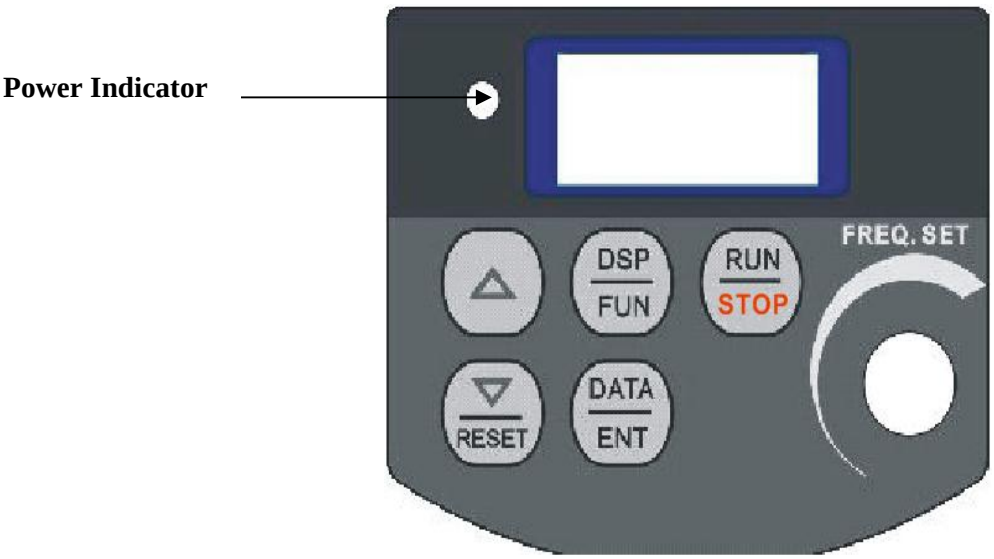
Quick Start Guide

This guide is to assist in installing and running the inverter to verify that the drive and motor are working properly. Starting, stopping and speed control will be from the keypad. If your application requires external control or special system programming, consult the 7300EV Instruction Manual supplied with your inverter.

Step 1 Before starting the inverter

Please refer to chapter one (Preface) and chapter two (Safety Precautions) of the 7300EV Instruction Manual. Verify drive was installed in accordance with the procedures as described in chapter three (Environment description and installation). If you feel this was abnormal, do not start the drive until qualified personnel have corrected the situation. (Failure to do so could result in serious injury.)

- **Check inverter and motor nameplates to determine that they have the same HP and voltage ratings. (Ensure that full load motor amps do not exceed that of the inverter.)**
- **Remove the terminal cover to expose the motor and power terminals.**
  - **a. Verify that AC power is wired to L1(L), L2, and L3(N) .**
  - **b. Verify that Motor leads are connected to T1, T2, and T3 .**
  - **c. IF brake module is necessary, please connect terminal voltage of the braking unit to + and - of the inverter.**



Step2 Apply power to the drive.

Apply AC power to the drive and observe operator. Three 7-segment display should show power voltage for 3~5 seconds and then show Frequency Command, factory sets 5.00. (Frequency Command of 7-segment display should be flashed all the time.)

Step3 Check motor rotation without load.

- **Press RUN Key. 7-segment Display will indicates 00.0to 05.0. Such value is the frequency output value.**
- **Check the operation direction of the motor.**
  IF the direction of the motor is incorrect:
  Press STOP Key, turn off the AC power supply. After Power indicator LED is off, change over theT1 and T2.
  Supply the power again, then check the motor direction.
- **Press STOP key.**

Step4 Check full speed at 50Hz/60Hz

- **Change the frequency with ⮝,⮟ arrow mark , please press DATA/ENTER after setting frequency.**
- **Set frequency to 50Hz/60Hz according to the above regulations.**
- **Press RUN Key, inspect the motor operation as motor accelerates to full load.**
- **Press STOP Key, inspect the motor operation as motor deceleration.**

Step5 Other settings

As for other function, please refer to 7300EV user manual.
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Set control mode (Vector, V/F) ……P. 4-26

Step6 vector Mode Settings

When the EV inverter is set to run in Vector Mode (C14=000), the motor parameters needs to be set. The required in formation should be readily available on the nameplate of the motor. (Motor kw=0.75 × HP)
The parameters to set for vector operation ave:
Motor Rated Current (Amps) (F43) See page 4-23
Motor Rated Voltage (Volts) (F44) See page 4-23
Motor Rated Frequency (Hz) (F45) See page 4-23
Motor Rated Power (KW) (F46) See page 4-23
Motor Rated Speed (RPM) (F47) See page 4-23
Additional Vector Mode Settings to adjust for optimum operations are:
Torque boost gain (F48) See page 4-23
Slip compensation gain (F49) See page 4-24
Low Frequency Voltage Compensation (F50) See page 4-25

7300EV user manual

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Preface

Preface

To extend the performance of the product and ensure personnel safety, read this manual thoroughly before using the inverter. Should there be any problem in using the product that can not be solved with the information provided in the manual, contact your nearest TECO distributor or sales representative who will be willing to help you.

※Precautions

The inverter is an electrical product. For your safety, there are symbols such as “Danger”, “Caution” in this manual as a reminder to pay attention to safety instructions on carrying, installing, operating, and checking the inverter. Be sure to follow the instructions for highest safety.

Danger	Indicates a potential hazard that causes death or serious personal injury if misused
Caution	Indicates that the inverter or the mechanical system might be damaged if misused

Danger

- Risk of electric shock. The DC link capacitors remain charged for five minutes after power has been removed. It is not permissible to open the equipment until 5 minutes after the power has been removed.
- Do not connect any wires when the inverter is powered. Do not check parts and signals on circuit boards when the inverter is in operation.
- Do not disassemble the inverter nor modify any internal wires, circuits, or parts.
- Ground the ground terminal of the inverter properly, for 200V class ground to 100 Ω or below, 400v class ground to 10Ω or below.

Caution

- Do not perform a voltage test on parts inside the inverter. High voltage can destroy these semiconductor parts.
- Do not connect T1 (U), T2 (V), and T3 (W) terminals of the inverter to any AC input power source.
- CMOS ICs on the inverter’s main board are sensitive to static electricity. Do not touch the main board.

Product Inspection

TECO’s inverters have all passed the function test before delivery. Please check the following when you receive and unpack the inverter:

- The model and capacity of the inverter is the same as those specified on your order.
- Is there any damage caused by transportation. If so, do not apply the power.

Contact TECO’s sales representatives if any of the above problems happened.

Chapter 1 Safety Precautions

1.1 Operation Precautions

1.1.1 Before Power Up

Danger

Make sure the main circuit connections are correct. L1(L), L2, and L3(N) are power-input terminals and must not be confused with T1, T2 and T3. Otherwise, inverter damage can result.

Caution

- The line voltage applied must comply with the inverter's specified input voltage.(See the nameplate)
- To avoid the front cover from disengaging, or other damge do not carry the inverter by its covers. Support the drive by the heat sink when transpoting. Improper handling can damage the inverter or injure personnel and should be avoided.
- To avoid fire, do not install the inverter on a flammable object. Intall on nonflammable objects such as metal.
- If several inverters are placed in the same control panel, provide heat removal means to maintain the temperature below 50 degree C to avoid overheat or fire.
- When removing or installing the operator, turn the power off first, and follow the instructions in the diagram to avoid operator error or no display caused by bad connections.

Warning

This product complies with IEC 61800-3, with built-in Filter in an unrestricted distribution and with use of external filter in restricted distribution. Under some environments with electric-magnetic interruption, product should be tested before used.

Caution

- Work on the device/system by unqualified personnel or failure to comply with warnings cam result in severe personal injury or serious damage to material. Only suitably qualified personnel trained in the setup, installation, commissioning and operation of the product should carry out work on the device/system.
- Only permanently-wired input power connections are allowed.

1.1.2 During Power up

Danger

- The inverter still has control power immediately after power loss. When the power is re-supplied, the inverter operation is controlled by F41.
- The inverter operation is controlled by F04 and C09 and the status of (FWD/REV RUN switch) when power is re-supplied. (F39 /F40) Power loss ride through / Auto reset after fault).

1. When F04=000, the inverter will not auto restart when power is re-supplied.
2. When F04=001 and operation switches (FWD/REV RUN) is OFF, the inverter will not auto restart when power is re-supplied.
3. When F04=001and operation switch ON and C09=000, the inverter will auto restart when power is re-supplied. Please turn OFF the run (start) switch to avoid damage to machine and injury to personnel before the power is re-supplied.

- When C09=000 (direct start on power up), please refer to the description and warning for C09 (Page 4-27) to verify the safety of operator and machine.

1.1.3 Before operation

Caution

Make sure the model and inverter capacity match the F00 setting (Page 4-12).

Warning

Warning! EV series built in Filter type leakage current can exceed the IEC standard limit of 3.5mA. Please ground the inverter as shown in figures 3.5 and 3.6.

Operation with ungrounded supplies:

1. Filtered inverters **CANNOT** be used on ungrounded supplies.
2. Unfiltered inverters can be used on ungrounded supplies. If any output phase is shorted to ground, the inverter may trip with OC.(over current trip)

Operation with Residual Current Device(RCD):

1. A filtered inverter with the trip limit of the RCD is 300mA
2. The neutral of the supply is grounded, as is the inverter.
3. Only one inverter is supplied from each RCD.

1.1.4 During operation

Danger

Do not connect or disconnect the motor while inverter is operating the motor. The inverter and the disconnect device can sustain damage from high levels of switch-off current transients.

Danger

- To avoid electric shock, do not take the front cover off while power is on.
- The motor will restart automatically after stop when auto-restart function is enabled. In this case, care must be taken while working around the drive and associated equipment .
- The operation of the stop switch is different than that of the emergency stop switch. The stop switch has to be activated to be effective. Emergency stop has to be de-activated to become effective.

Caution

- Do not touch heat-generating components such as heat sinks and brake resistors.
- The inverter can drive the motor from low speed to high speed. Verify the allowable speed ranges of the motor and the associated machinery.
- Note the settings related to the braking unit.
- Do not check signals on circuit PCB while the inverter is running.

Caution

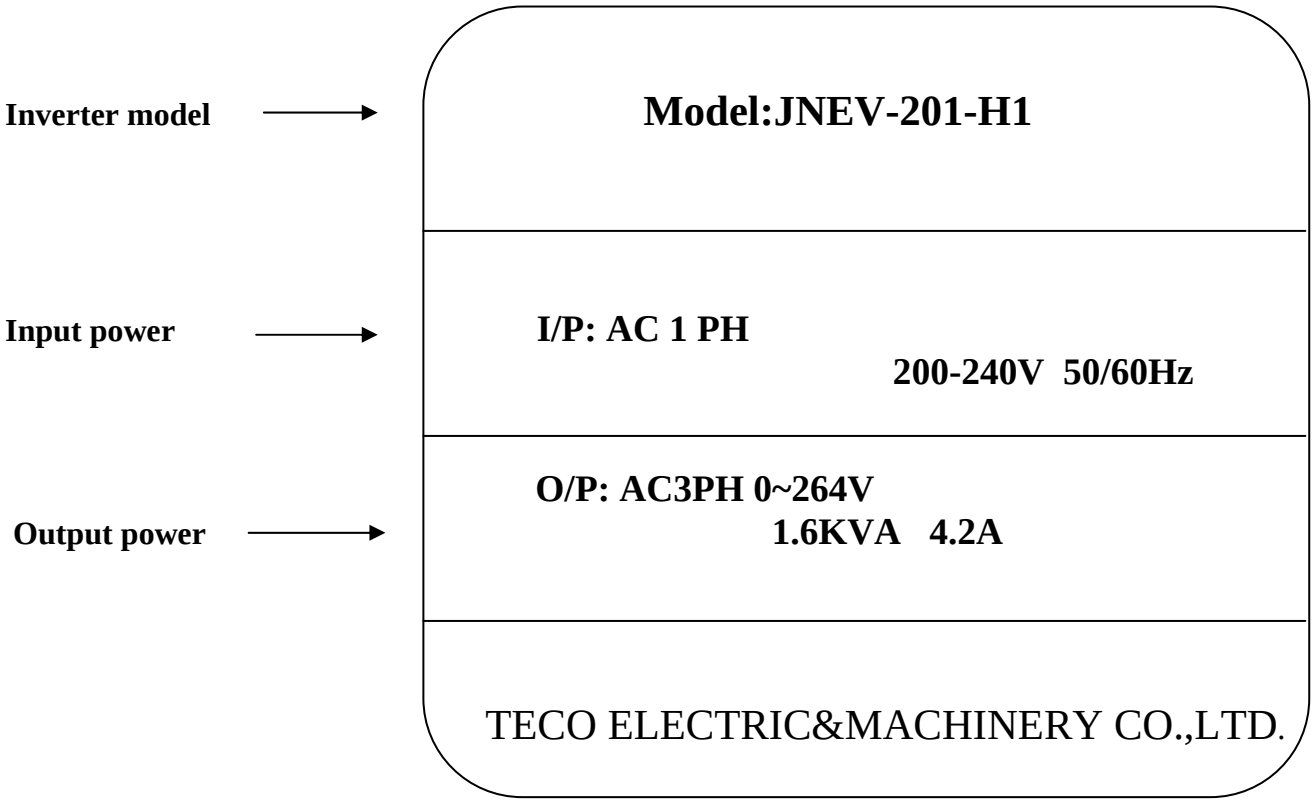
Risk of electric shock. The DC link capacitors remain charged for five minutes after power has been removed. It is not permissible to open the equipment until 5 minutes after the power has been removed.

1.1.5 Useable environment

Caution

When the IP20 inverter top dust cover has been removed the drive can be installed in a non-condensing environment with temperature ranging between –10 degree C to +50 degree C and relative humidity of 95% or less, but the environment should be free from water and metal dust.

Chapter 2 Model description



JNEV	**-**	**2**	**P5**	**-**	**H**	**1**	**F**	**N4S**
Series:		Input voltage :	Max suitable motor capacity:		SPEC	Power supply	Noise filter	Enclosure
		1: 110V	P2: 0.25 HP		H: standard	1:single phase	Blank : none	N4S:IP65 with water and dust proof switch
		2: 230V	P5: 0.5 HP			3:three phase	F: built-in	
		4: 460V	01: 1.0 HP					N4:IP65 without water and dust proof switch
			02: 2.0 HP					
			03: 3.0 HP					Blank: IP20

Chapter 3 Mounting and installation of the JNEV drive

3.1 Environment

The environment will directly affect the proper operation and the life of the inverter, so install the inverter in an environment that complies with the following conditions:

- Ambient temperature: 14~122 deg F (-10 to 50 deg C)
- Avoid exposure to rain or moisture.
- Avoid direct sunlight.
- Avoid smoke and salinity.
- Avoid corrosive liquid and gas.
- Avoid dust, lint fibers, and metal filings.
- Keep away from radio active and flammable materials.
- Avoid electromagnetic interference (soldering machines, power machine).
- Avoid vibration (stamping, punchpress). Add a vibration-proof pad if the situation can not be avoided.
- If several inverters are placed in the same control panel, provide heat remoual means to maintain the temperature below 50 degree C. See figure 3-1 for proper drive arrangment.

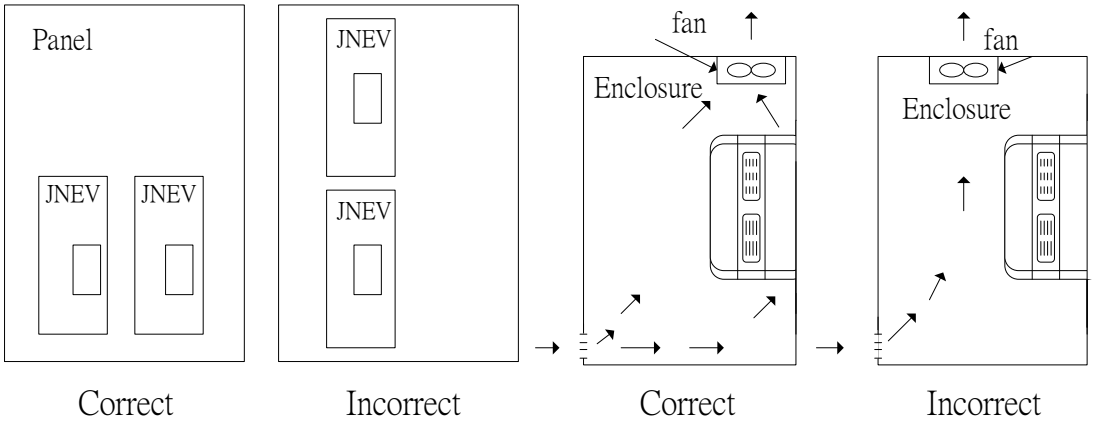


Figure 3-1 Panel and enclosure arrangement for drives

- Place the front side of the inverter outward and the top upward to improve heat dissipation.

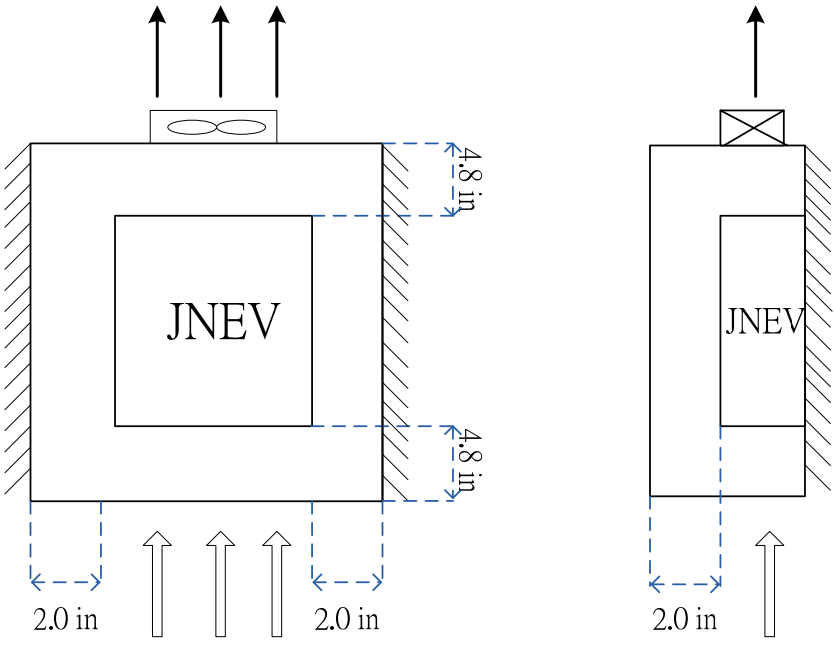


Figure 3-2 Mounting and clearance requirements

● All JNEV drives in IP-20 Enclosures can be DIN-RAIL mounted as shown below.

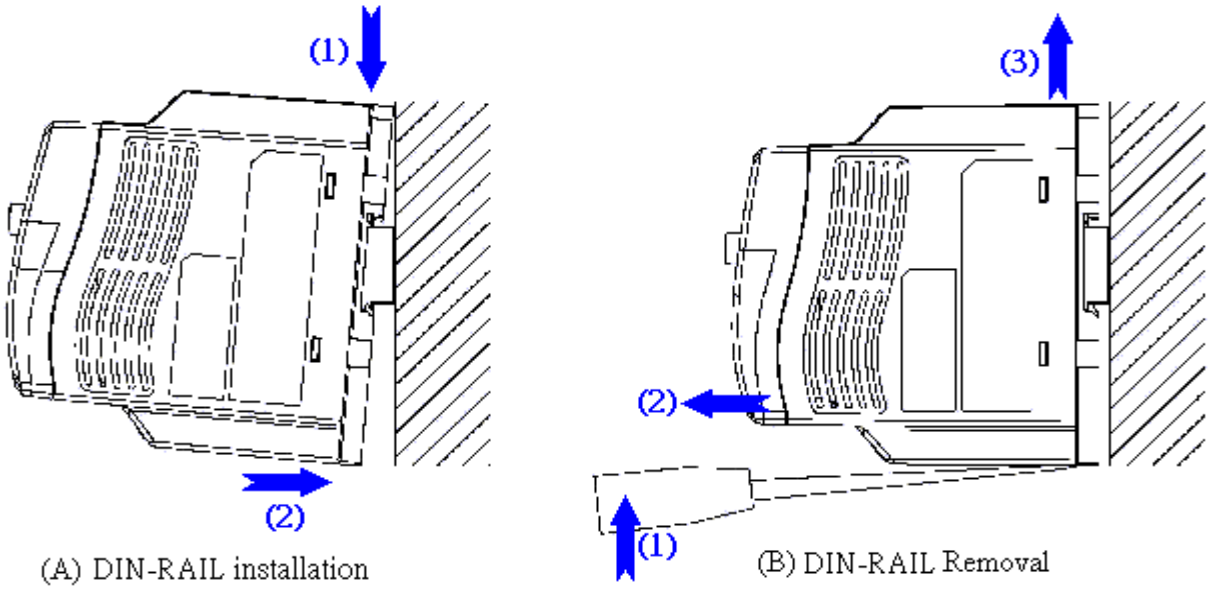


Figure 3-3 Din Rail Mounting of the JNEV Drive

●All JNEV Drives in IP-20 enclosures can be mounted side-by-side as shown below. (ambient temperature below 122 degree F)(50 degree C).

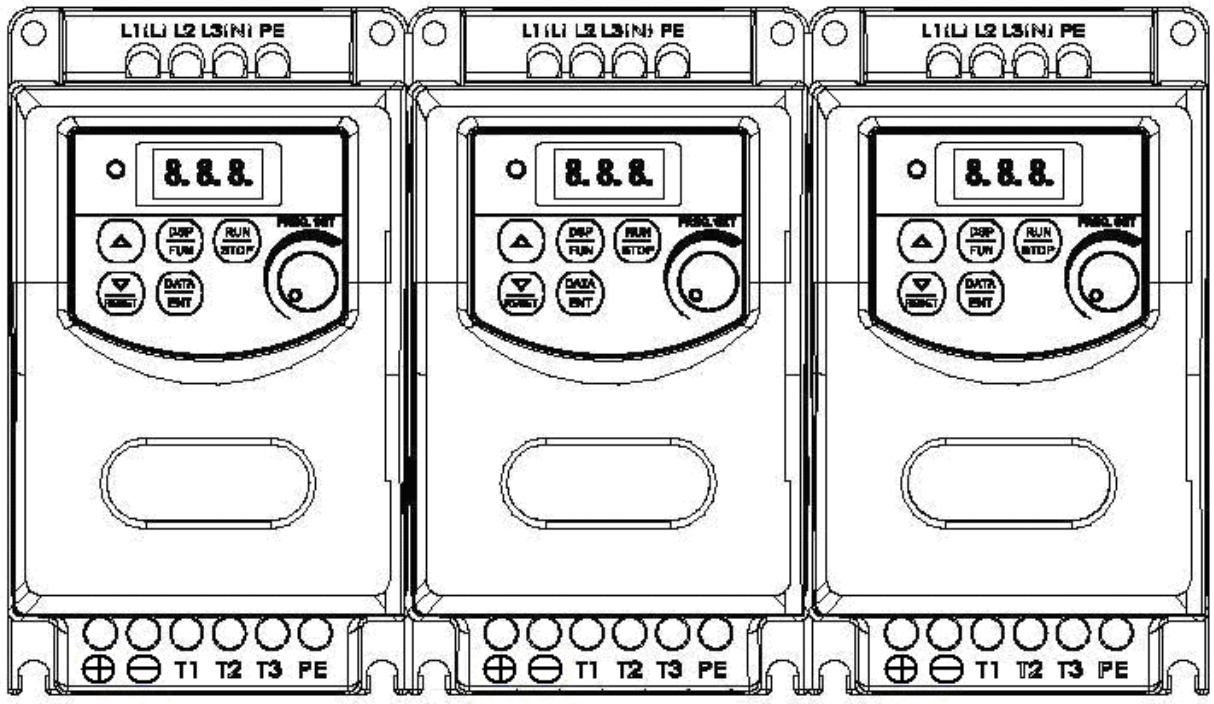
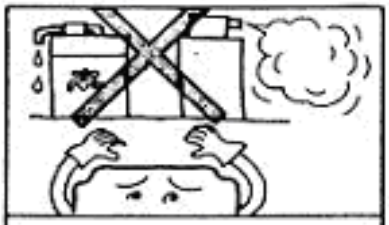


Figure 3-4 Side-by-side Mounting of the JNEV Drive

3.2 Mounting and installation

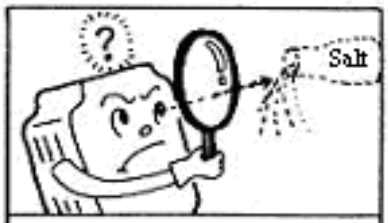
Do not use the inverter in an environment with the following conditions:

Direct sunlight



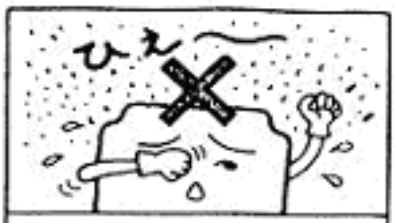
Corrosive gas and liquid

Oil

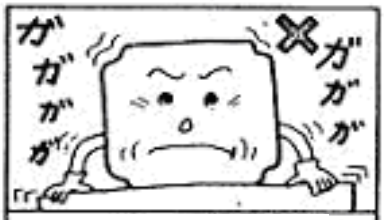


Salt

Wind, rain, and water drops may get into



Iron filings, dust

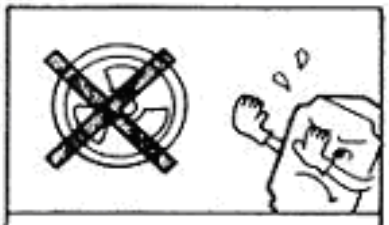


Excessive vibration

Extreme low temperature

Excessive high temperature

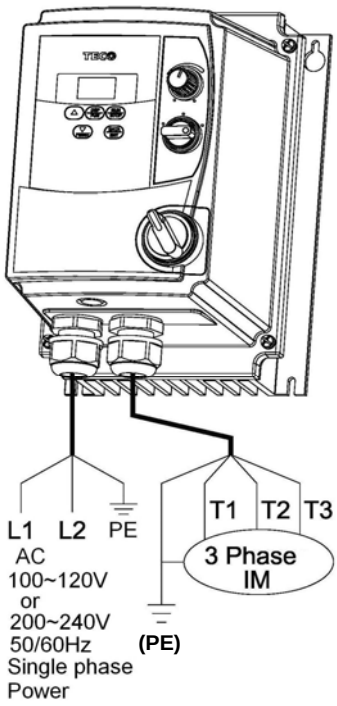
Electromagnetic wave and ultra high wave

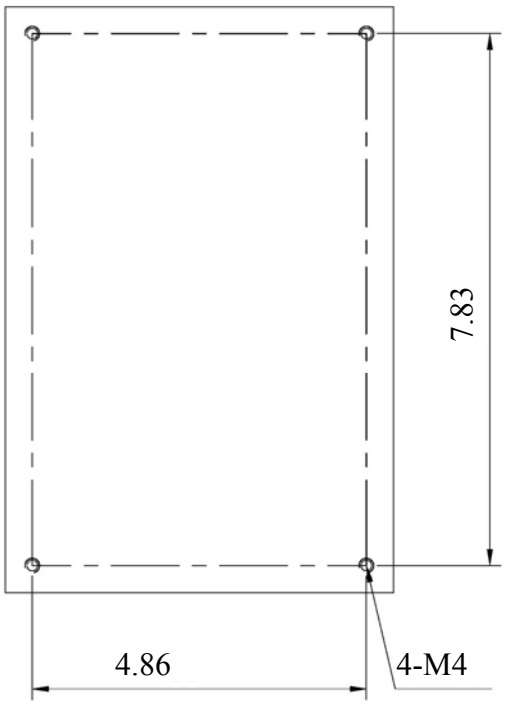


Radioactive materials

Inflammable materials

EV-1P2/1P5/101/2P2/2P5/201- -N4X(IP65)TYPE INSTALLATION :





NOTE :

1. POWER SWITCH , REV-0-FWD SWITCH AND Potentiometer are only for EV-1P2~201- N4S TYPE

2. Power supply cable : #14 AWG (2.0m)

3. Motor cable : #16 AWG (1.25m)

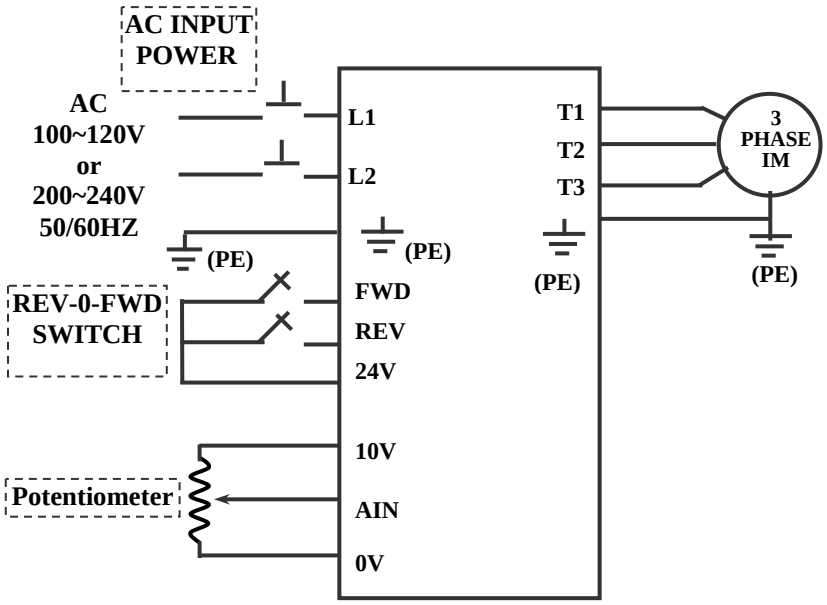
4. Tightening Torque :

(1). Power/Motor cable (plug in) Terminal : 4.34 in-lb

(2). Remote control wire : 3.47 in-lb

(3). Outer Cover (M4) : 5.20 in-lb

Figure 3-5 NEMA4 Mounting Instructions



NOTE:

(1). Input source : single-phase(L1,L2, ⏚(PE)) must be connected to a 100~120 or 200~240 supply.

(2). Output Motor : three-phase(T1,T2,T3,⏚(PE)).

Caution :

- **Do not start or stop the inverter using the main circuit power.**
- **FOR EV-1P2~201- -N4S TYPE : Set REV-0-FWD switch at 0 position so that the inverter has no run signal before power-up. Otherwise, injury may result.**

Figure 3-6 NEMA4 wiring diagram

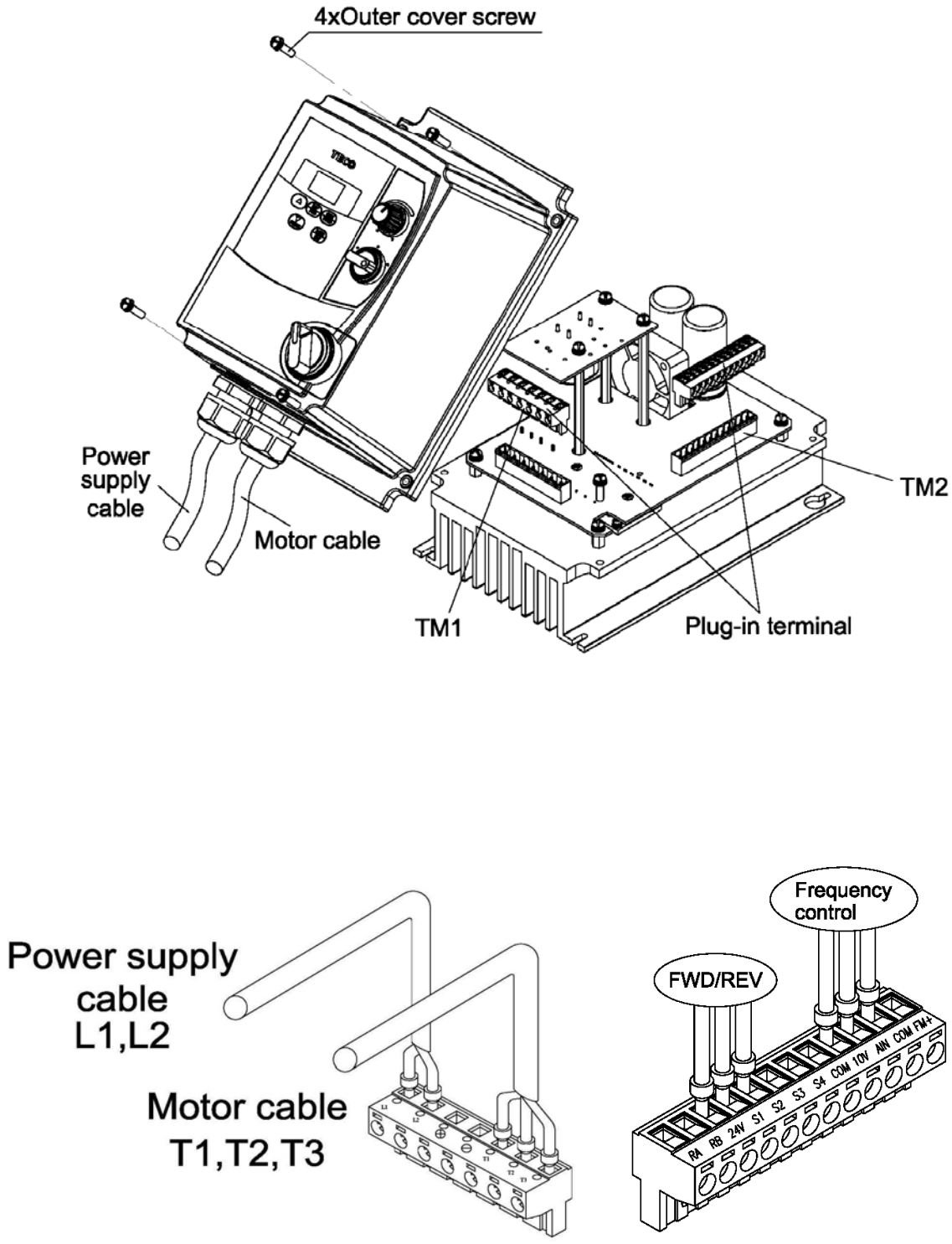


Figure 3-7 M/N XX-YYY-N4S (115V, 230V models) connection diagram

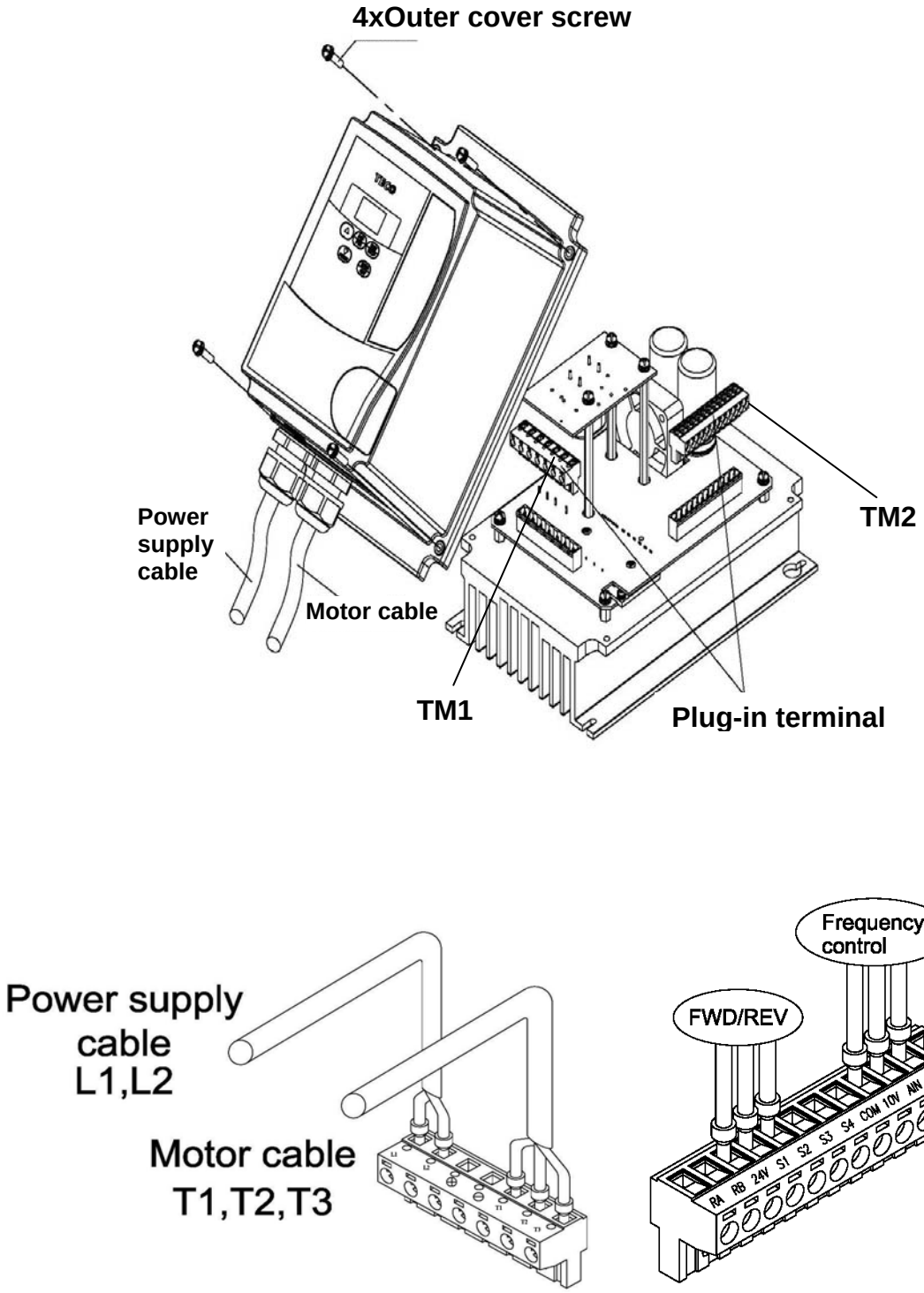


Figure 3-8 M/N XX-YYY-N4 (115V, 230 MODELS) connection diagram

3.3 Wiring Rules

3.3.1 Notice for wiring

A. Tightening torque:

Connect cables with a screwdriver or other suitable tools per the tightening torques listed below.

