INOVANCE

# MD600 Series

# Compact AC Drive Quick Start Guide

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## 1 Preface

The MD600 is a compact, general-purpose, and cost-effective AC drive for small automation equipment. Supporting Modbus RTU and CAN communication protocols, it features a compact size and high-performance open-loop vector control and can drive synchronous and asynchronous motors. The MD600 is widely used in small automation equipment in fields such as crystalline silicon, lithium battery, carpentry, logistics, cables, packaging, and machine tools.

This guide describes installation, wiring, keypad, commissioning, and parameters of the product. Read through this guide before use.

## 2 AC Drive Installation

### ■ Backplate mounting

T1 models (three-phase 380-480 V: 0.37-2.2 kW; single-phase 200-240 V: 0.37-1.5 kW) and T2 models (three-phase 380-480 V: 4-5.5 kW; single-phase 200-240 V: 2.2 kW) support backplate mounting.

Before installation, check that the installation tools and environment have been prepared. For details, see "Mechanical Design" in the MD600 Series Compact AC Drive Hardware Guide. This section describes quick backplate mounting steps.

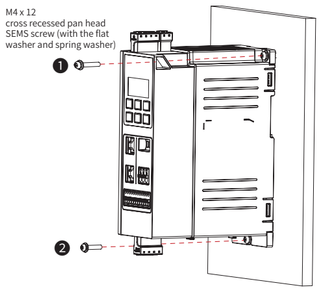



Figure 2-1 Backplate mounting

## 3 AC Drive Wiring

### 3.1 Main Circuit Wiring

For details, see "Electrical Design" in the MD600 Series Compact AC Drive Hardware Guide. This section describes quick wiring steps. The following figure takes the CAN model as an example to introduce the main circuit wiring.

To wire the main circuit, do as follows:



1. Ground the AC drive.
2. Check the rated value of the circuit breaker or fuse.
3. Check whether the rated motor voltage is compatible with the AC drive voltage.
4. Connect the AC drive to the motor.
5. Connect the AC drive to the mains power.

### 3.2 Control Circuit Wiring

◆ Precautions

I/O signals include analog input (AI), analog output (AO), digital input (DI), digital output (DO), and relay output signals. To avoid interference to the I/O signals, separate the I/O signal cables at least 20 cm away from the main circuit cables (R/S/T cables and U/V/W cables) and other power cables or power supply cables.

◆ AI1 wiring

AI1 supports voltage input of -10 V to 10 V or 0 V to 10 V or current input of 0 mA to 20 mA .

Weak analog signals are easy to suffer external interference. Therefore, route the analog cable away from the interference source and keep the cable length as short as possible (no longer than 20 m). In applications where the analog signal suffers severe interference, install a filter capacitor or ferrite magnetic core at the analog signal source.

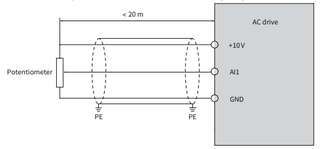



Figure 3-1 AI terminal wiring

◆ Wiring of DI1 to DI5

NOTE

When the OP terminal is connected to the internal 24 V power supply (DIP switch S4 set to 24V), do not short the COM and OP terminals. Otherwise, the internal 24 V power supply will be damaged.




Figure 3-2 Sink wiring

To use the internal 24 V power supply of the drive, which is the most commonly wiring method, set the DIP switch S4 to 24V (short the OP and 24V terminals), and connect the COM terminal of the drive to the 0V terminal of the external controller.

◆ DO wiring

When the DO needs to drive a relay, connect a snubber diode on both sides of the relay coil. Otherwise, the 24 VDC power supply may be damaged. Ensure that the driving capacity does not exceed 50 mA.

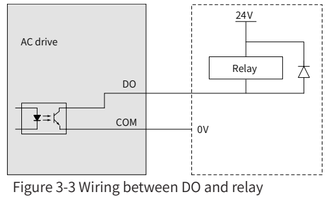



Figure 3-3 Wiring between DO and relay

NOTE

Connect the snubber diode with the polarity placed correctly. Otherwise, the DO circuit will be damaged upon the DO output.



DO: Optocoupler isolation; unipolarity open collector output

Output voltage range: 0 V to 24 V

Output current range: 0 mA to 50mA

The DO is a unipolarity terminal and can be wired only in the following way.

