

User Guide

# MD200 AC Drive

General Purpose

Open Loop



A04

Data Code: 19010397

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## Safety Information and Precautions

This guide is packaged together with the product for MD200 AC Drive. It contains basic information for quick start of the drive. For safety and more information, please refer to the MD200 AC Drive User Manual, which can be downloaded on website: <http://www.inovance.com>.

### ■ Electrical Safety

Extreme care must be taken at all times when working with the AC Drive or within the area of the AC Drive. The voltages used in the AC Drive can cause severe electrical shock or burns and is potentially lethal. Only authorized and qualified personnel should be allowed to work on AC Drives.

### ■ Machine/System Design and Safety of Personnel

Machine/system design, installation, commissioning startups and maintenance must be carried out by personnel who have the necessary training and experience. They must read this safety information and the contents of this manual. If incorrectly installed, the AC Drive may present a safety hazard.

The AC Drive uses high voltages and currents (including DC), carries a high level of stored electrical energy in the DC bus capacitors even after power OFF. These high voltages are potentially lethal.

The AC Drive is NOT intended to be used for safety related applications/functions. The electronic "STOP & START" control circuits within the AC Drive must not be relied upon for the safety of personnel. Such control circuits do not isolate mains power voltages from the output of the AC Drive. The mains power supply must be disconnected by an electrical safety isolation device before accessing the internal parts of the AC Drive.

Safety risk assessments of the machine or process system which uses an AC Drive must be undertaken by the user and or by their systems integrator/designer. In particular the safety assessment/design must take into consideration the consequences of the AC Drive failing or tripping out during normal operation and whether this leads to a safe stop position without damaging machine, adjacent equipment and machine operators/users. This responsibility lies with the user or their machine/process system integrator.

The system integrator/designer must ensure the complete system is safe and designed according to the relevant safety standards. Inovance Technology and Authorized Distributors can provide recommendations related to the AC drive to ensure long term safe operation.

### ■ Electrical Installation - Safety

Electrical shock risk is always present within an AC Drive including the output cable leading to the motor terminals. Where dynamic brake resistors are fitted external to the AC Drive, care must be taken with regards to live contact with the brake resistors, terminals which are at high DC voltage and potentially lethal. Cables from the AC Drive to the dynamic brake resistors should be double insulated as DC voltages are typically 300 VDC to 800 VDC.

Mains power supply isolation switch should be fitted to the AC Drive. The mains power supply must be disconnected via the isolation switch before any cover of the AC Drive can be removed or before any servicing work is undertaken stored charge in the DC bus capacitors of the PWM AC Drive is potentially lethal after the AC supply has been disconnected. The AC supply must be isolated at least 10 minutes before any work can be undertaken as the stored charge will have been discharged through the internal bleed resistor fitted across the DC bus capacitors.

Whenever possible, it is good practice to check the DC bus voltage with a VDC meter before accessing the AC Drive bridge. Where the AC Drive input is connected to the mains supply with a plug and socket, then upon disconnecting the plug and socket, be aware that the plug pins may be exposed and internally connected to the DC bus capacitors (via the internal bridge rectifier in reversed bias). Wait 10 minutes to allow stored charge in the DC bus capacitors to be dissipated by the bleed resistors before commencing work on the AC Drive.

### ■ Electrical Shock Hazard

Ensure the protective earthing conductor complies with technical standards and local safety regulations. Because the leakage current exceeds 3.5 mA in all models, IEC 61800-5-1 states that either the power supply must be automatically disconnected in case of discontinuity of the protective earthing conductor or a protective earthing conductor with across-section of at least 10 mm<sup>2</sup> (Cu) or 16 mm<sup>2</sup> (Al) must be used. Or use two PE cables and each cable must satisfy the IEC requirements independently. Failure to comply may result in death or serious injury.



When using an earth leakage circuit breaker, use a residual current operated protective device (RCD) of type B (breaker which can detect both AC and DC). Leakage current can cause unprotected components to operate incorrectly. If this is a problem, lower the carrier frequency, replace the components in question with parts protected against harmonic current, or increase the sensitivity amperage of the leakage breaker to at least 100 mA per drive.

Factors in determining leakage current:

- Size of the AC drive
- AC drive carrier frequency
- Motor cable type and length
- EMI/RFI filter

■ Approvals

Certification marks on the product nameplate indicate compliance with the corresponding certificates and standards.

| Certification | Mark  | Directives      |            | Standard     |
|---------------|---|-----------------|------------|--------------|
| CE            |  | EMC directives  | 2014/30/EU | EN 61800-3   |
|               |   | LVD directives  | 2014/35/EU | EN 61800-5-1 |
|               |   | RoHS directives | 2011/65/EU | EN 50581     |
| TUV           |  | -               |            | EN 61800-5-1 |

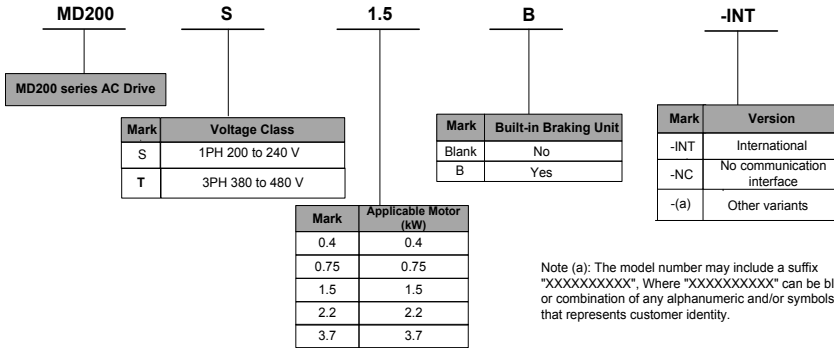
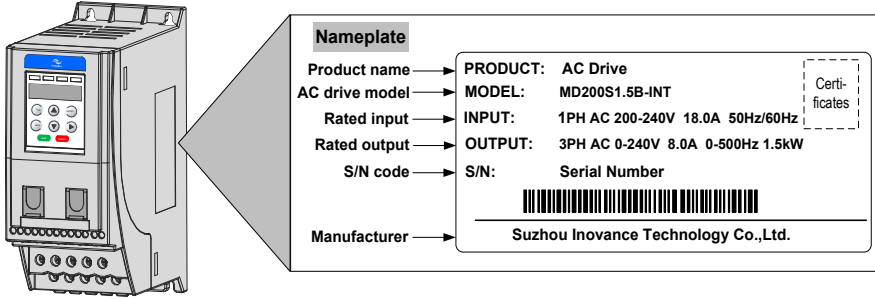
|             |   |
|-------------|---|
| <b>Note</b> | <ul style="list-style-type: none"> <li>• The above EMC directives are complied with only when the EMC electric installation requirements are strictly observed.</li> <li>• Machines and devices used in combination with this drive must also be CE certified and marked. The integrator who integrates the drive with the CE mark into other devices has the responsibility of ensuring compliance with CE standards and verifying that conditions meet European standards.</li> <li>• The installer of the drive is responsible for complying with all relevant regulations for wiring, circuit fuse protection, earthing, accident prevention and electromagnetic (EMC regulations). In particular fault discrimination for preventing fire risk and solid earthing practices must be adhered to for electrical safety (also for good EMC practice).</li> <li>• For more information on certification, consult our distributor or sales representative.</li> </ul> |
|-------------|---|

■ Motor Thermal Protection

Motor thermal protection is not assessed by UL.

# 1 Product Information

## 1.1 Nameplate and Designation Rule



## 1.2 General Specifications

| Voltage class       |                                  | 200 VAC to 240 VAC                      |   |      |      |      |      |
|---------------------|----------------------------------|---|---|------|------|------|------|
| Model: MD200SxxB(1) |                                  | 0.4                                     | 0.75                                    | 1.5  | 2.2  |      |      |
| Dimension(2)        | Height, Width, Depth             | [H]: 180 mm, [W]: 75 mm, [D]: 145 mm    |   |      |      |      |      |
| Mounting Hole, [mm] |                                  | Φ5.0                                    |   |      |      |      |      |
| Drive Input         | Rated Input voltage              |   | 1 PH, 200 VAC to 240 VAC , -15% to +10% |      |      |      |      |
|                     | Rated input current, [A]         |   | 6.5                                     | 11.0 | 18.0 | 27.0 |      |
|                     | Rated input frequency            |   | 50/60 Hz, ±5%                           |      |      |      |      |
|                     | Power capacity, [kVA]            |   | 1.7                                     | 3.0  | 4.8  | 7.1  |      |
| Drive Output        | Applicable motor                 | [kW]                                    | 0.4                                     | 0.75 | 1.5  | 2.2  |      |
|                     |                                  | [HP]                                    | 0.5                                     | 1    | 2    | 3    |      |
|                     | Output current, [A]              |   | 2.6                                     | 4.6  | 8.0  | 11.0 |      |
|                     | Default carrier frequency, [kHz] |   | 6                                       | 6    | 6    | 6    |      |
|                     | Overload capacity                |   | 150% for 60 Sec                         |      |      |      |      |
|                     | Max. output voltage              |   | 3 PH, 0 to 240 VAC                      |      |      |      |      |
|                     | Max. output frequency            |   | 50 to 500 Hz                            |      |      |      |      |
| Braking Resistor    | Recommended power, [W]           |   | 80                                      | 80   | 100  | 100  |      |
|                     | Recommended resistance, min. [Ω] |   | 200                                     | 150  | 100  | 70   |      |
| Weight, [kg]        |                                  | 1.1                                     |   |      |      |      |      |
| Voltage class       |                                  | 380 VAC to 480 VAC                      |   |      |      |      |      |
| Model: MD200TxxB(1) |                                  | 0.4                                     | 0.75                                    | 1.5  | 2.2  | 3.7  |      |
| Dimension(2)        | Height, Width, Depth             | [H] : 160 mm, [W] : 75 mm, [D] : 145 mm |   |      |      |      |      |
| Mounting Hole [mm]  |                                  | Φ5.0                                    |   |      |      |      |      |
| Drive Input         | Rated Input Voltage              |   | 3 PH 380 to 480 VAC, -15% to +10%       |      |      |      |      |
|                     | Rated Input Current, [A]         |   | 2.6                                     | 4.5  | 5.5  | 6.5  | 11.0 |
|                     | Rated input frequency            |   | 50/60 Hz, ±5%                           |      |      |      |      |
|                     | Power Capacity, [kVA]            |   | 1.0                                     | 1.5  | 3.0  | 4.0  | 5.9  |
| Drive Output        | Applicable Motor                 | [kW]                                    | 0.4                                     | 0.75 | 1.5  | 2.2  | 3.7  |
|                     |                                  | [HP]                                    | 0.5                                     | 1    | 2    | 3    | 5    |
|                     | Output Current, [A]              |   | 1.8                                     | 3.4  | 4.8  | 5.5  | 9.5  |
|                     | Default carrier Frequency, [kHz] |   | 6                                       | 6    | 6    | 6    | 4    |
|                     | Overload Capacity                |   | 150% for 60 Sec                         |      |      |      |      |
|                     | Max. output voltage              |   | 3 PH, 0 to 480 VAC                      |      |      |      |      |
|                     | Max. output frequency            |   | 50 to 500 Hz                            |      |      |      |      |
| Braking Resistor    | Recommended Power, [W]           |   | 150                                     | 150  | 250  | 300  | 400  |
|                     | Recommended Resistance, min. [Ω] |   | 300                                     | 300  | 220  | 200  | 130  |
| Mass, [kg]          |                                  | 1.1                                     |   |      |      |      |      |

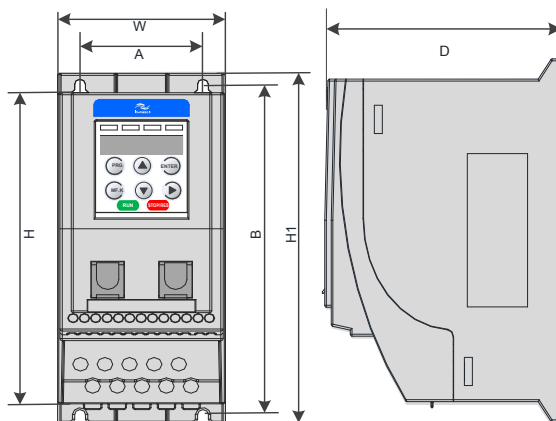
# 1 Product Information

| Voltage class          |                                  | 200 VAC to 240 VAC                      |                                       |      |      |      |      |
|------------------------|----------------------------------|---|---------------------------------------|------|------|------|------|
| Model: MD200SxxB-NC(1) |                                  | 0.4                                     | 0.75                                  | 1.5  | 2.2  |      |      |
| Dimension(2)           | Height, Width, Depth             | [H]: 180 mm, [W]: 75 mm, [D]: 145 mm    |                                       |      |      |      |      |
| Mounting Hole, [mm]    |                                  | Φ5.0                                    |                                       |      |      |      |      |
| Drive Input            | Rated Input voltage              |   | 1 PH, 200 to 240 VAC , -15% to +10%   |      |      |      |      |
|                        | Rated input current, [A]         |   | 6.5                                   | 11.0 | 18.0 | 27.0 |      |
|                        | Rated input frequency            |   | 50/60 Hz, ±5%                         |      |      |      |      |
|                        | Power capacity, [kVA]            |   | 1.7                                   | 3.0  | 4.8  | 7.1  |      |
| Drive Output           | Applicable motor                 | [kW]                                    | 0.4                                   | 0.75 | 1.5  | 2.2  |      |
|                        |                                  | [HP]                                    | 0.5                                   | 1    | 2    | 3    |      |
|                        | Output current, [A]              |   | 2.6                                   | 4.6  | 8.0  | 11.0 |      |
|                        | Default carrier frequency, [kHz] |   | 6                                     | 6    | 6    | 6    |      |
|                        | Overload capacity                |   | 150% for 60 Sec                       |      |      |      |      |
|                        | Max. output voltage              |   | 3 PH, 0 to 240 VAC                    |      |      |      |      |
|                        | Max. output frequency            |   | 50 to 500 Hz                          |      |      |      |      |
| Braking Resistor       | Recommended power, [W]           |   | 80                                    | 80   | 100  | 100  |      |
|                        | Recommended resistance, min. [Ω] |   | 200                                   | 150  | 100  | 70   |      |
| Weight, [kg]           |                                  | 1.1                                     |                                       |      |      |      |      |
| Voltage class          |                                  | 380 VAC to 480 VAC                      |                                       |      |      |      |      |
| Model: MD200TxxB-NC(1) |                                  | 0.4                                     | 0.75                                  | 1.5  | 2.2  | 3.7  |      |
| Dimension(2)           | Height, Width, Depth             | [H] : 160 mm, [W] : 75 mm, [D] : 145 mm |                                       |      |      |      |      |
| Mounting Hole [mm]     |                                  | Φ5.0                                    |                                       |      |      |      |      |
| Drive Input            | Rated Input Voltage              |   | 3 PH 380 VAC to 480 VAC, -15% to +10% |      |      |      |      |
|                        | Rated Input Current, [A]         |   | 2.6                                   | 4.5  | 5.5  | 6.5  | 11.0 |
|                        | Rated input frequency            |   | 50/60 Hz, ±5%                         |      |      |      |      |
|                        | Power Capacity, [kVA]            |   | 1.0                                   | 1.5  | 3.0  | 4.0  | 5.9  |
| Drive Output           | Applicable Motor                 | [kW]                                    | 0.4                                   | 0.75 | 1.5  | 2.2  | 3.7  |
|                        |                                  | [HP]                                    | 0.5                                   | 1    | 2    | 3    | 5    |
|                        | Output Current, [A]              |   | 1.8                                   | 3.4  | 4.8  | 5.5  | 9.5  |
|                        | Default carrier Frequency, [kHz] |   | 6                                     | 6    | 6    | 6    | 4    |
|                        | Overload Capacity                |   | 150% for 60 Sec                       |      |      |      |      |
|                        | Max. output voltage              |   | 3 PH, 0 to 480 VAC                    |      |      |      |      |
|                        | Max. output frequency            |   | 50 to 500 Hz                          |      |      |      |      |
| Braking Resistor       | Recommended Power, [W]           |   | 150                                   | 150  | 250  | 300  | 400  |
|                        | Recommended Resistance, min. [Ω] |   | 300                                   | 300  | 220  | 200  | 130  |
| Mass, [kg]             |                                  | 1.1                                     |                                       |      |      |      |      |

**Note**

(1): "B" denotes build-in brake function.

(2): The dimensions are shown as below:





## 1.3 Technical Specifications

| Items                                | Specification                             |   |
|--------------------------------------|---|---|
| Common functions                     | Highest frequency                         | V/F control: 0 to 500 Hz, SVC control: 0 to 500 Hz (only for three-phase models)  |
|                                      | Carrier frequency                         | 0.8 kHz to 12 kHz, and able to automatically adjust carrier frequency based on load characteristics   |
|                                      | Input frequency resolution                | Digital settings: 0.01 Hz; analog setting: highest frequency x 0.025%   |
|                                      | Control mode                              | V/F control   |
|                                      | Overload capacity                         | 150% rated current 60s, 180% rated current 2S   |
|                                      | Torque lifting                            | Automatic torque lifting, manual torque lifting, 0.1%~30.0%   |
|                                      | V/F curve                                 | Two ways: linear type; multi-point type   |
|                                      | Acceleration and deceleration curve       | Linear acceleration and deceleration mode, dynamic S curve. 2 types of acceleration and deceleration time, acceleration and deceleration time range 0.0~6500.0s   |
|                                      | DC braking                                | DC braking frequency: 0.00 Hz to 10 Hz Braking time: 0.0s~100.0 s current value for braking action:0% to 100%   |
|                                      | Jogging control                           | Jogging frequency range: 0.00 Hz to 50.00 Hz Jogging and acceleration time 0.0s~6500.0s   |
|                                      | Multiple speed section operation          | Achieve a maximum of 8 speed sections operation via control terminal  |
|                                      | Built-in PID                              | Able to achieve a closed loop control system of process control   |
|                                      | Automatic voltage regulation (AVR)        | Automatically maintains constant output voltage when voltage changes in the power grid  |
|                                      | Overvoltage and overcurrent stall control | Automatically limit the current and voltage during operation to prevent frequent over flow and voltage tripping   |
|                                      | Fast current limiting function            | Minimize overcurrent faults and protect drive normal operation  |
| Operation                            | Instantaneous stop prevention             | Use load feedback power to compensate for the reduction of voltage in case of instantaneous power cut, and maintain the drive running in a short time, the RUN indicator on the panel shall flash         |
|                                      | Fast current limiting                     | Minimize overcurrent faults of drive unit   |
|                                      | Timing control                            | Timing control function: set time range to 0.0 min ~ 6500.0 min   |
|                                      | Communication bus                         | Support field bus: RS485, CANlink (can be customized)   |
|                                      | Command source                            | Operating panel, control terminal, serial communication port, and can be switched in many ways  |
|                                      | Frequency source                          | 5 frequency sources: Digital, analog voltage, analog current, pulse (DI4), serial port, and can be switched in many ways  |
|                                      | Auxiliary frequency sources               | 5 auxiliary frequency sources can flexibly realize auxiliary frequency trimming and frequency synthesis   |
| Display & keyboard operation(format) | Input terminals                           | 4 digital input terminals, 1 support the highest 20 kHz high speed pulse input; 1 analog input terminals, support 0 ~ 10V/0 ~ 20mA input/output terminal  |
|                                      | Output terminals                          | 1 relay output terminals, one analog output terminals, support 0 ~ 10V voltage output   |
|                                      | Input/output terminal                     | 1 input/output terminal DIO, support selecting DI and DO function via DIP switch, details, see figure 2-2, DO common terminal is COM  |
| Display & keyboard operation(format) | Communication terminals                   | 1 line 485, communication, CANlink communication (can be customized)  |
|                                      | LED display                               | Display and Keyboard operation  |
|                                      | Keyboard lock and function selection      | Achieve keyboard partial or full lock, define the function of some keys to prevent misoperation   |
| Protection function                  | Protection function                       | Short circuit detection of electric motor, input and output phase loss protection, over-current protection, over-voltage protection, undervoltage protection, overheating protection, overload protection |

## 1.4 Environment

|                        |  |
|------------------------|--|
| Environment conditions | Indoor, keep away from direct sunlight, no dust, corrosive gas, flammable gas, oil mist, water vapor, water or salt, for instance.                                   |
| Altitude               | Use below 1000 m. The drive power derates 1% at every 100 m altitude increase. The highest allowed altitude is 3000 m.   |
| Storage Temperature    | -20°C to +60°C   |
| Operating Temperature  | -10°C to +50°C. When the temperature is between 40°C to 50°C, the drive current derates 1.5% at every 1°C increase. The highest allowed working temperature is 50°C. |
| Max. Humidity          | ≤ 95% RH, no-condensing  |
| Vibration              | ≤ 5.9 g/s <sup>2</sup> (0.6 g)   |
| Pollution Degree       | PD2  |
| Over-Voltage Category  | OVC III  |
| Power Supply System    | TT/TN  |
|                        | IT (Remove the screws of VDR and EMC filter according to section 2.3.)   |
| Enclosure              | IP20   |

## 1.5 EMC Filter

### 1.5.1 Internal Filter

Single-phase model standard built-in filter, able to meet the EN61800-3 C3 transmission requirement of CE certification. C3 filter is built in the drive.

