoring

3.1.3.5 Status parameter display switchover in the stop state

Through function codes P16.03 and P16.04, the user can select the parameters to be displayed in the stop state, including frequency reference, bus voltage DI, Do, and AI, etc. For details, please refer to P16. When parameters are selected, the user can view them in order by pressing on the operating panel. The example in Figure 5-8 illustrates the status parameter display switchover in the stop state when P16.03=0xFF.

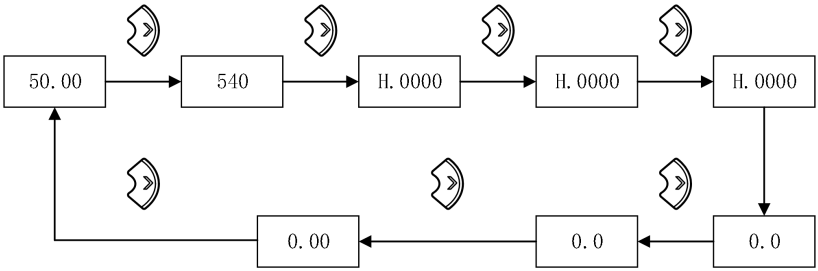


Figure 3-8 Example of status parameter display switchover in the stop state

3.2 Initial power-on

3.2.1 Inspection before power-on

Properly wire the drive according to the technical requirements indicated in Chapter 2.

3.2.2 Operation of initial power-on

When the drive passes the wiring and power supply inspection, turn on the air switch of the AC power supply at the drive input side to power on the drive. If the POWER indicator on the local operating panel turns on, the contactor engages normally, and the FAULT indicator stays off, it indicates that the drive initialization is completed.

The initial power-on process is shown in Figure 3-9:

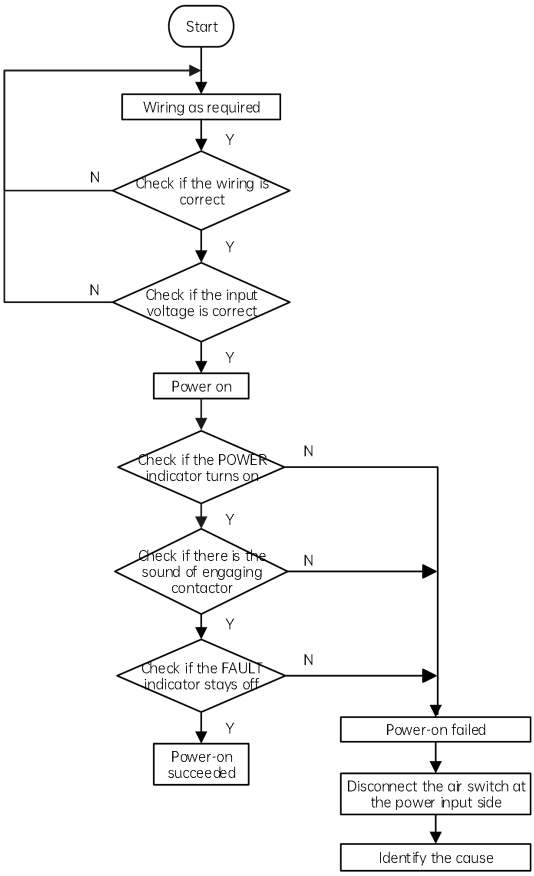


Figure 3-9 Initial power-on process

Chapter 4 Parameter List

4.1 Description of table headers

Item	Explanation		
Function code	Indicates the designation of a function code, such as P00.00;		
Name	Indicates the full name of the function code, which explains its main function;		
Default	Indicates the default value of the function code after restoration to the factory setting;		
Range	Indicates the maximum and the minimum values of the function code;		
Unit	V: Voltage	A: Current	℃: Temperature
	Ω: Resistance	mH: Inductance	%: Percentage
	rpm: Rotating speed	bps: Baud rate	Hz, kHz: Frequency
	ms, s, min, h, kh: Time	kW: Power	/: No unit
Modify	○: Indicates that the function code can be modified in the running state; ×: Indicates that the function code can be modified in the stop state; *: Indicates that the function code is read-only and can not be modified;		
Selection	Indicates the parameter setting list of the function code;		
User setting	Indicates the parameter setting by the user.		

4.2 Function code list of the basic menu

Function code	Name	Description	Range	Default	Modify
P00: System management					
P47.00	Air compressor mode enable	Used to enable the dedicated functions for air compressors 0: Disabled 1: Enabled	0 to 1	1	×
P47.01	Pressure sensor	0: AI1	0 to 1	0	×

Function code	Name	Description	Range	Default	Modify
	channel	1: AI2			
P47.02	Pressure sensor upper limit	0.00 to 20.00 MPa	0.00 to 20.00 MPa	1.60 MPa	×
P47.03	Loading mode	In the manual mode, loading is processed via the DI terminal or the electromagnetic valve controlled by communication; in the automatic mode, loading is processed automatically based on pressure. 0: Automatic 1: Manual	0 to 1	0	○
P47.04	Loading pressure	In the automatic mode, if the air outlet pressure is lower than this value, the system automatically starts loading after the delay time defined by P47.07. 0.00 to P47.02	0.00 to P47.02	0.60 MPa	○
P47.05	Unloading pressure	In the automatic mode, if the air outlet pressure is higher than this value, the system automatically starts unloading. 0.00 to P47.02	0.00 to P47.02	0.80 MPa	○
P47.06	Pressure reference	Used to set the exhaust pressure during the stable running of the air compressor. 0.00 to P47.02	0.00 to P47.02	0.70 MPa	○
P47.07	Loading delay time	Only after this delay time will the loading of the motor be allowed (for both automatic and manual loading). 0 to 3600 s	0 to 3600	10 s	○
P47.08	Loading running frequency lower limit	Used to define the minimum frequency reference allowed during the process of loading.	P47.09 to P02.10	100.0 Hz	○

Function code	Name	Description	Range	Default	Modify
		P47.09 to P02.10			
P47.09	No-load running frequency	Used to define the frequency reference allowed during no-load running. P08.07 to P47.08	P08.07 to P47.08	90.00 Hz	○
P47.10	No-load delay time	The system enters hibernation after no-load running for a period of this delay. 0 to 3600 s	0 to 3600 s	60 s	○
P47.11	Stop delay time	When a stop command is received, the system stops after no-load running for a period of this delay. 0 to 3600 s	0 to 3600 s	10 s	○
P47.12	Restart delay time	When the system is stopped, a restart can be enabled only after this delay. 0 to 36000 s	0 to 3600 s	30 s	○
P47.13	Hibernation function selection	0: Invalid 1: Automatic 2: Manual	0 to 1	1	×
P47.14	Temperature sensor channel	0: Head temperature PT1, auxiliary temperature PT2 1: Head temperature PT2, auxiliary temperature PT1	0 to 1	0	×
P47.15	PT1 correction low-point sampling value	Used to define the sampling value corresponding to -15℃ during temperature correction. 0 to 4095	0 to 4095	845	○
P47.16	PT1 correction middle-point sampling value	Used to define the sampling value corresponding to 105℃ during temperature correction. 0 to 4095	0 to 4095	1960	○
P47.17	PT1 correction	Used to define the sampling value	0 to 4095	2662	○

Function code	Name	Description	Range	Default	Modify
	high-point sampling value	corresponding to 185℃ during temperature correction. 0 to 4095			
P47.18	PT2 correction low-point sampling value	Used to define the sampling value corresponding to -15℃ during temperature correction. 0 to 4095	0 to 4095	845	○
P47.19	PT2 correction middle-point sampling value	Used to define the sampling value corresponding to 105℃ during temperature correction. 0 to 4095	0 to 4095	1960	○
P47.20	PT2 correction high-point sampling value	Used to define the sampling value corresponding to 185℃ during temperature correction. 0 to 4095	0 to 4095	2662	○
P47.21	Fan action temperature	The fan will start action when the compressor head temperature exceeds this value.	-30 to 170℃	85℃	○
P47.22	Fan stop temperature	The fan will stop action when the compressor head temperature falls below this value.	-30 to 170℃	75℃	○
P47.23	Pre-alarm pressure threshold	The system reports a pre-alarm when the air outlet pressure exceeds this threshold.	0.00 to P47.24	0.90 MPa	○
P47.24	Alarm pressure threshold	The system reports an alarm and stops operation when the air outlet pressure exceeds this value.	P47.23 to P47.02	1.00 MPa	○
P47.25	Pre-alarm temperature threshold	The system reports a pre-alarm when the compressor head temperature exceeds this value.	-20 to P47.26	105℃	○
P47.26	Alarm temperature threshold	The system reports an alarm and stops operation when the compressor head temperature exceeds this value.	P47.25 to 170℃	110℃	○