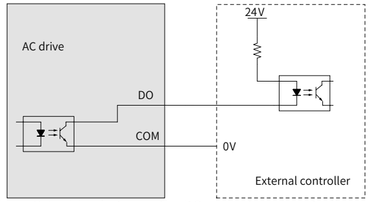



Figure 3-4 Wiring between the DO and external controller

### 3.3 Terminal Description

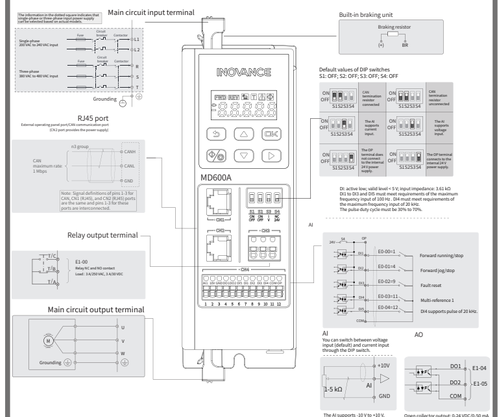



Figure 3-5 Wiring for CAN models

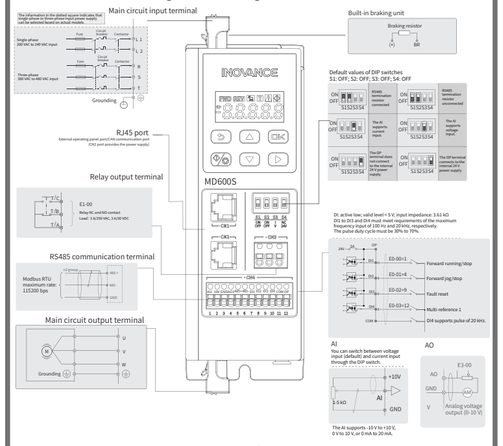
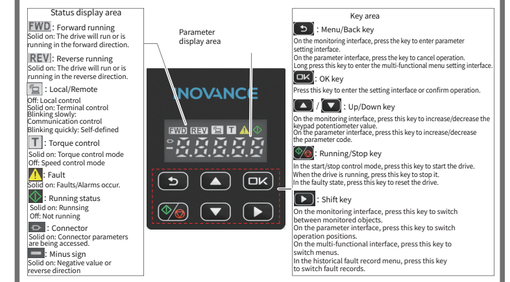



Figure 3-6 Wiring for RS485 models

## 4 Keypad

### 4.1 Keypad Descriptions






### 4.2 Parameter Settings

You can set parameters through the AC drive keypad. Take F1-01 (Rated motor power) as an example to describe the operation through the keypad.

Press to enter the level 1 parameter menu. Press , , and to access F1 group. Press OK to enter the level 2 parameter menu. Locate F1-01 and press OK to enter the parameter setting interface. Press , , and to change the value of F1-01 to 3.7 kW, and then press OK. After the setting is saved, the interface automatically returns to the level 2 parameter menu. Press to return to the level 1 parameter menu and the monitoring interface.

## 5 Quick Operation

### 5.1 Basic Commissioning Flowchart

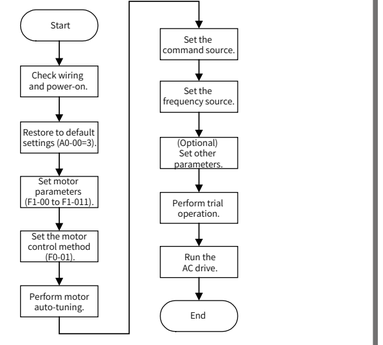



Figure 5-1 Basic commissioning flowchart

NOTE

The following section introduces the required commissioning steps aiming at quick commissioning. For details, see MD600 Series Compact AC Drive Function Guide.

### 5.2 Wiring and Power-on Check

After connecting the drive properly, close the power supply switch and check the display on the keypad of the drive. If the keypad displays the set frequency (default: 50.00 Hz), the drive is powered on.

### 5.3 Factory Setting Restoration

Set A0-00 (Parameter initialization) to 3 to restore parameters (including motor parameters) to default settings.

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| A0-00 | Parameter initialization | 0 | 0: No operation<br>1: Restore parameters (excluding motor parameters) to default settings<br>3: Restore parameters (including motor parameters) to default settings | 0: No operation<br>1: AC drive parameters except factory parameters, motor parameters, and records are restored to default settings.<br>3: AC drive parameters except factory parameters and records are restored to default settings. |

### 5.4 Motor Parameter Settings

Set motor parameters according to the motor nameplate, including the motor type, rated motor power, voltage, current, frequency, and speed, motor power factor, maximum frequency, and minimum frequency.

