



User Guide

# MD500 AC Drive

High Performance

Open and Closed Loop



A01

Data Code: 19010374

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## Safety Information and Precautions

This User Guide is packaged together with the MD500 AC drive. It contains basic information for quick start of the drive. For safety and more information, please refer to the MD500 Advanced User Guide, which can be downloaded on the website <http://www.inovance.cn>.

### ■ 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.

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.

The installer of the AC 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 performance). Within the European Union, all machinery in which this product is used must comply with required directives.

### ■ 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 600 to 700 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 inverter 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 DC bus voltage with a VDC meter before accessing the inverter 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 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 a cross-section of at least 10 mm<sup>2</sup> (Cu) or 16 mm<sup>2</sup> (Al) must be used. 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 200 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



CE mark indicates compliance with European safety and environmental regulations. It is required for engaging in business and commerce in Europe.

European standards include the Machinery Directive for machine manufacturers, the Low Voltage Directive for electronics manufacturers, and EMC guidelines for controlling noise.

The drive with CE mark meets the following EMC guidelines and the Low Voltage Directive.

- 2014/35/EU: Low Voltage Directive
- 2014/30/EU: Electromagnetic compatibility

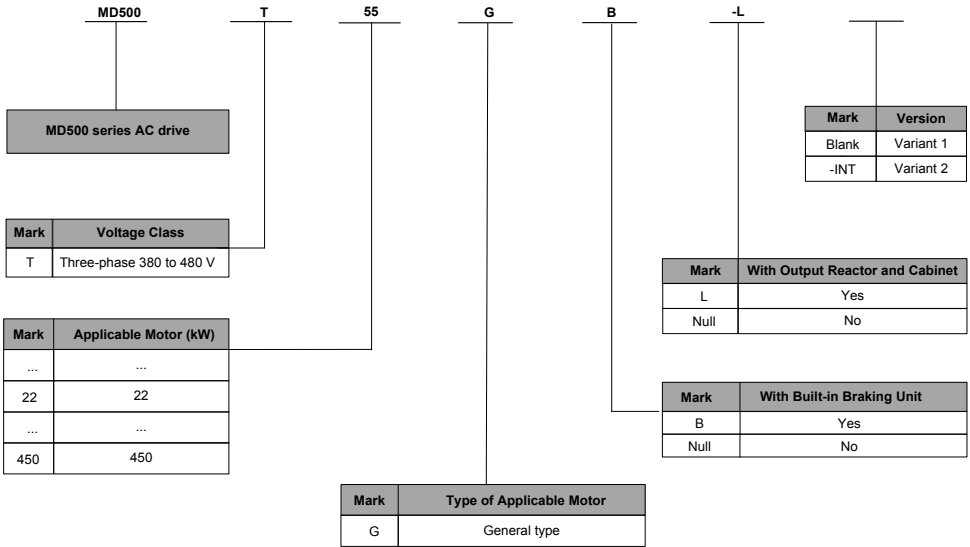
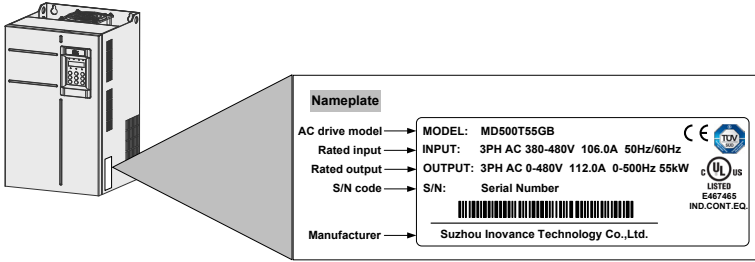
Machines and devices used in combination with this drive must also be CE certified and marked. The integrator who integrates the drive with the CE mark in into other devices has the responsibility of ensuring compliance with CE standards and verifying that conditions meet European standards.

## ■ Motor Thermal Protection

Motor thermal protection is not assessed by UL.

# 1. Product Information

## 1.1 Nameplate and Designation Rule



## 1.2 General Specifications

Table 1-1 Ratings of MD500T18.5GB to Ratings of MD500T160G

Voltage Class		380 to 480 VAC											
Model: MD500TxxxG(B <sup>(1)</sup> )		18.5	22	30	37	45	55	75	90	110	132	160	
Frame Size		T5		T6		T7		T8			T9		
Dimension	Height	[H]: 350 mm		[H]: 400 mm		[H1]: 540 mm		[H1]: 576 mm			[H1]: 915 mm		
	Width	[W]: 210 mm		[W]: 250 mm		[W]: 300 mm		[W]: 338 mm			[W]: 400 mm		
	Depth	[D]: 192 mm		[D]: 220 mm		[D]: 275 mm		[D]: 315 mm			[D]: 320 mm		
Mounting Hole (mm)		Φ6		Φ7		Φ10		Φ10			Φ10		
Depth	Rated input voltage		Three-phase 380 to 480V, -15% to +10%										
	Mounting Hole (mm)		49.5	59	57	69	89	106	139	164	196	240	287
	Rated input frequency		50/60 Hz, ±5%										
	Power capacity, [kVA]		45	54	52	63	81	97	127	150	179	220	263
Drive Output	Applicable motor	[kW]	18.5	22	30	37	45	55	75	90	110	132	160
		[HP]	25	30	40	50	60	75	100	120	150	180	220
	Output current, [A]		37	45	60	75	91	112	150	176	210	253	304
	Default carrier frequency, [kHz]		6	6	6	5	5	4	3	3	3	3	3
	Overload capacity		150% for 60 Sec										
	Max. output voltage		Three-phase 380 to 480 VAC (proportional to input voltage)										
	Max. output frequency		50 to 500 Hz										
Braking Resistor	Recommended power, [kW]		4	4.5	6	7	9	11	15	18	22	26	32
	Recommended resistance, [Ω]		32	27	10	16	13	10.5	7.7	6.4	5.3	4.4	3.6
Thermal Design	Thermal design power, [kW]		0.478	0.551	0.694	0.815	1.01	1.21	1.57	1.81	2.14	2.85	3.56
	Air flow, [CFM]		51.9	57.4	118.5	118.5	122.2	122.2	218.6	287.2	342.2	547	627
Enclosure		IP20											

**Note**
<sup>(1)</sup>: "B" denotes build-in brake function, for model MD500T18.5G to MD500T75G.

Figure 1-1 Overall dimensions of MD500T18.5GB to MD500T37GB (plastic housing)

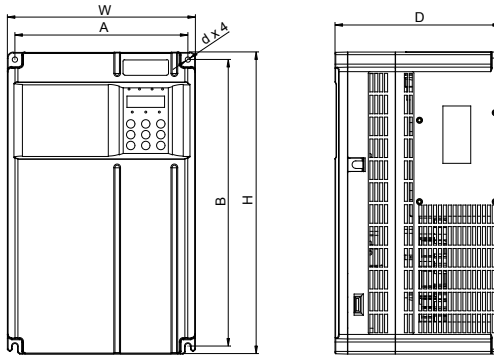


Figure 1-2 Overall dimensions of MD500T45GB to MD500T160G (sheet metal housing)

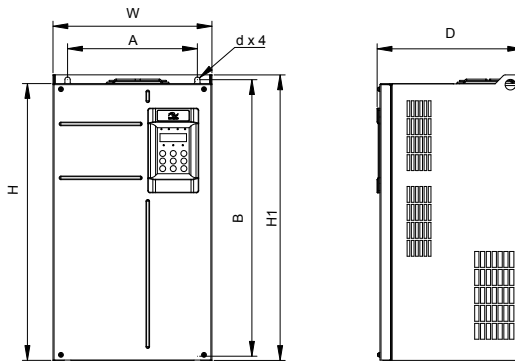


Table 1-2 Ratings of MD500T200G(-L) to MD500T450G(-L)

Voltage Class		380 to 480 VAC									
Model: MD500TxxxG(-L)		200	220	250	280	315	355	400	450		
Frame size		T10		T11		T12					
Dimension (MD500TxxxG)	Height	[H1]: 1134 mm		[H1]: 1284 mm		[H1]: 1405 mm					
	Width	[W]: 300 mm		[W]: 330 mm		[W]: 340 mm					
	Depth	[D]: 500 mm		[D]: 545 mm		[D]: 545 mm					
Dimension (MD500TxxxG-L)	Height	[H1]: 1472 mm		[H1]: 1622 mm		[H1]: 1733 mm					
	Width	[W]: 300 mm		[W]: 330 mm		[W]: 340 mm					
	Depth	[D]: 500 mm		[D]: 545 mm		[D]: 545 mm					
Mounting Hole (mm)		Φ13				Φ16					
Drive Input	Rated input voltage		Three-phase 380 to 480V, -15% to +10%								
	Rated input current [A]		365	410	441	495	565	617	687	782	
	Rated input frequency		50/60 Hz, ±5%								
	Power capacity, [kVA]		334	375	404	453	517	565	629	716	
Drive Output	Applicable motor	[kW]	200	220	250	280	315	355	400	450	
		[HP]	267	293	333	373	420	473	533	600	
	Output current, [A]		377	426	465	520	585	650	725	820	
	Default carrier frequency [kHz]		3	3	3	3	3	3	3	3	
	Overload capacity		150% for 60 Sec							130% for 60 Sec	
	Max. output voltage		Three-phase 380 to 480 VAC (proportional to input voltage)								
Max. output frequency		50 to 500 Hz									
Braking Resistor	Recommended power, [kW]		38	42	48	54	60	69	78	87	
	Recommended resistance, [Ω]		2.9	2.7	2.3	2.1	1.9	1.7	1.5	1.3	
Thermal Design	Thermal design power, [kW]		4.15	4.55	5.06	5.33	5.69	6.31	6.91	7.54	
	Air flow, [CFM]		638.4	722.5	789.4	882	645	860	860	860	
Enclosure		IP00									

Figure 1-3 Overall dimensions of MD500T200G to MD500T400G

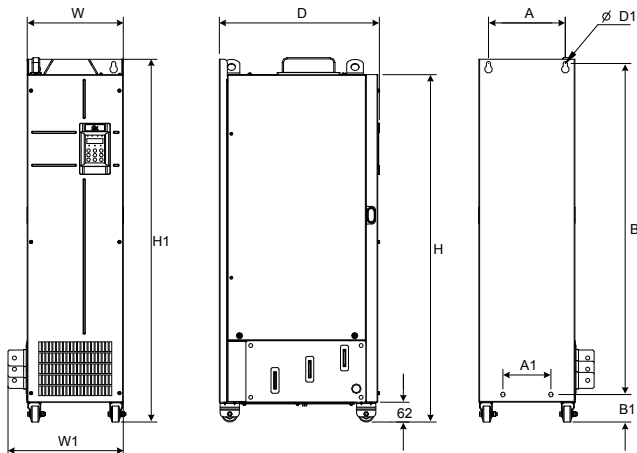
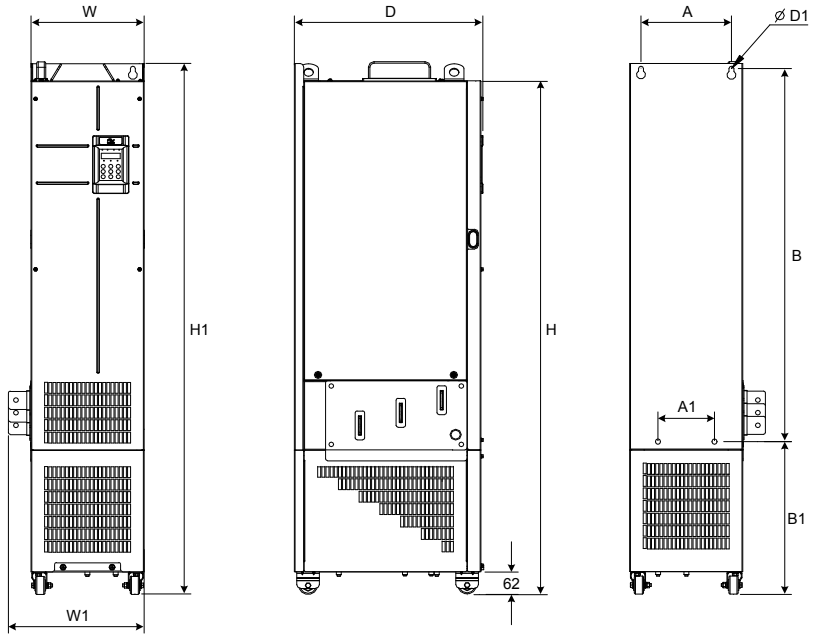




Figure 1-4 Overall dimensions of MD500T200G-L to MD500T450G-L (with output AC reactor)

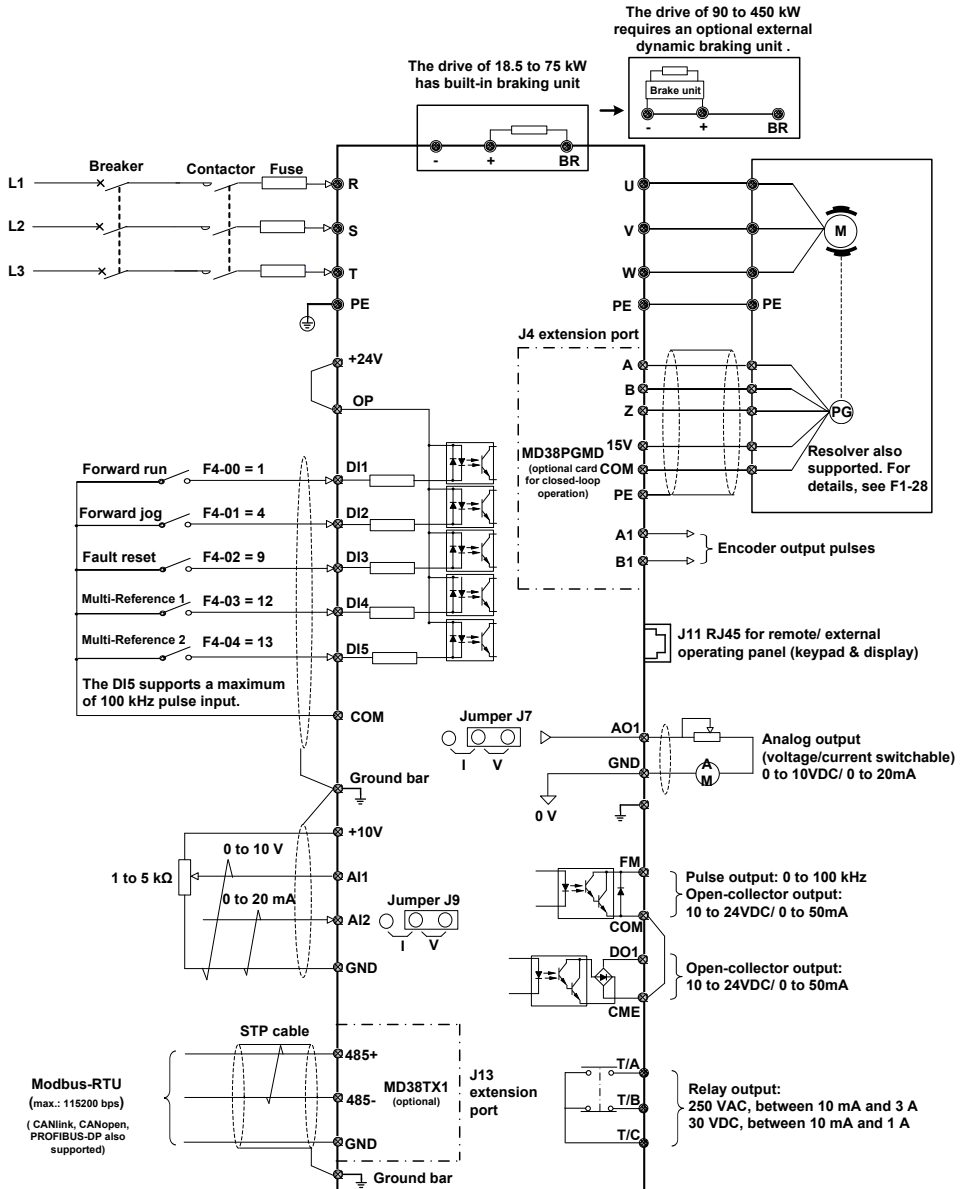


### 1.3 Environment

Item	Requirements
Altitude	Below 1000 m. 1% current derating current per 100 m at 1000 m to 3000 m Max. 3000 m allowed For altitudes above 3000 m, contact Inovance regarding PELV.
Storage Temperature	-25°C to +70°C
Operating Temperature	-10°C to +40°C 1.5% current derating per 1°C at 40°C to 50°C. Max. 50°C allowed
Max. Humidity	≤95%RH, no-condensing
Vibration	≤0.6g
Running Environment	PD2
Power Supply System	TT/TN IT (Remove the screws of VDR and EMC filter according to 2.4.)
Overtoltage category	OVC III
Enclosure	IP20 for 160kW and below, and IP00 for 200kW and large.

## 2 Wiring

### 2.1 Typical System Connection



## 2.2 Terminal Description

### ■ Terminals of Main Circuit

Figure 2-1 Main circuit terminals of MD500T18.5GB to MD500T37GB

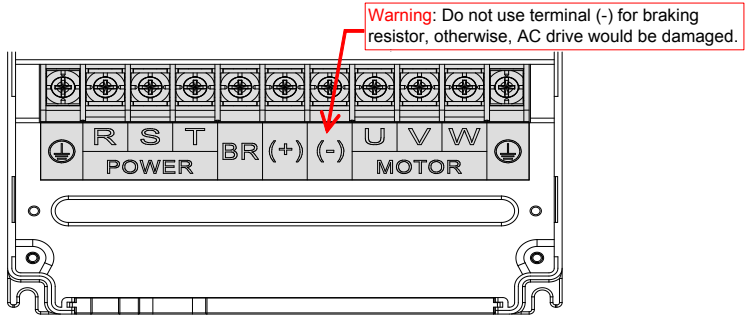


Figure 2-2 Main circuit terminals of MD500T45GB to MD500T160G

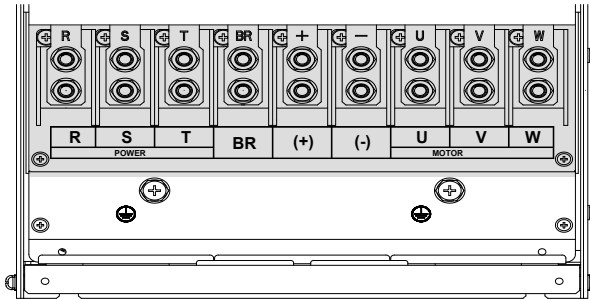
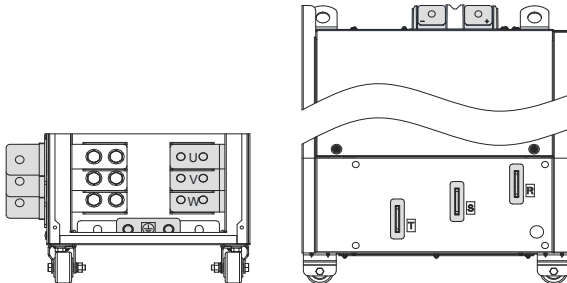

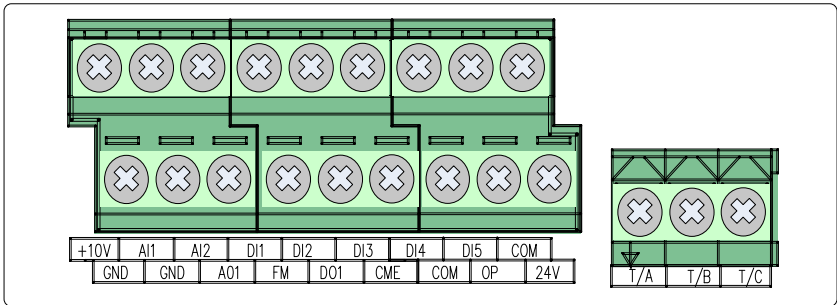
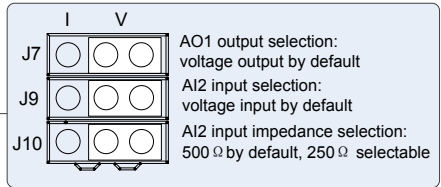
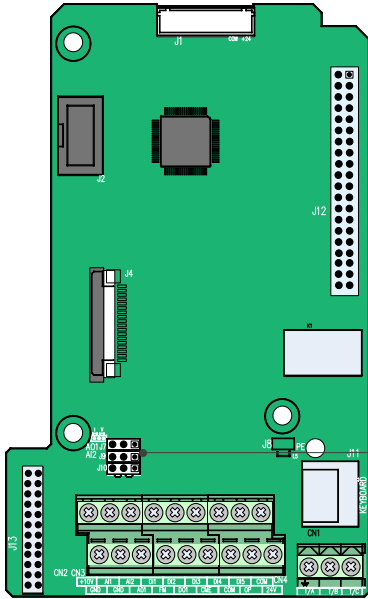


Figure 2-3 Main circuit terminals of MD500T200G to MD500T450G



Terminal	Terminal Name	Description
R, S, T	Three-phase supply input	Connect to the three-phase AC power supply.
(-), (+)	DC bus terminals	Connected to external braking unit (MDBUN) with AC drive units of 90 kW and above.
BR, (+)	Braking resistor connection	Connected to external braking resistor for AC drive units of 75 kW and below.
U, V, W	Output terminals	Connect to a three-phase motor.
	Ground (PE)	Grounding connection.