Function code	Name	Description	Range	Default	Modify
P47.27	Low-temperature protection threshold	The system reports an alarm and the air compressor start is disabled when the compressor head temperature falls below this value.	-30 to P47.25	-10℃	○
P47.28	Auxiliary temperature protection enable	0: Disabled 1: Enabled	0 to 1	0	×
P47.29	Auxiliary temperature pre-alarm value	The system reports a pre-alarm when the auxiliary temperature exceeds this value.	-30 to P47.30	105℃	○
P47.30	Auxiliary temperature alarm value	The system reports an alarm and stops operation when the auxiliary temperature exceeds this value.	P47.29 to 170℃	110℃	○
P47.31 to P47.33	Reserved	-	-	-	*
P47.34	Fan control mode	0: Automatic (Power line frequency fan automatically starts/stops based on the actual temperature.) 1: Manual (The start/stop of the fan is controlled by the DI terminal or 485 communication.)	0 to 1	0	×
P47.35	Pressure for frequency upper limit decrease	The frequency upper limit starts to decrease when the pressure exceeds this value.	0.00 to P47.06	0.05 MPa	○
P47.36	Frequency upper limit decrease ratio	0.0 to 5.0% (rated motor frequency) Used to define the decrease volume of the frequency upper limit for each increase of 0.01 MPa in pressure.	0.0 ~ 5.0%	2.0%	○
P47.37	Automatic frequency decrease threshold	When the percentage of the output current relative to the drive's rated current exceeds this value, the automatic frequency decrease function will be triggered.	0 to 120%	120%	○

Function code	Name	Description	Range	Default	Modify
		The value of 0 indicates that this function is disabled.			
P47.38	Power correction coefficient	0 to 200%	0 to 200%	100%	○
P47.39	Maintenance timeout	0 to 8000 h The value of 0 indicates that this function is disabled.	0 to 8000	0 h	○
P47.40	Maintenance count mode	0: Count during compressor running 1: Count during compressor running and hibernation	0 to 1	0	○
P47.41	Fan protection selection	Ones place: 0: Protection disabled for fan three-phase current unbalance 1: Protection enabled for fan three-phase current unbalance Tens place: 0: Fan overload protection disabled 1: Fan overload protection enabled	0 to 0x11	0x11	○
P47.42	Fan rated current	This parameter is related to the overload judgement of the fan.	0.0 to 40.0 A	0.0 A	○
P47.43	Fan current transformation ratio	1.0 to 4000.0	1.0 to 4000.0	1000.0	○
P47.44	Current unbalance ratio	When the ratio of the maximum current to the minimum current exceeds the value of P47.44 during the three-phase current detection of the fan, the system reports a fan current unbalance fault.	1.00 to 3.00	1.60	○

Function code	Name	Description	Range	Default	Modify
P47.45	Fan phase A current correction coefficient	0.0 to 150.0%	0.0 to 150.0%	100.0%	○
P47.46	Fan phase B current correction coefficient	0.0 to 150.0%	0.0 to 150.0%	100.0%	○
P47.47	Fan phase C current correction coefficient	0.0 to 150.0%	0.0 to 150.0%	100.0%	○
P47.48 to 59	Reserved	-	-	-	*
P48: Air compressor status check parameters					
P48.00	Maintenance time for Part 1	When the Part 1 use time (P48.05) exceeds this value, the system reports a pre-alarm. When the exceeding time extends longer than P47.37, the system reports an alarm and stops operation. The value of 0 indicates that the pre-alarm function is disabled.	0 to 65535	500 h	*
P48.01	Maintenance time for Part 2	When the Part 2 use time (P48.06) exceeds this value, the system reports a pre-alarm. When the exceeding time extends longer than P47.37, the system reports an alarm and stops operation. The value of 0 indicates that the pre-alarm function is disabled.	0 to 65535	500 h	*
P48.02	Maintenance time for Part 3	When the Part 3 use time (P48.07) exceeds this value, the system reports a pre-alarm. When the exceeding time extends longer than P47.37, the system reports an alarm and stops operation. The value of 0 indicates that the pre-alarm function is disabled.	0 to 65535	500 h	*
P48.03	Maintenance time for Part 4	When the Part 4 use time (P48.08) exceeds this value, the system	0 to 65535	500 h	*

Function code	Name	Description	Range	Default	Modify
		reports a pre-alarm. When the exceeding time extends longer than P47.37, the system reports an alarm and stops operation. The value of 0 indicates that the pre-alarm function is disabled.			
P48.04	Maintenance time for Part 5	When the Part 5 use time (P48.09) exceeds this value, the system reports a pre-alarm. When the exceeding time extends longer than P47.37, the system reports an alarm and stops operation. The value of 0 indicates that the pre-alarm function is disabled.	0 to 65535	500 h	*
P48.05	Part 1 use time	0 to 65535 h	0 to 65535	0 h	*
P48.06	Part 2 use time	0 to 65535 h	0 to 65535	0 h	*
P48.07	Part 3 use time	0 to 65535 h	0 to 65535	0 h	*
P48.08	Part 4 use time	0 to 65535 h	0 to 65535	0 h	*
P48.09	Part 5 use time	0 to 65535 h	0 to 65535	0 h	*
P48.10	Present pressure	0.00 to 20.00 MPa	0.00 to 20.00	0.00 MPa	*
P48.11	Present temperature	-30 to 170℃	-30 to 170	0℃	*
P48.12	Reserved				*
P48.13	Present auxiliary temperature	-30 to 170℃	-30 to 170℃	0℃	*
P48.14	Actual output power of the motor	0.0 to 6553.5 kW	0.0 to 6553.5	0 kW	*
P48.15	Signal status 1	Bit0: Air filter block signal 0: Normal 1: Fault Bit1: Oil filter block signal 0: Normal	0 to 0xFFFF	0	*

Function code	Name	Description	Range	Default	Modify
		1: Fault Bit2: Separator block signal 0: Normal 1: Fault Bit3: Air manifold block signal 0: Normal 1: Fault Bit4: External fault signal 1 0: Normal 1: Fault Bit5: External fault signal 2 0: Normal 1: Fault Bit6: Electromagnetic valve signal status 0: Unloading 1: Loading Bit7: Auxiliary motor state 0: Stopped 1: Running Bit8: Pressure pre-alarm signal 0: Invalid 1: Valid Bit9: Temperature pre-alarm signal 0: Invalid 1: Valid Bit10: Pressure alarm signal 0: Invalid 1: Valid Bit11: Temperature alarm signal 0: Invalid 1: Valid			

Function code	Name	Description	Range	Default	Modify
		Bit12: Pressure signal fault 0: Invalid 1: Valid Bit13: Temperature signal fault 0: Invalid 1: Valid Bit14: Low-temperature protection 0: Invalid 1: Valid Bit15: Main motor state 0: Stopped 1: Running			
P48.16	Signal status 2	Bit0: Part 1 maintenance reminder 0: Normal 1: Maintenance required Bit1: Part 2 maintenance reminder 0: Normal 1: Maintenance required Bit2: Part 3 maintenance reminder 0: Normal 1: Maintenance required Bit3: Part 4 maintenance reminder 0: Normal 1: Maintenance required Bit4: Part 5 maintenance reminder 0: Normal 1: Maintenance required Bit5 to 7: Reserved Bit8: Auxiliary temperature signal fault 0: Invalid 1: Valid	0 to 0xFFFF	0	*

Function code	Name	Description	Range	Default	Modify
		Bit9: Auxiliary temperature pre-alarm signal 0: Invalid 1: Valid Bit10: Auxiliary temperature alarm signal 0: Invalid 1: Valid Bit11: Maintenance timeout signal 0: Invalid 1: Valid Bit12: Phase sequence signal 0: Normal 1: Fault Bit13: Reversed Bit14: PTC overheat signal 0: Invalid 1: Valid Bit15: Emergency stop signal 0: Invalid 1: Valid			
P48.17	System state	0: Standby 1: Running 2: Fault 3: Emergency stop 4: Undervoltage 5: Alarm 6: Hibernation 7: Stopping 8: Restart delay	0 to 8	0	*
P48.18	Accumulated running time of the device	0 to 65535 h	0 to 65535	0	*