NOTE

If the motor is a synchronous motor with a large load that cannot be disconnected, perform static auto-tuning and manually set the line voltage of the back EMF after auto-tuning.

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| F1-00 | Motor type | 0 | 0: Common asynchronous motor<br>2: Permanent magnet synchronous motor | It is used to set the motor type. |
| F1-01 | Rated motor power | 3.7 | 0.1 kW to 1000.0 kW | It is used to set the rated motor power in the unit of kW. |
| F1-03 | Rated motor voltage | 380 | 1 V to 2000 V | It is used to set the rated motor voltage in the unit of V. |
| F1-04 | Rated motor current | 9.00 | 0.01 A to 655.35 A | It is used to set the rated motor current in the unit of A. |
| F1-06 | Rated motor frequency | 50.00 | 0.01 Hz to 599.00 Hz | It is used to set the rated motor frequency in the unit of Hz. |
| F1-07 | Rated motor speed | 1460 | 1 rpm to 65535 rpm | It is used to set the rated motor speed in the unit of rpm. |
| F1-10 | Maximum motor frequency | 50.00 | F1-06 to 599.00 Hz | It is used to set the allowed maximum frequency of the motor in the unit of Hz. |
| F1-11 | Minimum motor frequency | 0.00 | 0.00 Hz to F1-10 | It is used to set the allowed minimum frequency of the motor in the unit of Hz. |
| F1-12 | Synchronous motor back EMF | 300 V | 0 V to 6553.5 V | It is used to set the effective value of the linear back EMF of the synchronous motor at rated speed. The value is obtained through auto-tuning. |

### 5.5 Motor Control Mode Settings

You can set the motor control mode through F0-01 (Motor control mode). The drive supports the V/f control mode and SVC mode. As an open loop vector control mode, the SVC is applicable for high-performance control scenarios in which one AC drive can drive only one motor, such as the machine tool, centrifuge, drawing machine, and injection molding machine. If this mode is selected, parameter auto-tuning is required to obtain accurate parameters and maximize the advantage of the SVC mode. V/f is an open loop control mode based on constant voltage and frequency ratio. This mode is applicable to scenarios without high requirements on load control performance, such as fans and water pumps and scenarios without high requirements on accuracy of parameters. This mode is simply and easy to use. The dynamic performance of the V/f control mode is not as good as that of the SVC mode.

NOTE

When F1-00 (Motor type) is set to 0 (Common asynchronous motor), F0-01 (Motor control mode) can be set according to the application requirements.
When F1-00 (Motor type) is set to 2 (Permanent magnet synchronous motor), the SVC mode is recommended. The accuracy is low for the synchronous motor in the V/f control.

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| F0-01 | Motor control method | 0 | 0: SVC (sensorless vector control)<br>2: V/f control (speed open loop control) | It is used to set the motor control mode based on the application scenario and motor type. |

### 5.6 Motor Auto-tuning

The auto-tuning mode can be set by F1-69 (Auto-tuning mode). Select the auto-tuning mode based on the motor type and load condition. Press OK after selecting the auto-tuning mode. The AC drive displays "TUNE". Press , and the motor auto-tuning starts. When the current set frequency (50.00 Hz by default) is displayed, auto-tuning is completed. The auto-tuning process usually lasts for three minutes. Do not operate the AC drive during this period. Wait for the auto-tuning process to complete. After auto-tuning, parameters C4-20 to C4-64 are obtained and written.

NOTE

Before performing static partial parameter auto-tuning of the synchronous motor, enter F1-12 (Synchronous motor back EMF) manually.