Securing torque			
Horsepower	Power source	Tightening torque for TM1 terminal	
0.25/0.5/1	100-120V	0.74/0.1 (LBS-FT / KG-M)	8.66/10 (LBS-IN/KG-CM)
0.25/0.5/1	200-240V		
2/3	200-240V	1.286/0.18 (LBS-FT/KG-M)	15.97/18 (LBS-IN/KG-CM)
1/2/3	380-480V		

B. Power wires:

Power wires connect to terminals L1(L), L2, L3 (N), T1, T2, T3, P and N. Select power wire in accordance with the following criteria:

(1) Use wires with copper core only. Insulating materials with diameters should be based on working conditions at 221^{o}F (105 degree C).

(2) The minimum nominal voltage of 240Vac type connectors is 300V, and 480Vac type connector is 600V.

C. Control wire:

Control wire is connected to the TM2 control terminal. Select wire in accordance with the following criteria:

(1) Use copper core only. The insulating materials with diameters should be based on working conditions at 221^{o}F (105 degree C).

(2) To avoid noise interference, do not route the control wiring in the same conduit with power wires and motor wiring.

D. Nominal electrical specifications of the terminal block:

The following are nominal values of TM1:

Horsepower	Power source	Volts	Amps
0.25 / 0.5 / 1	100-120V	600	15
0.25 / 0.5 / 1	200-240V		
2 / 3	200-240V	600	40
1 / 2 / 3	380-480V		

※Note: Nominal values of input and output signals (TM2) – follow the specifications of class 2 wiring.

E. Fuse types

Drive input fuses are provided to disconnect the drive from power in the event that a component fails in the drive's power circuitry. The drive's electronic protection circuitry is designed to clear drive output short circuits and ground faults without blowing the drive input fuses. Below table shows the EV input fuse ratings.

To protect the inverter most effectively, use fuses with current-limit function.

RK5, CC/T type fuse for EV

110V class(1 ϕ)

JNEV-	HP	KW	KVA	100% CONT Output AMPS (A)	Max.RK5 FUSE Rating(A)	Max.CC or T FUSE Rating(A)
1P2-H1	0.25	0.2	0.53	1.7	10	20
1P5-H1	0.5	0.4	0.88	3.1	15	30
101-H1	1	0.75	1.6	4.2	20	40

220V class(1 ϕ)

JNEV-	HP	KW	KVA	100% CONT Output AMPS (A)	Max.RK5 FUSE Rating(A)	Max.CC or T FUSE Rating(A)
2P2-H1	0.25	0.2	0.53	1.7	8	15
2P5-H1	0.5	0.4	0.88	3.1	10	20
201-H1	1	0.75	1.6	4.2	15	30
202-H1	2	1.5	2.9	7.5	20	40
203-H1	3	2.2	4.0	10.5	25	50

220V class(3 ϕ)

JNEV-	HP	KW	KVA	100% CONT Output AMPS (A)	Max.RK5 FUSE Rating(A)	Max.CC or T FUSE Rating(A)
2P2-H3	0.25	0.2	0.53	1.7	5	8
2P5-H3	0.5	0.4	0.88	3.1	8	10
201-H3	1	0.75	1.6	4.2	12	15
202-H3	2	1.5	2.9	7.5	15	20
203-H3	3	2.2	4.0	10.5	20	30

440V class(3 ϕ)

JNEV-	HP	KW	KVA	100% CONT Output AMPS (A)	Max.RK5 FUSE Rating(A)	Max.CC or T FUSE Rating(A)
401-H3	1	0.75	1.7	2.3	6	10
402-H3	2	1.5	2.9	3.8	10	15
403-H3	3	2.2	4.0	5.2	10	20

*Fuse ratings are based upon 300V fuses for 120V inverters, and 300V fuses for 230V inverters, and 500V for 460V inverters

3.3.2 Options and wiring specifications

MCCB/ MC/ Fuse

- Warranty and replacement service does not apply to damage caused by the following conditions.

(1)MCCB or fuse is not installed, improperly installed, or improperly sized, and has resulted in inverter damage.

(2)MC or capacitor or surge absorber is installed between the inverter and the motor.

EV model	JNEV□□□H1(F)/H3				JNEV□□□ H3(F)
	1P2/2P2/1P5/2P5	101/201	202	203	401/402/403
Fuse	10A 300Vac	20A 300Vac	30A 300Vac		15A/600Vac
Main circuit terminal (TM1/TM3) ⊕ ⊖ L1 L2 L3 PE T1 T2 T3 PE	Wire dimension (14AWG)2.0mm^2 Terminal screw M4			Wire dimension (12AWG) 3.5mm^2 Terminal screw M4	Wire dimension (14AWG)2.0mm^2 Terminal screw M4
Signal terminal (TM2) 1~12	Wire dimension (#18AWG)0.75mm^2 Terminal screw M3				

- Use a single fuse for 1φ L/N model. For 3φ models, each L1(L)/L2/L3(N) phase must be fused.
- Please utilize three phase squirrel cage induction motor with appropriate capacity for inverter.
- IF the inverter is used to drive more than one motor, the total capacity must be smaller than the capacity of the AC drive. Additional thermal overload relays must installed in front of each motor.
- Do not install phase advancing capacitors, LC, or RC components between inverter and motor.

3.3.3Precautions for peripheral applications:

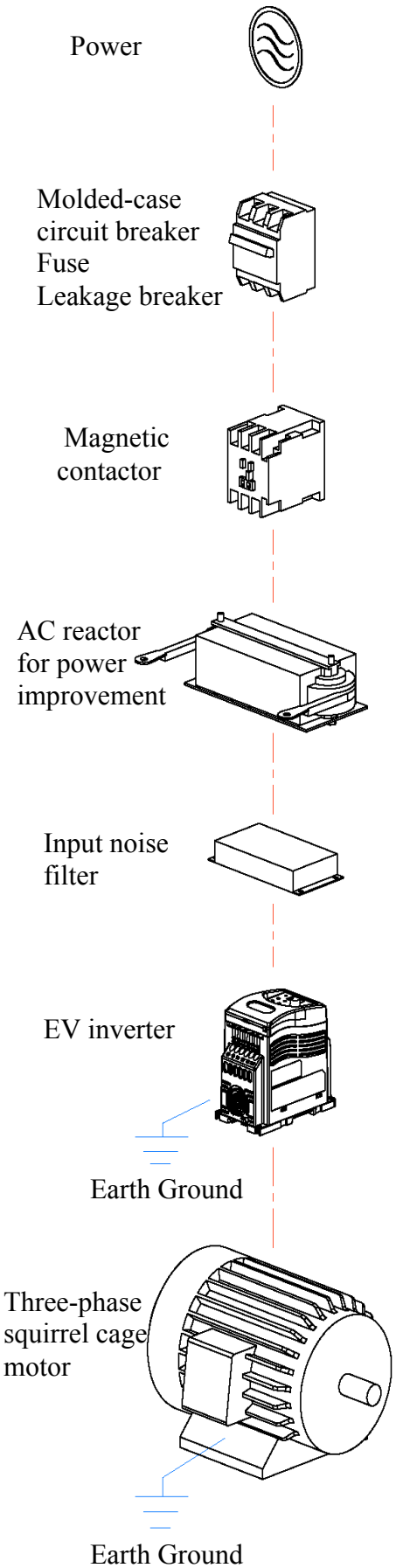


Figure 3-9 Typical installation schematic

Power supply:

●Make sure the correct voltage is applied to avoid damaging the inverter.

●A molded-case circuit breaker or fused disconnect must be installed between the AC source and the inverter.

Molded-case circuit breaker:

●Use a molded-case circuit breaker that conforms to the rated voltage and current of the inverter to control the power and protect the inverter.

●Do not use the circuit breaker as the run/stop switch for the inverter.

Fuse:

●A suitable fuse should be installed with inverter rated voltage and current when a MCCB is not being used.

Earth Leakage circuit breaker:

● Install a leakage breaker to prevent problems caused by current leakage and to protect personnel. Select current range up to 200mA, and action time up to 0.1 second to prevent high frequency failure.

Magnetic contactor:

●Normal operations do not need a magnetic contactor. When performing functions such as external control and auto restart after power failure, or when using a brake controller, install a magnetic contactor.

●Do not use the magnetic contactor as the run/stop switch for the inverter.

AC Line Reactor for power quality:

●When inverters are supplied with high capacity (above 600KVA) power source, a AC reactor can be connected to improve the PF.

Input noise filter:

●A filter must be installed when there are inductive loads affecting the inverter.

Inverter:

●Output terminals T1, T2, and T3 are connected to U, V, and W terminals of the motor. If the motor is reversed while the inverter is set to run forward, just swap any two terminals of T1, T2, and T3.

●To avoid damaging the inverter, do not connect the input terminals T1, T2, and T3 to AC input power.

●Connect the ground terminal properly.(230 V series: Rg <100Ω; 460 V series: Rg <10Ω.)

Make external connections as shown in figure 3-10. Check after wiring to make sure all connections are correct. (Do not use the control circuit buzzer to check connections)

(A) Main circuit must be separated from other high voltage or high current power line to avoid noise interference. Refer to following figures:

● The inverter uses dedicated power line

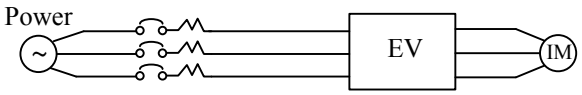
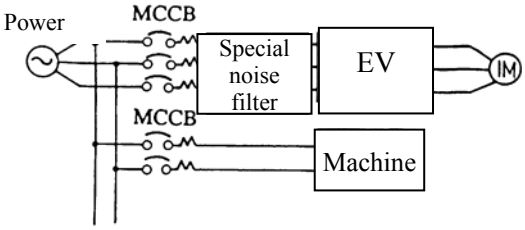
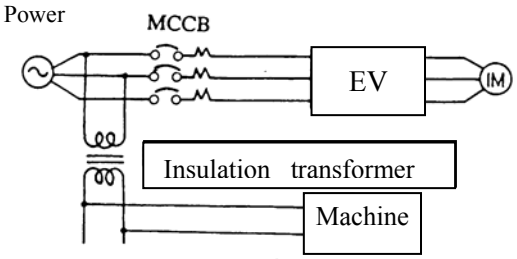


Figure3-10a Installation examples

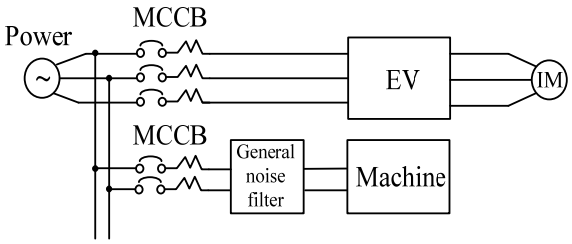
● Please added a noise filter or separation transformer when the inverter shares the power line with other machines.



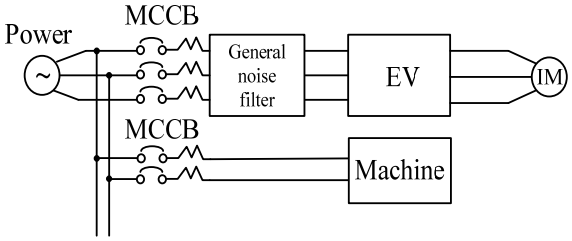


Correct

• A general noise filter may not provide correct results



Incorrect



Incorrect

Figure3-10 b Installation examples using a filter

● A noise filter in the output of the main circuit can suppress conductive noise. To prevent radiative noise, the wires should be put in a ferromagnetic metal pipe and separated from all other signal lines by at least 1ft.

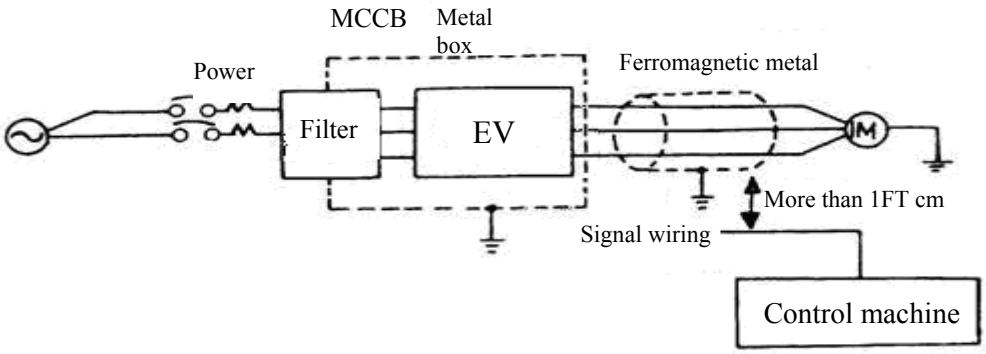
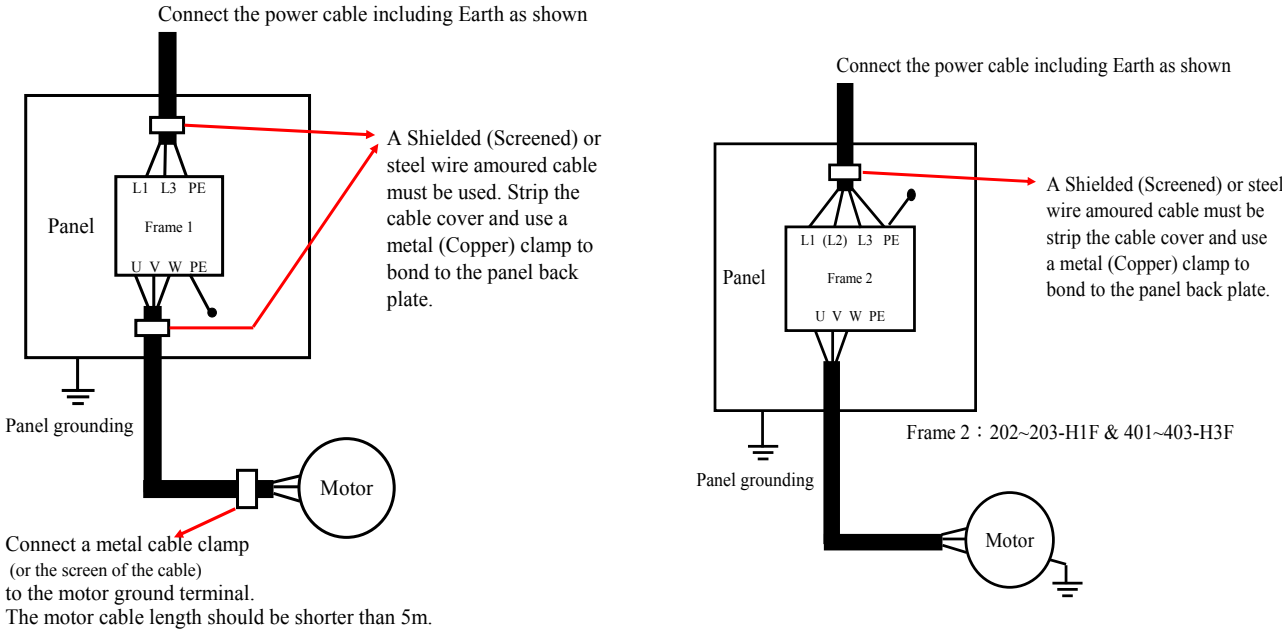


Figure 3-10c Installation examples with adjacent signal conductors

● The power supply and output PE terminals must be connected to ground to increase noise immunity of the built-in Filter.



(A)The control circuit wiring and main circuit wire/ other high voltage/current power wiring should be separated to avoid noise interruption.

● In order to prevent noise interference which could cause inverter faults, the control circuit signal should be shielded and twisted. Please refer to figure 3-12. The wiring distance should be less than 150ft (50m).

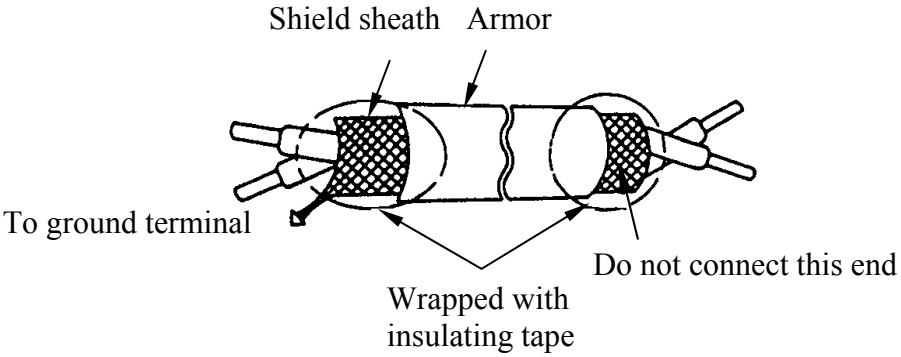


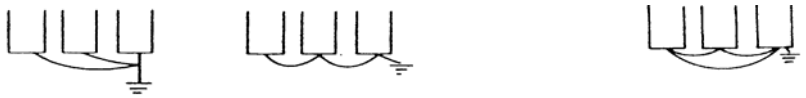
Figure 3-12 Processing the ends of twisted pair cables

(B)Connect ground terminals as follows: (200V class ground <100Ω ; 400V class ground <10Ω .)

● Ground wiring AWG is sized per the electrical equipment specifications and should be made as short as possible.

● Do not share the ground of the inverter with other high current loads (welding machine, high power motor).Connect the terminal to its own ground.

● Do not make a loop when several inverters share a common ground point.



(a) Good **(b) Good** **(c) Bad**

Figure 3-13 Grounding examples: multiple drives

(C) To ensure maximum safety, use correct wire size for the main power circuit and control circuit. (See table in section 3.2.2)

(D) Verify that all wiring is correct, wires are intact, and terminal screws are secured.

- When the connection between the inverter and the motor is too long, consider the voltage drop of the circuit. Phase-to-phase voltage drop (V) = $\sqrt{3}$ ×resistance of wire (Ω/km)×length of line (m)×current×10^{-3}. And the carrier frequency must be adjusted based on the length of the line.

The length of the line between the inverter and the motor	Below 25m	Below 50m	Below 100m	Over100m
Carrier Frequency	Below 16KHz	Below 12KHz	Below 8KHz	Below 5KHz
Settings of F40 parameter	16	12	8	5

3.4 Inverter Specification

3.4.1 Basic specification

Model	120V model			230V model									
	EV-□□□-H1			Single phase EV-□□□-H1(F)					Three phase EV-□□□-H3				
	1P2	1P5	101	2P2	2P5	201	202	203	2P2	2P5	201	202	203
Horsepower (HP)	0.25	0.5	1	0.25	0.5	1	2	3	0.25	0.5	1	2	3
Max.Applicable Motor output.HP*1 (KW)	0.25 (0.2)	0.5 (0.4)	1 (0.75)	0.25 (0.2)	0.5 (0.4)	1 (0.75)	2 (1.5)	3 (2.2)	0.5 (0.2)	0.5 (0.4)	1 (0.75)	2 (1.50)	3 (2.2)
Rated output current (A)	1.7	3.1	4.2	1.7	3.1	4.2	7.5	10.5	1.7	3.1	4.2	7.5	10.5
Rated capacity (KVA)	0.53	0.88	1.60	0.53	0.88	1.60	2.90	4.00	0.53	0.88	1.60	2.90	4.00
Input voltage range(V)	1PH 100~120V+10%, -15%(50/60Hz)			1PH 200~240V+10%, -15%(50/60Hz)					3PH 200~240V+10%, -15%(50/60Hz)				
Output voltage range(V)	3PH 0~240V												
Input current (A)	7.1	12.2	17.9	4.3	5.4	10.4	15.5	21	3.0	4.0	6.4	9.4	12.2
Inverter Weight Lb Inverter with filter weight Kb (KG)	1.37 (0.62)	1.50 (0.68)	1.59 (0.72)	1.43 (0.65) 1.57 (0.71)	1.48 (0.67) 1.71 (0.73)	1.48 (0.67) 1.71 (0.73)	2.20 (1) 2.76 (1.25)	2.31 (1.05) 2.87 (1.3)	1.34 (0.61)	1.34 (0.61)	1.46 (0.66)	2.09 (0.95)	2.20 (1.0)
Maximum momentary power loss time (S)	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0
Enclosure	IP20												

Model	460V model		
	EV-□□□-H3(F)		
	401	402	403
Horse power (HP)	1	2	3
Max.applicable Motor Output HP*1(KW)	1.0(0.75)	2.0(1.50)	3.0(2.2)
Rated output current (A)	2.3	3.8	5.2
Rated capacity (KVA)	1.7	2.9	4.0
Input voltage range(V)	3PH 380~480V+10%,-15%(50/60Hz)		
Output voltage range(V)	3PH 0~480V		
Input current (A)	3	4.8	6.6
Inverter Weight Lb (KG) Inverter with filter Weight Lb (KG)	3.31(1.26) 3.70(1.37)	3.35(1.29) 3.75(1.4)	3.42(1.34) 3.82(1.45)
Maximum momentary power loss time (S)	1.0	1.0	2.0
Enclosure	IP20		

* Based on a 4-Pole Motor

3.4.2 General Specifications

Frequency control	Range	0~200Hz
	Initial Drive	100%/3Hz (Vector mode)
	Speed Control Range	1:20 (Vector mode)
	Speed Control Precision	±0.5%(Vector mode)
	Setting resolution※1	Digital: 0.1Hz(0~99.9Hz)/1Hz(100~200Hz); analog: 0.06Hz/ 60Hz
	Keypad setting	Set directly with▲▼ keys or the VR on the keypad
	Display	7 segment*3 Displays; frequency/DC Voltage/Output Voltage / Current/ inverter parameters/fault log/program version/PID feedback control potentiometer.
	External signal setting	•External / 0(2)-10V/ 0(4)-20mA •Performs up/down controls with multi-functional contacts on the terminal base
	Frequency limit function	Upper/lower frequency limits, and two skip frequencies.
General control	Carrier frequency	4~16KHz (default 10KHz, above 10KHz with De-rating)
	V/F pattern	6 fixed patterns 50Hz/60Hz, 1 programmable
	Acc/dec control	Two-stage acc/dec time (0.1~999s)
	Multi-functional analog output	6 functions (refer to F26 description)
	Multi-functional input	19 functions (refer to F11~F14 description)
	Multi-functional output	16 functions (refer to F21 description)
	DI(digital input)	NPN/PNP alternative : 4 points standard, 2 points option (S1~S4 standard, S5~S6 option)
	DO(digital output)	Relay output *Form A contact ---- set to multi-function output. External multi-function output *option 1 point (open collector transistor 24V, 600mA)
	AI(analog input)	Set speed command and PID feedback signal (speed ,PID 4~20mA /0~10V)
	Other functions	Instantaneous power loss on restart, Speed search, fault restart, DC injection braking, torque boost, 2/3wire control, PID function
	Communication control	•RS485 Option card: Modbus RTU/ASCII mode, 4800~38400 bps, max. 254 stations •PC/PDA software
	Operation temperature	14~122 deg F(-10~50 deg C) IP20, 14~104 deg F(-10~40 deg C) IP65
	Storage temperature	-4~140 deg F(-20~60 deg C)
	Humidity	0 – 95% RH (non condensing)
	Height	Below 1000M
	Vibration immunity	1G(9.8m/s^2)
	EMI/EMS Compatibility	Built-in / external: class A, accordance with EN61800-3 first environment
	LVD	Accordance with EN50178
	Enclosure	IP20
	Safety Class	UL508C

Protective Functions	Over load protection	Inverter rated current 150%/1min
	International conformity	UL/CE
	Over voltage	230V Class: DC voltage >410V 460V Class: DC voltage >820V
	Under voltage	230V Class: DC voltage <190V 460V Class: DC voltage <380V
	Instantaneous power loss restart	Set to enable or disable
	Stall prevention	ACC/DEC/ Operation stall prevention and stall prevention level.
	Output terminal short circuit	Electronic circuit protection
	Other faults	Electronic circuit protection
	Other functions	Over current, over voltage, under voltage, over load, instantaneous power loss restart, ACC/DEC/ Operation stall prevention, output terminal sort circuit, grounding error, reverse limit, directly start as power on and fault reset limit.

※Note: The setting resolution of above 100 Hz is 1Hz when controlled by keypad, and 0.01 Hz when controlled using computer (PC) or programmable controller (PLC).

3.5 EV Wiring diagram

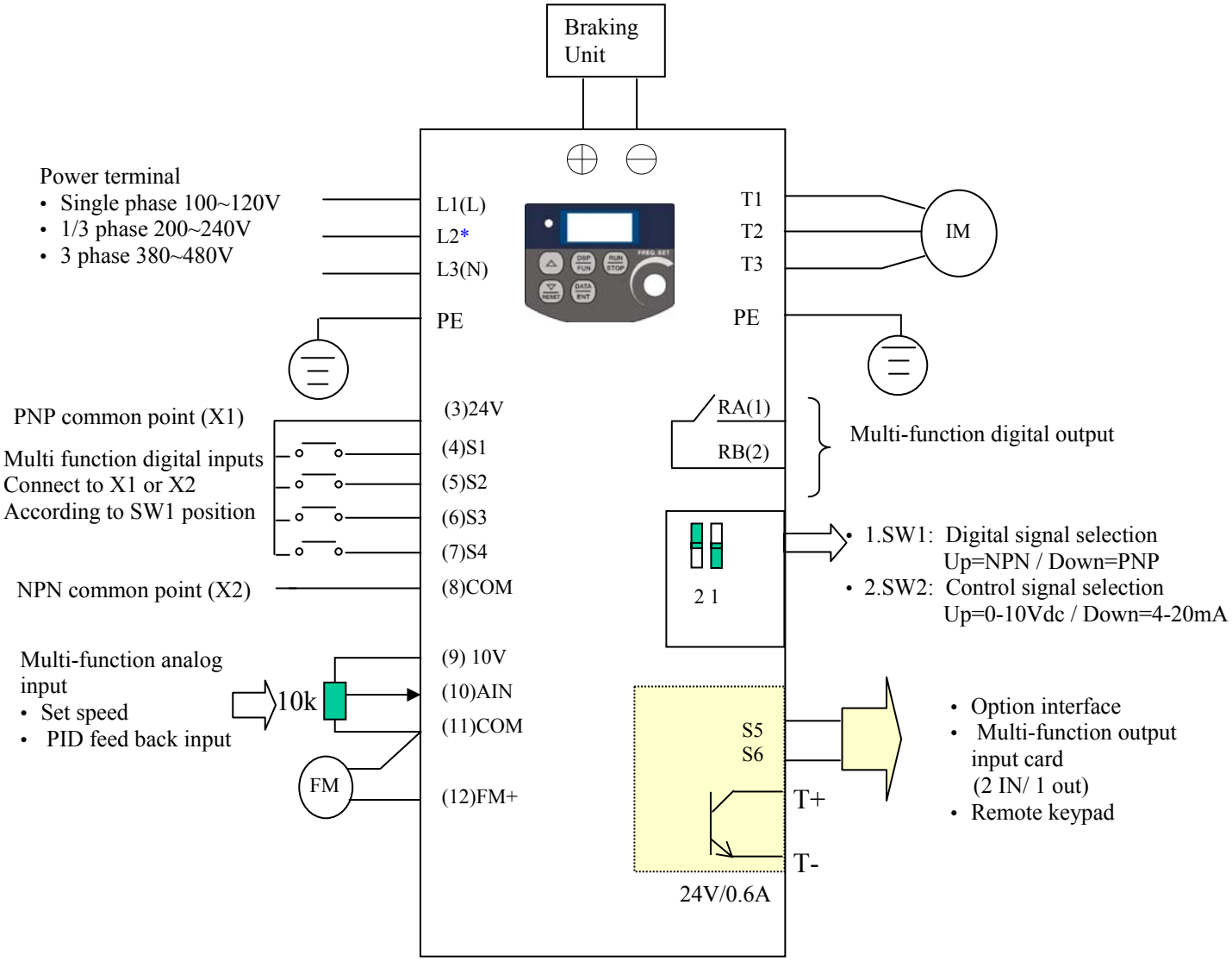
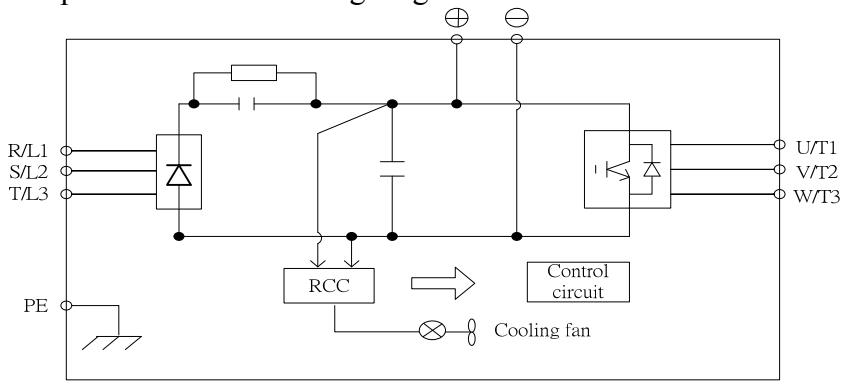


Figure 3-14 Wiring diagram

Note 1:- Connect inputs to Terminal 3 (internal 24vdc) for PNP mode (Positive switching).
Or to terminal 8 (Common) for NPN mode(Negative switching).

Note2:- External 24 Vdc may be used to supply the external contacts at each input
(Connect the 0V of the external supply to Common (terminal 8).)
* L2 is not used for single-phase operation

Example: Main circuit wiring diagram



3.6 Description of Inverter Terminal

Descriptions of power terminals

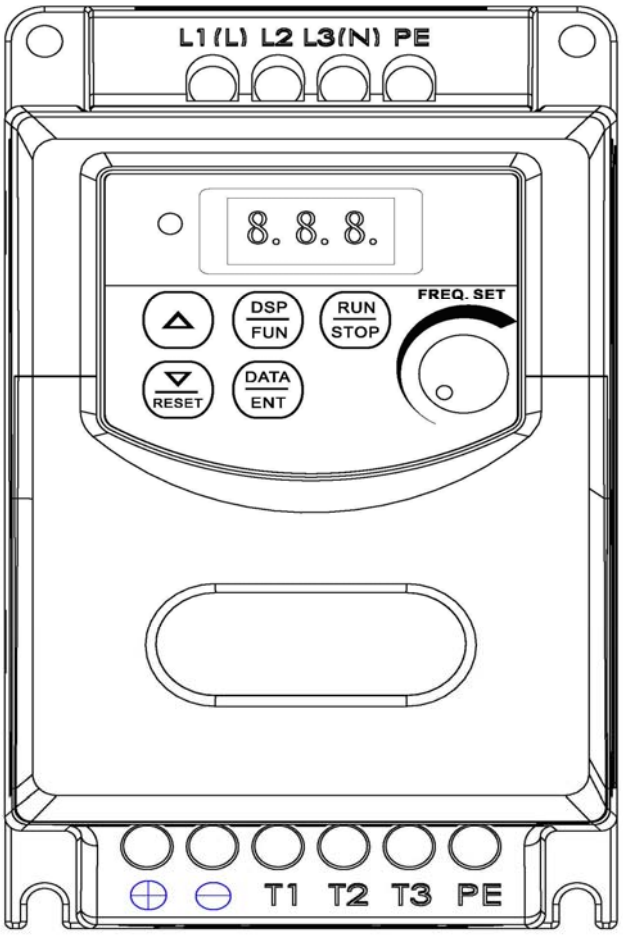


Figure 3-15 Power terminals locations

Symbol	Description
L1 (L)	Main power input Single-phase: L/N* Three-phase: L1/L2/L3
L2	
L3 (N)	
⊕	DC power and braking unit connection terminals. (match with braking units and braking resistor to brake)
⊖	
T1	Inverter output
T2	
T3	
PE	Grounding terminals (2 points)

* Braking units are required for applications where a load with high inertia needs to be stopped rapidly. Use a power-matched braking unit and resistor to dissipate the energy generated by the load while stopping. Otherwise inverter will trip on over voltage.
* Terminal at L2 will be non-functional for single-phase units.

Control signal terminals block description

TM2

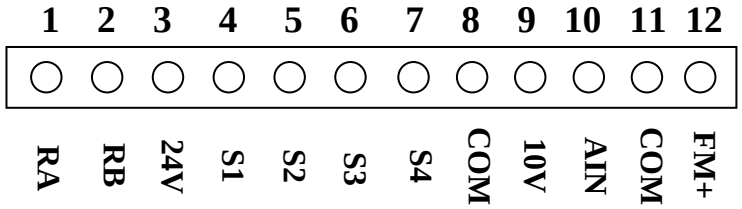
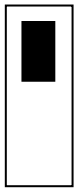


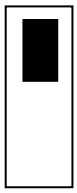
Figure 3-16 Signal terminal locations

Symbol	Description	
RA	Multi-functional output terminal Normally open contact	Rated contact capacity: (250VAC/1A) (30VDC/1A) Contact description: (refer to parameter F21)
RB		
10V	Supply for external potentiometer for speed reference.	
AIN	Analog frequency signal input terminal (high level : 8V/low level: 2V), adaptable to PNP (refer to parameter F15 description)	
24V	PNP (SOURCE) input, S1~S4 (S5/S6) common terminal, (set SW1 to PNP and connect option card power.)	
COM	NPN (SINK) input, S1~S4 (S5/S6) common terminal, (set SW1 to NPN, and analog input, connect option card power, output signal common terminal.)	
FM+	Multi-function analog output + terminal (refer to parameter F26 description), output signal: DC 0-10V.	