### 1.5.2 External Filter

- Single-phase model standard built-in filter, able to meet the EN61800-3 C2 transmission requirement of CE certification.

|             |  |
|-------------|--|
| <b>Note</b> | <ul style="list-style-type: none"> <li>Keep the connection cable between the filter and the drive as short as possible (shorter than 30 cm).</li> <li>Guarantee that the filter and the drive are connected to the same grounding surface.</li> <li>The grounding of the filter output terminal should be connected to the input ground terminal of the drive.</li> <li>The filter must be reliably grounded, failure to comply may result in filter malfunction.</li> </ul> |
|-------------|--|

| Drive mode   | Power capacity<br>kVA | Input current<br>A |
|--|-----------------------|--------------------|
| Single-phase power: 200 V to 240 V, 50/60Hz range: -15% to 10% |                       |                    |
| MD200S0.4(B)(-NC)  | 1.7                   | 6.5                |
| MD200S0.75(B)(-NC)   | 3.0                   | 11.0               |
| MD200S1.5(B)(-NC)  | 4.8                   | 18.0               |
| MD200S2.2(B)(-NC)  | 7.1                   | 27.0               |

- Three-phase model optional external filter, able to meet the EN61800-5 C3 transmission requirement of CE certification.

|             |  |
|-------------|--|
| <b>Note</b> | <ul style="list-style-type: none"> <li>Keep the connection cable between the filter and the drive as short as possible (shorter than 30 cm).</li> <li>Guarantee that the filter and the drive are connected to the same grounding surface.</li> <li>The grounding of the filter output terminal should be connected to the input ground terminal of the drive.</li> <li>The filter must be reliably grounded, failure to comply may result in filter malfunction.</li> </ul> |
|-------------|--|

| Drive mode   | Power capacity<br>kVA | Input current<br>A |
|--|-----------------------|--------------------|
| Three-phase power: 380 V to 480 V, 50/60 Hz range: -15% to 10% |                       |                    |
| MD200T0.4B(-NC)  | 1.0                   | 2.6                |
| MD200T0.75B(-NC)   | 1.5                   | 4.5                |
| MD200T1.5B(-NC)  | 3.0                   | 5.5                |
| MD200T2.2B(-NC)  | 4.0                   | 6.5                |
| MD200T3.7B(-NC)  | 5.9                   | 11.0               |

## 1.6 Reactor

### 1.6.1 Input AC Reactor

For MD200 series drive with power greater than 1kW, an AC reactor should be connected at the input terminal to reduce the current harmonics.

The sensitivity of a single-phase AC reactor shall be greater than 8 mH to meet the IEC 61000-3-12 standard.

The sensitivity of a three-phase AC reactor shall be greater than 5 mH to meet the IEC 61000-3-12 standard .

### 1.6.2 Output Reactor

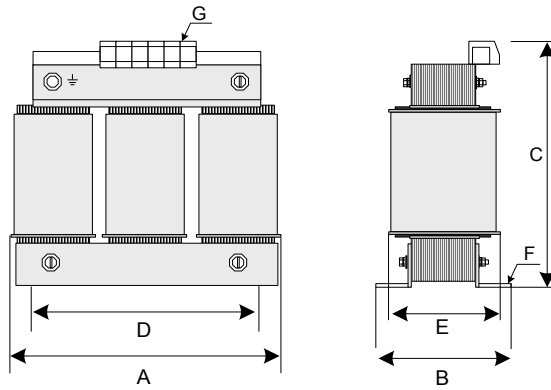
When the motor output cable is longer than 10 meters, the rising edge of pulse wave generates a reflected voltage at motor terminals due to the mismatch of characteristic impedance of the motor and cable. The reflected voltage is imposed on the high voltage square wave pulse, bringing impact for stator winding insulation, which causes sustained impact of greater heat loss and more partial discharge pulse due to high frequency harmonics, resulting in a rapid failure of motor insulation in PWM under pulse voltage.

Therefore, when the motor output cable is longer than 10 meters, install a reactor at the output terminal.

1) Recommended reactor model

| Drive mode   | Power capacity<br>kVA | Output current<br>A | Recommend output<br>reactor model<br>(SCHAFFNER) | Output reactor<br>inductance<br>mH | Motor cable length<br>after installation of<br>reactor<br>m |
|--|-----------------------|---------------------|--|------------------------------------|---|
| Single-phase power: 200 V to 240 V, 50/60Hz range: -15% to 10% |                       |                     |  |                                    |   |
| MD200S0.4 (B) (-NC)  | 1.7                   | 2.6                 | RWK 305-4-KL                                     | 1.47                               | 150   |
| MD200S0.75 (B) (-NC)   | 3.0                   | 4.6                 | RWK 305-7.8-KL                                   | 0.754                              | 150   |
| MD200S1.5 (B) (-NC)  | 4.8                   | 8.0                 | RWK 305-10-KL                                    | 0.588                              | 150   |
| MD200S2.2 (B) (-NC)  | 7.1                   | 11.0                | RWK 305-14-KL                                    | 0.42                               | 150   |
| Three-phase power: 380 V to 480 V, 50/60 Hz range: -15% to 10% |                       |                     |  |                                    |   |
| MD200T0.4B(-NC)  | 1.0                   | 1.8                 | RWK 305-7.8-KL                                   | 0.754                              | 150   |
| MD200T0.75B(-NC)   | 1.5                   | 3.4                 | RWK 305-7.8-KL                                   | 0.754                              | 150   |
| MD200T1.5B(-NC)  | 3.0                   | 4.8                 | RWK 305-7.8-KL                                   | 0.754                              | 150   |
| MD200T2.2B(-NC)  | 4.0                   | 5.5                 | RWK 305-7.8-KL                                   | 0.754                              | 150   |
| MD200T3.7B(-NC)  | 5.9                   | 9.5                 | RWK 305-14-KL                                    | 0.42                               | 150   |

## 2) Dimensions of the output reactor model:



| Drive mode     | A   | B      | C       | D   | E  | F     | G                   |
|----------------|-----|--------|---------|-----|----|-------|---------------------|
| RWK 305-4-KL   | 100 | max.60 | max.115 | 56  | 34 | 4.8×9 | 2.5 mm <sup>2</sup> |
| RWK 305-7.8-KL | 100 | max.60 | max.115 | 56  | 34 | 4.8×9 | 2.5 mm <sup>2</sup> |
| RWK 305-10-KL  | 100 | max.70 | max.115 | 56  | 43 | 4.8×9 | 2.5 mm <sup>2</sup> |
| RWK 305-14-KL  | 125 | max.70 | max.135 | 100 | 45 | 5×8   | 2.5mm <sup>2</sup>  |

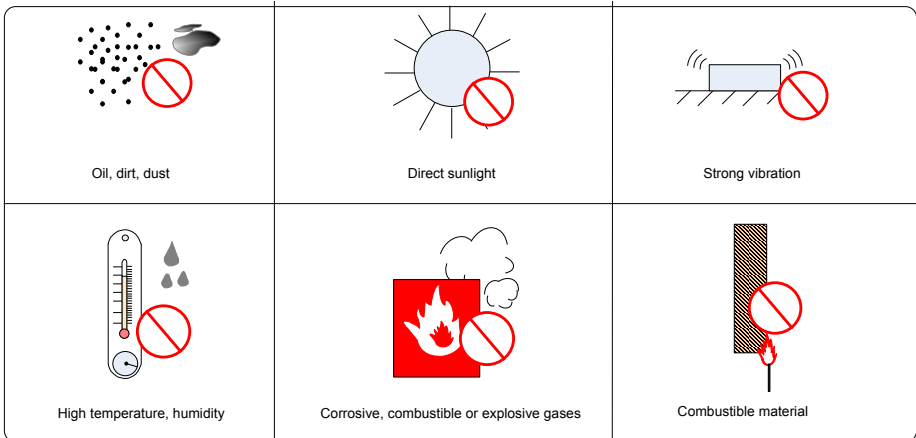
## 2 Mechanical Installation and Wiring

### 2.1 Mechanical Installation

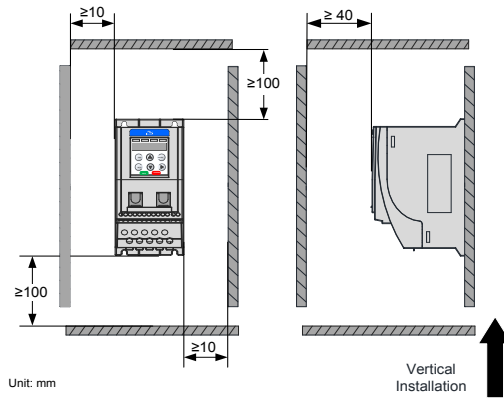
The AC drive must be installed in a noncombustible cabinet that provides effective electrical and mechanical protection for CE requirements. Installation must conform to local and regional laws and regulations, and to relevant IEC requirements.

#### 2.1.1 Installation Environment

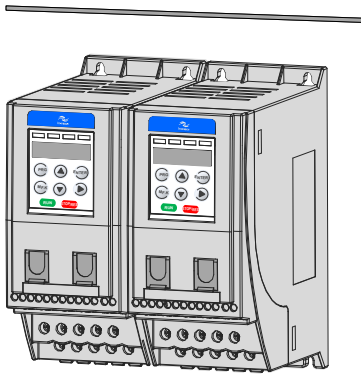
| Item                    | Requirements   |
|-------------------------|--|
| Cooling and ventilation | Ensure the mounting location is:<br>Install the AC drive on a backplate, and ensure there is sufficient space around the enclosure to allow for efficient heat dissipation.  |
| Mounting location       | Ensure the mounting location is:<br>Away from direct sunlight<br>In an area where humidity is 95% RH or less with no condensation<br>Protected against corrosive, combustible or explosive gases and vapours<br>Free from oil, dirt, dust or metallic powders. |
| Vibration               | Ensure the mounting location is not affected by levels of vibration that exceeds 0.6 g.<br>Avoid installing the enclosure near punching machines or other mechanical machinery that generates high levels of vibration or mechanical shock.                    |
| Protective enclosure    | The AC drive must be installed in a noncombustible cabinet that provides effective electrical and mechanical protection for CE requirements. Installation must conform to local and regional laws and regulations, and to relevant IEC requirements.           |



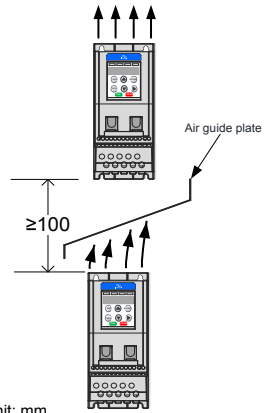
2.1.2 Cabinet Layout



Installing a single drive

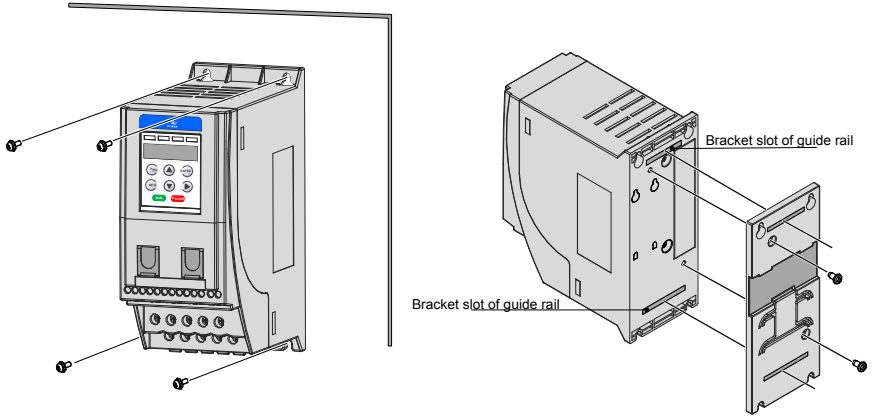


Installing drive side by side

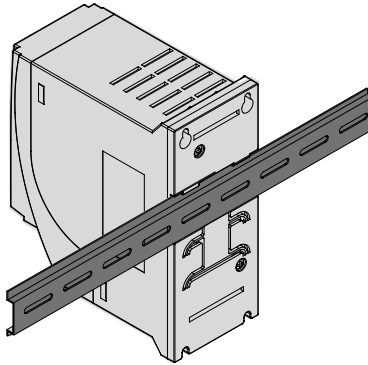


Installing one drive above another

2.1.3 Installation Method



Tightening screw



Installing guide rail

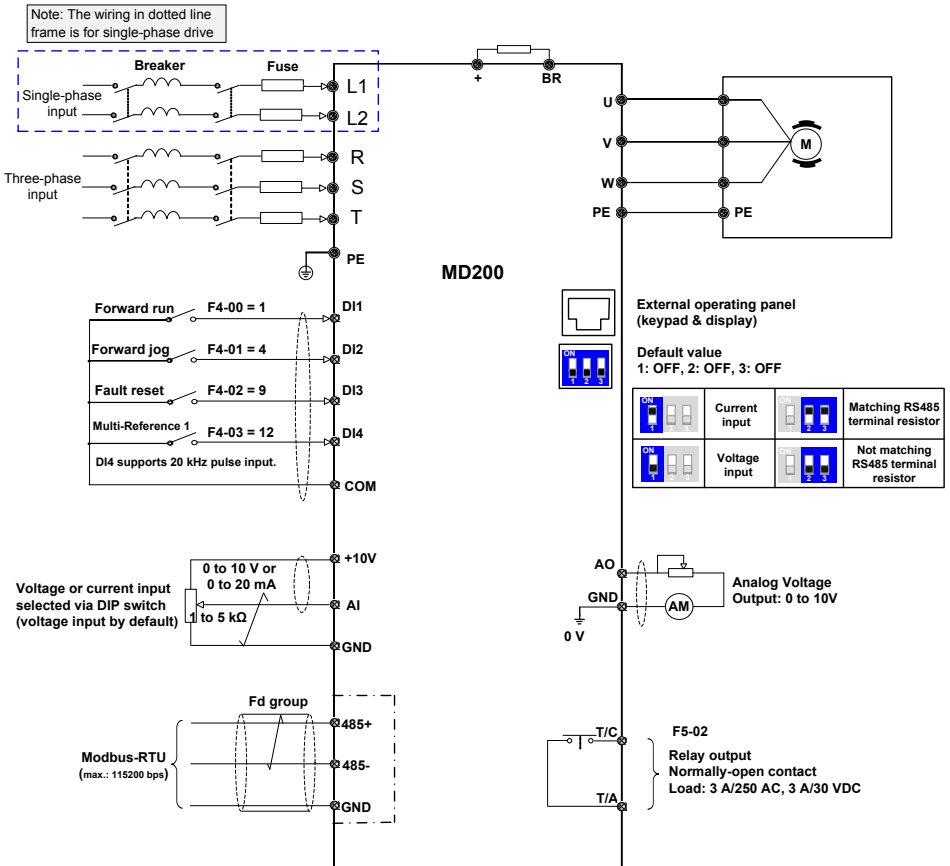
**Note**

Tighten all screws based on the specified tightening torque.

## 2.2 Wiring

### 2.2.1 Typical System Connection

■ MD200XXX terminal wiring diagram

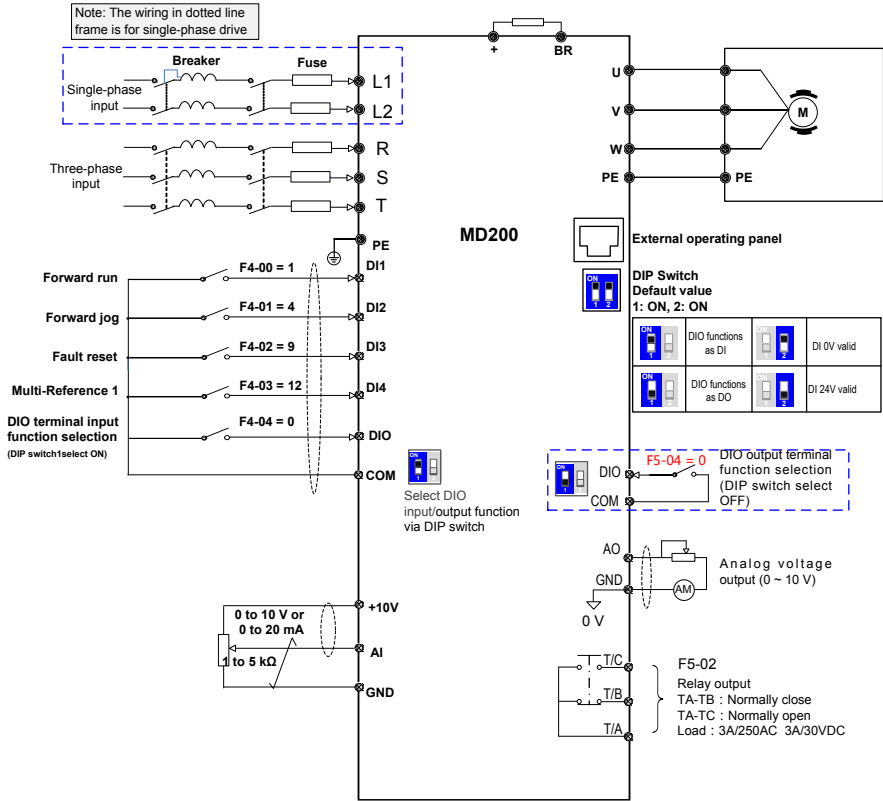


**Note**

For the DI terminals, low level is valid and valid level is < 5 V, input resistance is 3.6 K, DI1 to DI3 satisfies 100 Hz frequency input, and DI4 satisfies 20 kHz frequency input. The requirement of pulse duty cycle is 30% to 70%.