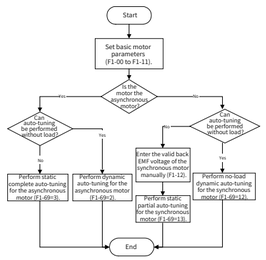



Figure 5-2 Motor auto-tuning flowchart

| Para. Code | Para. Name | Default | Value |
|---|---|---|---|
| F1-69 | Motor parameter auto-tuning mode | 0 | 0: No operation<br>1: Static partial auto-tuning of asynchronous motor<br>2: Dynamic auto-tuning of asynchronous motor<br>3: Static complete auto-tuning of asynchronous motor<br>12: No-load dynamic complete auto-tuning of synchronous motor<br>13: Static partial auto-tuning of synchronous motor |
| Description | 0: Disable<br>1: It applies to scenarios where the motor cannot be disconnected from the load and dynamic auto-tuning is not allowed. Some motor parameters are auto-tuned. Other parameters use default values.<br>2: It applies to scenarios where the motor can rotate at high speed without the load. It supports auto-tuning of all motor parameters under no-load and pure inertia load states.<br>3: It applies to scenarios where the motor cannot be disconnected from the load and dynamic auto-tuning is not allowed. Some motor parameters are auto-tuned. The auto-tuning precision is better than that when F1-69 is set to 1.<br>12: It applies to scenarios where the motor can rotate at high speed without the load. All motor parameters can be tuned.<br>13: It applies to scenarios where the motor cannot be disconnected from the load and dynamic auto-tuning is not allowed. Some motor parameters are auto-tuned. The auto-tuning precision is better than that when the synchronous motor is tuned with load. | | |

## 5.7 Command Source Settings

The command source is the source or input mode of commands to control the startup, stop, forward running, reverse running, jogging, and fault reset of the AC drive.

The AC drive has two control channels. Each control channel can be used to set the AC drive command source. Control channel 1 is active under factory parameters. You can set the command source of control channel 1 through the basic parameters in group F0.

You can select the keypad as the main command source of the AC drive by setting F0-03 (Main command source of control channel 1) to 0 (Keypad).

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| F0-03 | Command source of control channel 1 | 0 | 0: Keypad<br>1: Terminal<br>2: Communication<br>3: User-defined | It is used to set the main command source of control channel 1.<br>0: LED keypad or external operating panel You can control the motor by pressing RUN/STOP keys on the keypad.<br>1: Terminal. Control commands are input by the DI of the AC drive. The DI can be assigned with different functions according to different scenarios.<br>2: Communication control (such as Modbus) The AC drive needs to communicate with the host controller. You can input control commands through remote communication. This mode is suitable for remote control or centralized control on multiple equipment.<br>3: The source is user-defined. The control commands can be set by b1-01 to b1-09, ON_OFF1 (start/stop), OFF2 (coast to stop), and OFF3 (quick stop). |

## 5.8 Frequency Source Settings

The frequency source indicates the input source of the running frequency.

The AC drive supports two channels, which can be used to set the frequency source of the AC drive. You can set the frequency source of channel 1 through basic parameter setting in group F0.

F0-29 (Main frequency source) allows you to select the frequency source setting method, such as the parameter, AI, multi-reference, and communication.

| Para. Code | Para. Name | Default | Value |
|---|---|---|---|
| F0-29 | Main frequency source | 0 | 0: F0-30<br>2: AI1<br>5: HDI pulse<br>6: Multi-reference<br>7: Simple PLC<br>8: PID<br>9: Communication<br>10: Potentiometer MD-BP-M<br>Others: F connector |



| Para. Code | Para. Name | Default | Value |
|---|---|---|---|
| Description | 0: The main frequency is set by F0-30 (Digital setting of main frequency). The frequency can be changed by using the ▲ and ▼ keys on the keypad or the multi-functional input terminal functioning as the UP/DOWN key. When the AC drive is powered off and then powered on, whether the frequency adjusted by using UP/DOWN keys or multi-functional input terminal functioning as the UP/DOWN key is saved depends on the configuration of "retain values set by using UP/DOWN keys or multi-functional input terminal functioning as the UP/DOWN key". The "clear values adjusted by using UP/DOWN keys or multi-functional input terminal functioning as the UP/DOWN key" function of the DI allows you to clear values set by using UP/DOWN keys or multi-functional input terminal functioning as the UP/DOWN key.<br>2: AI1<br>The frequency is input by current or voltage signal through the AI1. The frequency is calculated according to the preset AI curve.<br>5: HDI pulse<br>The frequency is set through the pulse frequency of the DI4. The frequency is calculated based on the curve of the relationship between the pulse frequency and the set frequency.<br>6: Multi-reference<br>When multi-reference is used as the frequency source, combinations of different DI states correspond to different frequencies. The four multi-reference terminals can provide 16 states, corresponding to 16 frequencies.<br>7: Simple PLC<br>Simple PLC is a multi-speed operation instruction that can control the operation time and acceleration and deceleration time. Multi-reference parameters are used to set the frequency. The simple PLC module is used to set the running time and acceleration/deceleration time of each frequency. Up to 16 frequencies can be set.<br>8: PID<br>The main frequency is set through PID.<br>9: Communication<br>The main frequency is set through communication. The frequency can be input through remote communication. The AC drive must be equipped with a communication card to communicate with the host controller. This mode is suitable for remote control or centralized control on multiple equipment.<br>10: Potentiometer MD-BP-M<br>The main frequency is set through the potentiometer MD-BP-M.<br>Others: F connector<br>A function code is set for a floating-point connector, and the value of the connector is read as the main frequency. This mode is used for expansion besides the common sources.<br>Note:<br>The addresses for the frequency set by communication are 0x1000 (dedicated for Modbus) and 0x7310 (CAN and Modbus). When the frequency is written through communication by using address 0x1000, the setting option is set by n0-13. When the frequency is written through communication by using address 0x7310, the setting option is set by n0-14. | | |