Function code	Name	Description	Range	Default	Modify
P48.19	Accumulated loading running time	0 to 65535 h	0 to 65535	0	*
P48.20	Restart count down	0 to 3600 s	0 to 3600	0	*
P48.21	Reserved	-	-	-	*
P48.22	Fan phase A current display	0.0 to 40.0 A	0.0 to 40.0 A	0.0 A	*
P48.23	Fan phase B current display	0.0 to 40.0 A	0.0 to 40.0 A	0.0 A	*
P48.24	Fan phase C current display	0.0 to 40.0 A	0.0 to 40.0 A	0.0 A	*
P48.25	Fan phase A current sampling zero drift	0 to 4095	0 to 4095	0	*
P48.26	Fan phase B current sampling zero drift	0 to 4095	0 to 4095	0	*
P48.27	Reserved	-	-	-	*
P48.28	Fan output current	0.0 to 40.0 A	0.0 to 40.0 A	0.0 A	*
P48.29	Fan state	0 to 0x1 Bit0: 0: Fan stopped 1: Fan running	0 to 0x1	0	*
P48.30	AD value of PT1	0 to 4095	0 to 4095	0	*
P48.31	AD value of PT2	0 to 4095	0 to 4095	0	*
P48.32 to P48.59	Reserved	-	-	-	*
P97: Fault and protection parameters					
P97.00	Fault enable	Ones place: 0: Pulse-by-pulse current limit protection disabled 1: Pulse-by-pulse current limit	0 to 0x1111	0x1011	×

Function code	Name	Description	Range	Default	Modify
		protection enabled Tens place: 0: Hardware input phase loss detection fault disabled (only for models of 18.5 kW or above) 1: Hardware input phase loss detection fault enabled (only for models of 18.5 kW or above) Hundreds place: 0: Overload pre-alarm disabled 1: Overload pre-alarm enabled Thousands place: 0: Braking overcurrent disabled 1: Braking overcurrent enabled			
P97.01	Stall protection enable	Ones place: 0: Overvoltage stall protection disabled 1: Overvoltage stall protection enabled Tens place: 0: Undervoltage stall protection disabled 1: Undervoltage stall protection enabled 2: Undervoltage stop Hundreds place: 0: Overcurrent stall protection disabled 1: Overcurrent stall protection enabled Thousands place: 0: Input phase sequence disabled	0 to 0x1121	0x1101	×

Function code	Name	Description	Range	Default	Modify
		1: Input phase sequence enabled			
P97.02	Current limit level	20 to 200%	20 to 200%	150%	×
P97.03	Current limit adjustment coefficient	0 to 100	0 to 100	20	×
P97.04	Overvoltage stall protection action voltage	600 to 750 V	600 to 750 V	720 V	○
P97.05	Voltage regulator proportional coefficient for overvoltage stall protection	Used to define the proportional coefficient of the bus voltage regulator upon overvoltage stall.	0 to 1000	10	○
P97.06	Input phase loss fault enable	0: Disabled 1: Enabled	0 to 1	1	×
P97.07	Speed regulator proportional coefficient for overvoltage stall protection	Used to define the proportional coefficient of the rotation speed regulator upon overvoltage stall.	0 to 1000	60	○
P97.08	Reserved	-	-	-	-
P97.09	Voltage regulator proportional coefficient for undervoltage stall protection	Used to define the proportional coefficient of the bus voltage regulator upon undervoltage stall.	0 to 1000	40	○
P97.10	Voltage regulator integral coefficient for undervoltage stall protection	Used to define the integral coefficient of the bus voltage regulator upon undervoltage stall.	0 to 1000	20	○
P97.11	Undervoltage stall protection action voltage	When the bus voltage is lower than this value, the undervoltage stall protection will be triggered to lower the frequency and raise the	400 to 460 V	460 V	×

Function code	Name	Description	Range	Default	Modify
		voltage.			
P97.12	Undervoltage stall recovery judgment time	When the bus voltage is greater than P97.13, the drive stops lowering the frequency after the delay time defined by P97.12.	0.0 to 100.0 s	2.0 s	×
P97.13	Undervoltage stall protection pause voltage	When the bus voltage is greater than this value, the drive stops lowering the frequency.	460 to 500 V	485 V	×
P97.14	Phase loss protection enable	Ones place: 0: Input phase loss protection disabled 1: Input phase loss protection enabled Tens place: 0: Output phase loss protection disabled in the running state 1: Output phase loss protection enabled in the running state Hundreds place: 0: Short-to-ground detection upon power-on disabled 1: Short-to-ground detection upon power-on enabled Thousands place: 0: Output phase loss protection before running disabled 1: Output phase loss protection before running enabled	0 to 0x1111	0x1101	○
P97.15	Fault protection and alarm property setting 1	0: Coast to stop 1: Decelerate to stop 2: Keep running Ones place: Input phase loss (reserved) Tens place: Output phase loss	0 to 0	0	○

Function code	Name	Description	Range	Default	Modify
		(reserved) Hundreds place: Reserved Thousands place: Reserved			
P97.16	Fault protection and alarm property setting 2	0: Coast to stop 1: Decelerate to stop 2: Keep running Ones place: EEPROM read/write fault Tens place: Reserved Hundreds place: Reserved Thousands place: 485 communication fault	0 to 0x2002	0	○
P97.17	Fault protection and alarm property setting 3	0: Coast to stop 1: Decelerate to stop 2: Keep running Ones place: Fan locked-rotor Tens place: Motor overload Hundreds place: Motor overheat Thousands place: Reserved	0 to 0x222	0x0002	○
P97.18	Fault protection and alarm property setting 4	0: Coast to stop 1: Decelerate to stop 2: Keep running Ones place: Reserved Tens place: 24 V power supply overload Hundreds place: Reserved Thousands place: Reserved	0 to 0x20	0	○
P97.19	Fault protection and alarm property setting 5	0: Coast to stop 1: Decelerate to stop 2: Keep running Ones place: Power line frequency fan overload	0 to 0x222	0	○

Function code	Name	Description	Range	Default	Modify
		Tens place: Power line frequency fan three-phase unbalance Hundreds place: Input phase sequence fault Thousands place: Reserved			
P97.20	Reserved	-	-	-	-
P97.21	Reserved	-	-	-	-
P97.22	U phase fault	0 to 0x1111	0 to 0x1111	0	*
P97.23	V phase fault	0 to 0x1111	0 ~ 0x1111	0	*
P97.24	W phase fault	0 to 0x1111	0 to 0x1111	0	*
P97.25	Reserved	-	-	-	-
P97.26	Reserved	-	-	-	-
P97.27	Detection value of excessive speed deviation	0.0 to 50.0%	0.0 to 50.0%	0.0%	○
P97.28	Detection time of excessive speed deviation	When it is set to 0.0 s, speed deviation protection is disabled.	0.0 to 10.0 s	1.0 s	○
P97.29	Automatic fault reset count	When there are faults, the drive starts to reset after the time interval defined by P97.31. After the automatic fault reset count is reached, the reset can be started by the manual reset command only. If there is any manual reset command during the automatic reset, the automatic reset count will be cleared. If the drive runs normally without faults for 600 s, the fault reset count will be cleared. The value of 0 indicates that the automatic fault reset function is disabled.	0 to 100	0	○

Function code	Name	Description	Range	Default	Modify
P97.30	Fault relay action selection during automatic reset	0: Disabled 1: Enabled	0 to 1	0	○
P97.31	Automatic fault reset interval	2.0 to 600.0 s	2.0 to 600.0 s	5.0 s	○
P97.32	Present fault type	0: No fault 1: Overcurrent during acceleration (OC1) 2: Overcurrent during deceleration (OC2) 3: Overcurrent during operation at constant speed (OC3) 4: Overvoltage during acceleration (OV1) 5: Overvoltage during deceleration (OV2) 6: Overvoltage during operation at constant speed (OV3) 7: Undervoltage fault (Uv) 8: Input phase loss (SPI) 9: Output phase loss (SPO) 10: Power module protection (drv) 11: Inverter overheat (OH1) 12: Rectifier bridge overheat (OH2) 13: AC drive overload (OL1) 14: Motor overload (OL2) 15: External device fault (EF) 16: EEPROM read/write fault (EEP) 17: 485 communication error (CE) 18: EtherCAT communication timeout (E-CAt) 19: Current detection error (ItE) 20: CANopen communication timeout (E-CAN)	0 to 65	0	*
P97.33	Previous fault type		0 to 65	0	*
P97.34	Penultimate fault type		0 to 65	0	*