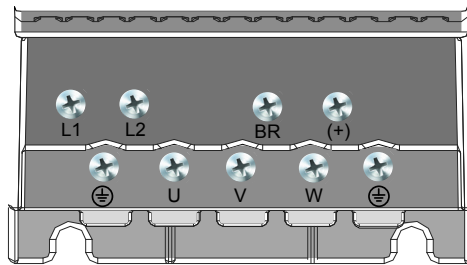


MD200XXX-NC terminal wiring diagram

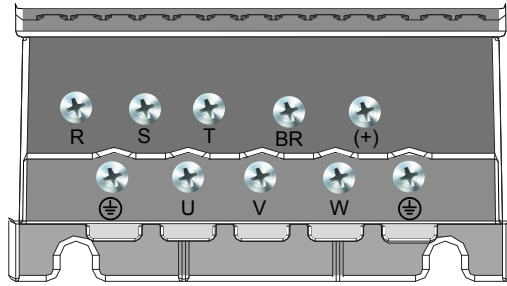


2.2.2 Terminal Description

Terminals of Main Circuit

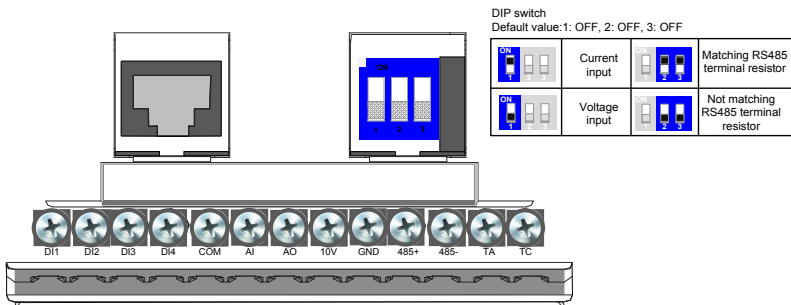


| Terminal | Terminal Name               | Description                                  |
|----------|-----------------------------|--|
| L1, L2   | Single-phase supply input   | Connect to the single-phase AC power supply. |
| BR, (+)  | Braking resistor connection | Connected to external braking resistor.      |
| U, V, W  | Output terminals            | Connect to a three-phase motor.              |
| ⊕        | Ground (PE)                 | Grounding connection.                        |



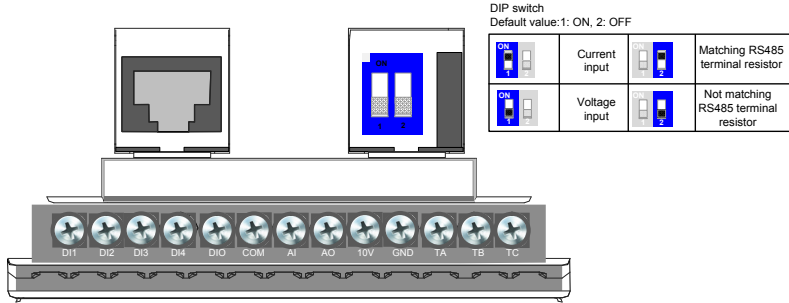
| Terminal | Terminal Name               | Description                                 |
|----------|-----------------------------|---|
| R, S, T  | Three-phase supply input    | Connect to the three-phase AC power supply. |
| BR, (+)  | Braking resistor connection | Connected to external braking resistor.     |
| U, V, W  | Output terminals            | Connect to a three-phase motor.             |
| ⊕        | Ground (PE)                 | Grounding connection.                       |

■ MD200XXX Main Control Board Terminals



| Terminal Mark | Terminal Name              | Function                                 |   |
|---------------|----------------------------|--|---|
| DI1-DI4       | Digital input              | Multi-functional input terminal          | Low effective, valid level < 5 V, DI-DI3 is low speed DI, frequency < 100 HZ, DI4 is high speed pulse input, highest can support 20 kHz frequency                     |
| COM           | 24 V grounded power supply | 24 V grounded power supply               | Internal isolation from COM   |
| +10 V         | Analog input/output        | 10 V analog voltage output               | 10V ± 10%, up to 10 mA  |
| GND           |                            | Analog ground                            | Internal isolation from COM   |
| AI            |                            | Analog input signal channel 1 at one end | (0 to 10V) / (0 to 20 mA) input, 12 bit resolution, with calibrated accuracy of 0.5%, the response time is less than 8 ms   |
| AO            |                            | Analog output 1                          | AO: 0 to 10 V, with calibrated accuracy of 100 mV, 10 bit resolution, with the calibrated accuracy of 1%  |
| T/A-T/C       | Relay output               | Relay output                             | TA-TC: Normally open;<br>Load: 3 A/250 VAC 3 A/30 VDC   |
| GND           | Communication              | Common ground with 10 V                  |   |
| 485+          |                            | RS485 positive communication signal      | Half duplex RS485 communication, with the highest baud rate of 115200, can support up to 64 nodes Note: 485 communication function can only be used on MD200XXX model |
| 485-          |                            | RS485 negative communication signal      |   |

■ MD200XXX-NC Main Control Board Terminals



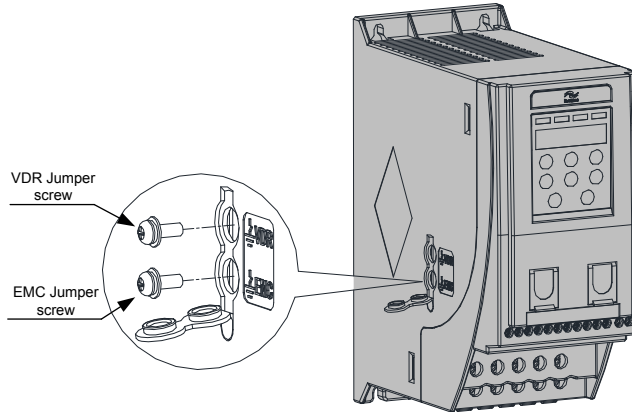
| Terminal Mark    | Terminal Name              | Function                                       |   |
|------------------|----------------------------|--|---|
| DI1-DI4          | Digital input              | Multi-functional input terminal                | Low effective, valid level < 5 V, DI-DI3 is low speed DI, frequency < 100 HZ, DI4 is high speed pulse input, highest can support 20 kHz frequency |
| DIO              | Digital input/output       | Multi-functional digital input/output terminal | Use DIP switch to select DI/DO function, for details, see figure 2-2, DO common terminal is COM.  |
| COM              | 24 V grounded power supply | 24 V grounded power supply                     | Internal isolation from COM   |
| +10 V            |                            | 10 V analog voltage output                     | 10V ± 10%, up to 10 mA  |
| GND              |                            | Analog ground                                  | Internal isolation from COM   |
| AI               |                            | Analog input/output                            | Analog input signal channel 1 at one end  |
| AO               |                            | Analog output 1                                | AO: 0 to 10 V, with calibrated accuracy of 100 mV, 10 bit resolution, with the calibrated accuracy of 1%  |
| T/A-T/C, T/A-T/B | Relay output               | Relay output                                   | TA-TC: Normally open; TA-TB: Normally close<br>Load: 3 A/250 VAC 3 A/30 VDC<br>Note: TA-TB is only used on MD200xxx-NC model                      |

## 2.2.3 Remove the EMC and VDR Screws



To prevent personnel injury or damage to the equipment, you must ensure mains power is off before you start.

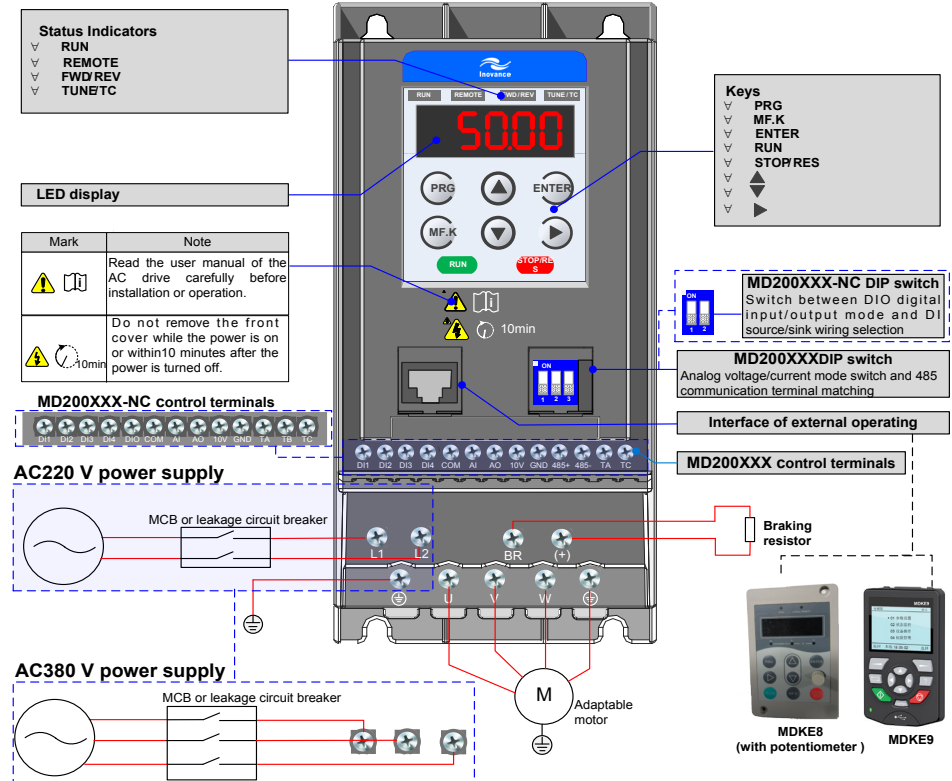
If the drive is applied in an IT system, remove the EMC and VDR screws as shown in the following figures.



## 3 Operating Panel

### 3.1 Get Familiar with Operating Panel

#### ■ Overview



Note: The wirings in dotted line frames are for both for three-phase and single-phase drive, you may perform wiring based on the model you receive.

#### ■ Keys on operation panel

| Key | Key Name    | Function   |
|-----|-------------|--|
|     | Programming | Enter or exit Level I menu.<br>Return to the previous menu.  |
|     | Confirm     | Enter each level of menu interface.<br>Confirm displayed parameter setting.  |
|     | Increment   | When navigating a menu, it moves the selection up through the screens available.<br>When editing a parameter value, it increases the displayed value.<br>When the AC drive is in RUN mode, it increases the speed.       |
|     | Decrement   | When navigating a menu, it moves the selection down through the screens available.<br>When editing a parameter value, it decreases the displayed value.<br>When the AC drive is in RUNNING mode, it decreases the speed. |
|     | Shift       | Select the displayed parameter in the STOP or RUNNING status.<br>Select the digit to be modified when modifying a parameter value  |

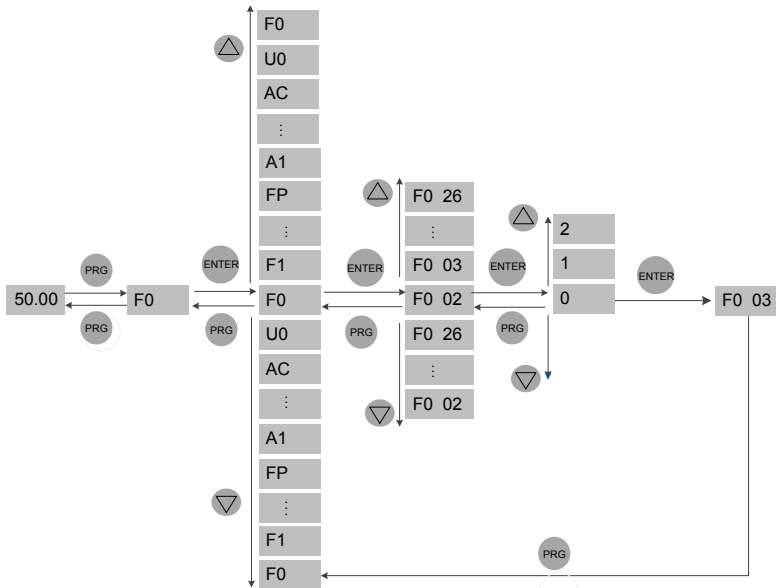
| Key | Key Name      | Function   |
|-----|---------------|--|
|     | RUN           | Start the AC drive when using the operating panel control mode.<br>It is inactive when using the terminal or communication control mode.   |
|     | Stop/Reset    | Stop the AC drive when the drive is in the RUNNING status.<br>Perform a reset operation when the drive is in the FAULT status.<br>Note: The functions of this key can be restricted by using function F7-02. |
|     | Multifunction | Perform a function switchover as defined by the setting of F7-01, for example to quickly switch command source or direction.   |

■ Status Indicators

There are four red LED status indicators at the top of the operating panel.

| Indicator | Indication  |
|-----------|---|
| RUN       | ON indicates the RUNNING status.                  |
|           | FLASHING indicates power dip ride-through.        |
|           | OFF indicates the STOP status.                    |
| REMOTE    | ON indicates under terminal control.              |
|           | FLASHING indicates under remote control.          |
|           | OFF indicates under operating panel control.      |
| FWD/REV   | ON indicates reverse motor rotation.              |
|           | OFF indicates forward motor rotation.             |
| TUNE/TC   | FLASHING indicates a fault condition on AC drive. |
|           | OFF indicates a normal condition on AC drive.     |

■ Operations of Parameters

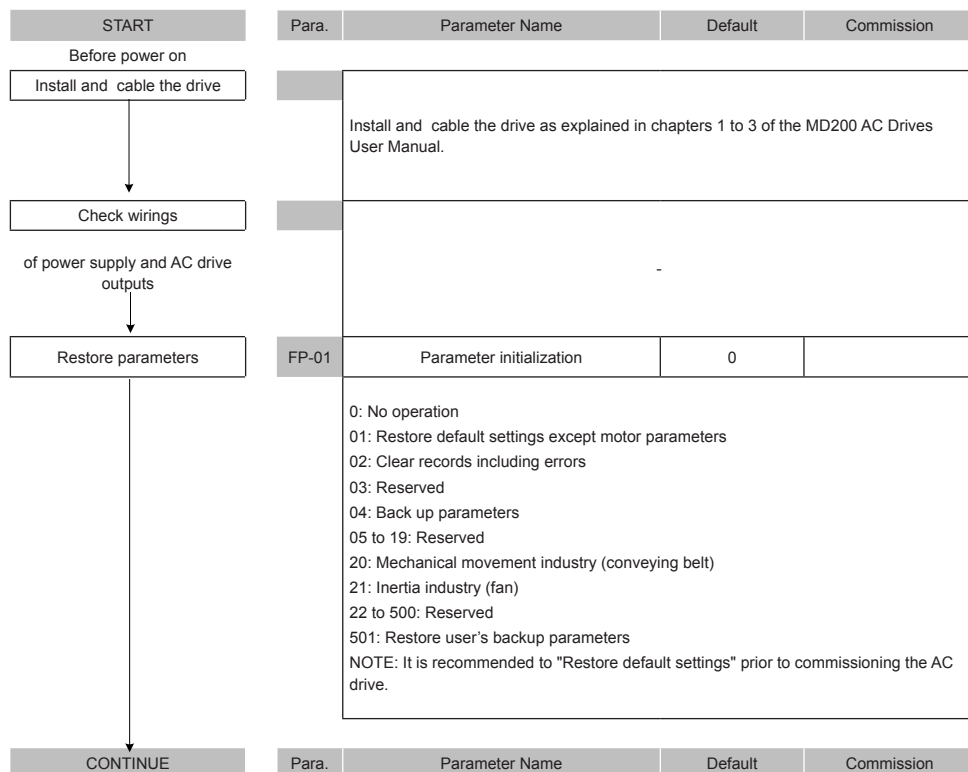


#### ■ Parameter Arrangement

| Parameter Group | Description                    | Remark                       |
|-----------------|--------------------------------|------------------------------|
| F0 to FF        | Standard parameter group       | Standard function parameters |
| A1 to AE        | Advanced parameter group       | AI/AO correction             |
| U0              | RUNNING status parameter group | Display of basic parameters  |

## 4 Quick Setup

### 4.1 Setup Flowchart





START

Set motor parameters

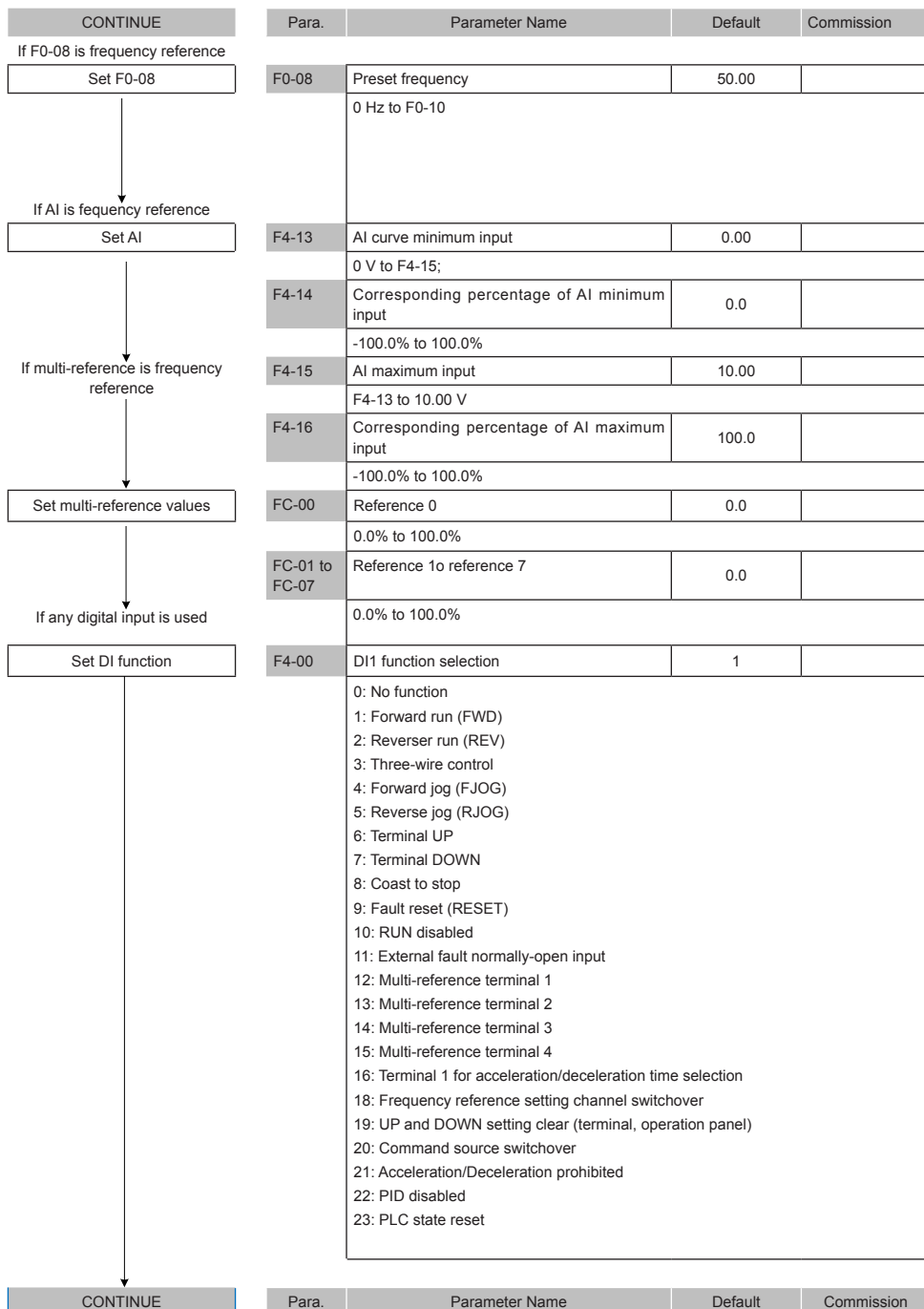
Perform motor auto-tuning

Select command source.