Symbol	Description
S1	Multi-function input terminals (refer to parameters F11~F14 description)
S2	
S3	
S4	

SW function description

SW1	Type of external signal	Remarks
	NPN input (SINK)	
	PNP input (SOURCE)	Factory default

SW2	Type of external signal	Remarks
	0~10V DC analog signal	(1) Effective when parameter F05=2 (analog input signal from TM2) (2) Factory setting is voltage input
	4~20mA analog signal	

3.7 Dimension

(1) IP20 Frame1: Single phase: JNEV-1P2~201-H1/H1F
Three phase: JNEV-2P2~201-H3

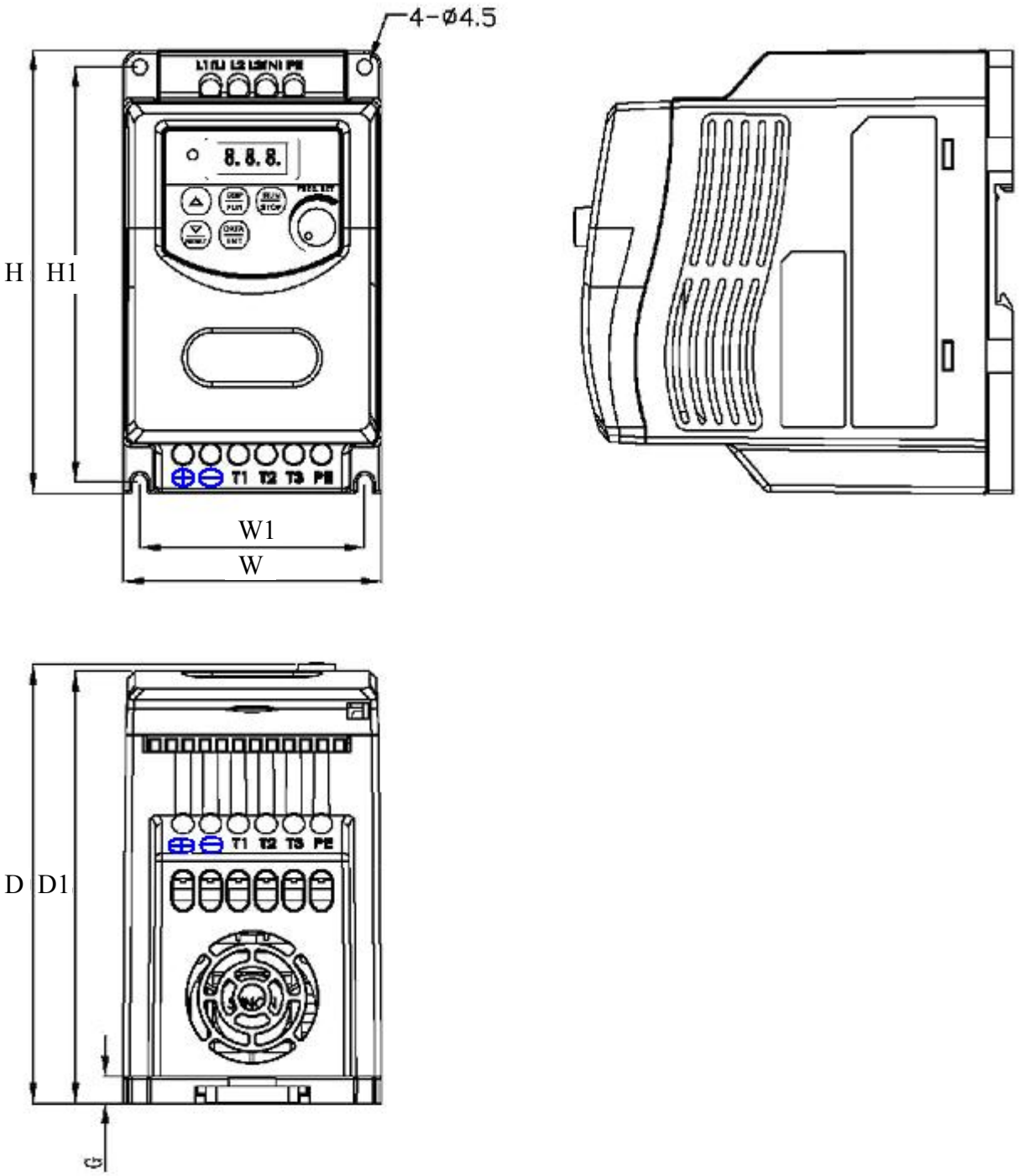


Figure 3-17 EV drive frame1 dimensions

(2) IP20 Frame2: Single phaseJNEV-202~203-H1/H1F
Three phase JNEV-202~203-H3
Three phase JNEV-401~403-H3/H3F

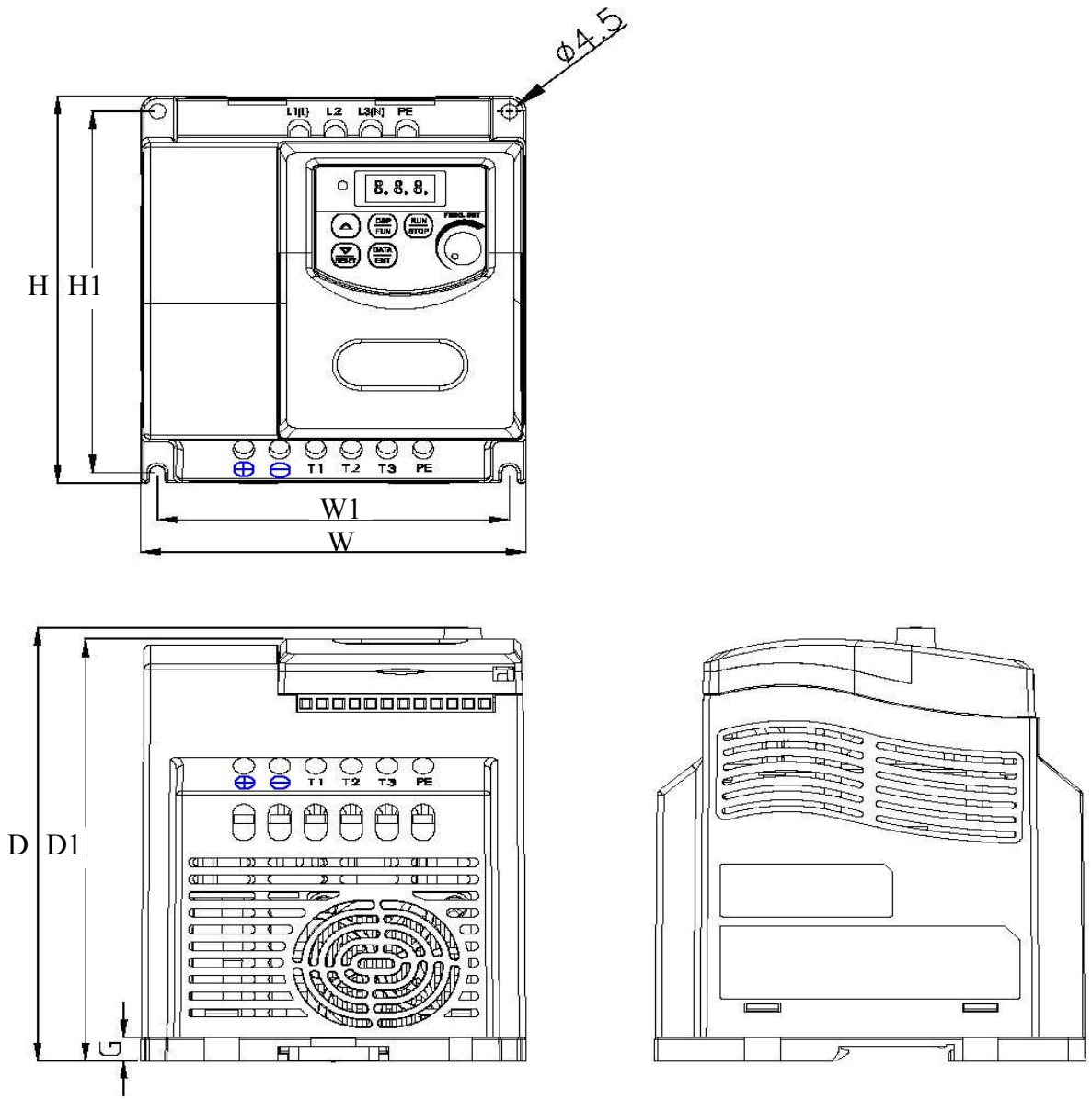


Figure 3-18 EV drive frame2 dimensions

Unit: mm/inch

LENGTH / MODEL	H	H1	W	W1
Frame 1	**132/5.2**	**123.5/4.86**	**77/3.03**	**67/2.64**
Frame 2	**132/5.2**	**123.5/4.86**	**118/4.65**	**108/4.25**
LENGTH / MODEL	**D**	**D1**	**G**	
Frame 1	**130.5/5.13**	**128.45/5.06**	**8/0.315**	
Frame 2	**148/5.83**	**144/5.67**	**8/0.315**	

(3) IP65 Frame1(switch) EV-1P2/1P5/101/2P2/2P5/201-N4S(IP65 type) : Unit: mm

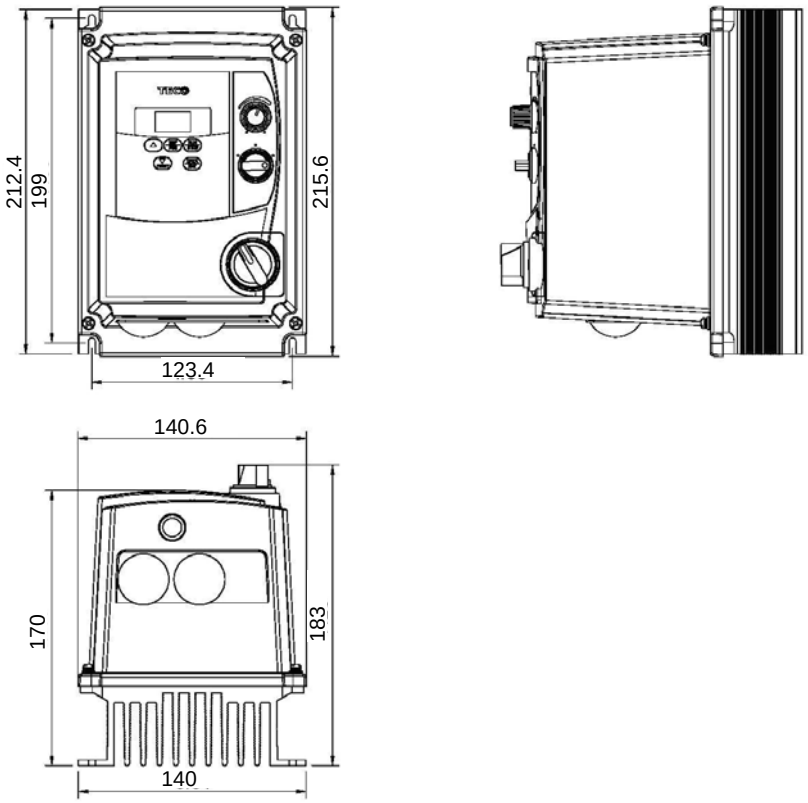


Figure 3-19 EV drive IP65 (switch) frame 1 dimensions

- **IP65 Frame1(no switch) EV-1P2/1P5/101/2P2/2P5/201-N4(IP65 type) : Unit: mm**

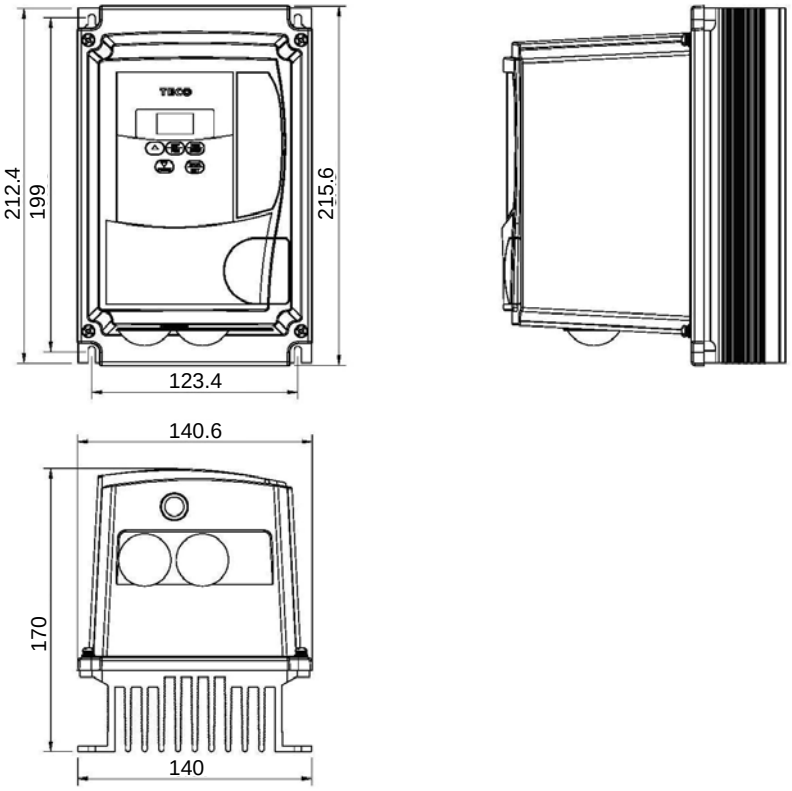


Figure 3-20 EV drive IP65 (no switch) Frame 1 dimensions

3.8 Installation and design consideration

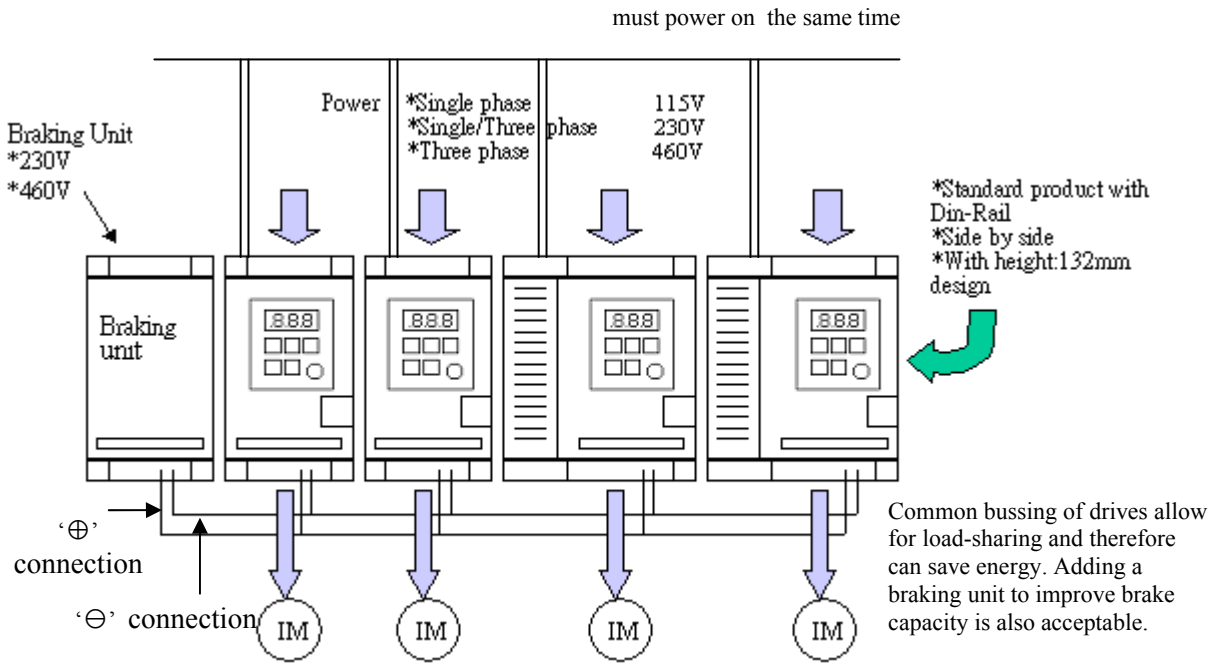
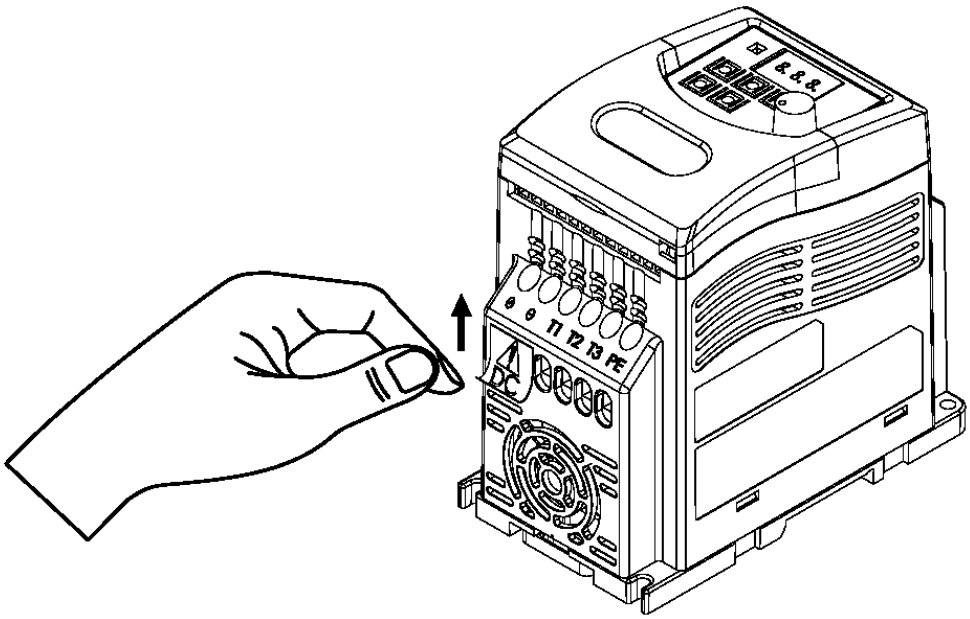


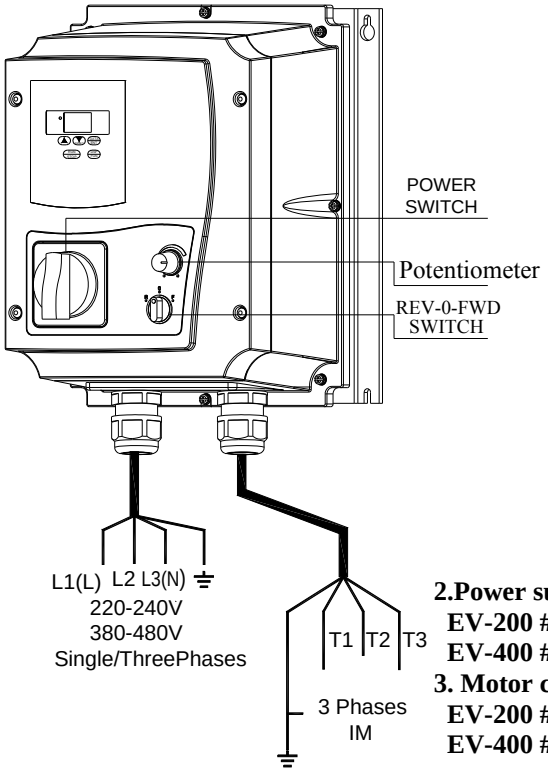
Figure 3-21 Common bus configurations

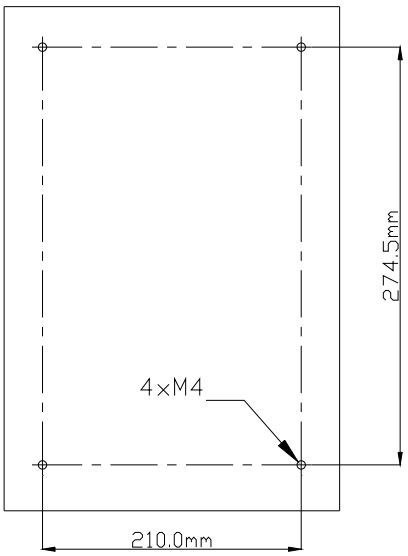
Note 1. Common bus connections from a common input power supply as shown above.
Note 2. When connecting a drive or drives' DC bus connections in parallel with larger. Hp rated drives, use a magnetic contactor with the ⊕&⊖ terminals, otherwise, inverter damage can result.

Note: If ⊕⊖ terminal block be used, please take off the TB label as shown below.



- **EV-202/203/401/402/403—N4X(IP65)TYPE INSTALLATION:**





2.Power supply cable :
EV-200 #12AWG(3.5mm²)
EV-400 #16AWG(1.25mm²)

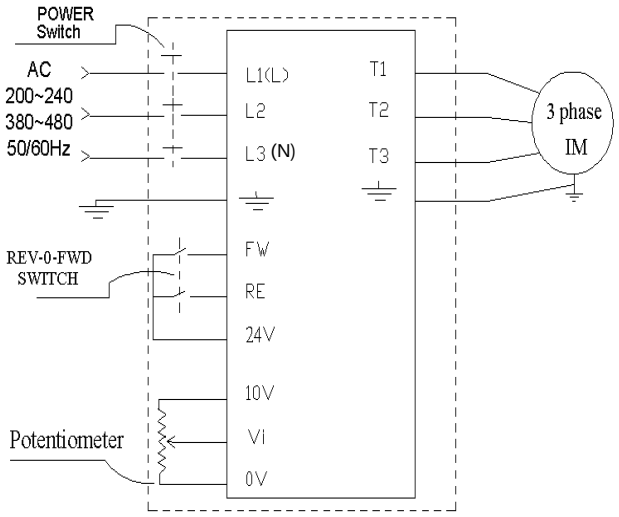
3. Motor cable :
EV-200 #14AWG(2.0mm²)
EV-400 #16AWG(1.25mm²)

4. Torque value of Screw :
(1).Power/Motor cable(TM1, TM3)
Terminal : 8 kgf-cm(6.94 in-lb)
(2).Remote control wire :
4 kgf-cm(3.47 in-lb)
(3).Outer Cover (M4) :
8kgf-cm(6.94 in-lb)

NOTE:

1.POWER SWITCH,REV-0-FWD SWITCH AND Potentiometer are only for EV-202~403-N4S TYPE

CIRCUIT DIAGRAM



NOTE:

(1).Input source: single-phase (L1(L),L3(N),⏚) ensuring that it is connected to a 200/240 supply or three-plase (L1 (L), L2, L3(N), ⏚) ensuring that it is connected to a 200/240,380/480V supply.

(2).Output Motor: three-phase (⏚, T1, T2, T3).

Caution:

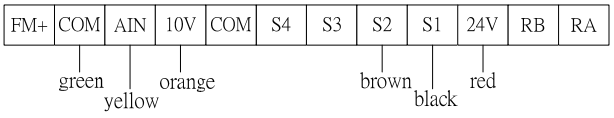
- **Do not start or stop the inverter using the main circuit power.**
- **FOR EV-202~403--N4S TYPE:**

Please always remain REV-0-FWD switch at 0 position. In order to keep inverter has no running signal before power-on again after power supply interrupted. Otherwise, injury may result.

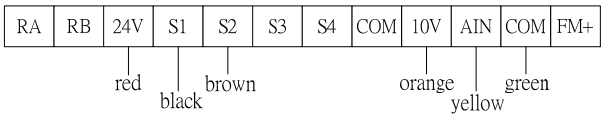
- **FOR EV-202~403--N4 TYPE:**

Please always remain RE or FW switch at OFF position. In order to keep inverter has no running signal before power-on again after power supply interrupted. Otherwise, injury may result.

TM2 202/203



TM2 401/402/403



- **IP65 Frame 2 (switch) EV- 202/203/401/402/403: Unit:mm**

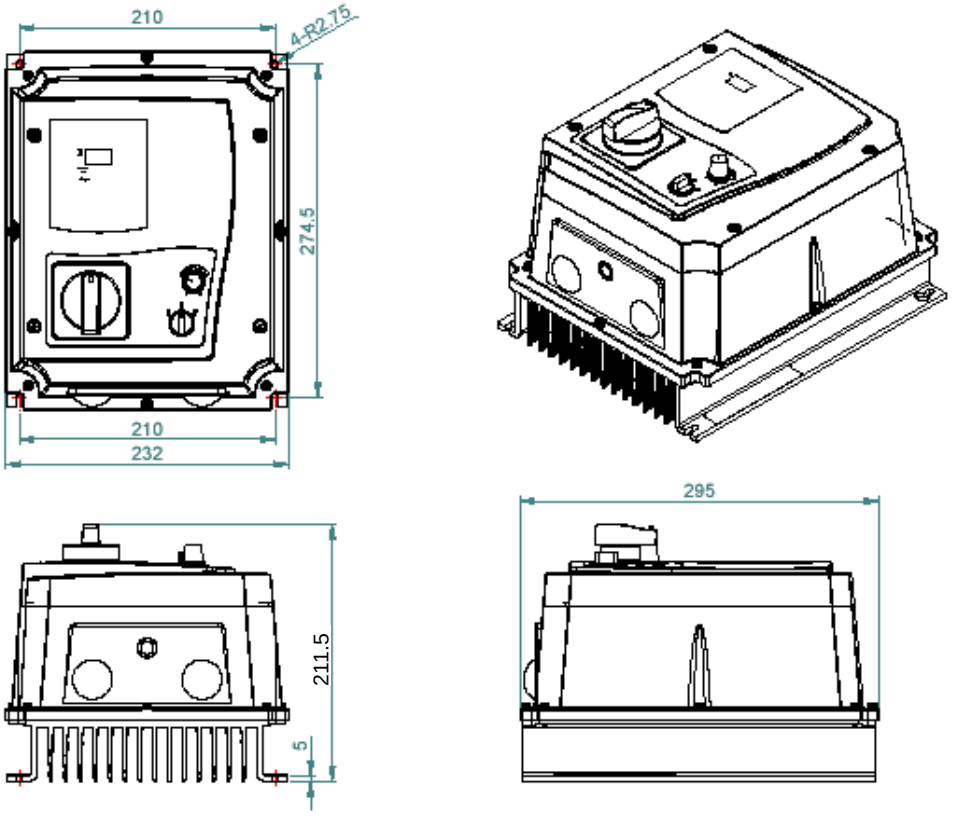


Figure 3-22 EV drive IP65 (switch) Frame 2 dimensions

- **IP65 Frame 2 (no switch) EV- 202/203/401/402/403: Unit:mm**

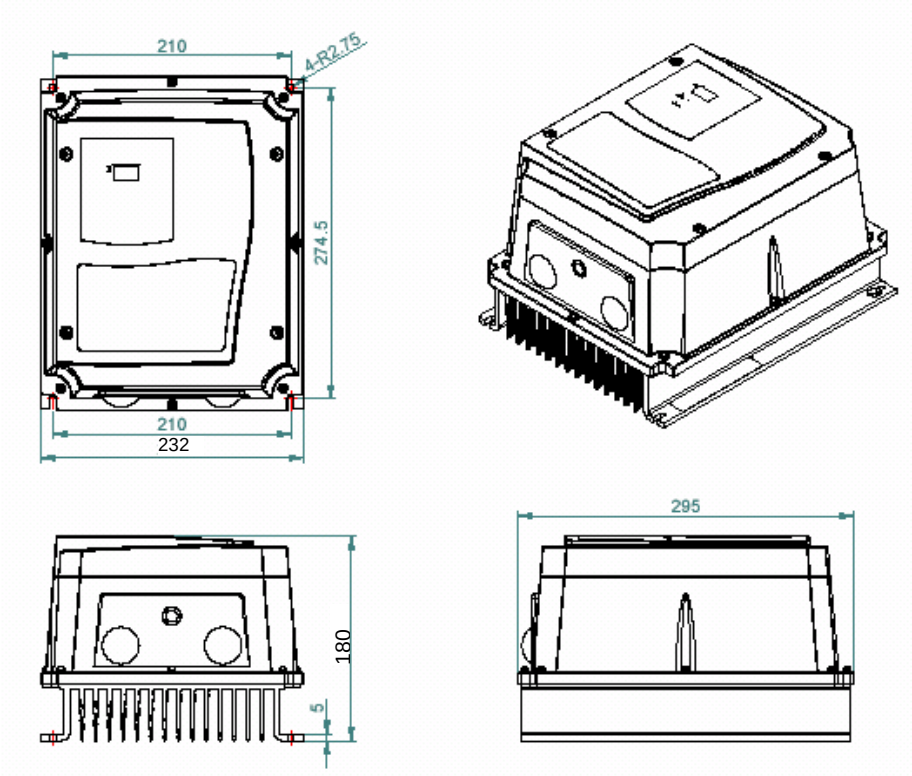
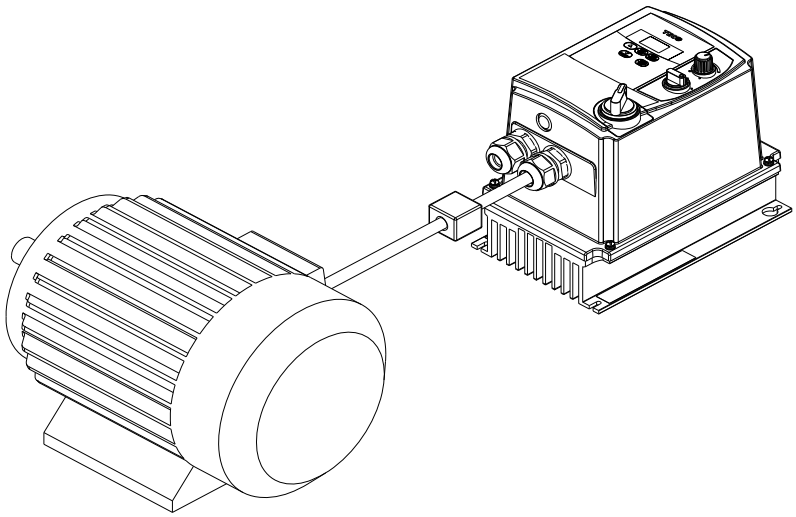


Figure 3-23 EV drive IP65 (no switch) Frame 2 dimensions

● **EV-2P2~201-H1FN4(S) (IP65) Connections & EMC Mounting:**

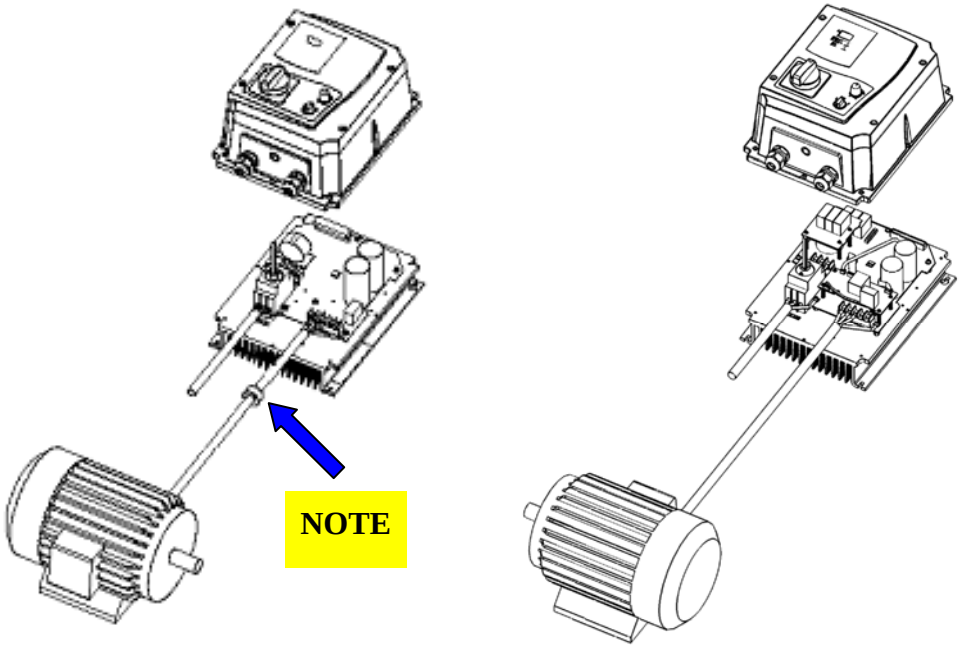


NOTE:
For IP65 2P2~201 FILTER MODELS, additional items will be find inside the box including: [1] pc of EMC conformed waterproof (IP65) ferrite core.
"CAUTION: if application require to meet EMC regulation, you MUST first constrain the motor cables, close the ferrite core onto the motor cable outside the plastic enclosure as stated in the above diagram. Besides, quadrilateral type ferrite core should close to inverter. Please also note the length of the Motor cable CANNOT exceed 5M under EMC regulation."

● **EV-202~203-H1FN4(S) & EV-401~403-H3FN4(S) (IP65) Connections & EMC Mounting:**

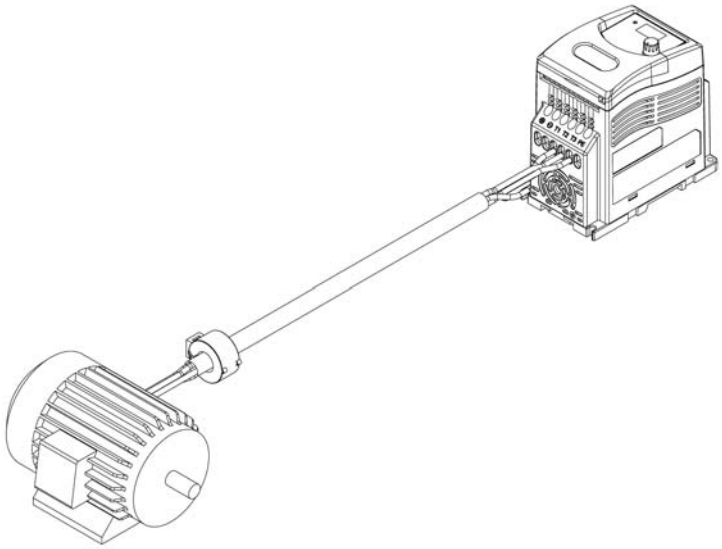
200V

400V



NOTE:
For IP65 202~203 FILTER MODELS, additional items will be find inside the box including: [1] pc of EMC conformed waterproof (IP65) ferrite core.
"CAUTION: if application require to meet EMC regulation, you MUST first constrain the motor cables, close the ferrite core onto the motor cable outside the plastic enclosure as stated in the above diagram. Besides, circular type ferrite core should close to inverter. Please also note the length of the Motor cable CANNOT exceed 5M under EMC regulation."

- **EV-2P2~201-H1F (Frame 1) (IP20) Connections & EMC Mounting:**



NOTE:
For IP20 2P2~201 FILTER MODELS, additional items will be find inside the box including: [1] pc of EMC conformed waterproof (IP65) ferrite core.
"CAUTION: if application require to meet EMC regulation, you MUST first let the ferrite core through the motor cables, then constrain the motor cable on the inverter as stated in the above diagram. Please also note the length of the Motor cable CANNOT exceed 5M under EMC regulation."