Function code	Name	Description	Range	Default	Modify
		21: PID feedback loss (FbL) 22: EtherNet IP communication timeout (E-IP) 23: Braking resistor over-current (brOC) 24: Auto-tuning fault (tUN) 25: Reserved 26: Profinet communication timeout (E-Pn) 27: I/O card communication timeout (E-Io) 28: Modbus TCP communication timeout (E-TCP) 29: STO1 fault (STO1) 30: STO2 fault (STO2) 31 to 32: Reserved 33: Short-to-ground fault (GdF) 34: Speed deviation fault (dEv) 35 to 38: Reserved 39: Motor overheat (OH3) 40: Reserved 41: 24 V power supply overload (24OL) 42 to 45: Reserved 46: Board-level communication error (bCE) 47: Reserved 48: BootLoader failure (bLt) 49: Power board software version mismatching (vEr) 50: Parameter upload/download timeout (UPdnE) 51: AI1 current input overcurrent (AIOC)			

Function code	Name	Description	Range	Default	Modify
		52: Reserved 53: Fan locked-rotor (FAn) 54: Pre-overload (POL1) 55: I/O option 24 V overload (IO-OL) 56: Hardware input phase loss (HSPI) 57: Power line frequency fan overload (PFOL) 58: Power line frequency fan three-phase unbalance (SPOF) 59: Input phase sequence fault (PSF) 60: Fan input phase loss (PFSPI) 61: Reserved 62: IGBT hardware fault 63: CBC fault 64: fan undervoltage fault (Fuv) 65: Pre-charge relay engagement fault (CtF)			
P97.35	Bus voltage upon the present fault	0.0 to 6553.5 V	0.0 to 6553.5 V	0.0 V	*
P97.36	Actual current upon the present fault	0.0 to 999.9 A	0.0 to 999.9 A	0.0 A	*
P97.37	Running frequency upon the present fault	0.00 to 655.35 Hz	0.00 to 655.35 Hz	0.00 Hz	*
P97.38	AC drive operation state upon the present fault	0 to 0xFFFF	0 to 0xFFFF	0	*
P97.39	Inverter bridge temperature upon the present fault	-40.0 to 150.0℃	-40.0 to 150.0℃	0.0℃	*
P97.40	Reserved				

Function code	Name	Description	Range	Default	Modify
P97.41	Input terminal status upon the present fault	0 to 0xFF	0 to 0xFF	0	*
P97.42	Output terminal status upon the present fault	0 to 0xF	0 to 0xF	0	*
P97.43	Running time upon the present fault	0.0 to 6553.5 s	0.0 to 6553.5 s	0.0 s	*
P97.44	Bus voltage upon the previous fault	0.0 to 6553.5 V	0.0 to 6553.5 V	0.0 V	*
P97.45	Actual current upon the previous fault	0.0 to 999.9 A	0.0 to 999.9 A	0.0 A	*
P97.46	Running frequency upon the previous fault	0.00 to 655.35 Hz	0.00 to 655.35 Hz	0.00 Hz	*
P97.47	AC drive operation state upon the previous fault	0 to 0xFFFF	0 to 0xFFFF	0	*
P97.48	Inverter bridge temperature upon the previous fault	0.0 to 150.0℃	0.0 to 150.0℃	0.0℃	*
P97.49	Reserved				
P97.50	Input terminal status upon the previous fault	0 to 0xFF	0 to 0xFF	0	*
P97.51	Output terminal status upon the previous fault	0 to 0xF	0 to 0xF	0	*
P97.52	Running time upon the previous fault	0.0 to 6553.5 min	0.0 to 6553.5 min	0.0 min	*
P97.53	Bus voltage upon the penultimate fault	0.0 to 6553.5 V	0.0 to 6553.5 V	0.0 V	*
P97.54	Actual current upon the penultimate fault	0.0 to 999.9 A	0.0 to 999.9 A	0.0 A	*

Function code	Name	Description	Range	Default	Modify
P97.55	Running frequency upon the penultimate fault	0.00 to 655.35 Hz	0.00 to 655.35 Hz	0.00 Hz	*
P97.56	AC drive operation state upon the penultimate fault	0 to 0xFFFF	0 to 0xFFFF	0	*
P97.57	Inverter bridge temperature upon the penultimate fault	0.0 to 150.0℃	0.0 to 150.0℃	0.0℃	*
P97.58	Reserved				
P97.59	Input terminal status upon the penultimate fault	0 to 0xFF	0 to 0xFF	0	*
P97.60	Output terminal status upon the penultimate fault	0 to 0xF	0 to 0xF	0	*
P97.61	Running time upon the penultimate fault	0.0 to 6553.5 min	0.0 to 6553.5 min	0.0 min	*

Chapter 5 Parameter Description

The parameter is described in the following format:

Function code	Function name	Value range	Default value

5.1 P47: Air compressor dedicated parameters

P47.00	Air compressor mode enable	0 to 1	0
P47.01	Pressure sensor channel	0 to 1	0
P47.02	Pressure sensor upper limit	0.00 to 20.00 MPa	1.60 MPa
P47.03	Loading mode	0 to 1	0
P47.04	Loading pressure	0.00 to P47.02	0.60 MPa
P47.05	Unloading pressure	0.00 to P47.02	0.80 MPa
P47.06	Pressure reference	0.00 to P47.02	0.70 MPa
P47.07	Loading delay time	0 to 3600	10 s
P47.08	Loading running frequency lower limit	P47.09 to P02.10	100.00 Hz
P47.09	No-load running frequency	P08.07 to P47.08	90.00 Hz
P47.10	No-load delay time	0 to 3600 s	60 s
P47.11	Stop delay time	0 to 3600 s	10 s
P47.12	Restart delay time	0 to 3600 s	30 s
P47.13	Hibernation function selection	0 to 1	1
P47.14	Temperature sensor channel	0 to 1	0
P47.15	PT1 correction low-point sampling value	0 to 4095	845
P47.16	PT1 correction middle-point sampling value	0 to 4095	1960
P47.17	PT1 correction high-point sampling value	0 to 4095	2662
P47.18	PT2 correction low-point sampling value	0 to 4095	845
P47.19	PT2 correction middle-point sampling value	0 to 4095	1960
P47.20	PT2 correction high-point sampling value	0 to 4095	2662

P47.21	Fan action temperature	-30 to 170℃	85℃
P47.22	Fan stop temperature	-30 to 170℃	75℃
P47.23	Pre-alarm pressure threshold	0.00 to P47.24	0.90 MPa
P47.24	Alarm pressure threshold	P47.23 to P47.02	1.00 MPa
P47.25	Pre-alarm temperature threshold	-20 to P47.26	105℃
P47.26	Alarm temperature threshold	P47.25 to 170℃	110℃
P47.27	Low-temperature protection threshold	-30 to P47.25	-10℃
P47.28	Auxiliary temperature protection enable	0 to 1	0
P47.29	Auxiliary temperature pre-alarm value	-30 to P47.30	105℃
P47.30	Auxiliary temperature alarm value	P47.29 to 170℃	110℃
P47.31 to 33	Reserved		
P47.34	Fan control mode	0 to 1	0
P47.35	Pressure for frequency upper limit decrease	0.00 to P47.06	0.05 MPa
P47.36	Frequency upper limit decrease ratio	0.0 to 5.0%	2.0%
P47.37	Automatic frequency decrease threshold	0 to 120%	120%
P47.38	Power correction coefficient	0 to 200%	100%
P47.39	Maintenance timeout	0 to 8000	0 h
P47.40	Maintenance count mode	0 to 1	0
P47.41	Fan protection selection	0 to 0x11	0x11
P47.42	Fan rated current	0.0 to 40.0 A	0.0 A
P47.43	Fan current transformation ratio	1.0 to 4000.0	1000.0
P47.44	Current unbalance ratio	1.00 to 3.00	1.60
P47.45	Fan phase A current correction coefficient	0.0 to 150.0%	100.0%
P47.46	Fan phase B current correction coefficient	0.0 to 150.0%	100.0%
P47.47	Fan phase C current correction coefficient	0.0 to 150.0%	100.0%
P47.48 to 59	Reserved		

5.2 P48: Air compressor status check parameters

P48.00	Maintenance time for Part 1	0 to 65535	500 h
P48.01	Maintenance time for Part 2	0 to 65535	500 h
P48.02	Maintenance time for Part 3	0 to 65535	500 h
P48.03	Maintenance time for Part 4	0 to 65535	500 h
P48.04	Maintenance time for Part 5	0 to 65535	500 h
P48.05	Part 1 use time	0 to 65535	0 h
P48.06	Part 2 use time	0 to 65535	0 h
P48.07	Part 3 use time	0 to 65535	0 h
P48.08	Part 4 use time	0 to 65535	0 h
P48.09	Part 5 use time	0 to 65535	0 h
P48.10	Present pressure	0.00 to 20.00	0.00 MPa
P48.11	Present temperature	-30 to 170	0℃
P48.12	Reserved		
P48.13	Present auxiliary temperature	-30 to 170℃	0℃
P48.14	Actual output power of the motor	0.0 to 6553.5	0 kW
P48.15	Signal status 1	0 to 0xFFFF	0
P48.16	Signal status 2	0 to 0xFFFF	0
P48.17	System state	0 to 8	0
P48.18	Accumulated running time of the device	0 to 65535	0
P48.19	Accumulated loading running time	0 to 65535	0
P48.20	Restart count down	0 to 3600	0
P48.21	Input power supply phase sequence	0 to 1	0
P48.22	Fan phase A current display	0.0 to 40.0 A	0.0 A
P48.23	Fan phase B current display	0.0 to 40.0 A	0.0 A
P48.24	Fan phase C current display	0.0 to 40.0 A	0.0 A
P48.25	Fan phase A current sampling zero drift	0 to 4095	0
P48.26	Fan phase B current sampling zero drift	0 to 4095	0

