

VFD C2000

Classical Field Oriented Control AC Motor Drive

Simplified Manual



Table of Contents

RECEIVING	1
UNPACKING	3
WIRING.....	6
MAIN CIRCUIT TERMINALS.....	10
CONTROL TERMINALS	16
ACCESSORIES.....	20
OPTION CARDS	27
SPECIFICATIONS.....	33
DIGITAL KEYPAD	39
WARNING CODES.....	44
FAULT CODES INFORMATION	52
SUMMARY OF PARAMETER SETTINGS.....	61

PLEASE READ PRIOR TO INSTALLATION FOR SAFETY.



- AC input power must be disconnected before any wiring to the AC motor drive is made.
- Even if the power has been turned off, a charge may still remain in the DC-link capacitors with hazardous voltages before the POWER LED is OFF. Please do not touch the internal circuit and components.
- There are highly sensitive MOS components on the printed circuit boards. These components are especially sensitive to static electricity. Please do not touch these components or the circuit boards before taking anti-static measures. Never reassemble internal components or wiring.
- Ground the AC motor drive using the ground terminal. The grounding method must comply with the laws of the country where the AC motor drive is to be installed.
- DO NOT install the AC motor drive in a place subjected to high temperature, direct sunlight and inflammables.



- Never connect the AC motor drive output terminals U/T1, V/T2 and W/T3 directly to the AC mains circuit power supply.
- Only qualified persons are allowed to install, wire and maintain the AC motor drives.
- Even if the 3-phase AC motor is stop, a charge may still remain in the main circuit terminals of the AC motor drive with hazardous voltages.

NOTE

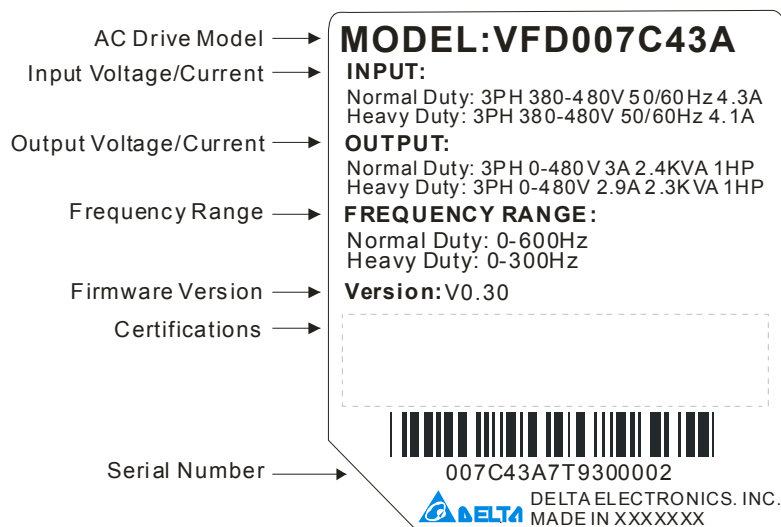
- The content of this manual may be revised without prior notice. Please consult our distributors or download the most updated version at <http://www.delta.com.tw/industrialautomation>

Receiving

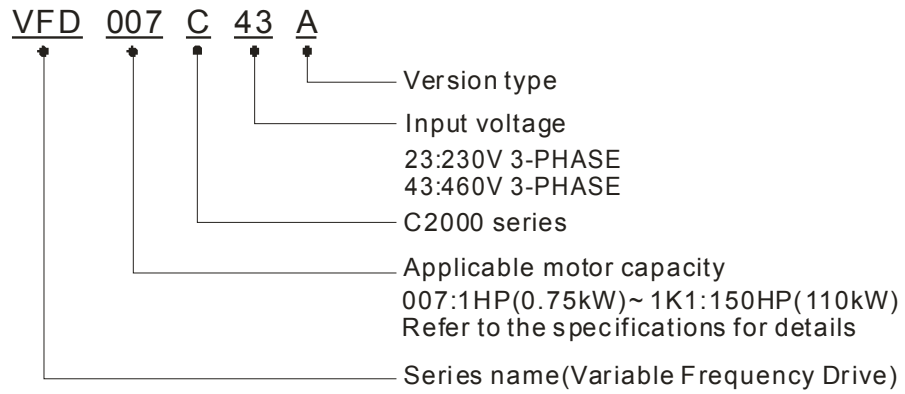
After receiving the AC motor drive, please check for the following:

1. Please inspect the unit to assure it was not damaged during shipment after unpacking.
2. Make sure that the part number printed on the package corresponds with the part number indicated on the nameplate.
3. Make sure that the voltage for the wiring lie within the range as indicated on the nameplate.
4. Please install the AC motor drive according to this manual.
5. Before applying the power, please make sure that all the devices, including power, motor, control board and digital keypad, are connected correctly.
6. When wiring the AC motor drive, please make sure that the wiring of input terminals "R/L1, S/L2, T/L3" and output terminals "U/T1, V/T2, W/T3" are correct to prevent drive damage.
7. After applying the power, it can select languages and set the parameter groups by the digital keypad (KPC-CC01).
8. After applying the power, please trial run with the low speed and then increase the speed gradually to the desired speed.

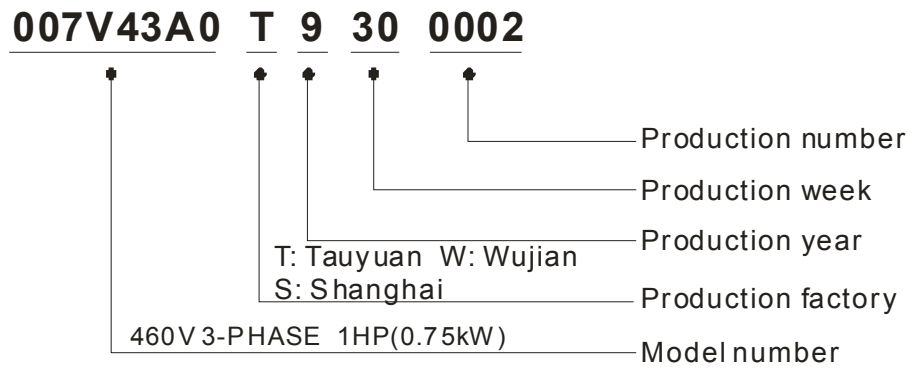
Nameplate Information



Model Name



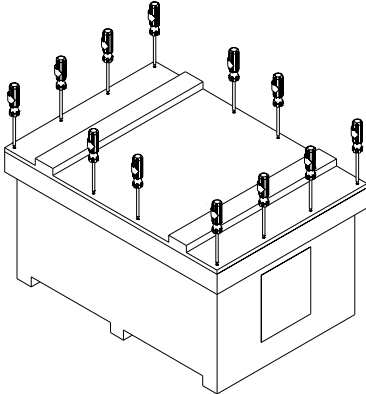
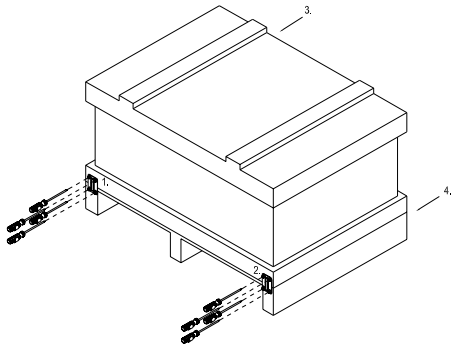
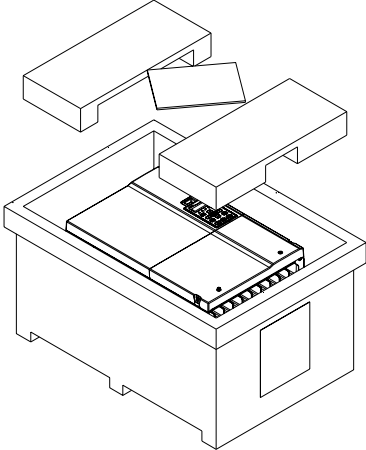
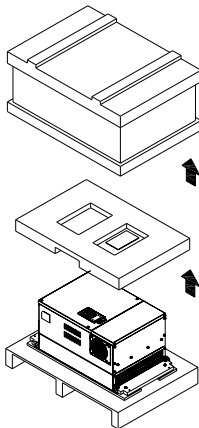
Serial Number

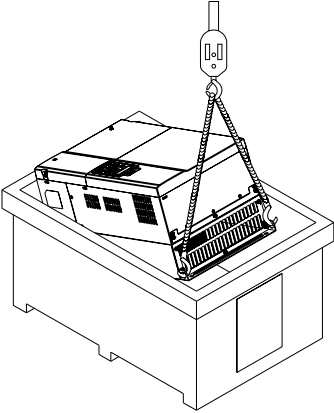
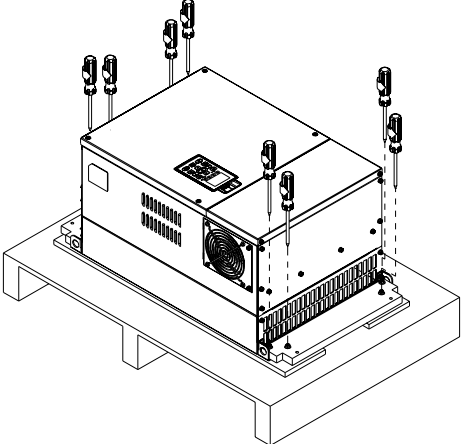
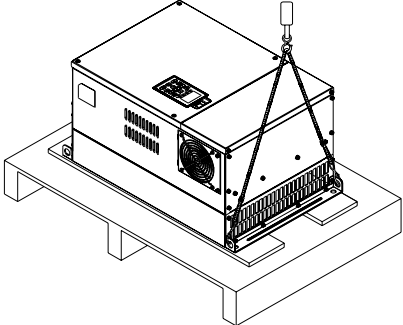
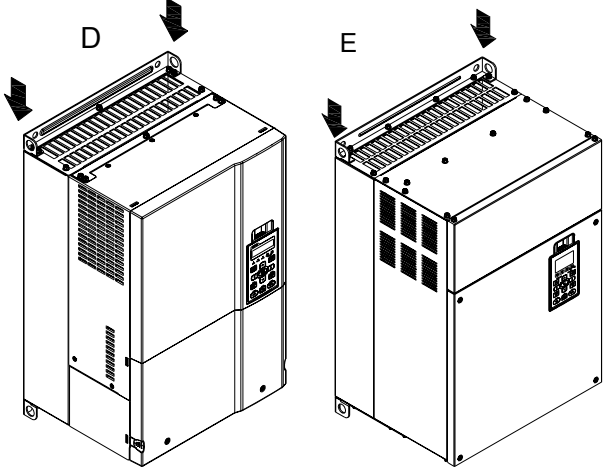


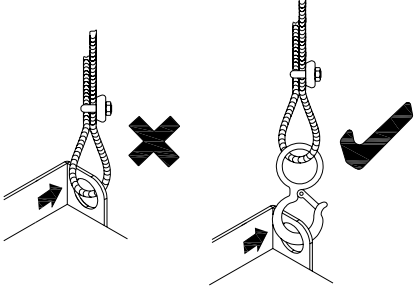
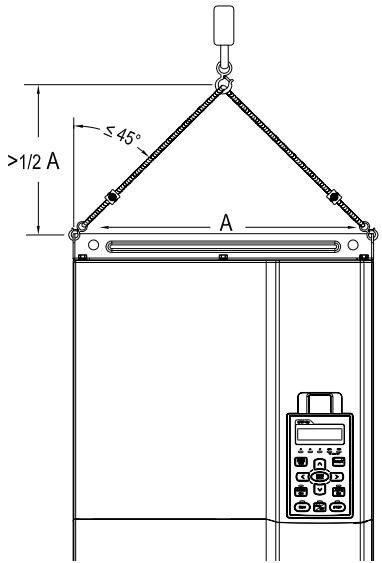
Unpacking

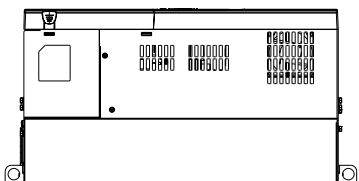
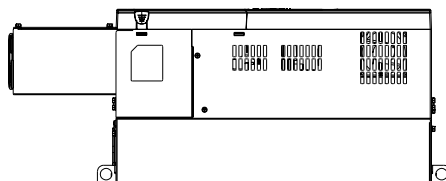
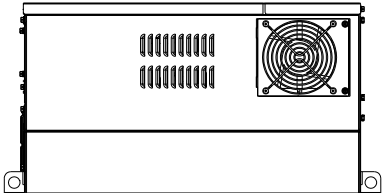
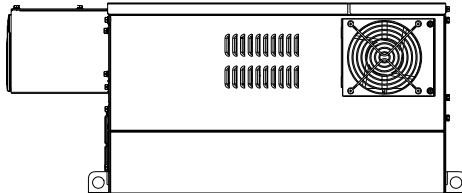
The AC motor drive should be kept in the shipping carton or crate before installation. In order to retain the warranty coverage, the AC motor drive should be stored properly when it is not to be used for an extended period of time.

For frame D and E models, it is packed in the crate. Please unpack by the following steps.

Frame D	Frame E
<p data-bbox="140 640 715 723">Loosen all the cover screws to open the crate. (total is 12 screws)</p> 	<p data-bbox="794 640 1497 768">Loosen all the screws on the 4 iron plates at the four bottom corners of the crate with 4 screws on each iron plate.</p> 
<p data-bbox="140 1216 595 1249">Remove the EPEs and manual.</p> 	<p data-bbox="794 1216 1425 1249">Remove the crate cover, EPEs and manual.</p> 

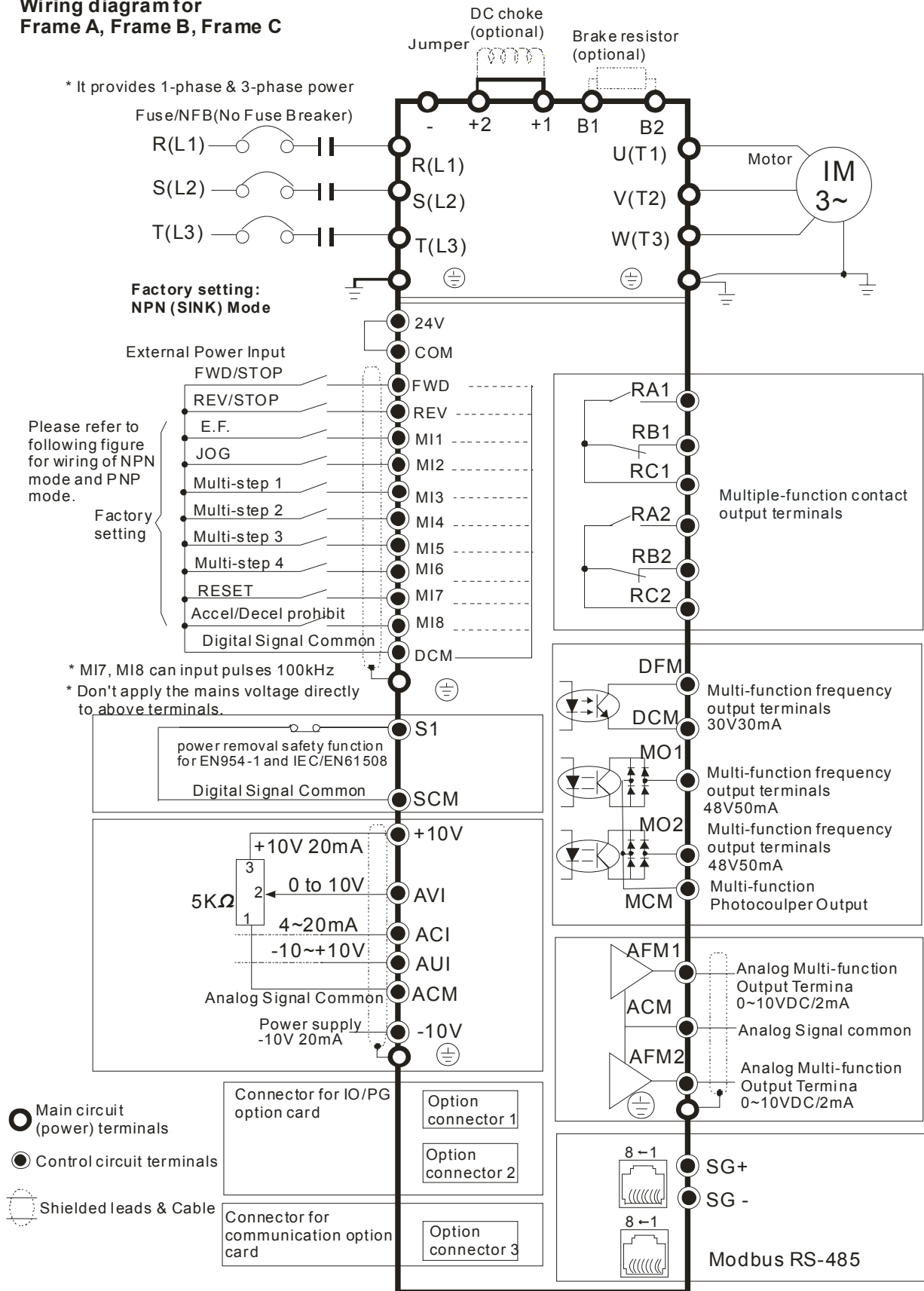
Frame D	Frame E
<p>Lifting the drive by hooking the lifting hole as shown in the following figure.</p> 	<p>Loosen 8 screws fastened on the pallet as shown in the following figure.</p> 
	<p>Lifting the drive by hooking the lifting hole as shown in the following figure.</p> 
<p>Using lifting hook Put the AC motor drive vertically on a flat surface as shown in the following diagram. The arrows show the position of lifting holes.</p> 	

Frame D	Frame E
<p>Make sure that the lifting hook is set as shown in the following diagram.</p> 	<p>Ensure that the angle between the lifting hole and lifting device is within the specification as shown in the following diagram.</p> 

Weights		Weights	
<p>VFDXXXXCXXA D 37.6 kg(82.9 lbs.)</p> 	<p>VFDXXXXCXXE D 40 kg(88.2 lbs.)</p> 		
<p>E 63.6 kg(140.2 lbs.)</p> 	<p>E 66 kg(145.5 lbs.)</p> 		

