

INSTRUCTION MANUAL

TECO INVERTER

**200V Class 0.4~15KW
(1.2~27.4KVA)**

**400V Class 0.75~18.5KW
(1.7~34KVA)**



TECO INVERTER

E510 Series

E510 user manual

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Chapter 0 Preface

0.1 Preface

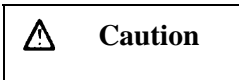
To extend the performance of the product and ensure personnel safety, please read this manual thoroughly before using the inverter. Should there be any problem in using the product that cannot be solved with the information provided in the manual, contact Our's technical or sales representative who will 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 handling, installing, operating, and checking the inverter. Be sure to follow the instructions for highest safety.



Indicates a potential hazard that could cause death or serious personal injury if misused.



Indicates that the inverter or the mechanical system might be damaged if misused.

Danger

- ✓ Do not make any connections when the inverter is powered on. Do not check parts and signals on circuit boards during the inverter operation.
- ✓ Do not disassemble the inverter or modify any internal wires, circuits, or parts.
- ✓ Ground the ground terminal of the inverter properly.

Caution

- ✓ Do not perform a voltage test on parts inside the inverter. High voltage can destroy the semiconductor components.
- ✓ Do not connect T1, T2, and T3 terminals of the inverter to any AC input power supply.
- ✓ CMOS ICs on the inverter's main board are susceptible to static electricity. Do not touch the main circuit board.

Chapter 1 Safety Precautions

1.1 Before Power Up

Caution

- ✓ The line voltage applied must comply with the inverter's specified input voltage.(See product nameplate)

Danger

- ✓ Make sure the main circuit connections are correct Single phase(L1,L3)/Three phase(L1,L2,L3) are power-input terminals and must not be mistaken for T1, T2 and T3. Otherwise, inverter damage can result.

Caution

- ✓ To avoid the risk of fire, do not install the inverter on flammable objects. Install on nonflammable objects such as metal surfaces.
- ✓ If several inverters are placed in the same control panel, provide heat extraction means to keep the temperature below 40°C to avoid overheat or fire hazard.

Warning

- ✓ This product is sold subject to IEC 61800-3. In a domestic environment this product may cause radio interference in which case the user may be required to apply corrective measures.

1.2 During Power Up

Danger

- ✓ When momentary power loss is longer than 2 seconds (the larger of horse power, the longer of time), the inverter does not have enough storage power to control the circuit; Therefore, when the power is re-applied, the operation of the inverter is based on the setup of 00-02(or00-03) /07-04 and the condition of external switch, this is considered to be 「restart」 in the following paragraphs.
- ✓ When the momentary power loss is short, the inverter still has enough storage power to control the circuit. Therefore, when power is re-applied, the inverter will automatically restart depending on the setup of 07-00.
- ✓ When restarting the inverter, the operation of the inverter is based on the setup of 00-02(or00-03) and 07-04 and the condition of external switch (FWD/REV button). Attention: the start operation will be regardless of 07-00/07-01/07-02:
 1. When 00-02(or00-03) =0, the inverter will not automatically run after restart.
 2. When 00-02(or00-03) =1 and the external switch (FWD/REV button) is OFF, the inverter will not run after restart.
 3. When 00-02(or00-03) =1, the external switch (FWD/REV button) is ON, and 04-09=0, the inverter will run automatically after restart.Attention: To ensure safety, please turn off the external switch (FWD/REV button) after power loss, to protect machines from possible damage and potential injury to personnel on sudden resumption of power.
- ✓ If 07-04 is set to 0 (direct start up), please refer to the description and warnings for 07-04 to verify the safety of operator and machine.

1.3 Before Operation

Danger

- ✓ Make sure the model and inverter capacity are the same as that set in parameter 13-00.

Caution

- ✓ On power up the supply voltage set in parameter 01-01 will flash on display for 2 seconds.

1.4 During Operation

Danger

- ✓ Do not connect or disconnect the motor during operation. Otherwise, the over-current will cause the inverter to trip or damage the unit.

Danger

- ✓ The motor will restart automatically after stop when auto-restart function is on. In this case, use caution while working near the drive, motor, or driven equipment.

Caution

- ✓ Do not touch heat-generating components such as heat sinks.
- ✓ The inverter can drive the motor from low speed to high speed. Verify the allowable speed range of the motor and the load before operation.
- ✓ Do not check signals on circuit boards while the inverter is running.

Caution

- ✓ Make sure the power is off before disassembling or checking the components

1.5 During Maintenance

Caution

- ✓ The Inverter can be used in environment in temperature range from 14°-104°F (-10-40°C) and relative humidity of 95%.

Inverter Disposal

Caution

Please dispose of this unit with care as an industrial waste and according to your required local regulations.

- ✓ The capacitors of inverter main circuit and printed circuit board are considered as hazardous waste and must not be burnt.
- ✓ The Plastic enclosure and parts of the inverter such as the cover board will release harmful gases if burnt.

Chapter 2 Definition of Mode

2.1 Model

E510 - 2 P5 - H 1 F

Supply voltage
2: 200V Class
4: 400V Class

Horsepower
200V Class P5: 0.5 HP
01: 1HP
02: 2 HP
03: 3 HP
05: 5 HP
08: 8 HP
10: 10 HP
15: 15HP
20: 20HP
400V Class P5: 0.5 HP
01: 1 HP
02: 2 HP
03: 3 HP
05: 5 HP
08: 8 HP
10: 10 HP
15: 15 HP
20: 20HP
25: 25HP

Filter F : Built-in
Blank: None

Power supply
1: Single phase
3: Three phase

Specification
H: Standard Type

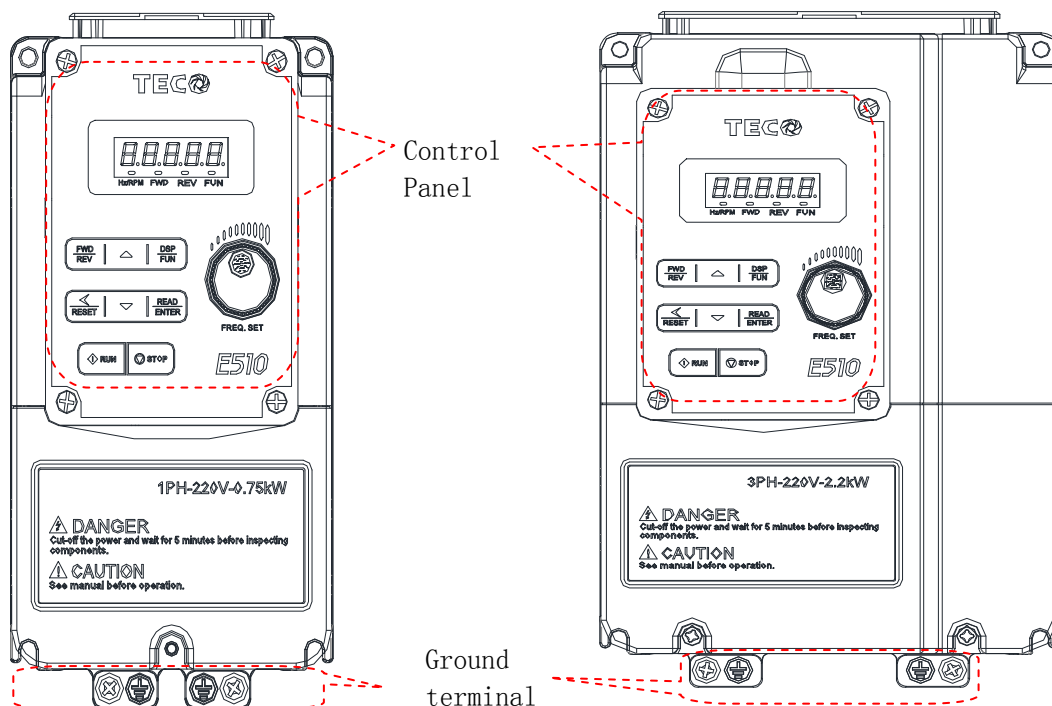
Chapter 3 Ambient Environment and Installation

3.1 Environment

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

Protection	
Protection class	IP20
Suitable environment	
Operating temperature	-10~50°C If several inverters are installed in the same control panel, please make sure the placement is conductively to vent heat.
Storage temperature	-20~60°C
Humidity	95% RH or less (no condensation) Notice prevention of inverter freezing up.
Shock	20Hz Below 1G (9.8m/s²) 20~50Hz 0.6G (5.88m/s²)
Installation sites	
Avoid direct sunlight.	
Avoid exposure to rain or moisture.	
Avoid oil mist and salinity.	
Avoid corrosive liquid and gas.	
Avoid dust, lint fibers, and small metal filings.	
Avoid electromagnetic interference (soldering machine, power machine).	
Keep away from radioactive and flammable materials.	
Avoid vibration (stamping, punching machine). Add a vibration-proof pad if the situation cannot be avoided.	

Exterior



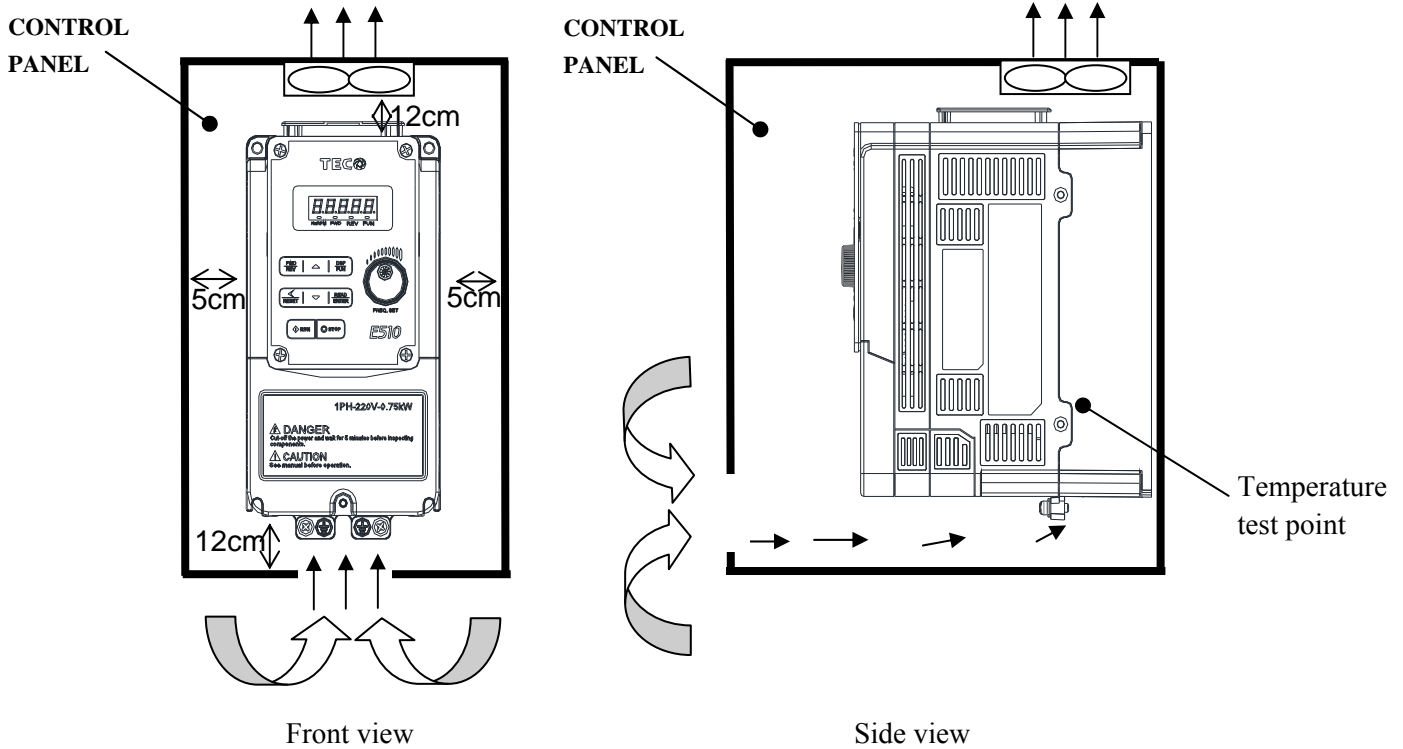
3.2 Installation space

Please notice that enough air circulation space for cooling inverters should be insured when installation.

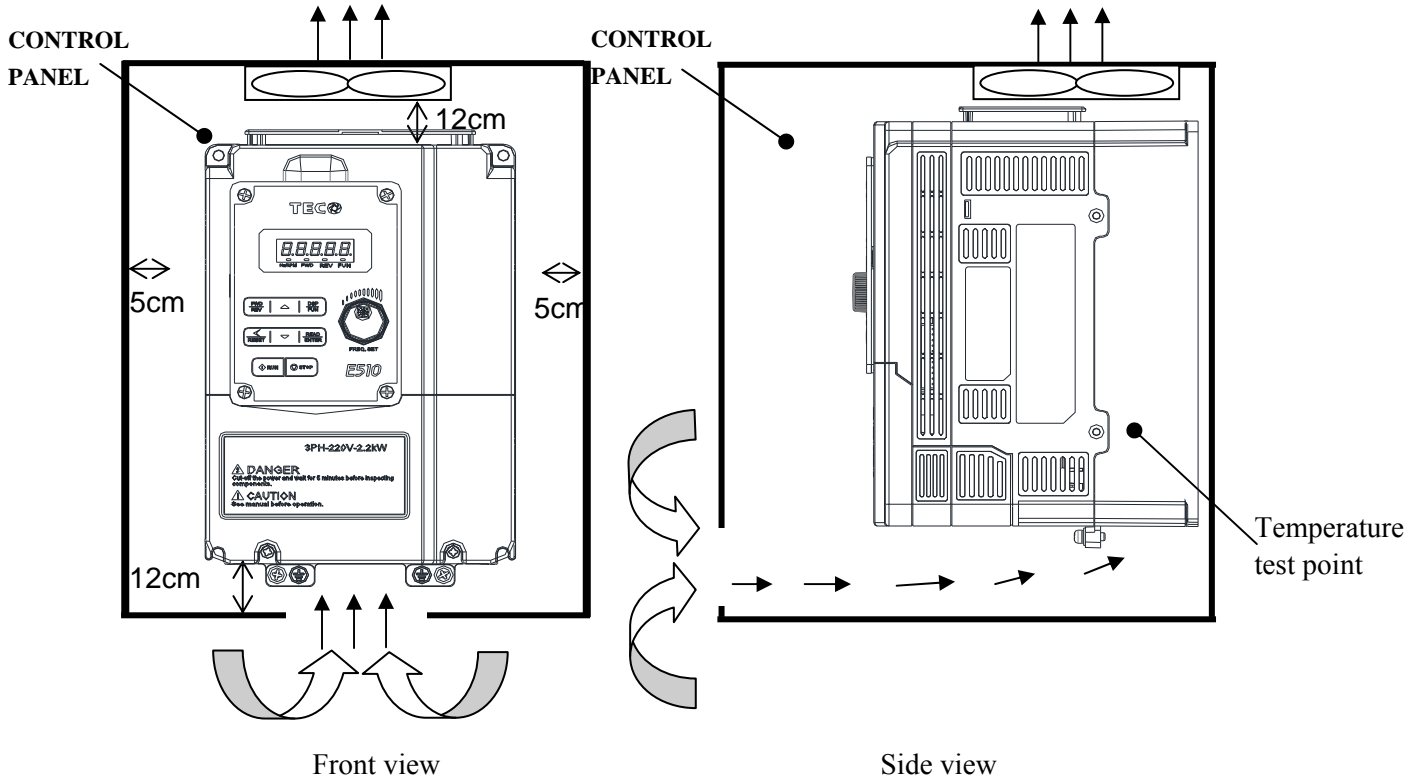
Single Installation

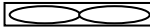
In order to ensure good cooling effect, be sure to install the transducer vertical.

Frame1 (horsepower: 2P5/201/401/402)



Frame2 (horsepower: 202/203/205/403/405)

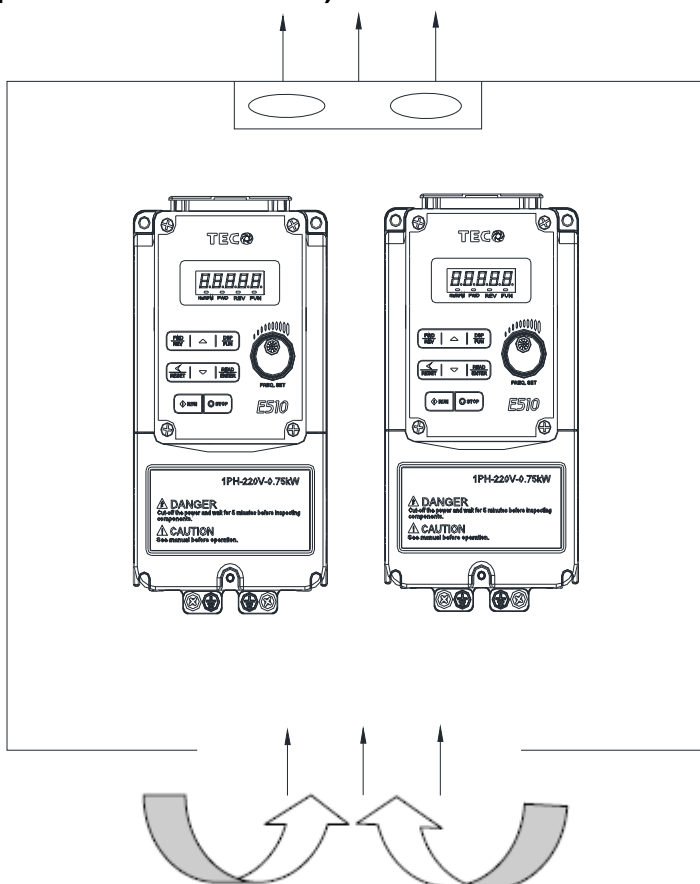


Note: “  means Fan.

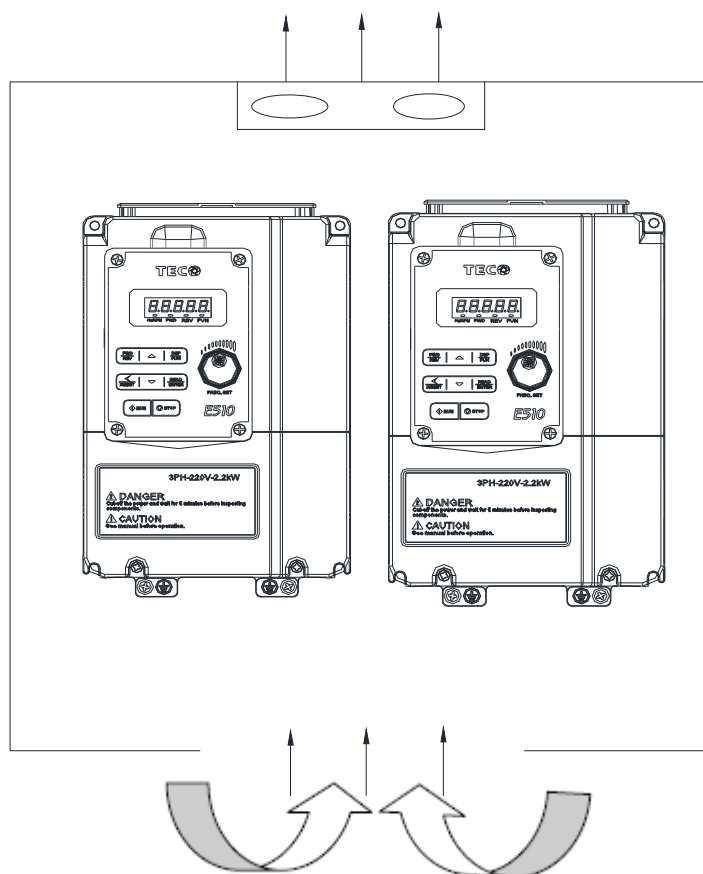
Installation of multiple parallel

Installing multiple inverters parallel, install as the following icon to ensure the cooling effect.

Frame1 (horsepower: 2P5/201/401/402)



Frame2 (horsepower: 202/203/205/403/405)



3.3 Wiring Rules

3.3.1 Wiring guidelines

(1) **Tightening torque:** Required Screwdriver Torques are as listed 3-1:

(2) **Power Cables:**

Power cables are connected to TM1 terminal block, terminals L1, L2, L3, T1, T2, T3,

Choose power cables according to the following criteria:

- Use copper wires only. Correct wire diameters should be based on ratings at 105°C.
- For rating voltage of wires, the minimum voltage of 200V class type is 300V.
- To ensure safety, power cord should be locked with O-pin.

(3) **Control Cables:** Control cables are connected to TM2 control terminal block. Choose control cables according to the following criteria:

- Use copper wires only. Correct wire diameters should be based on ratings at 105°C.
- For rating voltage of wires, the minimum voltage of 200V class type is 300V.
- To avoid noise interference, do not route power and control cables in the same conduit or trucking.











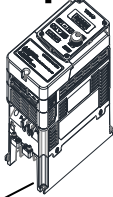


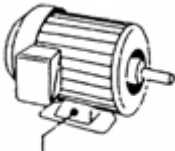

Chart 3-1

Model	TM1		TM2	
	AWG	Tightening torque	AWG	Tightening torque
Frame1	20~12AWG	1.0N.m	1.5mm²,	0.8N.m
Frame2	18~8AWG	1.8N.m	26~14AWG	

(4) **Notes:**

- Teco bears no responsibility to service for failures caused by the following conditions:
 - ✧ A molded-case circuit breaker is not installed, or an improper or overrated breaker is used, between the power source and the inverter.
 - ✧ A magnetic contactor, a phase capacitor, or a burst absorber is connected between the inverter and the motor.
- Use three-phase squirrel cage induction motor with capacity suitable for the inverter.
- If one inverter is driving several motors, the total current of all motors running simultaneously must be less than the rated current of the inverter, and each motor has to be equipped with a proper thermal relay.
- Do not add capacitive components, such as a phase capacitors, LC or RC, between the inverter and the motor.

3.3.2 Precautions for peripheral applications peripheral equipment

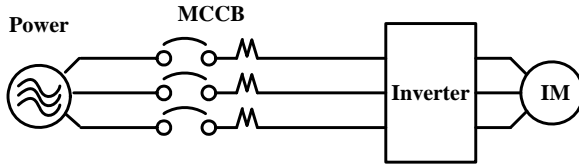
 	Power	<ul style="list-style-type: none"> ➤ Make sure the correct voltage is applied to avoid damaging the inverter. ➤ A molded-case circuit breaker or fused disconnect must be installed between the AC source and the inverter
 	Molded-case circuit breaker and Leakage breaker	<ul style="list-style-type: none"> ➤ Use a molded-case circuit breaker that conforms to the rated voltage and current of the inverter to control the power ON/OFF and protect the inverter. ➤ Do not use the circuit breaker as the run/stop switch for the inverter. ➤ Setting current should be 200mA or above and the operating time at 0.1 second or longer to prevent malfunctions.
 	Magnetic contactor	<ul style="list-style-type: none"> ➤ Normal operations do not need a magnetic contactor. However a contactor has to be installed in primary side when performing functions such as external control and auto restart after power failure, or when using a brake controller. ➤ Do not use the magnetic contactor as the run/stop switch of the inverter.
 	AC reactor for power quality improvement	<ul style="list-style-type: none"> ➤ When inverters below 200V/400V class 15KW are supplied with high capacity (above 600KVA) power source or an AC reactor can be connected to improve the power performance.
 	Input noise filter	<ul style="list-style-type: none"> ➤ A filter must be installed when there are inductive loads affecting the inverter.
  	Inverter	<ul style="list-style-type: none"> ➤ Single phase Input power terminals L1, and L3(Three phase:L1,L2and L3) can be used in any sequence regardless of phase. ➤ 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. ➤ Connect the ground terminal properly.
  <p>Ground</p>	Motor	<ul style="list-style-type: none"> ➤ Three-phase cage motor

Notes

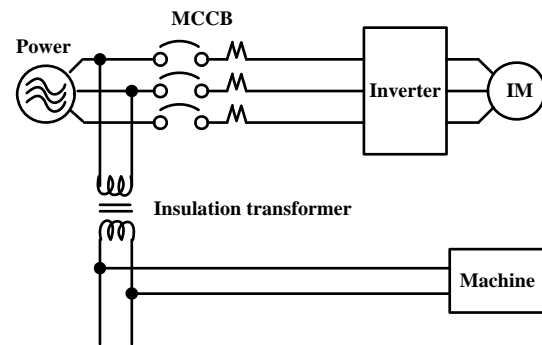
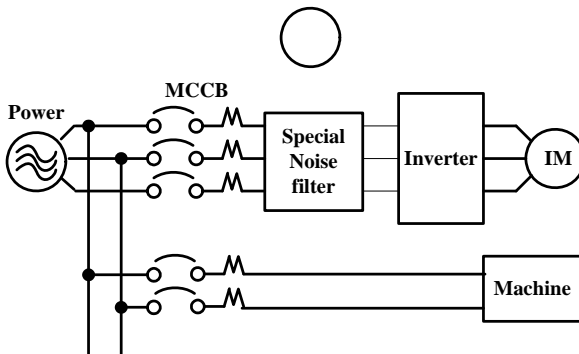
Make external connections according to the following instruction. Check connections after wiring to make sure all connections are correct. (Do not use the control circuit buzzer to check connections)

(1) Main circuit's wiring must be separated from other high voltage or high current power line to avoid noise interference. Refer to the figures below:

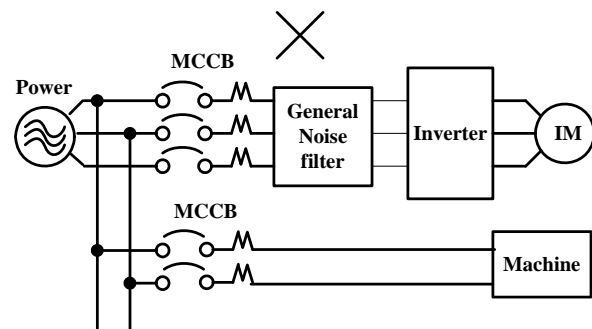
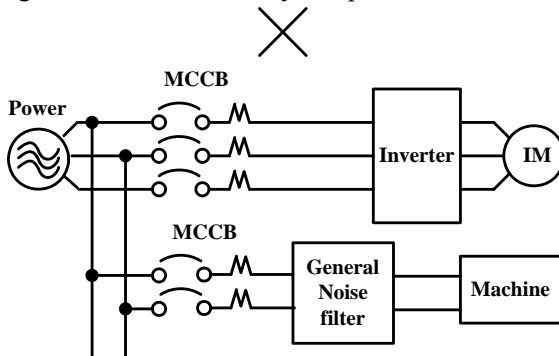
- The inverter uses dedicated power line



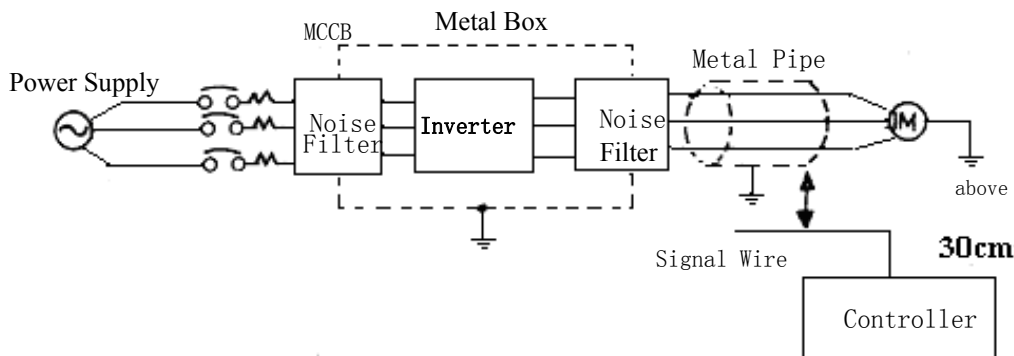
- Add a noise filter or separation transformer when sharing the power line with other machines, the inverter shares the power line with other machines.