P48.27	Reserved		
P48.28	Fan output current	0.0 to 40.0 A	0.0 A
P48.29	Fan state	0 to 0x1	0
P48.30	AD value of PT1	0 to 4095	0
P48.31	AD value of PT2	0 to 4095	0
P48.32 to 59	Reserved		

5.3 P97: Fault and protection parameters

P97.00	Fault enable	0 to 0x1111	0x1011

Ones place:

0: Pulse-by-pulse current limit protection disabled

1: Pulse-by-pulse current limit protection enabled

Tens place:

0: Hardware input phase loss detection fault disabled (only for models of 18.5 kW or above)

1: Hardware input phase loss detection fault enabled (only for models of 18.5 kW or above)

Hundreds place:

0: Overload pre-alarm disabled

1: Overload pre-alarm enabled

Thousands place:

0: Braking overcurrent disabled

1: Braking overcurrent enabled

P97.01	Stall protection enable	0 to 0x1121	0x1101

Ones place:

0: Overvoltage stall protection disabled

1: Overvoltage stall protection enabled

Tens place:

0: Undervoltage stall protection disabled

1: Undervoltage stall protection enabled

2: Undervoltage stop

Hundreds place:

0: Overcurrent stall protection disabled

1: Overcurrent stall protection enabled

Thousands place:

0: Input phase sequence disabled

1: Input phase sequence enabled

P97.02	Current limit level	20 to 200%	150%
P97.03	Current limit adjustment coefficient	0 to 100	20

The current limit function restricts the load current in real time within the limit set by P97.02 to avoid tripping caused by current overshoot. This function is especially useful for scenarios with large inertia or drastic change.

The current limit level (P97.02) defines the current threshold for the auto current limiting. Its range is a percentage relative to the drive's rated current.

The current limit adjustment coefficient (P97.03) defines the adjustment rate of the output frequency upon the auto current limiting.

If the frequency decrease rate (adjustment coefficient P97.03) upon the current limiting is too small, it is difficult to get out of the current limiting state, causing overload fault. If the frequency decrease rate is too large, the adjustment will be overly intensified, with the drive staying in the power generation state for overlong time, leading to overload protection.

The current limiting action may cause change to the output frequency. Thus, it is not recommended to use this function in applications requiring stable frequency output in constant-speed running.

When the auto current limit function is enabled, the current would be limited to a low level, which may affect the drive's overload capacity.

P97.04	Overvoltage stall protection action voltage	600 to 750 V	720 V

During the drive deceleration, due to the influence of load inertia, the actual decrease rate of the motor speed may be lower than the decrease rate of the output frequency. When this happens, the motor will return the energy to the drive, resulting in the increase of the DC bus voltage of the drive. If no measures are taken, there will be an overvoltage trip.

The function of overvoltage stall protection enables the detection of the bus voltage during the deceleration of the drive, and compares it with the overvoltage stall point defined by P97.04. If the overvoltage stall point is exceeded, the output frequency of the drive stops decreasing. When the detected bus voltage falls lower than the overvoltage stall point again, the drive restarts the deceleration, as shown in Figure 7-48.

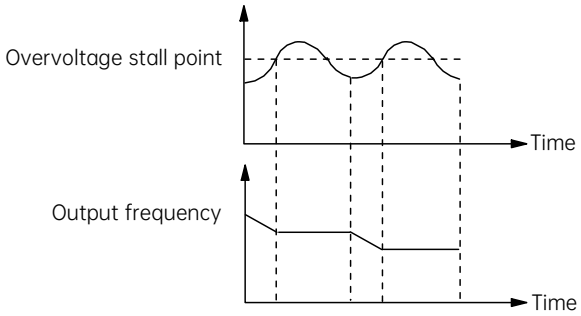


Figure 5-1 Overvoltage stall

P97.05	Voltage regulator proportional coefficient for overvoltage stall protection	0 to 1000	10
P97.06	Input phase loss fault enable	0 to 1	1
P97.07	Speed regulator proportional coefficient for overvoltage stall protection	0 to 1000	60
P97.08	Reserved		

It is used to set the proportional coefficients for the bus voltage regulator and the speed regulator upon overvoltage stall.

P97.09	Voltage regulator proportional coefficient for undervoltage stall protection	0 to 1000	40
P97.10	Voltage regulator integral coefficient for undervoltage stall protection	0 to 1000	20

It is used to set the proportional coefficient and integral coefficient for the bus voltage regulator upon undervoltage stall.

P97.11	Undervoltage stall protection action voltage	400 to 460 V	460 V

During undervoltage stall, when the bus voltage is lower than this value, the undervoltage stall protection will be triggered to lower the frequency and raise the voltage.

P97.12	Undervoltage stall recovery judgment time	0 to 100.0 s	2.0 s
P97.13	Undervoltage stall protection pause voltage	460 to 500 V	485 V

It is used to set the voltage point for undervoltage stall protection pause. When the bus voltage is greater than this value, the drive stops lowering the frequency after the delay time set by P97.12.

P97.14	Phase loss protection enable	0 to 0x1111	0x1101

It is used to select the input/output phase loss protection modes, as shown in Figure 7-49.