Select frequency reference setting channel

CONTINUE

| Para.           | Parameter Name  | Default         | Commission |
|-----------------|---|-----------------|------------|
| Motor Nameplate |   |                 |            |
|                 |   |                 |            |
| F1-01           | Rated motor power   | model dependent | 1.5        |
|                 | Unit: kW  |                 |            |
| F1-02           | Rated motor voltage   | model dependent | 380        |
|                 | Unit: V   |                 |            |
| F1-03           | Rated motor current   | model dependent | 3.4        |
|                 | Unit: A   |                 |            |
| F1-04           | Rated motor frequency   | model dependent | 50         |
|                 | Unit: Hz  |                 |            |
| F1-05           | Rated motor speed   | model dependent | 2800       |
|                 | Unit: rpm.  |                 |            |
| F1-37           | Auto-tuning selection   | 0               | 1          |
|                 | 0: No auto-tuning<br>1: Static auto-tuning<br>Steps of auto-tuning:<br>1. Ensure the UVW connection between AC drive and motor is not cut off by output contactor; if it is cut off, then manually handle with the output contactor.<br>2. Set F0-02 = 0 (operating panel), so that the key  can start the tuning procedure.<br>3. Set F1-37 = 1, press , then LED on panel will display letters "TUNE".<br>4. Press the key  on panel, then motor starts auto-tuning, it usually takes about 30 seconds to finish this auto-tuning, wait until LED stops displaying "TUNE" |                 |            |
| F0-02           | Command source selection  | 1               |            |
|                 | 0: Operating panel (keypad & display)<br>1: Terminal I/O control<br>2: Serial comms.  |                 |            |
| F0-03           | Main frequency reference setting channel selection  | 0               |            |
|                 | 0: Digital setting F0-08 (pressing  or  can revise F0-08 easily, and the revised value won't be cleared even after power off)<br>1: Digital setting F0-08 (pressing  or  can change F0-08 easily, but the revised value would be cleared after power off)<br>2: AI<br>5: Pulse setting (DI4)<br>6: Multi-reference setting<br>7: Simple PLC<br>8: PID<br>9: Communication setting   |                 |            |
| Para.           | Parameter Name  | Default         | Commission |



| CONTINUE  | Para. | Parameter Name  | Default | Commission |
|---|-------|---|---------|------------|
| ↓<br>If any digital output is used<br>↓<br>Set DO function<br>↓<br>CONTINUE | F4-00 | DI1 function selection  | 1       |            |
|   |       | 30: Pulse input as frequency reference (valid only for DI4)<br>32: Immediate DC injection braking<br>33: External fault normally-closed input<br>34: Frequency modification enabled<br>35: PID operation direction reverse<br>36: External stop 1<br>37: Command source switchover 2<br>38: PID integral disabled<br>39: Switchover between main frequency reference and preset frequency<br>40: Switchover between auxiliary frequency reference and preset frequency<br>43: PID parameter switchover<br>47: Emergency stop (ES)<br>48: External stop 2<br>49: Deceleration DC injection braking<br>50: Clear running time this time<br>51: Two-wire control/ Three-wire control<br>52: Reverse running prohibited |         |            |
|   | F4-01 | DI2 function selection  | 4       |            |
|   |       | Setting range same as DI1.  |         |            |
|   | F4-02 | DI3 function selection  | 9       |            |
|   |       | Setting range same as DI1.  |         |            |
|   | F4-03 | DI4 function selection  | 12      |            |
|   |       | Setting range same as DI1.  |         |            |
|   | F5-02 | Relay function selection(T/A-T/C)   | 0       |            |
|   |       | 0: No output<br>1: AC drive running<br>2: Fault output<br>3: Frequency level detection 1 output<br>4: Frequency reached<br>5: Zero-speed running (no output at stop)<br>6: Motor overload pending<br>7: AC drive overload pending<br>11: PLC cycle completed<br>12: Accumulative running time reached<br>13: Frequency limited<br>15: Ready for RUN<br>17: Frequency upper limit reached<br>18: Frequency lower limit reached (no output at stop)<br>19: Undervoltage<br>20: Communication setting<br>24: Accumulative power-on time reached<br>26: Frequency 1 reached<br>28: Current 1 reached<br>30: Timing reached  |         |            |
| CONTINUE  | Para. | Parameter Name  | Default | Commission |

| CONTINUE                             | Para. | Parameter Name  | Default         | Commission |
|--------------------------------------|-------|---|-----------------|------------|
| Set DO function                      | F5-02 | Relay function selection(T/A-T/C)   | 0               |            |
|                                      |       | 31: AI input exceeding limit<br>32: Load lost<br>33: Reverse running<br>34: Zero current<br>36: Output current exceeding limit<br>37: Frequency lower limit reached (having output at stop)<br>38: Alarm output<br>40: Current running time reached<br>41: Fault output   |                 |            |
| If an analog output is used          | F5-07 | AO function selection   | 0               |            |
| Set AO function                      |       | 0: Running frequency<br>1: Set frequency<br>2: Output current<br>3: Output torque<br>4: Output power<br>5: Output voltage<br>6: Pulse input (100% corresponding to 20 kHz)<br>7: AI<br>12: Communication setting<br>13: Motor rotational speed<br>14: Output current (100% corresponding to 100 A)<br>15: Output voltage (100% corresponding to 1000 V) |                 |            |
| Set accel./decel. time               | F0-17 | Acceleration time 1   | Model dependent |            |
|                                      |       | 0.0 to 6500.0s  |                 |            |
| If smooth accel./decel. is requested | F0-18 | Deceleration time 1   | Model dependent |            |
|                                      |       | 0.0 to 6500.0s  |                 |            |
| Set S-curve                          | F6-07 | Acceleration/Deceleration mode  | 0               |            |
|                                      |       | 0: Linear acceleration/deceleration<br>1: Static S-curve acceleration/deceleration<br>2: Dynamic S-curve acceleration/deceleration  |                 |            |
|                                      | F6-08 | Time proportion of S-curve at Accel. start  | 30.0            |            |
|                                      |       | 0.0% to (100.0% - F6-09)  |                 |            |
|                                      | F6-09 | Time proportion of S-curve at Accel. end  | 30.0            |            |
|                                      |       | 0.0% to (100.0% - F6-08)  |                 |            |
| CONTINUE                             | Para. | Parameter Name  | Default         | Commission |



## 5 Parameter Table

### 5.1 Introduction

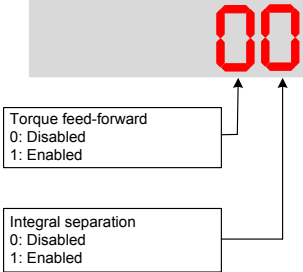
Groups F and A include standard function parameters. Group U includes the monitoring function parameters and extension card communication parameters.

### 5.2 Standard Parameters

| Para. No.                     | Para. Name  | Setting Range   | Default         | Comms. Address |
|-------------------------------|---|---|-----------------|----------------|
| Group F0: Standard Parameters |   |   |                 |                |
| F0-01                         | Motor 1 control mode  | 1: Feedback vector control (FVC)<br>2: V/F control  | 2               | 0xF001/0x0001  |
| F0-02                         | Command source selection  | 0: Operating panel<br>1: Terminal I/O control<br>2: Serial comms.   | 0               | 0xF002/0x0002  |
| F0-03                         | Main frequency reference setting channel selection                                      | 0: Digital setting (non-retentive at power down)<br>1: Digital setting (retentive at power down)<br>2: AI<br>5: Pulse reference(DI4)<br>6: Multi-reference<br>7: Simple PLC<br>8: PID reference<br>9: Serial comms. | 0               | 0xF003/0x0003  |
| F0-04                         | Auxiliary frequency reference setting channel selection                                 | Same with F0-03   | 0               | 0xF004/0x0004  |
| F0-05                         | Base value of range of auxiliary frequency reference for main and auxiliary calculation | 0: Relative to maximum frequency<br>1: Relative to main frequency reference   | 0               | 0xF005/0x0005  |
| F0-06                         | Range of auxiliary frequency reference for main and auxiliary calculation               | 0% to 150%  | 100%            | 0xF006/0x0006  |
| F0-07                         | Final Frequency reference setting selection   | 00 to 34  | 00              | 0xF007/0x0007  |
| F0-08                         | Preset frequency  | 0.00 to max. frequency (F0-10)  | 50.00 Hz        | 0xF008/0x0008  |
| F0-09                         | Running direction   | 0: Run in the default direction<br>1: Run in the direction reverse to the default direction   | 0               | 0xF009/0x0009  |
| F0-10                         | Max. frequency  | 50.00 to 500.00 Hz  | 50.00 Hz        | 0xF00A/0x000A  |
| F0-11                         | Setting channel of frequency upper limit  | 0: Set by F0-12<br>1: AI<br>2: External operating panel<br>4: Pulse reference (DI4)<br>5: Communication reference   | 0               | 0xF00B/0x000B  |
| F0-12                         | Frequency reference upper limit   | F0-14 to F0-10  | 50.00 Hz        | 0xF00C/0x000C  |
| F0-14                         | Frequency reference lower limit   | 0.00 Hz to frequency upper limit (F0-12)  | 0.00 Hz         | 0xF00E/0x000E  |
| F0-15                         | Carrier frequency   | 0.8 to 12.0 kHz   | Model dependent | 0xF00F/0x000F  |
| F0-16                         | Carrier frequency adjusted with temperature   | 0: Disabled<br>1: Enabled   | 1               | 0xF010/0x0010  |
| F0-17                         | Acceleration time1  | 0.00 to 650.00s (F0-19=2)<br>0.0 to 6500.0s (F0-19=1)<br>0 to 65000s (F0-19=0)  | Model dependent | 0xF011/0x0011  |

## 5 Parameter Table

| Para. No.                                  | Para. Name   | Setting Range  | Default               | Comms. Address |
|--|--|--|-----------------------|----------------|
| F0-18                                      | Deceleration time1                                     | 0.00 to 650.00s (F0-19=2)<br>0.0 to 6500.0s (F0-19=1)<br>0 to 65000s (F0-19=0) | Model dependent       | 0xF012/0x0012  |
| F0-19                                      | Acceleration/deceleration time unit                    | 0: 1s<br>1: 0.1s<br>2: 0.01s   | 1                     | 0xF012/0x0013  |
| F0-23                                      | Retentive of digital setting frequency upon stop       | 0: Not retentive<br>1: Retentive   | 0                     | 0xF017/0x0017  |
| F0-25                                      | Acceleration/Deceleration time base frequency          | 0: Maximum frequency (F0-10)<br>1: Frequency reference<br>2: 100 Hz            | 0                     | 0xF019/0x0019  |
| F0-26                                      | Base frequency for UP/DOWN modification during running | 0: Running frequency<br>1: Frequency Reference                                 | 0                     | 0xF01A/0x001A  |
| <b>Group F1: Motor 1 Parameters</b>        |  |  |                       |                |
| F1-01                                      | Rated motor power                                      | 0.1 to 5.5 kW  | Model dependent       | 0xF101/0x0101  |
| F1-02                                      | Rated motor voltage                                    | 1 to 600 V   | Model dependent       | 0xF102/0x0102  |
| F1-03                                      | Rated motor current                                    | 0.01 to 30.00 A  | Model dependent       | 0xF103/0x0103  |
| F1-04                                      | Rated motor frequency                                  | 0.01 Hz to max. frequency  | Model dependent       | 0xF104/0x0104  |
| F1-05                                      | Rated motor speed                                      | 1 to 65535 rpm   | Model dependent       | 0xF105/0x0105  |
| F1-06                                      | Asynchronous motor stator resistance                   | 0.001 to 65.535 ohm  | Auto-tuning dependent | 0xF106/0x0106  |
| F1-07                                      | Asynchronous motor rotor resistance                    | 0.001 to 65.535 ohm  | Auto-tuning dependent | 0xF107/0x0107  |
| F1-08                                      | Asynchronous motor leakage inductive reactance         | 0.001 to 65.535 mH   | Auto-tuning dependent | 0xF108/0x0108  |
| F1-09                                      | Asynchronous motor mutual inductive reactance          | 0.001 to 65.535 mH   | Auto-tuning dependent | 0xF109/0x0109  |
| F1-10                                      | Asynchronous motor no-load current                     | 0.01A to F0-03   | Auto-tuning dependent | 0xF109/0x010A  |
| F1-37                                      | Motor auto-tuning method selection                     | 0: No auto-tuning<br>1: Static auto-tuning 1<br>2: Complete auto-tuning        | 0                     | 0xF125/0x0125  |
| <b>Group F2: Vector Control Parameters</b> |  |  |                       |                |
| F2-00                                      | Speed loop proportional gain 1                         | 1 to 100   | 30                    | 0xF200/0x0200  |
| F2-01                                      | Speed loop integral time 1                             | 0.01 to 10.00s   | 0.50s                 | 0xF201/0x0201  |
| F2-02                                      | Switchover frequency 1                                 | 0.00 to F2-05  | 5.00 Hz               | 0xF202/0x0202  |
| F2-03                                      | Speed loop proportional gain 2                         | 1 to 100   | 20                    | 0xF203/0x0203  |
| F2-04                                      | Speed loop integral time 2                             | 0.01 to 10.00s   | 1.00s                 | 0xF204/0x0204  |
| F2-05                                      | Switchover frequency 2                                 | F2-02 to max. frequency  | 10.00 Hz              | 0xF205/0x0205  |
| F2-06                                      | SVC/FVC slip compensation gain                         | 50% to 200%  | 100%                  | 0xF206/0x0206  |
| F2-07                                      | SVC speed feedback filter time                         | 0.000 to 0.100s  | 0.050s                | 0xF207/0x0207  |
| F2-08                                      | Vector control over-excitation gain                    | 0 to 200   | 0                     | 0xF208/0x0208  |

| Para. No.                        | Para. Name   | Setting Range  | Default | Comms. Address |
|----------------------------------|--|--|---------|----------------|
| F2-09                            | Torque limit source in speed control                                     | 0: F2-10<br>1: AI<br>2: External operating panel<br>4: Pulse reference (DI5)<br>5: Serial comms.<br>6: Min. (AI1, AI2)<br>7: Max. (AI1, AI2)                       | 0       | 0xF209/0x0209  |
| F2-10                            | Digital setting of torque limit in speed control                         | 0.0% to 200.0%   | 150.0%  | 0xF20A/0x020A  |
| F2-11                            | Torque limit source in speed control (in regenerative state)             | 0: F2-10<br>1: AI<br>2: External operating panel<br>4: Pulse reference (DI5)<br>5: Communication reference<br>6: Min. (AI1, AI2)<br>7: Max. (AI1, AI2)<br>8: F2-12 | 0       | 0xF20B/0x020B  |
| F2-12                            | Digital setting of torque limit in speed control (in regenerative state) | 0.0% to 200.0%   | 150.0%  | 0xF20B/0x020B  |
| F2-13                            | Excitation adjustment proportional gain                                  | 0 to 60000   | 10      | 0xF20D/0x020D  |
| F2-14                            | Excitation adjustment integral gain                                      | 0 to 60000   | 10      | 0xF20E/0x020E  |
| F2-15                            | Torque adjustment proportional gain                                      | 0 to 60000   | 10      | 0xF20F/0x020F  |
| F2-16                            | Torque adjustment integral gain  | 0 to 60000   | 10      | 0xF210/0x0210  |
| F2-17                            | Speed loop property  |    | 00      | 0xF211/0x0211  |
| F2-18                            | Torque feed-forward gain   | 20 to 100  | 80      | 0xF212/0x0212  |
| F2-19                            | Torque feed-forward filter time  | 10 to 200  | 50      | 0xF213/0x0213  |
| F2-21                            | Max. torque coefficient of field weakening area                          | 50% to 200%  | 80%     | 0xF215/0x0215  |
| F2-22                            | Regenerative power limit   | 0.0%: no limit<br>0.1% to 200.0%   | 0.0%    | 0xF216/0x0216  |
| Group F3: V/F Control Parameters |  |  |         |                |



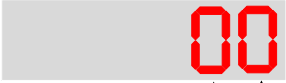

5 Parameter Table

| Para. No. | Para. Name   | Setting Range  | Default  | Comms. Address |
|-----------|--|--|----------|----------------|
| F3-00     | V/F curve setting  | 0: Linear V/F<br>1: Multi-point V/F<br>10: V/F complete separation<br>11: V/F half separation  | 0        | 0xF300/0x0300  |
| F3-01     | Torque boost   | 0.0%: automatic boost<br>0.1% to 30%   | 0.0%     | 0xF301/0x0301  |
| F3-02     | Cut-off frequency of torque boost                            | 0.00 Hz to max. frequency  | 50.00 Hz | 0xF302/0x0302  |
| F3-03     | Multi-point V/F frequency 1                                  | 0.00 Hz to F3-05   | 0.00 Hz  | 0xF303/0x0303  |
| F3-04     | Multi-point V/F voltage 1                                    | 0.0% to 100.0%   | 0.0%     | 0xF304/0x0304  |
| F3-05     | Multi-point V/F frequency 2                                  | F3-03 to F3-07   | 0.00 Hz  | 0xF305/0x0305  |
| F3-06     | Multi-point V/F voltage 2                                    | 0.0% to 100.0%   | 0.0%     | 0xF306/0x0306  |
| F3-07     | Multi-point V/F frequency 3                                  | F3-05 to rated motor frequency(F1-04)  | 0.00 Hz  | 0xF307/0x0307  |
| F3-08     | Multi-point V/F voltage 3                                    | 0.0% to 100.0%   | 0.0%     | 0xF308/0x0308  |
| F3-09     | Slip compensation gain                                       | 0.0% to 200.0%   | 0.0%     | 0xF309/0x0309  |
| F3-10     | V/F over-excitation gain                                     | 0 to 200   | 64       | 0xF30A/0x030A  |
| F3-13     | Voltage source for V/F separation                            | 0: Set by F3-14<br>1: AI<br>2: External operating panel<br>4: Pulse reference (DI4)<br>5: Multi-reference<br>6: Simple PLC<br>7: PID reference<br>8: Serial comms.<br>100.0% corresponds to the rated motor voltage. | 0        | 0xF30D/0x030D  |
| F3-14     | Digital setting of voltage for V/F separation                | 0 V to rated motor voltage   | 0 V      | 0xF30E/0x030E  |
| F3-15     | Voltage rise time of V/F separation                          | 0.0 to 1000.0s   | 0.0s     | 0xF30F/0x030F  |
| F3-16     | Voltage decline time of V/F separation                       | 0.0 to 1000.0s   | 0.0s     | 0xF310/0x0310  |
| F3-17     | Stop mode selection for V/F separation                       | 0: Frequency and voltage declining to 0 independently<br>1: Frequency declining after voltage declines to 0  | 0        | 0xF311/0x0311  |
| F3-18     | Current limit level  | 50% to 200%  | 150%     | 0xF312/0x0312  |
| F3-19     | Current limit selection                                      | 0: Disabled<br>1: Enabled  | 1        | 0xF313/0x0313  |
| F3-20     | Current limit gain   | 0 to 100   | 20       | 0xF314/0x0314  |
| F3-21     | Compensation factor of speed multiplying current limit level | 0 to 200%  | 50%      | 0xF315/0x0315  |