■ Terminals of Main Control Board



Terminal	Terminal Name	Description
+10V-GND	+10 VDC power supply	Provides +10 V power supply to an external unit. Generally used to supply an external potentiometer of 1 to 5 kΩ. Max. output current: 10 mA
+24V-COM	+24 VDC power supply	Provides +24 V power supply to an external unit. Generally used to supply the DI/DO terminals and external sensors. Max. output current: 170 mA.
OP	Input terminal for external power supply	Connected to +24 V by default. When DI1 to DI5 need to be driven by external signals, OP must be disconnected from + 24 V and connected to an external power supply.
AI1-GND	Analog input 1	Voltage range of inputs: 0 to 10 VDC; Input impedance: 22 kΩ

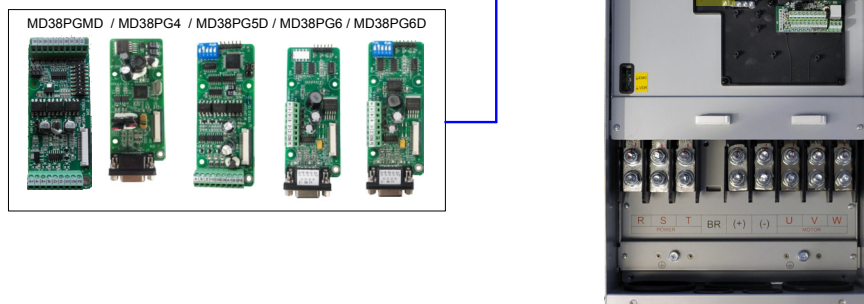
## 2 Wiring

Terminal	Terminal Name	Description
AI2-GND	Analog input 2	Either a voltage or a current input, determined by jumper J9; Input voltage range: 0 to 10 VDC Input current range: 0 to 20 mA Input impedance: 22 k $\Omega$ (voltage input), 500 $\Omega$ or 250 $\Omega$ (current input) decided by J10
DI1-COM	Digital input 1	Optically-coupled isolation compatible with dual-polarity inputs Input impedance: 1.39 k $\Omega$ Voltage range for inputs: 9 to 30 V
DI2-COM	Digital input 2	
DI3-COM	Digital input 3	
DI4-COM	Digital input 4	
DI5-COM	High-speed pulse input	In addition to having the same features as DI1 to DI4, DI5 can also be used for high-speed pulse inputs. Max. input frequency: 100 kHz Input impedance: 1.03 k $\Omega$
AO1-GND	Analog output 1	Either a voltage or a current output, determined by jumper J7. Output voltage range: 0 to 10 V Output current range: 0 to 20 mA.
DO1-CME	Digital output 1	Optically-coupled isolation, dual-polarity open-collector output. Output voltage range: 0 to 24 V Output current range: 0 to 50 mA. Note that CME and COM are internally insulated, but are shorted externally by a jumper. In this case, DO1 is driven by +24 V by default. Remove the jumper link if you need to apply external power to DO1
FM-COM	High-speed pulse output	Controlled by F5-00 (FM terminal output selection). Max. output frequency: 100 kHz. When used as an open-collector output, the specification is the same as for DO1.
T/A-T/B	Normally closed terminal	Contact driving capacity: 250 VAC, 3 A, Cos $\phi$ = 0.4, 30 VDC, 1 A. Applies to overvoltage Category II circuit
T/A-T/C	Normally open terminal	
Auxiliary interfaces		
J13	Extension card interface	Interface for the 28-core terminal and optional cards (I/O extension card, PLC card and various bus cards)
J4	PG card interface	Open-collector, UVW and Resolver are selectable options.
J11	External operating panel interface	Connected to an external operating panel.
Jumpers		
J7	AO1 output selection	Either a voltage or a current output, voltage output by default
J9	AI2 input selection	Either a voltage or a current input, voltage input by default.
J10	AI2 input resistance selection	Either 500 $\Omega$ or 250 $\Omega$ input, 500 $\Omega$ input by default

## 2.3 Extension PG Cards

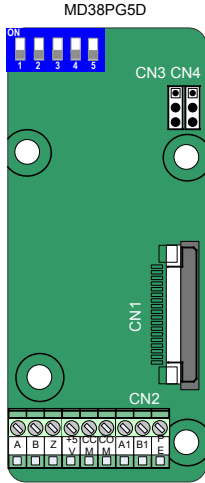
The MD500 supports different types of encoders. This chapter describes installation and use of these extension PG cards. For more details, refer to the user guide that is delivered together with product.

The following figure shows the mounting positions of these extension PG cards.

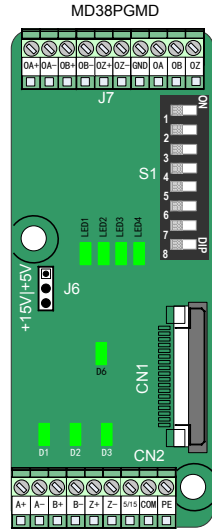


The following table lists the extension PG cards that are available for use with the drive.

Name	Model	Function	Frequency Dividing Coefficient	Remark
Resolver interface card	MD38PG4	For use with a resolver that has an excitation frequency of 10 kHz. The card has a DB9 interface.	Without frequency dividing function	Available for all models.
Open-collector encoder interface card	MD38PG5D	Open-collector encoder interface card with optional multiplying frequency division output. Requires a 15 VDC power supply.	2 to 62 even frequency dividing	Available for all models.
Differential encoder interface card	MD38PG6	Requires a 5 VDC power supply. The card has a DB9 interface.	1:1 frequency dividing	Available for all models.
Differential encoder interface card	MD38PG6D	With optional multiplying frequency division output. Requires a 5 VDC power supply. The card has a DB9 interface.	2 to 62 even frequency dividing	Available for all models.
Multi-functional encoder card	MD38PGMD	Compatible of differential input, open-collector input, push-pull input Supports differential output and open-collector output	0 to 63 frequency dividing	Available for all models.

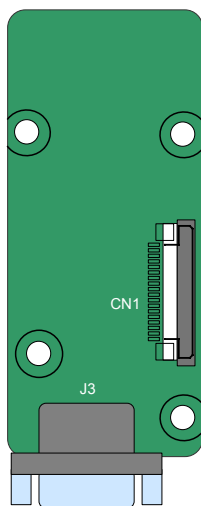


MD38PG5D Specification	
User interface	Oblique terminal block
Clearance	3.5 mm
Screw	Flathead
Pluggable	No
Cable specification	26 to 16 AWG (0.1 to 1.3 mm <sup>2</sup> )
Max. frequency	100 kHz
Frequency dividing coefficient	2 to 62 (even number)

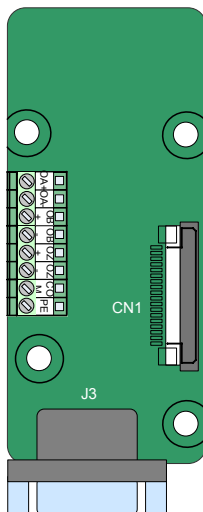


MD38PGMD Specification	
User interface	Oblique terminal block
Clearance	3.5 mm
Screw	Flathead
Cable specification	26 to 16 AWG (0.1 to 1.3 mm <sup>2</sup> )
Max. frequency	Differential: 500 kHz Open-collector: 100 kHz
Frequency dividing coefficient	0 to 63
Encoder power supply	5 V/200 mA, 15 V/100 mA
Encoder interface type	Differential, open-collector, push-pull
Frequency dividing interface type	Differential, open-collector

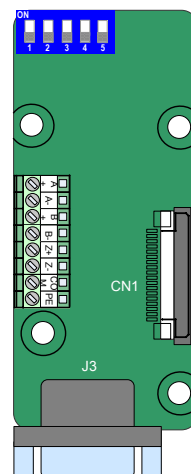
MD38PG4



MD38PG6



MD38PG6D



MD38PG4 Specification	
User interface J3	DB9 female plug
Pluggable	Yes
Cable specification	26 to 21 AWG (0.1 to 0.4 mm <sup>2</sup> )
Resolution	12-bit
Excitation frequency	10 kHz
Differential input limit	≤ 7 V
Frequency dividing	Without this function

MD38PG6 Specification	
User interface J3	DB9 female plug
Pluggable	Yes
Cable specification	26 to 21 AWG (0.1 to 0.4 mm <sup>2</sup> )
Max. frequency	500 kHz
Differential input limit	≤ 7 V
User interface J7, J8	Oblique terminal block
Clearance	3.5 mm
Screw	Flathead
Pluggable	No
Frequency dividing rate	500 kHz
Frequency dividing coefficient	1:1

MD38PG6D Specification	
User interface J3	DB9 female plug
Pluggable	Yes
Cable specification	26 to 21 AWG (0.1 to 0.4 mm <sup>2</sup> )
Max. frequency	500 kHz
Differential input limit	≤ 7 V
User interface J7, J8	Oblique terminal block
Clearance	3.5 mm
Screw	Flathead
Pluggable	No
Frequency dividing rate	500 kHz
Frequency dividing coefficient	2 to 62 (even number)



## ■ Extension PG Card (MD38PGMD)

Table 2-1 Terminal descriptions of MD38PGMD

Terminal		Function Description
CN2	A+	Encoder output signal A positive
	A-	Encoder output signal A negative
	B+	Encoder output signal B positive
	B-	Encoder output signal B negative
	Z+	Encoder output signal Z positive
	Z-	Encoder output signal Z negative
	5V/15V	Encoder 5V/15V power supply
	COM	Encoder power ground
	PE	Shield connecting point
J7	OA+	Differential frequency dividing output signal A positive
	OA-	Differential frequency dividing output signal A negative
	OB+	Differential frequency dividing output signal B positive
	OB-	Differential frequency dividing output signal B negative
	OZ+	Differential frequency dividing output signal Z positive
	OZ-	Differential frequency dividing output signal Z negative
	GND	Frequency dividing output reference ground
	OA	Open-collector frequency dividing output signal A
	OB	Open-collector frequency dividing output signal B
	OZ	Open-collector frequency dividing output signal Z
CN1	18-pin FFC interface, connecting to J4 on the control board of the AC drive	

### • DIP Switch Setting

Filter Selection		Definition	Address Setting					Value	Frequency Dividing Coefficient	DIP Switch	
8	7		6	5	4	3	2				1
0	0	Non-self-adaptive filter	0	0	0	0	0	0	Reserved	No output	
			0	0	0	0	0	1	1	Frequency divided by 1	
0	1	Self-adaptive filter	0	0	0	0	1	0	2	Frequency divided by 2	
			0	0	0	0	1	1	3	Frequency divided by 3	
1	0	Fixed inter-lock	...								
			1	1	1	1	0	1	61	Frequency divided by 61	
1	1	Automatic inter-lock	1	1	1	1	1	0	62	Frequency divided by 62	
			1	1	1	1	1	1	63	Frequency divided by 63	

- Indicators

Indicator	Indication	State	Description
D1/D2/D3	Encoder input signal indicator	ON or flash	The encoder has signal input.
		OFF	The encoder does not have signal input.
D6	Power indicator	ON	Normal.
		OFF	Power is not connected.
LED1	Encoder input signal quality indicator	ON	Input signal is slightly instable, which occurs when motor accelerates/decelerates or encoder signal input suffers slight interference.
		OFF	Input signal is normal, speed is stable and there is no interference.
		Flash slowly	Input signal is moderately instable, which occurs when motor accelerates/decelerates or encoder signal input suffers moderate interference.
		Flash quickly	Input signal is seriously instable, which occurs when motor accelerates/decelerates quickly or encoder signal input suffers severe interference.
LED2	Signal processing quality indicator	ON	Signal is slightly instable, which occurs when motor accelerates/decelerates or interference during signal input is not completely filtered (The number of interference pulses that are not filtered is less than 10 per time unit).
		OFF	Signal processing is normal, speed is stable and there is no interference.
		Flash slowly	Signal is moderately instable, which occurs when motor accelerates/decelerates or interference during signal input is not completely filtered (The number of interference pulses that are not filtered is less than 30 per time unit).
		Flash quickly	Signal is seriously instable, which occurs when motor accelerates/decelerates or interference during signal input is not completely filtered (The number of interference pulses that are not filtered is more than 30 per time unit).
LED3	Inter-lock state indicator	ON	Inter-lock enabled.
		OFF	Inter-lock disabled.
LED4	System state indicator	ON	Normal.
		OFF	The system is not operating or abnormal.
		Flash	The encoder cable breaks.

■ Extension Resolver Card (MD38PG4)

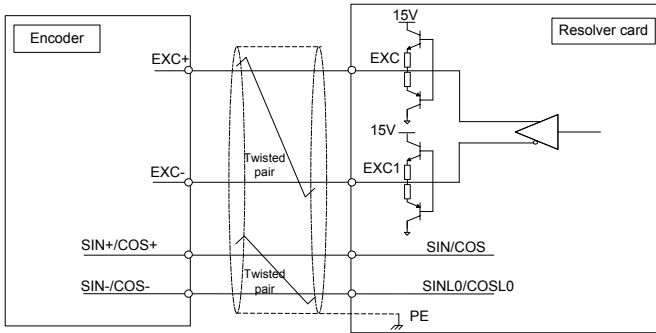
Table 2-2 Terminal descriptions of MD38PG4

Terminal	Pin	Definition	Function Description	Pin Arrangement
CN2	1	EXC1	Resolver excitation negative	
	2	EXC	Resolver excitation positive	
	3	SIN	Resolver feedback SIN positive	
	4	SINLO	Resolver feedback SIN negative	
	5	COS	Resolver feedback COS positive	
	6, 7, 8	NC	Vacant internally	
	9	COSLO	Resolver feedback COS positive	
CN1	18-pin FFC interface, connecting to J4 on the control board of the AC drive			

• Indicators

Indicator State	MD38PG4 Fault State	Description
D5 (ON), D6 (ON)	Signal SIN/COS amplitude too small	Generally, DB9 is not connected or wrongly connected, or even wire breaks. If the preceding conditions do not occur, check whether the resolver matches MD38PG4.
D5 (ON), D6 (OFF)	Phase-lock loop unlocked	Phase lag of the resolver is very large.
D5 (OFF), D6 (ON)	Signal SIN/COS amplitude exceeding the upper limit	It is caused by interference. Ground the motor well and connect the ground point of the resolver card to PE of the drive.
D5 (OFF), D6 (OFF)	Normal	-

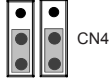
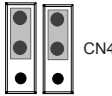
Wiring of MD38PG4 is shown as follows:



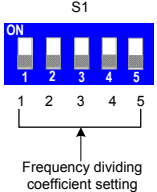
<b>Note</b>	<ul style="list-style-type: none"> <li>• Selection of resolver must satisfy parameter setting requirement of MD38PG4. Especially excited input DC resistance must be larger than 17 Ω (can be measured by multimeter). Otherwise, MD38PG4 cannot work normally.</li> <li>• It is suggested to select a resolver with a maximum of four pole-pairs. Otherwise, MD38PG4 will be overloaded.</li> </ul>
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■ Extension Open-collector PG Card (MD38PG5D)

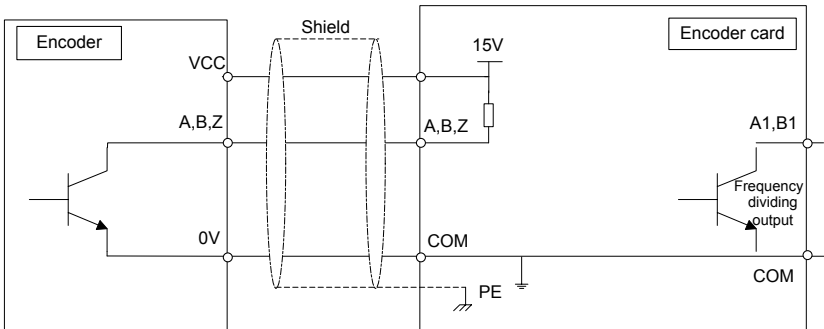
Table 2-3 Terminal descriptions of MD38PG5D

Terminal	Function Description	
CN2	A	Encoder output signal A positive
	B	Encoder output signal B positive
	Z	Encoder output signal Z positive
	15V	Encoder 15V/100mA power supply
	CCM	Power ground and frequency dividing output ground
	COM	Power ground and frequency dividing output ground
	A1	PG card frequency dividing output signal A (OC output, 0 to 24 V, 0 to 50 mA)
	B1	PG card frequency dividing output signal B (OC output, 0 to 24 V, 0 to 50 mA)
	PE	Shield connecting point
CN3, CN4	Supporting the "pulse + direction" function Pulse signal connected to phase A, direction signal connected to phase B	
	Not supporting the "pulse + direction" function (default setting)	
CN1	18-pin FFC interface, connecting to J4 on the control board of the AC drive	

• DIP switch setting (MD38PG5D)

DIP Switch Setting					Value	Frequency Dividing Coefficient	DIP Switch
1	2	3	4	5			
0	0	0	0	0	0	No output	
0	0	0	0	1	1	No output	
0	0	0	1	0	2	Frequency divided by 4	
0	0	0	1	1	3	Frequency divided by 6	
...							
1	1	1	1	1	31	Frequency divided by 62	