- A general noise filter may not provide correct results.

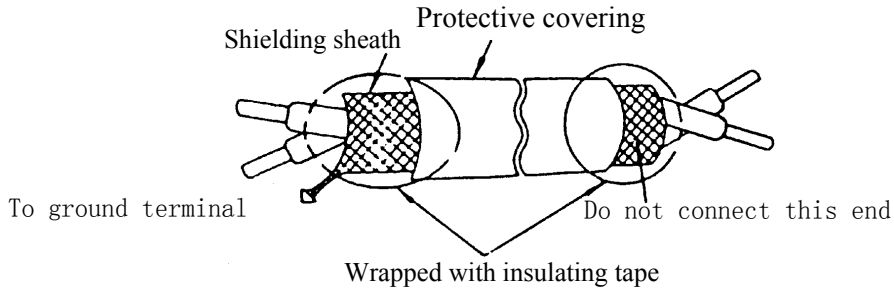


- To prevent radiated noise, the wires should be put in a metal pipe and distance from signal lines of other control equipment should be more than 30 cm.



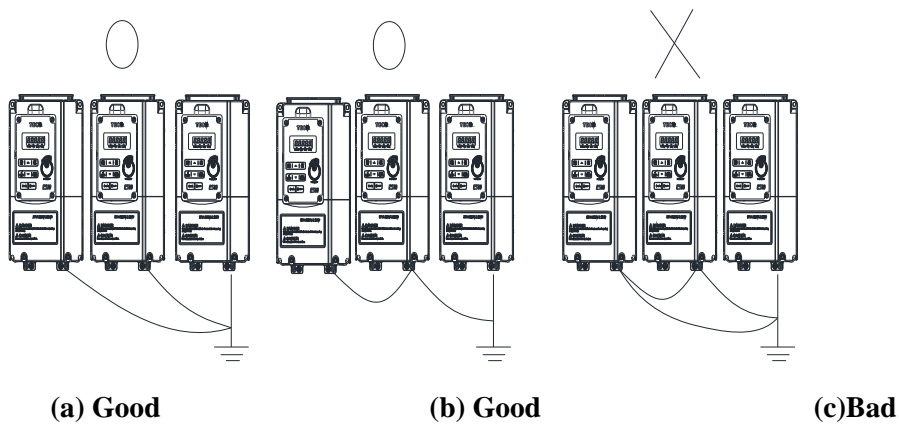
- When the connection between the inverter and the motor is too long, consider the voltage drop of the cables. Phase-to-phase voltage drop (V) = $\sqrt{3} \times \text{resistance of wire } (\Omega/\text{km}) \times \text{length of line (m)} \times \text{current} \times 10^{-3}$.

- (2) The control circuit wiring must be separated and routed away from the main circuit control line or other high voltage or current power lines to avoid noise interference.
- To avoid erroneous operation caused by noise interference, shield the control circuit wiring with twisted-wires, and connect the shielded wire to a ground terminal. Refer to the figure below. The wiring distance should not exceed 50 meters.



(3) Inverter Ground terminal must be connected to installation ground correctly and according to the required local wiring regulations.

- Ground cable size must be according to the required local wiring regulations. The shorter the better.
- Do not share the ground of the inverter with other high current loads (Welding machine, high power motor). Connect the terminals to their own ground.
- Do not make a loop when several inverters share a common ground point.



- (4) To ensure maximum safety, use correct wire size for the main power circuit and control circuit. (According to the required local regulations).
- (5) Verify that all wiring is correct, wires are intact, and terminal screws are secured.

3.4 Specifications

3.4.1 Product Specifications

220V Class: Single phase

Model: E510-□□□ - H1(F)	2P5	201	202	203
Horse power (HP)	0.5	1	2	3
Suitable motor capacity (KW)	0.4	0.75	1.5	2.2
Rated output current (A)	2.6	4.3	7.5	10.5
Rated capacity (KVA)	1.00	1.65	2.90	4.00
Input voltage range(V)	Single Phase: 200~240V (+10%-15%),50/60HZ			
Output voltage range(V)	Three phase : 0~240V			
Input current (A)	7.2	11	15.5	21
Inverter N.W (KG)	0.67	0.67	1	1.05
Inverter with filter (KG)	0.73	0.73	1.25	1.3
Allowable momentary power loss time (S)	1.0	1.0	2.0	2.0
Enclosure	IP20			

220V Class: Three phase

Model: E510-□□□ - H3	2P5	201	202	203	205
Horse power (HP)	0.5	1	2	3	5
Suitable motor capacity (KW)	0.4	0.75	1.5	2.2	3.7
Rated output current (A)	2.6	4.3	7.5	10.5	17.5
Rated capacity (KVA)	1.00	1.65	2.90	4.00	6.7
Input voltage range(V)	Three phase : 200~240V (+10%-15%),50/60HZ				
Output voltage range(V)	Three phase : 0~240V				
Input current (A)	4.0	6.4	9.4	12.2	20.5
Inverter N.W (KG)	0.61	0.66	0.95	1	1.9
Inverter with filter (KG)					
Allowable momentary power loss time (S)	1.0	1.0	2.0	2.0	2.0
Enclosure	IP20				

Model: E510-□□□ - H3	208	210	215	220
Horse power (HP)	7.5	10	15	20
Suitable motor capacity (KW)	5.5	7.5	11	15
Rated output current (A)	26	35	48	64
Rated capacity (KVA)	9.9	13.3	20.6	27.4
Input voltage range(V)	Three phase : 200~240V (+10%-15%),50/60HZ			
Output voltage range(V)	Three phase : 0~240V			
Input current (A)	33	42	57	70
Inverter N.W (KG)	6.25	6.25	15	15
Inverter with filter (KG)				
Allowable momentary power loss time (S)	1.0	1.0	2.0	2.0
Enclosure	IP20			

400V Class: Three phase

Model: E510-□□□ - H3	401	402	403	405
Horse power (HP)	1	2	3	5
Suitable motor capacity (KW)	0.75	1.5	2.2	3.7
Rated output current (A)	2.3	3.8	5.2	8.8
Rated capacity (KVA)	1.7	2.9	4.0	6.7
Input voltage range(V)	Three phase: 380~480V (+10%-15%),50/60HZ			
Output voltage range(V)	Three phase: 0~480V			
Input current (A)	4.2	5.6	7.3	11.6
Inverter N.W (KG)	1.2/1.3	1.2/1.3	1.8/2.2	1.8/2.2
Inverter with filter (KG)				
Allowable momentary power loss time (S)	2.0	2.0	2.0	2.0
Enclosure	IP20			

Model: E510-□□□ - H3	408	410	415	420	425
Horse power (HP)	7.5	10	15	20	25
Suitable motor capacity (KW)	5.5	7.5	11	15	18.5
Rated output current (A)	13.0	17.5	25	32	40
Rated capacity (KVA)	9.9	13.3	19.1	27.4	34
Input voltage range(V)	Three phase: 380~480V (+10%-15%),50/60HZ				
Output voltage range(V)	Three phase: 0~480V				
Input current (A)	17	23	31	38	48
Inverter N.W (KG)	6.25/6.75	6.25/6.75	6.25/6.75	15	15
Inverter with filter (KG)					
Allowable momentary power loss time (S)	1.0	1.0	1.0	2.0	2.0
Enclosure	IP20				

F: means built-in filter

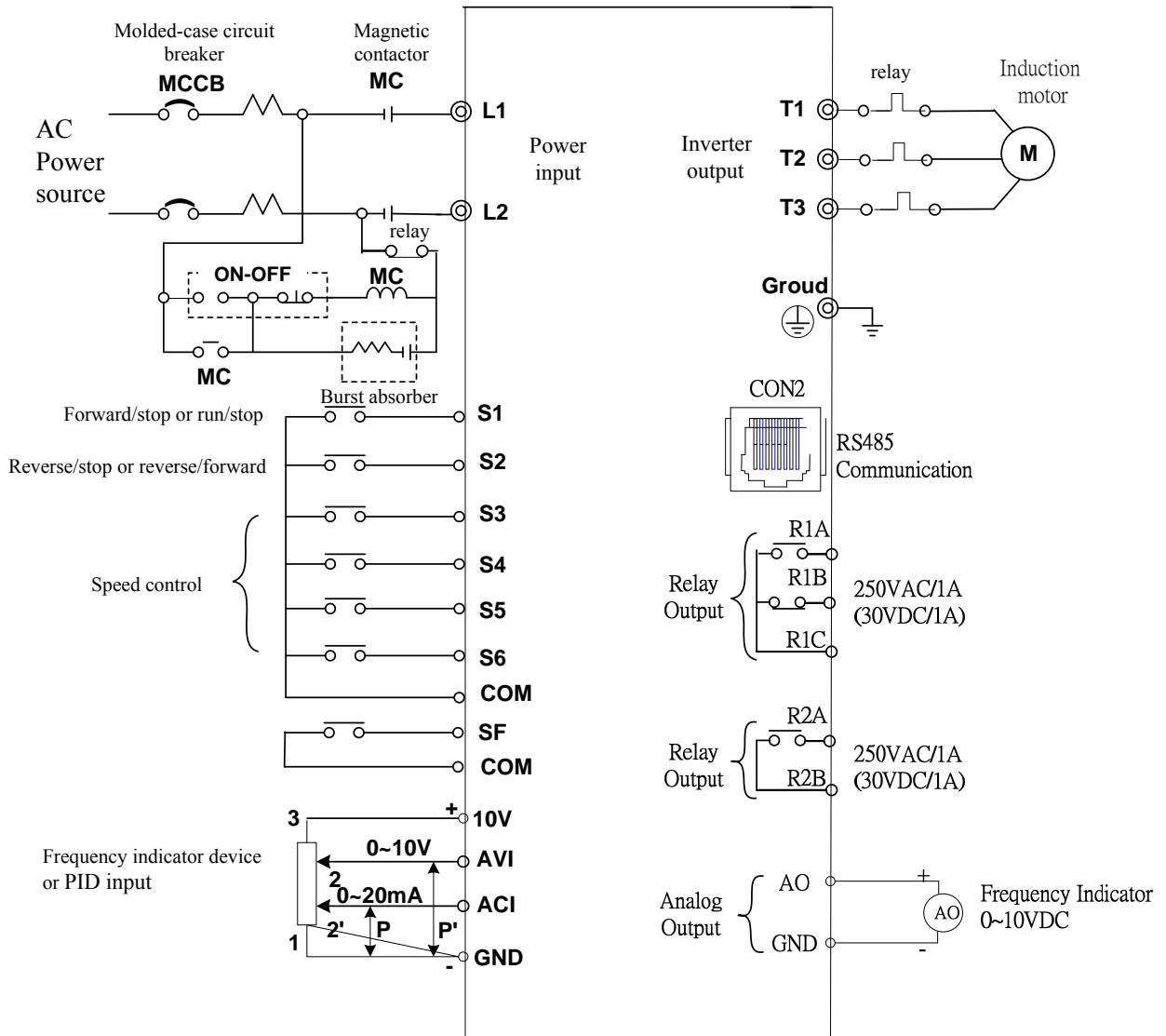
3.4.2 General Specifications

Item	E510	
Control Mode	V/F Control +Vector Control	
Frequency	Range	0.01~650.00Hz
	Setting resolution	Digital input: 0.01Hz
		Analog input: 0.06Hz/60Hz
	Setting	Keypad: Set directly with ▲ ▼ keys or the VR on the keypad External terminal: ·AVI(0~10V/2~10V), ACI(0~20mA/4~20mA)input ·Multifunction input up/down function(Group3) Communication settings
Frequency limit	·The lower and upper limit of frequency ·3 jump frequency can be set	
Run	Operation set	Panel: run, stop button control external terminal: ·Multi- operation-mode2 / 3 wire selection ·JoG operation Communication operation
	V / F curve setting	18 fixed curve, an arbitrary curve
	Commonly	

Control	Carrier frequency	1~16KHz
	Acceleration and deceleration control	<ul style="list-style-type: none"> • 2 Acc / dec time can be set • 4 S curve can be set
	Multifunction input	26 functions (refer to description on group3)
	Multifunction output	19 functions (refer to description on group3)
	Multifunction analog output	5 functions (refer to description on group3)
	Other features	Overload Detection, 16 preset speeds, Auto-run, Acc/Dec Switch (2 Stages), Main/Alt run Command select, Main/Alt Frequency Command select, PID control, torque boost, V/F start Frequency, abnormality reset and ect.
Display	LED	Display : parameter / parameter value / frequency / line speed / DC voltage / output voltage / output current / PID feedback / input and output terminal status / Heat sink temperature / Program Version / Fault Log and ect.
	Status Indicator	Instructions: run / stop / forward / reverse ,and etc.
Protective Functions	Overload Protection	The relays to protect the motor and the inverter.
	Over voltage	·220V: >410V , 380V: >820V
	Under Voltage	·220V: <190V , 380V: <380V
	Momentary Power Loss Restart	Inverter can auto-restart after power instantaneously loss.
	Stall Prevention	Stall prevention for Acceleration/ Deceleration/ Operation.
	Short-circuit output terminal	Electronic Circuit Protection
	Grounding Fault	Electronic Circuit Protection
	Other protection features	Protection for overheating of heat sink,The carrier frequency decreasing with the temperature function,fault output,reverse prohibit,prohibit for direct start after power up and error recovery ,parameter lock up
Communication control		Standard built-in RS485 communication (Modbus), One to one or One to many control.
Environment	Operating temperature	-10~50°C
	Storage temperature	-20~60°C
	Humidity	95% RH or less (no condensation)
	Shock	20Hz or less 1G(9.8m/s ²)20~50Hz 0.6G(5.88m/s ²)
	Protection class	IP20

3.5 Standard wiring

Single phrase:

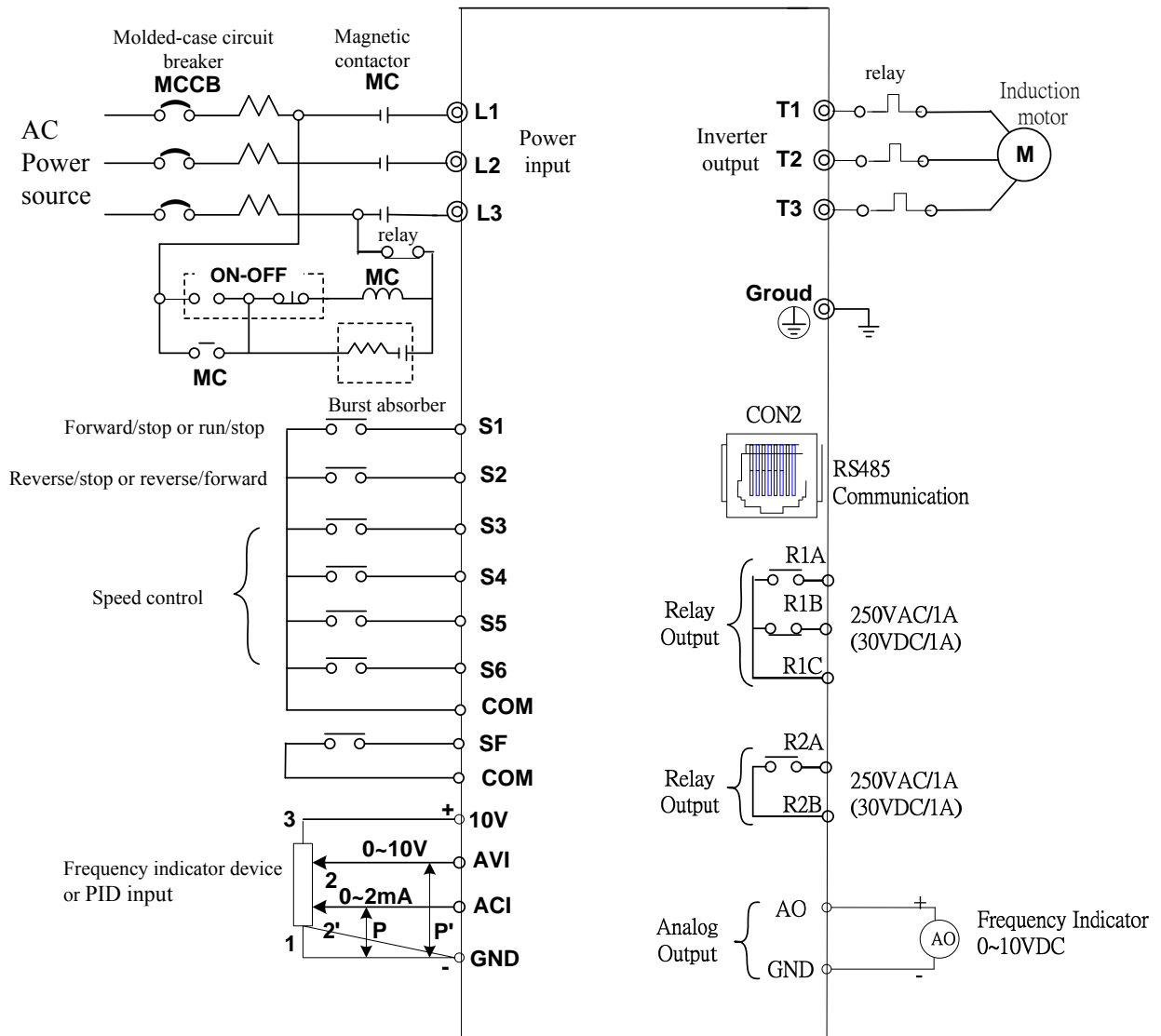


Model:

220V: E510-2P5-H/ E510-2P5-H1F/ E510-201-H/ E510-201-H1F

380V: E510-401-H3(F)/ E510-402-H3(F)

Three phase:




Model:

- 200V:** E510-2P5-H/E510-201-H/E510-202-H/E510-201-H1(F)/E510-203-H/E510-203-H1(F)/E510-205-H3/E510-208-H3/E510-210-H3/E510-215-H3/E510-220-H3/E510-415-H3/E510-420-H3
- 400V:** E510-403-H3(F)/E510-405-H3(F)/E510-408-H3/E510-415-H3/E510-420-H3/E510-420-H3/ E510-425-H3

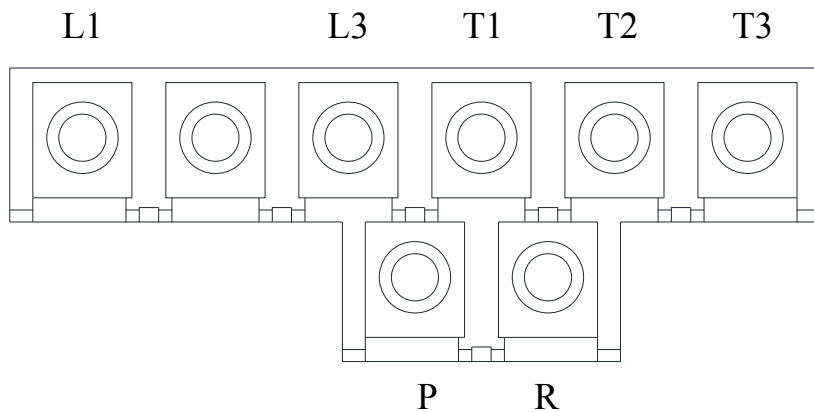
3.6 Terminal Description

3.6.1 Description of main circuit terminals

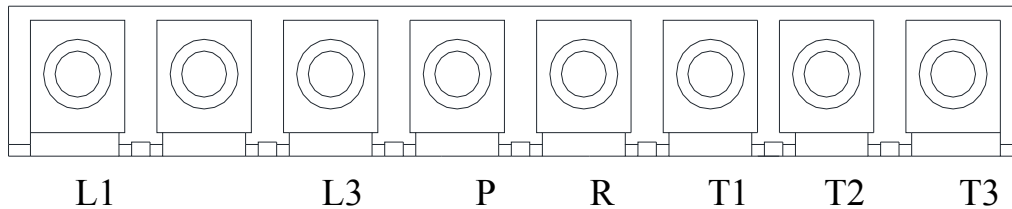
Terminal symbols	TM1 Function Description
L1	Main power input: Single-phase: L1, L3 Three-phase: L1, L2, L3
L2	
L3	
T1	Inverter output, connect to U, V, W port of motor
T2	
T3	
	Ground terminal

Single phrase:

Frame1 main circuit terminals:

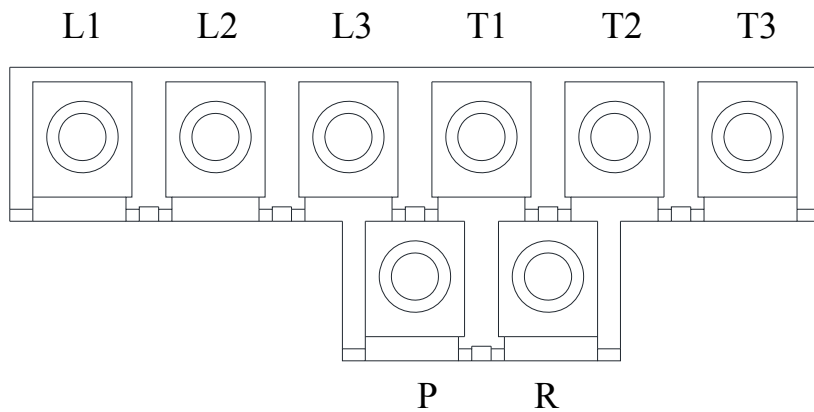


Frame 2, Frame 3, Frame 4 main circuit terminals:

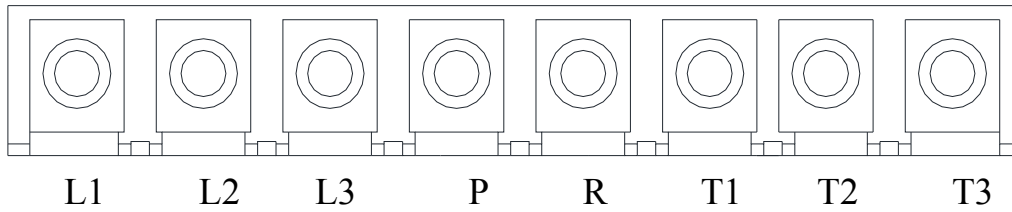


Three phrase:

Frame1 main circuit terminals:



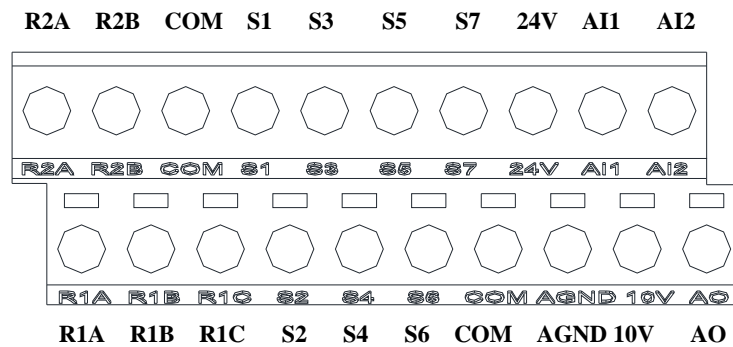
Frame 2, Frame 3, Frame 4 main circuit terminals:



3.6.2 Control circuit terminal description

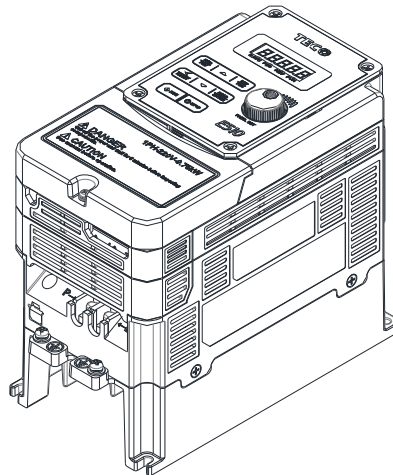
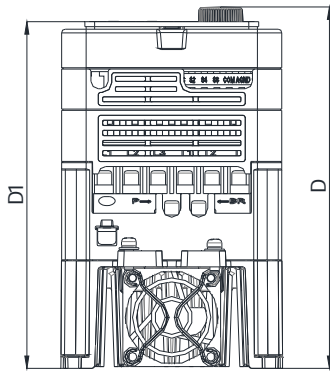
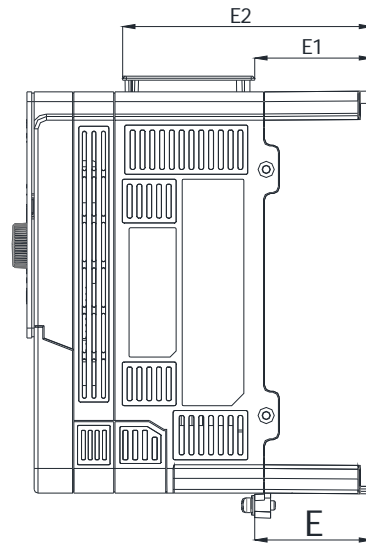
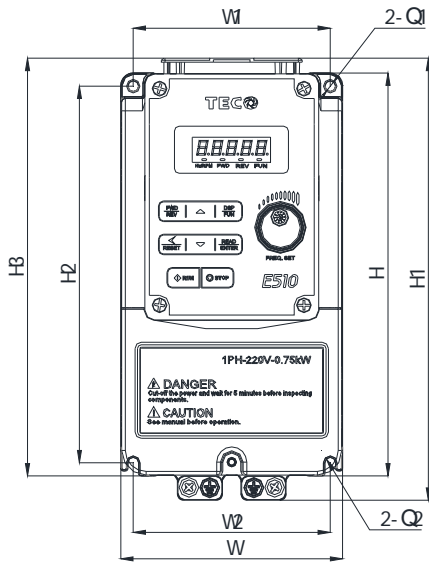
Terminal symbols	TM2 Function Description
R2A	Relay output terminal, Specification: 250VAC/1A(30VDC/1A)
R2B	
COM	S1~S7 public Point (COMMON) 【PNP】
S1	Multi-function input terminals(refer to group3)
S2	
S3	
S4	
S5	
S6	
SF	
24V	Frequency setting potentiometer (VR) Power terminal
AI1	Analog voltage input, Specification: 0~10VDC
AI2	Analog current input, Specification: 0~20mA
R1A	Relay output terminal, Specification: 250VAC/1A(30VDC/1A)
R1B	
R1C	
10V	Frequency setting potentiometer (VR) Power terminal
AO	Analog output positive port, Specification: Maximum output 10VDC/1mA
AGND	the analog ground terminal

Control circuit terminal:



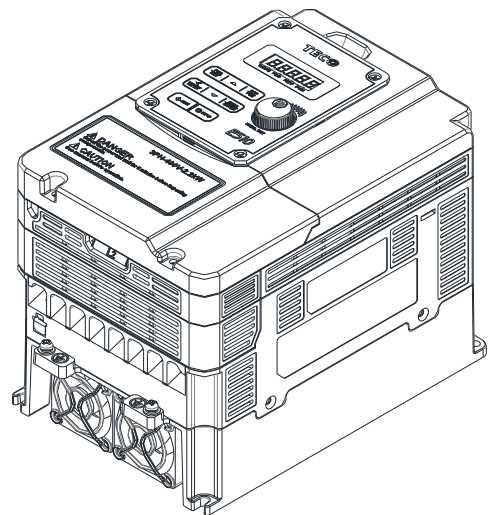
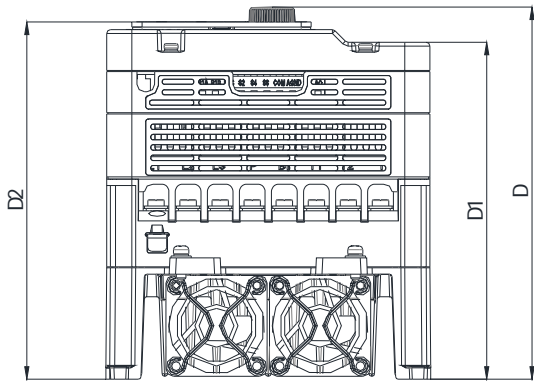
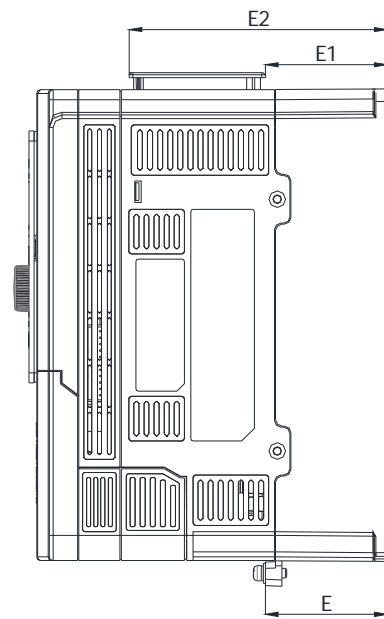
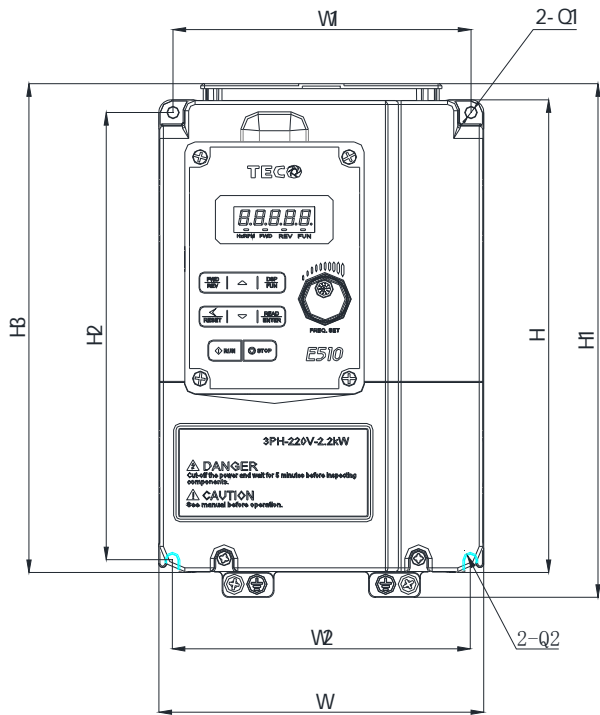
3.7 Outline Dimensions (unit: mm)

Frame1



Power	Model	dimension													
		W	W1	W2	H	H1	H2	H3	D	D1	E	E1	E2	Q1	Q2
200-240V Single or Three phase	E510-2P5-H	90.6	81	81	163.6	180	153	170	146.8	141	48	48	102	4.3	2.2
	E510-201-H														
200-240V Single- phase	E510-2P5-H1F														
	E510-201-H1F														
380-480V Three-phase	E510-401-H														
	E510-402-H														
	E510-401-H1F														
	E510-402-H1F														

Frame2



Power	Model	dimension														
		W	W1	W2	H	H1	H2	H3	D	D1	D2	E	E1	E2	Q1	Q2
200-240V Single or Three phase	E510-202-H	128.7	118	118	187.6	204	177.6	194.1	147.8	133.8	141.8	48.2	48.1	102.2	4.5	2.25
	E510-203-H															
200-240V Single-phase	E510-202-H1F															
	E510-203-H1F															
200-240V three-phase	E510-205-H3															
380-480V three-phase	E510-403-H3															
	E510-405-H3															
	E510-403-H3F															
	E510-405-H3F															

Chapter 4 Software Index

4.1 Keypad Description

4.1.1 Panel Function





































Type	Name	Function
Display	Main display area Status display area	Frequency Display, Parameter, voltage, Current, Temperature, abnormal and ect.
		Hz/RPM: When the panel shows the frequency, this indicator is lit (long bright light while inverter running, flicker while inverter stopping)
		FWD: When the inverter is running forward, this indicator is lit (long bright light while inverter running, flicker while inverter stopping)
		REV: When the inverter is running reverse, this indicator is lit (long bright light while inverter running, flicker while inverter stopping)
		MOD: When the panel shows parameter menu, this indicator is lit
Rheostat	Panel rheostat	Can be used to set the frequency
Button (8 buttons)	RUN	RUN: Enable the inverter run operation
	STOP	STOP: Enable the inverter stop operation
	▲	Used to check the code or increase the parameter value
	▼	Used to check the code or reduce the parameter values
	FWD/REV (Dual function keys)	FWD: turn to Forward REV: turn to Reverse
	DSP/FUN (Dual function keys)	DSP: Used to Switch the display content FUN: Used to examine the parameter content
	READ/ENTER	ENTER: ⊙ Turn to parameter values menu from parameter settings menu,

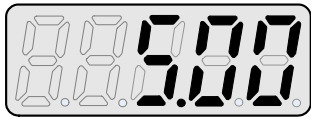


	(Dual function keys)	for example: in the 00-00 screen, press this button, it shows 0 (parameter value) Ⓢused to confirm after modifying the parameters or parameter values
	</ RESET (Dual function keys, a short press for left shift function, a long press for ENTER function)	“<”Left Shift: used while changing the parameters or parameter values

4.1.2 Show Description


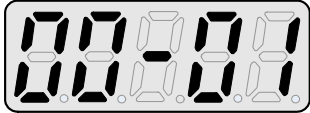
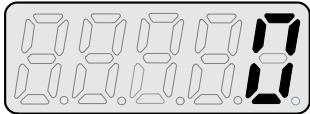

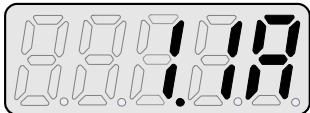



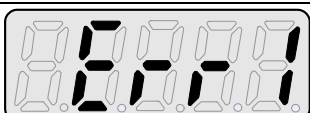
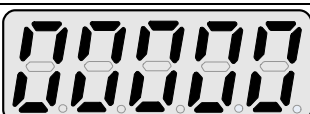
Numbers and letters show

Reality show	LED	Reality show	LED	Reality show	LED	Reality show	LED
0		A		n		Y	
1		b		o		-	
2		C		P		o	
3		d		q		-	
4		E		r		.	
5		F		S			
6		G		t			
7		H		u			
8		J		V			
9		L					


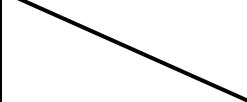
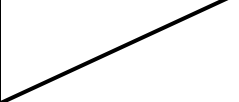






Digital tube lights flashing instructions

Actual output frequency	Set frequency	
LED lights	All lights flashing	Select Location flashing
		

LED display

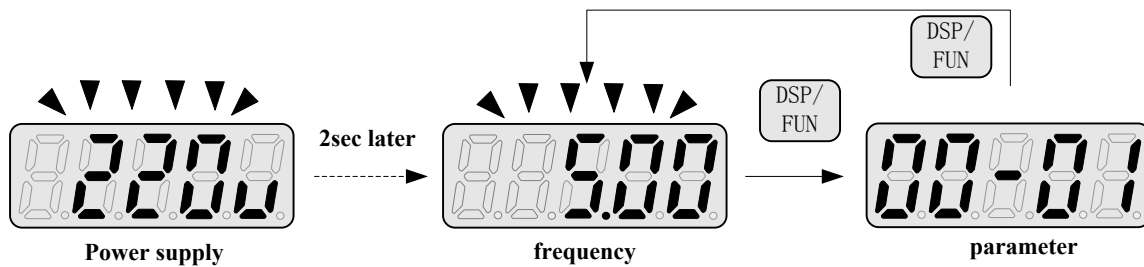
Display	Directions
	1. when Stop show the set frequency 2. when running show the actual output frequency
	Show Parameter
	Show Parameter Value
	Show output Voltage
	Show output Current
	Show DC voltage
	Show Temperature
	Show PID feedback
	Error display
	ACI / AVI(0~1000)

Description of indicator light lighting and flickering

	Indicator light lights		Indicator light flickers	
	Commentary in the manual		Commentary in the manual	
Frequency / linear speed Indicator light	 Hz/RPM	lights while displaying frequency or linear speed		
Menu mode indicator light	 FUN	lights while not displaying frequency or linear		flickers while starting fire mode
FWD indicator light	 FWD	lights while running forward		flickers while stopping forward
REV indicator light	 REV	lights while running reverse		flickers while stopping reverse

4.1.3 Function structure of LED digital tube displaying

Basic screen shows as below:

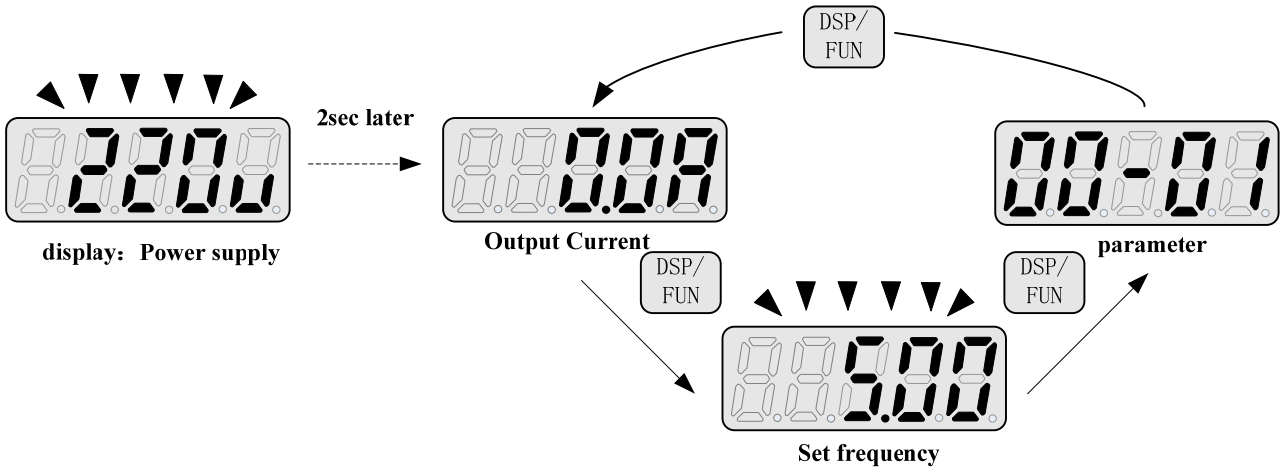


User modify screen shows as below:

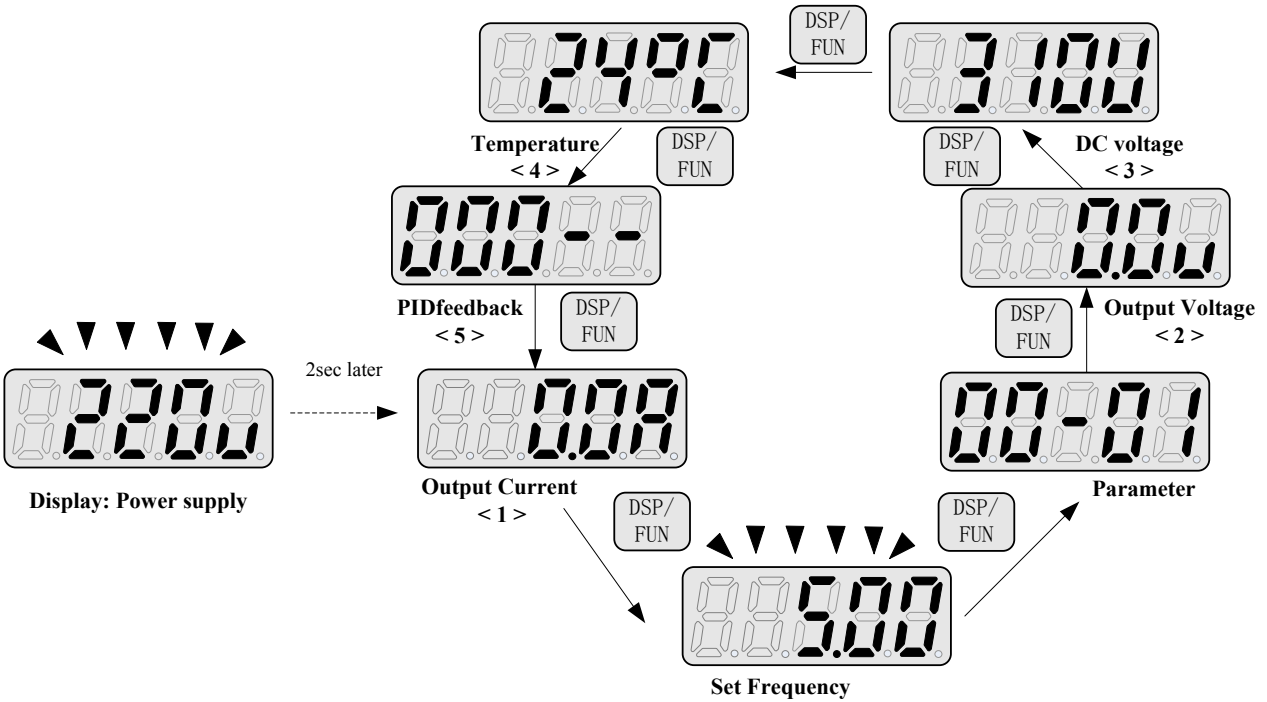
12- 00	Display Mode
Range	0 0 0 0 0 high Low 00000~88888 Each of the range of 0 to 8
	【0】:Disable display 【1】:output Current 【2】:output Voltage 【3】:DC voltage 【4】:Temperature 【5】:PID feedback 【6】:AVI 【7】:ACI 【8】:Count

The highest bit of 12-00 sets the power on destined menu, other bits set user setting menus

Example 1: 12- 00= 【10000】

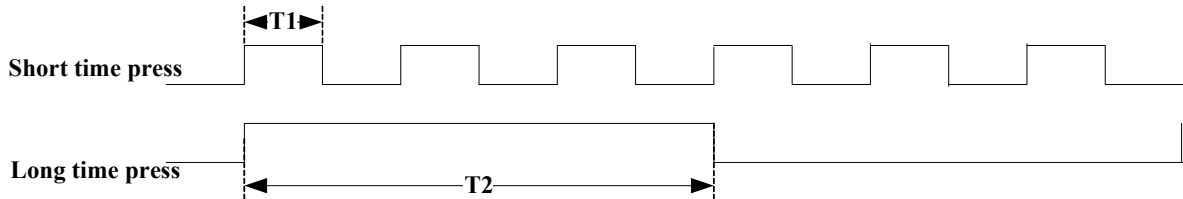


Example 2: 12- 00= 【12345】



Special key note:

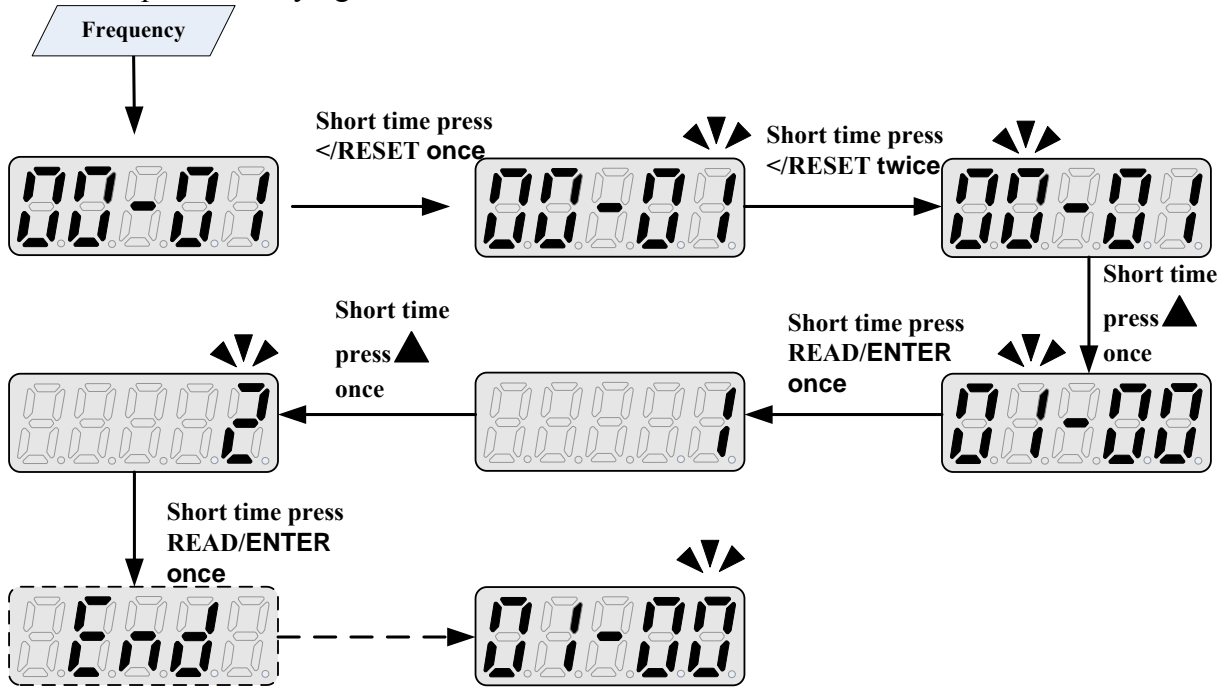
1. “▲”/“▼”:



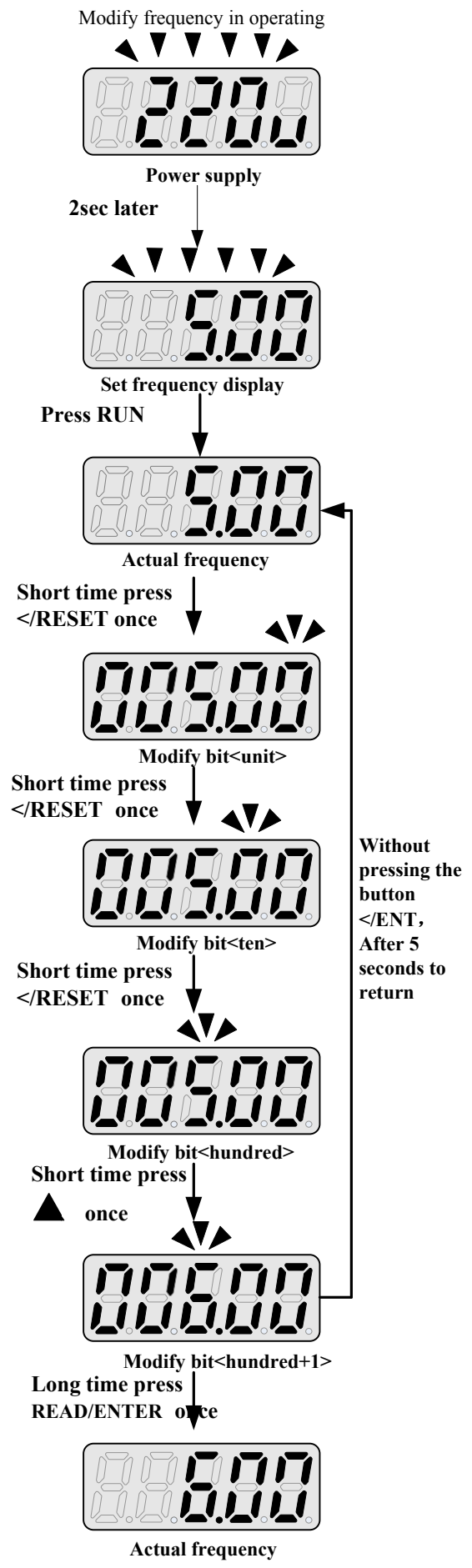
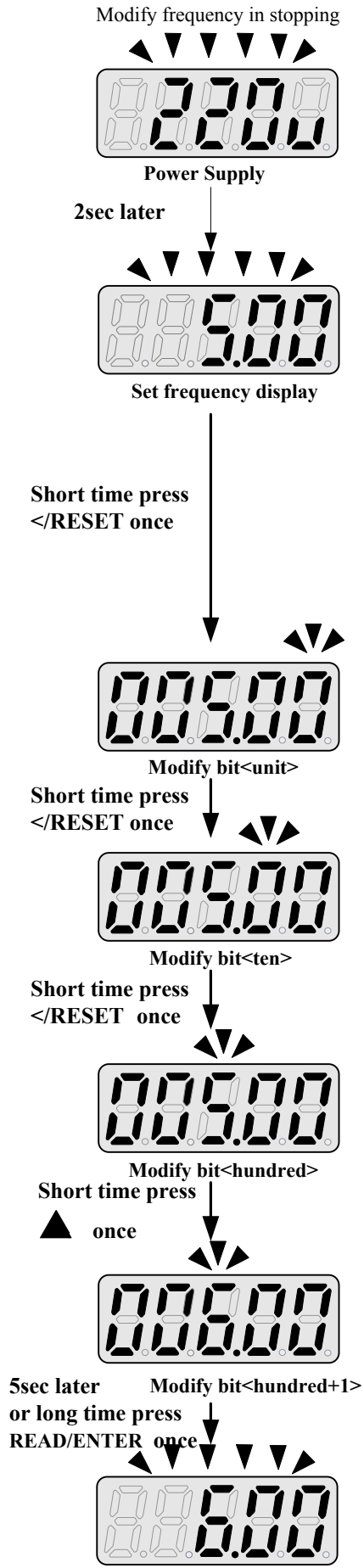
Short pressing changes the number of the selected bit by unitage; long pressing changes the number of the selected bit continuously.

4.1.4 Example of keypad operation

Example1: Modifying Parameters

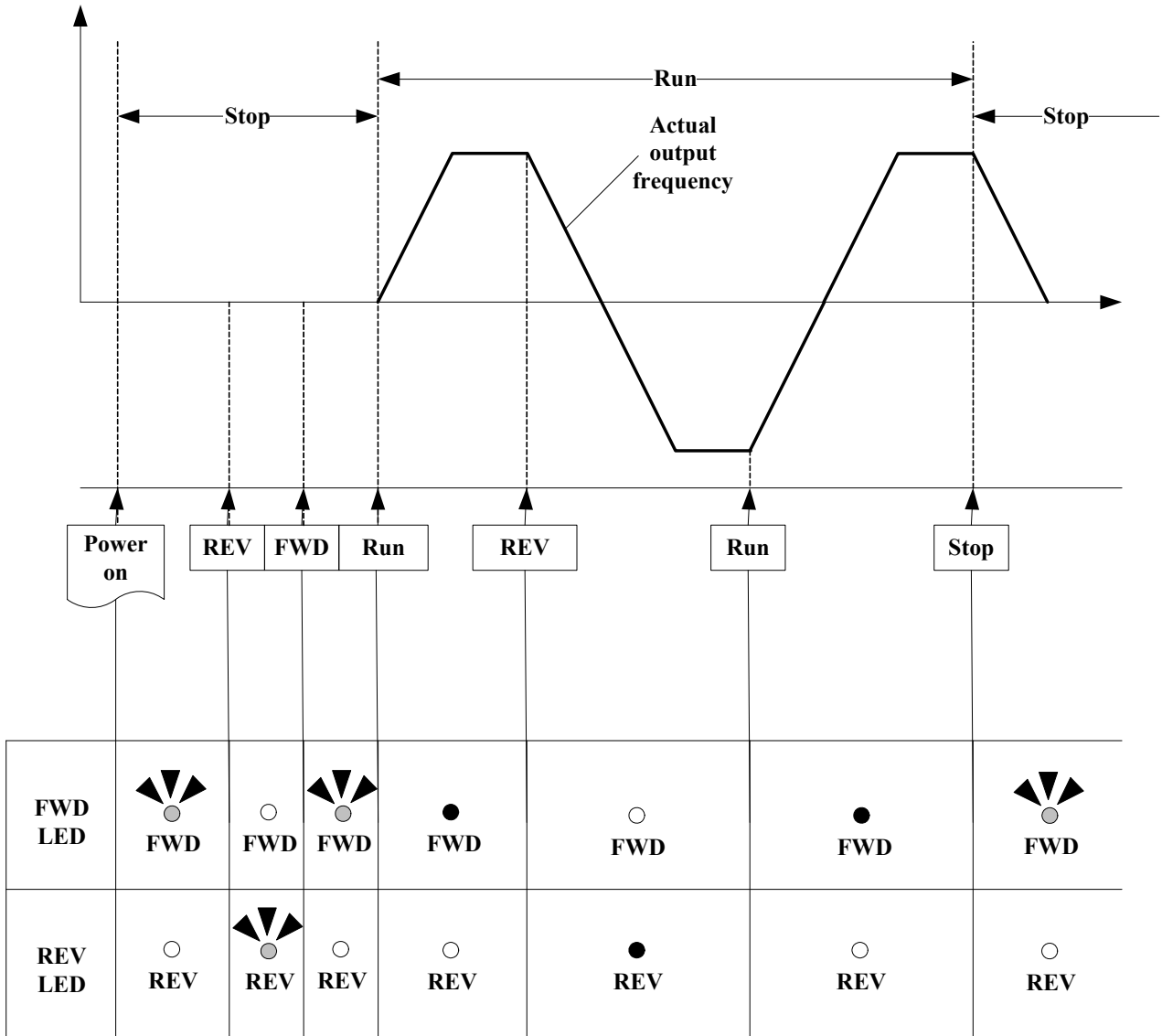


Example2: Modify the frequency while running and stopping with keypad.



Notice: while changing frequency command by panel during running and stopping, it is limited between upper and lower limit frequency.