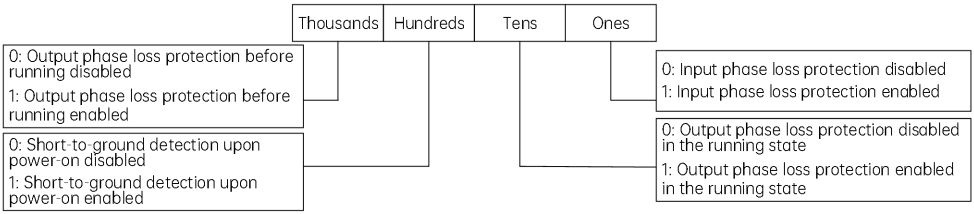


Figure 5-2 Input/output phase loss protection setting

P97.15	Fault protection and alarm property setting 1	0	0

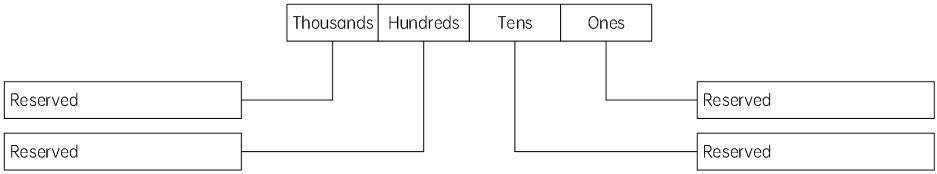


Figure 5-3 Fault protection and alarm property setting 1

P97.16	Fault protection and alarm property setting 2	0 to 0x2002	0

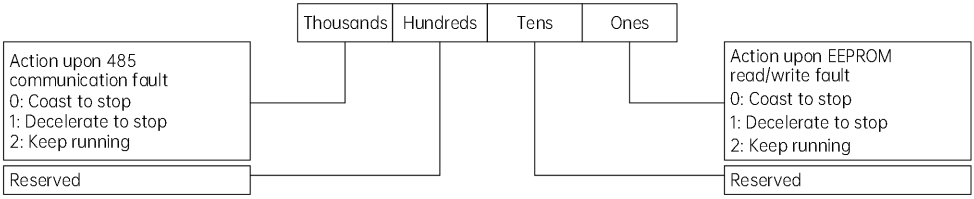


Figure 5-4 Fault protection and alarm property setting 2

P97.17	Fault protection and alarm property setting 3	0 to 0x222	0x0002

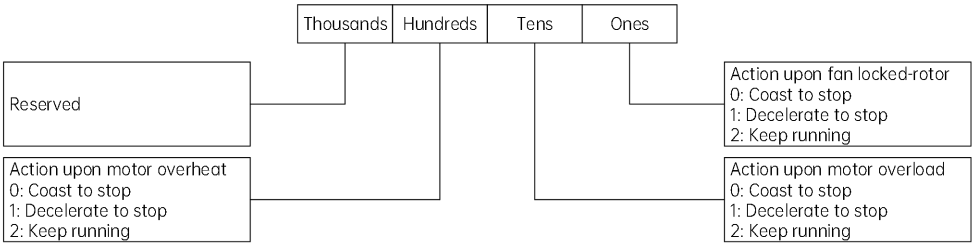


Figure 5-5 Fault protection and alarm property setting 3

P97.18	Fault protection and alarm property setting 4	0 to 0x20	0

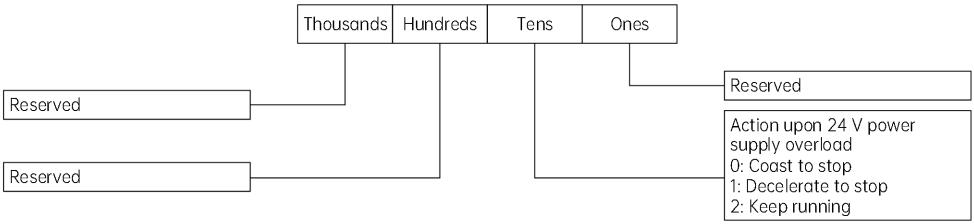


Figure 5-6 Fault protection and alarm property setting 4

P97.19	Fault protection and alarm property setting 5	0 to 0x222	0

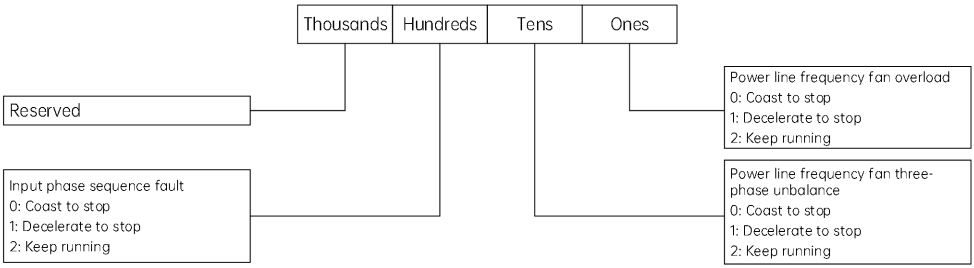


Figure 5-7 Fault protection and alarm property setting 5

P97.22	U phase fault	0 to 0x1111	0
P97.23	V phase fault	0 to 0x1111	0
P97.24	W phase fault	0 to 0x1111	0
P97.27	Detection value of excessive speed deviation	0.0 to 50.0%	0.0%

P97.28	Detection time of excessive speed deviation	0.0 to 10.0	1.0 s

It is used to set the detection method for excessive speed deviation (DEV).

When the speed deviation (difference between the speed reference and the actual motor speed) exceeds the value set by P97.27, and the hold time of such state exceeds the time set by P97.28, it is defined as excessive speed deviation. Set P97.27 based upon 100% of the maximum output frequency.

When it is set to 0.0 s, speed deviation protection is disabled.

P97.29	Automatic fault reset count	0 to 100	0

The automatic reset function can automatically reset faults during operation according to the preset number of attempts and the preset time of interval. The value of 0 means the auto reset function is disabled, and the fault protection shall be initiated immediately.

When there are faults, the drive starts to reset after the time interval defined by P97.31. After the automatic fault reset count P97.29 is reached, the reset can be started by the manual reset command only. If there is any manual reset command during the automatic reset, the automatic reset count will be cleared.

If the drive runs normally without faults for 600 s, the fault reset count will be cleared.

WARNING

(1) The inverter module protection (OUT), external device fault (EF), and the short-to-ground fault (GdF) cannot be reset (neither automatic nor manual reset); the undervoltage fault (Uv), board-level communication error (bCE), and power board software version mismatching (vEr) can be automatically reset immediately when the fault disappears; other faults can be manually reset or automatically reset according to the requirements;

(2) During the reset interval, the output is locked and the drive runs at zero frequency; after the automatic reset is completed, the drive will automatically start using speed tracking;

(3) Implement the automatic fault reset function with caution. Otherwise, personal injury and property damage may occur.

P97.30	Fault relay action selection during automatic reset	0 to 1	0

0: Disabled

1: Enabled

P97.31	Automatic fault reset interval	2.0 to 600.0	5.0 s

P97.32	Present fault type	0 to 65	0

P97.33	Previous fault type	0 to 65	0
P97.34	Penultimate fault type	0 to 65	0

P97.35	Bus voltage upon the present fault	0.0 to 6553.5	0.0 V
P97.36	Actual current upon the present fault	0.0 to 999.9	0.0 A
P97.37	Running frequency upon the present fault	0.00 to 655.35	0.00 Hz
P97.38	AC drive operation state upon the present fault	0 to 0xFFFF	0
P97.39	Inverter bridge temperature upon the present fault	-40.0 to 150.0	0.0℃
P97.40	Reserved		
P97.41	Input terminal status upon the present fault	0 to 0xFF	0
P97.42	Output terminal status upon the present fault	0 to 0xF	0
P97.43	Running time upon the present fault	0.0 to 6553.5	0.0 s
P97.44	Bus voltage upon the previous fault	0.0 to 6553.5	0.0 V
P97.45	Actual current upon the previous fault	0.0 to 999.9	0.0 A
P97.46	Running frequency upon the previous fault	0.00 to 655.35	0.00 Hz
P97.47	AC drive operation state upon the previous fault	0 to 0xFFFF	0
P97.48	Inverter bridge temperature upon the previous fault	0.0 to 150.0	0.0℃
P97.49	Reserved		
P97.50	Input terminal status upon the previous fault	0 to 0xFF	0
P97.51	Output terminal status upon the previous fault	0 to 0xF	0
P97.52	Running time upon the previous fault	0.0 to 6553.5 min	0.0 min
P97.53	Bus voltage upon the penultimate fault	0.0 to 6553.5	0.0 V

P97.54	Actual current upon the penultimate fault	0.0 to 999.9	0.0 A
P97.55	Running frequency upon the penultimate fault	0.00 to 655.35	0.00 Hz
P97.56	AC drive operation state upon the penultimate fault	0 to 0xFFFF	0
P97.57	Inverter bridge temperature upon the penultimate fault	0.0 to 150.0	0.0℃
P97.58	Reserved		
P97.59	Input terminal status upon the penultimate fault	0 to 0xFF	0
P97.60	Output terminal status upon the penultimate fault	0 to 0xF	0
P97.61	Running time upon the penultimate fault	0.0 to 6553.5 min	0.0 min

MV810A records the types of the latest three faults (P97.32, P97.33, and P97.34), and records the bus voltage (P97.35), output current (P97.36), running frequency (P97.37), and operation state (P97.38) upon the present fault occurrence, which serve as the reference for users. For details about the operation state, see P01.17.

Chapter 6 Troubleshooting

6.1 Diagnosis and solution of faults on display

All possible fault types of MV810A are summarized in Table 8-1, as categorized into 35 fault codes. Before seeking for assistance, the user can perform the fault diagnosis according to this table and record the fault symptoms in details. This will help when contacting the distributor for technical support.

Table 6-1 Fault types and solutions

Fault code	Fault type	Possible cause	Solution
OC1	Overcurrent during acceleration	The acceleration time is too short.	Prolong the acceleration time.
		The motor parameters are incorrect.	Perform auto-tuning of motor parameters.
		When instantaneous stop happens, the rotating motor is restarted.	Set the startup mode P08.00 to "Startup after speed tracking."
		The drive power is too low.	Use a drive with higher power.
		The V/F curve is improper.	Adjust the V/F curve and the manual torque boost.
OC2	Overcurrent during deceleration	The deceleration time is too short.	Increase the deceleration time.
		There is potential energy load, or the load inertial torque is too large.	Add additional appropriate dynamic braking components.
		The drive power is too low.	Use a drive with higher power.
OC3	Overcurrent during operation at constant speed	The acceleration/deceleration time is set too short.	Increase 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 too low.	Use a drive with higher power.
OV1	Overvoltage during acceleration	Abnormal input voltage	Check the input power supply.
		The acceleration time is too short.	Increase the acceleration time appropriately.