Chapter 4 Programming instructions & Parameter list

4.1 Keypad description

4.1.1 Keypad display

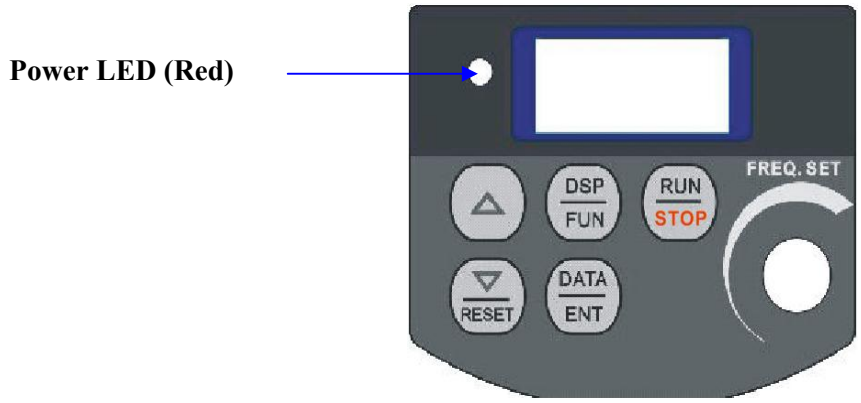


Figure 4-1 Keypad layout

4.1.2 Operation Instruction of the keypad

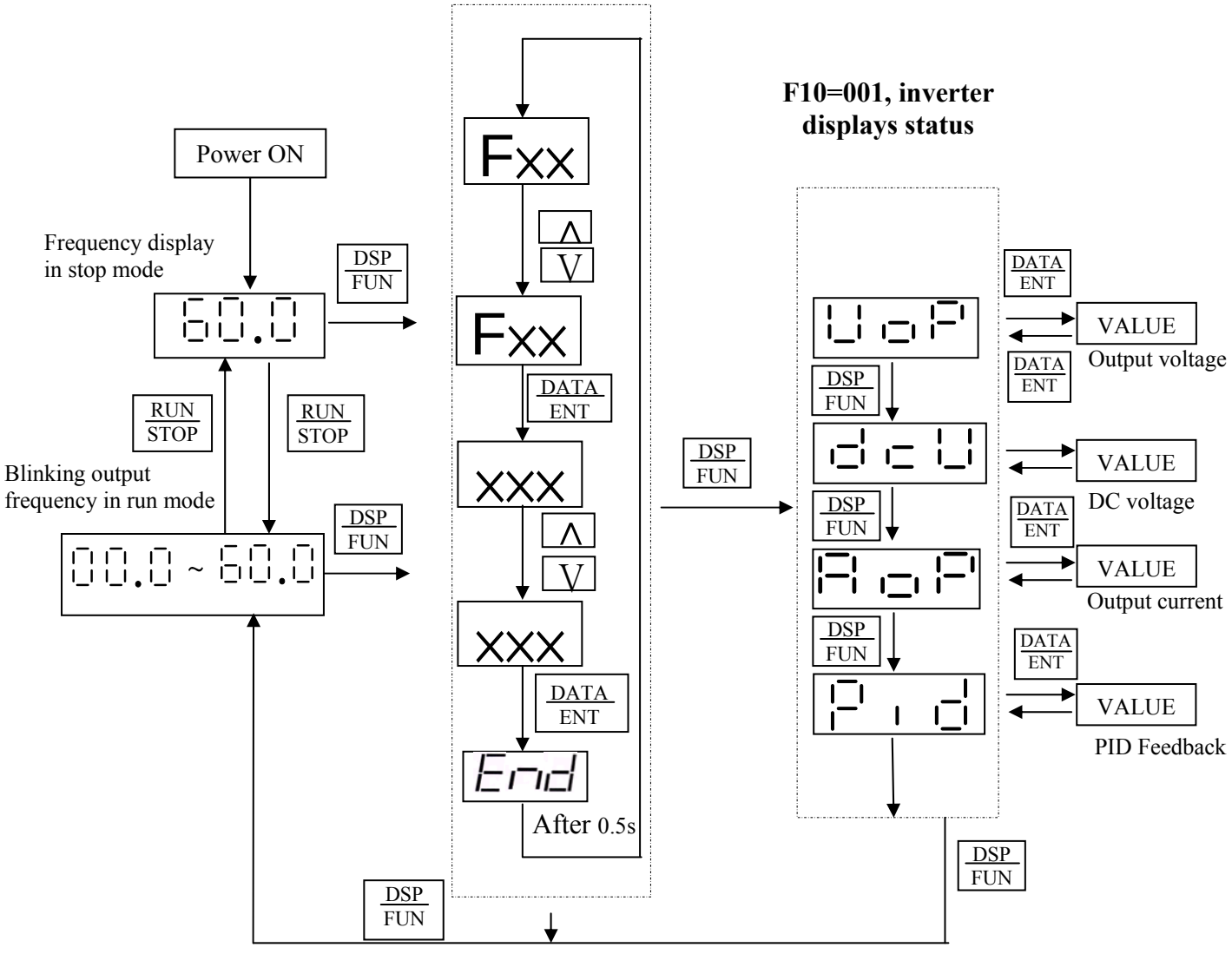


Figure 4-2 Keypad Operations Sequence

*1: Display flashes with set frequency in stop mode, but it is solid in run mode.
*2: The frequency can be set during both stop and run modes.

● **Remote/Local change function**

• **Local mode**

●Run command via **RUN/STOP** key on the keypad

●Frequency command

When C41=000: only UP/DOWN key on the keypad can control and F05 setting has no effect.

When C41=001: only VR on the keypad can control and F05 setting has no effect.

• **Remote mode**

●Run command from Run parameter **(F04)** control setting

●Frequency command from Frequency parameter **(F05)** control setting

•Remote/Local change mode on keypad is achieved by simultaneously pressing ▼/RESET and DATA/ENT. Each successive operation toggles between local and remote.

Note: The inverter must be stopped.

4.2 Parameter function list

Basic parameter function list

F	Function Description	Range/ Code	Factory Default	Remarks
00	Inverter horse power capacity			
01	Acceleration time 1	00.1~999s	05.0	*1 *2
02	Deceleration time 1	00.1~999s	05.0	*1 *2
03	Motor rotation direction	000: Forward 001: Reverse	000	*1
04	Run command source	000: keypad 001: External Terminal 002: Communication Control	000	
05	Frequency command source	000: UP/Down Key on control panel 001: Potentiometer on control panel 002: AIN input signal from (TM2) 003: Multi-function input terminal UP/DOWN function 004: RS-485 Communication frequency setting	000	
06	External control operation mode	000: Forward/ Stop-Reverse/Stop 001: Run/ Stop-Forward/Reverse 002:3-wire—Run/ Stop	000	
07	Frequency upper limit	01.0 ~200Hz	50.0/60.0	*2
08	Frequency lower limit	00.0 ~200Hz	00.0	*2
09	Stopping method	000: Decelerate to stop 001: Coast to stop	000	
10	Status display parameters	000: No display 001: Display	000	*1
11	Terminal S1 Function	000: Forward 001: Reverse 002: Preset Speed Command 1 003: Preset Speed Command 2 004: Preset Speed Command 3 005: Jog frequency Command 006: Emergency stop(E.S.) 007: Base Block (b.b.) 008: Select 2nd accel / decel time 009: Reset 010: Up command 011: Down command 012: Control signal switch 013: Communication control signal switch 014: Acceleration/deceleration prohibit 015: Master/Auxiliary speed source select 016: PID function disable 017: Analog frequency signal input(terminal AIN) 018: PID feedback signal (terminal AIN) 019: DC Brake signal *6 020: DC Brake base on TM2 AIN Frequency *9	000	
12	Terminal S2 Function		001	
13	Terminal S3 Function		005	
14	Terminal S4 Function		006	
15	Terminal AIN Function		017	
16	AIN signal select	000: 0~10V(0~20mA) 001: 4~20mA(2~10V)	000	
17	AIN Gain (%)	000~200	100	*1

F	Function Description	Range/ Code	Factory Default	Remarks
18	AIN Bias (%)	000~100	000	*1
19	AIN Bias	000: Positive 001: Negative	000	*1
20	AIN Slope Direction	000: Positive 001: Negative	000	*1
21	Multi-function output RY1	000: Run 001: Frequency reached (Set frequency ± F23) 002: Frequency is within the range set by (F22±F23) 003: Frequency Detection (>F22) 004: Frequency Detection (<F22) 005: Fault terminal 006: Auto reset and restart 007: Momentary power loss 008: Emergency Stop(E.S.) 009: Base Block (b.b.) 010: Motor overload protection 011: Inverter overload protection 012: retain 013: Power On 014: Communication error 015: Output current detection(>F24)	000	
22	Output frequency at the Set value (Hz)	00.0~200	00.0	*1
23	Frequency detection range (±Hz)	00.0~30.0	00.0	*1
24	Output current set value	000~100%	000	
25	Output current detection time	00.0~25.5(Sec)	00.0	
26	Multi-function output analog type selection (0~10Vdc)	000: Output frequency 001: Set frequency 002: Output voltage 003: DC voltage 004: Output current 005: PID feedback signal	000	*1
27	Multi-function analog output gain (%)	000~200%	100	*1
28	Preset frequency 1 (Main frequency setting)	00.0~200Hz	05.0	*1
29	Preset frequency 2	00.0~200Hz	05.0	*1
30	Preset frequency 3	00.0~200Hz	10.0	*1
31	Preset frequency 4	00.0~200Hz	20.0	*1
32	Preset frequency 5	00.0~200Hz	30.0	*1
33	Preset frequency 6	00.0~200Hz	40.0	*1
34	Preset frequency 7	00.0~200Hz	50.0	*1
35	Preset frequency 8	00.0~200Hz	60.0	*1
36	Jog frequency instruction	00.0~200Hz	05.0	*1

F	Function Description	Range/ Code	Factory Default	Remarks
37	DC braking time	00.0~25.5 Sec	00.5	
38	DC braking start frequency	01.0~10.0 Hz	01.5	
39	DC braking level	000~020%	005	
40	Carrier frequency	004~016	010	4~16K
41	Auto Restart for power-loss	000: Enable 001: Disable	001 *6	
42	Auto-restart times	000~005	000	
43	Motor rated current			*4
44	Motor rated voltage			*4
45	Motor rated frequency			*4
46	Motor rated power			*4
47	Motor rated speed	0~120 (*100 RPM) *8		*4
48	Torque Boost Gain (Vector)	001~450		
49	Slip Compensation Gain (Vector)	001~450		
50	Low frequency voltage compensation	000~40		
51	Advanced parameter function display	000: don't display 001: display	000	*1
52	Factory default	010: Reset to factory default (50Hz) 020: Reset to factory default (60Hz)	000	
53	Software version	CPU Version		*3 *4
54	Latest 3 fault records			*3 *4

Advanced function parameter list**(Enable access to these parameters by setting F51=001)**

C	Function Description	Range/ Code	Factory default	Remarks
00	Reverse run instruction	000: Reverse enable 001: Reverse disable	000	
01	Acceleration stall-prevention	000: Acceleration stall prevention enable 001: Acceleration stall prevention disable	000	
02	Acceleration stall-prevention level (%)	050 - 300	200	
03	Deceleration stall-prevention	000: Deceleration stall prevention enable 001: Deceleration stall prevention disable	000	
04	Deceleration stall-prevention level (%)	050 - 300	200	
05	Run stall-prevention	000: Run stall prevention available 001: Run stall prevention unavailable	000	
06	Run stall-prevention level (%)	050 - 300	200	
07	Stall prevention time during run	000: according to decel time set in F02 001: according to decel time set in C08	000	
08	Stall prevention deceleration time set	00.1 – 999 Sec	03.0	
09	Direct start on power up	000: Direct start available 001: Direct start disabled	001	

C	Function Description	Range/ Code	Factory default	Remarks
10	Reset mode	000: RUN instruction is OFF, Reset command is available. 001: Whether RUN instruction is OFF or ON, Reset command is available.	000	
11	Acceleration time 2	00.1~999 Sec	05.0	*1 *2
12	Deceleration time 2	00.1~999 Sec	05.0	*1 *2
13	Fan control	000: Auto-run at set temperature 001: Run when inverter runs 002: Always run 003: Always stop	001	This function only available for IP20 type, For IP65 type , fan will run while power is on.
14	Control mode	000:Vector control 001:V/F Control	000	*4
15	V/F Pattern setting	001 ~ 007	001/004	*8
16	V/F base output voltage set	198~265V / 380~530V	220/440	
17	Max output frequency (Hz)	00.2 – 200	50.0/60.0	
18	Output voltage ratio at max frequency (%)	00.0 – 100	100	
19	Mid frequency(Hz)	00.1 – 200	25.0/30.0	
20	Output voltage ratio at mid frequency (%)	00.0 – 100	50.0	
21	Min output frequency (Hz)	00.1 – 200	00.5/00.6	
22	Output voltage ratio at Min frequency (%)	00.0 – 100	01.0	
23	Torque Boost Gain (V/F)	00.0 ~ 30.0%	00.0	*1
24	Slip Compensation Gain (V/F)	00.0 ~100%	00.0	*1
25	Motor no load current			Varies with motor rating *4
26	Electronic thermal relay protection for motor (OL1)	000: Enable motor protection 001: Disable motor protection	000	
27	Skip frequency 1(Hz)	00.0~200	00.0	*1
28	Skip frequency 2(Hz)	00.0~200	00.0	*1
29	Skip frequency range (±Hz)	00.0~30.0	00.0	*1

C	Function Description	Range/ Code	Factory default	Remarks
30	PID operation mode	000: PID Function unavailable 001: PID control, Bias D control 002: PID Control, Feedback D control 003: PID Control, Bias D reverse characteristics control. 004: PID Control, Feedback D reverse characteristics control.	000	
31	PID Error gain	0.00 – 10.0	1.00	*1
32	P: Proportional gain	0.00 – 10.0	01.0	*1
33	I: Integral time (s)	00.0 – 100	10.0	*1
34	D: Differential time (s)	0.00 – 10.0	0.00	*1
35	PID OFFSET	000: Positive direction 001: Negative direction	000	*1
36	PID OFFSET adjust (%)	000 – 109	000	*1
37	PID Update time (s)	00.0 - 02.5	00.0	*1
38	PID Sleep mode threshold	00.0~200Hz	00.0	
39	PID Sleep delay time	00.0~25.5	00.0	
40	Frequency Up/ Down control using MFIT	000: UP/Down command is available. Set frequency is held when inverter stops. 001: UP/Down command is available. Set frequency resets to 0Hz when inverter stops. 002: UP/Down command is available. Set frequency is held when inverter stops. Up/Down is available in stop.	000	
41	Local/Remote frequency control select (Run command by the Run/Stop key)	000: UP/Down key on keypad sets frequency 001: Potentiometer on the keypad set frequency	000	
42	Terminal S5 function (option)	000: Forward 001: Reverse 002: Preset Speed Command 1 003: Preset Speed Command 2 004: Preset Speed Command 3 005: Jog Frequency Command 006: Emergency Stop(E.S.) 007: Base Block (b.b.) 008: Select 2nd accel/decel time. 009: Reset 010: Up Command 011: Down Command 012: Control signal switch 013: Communication control signal switch 014: Acceleration/ deceleration disable 015: Master/auxiliary speed source select 016: PID function disable 019: DC Brake signal *7 020: DC Brake base on TM2 AIN Frequency *9	007	
43	Terminal S6 function (option)		009	
44	Multi-function input terminal S1~S6 signal scan time (mSec ×8)	001~100	010	

C	Function Description	Range/ Code	Factory default	Remarks
45	Confirming AIN signal scan time (mSec x 8)	001~100	050	
46	Multi-function output T+，T- (option)	000: Run 001: Frequency reached (Set frequency ± F23) 002: Frequency is within the range set by (F22±F23) 003: Frequency detection (>F22) 004: Frequency detection (<F22) 005: Fault terminal 006: Auto-restart 007: Momentary power loss 008: Emergency Stop(E.S.) 009: Base Block(b.b.) 010: Motor overload protection 011: Inverter overload protection 012: retain 013: Power ON 014: Communication error 015: Output current detection(>F24)	005	
47	Remote keypad control selection	000: Disable (no signal loss detection) 001: Enable. On signal loss stop according to F09 002: Enable. Runs at the last set frequency. On signal loss Stop is according to F04 setting or Stop key on keypad.	000	Stop inverter then connect remote keypad for proper operation *4
48	Copy module	000: Copy module disable 001: copy to module from inverter 002: copy to inverter from module 003: read/ write check	000	*3
49	Inverter communication address	001 ~ 254	001	*3 *4
50	Baud rate (bps)	000: 4800 001: 9600 002: 9200 003: 38400	003	*3 *4
51	Stop bit	000: 1 Stop bit 001: 2 Stop bit	000	*3 *4
52	Parity bit	000: No parity 001: Even parity 002: Odd parity	000	*3 *4
53	Data bits	000: 8 bits data 001: 7 bits data (Only for Modbus ASCII Mode)	000	*3 *4
54	Communication time-out detection time	00.0 ~ 25.5 Sec	00.0	*3*5

C	Function Description	Range/ Code	Factory default	Remarks
55	Communication time-out operation selection	000: Deceleration to stop. (F02: Deceleration time 1). 001: Coast to stop. 002: Deceleration to stop. (C12: Deceleration time 2). 003: continue operating.	000	*3*5

Note: *1: Can be modified in Run mode.

***2: Frequency resolution is 1Hz for settings above 100 Hz.**

***3: Cannot be modified during communication.**

***4: Do not change while making factory setting.**

F52 factory setting is 020(60HZ) and motor parameter value is 17.0.

F52 factory setting is 010(50HZ) and motor parameter value is 14.0.

***5: Available in Software version 1.2 or later**

***6: Changed in Software version 1.5 or later**

***7: Changed in Software version 1.6 or later**

***8: Changed in Software version 1.7 or later**

***9: Increased in Software version 2.1 or later**

4.3 Parameter function description
Basic function parameter list

F00 Inverter horse power capacity

F00	Inverter model	
1P2	JNEV	1P2
1P5		1P5
101		101
2P2		2P2
2P5		2P5
201		201
202		202

F00	Inverter model	
203	JNEV	203
401		401
402		402
403		403

F01 Acceleration time 1 (s): 00.1 – 999
F02 Deceleration time 1 (s): 00.1 – 999

Formula for acceleration/deceleration time: Denominator is based on the setting of Cn14
a) Motor rating frequency (Sensor less vector control C14=000)
b) Max output frequency (V/f mode C14=001)

a)

$$\text{Acceleration time} = F01 \times \frac{\text{Set frequency}}{\text{F45(rated frequency)}} \qquad \text{Deceleration time} = F02 \times \frac{\text{Set frequency}}{\text{F45(rated frequency)}} \quad \text{(vector)}$$

b)

$$\text{Acceleration time} = F01 \times \frac{\text{Set frequency}}{\text{C17(Max output frequency)}} \qquad \text{Deceleration time} = F02 \times \frac{\text{Set frequency}}{\text{C17(Max output frequency)}} \quad \text{(V/F)}$$

F03 Motor rotation direction **000: Forward**
001: Reverse

Parameter F04 =000 must be set to 000 for this function to be effective.

F04 Run signal source
000: keypad
001: External Terminal
002: Communication Control

1.) F04=000, inverter is controlled by keypad.
2.) F04=001, inverter is controlled by external terminal.
3.) F04=002, inverter is controlled by serial communication.

F05 Frequency signal source
000: UP/Down Key on keypad
001: Potentiometer on keypad
002:TM2 input signal (Terminal AIN)
003: Multi-function input terminal UP/DOWN function
004: Frequency set by communication method
(When C47=1,Remote Keypad has priority)

1.) F5=001, when any of parameter group F11~ F15 is set to 015 and multi-function input terminal is OFF, the frequency is set by the potentiometer on the Keypad. If the multi-function input terminal is ON, the frequency is set by the analog signal (auxiliary speed) from TM2.
2.) F5=002, when any of parameter group F11~ F15 is set to 015 and multi-function input terminal is OFF, the frequency is set by the analog signal (auxiliary speed) from TM2. If the multi-function input terminal ON, the frequency is set by the potentiometer on Keypad.

3.) Up/Down terminal: please refer to description of parameter group F11~ F15 (multi-function input terminal).

4.) Priority of reading frequency command: Jog> preset frequency > (Keypad▲▼ or TM2 UP/ Down or communication)

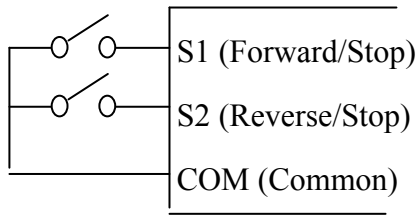
F06 : External control operation mode	**000: Forward/ Stop-Reverse/Stop** **001: Run/ Stop-Forward/Reverse** **002: 3-wire—Run/ Stop**

1.) F06 is only available when F04 = 001 (external terminal).

2.) When both forward and reverse commands are ON, this will result in a stopped mode.

Parameter F06 = 000, Control method is as follows:

(1). NPN input signal:



(2). PNP input signal:

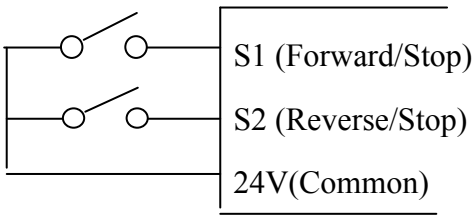
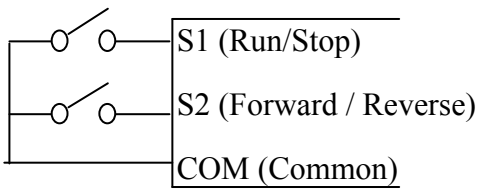


Figure 4-3a Fwd/stop-Reverse/Stop wiring detail

Parameter F06 = 001, Control method is as follows:

(1). NPN input signal:



(2). PNP input signal:

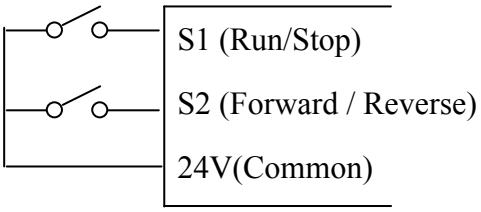
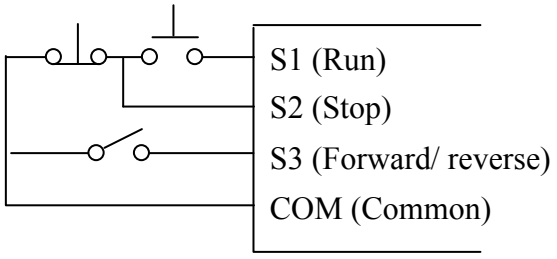


Figure 4-3b RUN/STOP-Forward/Reverse Wiring detail

Parameter F06 = 002, Control method is as follows:

(1). NPN input signal:



(2). PNP input signal:

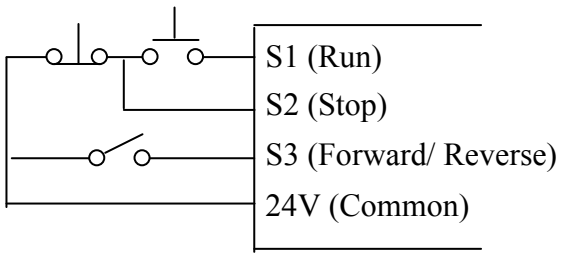


Figure 4-3c 3-WIRE Run/Stop detail

Note: In 3 wire control mode terminals S1-S3 are used, therefore parameters F11~ F13 are ineffective.

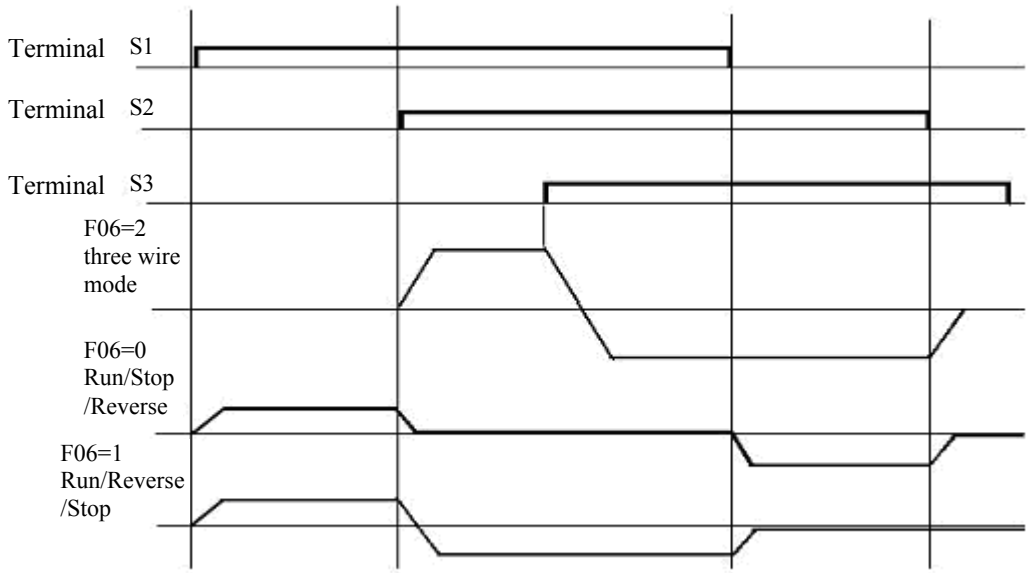


Figure 4-4 Control Method Sequences

Note: C00=001, reverse command is disabled.

F07 Frequency upper limit (Hz): 01.0 - 200
F08 Frequency lower limit (Hz): 00.0 - 200

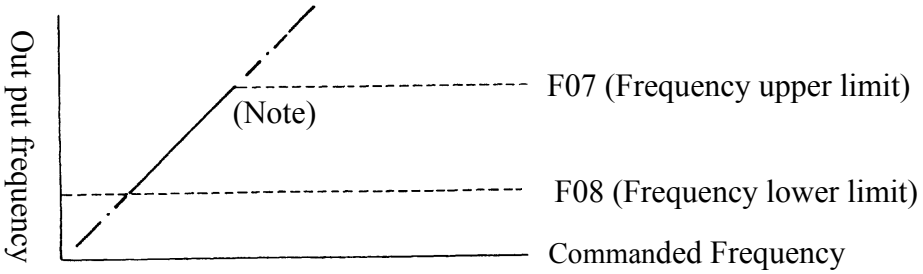


Figure 4-5 Frequency Limits

Note: If F07 = 0 Hz and frequency command = 0 Hz, the inverter will 0-speed stop.
If F08 > 0 Hz and frequency command ≦F08, inverter will run at F08 set value.

F09 Stopping method	**000: Decelerate to stop**
	001: Free run (Coast) to stop

1.) F09 = 000: after receiving stop command, the motor will decelerate to stop according to setting of F02, deceleration time 1.
2.) F09 = 001: after receiving stop command, the motor will free-run (Coast) to stop.

F10 Status monitoring display	**000: Disable**
	001: Enable.

F10 = 001 displays motor current, voltage, DC bus voltage, and PID feedback.

F11~15	**Selectable Functions for input terminals (S1-S4& AIN)** **000: Forward run** **001: Reverse run** **002: Preset speed command 1** **003: Preset speed command 2** **004: Preset speed command 3** **005: Jog frequency command** **006: External Emergency stop(E.S.)** **007: Base block (b.b.)** **008: Switch to 2nd acceleration/ deceleration time** **009: Reset** **010: Up command** **011: Down command** **012: Control signal switch** **013: Communication mode. Disable – Enable.** **014: Acceleration/deceleration prohibit** **015: Master/Auxiliary speed switch** **016: PID function prohibit** **017: Analog frequency signal input (terminal AIN)** **018: PID feedback signal (terminal AIN)** **019: DC Brake signal** **020: DC Brake base on TM2 AIN Frequency**

1.) S1-AIN on TM2 are multi-function input terminals which can be set to the above 19 functions.

2.) F11~F15 function description:

F11~F15=000/001(Forward/ Reverse)

Forward command ON sets the inverter running forward, while OFF stops, the inverter. F11 factory default is forward command.

Reverse command ON sets the inverter running reverse, While OFF, the inverter stops. F12 factory default is reverse command.

If forward –reverse command are ON at the same time the inverter is in Stop mode.

F11~F15=002~004(Preset speed command 1~3)

When run signal is applied and the selected external multi-function input terminal is on, the inverter will run at one of 8 preset speeds which are controlled by the status of the terminals. The corresponding speeds are programmed in parameters F28 to F36 as shown in the table below.

F11~F15=005(Jog frequency command)

When run signal is applied and the selected external multi-function input terminal is on and set to Jog speed, the inverter will run according to F36 setting.

Priority of the frequencies: Jog > preset speed

Preset Speed Command 3 Set value=004	Preset Speed Command 2 Set value=003	Preset Speed Command 1 Set value=002	Jog Frequency Command Set value=005	Output frequency set value
X	X	X	1	F36
0	0	0	0	F28
0	0	1	0	F29
0	1	0	0	F30
0	1	1	0	F31
1	0	0	0	F32
1	0	1	0	F33
1	1	0	0	F34
1	1	1	0	F35

F11~F15=006: Emergency Stop (E.S)

The inverter will decelerate to stop by C12 setting on receiving the external emergency stop signal regardless of F09 setting.

The display will be blinking with "E.S".

The inverter will only start again when the Emergency Stop signal is removed and the start signal is turned off and then on again (remote start mode) or the Run key is pressed (keypad mode).

Removing the Emergency Stop signal before the inverter has fully stopped will not inhibit the Emergency Stop operation.

Output relay can be set to Emergency. Stop fault by setting F21=008

F11~F15=007: Base Block (b.b.)

The inverter will stop immediately on receiving the Base Block signal regardless of the setting of F09 and blink "b.b". The inverter will auto restart at speed search when the Base Block signal is released.

F11~F15=008: Switching to 2nd acceleration/ deceleration time

When the external terminal is ON it selects the 2nd acceleration/ deceleration time. (see parameters C11,C12)

F11~F15=009: Reset command

When the reset command ON, the inverter will be disabled. Reset table faults will be cleared.

F11~F15=010/011: UP / DOWN function: (Controlled by acceleration/deceleration times)

Set F05=003, to enable the UP/DOWN function. Note: the UP/DOWN key on the Keypad is unavailable for changing frequency directly.

Set C40=000, When UP/DOWN terminal is ON, the inverter begins acceleration/deceleration to a frequency and stops acceleration/ deceleration when the UP/ DOWN signal has been released. The drive continues to run at the most recent set speed.

The inverter will decelerate to stop or free run to stop when the run command is OFF according to F09. The speed at which the inverter stops will be stored in F28.

NOTE: UP/DOWN key is now unavailable for modifying frequency. It should be modified by setting Parameter F28.

Set C40=001, The inverter will run from 0Hz on receiving run command.

UP/DOWN action is similar to the above description. When the run command is released, the inverter will decelerate to stop or free run to stop (0 Hz) according to the setting of F09.

The inverter will output from 0Hz in next operation.

Note: UP/ DOWN commands are disabled if both terminals are ON at the same time.

F11~F15=012: Control signal switch

External control terminal OFF: operation signal/ frequency signal is controlled by F04/F05.

External control terminal ON: Operation signal/frequency signal is controlled by Keypad display.

F11~F15=013: Communication mode select.

External control terminal OFF: in communication, the inverter is controlled by master (PC or PLC) run/ frequency signal and allows parameter modification. The Keypad and TM2 run/frequency signal is not available for inverter at this time. The keypad is only available for display of voltage/ current/ frequency and read parameters but cannot modify them. It is also available for emergency stop.

External control terminal ON: PC/PLC can read and modify parameters. BUT all controls are from the keypad. (Not affected by settings of F04 & F05).

F11~F15=014: Acceleration/deceleration Disable.

When the external control terminal ON, the inverter will stop acceleration/ deceleration will the signal is released. The motion is as follows:

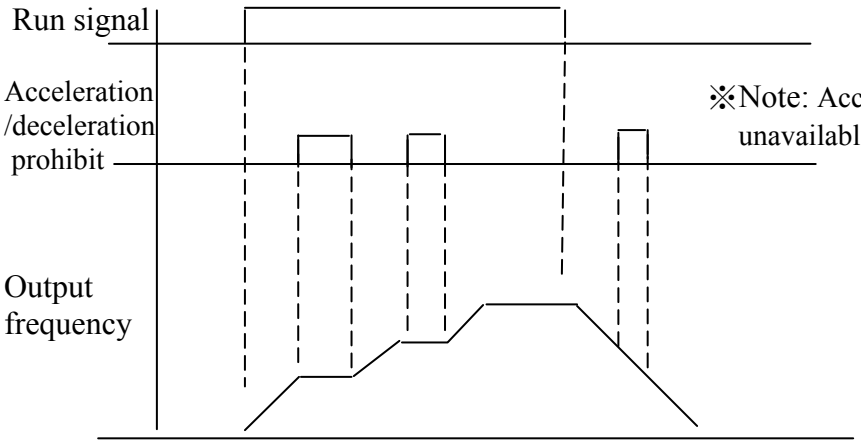


Figure 4-6 Acceleration/Deceleration Prohibit

F11~F15=015 Master/Auxiliary speed switch

1) F05=001, when one of the parameters F11~ F15 is set to 015, and multi-function input terminal is OFF, the frequency is set by the potentiometer on the Keypad(Master speed), When the multi-function input terminal is ON, the frequency is set by the analog signal on TM2 (Auxiliary speed AIN).

2.) F05=002, when one of the parameters F11~ F15 is set to 015, and multi-function input terminal is OFF, the frequency is set by the analog signal on TM2,

(Master Auxiliary speed AIN); While multi-function input terminal is ON, the frequency is set by the potentiometer on the Keypad (Auxiliary speed).

F11~F15=016 (PID function Disable)

When input terminal is on, PID functions set by C30 are disabled.
When input terminal is the PID functions are enabled.

F15=017 Analog frequency signal input (Terminal AIN)

Frequency reference can be set by 0-10Vdc or 4-20mA on terminal AIN as set by F16 and SW2.

F15=018 PID Feedback signal input (Terminal AIN)

PID feedback can be connected to AIN terminal 0-10Vdc/0~20mA or 2~10V/4-20mA as set by F16 and SW2.
The PID command (set point) is selected by parameter F05.
F05=000 (up/down keys set frequency)
F05=001 (VR on keypad sets frequency)

F11~F15=019 DC Brake signal

When TM2 DC Brake signal is OFF, and the brake time of F37 has not been over, then brake time is according to set value of F37. When TM2 DC Brake signal is ON, and the brake time of F37 has already been over, the brake is stopped according to DC Brake signal OFF of TM2, and DC brake level is decreased to 2.5% to avoid motor overheat.

Danger:
The motor will be overheated easily if the brake time is too long. Please make sure the heat dissipation of the motor is good to avoid the motor failure.

F11~F15=020 DC Brake base on TM2 AIN Frequency

When the external control terminal ON, and external Run command ON. If TM2 AIN frequency is lower than F38 DC braking start frequency, the DC brake is active. When the brake time of F37 has already been over, the brake is stopped according to DC Brake signal OFF of TM2, and DC brake level is decreased to 2.5% to avoid motor overheat.
This function is only used to external terminal run command (F04 = 001), and AIN input frequency source (F05 = 002).