Wiring of MD38PG5D is shown as follows:



■ Extension Differential PG Card With Frequency Dividing (MD38PG6, MD38PG6D)

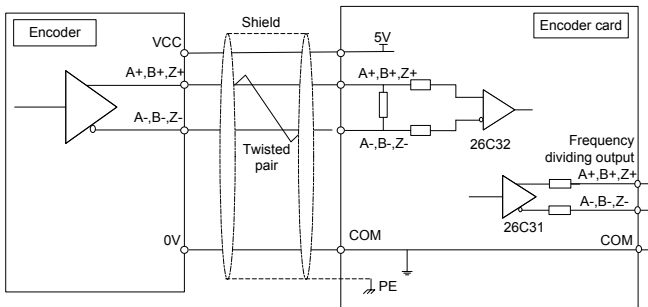
Table 2-4 Terminal descriptions of MD38PG6 and MD38PG6D

Terminal	Pin	Definition	Function Description	Pin Arrangement
J3	1	A+	Encoder output signal A positive	
	2	A-	Encoder output signal A negative	
	3	B+	Encoder output signal B positive	
	4	B-	Encoder output signal B negative	
	5	Z+	Encoder output signal Z positive	
	6	Null	Vacant internally	
	7	+5V	Encoder 5V power supply positive	
	8	COM	Encoder power supply negative	
	9	Z-	Encoder output signal Z negative	
J7, J8	OA+		Frequency dividing output signal A positive	
	OA-		Frequency dividing output signal A negative	
	OB+		Frequency dividing output signal B positive	
	OB-		Frequency dividing output signal B negative	
	OZ+		Frequency dividing output signal Z positive	
	OZ-		Frequency dividing output signal Z negative	
	COM		Signal power ground	
	PE		Shield connecting point	
CN1	18-pin FFC interface, connecting to J4 on the control board of the AC drive			

• DIP Switch Setting (MD38PG6D)

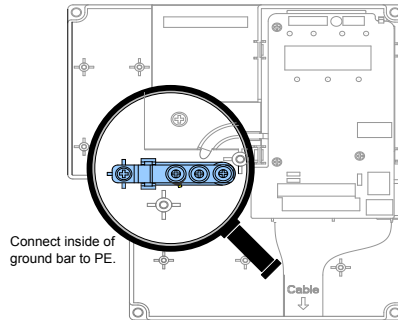
DIP Switch Setting					Value	Frequency Dividing Coefficient	DIP Switch
1	2	3	4	5			
0	0	0	0	0	0	No output	
0	0	0	0	1	1	No output	
0	0	0	1	0	2	Frequency divided by 4	
0	0	0	1	1	3	Frequency divided by 6	
...	...	...	...	...	...	...	
1	1	1	1	1	31	Frequency divided by 62	

Wiring of MD38PG6/MD38PG6D is shown as follows:



### ■ Grounding Shield of Extension Encoder Card

On prerequisite that AC drive parameters are set properly, if PG card feedback speed or position is instable, it indicates that PG card suffers electromagnetic interference. In this case, connect shield of encoder signal lines to PE of the AC drive to restrain interference.



After installation of the PG card is done, PE of PG card is connected automatically. When connecting encoder, connect shield of signal lines to PE of PG card to complete the shield grounding.

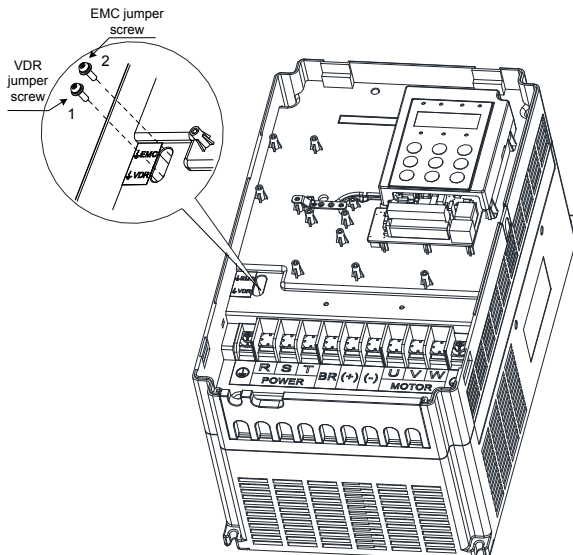
To install PG card, remove screw in amplified position and align mounting holes of PG card to the four fixing pins and fix PG card with the prepared M3 x 8 screws.

### ■ EMC Guidance

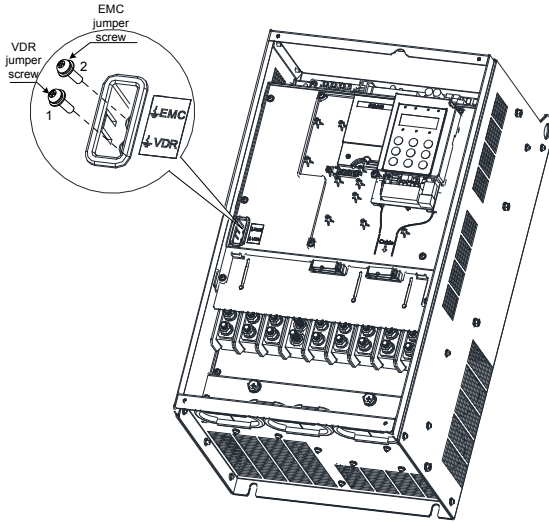
- Do not bundle encoder cable and power cables together. Failure to comply will result in encoder interference.
- Motor housing must be connected to PE of the AC drive. Meanwhile, connect grounding cable of motor to motor housing reliably. Failure to comply will result in poor grounding effect.
- An STP cable is suggested. For differential encoders, perform cable connection based on differential pairs properly and connect shield to PE of the AC drive.
- For large equipment applications where AC drive is far away from motor and motor cable is longer than 10 m, grounding effect is not good due to influence of cable inductance. In this case, encoder shield need not be connected to PE of AC drive.

## 2.4 Remove the EMC and VDR Screws

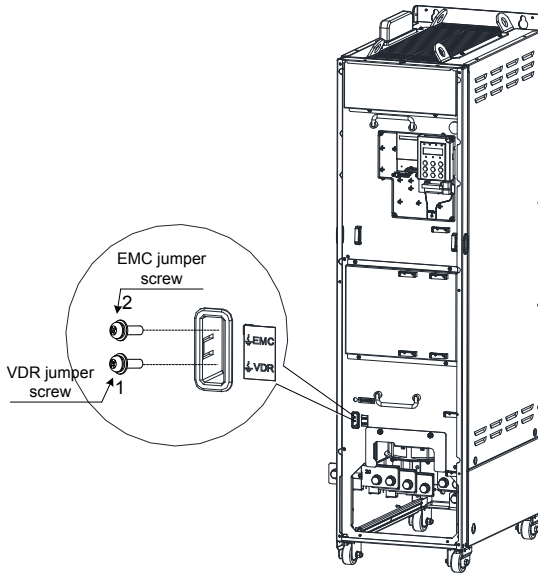
MD500T18.5G to MD500T37G:



MD500T45G to MD500T160G



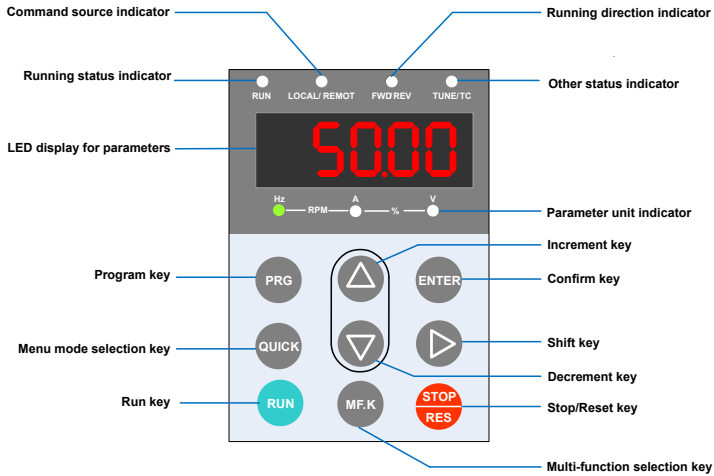
MD500T200G to MD500T450G



## 3 Operation Panel (Keypad & Display)

### 3.1 Get Familiar with Operating Panel

#### ■ Overview



#### ■ Status Indicators

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

Indicator	Indication
<input type="radio"/> RUN	OFF indicates the STOP status. ON indicates the RUNNING status.
<input type="radio"/> LOCAL/REMOT	OFF indicates under operating panel control. ON indicates under terminal control. FLASHING indicates under serial communication control.
<input type="radio"/> FWD/REV	OFF indicates forward motor rotation. ON indicates reverse motor rotation.
<input type="radio"/> TUNE/TC	ON indicates torque control mode. FLASHING SLOWLY (once a second) indicates auto-tuning status. FLASHING QUICKLY (four times a second) indicates a fault condition.

#### ■ Parameter Unit Indicator

Indicator appearance	Meaning
Hz <input checked="" type="radio"/> RPM <input type="radio"/> A <input type="radio"/> % <input type="radio"/> V	Hz for frequency
Hz <input type="radio"/> RPM <input checked="" type="radio"/> A <input type="radio"/> % <input type="radio"/> V	A for current
Hz <input type="radio"/> RPM <input type="radio"/> A <input type="radio"/> % <input checked="" type="radio"/> V	V for voltage
Hz <input checked="" type="radio"/> RPM <input checked="" type="radio"/> A <input type="radio"/> % <input type="radio"/> V	RPM for motor speed
Hz <input type="radio"/> RPM <input checked="" type="radio"/> A <input checked="" type="radio"/> % <input type="radio"/> V	Percentage

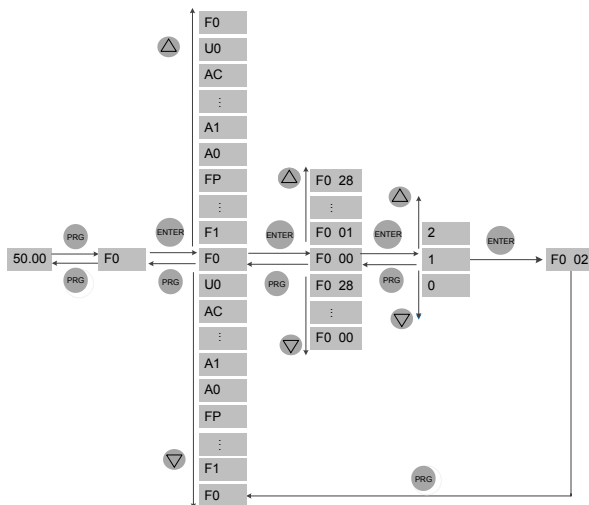


### 3 Operating Panel (Keypad & Display)

#### ■ Keys on Operation Panel

Key	Key Name	Function
	Programming	Enter or exit Level I menu. Return to the previous menu.
	Confirm	Enter each level of menu interface. Confirm displayed parameter setting.
	Increment	When navigating a menu, it moves the selection up through the screens available. When editing a parameter value, it increases the displayed value. 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. When editing a parameter value, it decreases the displayed value. When the AC drive is in RUNNING mode, it decreases the speed.
	Shift	Select the displayed parameter in the STOP or RUNNING status. Select the digit to be modified when modifying a parameter value
	RUN	Start the AC drive when using the operating panel control mode. 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. Perform a reset operation when the drive is in the FAULT status. 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.
	Menu mode selection	Press it to switch over between menu modes as defined by the setting of FP-03.

#### ■ Operations of Parameters

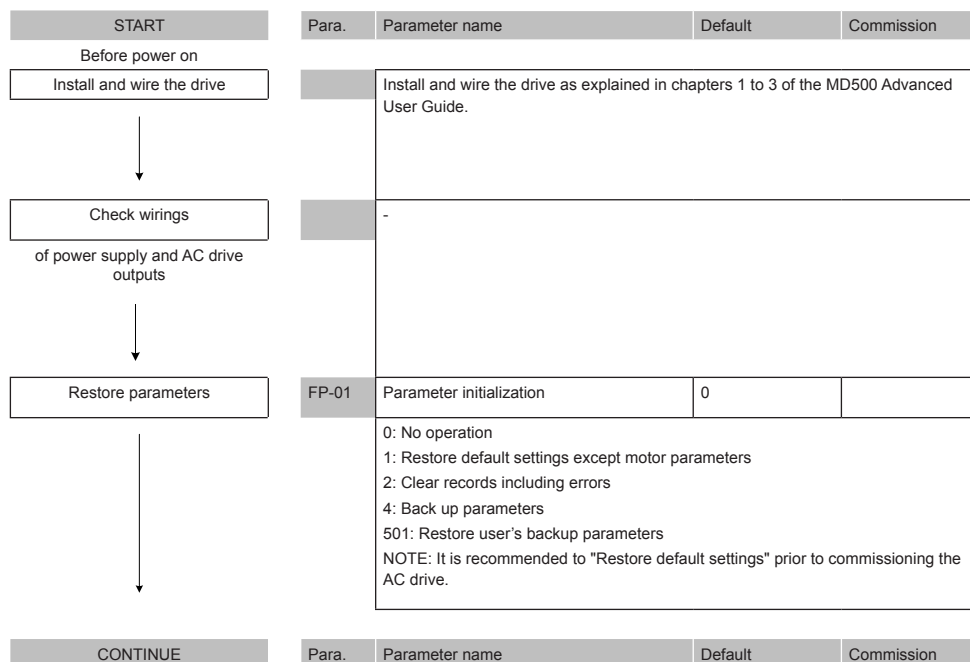


#### ■ Parameter arrangement








Function Code Group	Description	Remark
F0 to FF	Standard function code group	Standard function parameters
A0 to AC	Advanced function code group	AI/AO correction
U0 to U3	RUNNING status function code group	Display of basic parameters

## 4 Quick Setup

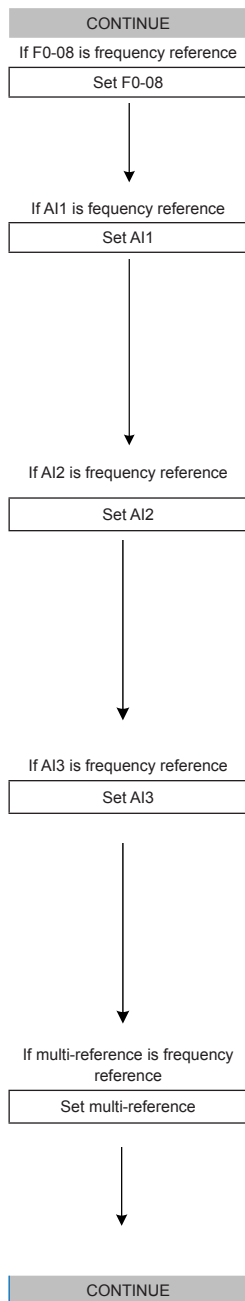
### 4.1 Setup flowchart



START		Para.	Parameter name	Default	Commission
Set motor parameters		Motor Nameplate			
If an encoder is used Set encoder parameters		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.			
		F1-27	Encoder pulses per revolution	1024	
		1 to 65535 ppr			
		F1-28	Encoder type	0	
		0: ABZ incremental encoder 2: Resolver			
F1-30	A/B phase sequence of ABZ encoder	0			
0: Forward 1: Reserve					
F1-31	Encoder installation angle	0.0			
0.0° to 359.9°					
F1-34	Number of pole pairs of resolver	1			
1 to 65535 pairs of poles					
CONTINUE		Para.	Parameter name	Default	Commission

START	Para.	Parameter name	Default	Commission
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Perform motor auto tuning</div> <div style="text-align: center;">↓</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Select command source</div> <div style="text-align: center;">↓</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Select control mode</div> <div style="text-align: center;">↓</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Select frequency reference setting channel</div> <div style="text-align: center;">↓</div>	F1-37	Auto-tuning selection	0	
	0: No auto-tuning 1: Asynchronous motor static auto-tuning 1 2: Asynchronous motor dynamic auto-tuning 3: Asynchronous motor static auto-tuning 2 NOTE: Motor won't rotate at this stage if choose 1 or 3, for they are both static, while if choose 2 then motor will rotate, so better disconnect load from motor shaft for safety. Steps of auto-tuning: 1. Ensure the UVW connection between inverter and motor is not disconnected by output contactor; if it is, then manually handle with the output contactor; 2. Set F0-02 = 0 (operating panel), so that the key  can start the tuning procedure. 3. Set F1-37 = 1 or 2 or 3, press  , then LED on panel will display letters "TUNE". 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) (indicator 'LOCAL/REMOT' turns OFF) 1: Terminal I/O control (indicator 'LOCAL/REMOT' turns ON) 2: Serial comms. (indicator 'LOCAL/REMOT' turns flashing)			
	F0-01	Motor 1 control mode	0	
0: SVC control 1: FVC control 2: V/F control				
	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) 1: Digital setting F0-08 (pressing  or  can change F0-08 easily, but the revised value would be cleared after power off) 2: AI1 3: AI2 4: AI3 5: Pulse setting (DI5) 6: Multi-reference setting 7: Simple PLC 8: PID 9: Communication setting				
CONTINUE	Para.	Parameter name	Default	Commission

## 4 Quick Setup



Para.	Parameter name	Default	Commission
F0-08	Preset frequency 0 Hz to F0-10	50.00	
F4-13	AI curve 1 minimum input 0 V to F4-15;	0.00	
F4-14	Corresponding percentage of AI1 minimum input -100.0% to 100.0%	0.0	
F4-15	AI1 maximum input F4-13 to 10.00 V	10.00	
F4-16	Corresponding percentage of AI1 maximum input -100.0% to 100.0%	100.0	
F4-18	AI curve 2 minimum input 0 V to F4-20;	0.00	
F4-19	Corresponding percentage of AI2 minimum input -100.0% to 100.0%	0.0	
F4-20	AI2 maximum input F4-18 to 10.00 V	10.00	
F4-21	Corresponding percentage of AI2 maximum input -100.0% to 100.0%	100.0	
F4-23	AI curve 3 minimum input 0 V to F4-25;	0.00	
F4-24	Corresponding percentage of AI3 minimum input -100.0% to 100.0%	0.0	
F4-25	AI3 maximum input F4-23 to 10.00 V	10.00	
F4-26	Corresponding percentage of AI3 maximum input -100.0% to 100.0%	100.0	
FC-00	Reference 0 0.0 to 100.0%.	0.0	
FC-01 to FC-15	Reference 1-15 0.0 to 100.0%.	0.0	

Para.	Parameter name	Default	Commission
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CONTINUE	Para.	Parameter name	Default	Commission
If any digital input is used				
Set DI function	F4-00	D11 function selection	1	
↓		0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) 3: Three-wire control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: RUN pause 11: External fault normally open (NO) input 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4 16: Terminal 1 for acceleration/deceleration time selection 17: Terminal 2 for acceleration/deceleration time selection 18: Frequency source switchover 19: UP and DOWN setting clear (terminal, keypad) 20: Command source switchover terminal 1 21: Acceleration/Deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30: Pulse input (enabled only for DI5) 31: Reserved 32: Immediate DC injection braking 33: External fault normally closed (NC) input 34: Frequency modification forbidden 35: PID action direction reverse 36: External STOP terminal 1 37: Command source switchover terminal 2 38: PID integral disabled 39: Switchover between main frequency source X and preset frequency 40: Switchover between auxiliary frequency source Y and preset frequency 41: Motor selection terminal 1 42: Motor selection terminal 2 43: PID parameter switchover		