4.1.5 Operation Control



4.2 Programmable Functions List

Parameter Group No.	Description
Group 00	The basic parameters group
Group 01	V/F command group
Group 02	Motor parameter group
Group 03	External terminal digital signal input (output) function group
Group 04	External terminal analog signal input (output) function group
Group 05	Preset Frequency function group
Group 06	Auto Run (Auto Sequencer) function group
Group 07	Start/Stop command group
Group 08	Protection function group
Group 09	Communication function group
Group 10	PID function group
Group 11	Assistant function group
Group 12	Monitor function group
Group 13	Maintenance function group
Group 14	PLC Setting function group
Group 15	PLC Monitoring function group

Parameter Attribute	
*1	Indicate this parameter can be adjusted during running mode
*2	Cannot be modified while communication is active
*3	Do not change while making factory setting
*4	Read only

Group 00- The basic parameters group					
No.	Description	Range	Factory Setting	Unit	attribute
00-00	Control mode	0 : V/F mode	0	-	
		1 : Vector mode			
00-01	Reserved				
00-02	Main Run Command Source Selection	0:Keypad	0	-	
		1:External Run/Stop Control			
		2:Communication			
		3:PLC			
00-03	Subsidiary Run Command Source Selection	0:Keypad	0	-	
		1:External Run/Stop Control			
		2:Communication			
00-04	Operation modes for external terminals	0: Forward/Stop-Reverse/Stop	0	-	
		1: Run/Stop-Forward/Reverse			
		2: 3-Wire Control Mode-Run/Stop			
00-05	Main Frequency Command Source Selection	0:Keypad	0	-	
		1:Potentiometer on Keypad			
		2:External AVI Analog Signal Input			
		3:External ACI Analog Signal Input			
		4:External Up/Down Frequency Control			
		5:Communication setting Frequency			
6:PID ouput control					
00-06	Subsidiary Frequency Command Source Selection	0:Keypad	4	-	
		1:Potentiometer on Keypad			
		2:External AVI Analog Signal Input			
		3:External ACI Analog Signal Input			
		4:External Up/Down Frequency Control			
		5:Communication setting Frequency			
6:PID					
00-07	Combination of the Main and Subsidiary Frequency Command	0:Main or Subsidiary Frequency Command select input 1:Main + Subsidiary Frequency input	0	-	
00-08	Communication Frequency Command	0.00~650.00	60.00	Hz	*4
00-09	Frequency command memory mode	0:store frequency before power-down	0	-	
		1:Save Keypad Frequency			
00-10	Initial Frequency Selection (for keypad)	0:by Current Frequency Command	0	-	
		1:by 0 Frequency Command			
		2:by 00-11			
00-11	Initial Frequency set of Keypad	0.00~650.00	50.00/60.00	Hz	
00-12	Frequency Upper Limit	0.01~650.00	50.00/60.00	Hz	
00-13	Frequency Lower Limit	0.00~649.99	0.00	Hz	
00-14	Acceleration Time 1	0.1~3600.0	10.0	Sec	*1
00-15	Deceleration Time 1	0.1~3600.0	10.0	Sec	*1
00-16	Acceleration Time 2	0.1~3600.0	10.0	Sec	*1
00-17	Deceleration Time 2	0.1~3600.0	10.0	Sec	*1
00-18	Jog Frequency	1.00~25.00	2.00	Hz	*1
00-19	Jog Acceleration Time	0.1~25.5	0.5	Sec	*1
00-20	Jog Deceleration Time	0.1~25.5	0.5	Sec	*1

Group 01-V/F command group					
No.	Description	Range	Factory Setting	Unit	attribute
01-00	Volts/Hz Patterns	1~18	0/9	-	
01-01	v/f max voltage	200V:170.0~264.0 400V:323.0~528.0	220.0/440.0	Vac	
01-02	Maximum Frequency	0.20 ~ 650.00	50.00/60.00	Hz	
01-03	Maximum Frequency Voltage Ratio	0.0 ~ 100.0	100.0	%	
01-04	Medium Frequency 2	0.10 ~ 650.00	25.00/30.00	Hz	
01-05	Medium Frequency Voltage Ratio2	0.0 ~ 100.0	50.0	%	
01-06	Medium Frequency 1	0.10 ~ 650.00	10.00/12.00	Hz	
01-07	Medium Frequency Voltage Ratio1	0.0 ~ 100.0	20.0	%	
01-08	Minimum Frequency	0.10 ~ 650.00	0.50/0.60	Hz	
01-09	Minimum Frequency Voltage Ratio	0.0 ~ 100.0	1.0	%	
01-10	Volts/Hz Curve Modification (Torque Boost)	0 ~ 10.0	0.0	%	*1
01-11	V/F start Frequency	0.00~10.00	0.00	Hz	
01-12	The time of Slip compensation low-pass filter	0.05~10.00	0.10	S	

Group 02- Motor parameter group					
No.	Description	Range	Factory Setting	Unit	attribute
02-00	Motor No Load Current	----		Amps(AC)	*4
02-01	Motor Rated Current (OL1)	----		A	*4
02-02	Motor rated Slip Compensation	0.0 ~ 100.0	0.0	%	*1
02-03	Motor rated speed	----		Rpm	*4
02-04	Motor rated voltage	----			
02-05	Motor rated power	----			
02-06	Rated motor frequency	----			
02-07	Motor Series	2 ~16	4		
02-08 ~ 02-13	Reserved				
02-14	Motor parameters automatically adjusted	0:Not perform 1:Implementation of the motor parameters self-learning	0		
02-15	Stator resistance gain	----			
02-16	Rotor resistance gain	----			

Group 03- External terminal digital signal input(output) function group					
No.	Description	Range	Factory Setting	Unit	attribute
03-00	Multifunction Input Term. S1	0:Forward/Stop Command	0	-	
03-01	Multifunction Input Term. S2	1:Reverse/Stop Command	1	-	
03-02	Multifunction Input Term. S3	2:Preset Speed unit 0(5-02)	2	-	
03-03	Multifunction Input Term. S4	3:Preset Speed unit 1(5-03)	3	-	
03-04	Multifunction Input Term. S5	4:Preset Speed unit 2(5-05)	4	-	
03-05	Multifunction Input Term. S6	6:Jog Forward Command	17		
		7:Jog Reverse Command			
		8:Up Command			
		9:Down Command			
		10:Acc/Dec 2			
		11:Acc/Dec Disabled			
		12:Main/Alt run Command select			
		13:Main/Alt Frequency Command select			
		14:Emergency Stop			
		15: Base Block			
		16:PID Function Disabled			
		17:Reset			
		18:Auto Run Mode enable			
		19: Speed Search			
		20: Energy-saving operation (only V/F)			
21: PID Integrator zero					
22: Counter trigger signal input					
23: Instruction counter to 0					
24: PLC stop					
25: Reserved					
26: Reserved					
27: Power Source Detect for KEB Function					
03-06	Up/Down frequency width	0.00~5.00	0.00	Hz	
03-07	Up/Down keep Frequency mode	0:When Up/Down is used, the preset frequency is held as the inverter stops, and the UP/Down function is disabled.	0	-	
		1:When Up/Down is used, the preset frequency is reset to 0 Hz as the inverter stops.			
		2:When Up/Down is used, the preset frequency is held as the inverter stops, and the UP/Down is available.			
03-08	S1 ~ S6、SF confirm the scan times	1~200	10	1mSec	
03-09	S1~ S5 switch type select	xxxx0:S1 NO xxx1:S1 NC	00000	-	
		xxx0x:S2 NO xxx1x:S2 NC			
		xx0xx:S3 NO xx1xx:S3 NC			
		x0xxx:S4 NO x1xxx:S4 NC			
		0xxxx:S5 NO 1xxxx:S5 NC			
03-10	S6、SFswitch type select	xxxx0:S6 NO xxxx1:S6 NC	00000	-	
		Xxx0x:SF NO xxx1x:SF NC			
03-11	Output Relay(RY1)	0:Run	0	-	
03-12	Output Relay(RY2)	1:Fault			
		2:setting Frequency			
		3:Frequency Reached (3-13±3-14)			
		4:Frequency Threshold Level (> 3-13) - Frequency Reached			

Group 03- External terminal digital signal input(output) function group					
No.	Description	Range	Factory Setting	Unit	attribute
		5:Frequency Threshold Level (< 3-13) - Frequency Reached			
		6:Auto Restart			
		7:Momentary AC Power Loss			
		8:Emergency Stop Mode			
		9:Base Block Stop Mode			
		10:Motor Overload Protection(OL1)			
		11:Drive Overload Protection(OL2)			
		12: Over-torque detection (OL3)			
		13:Output current Reached			
		14:Brake control			
		15: PID Feedback disconnection detection			
		16: Set the count value reaches instructions (3-22~23)			
		17: Count value reaches the specified direction (3-22~23)			
		18: PLC Status Indicator (00-02)			
		19: PLC control			
		20: Energy Saving (V/F)			
		21: Integration Value Resets to Zero			
		22: Counter Trigger Signal input			
		23: Counter is cleared to Zero			
		24: PLC application			
03-13	Frequency Output Setting (Hz)	0.00~650.00	0.00	Hz	*1
03-14	Frequency Detection Range	0.00~30.00	2.00	Hz	*1
03-15	Output current Reached Level(A)	0.1~15.0	0.1	A	
03-16	Output current detection time(s)	0.1~10.0	0.1	Sec	
03-17	Brake Release Level	0.00~20.00	0.00	Hz	
03-18	Brake Engage Level	0.00~20.00	0.00	Hz	
03-19	Relay Output format	0:A (Normal open) 1:B (Normal close)	0	-	
03-20	Internal / external multi-function input terminal selection	0~63	0	-	
03-21	Action to set the internal multi-function input terminals	0~63	0	-	
03-22	Count reaches the set	0~9999	0	-	
03-23	Specifies the count reaches the set	0~9999	0	-	
03-24	Low current detection setting	0: Invalid 1: Effective	0	-	
03-25	Low Current Detection Level	5%~100%	20%	%	
03-26	Low current detection delay time	0.0~50.0s	20.0	Sec	

※ “NO”: Normal open, “NC”: Normal close.

Group 04- External terminal analog signal input(output) function group					
No.	Description	Range	Factory Setting	Unit	attribute
04-00	AVI/ACI analog Input signal type select	AVI ACI	0	-	
		0:0~10V 0~20mA			
		1:0~10V 4~20mA			
		2:2~10V 0~20mA			
3:2~10V 4~20mA					
04-01	AVI Signal Verification Scan	1~200	50	2mSec	
04-02	AVI Gain	0 ~ 1000	100	%	*1
04-03	AVI Bias	0 ~ 100	0	%	*1
04-04	AVI Bias Selection	0: Positive 1: Negative	0	-	*1
04-05	AVI Slope	0: Positive 1: Negative	0	-	*1
04-06	ACI Signal Verification Scan	1~200	50	2mSec	
04-07	ACI Gain	0 ~ 1000	100	%	*1
04-08	ACIBias	0 ~ 100	0	%	*1
04-09	ACI Bias Selection	0: Positive 1: Negative	0	-	*1
04-10	ACI Slope	0: Positive 1: Negative	0	-	*1
04-11	Analog Output Mode(AO)	0: Output Frequency 1: Frequency Setting 2: Output Voltage 3: DC Bus Voltage 4: Motor Current	0	-	*1
04-12	Analog OutputAO Gain (%)	0 ~ 1000	100	%	*1
04-13	Analog Output AO Bias (%)	0 ~ 100	0	%	*1
04-14	AO Bias Selection	0: Positive 1: Negative	0	-	*1
04-15	AO Slope	0: Positive 1: Negative	0	-	*1

Group 05- Preset Frequency function group					
No.	Description	Range	Factory Setting	Unit	attribute
05-00	Preset Speed Control mode Selection	0: common (Is uniform time(Acc1/Dec1or Acc2/Dec2))	0	-	
		1: special (Is single time Acc0/Dec0~ Acc7/Dec7)			
05-01	Preset Speed 0 (Keypad Freq)	0.00 ~ 650.00	5.00	Hz	
05-02	Preset Speed1 (Hz)		5.00	Hz	*1
05-03	Preset Speed2 (Hz)		10.00	Hz	*1
05-04	Preset Speed3 (Hz)		20.00	Hz	*1
05-05	Preset Speed4 (Hz)		30.00	Hz	*1
05-06	Preset Speed5 (Hz)		40.00	Hz	*1
05-07	Preset Speed6 (Hz)		50.00	Hz	*1
05-08	Preset Speed7 (Hz)		50.00	Hz	*1
05-09	Preset Speed8 (Hz)		0.00	Hz	*1
05-10	Preset Speed9 (Hz)		0.00	Hz	*1

Group 05- Preset Frequency function group					
No.	Description	Range	Factory Setting	Unit	attribute
05-11	Preset Speed10 (Hz)	0.1 ~ 3600.0	0.00	Hz	*1
05-12	Preset Speed11 (Hz)		0.00	Hz	*1
05-13	Preset Speed12 (Hz)		0.00	Hz	*1
05-14	Preset Speed13 (Hz)		0.00	Hz	*1
05-15	Preset Speed14 (Hz)		0.00	Hz	*1
05-16	Preset Speed15 (Hz)		0.00	Hz	*1
05-17	Preset Speed0-Acctime		10.0	Sec	*1
05-18	Preset Speed0-Dectime		10.0	Sec	*1
05-19	Preset Speed1-Acctime		10.0	Sec	*1
05-20	Preset Speed1-Dectime		10.0	Sec	*1
05-21	Preset Speed2-Acctime		10.0	Sec	*1
05-22	Preset Speed2-Dectime		10.0	Sec	*1
05-23	Preset Speed3-Acctime		10.0	Sec	*1
05-24	Preset Speed3-Dectime		10.0	Sec	*1
05-25	Preset Speed4-Acctime		10.0	Sec	*1
05-26	Preset Speed4-Dectime		10.0	Sec	*1
05-27	Preset Speed5-Acctime		10.0	Sec	*1
05-28	Preset Speed5-Dectime		10.0	Sec	*1
05-29	Preset Speed6-Acctime		10.0	Sec	*1
05-30	Preset Speed6-Dectime		10.0	Sec	*1
05-31	Preset Speed7-Acctime		10.0	Sec	*1
05-32	Preset Speed7-Dectime		10.0	Sec	*1
05-33	Preset Speed8-Acctime		10.0	Sec	*1
05-34	Preset Speed8-Dectime		10.0	Sec	*1
05-35	Preset Speed9-Acctime		10.0	Sec	*1
05-36	Preset Speed9-Dectime		10.0	Sec	*1
05-37	Preset Speed10-Acctime		10.0	Sec	*1
05-38	Preset Speed10-Dectime		10.0	Sec	*1
05-39	Preset Speed11-Acctime		10.0	Sec	*1
05-40	Preset Speed11-Dectime		10.0	Sec	*1
05-41	Preset Speed12-Acctime		10.0	Sec	*1
05-42	Preset Speed12-Dectime		10.0	Sec	*1
05-43	Preset Speed13-Acctime		10.0	Sec	*1
05-44	Preset Speed13-Dectime	10.0	Sec	*1	
05-45	Preset Speed14-Acctime	10.0	Sec	*1	
05-46	Preset Speed14-Dectime	10.0	Sec	*1	
05-47	Preset Speed15-Acctime	10.0	Sec	*1	
05-48	Preset Speed15-Dectime	10.0	Sec	*1	

Group 06- Auto Run(Auto Sequencer) function group

No.	Description	Range	Factory Setting	Unit	attribute
06-00	Auto Run (sequencer) mode selection	0: Disabled. 1: Single cycle. (Continues to run from theUnfinished step if restarted). 2: Periodic cycle. (Continues to run from the unfinished step if restarted). 3: Single cycle, then holds the speed Of final step to run. (Continues to run from the unfinished step if restarted). 4: Single cycle. (Starts a new cycle if restarted). 5: Periodic cycle. (Starts a new cycle if restarted). 6: Single cycle, then hold the speed of final step to run. (Starts a new cycle if restarted).	0	-	
06-01	Auto _ Run Mode Frequency Command 1	0.00~650.00	0.00	Hz	*1
06-02	Auto _ Run Mode Frequency Command 2		0.00	Hz	*1
06-03	Auto _ Run Mode Frequency Command 3		0.00	Hz	*1
06-04	Auto _ Run Mode Frequency Command 4		0.00	Hz	*1
06-05	Auto _ Run Mode Frequency Command 5		0.00	Hz	*1
06-06	Auto _ Run Mode Frequency Command 6		0.00	Hz	*1
06-07	Auto _ Run Mode Frequency Command 7		0.00	Hz	*1
06-08	Auto _ Run Mode Frequency Command 8		0.00	Hz	*1
06-09	Auto _ Run Mode Frequency Command 9		0.00	Hz	*1
06-10	Auto _ Run Mode Frequency Command10		0.00	Hz	*1
06-11	Auto _ Run Mode Frequency Command 11		0.00	Hz	*1
06-12	Auto _ Run Mode Frequency Command 12		0.00	Hz	*1
06-13	Auto _ Run Mode Frequency Command 13		0.00	Hz	*1
06-14	Auto _ Run Mode Frequency Command 14		0.00	Hz	*1
06-15	Auto _ Run Mode Frequency Command 15		0.00	Hz	*1
06-16	Auto _ Run Mode Running Time Setting 0	0.0 ~ 3600.0	0.0	Sec	

Group 06- Auto Run(Auto Sequencer) function group					
No.	Description	Range	Factory Setting	Unit	attribute
06-17	Auto_Run Mode Running Time Setting 1		0.0	Sec	
06-18	Auto_Run Mode Running Time Setting 2		0.0	Sec	
06-19	Auto_Run Mode Running Time Setting 3		0.0	Sec	
06-20	Auto_Run Mode Running Time Setting 4		0.0	Sec	
06-21	Auto_Run Mode Running Time Setting 5		0.0	Sec	
06-22	Auto_Run Mode Running Time Setting 6		0.0	Sec	
06-23	Auto_Run Mode Running Time Setting 7		0.0	Sec	
06-24	Auto_Run Mode Running Time Setting 8		0.0	Sec	
06-25	Auto_Run Mode Running Time Setting 9		0.0	Sec	
06-26	Auto_Run Mode Running Time Setting 10		0.0	Sec	
06-27	Auto_Run Mode Running Time Setting 11		0.0	Sec	
06-28	Auto_Run Mode Running Time Setting 12		0.0	Sec	
06-29	Auto_Run Mode Running Time Setting 13		0.0	Sec	
06-30	Auto_Run Mode Running Time Setting 14		0.0	Sec	
06-31	Auto_Run Mode Running Time Setting 15		0.0	Sec	
06-32	Auto_Run Mode Running Direction 0	0:stop 1: forward 2: reverse	0	-	
06-33	Auto_Run Mode Running Direction 1		0	-	
06-34	Auto_Run Mode Running Direction 2		0	-	
06-35	Auto_Run Mode Running Direction 3		0	-	
06-36	Auto_Run Mode Running Direction 4		0	-	
06-37	Auto_Run Mode Running Direction 5		0	-	
06-38	Auto_Run Mode Running Direction 6		0	-	
06-39	Auto_Run Mode Running Direction 7		0	-	
06-40	Auto_Run Mode Running Direction 8		0	-	
06-41	Auto_Run Mode Running		0	-	

Group 06- Auto Run(Auto Sequencer) function group					
No.	Description	Range	Factory Setting	Unit	attribute
	Direction 9				
06-42	Auto_ Run Mode Running Direction10		0	-	
06-43	Auto_ Run Mode Running Direction 11		0	-	
06-44	Auto_ Run Mode Running Direction12		0	-	
06-45	Auto_ Run Mode Running Direction13		0	-	
06-46	Auto_ Run Mode Running Direction 14		0	-	
06-47	Auto_ Run Mode Running Direction 15		0	-	

Group 07- Start/Stop command group					
No.	Description	Range	Factory Setting	Unit	attribute
07-00	Momentary Power Loss and Restart	0: Momentary Power Loss and Restart disable 1: Momentary power loss and restart enable	0	-	
07-01	Auto Restart Delay Time	0.0~800.0	0.0	Sec	
07-02	Number of Auto Restart Attempts	0~10	0	-	
07-03	Reset Mode Setting	0: Enable Reset Only when Run Command is Off 1: Enable Reset when Run Command is On or Off	0	-	
07-04	Direct Running After Power Up	0: Enable Direct running after power up 1: Disable Direct running after power up	1	-	
07-05	Delay-ON Timer	1.0~300.0	1.0	Sec	
07-06	DC Injection Brake Start Frequency (Hz) @stopped	0.10 ~ 10.00	1.5	Hz	
07-07	DC Injection Brake Level (%) @Stopped	0.0 ~ 150.0	50.0	%	
07-08	DC Injection Brake Time (Seconds) @stopped	0.0 ~ 25.5	0.5	Sec	
07-09	Stop mode	0 : Deceleration stop 1 : Free stop	0	-	
07-10	Starting methods	0 : Normal start 1 : Speed Search	0	-	
07-11	Automatically reset and then start the way	0 : Speed Search 1 : Normal start	0	-	
07-12	Allows instantaneous stop time	0.0 ~ 2.0	0.5	Sec	
07-13	Main circuit low voltage detected	150.0~210.0 300.0~420.0	190.0/380.0	Vac	
07-14	Kinetic Energy Back-up Deceleration Time	0.0~25.0: KEB Deceleration Time	0.0	Sec	

Group 08- Protection function group					
No.	Description	Range	Factory Setting	Unit	attribute
08-00	Trip Prevention Selection	xxxx0: Enable Trip Prevention During Acceleration xxxx1: Disable Trip Prevention During Acceleration xxx0x: Enable Trip Prevention During Deceleration xxx1x: Disable Trip Prevention During Deceleration xx0xx: Enable Trip Prevention in Run Mode xx1xx: Disable Trip Prevention in Run Mode x0xxx: Enable over voltage Prevention in Run Mode x1xxx: Disable over voltage Prevention in Run Mode	00000	-	
08-01	Trip Prevention Level During Acceleration (%)	50 ~ 200	200	Inverter Rated Current 100%	
08-02	Trip Prevention Level During Deceleration (%)	50 ~ 200	200	Inverter Rated Current 100%	
08-03	Trip Prevention Level In Run Mode (%)	50 ~ 200	200	Inverter Rated Current 100%	
08-04	over voltage Prevention Level in Run Mode	350~390	380	VDC	
08-05	Electronic Motor Overload Protection Operation Mode	0: Enable Electronic Motor Overload Protection 1: Disable Electronic Motor Overload Protection	0	-	
08-06	Operation After Overload Protection is Activated	0: Coast-to-Stop After Overload Protection is Activated 1: Drive Will Not Trip when Overload Protection is Activated (OL1)	0	-	
08-07	OH over heat Protection (cooling fan control)	0: Auto (Depends on temp.) 1: Operate while in RUN mode 2: Always Run 3: Disabled	1	-	
08-08	AVR Function	0: AVR function enable	4	-	
		1: AVR function Disable			
		2: AVR function disable for stop			
		3: AVR function disable for Deceleration.			
		4: AVR function disable for stop and Deceleration.			
5: when VDC>360V, AVR function disable for stop and Deceleration.					

Group 08- Protection function group					
No.	Description	Range	Factory Setting	Unit	attribute
08-09	Input phase lost protection	0: Disabled 1: Enabled	0	-	
08-10	Output due to phase protection	0: Invalid	0	-	
		1: Effective			
08-11	Motor type selection	0: Electronic relays protect standard motor	0	-	
		1: Electronic relays protect Special motor			
08-12	Motor overload protection selection	0: Electronic relays protect motor (OL=103 %) (150%1Minutes)	0	-	
		1: Electronic relays protect motor (OL=113%) (123%1 Minutes)			
08-13	Over torque detection Control	0: Over-torque detection is not valid	0	-	
		1: Detected after the set frequency			
		2: Detect when running			
08-14	Action selection over torque protection	0: Stop output after over-torque detection (Free-run stop)	0	-	
		1: Continue to run after over-torque detection (Display only OL3)			
08-15	Over Torque Detection Level	30 ~ 300	160	-	
08-16	Over Torque Detection Time	0.0 ~ 25.0	0.1	-	
08-17	Fire mode	0: Invalid	0	-	
		1: Effective			

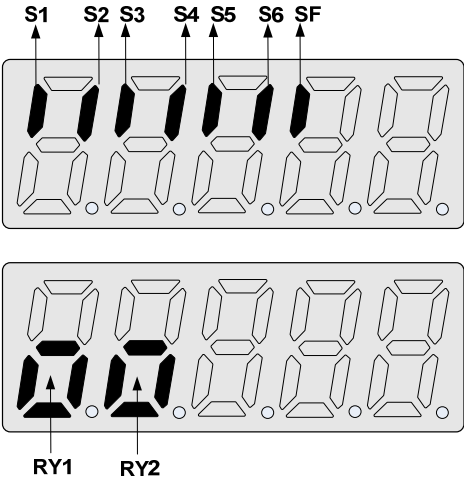
Group 09- Communication function group					
No.	Description	Range	Factory Setting	Unit	attribute
09-00	Assigned Communication Station Number	1 ~ 32	1	-	*2*3
09-01	RTU code /ASCII code select	0:RTU code 1:ASCII code	0	-	*2*3
09-02	Baud Rate Setting (bps)	0:4800 1:9600 2:19200 3:38400	2	bps	*2*3
09-03	Stop Bit Selection	0:1 Stop Bit 1:2 Stop Bits	0	-	*2*3
09-04	Parity Selection	0:Without Parity 1:With Even Parity 2:With Odd Parity	0	-	*2*3
09-05	Data Format Selection	0: 8-Bits Data 1: 7-Bits Data	0	-	*2*3
09-06	Communication time-out detection time	0.0 ~ 25.5	0.0	Sec	
09-07	Communication time-out operation selection	0:Deceleration to stop (00-15: Deceleration time 1) 1:Coast to stop 2: Deceleration to stop (00-17: Deceleration time 2) 3: continue operating	0	-	
09-08	Err6 fault tolerance times	1 ~ 20	3		

Group 09- Communication function group					
No.	Description	Range	Factory Setting	Unit	attribute
09-09	Drive Transmit Wait Time (ms)	5 ~ 65	5	mSec	

Group10- PID function group					
No.	Description	Range	Factory Setting	Unit	attribute
10-00	PID target value selection (when 00-03\00-04=6, this function is enabled)	0:Potentiometer on Keypad 1: External AVI Analog Signal Input 2: External ACI Analog Signal Input 3: Communication setting Frequency 4: By 10-02	1	-	*1
10-01	PID feedback value selection	0:Potentiometer on Keypad 1:External AVI Analog Signal Input 2:External ACI Analog Signal Input 3:Communication setting Frequency	2	-	*1
10-02	PID keypad input	0.0~100.0	50.0	%	*1
10-03	PID Mode Selection	0:Disabled 1: Bias D Control 2: Feedback D Control 3: PIDcontrol, Bias D reversed Characteristics control 4: PIDcontrol, feedback D reversed Characteristics control	0	-	
10-04	Feedback Gain coefficient	0.00 ~ 10.00	1.00	%	*1
10-05	Proportional Gain	0.0 ~ 10.0	1.0	%	*1
10-06	Integration Time	0.0 ~ 100.0	10.0	Sec	*1
10-07	Differentiation Time	0.00 ~ 10.00	0.00	Sec	*1
10-08	PID Offset	0: Positive 1: Negative	0	-	*1
10-09	PID Offset Adjust	0 ~ 109	0	%	*1
10-10	PID Output Lag Filter Time	0.0 ~ 2.5	0.0	Sec	*1
10-11	Feedback Loss Detection Mode	0: Disabled 1: Enabled - Drive Continues to Operate After Feedback Loss 2: Enabled - Drive "STOPS" After Feedback Loss	0	-	
10-12	Feedback Loss Detection Level	0 ~ 100	0	%	
10-13	Feedback Loss Detection Delay Time	0.0 ~25.5	1.0	Sec	
10-14	Integration Limit Value	0 ~ 109	100	%	*1
10-15	Integration Value Resets to Zero when Feedback Signal Equals the Intended Value	0:Disabled 1: 1 Second 30: 30 Seconds 0 ~ 30	0	-	
10-16	Allowable Integration Error Margin (Units) (1 Unit = 1/8192)	0 ~ 100	0	-	
10-17	PID Sleep Frequency Level	0.00~650.00	0.00	Hz	
10-18	PID Sleep Function Delay Time	0.0 ~25.5	0.0	Sec	