F16 AIN signal select
000: 0~10V/0~20mA
001: 2~10V/4~20mA

F16: **AIN signal select**: set SW2 to appropriate V/I signal selection
F16=000: 0~10V/0~20mA
F16=001: 2~10V/4~20mA

F17 AIN Gain (%) 000 - 200
F18 AIN Bias (%) 000 - 100

1.) F19= 000: 0V (4mA) corresponding to lower frequency limit, 10V (20mA) corresponding to upper frequency limit.
2.) F19= 001: 10V (20mA) corresponding to lower frequency limit, 0V (4mA) corresponding to upper frequency limit.

Fig 4-7a setting:

	F17	F18	F19	F20
A	100%	050%	000	000
B	100%	000%	000	000

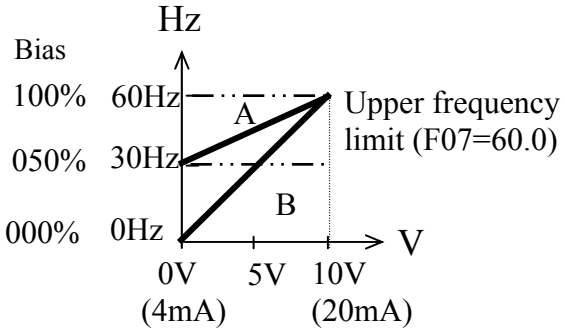


Fig 4-7a

Fig 4-7b setting:

	F17	F18	F19	F20
C	100%	050%	000	001
D	100%	000%	000	001

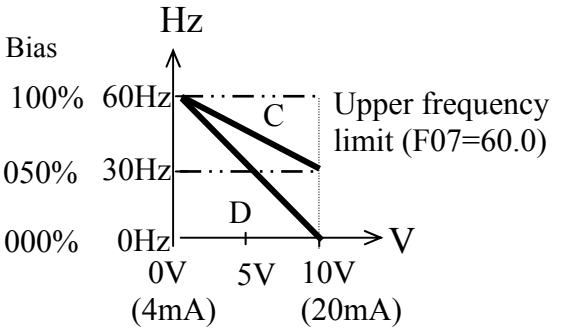


Fig 4-7b

Fig 4-7c setting:

	F17	F18	F19	F20
E	100%	020%	001	000

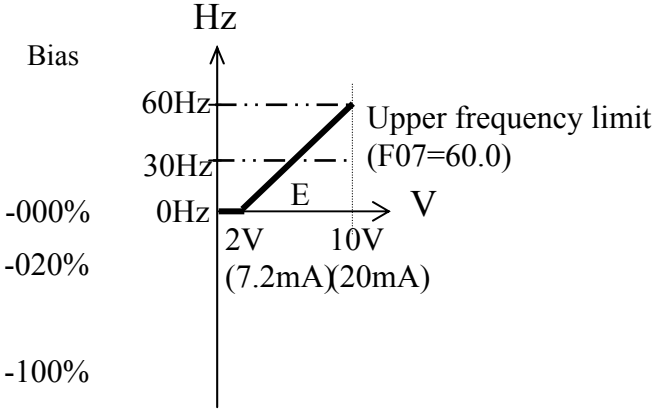


Fig 4-7c

Fig 4-7d setting:

	F17	F18	F19	F20
F	100%	050%	001	001

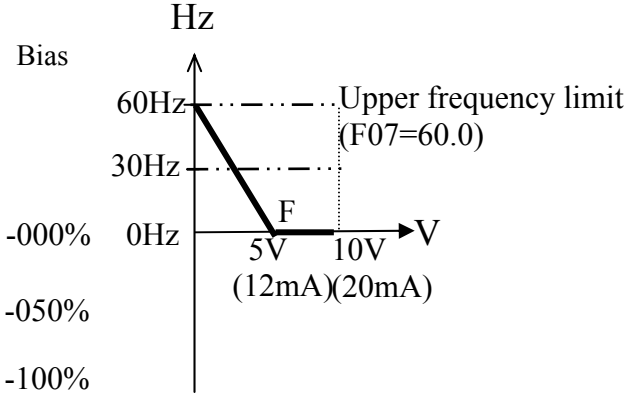


Fig 4-7d

F19 AIN Bias: 000: Positive 001: Negative
F20 AIN signal slope direction. 000: Positive 001: Negative
C45 AIN signal scan time confirmation. (mSec × 8): 001 – 100

Refer to F17/F18 description

The inverter reads A/D average value every C45 x 8mS. The user can set scan interval time according to noise levels in the operation environment. Extend C45 if noise is a problem, however the response speed will be slower.

F21 Multi function output RY1
000: Run
001: Frequency reached (Preset target frequency ± F23)
002: Frequency reached (Preset output frequency level (F22) ±F23)
003: Frequency Detection (>F22)
004: Frequency Detection (<F22)
005: Fault output
006: Auto restart
007: Momentary power loss
008: Emergency Stop(E.S.)
009: Base Block(b.b.)
010: Motor overload protection
011: Inverter overload protection
012: Reserve
013: Power On
014: Communication error
015: Output current detection(>F24)
F22 Preset Output frequency reached =00.0 ~ 200Hz
F23 Frequency detection range =00.0 ~ 30Hz

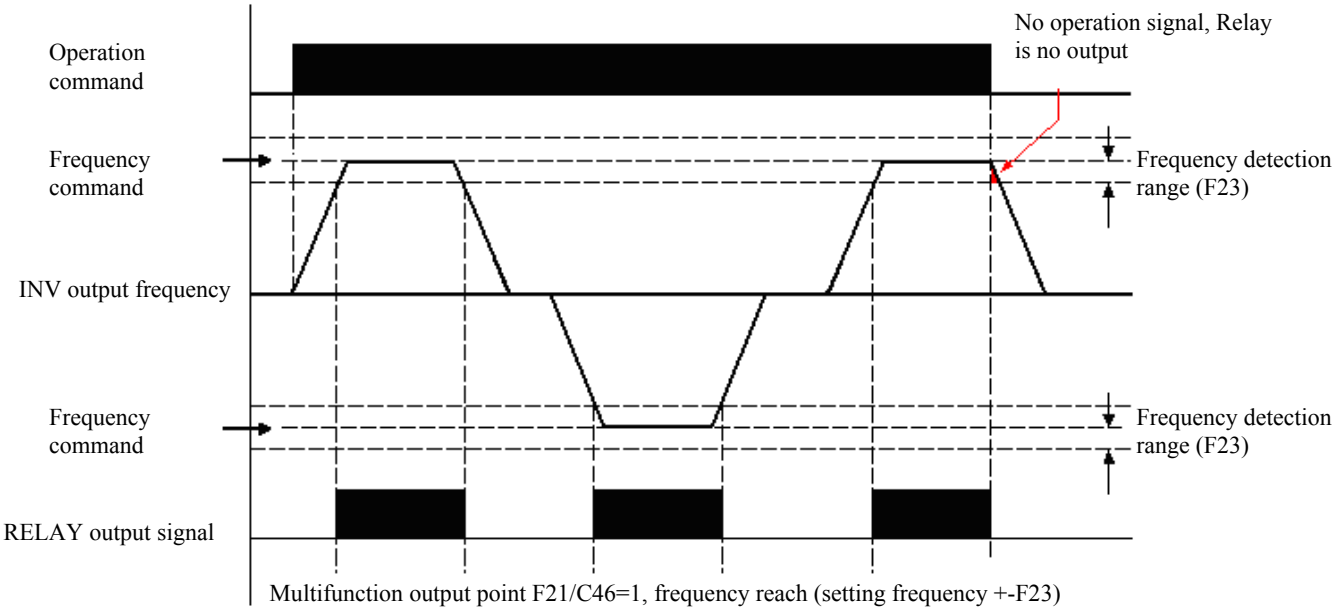


Figure 4-8a Frequency Reached (F21/C46=1)

F21/C46=002 Preset output Frequency F22 ± F23 reached.

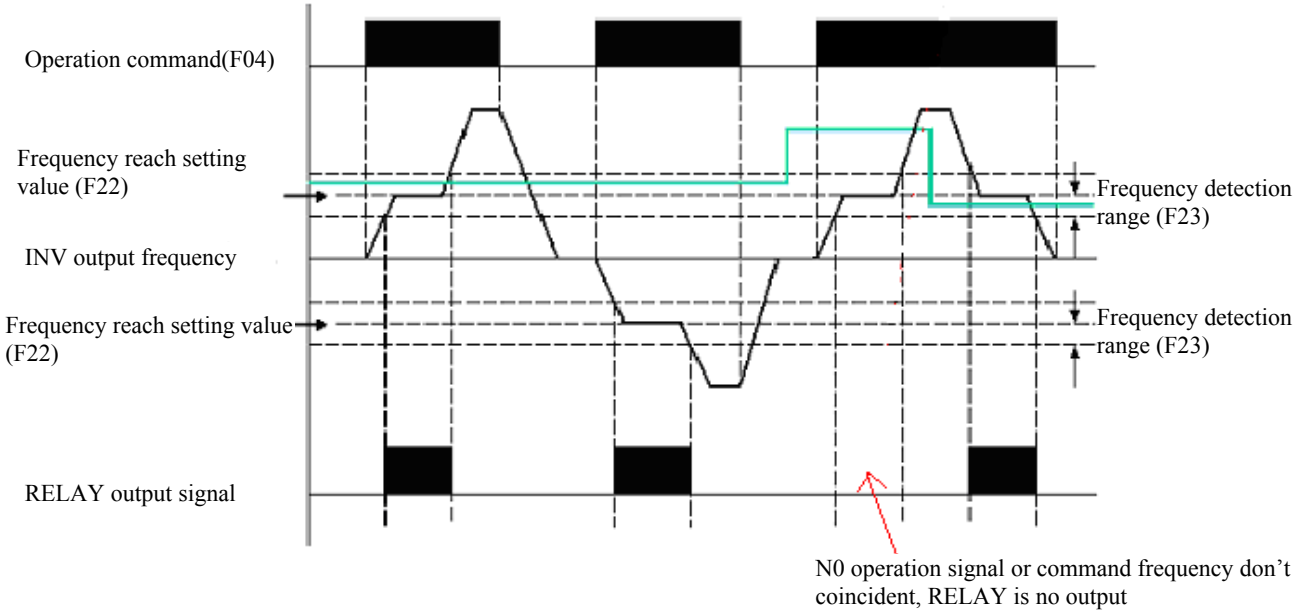


Figure 4-8b Frequency Reached (F21/C46=2)

F21/C46=003 Frequency detection Fout>F22

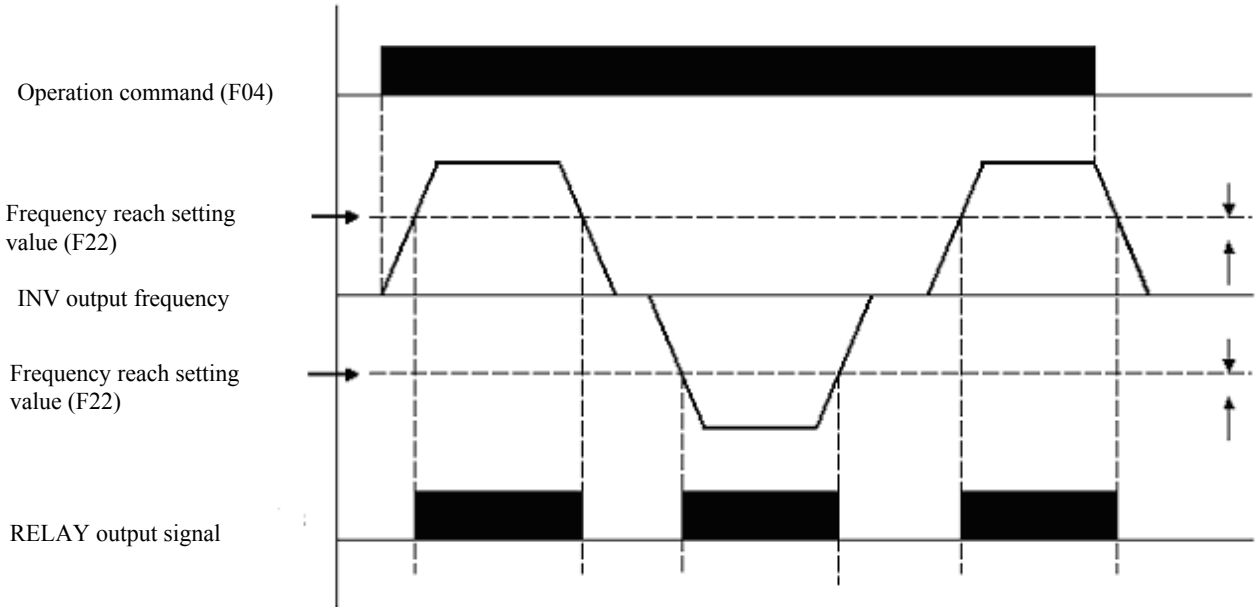


Figure 4-8c Frequency Detection (F21/C46=3)

F21/C46=004 Frequency detection Fout< F22

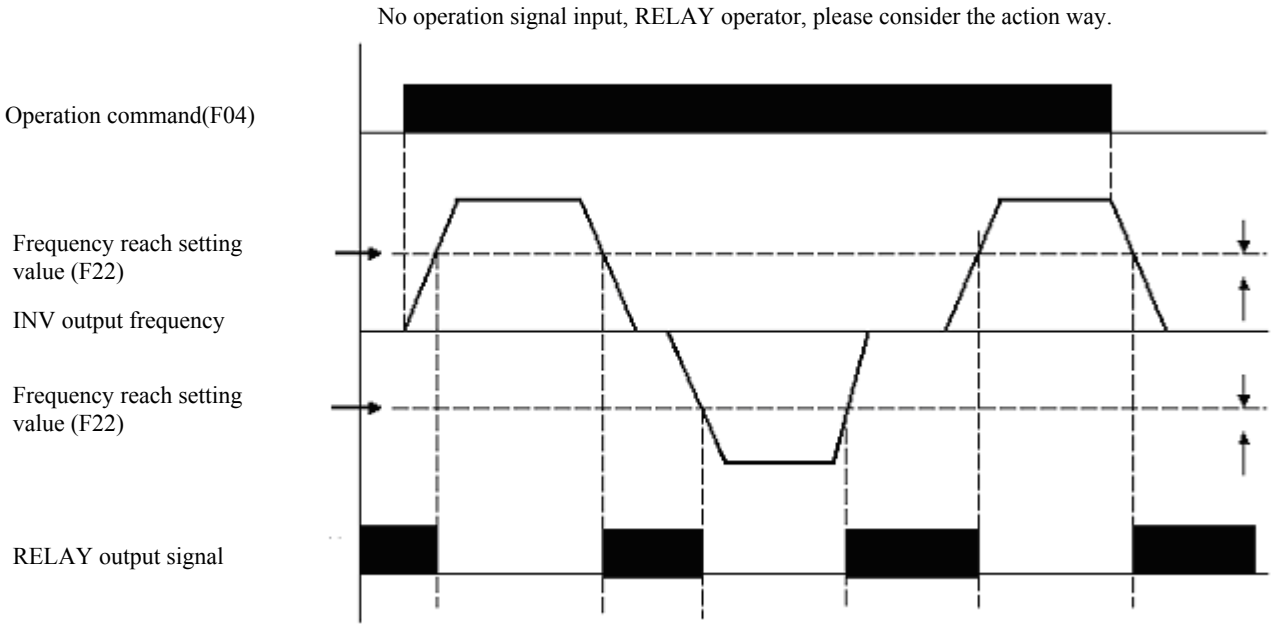


Figure 4-8d Frequency Detection (F21/C46=4)

F24 Output current reached setting value

F25 Output current detection time

F21: Output current detection value >F24
C46: Output current detection value >F24 When setting value is 015
F24: Setting value (000~100%) by motor rated current (F43)
F25: Setting value (00.0~25.5) unit : sec

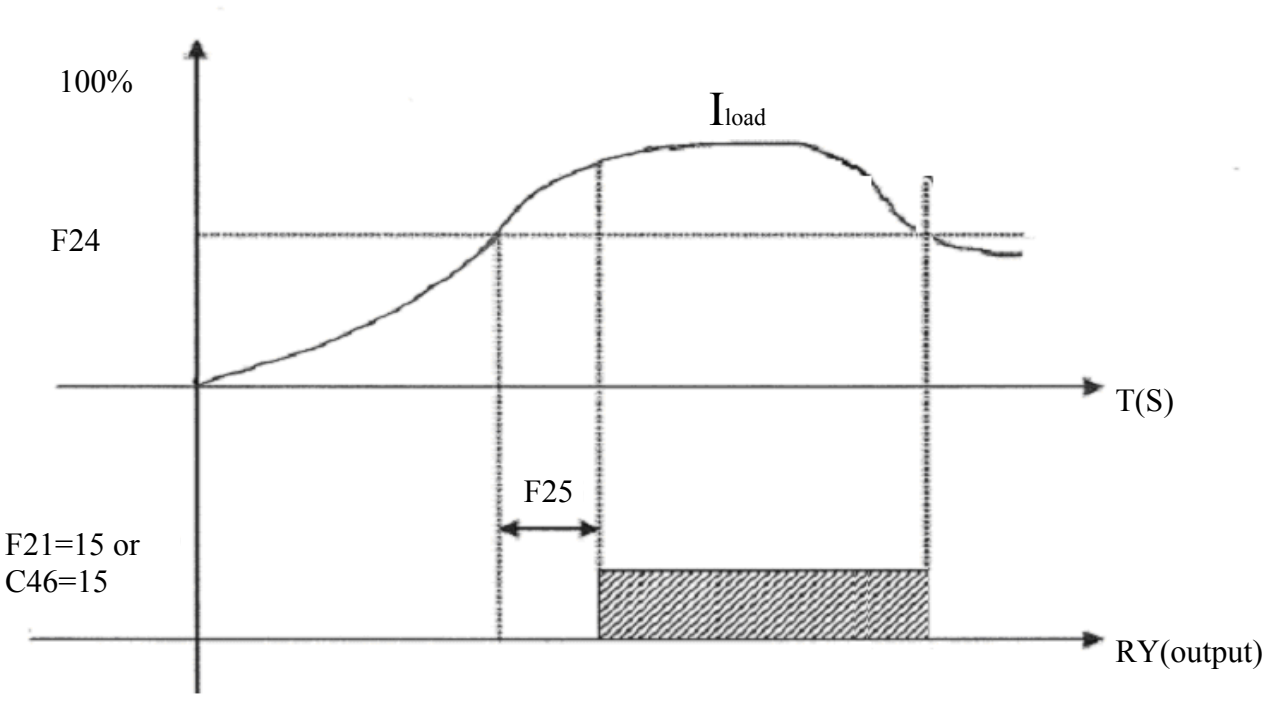


Figure 4-9 Output current detection

Multi-function analog output:
F26 Multi-function output analog type selection
001: Set frequency
002: Output frequency
003: DC voltage
004: Output current
005: PID feedback signal
F27 Multi-function analog output gain = 000 ~ 200%

0-10 Vdc output from the FM+ multi-function analog output terminal.
Output can be set to any of the above selections.

F27 is used to scale the output signal supplied to the externally connected analog device.

F26=005, PID Feedback. The analog input to terminal AIN (0-10vdc or 4-20mA), will be outputted from terminal FM+ as 0-10Vdc.
Please refer to page 4-36 to get more information.
Note: Due to hardware limits, the max output voltage from FM+ terminal will be limited to 10V.

Keypad, jog, and preset frequency setting (MFIT):
Note1: Frequency selection will be made according to the setting of terminals S1-S4 & AIN and also setting of parameters F11 – F15 as required.
Note2: Selected preset frequency values should be programmed in parameters F28- F36 as required.

1) F11~F15=002-004 (Preset frequency Command 1~3)

When the run signal is applied and any of the selected multi-function input terminals is ON, the inverter will run at the preset frequency according to the table below.

2) F11~F15=005 (Jog Frequency Command)

External input terminal is set to Jog operation. When ON, the inverter will run at Jog frequency.

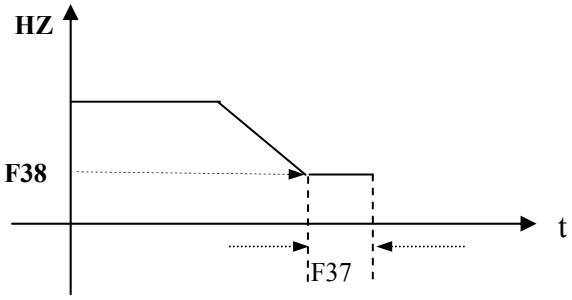
Parameter	Description	Frequency range	Factory default
F28	Preset frequency 1 (Hz)	00.0 - 200	05.0
F29	Preset frequency 2 (Hz)	00.0 - 200	05.0
F30	Preset frequency 3 (Hz)	00.0 - 200	10.0
F31	Preset frequency 4 (Hz)	00.0 - 200	20.0
F32	Preset frequency 5 (Hz)	00.0 - 200	30.0
F33	Preset frequency 6 (Hz)	00.0 - 200	40.0
F34	Preset frequency 7 (Hz)	00.0 - 200	50.0
F35	Preset frequency 8 (Hz)	00.0 - 200	60.0
F36	Jog frequency (Hz)	00.0 - 200	05.0

Set frequency priority: Jog→ Preset frequency →External analog frequency signal

Preset Frequency Command 3 Set value =004	Preset Frequency Command 2 Set value =003	Preset Frequency Command 1 Set value =002	Jog frequency Command Set value =005	Output frequency
0	0	0	0	F28
0	0	1	0	F29
0	1	0	0	F30
0	1	1	0	F31
1	0	0	0	F32
1	0	1	0	F33
1	1	0	0	F34
1	1	1	0	F35
X	X	X	1	F36

F37 DC braking time (s) : 00.0~25.5
F38 DC braking start frequency (Hz) : 01.0~10.0
F39 DC braking level (%) : 00.0~20.0%

F37 / F38: DC braking time and start frequency, per the following figure:



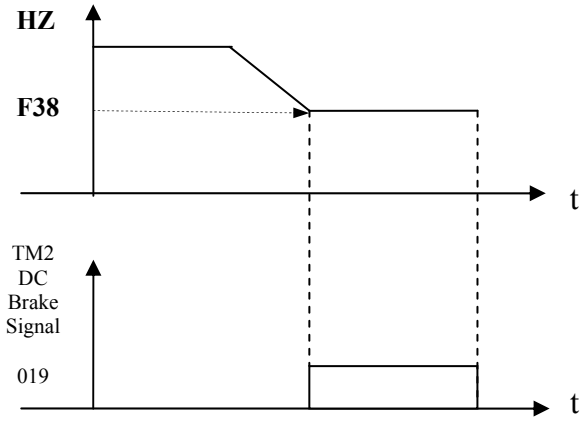


Figure 4-10 DC Injection Braking

F40 Carrier frequency (KHz) : 004-016
Set this parameter to a level from 4-16KHz as required. (Default is 10 KHz).

***Note: In situations where there is excessive audible noise from the motor or it is required to reduce electrical noise from the inverter caused by use of long cable then the carrier frequency can be adjusted as follows:**

- To reduce noise due to long cable decrease carrier frequency.
- To reduce motor audible noise increase carrier frequency. However the output current from the inverter will be de-rated according to the table on page 4-24.
- When output current is over the full load current of inverter, the carrier frequency will be decreased automatically.

F40	Carrier frequency	F40	Carrier frequency	F40	Carrier frequency	F40	Carrier frequency
004	4KHz	008	8KHz	012	12KHz	016	16KHz
005	5KHz	009	9KHz	013	13KHz		
006	6KHz	010	10KHz	014	14KHz		
007	7KHz	011	11KHz	015	15KHz		

Corresponding list of current and carrier frequency

Model / Carrier frequency	EV-1P2/2P2 H1/H1F/H3	EV-1P5/2P5 H1/H1F/H3	EV-101/201 H1/H1F/H3	EV-202 H1/H1F/H3	EV-203 H1/H1F/H3	EV-401 H3/H3F	EV-402 H3/H3F	EV-403 H3/H3F
4~10K	1.7	3.1	4.2	7.5	10.5	2.3	3.8	5.2
12K	1.7	3.1	4.2	7.5	10.5	2.2	2.2	3.7
14K	1.6	3.0	4.0	7.0	10.0	2.2	2.2	3.6
16K	1.5	2.8	3.8	6.8	8.7	2.1	2.1	3.5

F41 Auto restart on momentary power loss. **000:** Enable
001: Disable

F41=000: Auto restart after a momentary power loss is enabled on resumption of power and applying the run signal, according to setting of parameter F4.
The Inverter will carry out an auto speed search, once the motor rotation speed is found then it will accelerate to the running speed before the power loss.
F41=001: Disable.

F42 Auto restart times: 000 ~ 005

1.) F42=000: The inverter will not auto-restart on fault trip.
2.) F42>000
The Inverter will carry out an auto search 0.5 sec after the fault trip, and while the inverter output is switched off and the motor is coasting to stop.
Once the rotation speed is determined the inverter will accelerate or decelerate to speed before the fault.
3.) When OL1, OL2, OH, BB faults happens, Auto restart doesn't work.
Note: Auto restart doesn't work while DC injection braking or deceleration to stop is performed.

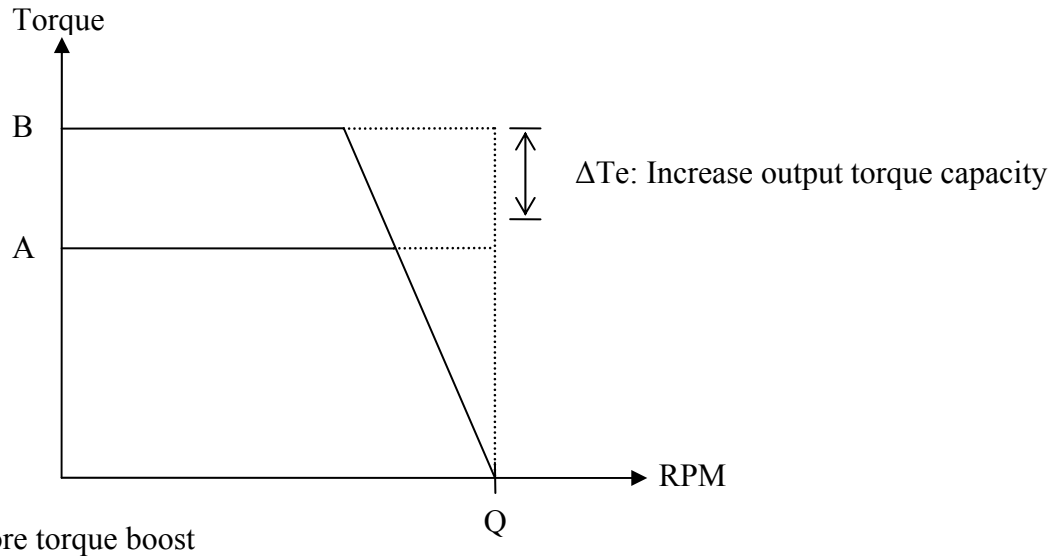
F43 Motor rated current (A)
F44 Motor rated voltage (Vac)
F45 Motor rated frequency (Hz)
F46 Motor rated power (KW)
F47 Motor rated speed (RPM) : F47 X 10= Motor rated speed

F48 Torque boost gain (Vector), C14=000

Performance: If the motor load is determined to be too large increase the output torque.

$$\Delta Te \fallingdotseq \underset{\text{(load current)}}{I} \times \underset{\text{(compensation gain)}}{Gain}$$

• Torque/Speed curve pattern:



A: before torque boost
B: after torque boost

Figure 4-11 Output Torque Capacity

• Operating frequency range: 0~Motor rate frequency
• When the motor output torque is not enough and increase F48 setting value.
• When the motor is erratic or vibrates decrease F48 setting value.
• The max. Output torque limit to the inverter is current rated.
• If increase F48 setting value then the output current is too large. Please increase F49 setting value on the same time.

F49 Slip compensation gain (vector), C14=000

Performance: If the motor load appears too large, increase slip compensation.

$$\Delta F_{slip} \fallingdotseq \underset{\text{(load current)}}{I} \times \underset{\text{(compensation gain)}}{Gain}$$

• Torque/Speed curve pattern:

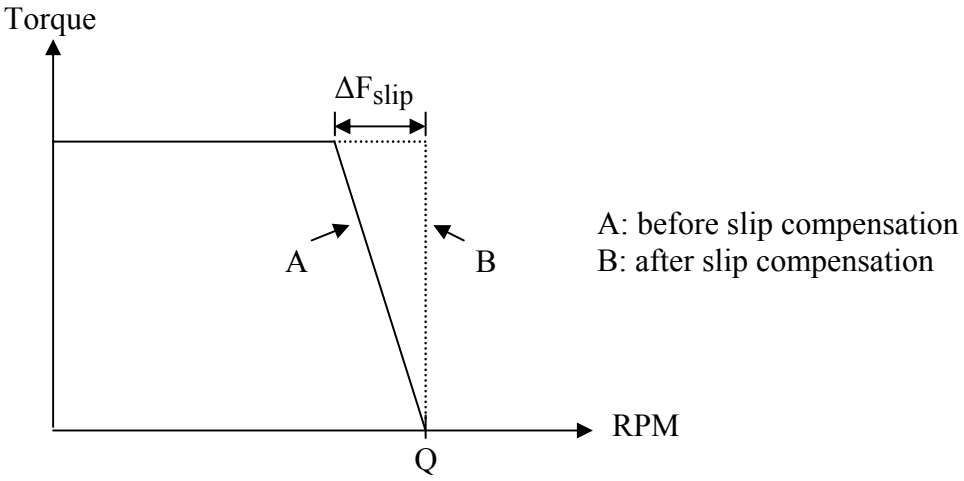


Figure 4-12 Slip Compensation

• Operating frequency range: 0~motor rated frequency.
• When the motor output rotation speed is too low increase F49 setting value.
• When the motor is erratic or vibrates, decrease F48 setting value.
• The max. output rotation speed limit to the motor max. setting frequency.
• If increase F49 setting value then the output current is too large. Increase F48 setting value at the same time.

F50 Low frequency voltage compensation, C14=000

Performance: During low frequency
Increase F50 setting value to increase output voltage and low frequency torque.
Decrease F50 setting value to decrease output voltage and low frequency torque.

• Output voltage/frequency curve pattern:

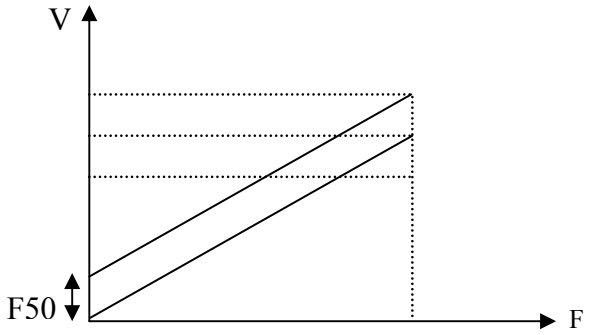


Figure 4-13 Low Frequency Voltage Compensation

• Operating frequency range: 0~12HZ / 60HZ
0~10HZ / 50HZ

• During low frequency use:
When the motor output torque is insufficient, increase F50 setting value.
When the motor is vibrating excessively, decrease F50 setting value.

F51 Advanced parameter function display
000:Disable access to advanced parameters (Group C)
001:Enable access to advanced parameters (Group C)

F51=000. Parameter group C can not be displayed or accessed.
F51=001. Enable display and access to parameter group C.

F52 Factory default **010: Reset parameters to factory default (50Hz)**
020: Reset parameters to factory default (60Hz)

F53 Software version

F54 Fault records (Latest 3 times)

Advanced Parameters List (Group C parameters)

C00 Reverse run **000: Reverse enable**
001: Reverse disable

When F04=000 and C00=001, F03 (motor direction) is disabled, the inverter is set to forward operation.
When F04=001 or 002, and C00=001, reverse command is disabled.

C01 Acceleration stall-prevention:
=000: Enable Stall prevention during Acceleration.
=001: Disable Stall prevention during Acceleration.
C02 Acceleration stall-prevention level: 050% ~ 200%
C03 Deceleration stall-prevention:
= 000: Enable Stall prevention during deceleration.
= 001: Disable Stall prevention during deceleration.
C04 Deceleration stall-prevention level: 050% ~ 200%
C05 Run stall-prevention:
= 000: Enable Stall prevention in Run mode.
= 001: Disable Stall prevention in Run mode.
C06 Run stall-prevention level: 050% ~ 200%
C07 Stall prevention time during run mode.
= 000: Set by parameter F02 (Deceleration 1).
= 001: Set by parameter C08.
C08 Stall prevention deceleration time: 00.1 ~ 999s

1.) When the Acceleration time is set too low, the inverter could trip on Over Current (OC). If the time can not be increased then trip prevention can be used. A trip prevention level has to be programmed. When the inverter detects this level it holds the acceleration until the current is below this set level and then continues with acceleration.

2.) When the Deceleration time is set too low the inverter could trip on Over Voltage (OV). If the time can not be increased then trip prevention can be used. A trip prevention level has to be programmed. When the inverter detects this level it holds the deceleration until the voltage is below this set level and then continues with deceleration.

3.) The Inverter could trip (Stall) during run mode due to an impact load or sudden change of the load.
Stall prevention in run mode will detect a programmed stall level (C06) for a period of time (C07). If the level exceeds C06, then the inverter reduces its frequency (speed) to provide the required additional torque to overcome the stall. Once this level is below the programmed stall level, then it ramps up to its normal running speed.

C09 Direct start on power up	**000: Enable direct start on power up.** **001: Disable direct start on power up.**


Danger:

1.) When C09=000 and external run mode (F04=001), the inverter will auto start when the power is supplied to the inverter and the run switch is ON.

This feature should only be considered when all safety implications of its use have been investigated. (Risk assessment for maintenance, use of warning labels etc.)
We recommend that this mode stay disabled.

2.) When C09=001 and external run mode (F04=001), the inverter will not auto start when power is supplied and the RUN switch is ON.
Inverter display will blink "SP1" error message. It can only restart after the RUN switch was turned off and ON again.

C10 Reset mode	000: Reset is enable when RUN switch is OFF. 001: Reset is enable with RUN switch OFF or ON.

C10=000. Fault can not be reset, therefore the inverter can not start when the RUN switch is in ON position. (F4=001)

C11 2nd acceleration time (s): 00.1 – 999
C12 2nd deceleration time (s): 00.1 – 999 for emergency Stop reference

C13 Fan control	000: Auto-run by temperature 001: Run when inverter running 002: Always run. 003: Always stop.

1.) C13=000: The fan will auto run at or above a set certain temperature in order to extend the life span of the fan.
2.) C13=001: The fan runs as long as inverter is running.
3.) C13=002: The fan runs as long as power is supplied.
3.) C13=003: The fan does not run at any time.

C14 Control mode	Vector control or V/F control
C17 Max. output frequency (HZ)	= 50.0 –200Hz
C18 Output voltage ratio at max. frequency (%)	= 00.0 – 100%
C19 Mid frequency (HZ)	= 00.1 – 200Hz
C20 Output voltage ratio at mid. frequency (%)	= 00.0 – 100%
C21 Min. output frequency (HZ)	= 00.1 – 200Hz
C22 Output voltage ratio at min. frequency (%)	= 00.0 – 100%

C17~C22 please refer to C15 description

C15 Preset V/F patterns = 1 – 7

C15 = 007. Select user-set v/f pattern by setting parameters C17~C22.
See the diagram below. Care should be taken when this feature is used as improper setting of these parameters will have an adverse effect on motor performance.