CONTINUE	Para.	Parameter name	Default	Commission
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CONTINUE	Para.	Parameter name	Default	Commission
↓	F4-00	DI1 function selection	1	
		44: User-defined fault 1 45: User-defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop 48: External STOP terminal 2 49: Deceleration DC injection braking 50: Clear the current running time 51-59: Reserved Setting range:0 to 59;		
	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.		
	F4-04	DI5 function selection	13	
		Setting range same as DI1;		
F4-05	DI6 function selection	0		
	Setting range same as DI1;			
F4-06	DI7 function selection	0		
	Setting range same as DI1;			
F4-07	DI8 function selection	0		
	Setting range same as DI1			
F4-08	DI9 function selection	0		
	Setting range same as DI1.			
F4-09	DI10 function selection	0		
	Setting range same as DI1;			
F5-00	FM output mode selection	0		
	0: FM terminal outputs pulses, the frequency of which represents the value of variable which is assigned by F5-06. 1: FM terminal outputs switch signal, the value of which represents the status of variable which is assigned by F5-01			
F5-01	FM (switch signal) function selection	0		
	0: No output 1: AC Drive running 2: Fault output 3: Frequency-level detection FDT1 output 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload pre-warning 7: AC drive overload pre-warning			
CONTINUE	Para.	Parameter name	Default	Commission

If any digital output is used  
 Set DO function

CONTINUE	Para.	Parameter name	Default	Commission
If any digital output is used				
Set DO function	F5-01	FM (switch signal) function selection	0	
		8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle completed 12: Accumulative running time reached 13: Frequency limited 14: Torque limited 15: Ready for RUN 16: Reserved 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Undervoltage status output 20: Communication setting 21,22: Reserved 23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency level detection FDT2 output 26: Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached 30: Timing duration reached 31: AI1 input limit exceeded 32: Load lost 33: Reverse running 34: Zero current status 35: Module temperature reached 36: Software current limit exceeded 37: Frequency lower limit reached (having output at stop) 38: Alarm output 39: Motor overheat warning 40: Current running time reached 41: Fault output (no output at undervoltage)		
	F5-02	Relay function selection(T/A-T/B-T/C)	2	
		Setting range same as FM;		
	F5-03	Relay function selection (P/A-P/B-P/C)	0	
		Setting range same as FM; the relay P/A-P/B-P/C is on extension I/O card.		
	F5-04	DO1 function selection	1	
		Setting range same as FM		
	F5-05	Extension card DO2 function selection	4	
		Setting range same as FM		
CONTINUE	Para.	Parameter name	Default	Commission



CONTINUE	Para.	Parameter name	Default	Commission
<p>↓</p> <p>if an analog output is used</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Set AO function</div> <p>↓</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Set accel/decel time</div> <p>↓</p> <p>If smooth accel/decel is requested</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Set S-curve</div> <p>↓</p>	F5-06	FM (pulse signal) function selection	0	
		0: Running frequency 1: Set frequency 2: Output current 3: Output torque (absolute value) 4: Output power 5: Output voltage 6: Pulse input 7: AI1 8: AI2 9: AI3 10: Length 11: Count value 12: Communication setting 13: Motor rotational speed 14: Output current 15: Output voltage 16: Output torque (actual value)		
	F5-07	AO1 function selection	0	
		Setting range same as F5-06		
	F5-08	AO2 function selection	1	
		Setting range same as F5-06; AO2 is on extension card.		
	F0-17	Acceleration time 1	model dependent	
		0.00 to 650.00s (if F0-19=2) 0.0 to 6500.0s (if F0-19=1) 0 to 65000s (if F0-19=0)		
	F0-18	Deceleration time 1	model dependent	
		0.00 to 650.00s (if F0-19=2) 0.0 to 6500.0s (if F0-19=1) 0 to 65000s (if F0-19=0)		
	F6-07	Acceleration/Deceleration mode	0	
		0: Linear acceleration/deceleration 1: Static S-curve acceleration/deceleration 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

CONTINUE	Para.	Parameter name	Default	Commission
if it is V/F control				
Set V/F parameters	F3-00	V/F curve selection 0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 4: 1.4-power V/F 5: 1.6-power V/F 6: 1.8-power V/F 7: 2.0-power V/F 8: 1.8-power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation SETTING RANGE: 0 to 11	0	
	F3-01	Torque boost 0.0 to 30.0 %; NOTE: if it is 0, then auto torque boost is activated, and it is recommended to use auto torque boost.	0.0	
	F3-02	Frequency limit of torque boost 0.00 Hz to maximum output frequency	50.00	
	F3-03	Multi-point V/F frequency 1 0.00 Hz to F3-05	0.00	
	F3-04	Multi-point V/F voltage 1 0.0 to 100.0 V	0.0	
	F3-05	Multi-point V/F frequency 2 F3-03 to F3-07, Hz	0.00	
	F3-06	Multi-point V/F voltage 2 0.0 to 100.0 V	0.0	
	F3-07	Multi-point V/F frequency 3 F3-05 to rated motor frequency F1-04, Hz	0.00	
	F3-08	Multi-point V/F voltage 3 0.0 to 100.0 V	0.0	
		Use operating panel, or digital input terminal, or serial communication control, to start inverter, check if the running performance satisfies your application. If yes, then go forward to next step, if NO, then go back to check.		
Trial RUN	F2-00	Speed loop proportional gain 1 0 to 100	30	
if it is SVC or FVC control	F2-01	Speed loop integral time 1 0.01 to 10.00 Sec.	0.5	
Adjust speed loop parameters To achieve better performance	F2-02	Switchover frequency 1 0.00Hz to F2-05	5.00	
	F2-03	Speed loop proportional gain 2 0 to 100	20	
	F2-04	Speed loop integral time 2 0.01 to 10.00 Sec.	1.0	
	F2-05	Switchover frequency 2 F2-02 to maximum output frequency	10.00	
Finish				

## 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.

The parameter description tables in this chapter use the following symbols. The symbols in the parameter table are described as follows:

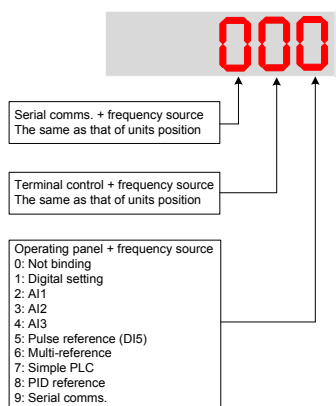
Symbol	Meaning
☆	It is possible to modify the parameter with the drive in the stop or in the Run status.
★	It is not possible to modify the parameter with the drive in the Run status.
●	The parameter is the actual measured value and cannot be modified.
*	The parameter is a factory parameter and can be set only by the manufacturer.

### 5.2 Standard Parameters

Para. No.	Para. Name	Setting Range	Default	Property
Group F0: Standard Parameters				
F0-00	G/P type display	1 : G type 2: P type	1	●
F0-01	Motor 1 control mode	0: SVC control 1: FVC control 2: V/F control	0	★
F0-02	Command source selection	0: Operating panel (keypad & display) (LED off) 1: Terminal I/O control (LED on) 2: Serial comms. (LED flashing)	0	☆
F0-03	Main frequency reference setting channel selection	0: Digital setting (non-retentive at power down) 1: Digital setting (retentive at power down) 2: AI1 3: AI2 4: AI3 5: Pulse reference 6: Multi-reference 7: Simple PLC 8: PID reference 9: Serial comms.	0	★
F0-04	Auxiliary frequency reference setting channel selection	0: Digital setting (non-retentive at power down) 1: Digital setting (retentive at power down) 2: AI1 3: AI2 4: AI3 5: Pulse reference 6: Multi-reference 7: Simple PLC 8: PID reference 9: Serial comms.	0	★
F0-05	Base value of range of auxiliary frequency reference for Main and auxiliary calculation	0: Relative to maximum frequency 1: Relative to main frequency reference	0	☆
F0-06	Range of auxiliary frequency reference for main and auxiliary calculation	0% to 150%	100%	☆

Para. No.	Para. Name	Setting Range	Default	Property
F0-07	Final Frequency reference setting selection	00 to 34  <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">Main and auxiliary calculation relationship 0: Main + auxiliary 1: Main - auxiliary 2: Max. (main, auxiliary) 3: Min. (main, auxiliary)</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">Final frequency reference selection 0: Main frequency reference 1: Main and auxiliary calculation result 2: Switchover between main frequency reference and auxiliary frequency reference 3: Switchover between main frequency reference and main and auxiliary calculation result 4: Switchover between auxiliary frequency reference and main and auxiliary calculation result</div>	00	☆
F0-08	Preset frequency	0.00 to max. frequency (F0-10)	50.00 Hz	☆
F0-09	Running direction	0: Run in the default direction 1: Run in the direction reverse to the default direction	0	☆
F0-10	Max. frequency	50.00 to 500.00 Hz	50.00 Hz	★
F0-11	Setting channel of frequency upper limit	0: Set by F0-12 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication reference	0	★
F0-12	Frequency reference upper limit	F0-14 to F0-10	50.00 Hz	☆
F0-13	Frequency reference upper limit offset	0.00 Hz to max. frequency (F0-10)	0.00 Hz	☆
F0-14	Frequency reference lower limit	0.00 Hz to frequency upper limit (F0-12)	0.00 Hz	☆
F0-15	Carrier frequency	Model dependent	Model dependent	☆
F0-16	Carrier frequency adjusted with temperature	0: Disabled 1: Enabled	1	☆
F0-17	Acceleration time 1	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	Model dependent	☆
F0-18	Deceleration time 1	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	Model dependent	☆
F0-19	Acceleration/Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★
F0-21	Frequency offset of Auxiliary frequency setting channel for main and auxiliary calculation	0.00 Hz to max. frequency (F0-10)	0.00 Hz	☆
F0-22	Frequency reference resolution	2: 0.01 Hz	2	★

## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
F0-23	Retentive of digital setting frequency upon stop	0: Not retentive 1: Retentive	0	☆
F0-24	Motor parameter group selection	0: Motor parameter group 1 1: Motor parameter group 2	0	★
F0-25	Acceleration/Deceleration time base frequency	0: Maximum frequency (F0-10) 1: Frequency reference 2: 100 Hz	0	★
F0-26	Base frequency for UP/DOWN modification during running	0: Running frequency 1: Frequency Reference	0	★
F0-27	Command source + frequency source	000 to 999 	000	☆
F0-28	Serial port comms. protocol	0: Modbus protocol 1: PROFIBUS-DP protocol or CANopen protocol	0	★
<b>Group F1: Motor 1 Parameters</b>				
F1-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor	0	★
F1-01	Rated motor power	0.1 to 1000.0 kW	Model dependent	★
F1-02	Rated motor voltage	1 to 2000 V	Model dependent	★
F1-03	Rated motor current	0.01 to 655.35 A (AC drive power ≤ 55 kW) 0.1 to 6553.5 A (AC drive power > 55 kW)	Model dependent	★
F1-04	Rated motor frequency	0.01 Hz to max. frequency	Model dependent	★
F1-05	Rated motor speed	1 to 65535 rpm	Model dependent	★
F1-06	Stator resistance	0.001 to 65.535 Ω (AC drive power ≤ 55 kW) 0.0001 to 6.5535 Ω (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-07	Rotor resistance	0.001 to 65.535 Ω (AC drive power ≤ 55 kW) 0.0001 to 6.5535 Ω (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-08	Leakage inductive reactance	0.01 to 655.35 mH (AC drive power ≤ 55 kW) 0.001 to 65.535 mH (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-09	Mutual inductive reactance	0.1 to 6553.5 mH (AC drive power ≤ 55 kW) 0.01 to 655.35 mH (AC drive power > 55 kW)	Auto-tuning dependent	★

Para. No.	Para. Name	Setting Range	Default	Property
F1-10	No-load current	0.01 A to F1-03 (AC drive power ≤ 55 kW) 0.1 A to F1-03 (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-27	Encoder pulses per revolution	1 to 65535	1024	★
F1-28	Encoder type	0: ABZ incremental encoder 2: Resolver	0	★
F1-30	A/B phase sequence of ABZ incremental encoder	0: Forward 1: Reserve	0	★
F1-34	Number of pole pairs of resolver	1 to 65535	1	★
F1-36	Encoder wire-break fault detection time	0.0s: No detection 0.1s to 10.0s	0.0s	★
F1-37	Motor auto-tuning method selection	0: No auto-tuning 1: Static auto-tuning 1 2: Dynamic auto-tuning 3: Static auto-tuning 2	0	★
Group F2: Vector Control Parameters				
F2-00	Speed loop proportional gain 1	1 to 100	30	☆
F2-01	Speed loop integral time 1	0.01s to 10.00s	0.50s	☆
F2-02	Switchover frequency 1	0.00 to F2-05	5.00 Hz	☆
F2-03	Speed loop proportional gain 2	1 to 100	20	☆
F2-04	Speed loop integral time 2	0.01s to 10.00s	1.00s	☆
F2-05	Switchover frequency 2	F2-02 to max. frequency	10.00 Hz	☆
F2-06	SVC/FVC slip compensation gain	50% to 200%	100%	☆
F2-07	Speed feedback filter time constant	0.000s to 0.100s	0.015s	☆
F2-09	Torque limit source in speed control	0: F2-10 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Serial comms. 6: Min. (AI1, AI2) 7: Max. (AI1, AI2)	0	☆
F2-10	Digital setting of torque limit in speed control	0.0% to 200.0%	150.0%	☆
F2-11	Torque limit source in speed control (in regenerative state)	0: F2-10 1: AI 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication reference 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: F2-12	0	☆
F2-12	Digital setting of torque limit in speed control (in regenerative state)	0.0% to 200.0%	150.0%	☆
F2-13	Excitation adjustment proportional gain	0 to 60000	2000	☆
F2-14	Excitation adjustment integral gain	0 to 60000	1300	☆
F2-15	Torque adjustment proportional gain	0 to 60000	2000	☆

## 5 Parameter Table

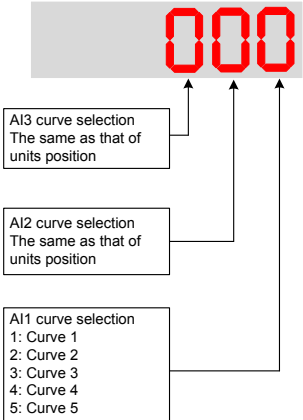
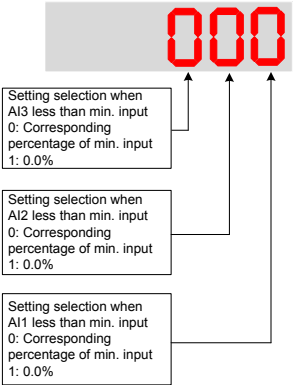
Para. No.	Para. Name	Setting Range	Default	Property
F2-16	Torque adjustment integral gain	0 to 60000	1300	☆
F2-17	Speed loop integral separation selection	0: Disabled 1: Enabled	0	☆
F2-21	Max. torque coefficient of field weakening area	50% to 200%	100%	☆
F2-22	Regenerative power limit selection	0: Disabled 1: Enabled in the whole process 2: Enabled at constant speed 3: Enabled during deceleration	0	☆
F2-23	Regenerative power limit	0.0% to 200.0%	Model dependent	☆
<b>Group F3: V/F Control Parameters</b>				
F3-00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 4: 1.4-power V/F 6: 1.6-power V/F 8: 1.8-power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation	0	★
F3-01	Torque boost	0.0%: no torque boost 0.1% to 30.0%	Model dependent	☆
F3-02	Cut-off frequency of torque boost	0.00 Hz to max. frequency	50.00 Hz	★
F3-03	Multi-point V/F frequency 1	0.00 Hz to F3-05	0.00 Hz	★
F3-04	Multi-point V/F voltage 1	0.0% to 100.0%	0.0%	★
F3-05	Multi-point V/F frequency 2	F3-03 to F3-07	0.00 Hz	★
F3-06	Multi-point V/F voltage 2	0.0% to 100.0%	0.0%	★
F3-07	Multi-point V/F frequency 3	F3-05 to rated motor frequency (F1-04)	0.00 Hz	★
F3-08	Multi-point V/F voltage 3	0.0% to 100.0%	0.0%	★
F3-10	V/F over-excitation gain	0 to 200	64	☆
F3-11	V/F oscillation suppression gain	0 to 100	40	☆
F3-13	Voltage source for V/F separation	0: Set by F3-14 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Multi-reference 6: Simple PLC 7: PID reference 8: Serial comms. 100.0% corresponds to rated motor voltage (F1-02, A2-02).	0	☆
F3-14	Digital setting of voltage for V/F separation	0 V to rated motor voltage	0 V	☆
F3-15	Voltage rise time of V/F separation	0.0s to 1000.0s	0.0s	☆
F3-16	Voltage decline time of V/F separation	0.0s to 1000.0s	0.0s	☆

Para. No.	Para. Name	Setting Range	Default	Property
F3-17	Stop mode selection for V/F separation	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declines to 0	0	☆
F3-18	Current limit level	50% to 200%	150%	★
F3-19	Current limit selection	0: Disabled 1: Enabled	1	★
F3-20	Current limit gain	0 to 100	20	☆
F3-21	Compensation factor of speed multiplying current limit level	50% to 200%	50%	★
F3-22	Voltage limit	650 to 800 V	770 V	★
F3-23	Voltage limit selection	0: Disabled 1: Enabled	1	★
F3-24	Frequency gain for voltage limit	0 to 100	30	☆
F3-25	Voltage gain for voltage limit	0 to 100	30	☆
F3-26	Frequency rise threshold during voltage limit	0 to 50 Hz	5 Hz	★
<b>Group F4: Input Terminals</b>				
F4-00	DI1 function selection	0: No function 1: Forward run (FWD) 2: Reverser run (REV) 3: Three-wire control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: RUN disabled 11: External fault normally-open input 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4 16: Terminal 1 for acceleration/deceleration time selection 17: Terminal 2 for acceleration/deceleration time selection 18: Frequency reference setting channel switchover 19: UP and DOWN setting clear (terminal, operation panel) 20: Command source switchover 1 21: Acceleration/Deceleration prohibited 22: PID disabled 23: PLC state reset 24: Wobble disabled 25: Counter input 26: Counter reset 27: Length signal pulses count 28: Length reset 29: Torque control prohibited	1	★

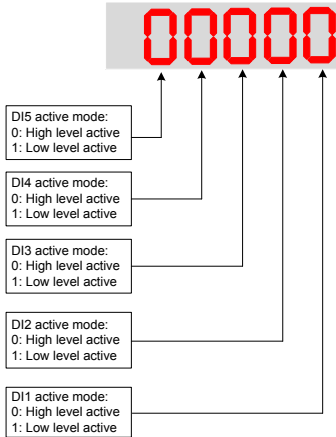
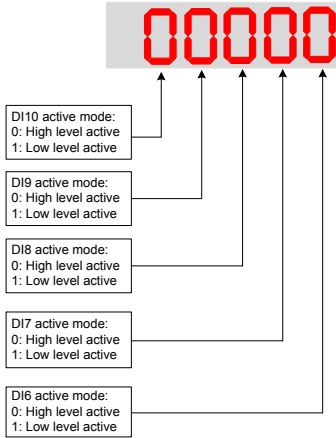


## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
F4-01	DI2 function selection	30: Pulse input as frequency reference (valid only for DI5) 31: Reserved	4	★
F4-02	DI3 function selection	32: Immediate DC injection braking 33: External fault normally-closed input 34: Frequency modification enabled	9	★
F4-03	DI4 function selection	35: PID operation direction reverse 36: External stop 1 37: Command source switchover 2	12	★
F4-04	DI5 function selection	38: PID integral disabled 39: Switchover between main frequency reference and preset frequency	13	★
F4-05	DI6 function selection	40: Switchover between auxiliary frequency reference and preset frequency 41: Motor selection	0	★
F4-06	DI7 function selection	42: Reserved 43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2	0	★
F4-07	DI8 function selection	46: Speed control/ Torque control 47: Emergency stop (ES) 48: External stop 2	0	★
F4-08	DI9 function selection	49: Deceleration DC injection braking 50: Clear running time this time	0	★
F4-09	DI10 function selection	51: Two-wire control/ Three-wire control 52: Reverse running prohibited 53 to 59: Reserved	0	★
F4-10	DI filter time	0.000s to 1.000s	0.010s	☆
F4-11	Terminal I/O control mode	0: Two-wire mode 1 1: Two-wire mode 2 2: Three-wire mode 1 3: Three-wire mode 2	0	★
F4-12	Terminal UP/DOWN rate	0.001 to 65.535 Hz/s	1.000 Hz/s	☆
F4-13	AI curve 1 min. input	0.00 V to F4-15	0.00 V	☆
F4-14	Corresponding percentage of AI curve 1 min. input	-100.00% to 100.0%	0.0%	☆
F4-15	AI curve 1 max. input	F4-13 to 10.00 V	10.00 V	☆
F4-16	Corresponding percentage of AI curve 1 max. input	-100.00% to 100.0%	100.0%	☆
F4-17	AI1 filter time	0.00s to 10.00s	0.10s	☆
F4-18	AI curve 2 min. input	0.00 V to F4-20	0.00 V	☆
F4-19	Corresponding percentage of AI curve 2 min. input	-100.00% to 100.0%	0.0%	☆
F4-20	AI curve 2 max. input	F4-18 to 10.00 V	10.00 V	☆
F4-21	Corresponding percentage of AI curve 2 max. input	-100.00% to 100.0%	100.0%	☆
F4-22	AI2 filter time	0.00s to 10.00s	0.10s	☆
F4-23	AI3 curve min. input	-10.00 V to F4-25	0.00 V	☆
F4-24	Corresponding percentage of AI curve 3 min. input	-100.00% to 100.0%	0.0%	☆

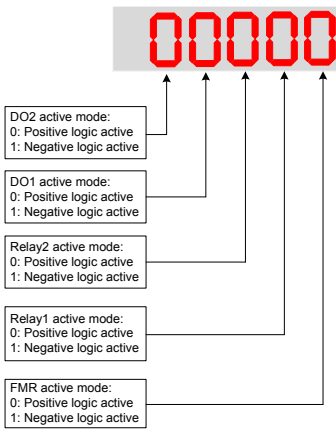
Para. No.	Para. Name	Setting Range	Default	Property
F4-25	AI curve 3 max. input	F4-23 to 10.00 V	10.00 V	☆
F4-26	Corresponding percentage of AI curve 3 max. input	-100.00% to 100.0%	100.0%	☆
F4-27	AI3 filter time	0.00s to 10.00s	0.10s	☆
F4-28	Pulse min. input	0.00 kHz to F4-30	0.00 kHz	☆
F4-29	Corresponding percentage of pulse min. input	-100.00% to 100.0%	0.0%	☆
F4-30	Pulse max. input	F4-28 to 100.00 kHz	50.00 kHz	☆
F4-31	Corresponding percentage of pulse max. input	-100.00% to 100.0%	100.0%	☆
F4-32	Pulse filter time	0.00s to 10.00s	0.10s	☆
F4-33	AI curve selection	111 to 555 	321	☆
F4-34	Setting selection when AI less than min. input	000 to 111 	000	☆
F4-35	DI1 delay	0.0s to 3600.0s	0.0s	☆
F4-36	DI2 delay	0.0s to 3600.0s	0.0s	★
F4-37	DI3 delay	0.0s to 3600.0s	0.0s	★

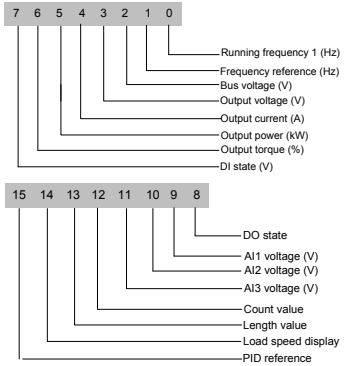
5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
F4-38	DI active mode selection 1	00000 to 11111 	00000	★
F4-39	DI active mode selection 2	00000 to 11111 	00000	★
<b>Group F5: Output Terminals</b>				
F5-00	FM terminal output mode	0: Pulse output (FMP) 1: Digital output (FMR)	0	☆
F5-01	FMR function selection	0: No output 1: AC drive running 2: Fault output 3: Frequency level detection 1 output 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload pending 7: AC drive overload pending 8: Set count value reached 9: Designated count value reached 10: Length reached	0	☆

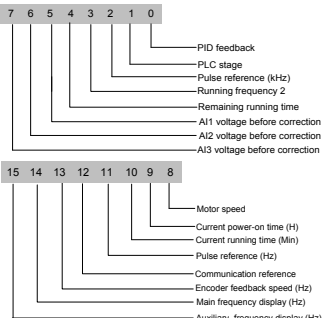
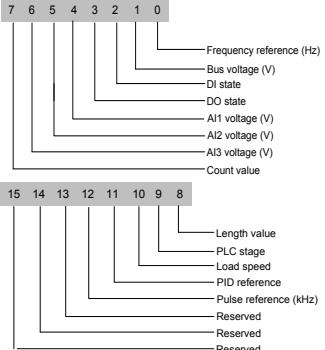
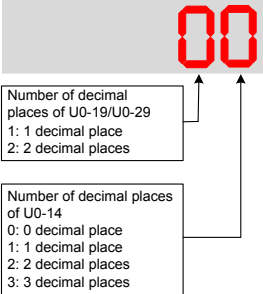
Para. No.	Para. Name	Setting Range	Default	Property
F5-01	FMR function selection	11: PLC cycle completed 12: Accumulative running time reached 13: Frequency limited 14: Torque limited 15: Ready for RUN 16: AI1 > AI2 17: Frequency upper limit reached	0	☆
F5-02	Relay (T/A-T/B-T/C) function selection	18: Frequency lower limit reached (no output at stop) 19: Undervoltage 20: Communication setting 21: Reserved 22: Reserved 23: Zero-speed running 2 (having output at stop)	2	☆
F5-03	Extension card relay (P/A-P/ B-P/C) function selection	24: Accumulative power-on time reached 25: Frequency level detection 2 26: Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached 30: Timing reached	0	☆
F5-04	DO1 function selection	31: AI1 input exceeding limit 32: Load lost 33: Reverse running 34: Zero current 35: IGBT temperature reached 36: Output current exceeding limit	1	☆
F5-05	Extension card DO2 function selection	37: Frequency lower limit reached (having output at stop) 38: Alarm output 39: Motor overheat pending 40: Current running time reached 41: Fault output	4	☆
F5-06	FMP function selection	0: Running frequency 1: Frequency reference 2: Output current 3: Output torque (absolute value) 4: Output power 5: Output voltage	0	☆
F5-07	AO1 function selection	6: Pulse input 7: AI1 8: AI2 9: AI3 10: Length 11: Counting value	0	☆
F5-08	AO2 function selection	12: Communication reference 13: Motor speed 14: Output current (100.0% corresponds to 1000.0 A) 15: Output voltage(100.0% corresponds to 1000.0 V) 16: Motor output torque (actual value, a percentage of rated motor torque)	1	☆

## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
F5-09	Max. FMP output frequency	0.01 to 100.00 kHz	50.00 kHz	☆
F5-10	AO1 zero offset coefficient	-100.0% to 100.0%	0.0%	☆
F5-11	AO1 gain	-10.00 to 10.00	1.00	☆
F5-12	AO2 zero offset coefficient	-100.0% to 100.0%	0.00%	☆
F5-13	AO2 gain	-10.00 to 10.00	1.00	☆
F5-17	FMR output delay	0.0s to 3600.0s	0.0s	☆
F5-18	Relay 1 output delay	0.0s to 3600.0s	0.0s	☆
F5-19	Relay 2 output delay	0.0s to 3600.0s	0.0s	☆
F5-20	DO1 output delay	0.0s to 3600.0s	0.0s	☆
F5-21	DO2 output delay	0.0s to 3600.0s	0.0s	☆
F5-22	DO active mode selection 1	00000 to 11111  <p>DO2 active mode: 0: Positive logic active 1: Negative logic active</p> <p>DO1 active mode: 0: Positive logic active 1: Negative logic active</p> <p>Relay2 active mode: 0: Positive logic active 1: Negative logic active</p> <p>Relay1 active mode: 0: Positive logic active 1: Negative logic active</p> <p>FMR active mode: 0: Positive logic active 1: Negative logic active</p>	00000	☆
<b>Group F6: Start/Stop Control</b>				
F6-00	Start mode	0: Direct start 1: Catching a spinning motor 2: Pre-excited start 3: SVC quick start	0	☆
F6-01	Mode of catching a spinning motor	0: From stop frequency 1: From zero speed 2: From max. frequency	0	★
F6-02	Speed of catching a spinning motor	1 to 100	20	☆
F6-03	Start frequency	0.00 to 10.00 Hz	0.00 Hz	☆
F6-04	Start frequency holding time	0.0s to 100.0s	0.0s	★
F6-05	DC injection braking 1 level/Pre- excitation level	0% to 100%	50%	★
F6-06	DC injection braking 1 active time/Pre- excitation active time	0.0s to 100.0s	0.0s	★
F6-07	Acceleration/Deceleration mode	0: Linear acceleration/deceleration 1: Static S-curve acceleration/deceleration 2: Dynamic S-curve acceleration/deceleration	0	★
F6-08	Time proportion of S-curve start segment	0.0% to (100.0% – F6-09)	30.0%	★

Para. No.	Para. Name	Setting Range	Default	Property
F6-09	Time proportion of S-curve end segment	0.0% to (100.0% - F6-08)	30.0%	★
F6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
F6-11	DC injection braking 2 start frequency	0.00 Hz to maximum frequency	0.00 Hz	☆
F6-12	DC injection braking 2 delay time	0.0 to 100.0s	0.0s	☆
F6-13	DC injection braking 2 level	0% to 100%	50%	☆
F6-14	DC injection braking 2 active time	0.0s to 100.0s	0.0s	☆
F6-15	Braking use ratio	0% to 100%	100%	☆
F6-18	Catching a spinning motor current limit	30% to 200%	Model dependent	★
F6-21	Demagnetization time (effective for SVC)	0.00s to 5.00s	Model dependent	☆
F6-23	Overexcitation selection	0: Disabled 1: Enabled during deceleration 2: Enabled in the whole process	0	☆
F6-24	Overexcitation suppression current level	0% to 150%	100%	☆
F6-25	Overexcitation gain	1.00 to 2.50	1.25	☆
Group F7: Keypad Operation and LED Display				
F7-00	LED default display check	0: Disabled 1: Enabled	0	☆
F7-01	MF.K key function selection	0: MF.K key disabled 1: Switchover from remote control (terminal or communication) to keypad control 2: Switchover between forward rotation and reverse rotation 3: Forward jog 4: Reverse jog	0	★
F7-02	STOP/RESET key function	0: STOP/RESET key enabled only in keypad control 1: STOP/RESET key enabled in any operation mode	1	☆
F7-03	LED display running parameters 1	0000 to FFFF 	1F	☆

5 Parameter Table


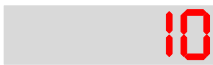

Para. No.	Para. Name	Setting Range	Default	Property
F7-04	LED display running parameters 2	0000 to FFFF 	0	☆
F7-05	LED display stop parameters	0000 to FFFF 	33	☆
F7-06	Load speed display coefficient	0.001 to 65.000	1.000	☆
F7-07	Heatsink temperature of inverter module	-20°C to 120°C	-	●
F7-08	Product series	-	-	●
F7-09	Accumulative running time	0 to 65535 h	-	●
F7-10	Performance software version	-	-	●
F7-11	Function software version	-	-	●
F7-12	Number of decimal places for load speed display	10 to 23 	21	☆
F7-13	Accumulative power-on time	0 to 65535 h	-	●
F7-14	Accumulative power consumption	0 to 65535 kWh	-	●

Para. No.	Para. Name	Setting Range	Default	Property
Group F8: Auxiliary Functions				
F8-00	Jog frequency reference	0.00 Hz to max. frequency	2.00 Hz	☆
F8-01	Jog acceleration time	0.0s to 6500.0s	20.0s	☆
F8-02	Jog deceleration time	0.0s to 6500.0s	20.0s	☆
F8-03	Acceleration time 2	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	Model dependent	☆
F8-04	Deceleration time 2	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	Model dependent	☆
F8-05	Acceleration time 3	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	Model dependent	☆
F8-06	Deceleration time 3	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	Model dependent	☆
F8-07	Acceleration time 4	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	0.0s	☆
F8-08	Deceleration time 4	0.00s to 650.00s (F0-19 = 2) 0.0s to 6500.0s (F0-19 = 1) 0s to 65000s (F0-19 = 0)	0.0s	☆
F8-09	Frequency jump 1	0.00 Hz to max. frequency	0.00 Hz	☆
F8-10	Frequency jump 2	0.00 Hz to max. frequency	0.00 Hz	☆
F8-11	Frequency jump band	0.00 Hz to max. frequency	0.00 Hz	☆
F8-12	Forward/Reverse run switchover dead-zone time	0.0s to 3000.0s	0.0s	☆
F8-13	Reverse RUN selection	0: Disabled 1: Enabled	0	☆
F8-14	Running mode when frequency reference lower than frequency lower limit	0: Run at frequency reference lower limit 1: Stop 2: Run at zero speed	0	☆
F8-15	Droop rate	0.0% to 100.0% Note: 0.0% to 100.0% correspond to 0.00 to 10.00 on operating panel.	0.0%	☆
F8-16	Accumulative power-on time threshold	0 to 65000 h	0 h	☆
F8-17	Accumulative running time threshold	0 to 65000 h	0 h	☆
F8-18	Startup protection selection	0: Disabled 1: Enabled	0	☆
F8-19	Frequency detection value 1	0.00 Hz to max. frequency	50.00 Hz	☆
F8-20	Frequency detection hysteresis 1	0.0% to 100.0%	5.0%	☆
F8-21	Detection width of target frequency reached	0.0% to 100.0%	0.0%	☆
F8-22	Jump frequency function	0: Disabled 1: Enabled	0	☆
F8-25	Switchover frequency of accel time 1 and accel time 2	0.00 Hz to max. frequency	0.00 Hz	☆
F8-26	Switchover frequency of decel time 1 and decel time 2	0.00 Hz to max. frequency	0.00 Hz	☆






## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
F8-27	Set highest priority to terminal JOG function	0: Disabled 1: Enabled	0	☆
F8-28	Frequency detection value 2	0.00 Hz to max. frequency	50.00 Hz	☆
F8-29	Frequency detection hysteresis 2	0.0% to 100.0%	5.0%	☆
F8-30	Detection of frequency 1	0.00 Hz to max. frequency	50.00 Hz	☆
F8-31	Detection width of frequency 1	0.0% to 100.0% (max. frequency)	0.0%	☆
F8-32	Detection of frequency 2	0.00 Hz to max. frequency	50.00 Hz	☆
F8-33	Detection width of frequency 2	0.0% to 100.0% (max. frequency)	0.0%	☆
F8-34	Zero current detection level	0.0% to 300.0% (rated motor current)	5.0%	☆
F8-35	Zero current detection delay	0.01s to 600.00s	0.10s	☆
F8-36	Output overcurrent threshold	0.0% (no detection) 0.1% to 300.0% (rated motor current)	200.0%	☆
F8-37	Output overcurrent detection delay	0.00s to 600.00s	0.00s	☆
F8-38	Detection level of current 1	0.0% to 300.0% (rated motor current)	100.0%	☆
F8-39	Detection width of current 1	0.0% to 300.0% (rated motor current)	0.0%	☆
F8-40	Detection level of current 2	0.0% to 300.0% (rated motor current)	100.0%	☆
F8-41	Detection width of current 2	0.0% to 300.0% (rated motor current)	0.0%	☆
F8-42	Timing function	0: Disabled 1: Enabled	0	★
F8-43	Running time setting channel	0: Set by F8-44 1: AI1 2: AI2 3: AI3 (100% of analog input corresponds to the value of F8-44)	0	★
F8-44	Running time	0.0 to 6500.0 min	0.0 min	★
F8-45	AI1 input voltage lower limit	0.00 V to F8-46	3.10 V	☆
F8-46	AI1 input voltage upper limit	F8-45 to 10.00 V	6.80 V	☆
F8-47	Module temperature threshold	0°C to 100°C	75°C	☆
F8-48	Cooling fan working mode	0: Working during drive running 1: Working continuously	0	☆
F8-49	Wakeup frequency	F8-51 to max. frequency (F0-10)	0.00 Hz	☆
F8-50	Wakeup delay time	0.0s to 6500.0s	0.0s	☆
F8-51	Hibernating frequency	0.00 Hz to wakeup frequency (F8-49)	0.00 Hz	☆
F8-52	Hibernating delay time	0.0s to 6500.0s	0.0s	☆
F8-53	Running time threshold this time	0.0 to 6500.0 min	0.0 min	☆
F8-54	Output power correction coefficient	0.0% to 200.0%	100.0%	☆
F8-55	Deceleration time for emergency stop	0s to 6553.5s	Model dependent	☆
<b>Group F9: Fault and Protection</b>				
F9-00	Motor overload protection	0: Disabled 1: Enabled	1	☆
F9-01	Motor overload protection gain	0.20 to 10.00	1.00	☆

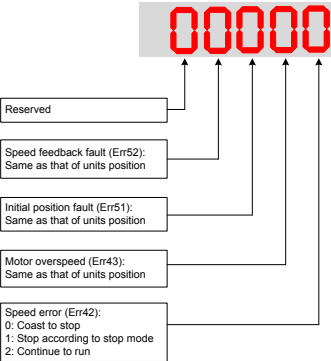
Para. No.	Para. Name	Setting Range	Default	Property
F9-02	Motor overload pre-warning coefficient	50% to 100%	80%	☆
F9-03	Overvoltage protection gain	0 (no overvoltage stall) to 100	30	☆
F9-04	Overvoltage protection voltage	650 to 800 V	770 V	☆
F9-07	Detection of short-circuit to ground upon power-on	00 to 11  Short-circuit to ground protection before running 0: Disabled 1: Enabled Short-circuit to ground protection at power-on 0: Disabled 1: Enabled	01	☆
F9-08	Braking unit applied voltage	650 to 800 V	760 V	★
F9-09	Auto reset times	0 to 20	0	☆
F9-10	Selection of DO action during auto reset	0: Not act 1: Act	0	☆
F9-11	Delay of auto reset	0.1s to 100.0s	1.0s	☆
F9-12	Input phase loss/pre-charge relay protection	 Pre-charge relay protection 0: Disabled 1: Enabled Input phase loss 0: Disabled 1: Enabled	11	☆
F9-13	Output phase loss protection	 During running 0: Disabled 1: Enabled Before running 0: Disabled 1: Enabled	01	☆
F9-14	1st fault type	0: No fault 1: Reserved 2: Overcurrent during acceleration 3: Overcurrent during deceleration 4: Overcurrent at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Pre-charge resistor fault 9: Undervoltage 10: AC drive overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: IGBT overheat 15: External fault	-	●

## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
F9-15	2nd fault type	16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto-tuning fault 20: Encoder fault 21: EEPROM read-write fault 22: AC drive hardware fault 23: Motor short circuited to ground 24: Reserved 25: Reserved 26: Accumulative running time reached 27: User-defined fault 1	-	●
F9-16	3rd (latest) fault type	28: User-defined fault 2 29: Accumulative power-on time reached 30: Load loss 31: PID feedback lost during running 40: Pulse-by-pulse current limit fault 41: Motor switchover fault during running 42: Speed error 43: Motor overspeed 45: Motor overtemperature 51: Initial position error 55: Slave fault in master/slave control	-	●
F9-17	Frequency upon 3rd fault	-	-	●
F9-18	Current upon 3rd fault	-	-	●
F9-19	Bus voltage upon 3rd fault	-	-	●
F9-20	DI state upon 3rd fault	-	-	●
F9-21	DO state upon 3rd fault	-	-	●
F9-22	AC drive state upon 3rd fault	-	-	●
F9-23	Power-on time upon 3rd fault	-	-	●
F9-24	Running time upon 3rd fault	-	-	●
F9-27	Frequency upon 2nd fault	-	-	●
F9-28	Current upon 2nd fault	-	-	●
F9-29	Bus voltage upon 2nd fault	-	-	●
F9-30	DI state upon 2nd fault	-	-	●
F9-31	DO state upon 2nd fault	-	-	●
F9-32	AC drive state upon 2nd fault	-	-	●
F9-33	Power-on time upon 2nd fault	-	-	●
F9-34	Running time upon 2nd fault	-	-	●
F9-37	Frequency upon 1st fault	-	-	●
F9-38	Current upon 1st fault	-	-	●
F9-39	Bus voltage upon 1st fault	-	-	●
F9-40	DI state upon 1st fault	-	-	●
F9-41	DO state upon 1st fault	-	-	●
F9-42	AC drive state upon 1st fault	-	-	●
F9-43	Power-on time upon 1st fault	-	-	●

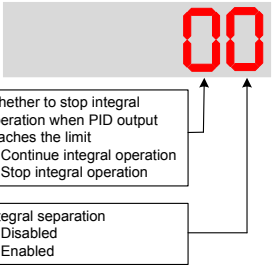
Para. No.	Para. Name	Setting Range	Default	Property
F9-44	Running time upon 1st fault	-	-	●
F9-47	Fault protection action selection 1	00000 to 22222  <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid black; padding: 2px;">Communication fault (Err16): Same as that of units position</div> <div style="border: 1px solid black; padding: 2px;">External fault (Err15): Same as that of units position</div> <div style="border: 1px solid black; padding: 2px;">Output phase loss (Err13): Same as that of units position</div> <div style="border: 1px solid black; padding: 2px;">Input phase loss (Err12): Same as that of units position</div> <div style="border: 1px solid black; padding: 2px;">Motor overload (Err11): 0: Coast to stop 1: Stop according to stop mode 2: Continue to run</div> </div>	00000	☆
F9-48	Fault protection action selection 2	00000 to 11111  <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid black; padding: 2px;">Accumulative running time reached (Err26): 0: Coast to stop 1: Stop according to stop mode 2: Continue to run</div> <div style="border: 1px solid black; padding: 2px;">Motor overheat (Err25): 0: Coast to stop 1: Stop according to stop mode 2: Continue to run</div> <div style="border: 1px solid black; padding: 2px;">Reserved</div> <div style="border: 1px solid black; padding: 2px;">EEPROM read-write fault (Err21): 0: Coast to stop 1: Stop according to stop mode</div> <div style="border: 1px solid black; padding: 2px;">Encoder fault (Err20): 0: Coast to stop 1: Switch over to V/F control, stop according to stop mode 2: Switch over to V/F control, continue to run</div> </div>	00000	☆
F9-49	Fault protection action selection 3	00000 to 22222  <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid black; padding: 2px;">PID feedback lost during running (Err31): 0: Coast to stop 1: Stop according to stop mode 2: Continue to run</div> <div style="border: 1px solid black; padding: 2px;">Load loss (Err30): 0: Coast to stop 1: Decelerate to stop 2: Continue to run at 7% of rated motor frequency and restore to the frequency reference if the load recovers</div> <div style="border: 1px solid black; padding: 2px;">Accumulative power-on time reached (Err29): 0: Coast to stop 1: Stop according to stop mode 2: Continue to run</div> <div style="border: 1px solid black; padding: 2px;">User-defined fault 2 (Err28): 0: Coast to stop 1: Stop according to stop mode 2: Continue to run</div> <div style="border: 1px solid black; padding: 2px;">User-defined fault 1 (Err27): 0: Coast to stop 1: Stop according to stop mode 2: Continue to run</div> </div>	00000	☆

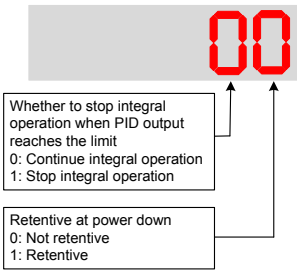
## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
F9-50	Fault protection action selection 4	00000 to 22222 	00000	☆
F9-54	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Frequency reference 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	0	☆
F9-55	Backup frequency upon fault	0.0% to 100.0% (max. frequency)	100.0%	☆
F9-56	Type of motor temperature sensor	0: No temperature sensor 1: PT100 2: PT1000	0	☆
F9-57	Motor overheat protection threshold	0°C to 200°C	110°C	☆
F9-58	Motor overheat pre-warning threshold	0°C to 200°C	90°C	☆
F9-59	Power dip ride-through function selection	0: Disabled 1: Bus voltage constant control 2: Decelerate to stop	0	★
F9-60	Threshold of power dip ride- through function disabled	80% to 100%	85%	★
F9-61	Judging time of bus voltage recovering from power dip	0.0s to 100.0s	0.5s	★
F9-62	Threshold of power dip ride- through function enabled	60% to 100%	80%	★
F9-63	Load lost protection	0: Disabled 1: Enabled	0	☆
F9-64	Load lost detection level	0.0% to 100.0%	10.0%	☆
F9-65	Load lost detection time	0.0s to 60.0s	1.0s	☆
F9-67	Overspeed detection level	0.0% to 50.0% (max. frequency)	20.0%	☆
F9-68	Overspeed detection time	0.0s to 60.0s	1.0s	☆
F9-69	Detection level of speed error	0.0% to 50.0% (max. frequency)	20.0%	☆
F9-70	Detection time of speed error	0.0s to 60.0s	5.0s	☆
F9-71	Power dip ride-through gain Kp	0 to 100	40	☆
F9-72	Power dip ride-through integral coefficient	0 to 100	30	☆
F9-73	Deceleration time of power dip ride-through	0.0s to 300.0s	20.0s	★

Para. No.	Para. Name	Setting Range	Default	Property
Group FA: PID Function				
FA-00	PID reference setting channel	0: Set by FA-01 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Serial comms. 6: Multi-reference	0	☆
FA-01	PID digital setting	0.0% to 100.0%	50.0%	☆
FA-02	PID feedback setting channel	0: AI1 1: AI2 2: AI3 3: AI1 - AI2 4: Pulse reference (DI5) 5: Serial comms. 6: AI1 + AI2 7: Max. ( AI1 ,  AI2 ) 8: Min. ( AI1 ,  AI2 )	0	☆
FA-03	PID operation direction	0: Forward 1: Reverse	0	☆
FA-04	PID reference and feedback range	0 to 65535	1000	☆
FA-05	Proportional gain Kp1	0.0 to 1000.0	20.0	☆
FA-06	Integral time Ti1	0.01s to 10.00s	2.00s	☆
FA-07	Differential time Td1	0.000s to 10.000s	0.000s	☆
FA-08	PID output limit in reverse direction	0.00 Hz to max. frequency	0.00 Hz	★
FA-09	PID error limit	0.0% to 100.0%	0.0%	☆
FA-10	PID differential limit	0.00% to 100.00%	0.10%	☆
FA-11	PID reference change time	0.00s to 650.00s	0.00s	☆
FA-12	PID feedback filter time	0.00s to 60.00s	0.00s	☆
FA-13	PID output filter time	0.00s to 60.00s	0.00s	☆
FA-14	Reserved	-	-	-
FA-15	Proportional gain Kp2	0.0 to 1000.0	20.0	☆
FA-16	Integral time Ti2	0.01s to 10.00s	2.00s	☆
FA-17	Differential time Td2	0.000s to 10.000s	0.000s	☆
FA-18	PID parameter switchover condition	0: No switchover 1: Switchover via DI 2: Auto switchover based on PID error 3: Auto switchover based on running frequency	0	☆
FA-19	PID error 1 for auto switchover	0.0% to FA-20	20.0%	☆
FA-20	PID error 2 for auto switchover	FA-19 to 100.0%	80.0%	☆
FA-21	PID initial value	0.0% to 100.0%	0.0%	☆
FA-22	PID initial value active time	0.00s to 650.00s	0.00s	☆

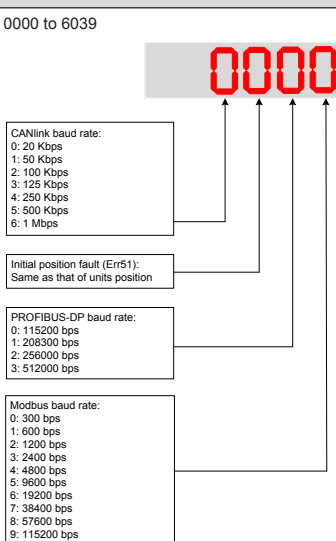
## 5 Parameter Table

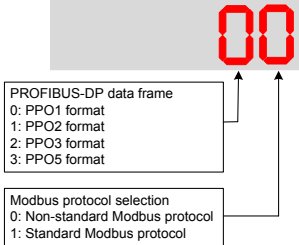
Para. No.	Para. Name	Setting Range	Default	Property
FA-25	PID integral property	00 to 11  Whether to stop integral operation when PID output reaches the limit 0: Continue integral operation 1: Stop integral operation Integral separation 0: Disabled 1: Enabled	00	☆
FA-26	Detection level of PID feedback loss	0.0%: No detection 0.1% to 100.0%	0.0%	☆
FA-27	Detection time of PID feedback loss	0.0s to 20.0s	0.0s	☆
FA-28	Selection of PID operation at stop	0: Disabled 1: Enabled	0	☆
<b>Group Fb: Wobble Function, Fixed Length and Count</b>				
Fb-00	Wobble setting mode	0: Relative to the frequency reference 1: Relative to the max. frequency	0	☆
Fb-01	Wobble amplitude	0.0% to 100.0%	0.0%	☆
Fb-02	Wobble step	0.0% to 50.0%	0.0%	☆
Fb-03	Wobble cycle	0.0s to 3000.0s	10.0s	☆
Fb-04	Triangular wave rising time coefficient	0.0% to 100.0%	50.0%	☆
Fb-05	Set length	0 to 65535 m	1000 m	☆
Fb-06	Actual length	0 to 65535 m	0 m	☆
Fb-07	Number of pulses per meter	0.1 to 6553.5	100.0	☆
Fb-08	Set count value	1 to 65535	1000	☆
Fb-09	Designated count value	1 to 65535	1000	☆
<b>Group FC: Multi-Reference and Simple PLC Function</b>				
FC-00	Reference 0	-100.0% to 100.0%	0.0%	☆
FC-01	Reference 1	-100.0% to 100.0%	0.0%	☆
FC-02	Reference 2	-100.0% to 100.0%	0.0%	☆
FC-03	Reference 3	-100.0% to 100.0%	0.0%	☆
FC-04	Reference 4	-100.0% to 100.0%	0.0%	☆
FC-05	Reference 5	-100.0% to 100.0%	0.0%	☆
FC-06	Reference 6	-100.0% to 100.0%	0.0%	☆
FC-07	Reference 7	-100.0% to 100.0%	0.0%	☆
FC-08	Reference 8	-100.0% to 100.0%	0.0%	☆
FC-09	Reference 9	-100.0% to 100.0%	0.0%	☆
FC-10	Reference 10	-100.0% to 100.0%	0.0%	☆
FC-11	Reference 11	-100.0% to 100.0%	0.0%	☆
FC-12	Reference 12	-100.0% to 100.0%	0.0%	☆
FC-13	Reference 13	-100.0% to 100.0%	0.0%	☆

Para. No.	Para. Name	Setting Range	Default	Property
FC-14	Reference 14	-100.0% to 100.0%	0.0%	☆
FC-15	Reference 15	-100.0% to 100.0%	0.0%	☆
FC-16	Simple PLC running mode	0: Stop after running one cycle 1: Keep final values after running one cycle 2: Repeat after running one cycle	0	☆
FC-17	Simple PLC retentive selection	00 to 11 	00	☆
FC-18	Running time of simple PLC reference 0	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-19	Acceleration/deceleration time of simple PLC reference 0	0 to 3	0	☆
FC-20	Running time of simple PLC reference 1	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-21	Acceleration/deceleration time of simple PLC reference 1	0 to 3	0	☆
FC-22	Running time of simple PLC reference 2	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-23	Acceleration/deceleration time of simple PLC reference 2	0 to 3	0	☆
FC-24	Running time of simple PLC reference 3	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-25	Acceleration/deceleration time of simple PLC reference 3	0 to 3	0	☆
FC-26	Running time of simple PLC reference 4	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-27	Acceleration/deceleration time of simple PLC reference 4	0 to 3	0	☆
FC-28	Running time of simple PLC reference 5	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-29	Acceleration/deceleration time of simple PLC reference 5	0 to 3	0	☆
FC-30	Running time of simple PLC reference 6	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-31	Acceleration/deceleration time of simple PLC reference 6	0 to 3	0	☆
FC-32	Running time of simple PLC reference 7	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-33	Acceleration/deceleration time of simple PLC reference 7	0 to 3	0	☆
FC-34	Running time of simple PLC reference 8	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-35	Acceleration/deceleration time of simple PLC reference 8	0 to 3	0	☆
FC-36	Running time of simple PLC reference 9	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-37	Acceleration/deceleration time of simple PLC reference 9	0 to 3	0	☆
FC-38	Running time of simple PLC reference 10	0.0s (h) to 6553.5s (h)	0.0s (h)	☆

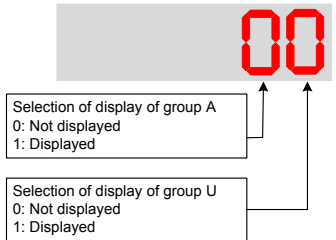
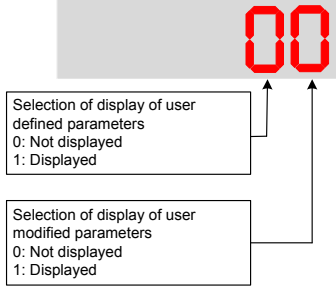


## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
FC-39	Acceleration/deceleration time of simple PLC reference 10	0 to 3	0	☆
FC-40	Running time of simple PLC reference 11	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-41	Acceleration/deceleration time of simple PLC reference 11	0 to 3	0	☆
FC-42	Running time of simple PLC reference 12	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-43	Acceleration/deceleration time of simple PLC reference 12	0 to 3	0	☆
FC-44	Running time of simple PLC reference 13	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-45	Acceleration/deceleration time of simple PLC reference 13	0 to 3	0	☆
FC-46	Running time of simple PLC reference 14	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-47	Acceleration/deceleration time of simple PLC reference 14	0 to 3	0	☆
FC-48	Running time of simple PLC reference 15	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-49	Acceleration/deceleration time of simple PLC reference 15	0 to 3	0	☆
FC-50	Time unit of simple PLC running	0: s (second) 1: h (hour)	0	☆
FC-51	Reference 0 source	0: Set by FC-00 1: AI1 2: AI2 3: AI3 4: Pulse reference 5: PID 6: Set by preset frequency (F0-08), modified via terminal UP/DOWN	0	☆
<b>Group Fd: Communication</b>				
Fd-00	Baud rate	0000 to 6039   <p>CANlink baud rate: 0: 20 Kbps 1: 50 Kbps 2: 100 Kbps 3: 125 Kbps 4: 250 Kbps 5: 500 Kbps 6: 1 Mbps</p> <p>Initial position fault (Err51): Same as that of units position</p> <p>PROFIBUS-DP baud rate: 0: 115200 bps 1: 208300 bps 2: 256000 bps 3: 512000 bps</p> <p>Modbus baud rate: 0: 300 bps 1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps</p>	5005	☆

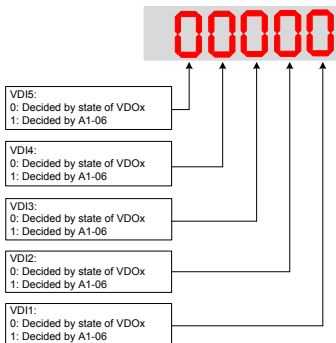
Para. No.	Para. Name	Setting Range	Default	Property
Fd-01	Data format symbol	0: No check: data format <8, N, 2> 1: Even parity check: data format <8, E, 1> 2: Odd parity check: data format <8, O, 1> 3: No check: data format <8, N, 1>	0	☆
Fd-02	Local address	0: Broadcast address; 1 to 247	1	☆
Fd-03	Modbus response delay	0 to 20 ms	2	☆
Fd-04	Communication timeout	0.0s: invalid 0.1s to 60.0s Valid for Modbus, PROFIBUS-DP and CANlink	0.0s	☆
Fd-05	Modbus protocol selection and PROFIBUS-DP data frame	00 to 31 	30	☆
Fd-06	Current resolution read by communication	0: 0.01 A (valid when ≤ 55 kW) 1: 0.1 A	0	☆
Fd-08	Extension card (PROFIBUS-DP, CANopen) interruption detection time	0.0s (invalid) 0.1s to 60.0s	0	☆
<b>Group FE: User-Defined Parameters</b>				
FE-00	User-defined parameter 0	F0-00 to FP-xx, A0-00 to Ax-xx, U0-00 to U0-xx, U3- 00 to U3-xx	F0-00	☆
FE-01	User-defined parameter 1		F0-02	☆
FE-02	User-defined parameter 2		F0-03	☆
FE-03	User-defined parameter 3		F0-07	☆
FE-04	User-defined parameter 4		F0-08	☆
FE-05	User-defined parameter 5		F0-17	☆
FE-06	User-defined parameter 6		F0-18	☆
FE-07	User-defined parameter 7		F3-00	☆
FE-08	User-defined parameter 8		F3-01	☆
FE-09	User-defined parameter 9		F4-00	☆
FE-10	User-defined parameter 10		F4-01	☆
FE-11	User-defined parameter 11		F4-02	☆
FE-12	User-defined parameter 12		F5-04	☆
FE-13	User-defined parameter 13		F5-07	☆
FE-14	User-defined parameter 14		F6-00	☆
FE-15	User-defined parameter 15		F6-10	☆
FE-16	User-defined parameter 16		F0-00	☆
FE-17	User-defined parameter 17	F0-00	☆	