When the main frequency source is set to "0: Digital setting", the main frequency set by parameters is in the unit of Hz. When the main frequency source is set to other options, the frequency is set in percentage. The base value (100%) is determined by the frequency per unit value of A2-04.

◆ Frequency source: parameter

After setting F0-29 (Main frequency source) to 0 (F0-30), the value of F0-30 (Digital setting of main frequency) is the active frequency.

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| F0-30 | Digital setting of main frequency | 50.00 | 0.00 Hz to A2-17 | It defines the target frequency. It is valid when F0-29 is set to 0. |

◆ Frequency source: AI

After F0-29 (Main frequency source) is set to 2 (AI), the AI is used as the active frequency source.

By default, curve 1 of the AI is active and is a two-point curve. The related parameters are as follows.

| Para. Code | Para. Name | Default | Value |
|---|---|---|---|
| E2-40 | Minimum input of AI curve 1 | 0.00 | -10.00 V to E2-42 |
| Description | When the main frequency is set by the AI, each AI supports five types of AI curves. The AI curve is used to set the relation between the analog input voltage (or current) and the percentage corresponding to the rated frequency (C4-06). The x axis of the AI curve represents the analog input voltage or current, and the y axis represents the set value corresponding to the analog input, which is the percentage to the rated frequency (C4-06).<br>Five AI curves are provided. Curves 1 to 3 are two-point curves, and their relevant parameters are E2-40 to E2-51. Curves 4 and 5 are four-point curves, and their relevant parameters are E2-52 to E2-67. The two points on curves 1 to 3 are the minimum input point and maximum input point, respectively. E2-40 corresponds to the x axis of the AI curve 1 minimum input, that is, the minimum analog input voltage or current. | | |

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| E2-41 | Percentage corresponding to minimum input of AI curve 1 | 0.00 | -800.0% to 800.0% | E2-41 corresponds to the y axis of AI curve 1 minimum input, that is, the per unit value percentage corresponding to the minimum analog input. |
| E2-42 | Maximum input of AI curve 1 | 10.00 | E2-40 to 10.00 V | E2-42 corresponds to the x axis of AI curve 1 maximum input, that is, the maximum analog input voltage or current. |
| E2-43 | Percentage corresponding to maximum input of AI curve 1 | 100.0 | -800.0% to 800.0% | E2-43 corresponds to the y axis of AI curve 1 maximum input, that is, the per unit value percentage corresponding to the maximum analog input. |

◆ Frequency source: multi-reference

After F0-29 (Main frequency source) is set to 6 (Multi-reference), the multi-reference is used as the active frequency source.

You can assign the multi-reference terminal function to the DI and switch among pre-set multi-references through the DI. The related parameters are as follows.



| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| F0-10 | DI1 function selection | 1 | 12: Multi-reference terminal 1<br>13: Multi-reference terminal 2<br>14: Multi-reference terminal 3<br>15: Multi-reference terminal 4 | Multi-reference is selected as the main frequency source. 16 speeds or 16 references can be set through combinations of 16 states of these four terminals.<br>It is suitable for applications where the operating frequency of the drive does not require continuous adjustment, and only several frequency values need to be used. |
| F0-11 | DI2 function selection | 4 | | |
| F0-12 | DI3 function selection | 9 | | |
| F0-13 | DI4 function selection | 12 | | |
| F0-38 | Multi-reference 0 setting mode | 0 | 0: F0-39<br>1: AI<br>4: Pulse<br>5: PID<br>6: Digital setting of main frequency for the current valid channel | It defines the source of multi-reference 0. |
| F0-39 | Multi-reference 0 | 0.0 | -800.0% to 800.0% | The unit of the multi-reference is %. The AC drive provides four multi-reference terminals (b8-03 to b8-06), which provide 16 states, corresponding to 16 frequency setpoints.<br>This parameter defines the frequency reference of each speed when the frequency reference source is set to multi-reference. b8-09 to b8-24 correspond to a total of 16 frequency setpoints for 16 multi-references numbered from 0 to 15. The frequency setpoint is calculated as a percentage to the rated frequency. The value 100% corresponds to the rated motor frequency.<br>The source of multi-reference 0 is selected by b8-08, and the other multi-references are set by other parameters.<br>When outputting to a floating-point connector, the multi-reference value is a percentage of the rated value. |
| F0-40 | Multi-reference 1 | 0.0 | -800.0% to 800.0% | |
| F0-41 | Multi-reference 2 | 0.0 | -800.0% to 800.0% | |
| F0-42 | Multi-reference 3 | 0.0 | -800.0% to 800.0% | |