Wiring

Wiring diagram for Frame A, Frame B, Frame C



Wiring diagram for frame D and above

* It provides 1-phase & 3-phase power

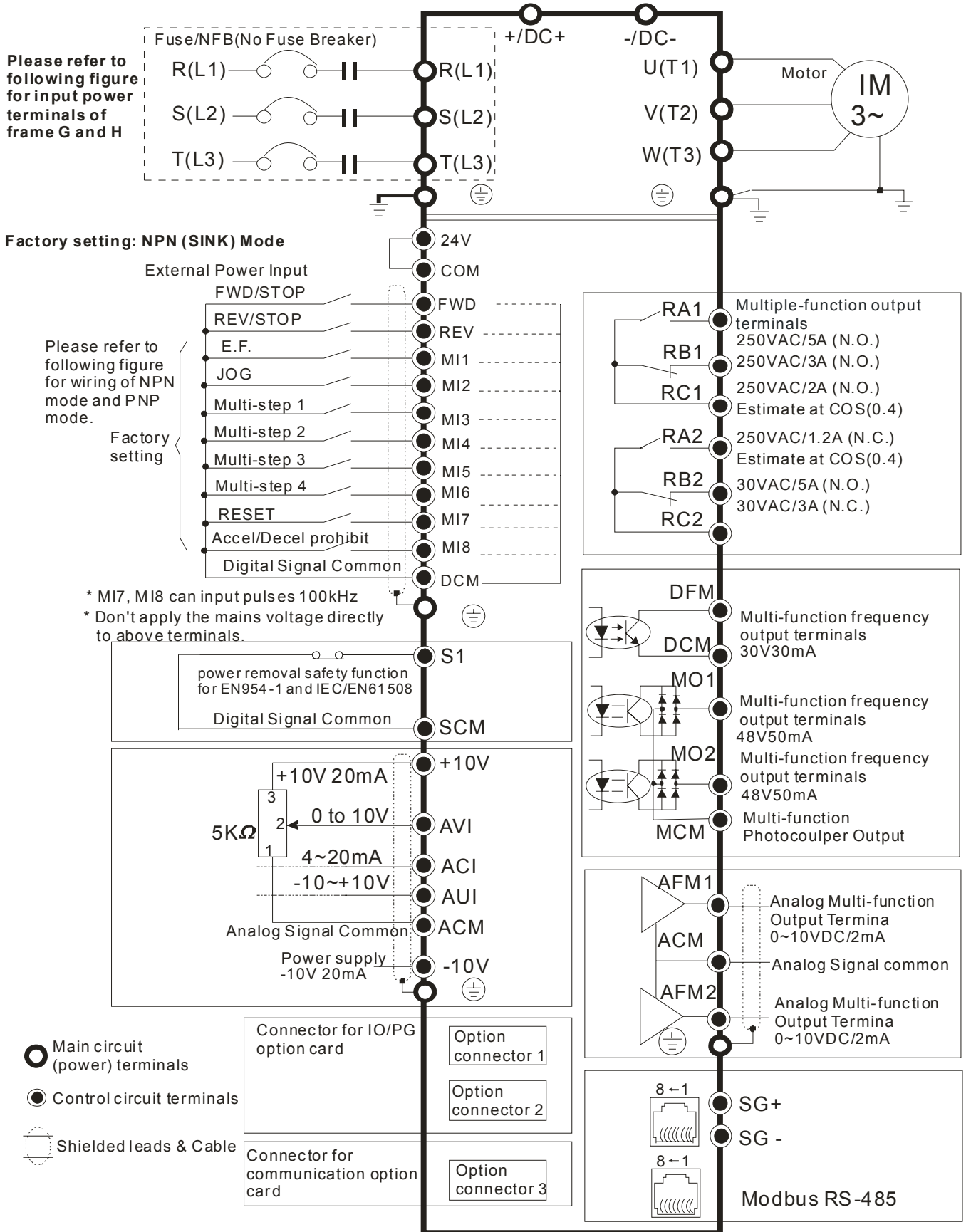


Figure 1

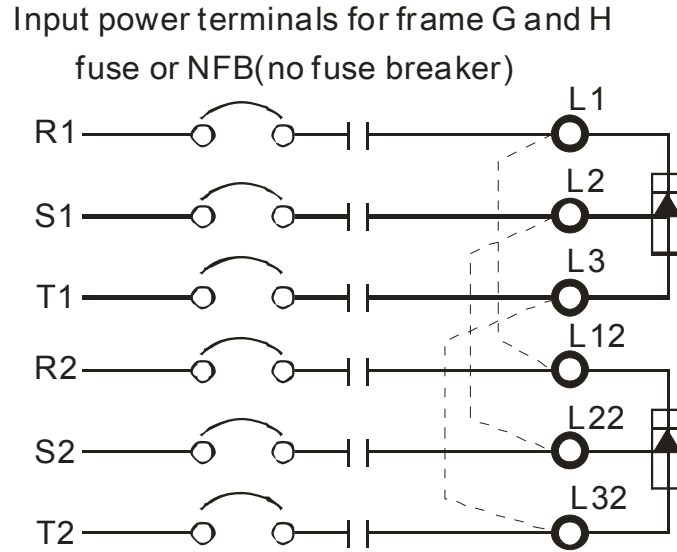


Figure 2 Wiring diagram for AFE connected in parallel

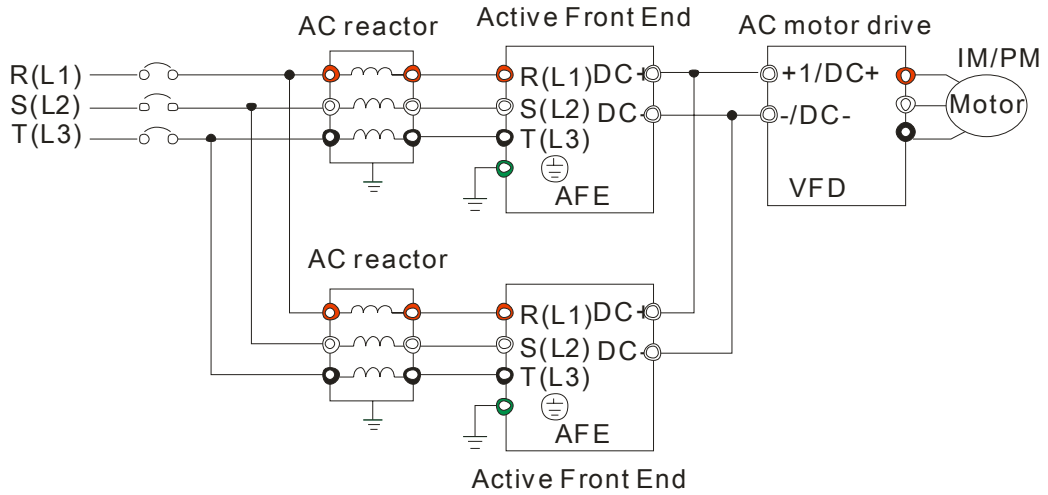


Figure 3 Wiring diagram for AFE to be used as the brake unit

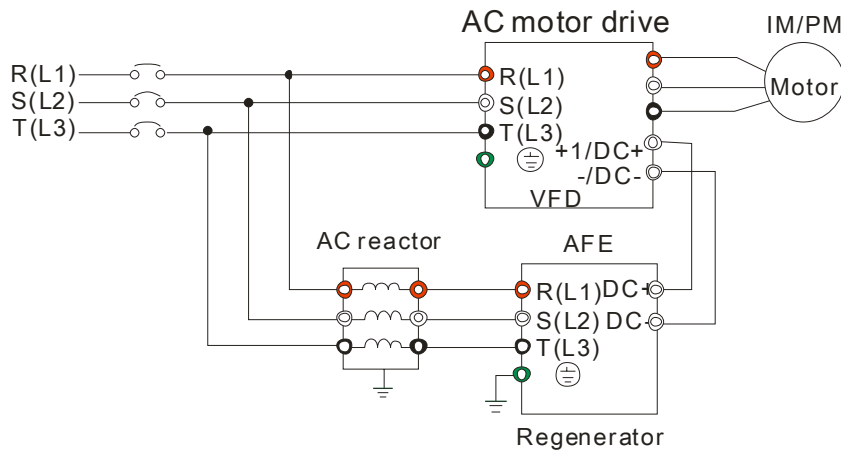
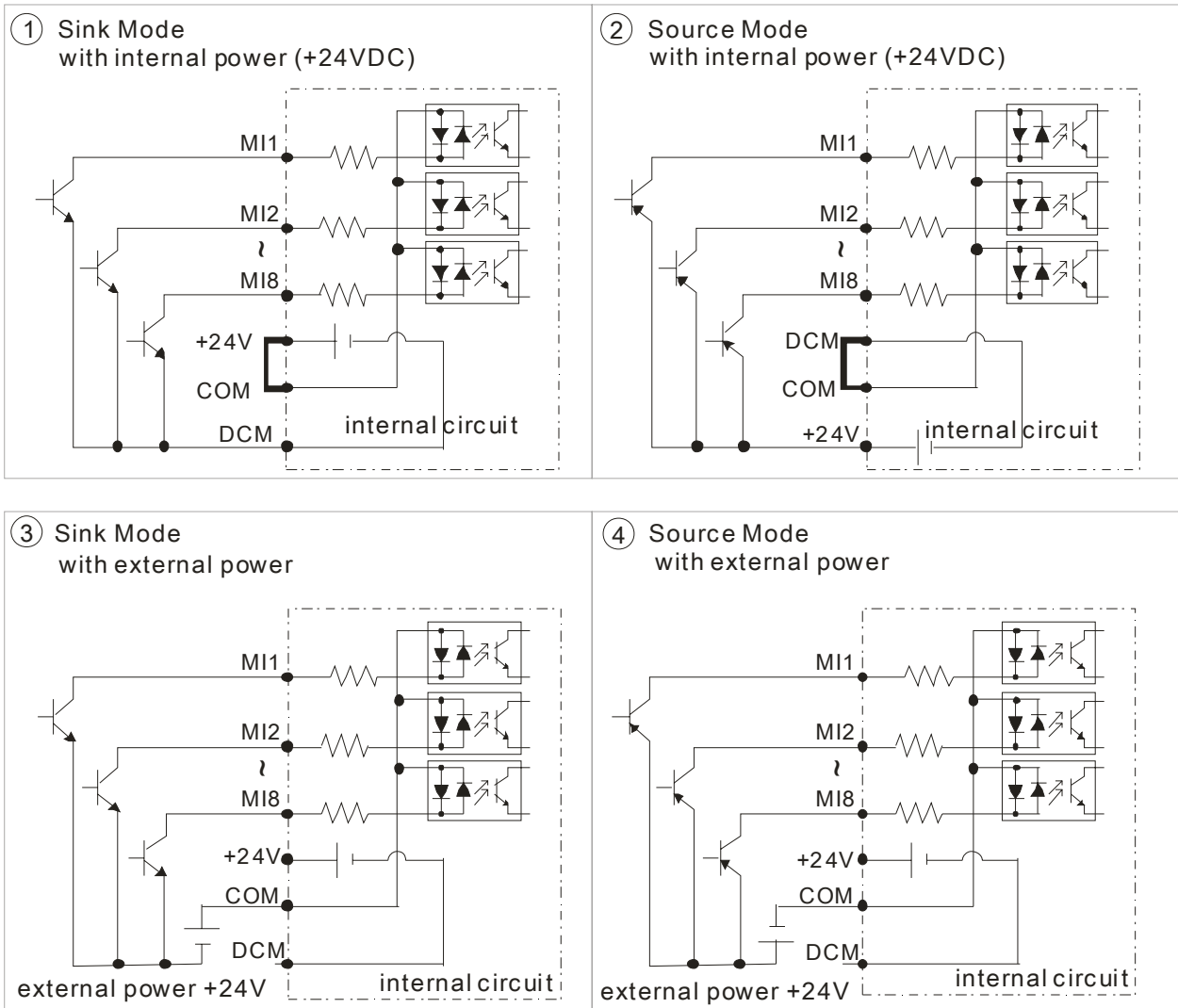


Figure 2 and 3 are for the option accessory-Active Front End (AFE)

Figure 4
Wiring for SINK (NPN)/SOURCE (PNP) mode

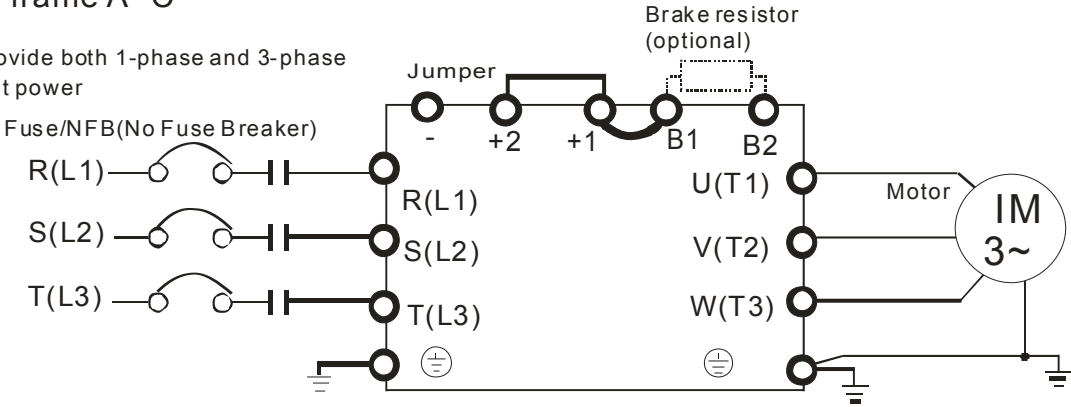


Main Circuit Terminals

Figure 1

For frame A~C

* Provide both 1-phase and 3-phase input power



For frame A~C

* Provide both 1-phase and 3-phase input power

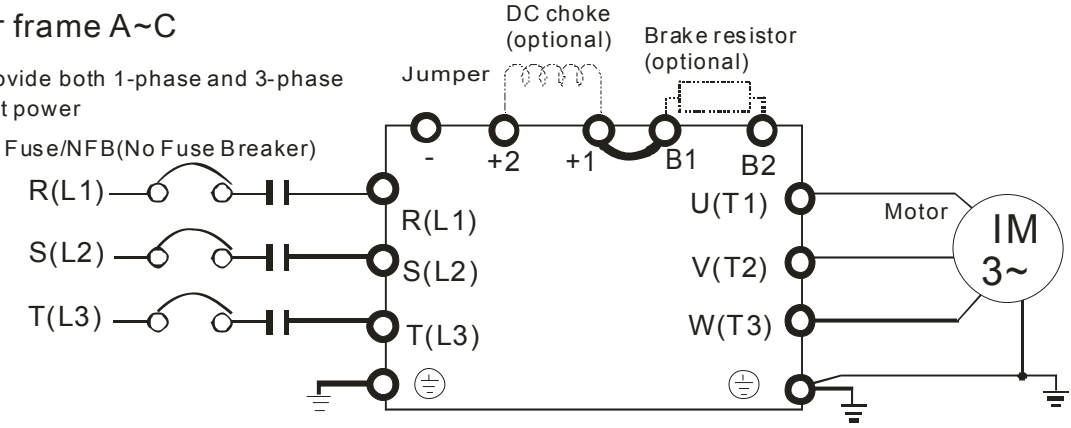


Figure 2

For frame D and above

* Provide both 1-phase and 3-phase input power

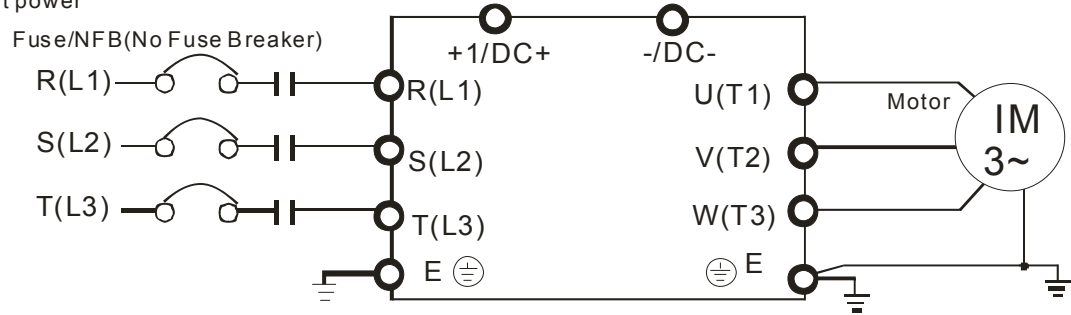
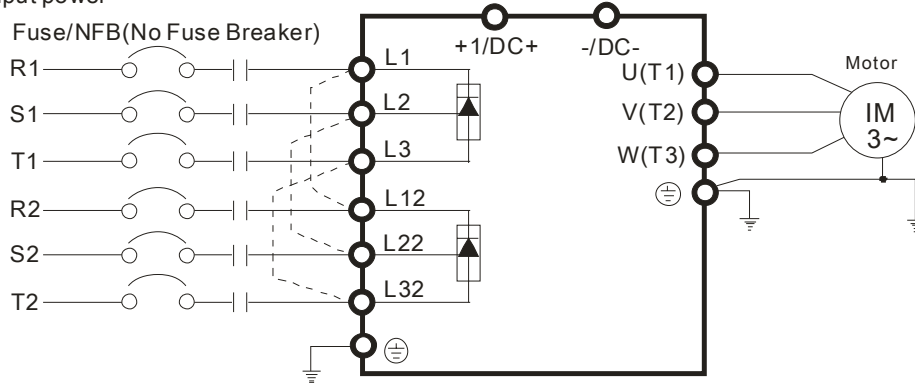


Figure 3

For frame G and frame H

* Provide both 1-phase and 3-phase input power



Terminals	Descriptions
R/L1, S/L2, T/L3	AC line input terminals (1-phase/3-phase)
U/T1, V/T2, W/T3	AC drive output terminals for connecting 3-phase induction motor
+1, +2	Connections for DC reactor to improve the power factor. It needs to remove the jumper for installation. (for 230V models: $\geq 30\text{kW}$, built-in DC reactor) (for 460V models: $\geq 37\text{kW}$, built-in DC reactor)
B1, B2	Connections for brake resistor (optional)
+, -	Connections for brake unit (VFDB series) (for 230V models: $\leq 22\text{kW}$, built-in brake unit) (for 460V models: $\leq 30\text{kW}$, built-in brake unit)
⊕ E	Earth connection, please comply with local regulations.



Main power terminals

- ☑ Do not connect 3-phase models to an 1-phase power source. It is unnecessary to consider phase-sequence for these terminals R/L1, S/L2 and T/L3.
- ☑ It is recommended to add a magnetic contactor(MC) in the power input wiring to cut off power quickly and reduce malfunction when activating the protection function of the AC motor drive. Both ends of the MC should have an R-C surge absorber.
- ☑ Please make sure to fasten the screw of the main circuit terminals to prevent sparks which is made by the loose screws due to vibration.
- ☑ Please use voltage and current within the specification.
- ☑ When using a general GFCI (Ground Fault Circuit Interrupter), select a current sensor with sensitivity of 200mA or above and not less than 0.1-second operation time to avoid nuisance tripping.

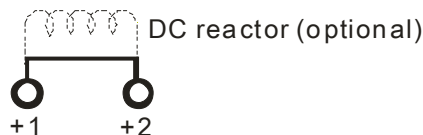
- ☑ Please use the shield wire or tube for the power wiring and ground the two ends of the shield wire or tube.
- ☑ Do NOT run/stop AC motor drives by turning the power ON/OFF. Run/stop AC motor drives by RUN/STOP command via control terminals or keypad. If you still need to run/stop AC motor drives by turning power ON/OFF, it is recommended to do so only ONCE per hour.

Output terminals for main circuit

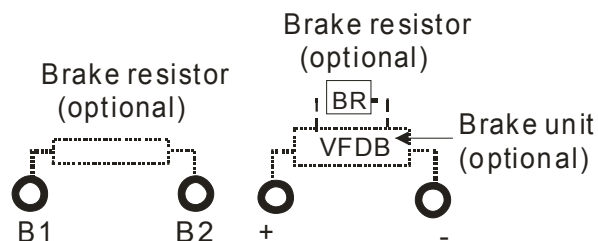
- ☑ When it needs to install the filter at the output side of terminals U/T1, V/T2, W/T3 on the AC motor drive. Please use inductance filter. Do not use phase-compensation capacitors or L-C (Inductance-Capacitance) or R-C (Resistance-Capacitance), unless approved by Delta.
- ☑ DO NOT connect phase-compensation capacitors or surge absorbers at the output terminals of AC motor drives.
- ☑ Use well-insulated motor, suitable for inverter operation.

Terminals for connecting DC reactor, external brake resistor, external brake resistor and DC circuit

- ☑ This is the terminals used to connect the DC reactor to improve the power factor. For the factory setting, it connects the short-circuit object. Please remove this short-circuit object before connecting to the DC reactor.



- ☑ Connect a brake resistor or brake unit in applications with frequent deceleration ramps, short deceleration time, too low brake torque or requiring increased brake torque.

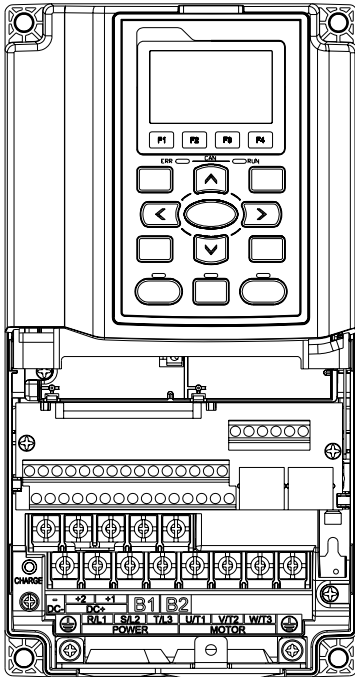


- ☑ The external brake resistor should connect to the terminals (B1, B2) of AC motor drives.
- ☑ For those models without built-in brake resistor, please connect external brake unit and brake resistor (both of them are optional) to increase brake torque.

- ☑ When the terminals +1, +2 and - are not used, please leave the terminals open.
- ☑ DO NOT connect [+1, -], [+2, -], [+1/DC+, -/DC-] or brake resistor directly to prevent drive damage.

Main Circuit Terminals

Frame A



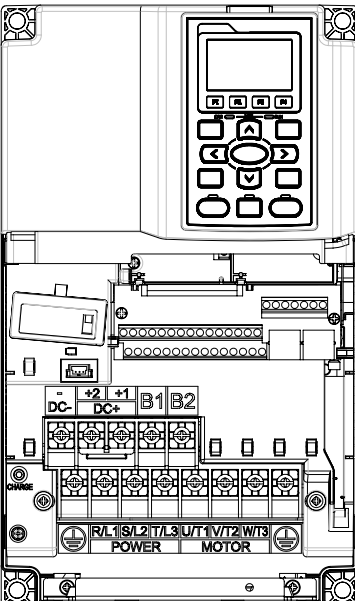
Main circuit terminals:

R/L1, S/L2, T/L3, U/T1, V/T2, W/T3, ⊕, B1, B2, +1, +2, -

Models	Max. Wire Gauge	Min. Wire Gauge	Torque(±10%)
VFD007C23A/E	8 AWG. (8.4mm ²)	14 AWG. (2.1mm ²)	20kgf-cm (17.4 lbf-in)
VFD015C23A/E		12 AWG. (3.3mm ²)	
VFD022C23A/E		10 AWG. (5.3mm ²)	
VFD037C23A/E		10 AWG. (5.3mm ²)	
VFD007C43A/E		14 AWG. (2.1mm ²)	
VFD015C43A/E		14 AWG. (2.1mm ²)	
VFD022C43A/E		14 AWG. (2.1mm ²)	
VFD037C43A/E		12 AWG. (3.3mm ²)	
VFD040C43A/E		10 AWG. (5.3mm ²)	
VFD055C43A/E		10 AWG. (5.3mm ²)	

UL installations must use 600V, 75°C or 90 °C wire. Use copper wire only.

Frame B



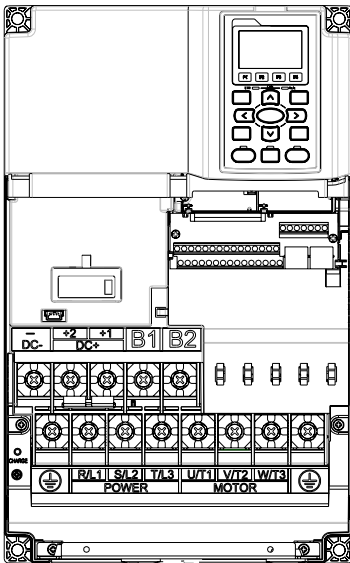
Main circuit terminals:

R/L1, S/L2, T/L3, U/T1, V/T2, W/T3, ⊕, B1, B2, +1, +2, -

Models	Max. Wire Gauge	Min. Wire Gauge	Torque (±10%)
VFD055C23A/E	4 AWG. (21.2mm ²)	8 AWG. (8.4mm ²)	35kgf-cm (30.4 lbf-in)
VFD075C23A/E		6 AWG. (13.3mm ²)	
VFD110C23A/E		4 AWG. (21.2mm ²)	
VFD075C43A/E		10 AWG. (5.3mm ²)	
VFD110C43A/E		8 AWG. (8.4mm ²)	
VFD150C43A/E		8 AWG. (8.4mm ²)	

UL installations must use 600V, 75°C or 90 °C wire. Use copper wire only.

Frame C



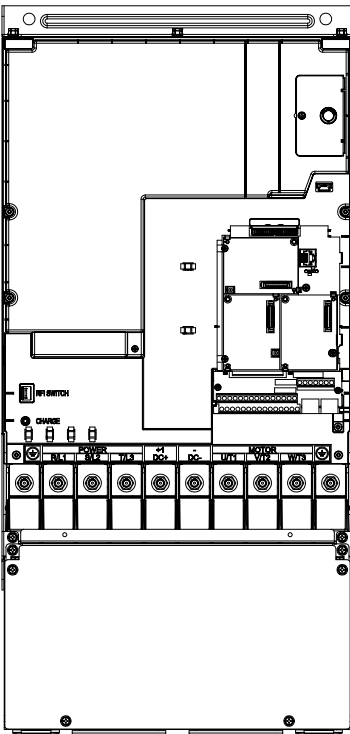
Main circuit terminals:

R/L1, S/L2, T/L3, U/T1, V/T2, W/T3, ⊕, B1, B2, +1, +2, -

Models	Max. Wire Gauge	Min. Wire Gauge	Torque (±10%)
VFD150C23A/E	1/0 AWG. (53.5mm ²)	2 AWG. (33.6mm ²)	80kgf-cm (69.4 lbf-in)
VFD185C23A/E		1 AWG. (42.4mm ²)	
VFD220C23A/E		1/0 AWG. (53.5mm ²)	
VFD185C43A/E		6 AWG. (13.3mm ²)	
VFD220C43A/E		4 AWG. (21.2mm ²)	
VFD300C43A/E		3 AWG. (26.7mm ²)	

UL installations must use 600V, 75°C or 90 °C wire. Use copper wire only.

Frame D



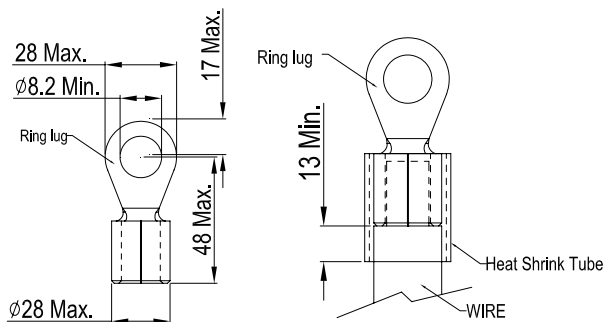
Main circuit terminals:

R/L1, S/L2, T/L3, U/T1, V/T2, W/T3, ⊕, DC+, DC-

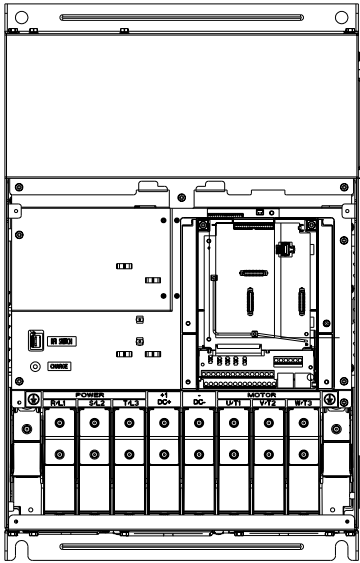
Models	Max. Wire Gauge	Min. Wire Gauge	Torque (±10%)
VFD300C23A	300MCM (152mm ²)	4/0 AWG. (107mm ²)	200kgf-cm (173in-lbf)
VFD370C23A		250MCM (126mm ²)	
VFD370C43A		1/0 AWG. (42.4mm ²)	
VFD450C43A		2/0 AWG. (67.4mm ²)	
VFD550C43A		3/0 AWG. (85mm ²)	
VFD750C43A		300MCM (152mm ²)	
VFD300C23E	4/0 AWG. (107mm ²)	4/0 AWG. (107mm ²)	
VFD370C23E		4/0 AWG. (107mm ²)	
VFD370C43E		1/0 AWG. (42.4mm ²)	
VFD450C43E		2/0 AWG. (67.4mm ²)	
VFD550C43E		3/0 AWG. (85mm ²)	
VFD750C43E		4/0 AWG. (107mm ²)	

UL installations must use 600V, 75°C or 90 °C wire. Use copper wire only.

When using the ring terminal, please comply with the following specification.



Frame E



Main circuit terminals:

R/L1, S/L2, T/L3, U/T1, V/T2, W/T3, ⊕, +1/DC+, -/DC-

Models	Max. Wire Gauge	Min. Wire Gauge	Torque (±10%)
VFD450C23A/E	3/0AWG.*2 (85mm ² *2)	1/0AWG.*2 (53.5mm ² *2)	200kgf-cm (173in-lbf)
VFD550C23A/E		3/0AWG.*2 (85mm ² *2)	
VFD750C23A		250MCM (126mm ²)	
VFD900C43A/E		1/0AWG.*2 (53.5mm ² *2)	
VFD1100C43A/E		3/0AWG.*2 (85mm ² *2)	
VFD750C23E	4/0 AWG. (107mm ²)	4/0 AWG. (107mm ²)	

1. UL installations must use 600V, 75°C or 90 °C wire. Use copper wire only.
2. Specification of grounding wire ⊕: 300MCM [152 mm²] as shown in the following figure 2.
3. When using the ring terminal, please comply with the following specification shown in Figure 1.
4. The figure 3 shows the specification of insulated heat shrink tubing that comply with UL (600C, YDPU2).