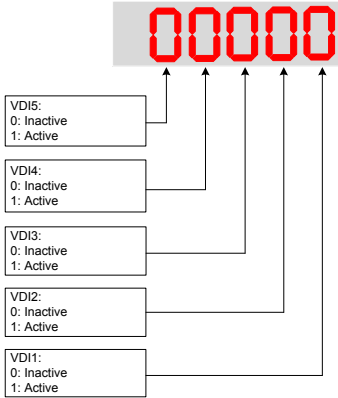
## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
FE-18	User-defined parameter 18	F0-00 to FP-xx, A0-00 to Ax-xx, U0-00 to U0-xx, U3- 00 to U3-xx	F0-00	☆
FE-19	User-defined parameter 19		F0-00	☆
FE-20	User-defined parameter 20		F0-00	☆
FE-21	User-defined parameter 21		F0-00	☆
FE-22	User-defined parameter 22		F0-00	☆
FE-23	User-defined parameter 23		F0-00	☆
FE-24	User-defined parameter 24		F0-00	☆
FE-25	User-defined parameter 25		F0-00	☆
FE-26	User-defined parameter 26		F0-00	☆
FE-27	User-defined parameter 27		F0-00	☆
FE-28	User-defined parameter 28		F0-00	☆
FE-29	User-defined parameter 29		F0-00	☆
Group FF: Manufacturer Parameters, Access Denied				
Group FP: Function Parameter Management				
FP-00	User password	0 to 65535	0	☆
FP-01	Parameter initialization	0: No operation 1: Restore factory parameters except motor parameters 2: Clear records 4: Back up current user parameters 501: Restore user backup parameters	0	★
FP-02	Parameter display property	00 to 11 	11	☆
FP-03	Selection of individualized parameter display	00 to 11 	00	☆
FP-04	Selection of parameter modification	0: Disabled 1: Enabled	0	☆

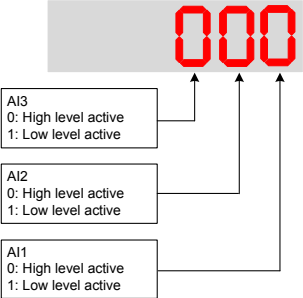
Para. No.	Para. Name	Setting Range	Default	Property
Group A0: Torque Control and Limit				
A0-00	Speed/Torque control selection	0: Speed control 1: Torque control	0	★
A0-01	Torque reference source in torque control	0: Set by A0-03 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication reference 6: MIN (AI1, AI2) 7: MAX (AI1, AI2)	0	★
A0-03	Torque digital setting in torque control	-200.0% to 200.0%	150.0%	☆
A0-05	Forward max. frequency in torque control	0.00 Hz to max. frequency (F0-10)	50.00 Hz	☆
A0-06	Reverse max. frequency in torque control	0.00 Hz to max. frequency (F0-10)	50.00 Hz	☆
A0-07	Acceleration time in torque control	0.00s to 650.00s	0.00s	☆
A0-08	Deceleration time in torque control	0.00s to 650.00s	0.00s	☆
Group A1: Virtual DI/DO				
A1-00	VDI1 function selection	0: No function 1: Forward run (FWD) 2: Reverser run (REV) 3: Three-wire control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop	0	★
A1-01	VDI2 function selection	9: Fault reset (RESET) 10: RUN disabled 11: External fault normally-open input 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4 16: Terminal 1 for acceleration/deceleration time selection 17: Terminal 2 for acceleration/deceleration time selection	0	★
A1-02	VDI3 function selection	18: Frequency reference setting channel switchover 19: UP and DOWN setting clear (terminal, operation panel) 20: Command source switchover 1 21: Acceleration/Deceleration prohibited 22: PID disabled 23: PLC state reset 24: Wobble disabled 25: Counter input 26: Counter reset 27: Length signal pulses count 28: Length reset 29: Torque control prohibited	0	★

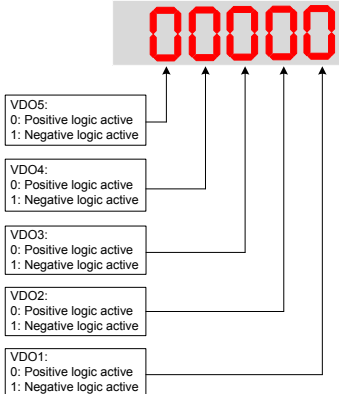
5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
A1-03	VDI4 function selection	30: Pulse input as frequency reference (valid only for DI5) 31: Reserved	0	★
A1-04	VDI5 function selection	32: Immediate DC injection braking 33: External fault normally-closed input 34: Frequency modification enabled 35: PID operation direction reverse 36: External stop 1 37: Command source switchover 2 38: PID integral disabled 39: Switchover between main frequency reference and preset frequency 40: Switchover between auxiliary frequency reference and preset frequency 41: Motor selection 42: Reserved 43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/ Torque control 47: Emergency stop (ES) 48: External stop 2 49: Deceleration DC injection braking 50: Clear running time this time 51: Two-wire control/ Three-wire control 52: Reverse running prohibited 53 to 59: Reserved	0	★
A1-05	VDI active state setting mode	00000 to 11111  	00000	★

Para. No.	Para. Name	Setting Range	Default	Property
A1-06	Selection of VDI active state	00000 to 11111 	00000	★
A1-07	Function selection for AI1 used as DI	0: No function 1: Forward run (FWD) 2: Reverser run (REV) 3: Three-wire control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: RUN disabled 11: External fault normally-open input 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4 16: Terminal 1 for acceleration/deceleration time selection 17: Terminal 2 for acceleration/deceleration time selection 18: Frequency reference setting channel switchover 19: UP and DOWN setting clear (terminal, operation panel) 20: Command source switchover 1 21: Acceleration/Deceleration prohibited 22: PID disabled 23: PLC state reset 24: Wobble disabled 25: Counter input 26: Counter reset 27: Length signal pulses count 28: Length reset 29: Torque control prohibited 30: Pulse input as frequency reference (valid only for DI5) 31: Reserved	0	★

5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
A1-08	Function selection for AI2 used as DI	32: Immediate DC injection braking 33: External fault normally-closed input 34: Frequency modification enabled 35: PID operation direction reverse 36: External stop 1 37: Command source switchover 2 38: PID integral disabled 39: Switchover between main frequency reference and preset frequency 40: Switchover between auxiliary frequency reference and preset frequency 41: Motor selection 42: Reserved	0	★
A1-09	Function selection for AI3 used as DI	43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/ Torque control 47: Emergency stop (ES) 48: External stop 2 49: Deceleration DC injection braking 50: Clear running time this time 51: Two-wire control/ Three-wire control 52: Reverse running prohibited 53 to 59: Reserved	0	★
A1-10	Active state selection for AI used as DI	000 to 111 	000	☆
A1-11	VDO1 function selection	0: No output 1: AC drive running 2: Fault output 3: Frequency level detection 1 output 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload pending 7: AC drive overload pending 8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle completed 12: Accumulative running time reached 13: Frequency limited 14: Torque limited 15: Ready for RUN	0	☆

Para. No.	Para. Name	Setting Range	Default	Property
A1-12	VDO2 function selection	16: AI1 > AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Undervoltage 20: Communication setting 21: Reserved 22: Reserved	0	☆
A1-13	VDO3 function selection	23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency level detection 2 26: Frequency 1 reached 27: Frequency 2 reached	0	☆
A1-14	VDO4 function selection	28: Current 1 reached 29: Current 2 reached 30: Timing reached 31: AI1 input exceeding limit 32: Load lost 33: Reverse running 34: Zero current 35: IGBT temperature reached	0	☆
A1-15	VDO5 function selection	36: Output current exceeding limit 37: Frequency lower limit reached (having output at stop) 38: Alarm output 39: Motor overheat pending 40: Current running time reached 41: Fault output	0	☆
A1-16	VDO1 output delay	0.0s to 3600.0s	0.0s	☆
A1-17	VDO2 output delay	0.0s to 3600.0s	0.0s	☆
A1-18	VDO3 output delay	0.0s to 3600.0s	0.0s	☆
A1-19	VDO4 output delay	0.0s to 3600.0s	0.0s	☆
A1-20	VDO5 output delay	0.0s to 3600.0s	0.0s	☆
A1-21	VDO active mode selection	00000 to 11111 	00000	☆



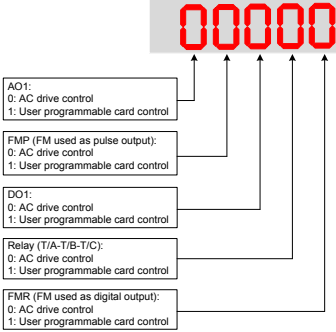
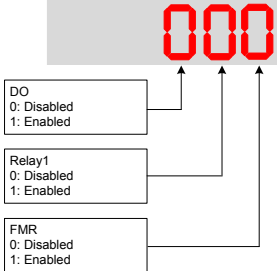
## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
Group A2: Motor 2 Parameters				
A2-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor	0	★
A2-01	Rated motor power	0.1 to 1000.0 kW	Model dependent	★
A2-02	Rated motor voltage	1 to 2000 V	Model dependent	★
A2-03	Rated motor current	0.01 to 655.35 A (AC drive power ≤ 55 kW) 0.1 to 6553.5 A (AC drive power > 55 kW)	Model dependent	★
A2-04	Rated motor frequency	0.01 Hz to max. frequency	Model dependent	★
A2-05	Rated motor speed	1 to 65535 rpm	Model dependent	★
A2-06	Stator resistance	0.001 to 65.535 Ω (AC drive power ≤ 55 kW) 0.0001 to 6.5535 Ω (AC drive power > 55 kW)	Auto-tuning dependent	☆
A2-07	Rotor resistance	0.001 to 65.535 Ω (AC drive power ≤ 55 kW) 0.0001 to 6.5535 Ω (AC drive power > 55 kW)	Auto-tuning dependent	☆
A2-08	Leakage inductive reactance	0.01 to 655.35 mH (AC drive power ≤ 55 kW) 0.001 to 65.535 mH (AC drive power > 55 kW)	Auto-tuning dependent	☆
A2-09	Mutual inductive reactance	0.1 to 6553.5 mH (AC drive power ≤ 55 kW) 0.01 to 655.35 mH (AC drive power > 55 kW)	Auto-tuning dependent	☆
A2-10	No-load current	0.01 A to A2-03 (AC drive power ≤ 55 kW) 0.1 A to A2-03 (AC drive power > 55 kW)	Auto-tuning dependent	☆
A2-27	Encoder pulses per revolution	1 to 65535	1024	☆
A2-28	Encoder type	0: ABZ incremental encoder 2: Resolver	0	☆
A2-29	Speed feedback channel selection	0: Local PG card 1: Extension PG card 2: Pulse input (DI5)	0	☆
A2-30	A/B phase sequence of ABZ incremental encoder	0: Forward 1: Reserve	0	☆
A2-31	Encoder installation angle	0.0° to 359.9°	0.0°	☆
A2-34	Number of pole pairs of resolver	1 to 65535	1	☆
A2-36	Encoder wire-break fault detection time	0.0s: No detection 0.1s to 10.0s	0.0s	★
A2-37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 1 2: Asynchronous motor dynamic auto-tuning 3: Asynchronous motor static auto-tuning 2	0	☆
A2-38	Speed loop proportional gain 1	1 to 100	30	☆
A2-39	Speed loop integral time 1	0.01s to 10.00s	0.50	☆
A2-40	Switchover frequency 1	0.00 to A2-43	5.00	☆
A2-41	Speed loop proportional gain 2	1 to 100	20	☆
A2-42	Speed loop integral time 2	0.01s to 10.00s	1.00	☆
A2-43	Switchover frequency 2	A2-40 to max. frequency	10.00	☆
A2-44	Vector control slip gain	50% to 200%	100%	☆
A2-45	Speed loop filter time constant	0.000s to 0.100s	0.000s	☆

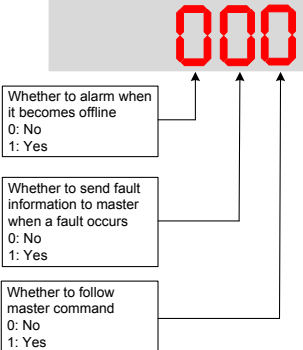
Para. No.	Para. Name	Setting Range	Default	Property
A2-47	Torque limit source in speed control	0: Set by A2-48 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Serial comms. 6: Min. (AI1, AI2) 7: Max. (AI1, AI2)	0	☆
A2-48	Digital setting of torque limit in speed control	0.0% to 200.0%	150.0%	☆
A2-49	Torque limit source in speed control (regenerative)	0: Set by A2-48 1: AI 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication reference 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: Set by A2-50	0	☆
A2-50	Digital setting of torque limit in speed control (regenerative)	0.0% to 200.0%	150.0%	☆
A2-51	Excitation adjustment proportional gain	0 to 60000	2000	☆
A2-52	Excitation adjustment integral gain	0 to 60000	1300	☆
A2-53	Torque adjustment proportional gain	0 to 60000	2000	☆
A2-54	Torque adjustment integral gain	0 to 60000	1300	☆
A2-55	Speed loop integral separation selection	0: Disabled 1: Enabled	0	☆
A2-59	Max. torque coefficient in field weakening area	50% to 200%	100%	☆
A2-60	Regenerative power limit selection	0: Disabled 1: Enabled in whole process 2: Enabled at constant speed 3: Enabled during deceleration	0	☆
A2-61	Regenerative power upper limit	0.0% to 200.0%	Model dependent	☆
A2-62	Motor 2 control mode	0: SVC control 1: FVC control 2: V/F control	0	★
A2-63	Motor 2 acceleration/deceleration time selection	0: The same motor 1 2: Acceleration/deceleration time 2 3: Acceleration/deceleration time 3 4: Acceleration/deceleration time 4	0	☆
A2-64	Motor 2 torque boost	0.0%: Ineffective 0.1% to 30.0%	Model dependent	☆
A2-66	Motor 2 oscillation suppression gain	0 to 100	40	☆
Group A5: Control Optimization				
A5-00	DPWM switchover frequency upper limit	5.00 Hz to max. frequency	8.00 Hz	☆
A5-01	PWM modulation pattern	0: Asynchronous modulation 1: Synchronous modulation	0	☆

## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
A5-02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode 1	1	☆
A5-03	Random PWM depth	0: Random PWM invalid 1 to 10	0	☆
A5-04	Overcurrent fast prevention	0: Disabled 1: Enabled	1	☆
A5-05	Max. output voltage coefficient	100% to 110%	105%	★
A5-06	Undervoltage threshold	210 to 420 V	350 V	☆
A5-08	Dead-zone time adjustment	100% to 200%	150%	★
A5-09	Overvoltage threshold	200.0 to 2500.0 V	Model dependent	★
Group A6: AI Curve Setting				
A6-00	AI curve 4 min. input	-10.00 V to A6-02	0.00 V	☆
A6-01	Corresponding percentage of AI curve 4 min. input	-100.0% to 100.0%	0.0%	☆
A6-02	AI curve 4 inflexion 1 input	A6-00 to A6-04	3.00 V	☆
A6-03	Corresponding percentage of AI curve 4 inflexion 1 input	-100.0% to 100.0%	30.0%	☆
A6-04	AI curve 4 inflexion 2 input	A6-02 to A6-06	6.00 V	☆
A6-05	Corresponding percentage of AI curve 4 inflexion 2 input	-100.0% to 100.0%	60.0%	☆
A6-06	AI curve 4 max. input	A6-04 to 10.00 V	10.00 V	☆
A6-07	Corresponding percentage of AI curve 4 max. input	-100.0% to 100.0%	100.0%	☆
A6-08	AI curve 5 min. input	-10.00 V to A6-10	-10.00 V	☆
A6-09	Corresponding percentage of AI curve 5 min. input	-100.0% to 100.0%	-100.0%	☆
A6-10	AI curve 5 inflexion 1 input	A6-08 to A6-12	-3.00 V	☆
A6-11	Corresponding percentage of AI curve 5 inflexion 1 input	-100.0% to 100.0%	-30.0%	☆
A6-12	AI curve 5 inflexion 2 input	A6-10 to A6-14	3.00 V	☆
A6-13	Corresponding percentage of AI curve 5 inflexion 2 input	-100.0% to 100.0%	30.0%	☆
A6-14	AI curve 5 max. input	A6-12 to 10.00 V	10.00 V	☆
A6-15	Corresponding percentage of AI curve 5 max. input	-100.0% to 100.0%	100.0%	☆
A6-24	Jump point of AI1 input corresponding setting	-100.0% to 100.0%	0.0%	☆
A6-25	Jump amplitude of AI1 input corresponding setting	0.0% to 100.0%	0.5%	☆
A6-26	Jump point of AI2 input corresponding setting	-100.0% to 100.0%	0.0%	☆
A6-27	Jump amplitude of AI2 input corresponding setting	0.0% to 100.0%	0.5%	☆
A6-28	Jump point of AI3 input corresponding setting	-100.0% to 100.0%	0.0%	☆
A6-29	Jump amplitude of AI3 input corresponding setting	0.0% to 100.0%	0.5%	☆

Para. No.	Para. Name	Setting Range	Default	Property
Group A7: User Programmable Card				
A7-00	User programmable function selection	0: Disabled 1: Enabled	0	★
A7-01	AC drive output terminal control source selection	00000 to 11111 	00000	★
A7-02	User programmable card AI3 and AO2 function selection	0: AI3 (voltage input), AO2 (voltage output) 1: AI3 (voltage input), AO2 (current output) 2: AI3 (current input), AO2 (voltage output) 3: AI3 (current input), AO2 (current output) 4: AI3 (PTC input), AO2 (voltage output) 5: AI3 (PTC input), AO2 (current output) 6: AI3 (PT100 input), AO2 (voltage output) 7: AI3 (PT100 input), AO2 (current output)	0	★
A7-03	PLC program controls the FMP output	0.0% to 100.0%	0.0%	☆
A7-04	PLC program controls the AO1 output	0.0% to 100.0%	0.0%	☆
A7-05	Selection of PLC program controlling digital output	000 to 111 	000	☆
A7-06	Setting frequency reference via the user programmable card	-100.00% to 100.00%	0.00%	☆
A7-07	Setting torque reference via the user programmable card	-200.0% to 200.0%	0.0%	☆
A7-08	Setting running command via the user programmable card	0: No command 1: Forward run 2: Reverse run 3: Forward jog 4: Reverse jog 5: Coast to stop 6: Decelerate to stop 7: Fault reset	0	☆