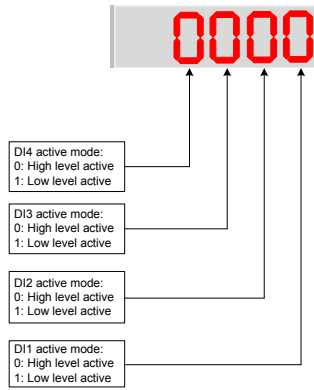
| Para. No.                        | Para. Name                                    | Setting Range   | Default                                       | Comms. Address |
|----------------------------------|---|---|---|----------------|
| F3-22                            | Voltage limit                                 | 330.0 to 800.0 V  | Single phase : 390.0 V<br>Three phase: 760.0V | 0xF316/0x0316  |
| F3-23                            | Voltage limit selection                       | 0: Disabled<br>1: Enabled   | 1   | 0xF318/0x0317  |
| F3-24                            | Frequency gain for voltage limit              | 0 to 100  | 50  | 0xF318/0x0318  |
| F3-25                            | Voltage gain for voltage limit                | 0 to 100  | 30  | 0xF319/0x0319  |
| F3-26                            | Frequency rise threshold during voltage limit | 0 to 50 Hz  | 5 Hz  | 0xF31A/0x031A  |
| F3-27                            | Slip compensation time constant               | 0.1 to 10.0s  | 0.5   | 0xF31B/0x031B  |
| <b>Group F4: Input Terminals</b> |   |   |   |                |
| F4-00                            | DI1 function selection                        | 0: No function<br>1: Forward run (FWD)<br>2: Reverser run (REV)<br>3: Three-wire control<br>4: Forward jog (FJOG)<br>5: Reverse jog (RJOG)<br>6: Terminal UP<br>7: Terminal DOWN<br>8: Coast to stop<br>9: Fault reset (RESET)<br>10: RUN disabled  | 1   | 0xF400/0x0400  |
| F4-01                            | DI2 function selection                        | 11: External fault normally-open input<br>12: Multi-reference terminal 1<br>13: Multi-reference terminal 2<br>14: Multi-reference terminal 3<br>15: Multi-reference terminal 4<br>16: Terminal 1 for acceleration/deceleration time selection<br>18: Frequency reference setting channel switchover<br>19: UP and DOWN setting clear (terminal, operation panel)<br>20: Command source switchover<br>21: Acceleration/Deceleration prohibited<br>22: PID disabled<br>23: PLC state reset<br>30: Pulse input as frequency reference (On MD200XXX model, it is valid for DI4 terminal ; On MD200XXX-NC model), it is valid for DIO terminal)<br>(To be continued) | 4   | 0xF401/0x0401  |

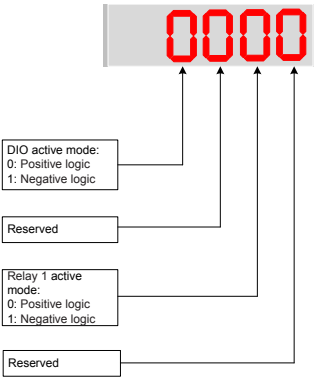
## 5 Parameter Table

| Para. No. | Para. Name   | Setting Range   | Default    | Comms. Address |
|-----------|--|---|------------|----------------|
| F4-02     | DI3 function selection   | 32: Immediate DC injection braking<br>33: External fault normally-closed input<br>34: Frequency modification enabled<br>35: PID operation direction reverse   | 9          | 0xF402/0x0402  |
| F4-03     | DI4 function selection   | 36: External stop 1<br>37: Command source switchover 2  | 12         | 0xF403/0x0403  |
| F4-04     | DIO terminal input function selection (only used on MD200XXX-NC model) | 38: PID integral disabled<br>39: Switchover between main frequency reference and preset frequency<br>40: Switchover between auxiliary frequency reference and preset frequency<br>43: PID parameter switchover<br>47: Emergency stop (ES)<br>48: External stop 2<br>49: Deceleration DC injection braking<br>50: Clear running time this time<br>51: Two-wire control/ Three-wire control<br>52: Reverse running prohibited (End) |            |                |
| F4-10     | DI filter time   | 0.000s to 1.000s  | 0.010s     | 0xF40A/0x040A  |
| F4-11     | Terminal I/O control mode  | 0: Two-wire control mode 1<br>1: Two-wire control mode 2<br>2: Three-wire control mode 1<br>3: Three-wire control mode 2  | 0          | 0xF40B/0x040B  |
| F4-12     | Terminal UP/DOWN rate  | 0.001 to 65.535 Hz/s  | 1.000 Hz/s | 0xF40C/0x040C  |
| F4-13     | AI curve1 min. input   | 0.00 V to F4-15   | 0.00 V     | 0xF40D/0x040D  |
| F4-14     | Corresponding percentage of AI curve 1 min. input                      | -100.00% to 100.00%   | 0.0%       | 0xF40E/0x040E  |
| F4-15     | AI curve 1 max. input  | F4-13 to 10.00 V  | 10.00 V    | 0xF40F/0x040F  |
| F4-16     | Corresponding percentage of AI curve1 max. input                       | -100.00% to 100.00%   | 100.0%     | 0xF410/0x0410  |
| F4-17     | AI1filtertime  | 0.00s to 10.00s   | 0.10s      | 0xF411/0x0411  |
| F4-18     | AI curve 2 min. input  | 0.00 V to F4-20   | 0.00 V     | 0xF412/0x0412  |
| F4-19     | Corresponding percentage of AI curve 2 min. input                      | -100.00% to 100.00%   | 0.0%       | 0xF413/0x0413  |
| F4-20     | AI curve 2 max. input  | F4-18 to 10.00 V  | 10.00 V    | 0xF414/0x0414  |
| F4-21     | Corresponding percentage of AI curve 2 max. input                      | -100.00% to 100.00%   | 100.0%     | 0xF415/0x0415  |
| F4-22     | External operating panel potentiometer filter time                     | 0.00 to 10.00s  | 0.10s      | 0xF416/0x0416  |
| F4-28     | Pulse min. input   | 0.00 kHz to F4-30   | 0.00 kHz   | 0xF41C/0x041C  |
| F4-29     | Corresponding percentage of pulse min. input                           | -100.00% to 100.00%   | 0.0%       | 0xF41D/0x041D  |
| F4-30     | Pulse max. input   | F4-28 to 20.00 kHz  | 50.00 kHz  | 0xF41E/0x041E  |
| F4-31     | Corresponding percentage of pulse max. input                           | -100.00% to 100.00%   | 100.0%     | 0xF41F/0x041F  |
| F4-32     | Pulse filter time  | 0.00s to 10.00s   | 0.10s      | 0xF420/0x0420  |

| Para. No. | Para. Name                                     | Setting Range   | Default | Comms. Address |
|-----------|--|---|---------|----------------|
| F4-33     | AI curve selection                             |  <p>External operating panel potentiometer curve selection<br/>1: Curve 1 (two-point, see F4-13 to F4-16)<br/>2: Curve 2 (two-point, see F4-18 to F4-21)</p> <p>AI curve selection<br/>1: Curve 1 (two-point, see F4-13 to F4-16)<br/>2: Curve 2 (two-point, see F4-18 to F4-21)</p> | 21      | 0xF421/0x0421  |
| F4-34     | Setting selection when AI less than min. input |  <p>Setting selection when external operating panel potentiometer less than min. input<br/>0: Corresponding percentage of min. input<br/>1: 0.0%</p> <p>Setting selection when AI less than min. input<br/>0: Corresponding percentage of min. input<br/>1: 0.0%</p>                 | 00      | 0xF422/0x0422  |
| F4-35     | DI1 delay                                      | 0.0 to 3600.0s  | 0.0s    | 0xF423/0x0423  |
| F4-36     | DI2 delay                                      | 0.0 to 3600.0s  | 0.0s    | 0xF424/0x0424  |
| F4-37     | DI3 delay                                      | 0.0 to 3600.0s  | 0.0s    | 0xF425/0x0425  |

5 Parameter Table

| Para. No.                         | Para. Name  | Setting Range   | Default | Comms. Address |
|-----------------------------------|---|---|---------|----------------|
| F4-38                             | DI active mode selection1   |  <p>DI4 active mode:<br/>0: High level active<br/>1: Low level active</p> <p>DI3 active mode:<br/>0: High level active<br/>1: Low level active</p> <p>DI2 active mode:<br/>0: High level active<br/>1: Low level active</p> <p>DI1 active mode:<br/>0: High level active<br/>1: Low level active</p>   | 00000   | 0xF426/0x0426  |
| F4-41                             | DIO terminal type   | 0: DI/Pulse input<br>1: DO  | 0       | 0xF429/0x0429  |
| <b>Group F5: Output Terminals</b> |   |   |         |                |
| F5-02                             | Relay (T/A-T/C) function selection                                      | 0: No output<br>1: AC drive running<br>2: Fault output<br>3: Frequency level detection 1 output<br>4: Frequency reached<br>5: Zero-speed running (no output at stop)<br>6: Motor overload pending<br>7: AC drive overload pending<br>11: PLC cycle completed<br>12: Accumulative running time reached<br>13: Frequency limited<br>15: Ready for RUN<br>17: Frequency upper limit reached<br>18: Frequency lower limit reached (no output at stop) | 2       | 0xF502/0x0502  |
| F5-04                             | DIO terminal output function selection (only used on MD200XXX-NC model) | 19: Undervoltage<br>20: Communication setting<br>24: Accumulative power-on time reached<br>26: Frequency 1 reached<br>28: Current 1 reached<br>30: Timing reached<br>31: AI input exceeding limit<br>32: Load lost<br>33: Reverse running<br>34: Zero current<br>36: Output current exceeding limit<br>37: Frequency lower limit reached (having output at stop)<br>38: Alarm output<br>40: Current running time reached<br>41: Fault output      | 0       | 0xF504/0x0504  |

| Para. No.                           | Para. Name                               | Setting Range  | Default | Comms. Address |
|-------------------------------------|--|--|---------|----------------|
| F5-07                               | AO function selection                    | 0: Running frequency<br>1: Frequency reference<br>2: Output current<br>3: Output torque<br>4: Output power<br>5: Output voltage<br>6: Pulse input<br>7: AI<br>8: External operating panel potentiometer<br>10: Length<br>11: Count value<br>12: Communication reference<br>13: Motor speed<br>14: Output current<br>15: Output voltage<br>16: Motor output torque (actual value) | 0       | 0xF507/0x0507  |
| F5-10                               | AO zero offset coefficient               | -100.0% to 100.0%  | 0.0%    | 0xF50A/0x050A  |
| F5-11                               | AO gain                                  | -10.00 to 10.00  | 1.00    | 0xF50B/0x050B  |
| F5-18                               | Relay1 output delay                      | 0.0 to 3600.0s   | 0.0s    | 0xF512/0x0512  |
| F5-20                               | DIO output delay                         | 0.0 to 3600.0s   | 0.0s    | 0xF514/0x0514  |
| F5-22                               | DO active mode selection 1               |  <p>DIO active mode:<br/>0: Positive logic<br/>1: Negative logic</p> <p>Reserved</p> <p>Relay 1 active mode:<br/>0: Positive logic<br/>1: Negative logic</p> <p>Reserved</p>   | 0000    | 0xF516/0x0516  |
| <b>Group F6: Start/Stop Control</b> |  |  |         |                |
| F6-00                               | Start mode                               | 0: Direct start<br>1: Catching a spinning motor  | 0       | 0xF600/0x0600  |
| F6-01                               | Mode of catching a spinning motor        | 0: From stop frequency<br>1: From 50 Hz<br>2: From max. frequency  | 0       | 0xF601/0x0601  |
| F6-03                               | Start frequency                          | 0.00 to 10.00 Hz   | 0.00 Hz | 0xF603/0x0603  |
| F6-04                               | Start frequency holding time             | 0.0 to 100.0s  | 0.0s    | 0xF604/0x0604  |
| F6-07                               | Acceleration/Deceleration mode           | 0: Linear acceleration/deceleration<br>1: Static S-curve acceleration/deceleration<br>2: Dynamic S-curve acceleration/deceleration   | 0       | 0xF607/0x0607  |
| F6-08                               | Time proportion of S-curve start segment | 0.0% to (100.0% -F6-09)  | 30.0%   | 0xF608/0x0608  |
| F6-09                               | Time proportion of S-curve end segment   | 0.0% to (100.0% -F6-08)  | 30.0%   | 0xF609/0x0609  |

5 Parameter Table

| Para. No.   | Para. Name                             | Setting Range  | Default | Comms. Address |
|---|--|--|---------|----------------|
| F6-10   | Stop mode                              | 0: Decelerate to stop<br>1: Coast to stop  | 0       | 0xF60A/0x060A  |
| F6-11   | DC injection braking 2 start frequency | 0.00 Hz to maximum frequency   | 0.00 Hz | 0xF60B/0x060B  |
| F6-12   | DC injection braking 2 delay time      | 0.0 to 100.0s  | 0.0s    | 0xF60C/0x060C  |
| F6-13   | DC injection braking 2 level           | 0% to 100%   | 50%     | 0xF60D/0x060D  |
| F6-14   | DC injection braking 2 active time     | 0.0 to 100.0s  | 0.0s    | 0xF60E/0x060E  |
| F6-21   | Demagnetization time                   | 0.00s to 5.00s   | 0.5s    | 0xF615/0x0615  |
| F6-22   | Min. output frequency                  | 0.00 Hz to F6-11   | 0.00 Hz | 0xF616/0x0616  |
| F6-23   | Reserved by manufacturer               | 1 to 100   | 10      | 0xF617/0x0617  |
| <b>Group F7: Keypad Operation and LED Display</b> |  |  |         |                |
| F7-00   | LED default display check              | 0: Disabled<br>1: Enabled  | 0       | 0xF700/0x0700  |
| F7-01   | MF.K key function selection            | 0: MF.K key disabled<br>1: Switchover from remote control (terminal or communication) to keypad control<br>2: Switchover between forward rotation and reverse rotation<br>3: Forward jog<br>4: Reverse jog<br>5: Parameter display mode switchover   | 0       | 0xF701/0x0701  |
| F7-02   | STOP/RESET key function                | 0: STOP/RESET key enabled only in keypad control<br>1: STOP/RESET key enabled in any operation mode  | 1       | 0xF702/0x0702  |
| F7-03   | LED display running parameters<br>1    | <p>0000 to FFFF</p> <p>7 6 5 4 3 2 1 0</p> <ul style="list-style-type: none"> <li>Running frequency (Hz)</li> <li>Frequency reference (Hz)</li> <li>Bus voltage (V)</li> <li>Output voltage (V)</li> <li>Output current (A)</li> <li>Output power (kW)</li> <li>Output torque (%)</li> <li>DI state (V)</li> </ul> <p>15 14 13 12 11 10 9 8</p> <ul style="list-style-type: none"> <li>DO state</li> <li>AI voltage (V)</li> <li>Reserved</li> <li>External operating panel potentiometer voltage (V)</li> <li>Count value</li> <li>Length value</li> <li>Load speed display</li> <li>PID reference</li> </ul> | 001F    | 0xF703/0x0703  |

| Para. No. | Para. Name   | Setting Range    | Default | Comms. Address |
|-----------|--|------------------|---------|----------------|
| F7-04     | LED display running parameters<br>2                | 0000 to FFFF<br> | 0000    | 0xF704/0x0704  |
| F7-05     | LED display stop parameters                        | 0000 to 1FFF<br> | 0033    | 0xF705/0x0705  |
| F7-06     | Load speed display coefficient                     | 0.0001 to 65.000 | 1.0000  | 0xF706/0x0706  |
| F7-07     | Heatsink temperature of IGBT                       | 0°C to 100°C     | -       | 0xF707/0x0707  |
| F7-08     | Product series                                     | 200              | -       | 0xF708/0x0708  |
| F7-09     | Accumulative running time                          | 0 to 65535h      | -       | 0xF709/0x0709  |
| F7-10     | Performance software version                       | -                | -       | 0xF70A/0x070A  |
| F7-11     | Function software version                          | -                | -       | 0xF70B/0x070B  |
| F7-12     | Number of decimal places for<br>load speed display | 10 to 23<br>     | 21      | 0xF70C/0x070C  |
| F7-13     | Accumulative power-on time                         | 0 to 65535 h     | -       | 0xF70D/0x070D  |