Figure 1

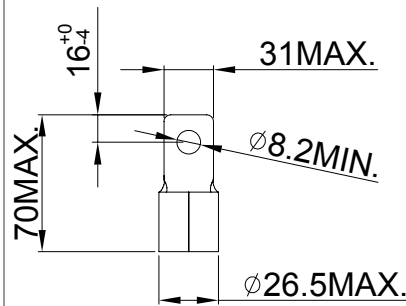


Figure 2 ⊕ E

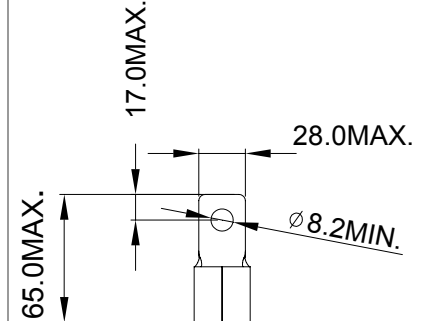
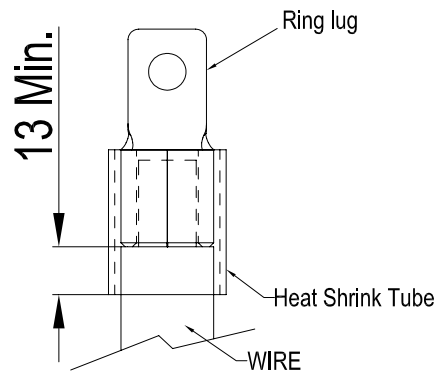
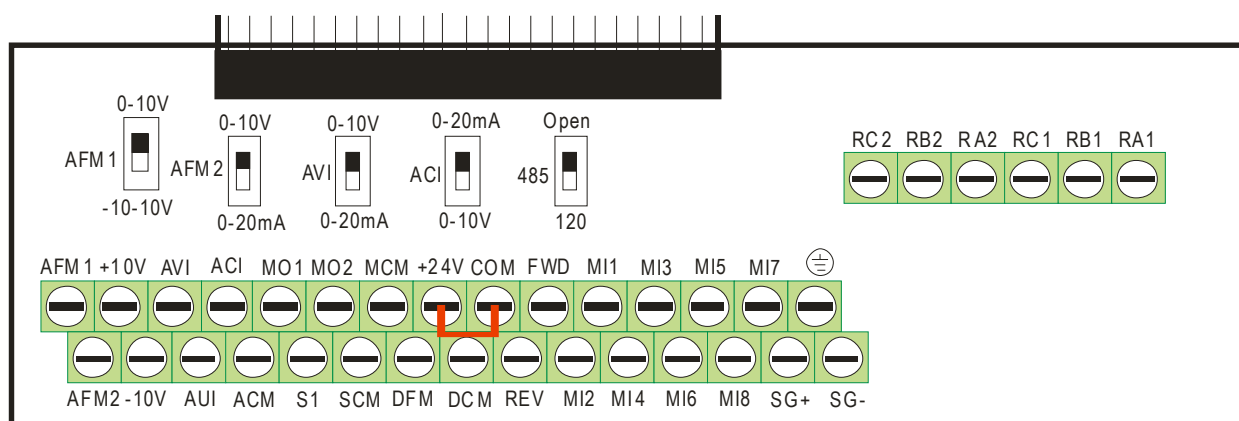


Figure 3



Control Terminals



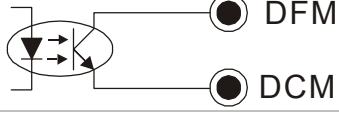
Specifications of control terminals

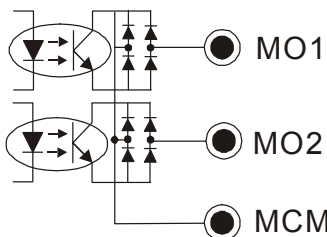
Wire Gauge: 26 to 16AWG (0.1281-1.318mm²), Torque: 5kgf-cm [4.31 lbf-in] (0.4905Nm)

Notes:

- ☑ Please place the wire into the wiring hole and tighten the wire with the slot type screwdriver. It needs to leave 7mm at the wiring end for the optimal wiring. Please be careful for using the wiring without terminal block and put the wires into the wiring hole in order.
- ☑ Specifications of the slot type screwdriver: 3.5mm (head) X 0.6mm (thickness)
- ☑ The factory setting is SINK mode (NPN) and +24V-COM is short circuit. Refer to chapter wiring (figure 4) for details.

Terminals	Terminal Function	Factory Setting (NPN mode)
+24V	Digital control signal common (Source)	+24V±5% 200mA
COM	Digital control signal common (Sink)	Common for multi-function input terminals
FWD	Forward-Stop command	FWD-DCM: ON→ forward running OFF→ deceleration to stop
REV	Reverse-Stop command	REV-DCM: ON→ reverse running OFF→ deceleration to stop
MI1	Multi-function input 1	Refer to parameters 02-01~02-08 to program the multi-function inputs MI1~MI8. ON: the activation current is 6.5mA OFF: leakage current tolerance is 10μA
MI2	Multi-function input 2	
MI3	Multi-function input 3	
MI4	Multi-function input 4	
MI5	Multi-function input 5	
MI6	Multi-function input 6	

Terminals	Terminal Function	Factory Setting (NPN mode)
MI7	Multi-function input 7	
MI8	Multi-function input 8	
DFM	Digital frequency meter 	<p>Regard the pulse voltage as the output monitor signal</p> <p>Duty-cycle: 50%</p> <p>Min. load impedance: 1kΩ/100pf</p>
DCM	Digital frequency signal common	<p>Max. current: 30mA</p> <p>Max. voltage: 30Vdc</p>

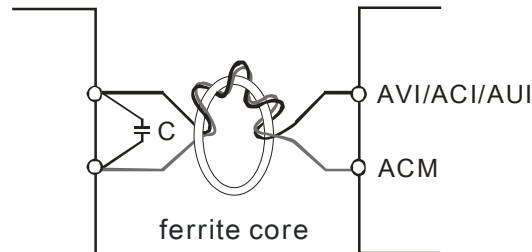
RA1	Multi-function relay output 1 (N.O.) a	<p>Resistive Load: 5A(N.O.)/3A(N.C.) 277VAC</p> <p>5A(N.O.)/3A(N.C.) 30VDC</p> <p>Inductive Load (COS 0.4): 2.0A(N.O.)/1.2A(N.C.) 277VAC</p> <p>2.0A(N.O.)/1.2A(N.C.) 30VDC</p> <p>It is used to output each monitor signal, such as drive is in operation, frequency attained or overload indication.</p>
RB1	Multi-function relay output 1 (N.C.) b	
RC1	Multi-function relay common	
RA2	Multi-function relay output 2 (N.O.) a	
RB2	Multi-function relay output 2 (N.C.) b	
RC2	Multi-function relay common	
MO1	Multi-function Output 1 (photocoupler)	<p>The AC motor drive outputs each monitor signal, such as drive in operation, frequency attained and overload indication, via transistor (open collector).</p> 
MO2	Multi-function Output 2 (photocoupler)	
MCM	Multi-function Output Common	
+10V	Potentiometer power supply	+10Vdc 20mA
-10V	Potentiometer power supply	-10Vdc 20mA
AVI	Analog voltage input	<p>Impedance: 20kΩ</p> <p>Range: 4 ~ 20mA/0~10V =0~Max. Output Frequency (Pr.01-00)</p> <p>AVI switch, factory setting is 0~10V</p>

Terminals	Terminal Function	Factory Setting (NPN mode)
ACI	Analog current input 	Impedance: 250Ω Range: 4 ~ 20mA/0~10V=0~Max. Output Frequency (Pr.01-00) ACI Switch, factory setting is 4~20mA
AUI	Auxiliary analog voltage input 	Impedance: 20kΩ Range: -10~+10VDC=0~Max. Output Frequency(Pr.01-00)
AFM1		Impedance: 100kΩ (voltage output) Output current: 20mA max Resolution: 0~10V corresponds to Max. operation frequency Range: 0~10V → -10~+10V AFM Switch, factory setting is 0~10V
AFM2		Impedance: 100Ω (current output) Output current: 20mA max Resolution: 0~10V corresponds to Max. operation frequency Range: 0~10V → 4~20mA AFM Switch, factory setting is 0~10V
ACM	Analog Signal Common	Common for analog terminals
S1	Power removal safety function for EN954-1 and IEC/EN61508	
SCM		
SG+	Modbus RS-485	
SG-		

NOTE: Wire size of analog control signals: 18 AWG (0.75 mm²) with shielded wire

Analog input terminals (AVI, ACI, AUI, ACM)

- ☑ Analog input signals are easily affected by external noise. Use shielded wiring and keep it as short as possible (<20m) with proper grounding. If the noise is inductive, connecting the shield to terminal ACM can bring improvement.
- ☑ If the analog input signals are affected by noise from the AC motor drive, please connect a capacitor and ferrite core as indicated in the following diagram.



wind each wires 3 times or more around the core

Digital inputs (FWD, REV, MI1~MI8, COM)

- ☑ When using contacts or switches to control the digital inputs, please use high quality components to avoid contact bounce.

Transistor outputs (MO1, MO2, MCM)

- ☑ Make sure to connect the digital outputs to the right polarity.
- ☑ When connecting a relay to the digital outputs, connect a surge absorber across the coil and check the polarity.

Accessories

Following are the accessories that users are able to purchase or inquire your dealer for the suitable specification and model to improve the efficiency of the drive.

All Brake Resistors & Brake Units Used in AC Motor Drives

230V series

Applicable Motor		* ¹ 125% Brake Torque 10%ED					* ² Max. Brake Torque			
HP	kW	Brake Unit		Equivalent Resistor Value for Each AC Motor Drive	Brake Resistor		Brake Current (A)	Min. Brake Resistor	Max. Brake Resistor	Max. Peak Power
		VFDB	Quantity		* ³ Model Name	Quantity				
1	0.7			80W200Ω	BR080W200	1	1.9	63.3	6	2.3
2	1.5			200W91Ω	BR200W091	1	4.2	47.5	8	3.0
3	2.2			300W70Ω	BR300W070	1	5.4	38.0	10	3.8
5	3.7			400W40Ω	BR400W040	1	9.5	19.0	20	7.6
7.5	5.5			1000W20Ω	BR1K0W020	1	19	14.6	26	9.9
10	7.5			1000W20Ω	BR1K0W020	1	19	14.6	26	9.9
15	11			1500W13Ω	BR1K5W013	1	29	13.6	28	10.6
20	15			2000W8.6Ω	BR1K0W4P3	2	44	8.3	46	17.5
25	18			2000W8.6Ω	BR1K0W4P3	2	44	8.3	46	17.5
30	22			3000W6.6Ω	BR1K5W3P3	2	58	5.8	66	25.1
40	30	2015	2	4000W5.1Ω	BR1K0W5P1	4	75	4.8	80	30.4
50	37	2022	2	4800W3.9Ω	BR1K2W3P9	4	97	3.2	120	45.6
60	45	2022	2	6000W3.3Ω	BR1K5W3P3	4	118	3.2	120	45.6
75	55	2022	3	7200W2.6Ω	BR1K2W3P9	6	145	2.1	180	68.4
100	75	2022	4	9600W2Ω	BR1K2W3P9	8	190	1.6	240	91.2

460V series

Applicable Motor		* ¹ 125% Brake Torque 10%ED					* ² Max. Brake Torque			
HP	kW	Brake Unit		Equivalent Resistor Value for Each AC Motor Drive	Brake Resistor		Brake Current (A)	Min. Brake Resistor	Max. Brake Resistor	Max. Peak Power
		VFDB	Qty.		Model Name	Qty.				
1	0.7			80W750Ω	BR080W750	1	1	190.0	4	3.0
2	1.5			200W360Ω	BR200W360	1	2.1	126.7	6	4.6
3	2.2			300W250Ω	BR300W250	1	3	108.6	7	5.3
5	3.7			400W150Ω	BR400W150	1	5.1	84.4	9	6.8
5	4.0			1000W75Ω	BR1K0W075	1	10.2	54.3	14	10.6
7.5	5.5									
10	7.5			1000W75Ω	BR1K0W075	1	10.2	47.5	16	12.2
15	11			1500W43Ω	BR1K5W043	1	17.6	42.2	18	13.7
20	15			2000W32Ω	BR1K0W016	2	24	26.2	29	22.0
25	18			2000W32Ω	BR1K0W016	2	24	23.0	33	25.1
30	22			3000W26Ω	BR1K5W013	2	29	23.0	33	25.1
40	30			4000W16Ω	BR1K0W016	4	47.5	14.1	54	41.0
50	40	4045	1	4800W15Ω	BR1K2W015	4	50	12.7	60	45.6
60	45	4045	1	6000W13Ω	BR1K5W013	4	59	12.7	60	45.6
75	55	4030	2	7200W10Ω	BR1K2W015	6	76	9.5	80	60.8
100	75	4045	2	9600W7.5Ω	BR1K2W015	8	100	6.3	120	91.2
125	90	4045	2	12000W6.5Ω	BR1K5W013	8	117	6.3	120	91.2
150	110	4045	3	15000W5.2Ω	BR1K5W013	10	145	4.2	180	136.8

*¹ Calculation of 125% brake torque: (kw)*125%*0.8 (0.8 is the motor efficiency)

Because of the limit of power consumption of resistor, the longest working time of 10%ED is 10sec(on: 10sec/ off: 90sec)

*² See the curve diagram of brake performance for the relation of duty-cycle value ED and brake current.

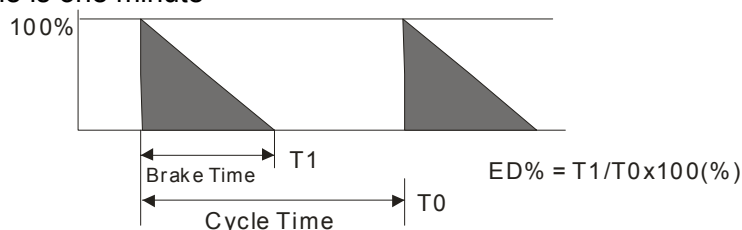
*³ The resistors under 400W need to set on the rack with the surface temperature less than 250°C. For the resistors more than 1000W, the surface temperature must be less than 350°C.

NOTE

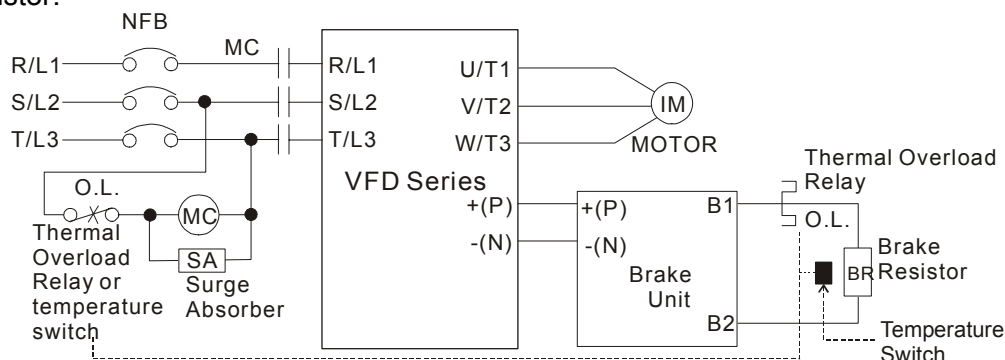
1. Definition for Brake Usage ED%

Explanation: The definition of the brake usage ED(%) is for assurance of enough time for the brake unit and brake resistor to dissipate away heat generated by braking. When the brake resistor heats up, the resistance would increase with temperature, and brake torque would decrease accordingly.

Suggested cycle time is one minute



2. For safety consideration, install an overload relay between the brake unit and the brake resistor. In conjunction with the magnetic contactor (MC) prior to the drive, it can perform complete protection against abnormality. The purpose of installing the thermal overload relay is to protect the brake resistor from damage due to frequent brake, or due to brake unit keeping operating resulted from unusual high input voltage. Under such circumstance, just turn off the power to prevent damaging the brake resistor.



Note1: When using the AC drive with DC reactor, please refer to wiring diagram in the AC drive user manual for the wiring of terminal +(P) of Brake unit.

Note2: **Do NOT** wire terminal -(N) to the neutral point of power system.

3. If damage to the drive or other equipment are due to the fact that the brake resistors and the brake modules in use are not provided by Delta, the warranty will be void.
4. Take into consideration the safety of the environment when installing the brake resistors.
5. If the minimum resistance value is to be utilized, consult local dealers for the calculation of the Watt figures.
6. When using more than 2 brake units, equivalent resistor value of parallel brake unit can't be less than the value in the column "Equivalent Resistor Value for Each AC Drive". When using the brake unit, please read the wiring information in the user manual of brake unit thoroughly prior to taking into operation.
7. This table shows the recommended value for the common applications. For those applications with frequent brake, it is recommended to use Watt values with 2 to 3 times of recommended values.

No-fuse Circuit Breaker Chart

Per UL 508, paragraph 45.8.4, part a,

For 3-phase drives, the current rating of the breaker shall be within 2-4 times drive input rated current.

230V 3-phase	
Model	Recommended no-fuse breaker (A)
VFD007C23A/E	15
VFD015C23A/E	20
VFD022C23A/E	30
VFD037C23A/E	40
VFD055C23A/E	50
VFD075C23A/E	60
VFD110C23A/E	100
VFD150C23A/E	125
VFD185C23A/E	150
VFD220C23A/E	200
VFD300C23A/E	225
VFD370C23A/E	250
VFD450C23A/E	300
VFD550C23A/E	400
VFD750C23A/E	450

460V 3-phase	
Model	Recommended no-fuse breaker (A)
VFD007C43A/E	5
VFD015C43A/E	10
VFD022C43A/E	15
VFD040C43A/E	20
VFD037C43A/E	20
VFD055C43A/E	30
VFD075C43A/E	40
VFD110C43A/E	50
VFD150C43A/E	60
VFD185C43A/E	75
VFD220C43A/E	100
VFD300C43A/E	125
VFD370C43A/E	150
VFD450C43A/E	175
VFD550C43A/E	250
VFD750C43A/E	300
VFD900C43A/E	300
VFD1100C43A/E	400

Fuse Specification Chart

Smaller fuses than those shown in the table are permitted.

230V Model	Input Current I (A)		Output Current I (A)		Line Fuse	
	Heavy Load	Normal Load	Heavy Load	Normal Load	I (A)	Bussmann P/N
VFD007C23A/E	6.1	6.4	4.8	5	15	JJN-10
VFD015C23A/E	11	12	7.1	8	20	JJN-6
VFD022C23A/E	15	16	10	11	30	JJN-30
VFD037C23A/E	18.5	20	16	17	40	JJN-40
VFD055C23A/E	26	28	24	25	50	JJN-50
VFD075C23A/E	34	36	31	33	60	JJN-60
VFD110C23A/E	50	52	47	49	100	JJN-100
VFD150C23A/E	68	72	62	65	125	JJN-125
VFD185C23A/E	78	83	71	75	150	JJN-150
VFD220C23A/E	95	99	86	90	200	JJN-200
VFD300C23A/E	118	124	114	120	225	JJN-225
VFD370C23A/E	136	143	139	146	250	JJN-250
VFD450C23A/E	162	171	171	180	300	JJN-300
VFD550C23A/E	196	206	204	215	400	JJN-400
VFD750C23A/E	233	245	242	255	450	JJN-450
VFD900C23A/E						

460V Model	Input Current I (A)		Output Current I (A)		Line Fuse	
	Heavy Load	Normal Load	Heavy Load	Normal Load	I (A)	Bussmann P/N
VFD007C43A/E	4.1	4.3	2.9	3	10	JJS-10
VFD015C43A/E	5.6	5.9	3.8	4	10	JJS-10
VFD022C43A/E	8.3	8.7	5.7	6	15	JJS-15
VFD037C43A/E	13	14	8.1	9	20	JJS-20
VFD040C43A/E	14.5	15.5	9.5	10.5	20	JJS-20
VFD055C43A/E	16	17	11	12	30	JJS-30
VFD075C43A/E	19	20	17	18	40	JJS-40
VFD110C43A/E	25	26	23	24	50	JJS-50
VFD150C43A/E	33	35	30	32	60	JJS-60
VFD185C43A/E	38	40	36	38	75	JJS-75
VFD220C43A/E	45	47	43	45	100	JJS-100
VFD300C43A/E	60	63	57	60	125	JJS-125
VFD370C43A/E	70	74	69	73	150	JJS-150
VFD450C43A/E	96	101	86	91	175	JJS-175
VFD550C43A/E	108	114	105	110	250	JJS-250
VFD750C43A/E	149	157	143	150	300	JJS-300
VFD900C43A/E	159	167	171	180	300	JJS-300
VFD1100C43A/E	197	207	209	220	400	JJS-400

AC Reactor

230V, 50/60Hz, 3-Phase

kW	HP	Fundamental Amps	Max. continuous Amps	Inductance (mh) 3~5% impedance	
				3% impedance	5% impedance
0.75	1	4	6	3	6.5
1.5	2	8	12	1.5	3
2.2	3	12	18	1.25	2.5
3.7	5	18	27	0.8	1.5
5.5	7.5	25	37.5	0.5	1.2
7.5	10	35	52.5	0.4	0.8
11	15	45	67.5	0.3	0.7
15	20	55	82.5	0.25	0.5
18.5	25	80	120	0.2	0.4
22	30	100	150	0.15	0.3
30	40	130	195	0.1	0.2
37	50	160	240	0.075	0.15
45	60	200	300	0.055	0.110
55	75	250	375	0.090	0.150
75	100	320	480	0.040	0.075

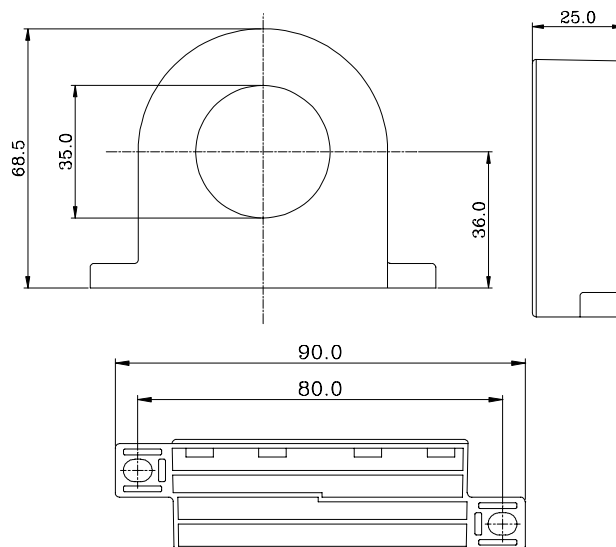
460V, 50/60Hz, 3-phase

kW	HP	Fundamental Amps	Max. Continuous Amps	Inductance (mh) 3~5% impedance	
				3% impedance	5% impedance
0.75	1	4	6	9	12
1.5	2	4	6	6.5	9
2.2	3	8	12	5	7.5
3.7	5	12	18	2.5	4.2
4	5	12	18	2.5	4.2
5.5	7.5	18	27	1.5	2.5
7.5	10	18	27	1.5	2.5
11	15	25	37.5	1.2	2
15	20	35	52.5	0.8	1.2
18.5	25	45	67.5	0.7	1.2
22	30	45	67.5	0.7	1.2
30	40	80	120	0.4	0.7
37	50	80	120	0.4	0.7
45	60	100	150	0.3	0.45
55	75	130	195	0.2	0.3
75	100	160	240	0.15	0.23
90	125	200	300	0.110	0.185
110	150	250	375	0.090	0.150

Zero Phase Reactor

RF220X00A

UNIT: mm(inch)



Cable Type (Note)	Recommended Wire Size (mm ²)			Qty.	Wiring Method
	AWG	mm ²	Nominal (mm ²)		
Single-core	≤10	≤5.3	≤5.5	1	Diagram A
	≤2	≤33.6	≤38	4	Diagram B
Three-core	≤12	≤3.3	≤3.5	1	Diagram A
	≤1	≤42.4	≤50	4	Diagram B

NOTE 600V Insulated unshielded Cable.

Note 1: The table above gives approximate wire size for the zero phase reactors but the selection is ultimately governed by the type and diameter of cable fitted i.e. the cable must fit through the center hole of zero phase reactors.

Note 2: Only the phase conductors should pass through, not the earth core or screen.

Note 3: When long motor output cables are used an output zero phase reactor may be required to reduce radiated emissions from the cable.

Diagram A

Please wind each wire 4 times around the core. The reactor must be put at inverter output as close as possible.