## 5 Parameter Table

Para. No.	Para. Name	Setting Range	Default	Property
A7-09	Setting torque reference via the user programmable card	0: No fault 80 to 89: User defined fault codes	0	☆
<b>Group A8: Point-point Communication</b>				
A8-00	Point-point communication	0: Disabled 1: Enabled	0	☆
A8-01	Master or slave selection	0: Master 1: Slave	0	☆
A8-02	Selection of action of the slave in point-point communication	000 to 111 	011	★
A8-03	The slave received data	0: Output frequency 1: Frequency reference	0	☆
A8-04	Zero offset of received data	-100.00 to 100.00	0.00	☆
A8-05	Gain of received data	-10.00 to 10.00	1.00	☆
A8-06	Point-point communication interruption detection time	0.0s to 10.0s	1.0s	☆
A8-07	Master data sending cycle in point-point communication	0.001s to 10.000s	0.001s	☆
A8-11	Window width	0.20 to 10.00 Hz	0.50 Hz	☆
<b>Group AC: AI/AO Correction</b>				
AC-00	AI1 measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-01	AI1 displayed voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-02	AI1 measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆
AC-03	AI1 displayed voltage 2	-10.00 to 10.000 V	Factory-corrected	☆
AC-04	AI2 measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-05	AI2 displayed voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-06	AI2 measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆
AC-07	AI2 displayed voltage 2	-10.00 to 10.000 V	Factory-corrected	☆

Para. No.	Para. Name	Setting Range	Default	Property
AC-08	AI3 measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-09	AI3 displayed voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-10	AI3 measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆
AC-11	AI3 displayed voltage 2	-10.00 to 10.000 V	Factory-corrected	☆
AC-12	AO1 target voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-13	AO1 measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-14	AO1 target voltage 2	-10.00 to 10.000 V	Factory-corrected	☆
AC-15	AO1 measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆
AC-16	AO2 target voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-17	AO2 measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆
AC-18	AO2 target voltage 2	-10.00 to 10.000 V	Factory-corrected	☆
AC-19	AO2 measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆

## 5.3 Monitoring Function Code

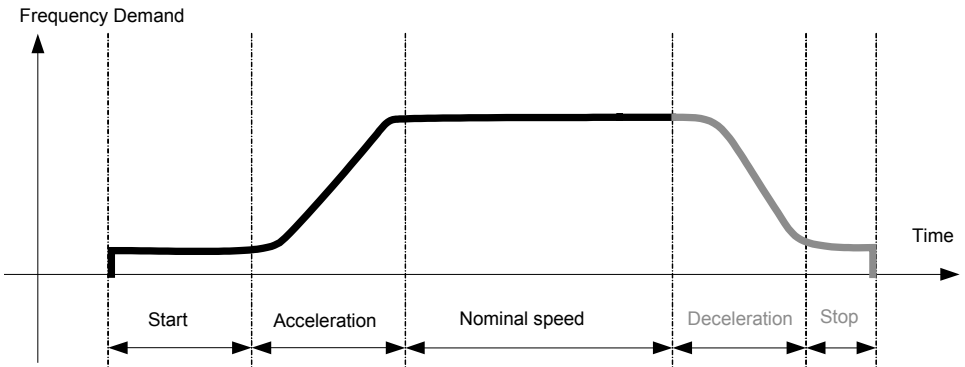
Para. No.	Para. Name	Display Range	Communication Address
Group U0: Monitoring Parameters			
U0-00	Running frequency	0.00 to 500.0 Hz	7000H
U0-01	Frequency reference	0.00 to 500.0 Hz	7001H
U0-02	Bus voltage	0.0 to 3000.0 V	7002H
U0-03	Output voltage	0 to 1140 V	7003H
U0-04	Output current	0.00 to 655.35 A	7004H
U0-05	Output power	0 to 32767 kW	7005H
U0-06	Output torque	-200.0% to 200.0%	7006H
U0-07	DI state	0 to 32767	7007H
U0-08	DO state	0 to 1023	7008H
U0-09	AI1 voltage	-	7009H
U0-10	AI2 voltage	-	700AH
U0-11	AI3 voltage	-	700BH
U0-12	Count value	-	700CH
U0-13	Length value	-	700DH
U0-14	Load speed display	0 to 65535	700EH
U0-15	PID reference	0 to 65535	700FH
U0-16	PID feedback	0 to 65535	7010H
U0-17	PLC stage	-	7011H
U0-18	Pulse reference	0.00 to 20.00 kHz	7012H
U0-19	Feedback speed	-500.0 to 500.0 Hz	7013H
U0-20	Remaining running time	0.0 to 6500.0 min	7014H
U0-21	AI1 voltage before correction	0.00 to 10.57 V	7015H
U0-22	AI2 voltage (V)/ current (mA) before correction	0.00 to 10.57 V	7016H
U0-23	AI3 voltage before correction	-10.57 to 10.57 V	7017H
U0-24	Motor speed	0 to rated motor speed	7018H
U0-25	Accumulative power-on time	-	7019H
U0-26	Accumulative running time	-	701AH
U0-27	Pulse reference	0 to 65535 Hz	701BH
U0-28	Communication reference	-100.00% to 100.00%	701CH
U0-29	Encoder feedback speed	-	701DH
U0-30	Main frequency reference	0.00 to 500.00 Hz	701EH
U0-31	Auxiliary frequency reference	0.00 to 500.00 Hz	701FH
U0-32	Viewing any register address value	-	7020H
U0-34	Motor temperature	-	7021H
U0-35	Target torque	-200.0% to 200.0%	7022H
U0-36	Resolver position	0 to 4095	7023H
U0-37	Power factor angle	-180° to 180°	7024H
U0-38	ABZ position	0 to 65535	7025H
U0-39	Target voltage upon V/F separation	0 V to rated motor voltage	7026H
U0-40	Output voltage upon V/F separation	0 V to rated motor voltage	7027H
U0-41	DI state display	-	7028H

Para. No.	Para. Name	Display Range	Communication Address
U0-42	DO state display	-	702AH
U0-43	DI set for function state display 1	-	702BH
U0-44	DI set for function state display 2	-	702CH
U0-45	Fault information	0 to 51	702DH
U0-58	Phase Z counting	0 to 65535	703AH
U0-59	Frequency Reference	-100.00% to 100.00%	703BH
U0-60	Running frequency	-100.00% to 100.00%	703CH
U0-61	AC drive state	0 to 65535	703DH
U0-62	Current fault code	0 to 99	703EH
U0-63	Sending value of point-point communication	-100.00% to 100.00%	703FH
U0-64	Number of slaves	0 to 63	7040H
U0-65	Torque upper limit	-200.00% to 200.00%	7041H
U0-66	Communication extension card type	100: CANopen 200: PROFIBUS-DP 300: CANlink	7042H
U0-67	Communication extension card version	-	-
U0-68	DP card AC drive status	bit0: running status bit1: running direction bit2: whether AC drive faulty bit3: target frequency reached bit4 to bit7: reserved bit8 to bit 15: fault codes	7043H
U0-69	Speed of transmitting DP	0.00 Hz to max. frequency	7044H
U0-70	Motor speed of transmitting DP	0 to rated motor	7045H
U0-71	Communication card current display	-	-
U0-72	Communication card faulty state	-	-
U0-73	Motor SN	0: Motor 1 1: Motor 2	7046H
U0-74	AC drive output torque	-200.0% to 200.00%	7047H
U0-76	Low bits of accumulative power consumption	0.0 to 999.0 (min. unit: 0.1°)	704CH
U0-77	High bits of accumulative power consumption	0 to 65535 (min. unit: 1°)	704DH
U0-78	Linear speed	0 to 65535	704EH

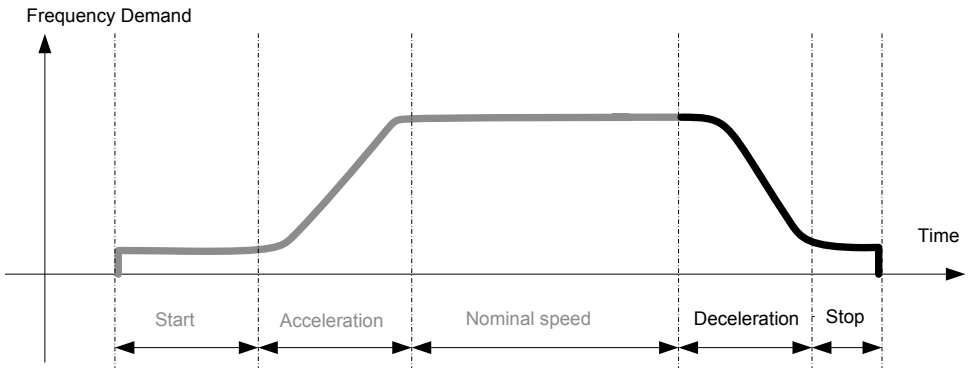


## 6 Troubleshooting

## 6.1 Performance Fine Tuning



Stage	Symptom	Diagnostics	Remedies
Start	Rollback	Start frequency is too low	Increase F6-03, ranging 0 to 10 Hz
		Torque output is insufficient	Make sure F3-00 = 0, F3-01 = 0
	Starting jerk	Start frequency is too high	Decrease F6-03, ranging 0 to 10 Hz
Acceleration	Jerk when acceleration starts	Too fast acceleration at this section	Increase F6-08, ranging 0 to $(100 - (F6-09))\%$ ; Or increase F0-17, ranging 0s to 650s
	Jerk when acceleration end	Too fast acceleration at this section	Increase F6-09, ranging 0 to $(100 - (F6-08))\%$ Or increase F0-17, ranging 0s to 650s
	Overshoot when acceleration ends	Too big speed loop PI gains	Decrease F2-03, ranging 1 to 100 Or increase F2-04, ranging 0.01s to 10s
	Vibration	Too small margin between F2-02 and F2-05	Make sure F2-05 - F2-02 > 3Hz, usually increase F2-05, ranging from F2-02 to 7 Hz
Current limit protection occurs		It reaches current limit	
Nominal speed	Vibration	Too big speed loop PI gains	Decrease F2-00 or F2-03, ranging 0 to 100; Or increase F2-01 or F2-04, ranging 0.01 to 10.00
		Too big current loop PI gains	Double check the motor parameters and then perform motor auto-tuning once more



Stage	Symptom	Diagnostics	Remedies
Deceleration	Vibration	Current limit protection occurring	It reaches current limit.
Stop	Jerk	Too strong DC injection at stop	Decrease F6-13, ranging 0 to 100%.
	Slip	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

Display	Fault Name	Possible Causes	Solutions
<b>Err02</b>	Overcurrent during acceleration	Ground fault or short circuit exists in the output circuit.	Check whether short-circuit occurs on the motor, motor cable or contactor.
		Control mode is SVC or FVC but motor auto-tuning is not performed.	Set motor parameters according to motor nameplate and perform motor auto-tuning.
		Acceleration time is too short.	Increase acceleration time.
		The current limit parameters are set improperly.	Ensure that current limit is enabled (F3-19 = 1). The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. The setting of current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		Customized torque boost or V/F curve is not appropriate.	Adjust the customized torque boost or V/F curve.
		The spinning motor is started.	Enable the catching a spinning motor function or start the motor after it stops.
		The AC drive suffers external interference.	View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the drive board or hall device problem.
<b>Err03</b>	Overcurrent during deceleration	Ground fault or short circuit exists in the output circuit.	Check whether short-circuit occurs on the motor, motor cable or contactor.
		Control mode is SVC or FVC but motor auto-tuning is not performed.	Set the motor parameters according to the motor nameplate and perform motor auto-tuning.
		Acceleration time is too short.	Increase acceleration time.
		The current limit parameters are set improperly.	Ensure that current limit is enabled (F3-19 = 1). The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. The setting of the current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		Braking unit and braking resistor are not installed.	Install braking unit and braking resistor.
		The AC drive suffers external interference.	View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the drive board or hall device problem.
<b>Err04</b>	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.
		Control mode is SVC or FVC but motor auto-tuning is not performed.	Set motor parameters according to motor nameplate and perform motor auto-tuning.
		The current limit parameters are set improperly.	Ensure that current limit is enabled (F3-19 = 1). The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. The setting of current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		The AC drive power class is small.	If output current exceeds rated motor current or rated output current of the AC drive during stable running, replace a drive of larger power class.
		The AC drive suffers external interference.	View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the drive board or hall device problem.

Display	Fault Name	Possible Causes	Solutions
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 or install a braking resistor.
		The voltage limit parameters are set improperly.	Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of voltage limit (F3-22) is too large. Adjust it between 700 V and 770 V. The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50.
		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	The voltage limit parameters are set improperly.	Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of voltage limit (F3-22) is too large. Adjust it between 700 V and 770 V. The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50.
		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	The voltage limit parameters are set improperly.	Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of voltage limit (F3-22) is too large. Adjust it between 700 V and 770 V. The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50. The setting of frequency rise threshold during voltage limit (F3-26) is too small. Adjust it between 5 Hz and 20 Hz.
		An external force drives motor during running.	Cancel the external force or install a braking resistor
Err08	Pre-charge resistor fault	Bus voltage fluctuates around undervoltage threshold continuously.	Contact the agent or Inovance.
Err09	Undervoltage	Instantaneous power failure occurs	Enable the power dip ride through function (F9-59 ≠ 0).
		The AC drive's input voltage is not within the permissible range.	Adjust the voltage to normal range.
		The bus voltage is abnormal.	Contact the agent or Inovance.
		The rectifier bridge, the buffer resistor, the drive board or the control board are abnormal.	Contact the agent or Inovance.
Err10	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.
Err11	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.

Display	Fault Name	Possible Causes	Solutions
Err 12	Power input phase loss	Input phase loss occurs.	Eliminate faults in external circuitry.
		Drive board, lightning protection board, control board, or rectifier bridge is abnormal.	Contact the agent or Inovance.
Err 13	One drive output phase loss	Motor winding is damaged.	Check resistance between motor wires. 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 module is abnormal.	Contact the agent or Inovance.
Err 14	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.
Err 14	IGBT overheat	Thermally sensitive resistor of IGBT is damaged.	Replace the damaged thermally sensitive resistor.
		The inverter IGBT is damaged.	Replace the inverter IGBT.
Err 15	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.
Err 16	Comms. fault	Host computer is in abnormal state.	Check the cable of host computer.
		Communication cable is abnormal.	Check the communication cables.
		The serial port communication protocol (F0-28) of extension communication card is set improperly.	Set F0-28 of extension communication card correctly.
		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.	
Err 17	Contactor fault	Drive board and power supply are abnormal.	Replace drive board or power supply board.
		Contactor is abnormal.	Replace contactor.
		The lightning protection board is abnormal.	Replace the lightning protection board.
Err 18	Current detection fault	The hall is abnormal.	Replace the hall .
		The drive board is abnormal.	Replace the drive board.
Err 19	Motor tuning fault	Motor parameters are not set according to nameplate.	Set motor parameters correctly according to nameplate.
		Motor auto-tuning times out.	Check the cable connecting AC drive and motor.
		The encoder is abnormal.	Check whether F1-27 (encoder pulses per revolution) is set correctly. Check whether signal lines of encoder are connected correctly and securely.
Err 20	Encoder fault	Encoder is not matched.	Set the type of encoder correctly.
		Encoder wiring is incorrect.	Check the PG card power supply and phase sequence.
		Encoder is damaged.	Replace encoder.
		PG card is abnormal.	Replace PG card.
Err 21	EEPROM read-write fault	The EEPROM chip is damaged.	Replace the main control board.
Err 23	Short circuit to ground	Motor is short circuited to the ground.	Replace cable or motor.

Display	Fault Name	Possible Causes	Solutions
Err26	Accumulative running time reached	Accumulative running time reaches the setting value.	Clear the record through parameter initialization.
Err27	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.	
Err28	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.	
Err29	Accumulative power-on time reached	Accumulative power-on time reaches the setting value.	Clear the record through parameter initialization.
Err30	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.
Err31	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.
Err40	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.
Err41	Motor switchover fault during running	Motor switchover via terminal during drive running of the AC drive.	Perform motor switchover after the AC drive stops.
Err42	Speed error	Encoder parameters are set improperly.	Set encoder parameters properly.
		Motor auto-tuning is not performed.	Perform motor auto-tuning.
		F9-69 (detection level of speed error) and F9-70 (detection time of speed error) are set incorrectly.	Set F9-69 and F9-70 correctly based on actual condition.
Err43	Motor overspeed	Encoder parameters are set improperly.	Set encoder parameters properly.
		Motor auto-tuning is not performed.	Perform motor auto-tuning.
		F9-67 (Overspeed detection level) and F9-68 (Overspeed detection time) are set incorrectly.	Set F9-67 and F9-68 correctly based on the actual situation.
Err45	Motor overtemp.	Cable connection of temperature sensor becomes loose	Check cable connection of temperature sensor.
		The motor temperature is too high.	Decrease carrier frequency or take other measures to cool the motor.
Err61	Two or three drive output phases loss	Resistance of braking resistor is too small.	Replace a braking resistor of larger resistance.
Err62	Short-circuit of braking circuit	Braking module is abnormal.	Contact the agent or Inovance.

## 6.2 Common Symptoms and Diagnostics

Fault Name	Possible Causes	Solutions
There is no display at power-on.	The mains voltage is not input or too low.	Check the power supply.
	The switching power supply on drive board of the AC drive is faulty.	Check bus voltage. Check that the 24V output and +10V output on the control board are normal.
	Wires between control board and drive board and between control board and operating panel break.	Re-connect the 8-pin wire and 40-pin wire.
	Pre-charge resistor of the AC drive is damaged.	Contact the agent or Inovance.
	Control board or operating panel is faulty.	
	Rectifier bridge is damaged.	
HC is displayed at power-on.	Wire between drive board and control board is in poor contact.	Re-connect the 8-pin wire and 28-pin wire.
	Related components on control board are damaged	Contact the agent or Inovance.
	The motor or motor cable is short circuited to ground.	
	The hall is damaged.	
	The mains voltage is too low.	
HC The display is normal upon power-on, but "HC" is displayed after start and the motor stops immediately.	The cooling fan is damaged or locked-rotor occurs.	Replace the fan.
	Short circuit exists in wiring of control terminals.	Eliminate short circuit fault in control circuit wiring.
Err 14 (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).	Contact the agent or Inovance.
Err 17 is detected upon power-on or running.	The pre-charge relay or contactor is not closed.	Check whether the relay or contactor cable is loose.
		Check whether the relay or contactor is faulty.
		Check whether 24 V power supply of the contactor is faulty.
		Contact the agent or Inovance.
Err 23 is displayed at power-on.	Motor or motor output cable is short circuited to ground.	Use a megger to measure insulation resistance of motor and motor cable.
	The AC drive is damaged.	Contact the agent or Inovance.

Fault Name	Possible Causes	Solutions
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 following parameters properly: Encoder parameters Motor ratings, such as rate motor frequency and rated motor speed Motor 1 control mode (F0-01) and command source selection (F0-02) F3-01 (torque boost) in V/F control under heavy-load start.
	Cable connection between drive board and control board is in poor contact.	Re-connect wirings and ensure secure connection.
	The drive board is faulty.	Contact the agent or Inovance.
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.
	Jumper across OP and +24 V becomes loose.	Re-confirm the jumper bar across OP and +24 V.
	The control board is faulty.	Contact the agent or Inovance.
Motor speed does not rise in FVC control.	Encoder is faulty.	Replace encoder and re-confirm cable connection.
	Encoder connection is incorrect or in poor contact.	Reconnect the encoder to ensure in good contact.
	PG card is faulty.	Replace the PG card.
	Drive board is faulty.	Contact the agent or Inovance.
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.



## Revision History

Revision	Date	Revising Author	Description
V0.0	27th NOV'2015	PMT	Related firmware version: F7-10 = U76.56 and F7-11 = U77.56.
A01	7th AUG'2016	PMT	Related firmware version: F7-10 = U76.56 and F7-11 = U77.56.



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