Group10- PID function group					
No.	Description	Range	Factory Setting	Unit	attribute
10-19	PID Wake up frequency Level	0.00 ~ 650.00	0.00	Hz	
10-20	PID Wake up function Delay Time	0.0 ~ 25.5	0.0	Sec	
10-21	Max PID Feedback Setting	0 ~999	100	-	*1
10-22	Min PID Feedback Setting	0 ~999	0	-	*1

Group11- Assistant function group					
No.	Description	Range	Factory Setting	unit	attribute
11-00	Reverse operation control	0: Reverse command is enabled 1: Reverse command is disabled	0	-	
11-01	Carrier Frequency (kHz)	1~16	5	KHz	
11-02	Carrier mode Selection	0:Carrier mode0 3-phase PW M modulation 1:Carrier mode1 2-phase PW M modulation 2:Carrier mode0 2 2-phase randomized PW M modulation	0	-	
11-03	Carrier Frequency Reduction by temperature raising	0:disabled 1:enabled	0	-	
11-04	S-Curve Acc 1	0.0 ~ 4.0	0.00	Sec	
11-05	S-Curve Acc 2	0.0 ~ 4.0	0.00	Sec	
11-06	S-Curve Dec 3	0.0 ~ 4.0	0.00	Sec	
11-07	S-Curve Dec 4	0.0 ~ 4.0	0.00	Sec	
11-08	Skip Frequency 1	0.00 ~ 650.00	0.00	Hz	*1
11-09	Skip Frequency 2	0.00 ~ 650.00	0.00	Hz	*1
11-10	Skip Frequency 3	0.00 ~ 650.00	0.00	Hz	*1
11-11	Skip Frequency Bandwidth (±)	0.00 ~ 30.00	0.00	Hz	*1
11-12	Operating gain of energy conservation (VF)	0 ~ 100	80	%	
11-13	Regeneration avoidance operation selection	0 : Regeneration avoidance function invalid 1 : Regeneration avoidance function is always valid 2 : Only in the constant, Regeneration avoidance function valid	0	-	
11-14	Regeneration avoidance operation level	300~800V	380/760	-	
11-15	Regeneration avoidance frequency limit of compensation	0.00~15.00Hz : the frequency of start-up limit when regeneration avoidance function started	3.00	Hz	
11-16	Regeneration avoidance voltage gain	0~200	100	%	
11-17	Regeneration avoidance Frequency gain	0~200	100	%	

Group12 Monitor function group					
No.	Description	Range	Factory Setting	Unit	attribute
12-00	Display Mode	00000~77777 Each of the range of 0 to 7	00000	-	*1
		0:Disable display			
		1:output Current			
		2:output Voltage			
		3:DC voltage			
		4:Temperature			
		5:PID feedback			
		6:AVI			
		7:ACI			
8: Count					
12-01	PID Feedback Display Mode	0:Displayed in Integer (xxx)	0	-	*1
		1:Displayed with One Decimal Place (xx.x)			
		2:Displayed with Two Decimal Places (x.xx)			
12-02	PID Feedback Display Unit Setting	0:xxx--	0	-	*1
		1:xxxpb(pressure)			
		2:xxxfl(flow)			
12-03	Custom Units (Line Speed) Value	0~65535	1500/1800	RPM	*1
12-04	Custom Units (Line Speed) Display Mode	0:Drive Output Frequency is Displayed	0	-	*1
		1:Line Speed is Displayed in Integer (xxxxx)			
		2:Line Speed is Displayed with One Decimal Place (xxxx.x)			
		3:Line Speed is Displayed with Two Decimal Places (xxx.xx)			
		4:Line Speed is Displayed with Three Decimal Places (xx.xxx)			
12-05	Input and output terminal status display		-	-	*4
			-	-	*4
12-06	Display of life alarm status	xxxx0: life alarm of inrush current suppression circuit is invalid	00000	-	*1
		xxxx1: life alarm of inrush current suppression circuit is valid			
		xxx0x: life alarm of control circuit capacitors is invalid			
		xxx1x: life alarm of control circuit capacitors is valid			
12-07	Detect main circuit	xx0xx: life alarm of main circuit capacitors is invalid	100	%	
		xx1xx: life alarm of main circuit capacitors is valid			
12-07	Detect main circuit	Reserved	100	%	

Group12 Monitor function group					
No.	Description	Range	Factory Setting	Unit	attribute
	capacitors				
12-08	Display of inrush current suppression circuit	0~100	100	%	
12-09	Display of control circuit capacitors	0~100	100	%	
12-10	Display of main circuit capacitors	0~100	100	%	
12-11	Output current when Fault appeared	----	0	A	
12-12	Output voltage when fault appeared	----	0	Vac	
12-13	Output frequency when fault appeared	----	0	Hz	
12-14	DC bus voltage when fault appeared	----	0	Vac	
12-15	Frequency command when fault appeared	----	0	Hz	

Group 13 Maintenance function group					
No.	Description	Range	Factory Setting	unit	attribute
13-00	Drive Horsepower Code	----	-	-	*3
13-01	Software Version	----	-	-	*3*4
13-02	Fault Log (Last 3 Faults)	----	-	-	*3*4
13-03	Accumulated Operation Time1 1	0~23	-	hour	*3
13-04	Accumulated Operation Time1 2	0~65535	----	day	*3
13-05	Accumulated Operation Time Mode	0:Time Under Power 1:Run Mode Time Only	0	-	*3
13-06	Parameter Lock	0:Enable all Functions 1:05-01~05-08 cannot be changed 2:All Functions cannot be changed Except 05-01~05-08 3:Disable All Function	0	-	
13-07	Parameter password	00000~65535	00000	-	
13-08	Reset Drive to Factory Settings	1150:Reset to the 50Hz factory setting 1160:Reset to the60Hz factory setting	00000	-	

Group 14 PLC Setting function					
No.	Description	Range	Factory Setting	unit	attribute
14-00	Setting value1 of T1	0~9999	0	-	
14-01	Setting value1 of T1 (mode 7)	0~9999	0	-	
14-02	Setting value1 of T2	0~9999	0	-	
14-03	Setting value1 of T2 (mode 7)	0~9999	0	-	
14-04	Setting value1 of T3	0~9999	0	-	
14-05	Setting value1 of T3	0~9999	0	-	

Group 14 PLC Setting function					
No.	Description	Range	Factory Setting	unit	attribute
	(mode 7)				
14-06	Setting value1 of T4	0~9999	0	-	
14-07	Setting value1 of T4 (mode 7)	0~9999	0	-	
14-08	Setting value1 of T5	0~9999	0	-	
14-09	Setting value1 of T5 (mode 7)	0~9999	0	-	
14-10	Setting value1 of T6	0~9999	0	-	
14-11	Setting value1 of T6 (mode 7)	0~9999	0	-	
14-12	Setting value1 of T7	0~9999	0	-	
14-13	Setting value1 of T7 (mode 7)	0~9999	0	-	
14-14	Setting value1 of T8	0~9999	0	-	
14-15	Setting value1 of T8 (mode 7)	0~9999	0	-	
14-16	Setting value1 of C1	0~65535	0	-	
14-17	Setting value1 of C2	0~65535	0	-	
14-18	Setting value1 of C3	0~65535	0	-	
14-19	Setting value1 of C4	0~65535	0	-	
14-20	Setting value1 of C5	0~65535	0	-	
14-21	Setting value1 of C6	0~65535	0	-	
14-22	Setting value1 of C7	0~65535	0	-	
14-23	Setting value1 of C8	0~65535	0	-	
14-24	Setting value1 of AS1	0~65535	0	-	
14-25	Setting value2 of AS1	0~65535	0	-	
14-26	Setting value3 of AS1	0~65535	0	-	
14-27	Setting value1 of AS2	0~65535	0	-	
14-28	Setting value2 of AS2	0~65535	0	-	
14-29	Setting value3 of AS2	0~65535	0	-	
14-30	Setting value1 of AS3	0~65535	0	-	
14-31	Setting value2 of AS3	0~65535	0	-	
14-32	Setting value3 of AS3	0~65535	0	-	
14-33	Setting value1 of AS4	0~65535	0	-	
14-34	Setting value2 of AS4	0~65535	0	-	
14-35	Setting value3 of AS4	0~65535	0	-	
14-36	Setting value1 of MD1	0~65535	1	-	
14-37	Setting value2 of MD1	0~65535	1	-	
14-38	Setting value3 of MD1	1~65535	1	-	
14-39	Setting value1 of MD2	0~65535	1	-	
14-40	Setting value2 of MD2	0~65535	1	-	
14-41	Setting value3 of MD2	1~65535	1	-	
14-42	Setting value1 of MD3	0~65535	1	-	
14-43	Setting value2 of MD3	0~65535	1	-	
14-44	Setting value3 of MD3	1~65535	1	-	
14-45	Setting value1 of MD4	0~65535	1	-	
14-46	Setting value2 of MD4	0~65535	1	-	
14-47	Setting value3 of MD4	1~65535	1	-	

Group 15 PLC Monitoring function					
No.	Description	Range	Factory Setting	unit	attribute
15-00	Current value of T1	0~9999	0	-	
15-01	Current value of T1(mode 7)	0~9999	0	-	
15-02	Current value of T2	0~9999	0	-	
15-03	Current value of T2(mode 7)	0~9999	0	-	
15-04	Current value of T3	0~9999	0	-	
15-05	Current value of T3(mode 7)	0~9999	0	-	
15-06	Current value of T4	0~9999	0	-	
15-07	Current value of T4(mode 7)	0~9999	0	-	
15-08	Current value of T5	0~9999	0	-	
15-09	Current value of T5(mode 7)	0~9999	0	-	
15-10	Current value of T6	0~9999	0	-	
15-11	Current value of T6(mode 7)	0~9999	0	-	
15-12	Current value of T7	0~9999	0	-	
15-13	Current value of T7(mode 7)	0~9999	0	-	
15-14	Current value of T8	0~9999	0	-	
15-15	Current value of T8(mode 7)	0~9999	0	-	
15-16	Current value of C1	0~65535	0	-	
15-17	Current value of C2	0~65535	0	-	
15-18	Current value of C3	0~65535	0	-	
15-19	Current value of C4	0~65535	0	-	
15-20	Current value of C5	0~65535	0	-	
15-21	Current value of C6	0~65535	0	-	
15-22	Current value of C7	0~65535	0	-	
15-23	Current value of C8	0~65535	0	-	
15-24	Current value of AS1	0~65535	0	-	
15-25	Current value of AS2	0~65535	0	-	
15-26	Current value of AS3	0~65535	0	-	
15-27	Current value of AS4	0~65535	0	-	
15-28	Current value of MD1	0~65535	0	-	
15-29	Current value of MD2	0~65535	0	-	
15-30	Current value of MD3	0~65535	0	-	
15-31	Current value of MD4	0~65535	0	-	
15-32	Current value of TD	0~65535	0	μs	

4.3 Parameter Function Description

00- The basic parameters group

00- 00	Control Mode
Range	【0】 :V/F mode 【1】 :Vector mode

To select the appropriate vector control mode or V/F mode according to the load characteristics.

- If V/F mode is selected, please set parameters, group1 to comply with the load features.
- Vector is best suited to control the general load or rapidly-changed torque load.

00- 02	Main Run Command Source Select
Range	【0】 :Keypad 【1】 :External Run/Stop Control 【2】 :Communication 【3】 :PLC

- Parameter 00 - 02 sets the inverter Main Run command source. Switching between 00-02 and 00-03,see code range of external ports (03-00~03-05): **【12】** function description of main/sub frequency command.

00- 03	Alternative Run Command Source Select
Range	【0】 :Keypad 【1】 :External Run/Stop Control 【2】 :Communication

- Parameter 00- 03 sets the inverter Alternative Run command source. Switching between 00-02 and 00-03,see code range of external ports (03-00~03-05): **【12】** function description of main/sub frequency command.

00- 04	Operation modes for external terminals
Range	【0】 :Forward/stop-reverse/stop 【1】 :Run/stop-forward/reverse 【2】 :3-wire control mode -run/stop

- When operation command 00- 02/00- 03 =1 (external terminal), 00- 04 is valid.
- 2-wire operation mode : After setting 00- 04= **【0/1】** ,each of (03 - 00 03 - 04) can be set to **【0】** or **【1】**
00- 04= **【0】** , in external terminals function code,0 stand for fwd/stop,1 stand for rev/stop.
00- 04= **【1】** , in external terminals function code,0 stand for run/stop,1 stand for fwd/rev.
- 3-wire operation mode : 00 - 04 = **【2】** , then terminals S1, S2, S3 is combined to execute this function , no matter what the value is in 03 - 00,03 - 01,03 - 02. (refer to Group 03)

00- 05	Main Frequency Command Source Select
00- 06	Alternative Frequency Command Source Select
Range	【0】 :UP/DOWN of Keypad 【1】 :Potentiometer on Keypad 【2】 :External AVI Analog Signal Input 【3】 :External ACI Analog Signal Input 【4】 :External Up/Down Frequency Control 【5】 :Communication setting Frequency 【6】 :PID

- Parameter 00 - 05/00- 06 sets the inverter frequency command source.
- When 00 - 05/00- 06 = **【6】** , frequency command source is output of PID.

※Note: 00 - 05(Main Frequency Command Source)and 00- 06 (Alternative Frequency Command Source) can not be the same, Otherwise the panel will display Err2.

00- 07	Combination of the Main and Subsidiary FrequencyCommand
Range	【0】 :Main or Subsidiary Frequency Command select input 【1】 :Main + Subsidiary Frequency input

- When 00 - 07 = **【0】** , the frequency source is one of parameter 00 - 05 and 00 - 06, the default one is 00 -

05, when needs to switch to 00 - 06, an external multi-functional terminal function code **【13】**(Main / Sub frequency source switching) is needed see description of parameter (3-00 ~ 3-05).

00- 08	Communication Frequency Command
Range	【0.00~650.00】 Hz

- This parameter can be used to set frequency command or read communication frequency command (read only)
- This parameter is only effective in the communication mode.

00- 09	Saving Communication Frequency Command
Range	【0】 :disable 【1】 :enable

- This parameter is only effective in the communication mode.

00-10	Initial Frequency Selection
Range	【0】 :By Current Freq Command 【1】 :By Zero Freq Command 【2】 :By 00-11

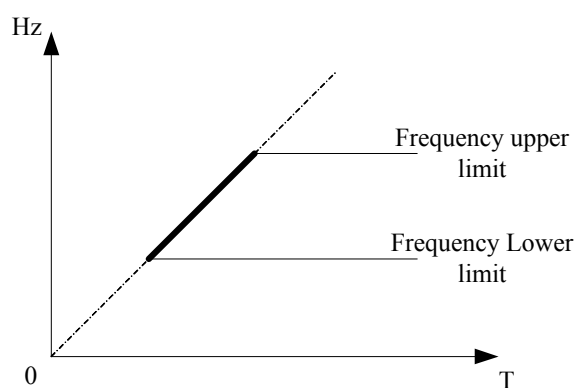
00-11	Initial Frequency Setpoint
Range	【0.00~650.00】 Hz

- This parameter is only used when the frequency source is keypad.
- When 00-10= **【0】** ,the initial frequency will be current frequency.
- When 00-10= **【1】** ,the initial frequency will be 0.
- When 00-10= **【2】** ,the initial frequency will be 00-11.

00-12	Frequency Upper limit
Range	【0.01~650.00】 Hz

00-13	Frequency Lower limit
Range	【0.00~649.99】 Hz

- When 00-13 = **【0】** ,and the frequency command value is also zero, the inverter works in zero speed stopping state; When 00-13> 0, and the frequency command value ≤ 00-13, inverter output the frequency lower limit.



00-14	Acceleration time 1
Range	【0.1~3600.0】 Sec

00-15	Deceleration time 1
Range	【0.1~3600.0】 Sec

00-16	Acceleration time 2
Range	【0.1~3600.0】 Sec

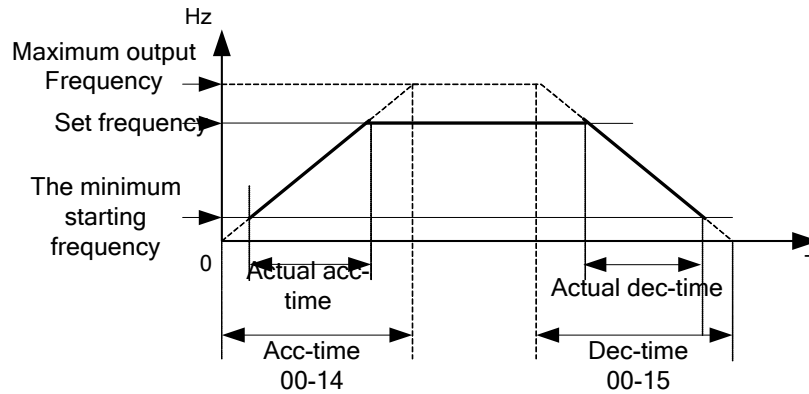
00-17	Deceleration time 2
Range	【0.1~3600.0】 Sec

- Acceleration time is starting from the lowest frequency converter frequency to the maximum output frequency of the time spent.

- Deceleration time is the maximum output frequency from the frequency converter to minimize the initial frequency of the time spent.
- Actual acceleration and deceleration time is calculated as follows:

$$\text{Actual acceleration time} = \frac{(00-14) \times (\text{Set frequency} - \text{The minimum starting frequency})}{\text{Maximum output frequency}}$$

$$\text{Actual deceleration time} = \frac{(00-15) \times (\text{Set frequency} - \text{The minimum starting frequency})}{\text{Maximum output frequency}}$$



00-18	Jog Frequency
Range	【1.00~25.00】 Hz
00-19	Jog Acceleration Time
Range	【0.1~25.5】 Sec
00-20	Jog Deceleration Time
Range	【0.1~25.5】 Sec

- The JOG function is executed by setting multi-terminal parameter 03 - 00 ~03 - 05 to **【6 / 7】** .
(See figures in descriptions of parameter group 03).

01-V/F command group

01- 00	Volts/Hz Patterns (V/F)
Range	【0~18】

- 1. setting 01- 00=【1~17】 means V / F curve is fixed (parameter 01 - 02 ~ 01 - 09 setting does not work).
- 2.18 fixed curves refer to the diagram:

TYPE	50Hz		60Hz	
Func tion	01-00	V/F pattern	01-00	V/F pattern
General Use	=【0】		=【9】	
	=【1】		=【10】	
	=【2】		=【11】	
=【3】	=【12】			
High start torque	=【4】		=【13】	
	=【5】		=【14】	
Decreasing torque	=【6】		=【15】	
	=【7】		=【16】	
	=【8】		=【17】	

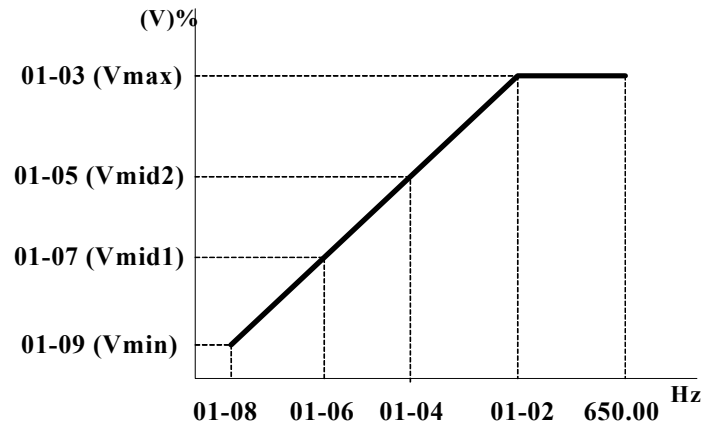
In figures above, "V" of 100% means the maximum output voltage, percentage of B, C is shown in tables below.

01- 00	B	C
0 / 9	7.5%	4.5%
1 / 10	10.0%	7.0%
2	11.0%	8.5%
3	12.0%	9.5%
4	17.5%	4.0%
5	25.0%	5.0%
11	11.0%	8.0%
12	12.0%	9.0%
13	20.5%	7.0%
14	28.5%	8.0%
6 / 15	45.0%	1.0%
7 / 16	55.0%	1.0%
8 / 17	65.0%	1.0%

- 3.Setting 01 - 00 =[18] means the 7th V / F curve is selected, users can set needed V / F curves by parameters (01 - 02 ~ 01 - 09).

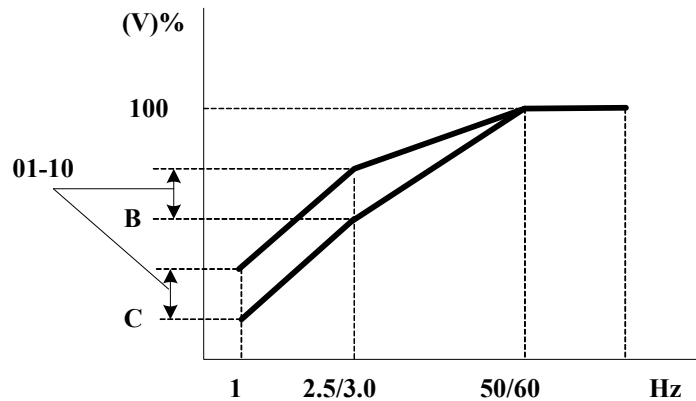
01- 01	v/f Maximum voltage
Range	【200V: 170.0~264.0, 400V: 323.0~528.0】 V
01- 02	Maximum Frequency
Range	【0.20 ~ 650.00】 Hz
01- 03	Maximum Frequency Voltage Ratio
Range	【0.0 ~ 100.0】 %
01- 04	Medium Frequency 2
Range	【0.10 ~ 650.00】 Hz
01- 05	Medium Frequency Voltage Ratio 2
Range	【0.0 ~ 100.0】 %
01- 06	Medium Frequency 1
Range	【0.10 ~ 650.00】 Hz
01- 07	Medium Frequency Voltage Ratio 1
Range	【0.0 ~ 100.0】 %
01- 08	Minimum Frequency
Range	【0.10 ~ 650.00】 Hz
01- 09	Minimum Frequency Voltage Ratio
Range	【0.0 ~ 100.0】 %

- If sets 01-00= 【18】 ,any V/F curve can be set with parameters 01- 02~01- 09,an the maximum output frequency depends on 01-02 setting.
- If 01-00 ≠ 【18】 , the maximum output frequency is fixed to 50.00HZ or 60.00HZ,and 01-02 does not work.



01-10	Volts/Hz Curve Modification (Torque Boost)
Range	【0 ~ 10.0】 %

- Inverter output a V / F curve composed by B, C and 01-10 setting to improve the output torque.
- Calculation of B, C point voltage: B point voltage = Xb × maximum output voltage, C point voltage = Xc × maximum output voltage (Xb, Xc see P4-16). When 01-10 = 0, the torque improvement is disabled.



01-11	V/F start Frequency
Range	【0.00 ~ 10.00】 Hz
01-12	The time of Slip compensation low-pass filter
Range	【0.05 ~ 10.00】 S

02- Motor parameter group

02- 00	Motor no load current
Range	----
02- 01	Motor Rated Current
Range	----
02- 02	Motor rated Slip Compensation
Range	【0.0 ~ 200.0】 (%)
02- 03	Motor Rated Speed
Range	----

- When the induction motor is in running, there must be slip due to the load. It is necessary to boost voltage to improve the precision of the speed.

$$\text{Slip frequency boost} = \frac{\text{Output Current} - (02-00)}{(02-01) - (02-00)} \times (02-02) \times \text{Rate motor slip}$$

$$\text{Rate motor slip} = \text{Motor synchronization speed} - \text{Motor Rated Speed}$$

$$(02-02)\text{approximate Value} = \frac{\text{Motor synchroni zat i on speed} - \text{Rat ed speed}}{\text{Motor synchroni zat i on speed}}$$

Motor synchronization speed——Marked on the motor nameplate

$$\text{Motor synchronization speed (RPM)} = \frac{120}{\text{Motor Poles}} \times \text{Motor rated frequency (50Hz or 60Hz)}$$

Example 4Poles 60Hz induction motor synchronization speed = $\frac{120}{4} \times 60 = 1800$ (RPM)

※Note: 02-00/02-01 differs with the inverter capacities(13-00),It should be regulated according to actual conditions.

02-04	Motor Rated Voltage
Range	----
02-05	Motor Rated Power
Range	----
02-06	Motor Rated Frequency
Range	----
02-07	Number of motor poles
Range	【2~16】
02-14	Motor Parameter Auto Tuning
Range	【0】:Invalid 【1】:Valid
02-15	Stator Resistance
Range	----
02-16	Rotor Resistance
Range	----

- If select vector mode(00-00=【1】),after power Set the motor nameplate to 02-01、02-03~02-06,then set 02-14 to 1,the inverter will execute automatic parameter measurement function, the displayment of panel turn AT to END and Back to the display frequency means automatic parameter measurement has been completed.The inverter will write the parameter of motor to 02-15~02-16 automatically, and 02-14 turn back to 0.
- Each time the motor must be replaced once a self-learning.
- This parameter group only affect vector mode.