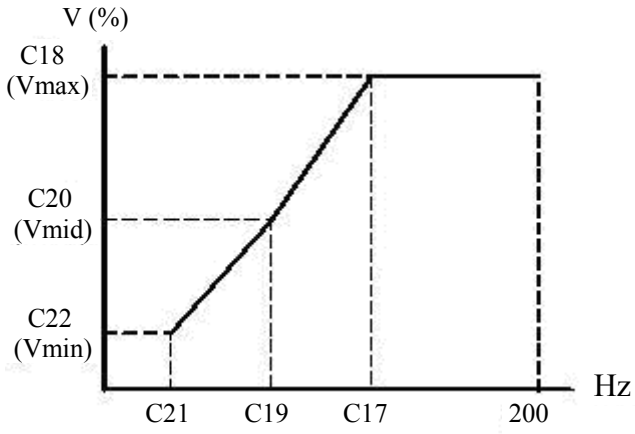


Figure 4-14a User configured V/F pattern

C15 = 001– 006 fixed V/F patterns (see below).

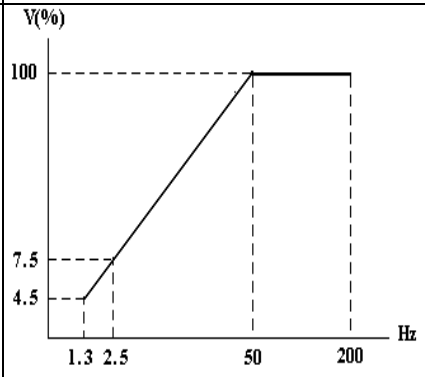
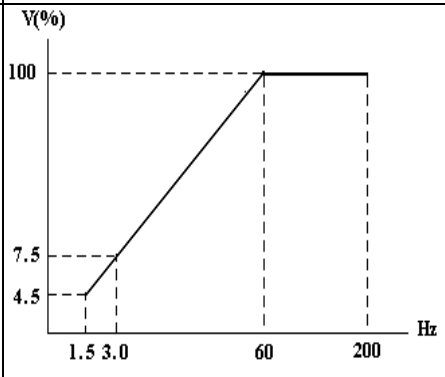
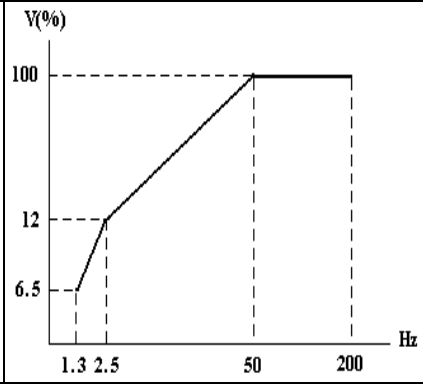
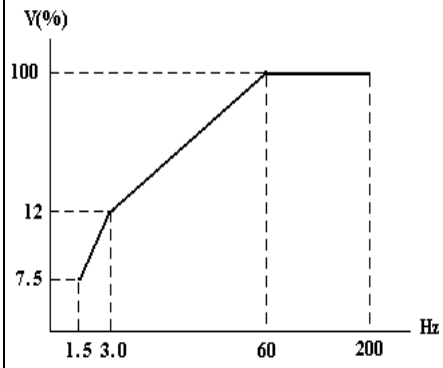
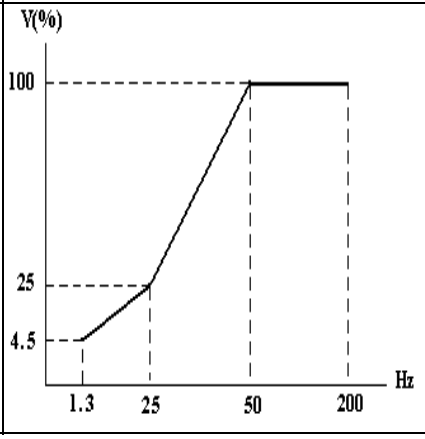
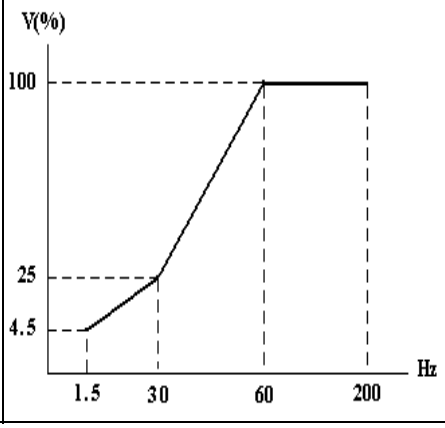
Spec	Purpose	C15	V/F Pattern	Spec	Purpose	C15	V/F Pattern
50 Hz System	General	001		60 Hz System	General	004	
	High starting torque	002			High starting torque	005	
	Variable torque	003			Variable torque	006	

Figure 4-14b Pre-configured V/F patterns

C16 VF base output voltage set

At C17=60HZ

C18=100%

For 200~240V, patterns based an output voltage are shown below. (Corresponding settings for 400-480 volts input: multiply by 2)

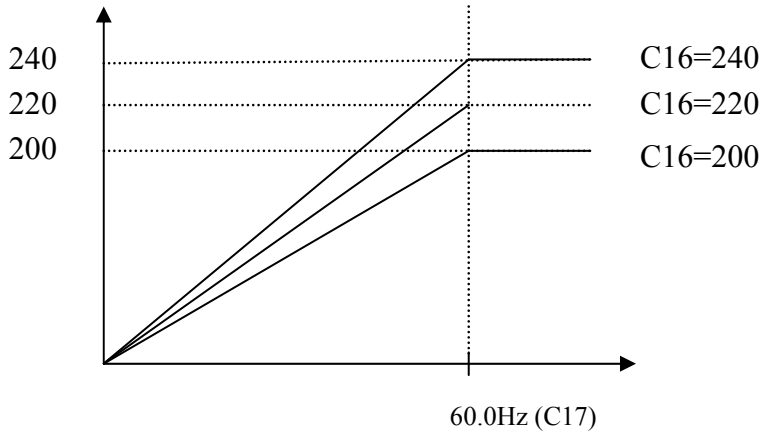


Figure 4-15 V/HZ curves with varying base voltages

When the output voltage is set higher than the input voltage, the max output voltage is limited to the max input voltage.

C23 Torque Boost Gain (V/F) (%) 00.0 – 30.0%

C24 Slip Compensation Gain (V/F) (%) 00.0 – 100%

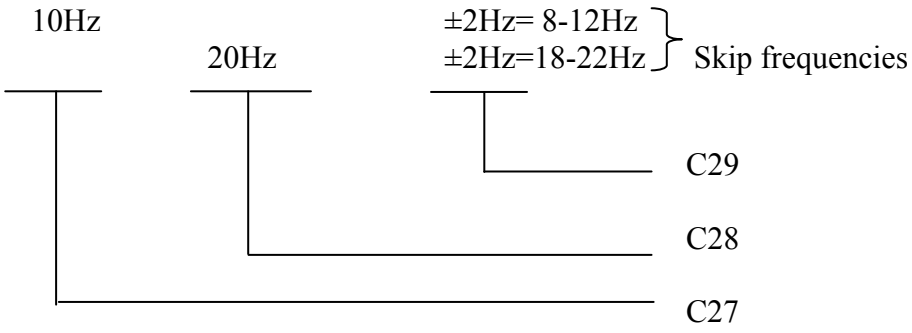
C25 Motor no load current (A)

Motor no load current varies with inverter capacity F00. Please adjust according the actual conditions.

C26 Electronic thermistor protection for motor (OL1) :
000: Protection Enabled
001: Protection Disabled

C27 Skip frequency 1 (Hz) : 00.0 –200
C28 Skip frequency 2 (Hz) : 00.0 –200
C29 Skip frequency range (± Hz) : 00.0 –30.0

Example: C27=10.0Hz/C28=20.0Hz / C29=02.0Hz



C30 PID operation mode
000: PID Function disabled.
001: PID Control, Deviation is derivative controlled
002: PID Control, Feedback is derivative controlled.
003: Same as 001 but (reverse characteristics control).
004: Same as 002 but (reverse characteristics control).

C30 =1: D is the deviation of PID error in the unit time (C34).

=2: D is the deviation of feedback value in the unit time (C34).

=3: D is the deviation of PID error in the unit time (C34). If the deviation is positive, the output frequency decreases, and vice versa.

=4: D is the deviation of feedback value in unit time (C34).When the deviation is positive, the frequency decreases, and vice versa.

C31 PID error gain : 0.00 - 10.0

C31 is PID error gain, that is feedback value = feedback value × C31.

C32 P: Proportional gain : 0.00 - 10.0

C32: Proportional gain for P control.

C33 I: Integral time (s) : 00.0 - 100

C33: Integral time for I control

C34 D: Differential time (s) : 0.00 - 10.0

C34: Differential time for D control.

C35 PID offset 000: Positive direction
001: Negative direction
C36 PID offset adjust (%) : 000 ~ 109%

PID operation result can be adjusted by C36 (C35 effects the polarity of C36).

C37 PID update time (s): 00.0 - 02.5

C37: the refresh time of the PID output command.

Note: PID function is used in flow control, external fan wind volume control, and temperature control. See flow control diagram below.

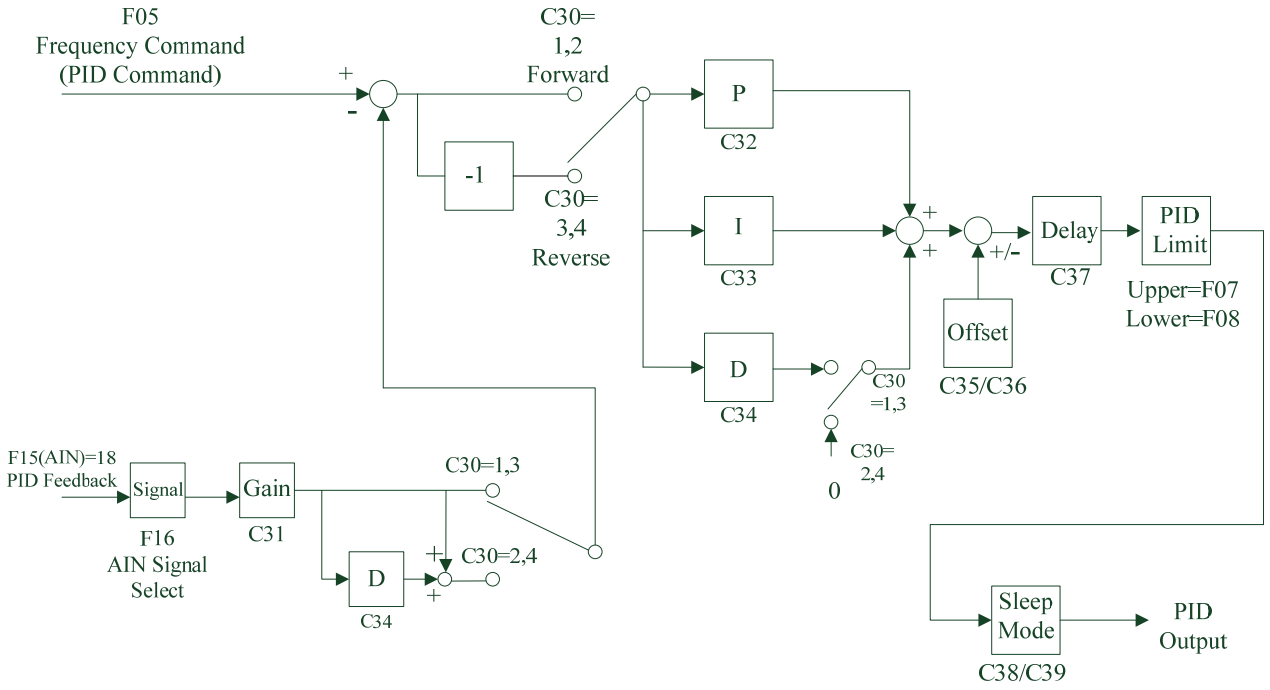


Figure 4-16 PID flow control diagram

1. In PID mode select, AIN on TM2 is the PID feedback signal (Set F15=018.)
2. The PID command (set point) is selected by parameter F05 (selections 000 & 001). This value is stored in F28.

C38 PID Sleep start frequency (Hz) 00.0~200Hz
C39 PID Sleep delay time (sec) 00.0~25.5sec

PID sleep mode requires setting all functions below
C30=001~004(PID Enable)
F15=018(AIN is PID feedback signal)
F28=PID preset frequency
C38 sleep start frequency, unit: Hz
C39 PID sleep delay time, unit: Sec

When PID output frequency becomes lower than the PID sleep start frequency (C38) for a period of time (C39),then the inverter output will decelerate to zero speed(Sleep mode). When the PID output frequency becomes higher than the sleep start frequency (C38), the inverter output accelerates to PID output frequency (Wake mode). Refer to figure 4-17.
.

Timing diagram is as following:

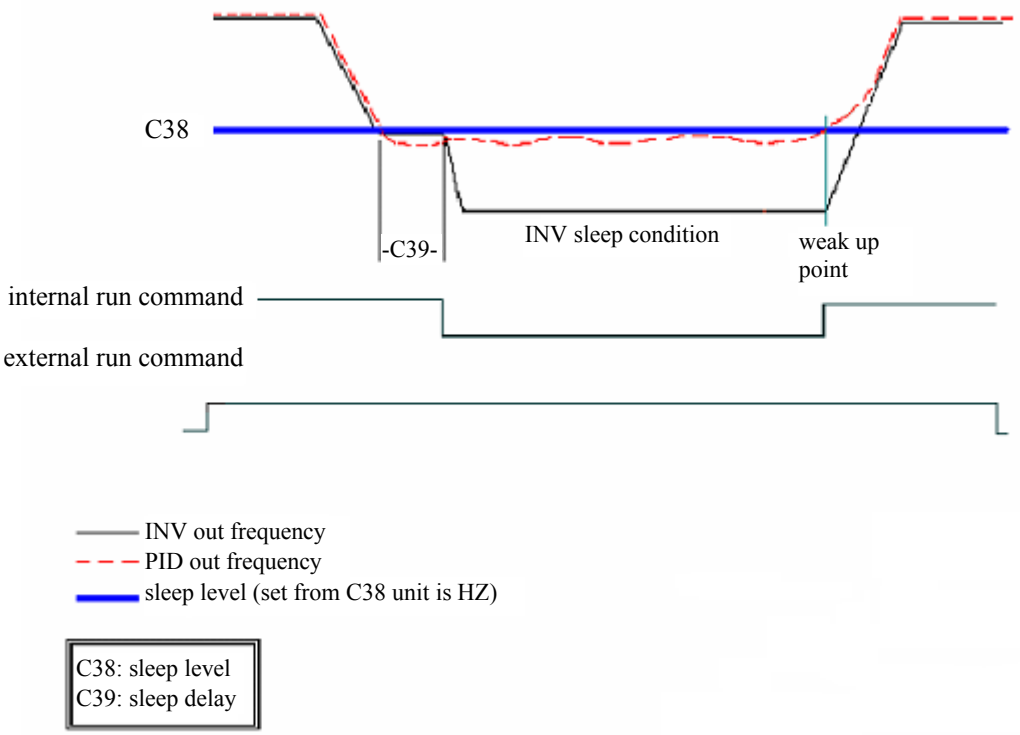


Figure 4-17 Sleep/ Wake Mode

C40 Frequency Up/Down control using MFIT :

000: When using Up/Down command, the set frequency by this function will be stored after the inverter stops.
UP/DOWN function is not available in stop mode.

001: When using Up/Down command, the set frequency will be reset to 0Hz after the inverter stops.

002: When using Up/Down command, the set frequency will be stored after the inverter stops. UP/DOWN function is available in stop mode.

1) C40=000: when the RUN signal is ON, the inverter will accelerate to the F28 setting then continue to run at the set command speed. When UP/DOWN terminal is activated, the inverter begins to accelerate/decelerate until the signal is released then. It run at the reached speed.

   When the RUN signal is OFF, the inverter decelerates to stop (or coasts to stop) according to the setting of F09. The last output frequency when the RUN signal is OFF, will be stored in F28.

   UP/DOWN Key is unavailable in stop. The stored frequency can not be changed by Up/Down

   Terminal, but can be changed by the content of F28 by keypad.

2) C40=001: the inverter will run from 0 Hz as the run signal is applied.
   UP/DOWN operation method is same as C40=000. But on next RUN signal is ON, inverter always starts up from 0Hz.

3) C40=002: Same as when C40=001 but UP/DOWN is available while in stop mode.

C41 Local /Remote control select description

(Selected by pressing Reset & Enter keys Simultaneously).
Every time these two keys are pressed the control mode toggles
From one to the other. This is a useful function for commissioning (quick, mode change over).

For example if the Start/stop and Frequency setting is set to communication method.
(F04=2 & F05=4), then the inverter can be put to local mode by this method.

This function is useful for quick change over between local and remote modes
For setting frequency and run functions of the inverter, in local mode there is no need to change the setting of parameters F04 & F05.

In local mode. Run/stop and frequency can be set from the keypad.
Set C41=000 for frequency to be set by up/down keys.
Set C41=001 for frequency to be set by VR (Potentiometer) on keypad.
F04&F05 setting are ineffective.

In Remote mode. Run/stop & frequency functions will be according to the setting of parameters F04 (run modes) & F05 (Frequency modes).

C42/43 (option card)	**S5/S6 terminal on MFIT Setting**
	000: Forward
	001: Reverse
	002: Preset speed command 1
	003: Preset speed command 2
	004: Preset speed command 3
	005: Jog Frequency Command
	006: Emergency Stop (E.S.)
	007: Base Block (b.b.)
	008: Switching to 2nd acceleration/ deceleration time.
	009: Reset
	010: Up Command
	011: Down Command
	012: Control signal switch
	013: Communication control signal switch
	014: Acceleration/ deceleration disable
	015: Master/ auxiliary speed switch
	016: PID function disable
	019: DC Brake signal
	020: DC Brake base on TM2 AIN Frequency

Refer to F11~F14

C44: Multi-function input terminal S1~S6 signal scan time (N. msec ×8), N = (1~100 times).
C45: AIN signal scan time (N. msec ×8), N = (1~100 times).

1.) If the C44 scan time is set to 80 ms as an example (i.e N=10) then digital input signals on for less than 80 msec will be ignored.
2.) If the scan signal is seen for N times (scan times), the inverter takes it as signal change. If it is seen for less than N times, it is seed as noise. One scan time: 8ms.
3.) User can set scan interval time according to noise in the operation environment. Extend C44/C45 if noise is a problem, however this will reduce the scan response time.

C46 (Option card) Multi-function output T+, T-

000: Run
001: Frequency reached [Preset target frequency ± F23]
002: Frequency reached [Preset output frequency level (F22) ±F23]
003: Frequency detection (>F22)
004: Frequency detection (<F22)
005: Fault.
006: Auto-restart
007: Momentary power loss
008: Emergency Stop (E.S.)
009: Base Block (b.b.)
010: Motor overload protection
011: Inverter overload protection
012: Reserve
013: Power ON
014: Communication error
015: Output current detection(>F24)

Refer to F21 description:

C47 Remote keypad control selection

000: Disable
001: Enable. Operation according to F09 on signal loss.
002: Enable. Operation at the last set frequency on signal loss.
(Stop mode by Inverter keypad or F04 parameter as appropriate).

1. Before Remote keypad installed, set C47 to 001 or 002 by main keypad, then POWER OFF and install the Remote keypad.
2. When C47=001, C49~C53 set parameter disable the following parameters will be auto set: Inverter communication address: No 1, Data bytes: 8 bit, Baud rated (bps): 38400, Parity bytes: no parity, Stop bytes: 1 bit.
3. Set C47 to 000 by main keypad after Remote keypad removed.
4. C47 can't be changed by Remote keypad.

Note: 1. For safety reason, please install or remove Remote keypad when POWER OFF.
2. If the Remote keypad installed while POWER ON and in stop mode, the inverter will be controlled by Remote keypad.
3. If the Remote keypad installed while POWER ON and in run mode, the inverter will be controlled by main keypad, it will not be effective until the inverter has stopped.

C48 Copy module

000: Copy module Disabled
001: Copy to module from inverter (Read)
The display will be blinking with "CPy"
002: Copy to inverter from module (write)
The display will be blinking with "CPy"
003: Read/ write check (Compare the parameters)
The display will be blinking with "CPr"

Note: Module copy function is applicable only to inverters with the same voltage and KW rating.

C49 Inverter communication address: 001~ 254

C49 set communication address, for the specific inverter when multi-inverters are controlled by communication method.

C50 Baud rate (bps)

000: 4800
001: 9600
002: 19200
003: 38400

C51 Stop bit	**000: 1 Stop bit** **001: 2 Stop bit**

C52 Parity bit	**000: No parity** **001: Even parity** **002: Odd parity**

C53 Data bits	**000: 8 bits data** **001: 7 bits data**

1. RS-485 communication: (requires RS485 port device)

1 to 1 control: PC or PLC or controller controls one inverter (C49 is set to 001~254).

1 to multiple drives control: PC or PLC or other controllers control several inverters (The maximum of inverter could be controlled is 32). When the communication address =000, the inverter is controlled by communication regardless of the C49 setting.

2. RS-232communication: (requires RS232 port)

1 to 1 control: PC or PLC or controller controls one inverter (C49 is set to 001~254).

Note: a. The BAUD RATE(C50) and communication format (C51/C52/C53) of PC (or PLC or other controller) and inverter should be the same.

b. The inverter will validate the modified parameters after the parameters modified by PC.

c. Communication protocol: refer to EV communication protocol description.

d. Parameter C49~C53 can't be changed via communication module

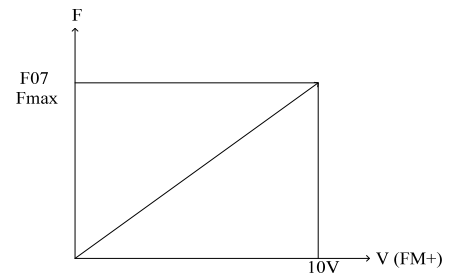
C54/ C55 Communication time-out detection time / Communication time-out operation selection

(1) Time-out detection time: 00.0~25.5sec; setting 00.0 sec: disable time-out function.
Default: 00.0sec
Communication time-out detection enable or not is according to C54，not relationship with Run/Frequency command.
*Cannot be modified during communication.

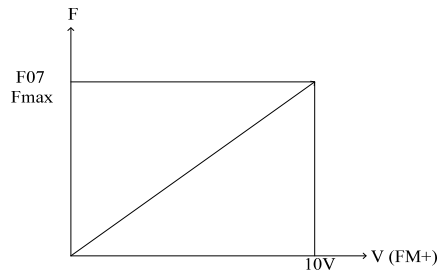
(2) Time-out operation selection:
000: Deceleration to stop (F02: Deceleration time 1).
001: Free run to stop.
002: Deceleration to stop (C12: Deceleration time 2).
003: Continue operating.
Default=000
Reset method:
a. Push the "Reset" button directly.
b. Receive correct Modbus data from Master.
After communication time-out, the motor decelerates to stop (C55 = 000, 001, 002). And the motor does not run automatic after reset, the inverter must set the run command again to restart.
*Cannot be modified during communication.
*Detail list please see Appendix.

F26 Multifunction analog output control:

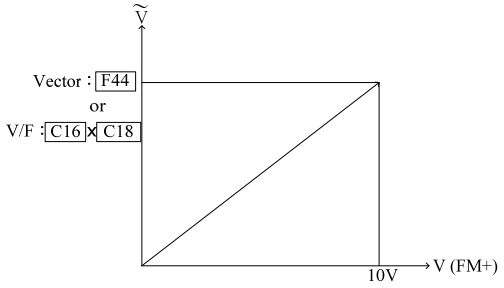
F26=000



F26=001

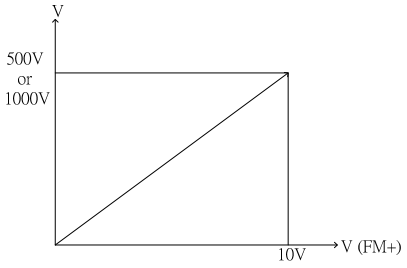


F26=002



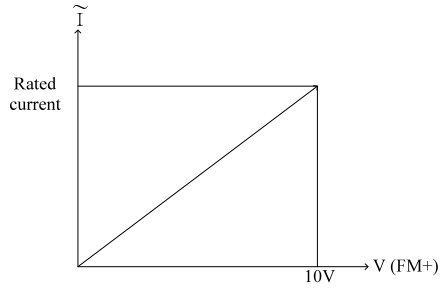
1. When C14=0 (vector)
   FM+ 0~10V corresponds to 0~ motor rated voltage (F44)
2. When C14=1 (V/F) FM+ 0~10V corresponds to 0~ V/F base output voltage set (C16) x Max output frequency voltage ratio % (C18)

F26=003



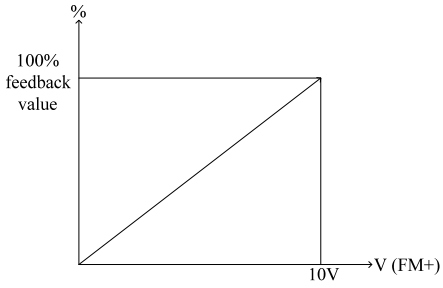
200V class: FM+ 0~10V corresponds to 0~500Vdc
400V class: FM+ 0~10V corresponds to 0~1000Vdc

F26=004



Ex. The rated current of 201 is 4.5A, FM+ 0~10V corresponds to 0~4.5A

F26=005



1. When C-30≠0, FM+ 0~10V corresponds to 0~100% feedback value.
2. When C30=0 FM+ 0~10Vcorresponds to 0~10V or 0 ~ 20mA on S6.

Chapter 5 Troubleshooting and maintenance

5.1Trouble indication and corrective action

5.1.1 Fault/ Error display and Diagnostics

1. Un- reset able / un recoverable Errors

Display	Error	Cause	Corrective Action
EPR	EEPROM problem	EEPROM problem	Change EEPROM
@ OV	Over voltage during stop	Voltage Detection circuit malfunction	Repair or replace unit
@ LV	Under voltage during stop	1. Power voltage too low 2. Restraining resistor or fuse burnt out. 3. Detection circuit malfunctions	1. Check if the power voltage is correct or not 2. Replace the restraining resistor or the fuse 3. repair or replace unit
@ OH	The inverter is overheated during stop	1. Thermal Detection circuit malfunction 2. Ambient temperature too high or bad ventilation	1. Repair or replace unit 2. Improve ventilation conditions or relocate inverter
CTR	Current transducer detection error	Current transducer or circuit error.	Repair or replace unit

Note: "@" the Failure contact does not operate.

2. Errors which can be recovered both manually and automatically

Display	Error	Cause	Corrective Action
OCS	Over current at start	1.Motor winding and frame short circuit 2.Motor and ground short circuit 3.Power module is damaged	1. Check the motor 2. Check the wiring 3. Replace the power module
OCD	Over-current at deceleration	The preset deceleration time is too short	Set a longer deceleration time
OCA	Over-current at acceleration	1. Acceleration time is too short 2. The capacity of the motor is higher than the capacity of the inverter 3.Short circuit between the motor winding and frame. 4.Short circuit between motor wiring and earth 5. IGBT module is damaged	1. Set a longer acceleration time 2. Replace the inverter with the same or greater capacity as that of the motor 3. Check the motor 4. Check the wiring 5. Replace the IGBT module
OCC	Over-current during run	1. Transient load change 2. Transient power change	Increase inverter capacity
OVC	Over voltage during operation/ deceleration	1. Deceleration time setting is too short or excessive load inertia 2. Power voltage varies widely	1. Set a longer deceleration time 2. Add a braking resistor or braking unit 3. Add a reactor at the input line side 4. Increase inverter capacity
OHC	High heat sink temperature during operation	1. Heavy load 2. Ambient temperature too high or bad ventilation	1. Check if there are any problems with the load 2. Increase inverter capacity 3. Improve ventilation conditions 4. Inspect the setting value of parameter C13
COT	Communication time-out detection	1. C54 communication time-out detection time is too short. 2. Inverter communication is broke. 3. Inverter can not receive the correct Modbus data within detection time.	1. Increase C54 communication time-out detection time. 2. Keep the inverter communication. 3. Check the received Modbus data is correct from Master.
OVP	Over Speed	The acceleration or deceleration time is too short.	Set a longer acceleration or deceleration time.

3. Errors which can only be recovered manually (no auto-restart)

Display	Error	Cause	Corrective Action
OC	Over-current during stop	1. OC Detection circuit malfunction 2. Bad connection for CT signal cable	Send the inverter back for repair
OL1	Motor overload	1. Heavy load 2. Improper settings of F43	1. Increase motor capacity 2. Set F43 correctly according to motor nameplate.
OL2	Inverter overload	Excessively heavy load	Increase inverter capacity
LVC	Under voltage during operation	1. Power voltage too low 2. Power voltage varies widely	1. Improve power quality. 2. Set a longer acceleration time 3. Add a reactor at the power input side 4. Contact technical support

5.1.2 Set up Configuration, Interface Errors.

Display	Error	Description
SP0	Zero speed stop	Set frequency is <0.1Hz Increase set frequency
SP1	Fail to start directly	1. If the inverter is set to external control mode (F04=001), and direct start is disabled (C09=001), the inverter cannot be started and will flash STP1 when the Run switch is ON when applying power (see descriptions of C09). 2. Direct start is possible when C09=000.
SP2	Keypad emergency stop	1. If the inverter is set to external control mode (F04=001), the inverter will stop according to the setting of F9 when the stop key is pressed. STP2 flashes after stop. Turn the Run switch to OFF and then ON again to restart the inverter. 2. If the inverter is in communication mode and Stop key is enabled, the inverter will stop in the way set by F9 when Stop key is pressed during operation and then flashes STP2. The PC has to send a Stop command then a Run command to the inverter for it to be restarted.
E.S.	External emergency stop	The inverter will decelerate to stop and flashes E.S. when there is an external emergency stop signal via the multi-function input terminals(see descriptions of F11~F14).
b.b.	External base block	The inverter stops immediately and then flashes b.b. when external base block is input through the multi-functional input terminal (see descriptions of F11~F14).
PID	PID feedback signal loss	PID feedback signal circuit error detection
————	REMOTE KEYPAD cable broken	1. When REMOTE KEYPAD does not connect with inverter, this signal will be displayed on the Remote keypad. 2. When REMOTE KEYPAD connects with inverter, this signal will be displayed on the main keypad. 3. When both REMOTE KEYPAD and main KEYPAD display this signal means communication errors.

5.1.3 Keypad operation error description

Display	Error	Cause	Corrective Action
Er1	Key operation error	1. Attempt to Press▲ or ▼ keys when F05> 0 or in speed operation. 2. Attempt to modify parameters, which can not be modified during Run (see parameter list).	1. ▲ or ▼ keys can be used to modify frequencies only when F05=0. 2. Modify parameters only in stop mode.
Er2	Parameter setting error	1. F07 is within ranges of C27±C29or C28±C29 2. F07<F08 or F07=F08	1. Modify F32~F33 2. 3-00>3-01
Er5	Modification of parameter is not allowed during communication	1. Issue a control command during communication disabled 2. Modify C49~C53 during communication. 3. Change C47 by remote keypad.	1. Issue the enabling command before while communicating. 2. Set up parameters before communicating. 3. Change C47 by inverter keypad.
Er6	Communication error	1. Incorrect wiring. 2. Incorrect settings of communication parameters. 3. Check-sum error. 4. Incorrect communication verification.	1. Check the hardware and wiring. 2. Check C49~C53
Er7	Incorrect parameter settings	1. Attempt to modify F00 2. Voltage and current detection circuits are malfunctioning.	Reset inverter or contact technical support
EP1	Parameter set error, Copy Unit failure	1. Set C48=1.2, can not connect with Copy Unit. 2. Copy Unit failure. 3. The voltage and drive rating on Copy Unit & the inverter are different.	1.Modify C48 2.Change Copy Unit 3.Copy from keypad to inverter with only matched HP ratings
EP2	Parameters do not match	Copy the parameter to inverter to verify the parameter not matched.	1. Change Copy Unit 2. The voltage and HP rating of Copy Unit is different than the inverter.

5.2 General functional troubleshooting

Status	Checking point	Corrective Action
Motor does not run	Is power applied to L1, L2, and L3(N) terminals (is the charging indicator lit)?	• Is the power applied? • Turn the power OFF and then ON again. • Make sure the input line voltage is correct. • Make sure all terminal screws are secured firmly.
	Are there voltage outputs on T1, T2, and T3 terminals?	Turn the power OFF and then ON again.
	Is the motor mechanically overloaded?	• Reduce the load to improve performance.
	Are there any problems with the inverter?	• See error descriptions to check wiring and correct if necessary.
	Has the forward or reverse run commands been issued?	
	Is there an analog input signal?	• Is analog frequency input signal wiring correct? • Is frequency input voltage correct?
	Is operation mode setting correct?	• Configure operations through the digital panel
Motor rotates in the wrong direction	Are wiring for output terminals T1, T2, and T3 correct?	• Wiring must match U, V, and W terminals of the motor.
	Are wiring for forward and reverse signals correct?	• Check wiring and correct if necessary.
Motor rotates in the wrong direction The motor speed can not vary	Are wiring for output terminals T1, T2, and T3 correct?	• Check wiring and correct if necessary.
	Is the setting of frequency command source correct?	• Check the operation mode setting on the keypad.
	Is the load too large?	• Reduce the applied load.
Motor running at too high or too low speeds.	Is the setting of operation mode correct?	• Confirm the motor's specifications.
	Is the load too large?	• Confirm the gear ratio.
	Are specifications of the motor (poles, voltage…) correct?	• Confirm the highest output frequency.
Motor speed is incorrect or erratic	Is the gear ratio correct?	• Reduce the load.
	Is the setting of the highest output frequency correct?	• Minimize the variation of the load. • Increase capacities of the inverter and the motor.
	Is the load too large?	• Add an AC reactor at the power input side if using single-phase power. • Check wiring if using three-phase power.