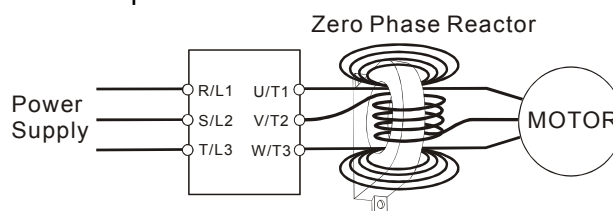
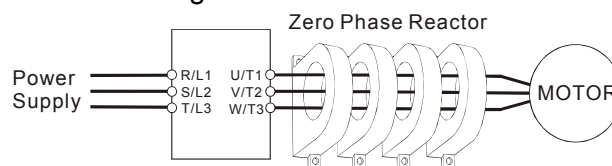


Diagram B

Please put all wires through 4 cores in series without winding.



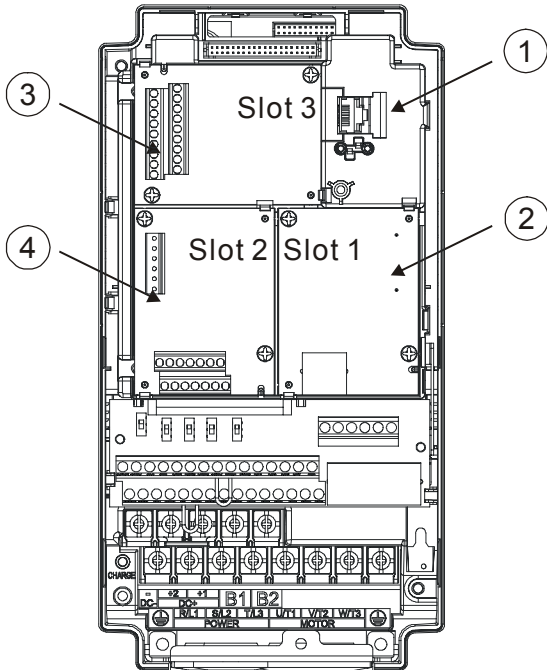
DC Reactor

EMI Filter

AC Motor Drive	Filter Model Name	Input Current	Cable Length C2			Cable Length C1		
			2kHz	8kHz	15/10/9kHz	2kHz	8kHz	15/10/9kHz
VFD037C23A	KMF325A	20A	50m	50m	50m	×	×	×
VFD110C23A	KMF370A	59A	50m	50m	50m	50m	×	×
VFD220C23A	KMF3100A	99A	50m	50m	50m	×	×	×
VFD370C23A	KMF3150A MIF3150	150A	50m	×	×	×	×	×
VFD750C23A	MIF3400A	225A	50m	50m	50m	×	×	×
VFD055C43A	KMF318A	17A	50m	50m	50m	×	×	×
VFD150C43A	KMF350A	44A	50m	50m	50m	×	×	×
VFD300C43A	KMF370A	63A	50m	50m	50m	×	×	×
VFD750C43A	MIF3150	150A	50m	50m	50m	×	×	×
VFD1100C43A	KMF3400B	220A	50m	50m	50m	×	×	×

Option Cards

Following are optional cards used to enhance drive's performance. Please choose by your requirement or consult our distributors if there is any question.



1	RJ45(female) for digital keypad KPV-CC01 KPV-CE01
2	Communication extension card (Slot 1) CMC-MOD01 CMC-PD01 CMC-DN01 EMC-COP01 CMC-EIP01
3	I/O card & Relay card (Slot 3) EMC-D42A EMC-R6AA EMC-D611A
4	PG cards (Slot 2) EMC-PG01L EMC-PG01O

EMC-D42A

I/O extension card	Terminals	Descriptions
	COM	Common for Multi-function input terminals Common for digital control signals SINK (NPN)/SOURCE (PNP)
	MI10 MI11 MI12 MI13	Refer to parameters 02-26~02-29 to program the multi-function inputs MI10~MI13. Internal power is applied from terminal E24: +24Vdc±5% 200mA, 5W External power +24VDC: max. voltage 30VDC, min. voltage 19VDC, 30W ON: the activation current is 6.5mA OFF: leakage current tolerance is 10µA
	MO10 MO11	Multi-function output terminals (photocoupler) Duty-cycle: 50% Max. output frequency: 100Hz Max. current: 50mA Max. voltage: 48VDC

	MXM	Common for multi-function output terminals MO10, MO11(photocoupler) Max 48VDC 50mA
--	-----	---

EMC-D611A

	Terminals	Descriptions
I/O extension card	COM	Common for Multi-function input terminals Common for digital control signals SINK (NPN)/SOURCE (PNP)
	MI10 MI11 MI12 MI13 MI14 MI15	Refer to parameters 02-26~02-31 to program the multi-function inputs MI10~MI13. Internal power is applied from terminal E24: +24Vdc±5% 200mA, 5W External power +24VDC: max. voltage 30VDC, min. voltage 19VDC, 30W ON: the activation current is 6.5mA OFF: leakage current tolerance is 10µA
	MO10 MO11	Multi-function output terminals (photocoupler) Duty-cycle: 50% Max. output frequency: 100Hz Max. current: 50mA Max. voltage: 48VDC
	MXM	Common for multi-function output terminals MO10, MO11(photocoupler) Max 48VDC 50mA

EMC-R6AA

	Terminals	Descriptions
Relay card	R10A~R15A R10C~R15C	Resistive load: 5A(N.O.)/3A(N.C.) 250VAC 5A(N.O.)/3A(N.C.) 30VDC Inductive load (COS 0.4): 2.0A(N.O.)/1.2A(N.C.) 250VAC 2.0A(N.O.)/1.2A(N.C.) 30VDC It is used to output each monitor signal, such as drive is in operation, frequency attained or overload indication.

EMC-PG01L

PG card	Terminals	Descriptions
---------	-----------	--------------

	PG1	VP	Output voltage for power: +5V/+12V±5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA
		DCM	Common for power and signal
		A1, /A1, B1, /B1, Z1, /Z1	Input signal. Input type is selected by ABZ1. It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec
	PG2	A2, /A2, B2, /B2	Input signal. Input type is selected by AB2. It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec.
	PG OUT	A/O, B/O, C/O	Output signal. It has division frequency function. Max. output voltage for Line driver: 5VDC Max. output current: 50mA Max. output frequency: 300kP/sec

EMC-PG010

	Terminals		Descriptions
PG card	PG1	VP	Output voltage for power: +5V/+12V±5% (use FSW3 to switch +5V/+12V) Max. output current: 200mA
		DCM	Common for power and signal
		A1, /A1, B1, /B1, Z1, /Z1	Input signal. Input type is selected by ABZ1. It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec
	PG2	A2, /A2, B2, /B2	Input signal. Input type is selected by AB2. It can be 1-phase or 2-phase input. Max. output frequency: 300kP/sec
	PG OUT	V+	External power
		V-	Output voltage for power: +5V ~ +20V Max. output current: 50mA
		A/O, B/O, C/O	Output signal. It has division frequency function. Input signal of open collector. Please add a pull-high resistor on the external power V+~V- (e.g. power of PLC) to prevent the interference of the receiving signal. Max. output frequency: 300kP/sec

CMC-MOD01

Interface	RJ-45 with Auto MDI/MDIX
Number of Port	1 Port
Transmission Method	IEEE 802.3, IEEE 802.3u
Communication Cable	Category 5e shielding 100M
Communication Speed	10/100 Mbps Auto-Detect

Network Protocol	ICMP, IP, TCP, UDP, DHCP, SMTP, MODBUS OVER TCP/IP, Delta Configuration
------------------	---

CMC-PN01

Data Type	Periodic data switch
Module Model	CMC-PD01
GSD Document	DELTA08DB.GSD
Product ID	08DB(HEX)
Serial Communication Speed (auto detection)	Support 9.6kbps, 19.2kbps, 93.75kbps, 187.5kbps, 500kbps, 1.5Mbps, 3Mbps, 6Mbps, 12Mbps (bits/sec)

PROFIBUS-DP connector for communication

Connector	DB9 connector
Transmission Method	High-speed RS-485
Transmission Cable	Shielded twisted pair
Electrical Isolation	500VDC

CMC-DN01

Connector	5-pin pluggable connector (pin interval: 5.08mm)
Transmission Method	CAN
Transmission Cable	Shielded twisted pair with 2-wire bus power cable and drain
Transmission Rate	125kbps, 250kbps, 500kbps and extension serial transmission rate
Network Protocol	DeviceNet protocol

Port for connecting to the AC Motor Drive

Connector	50-pin communication terminal
Transmission Method	SPI communication
Terminal Functions	<ol style="list-style-type: none"> 1. communication module communicates with the AC motor drive via this interface 2. The AC motor drive supplies the power to the communication module via this interface
Communication Protocol	Delta HSSP protocol

CMC-EIP01

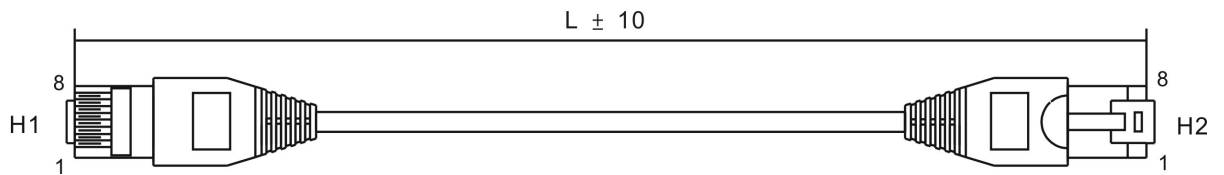
Interface	RJ-45 with Auto MDI/MDIX
Number of Port	1 Port
Transmission Method	IEEE 802.3, IEEE 802.3u
Communication Cable	Category 5e shielding 100M
Communication Speed	10/100 Mbps Auto-Detect
Network Protocol	ICMP, IP, TCP, UDP, DHCP, SMTP, EtherNet/IP, Delta Configuration

CMC-COP01

Interface	RJ-45
Number of Port	1 Port
Transmission Method	CAN
Communication Cable	Standard CAN cable
Communication Speed	1M 500k, 250k, 100k, 50k
Network Protocol	CANopen protocol

- CANopen communication cable

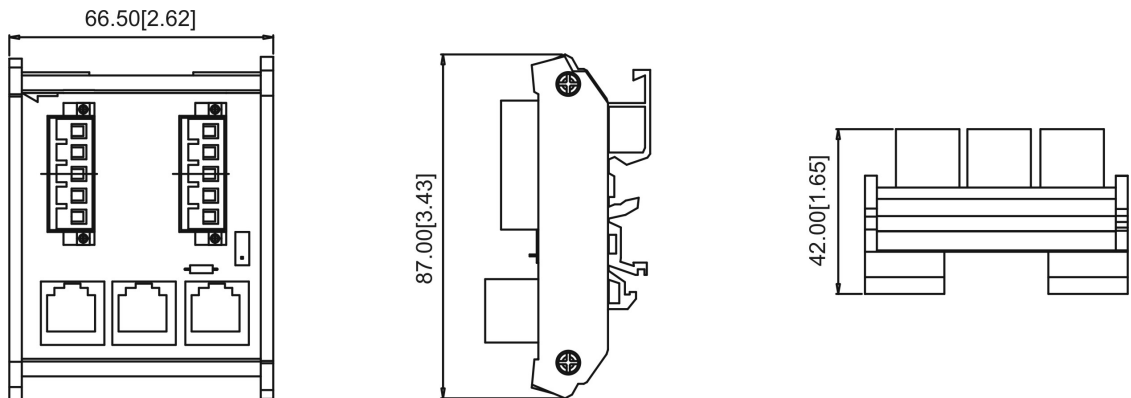
Part no.: TAP-CB03, TAP-CB04



Title	Part No.	mm	L	inch
1	TAP-CB03	500 ± 10		19 ± 0.4
2	TAP-CB04	1000 ± 10		39 ± 0.4

- CANopen communication distribution box

Part no.: TAP-CN03



Specifications of Terminal Screws

EMC-D42A	Wire gauge: 24~12AWG (0.205~3.31mm ²)
	Torque: 4Kgf-cm [3.47lbf-in]
EMC-R6AA	Wire Gauge: 24~16AWG (0.205~1.31mm ²)
	Torque: 6Kgf-cm [5.21lbf-in]
EMC-PG01L EMC-PG01O	Wire gauge: 30~16AWG (0.0509~1.31mm ²) Torque: 2Kgf-cm [1.74lbf-in]

Specifications

230V Series

Frame Size		A				B			C			D		E			
Model Number	VFD- C	007	015	022	037	055	075	110	150	185	220	300	370	450	550	750	
Max. Applicable Motor Output (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	
Max. Applicable Motor Output (hp)		1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	
Output Rating	HEAVY DUTY	Rated Output Capacity (kVA)	1.9	2.8	4.0	6.4	9.6	12	19	25	28	34	45	55	68	81	96
		Rated Output Current (A)	4.8	7.1	10	16	24	31	47	62	71	86	114	139	171	204	242
		Overload Endurance	150% of rated current for 1 minute, 180% of rated current for 2 seconds														
		Max. Output Frequency (Hz)	300.00Hz														
		Carrier Frequency (kHz)	2~6kHz														
	NORMAL DUTY	Rated Output Capacity (kVA)	2.0	3.2	4.4	6.8	10	13	20	26	30	36	48	58	72	86	102
		Rated Output Current (A)	5	8	11	17	25	33	49	65	75	90	120	146	180	215	255
		Overload Endurance	120% of rated current for 1 minute, 160% of rated current for 3 seconds														
		Max. Output Frequency (Hz)	600.00kHz (45kW: 400.00Hz)														
		Carrier Frequency (kHz)	2~15kHz					2~10kHz					2~9kHz				
Input Rating	Input Current (A) Heavy Duty	6.1	11	15	18.5	26	34	50	68	78	95	118	136	162	196	233	
	Input Current (A) Normal Duty	6.4	12	16	20	28	36	52	72	83	99	124	143	171	206	245	
	Rated Voltage/Frequency	3-phase AC 200V -15% ~240V +10%, 50/60Hz															
	Operating Voltage Range	170~265Vac															
	Frequency Tolerance	47~63Hz															
Cooling Method	Natural	Fan cooling															
Braking Chopper		Built-in										Option					
DC reactor		Option										Built-in					
EMI Filter		Option															

460V Series

Frame Size		A					B			C				
Model Number VFD-__ C		007	015	022	037	040	055	075	110	150	185	220	300	
Max. Applicable Motor Output (kW)		0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22	30	
Max. Applicable Motor Output (hp)		1	2	3	5	5	7.5	10	15	20	25	30	40	
Output Rating	HEAVY DUTY	Rated Output Capacity(kVA)	2.3	3.0	4.5	6.5	7.6	9.6	14	18	24	29	34	45
		Rated Output Current (A)	2.9	3.8	5.7	8.1	9.5	11	17	23	30	36	43	57
		Overload Endurance	150% of rated current for 1 minute, 180% of rated current for 2 seconds											
		Max. Output Frequency (Hz)	300.00Hz											
		Carrier Frequency (kHz)	2~6kHz											
	NORMAL DUTY	Rated Output Capacity (kVA)	2.4	3.2	4.8	7.2	8.4	10	14	19	25	30	36	48
		Rated Output Current (A)	3.0	4.0	6.0	9.0	10.5	12	18	24	32	38	45	60
		Overload Endurance	120% of rated current for 1 minute, 160% of rated current for 3 seconds											
		Max. Output Frequency (Hz)	600.00kHz											
		Carrier Frequency (kHz)	2~15kHz						2~10kHz					
Input Rating	Input Current (A) HEAVY Duty	4.1	5.6	8.3	13	14.5	16	19	25	33	38	45	60	
	Input Current (A) NORMAL Duty	4.3	5.9	8.7	14	15.5	17	20	26	35	40	47	63	
	Rated Input Current (A) Heavy Duty	3-phase AC 380V -15%~480V +10%, 50/60Hz												
	Operating Voltage Range	170~265Vac												
	Frequency Tolerance	47~63Hz												
Cooling Method		Natural Cooling		Fan Cooling										
Braking Chopper		Built-in										Option		
DC reactor		Option										Built-in		
EMI Filter		VFDXXXC43A: without EMI filter VFDXXXC43E: built-in EMI filter												




460V Series - continue

Frame Size		D				E		*F		*G		*H			
Model Number VFD-__C		370	450	550	750	900	1100	1320	1600	1850	2200	2800	3150	3550	
Max. Applicable Motor Output (kW)		37	45	55	75	90	110	132	160	185	220	280	315	355	
Max. Applicable Motor Output (hp)		50	60	75	100	125	150	175	215	250	300	375	425	475	
Output Rating	HEAVY DUTY	Rated Output Capacity(kVA)	55	69	84	114	136	167	197	235	280	348	417	466	517
		Rated Output Current (A)	69	86	105	143	171	209	247	295	352	437	523	585	649
		Overload Endurance	150% of rated current for 1 minute, 180% of rated current for 2 seconds												
		Max. Output Frequency (Hz)	300Hz												
		Carrier Frequency (kHz)	2~6kHz												
	NORMAL DUTY	Rated Output Capacity (kVA))	58	73	88	120	143	175	207	247	295	367	438	491	544
		Rated Output Current (A))	73	91	110	150	180	220	260	310	370	460	550	616	683
		Overload Endurance	120% of rated current for 1 minute, 160% of rated current for 3 seconds												
		Max. Output Frequency (Hz)	600kHz (55kW: 400.00Hz)												
		Carrier Frequency (kHz)	2~10kHz					2~9kHz							
Input Rating	Input Current (A) HEAVY Duty	70	96	108	149	159	197	228	285	361	380	469	527	594	
	Input Current (A) NORMAL Duty	74	101	114	157	167	207	240	300	380	400	494	555	625	
	Rated Input Current (A) Heavy Duty	3-phase AC 380V -15%~480V +10%, 50/60Hz													
	Operating Voltage Range	323~528VAC													
	Frequency Tolerance	47~63Hz													
Cooling Method	Fan Cooling														
Brake Chopper	Option														
DC Reactor	Built-in														
EMI Filter	VFDXXXC43A: need to be used with conduit box kit for NEMA1 VFDXXX43E: NEMA1														

 **NOTE**

*Frame F~H are under development.

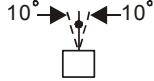
General Specifications		
Control Characteristics	Control Method	1: V/f, 2: VF+PG, 3: FOC, 4: open loop vector control
	Torque Characteristics	Heavy duty (low carrier, constant torque applications): 2 kHz carrier frequency, 150% overload for 1 minute, higher carrier frequency possible with current derating. Normal duty (high carrier, variable torque applications): maximum carrier frequency, depending on inverter capacity, 120% overload for 1 minute.
	Starting Torque	For Open Loop Vector Control and CT mode: up to 150% or above at 0.5Hz For Flux Vector Control and CT mode: up to 150% at 0Hz for 1 minute
	Speed Control Range	1:40 (V/f control) 1:100 (Open Loop Vector control) 1:1000 (Close Loop Vector control)
	Speed Control Accuracy	±0.3% (V/f control) ±0.03% (V/f+PG control) ±0.2% (Open Loop Vector control) ±0.02% (Close Loop Vector control)
	Speed Response Ability	5Hz (vector control can be up to 40Hz)
	Torque Limit	Max. 200% torque current
	Torque Accuracy	±5%
	Max. Output Frequency (Hz)	CT mode:0.01~300.00Hz; VT mode: 0.00 ~ 600.00 Hz
	Frequency Output Accuracy	Digital command: ±0.01%, -10°C ~+40°C, Analog command: ±0.1%, 25±10°C
	Frequency Setting Resolution	Digital command: 0.01Hz, Analog command: 0.03 X max. output frequency/60 Hz (±11 bit)
	Output Frequency Resolution	0.01 Hz
	Overload Tolerance	CT mode : 150% of rated output current for 1 min. (not available when using 200 V 110 kW or 400 V 220 to 300 kW inverters) VT mode : 120% of rated output current for 1 min.
	Frequency Setting Signal	+10V~-10, 0~+10V, 4~20mA, Pulse input
	Accel./decel. Time	0.00~6000.0 seconds
	Brake Torque	About 20%
Main control function	Torque control, Speed/torque control switching, Feed forward control, Zero-servo control, Momentary power loss ridethru, Speed search, Over-torque detection, Torque limit, 17-step speed (max), Accel/decel time switch, S-curve accel/decel, 3-wire sequence, Auto-Tuning (rotational, stationary), Dwell, Cooling fan on/off switch, Slip compensation, Torque compensation, Skip frequency, Frequency upper/lower limit settings, DC injection braking at start/stop, High slip braking, PID control (with sleep function), Energy saving control, MODOBUS communication (RS-485 RJ45) max. 115.2 kbps), Fault restart, Parameter copy	

Protection Characteristics	Motor Protection	Electronic thermal relay protection
	Over-current Protection	The current forces 220% of the over-current protection and 300% of the rated current
	Fuse blown protection	Stops for fuse blown.
	Over-voltage Protection	230: drive will stop when DC-BUS voltage exceeds 410V 460: drive will stop when DC-BUS voltage exceeds 820V
	Low-voltage Protection	230: drive will stop when DC-BUS voltage exceeds 190V 460: drive will stop when DC-BUS voltage exceeds 380V
	Overload Ability	Constant/variable torque: 150% for 60 seconds; 200% for 2 seconds
	Over-temperature Protection	Built-in temperature sensor
	Stall prevention	Stall prevention during acceleration, deceleration and running independently.
	Grounding Leakage Current Protection	Leakage current is higher than 50% of rated current of the AC motor drive
Certifications	  	

Environment for Operation, Storage and Transportation

DO NOT expose the AC motor drive in the bad environment, such as dust, direct sunlight, corrosive/inflammable gasses, humidity, liquid and vibration environment. The salt in the air must be less than 0.01mg/cm² each year.

Environment	Installation location	IEC60364-1/IEC60664-1 Pollution degree 2, Indoor use only		
	Surrounding Temperature	Operation	NEMA 1 / IP20	When operating at rated current, the surrounding temperature must be within -10~+ 40°C. For 40°C~60 °C, please derate 2% rated current per increasing 1°C.
			IP20	When operating at rated current, the surrounding temperature must be within -10~+ 50°C. For 50°C~60 °C, please derate 2% rated current per increasing 1°C.
		Storage		-25 °C ~ +70 °C
		Transportation		-25 °C ~ +70 °C
		Non-condensation, non-frozen		
	Rated Humidity	Operation	Max. 90%	
		Storage/ Transportation	Max. 95%	
		No condensation		
	Air Pressure	Operation	86 to 106 kPa	
		Storage	86 to 106 kPa	
		Transportation	70 to 106 kPa	
	Pollution Level	IEC721-3-3		
		Operation	Class 3C2, Class 3S2	
		Storage	Class 2C2, Class 2S2	
		Transportation	Class 1C2, Class 1S2	
No concentrate				

	Altitude	Operation	0-1000m. For 1000-3000m, please derate 2% rated current or decrease 0.5°C surrounding temperature per 100m. The corner grounded system can only be used at 2000m and below.
Package Drop	Storage	ISTA procedure 1A(according to weight) IEC60068-2-31	
	Transportation		
Vibration	1.0mm peak to peak, 2-13.2Hz; 0.7G~1.0G from 13.2-55 Hz; 1.0G from 55-512 Hz (comply with IEC 60068-2-6)		
Shock Resistance	15G for 11 ms (comply with IEC/EN 60068 2-27)		
Operation Position	Max. allowed offset angle $\pm 10^\circ$ (for normal installation position)		

Digital Keypad



KPC-CC01






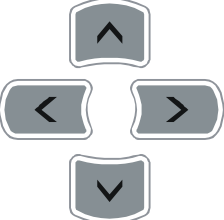

KPC-CE01 (optional)




Communication interface	RJ-45 (socket), RS-485 interface.
Installation Method	Embedded type and can be put flat on the surface of the control box. The front cover is water proof.
















Descriptions of Keypad Functions




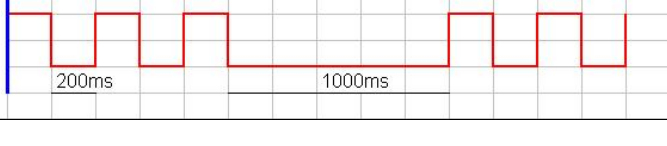


Key	Descriptions
	<p>Start Operation Key</p> <ol style="list-style-type: none"> 1. It is only valid when the source of operation command is from the keypad. 2. It can operate the AC motor drive by the function setting and the RUN LED will be ON. 3. It can be pressed again and again during stop. 4. When enabling "HAND" mode, it is only valid when the source of operation command is from the keypad.
	<p>Stop Command Key. This key has the highest priority in any situation.</p> <ol style="list-style-type: none"> 1. When it receives STOP command, no matter the AC motor drive is in operation or stop status, the AC motor drive needs to execute "STOP" command. 2. The RESET key can be used to reset the drive after the fault occurs. For those faults that can't be reset by the RESET key, see the fault records after pressing MENU key for details.