◆ Frequency source: communication

After F0-29 (Main frequency source) is set to 9 (Communication), communication is set as the active frequency source.

When the command source is set to communication, you need to configure basic communication parameters to enable the AC drive to communicate with the host controller. The host controller needs to follow the communication address and format specified by the AC drive to write communication commands to the AC drive.

## 5.9 Other Parameter Settings

◆ Motor direction

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| F2-14 | Motor running direction selection | 0 | 0: Normal direction<br>1: Opposite to normal direction | It is used to set the motor running direction. |

◆ Acceleration/deceleration time

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| F0-46 | Ramp acceleration/deceleration time base frequency | 0 | 0: Rated frequency<br>1: Max. frequency<br>2: 100 Hz<br>3: Frequency reference | It is used to set the base frequency of ramp acceleration/deceleration time.<br>Note:<br>Acceleration time indicates time required by the AC drive to accelerate from 0 Hz to the ramp acceleration/deceleration time base frequency. Deceleration time indicates time required by the AC drive to decelerate from the ramp acceleration/deceleration time base frequency to 0 Hz. |
| F0-48 | Ramp 1 acceleration time | 20.0s | 0.0s to 6500.0s | It is used to set the first group of acceleration time. By default, the first group of acceleration/deceleration time is selected.<br>It indicates the time required for the output frequency to increase from 0 to the ramp acceleration/deceleration time base frequency (b7-01). The time is used to set the accelerated speed during acceleration.<br>The AC drive provides four groups of acceleration/deceleration time, which can be selected by using the parameter b7-02 or b7-03 or DI. Acceleration time setting requirements: The acceleration current must be limited below the overcurrent capacity of the AC drive, so as not to cause the AC drive to trip due to overcurrent stall. |
| F0-49 | Ramp 1 deceleration time | 20.0s | 0.0s to 6500.0s | It is used to set the first group of deceleration time. By default, the first group of acceleration/deceleration time is selected.<br>It indicates the time required for the output frequency to decrease from the ramp acceleration/deceleration time base frequency (b7-01) to 0. The time is used to set the accelerated speed during deceleration.<br>The AC drive provides four groups of acceleration/deceleration time, which can be selected by using the parameter b7-02 or b7-03 or DI. Deceleration time setting requirements: The settings must prevent smooth circuit overvoltage, so as not to cause the AC drive to trip due to overvoltage stall. |



◆ Stop mode

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| d0-04 | OFF1 stop mode | 0 | 0: Decelerate to stop<br>1: Coast to stop<br>2: Stop at maximum capability | It is used to set the OFF1 stop mode.<br>0: The stop mode is determined by the valid ramp settings.<br>1: The AC drive stops output to shut down. At this time, the power supply of the motor is cut off and the driving system is in the free braking state.<br>2: In this mode, the motor speed reference is set to 0 forcibly. The motor decelerates to 0 based on the maximum output capacity. The minimum deceleration time is fixed to 50 ms. The output torque or current may reach the limit value during deceleration. |

◆ Relay output

| Para. Code | Para. Name | Default | Value | Description |
|---|---|---|---|---|
| F0-17 | RO1 output function selection | 2 | 0: No output<br>1: AC Drive running<br>2: Fault | It is used to set the RO1 output function. When the function triggering conditions are met, an active signal is output; otherwise, an inactive is output.<br>0: No output<br>The output terminal has no function.<br>1: AC drive running<br>When the AC drive is running with output frequency (can be 0), the terminal outputs an active signal.<br>2: Fault<br>When the AC drive stops due to a fault (coast to stop, stop at maximum capability, quick stop, or decelerate to stop), the terminal outputs the active signal. |

## 5.10 Trial Run

After ensuring that the above parameters are set correctly, try to disconnect the motor from the load or reduce the load to the minimum to perform trial run. Then determine whether the motor running parameters are the same as the set values.