5 Parameter Table

| Para. No.                     | Para. Name   | Setting Range  | Default  | Comms. Address |
|-------------------------------|--|--|----------|----------------|
| F7-14                         | Accumulative power consumption   | 0 to 65535 kWh   | -        | 0xF70E/0x070E  |
| Group F8: Auxiliary Functions |  |  |          |                |
| F8-00                         | Jog frequency reference  | 0.00 Hz to max. frequency  | 2.00 Hz  | 0xF800/0x0800  |
| F8-01                         | Jog acceleration time  | 0.0 to 6500.0s   | 20.0s    | 0xF801/0x0801  |
| F8-02                         | Jog deceleration time  | 0.0 to 6500.0s   | 20.0s    | 0xF802/0x0802  |
| F8-03                         | Acceleration time 2  | 0.0 to 6500.0s   | 20.0s    | 0xF803/0x0803  |
| F8-04                         | Deceleration time 2  | 0.0 to 6500.0s   | 20.0s    | 0xF804/0x0804  |
| F8-07                         | Acceleration time 4  | 0.0 to 6500.0s   | 0.0s     | 0xF807/0x0807  |
| F8-08                         | Deceleration time 4  | 0.0 to 6500.0s   | 0.0s     | 0xF808/0x0808  |
| F8-12                         | Forward/Reverse run switchover dead-zone time                          | 0.0 to 3000.0s   | 0.0s     | 0xF80C/0x080C  |
| F8-13                         | Reverse RUN selection  | 0: Disabled<br>1: Enabled  | 0        | 0xF80D/0x080D  |
| F8-14                         | Running mode when frequency reference lower than frequency lower limit | 0: Run at frequency reference lower limit<br>1: Stop<br>2: Run at zero speed | 0        | 0xF80E/0x080E  |
| F8-16                         | Accumulative power-on time threshold                                   | 0 to 65000 h   | 0h       | 0xF810/0x0810  |
| F8-17                         | Accumulative running time threshold                                    | 0 to 65000 h   | 0h       | 0xF811/0x0811  |
| F8-18                         | Startup protection selection   | 0: Disabled<br>1: Enabled  | 0        | 0xF812/0x0812  |
| F8-19                         | Frequency detection value 1  | 0.00 Hz to max. frequency  | 50.00 Hz | 0xF813/0x0813  |
| F8-20                         | Frequency detection hysteresis 1                                       | 0.0% to 100.0%   | 5.0%     | 0xF814/0x0814  |
| F8-21                         | Detection width of target frequency reached                            | 0.0% to 100.0%   | 0.0%     | 0xF815/0x0815  |
| F8-25                         | Switchover frequency of accel. time 1 and accel. time 2                | 0.00 Hz to max. frequency  | 0.00 Hz  | 0xF819/0x0819  |
| F8-26                         | Switchover frequency of decel. time 1 and decel. time 2                | 0.00 Hz to max. frequency  | 0.00 Hz  | 0xF81A/0x081A  |
| F8-27                         | Set highest priority to terminal JOG function                          | 0: Disabled<br>1: Enabled  | 0        | 0xF81B/0x081B  |
| F8-30                         | Detection of frequency1  | 0.00 Hz to max. frequency  | 50.00 Hz | 0xF81E/0x081E  |
| F8-31                         | Detection width of frequency1  | 0.0% to 100.0% (max. frequency)  | 0.0%     | 0xF81F/0x081F  |
| F8-34                         | Zero current detection level   | 0.0% to 300.0% (rated motor current)   | 5.0%     | 0xF822/0x0822  |
| F8-35                         | Zero current detection delay   | 0.01s to 600.00s   | 0.10s    | 0xF823/0x0823  |
| F8-36                         | Output overcurrent threshold   | 0.0% (no detection)<br>0.1% to 300.0% (rated motor current)                  | 200.0%   | 0xF824/0x0824  |
| F8-37                         | Output overcurrent detection delay                                     | 0.00s to 600.00s   | 0.00s    | 0xF825/0x0825  |
| F8-38                         | Detection level of current1  | 0.0% to 300.0% (rated motor current)   | 100.0%   | 0xF826/0x0826  |
| F8-39                         | Detection width of current1  | 0.0% to 300.0% (rated motor current)   | 0.0%     | 0xF827/0x0827  |
| F8-42                         | Timing function  | 0: Disabled<br>1: Enabled  | 0        | 0xF82A/0x082A  |
| F8-43                         | Running time setting channel   | 0: Set by F8-44<br>1: AI   | 0        | 0xF82B/0x082B  |

| Para. No.  | Para. Name   | Setting Range   | Default   | Comms. Address |
|--|--|---|---|----------------|
| F8-44  | Running time                                       | 0.0 to 6500.0 min   | 0.0 min   | 0xF82C/0x082C  |
| F8-45  | AI input voltage lower limit                       | 0.00 V to F8-46   | 3.10 V  | 0xF82D/0x082D  |
| F8-46  | AI input voltage upper limit                       | F8-45 to 10.00 V  | 6.80 V  | 0xF82E/0x082E  |
| F8-48  | Cooling fan working mode                           | 0: Working during drive running<br>1: Working continuously<br>2: Working when temperature reached | 0   | 0xF830/0x0830  |
| F8-49  | Wakeup frequency                                   | F8-51 to max. frequency (F0-10)   | 0.00 Hz   | 0xF831/0x0831  |
| F8-50  | Wakeup delay time                                  | 0.0 to 6500.0s  | 0.0s  | 0xF832/0x0832  |
| F8-51  | Hibernating frequency                              | 0.00 Hz to wakeup frequency (F8-49)   | 0.00 Hz   | 0xF833/0x0833  |
| F8-52  | Hibernating delay time                             | 0.0 to 6500.0 s   | 0.0s  | 0xF834/0x0834  |
| F8-53  | Running time threshold this time                   | 0.0 to 6500.0 min   | 0.0 min   | 0xF835/0x0835  |
| F8-54  | Output power correction coefficient                | 0.0% to 200.0%  | 100.0%  | 0xF836/0x0836  |
| F8-55  | Emergency deceleration time                        | 0.0 to 6500.0 s   | 10.0s   | 0xF837/0x0837  |
| F8-57  | Speed synchronous control selection                | 0: Disabled<br>1: Enabled   | 0   | 0xF839/0x0839  |
| <p>It selects whether to enable the speed synchronous control function.</p> <p>This function means direction data communication between two or more AC drives via CANlink, implementing target frequency of one or more slaves to be synchronized to that of the master.</p> <p>When this function is enabled, CANlink communication addresses of the master and slaves are matched automatically. The baud rate in speed synchronous control is set in Fd-00.</p> |  |   |   |                |
| F8-58  | Master and slave selection in synchronous control  | 0: Master<br>1: Slave   | 0   | 0xF83A/0x083A  |
| <p>It is used to select whether the AC drive is master or slave. When the AC drive is slave, set F0-03 = 9 to set frequency reference via communication.</p>   |  |   |   |                |
| <b>Group F9: Fault and Protection</b>  |  |   |   |                |
| F9-00  | Motor overload protection                          | 0: Disabled<br>1: Enabled   | 1   | 0xF900/0x0900  |
| F9-01  | Motor overload protection gain                     | 0.20 to 10.00   | 1.0   | 0xF901/0x0901  |
| F9-02  | Motor overload pre-warning coefficient             | 50% to 100%   | 80%   | 0xF902/0x0902  |
| F9-07  | Detection of short-circuit to ground upon power-on | 0: Disabled<br>1: Enabled   | 1   | 0xF907/0x0907  |
| F9-08  | Braking unit applied voltage                       | 310.0 V to 800.0 V  | Single phase:<br>378.0 V<br>Three phase:<br>700.0 V | 0xF908/0x0908  |
| F9-09  | Auto reset times                                   | 0 to 20   | 0   | 0xF909/0x0909  |
| F9-10  | Selection of DO action during auto reset           | 0: Not act<br>1: Act  | 0   | 0xF90A/0x090A  |
| F9-11  | Delay of auto reset                                | 0.1 s to 100.0 s  | 1.0s  | 0xF90B/0x090B  |
| F9-13  | Output phase loss protection                       | 0: Disabled<br>1: Enabled   | 1   | 0xF90D/0x090D  |

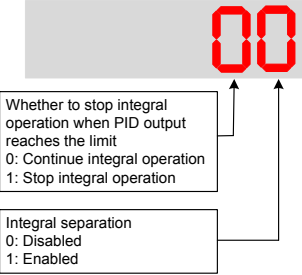
5 Parameter Table

| Para. No. | Para. Name                    | Setting Range   | Default | Comms. Address |
|-----------|-------------------------------|---|---------|----------------|
| F9-14     | 1st fault type                | 0: No fault   | -       | 0xF90E/0x090E  |
| F9-15     | 2nd fault type                | 1: Reserved   | -       | 0xF90F/0x090F  |
| F9-16     | 3rd (latest) fault type       | 2: Overcurrent during acceleration<br>3: Overcurrent during deceleration<br>4: Overcurrent at constant speed<br>5: Overvoltage during acceleration<br>6: Overvoltage during deceleration<br>7: Overvoltage at constant speed<br>8: Pre-charge resistor overloaded<br>9: Undervoltage<br>10: AC drive overloaded<br>11: Motor overloaded<br>12: Input phase loss<br>13: Output phase loss<br>14: IGBT overheat<br>15: External fault<br>16: Communication abnormal<br>17: Reserved<br>18: Current detection abnormal<br>19: Motor auto-tuning abnormal<br>20: Reserved<br>21: Parameter read-write abnormal<br>22: Reserved<br>23: Motor short circuited to ground<br>24: Reserved<br>25: Reserved<br>26: Accumulative running time reached<br>29: Accumulative power-on time reached<br>30: Load lost<br>31: PID feedback lost during running<br>40: Overcurrent fast prevention timeout<br>41: Reserved<br>42: Excessive speed deviation<br>43: Reserved<br>45: Reserved<br>51: Reserved<br>55: Slave fault in speed synchronous | -       | 0xF910/0x0910  |
| F9-17     | Frequency upon 3rd fault      | -   | -       | 0xF911/0x0911  |
| F9-18     | Current upon 3rd fault        | -   | -       | 0xF912/0x0912  |
| F9-19     | Bus voltage upon 3rd fault    | -   | -       | 0xF913/0x0913  |
| F9-20     | DI state upon 3rd fault       | -   | -       | 0xF914/0x0914  |
| F9-21     | DO state upon 3rd fault       | -   | -       | 0xF915/0x0915  |
| F9-22     | AC drive state upon 3rd fault | -   | -       | 0xF916/0x0916  |
| F9-23     | Power-on time upon 3rd fault  | -   | -       | 0xF917/0x0917  |
| F9-24     | Running time upon 3rd fault   | -   | -       | 0xF918/0x0918  |
| F9-27     | Frequency upon 2nd fault      | -   | -       | 0xF91B/0x081B  |
| F9-28     | Current upon 2nd fault        | -   | -       | 0xF91C/0x091C  |
| F9-29     | Bus voltage upon 2nd fault    | -   | -       | 0xF91D/0x091D  |
| F9-30     | DI state upon 2nd fault       | -   | -       | 0xF91E/0x091E  |
| F9-31     | DO state upon 2nd fault       | -   | -       | 0xF91F/0x091F  |

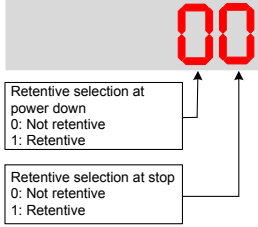
| Para. No.              | Para. Name  | Setting Range  | Default | Comms. Address |
|------------------------|---|--|---------|----------------|
| F9-32                  | AC drive state upon 2nd fault                         | -  | -       | 0xF920/0x0920  |
| F9-33                  | Power-on time upon 2nd fault                          | -  | -       | 0xF921/0x0921  |
| F9-34                  | Running time upon 2nd fault                           | -  | -       | 0xF922/0x0922  |
| F9-37                  | Frequency upon 1st fault                              | -  | -       | 0xF925/0x0925  |
| F9-38                  | Current upon 1st fault                                | -  | -       | 0xF926/0x0926  |
| F9-39                  | Bus voltage upon 1st fault                            | -  | -       | 0xF927/0x0927  |
| F9-40                  | DI state upon 1st fault                               | -  | -       | 0xF928/0x0928  |
| F9-41                  | DO state upon 1st fault                               | -  | -       | 0xF929/0x0929  |
| F9-42                  | AC drive state upon 1st fault                         | -  | -       | 0xF92A/0x092A  |
| F9-43                  | Power-on time upon 1st fault                          | -  | -       | 0xF92B/0x092B  |
| F9-44                  | Running time upon 1st fault                           | -  | -       | 0xF92C/0x092C  |
| F9-47                  | Fault protection action selection 1                   | 00000 to 22222   | 00000   | 0xF92F/0x092F  |
| F9-48                  | Fault protection action selection 2                   | 00000 to 11111   | 00000   | 0xF930/0x0930  |
| F9-49                  | Fault protection action selection 3                   | 00000 to 22222   | 00000   | 0xF931/0x0931  |
| F9-54                  | Frequency selection for continuing to run upon fault  | 0: Current running frequency<br>1: Frequency reference<br>2: Frequency upper limit<br>3: Frequency lower limit<br>4: Backup frequency upon abnormality | 0       | 0xF936/0x0936  |
| F9-55                  | Backup frequency upon fault                           | 0.0% to 100.0% (max. frequency)  | 100.0%  | 0xF937/0x0937  |
| F9-59                  | Power dip ride-through function selection             | 0: Disabled<br>1: Bus voltage constant control<br>2: Decelerate to stop  | 0       | 0xF93B/0x093B  |
| F9-60                  | Threshold of power dip ride-through function disabled | 80% to F9-60   | 85%     | 0xF93C/0x093C  |
| F9-61                  | Judging time of bus voltage recovering from power dip | 0.0 to 100.0 s   | 0.5s    | 0xF93D/0x093D  |
| F9-62                  | Threshold of power dip ride-through function enabled  | 60% to 100%  | 80%     | 0xF93E/0x093E  |
| F9-63                  | Load lost protection                                  | 0: Disabled<br>1: Enabled  | 0       | 0xF93F/0x093F  |
| F9-64                  | Load lost detection level                             | 0.0% to 100.0%   | 10.0%   | 0xF940/0x0940  |
| F9-65                  | Load lost detection time                              | 0.0 to 60.0s   | 1.0s    | 0xF941/0x0941  |
| F9-71                  | Power dip ride-through gain Kp                        | 0 to 100   | 40      | 0xF947/0x0947  |
| F9-72                  | Power dip ride-through integral coefficient           | 0 to 100   | 30      | 0xF948/0x0948  |
| F9-73                  | Deceleration time of power dip ride-through           | 0.0 to 300.0s  | 20.0s   | 0xF949/0x0949  |
| F9-74                  | Restart mode after fault reset                        | 0: Normal<br>1: Catching a spinning motor  | 0       | 0xF94A/0x094A  |
| Group FA: PID Function |   |  |         |                |
| FA-00                  | PID reference setting channel                         | 0: Set by FA-01<br>1: AI<br>2: External operating panel potentiometer<br>4: Pulse reference (DI4)<br>5: Via communication<br>6: Multi-reference        | 0       | 0xFA00/0x0A00  |

## 5 Parameter Table

| Para. No. | Para. Name   | Setting Range  | Default | Comms. Address |
|-----------|--|--|---------|----------------|
| FA-01     | PID digital setting                                  | 0.0% to 100.0%   | 50.0%   | 0xFA01/0x0A01  |
| FA-02     | PID feedback setting channel                         | 0: AI<br>1: External operating panel potentiometer<br>3: AI - external operating panel potentiometer<br>4: PULSE reference (DI4)<br>5: Via communication<br>6: AI + external operating panel potentiometer<br>7: Max. ( AI ,  external operating panel potentiometer )<br>8: Min. ( AI ,  external operating panel potentiometer ) | 0       | 0xFA02/0x0A02  |
| FA-03     | PID operation direction                              | 0: Forward<br>1: Reverse   | 0       | 0xFA03/0x0A03  |
| FA-04     | PID reference and feedback range                     | 0 to 65535   | 1000    | 0xFA04/0x0A04  |
| FA-05     | Proportional gain Kp1                                | 0.0 to 1000.0  | 20.0    | 0xFA05/0x0A05  |
| FA-06     | Integral time T <sub>I1</sub>                        | 0.01s to 10.00s  | 2.00s   | 0xFA06/0x0A06  |
| FA-07     | Differential time T <sub>d1</sub>                    | 0.000s to 10.000s  | 0.000s  | 0xFA07/0x0A07  |
| FA-08     | PID output limit in reverse direction                | 0.00 Hz to max. frequency  | 0.00 Hz | 0xFA08/0x0A08  |
| FA-09     | PID error limit                                      | 0.0% to 100.0%   | 0.0%    | 0xFA09/0x0A09  |
| FA-10     | PID differential limit                               | 0.00% to 100.00%   | 0.10%   | 0xFA0A/0x0A0A  |
| FA-11     | PID reference change time                            | 0.00s to 650.00s   | 0.00s   | 0xFA0B/0x0A0B  |
| FA-12     | PID feedback filter time                             | 0.00s to 60.00s  | 0.00s   | 0xFA0C/0x0A0C  |
| FA-13     | PID output filter time                               | 0.00s to 60.00s  | 0.00s   | 0xFA0D/0x0A0D  |
| FA-15     | Proportional gain Kp2                                | 0.0 to 1000.0  | 20.0    | 0xFA0F/0x0A0F  |
| FA-16     | Integral time T <sub>I2</sub>                        | 0.01s to 10.00s  | 2.00s   | 0xFA10/0x0A10  |
| FA-17     | Differential time T <sub>d2</sub>                    | 0.000s to 10.000s  | 0.000s  | 0xFA11/0x0A11  |
| FA-18     | PID parameter switchover condition                   | 0: Not switched over<br>1: Switched over via DI<br>2: Switched over automatically according to error<br>3: Switched over automatically according to running frequency  | 0       | 0xFA12/0x0A12  |
| FA-19     | PID error 1 for auto switchover                      | 0.0% to FA-20  | 20.0%   | 0xFA13/0x0A13  |
| FA-20     | PID error 2 for auto switchover                      | FA-19 to 100.0%  | 80.0%   | 0xFA14/0x0A14  |
| FA-21     | PID initial value                                    | 0.0% to 100.0%   | 0.0%    | 0xFA15/0x0A15  |
| FA-22     | PID initial value active time                        | 0.00s to 650.00s   | 0.00s   | 0xFA16/0x0A16  |
| FA-23     | Max. value of two outputs error in forward direction | 0.00% to 100.00%   | 1.00%   | 0xFA17/0x0A17  |
| FA-24     | Max. value of two outputs error in reverse direction | 0.00% to 100.00%   | 1.00%   | 0xFA18/0x0A18  |

| Para. No.  | Para. Name                              | Setting Range  | Default | Comms. Address |
|--|---|--|---------|----------------|
| FA-25  | PID integral property                   | 00 to 11<br>                        | 00      | 0xFA19/0x0A19  |
| FA-26  | Detection level of PID feedback loss    | 0%: No detection<br>0.1% to 100.0%   | 0.0%    | 0xFA1A/0x0A1A  |
| FA-27  | Detection time of PID feedback loss     | 0.0 to 20.0s   | 0.0s    | 0xFA1B/0x0A1B  |
| FA-28  | Selection of PID operation at stop      | 0: Disabled<br>1: Enabled  | 0       | 0xFA1C/0x0A1C  |
| <b>Group Fb: Wobble Function, Fixed Length and Count</b> |   |  |         |                |
| Fb-00  | Wobble setting mode                     | 0: Relative to the frequency reference<br>1: Relative to the max. frequency  | 0       | 0xFB00/0x0B00  |
| Fb-01  | Wobble amplitude                        | 0.0% to 100.0%   | 0.0%    | 0xFB01/0x0B01  |
| Fb-02  | Wobble step                             | 0.0% to 50.0%  | 0.0%    | 0xFB02/0x0B02  |
| Fb-03  | Wobble cycle                            | 0.1 to 3000.0s   | 10.0s   | 0xFB03/0x0B03  |
| Fb-04  | Triangular wave rising time coefficient | 0.1% to 100.0%   | 50.0%   | 0xFB04/0x0B04  |
| Fb-05  | Set length                              | 0 to 65535 m   | 1000 m  | 0xFB05/0x0B05  |
| Fb-06  | Actual length                           | 0 to 65535 m   | 0 m     | 0xFB06/0x0B06  |
| Fb-07  | Number of pulses per meter              | 0.1 to 6553.5  | 100.0   | 0xFB07/0x0B07  |
| Fb-08  | Set count value                         | 1 to 65535   | 1000    | 0xFB08/0x0B08  |
| <b>Group FC: Multi-Reference and Simple PLC Function</b> |   |  |         |                |
| FC-00  | Reference0                              | -100.0% to 100.0%  | 0.0%    | 0xFC00/0x0C00  |
| FC-01  | Reference1                              | -100.0% to 100.0%  | 0.0%    | 0xFC01/0x0C01  |
| FC-02  | Reference2                              | -100.0% to 100.0%  | 0.0%    | 0xFC02/0x0C02  |
| FC-03  | Reference3                              | -100.0% to 100.0%  | 0.0%    | 0xFC03/0x0C03  |
| FC-04  | Reference4                              | -100.0% to 100.0%  | 0.0%    | 0xFC04/0x0C04  |
| FC-05  | Reference5                              | -100.0% to 100.0%  | 0.0%    | 0xFC05/0x0C05  |
| FC-06  | Reference6                              | -100.0% to 100.0%  | 0.0%    | 0xFC06/0x0C06  |
| FC-07  | Reference7                              | -100.0% to 100.0%  | 0.0%    | 0xFC07/0x0C07  |
| FC-16  | Simple PLC running mode                 | 0: Stop after running one cycle<br>1: Keep final values after running one cycle<br>2: Repeat after running one cycle | 0       | 0xFC10/0x0C10  |