Fault code	Fault type	Possible cause	Solution
		When instantaneous stop happens, the rotating motor is restarted.	Set the startup mode P08.00 to "Startup after speed tracking."
OV2	Overvoltage during deceleration	The deceleration time is too short (compared with the regenerative energy).	Increase the deceleration time.
		There is potential energy load, or the load inertial torque is too large.	Select appropriate dynamic braking components.
OV3	Overvoltage during operation at constant speed	In vector control, the ASR parameters are not set properly.	Refer to the ASR parameter setting of Group P05.
		The acceleration/deceleration time is too short.	Increase the acceleration/deceleration time appropriately.
		Abnormal input voltage	Check the input power supply.
		Abnormal fluctuation of input voltage	Install an input reactor.
		Large load inertia	Adopt dynamic braking components.
Uv	Undervoltage fault	The bus voltage of the drive is too low (lower than 350 V DC).	Check the input power voltage; Check the bus voltage of the drive; Seek for technical support.
SPI	Input phase loss	There is phase loss in input R, S, or T.	Check the installation wiring; Check the input voltage.
SPO	Output phase loss	There is phase loss in output U, V, or W.	Check the output wiring; Check the motor and the cables.
drv	Power module protection	There is interphase short circuit or short-to-ground circuit in the three phases output.	Rewire and check the motor insulation.
		Instantaneous overcurrent of the drive.	Refer to the overcurrent solutions.
		The duct is blocked or the fan is damaged.	Unblock the duct or replace the fan.

Fault code	Fault type	Possible cause	Solution
		The ambient temperature is too high.	Lower the ambient temperature.
		Wires or plug-in units of the control board are loose.	Check them and rewire.
		Abnormal current waveform caused by output loss or other reasons	Check the wiring
		The auxiliary power supply is damaged, and the drive voltage is insufficient.	Seek for technical support.
		Inverter module shoot-through	Seek for technical support.
		Abnormal control board	Seek for technical support.
		Braking pipe damaged	Seek for technical support.
OH1	Inverter overheat	The ambient temperature is too high.	Lower the ambient temperature.
		The duct is blocked.	Unblock the duct.
		The fan is damaged.	Replace the fan.
		The inverter module is abnormal.	Seek for technical support.
OH2	Rectifier bridge overheat	The ambient temperature is too high.	Lower the ambient temperature.
		The duct is blocked.	Unblock the duct.
		The fan is damaged.	Replace the fan.
OL1	AC drive overload	The motor parameters are incorrect.	Re-perform auto-tuning of motor parameters.
		The load is too large.	Use a drive with higher power.
		The DC braking amount is too large.	Reduce the DC braking current and increase the braking time.
		When instantaneous stop happens, the rotating motor is restarted.	Set the startup mode P08.00 to "Startup after speed tracking."

Fault code	Fault type	Possible cause	Solution
		The acceleration time is too short.	Increase the acceleration time.
		The power grid voltage is too low.	Check the power grid voltage.
		The V/F curve is inappropriate.	Adjust the V/F curve and the torque boost.
OL2	Motor overload	The motor overload protection coefficient setting is incorrect.	Set the motor overload protection coefficient correctly.
		The motor is blocked or the sudden change of load is too large.	Check the load.
		The general-purpose motor runs at low speed for a long time with high load.	For long-time low-speed running, a specific motor shall be used.
		The power grid voltage is too low.	Check the power grid voltage.
		The V/F curve is inappropriate.	Set the V/F curve and the torque boost correctly
EF	Emergency stop or external device fault	External fault emergency stop terminal is enabled.	After the external fault is revoked, release the external fault terminal.
EEP	EEPROM read/write fault	The read/write error of the control parameters occurs.	Seek for technical support.
CE	485 communication error	The baud rate is set improperly.	Set the baud rate properly.
		Serial port communication error	Seek for technical support.
		The fault alarm parameters are set improperly.	Modify the P15.03 setting.
		The host device does not work.	Check if the host device is working and if the wiring is correct.
ItE	Current detection error	Wires or plug-in units of the control board are loose.	Check them and rewire.
		The auxiliary power supply is damaged.	Seek for technical support.
		The Hall device is damaged.	Seek for technical support.
		The amplifying circuit is abnormal.	Seek for technical support.

Fault code	Fault type	Possible cause	Solution
FbL	PID feedback loss	The parameters for feedback loss are set improperly.	Modify the P14.22 setting.
		Feedback wire breakage	Rewire.
		The reference of closed-loop feedback is too low.	Refer to the P14.01 setting and increase the feedback reference.
tUN	Auto-tuning fault	The parameters corresponding to the motor nameplate specifications are not set correctly.	Set the parameters properly according to the motor nameplate.
		Reverse rotation auto-tuning is performed when the reverse running is prohibited.	Enable the reverse running.
		Auto-tuning timeout	Check the motor wiring.
			Check the P02.11 (frequency upper limit) and see whether the P02.12 set value is lower than the rated frequency.
oPt	Option fault	The expansion card is not installed properly.	Reinstall the expansion card.
		The expansion card is damaged.	Seek for technical support.
GdF	Short-to-ground fault	One of the phases (most likely the phase U) is short circuited to ground.	Check the connection of the output three phases to ground, and remove the fault.
dEv	Excessive speed deviation (DEV) fault	The ASR parameters are improper.	Modify the Group P05 function codes.
		The speed deviation detection value is set too small.	Modify the speed deviation detection setting.
		Significant load fluctuation	Eliminate the load vibration.
Fbo	PID feedback over-limit	The PID feedback value exceeds the limit.	Check whether the input voltage of the feedback is normal. If it is normal, seek for technical support.
OH3	Motor overheat	The ambient temperature is too high.	Lower the ambient temperature.

Fault code	Fault type	Possible cause	Solution
		The motor duct is blocked.	Unblock the motor duct.
		The motor fan is damaged.	Replace the motor fan.
		The motor runs at low frequency with high load for a long time.	Employ a large external fan to help the cooling of the motor.
24OL	24 V power supply overload	The wiring of the control board terminal may be incorrect, or the load is excessively large.	Control the 24 V output, and the overall current of the digital output shall be less than 200 mA.
bCE	Board-level communication error	Incorrect connection of board detection signals	Seek for technical support.
POL1	Pre-overload alarm	The motor parameters are not set correctly, and the load is excessively large.	Set the related parameters properly; check whether there is abnormal load.
bLt	BootLoader failure		Seek for technical support.
vEr	power board software version mismatching	The software version to be burned is not consistent with the current software version number.	Set P00.06 to 1 to upgrade software.
UPdnE	Parameter upload/download timeout	Parameter upload/download timeout	Check the wiring. If the wiring is correct, seek for technical support.
AIOC	AI1 current input overcurrent	Check whether the AI1 input current is normal.	Seek for technical support.
FAn	Fan locked-rotor	Check whether the fan is blocked by foreign matters.	Clean the motor fan.
IO-OL	I/O option 24 V overload	Check whether the wiring of the I/O option terminal is correct, and whether the load is overlarge.	Control the 24 V output, and the overall current shall be less than 400 mA.

6.2 Operation exceptions

Table 6-2 Operation exceptions and the corresponding solutions

Symptom	Condition	Possible cause	Solution
The function code can not be modified	Function code modification is not available in the running state.	The function code does not support modification in the running state.	Modify the function code in the stop state.
	Modification is available only of part of the function codes.	The function code P00.03 is set to 1 or 2.	Set P00.03 to 0.
		The function code represents the actually detected value.	Parameters of actually detected values do not support modification by the user.
The drive stops unexpectedly during operation.	No stop command is received, but the drive stops automatically and the running indicator is off.	Fault alarms occur.	Perform the fault diagnosis, and reset the fault.
		A single cycle of the simple PLC is completed.	Check the PLC parameter setting.
		Power supply interruption	Check the power supply
		Operation command channel switchover	Check the function codes related to the operation command channels.
		Excessively large speed deviation	Modify the speed deviation detection value.
		The positive/negative logic of the control terminals changes.	Check whether P09.12 and P09.13 are set according to the requirements.
	No stop command is received, but the motor stops automatically and the running indicator is on (running at zero frequency).	Automatic fault reset	Check the automatic fault reset setting and find out the cause
		Simple PLC pause	Check the PLC pause function terminal.
		External interruption	Check the external interruption setting and find out the cause
		The frequency reference is 0.	Check the frequency reference.