# 6 Troubleshooting

| Fault Description | Possible Cause | Check Method | Solution |
|---|---|---|---|
| There is no display upon power-on. | There is no voltage input or the input voltage is too low. | Check whether the AC drive input voltage is in the range indicated on the nameplate. | Contact the agent or Inovance for technical support. |
| | The switched-mode power supply on the drive board of the drive is faulty. | Measure the voltage values of the 24V and 10V output interfaces on the drive board to check whether the values reach 24 V and 10 V. | |
| | The snubber resistor of the AC drive is damaged. | Determine the standard value of the pre-charge resistor based on the model information on the AC drive housing, and then measure the pre-charge resistor to check whether it is damaged.<br>Three-phase 380 V<br>● The 0.37 kW, 0.75 kW, and 1.5 kW models have one 15 Ω pre-charge resistor. The 2.2 kW models have two 15 Ω pre-charge resistors in series.<br>● The 4 kW and 5.5 kW models have two 5 Ω pre-charge resistors in series.<br>Single-phase 220 V<br>● The 0.37 kW and 0.75 kW models have one 20 Ω pre-charge resistor.<br>● The 1.5 kW models have two 20 Ω pre-charge resistors in series.<br>● The 2.2 kW models have two 5 Ω pre-charge resistors in series. | |
| | The rectifier bridge is damaged. | Check whether the switched-mode power supply and pre-charge resistor are normal. If they are normal, the rectifier bridge may be faulty. | |
| | The control board or the keypad is faulty. | Check whether the switched-mode power supply, pre-charge resistor, and input voltage are normal. If they are normal, the control board or keypad may be faulty. | |
| "-H-C" is displayed after power-on. | The motor or the motor cable is short circuited to ground. | Check the motor and output cable voltage with a tramegger. If the voltage is close to 0, the motor or motor cable is short circuited to ground. | Contact the agent or Inovance for technical support. |
| | The mains voltage is too low. | Check whether the AC drive input voltage is in the range indicated on the nameplate. | |
| | Related components on the control board are damaged. | If the motor is not short circuited to ground and the power grid voltage is normal, the control board may be damaged. | |
| E023.1 (Drive output short-circuited to ground) is displayed after power-on. | The motor or the motor cable is short circuited to ground. | Check the motor and output cable voltage with a tramegger. If the voltage is close to 0, the motor or motor cable is short circuited to ground. | Reconnect the circuit that is shorted. |
| | The AC drive is damaged. | If the motor or motor cable is not short circuited to ground, the AC drive may be damaged. | Contact the agent or Inovance for technical support. |
| The display is normal upon power-on. However, after the drive starts to run, "-H-C" is displayed and the drive stops immediately. | The cable of the external control terminal is short circuited. | Measure the voltage of the external control terminal to determine whether short circuit occurs. | Reconnect the terminal that is shorted. |
| | The fan is damaged or shorted. | Check whether the fan can work properly and check whether the circuit voltage is close to 0. | Reconnect the fan cable or contact the manufacturer to replace the fan. |
| | The AC drive is damaged. | If the motor is not short circuited to ground and the fan is normal, the AC drive may be damaged. | Contact the agent or Inovance for technical support. |