Key	Descriptions
	<p>Cancel Key</p> <ol style="list-style-type: none"> 1. It is used to cancel the input value in the parameter setting display before pressing “OK” key. 2. It can be used to return to the previous menu in those pages with sub-menu.
	<p>It can return to the main menu after pressing MENU key.</p>
	<p>Operation Direction Key</p> <ol style="list-style-type: none"> 1. This key is only control the operation direction NOT for running the drive. FWD: forward, REV: reverse. 2. Refer to the LED descriptions of FWD/REV for details.
	<p>HAND ON Key</p> <ol style="list-style-type: none"> 1. This key is executed by the parameter settings of the source of Hand frequency and hand operation. The factory settings of both source of Hand frequency and hand operation are the digital keypad. 2. This function is only valid when pressing at stop status. 3. Hand mode display: H/A LED is ON (only for KPC-CE01 keypad). It displays HADN mode in the KPC-CC01 keypad.
	<p>Auto Operation Key</p> <ol style="list-style-type: none"> 1. This key is executed by the parameter settings of the source of AUTO frequency and AUTO operation. The factory setting is the external terminal (source of operation is 4-20mA). 2. When the drive is stop, it will change to the settings of Auto frequency source and operation source immediately after pressing this button. When the drive is in the operation, it will stop the drive (will display AHSP warning message) after pressing this button. Then, changing it to the settings of Auto frequency source and operation source. 3. AUTO mode display: H/A LED is OFF (only for KPC-CE01 keypad). It displays AUTO mode in the KPC-CC01 keypad.
	<p>Left/Right/Up/Down Key</p> <ol style="list-style-type: none"> 1. In the numeric value setting mode, it is used to move the cursor and change the numeric value. 2. In the menu/text selection mode, it is used to move the selected item.
	<p>ENTER Key</p> <p>It is used to enter the selected sub-menu or confirm the command if it is the last level.</p>

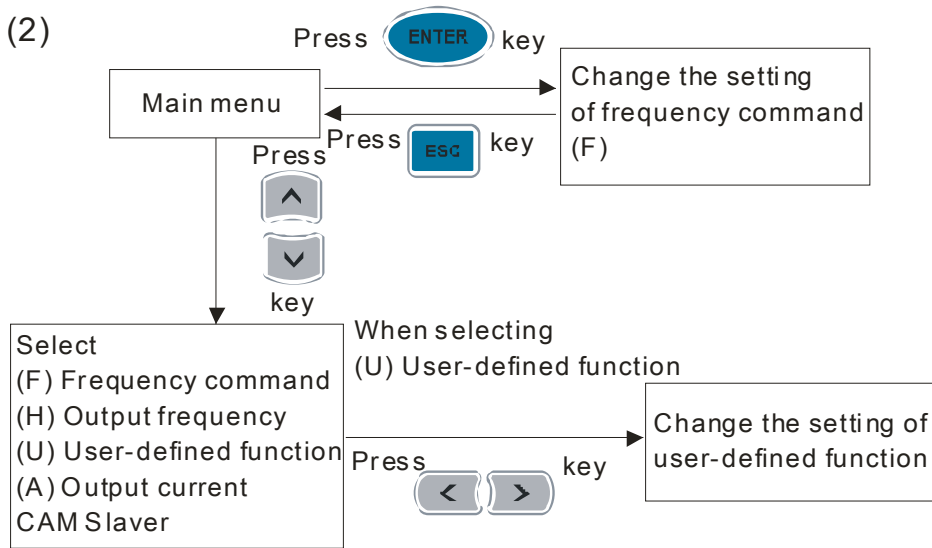
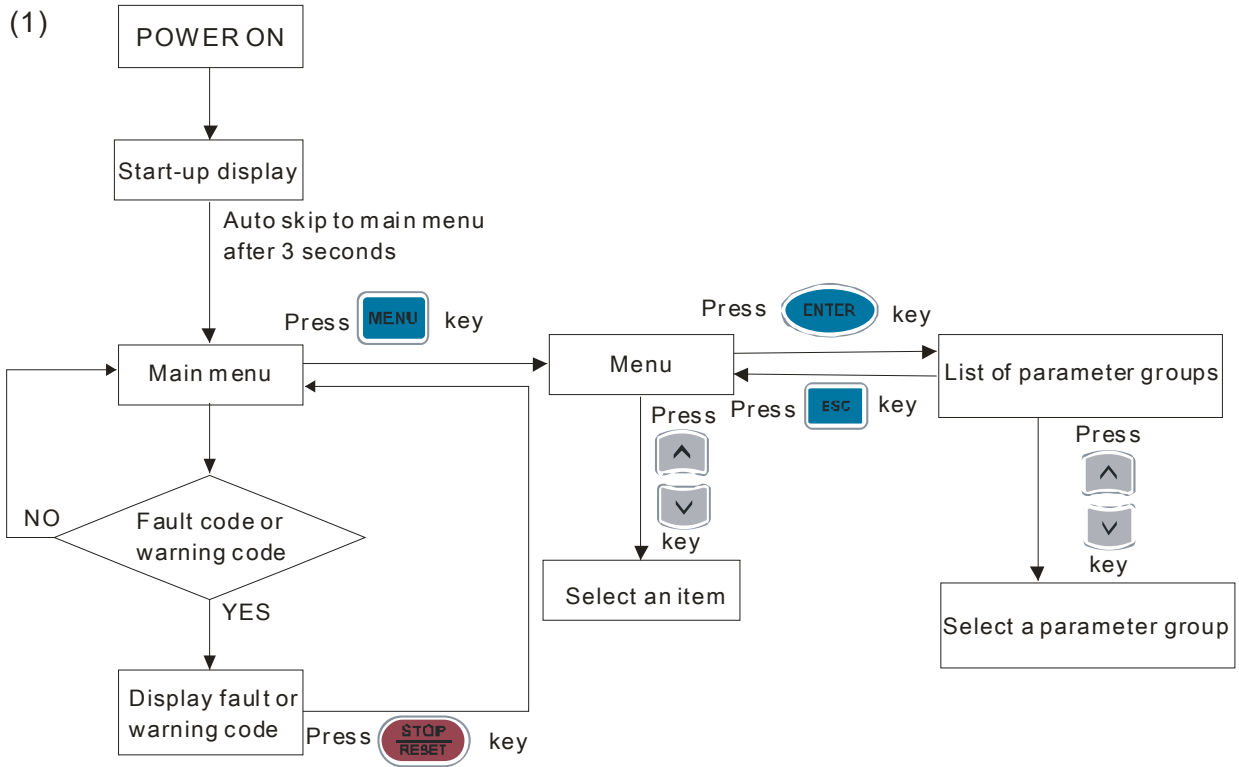
Key	Descriptions
	Function Key 1. It has the factory setting function and the function can be set by the user. The present factory setting: F1 is JOG function. 2. These function keys can be re-defined in software TPEditor.

Descriptions of LED Functions

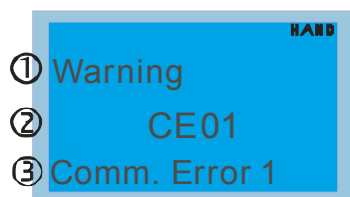
LED	Descriptions															
	Steady ON: operation indicator of the AC motor drive, including DC brake, zero speed, standby, restart after fault and speed search. Blinking: drive is decelerating to stop or in the status of base block. Steady OFF: drive doesn't execute the operation command															
	Steady ON: stop indicator of the AC motor drive. Blinking: drive is in the standby status. Steady OFF: drive doesn't execute "STOP" command.															
	Operation Direction LED (green: forward running, red: reverse running) Steady ON: drive is in forward running status. Blinking: drive is changing the operation direction. Steady OFF: drive is in reverse running status.															
CAN~"RUN"	<table border="1"> <thead> <tr> <th>Definition</th> <th>Condition</th> <th>CANopen State</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>  </td> <td>Initial</td> </tr> <tr> <td>Blinking</td> <td>  </td> <td>Pre-Operation</td> </tr> <tr> <td>Single flash</td> <td>  </td> <td>Stopped</td> </tr> <tr> <td>ON</td> <td>  </td> <td>Operation</td> </tr> </tbody> </table>	Definition	Condition	CANopen State	OFF		Initial	Blinking		Pre-Operation	Single flash		Stopped	ON		Operation
	Definition	Condition	CANopen State													
	OFF		Initial													
	Blinking		Pre-Operation													
	Single flash		Stopped													
ON		Operation														

CAN~"ERR"		Definition	Condition	CANopen State
		OFF		No Error
		Single flash		1 Message fail
		Double flash		Guarding or Heartbeat fail
		Triple flash		SYNC fail
ONLY LED		Can be set during operation. LED for manual mode. It is ON in manual mode and OFF in auto mode.		
ONLY LED		Can be set during operation. LED for auto mode. It is ON in auto mode and OFF in manual mode.		

Flow Chart of Digital Keypad



Warning Codes



① Warning

② CE01

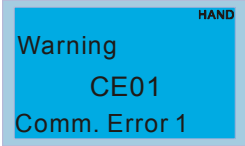
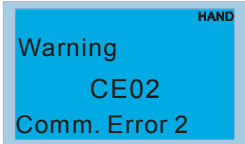
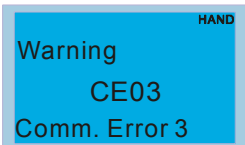
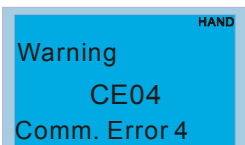
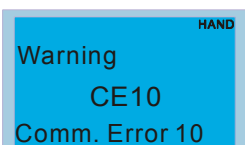
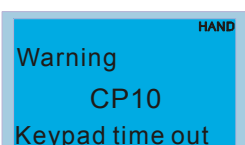
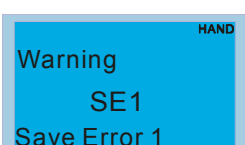
③ Comm. Error 1

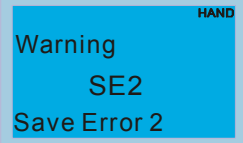
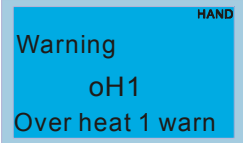
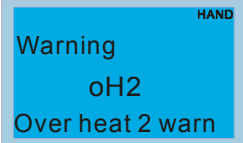
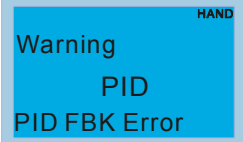
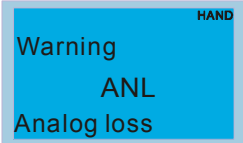
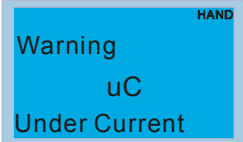
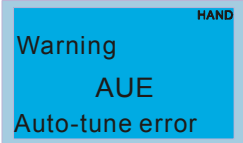
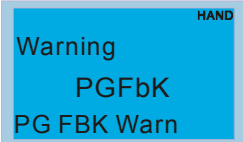
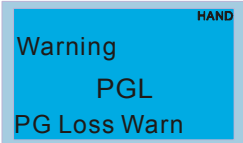
① Warning message indication

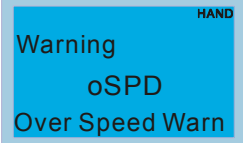

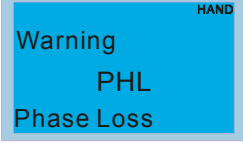
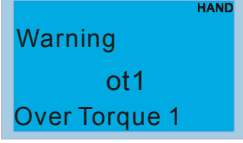
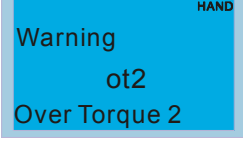
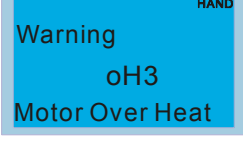
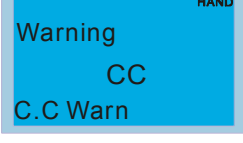

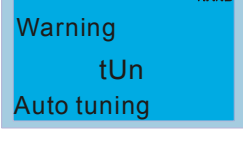
② Display warning code in abbreviation

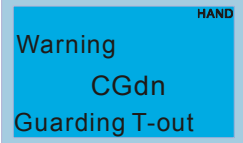
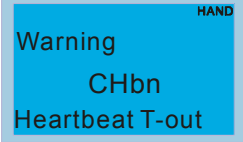
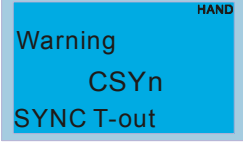

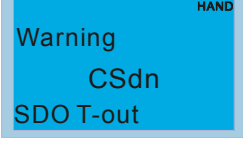
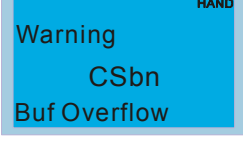
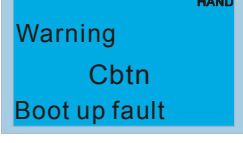
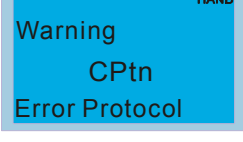
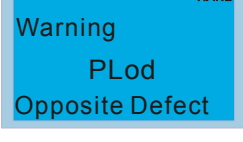
This code is the same as shown in the keypad (KPC-CE01)

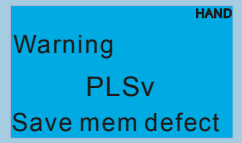
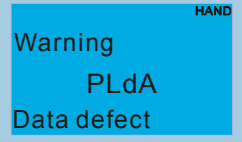
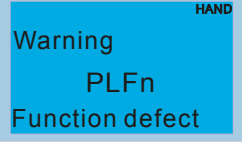
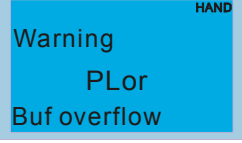
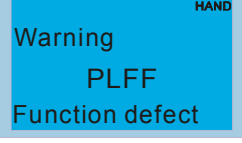
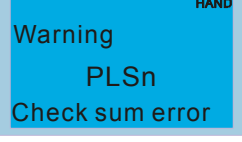
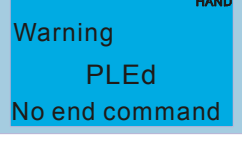
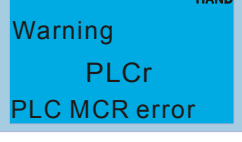

③ Descriptions of warning code

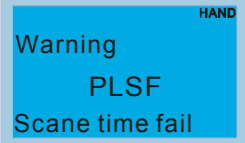
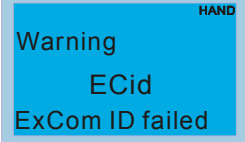
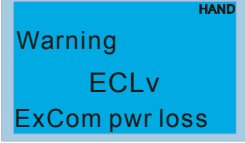
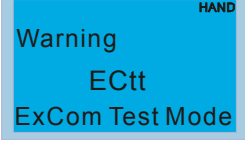
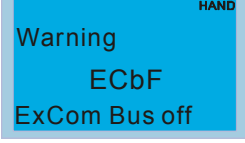
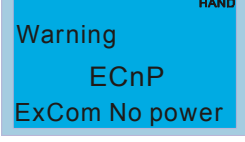


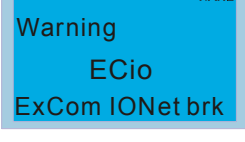
Display on LCM Keypad	Descriptions
	Modbus function code error
	Address of Modbus data is error
	Modbus data error
	Modbus communication error
	Modbus transmission time-out
	Keypad transmission time-out
	Keypad COPY error

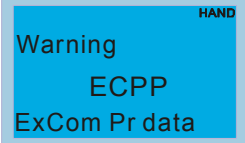
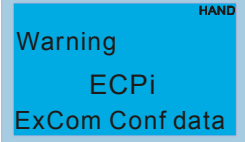
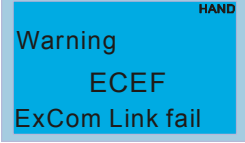

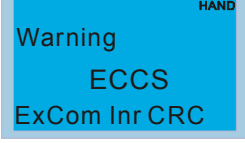
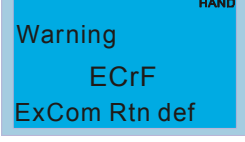
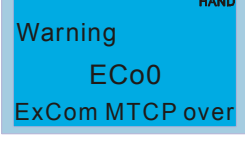
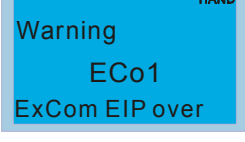
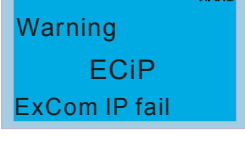
Display on LCM Keypad	Descriptions
 <p>Warning SE2 Save Error 2</p>	Keypad COPY error 2
 <p>Warning oH1 Over heat 1 warn</p>	IGBT over-heating warning
 <p>Warning oH2 Over heat 2 warn</p>	Capacity over-heating warning
 <p>Warning PID PID FBK Error</p>	PID feedback error
 <p>Warning ANL Analog loss</p>	ACI signal error
 <p>Warning uC Under Current</p>	Low current
 <p>Warning AUE Auto-tune error</p>	Auto tuning error
 <p>Warning PGFbK PG FBK Warn</p>	PG feedback error
 <p>Warning PGL PG Loss Warn</p>	PG feedback loss

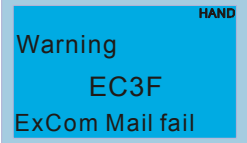
Display on LCM Keypad	Descriptions
 <p>Warning oSPD Over Speed Warn</p>	Over-speed warning
 <p>Warning DAvE Deviation Warn</p>	Over speed deviation warning
 <p>Warning PHL Phase Loss</p>	Phase loss
 <p>Warning ot1 Over Torque 1</p>	Over torque 1
 <p>Warning ot2 Over Torque 2</p>	Over torque 2
 <p>Warning oH3 Motor Over Heat</p>	Motor over-heating
 <p>Warning CC C.C Warn</p>	Current clamp
 <p>Warning oSL Over Slip Warn</p>	Over slip
 <p>Warning tUn Auto tuning</p>	Auto tuning warning

Display on LCM Keypad	Descriptions
 <p>Warning CGdn Guarding T-out</p>	Guarding time-out
 <p>Warning CHbn Heartbeat T-out</p>	Heartbeat time-out
 <p>Warning CSYn SYNC T-out</p>	CAN synchrony time-out
 <p>Warning CbFn Can Bus Off</p>	CAN bus off
 <p>Warning CSdn SDO T-out</p>	CAN SDO transmission time-out
 <p>Warning CSbn Buf Overflow</p>	CAN SDO received register overflow
 <p>Warning Cbtn Boot up fault</p>	CAN boot up error
 <p>Warning CPtn Error Protocol</p>	CAN format error
 <p>Warning PLod Opposite Defect</p>	PLC download error

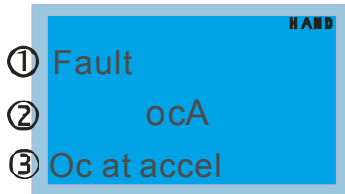
Display on LCM Keypad	Descriptions
 <p>Warning PLSv Save mem defect</p>	Save error of PLC download
 <p>Warning PLdA Data defect</p>	Data error during PLC operation
 <p>Warning PLFn Function defect</p>	Function code of PLC download error
 <p>Warning PLor Buf overflow</p>	PLC register overflow
 <p>Warning PLFF Function defect</p>	Function code of PLC operation error
 <p>Warning PLSn Check sum error</p>	PLC checksum error
 <p>Warning PLEd No end command</p>	PLC end command is missed
 <p>Warning PLCr PLC MCR error</p>	PLC MCR command error
 <p>Warning PLdF Download fail</p>	PLC download fail

Display on LCM Keypad	Descriptions
 <p>Warning PLSF Scane time fail</p>	PLC scan time time-out
 <p>Warning ECid ExCom ID failed</p>	Repeated MAC ID of communication card error Setting of node address of communication card error
 <p>Warning ECLv ExCom pwr loss</p>	Low voltage of communication card
 <p>Warning ECtt ExCom Test Mode</p>	Communication card enters test mode
 <p>Warning ECbF ExCom Bus off</p>	DeviceNet bus-off
 <p>Warning ECnP ExCom No power</p>	No power supply on the DeviceNet network
 <p>Warning ECFF ExCom Facy def</p>	Manufactory error
 <p>Warning ECiF ExCom Inner err</p>	Serious internal error
 <p>Warning ECio ExCom IONet brk</p>	IO communication is interrupted

Display on LCM Keypad	Descriptions
	Error occurs when the master sets the parameters
	Profibus layout data error
	Ethernet communication error
	Communication between communication card and the AC motor drive is time-out
	Check sum error (communication between communication card and the AC motor drive)
	Re-set the communication card to the factory settings
	Modbus TCP exceeds max. communication number
	EtherNet/IP exceeds max. communication number
	IP error

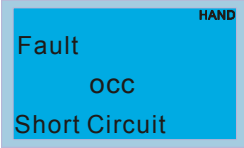
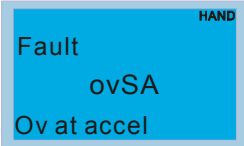
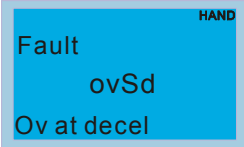
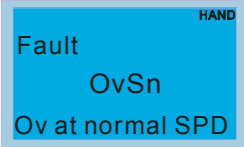
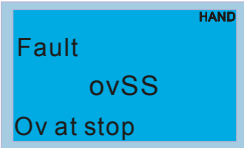
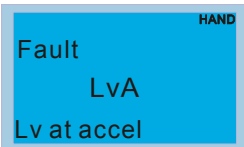
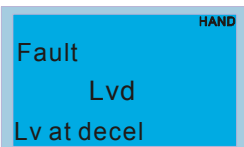
Display on LCM Keypad	Descriptions
 A blue rectangular display with a thin grey border. The text is white. In the top right corner, the word "HAND" is written in a small font. Below it, the word "Warning" is written in a larger font. Underneath "Warning", the code "EC3F" is displayed. At the bottom, the text "ExCom Mail fail" is shown. <p>Warning EC3F ExCom Mail fail</p>	Mail warning

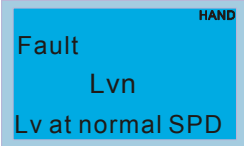
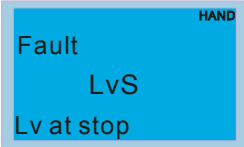
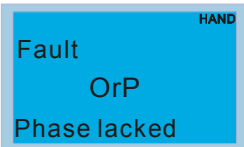
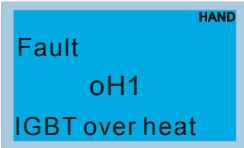
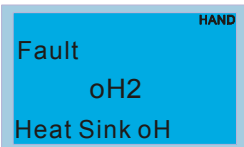
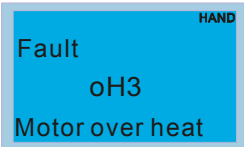
Fault Codes Information

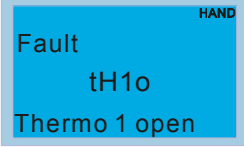
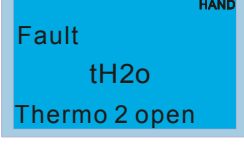
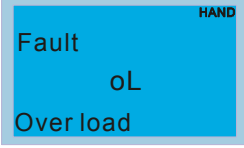
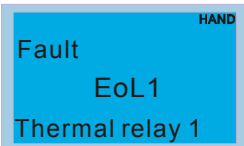
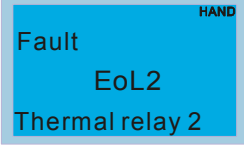
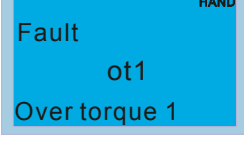
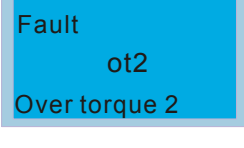
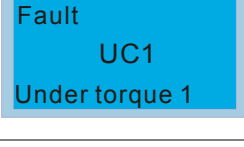
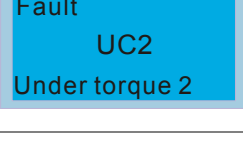