Symptom	Condition	Possible cause	Solution
		The startup frequency is higher than the frequency reference.	Check the startup frequency
		Jump frequency is set improperly.	Check the jump frequency setting
		The closed-loop output is negative when the reverse running is disabled.	Check the setting of P14.19 and P08.27.
		"FWD prohibit" terminal is enabled during forward running.	Check the terminal function setting.
		"REV prohibit" terminal is enabled during reverse running.	Check the terminal function setting.
		Transient low-voltage compensation is applied for restart after power failure, and the power supply voltage is too low.	Check the input voltage and the function setting of restart after power failure.
The drive does not work.	The drive does not work when started.	The coast-to-stop function terminal is enabled.	Check the coast-to-stop terminal.
		The drive running prohibit terminal is enabled.	Check the drive running prohibit terminal.
		The external stop function terminal is enabled.	Check the external stop function terminal.
		Under the three-wire control mode, the three-wire control function terminal is not closed.	Configure and close the three-wire control terminal.
		Fault alarms occur.	Clear the fault.
		The virtual terminal function of the host device is set improperly.	Disable the virtual terminal function, or set the function properly via the host device; the fault can also be cleared by modifying the P09.16 setting.

Symptom	Condition	Possible cause	Solution
		The positive and negative logic of the input terminal are not set correctly.	Check the settings of P09.12 and P09.13.
The drive reports Uv immediately upon powering on.	he thyristor or the contactor is disconnected, and the drive is overload.	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, and the drive will display Uv.	Run the drive after the thyristor or the contactor is fully closed, or seek for technical support.

Chapter 7 Maintenance

Many factors, such as the extremity in ambient temperature, humidity, dust, and vibration, as well as the aging of the internal components, will give rise to the occurrence of potential faults. Therefore, it is necessary to conduct daily/periodical maintenance for this AC drive product.

7.1 Daily inspection

WARNING

As safety precautions, before inspection and maintenance of the drive, please check the following matters. Otherwise, electrical shock may occur:

① The drive's power supply is cut off;

② Confirm that the charging LED indicator is off before opening the drive cover;

③ The voltage between terminals +/DC+ and -/DC- measured by a DC high-voltmeter should be below 36 V.

The drive shall be working in the environments specified in Section 3.2 in the full version of this manual. In addition, there may be some unexpected situations during operation. The users need to carry out daily maintenance according to 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 locate the causes for potential faults in the early stage.

Table 7-1 Instructions for daily inspection

Item	Instructions			Standard
	Aspect	Cycle	Methods	
Operating environment	1. Temperature and humidity	Any time	1. Thermometer and hygrometer	1. - 10℃ to + 40℃, derated use from 40℃ to 50℃
	2. Dust, water dripping and leakage		2. Visual inspection	2. No water dripping or leakage
	3. Odor		3. Smell	3. No strange smell
AC drive	1. Vibration and heating	Any time	1. Touch on the enclosure	1. The vibration is stable and limited; the temperature of the enclosure is normal; the fan is operating normally.
	2. Noise		2. Listen	2. No abnormal sound

Item	Instructions			Standard
	Aspect	Cycle	Methods	
Motor	1. Heating	Any time	1. Touch by hand	1. No abnormal heating
	2. Noise		2. Listen	2. Low and regular noise
Running status	1. Output current	Any time	1. Current meter	1. Within the rated range, and three-phase balanced
	2. Output voltage		2. Voltmeter	2. Within the rated range, and three-phase balanced
	3. Internal temperature		3. Thermometer	3. The difference with the ambient temperature is less than 35℃

7.2 Periodical maintenance

Users are recommended to carry out periodical maintenance for the drive once every 3 or 6 months based on the operating environment.

WARNING

① Only trained professionals are allowed to disassemble the drive, maintain, and replace parts of the device;

② Do not leave any screws, gaskets or other metal objects in the machine. Otherwise, the device may be damaged.

General inspections:

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

(2) Check if the main circuit terminals are poorly connected, and if the connection part of the copper bar is overheated;

(3) Check if there is any damage to the power cables and control cables, especially whether there is any wear/cut on the cable sheath which may contact the metal surface;

(4) Check if the insulation tapes around the power cable lugs are stripped;

(5) Clean out the dust on the circuit board and the duct; a vacuum cleaner is recommended;

(6) Before testing the grounding insulating performance of the drive, short all the input and output terminals (L1, L2, L3/N, U, V, W, BR, +/DC+, -/DC-) of the main circuit first. It is strictly forbidden to conduct the grounding test for a single terminal; otherwise, the drive may be damaged. Please use a 500 V megger during the test;

(7) To test the insulating performance of the motor, it is needed to disconnect the input terminals U, V, and W of the motor from the drive, and conduct test independently; otherwise, the drive may be damaged.

WARNING

① The drive has passed the dielectric strength test before delivery. Thus, the user shall not conduct the test again; otherwise, improper test may damage the drive.

② If it is needed to replace the original components, make sure the models and specifications of new components are the same with those of the original components; otherwise, the drive will be damaged.

7.3 Replacement of quick-wear parts

The quick-wear parts of this AC drive product mainly include the fans and the filter electrolytic capacitor, the service life of which depends on the operating environment and the maintenance. The service life of components in general conditions is listed in the table below.

Table 7-2 Service life of components

Component	Service life
Fan	30,000 to 40,000 hours
Electrolytic capacitor	40,000 to 50,000 hours
Relay	About 100,000 times

Users can replace the parts according to the accumulated running time.

(1) Fan

Possible causes of damage: Wear of the bearing, or aging of the blades.

Inspection standards: Check whether there is any crack on the blades, and whether there is any abnormal vibration or noise at startup.

(2) Electrolytic capacitor

Possible causes of damage: High ambient temperature, increased pulse current caused by rapid changing load, or electrolyte aging.

Inspection standards: Check whether there is liquid leakage, and whether the safety valve is protruded; measure the static capacitance and the insulating resistance.

(3) Relay

Possible causes of damage: Erosion, or frequent actions.

Inspection standards: Check whether the relay can be opened and closed properly.

7.4 Storage

The following points must be followed for the temporary and long-term storage of the drive:

(1) The drive should be stored in the place with good ventilation and away from high temperature, humidity, dust, and metal powder;

(2) Long-term storage will cause the deterioration of the electrolytic capacitor. The drive should be powered on for a test at least once (for at least 5 hours) within 2 years. To power on the drive, the input voltage should be raised gradually to the rated value via a regulator.

Appendix 1 Warranty and Service

Megmeet rigorously adheres to the ISO 9001:2008 standard in manufacturing motor drive products. If any irregularities occur with our products, please contact the product supplier or the headquarters directly. Megmeet is committed to delivering comprehensive technical support services to all our clients.

1. Warranty period

The warranty period for the product is 18 months from the date of purchase, but not exceeding 24 months after the manufacturing date recorded on the nameplate.

2. Warranty scope

During the warranty period, any abnormalities arising from the responsibility of our company can be repaired or replaced free of charge by our company. However, a certain amount of repair charges may apply even within the warranty period under the following circumstances:

(1) Damage caused by fire, flood, severe lightning strikes, or similar reasons;

(2) Man-made damage caused by users' unauthorized modifications;

(3) Damage due to dropping or transportation after purchase;

(4) Damage caused by usage beyond the standard specifications or requirements;

(5) Damage resulting from operation/use not in accordance with the user manual.

3. After-sales service

(1) If there are special requirements for the installation and commissioning of the drive product, or if the product's performance or functionality is not satisfactory, please contact the product distributor or Megmeet.

(2) In case of any abnormalities, please seek assistance by contacting the product supplier or Megmeet.

(3) During the warranty period, any abnormalities caused by manufacturing and design defects will be repaired free of charge by our company.

(4) Beyond the warranty period, repairs will be conducted at the customer's request and charged by our company.

(5) Service fees are calculated based on actual costs. Any agreements in place will take precedence.

Shenzhen Megmeet Electrical Co., Ltd.

Add: 5th Floor, Block B, Unisplendour Information Harbor, Langshan Road, Nanshan District, Shenzhen, 518057, China

Tel: +86-755-86600500

Fax: +86-755-86600562

Website: www.megmeet.com

Shenzhen Megmeet Electrical Co., Ltd.

Drive Warranty Bill

Customer company:	
Detailed address:	
Zip code:	Contact:
Tel:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Purchase date:
Service unit:	
Contact:	Tel:
Maintenance person:	Tel:
Maintenance date:	
Comment on service: ☐ **Excellent** ☐ **Good** ☐ **Fair** ☐ **Unsatisfactory** Other comment: User's signature: Date:	
Customer Service Center follow-up record: ☐ **Follow-up phone call** ☐ **Follow-up letter** Other: 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:	
Zip code:	Contact:
Tel:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Purchase date:
Service unit:	
Contact:	Tel:
Maintenance person:	Tel:
Maintenance date:	
Comment on service: ☐ **Excellent** ☐ **Good** ☐ **Fair** ☐ **Unsatisfactory** Other comment: User's signature: Date:	
Customer Service Center follow-up record: ☐ **Follow-up phone call** ☐ **Follow-up letter** Other: Signature of the technical support engineer: Date:	

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