| Fault Description | Possible Cause | Check Method | Solution |
|---|---|---|---|
| "E014.1" (drive overheat) is detected frequently. | The carrier frequency is set too high. | Check the set carrier frequency (A5-01) and effective carrier frequency (A5-02). If the values are much higher than the default values, reset the parameters. | Reduce the set carrier frequency (A5-01) and effective carrier frequency (A5-02). |
| | The cooling fan is damaged, or the air duct is blocked. | Check whether the fan can work normally and whether the ventilation duct is blocked. | Replace the cooling fan or clean the air duct. |
| | The ambient temperature is too high. | Check whether the ambient temperature is higher than 50°C. | Lower down the ambient temperature, and then start the AC drive. |
| | Devices (thermistor or other devices) inside the AC drive are damaged. | Check the function of components (thermistor or other devices) on the control board. | Contact the agent or Inovance for technical support. |
| The motor does not rotate when the AC drive is running. | The cabling between the AC drive and the motor is abnormal. | Check whether wiring between the AC drive and the motor is correct by referring to the electrical wiring diagram in MD600 Series Compact AC Drive Hardware Guide. | Reconnect the AC drive and the motor. |
| | The AC drive parameters (motor parameters) are set incorrectly. | Check whether the motor rated parameters (C4-01 to C4-11) are set correctly according to the motor nameplate. | Restore parameters to default settings and reset related parameters. |
| | | Check whether the rated motor parameters (C4-01 to C4-11) are consistent with those on the motor nameplate, such as the rated motor frequency and rated motor speed. | Set the motor rated parameters (C4-01 to C4-11) according to the motor nameplate. |
| | | Check whether the control mode (d0-00), command source of control channel 1 (b1-00), and command source of control channel 2 (b3-00) are set correctly according to the actual working conditions. | Set d0-00, b1-00, and b3-00 correctly according to the actual working conditions. |
| | | Check the torque boost parameter (d2-14/d2-15) under heavy load start in the V/f control mode. | Set torque boost parameters (d2-14/d2-15) properly. |
| | The drive board is faulty. | If the parameters are set correctly and the wiring is proper, the drive board may be faulty. | Contact the agent or Inovance for technical support. |
| The DI is inactive. | The related parameters are set incorrectly. | Check whether parameters related to terminal settings (E0 group) comply with the scheme design. | Reset parameters related to terminal settings (E0 group). |
| | The external signal is incorrect. | Check whether the external signal cable is connected correctly by referring to the electrical wiring diagram in MD600 Series Compact AC Drive Hardware Guide. | Re-connect the external signal cable. |
| | The DIP switch is abnormal. | Check whether the S4 DIP switch is set to 24V. | Set the S4 DIP switch to 24V. |
| | The control board is faulty. | If the parameters are set correctly and the external signal cable is connected properly, the control board may be faulty. | Contact the agent or Inovance for technical support. |
| The motor coasts to stop or the brake fails during decelerating or decelerating to stop. | The overvoltage suppression protection function takes effect. | Check whether the braking resistor is configured and whether d1-54 (Overvoltage suppression) is set to 1 (Enable). | If the braking resistor is configured, set d1-54 (Overvoltage suppression) is set to 0 (Disable) or increase the value of F0-49 (Deceleration time). |
| The drive detects overcurrent (E002.1, E002.2) or overvoltage (E005.2) frequently. | The motor parameters are set incorrectly. | Check whether the motor rated parameters (C4-01 to C4-11) are set correctly according to the motor nameplate and motor user guide. | Set the motor parameters or perform motor auto-tuning again. |
| | The acceleration/deceleration time is improper. | Set F0-48 (Acceleration time) and F0-49 (Deceleration time) to 120s. If no fault is reported, the values of F0-48 and F0-49 are too small. | Set acceleration/deceleration time properly. Increase the time by 1s to 2s each time for test. |
| | The motor is started while rotating. | Check whether a running motor is started. | Set the start mode (d0-02) to flying start or start the motor after it stops. |
| | The terminal function is set to "quick stop", or the DI signal suffers interference. | Check whether function 47 (Emergency stop) is assigned to the terminal and check whether the terminal input is normal. | Check the DI wiring by referring to the electrical wiring diagram in MD600 Series Compact AC Drive Hardware Guide. Increase the DI filter time (E0-16/E0-17) by step value of 0.05s. |
| | The load fluctuates. | Check the AC drive load condition. | Contact the agent or Inovance for technical support. |
| The motor is running properly, but the AC drive reports an overload error (E010.1) | The AC drive power is smaller than the motor power. | Compare the rated power of the AC drive (A3-02) with that of the motor (C4-01). Check the carrier frequency (A5-01/A5-02). If the values of A5-01/A5-02 are higher than the default values, decrease the values. | The AC drive is derated when the motor is running at the frequency below 5 Hz or when the carrier frequency is high. Decrease the carrier frequency (A5-01/A5-02) or select the AC drive with a higher power rating. |
| The drive detects overvoltage (E005.2) during deceleration. | The braking resistor is not connected. | Check whether the braking resistor is connected. | Configure and connect a braking resistor. |
| | The overvoltage suppression function is disabled. | Check whether d1-54 (Overvoltage suppression) is set to 1 (Enable). | Set d1-54 (Overvoltage suppression) is set to 1 (Enable). |
| | The over-excitation function is disabled. | Check the value of d0-41 (Over-excitation gain). The value 0 indicates that over-excitation is disabled. | Increase the value of d0-41 (Over-excitation gain) properly. This can increase motor energy consumption during deceleration, decrease bus feedback energy, and decrease the occurrence frequency of overvoltage during deceleration. |

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