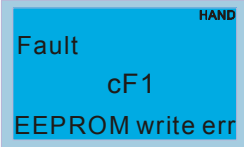
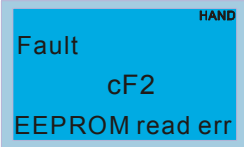
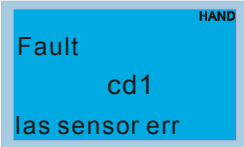
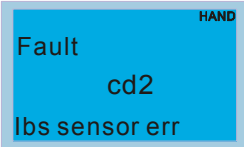
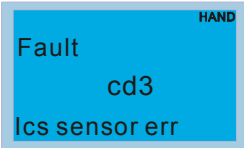
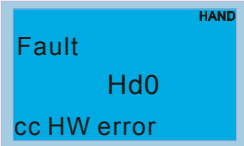
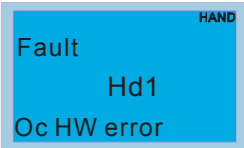
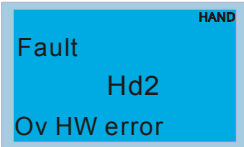
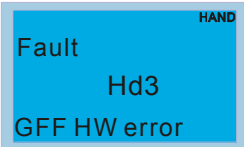
- ① Fault code indication
- ② Display fault code in abbreviation
This code is the same as shown in the keypad (KPC-CE01)
- ③ Descriptions of fault code

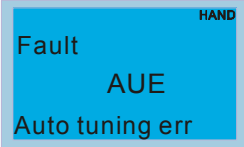
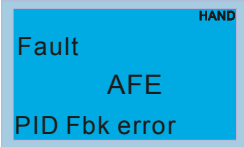
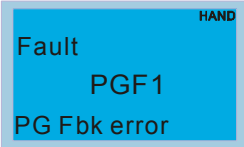
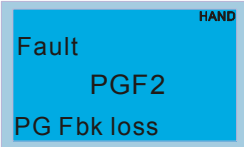
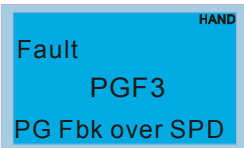
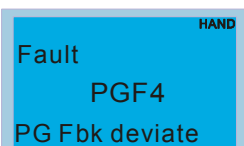
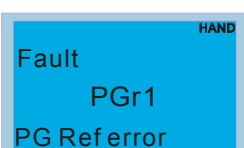
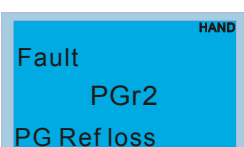
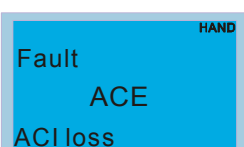
Display on LCM Keypad	Descriptions
	<p>Over-current during acceleration: Output current exceeds triple rated current during acceleration.</p> <p>Corrective Actions</p> <ol style="list-style-type: none"> Short-circuit at motor output: Check for possible poor insulation at the output lines. Acceleration Time too short: Increase the Acceleration Time. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model.
	<p>Over-current during deceleration: Output current exceeds triple rated current during deceleration.</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> Short-circuit at motor output: Check for possible poor insulation at the output line. Deceleration Time too short: Increase the Deceleration Time. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model.
	<p>Over-current during steady status operation: Output current exceeds triple rated current during constant speed.</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> Short-circuit at motor output: Check for possible poor insulation at the output line. Sudden increase in motor loading: Check for possible motor stall. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model.
	<p>Hardware failure in current detection</p> <p>Corrective Actions:</p> <p>Return to the factory.</p>
	<p>Ground fault. When (one of) the output terminal(s) is grounded, short circuit current is more than 50% of AC motor drive rated current, the AC motor drive power module may be damaged.</p> <p>NOTE: The short circuit protection is provided for AC motor drive protection, not for protection of the user.</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> Check the wiring connections between the AC motor drive and motor for possible short circuits, also to ground.


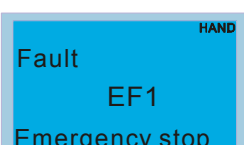
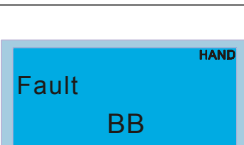
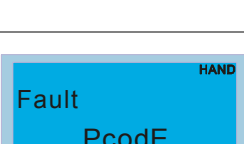
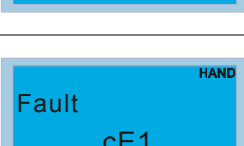
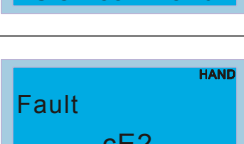
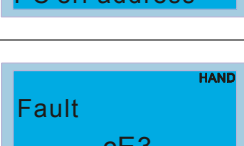
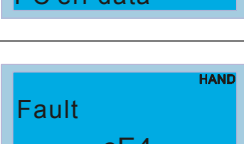
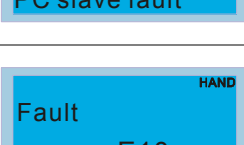
Display on LCM Keypad	Descriptions
	2. Check whether the IGBT power module is damaged. 3. Check for possible poor insulation at the output line.
	Short-circuit is detected between upper bridge and lower bridge of the IGBT module. Corrective Actions: Return to the factory.
	DC BUS over-voltage during acceleration (230V: DC 450V; 460V: DC 900V) Corrective Actions: <ol style="list-style-type: none"> 1. Check if the input voltage falls within the rated AC motor drive input voltage range. 2. Check for possible voltage transients. 3. If DC BUS over-voltage due to regenerative voltage, please increase the Deceleration Time or add an optional brake resistor.
	DC BUS over-voltage during deceleration (230V: DC 450V; 460V: DC 900V) Corrective Actions: <ol style="list-style-type: none"> 1. Check if the input voltage falls within the rated AC motor drive input voltage range. 2. Check for possible voltage transients. 3. If DC BUS over-voltage due to regenerative voltage, please increase the Deceleration Time or add an optional brake resistor.
	DC BUS over-voltage in constant speed (230V: DC 450V; 460V: DC 900V) Corrective Actions: <ol style="list-style-type: none"> 1. Check if the input voltage falls within the rated AC motor drive input voltage range. 2. Check for possible voltage transients. 3. If DC BUS over-voltage due to regenerative voltage, please increase the Deceleration Time or add an optional brake resistor.
	Hardware failure in voltage detection. Corrective Actions: Check if input voltage is within specification range and monitor if there is surge voltage.
	DC BUS voltage is less than Pr.06-00 during acceleration. Corrective Actions: <ol style="list-style-type: none"> 1. Check if the input voltage is normal 2. Check for possible sudden load
	DC BUS voltage is less than Pr.06-00 during deceleration. Corrective Actions: <ol style="list-style-type: none"> 1. Check if the input voltage is normal 2. Check for possible sudden load

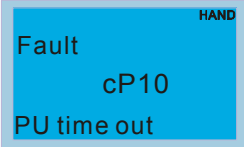
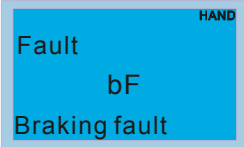
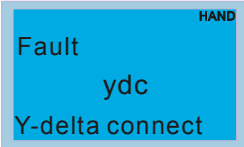
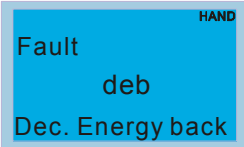
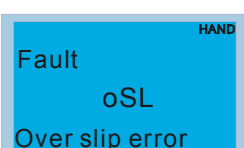
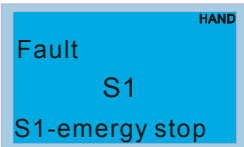
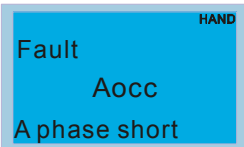
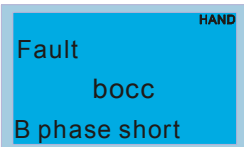
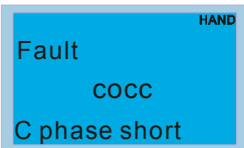
Display on LCM Keypad	Descriptions
 <p>Fault Lvn Lv at normal SPD</p>	<p>DC BUS voltage is less than Pr.06-00 in constant speed.</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check if the input voltage is normal 2. Check for possible sudden load
 <p>Fault LvS Lv at stop</p>	<p>DC BUS voltage is less than Pr.06-00 at stop.</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check if the input voltage is normal 2. Check for possible sudden load
 <p>Fault OrP Phase lacked</p>	<p>Phase Loss.</p> <p>Corrective Actions:</p> <p>Check Power Source Input if all 3 input phases are connected without loose contacts.</p> <p>For models 40hp and above, please check if the fuse for the AC input circuit is blown.</p>
 <p>Fault oH1 IGBT over heat</p>	<p>IGBT overheating</p> <p>IGBT temperature exceeds protection level</p> <p>1 to15HP: 90 °C 20 to 100HP: 100 °C</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Ensure that the ambient temperature falls within the specified temperature range. 2. Make sure that the ventilation holes are not obstructed. 3. Remove any foreign objects from the heatsinks and check for possible dirty heat sink fins. 4. Check the fan and clean it. 5. Provide enough spacing for adequate ventilation.
 <p>Fault oH2 Heat Sink oH</p>	<p>Heatsink overheating</p> <p>Heat sink temperature exceeds 90°C</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Ensure that the ambient temperature falls within the specified temperature range. 2. Make sure that the ventilation holes are not obstructed. 3. Remove any foreign objects from the heatsinks and check for possible dirty heat sink fins. 4. Check the fan and clean it. 5. Provide enough spacing for adequate ventilation.
 <p>Fault oH3 Motor over heat</p>	<p>Motor overheating</p> <p>The AC motor drive detects that the internal temperature exceeds Pr.06-30 (PTC level)</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Make sure that the motor is not obstructed. 2. Ensure that the ambient temperature falls within the specified temperature range. 3. Take the next higher power AC motor drive model.


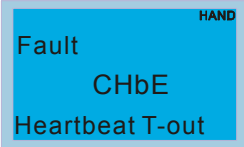
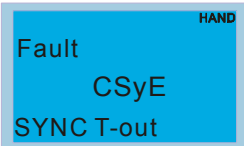
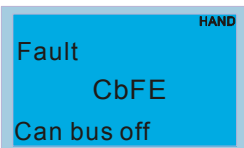
Display on LCM Keypad	Descriptions
	Temperature detection circuit error (IGBT) Corrective Actions: Return to the factory.
	Temperature detection circuit error (capacity module) Corrective Actions: Return to the factory.
	Overload. The AC motor drive detects excessive drive output current. NOTE: The AC motor drive can withstand up to 150% of the rated current for a maximum of 60 seconds. Corrective Actions: 1. Check whether the motor is overloaded. 2. Take the next higher power AC motor drive model.
	Electronics thermal relay 1 protection. Corrective Actions: 1. Check the setting of electronics thermal relay (Pr.06-14) 2. Take the next higher power AC motor drive model
	Electronics thermal relay 2 protection. Corrective Actions: 1. Check the setting of electronics thermal relay (Pr.06-28) 2. Take the next higher power AC motor drive model
	These two fault codes will be displayed when output current exceeds the over-torque detection level (Pr.06-07 or Pr.06-10) and exceeds over-torque detection(Pr.06-08 or Pr.06-11) and it is set 2 or 4 in Pr.06-06 or Pr.06-09.
	Corrective Actions: 1. Check whether the motor is overloaded. 2. Check whether motor rated current setting (Pr.05-01) is suitable 3. Take the next higher power AC motor drive model.
	Low torque 1
	Low torque 2

Display on LCM Keypad	Descriptions
	<p>Internal EEPROM can not be programmed.</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Press "RESET" key to the factory setting 2. Return to the factory.
	<p>Internal EEPROM can not be read.</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Press "RESET" key to the factory setting 2. Return to the factory.
	<p>U-phase error</p> <p>Corrective Actions:</p> <p>Re-power on to try it. If fault code is still displayed on the keypad please return to the factory.</p>
	<p>V-phase error</p> <p>Corrective Actions:</p> <p>Re-power on to try it. If fault code is still displayed on the keypad please return to the factory.</p>
	<p>W-phase error</p> <p>Corrective Actions:</p> <p>Re-power on to try it. If fault code is still displayed on the keypad please return to the factory.</p>
	<p>CC (current clamp).</p> <p>Corrective Actions:</p> <p>Re-power on to try it. If fault code is still displayed on the keypad please return to the factory</p>
	<p>OC hardware error.</p> <p>Corrective Actions:</p> <p>Re-power on to try it. If fault code is still displayed on the keypad please return to the factory.</p>
	<p>OV hardware error.</p> <p>Corrective Actions:</p> <p>Re-power on to try it. If fault code is still displayed on the keypad please return to the factory.</p>
	<p>GFF hardware error.</p> <p>Corrective Actions:</p> <p>Re-power on to try it. If fault code is still displayed on the keypad please return to the factory.</p>

Display on LCM Keypad	Descriptions
 <p>Fault AUE Auto tuning err</p>	<p>Auto tuning error</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check cabling between drive and motor 2. Retry again
 <p>Fault AFE PID Fbk error</p>	<p>PID loss (ACI)</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check the wiring of the PID feedback 2. Check the PID parameters settings
 <p>Fault PGF1 PG Fbk error</p>	<p>PG feedback error</p> <p>Corrective Actions:</p> <p>Check if Pr.10-01 is set to 0 when it is PG feedback control.</p>
 <p>Fault PGF2 PG Fbk loss</p>	<p>PG feedback loss</p> <p>Corrective Actions:</p> <p>Check the wiring of the PG feedback.</p>
 <p>Fault PGF3 PG Fbk over SPD</p>	<p>PG feedback stall</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check the wiring of the PG feedback 2. Check if the setting of PI gain and deceleration is suitable 3. Return to the factory
 <p>Fault PGF4 PG Fbk deviate</p>	<p>PG slip error</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check the wiring of the PG feedback 2. Check if the setting of PI gain and deceleration is suitable 3. Return to the factory
 <p>Fault PGr1 PG Ref error</p>	<p>Pulse input error</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check the pulse wiring 2. Return to the factory
 <p>Fault PGr2 PG Ref loss</p>	<p>Pulse input loss</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check the pulse wiring 2. Return to the factory
 <p>Fault ACE ACI loss</p>	<p>ACI loss</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Check the ACI wiring 2. Check if the ACI signal is less than 4mA

Display on LCM Keypad	Descriptions
	<p>External Fault</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. Input EF (N.O.) on external terminal is closed to GND. Output U, V, W will be turned off. 2. Give RESET command after fault has been cleared.
	<p>Emergency stop</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. When the multi-function input terminals MI1 to MI6 are set to emergency stop, the AC motor drive stops output U, V, W and the motor coasts to stop. 2. Press RESET after fault has been cleared.
	<p>External Base Block</p> <p>Corrective Actions:</p> <ol style="list-style-type: none"> 1. When the external input terminal (B.B) is active, the AC motor drive output will be turned off. 2. Deactivate the external input terminal (B.B) to operate the AC motor drive again.
	<p>Password is locked.</p> <p>Corrective Actions:</p> <p>Keypad will be locked. Turn the power ON after power OFF to re-enter the correct password. See Pr.00-07 and 00-08.</p>
	<p>Illegal function code</p> <p>Corrective Actions:</p> <p>Check if the function code is correct (function code must be 03, 06, 10, 63)</p>
	<p>Illegal data address (00H to 254H)</p> <p>Corrective Actions:</p> <p>Check if the communication address is correct</p>
	<p>Illegal data value</p> <p>Corrective Actions:</p> <p>Check if the data value exceeds max./min. value</p>
	<p>Data is written to read-only address</p> <p>Corrective Actions:</p> <p>Check if the communication address is correct</p>
	<p>Modbus transmission time-out.</p>

Display on LCM Keypad	Descriptions
 <p>Fault cP10 PU time out</p>	Keypad transmission time-out.
 <p>Fault bF Braking fault</p>	Brake resistor fault Corrective Actions: If the fault code is still displayed on the keypad after pressing "RESET" key, please return to the factory.
 <p>Fault ydc Y-delta connect</p>	Y-connection/ Δ -connection switch error Corrective Actions: 1. Check the wiring of the Y-connection/ Δ -connection 2. Check the parameters settings
 <p>Fault deb Dec. Energy back</p>	When Pr.07-13 is not set to 0 and momentary power off or power cut, it will display dEb during accel./decel. stop. Corrective Actions: 1. Set Pr.07-13 to 0 2. Check if input power is stable
 <p>Fault oSL Over slip error</p>	It will be displayed when slip exceeds Pr.05-26 setting and time exceeds Pr.05-27 setting. Corrective Actions: 1. Check if motor parameter is correct (please decrease the load if overload) 2. Check the settings of Pr.05-26 and Pr.05-27
 <p>Fault S1 S1-emergy stop</p>	External emergency stop
 <p>Fault Aocc A phase short</p>	A-phase short-circuit
 <p>Fault bocc B phase short</p>	B-phase short-circuit
 <p>Fault cocc C phase short</p>	C-phase short-circuit

Display on LCM Keypad	Descriptions
 <p>Fault CGdE Guarding T-out</p>	Guarding time-out 1
 <p>Fault CHbE Heartbeat T-out</p>	Heartbeat time-out
 <p>Fault CSyE SYNC T-out</p>	CAN synchrony error
 <p>Fault CbFE Can bus off</p>	CAN bus off

Summary of Parameter Settings

This chapter provides summary of parameter settings for user to get the parameter information of setting ranges and factory settings and set parameters. The parameters can be set, changed and reset by the digital keypad.



- 1) \nearrow : the parameter can be set during operation
- 2) Refer to the parameters manual for details.

00 Drive Parameters

Parameter	Explanation	Settings	Factory Setting
00-00	Identity Code of the AC Motor Drive	4: 230V, 1HP (0.75kW) 5: 460 V, 1HP (0.75kW) 6: 230V, 2HP (1.5kW) 7: 460 V, 2HP (1.5kW) 8: 230V, 3HP (2.2kW) 9: 460 V, 3HP (2.2kW) 10: 230V, 5HP (3.7kW) 11: 460 V, 5HP (3.7kW) 12: 230V, 7.5HP (5.5kW) 13: 460 V, 7.5HP (5.5kW) 14: 230V, 10HP (7.5kW) 15: 460V, 10HP (7.5kW) 16: 230V, 15HP (11kW) 17: 460V, 15HP (11kW) 18: 230V, 20HP (15kW) 19: 460V, 20HP (15kW) 20: 230V, 25HP (18.5kW) 21: 460V, 25HP (18.5kW) 22: 230V, 30HP (22kW) 23: 460V, 30HP (22kW) 24: 230V, 40HP (30kW) 25: 460V, 40HP (30kW) 26: 230V, 50HP (37kW) 27: 460V, 50HP (37kW) 28: 230V, 60HP (45kW) 29: 460V, 60HP (45kW) 30: 230V, 75HP (50kW) 31: 460V, 75HP (50kW) 32: 230V, 100HP (75kW) 33: 460V, 100HP (75kW) 35: 460V, 125HP (90kW) 37: 460V, 150HP (110kW) 93: 460V, 5HP (4.0kW)	Read-only
00-01	Rated Current Display of the AC Motor Drive	Display by models	Read-only
00-02	Parameter Reset	0: No function 1: Read only 2: Reserved 6: Reset PLC (including CANopen Master Index) 7: Reset CANopen Index (Slave) 8: keypad lock 9: All parameters are reset to factory settings(base frequency is 50Hz) 10: All parameters are reset to factory settings (base	0

Parameter	Explanation	Settings	Factory Setting
		frequency is 60Hz)	
↗ 00-03	Start-up Display Selection	0: F (frequency command) 1: H (output frequency) 2: U (multi-function display, see Pr.00-04) 3: A (output current)	0
↗ 00-04	Content of Multi-function Display	0: Display output current (A) 1: Display counter value (c) 2: Display actual output frequency (H) 3: Display DC-BUS voltage (u) 4: Display output voltage (E) 5: Display output power angle (n) 6: Display output power in kW (P) 7: Display actual motor speed rpm (r) 8: Display estimate output torque in % (t) 9: Display PG feedback (G) (refer to Pr.10-00, 10-01) 10: Display PID feedback in % (b) 11: Display AVI in % (1.) 12: Display ACI in % (2.) 13: Display AUI in % (3.) 14: Display the temperature of heat sink in °C (i.) 15: Display the IGBT temperature of drive power module °C (c.) 16: The status of digital input (ON/OFF) (i) 17: The status of digital output (ON/OFF) (o) 18: Display the multi-step speed that is executing (S) 19: The corresponding CPU pin status of digital input(d.) 20: The corresponding CPU pin status of digital output(0.) 21: Number of actual motor revolution (PG1 of PG card)(P.) 22: Pulse input frequency (PG2 of PG card)(S.) 23: Pulse input position (PG2 of PG card)(4.) 24: Position command tracing error(P.) 25~27: Reserved 28: Display PLC register D1043 data (C)	0
00-05	Reserved		
00-06	Software Version	Read-only	##
↗ 00-07	Password Input	0 to 65535 0 to 2: times of wrong password	0
↗ 00-08	Password Set	0 to 65535 0: No password set or successful input in Pr.00-07 1: Password has been set	0
↗ 00-09	Display Advanced Parameters	Bit 0: Group 0 Bit 1: Group 1 Bit 2: Group 2 Bit 3: Group 3 Bit 4: Group 4 Bit 5: Group 5 Bit 6: Group 6 Bit 7: Group 7 Bit 8: Group 8 Bit 9: Group 9 Bit 10: Group 10 Bit 11: Group 11	0

Parameter	Explanation	Settings	Factory Setting
00-10	Control Mode	0: Speed mode 1: Reserved 2: Torque mode	0
00-11	Control of Speed Mode	0: VF (V/f control) 1: VFBG (V/f control+ Encoder) 2: SVC (Sensorless vector control) 3: FOCPG (Sensorless vector control+encoder)	0
00-12	Reserved		
00-13	Control of Torque Mode	0: TQCPG (Torque control + encoder) 1: Reserved	0
00-14	Reserved		
00-15	Reserved		
00-16	Duty Selection	0: Normal duty 1: Heavy duty	0
00-17	Carrier Frequency	Normal duty: 1-15HP: 2~15kHz 20-50HP: 2-10kHz 60-100HP: 2-09kHz Heavy duty: 1-15HP: 2-15kHz 20-50HP: 2-10kHz 60-100HP: 2-09kHz	8 6 2 2 2 2
00-18	Reserved		
00-19	Reserved		
00-20	Source of the Master Frequency Command	0: Digital keypad 1: RS-485 serial communication 2: External analog input (Pr.03-00) 3: External UP/DOWN terminal 4: Pulse input without direction command (Pr.10-16 without direction) 5: Pulse input with direction command (Pr.10-16) 6: CANopen card 7: Reserved 8: Communication card (not includes CANopen card)	0
00-21	Source of the Operation Command (AUTO)	0: Digital keypad 1: External terminals. Keypad STOP disabled. 2: RS-485 serial communication. Keypad STOP disabled. 3: CANopen card 4: Reserved 5: Communication card (not includes CANopen card)	0
00-22	Stop Method	0: Ramp to stop 1: Coast to stop	0
00-23	Motor Direction Control	0: Enable forward/reverse 1: Disable reverse 2: Disable forward	0
00-24 ~ 00-29	Reserved		
00-30	Source of the Frequency Command (HAND)	0: Digital keypad 1: RS-485 serial communication 2: External analog input (Pr.03-00) 3: External UP/DOWN terminal	0

Parameter	Explanation	Settings	Factory Setting
		4: Pulse input without direction command (Pr.10-16 without direction) 5: Pulse input with direction command (Pr.10-16) 6: CANopen card 7: Reserved 8: Communication card (not includes CANopen card)	
00-31	Source of the Operation Command (HAND)	0: Digital keypad 1: External terminal, "Stop" key on the keypad is invalid 2: RS-485, "Stop" key on the keypad is invalid 3: CANopen card 4: Reserved 5: Communication card (not includes CANopen card)	0