03- External terminal digital signal input(output)function group

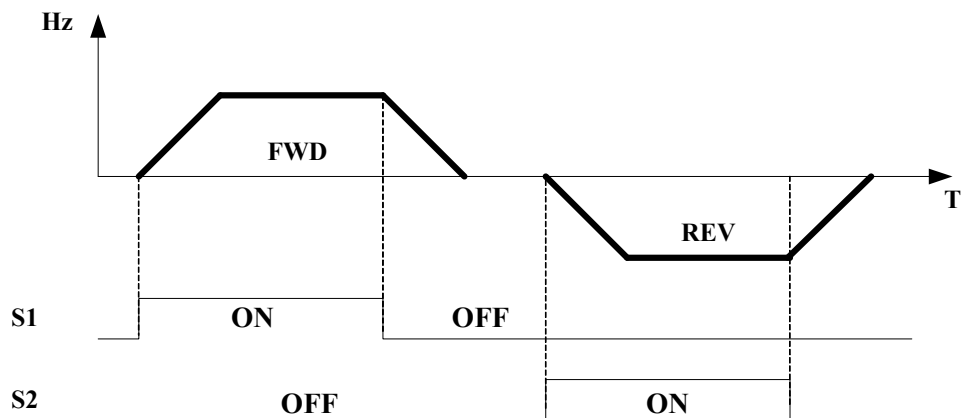
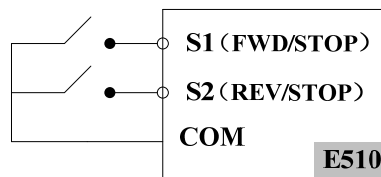
03-00	Multifunction Input Term. S1
03-01	Multifunction Input Term. S2
03-02	Multifunction Input Term. S3
03-03	Multifunction Input Term. S4
03-04	Multifunction Input Term. S5
03-05	Multifunction Input Term. S6
Range	【0】:Forward/Stop Command----- (refer to 00-02/00-03=1& 00-04) 【1】:Reverse/Stop Command----- (refer to 00-02/00-03=1& 00-04) 【2】:Preset Speed unit 0 (5-02) -----(5-02) (refer to Group5) 【3】:Preset Speed unit 1(5-03) -----(5-03) (refer to Group5) 【4】:Preset Speed unit 2(5-05) -----(5-05) (refer to Group5) 【5】:Preset Speed unit 3(5-09) -----(5-09) (refer to Group5)

- 【6】 :JOG Forward Command----- (refer to 00-18~00-20)
- 【7】 :JOG Reverse Command----- (refer to 00-18~00-20)
- 【8】 :Up Command----- (refer to 00- 05/00- 06=4& 03-06/03-07)
- 【9】 :Down Command---- (refer to 00- 05/00- 06=4& 03-06/03-07)
- 【10】 :Acc/Dec time 2
- 【11】 :Acc/Dec Disabled
- 【12】 :Main/sub Control Signal Select---- (refer to 00- 02/00- 03)
- 【13】 :Main/sub Frequency Command Select---- (refer to 00- 05/00- 06)
- 【14】 :Emergency Stop (controlled deceleration stop)
- 【15】 :Base Block (Coast to stop)
- 【16】 :PID Function Disabled----- (refer to Goup10)
- 【17】 :Reset
- 【18】 :Auto _ Run Mode----- (refer to Goup6)
- 【19】 :Speed Search
- 【20】 :Energy Saving(V/F)
- 【21】 :Integration Value Resets to Zero
- 【22】 :Counter Trigger Signal
- 【23】 :Counter Reset
- 【24】 :PLC stop
- 【25】 : Reserved
- 【26】 : Reserved
- 【27】 : Power Source Detect for KEB Function

1. 03- 00~03- 05= 【0, 1】 External Run/Stop Control (refer to 00- 04)

A.2-wire mode1:

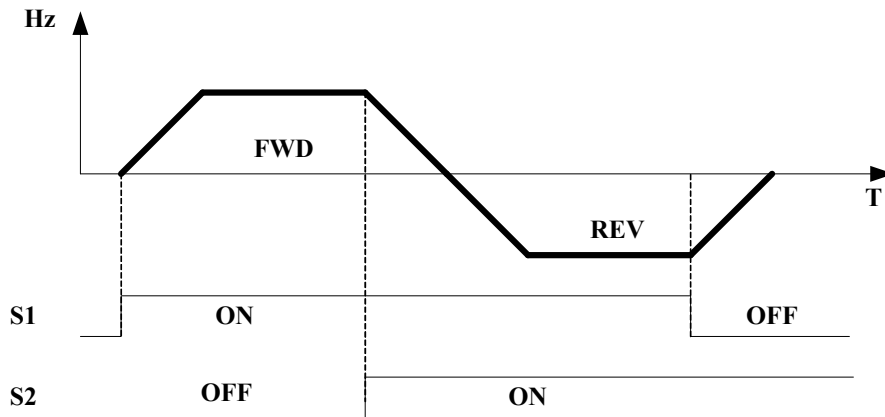
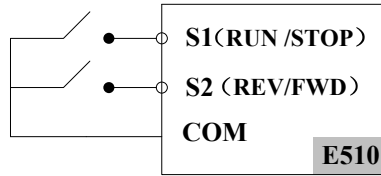
Example: 00- 04= 【0】 ; S1:03- 00= 【0】 (FWD/STOP); S2:03- 01= 【1】 (REV/STOP);



※Note: That both forward and reverse commands are ON will be treated as STOP.

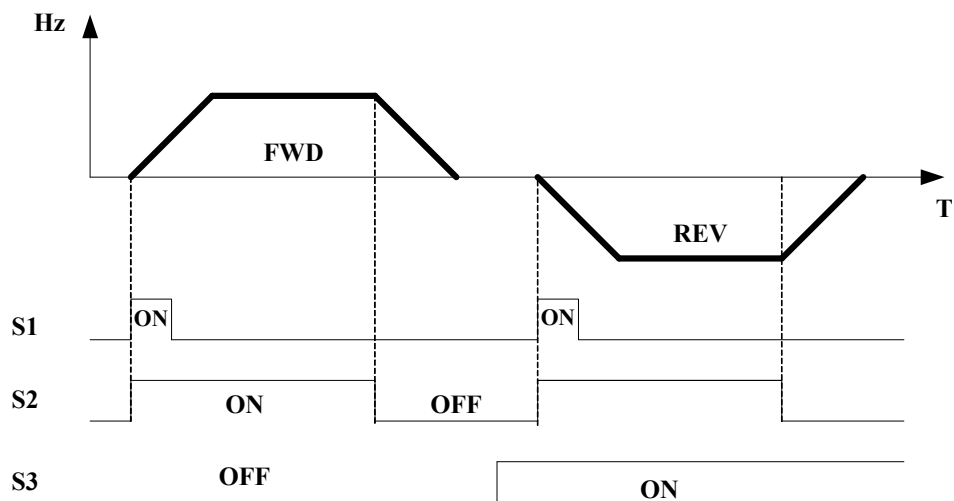
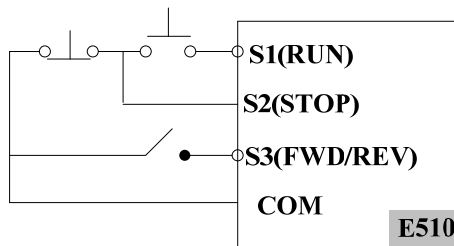
B. 2-wire mode 2:

Example: 00-04=【1】; S1:03-00=【0】(RUN/STOP); S2:03-01=【1】(REV/FWD);



C.3-wire:

Example: 00-04=2, As 3 wire control mode is selected, the terminal S1, S2 and S3 is not controlled by 03-00, 03-01 and 03-02.



2. 03- 00~03- 05= 【2, 3, 4, 5】 Preset speed Function

Any three of terminals S1 ~ S6 decide which one of multi-speed command 0~7 is selected as a group, the frequency command, accelerating and decelerating time was set by parameter group 5, the specific timing diagram sees in description of group 5.

Preset speed	Function setting and state of any three (A, B, C,D) of terminal S1 ~ S6				Frequency	Acc-time	Dec-time
	terminal A=2	terminal B=3	terminal C=4	terminal D=5			
speed 0	OFF	OFF	OFF	OFF	05- 01	05- 17	05-18
speed 1	OFF	OFF	OFF	ON	05- 02	05- 19	05-20
speed 2	OFF	OFF	ON	OFF	05- 03	05- 21	05-22
speed 3	OFF	OFF	ON	ON	05- 04	05- 23	05-24
speed 4	OFF	ON	OFF	OFF	05- 05	05- 25	05-26
speed 5	OFF	ON	OFF	ON	05- 06	05- 27	05-28
speed 6	OFF	ON	ON	OFF	05- 07	05- 29	05-30
speed 7	OFF	ON	ON	ON	05- 08	05- 31	05-32
speed 8	ON	OFF	OFF	OFF	05- 09	05- 33	05-34
speed 9	ON	OFF	OFF	ON	05- 10	05- 35	05-36
speed 10	ON	OFF	ON	OFF	05- 11	05- 37	05-38
speed 11	ON	OFF	ON	ON	05- 12	05- 39	05-40
speed 12	ON	ON	ON	ON	05- 13	05- 41	05-42
speed 13	ON	ON	ON	ON	05- 14	05- 43	05-44
speed 14	ON	ON	ON	ON	05- 15	05- 45	05-46
speed 15	ON	ON	ON	ON	05- 16	05- 47	05-48

3. 03- 00~03- 05= 【6, 7】 Forward/ Reverse JOG

A terminal with a function of 【6】 is turned on, inverter works in jog forward mode.

A terminal with a function of 【7】 is turned on, inverter works in jog reverse mode.

Note: If jog forward and jog reverse function is enabled at the same time, inverter works in stop mode.

4. 03- 00~03- 05= 【8, 9】 UP/DOWN

A terminal with function 【8】 is turned on ,frequency command increases by 03 - 06 setting, while running if the terminal is turned on longer than a time of it, the frequency command increases continuously until the frequency upper limit.

A terminal with function 【9】 is turned on , frequency command decreases by 03 - 06 setting, while running if the terminal is turned on longer than a time of it, the frequency command decreases continuously until 0Hz. See description of parameter 03 - 06 and 03 - 07.

※Note:The target frequency of UP/DOWN is determined by Terminal on-time and Acceleration and deceleration time 2.

5. 03- 00~03- 05= 【10】 Acc/Dec time 2

A terminal with function 【10】 is turned on ,the actual accelerating and decelerating time depends on accelerating and decelerating time 2 (00-16/00-17), and if it is turned off, depends on accelerating and decelerating time 1.

Example: 00-12 (Frequency upper limit) =50HZ(Defaults)

03-00 (Terminal S1) = 8

03-06 (up/down frequency) =0

00-14 (accelerating time 1) =5S

00-16 (accelerating time 2) =10S(Defaults)

When stopped,make s1 ON for 5 s,the actual accelerating time of inverter is 2.5s.

Explain:

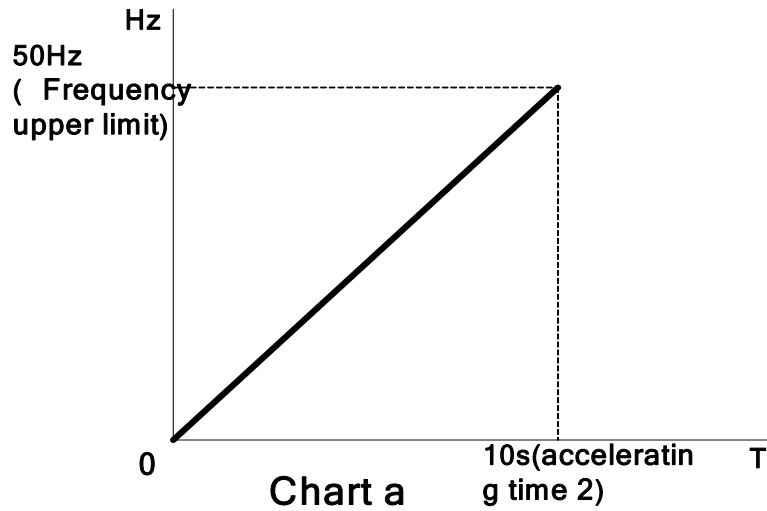


Chart a: The Frequency upper limit, the on-time and accelerating time 2 can be deduced target frequency.

$$\text{target frequency} = \frac{\text{upper frequency}}{\text{accelerating time 2}} \times \text{on-time of S1} = \frac{50\text{Hz}}{10\text{S}} \times 5\text{S} = 25\text{Hz}$$

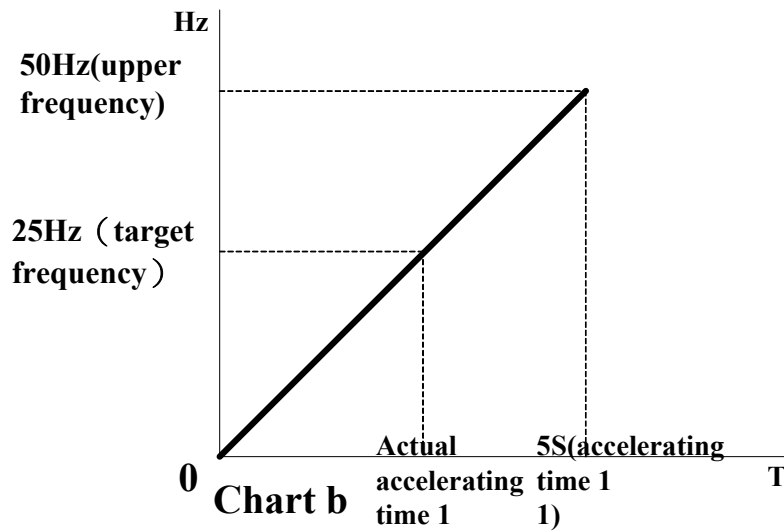


Chart b: the actual accelerating time :

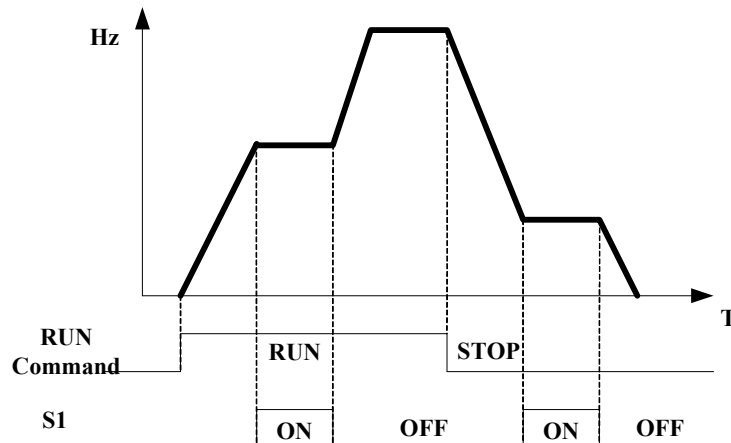
$$\text{actual accelerating time} = \frac{\text{target frequency}}{\text{upper frequency}} \times \text{accelerating time 1} = \frac{25\text{Hz}}{50\text{Hz}} \times 5\text{S} = 2.5\text{s}$$

6. 03- 00~03- 05= 【11】 Acc/Dec Disabled

A terminal with function 【11】 is turned on, accelerating and decelerating is prohibited, inverter works in constant speed mode, if it is turned off , accelerating and decelerating is allowed.

Example: Setting: Terminal S1 : 03-00 = 11 (prohibits accelerating and decelerating functions)

Timing diagram:



7. 03- 00~03- 05= 【12】 Main/sub Control Signal Select

A terminal with function 【12】 is turned on, the operation command source is the setting of main operation command(00-03) .

8. 03- 00~03- 05= 【13】 Main/sub Frequency Command Select

A terminal with function 【13】 is turned on, the operation command source is the setting of sub-operation command(00-06).

9. 03- 00~03- 05= 【14】 Emergency Stop (controlled deceleration stop)

A terminal with function 【14】 is turned on , inverter stops peremptorily in decelerating stop mode according to deceleration time 2.

10. 03- 00~03- 05= 【15】 Base Block (Coast to stop)

A terminal with function 【15】 is turned on, inverter stops shieldlessly in free-run stop mode.

11. 03- 00~03- 05= 【16】 PID Function Disabled

A terminal with function 【16】 is turned on, PID functions is disabled, if it is turned off , PID function is enabled.

12. 03- 00~03- 05= 【17】 Reset

When a failure that can be manually reset occurs ,turn on a terminal with function 【17】 , the failure will be reset. (Same to Reset button).

13. 03- 00~03- 05= 【18】 Auto _ Run Mode

Turn on a terminal with function 【18】 , the programmable auto-operation function is enabled, see description of parameters group 6.

14. 03- 00~03- 05= 【19】 Speed Search Stop

When starting, the inverter it detects the present speed of the motor, then accelerates from that present speed to preset speed.

15. 03- 00~03- 05= 【20】 Energy-saving operation

FAN, PUMP or other high inertia loads need greater starting torque, but once the operational speed is reached they need much less torque. In this mode the output voltage to is reduced to match the required torque demand, hence providing a saving in energy.

The output voltage gradually declines as the input is ON. It will gradually increase (to the original voltage) as the input is OFF.

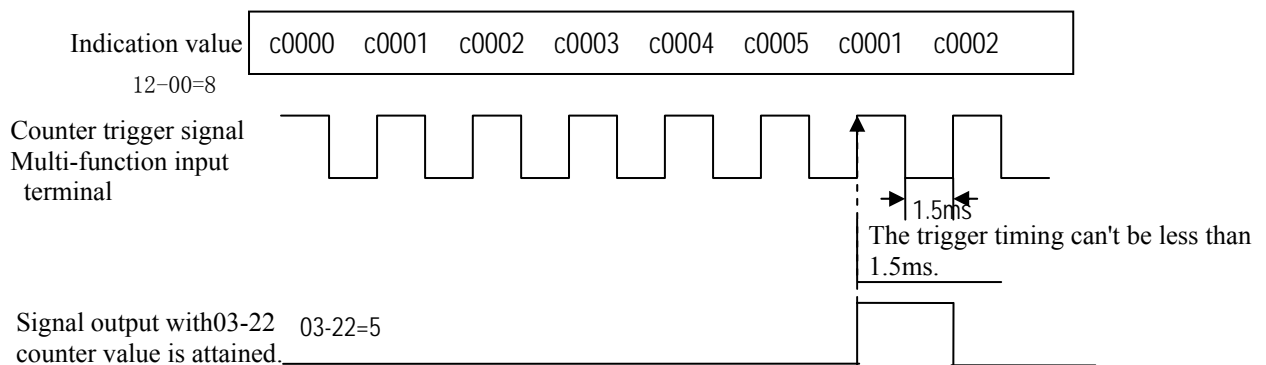
※Note: The acceleration and deceleration speed of energy saving operation is the same as the speed of speed search.

16. 03- 00~03- 05= 【21】 Integration Value Resets to Zero

When the multifunction terminal 03-00~05 is set at 21 and the input terminal is on, the Integration Value of PID Resets to Zero .

17. 03- 05= 【22】 Counter Trigger Signal

when the external terminal s1~s6 is set a function of 22,after turning it on then off once the counter value increase 1.



18. 03- 00~03- 05= 【23】 Counter Reset

When anyone of the external terminals S1~S6 is set a function of 23 and turned on, the counter value will be cleared, and display "c0000", only after this signal turns off, the inverter can receive trigger signal and count up.

19. 03- 00~03- 05= 【24】 PLC stop

When any one of the external terminals S1~S6 is set a function of 24 and turned on, the inverter perform the program of the build-in PLC.

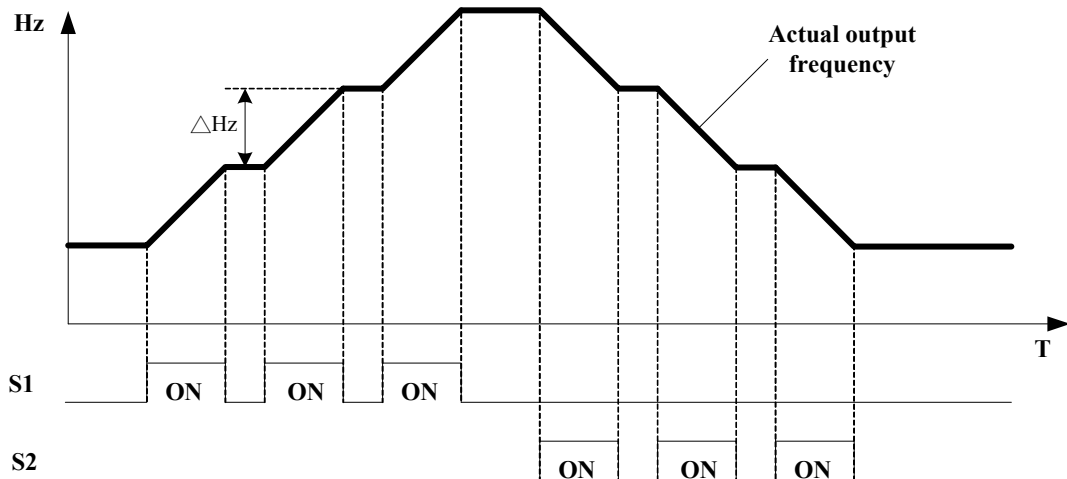
20. 03- 00~03- 05= 【27】 Power Source Detect for KEB Function

Power Source Detect for KEB Function with the use of parameter 07-14.

03- 06	up/down frequency
Range	【0.00~5.00】 Hz

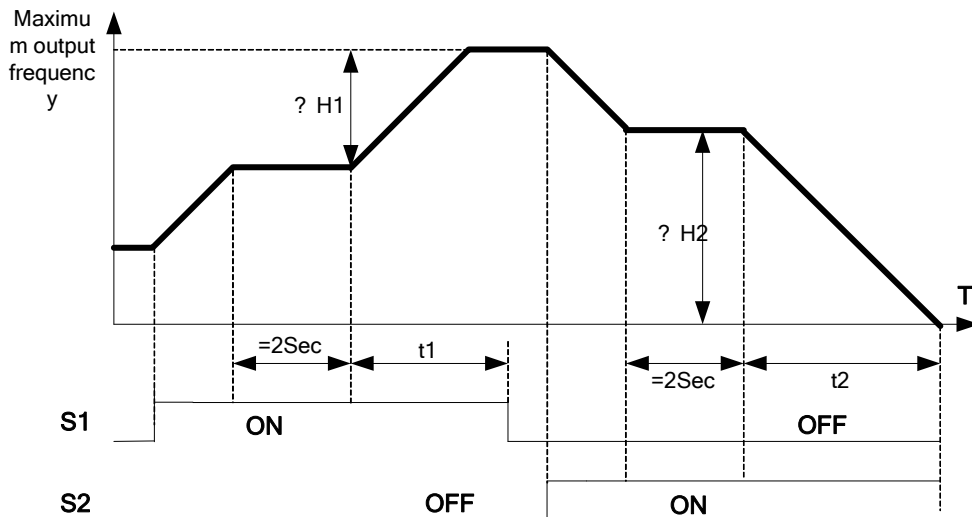
Example: S1: 03- 00= 【8】 Up frequency command, S2: 03- 01= 【9】 Down frequency command, 03- 06= 【△】 Hz

mode1: If the terminal turns on for less than 2Sec, turning on once makes frequency changing △ Hz



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mode 2: If UP/DOWN is pressed over 2Sec, the original UP/DOWN mode is restored (Please refer to the following diagram)



※ Note:

△H1: Set the frequency increment when acceleration, t1: on-time of timial when acceleration, △H2: Set the frequency increment when acceleration when deceleration, t2: on-time of timial when acceleration.

$$\Delta H 1 = \frac{\text{upper frequency}}{\text{accelerating time2}} \times \text{on-time of terminal t1}$$

$$\Delta H 2 = \frac{\text{lower frequency}}{\text{decelerating time2}} \times \text{on-time of terminal t2}$$

03- 07	Up/Down keep Frequency mode
Range	【0】 :When Up/Down is used, the preset frequency is held as the inverter stops,and the UP/Down function is disabled. 【1】 :When Up/Down is used, the preset frequency is reset to 0 Hz as the inverter stops. 【2】 :When Up/Down is used, the preset frequency is held as the inverter stops, and the UP/Down is available.

- If 03 - 07 = **【0】** , inverter output frequency will be stored in 05-01 when run signal shuts off, and increase / decrease frequency key is invalid when inverter works in stop mode, to change the frequency setting you need to modify 05-01 with keypad; But if 03-07 = 2, stop when the increase / decrease frequency key is effective when inverter works in stop mode.
- Set 03 - 07 = **【1】** , inverter will always output beginning with 0Hz, increase / decrease frequency key works in the same way described above, when run signal shuts off, inverter stops output, and frequency command always turns back to 0Hz, therefore inverter will still output beginning with 0Hz the next time.

03- 08	Multifunction terminal S1~S6、 SF confirm the scan times
Range	【1~200】 2msec

- TM2 terminal is used for scanning. If there are the same signals continuously input for N times, the inverter will treat the signal as normal. During the signal evaluation, if the scan times are less than N, the signal will be treated as noise.
- Each scan period is 1ms.
- The user can specify the scan times interval duration according to the noise environment. If the noise is serious, increase the value of 03-08, however the response will be slower.

※Note: Terminal SF is for safety switch, SF can cut off the inverter voltage output.

03- 09	s1~s5 switch type select
Range	【xxxx0】 :S1 NO 【xxxx1】 :S1 NC 【xxx0x】 :S2 NO 【xxx1x】 :S2 NC 【xx0xx】 :S3 NO 【xx1xx】 :S3 NC 【x0xxx】 :S4 NO 【x1xxx】 :S4 NC 【0xxxx】 :S5 NO 【1xxxx】 :S5 NC
03- 10	s6、 sf switch type select
Range	【xxxx0】 :S6 NO 【xxxx1】 :S6 NC 【xxx0x】 :SF NO 【xxx1x】 :SF NC

- ※Note: “NO”: Normal open, “NC”: Normal close.
- The switches type is decided by 03-09,Because of different types of switches, select switches type is necessary.
- If set 03-09=0 0 0 0 0, means S1~S5 types of switches is Normal open, otherwise, if each bit of 03-09 is set to “1”, types of switches is Normal close.
- Don't set 00-02/00-03=1 , before you set 03-09 (external terminal controlled)

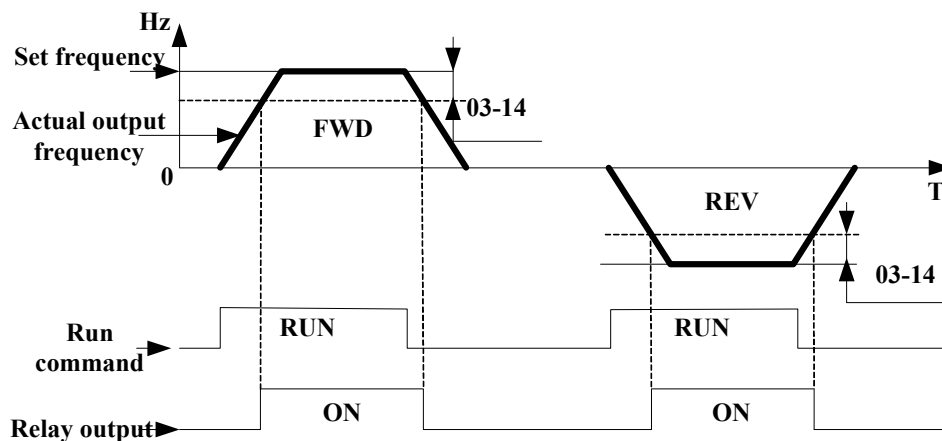
03-11	Output Relay(RY1)
03-12	Output Relay(RY2)
Range	【0】 :Run 【1】 :Fault 【2】 :Frequency Reached------(refer to 03-13/03-14) 【3】 :Set Frequency (3-13±3-14) -----(refer to 03-13/03-14) 【4】 :Frequency Threshold Level (> 03-13) - Frequency Reached ------(refer to 03-13/03-14) 【5】 :Frequency Threshold Level (< 03-13) - Frequency Reached ------(refer to 03-13/03-14) 【6】 :Auto-restart 【7】 :Momentary AC Power Loss------(refer to 07-00)

	【8】 :Emergency Stop Mode 【9】 :Base Block Stop Mode 【10】 :Motor Overload Protection (OL1) 【11】 :Drive Overload Protection (OL2) 【12】 :Over-torque Threshold Level (OL3) 【13】 :Current Reached------(refer to 03-15/03-16) 【14】 :Brake Control (DesiredFrequency Attained) -----(refer to 03-17/03-18) 【15】 :PID Feedback Signal Loss 【16】 :Terminal count value attained (3-22~23) 【17】 :Preliminary count value attained (3-22~23) 【18】 :PLC state instructions (00-02) 【19】 :PLC control
03-13	Frequency Reached Output Setting
Range	【0.00~650.00】 Hz
03-14	Frequency Detection Range (±)
Range	【0.00~30.00】 Hz