5.3 Troubleshooting Flowcharts 7300EV Series

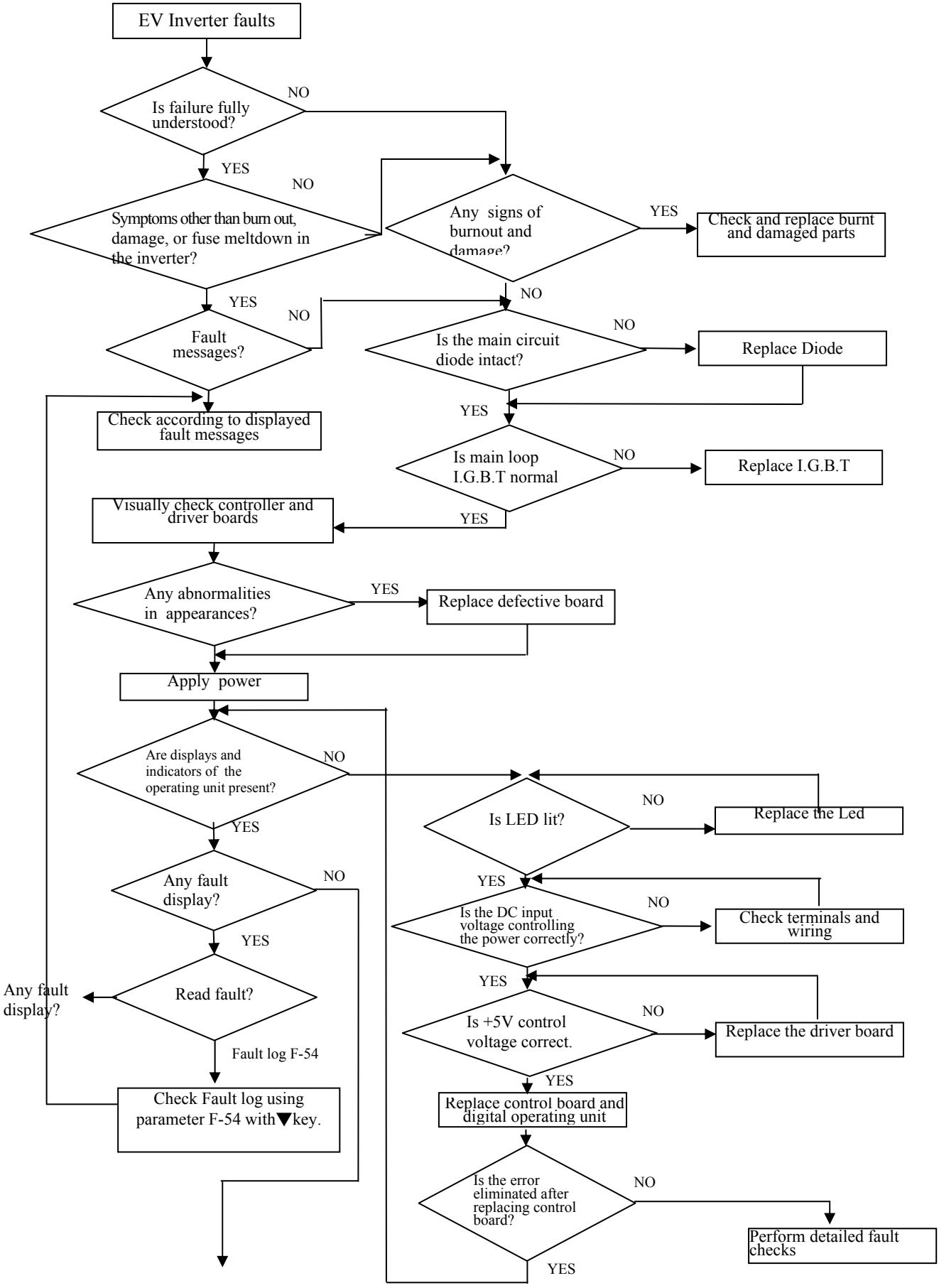


Figure 5-1 General troubleshooting flowchart

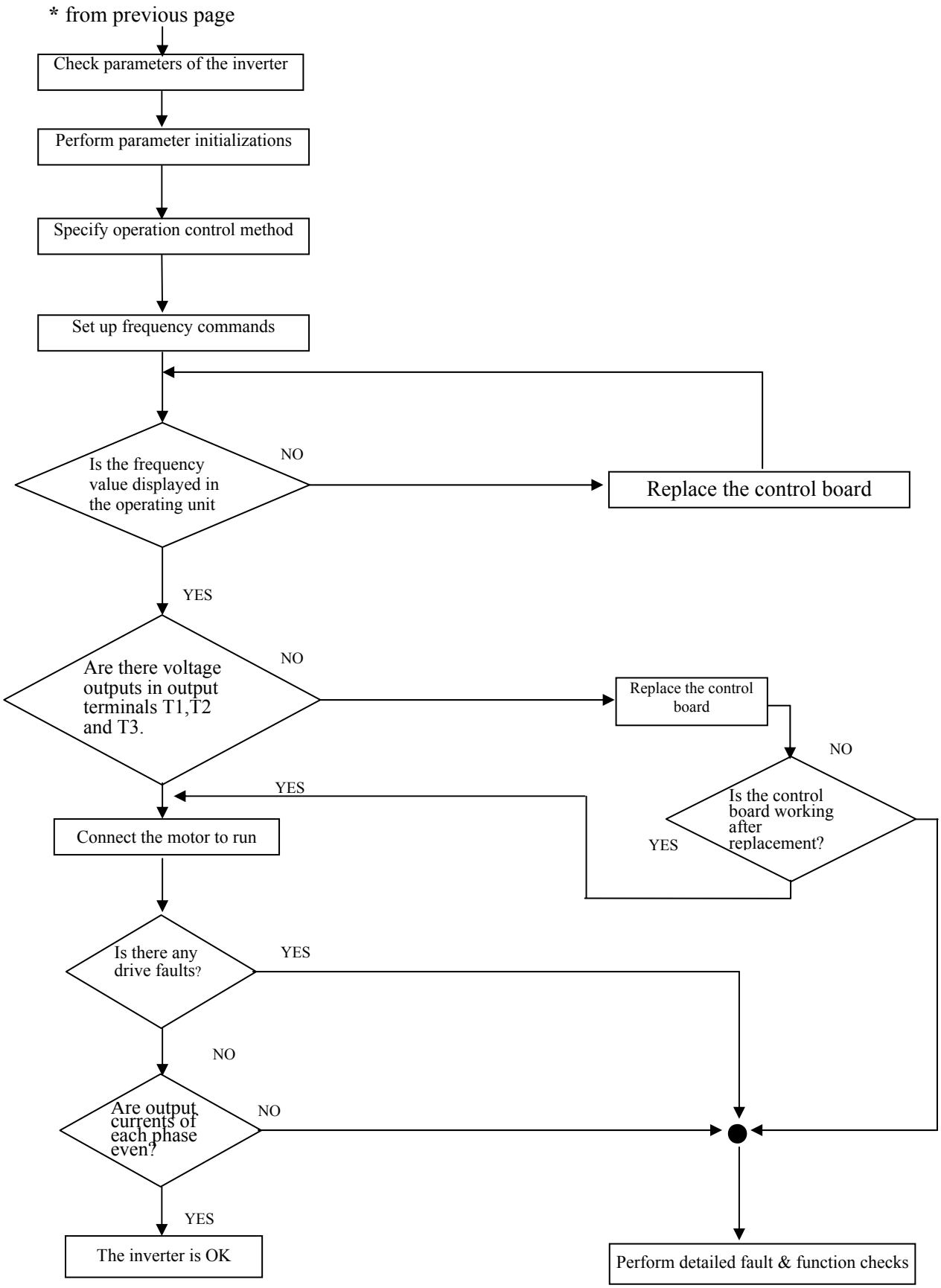


Figure 5-1 General troubleshooting flowchart, CONTD

Troubleshooting for OC, OL error displays

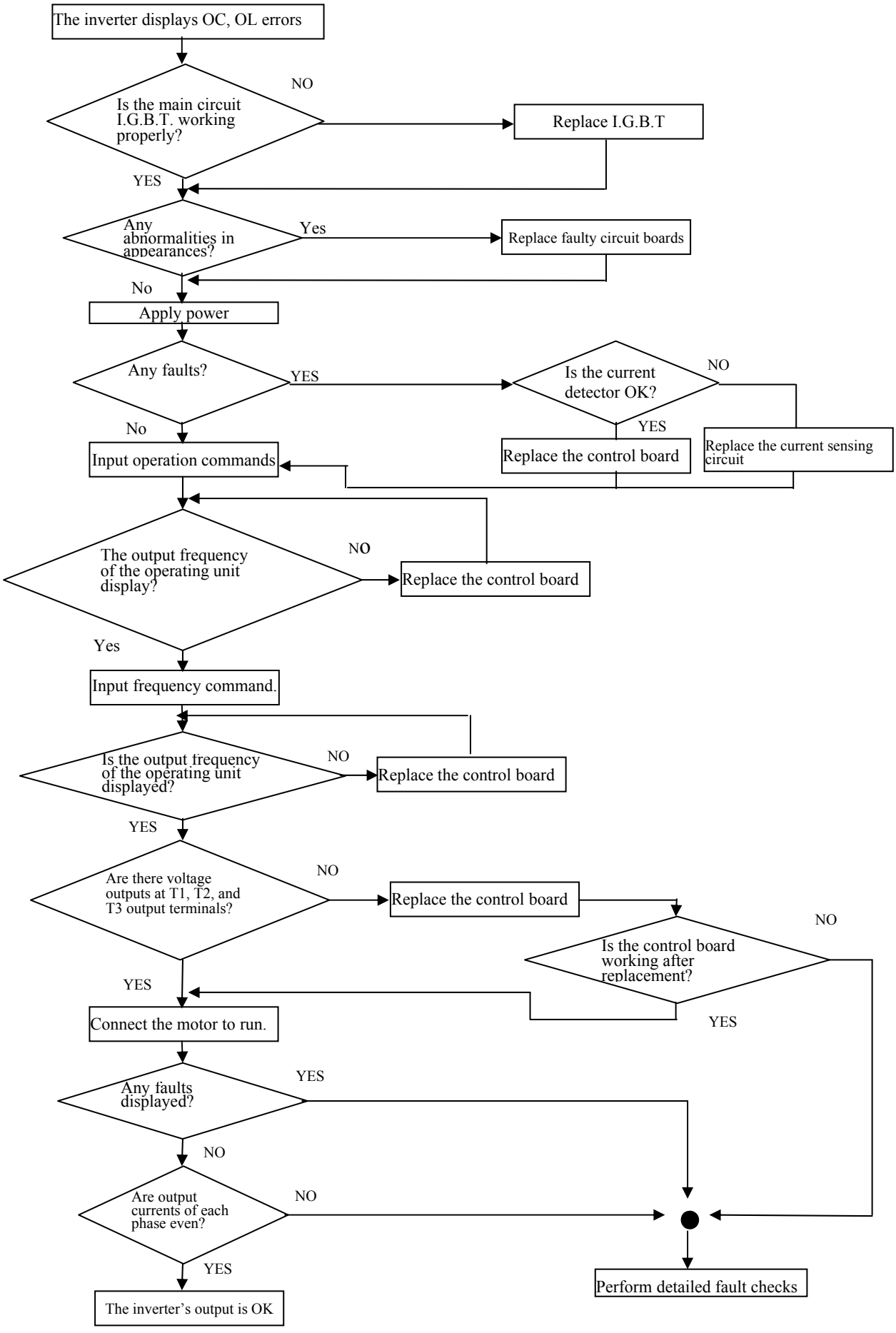


Figure 5-2 OC, OL fault troubleshooting

Troubleshooting for OV, LV error display

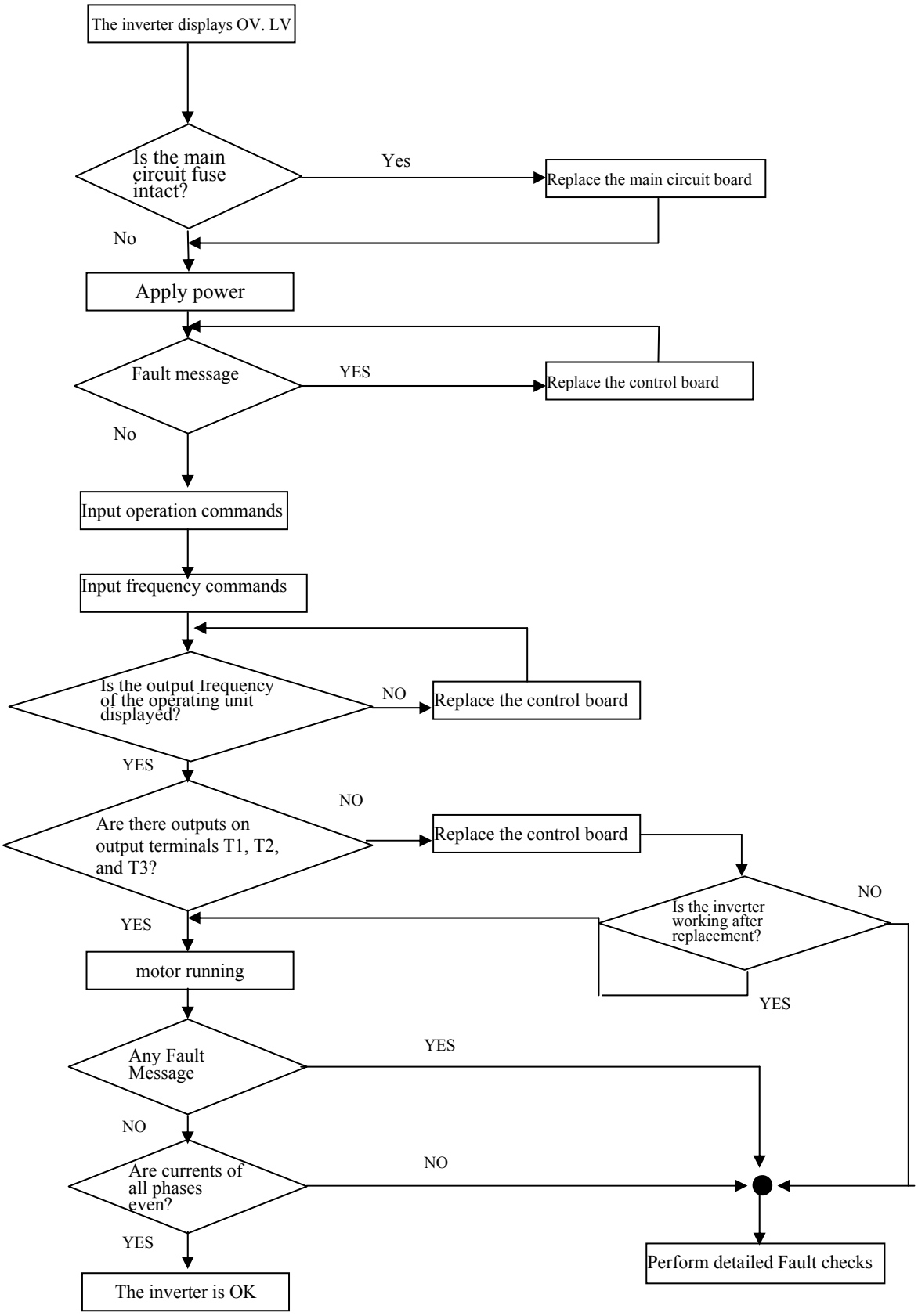


Figure 5-3 OV, Fault Troubleshooting

The motor doesn't run

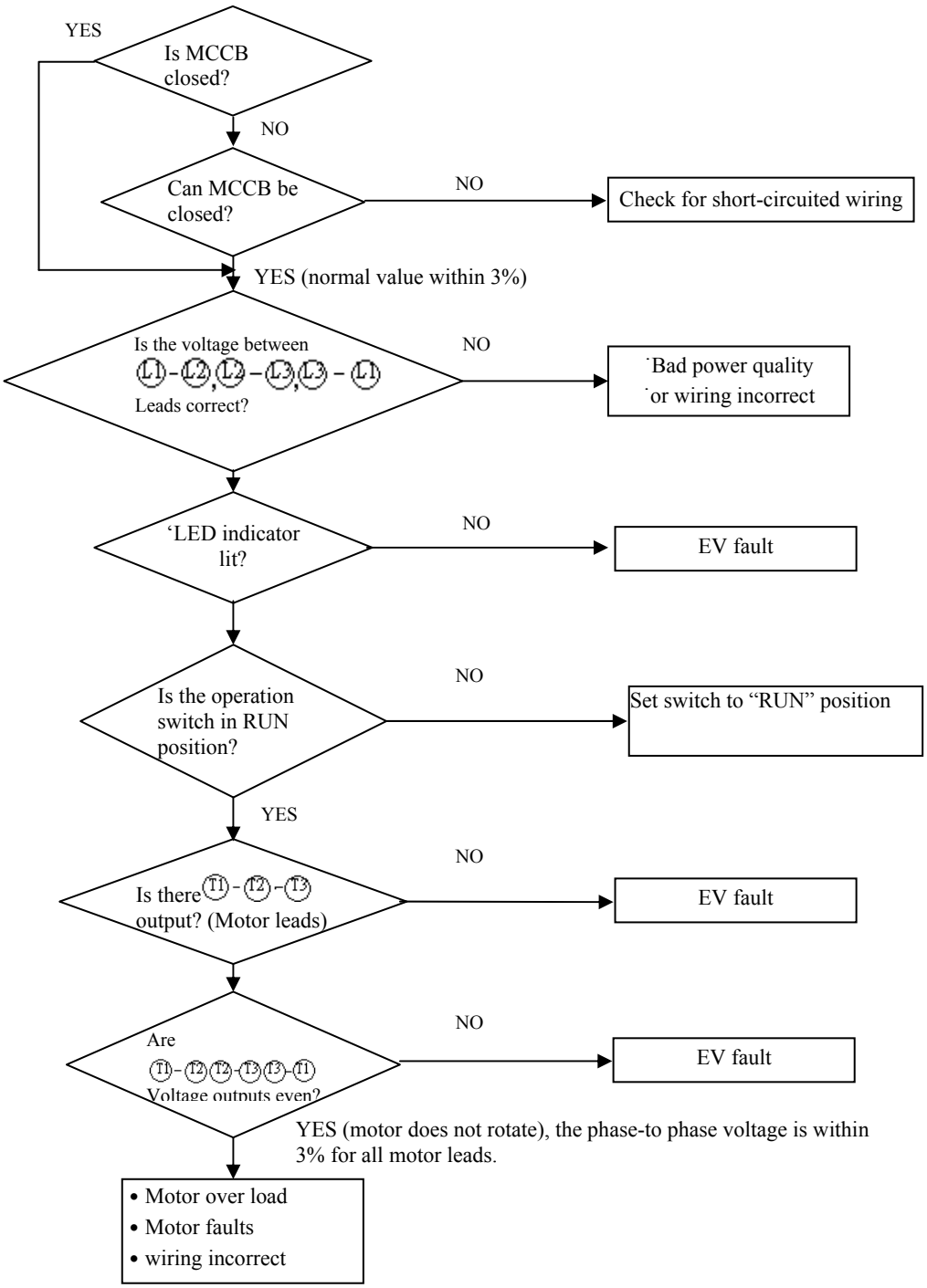


Figure 5-4 Drive Running Troubleshooting diagnostics

Motor is overheated

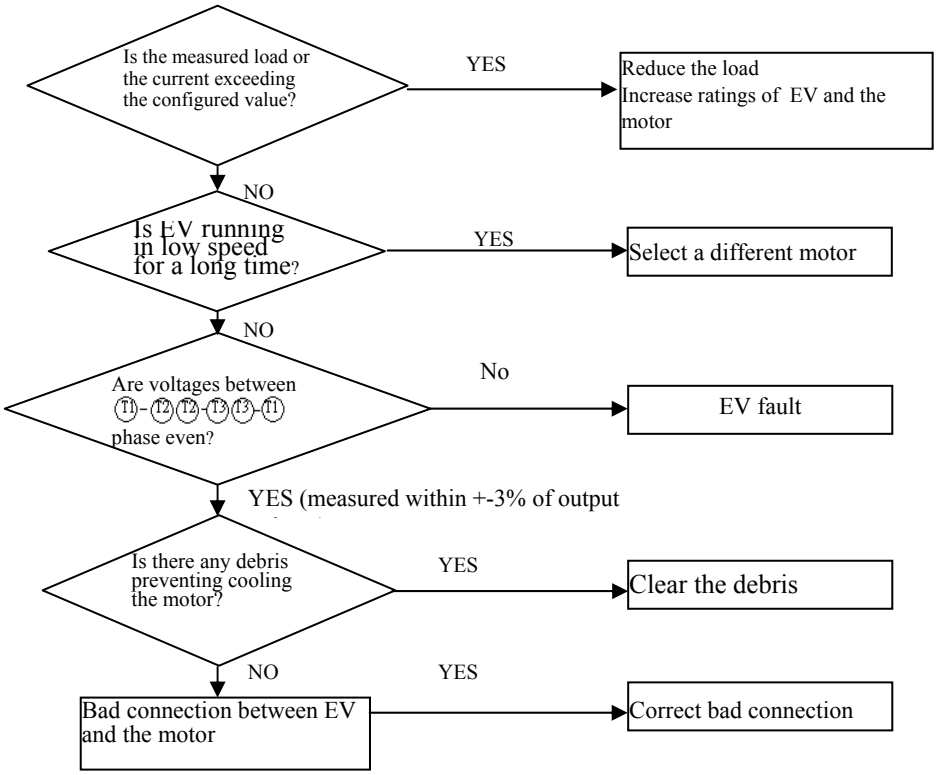


Figure5-5 Motor Overload/Overheating Diagnostics

Motor runs unevenly

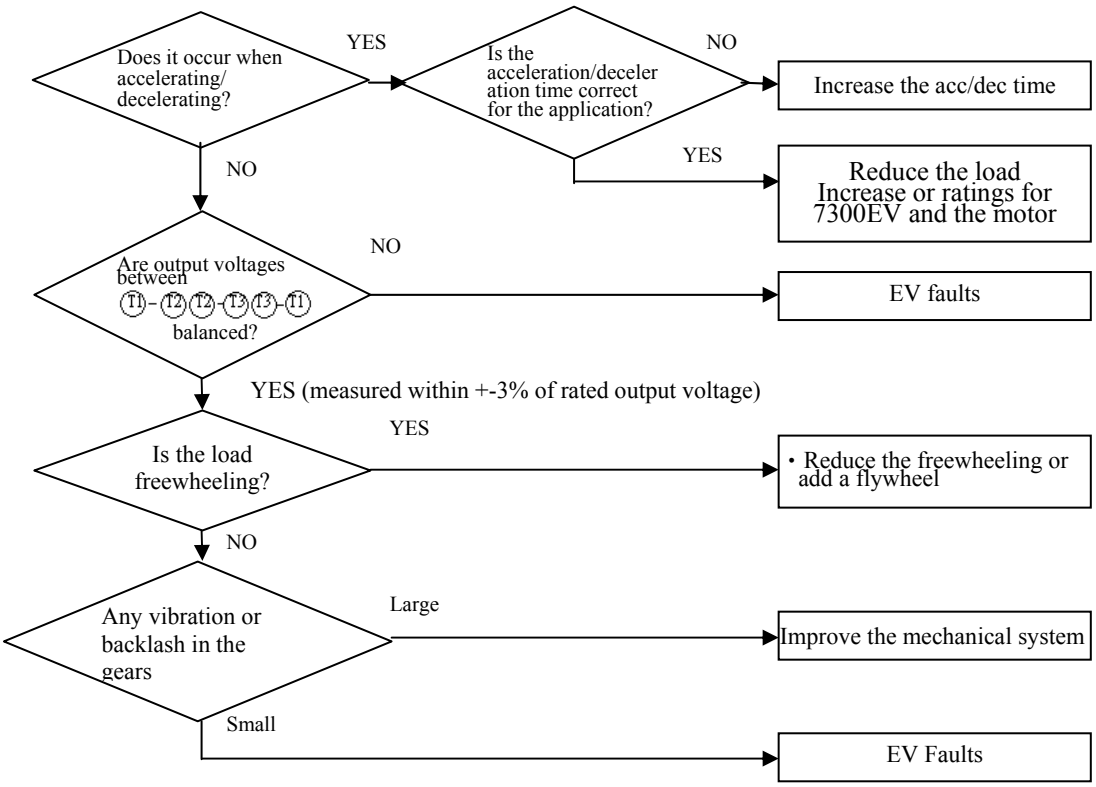


Figure5-6 Oneven Speed Operation Diagnostics

5.4 Routine and periodic checks

To ensure stable and safe operations, check and maintain the inverter regularly and periodically.
The table below lists the items to be check to ensure stable and safe operations.
Check these items 5 minutes after the "Charge" indicator goes out to prevent injury to personnel.

Items	Details	Checking period		Methods	Criteria	Remedies
		Daily	1 year			
Ambient conditions around the machine	Confirm the temperature and humidity at the machine	○		Measure with thermometer and hygrometer according to installation notices.	Temperature: -10 – 50°C (14~120°F) Humidity: Below 95% RH	Improve the ambient or relocate the drive to a better area.
	Are there inflammable materials in the vicinity?	○		Visual check	Keep area clear	
Installation and grounding of the inverter	Any unusual vibration from the machine	○		Visual, hearing check	No vibration	Secure screws
	Is the grounding resistance correct?		○	Measure the resistance with the Ground Resistor	200V series: below 100Ω 400V series: below 10Ω	Improve the grounding
Input power voltage	Is the voltage of the main circuit correct?	○		Measure the voltage with a multi-tester	Voltage must conform with the specifications	Improve input voltage
External terminals and internal mounting screws of the inverter	Are secure parts loose?		○	Visual check Check with a screwdriver	Secure terminals and no rust	Secure or send back for repair
	Is the terminal base damaged?		○			
	Visual rust stains present?		○			
Internal wiring of the inverter	Any unusual bends or breaks?		○	Visual check	No abnormalities	Replace or send back for repair
	Any damage of the wire insulation?		○			
Heat sink	Excessive dust or debris?	○		Visual check	No abnormalities	Clean up debris or dust
Printed circuit board	Conductive metal shavings or oil sludge present?		○	Visual check	No abnormalities	Clean or replace the circuit board
	Discolored, overheated, or burned parts		○			
Cooling fan	Unusual vibration and noise		○	Visual or hearing check	No abnormalities	Replace the cooling fan
	Excessive dust or debris?	○		Visual check		Clean fan
Power component	Excessive dust or debris?		○	Visual check	No abnormalities	Clean component
	Check resistance between each terminals		○	Measure with a multi-tester	No short circuit or broken circuit in three-phase output	Replace power component or inverter
Capacitor	Any unusual odor or leakage	○		Visual check	No abnormalities	Replace capacitor or inverter
	Any deformity or protrusion	○				

Chapter 6 Peripherals Components

6.1 Input side AC reactor

Model		Line input side AC inductance	
		Current (A)	inductance (mH)
JNEV-XXX-HXX	2P2/2P5-H1(F)/H3	5.0	2.1
	201-H1(F)/H3	5.0	2.1
	202-H1(F)/H3	19.0	1.1
	203-H1(F)/H3	25.0	0.71
	401- H3(F)	2.5	8.4
	402- H3(F)	5.0	4.2
	403- H3(F)	7.5	3.6

6.2 EMC filter

The inverter adapts rapid switching components to improve the efficiency of the motor and to reduce the motor noise. Using the EMC Filter allows the EMI (Electromagnetic Interference) and RFI (Radio Frequency interference)to be controlled within a certain range.

EMC standard

The inverter with filter complies with EMC standard 89/336/EEC on electro-magnetic interruption and radio interference. The inverters with filter have passed following test and comply with the specified standard.

EMI radio standard and EMS immunity standard:
EN 61800-3 1996/A11: 2000 : First Environment Unrestricted Distribution.
EN 61800-3 1996/A11: 2000 : First Environment Restricted Distribution.

Filter selection:

Inverter model		Rated (INPUT)	Built-in Filter model (First Environment./ Restricted Distribution.)	Optional Filter model (First Environment Unrestricted Distribution./ Restricted Distribution.)
JNEVXXX -HXX	1P2-H1	1 ϕ 85 ~132V	----------	JNFS24805-20-29 (Restricted Distribution.)
	1P5-H1	1 ϕ 85 ~132V	----------	
	101-H1	1 ϕ 85 ~132V	----------	
	2P2-H1	1 ϕ 170 ~264V	----------	
	2P5-H1	1 ϕ 170 ~264V	----------	
	201-H1	1 ϕ 170 ~264V	----------	
	2P2-H1F	1 ϕ 170 ~264V	Built-in (Restricted Distribution.)	JNFS24805-20-29 (Unrestricted Distribution.
	2P5-H1F	1 ϕ 170 ~264V		
	201-H1F	1 ϕ 170 ~264V		
	2P2-H3	3 ϕ 170 ~264V	----------	JNFS21019-8.9-07 (Restricted Distribution.)
	2P5-H3	3 ϕ 170 ~264V	----------	
	201-H3	3 ϕ 170 ~264V	----------	
	202-H1	1 ϕ 170 ~264V	----------	JNFS21015-22-07 (Unrestricted Distribution.)
	203-H1	1 ϕ 170 ~264V	----------	
	202-H1F	1 ϕ 170 ~264V	Built-in (Restricted Distribution.)	JNFS21015-22-07 (Unrestricted Distribution.)
	203-H1F	1 ϕ 170 ~264V		
	202-H3	3 ϕ 170 ~264V	----------	JNFS21016-15-07 (Unrestricted Distribution.)
	203-H3	3 ϕ 170 ~264V	----------	
	401-H3	3 ϕ 323~528 V	----------	JNFS20858-7-07 (Restricted Distribution.)
	402-H3	3 ϕ 323~528 V	----------	
	403-H3	3 ϕ 323~528 V	----------	
	401-H3F	3 ϕ 323~528 V	Built-in (Restricted Distribution.)	JNFS20858-7-07 (Unrestricted Distribution)
	402-H3F	3 ϕ 323~528 V		
	403-H3F	3 ϕ 323~528 V		