5 Parameter Table

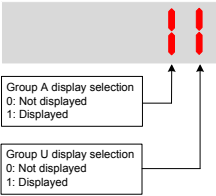
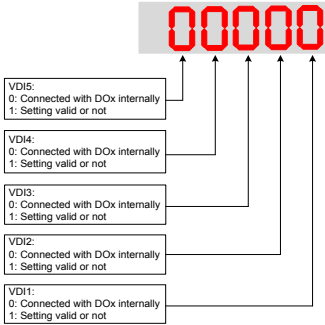
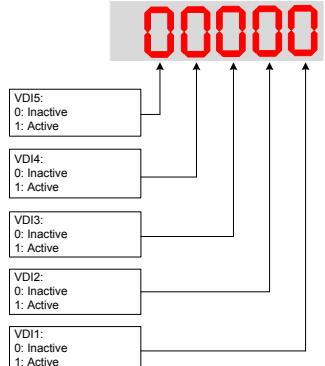
| Para. No. | Para. Name   | Setting Range   | Default  | Comms. Address |
|-----------|--|---|----------|----------------|
| FC-17     | Simple PLC retentive selection                           | 00 to 11<br> | 00       | 0xFC11/0xC11   |
| FC-18     | Running time of simple PLC reference 0                   | 0.0s (h) to 6500.0s (h)   | 0.0s (h) | 0xFC12/0xC12   |
| FC-19     | Acceleration/deceleration time of simple PLC reference 0 | 0 to 1  | 0        | 0xFC13/0xC13   |
| FC-20     | Running time of simple PLC reference 1                   | 0.0s (h) to 6500.0s (h)   | 0.0s (h) | 0xFC14/0xC14   |
| FC-21     | Acceleration/deceleration time of simple PLC reference 1 | 0 to 1  | 0        | 0xFC15/0xC15   |
| FC-22     | Running time of simple PLC reference 2                   | 0.0s (h) to 6500.0s (h)   | 0.0s (h) | 0xFC16/0xC16   |
| FC-23     | Acceleration/deceleration time of simple PLC reference 2 | 0 to 1  | 0        | 0xFC17/0xC17   |
| FC-24     | Running time of simple PLC reference 3                   | 0.0s (h) to 6500.0s (h)   | 0.0s (h) | 0xFC18/0xC18   |
| FC-25     | Acceleration/deceleration time of simple PLC reference 3 | 0 to 1  | 0        | 0xFC19/0xC19   |
| FC-26     | Running time of simple PLC reference 4                   | 0.0s (h) to 6500.0s (h)   | 0.0s (h) | 0xFC1A/0xC1A   |
| FC-27     | Acceleration/deceleration time of simple PLC reference 4 | 0 to 1  | 0        | 0xFC1B/0xC1B   |
| FC-28     | Running time of simple PLC reference 5                   | 0.0s (h) to 6500.0s (h)   | 0.0s (h) | 0xFC1C/0xC1C   |
| FC-29     | Acceleration/deceleration time of simple PLC reference 5 | 0 to 1  | 0        | 0xFC1D/0xC1D   |
| FC-30     | Running time of simple PLC reference 6                   | 0.0s (h) to 6500.0s (h)   | 0.0s (h) | 0xFC1E/0xC1E   |
| FC-31     | Acceleration/deceleration time of simple PLC reference 6 | 0 to 1  | 0        | 0xFC1F/0xC1F   |

| Para. No.                         | Para. Name   | Setting Range  | Default  | Comms. Address |
|-----------------------------------|--|--|----------|----------------|
| FC-32                             | Running time of simple PLC reference 7                   | 0.0s (h) to 6500.0s (h)  | 0.0s (h) | 0xFC20/0x0C20  |
| FC-33                             | Acceleration/deceleration time of simple PLC reference 7 | 0 to 1   | 0        | 0xFC21/0x0C21  |
| FC-50                             | Time unit of simple PLC running                          | 0: s<br>1: h   | 0        | 0xFC32/0x0C32  |
| FC-51                             | Reference 0 source                                       | 0: Set by FC-00<br>1: AI<br>2: External operating panel potentiometer<br>4: PULSE reference<br>5: PID<br>6: Set by F0-08 and modified via UP/DOWN  | 0        | 0xFC33/0x0C33  |
| Group Fd: Communication           |  |  |          |                |
| Fd-00                             | Baud rate  | 0000 to 5009<br><br>CANlink baud rate:<br>0: 20 Kbps<br>1: 50 Kbps<br>2: 100 Kbps<br>3: 125 Kbps<br>4: 250 Kbps<br>5: 500 Kbps<br>Reserved<br>Reserved<br>Modbus baud rate:<br>0: 300 bps<br>1: 600 bps<br>2: 1200 bps<br>3: 2400 bps<br>4: 4800 bps<br>5: 9600 bps<br>6: 19200 bps<br>7: 38400 bps<br>8: 57800 bps<br>9: 115200 bps | 5005     | 0xFD00/0x0D00  |
| Fd-01                             | Data format symbol                                       | 0: No check (8-N-2)<br>1: Even parity check (8-E-1)<br>2: Odd parity check (8-O-1)<br>3: No check (8-N-1) (Valid for Modbus)   | 0        | 0xFD01/0x0D01  |
| Fd-02                             | Local address  | 0: Broadcast address<br>1 to 247   | 1        | 0xFD02/0x0D02  |
| Fd-03                             | Response delay   | 0 to 20 ms   | 2        | 0xFD03/0x0D03  |
| Fd-04                             | Communication timeout                                    | 0.0: invalid<br>0.1s to 60.0s  | 0.0s     | 0xFD04/0x0D04  |
| Fd-05                             | Modbus protocol selection and PROFIBUS-DP data frame     | 0: Non-standard Modbus protocol<br>1: Standard Modbus protocol   | 1        | 0xFD05/0x0D05  |
| Fd-06                             | Current resolution read by communication                 | 0: 0.01 A<br>1: 0.1 A  | 0        | 0xFD06/0x0D06  |
| Fd-07                             | PC software selection                                    | 0: Disabled<br>1: Enabled  | 1        | 0xFD07/0x0D07  |
| Group FE: User-defined Parameters |  |  |          |                |


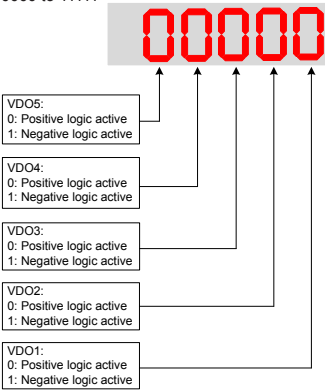


5 Parameter Table

| Para. No.                                      | Para. Name                | Setting Range  | Default       | Comms. Address |
|--|---------------------------|--|---------------|----------------|
| FE-00  | User-defined parameter 0  | F0.00 to FP.xx<br>A0.00 to Ax.xx<br>U0.00 to U0.xx   | F0.00         | 0xFE00/0x0E00  |
| FE-01  | User-defined parameter 1  |  | F0.00         | 0xFE01/0x0E01  |
| FE-02  | User-defined parameter 2  |  | F0.00         | 0xFE02/0x0E02  |
| FE-03  | User-defined parameter 3  |  | F0.00         | 0xFE03/0x0E03  |
| FE-04  | User-defined parameter 4  |  | F0.00         | 0xFE04/0x0E04  |
| FE-05  | User-defined parameter 5  |  | F0.00         | 0xFE05/0x0E05  |
| FE-06  | User-defined parameter 6  |  | F0.00         | 0xFE06/0x0E06  |
| FE-07  | User-defined parameter 7  |  | F0.00         | 0xFE07/0x0E07  |
| FE-08  | User-defined parameter 8  |  | F0.00         | 0xFE08/0x0E08  |
| FE-09  | User-defined parameter 9  |  | F0.00         | 0xFE09/0x0E09  |
| FE-10  | User-defined parameter 10 |  | F0.00         | 0xFE0A/0x0E0A  |
| FE-11  | User-defined parameter 11 |  | F0.00         | 0xFE0B/0x0E0B  |
| FE-12  | User-defined parameter 12 |  | F0.00         | 0xFE0C/0x0E0C  |
| FE-13  | User-defined parameter 13 |  | F0.00         | 0xFE0D/0x0E0D  |
| FE-14  | User-defined parameter 14 |  | F0.00         | 0xFE0E/0x0E0E  |
| FE-15  | User-defined parameter 15 |  | F0.00         | 0xFE0F/0x0E0F  |
| FE-16  | User-defined parameter 16 |  | F0.00         | 0xFE10/0x0E10  |
| FE-17  | User-defined parameter 17 |  | F0.00         | 0xFE11/0x0E11  |
| FE-18  | User-defined parameter 18 |  | F0.00         | 0xFE12/0x0E12  |
| FE-19  | User-defined parameter 19 |  | F0.00         | 0xFE13/0x0E13  |
| FE-20  | User-defined parameter 20 |  | F0.00         | 0xFE14/0x0E14  |
| FE-21  | User-defined parameter 21 |  | F0.00         | 0xFE15/0x0E15  |
| FE-22  | User-defined parameter 22 |  | F0.00         | 0xFE16/0x0E16  |
| FE-23  | User-defined parameter 23 |  | F0.00         | 0xFE17/0x0E17  |
| FE-24  | User-defined parameter 24 |  | F0.00         | 0xFE18/0x0E18  |
| FE-25  | User-defined parameter 25 |  | F0.00         | 0xFE19/0x0E19  |
| FE-26  | User-defined parameter 26 |  | F0.00         | 0xFE1A/0x0E1A  |
| FE-27  | User-defined parameter 27 |  | F0.00         | 0xFE1B/0x0E1B  |
| FE-28  | User-defined parameter 28 |  | F0.00         | 0xFE1C/0x0E1C  |
| FE-29  | User-defined parameter 29 |  | F0.00         | 0xFE1D/0x0E1D  |
| FE-30  | User-defined parameter 30 |  | F0.00         | 0xFE1E/0x0E1E  |
| FE-31  | User-defined parameter 31 | F0.00  | 0xFE1F/0x0E1F |                |
| <b>Group FP: Function Parameter Management</b> |                           |  |               |                |
| FP-00  | User password             | 0 to 65535   | 0             | 0x1F00         |
| FP-01  | Industry macro            | 0: No operation<br>01: Restore factory parameters except motor parameters<br>02: Clear records<br>03: Reserved<br>04: Back up current user parameters<br>05 to 19: Reserved<br>20: Mechanical movement industry (conveying belt)<br>21: Inertia industry (fan)<br>22 to 500: Reserved<br>501: Restore user backup parameters | 0             | 0x1F01         |

| Para. No.                      | Para. Name                      | Setting Range   | Default | Comms. Address |
|--------------------------------|---------------------------------|---|---------|----------------|
| FP-02                          | Parameter display property      | 00 to 11<br>         | 11      | 0x1F02         |
| FP-04                          | Parameter modification property | 0: Modifiable<br>1: Unmodifiable  | 0       | 0x1F04         |
| <b>Group A1: Virtual DI/DO</b> |                                 |   |         |                |
| A1-00                          | VDI1 function selection         | 0 to 59   | 0       | 0xA100/0x4100  |
| A1-01                          | VDI2 function selection         | 0 to 59   | 0       | 0xA101/0x4101  |
| A1-02                          | VDI3 function selection         | 0 to 59   | 0       | 0xA102/0x4102  |
| A1-03                          | VDI4 function selection         | 0 to 59   | 0       | 0xA103/0x4103  |
| A1-04                          | VDI5 function selection         | 0 to 59   | 0       | 0xA104/0x4104  |
| A1-05                          | VDI active state setting mode   | 00000 to 11111<br>   | 00000   | 0xA105/0x4105  |
| A1-06                          | Selection of VDI active state   | 00000 to 11111<br> | 00000   | 0xA106/0x4106  |

5 Parameter Table

| Para. No.                             | Para. Name                               | Setting Range  | Default  | Comms. Address |
|---------------------------------------|--|--|----------|----------------|
| A1-07                                 | Function selection for AI used as DI     | Same as F4-00  | 0        | 0xA107/0x4107  |
| A1-10                                 | Active state selection for AI used as DI |                     | 0        | 0xA10A/0x410A  |
| A1-11                                 | VDO1 function selection                  | 0: Connected with Dlx internally<br>1 to 41: same as F5-04   | 0        | 0xA10B/0x410B  |
| A1-12                                 | VDO2 function selection                  | 0: Connected with Dlx internally<br>1 to 41: same as F5-04   | 0        | 0xA10C/0x410C  |
| A1-13                                 | VDO3 function selection                  | 0: Connected with Dlx internally<br>1 to 41: same as F5-04   | 0        | 0xA10D/0x410D  |
| A1-14                                 | VDO4 function selection                  | 0: Connected with Dlx internally<br>1 to 41: same as F5-04   | 0        | 0xA10E/0x410E  |
| A1-15                                 | VDO5 function selection                  | 0: Connected with Dlx internally<br>1 to 41: same as F5-04   | 0        | 0xA10F/0x410F  |
| A1-16                                 | VDO1 output delay                        | 0.0 to 3600.0s   | 0.0s     | 0xA110/0x4110  |
| A1-17                                 | VDO2 output delay                        | 0.0 to 3600.0s   | 0.0s     | 0xA111/0x4111  |
| A1-18                                 | VDO3 output delay                        | 0.0 to 3600.0s   | 0.0s     | 0xA112/0x4112  |
| A1-19                                 | VDO4 output delay                        | 0.0 to 3600.0s   | 0.0s     | 0xA113/0x4113  |
| A1-20                                 | VDO5 output delay                        | 0.0 to 3600.0s   | 0.0s     | 0xA114/0x4114  |
| A1-21                                 | VDO active mode selection                | 00000 to 11111<br> | 00000    | 0xA115/0x4115  |
| <b>Group A5: Control Optimization</b> |  |  |          |                |
| A5-00                                 | DPWM switchover frequency upper limit    | 0.00 Hz to max. frequency  | 12.00 Hz | 0xA500/0x4500  |
| A5-02                                 | Dead zone compensation mode selection    | 0: No compensation<br>1: Compensation mode 1   | 1        | 0xA502/0x4502  |
| A5-03                                 | Random PWM depth                         | 0: Random PWM invalid<br>1 to 10: PWM carrier frequency random depth                                 | 3        | 0xA503/0x4503  |
| A5-04                                 | Overcurrent fast prevention              | 0: Disabled<br>1: Enabled  | 1        | 0xA504/0x4504  |

| Para. No.                              | Para. Name  | Setting Range             | Default   | Comms. Address |
|--|---|---------------------------|---|----------------|
| A5-05                                  | Max. output voltage coefficient                               | 100% to 110%              | 103%  | 0xA505/0x4505  |
| A5-06                                  | Undervoltage threshold  | 140.0 to 420.0 V          | Single phase:<br>200.0 V<br>Three phase:<br>350.0 V | 0xA600/0x4600  |
| A5-08                                  | Low speed carrier frequency upper limit                       | 0.0 to 6.0 kHz            | 0.0   | 0xA508/0x4508  |
| A5-09                                  | Overvoltage threshold   | 200.0 to 820.0 V          | Single phase:<br>410.0 V<br>Three phase:<br>820.0 V | 0xA509/0x4509  |
| Group A6: AI Curve Setting             |   |                           |   |                |
| A6-24                                  | Jump point of AI1 input corresponding setting                 | -100.0% to 100.0%         | 0.0%  | 0xA618/0x4618  |
| A6-25                                  | Jump amplitude of AI1 input corresponding setting             | 0.0% to 100.0%            | 0.5%  | 0xA619/0x4619  |
| A6-26                                  | Jump point of AI2 input corresponding setting                 | -100.0% to 100.0%         | 0.0%  | 0xA61A/0x461A  |
| A6-27                                  | Jump amplitude of AI2 input corresponding setting             | 0.0% to 100.0%            | 0.5%  | 0xA61B/0x461B  |
| Group AA: FVC/SVC Extension Parameters |   |                           |   |                |
| AA-05                                  | SVC speed filter  | 5 to 32 ms                | 15 ms   | 0xAA05/0x4A05  |
| AA-06                                  | SVC speed feedback method                                     | 0 to 3                    | 0   | 0xAA06/0x4A06  |
| AA-07                                  | SVC magnetic field adjustment bandwidth                       | 0.5 to 8.0 Hz             | 4.0 Hz  | 0xAA07/0x4A07  |
| AA-08                                  | SVC magnetic field open loop control low speed current        | 30% to 150%               | 100   | 0xAA08/0x4A08  |
| AA-09                                  | Open loop control switchover frequency                        | 2.0 to 100.0 Hz           | 4.0 Hz  | 0xAA07/0x4A07  |
| AA-10                                  | Open loop control deceleration speed fluctuation coefficient  | 0 to 6                    | 3   | 0xAA0A/0x4A0A  |
| AA-11                                  | Open loop control acceleration/ deceleration time             | 0.1 to 1000.0s            | 50.0s   | 0xAA0B/0x4A0B  |
| AA-12                                  | Resistance identification upon startup                        | 0: Disabled<br>1: Enabled | 0   | 0xAA0C/0x4A0C  |
| AA-13                                  | Stator resistance coefficient 1 identification before startup | 0 to 65535                | Auto-tuning parameter                               | 0xAA0D/0x4A0D  |
| AA-14                                  | Stator resistance coefficient 2 identification before startup | 0 to 65535                | Auto-tuning parameter                               | 0xAA0E/0x4A0E  |
| AA-15                                  | Stator resistance coefficient 3 identification before startup | 0 to 65535                | Auto-tuning parameter                               | 0xAA0F/0x4A0F  |
| Group AC: AI/AO Correction             |   |                           |   |                |
| AC-00                                  | AI measured voltage 1   | -10.00 to 10.000 V        | 350.0 V   | 0xAC00/0x4C00  |
| AC-01                                  | AI displayed voltage 1  | -10.00 to 10.000 V        | Factory-corrected                                   | 0xAC01/0x4C01  |
| AC-02                                  | AI measured voltage 2   | -10.00 to 10.000 V        | Factory-corrected                                   | 0xAC02/0x4C02  |
| AC-03                                  | AI displayed voltage 2  | -10.00 to 10.000 V        | Factory-corrected                                   | 0xAC03/0x4C03  |