01 Basic Parameters

Parameter	Explanation	Settings	Factory Setting
01-00	Max. Operation Frequency	50.00~600.00Hz	60.00/ 50.00
01-01	Base Frequency of Motor 1	0.00~600.00Hz	60.00/ 50.00
01-02	Max. Output Voltage of Motor 1	230V: 0.0V~255.0V 460V: 0.0V~510.0V	220.0 440.0
01-03	Mid-point Frequency 1 of Motor 1	0.00~600.00Hz	0.50
01-04	Mid-point Voltage 1 of Motor 1	230V: 0.0V~240.0V 460V: 0.0V~480.0V	5.0 10.0
01-05	Mid-point Frequency 2 of Motor 1	0.00~600.00Hz	0.50
01-06	Mid-point Voltage 2 of Motor 1	230V: 0.0V~240.0V 460V: 0.0V~480.0V	5.0 10.0
01-07	Min. Output Frequency of Motor 1	0.00~600.00Hz	0.00
01-08	Min. Output Voltage of Motor 1	230V: 0.0V~240.0V 460V: 0.0V~480.0V	0.0 0.0
01-09	Start Frequency	0.00~600.00Hz	0.50
01-10	Output Frequency Upper Limit	0.00~600.00Hz	600.00
01-11	Output Frequency Lower Limit	0.00~600.00Hz	0
01-12	Accel. Time 1	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
01-13	Decel Time 1	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
01-14	Accel Time 2	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
01-15	Decel Time 2	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
01-16	Accel Time 3	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0

	Parameter	Explanation	Settings	Factory Setting
✓	01-17	Decel Time 3	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
✓	01-18	Accel Time 4	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
✓	01-19	Decel Time 4	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
✓	01-20	JOG Acceleration Time	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
✓	01-21	JOG Deceleration Time	Pr.01-45=0: 0.00~600.00 sec Pr.01-45=1: 0.00~6000.0 sec	10.00 10.0
✓	01-22	JOG Frequency	0.00~600.00Hz	6.00
✓	01-23	1st/4th Accel/decel Frequency	0.00~600.00Hz	0.00
✓	01-24	S-curve for Acceleration Departure Time 1	Pr.01-45=0: 0.00~25.00 sec Pr.01-45=1: 0.0~250.0 sec	0.20 0.2
✓	01-25	S-curve for Acceleration Arrival Time 2	Pr.01-45=0: 0.00~25.00 sec Pr.01-45=1: 0.0~250.0 sec	0.20 0.2
✓	01-26	S-curve for Deceleration Departure Time 1	Pr.01-45=0: 0.00~25.00 sec Pr.01-45=1: 0.0~250.0 sec	0.20 0.2
✓	01-27	S-curve for Deceleration Arrival Time 2	Pr.01-45=0: 0.00~25.00 sec Pr.01-45=1: 0.0~250.0 sec	0.20 0.2
	01-28	Skip Frequency 1 (upper limit)	0.00~600.00Hz	0.00
	01-29	Skip Frequency 1 (lower limit)	0.00~600.00Hz	0.00
	01-30	Skip Frequency 2 (upper limit)	0.00~600.00Hz	0.00
	01-31	Skip Frequency 2 (lower limit)	0.00~600.00Hz	0.00
	01-32	Skip Frequency 3 (upper limit)	0.00~600.00Hz	0.00
	01-33	Skip Frequency 3 (lower limit)	0.00~600.00Hz	0.00
	01-34	Zero-speed Mode Selection	0: Output waiting 1: Zero-speed operation 2: Fmin (4 th output frequency setting)	0
	01-35	Base Frequency of Motor 2	0.00~600.00Hz	60.00/ 50.00
	01-36	Max. Output Voltage of Motor 2	230V: 0.0V~255.0V 460V: 0.0V~510.0V	220.0 440.0
	01-37	Mid-point Frequency 1 of Motor 2	0.00~600.00Hz	0.50
✓	01-38	Mid-point Voltage 1 of Motor 2	230V: 0.0V~240.0V 460V: 0.0V~480.0V	5.0 10.0
	01-39	Mid-point Frequency 2 of Motor 2	0.00~600.00Hz	0.50
✓	01-40	Mid-point Voltage 2 of Motor 2	230V: 0.0V~240.0V 460V: 0.0V~480.0V	5.0 10.0
	01-41	Min. Output Frequency of Motor 2	0.00~600.00Hz	0.00
✓	01-42	Min. Output Voltage of Motor 2	230V: 0.0V~240.0V	0.0 0.0

Parameter	Explanation	Settings	Factory Setting
		460V: 0.0V~480.0V	
01-43	V/f Curve Selection	0: V/f curve determined by Pr.01-00~01-08 1: 1.5 power curve 2: Square curve	0
01-44	Optimal Acceleration/Deceleration Setting	0: Linear accel./decel. 1: Auto accel., linear decel. 2: Linear accel., auto decel. 3: Auto accel./decel. 4: Linear, stall prevention by auto accel./decel. (limit by Pr.01-21 to 01-22)	0
01-45	Time Unit for Acceleration/Deceleration and S Curve	0: Unit: 0.01 sec 1: Unit: 0.1sec	0
01-46	Time for CANopen Quick Stop	0.00~600.00 sec	1.00
01-47 ~ 01-50	Reserved		

02 Digital Input/Output Parameters

Parameter	Explanation	Settings	Factory Setting
02-00	2-wire/3-wire Operation Control	0: 2-wire mode 1 1: 2-wire mode 2 2: 3-wire	0
02-01	Multi-function Input Command 1 (MI1)	0: no function	1
02-02	Multi-function Input Command 2 (MI2)	1: multi-step speed command 1/multi-step position command 1	2
02-03	Multi-function Input Command 3 (MI3)	2: multi-step speed command 2/multi-step position command 2	3
02-04	Multi-function Input Command 4 (MI4)	3: multi-step speed command 3/multi-step position command 3	4
02-05	Multi-function Input Command 5 (MI5)	4: multi-step speed command 4/multi-step position command 4	0
02-06	Multi-function Input Command 6 (MI6)	5: Reset	0
02-07	Multi-function Input Command 7 (MI7)	6: JOG command (by KPC-CC01 or external control)	0
02-08	Multi-function Input Command 8 (MI8)	7: acceleration/deceleration speed inhibit	0
02-26	Input Terminal with Extension Card (MI10)	8: the 1 st , 2 nd acceleration/deceleration time selection	0
02-27	Input Terminal with Extension Card (MI11)	9: the 3 rd , 4 th acceleration/deceleration time selection	0
02-28	Input Terminal with Extension Card (MI12)	10: EF input (Pr.07-20)	0
02-29	Input Terminal with Extension Card (MI13)	11: External B.B. input (Base Block)	0
02-30	Input Terminal with Extension Card (MI14)	12: output stop	0
02-31	Input Terminal with Extension Card (MI15)	13: cancel the setting of the optimal acceleration/deceleration time	0
	(02-30~02-31 is NOT available)	14: switch between motor 1 and motor 2	

Parameter	Explanation	Settings	Factory Setting
		15: operation speed command from AVI	
		16: operation speed command from ACI	
		17: operation speed command from AUI	
		18: Emergency stop (Pr.07-20)	
		19: Digital up command	
		20: Digital down command	
		21: PID function disabled	
		22: Clear counter	
		23: Input the counter value (MI6)	
		24: FWD JOG command	
		25: REV JOG command	
		26: TQCPG/FOCPG model selection	
		27: ASR1/ASR2 selection	
		28: Emergency stop (EF1)	
		29: Signal confirmation for Y-connection	
		30: Signal confirmation for Δ -connection	
		31: High torque bias (Pr.11-30)	
		32: Middle torque bias (Pr.11-31)	
		33: Low torque bias (Pr.11-32)	
		34: Switch between multi-step position and multi-speed control	
		35: Enable position control	
		36: Enable multi-step position learning function (valid at stop)	
		37: Enable pulse position input command	
		38: Disable write EEPROM function	
		39: Torque command direction	
		40: Force stop	
		41: HAND switch	
		42: AUTO switch	
		43: Enable resolution selection (refer to Pr.02-48)	
		44~47: Reserved	
		48: Mechanical gear ratio switch	
		49~50: Reserved	
		51: Selection for PLC mode bit0	
		52: Selection for PLC mode bit1	

Parameter	Explanation	Settings	Factory Setting
		53: Enable CANopen quick stop	
02-09	UP/DOWN Key Mode	0: up/down by the accel./decel. time 1: up/down constant speed (Pr.02-10)	0
02-10	The Accel./Decel. Speed of the UP/DOWN Key with Constant Speed	0.01~1.00Hz/ms	1
02-11	Multi-function Input Response Time	0.000~30.000 sec	0.005
02-12	Multi-function Input Mode Selection	0~65535 (0: N.O., 1: N.C.)	0
02-13	Multi-function Output 1 RY1	0: No function	11
02-14	Multi-function Output 2 RY2	1: Operation indication	1
02-16	Multi-function Output 3 (MO1)	2: Operation speed attained	0
02-17	Multi-function Output 4 (MO2)	3: Desired frequency attained 1 (Pr.02-22)	0
02-36	Output Terminal with the Extension Card (MO10)	4: Desired frequency attained 2 (Pr.02-24)	0
02-37	Output Terminal with the Extension Card (MO11)	5: Zero speed (frequency command)	0
02-38	Output Terminal with the Extension Card (MO12)	6: Zero speed with STOP(frequency command)	0
02-39	Output Terminal with the Extension Card (MO13)	7: Over torque 1(Pr.06-06~06-08)	0
02-40	Output Terminal with the Extension Card (MO14)	8: Over torque 2(Pr.06-09~06-11)	0
02-41	Output Terminal with the Extension Card (MO15)	9: Drive ready	0
02-42	Output Terminal with the Extension Card (MO16)	10: Low voltage warning (LV) (Pr.06-00)	0
02-43	Output Terminal with the Extension Card (MO17)	11: Malfunction indication	0
02-44	Output Terminal with the Extension Card (MO18)	12: Mechanical brake release (Pr.02-32)	0
02-45	Output Terminal with the Extension Card (MO19)	13: Overheat warning (Pr.06-15)	0
02-46	Output Terminal with the Extension Card (MO20)	14: Software brake signal indication (Pr.07-00)	
	(02-42~02-46 is not available)	15: PID feedback error	
		16: Slip error (oSL)	
		17: Terminal count value attained (Pr.02-20)	
		18: Preliminary count value attained (Pr.02-19)	
		19: External Base Block input	
		20: Warning output	
		21: Over voltage warning	
		22: Over-current stall prevention warning	
		23: Over-voltage stall prevention warning	
		24: Operation mode indication	
		25: Forward command	

Parameter	Explanation	Settings	Factory Setting	
		26: Reverse command		
		27: Output when current \geq Pr.02-33		
		28: Output when current \leq Pr.02-33		
		29: Output when frequency \geq Pr.02-34		
		30: Output when frequency \leq Pr.02-34		
		31: Y-connection for the motor coil		
		32: Δ -connection for the motor coil		
		33: Zero speed (actual output frequency)		
		34: Zero speed with stop(actual output frequency)		
		35: Error output selection 1(Pr.06-23)		
		36: Error output selection 2(Pr.06-24)		
		37: Error output selection 3(Pr.06-25)		
		38: Error output selection 4(Pr.06-26)		
		39: Position attained (Pr.10-19)		
		40: Speed attained (including zero speed)		
		41: Multi-position attained		
		42: Crane function		
		43: Motor zero-speed output (Pr.02-47)		
		44~46: Reserved		
		47: Brake is close to output		
		48~49: Reserved		
		50: Output for CANopen control		
		51: Output for communication card		
		52: Output for RS-485		
↗	02-18	Multi-output Direction	0~65535 (0: N.O., 1: N.C.)	0
↗	02-19	Terminal Count Value	0~65500	0
↗	02-20	Preliminary Counter Value	0~65500	0
↗	02-21	Digital Output Gain (DFM)	1 ~ 40	1
↗	02-22	Desired Frequency Attained 1	0.00 ~ 600.00Hz	60.00/ 50.00
↗	02-23	Width of the Desired Frequency Attained 1	0.00 ~ 600.00Hz	2.00
↗	02-24	Desired Frequency Attained 2	0.00 ~ 600.00Hz	60.00/ 50.00
↗	02-25	Width of the Desired Frequency Attained 2	0.00 ~ 600.00Hz	2.00
	02-32	Brake Delay Time	0.000~65.000sec	0.000
↗	02-33	Output Current Level Setting for Multi-function Output Terminals	0~100%	0

Parameter	Explanation	Settings	Factory Setting
02-34	Output Boundary for Multi-function Output Terminals	0.00~+-60.00Hz (it is motor speed when using PG)	0
02-35	External Operation Control Selection after Reset	0: Disable 1: Drive runs if run command exists after reset	0
02-47	Zero-speed Level of Motor	0~65535 rpm	0
02-48	Max. Frequency for Switching Resolution	0.01~600.00Hz	60.00
02-49	Delay Time for Max. Output Frequency Switch	0.000~65.000sec	0.000
02-50	Display the Status of Multi-function Input Terminal	Monitor the status of multi-function input terminals	Read-only
02-51	Display the Status of Multi-function Output Terminal	Monitor the status of multi-function output terminals	Read-only
02-52	Display the Status of External Multi-function Input Terminal Used by PLC	Monitor the status of PLC input terminals	Read-only
02-53	Display the Status of Analog Input Terminal Used by PLC	Monitor the status of PLC output terminals	Read-only

03 Analog Input/Output Parameters

Parameter	Explanation	Settings	Factory Setting
03-00	Analog Input 1 (AVI)	0: No function	1
03-01	Analog Input 2 (ACI)	1: Frequency command (speed limit in torque control mode)	0
03-02	Analog Input 3 (AUI)	2: Torque command (torque limit in speed mode)	0
		3: Torque compensation command	
		4: PID target value	
		5: PID feedback signal	
		6: P.T.C. thermistor input value	
		7: Positive torque limit	
		8: Negative torque limit	
		9: Regenerative torque limit	
		10: Positive/negative torque limit	
		11~17: Reserved	
03-03	AVI Analog Input Bias	-100.0~100.0%	0
03-04	ACI Analog Input Bias	-100.0~100.0%	0
03-05	AUI Analog Positive Input Bias	-100.0~100.0%	0
03-06	AUI Analog Negative Input Bias	-100.0~100.0%	0
03-07	Positive/negative Bias Mode (AVI)	0: No bias 1: Lower than bias=bias	0
03-08	Positive/negative Bias Mode (ACI)	2: Greater than bias=bias 3: The absolute value of the bias voltage while serving as	

Parameter	Explanation	Settings	Factory Setting
03-09	Positive/negative Bias Mode (AUI)	the center 4: Serve bias as the center	
03-10	Reserved		
03-11	Analog Input Gain 1 (AVI)	-500.0~500.0%	100.0
03-12	Analog Input Gain 2 (ACI)	-500.0~500.0%	100.0
03-13	Analog Positive Input Gain 3 (AUI)	-500.0~500.0%	100.0
03-14	Analog Negative Input Gain 4 (AUI)	-500.0~500.0%	100.0
03-15	Analog Input Filter Time (AVI)	0.00~2.00sec	0
03-16	Analog Input Filter Time (ACI)	0.00~2.00sec	0
03-17	Analog Input Filter Time (AUI)	0.00~2.00sec	0
03-18	Addition Function of the Analog Input	0: Disable (AVI, ACI, AUI) 1: Enable	0
03-19	Loss of the ACI Signal	0: Disable 1: Continue operation at the last frequency 2: Decelerate to 0Hz 3: Stop immediately and display EF	0
03-20	Multi-function Output 1 (AFM1)	0: Output frequency (Hz)	11
03-23	Multi-function Output 2 (AFM2)	1: Frequency command (Hz)	1
		2: Motor speed (Hz)	
		3: Output current (rms)	
		4: Output voltage	
		5: DC Bus voltage	
		6: Power factor	
		7: Power	
		8: Output torque	
		9: AVI	
		10: ACI	
		11: AUI	
		12: Iq current	
		13: Iq feedback value	
		14: Id current	
		15: Id feedback value	
		16: Vq-axis voltage	
		17: Vd-axis voltage	
		18: Torque command	
		19: PG2 frequency command	
		20: Output for CANopen control	

Parameter	Explanation	Settings	Factory Setting
		21: Analog output for communication card	
03-21	Gain for Analog Output 1 (AFM1)	0~200.0%	0
03-22	Analog Output 1 Value in REV Direction (AFM1)	0: Absolute value in REV direction 1: Output 0V in REV direction 2: Enable output voltage in REV direction	0
03-24	Gain for Analog Output 2 (AFM2)	0~200.0%	0
03-25	Analog Output 2 Value in REV Direction (AFM2)	0: Absolute value in REV direction 1: Output 0V in REV direction 2: Enable output voltage in REV direction	0
03-26	Low-pass Filter Display (AFM1)	0.001~65.535sec	0
03-27	Low-pass Filter Display (AFM2)	0.001~65.535sec	0
03-28	AVI Selection	0: 4-20mA 1: 0-10V	0
03-29	ACI Selection	0: 4-20mA 1: 0-10V	0
03-30	Status of Analog Output Terminal Used by PLC	Monitor the status of PLC output terminals	

04 Multi-step Speed Parameters

Parameter	Explanation	Settings	Factory Setting
04-00	1st Step Speed Frequency	0.00~600.00Hz	0
04-01	2nd Step Speed Frequency	0.00~600.00Hz	0
04-02	3rd Step Speed Frequency	0.00~600.00Hz	0
04-03	4th Step Speed Frequency	0.00~600.00Hz	0
04-04	5th Step Speed Frequency	0.00~600.00Hz	0
04-05	6th Step Speed Frequency	0.00~600.00Hz	0
04-06	7th Step Speed Frequency	0.00~600.00Hz	0
04-07	8th Step Speed Frequency	0.00~600.00Hz	0
04-08	9th Step Speed Frequency	0.00~600.00Hz	0
04-09	10th Step Speed Frequency	0.00~600.00Hz	0
04-10	11th Step Speed Frequency	0.00~600.00Hz	0
04-11	12th Step Speed Frequency	0.00~600.00Hz	0
04-12	13th Step Speed Frequency	0.00~600.00Hz	0
04-13	14th Step Speed Frequency	0.00~600.00Hz	0
04-14	15th Step Speed Frequency	0.00~600.00Hz	0
04-15	Multi-position 1	0~65535	0

	Parameter	Explanation	Settings	Factory Setting
✓	04-16	Multi-position 2	0~65535	0
✓	04-17	Multi-position 3	0~65535	0
✓	04-18	Multi-position 4	0~65535	0
✓	04-19	Multi-position 5	0~65535	0
✓	04-20	Multi-position 6	0~65535	0
✓	04-21	Multi-position 7	0~65535	0
✓	04-22	Multi-position 8	0~65535	0
✓	04-23	Multi-position 9	0~65535	0
✓	04-24	Multi-position 10	0~65535	0
✓	04-25	Multi-position 11	0~65535	0
✓	04-26	Multi-position 12	0~65535	0
✓	04-27	Multi-position 13	0~65535	0
✓	04-28	Multi-position 14	0~65535	0
✓	04-29	Multi-position 15	0~65535	0

05 Motor Parameters

	Parameter	Explanation	Settings	Factory Setting
	05-00	Motor Auto Tuning	0: No function 1: Rolling test of induction motor 2: Static test of induction motor	0
	05-01	Full-load Current of Induction Motor 1(A)	40~120% of drive's rated current	###
✓	05-02	Rated Power of Induction Motor 1(kW)	0~655.35kW	###
✓	05-03	Rated Speed of Induction Motor 1 (rpm)	0~65535 1710(60Hz, 4 poles), 1410(50Hz, 4 poles)	1710
	05-04	Pole Number of Induction Motor 1	2~20	4
	05-05	No-load Current of Induction Motor 1 (A)	0~factory setting of Pr.05-01	###
	05-06	Stator Resistance (Rs) of Induction Motor 1	0~65535mΩ	0
	05-07	Rotor Resistance (Rr) of Motor 1	0~65535mΩ	0
	05-08	Magnetizing Inductance (Lm) of Induction Motor 1	0~65535mH	0
	05-09	Stator Inductance (Lx) of Induction Motor 1	0~65535mH	0
	05-10 ~ 05-12	Reserved		
	05-13	Full-load Current of Induction Motor 2 (A)	40~120%	###
✓	05-14	Rated Power of Induction Motor 2 (kW)	0~655.35kW	###
✓	05-15	Rated Speed of Induction Motor 2 (rpm)	0~65535 1710(60Hz, 4 poles), 1410(50Hz, 4 poles)	1710

Parameter	Explanation	Settings	Factory Setting
05-16	Pole Number of Induction Motor 2	2~20	4
05-17	No-load Current of Induction Motor 2 (A)	0~ factory setting of Pr.05-01	###
05-18	Stator Resistance (Rs) of Induction Motor 2	0~65535mΩ	0
05-19	Rotor Resistance (Rr) of Induction Motor 2	0~65535mΩ	0
05-20	Magnetizing Inductance (Lm) of Induction Motor 2	0~65535mH	0
05-21	Stator Inductance (Lx) of Induction Motor 2	0~65535mH	0
✓ 05-22	Induction Motor 1/ 2 Selection	1: Motor 1 2: Motor 2	1
✓ 05-23	Frequency for Y-connection/△-connection Switch of Induction Motor	0.00~600.00Hz	60.00
✓ 05-24	Y-connection/△-connection Switch of Induction Motor	0: Disable 1: Enable	0
✓ 05-25	Delay Time for Y-connection/△-connection Switch of Induction Motor	0.000~60.000sec	0.200
05-26 ~ 05-30	Reserved		
05-31	Accumulative Motor Operation Time (Min)	00~1439	0
05-32	Accumulative Motor Operation Time (day)	00~65535	0

06 Protection Parameters

Parameter	Explanation	Settings	Factory Setting
✓ 06-00	Low Voltage Level	230V: 160.0~220.0Vdc 460V: 320.0~440.0Vdc	180.0 360.0
✓ 06-01	Over-voltage Stall Prevention	0: Disable 230V: 350.0~450.0Vdc 460V: 700.0~900.0Vdc	380.0 760.0
06-02	Reserved		
✓ 06-03	Over-current Stall Prevention during Acceleration	Normal load: 0~160% (100%: drive's rated current) Heavy load: 0~180% (100%: drive's rated current)	120 150
✓ 06-04	Over-current Stall Prevention during Operation	Normal load: 0~160% (100%: drive's rated current) Heavy load: 0~180% (100%: drive's rated current)	120 150
✓ 06-05	Accel./Decel. Time Selection of Stall Prevention at Constant Speed	0: by current accel/decel time 1: by the 1st accel/decel time 2: by the 2nd accel/decel time 3: by the 3rd accel/decel time 4: by the 4th accel/decel time 5: by auto accel/decel time	0
✓ 06-06	Over-torque Detection Selection (OT1)	0: Disable 1: Over-torque detection during constant speed operation, continue to operate after detection 2: Over-torque detection during constant speed operation,	0

Parameter	Explanation	Settings	Factory Setting
		stop operation after detection 3: Over-torque detection during operation, continue to operation after detection 4: Over-torque detection during operation, stop operation after detection	
06-07	Over-torque Detection Level (OT1)	10~250% (100%: drive's rated current)	150
06-08	Over-torque Detection Time (OT1)	0.0~60.0sec	0.1
06-09	Over-torque Detection Selection (OT2)	0: Disable 1: Over-torque detection during constant speed operation, continue to operate after detection 2: Over-torque detection during constant speed operation, stop operation after detection 3: Over-torque detection during operation, continue to operation after detection 4: Over-torque detection during operation, stop operation after detection	0
06-10	Over-torque Detection Level (OT2)	10~250% (100%: drive's rated current)	150
06-11	Over-torque Detection Time (OT2)	0.0~60.0sec	0.1
06-12	Reserved		
06-13	Electronic Thermal Relay Selection (Motor 1)	0: Inverter motor 1: Standard motor 2: Disable	2
06-14	Electronic Thermal Characteristic for Motor 1	30.0~600.0sec	60.0
06-15	Heat Sink Over-heat (OH) Warning	0.0~110.0 °C	85.0
06-16	Stall Prevention Limit Level	0 ~ 100% (refer to Pr.06-03, 06-04)	50
06-17	Present Fault Record	0: No fault	0
06-18	Second Most Recent Fault Record	1: Over-current during acceleration (ocA)	0
06-19	Third Most Recent Fault Record	2: Over-current during deceleration (ocd)	0
06-20	Fourth Most Recent Fault Record	3: Over-current during constant speed(ocn)	0
06-21	Fifth Most Recent Fault Record	4: Ground fault (GFF)	0
06-22	Sixth Most Recent Fault Record	5: IGBT short-circuit (occ)	0
		6: Over-current at stop (ocS)	
		7: Over-voltage during acceleration (ovA)	
		8: Over-voltage during deceleration (ovd)	
		9: Over-voltage during constant speed (ovn)	
		10: Over-voltage at stop (ovS)	
		11: Low-voltage during acceleration (LvA)	
		12: Low-voltage during deceleration (Lvd)	
		13: Low-voltage during constant speed (Lvn)	