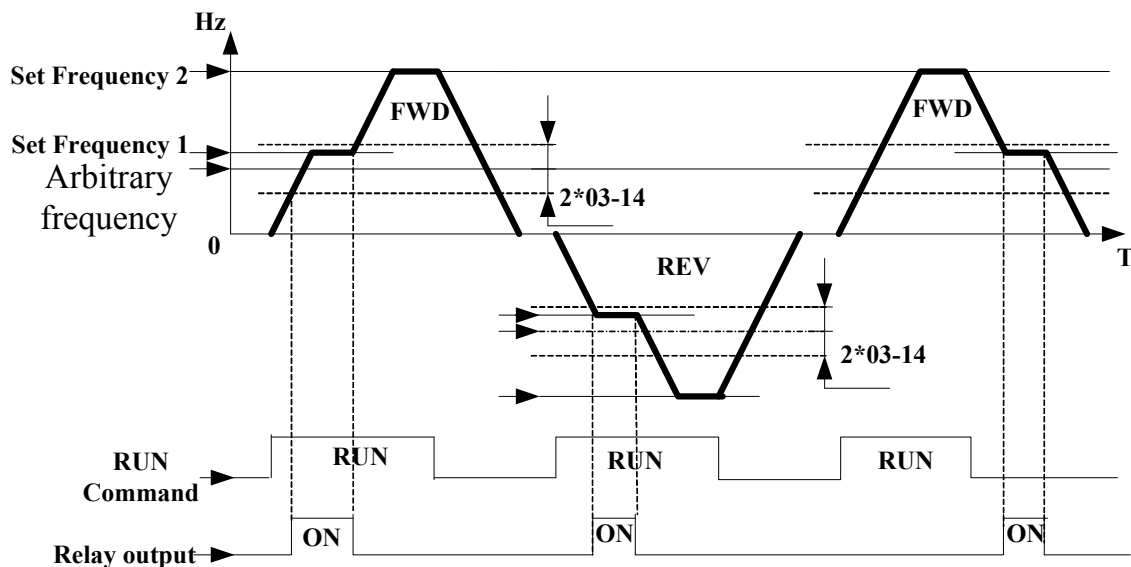
2. When 03-11/03-12 = **【1】** ,if failure occurs ,relay act

3. If 03-11/03-12= **【2】** ,When inverter actual output frequency reaches frequency command, relay act.

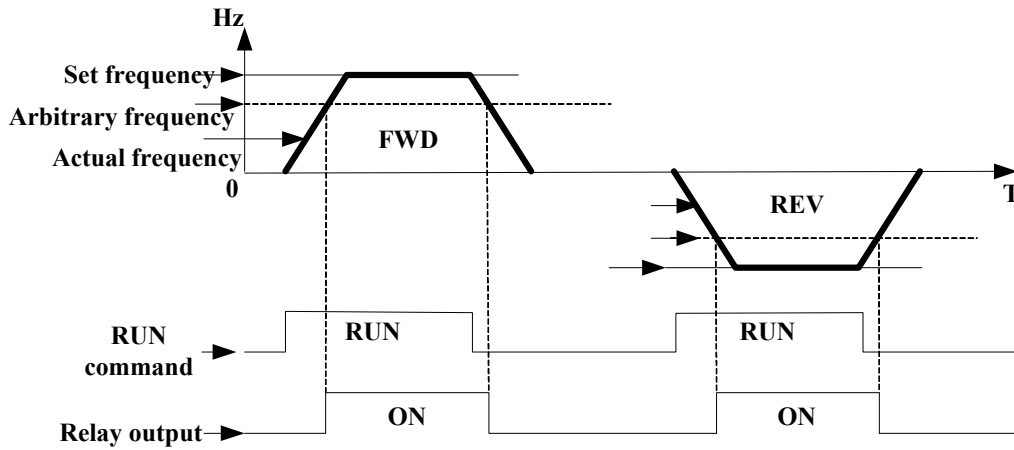
Actual output frequency=(Set frequency-03-14) relay output



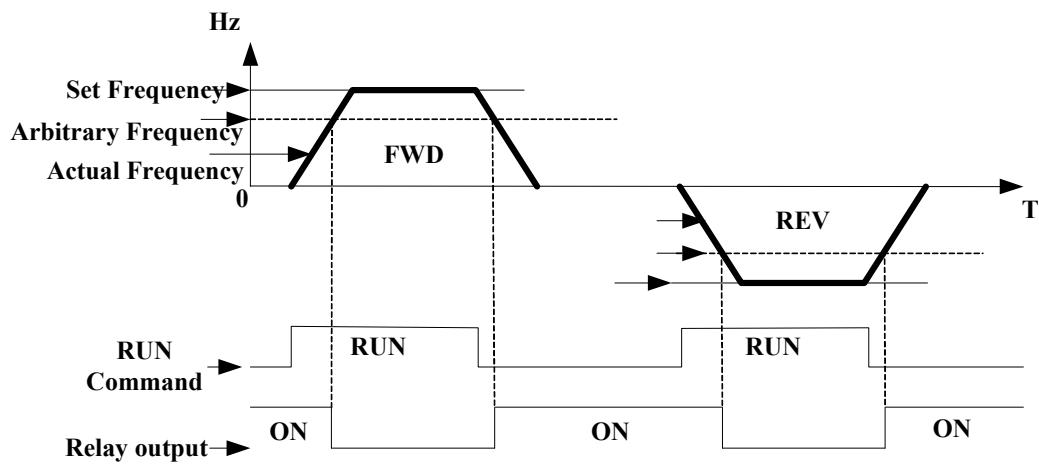
4. If 03-11/03-12= **【3】** ,When inverter actual output frequency reaches the arbitrary frequency setting (03 - 13 +/- 03-14 setting), relay act.



5. 03-11/03-12=【4】， Frequency detection $F_{out} > 03-13$

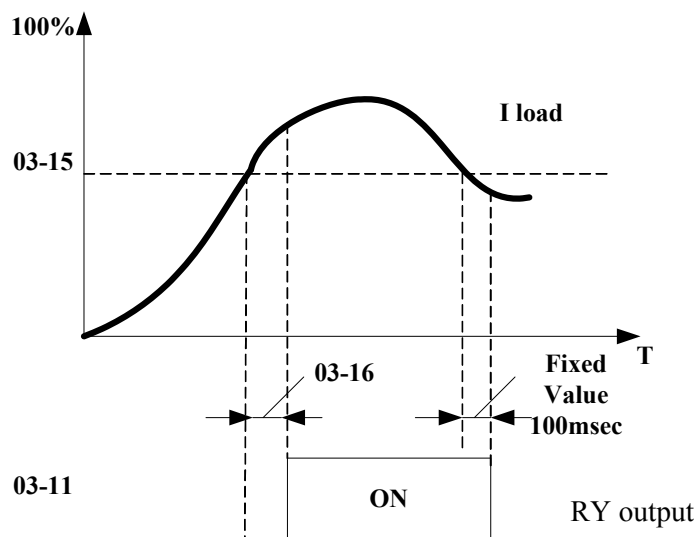


6. 03-11/03-12=【5】， Frequency detection $F_{out} < 03-13$



03-15	Output current Reached Level
Range	【0.1~15.0】 A
03-16	Output current detection time
Range	【0.1~10.0】 Sec

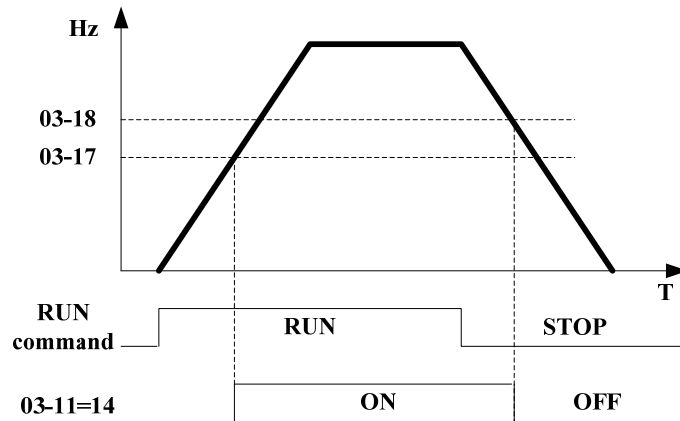
- 03-11=14: Output current detection value $> 03-15$, relay output.
- 03-15: Setting value (0.1~15.0) by motor rated current.
- 01-16: Setting value(0.1~10.0)unit: sec.



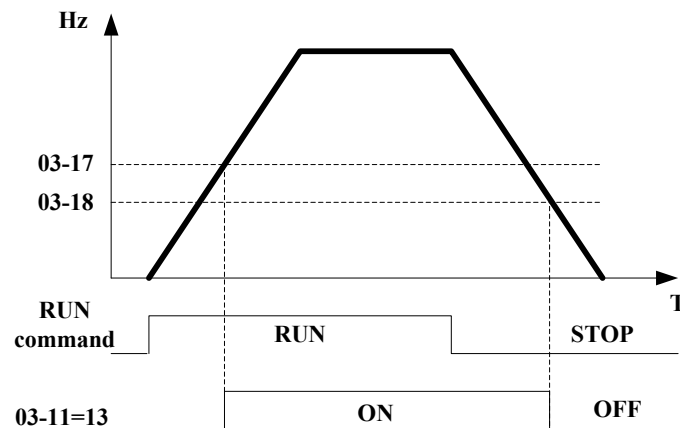
03-17	Brake Release Level
Range	【0.00~20.00】 Hz
03-18	Brake Engage Level
Range	【0.00~20.00】 Hz

- If 03-11 = 14, in accelerating mode, when inverter actual frequency reaches 03-17 mechanical brake release frequency, the relay act;
- In decelerating mode, when inverter actual frequency reaches 03-18 mechanical brake action frequency, the relay stops acting;

When 03-17 < 03-18, the timing diagram is shown as below:



When 03-17 > 03-18, the timing diagram is shown as below:



03- 19	Relay Output mode
Range	【0】 :A (Normal open) 【1】 :B (Normal close)

- When 03-09=0,
- The Set condition of 03-11,03-12 are met , relay output ; otherwise relay no output.
- When 03-09=1,
- The Set condition of 03-11,03-12 are met , relay no output ; otherwise relay output.

03- 20	Internal/External Multi-function Input Terminals Selection
Range	【0~63】

➤ The parameters of 03-02 is to determine the multi-function input terminals need for internal or external multi-function input terminals. If you select the internal multi-function input terminal, the terminal's open, closed decision by the parameter 03-21 decision.

03-20 representatives from each of the following:

03- 20= 0 0 0 0 0 0
 S6 S5 S4 S3 S2 S1

0: representative external multi-function input terminals

1 : representative internal multi-function input terminals

※ Note:S1、S2 Selected as internal multi-function input terminals, S3、S4、S5、S6 Selected as external multi-function input terminals. The setting:03-02=000011.

03- 21	Internal Multi-function Input Terminals action setting
Range	【0~63】

➤ The parameters of 03-02 is to determine the Opening and closing of multi-function input terminals.

03-21 representatives from each of the following:

03- 21= 0 0 0 0 0 0
 S6 S5 S4 S3 S2 S1

0: representative internal multi-function input terminals is open

1 : representative internal multi-function input terminals is close

Example : internal multi-function input terminals S1、S2 Selected as opening, S3、S4、S5、S6 Selected as closing. The setting:03-02=000011.

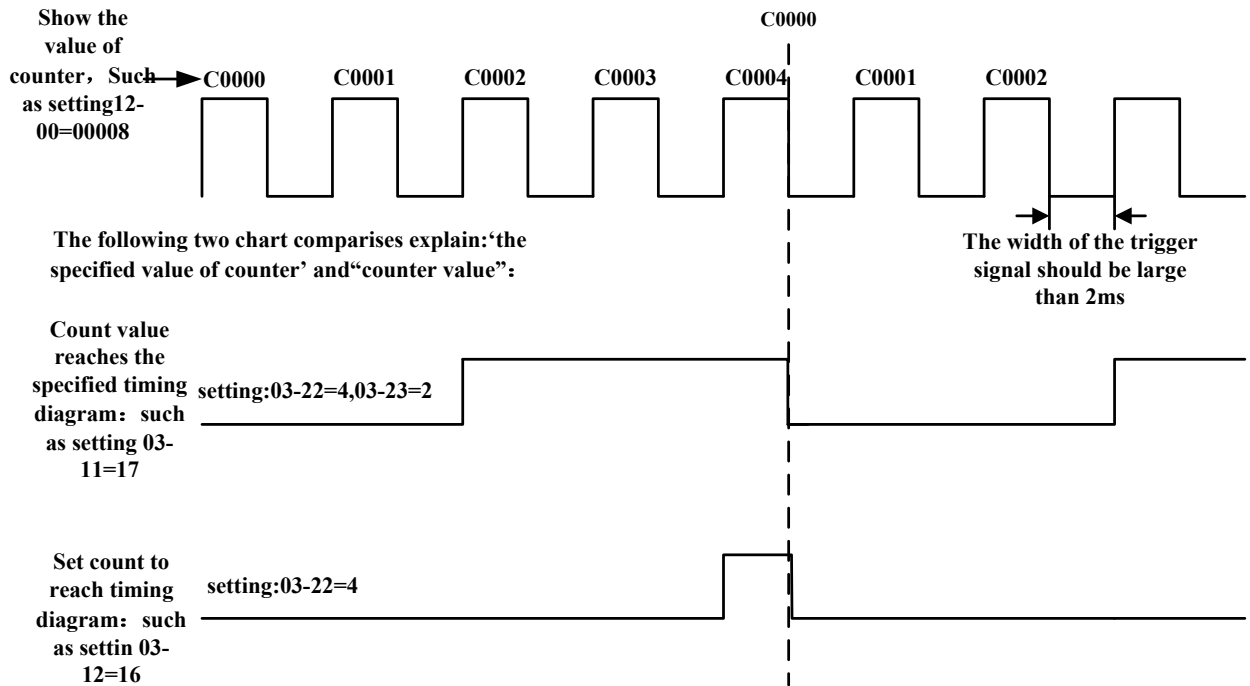
03- 22	Count reaches the set
Range	【0~9999】

➤ The parameters of 03-02 is to set Internal counter counts of E510,the counter can be triggered by any multi-function terminal.When the counts reach, multi-function RELAY output Contact action.

➤ Example: 03- 22 is set to 5, When the counts reach 5, multi-function RELAY output Contact action.

03- 23	Preliminary Count Value
Range	【0~9999】

➤ When the count value Increases from c0001 to the parameter value (below the specified count is 2), the multi-function output terminal (below the multi-function output terminal is RY1) node action, action to the specified value of counter (below the specified count is 4), the end of the action, at the same time the value of counter will automatically reset to c0000. This function can be used for low-speed operation is required before the inverter stopped.



03- 24	Low current detection
Range	【0】 :disable 【1】 :enable
03- 25	Low current level
Range	【5%~100%】
03- 26	Low current detection time
Range	【0.0~50.0s】

- When 03-24=1, if output current < low current detection level, wait for delay time, keyboard panel displays an error: ud-c.

04- External terminal analog signal input (output)function group

04- 00	AVI/ACI analog Input signal type select	
Range	AVI	ACI
	【0】 :0~10V	0~20mA
	【1】 :0~10V	4~20mA
	【2】 :2~10V	0~20mA
	【3】 :2~10V	4~20mA

- AVI(0~10V) , ACI(0~20mA)

$$\text{AVI}(0\sim 10\text{V}) : F(\text{Hz}) = \frac{V(\text{v})}{10(\text{v})} \times (00 - 12) \quad ; \quad \text{ACI}(0\sim 20\text{mA}) : F(\text{Hz}) = \frac{I(\text{mA})}{20(\text{mA})} \times (00 - 12)$$

- AVI(2~10V) , ACI(4~20mA)

$$\text{AVI}(2\sim 10\text{V}) : F(\text{Hz}) = \frac{V - 2(\text{v})}{10 - 2(\text{v})} \times (00 - 12), V \geq 2 ;$$

$$\text{ACI}(4\sim 20\text{mA}) : F(\text{Hz}) = \frac{I - 4(\text{mA})}{20 - 4(\text{mA})} \times (00 - 12), I \geq 4 ;$$

04- 01	AVI signal verification Scan Time
Range	【1~200】 2msec
04- 02	AVIGain
Range	【0 ~ 1000】 %
04- 03	AVI Bias
Range	【0~ 100】 %
04- 04	AVI Bias Selection
Range	【0】 : positive 【1】 : Negative
04- 05	AVI Slope
Range	【0】 : positive 【1】 : Negative
04- 06	ACI signal verification Scan Time
Range	【1~200】 2msec
04- 07	ACIGain
Range	【0 ~ 1000】 %
04- 08	ACI Bias
Range	【0 ~ 100】 %
04- 09	ACI Bias Selection
Range	【0】 : positive 【1】 : Negative
04-10	ACI Slope
Range	【0】 : positive 【1】 : Negative

- 04- 01/04- 06 signal verification Scan Time:

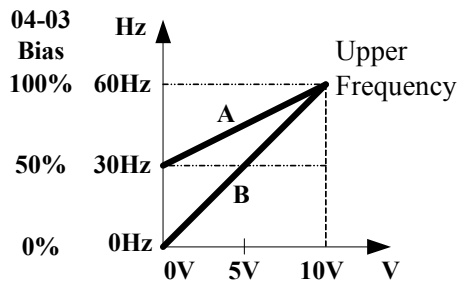
The inverter reads the average value of A/D signals once per(04- 01/04- 06 x 2ms). Set scan intervals according to possible noise interference in the environment. Increase 04- 01/04- 06 in an environment with noise interference, but the response time will increase accordingly.

Take AVI (04-02~04-05) as an example to describe:

(1) Gain(04-02) is set to 100%, after setting offset(04-03), relation between voltage and frequency is shown below:

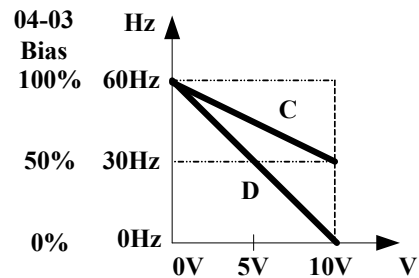
1) The setting of figure1:

	04- 02	04- 03	04- 04	04- 05
A	100%	50%	0	0
B	100%	0%	0	0



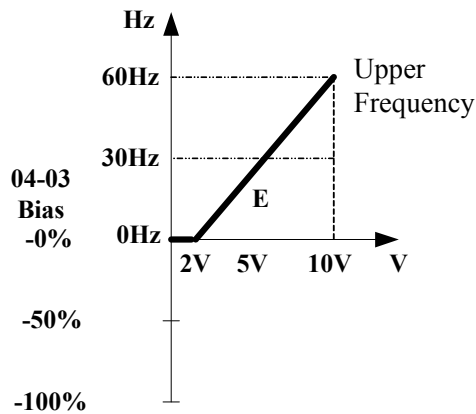
2) The setting of figure2:

	04- 02	04- 03	04- 04	04- 05
C	100%	50%	0	1
D	100%	0%	0	1



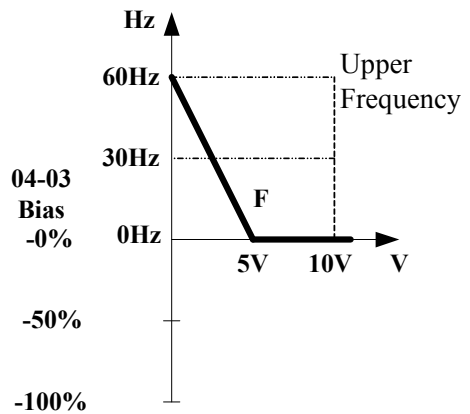
3) The setting of figure3:

	04- 02	04- 03	04- 04	04- 05
E	100%	20%	1	0



4) The setting of figure4:

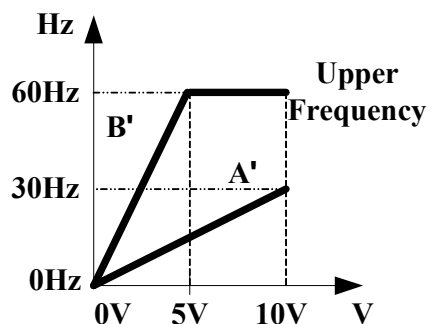
	04- 02	04- 03	04- 04	04- 05
F	100%	50%	1	1



(2) Gain(04-03) is set to 0%, after setting offset(04-02), relation between voltage and frequency is shown below:

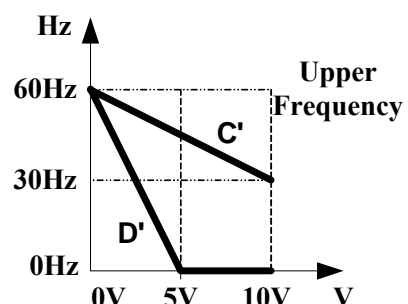
5) The setting of figure5:

	04- 02	04- 03	04- 04	04- 05
A'	50%	0%	0/1	0
B'	200%	0%	0/1	0



6) The setting of figure6:

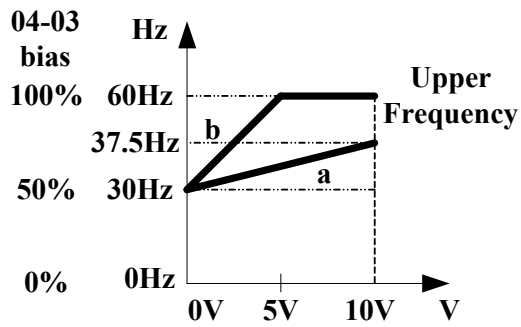
	04- 02	04- 03	04- 04	04- 05
C'	50%	0%	0/1	1
D'	200%	0%	0/1	1



(3) Gain(04-02) is not set to 100%, after setting offset(04-03), relation between voltage and frequency is shown below:

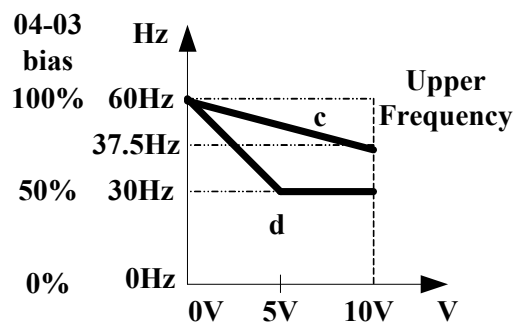
7) The setting of figure7:

	04- 02	04- 03	04- 04	04- 05
a	50%	50%	0	0
b	200%	50%	0	0



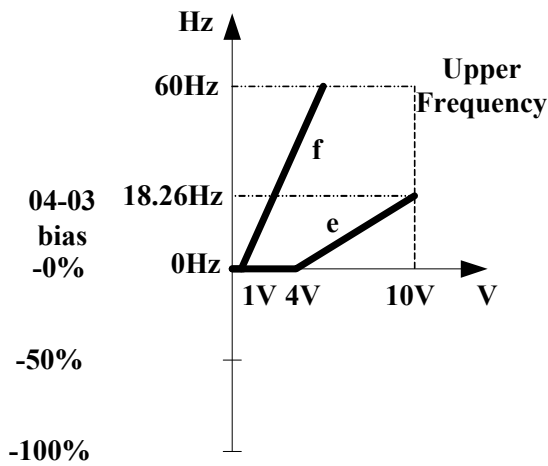
8) The setting of figure8:

	04- 02	04- 03	04- 04	04- 05
c	50%	50%	0	1
d	200%	50%	0	1



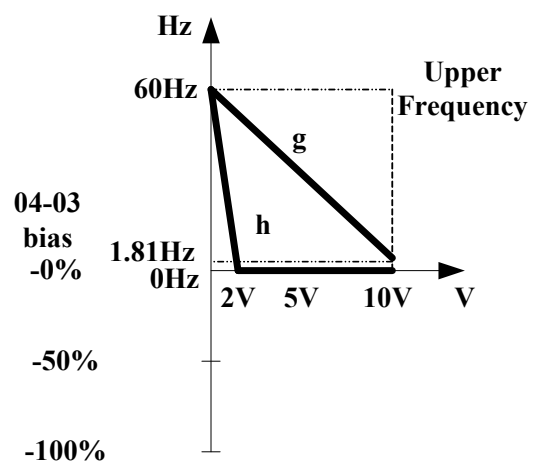
9) The setting of figure9:

	04- 02	04- 03	04- 04	04- 05
e	50%	20%	1	0
f	200%	20%	1	0



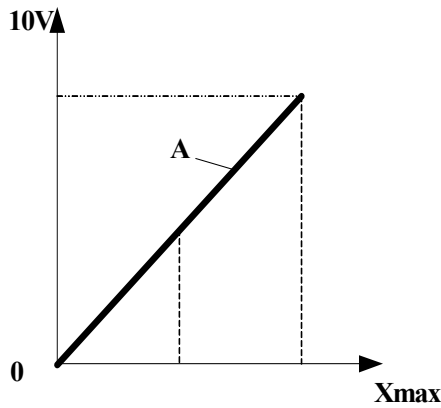
10) The setting of figure10:

	04- 02	04- 03	04- 04	04- 05
g	50%	50%	1	1
h	200%	0%	0	1



04-11	Analog Output (AO) Mode
Range	【0】 :Output frequency 【1】 :Frequency Setting 【2】 :Output voltage 【3】 :DC Bus Voltage 【4】 :Output current

Example:when 04-11=0,“A” stand for Output frequency, “Xmax”stand for upper frequency limit.



04-11	A	Xmax
【0】	Output frequency	upper frequency limit
【1】	Frequency Setting	upper frequency limit
【2】	Output voltage	Motor Rated Voltage
【3】	DC Bus Voltage	220V: 0~400V 440V: 0~800V
【4】	Output current	2 times rated current of inverter

04-12	AO Gain
Range	【0 ~ 1000】 %
04-13	AO Bias
Range	【0 ~ 100】 %
04-14	AO Bias Selection
Range	【0】 : positive 【1】 : Negative
04-15	AO Slope
Range	【0】 : positive 【1】 : Negative

➤ AO: 04-12~04-15 function the same as AVI (04-02~04-05) 。

The multifunction analog output terminal of the terminal block (TM2), is 0~10Vdc analog output. The output type is determined by the 04-11. The output voltage level can be scaled by parameter 04-12 to suit external meters and peripherals.

Note: the max output voltage is 10V due to hardware of the circuit. Use only devices that require a maximum of 10V signal.