## 5 Parameter Table

| Para. No.  | Para. Name             | Setting Range      | Default           | Comms. Address |
|--|------------------------|--------------------|-------------------|----------------|
| AC-12  | AO target voltage 1    | -10.00 to 10.000 V | Factory-corrected | 0xAC0C/0x4C0C  |
| AC-13  | AO measured voltage 1  | -10.00 to 10.000 V | Factory-corrected | 0xAC0D/0x4C0D  |
| AC-14  | AO target voltage 2    | -10.00 to 10.000 V | Factory-corrected | 0xAC0E/0x4C0E  |
| AC-15  | AO measured voltage 2  | -10.00 to 10.000 V | Factory-corrected | 0xAC0F/0x4C0F  |
| Note: Parameters in groups A1 and A5 are not displayed by default. They can be displayed by setting FP-02. |                        |                    |                   |                |
| Group AE: AI/AO Manufacturer Correction Value  |                        |                    |                   |                |
| AE-00  | AI1 measured voltage 1 | -9.999 to 4.000 V  | 2.000 V           | 0xAE00/0x4E00  |
| AE-01  | AI1 sampled voltage 1  | -9.999 to 4.000 V  | 2.000 V           | 0xAE01/0x4E01  |
| AE-02  | AI1 measured voltage 2 | -9.999 to 9.999 V  | 8.000 V           | 0xAE02/0x4E02  |
| AE-03  | AI1 sampled voltage 2  | -9.999 to 9.999 V  | 8.000 V           | 0xAE03/0x4E03  |
| AE-12  | AO1 ideal voltage 1    | 0.500 to 4.000 V   | 2.000 V           | 0xAE0C/0x4E0C  |
| AE-13  | AO1 measured voltage 1 | 0.500 to 4.000 V   | 2.000 V           | 0xAE0D/0x4E0D  |
| AE-14  | AO1 ideal voltage 2    | 6.000 to 9.999 V   | 8.000 V           | 0xAE0E/0x4E0E  |
| AE-15  | AO1 measured voltage 2 | 6.000 to 9.999 V   | 8.000 V           | 0xAE0E/0x4E0E  |

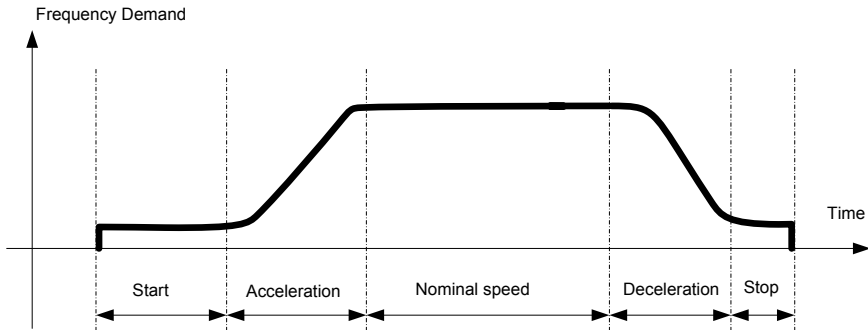
## 5.3 Monitoring Parameter

| Para. No                        | Para. Name                                     | Comms. Address |
|---------------------------------|--|----------------|
| Group U0: Monitoring Parameters |  |                |
| U0-00                           | Running frequency                              | 0x7000         |
| U0-01                           | Frequency reference                            | 0x7001         |
| U0-02                           | Bus voltage                                    | 0x7002         |
| U0-03                           | Output voltage                                 | 0x7003         |
| U0-04                           | Output current                                 | 0x7004         |
| U0-05                           | Output power                                   | 0x7005         |
| U0-06                           | Output torque                                  | 0x7006         |
| U0-07                           | DI state                                       | 0x7007         |
| U0-08                           | DO state                                       | 0x7008         |
| U0-09                           | AI voltage                                     | 0x7009         |
| U0-10                           | Communication protocol                         | 0x700A         |
| U0-11                           | External operating panel potentiometer voltage | 0x700B         |
| U0-12                           | Count value                                    | 0x700C         |
| U0-13                           | Length value                                   | 0x700D         |
| U0-14                           | Load speed display                             | 0x700E         |
| U0-15                           | PID reference                                  | 0x700F         |
| U0-16                           | PID feedback                                   | 0x7010         |
| U0-17                           | PLC stage                                      | 0x7011         |
| U0-18                           | Pulse reference                                | 0x7012         |
| U0-19                           | Feedback speed                                 | 0x7013         |
| U0-20                           | Remaining running time                         | 0x7014         |
| U0-21                           | AI voltage before correction                   | 0x7015         |

| Para. No                        | Para. Name                                     | Comms. Address |
|---------------------------------|--|----------------|
| Group U0: Monitoring Parameters |  |                |
| U0-22                           | External operating panel potentiometer voltage | 0x7016         |
| U0-24                           | Motor speed                                    | 0x7018         |
| U0-25                           | Accumulative power-on time                     | 0x7019         |
| U0-26                           | Accumulative running time                      | 0x701A         |
| U0-27                           | Pulse reference                                | 0x701B         |
| U0-28                           | Communication reference                        | 0x701C         |
| U0-30                           | Main frequency reference                       | 0x701E         |
| U0-31                           | Auxiliary frequency reference                  | 0x701F         |
| U0-32                           | Viewing any register address value             | 0x7020         |
| U0-35                           | Target torque                                  | 0x7023         |
| U0-37                           | Power factor angle                             | 0x7025         |
| U0-39                           | Target voltage upon V/F separation             | 0x7027         |
| U0-40                           | Output voltage upon V/F separation             | 0x7028         |
| U0-41                           | DI state display                               | 0x7029         |
| U0-42                           | DO state display                               | 0x702A         |
| U0-45                           | Fault information                              | 0x702D         |
| U0-59                           | Reserved                                       | 0x703B         |
| U0-60                           | Reserved                                       | 0x703C         |
| U0-61                           | AC drive state                                 | 0x703D         |
| U0-62                           | Current fault code                             | 0x703E         |
| U0-63                           | Reserved                                       | 0x703F         |
| U0-64                           | Number of slaves                               | 0x7040         |
| U0-65                           | Torque upper limit                             | 0x7041         |
| U0-69                           | Speed of transmitting DP                       | 0x7045         |
| U0-71                           | Communication card current display             | 0x7047         |
| U0-78                           | Linear speed                                   | 0x704E         |

## 6 Troubleshooting

## 6.1 AC Drive Performance Fine Tuning



| Stage         | Symptom                         | Diagnostics                                | Remedies  |
|---------------|---------------------------------|--|---|
| Start         | Rollback                        | Start frequency is too low                 | Increase F6-03, ranging 0 to 10 Hz  |
|               | Starting jerk                   | Torque output is insufficient              | Make sure F3-00 = 0, F3-01 = 0  |
| Acceleration  | Jerk when acceleration starts   | Start frequency is too high                | Decrease F6-03, ranging 0 to 10 Hz  |
|               | Jerk when acceleration end      | Too fast acceleration at this section      | Increase F6-08, ranging 0 to $(100-(F6-09))\%$<br>Or increase F0-17, ranging 0 to 6500s |
|               | Vibration                       | Too fast acceleration at this section      | Increase F6-09, ranging 0 to $(100-(F6-08))\%$<br>Or increase F0-17, ranging 0 to 6500s |
| Nominal speed | Vibration                       | Overcurrent stall prevention occurs        | It reaches current limit  |
| Deceleration  | Vibration                       | Too big current loop PI gains              | Double check the motor parameters and then perform motor auto-tuning once more          |
| Stop          | Jerk                            | Overcurrent stall prevention occurs        | it reaches current limit  |
|               | Slip                            | Too strong DC injection at stop            | Decrease F6-13, ranging 0 to 100%   |
|               |                                 | Too short DC injection active time at stop | Increase F6-14, ranging 0 to 100s   |
|               |                                 | Too weak DC injection at stop              | Increase F6-13, ranging 0 to 100%   |
|               | Braking device applies too late | check the timing of braking device         |   |

## 6.2 Fault Codes and Troubleshooting

| Display | Fault Name                      | Possible Causes   | Solutions  |
|---------|---------------------------------|---|--|
| Err02   | Overcurrent during acceleration | Ground fault or short circuit exists in the output circuit.                           | Check whether short-circuit occurs on the motor, the motor cable or contactor.   |
|         |                                 | Acceleration time is too short.   | Increase acceleration time.  |
|         |                                 | Customized torque boost or V/F curve is not appropriate.                              | Adjust the customized torque boost or V/F curve.                                 |
|         |                                 | The voltage is too low.   | Adjust the voltage to normal range.  |
|         |                                 | The spinning motor is started.  | Enable the catching a spinning motor function or start the motor after it stops. |
|         |                                 | A load is added suddenly during acceleration.   | Cancel the suddenly added load.  |
|         |                                 | The AC drive power class is small.  | Replace a drive of larger power class.   |
|         |                                 | The braking resistor resistance is small.<br>The braking resistor is short circuited. | Replace a new braking resistor.  |
| Err03   | Overcurrent during deceleration | Ground fault or short circuit exists in the output circuit.                           | Check whether short-circuit occurs on motor, motor cable or contactor.           |
|         |                                 | Acceleration time is too short.   | Increase acceleration time.  |
|         |                                 | The voltage is too low.   | Adjust the voltage to normal range.  |
|         |                                 | A load is added suddenly during deceleration.   | Cancel the suddenly added load.  |
|         |                                 | Braking unit and braking resistor are not installed.                                  | Install braking unit and braking resistor.                                       |
|         |                                 | The braking resistor resistance is small.<br>The braking resistor is short circuited. | Replace a new braking resistor.  |
| Err04   | Overcurrent at constant speed   | Ground fault or short circuit exists in the output circuit.                           | Check whether short-circuit occurs on the motor, motor cable or contactor.       |
|         |                                 | The voltage is too low.   | Adjust the voltage to normal range.  |
|         |                                 | A load is added suddenly during running.  | Cancel the suddenly added load.  |
|         |                                 | The AC drive power class is small.  | Replace a drive of larger power class.   |
|         |                                 | The braking resistor resistance is small.<br>The braking resistor is short circuited. | Replace a new braking resistor.  |
| Err05   | Overvoltage during acceleration | Input voltage is too high.  | Adjust input voltage to normal range.  |
|         |                                 | An external force drives motor during acceleration.                                   | Cancel the external force.   |
|         |                                 | Braking unit and braking resistor are not installed.                                  | Install braking unit and braking resistor.                                       |
|         |                                 | Acceleration time is too short.   | Increase acceleration time.  |
| Err06   | Overvoltage during deceleration | Input voltage is too high.  | Adjust input voltage to normal range.  |
|         |                                 | An external force drives motor during deceleration.                                   | Cancel the external force or install braking resistor.                           |
|         |                                 | Deceleration time is too short.   | Increase deceleration time.  |
|         |                                 | Braking unit and braking resistor are not installed.                                  | Install braking unit and braking resistor.                                       |
| Err07   | Overvoltage at constant speed   | Input voltage is too high.  | Adjust input voltage to normal range.  |
|         |                                 | An external force drives motor during running.  | Cancel the external force or install a braking resistor                          |
| Err08   | Control power fault             | Input voltage is not within the permissible range.                                    | Adjust the input voltage in the permissible range.                               |



| Display       | Fault Name               | Possible Causes  | Solutions  |
|---------------|--------------------------|--|--|
| <b>Err09</b>  | Undervoltage             | Instantaneous power failure occurs   | Reset the fault.   |
|               |                          | The AC drive's input voltage is not within the permissible range.                                    | Adjust the voltage to normal range.  |
|               |                          | The bus voltage is abnormal.   | Replace the AC drive.  |
|               |                          | The rectifier bridge, the pre-charge resistor, the drive board or the control board are abnormal.    | Replace the AC drive.  |
| <b>Err 10</b> | Drive overload           | Load is too heavy or locked-rotor occurs on motor.   | Reduce load or check motor and mechanical conditions.  |
|               |                          | The AC drive power class is small.   | Replace a drive of larger power class.   |
| <b>Err 11</b> | Motor overload           | F9-01 (Motor overload protection gain) is set improperly.  | Set F9-01 correctly.   |
|               |                          | Load is too heavy or locked-rotor occurs on motor.   | Reduce load or check motor and mechanical conditions.  |
|               |                          | The AC drive power class is small.   | Replace a drive of larger power class.   |
| <b>Err 12</b> | Input phase loss         | Three phase input is abnormal.   | Eliminate faults in external circuitry.  |
|               |                          | Drive board is abnormal.   |  |
|               |                          | Lightning protection board is abnormal.  | Contact the agent or Inovance.   |
|               |                          | Control board is abnormal.   |  |
| <b>Err 13</b> | Output phase loss        | Motor winding is damaged.  | Check resistance between motor cables.<br>Replace motor is winding is damaged.                 |
|               |                          | The cable connecting the AC drive and the motor is abnormal.   | Check for wiring errors and ensure the output cable is connected properly.                     |
|               |                          | The AC drive's three-phase outputs are unbalanced when the motor is running.                         | Check whether the motor three-phase winding is normal.   |
|               |                          | The drive board or the IGBT is abnormal.   | Replace the AC drive.  |
| <b>Err 14</b> | IGBT overheat            | The ambient temperature is too high.   | Lower the ambient temperature.   |
|               |                          | The ventilation is clogged.  | Clean the ventilation.   |
|               |                          | The fan is damaged.  | Replace the cooling fan.   |
|               |                          | Thermally sensitive resistor of IGBT is damaged.   | Replace the AC drive.  |
|               |                          | The AC drive IGBT is damaged.  | Replace the AC drive.  |
| <b>Err 15</b> | External equipment fault | External fault signal is input via DI.   | Confirm that the mechanical condition allows restart (F8-18) and reset the operation.          |
|               |                          | External fault signal is input via virtual I/O.  | Confirm that the virtual I/O parameters in group A1 are set correctly and reset the operation. |
| <b>Err 16</b> | Communication fault      | Host computer is in abnormal state.  | Check the cable of host computer.  |
|               |                          | Communication cable is abnormal.   | Check the communication cables.  |
|               |                          | Communication parameters in group Fd are set improperly.   | Set communication parameters in group Fd properly.   |
|               |                          | After all the preceding checkings are done but the fault still exists, restore the default settings. |  |
| <b>Err 18</b> | Current detection fault  | The drive board is abnormal.   | Replace the AC drive.  |
| <b>Err21</b>  | EEPROM read-write fault  | EEPROM chip is damaged   | Replace the AC drive.  |
| <b>Err23</b>  | Short circuit to ground  | Motor is short circuited to the ground.  | Replace cable or motor.  |
|               |                          | Top tube of the AC drive is damaged. Ask professional to check.                                      | Replace the AC drive.  |

| Display      | Fault Name                         | Possible Causes  | Solutions  |
|--------------|------------------------------------|--|--|
| <b>Err26</b> | Accumulative running time reached  | Accumulative running time reaches the setting value.   | Clear the record through parameter initialization.   |
| <b>Err27</b> | User-defined fault 1               | User-defined fault 1 is input via DI.  | Reset the operation.   |
|              |                                    | User-defined fault 1 is input via virtual I/O.   |  |
| <b>Err28</b> | User-defined fault 2               | User-defined fault 2 is input via DI.  | Reset the operation.   |
|              |                                    | User-defined fault 2 is input via virtual I/O.   |  |
| <b>Err29</b> | Accumulative power-on time reached | Accumulative power-on time reaches the setting value.  | Clear the record through parameter initialization.   |
| <b>Err30</b> | Off load fault                     | The output current of AC drive is smaller than F9-64 (load loss detection level).  | Check whether load is disconnected or the setting of F9-64 and F9-65 (load lost detection time) satisfies actual running condition.  |
| <b>Err31</b> | PID feedback lost during running   | PID feedback is smaller than the setting value of FA-26 (detection level of PID feedback loss).                                      | Check PID feedback or set FA-26 properly.  |
| <b>Err40</b> | Quick current limit                | Load is too heavy or locked-rotor occurs on motor.   | Reduce load or check motor and mechanical conditions.  |
|              |                                    | The AC drive power class is small.   | Replace a drive of larger power class.   |
| <b>Err55</b> | Slave faulty in speed synchronous  | When speed synchronous is enabled, the master receives CAN communication data but does not detect the slave. Then Err55 is reported. | <ol style="list-style-type: none"> <li>1. Check the slave CAN communication cable connection.</li> <li>2. Check whether CAN communication of the slave is normal.</li> </ol> |

### 6.3 Symptoms and Diagnostics

| Fault Name   | Possible Causes  | Solutions  |
|--|--|--|
| There is no display at power-on. <b>HC</b>           | The mains voltage is not input or too low.                         | Check the power supply.  |
|  | The AC Drive is damaged.   | Replace the AC drive.  |
| <b>HC</b> is displayed at power-on.                  | Cable between drive board and control board is in poor contact.    | Re-connect the 4-pin cable and 28-pin cable.                             |
|  | Control board is damaged   | Replace the AC drive.  |
|  | The motor or motor cable is short circuited to ground.             | Check whether short-circuit occurs on motor, motor cable or contactor.   |
|  | The mains voltage is too low.                                      | Check the power supply.  |
| <b>Err14</b> (IGBT overheat) is detected frequently. | The setting of carrier frequency is too high.                      | Reduce carrier frequency (F0-15).  |
|  | The cooling fan is damaged, or ventilation is clogged.             | Replace the fan or clean the ventilation.                                |
|  | Components inside the AC drive are damaged (thermistor or others). | Replace the AC drive.  |
| The motor does not rotate after the AC drive runs.   | It is motor or motor cable problem.                                | Check that wiring between AC drive and motor is normal.                  |
|  | Related AC drive and motor parameters are set improperly.          | Restore the factory parameters and re-set the motor parameters properly. |
|  | The drive board is faulty.   | Replace the AC drive.  |
| The DI terminals are disabled.                       | Related parameters are set incorrectly.                            | Check and set parameters in group F4 again.                              |
|  | External signals are incorrect.                                    | Re-connect external signal cables.                                       |
|  | The control board is damaged.                                      | Replace the AC drive.  |

## 6 Troubleshooting

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| Fault Name   | Possible Causes                             | Solutions  |
|--|---|--|
| The AC drive detects overcurrent and overvoltage frequently. | Motor parameters are set improperly.        | Set motor parameters or perform motor auto-tuning again. |
|  | Acceleration/deceleration time is improper. | Set proper acceleration/deceleration time.               |
|  | Load fluctuates.                            | Contact the agent or Inovance.                           |

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## Revision History

| Date     | Version | Change Description  |
|----------|---------|---|
| Jan 2016 | V0.0    | Related firmware version: F7-10 = U10.05 and F7-11 = U0.06  |
| Mar 2016 | A01     | Related firmware version: F7-10 = U10.06 and F7-11 = 001.00   |
| Nov 2016 | A02     | Modified Approvals, designation rule and nameplate<br>Added information of three-phase model  |
| May 2017 | A03     | Modified information of three-phase model<br>Modified information of parameters<br>Added mechanical installation and CE certification |
| Sep 2017 | A04     | Added single-phase and three-phase -NC model<br>Added F4-04 parameter<br>Added three-phase filter and reactor model selection         |

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