Parameter	Explanation	Settings	Factory Setting
		14: Low-voltage at stop (LvS)	
		15: Phase loss (PHL)	
		16: IGBT over-heat (oH1)	
		17: Heat sink over-heat (oH2) (for 40hp above)	
		18: TH1: IGBT hardware failure (tH1o)	
		19: TH2: Heat sink hardware failure (tH2o)	
		20: Reserved	
		21: over-load (oL)(when it exceeds 150% rated current, 1min later it will be overload)	
		22: Electronics thermal relay 1 (EoL1)	
		23: Electronics thermal relay 2 (EoL2)	
		24: Motor PTC overheat (oH3) (PTC)	
		25: Reserved	
		26: Over-torque 1 (ot1)	
		27: Over-torque 2 (ot2)	
		28: Reserved	
		29: Reserved	
		30: Memory write-in error (cF1)	
		31: Memory read-out error (cF2)	
		32: Reserved	
		33: U-phase current detection error (cd1)	
		34: V-phase current detection error (cd2)	
		35: W-phase current detection error (cd3)	
		36: Clamp current detection error (Hd0)	
		37: Over-current detection error (Hd1)	
		38: Over-voltage detection error (Hd2)	
		39: Ground current detection error (Hd3)	
		40: Auto tuning error (AuE)	
		41: PID feedback loss (AFE)	
		42: PG feedback error (PGF1)	
		43: PG feedback loss (PGF2)	
		44: PG feedback stall (PGF3)	
		45: PG slip error (PGF4)	
		46: PG ref loss (PGr1)	
		47: PG ref loss (PGr2)	
		48: Analog current input loss (ACE)	
		49: External fault input (EF)	
		50: Emergency stop (EF1)	

Parameter	Explanation	Settings	Factory Setting
		51: External Base Block (bb)	
		52: Password error (PcodE)	
		53: Software password is locked (ccodE)	
		54: Communication error (cE1)	
		55: Communication error (cE2)	
		56: Communication error (cE3)	
		57: Communication error (cE4)	
		58: Communication Time-out (cE10)	
		59: PU Time-out (cP10)	
		60: Brake transistor error (bF)	
		61: Y-connection/ Δ -connection switch error (ydc)	
		62: Decel. Energy Backup Error (dEb)	
		63: Slip error (oSL)	
		64~65: Reserved	
		73: S1 Power removal safety function error	
		101: CGdE CANopen software loss 1	
		102: CHbE CANopen software loss 2	
		103: CSyE CANopen synchrony error	
		104: CbFE CANopen hardware loss	
		105: CIdE CANopen	
		106: CAde CANopen	
		107: CFrE CANopen	

Parameter	Explanation	Settings	Factory Setting
✓ 06-23	Fault Output Option 1	0~65535(refer to bit table for fault code)	0
✓ 06-24	Fault Output Option 2	0~65535(refer to bit table for fault code)	0
✓ 06-25	Fault Output Option 3	0~65535(refer to bit table for fault code)	0
✓ 06-26	Fault Output Option 4	0~65535(refer to bit table for fault code)	0
✓ 06-27	Electronic Thermal Relay Selection 2 (Motor 2)	0: Inverter motor 1: Standard motor 2: Disable	2
✓ 06-28	Electronic Thermal Characteristic for Motor 2	30.0~600.0sec	60.0
✓ 06-29	PTC Detection Selection	0: Warn and keep operation 1: Warn and ramp to stop 2: Warn and coast to stop	0
✓ 06-30	PTC Level	0.0 ~ 100.0%	50.0
✓ 06-31	Frequency Command	0.00~655.35 Hz	Read

Parameter	Explanation	Settings	Factory Setting
	for Malfunction		only
06-32	Output Frequency at Malfunction	0.00~655.35 Hz	Read only
06-33	Output Voltage at Malfunction	0.0~6553.5 V	Read only
06-34	DC Voltage at Malfunction	0.0~6553.5 V	Read only
06-35	Output Current at Malfunction	0.00~655.35 Amp	Read only
06-36	IGBT Temperature at Malfunction	0.0~6553.5 °C	Read only
06-37	Heat Sink Temperature at Malfunction	0.0~6553.5 °C	Read only
06-38	Motor Speed in rpm at Malfunction	0~65535	Read only
06-39	Torque Command at Malfunction	0~65535	Read only
06-40	Status of Multi-function Input Terminal at Malfunction	0~65535	Read only
06-41	Status of Multi-function Output Terminal at Malfunction	0~65535	Read only
06-42	Drive Status at Malfunction	0~65535	Read only
06-43	Reserved		
06-44	Reserved		
06-45	Treatment of Output Phase Loss (OPL)	0~4	0
06-46	Deceleration Time of Output Phase Loss	0~65535	0
06-47	Current Bandwidth	0~65535	0
06-48	DC Brake Time of Output Phase Loss	0~65535	0
06-49	Level of Output Phase Loss	0~65535	0
06-50	Time of Output Phase Loss	0.00~600.00sec	0.00
06-51	Reserved		
06-52	Ripple of Output Phase Loss	0.0~320.0	0.0
06-53	Treatment of Output Phase Loss (orP)	0: Warn and keep operation 1: Warn and ramp to stop 2: Warn and coast to stop	0
06-54	Reserved		
06-55	Protection for Carrier Wave	0: constant rated current and limit carrier wave by load current and temperature 1: constant carrier frequency and limit load current by setting carrier wave 2: constant rated current(same as setting 0), but close current limit	0
06-63	Operation Time when Malfunction 1 Occurs	0 to 64799 min	Read only
06-64	Operation Time when Malfunction 2 Occurs	0 to 64799 min	Read only
06-65	Operation Time when Malfunction 3 Occurs	0 to 64799 min	Read only

Parameter	Explanation	Settings	Factory Setting
06-66	Operation Time when Malfunction 4 Occurs	0 to 64799 min	Read only
06-67	Operation Time when Malfunction 5 Occurs	0 to 64799 min	Read only
06-68	Operation Time when Malfunction 6 Occurs	0 to 64799 min	Read only

07 Special Parameters

Parameter	Explanation	Settings	Factory Setting
✓ 07-00	Software Brake Level	230V: 350.0~450.0Vdc 460V: 700.0~900.0Vdc	380.0 760.0
✓ 07-01	DC Brake Current Level	0~100%	0
✓ 07-02	DC Brake Time at Start-up	0.0~60.0sec	0.0
✓ 07-03	DC Brake Time at Stop	0.0~60.0sec	0.0
✓ 07-04	Start-point for DC Brake	0.00~600.00Hz	0.00
✓ 07-05	Proportional Gain for DC Brake	1~500	50
✓ 07-06	Momentary Power Loss Operation Selection	0: Operation stop after momentary power loss 1: Operation continues after momentary power loss, speed search starts with the Master Frequency reference value 2: Operation continues after momentary power loss, speed search starts with the minimum frequency	0
✓ 07-07	Maximum Allowable Power Loss Time	0.1~5.0sec	2.0
✓ 07-08	B.B. Time for Speed Search	0.1~5.0sec	0.5
✓ 07-09	Current Limit for Speed Search	20~200%	150
✓ 07-10	Base-block Speed Search	0: Stop operation 1: Speed search starts with last frequency command 2: Speed search starts with minimum output frequency	0
✓ 07-11	Auto Restart after Fault	0~10	0
✓ 07-12	Speed Search during Start-up	0: Disable 1: Speed search from maximum frequency 2: Speed search from start-up frequency 3: Speed search from minimum frequency	0
✓ 07-13	Decel. Time Selection for Momentary Power Loss	0: Disable 1: 1st decel. time 2: 2nd decel. time 3: 3rd decel. time 4: 4th decel. time 5: current decel. time 6: Auto decel. time	0
✓ 07-14	DEB Return Time	0.0~25.0sec	0.0
✓ 07-15	Dwell Time at Accel.	0.00 ~ 600.00sec	0.00
✓ 07-16	Dwell Frequency at Accel.	0.00 ~ 600.00Hz	0.00
✓ 07-17	Dwell Time at Decel.	0.00 ~ 600.00sec	0.00
✓ 07-18	Dwell Frequency at Decel.	0.00 ~ 600.00Hz	0.00

Parameter	Explanation	Settings	Factory Setting
07-19	Fan Control	0: Fan always ON 1: 1 minute after AC motor drive stops, fan will be OFF 2: AC motor drive runs and fan ON, AC motor drive stops and fan OFF 3: Fan ON to run when preliminary heat sink temperature (around 60°C) attained. 4: Fan always OFF	0
07-20	Emergency Stop (EF) & Forced Stop Selection	0: Coast stop 1: By deceleration Time 1 2: By deceleration Time 2 3: By deceleration Time 3 4: By deceleration Time 4 5: System Deceleration 6: Automatic Deceleration	0
07-21	Auto Energy-saving Operation	0: Disable 1: Enable	0
07-22	Energy-saving Gain	10 ~ 1000%	100
07-23	Auto Voltage Regulation(AVR) Function	0: Enable AVR 1: Disable AVR 2: Disable AVR when deceleration stop	0
07-24	Filter Time of Torque Command	0.001~10.000sec	0.020
07-25	Filter Time of SVC Slip Compensation	0.001~10.000sec	0.100
07-26	SVC Torque Compensation Gain	0~10	0
07-27	SVC Slip Compensation Gain	0.00~10.00	0.00
07-28	Reserved		
07-29	Slip Deviation Level	0.0~100.0%	0
07-30	Detection Time of Slip Deviation	0.0~10.0sec	1.0
07-31	Over Slip Treatment	0: Warn and keep operation 1: Warn and ramp to stop 2: Warn and coast to stop	0
07-32	Hunting Gain	0~10000	2000
07-33	Time for Restart after Fault	00~60000sec	600

08 High-function PID Parameters

Parameter	Explanation	Settings	Factory Setting
08-00	Input Terminal for PID Feedback	0: No function 1: Negative PID feedback: input from external terminal AVI (Pr.03-00) 2: Negative PID feedback from PG card (Pr.10-15, skip direction) 3: Negative PID feedback from PG card (Pr.10-15) 4: Positive PID feedback from external terminal AVI (Pr.03-00) 5: Positive PID feedback from PG card (Pr.10-15, skip direction) 6: Positive PID feedback from PG card (Pr.10-15)	380.0 760.0

	Parameter	Explanation	Settings	Factory Setting
✓	08-01	Proportional Gain (P)	0.0~500.0%	80.0
✓	08-02	Integral Time (I)	0.00~100.00sec	1.00
✓	08-03	Derivative Control (D)	0.00~1.00sec	0.00
✓	08-04	Upper Limit for Integral Control	0.0~100.0%	100.0
✓	08-05	PID Output Frequency Limit	0.0~110.0%	100.0
	08-06	Reserved		
✓	08-07	PID Delay Time	0.0~2.5sec	0.0
✓	08-08	Feedback Signal Detection Time	0.0~3600.0sec	0.0
✓	08-09	Feedback Fault Treatment	0: Warn and keep operation 1: Warn and ramp to stop 2: Warn and coast to stop 3: Warn and keep at last frequency	0
✓	08-10	Sleep Frequency	0.00 ~ 600.00Hz	0.00
✓	08-11	Wake-up Frequency	0.00 ~ 600.00Hz	0.00
✓	08-12	Sleep Time	0.0 ~ 6000.0sec	0.0
✓	08-13	PID Deviation Level	1.0 ~ 50.0%	10.0
✓	08-14	PID Deviation Time	0.1~300.0sec	5.0
✓	08-15	Filter Time for PID Feedback	0.1~300.0sec	5.0
✓	08-16	PID Compensation Selection	0: Parameter setting 1: Analog input	0
✓	08-17	PID Compensation	-100.0~+100.0%	0
	08-18	Reserved		
	08-19	Reserved		
	08-20	Selection of PID Mode	0: Old PID mode 1: New PID mode	0
	08-21	Change Operation Direction by PID	0: Disable 1: Enable	0

09 Communication Parameters

	Parameter	Explanation	Settings	Factory Setting
✓	09-00	Communication Address	1~254	1
✓	09-01	COM1 Transmission Speed	4.8 ~ 115.2kbps	9.6
✓	09-02	COM1 Transmission Fault Treatment	0: Warn and keep operation 1: Warn and ramp to stop 2: Warn and coast to stop 3: No warning and keep operation	3
✓	09-03	COM1 Time-out Detection	0.0 ~ 100.0sec	0.0
✓	09-04	COM1 Communication Protocol	0: 7N1 (ASCII) 1: 7N2 (ASCII) 2: 7E1 (ASCII) 3: 7O1 (ASCII)	1

Parameter	Explanation	Settings	Factory Setting
		4: 7E2 (ASCII) 5: 7O2 (ASCII) 6: 8N1 (ASCII) 7: 8N2 (ASCII) 8: 8E1 (ASCII) 9: 8O1 (ASCII) 10: 8E2 (ASCII) 11: 8O2 (ASCII) 12: 8N1 (RTU) 13: 8N2 (RTU) 14: 8E1 (RTU) 15: 8O1 (RTU) 16: 8E2 (RTU) 17: 8O2 (RTU)	
09-05 ~ 09-08	Reserved		
✓ 09-09	Response Delay Time	0.0~200.0ms	2.0
✓ 09-10	Transmission Master Frequency	0.00~600.00Hz	60.00
✓ 09-11	Block Transfer 1	0~65535	0
✓ 09-12	Block Transfer 2	0~65535	0
✓ 09-13	Block Transfer 3	0~65535	0
✓ 09-14	Block Transfer 4	0~65535	0
✓ 09-15	Block Transfer 5	0~65535	0
✓ 09-16	Block Transfer 6	0~65535	0
✓ 09-17	Block Transfer 7	0~65535	0
✓ 09-18	Block Transfer 8	0~65535	0
✓ 09-19	Block Transfer 9	0~65535	0
✓ 09-20	Block Transfer 10	0~65535	0
✓ 09-21	Block Transfer 11	0~65535	0
✓ 09-22	Block Transfer 12	0~65535	0
✓ 09-23	Block Transfer 13	0~65535	0
✓ 09-24	Block Transfer 14	0~65535	0
✓ 09-25	Block Transfer 15	0~65535	0
✓ 09-26	Block Transfer 16	0~65535	0
09-27 ~ 09-29	Reserved		
09-30	Communication Decode Method	0: 20XX 1: 60XX	0
09-31 ~ 09-34	Reserved		
09-35	PLC Address	1~254	0
09-36	CANopen Slave Address	1~127	0
09-37	CANbus Speed	0: 1M 1: 500k	0

Parameter	Explanation	Settings	Factory Setting
		2: 250k 3: 125k 4: 100k 5: 50k	
09-38	CANbus Frequency Gain	1.00 ~ 2.00	1.00
09-39	CANbus Warning Record	bit 0: CANopen Guarding Time out bit 1: CANopen Heartbeat Time out bit 2: CANopen SYNC Time out bit 3: CANopen SDO Time out bit 4: CANopen SDO buffer overflow bit 5: Can Bus Off bit 6: Error protocol of CANopen	0
09-40	CANopen Decode Method	0: Communication definition of C2000 series 1: CANopen DS402 protocol	1
09-41	CAN Master/Slave	0: Node reset status 1: COM reset status 2: Boot up status 3: Pre-operation status 4: Operation status 5: Stop status	0
09-42	CANopen Control Status	0: Not ready for use status 1: Inhibit start status 2: Ready to switch on status 3: Switched on status 4: Enable operation status 7: Active status of quick stop 13: Active status of error reaction 14: Error status	0
09-43	Reserved		
09-44	Reserved		
09-45	CANopen Selection	0: 20XX 1: 60XX	1
09-42	CAN Master Address	1~127	100
09-47 ~ 09-59	Reserved		
09-60	Identifications for Communication Card	0: No communication card 1: DeviceNet Slave 2: Profibus-DP Slave 3: CANopen Slave 4: Modbus-TCP Slave 5: EtherNet/IP Slave 6~8: Reserved	0
09-61	Firmware Version of Communication Card	Read-only	##
09-62	Production Code	Read-only	##
09-63	Error Code	Read-only	##
09-64 ~ 09-69	Reserved		
09-70	Address of Communication Card	DeviceNet: 0-63 Profibus-DP: 1-125	1
09-71	Setting of DeviceNet Speed (according to Pr.09-72)	Standard DeviceNet: 0: 125Kbps 1: 250Kbps	2

Parameter	Explanation	Settings	Factory Setting
		2: 500Kbps Non standard DeviceNet: (Delta only) 0: 10Kbps 1: 20Kbps 2: 50Kbps 3: 100Kbps 4: 125Kbps 5: 250Kbps 6: 500Kbps 7: 800Kbps 8: 1Mbps	
09-72	Communication Speed Type of DeviceNet	0: Standard DeviceNet speed 1: Non-standard DeviceNet speed	0
09-73	Reserved		
09-74	Reserved		
09-75	IP Configuration of Communication Card	0: Static IP 1: Dynamic IP (DHCP)	0
09-76	IP Address 1 of Communication Card	0~255	0
09-77	IP Address 2 of Communication Card	0~255	0
09-78	IP Address 3 of Communication Card	0~255	0
09-79	IP Address 4 of Communication Card	0~255	0
09-80	Mask Address 1 of Communication Card	0~255	0
09-81	Mask Address 2 of Communication Card	0~255	0
09-82	Mask Address 3 of Communication Card	0~255	0
09-83	Mask Address 4 of Communication Card	0~255	0
09-84	Gateway Address 1 of Communication Card	0~255	0
09-85	Gateway Address 2 of Communication Card	0~255	0
09-86	Gateway Address 3 of Communication Card	0~255	0
09-87	Gateway Address 4 of Communication Card	0~255	0
09-88	Password for Communication Card (Low word)	0~255	0
09-89	Password for Communication Card (High word)	0~255	0
09-90	Reset Communication Card	0: Disable 1: Return to the factory settings	0
09-91	Additional Setting for Communication Card	Bit0: Enable IP filter Bit1: Enable to write internet parameters (1bit). This bit will be changed to 0(disable) when it finishes saving the update of internet parameters. Bit 2: Enable login password (1bit). This bit will be changed to 0(disable) when it finishes saving the update of internet parameters is finished.	0
09-92	Status of	Bit0: Enable password	0

Parameter	Explanation	Settings	Factory Setting
	Communication Card	Bit0=1: it has password for the communication card. Bit0=0: no password for the communication card	

10 Speed Feedback Control Parameters

Parameter	Explanation	Settings	Factory Setting
10-00	Encoder Type Selection	0: No function 1: ABZ 2: Reserved 3: Reserved	0
10-01	Encoder Pulse	1~20000	600
10-02	Encoder Input Type Setting	0: Disable 1: Phase A leads in a forward run command and phase B leads in a reverse run command 2: Phase B leads in a forward run command and phase A leads in a reverse run command 3: Phase A is a pulse input and phase B is a direction input. (low input=reverse direction, high input=forward direction) 4: Phase A is a pulse input and phase B is a direction input. (low input=forward direction, high input=reverse direction) 5: 1-phase input	0
✓ 10-03	Output Setting for Frequency Division (denominator)	1~255	1
✓ 10-04	Electrical Gear A1	1~65535	100
✓ 10-05	Electrical Gear B1	1~65535	100
✓ 10-06	Electrical Gear A2	1~65535	100
✓ 10-07	Electrical Gear B2	1~65535	100
✓ 10-08	Encoder Feedback Fault Treatment	0: Warn and keep operation 1: Warn and ramp to stop 2: Warn and coast to stop	2
✓ 10-09	Detection Time for Encoder Feedback Fault	0.0~10.0sec	1.0
✓ 10-10	Encoder Stall Level	0~120% (0: disable)	115
✓ 10-11	Encoder Stall Detection Time	0.0 ~ 2.0sec	0.1
✓ 10-12	Encoder Stall Error Treatment	0: Warn and keep operation 1: Warn and ramp to stop 2: Warn and coast to stop	2
✓ 10-13	Encoder Slip Range	0~50% (0: disable)	50
✓ 10-14	Encoder Slip Detection Time	0.0 ~ 10.0sec	0.5
✓ 10-15	Encoder Slip Error Treatment	0: Warn and keep operation 1: Warn and ramp to stop 2: Warn and coast to stop	2
✓ 10-16	Pulse Input Type Setting	0: Disable 1: Phase A leads in a forward run command and phase B leads in a reverse run command 2: Phase B leads in a forward run command and phase A leads in a reverse run command 3: Phase A is a pulse input and phase B is a direction input. (low input=reverse direction, high input=forward direction)	0

Parameter	Explanation	Settings	Factory Setting
		4: Phase A is a pulse input and phase B is a direction input. (low input=forward direction, high input=reverse direction)	
✓ 10-17	Electrical Gear A (PG1 of PG card)	1~5000	100
✓ 10-18	Electrical Gear B (PG2 of PG card)	1~5000	100
✓ 10-19	Positioning for Encoder Position	0~65535 pulses	0
✓ 10-20	Range for Encoder Position Attained	0~65535 pulses	10
✓ 10-21	PG2 Filter Time	0~65.535 sec	0.100

11 Advanced Parameters

Parameter	Explanation	Settings	Factory Setting
✓ 11-00	System Control	bit 0: Auto tuning for ASR and APR bit 1: Inertia estimate (only for FOC PG mode) bit 2: Zero servo bit 3: Reserved	0
✓ 11-01	Per Unit of System Inertia	1~65535 (256=1PU)	400
✓ 11-02	ASR1/ASR2 Switch Frequency	0.00~600.00Hz (0: disable)	7.00
✓ 11-03	ASR1 Low-speed Bandwidth	0~40Hz	10
✓ 11-04	ASR2 High-speed Bandwidth	0~40Hz	10
✓ 11-05	Zero-speed Bandwidth	0~40Hz	10
✓ 11-06	ASR (Auto Speed Regulation) Control (P) 1	0~40Hz	10
✓ 11-07	ASR (Auto Speed Regulation) Control (I) 1	0.000~10.000sec	0.100
✓ 11-08	ASR (Auto Speed Regulation) Control (P) 2	0~40Hz	10
✓ 11-09	ASR (Auto Speed Regulation) Control (I) 2	0.000~10.000sec	0.100
✓ 11-10	P Gain of Zero Speed	0~40Hz	10
✓ 11-11	I Gain of Zero Speed	0.000~10.000sec	0.100
✓ 11-12	Gain for ASR Speed Feed Forward	0~100%	0
✓ 11-13	PDFF Gain	0~200	30
✓ 11-14	Low-pass Filter Time of ASR Output	0.000~0.350sec	0.008
✓ 11-15	Notch Filter Depth	0~20db	0
✓ 11-16	Notch Filter Frequency	0.00~200.00Hz	0.0
✓ 11-17	Forward Motor Torque Limit	0~500%	200
✓ 11-18	Forward Regenerative Torque Limit	0~500%	200

	Parameter	Explanation	Settings	Factory Setting
✓	11-19	Reverse Motor Torque Limit	0~500%	200
✓	11-20	Reverse Regenerative Torque Limit	0~500%	200
✓	11-21	Gain Value of Flux Weakening Curve for Motor 1	0~200%	90
✓	11-22	Gain Value of Flux Weakening Curve for Motor 2	0~200%	90
✓	11-23	Speed Response of Flux Weakening Area	0~150%	65
✓	11-24	APR Gain	0.00~40.00Hz	10.00
✓	11-25	Gain Value of APR Feed Forward	0~100	30
✓	11-26	APR Curve Time	0.00~655.35 sec	3.00
✓	11-27	Max. Torque Command	0~500%	100
✓	11-28	Source of Torque Offset	0: Digital keypad 1: RS-485 communication (Pr.11-29) 2: Analog input (Pr.03-00)	0
✓	11-29	Torque Offset Setting	0~100%	0.0
✓	11-30	High Torque Offset	0~100%	30.0
✓	11-31	Middle Torque Offset	0~100%	20.0
✓	11-32	Low Torque Offset	0~100%	10.0
✓	11-33	Source of Torque Command	0: Digital keypad 1: RS-485 communication (Pr.11-34) 2: Analog input (Pr.03-00) 3: CANopen 4: Reserved 5: Communication card	0
✓	11-34	Torque Command	-100.0~+100.0% (Pr.11-27=100%)	0
✓	11-35	Low-pass Filter Time of Torque Command	0.000~1.000sec	0.000
✓	11-36	Speed Limit Selection	0: Pr.11-37~11-38 1: By frequency command (Pr.00-20)	0
✓	11-37	Forward Speed Limit (torque mode)	0~120%	10
✓	11-38	Reverse Speed Limit (torque mode)	0~120%	10
	11-39	Reserved		
	11-40	Reserved		