EV EXTERNAL FILTER SIZE

- **JNFS24805-20-29 FOR EV-1P2~201-H1** **Unit: mm(inch)**

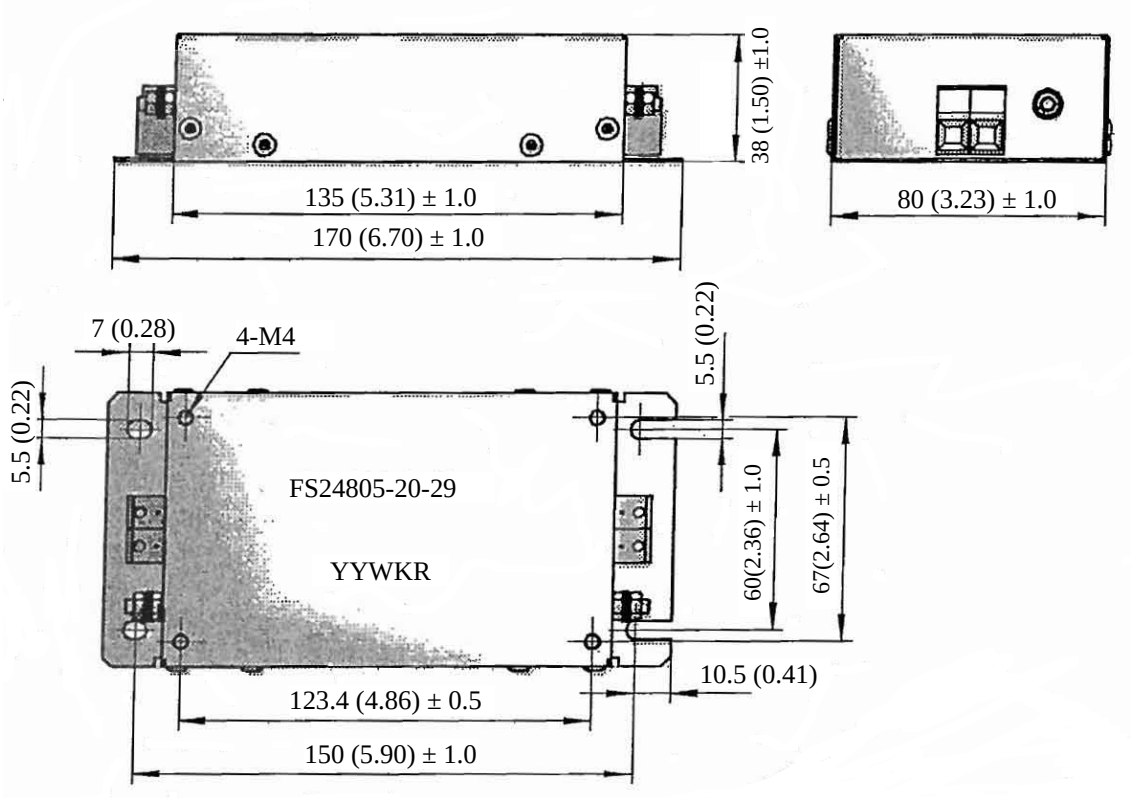


Figure 6-1a External Filter Dimensions JNFS24805-20-29

- **JNFS21019-8.9-07 FOR EV-2P2~201-H3** **Unit: mm(inch)**

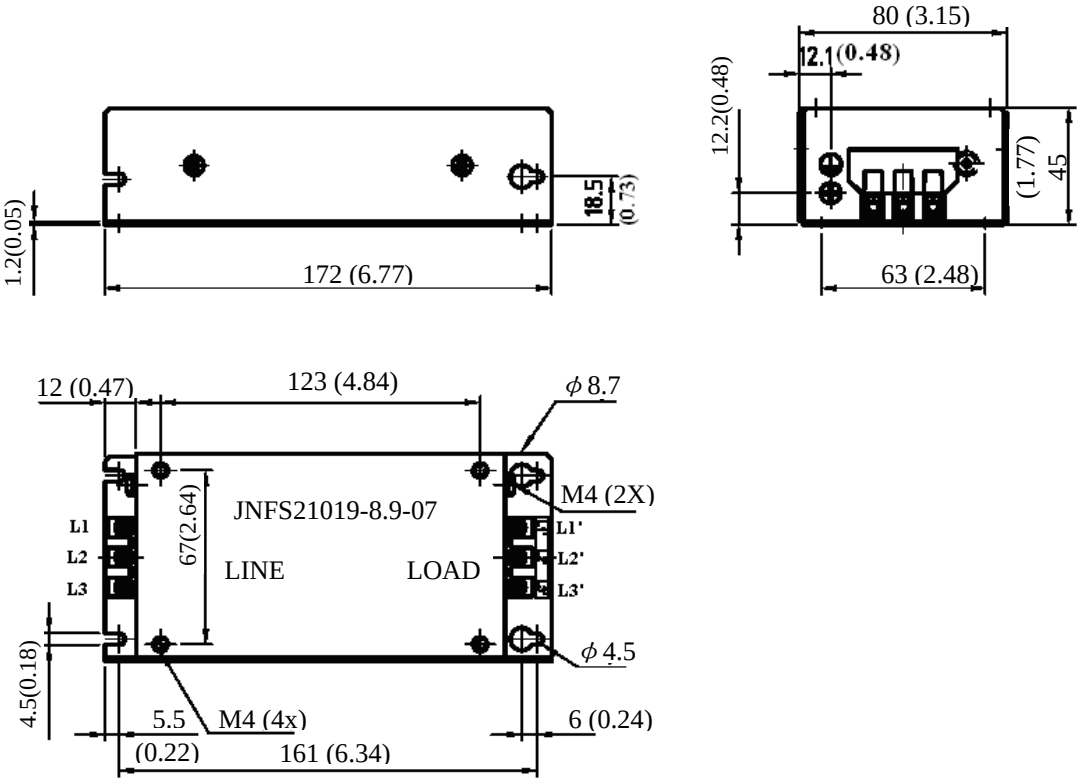


Figure 6-1b External Filter Dimensions JNFS21019-8.9-07

- **JNFS21015-22-07 FOR EV-202~203-H1 Unit: mm(inch)**

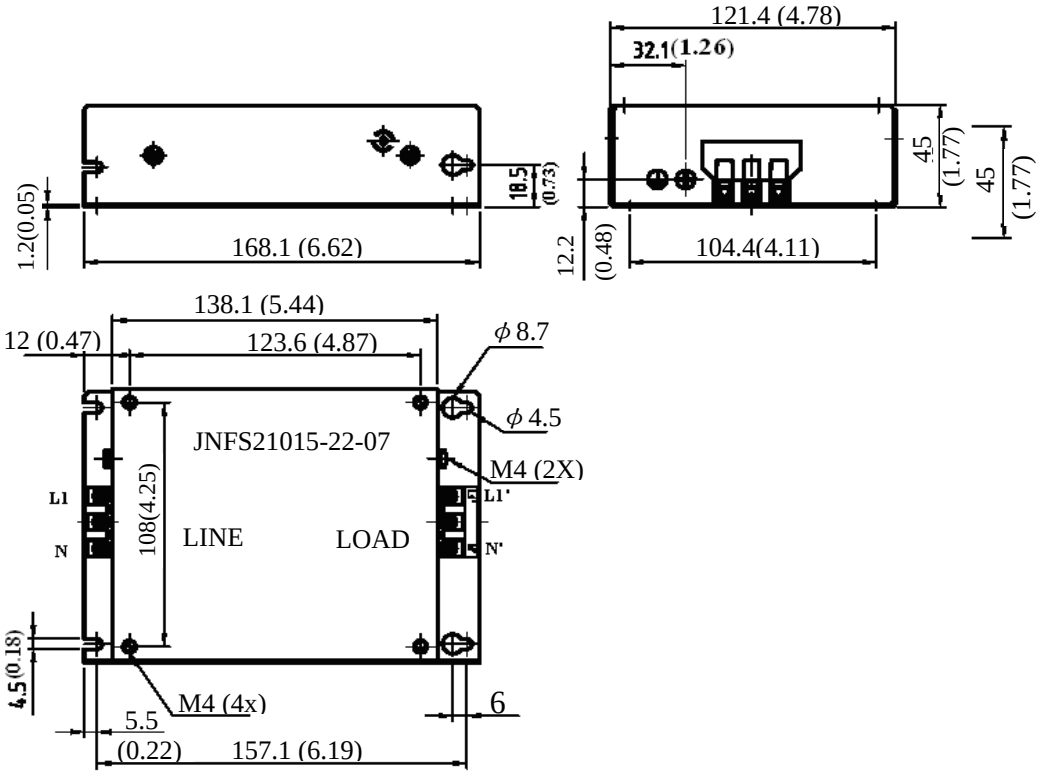


Figure 6-1c External Filter Dimensions JNFS21015-22-07

- **JNFS21016-15-07 FOR EV-202~203-H3 Unit: mm(inch)**

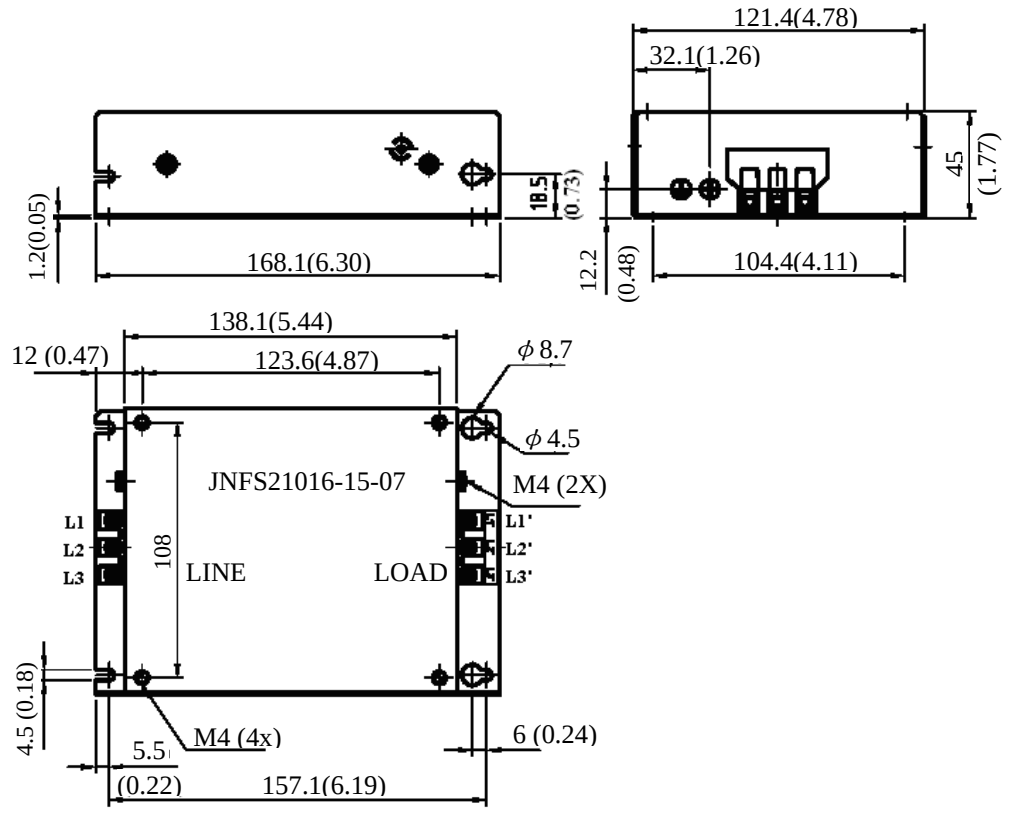


Figure 6-1d External Filter Dimensions JNFS21016-15-07

- **JNFS20858-7-07 FOR EV-401~403-H3 Unit: mm(inch)**

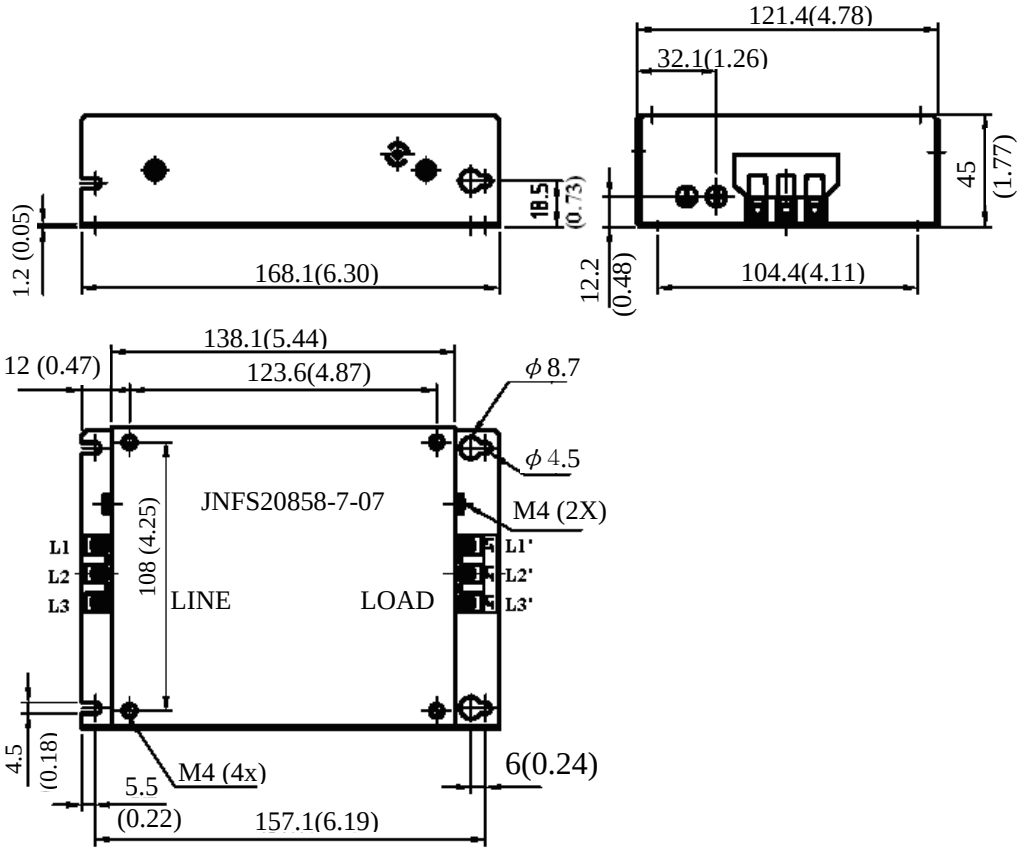


Figure 6-1e External Filter Dimensions JNFS20858-7-07

6.3 Option card

6.3.1 RS-485 option card (Model: JNSIF-485)

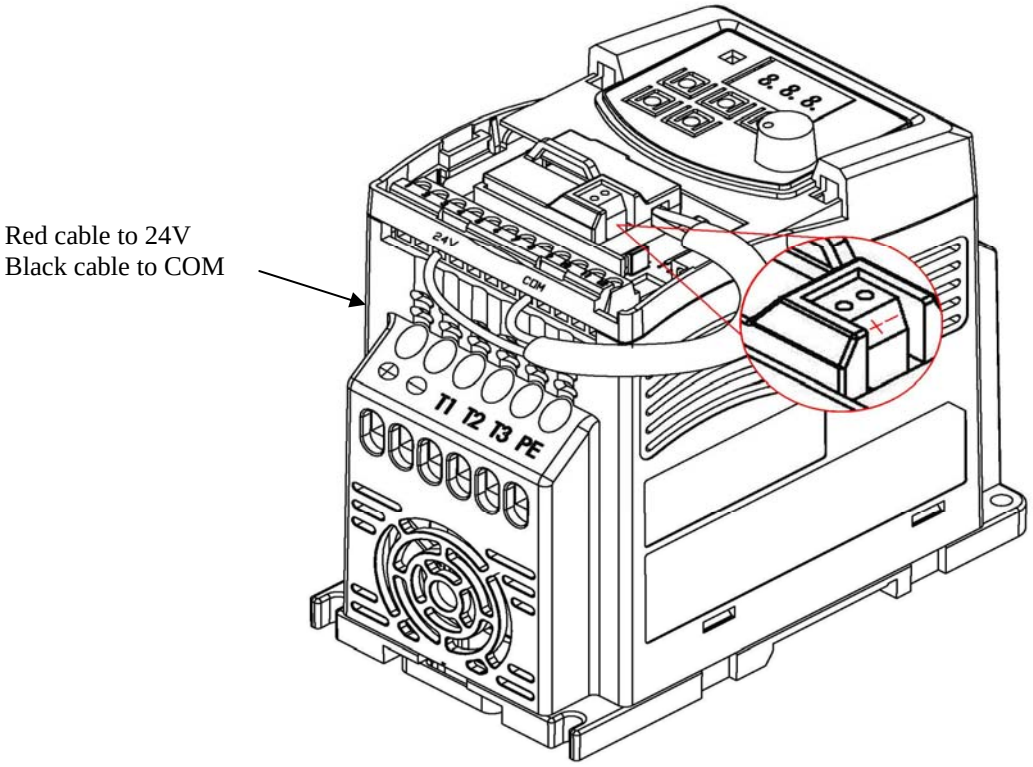


Figure 6-2 JNSIF-485 MODULE

JNSIF-485 wiring diagram:

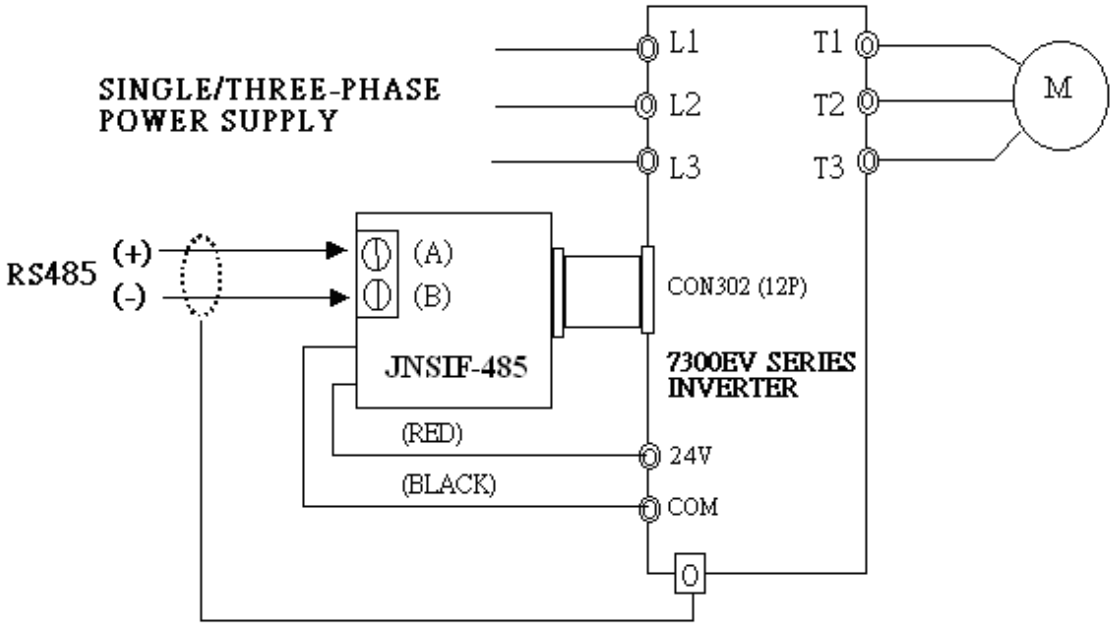


Figure 6-3 JNSIF-485 wiring diagram

※ Note :

In order to avoid external static electricity interference with option cards function, please replace cover of the inverter after installing option cards.

Please use isolated RS232 / RS485 converter connections with PC and option card to avoid equipment damage.

6.3.2 RS-232 option card (model: JNSIF-232)

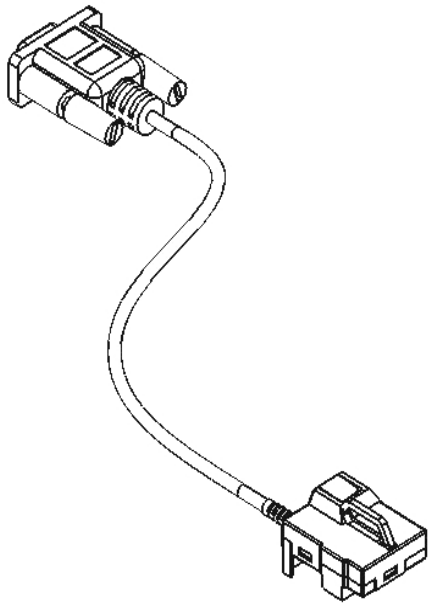


Figure 6-4a JNSIF-232 CABLE

JNSIF-232 wiring diagram

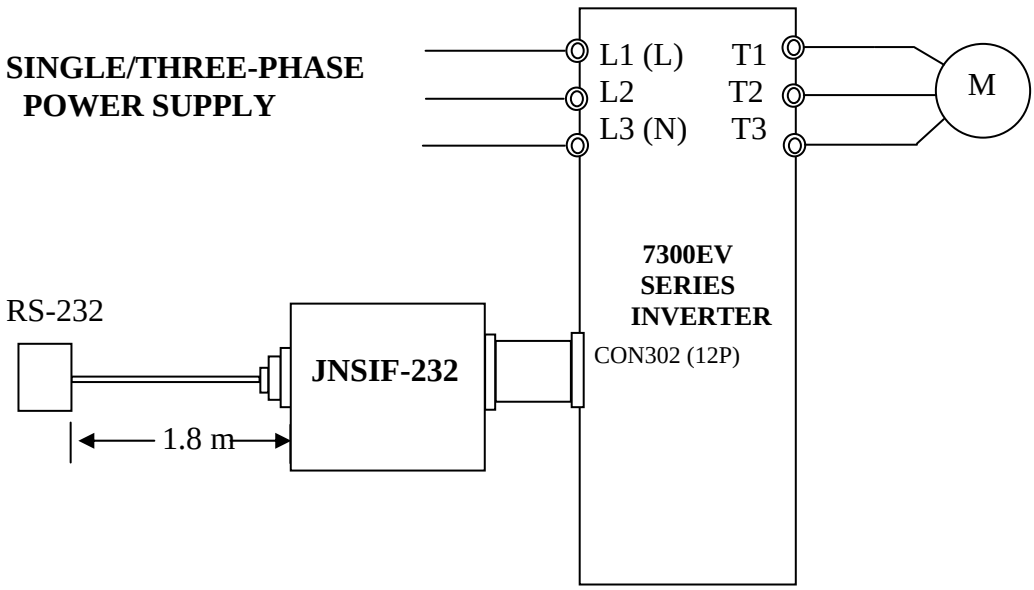


Figure 6-4b JNSIF-232 WIRING DIAGRAM

6.3.3program copy option card (Copy Unit) (model: JNSIF-MP)

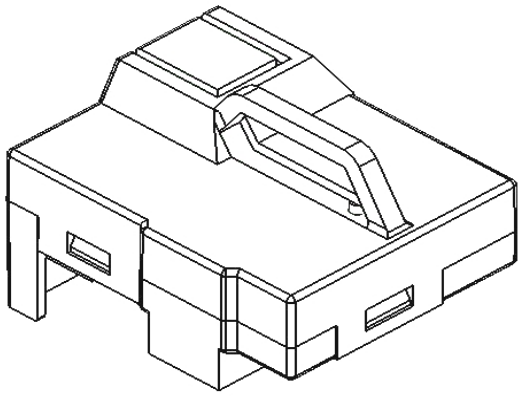


Figure 6-5a JNSIF-MP MODULE

JNSIF-MP Wiring diagram

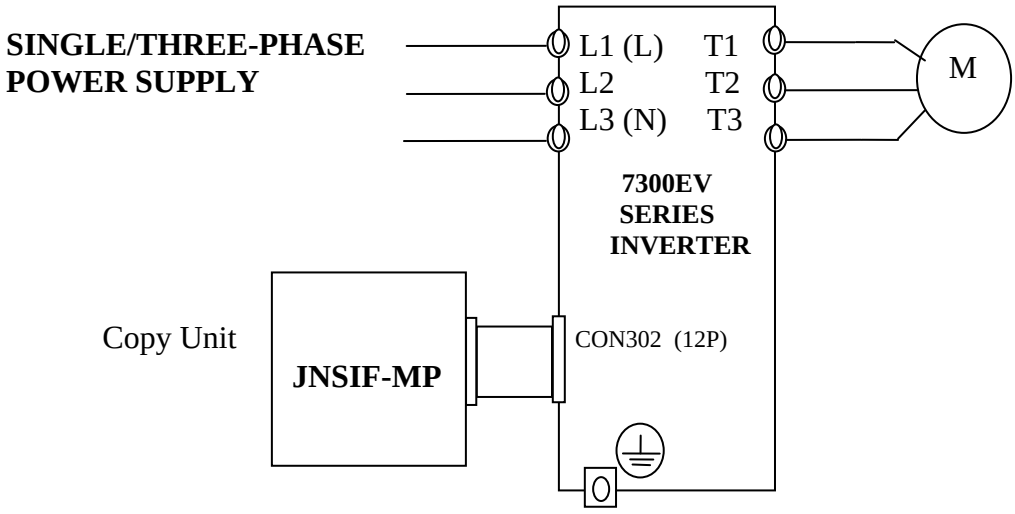


Figure 6-5b JNSIF-MP wiring diagram

6.3.4 Remote keypad (Remote keypad)(Model: JNSDOP-LED-2M)

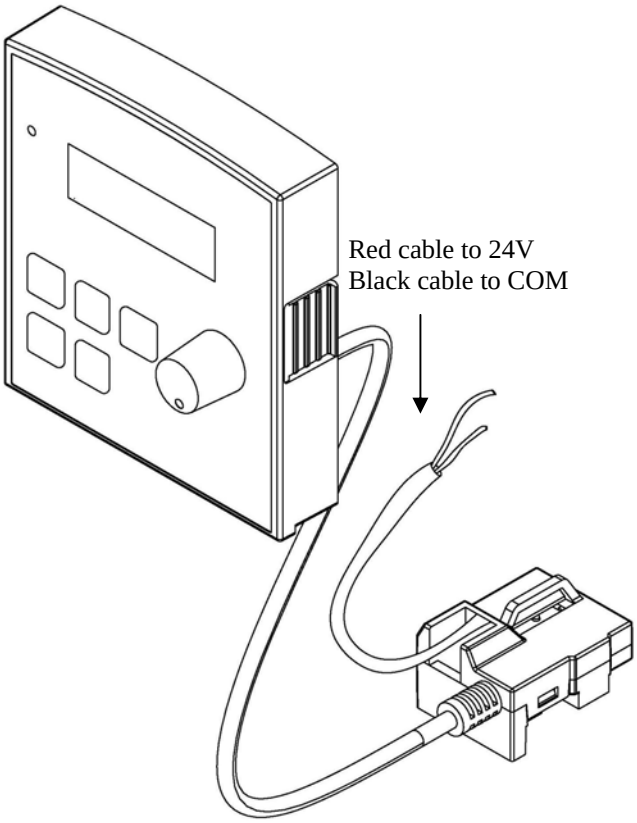


Figure 6-6a Remote keypad

JNSDOP-LED-2M wiring diagram

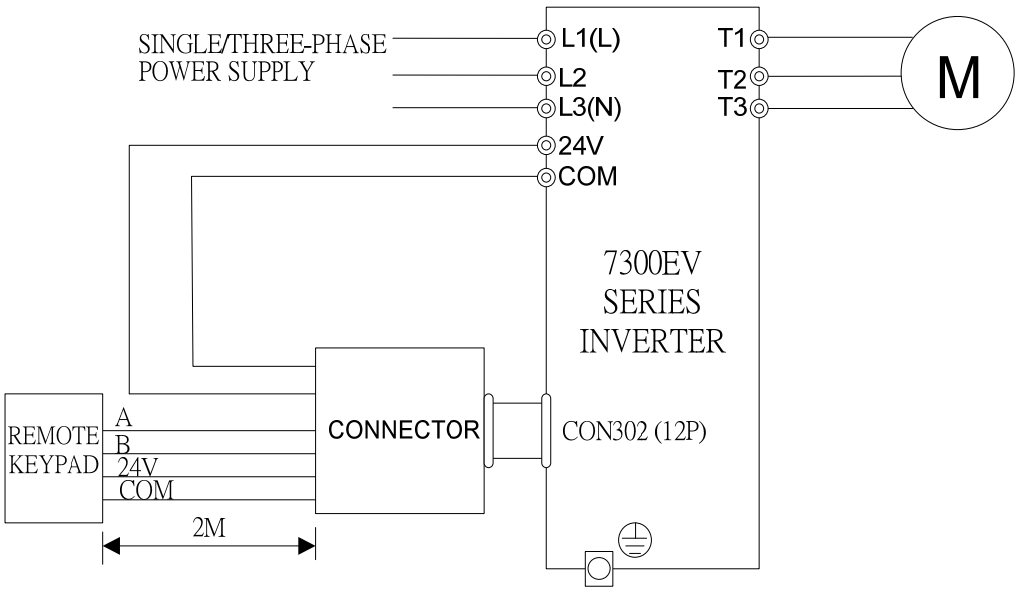


Figure 6-6b Remote keypad Wiring Diagram

* When the inverter is powered on or off the user can set up or remove the remote keypad. (Must be in remote terminal configuration)

6.3.5 Input/ Output expansion card(model: JNSIF-IO)

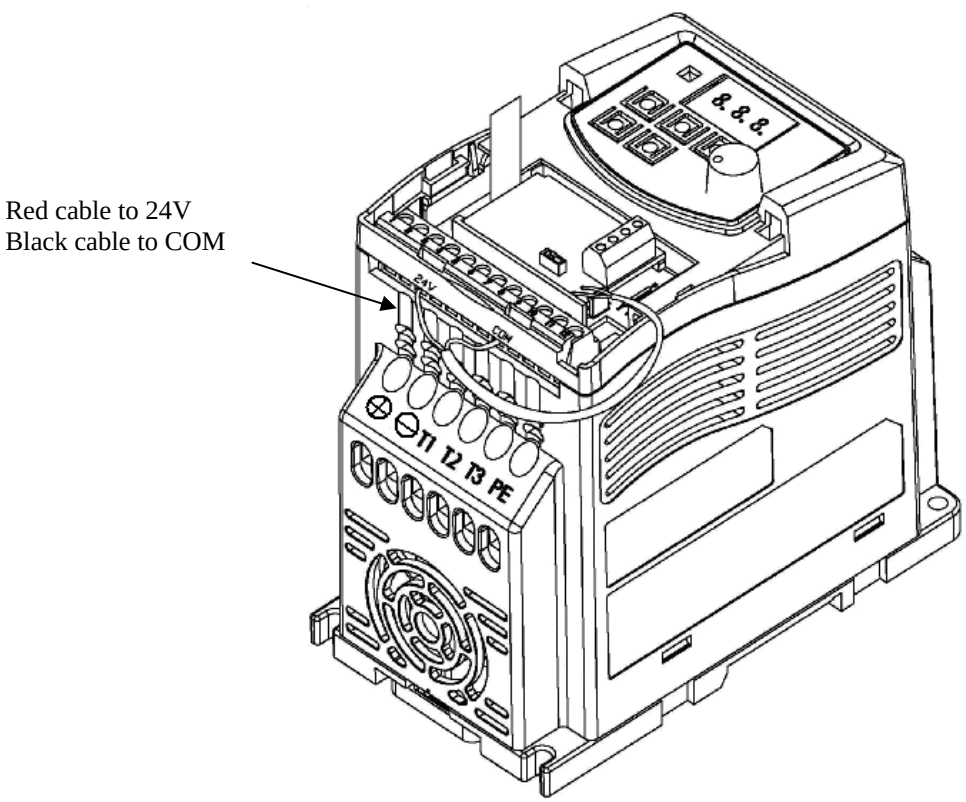


Figure 6-7a JNSIF-IO CARD

JNSIF-IO wiring diagram

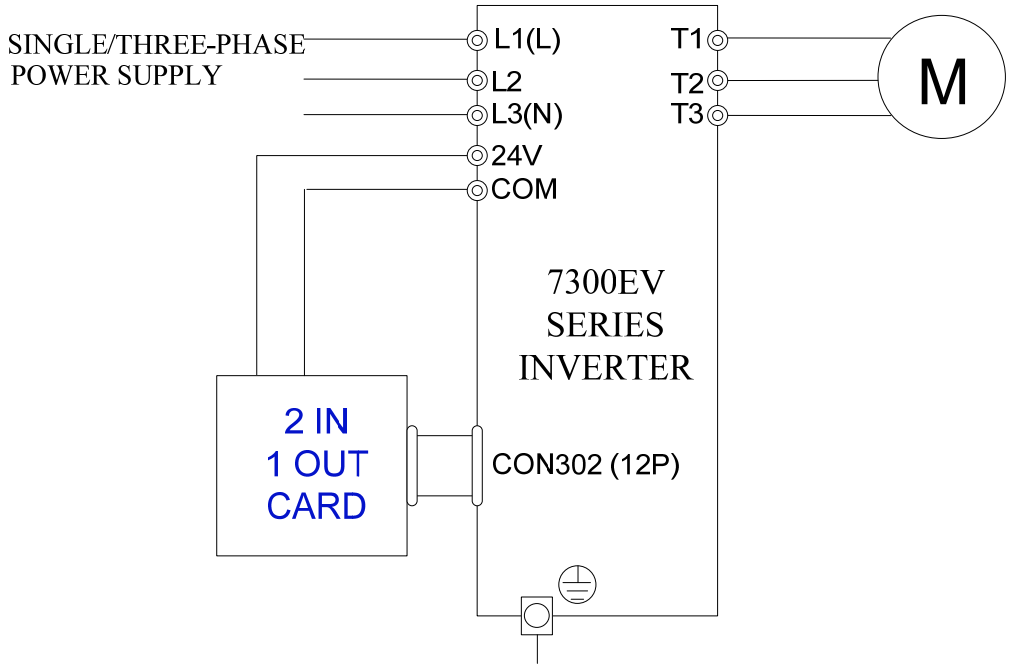
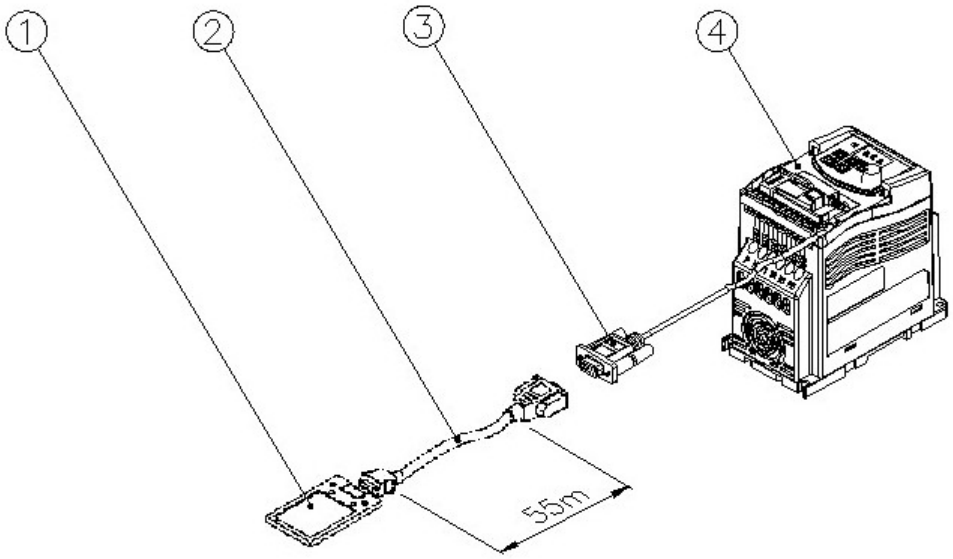


Figure 6-7b JNSIF-IO Wiring Diagram

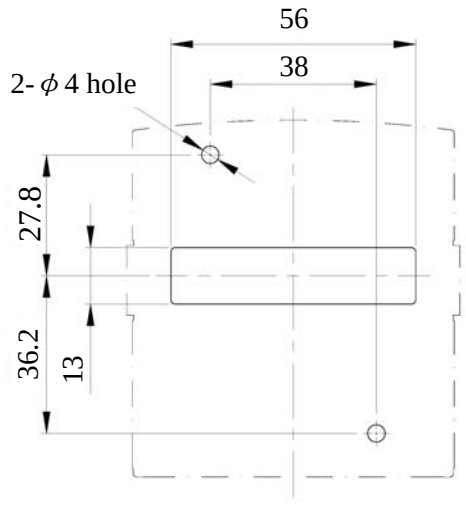
Note: Please refer to the function C42, C43, C46 for the setting.

6.3.6 PDA Link

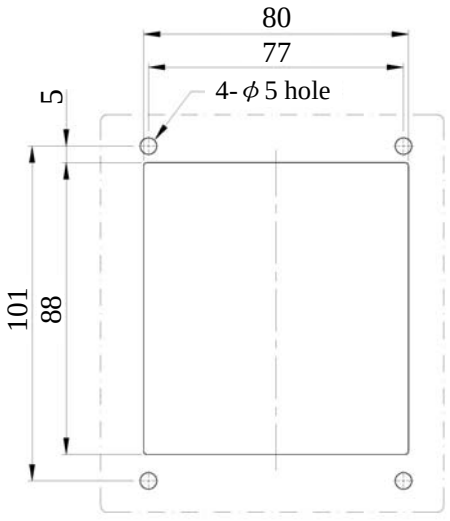
(1) HP iPAQ Pocket PC h2210. (PDA) / PC hx2190
(2) PDA wire (JNSWPDA).
(3) RS-232 Interface Card (JNSIF-232).
(4) Inverter



6.3.7 Remote keypad Installation Dimension Unit: mm



Dimension for remote keypad installation to control panel

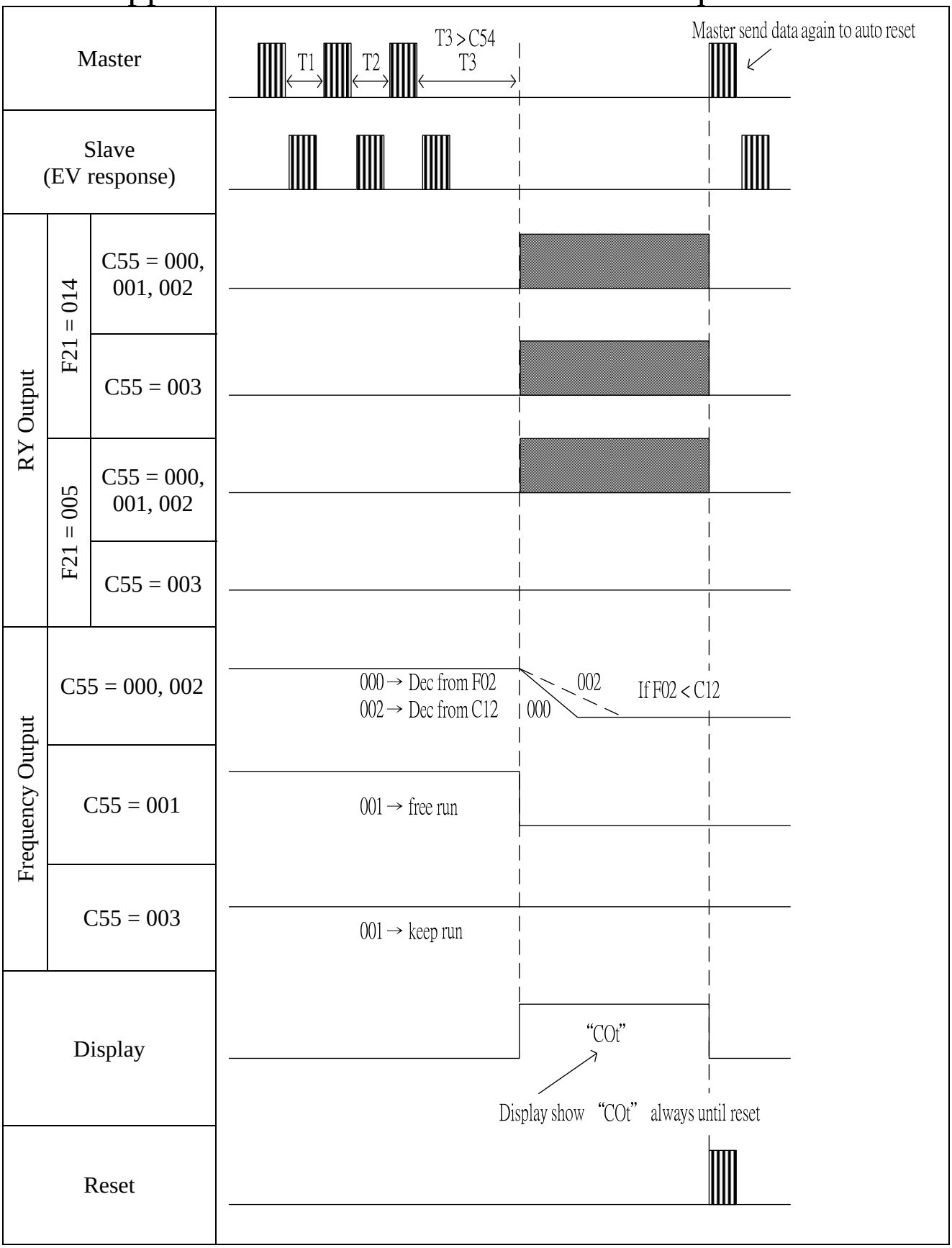


Dimension for remote keypad box installation to control panel

Appendix EVinverter parameter setting list

Customer Name		Model of the inverter:			
Location of use:		Customer’s telephone number:			
Customer’s address:					
Parameter code	Setting	Parameter code	Setting	Parameter code	Setting
F00		F38		C22	
F01		F39		C23	
F02		F40		C24	
F03		F41		C25	
F04		F42		C26	
F05		F43		C27	
F06		F44		C28	
F07		F45		C29	
F08		F46		C30	
F09		F47		C31	
F10		F48		C32	
F11		F49		C33	
F12		F50		C34	
F13		F51		C35	
F14		F52		C36	
F15		F53		C37	
F16		F54		C38	
F17		C01		C39	
F18		C02		C40	
F19		C03		C41	
F20		C04		C42	
F21		C05		C43	
F22		C06		C44	
F23		C07		C45	
F24		C08		C46	
F25		C09		C47	
F26		C10		C48	
F27		C11		C49	
F28		C12		C50	
F29		C13		C51	
F30		C14		C52	
F31		C15		C53	
F32		C16		C54	
F33		C17		C55	
F34		C18			
F35		C19			
F36		C20			
F37		C21			

Appendix Communication time out sequence list



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440V 0.75～2.2KW (1～3HP)