05- Preset Frequency function group

05- 00	Preset Speed Control mode Selection
Range	【0】 :common Is uniform time(Acc1/Dec1or Acc2/Dec2) 【1】 :Special (is single time Acc0/Dec0~ Acc7/Dec7)

05- 01	Preset Speed 0 (Keypad Freq)
05- 02	Preset Speed 1
05- 03	Preset Speed 2
05- 04	Preset Speed 3
05- 05	Preset Speed 4
05- 06	Preset Speed 5
05- 07	Preset Speed 6
05- 08	Preset Speed 7
05- 09	Preset Speed 8
05- 10	Preset Speed 9
05- 11	Preset Speed 10
05- 12	Preset Speed 11
05- 13	Preset Speed 12
05- 14	Preset Speed 13
05- 15	Preset Speed 14
05- 16	Preset Speed 15
Range	【0.00 ~ 650.00】 Hz
05-17	Preset Speed 0 Acceleration time
05-18	Preset Speed 0 Deceleration time
05-19	Preset Speed 1 Acceleration time
05- 20	Preset Speed 1 Deceleration time
05- 21	Preset Speed 2 Acceleration time
05- 22	Preset Speed 2 Deceleration time
05- 23	Preset Speed 3 Acceleration time
05- 24	Preset Speed 3 Deceleration time
05- 25	Preset Speed 4 Acceleration time
05- 26	Preset Speed 4 Deceleration time
05- 27	Preset Speed 5 Acceleration time
05- 28	Preset Speed 5 Deceleration time
05- 29	Preset Speed 6 Acceleration time
05- 30	Preset Speed 6 Deceleration time
05- 31	Preset Speed 7Acceleration time
05- 32	Preset Speed 7 Deceleration time
05- 33	Preset Speed 8Acceleration time
05- 34	Preset Speed 8 Deceleration time
05- 35	Preset Speed 9Acceleration time
05- 36	Preset Speed 9 Deceleration time
05- 37	Preset Speed 10Acceleration time
05- 38	Preset Speed 10 Deceleration time
05- 39	Preset Speed 11Acceleration time
05- 40	Preset Speed 11 Deceleration time
05- 41	Preset Speed 12Acceleration time
05- 42	Preset Speed 12 Deceleration time
05- 43	Preset Speed 13Acceleration time

05- 44	Preset Speed 13 Deceleration time
05- 45	Preset Speed 14Acceleration time
05- 46	Preset Speed 14 Deceleration time
05- 47	Preset Speed 15Acceleration time
05- 48	Preset Speed 15 Deceleration time
Range	【0.1 ~ 3600.0】 Sec

- When 05- 00 = 【0】 ,Acc-time (Dec-time) is determined by the 00-14/00-15(or 00-16/00-17).
- When 05- 00 = 【1】 ,Acc-time (Dec-time) is determined by the 05-17~05- 48.
- Function Description:
- Formula for calculating acceleration and deceleration time:

$$\text{Actual Acc time} = \frac{\text{Acc time of group 0} \times \text{Preset Frequency}}{\text{Maximum Frequency}}$$

$$\text{Actual Dec time} = \frac{\text{Dec time of group 0} \times \text{Preset Frequency}}{\text{Maximum Frequency}}$$

- 01- 00= 【18】 ,Maximum output frequency =01-02 setting
- 01- 00≠ 【18】 ,Maximum output frequency =50.00(or 60.00)

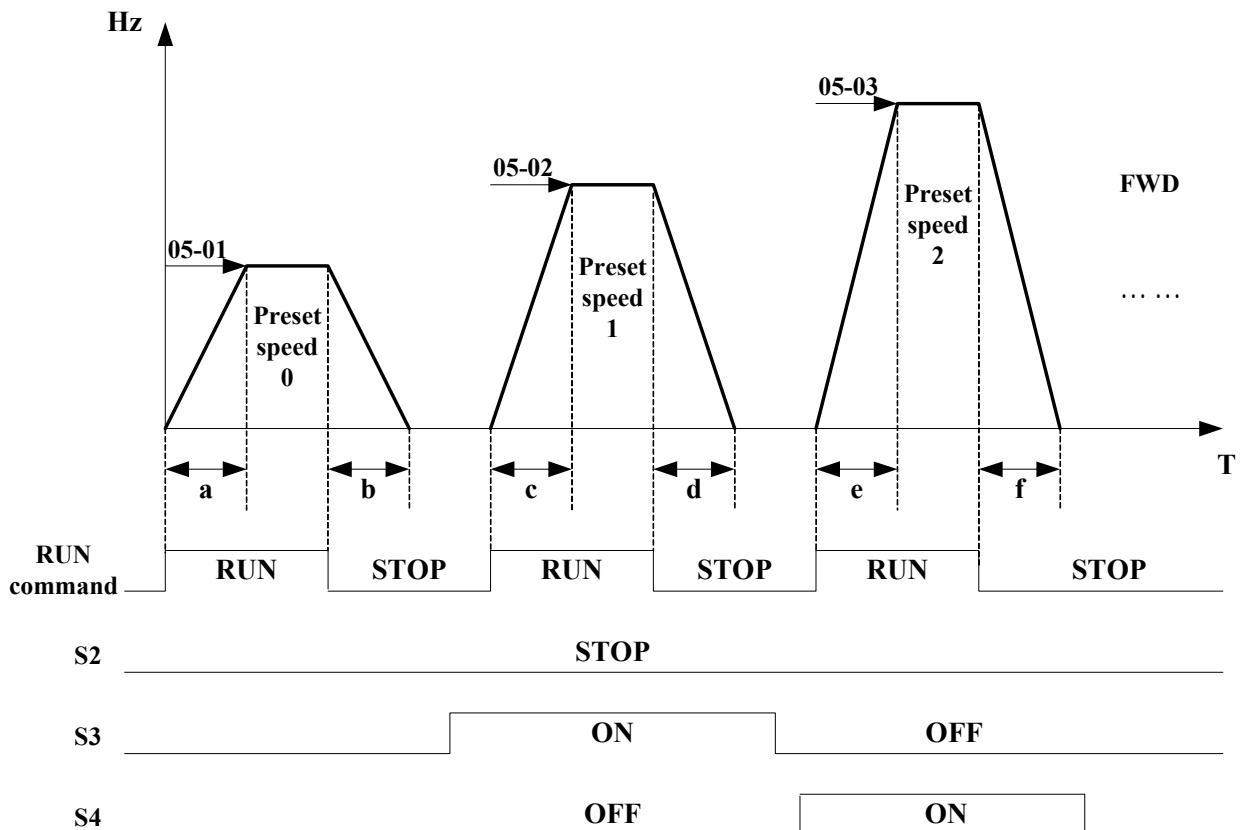
Example : 01- 00≠ 【18】 ,01- 02= 【50】 hz, 05- 02= 【10】 hz(preset speed1), 05-19= 【5】 s(Acc-time),05-20= 【20】 s(Dec-time)

$$\text{Preset speed 1 Actual Acc time} = \frac{(05-19) \times 10(\text{hz})}{01-02} = 1(\text{s})$$

$$\text{Preset speed 1 Actual Dec time} = \frac{(05-20) \times 10(\text{hz})}{01-02} = 4(\text{s})$$

- When 05-00= 【1】 ,the time has two modes to be set
- Example: 00- 02= 【1】 (External Run/Stop Control); S1: 03- 00= 【0】 (RUN/STOP);
S2: 03- 01= 【1】 (forward/reserve); S3: 03- 02= 【2】 (preset speed 1);
S4: 03-03= 【3】 (preset speed 2);

mode1 1:

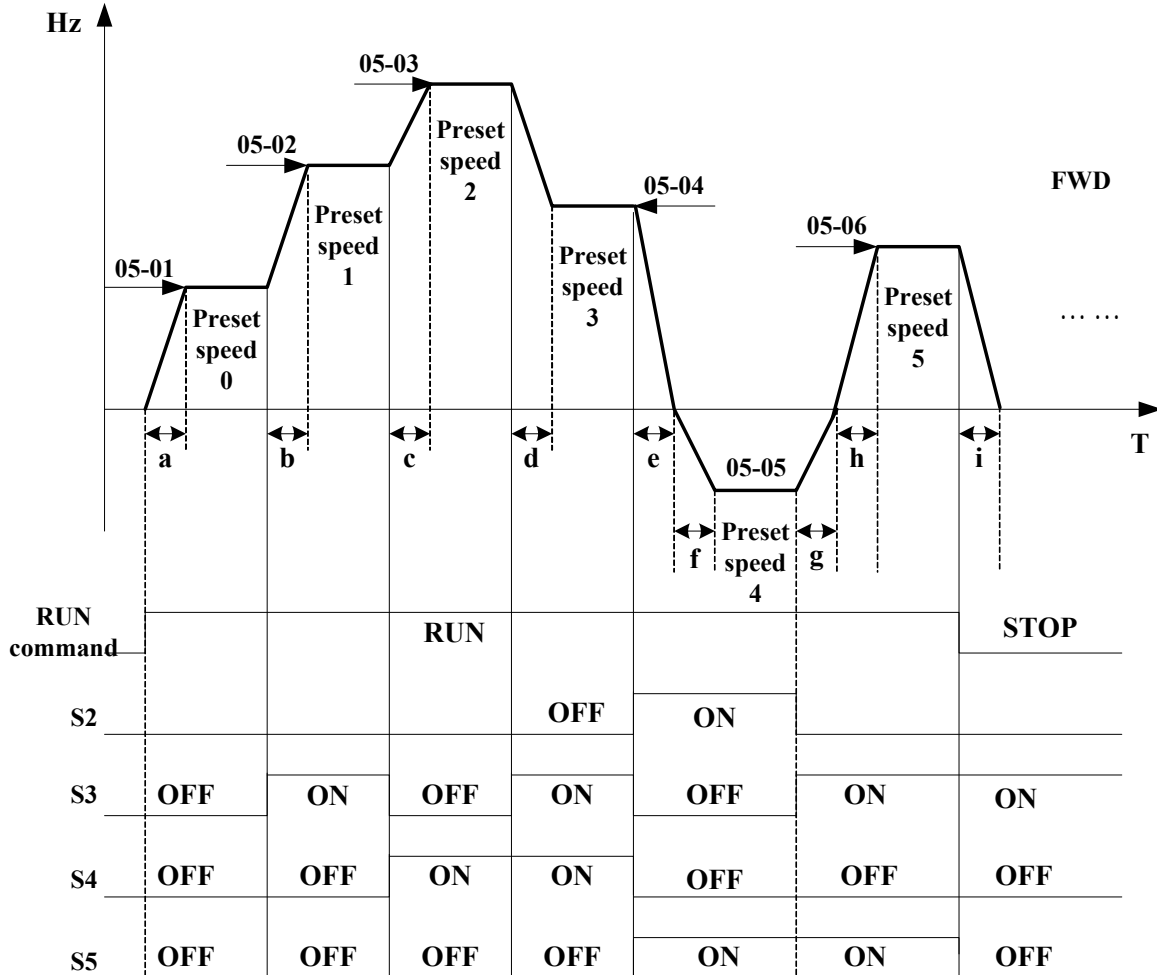


When the run command is uncontinuous, calculate acceleration and deceleration time of each segment like this

$$a = \frac{(05-17) \times (05-01)}{01-02}, b = \frac{(05-18) \times (05-01)}{01-02}, c = \frac{(05-19) \times (05-02)}{01-02}, d = \frac{(05-20) \times (05-02)}{01-02} \dots$$

Unit (sec)

mode 2:



When the run command is continuous, calculate acceleration and deceleration time of each segment like this

$$a = \frac{(05-17) \times (05-01)}{01-02}, b = \frac{(05-19) \times [(05-02) - (05-01)]}{01-02}, c = \frac{(05-21) \times [(05-03) - (05-02)]}{01-02}$$

$$d = \frac{(05-24) \times [(05-03) - (05-04)]}{01-02}, e = \frac{(05-26) \times (05-05)}{01-02}, f = \frac{(05-25) \times (05-05)}{01-02},$$

$$g = \frac{(05-28) \times (05-05)}{01-02}, h = \frac{(05-27) \times (05-06)}{01-02}, i = \frac{(05-28) \times (05-06)}{01-02} \dots \text{Unit (sec)}$$

06- Auto Run(Auto Sequencer) function group

06- 00	Auto Run(sequencer) mode selection
Range	<p>【0】 :Disabled</p> <p>【1】 :Single cycle (Continues to run from the unfinished step if restarted).</p> <p>【2】 :Periodic cycle. (Continues to run from the unfinished step if restarted).</p> <p>【3】 :Single cycle, then holds the speed of final step to run. (Continues to run from the unfinished step if restarted).</p> <p>【4】 :Single cycle. (Starts a new cycle if restarted).</p> <p>【5】 :Periodic cycle. (Starts a new cycle if restarted).</p> <p>【6】 :Single cycle, then hold the speed of final step to run. (Starts a new cycle if restarted).</p>

Frequency of the step 0 is set by patameter 05-01	
06- 01	Auto _ Run Mode Frequency Command 1
06- 02	Auto _ Run Mode Frequency Command 2
06- 03	Auto _ Run Mode Frequency Command 3
06- 04	Auto _ Run Mode Frequency Command 4
06- 05	Auto _ Run Mode Frequency Command 5
06- 06	Auto _ Run Mode Frequency Command 6
06- 07	Auto _ Run Mode Frequency Command 7
06- 08	Auto _ Run Mode Frequency Command 8
06- 09	Auto _ Run Mode Frequency Command 9
06- 10	Auto _ Run Mode Frequency Command 10
06- 11	Auto _ Run Mode Frequency Command 11
06- 12	Auto _ Run Mode Frequency Command 12
06- 13	Auto _ Run Mode Frequency Command 13
06- 14	Auto _ Run Mode Frequency Command 14
06- 15	Auto _ Run Mode Frequency Command 15
Range	【0.00 ~ 650.00】 Hz

06- 16	Auto_ Run Mode Running Time Setting0
06- 17	Auto_ Run Mode Running Time Setting1
06- 18	Auto_ Run Mode Running Time Setting2
06- 19	Auto_ Run Mode Running Time Setting3
06- 20	Auto_ Run Mode Running Time Setting4
06- 21	Auto_ Run Mode Running Time Setting5
06- 22	Auto_ Run Mode Running Time Setting6
06- 23	Auto_ Run Mode Running Time Setting7
06-24	Auto_ Run Mode Running Time Setting8
06-25	Auto_ Run Mode Running Time Setting9
06-26	Auto_ Run Mode Running Time Setting10
06-27	Auto_ Run Mode Running Time Setting11
06-28	Auto_ Run Mode Running Time Setting12
06-29	Auto_ Run Mode Running Time Setting13
06-30	Auto_ Run Mode Running Time Setting14
06-31	Auto_ Run Mode Running Time Setting15
Range	【0.00 ~ 3600.0】 Sec

06- 32	Auto_ Run Mode Running Direction 0
---------------	---

06- 33	Auto_ Run Mode Running Direction1
06- 34	Auto_ Run Mode Running Direction2
06- 35	Auto_ Run Mode Running Direction3
06- 36	Auto_ Run Mode Running Direction4
06- 37	Auto_ Run Mode Running Direction5
06- 38	Auto_ Run Mode Running Direction6
06- 39	Auto_ Run Mode Running Direction7
06- 40	Auto_ Run Mode Running Direction8
06- 41	Auto_ Run Mode Running Direction9
06- 42	Auto_ Run Mode Running Direction10
06- 43	Auto_ Run Mode Running Direction11
06- 44	Auto_ Run Mode Running Direction12
06- 45	Auto_ Run Mode Running Direction13
06- 46	Auto_ Run Mode Running Direction14
06- 47	Auto_ Run Mode Running Direction15
Range	【0】 : STOP 【1】 : forward 【2】 : reverse

※ Note: For executing following options, a terminal with function **【18】** is needed, and it should be turned on.

➤ **Auto Run (sequencer) various modes cab is selected by parameter (06-00)**

➤ **Auto Run (sequencer) mode set up parameters are parameters (06-01~06-47)**

- Programmable auto-operation mode selection and options: With frequency command 1 to 15 (06-01 ~ 06-15), programmable auto-operation option time parameters (06-17 ~ 06-31) and mode selection parameter (06-00), simple PLC function can be executed, and the direction of each phases can be set with (06-32 ~ 06-47). In addition, in phases 0, frequency command is master frequency 05-01, 06-16 sets option time, and 06-32 sets option direction.
- Examples of options each kind of programmable auto-operation mode are shown as below.

(A) Single Cycle Running (06- 00=1,4)

The inverter will run for a single full cycle based upon the specified setting mode. Then, it will stop.

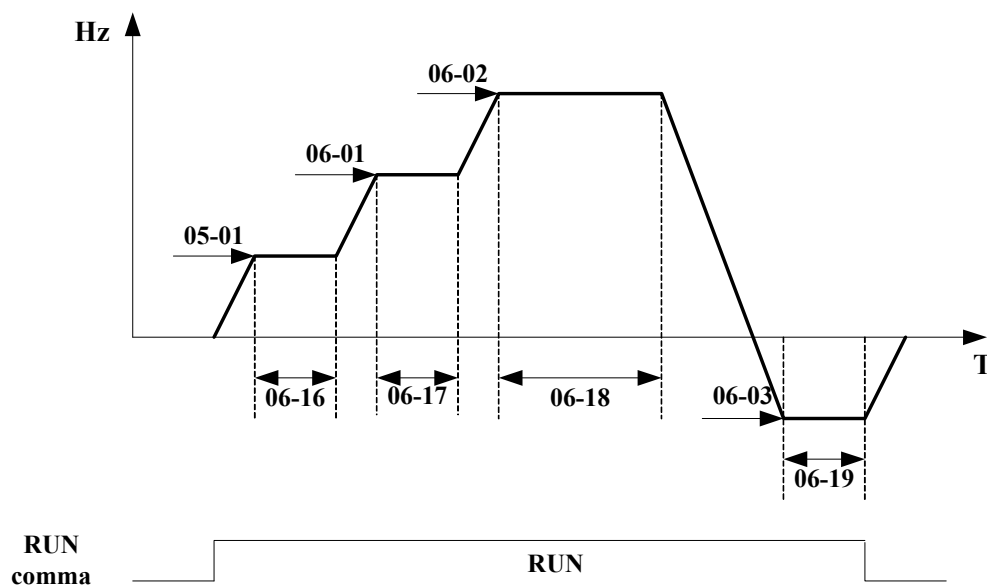
For example : 06- 00= **【1】** (or **【4】**),

Panel Frequency (05-01)= **【15】** Hz, 06- 01= **【30】** Hz, 06- 02= **【50】** Hz, 06- 03= **【20】** Hz

06-16= **【20】** s, 06-17= **【25】** s, 06-18= **【30】** s 06-19= **【40】** s,

06-32= **【1】**, 06-33= **【1】**, 06-34= **【1】** (FWD), 06-35= **【2】** (REV),

06-04~ 06-15= **【0】** Hz , 06-20~06-31= **【0】** s , 06-36~06-47= **【0】**

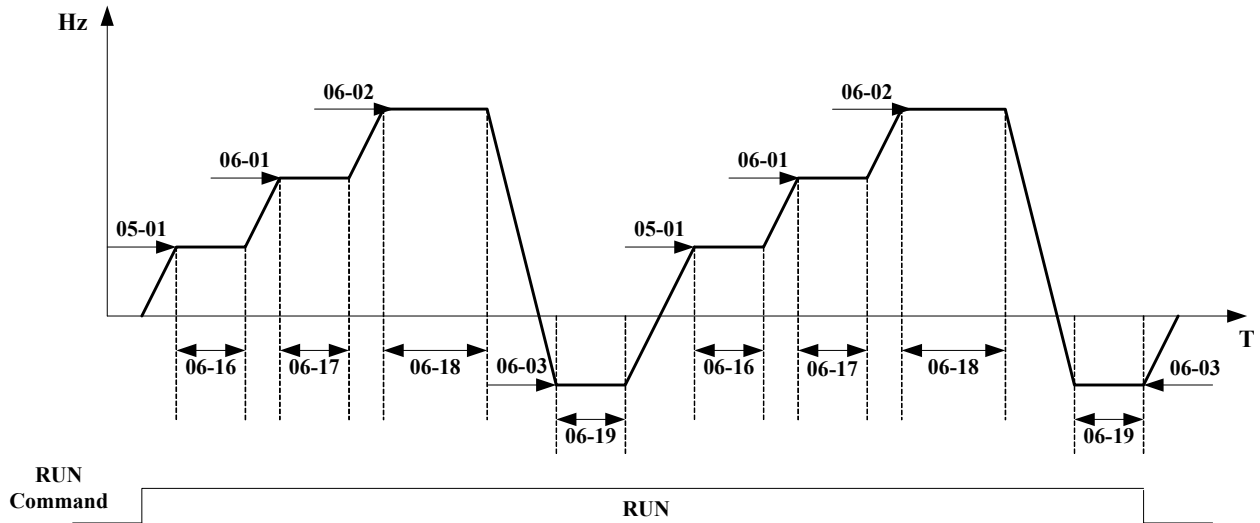


(B) Periodic cycle Running (06-00=2,5)

The inverter will repeat the same cycle periodically.

Example :

06-00=【2】(or【5】) 06-01~06-15,06-16~13-31,06-32~06-47:Same setting as the example (A)

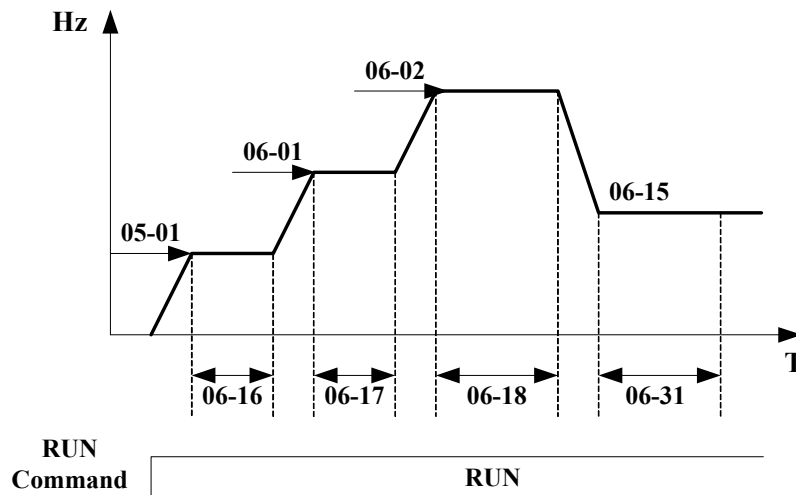


(C)Auto_Run Mode for Single Cycle (06-00=【3,6】)

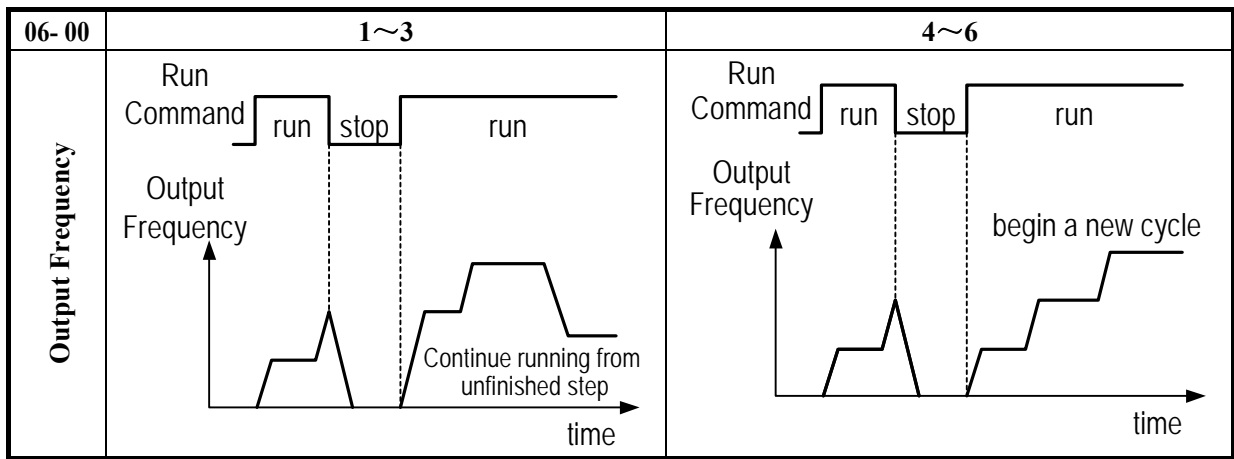
The speed of final step will be held to run.

Example:: 06-00=【3】(or【6】),

Panel Frequency (05-01)=【15】Hz, 06-01=【30】Hz, 06-02=【50】Hz, 06-15=【20】Hz,
 06-16=【20】s, 06-17=【25】s, 06-18=【30】s, 06-31=【40】s,
 06-32=【1】, 06-33=【1】, 06-34=【1】, 06-47=【1】(FWD),
 06-04~06-15=【0】Hz, 06-20~06-30=【0】s, 06-35~06-46=【0】



- 06-00=【1~3】，If the inverter stops and re-starts, it will continue running from the unfinished step, according to the setting of 06-00.
- 06-00=【4~6】，If the inverter stops and re-starts, it will begin a new cycle and continue running according to the setting of 06-00.



ACC/DEC time follow the setting of 00-14/00-15 or 00-16/00-17 in Auto Run Mode.

- ※ Note:06-16 and 06-32 should be used in company with panel setting frequency(05-01) as the 0 step of atuo programable run.

07- Start/Stop command group

07- 00	Momentary power loss and restart
Range	【0】 :Momentary Power Loss and Restart disable 【1】 :Momentary power loss and restart enable

- If the input power supply due to sudden increase in supply demand by other equipment results in voltage drops below the under voltage level, the inverter will stop output at once. If the power supply voltage level recovers in the 07-12 preset time, it will spin start tracing from the trip frequency, or otherwise the inverter will trip with ‘LV-C’ fault displayed.
- When 07- 00= **【0】** : as power lost, the inverter will not start.
- When 07 - 00 = **【1】** if the loss time is less than the value of 07-12, the inverter will Spin Start in 0.5 second as the power is resumed and restart times are infinite.
- if it is to long time after power down, invanter will start in normal start mode instead of speed search mode after power on.
- ※ Note: 00-02=1, 07-04=0, after a power loss for a long time, please turn OFF the power and power switches to avoid any possible injury to operators and machines when the power is resumed unexpectedly.

07- 01	Auto Restart Delay Time
Range	【0.0~800.0】 Sec
07- 02	Number of Auto Restart Attempts
Range	【0~10】

- 07- 02= **【0】** : The inverter will not auto restart after trips due to fault.
- 07- 02>**【0】** , 07- 01= **【0】** : The inverter will conduct SPIN START in 0.5 second after trips due to fault. The motor will Coast to stop while the output is switched off, Once the rotating speed is determined then it will accelerate or decelerate from this speed to the running speed before the fault.
- 07- 02>**【0】** , 07- 01>**【0】** The output will be stopped for a period which is determined by the 07-01 after a fault trip. Then, spin start to set target frequency.
- Auto restart after a fault will not function while DC injection braking or decelerating to stop

07- 03	Reset Mode Setting
Range	【0】 :Enable Reset Only when Run Command is Off 【1】 :Enable Reset when Run Command is On or Off

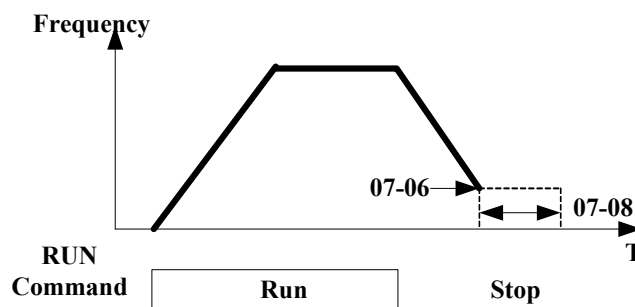
- 07-03=0 Once the inverter is detected a fault, please turn Run switch Off and then On again to perform reset, otherwise restarting will not be possible.

07- 04	Direct Running After Power Up
Range	【0】 :Enable Direct running after power up 【1】 :Disable Direct running after power up
07- 05	Delay-ON Timer (Seconds)
Range	【1.0~300.0】 Sec

- 07-04=0 and the inverter is set external terminal controlled (00-02/00-03=1) , if the run switch is ON as power is supplied, the inverter will auto start. It is recommend that the power is turned off and the run switch is also off to avoid possibility of injury to operators and machines as the power is reapplied.
- ※ Note: IF this mode is required all safety measures must be considered including warning labels.
- 07-04=1 and the inverter is set external terminal controlled (00-02/00-03=1) , if the run switch is ON as power is supplied, the inverter will not auto start and the display will flash with STP1. It is necessary to turn OFF the run switch and then ON to start normally.

07- 06	DC Injection Brake Start Frequency (Hz) @Stopped
Range	【0.10 ~ 10.00】 Hz
07- 07	DC Injection Brake Level (%)@Stopped
Range	【0.0~ 150.0】 %
07- 08	DC Injection Brake Time (Seconds)@stopped
Range	【0.0 ~ 25.5】 Sec

- 07- 08 / 07- 06 is the action time and start frequency of DC braking, as graph below:



07-09	Momentary Power Loss Ride-Thru Time (Seconds):
Range	【0.0 ~ 2.0】

- Grid voltage drop can cause an instant, when the voltage drops to a low-voltage inverter Protection Level, the drive will stop output. If the power in the 07-09 recovery within the time set, the inverter will restart with speed search (starting from the escape frequency tracking), otherwise the drive will show LV-C, and tripping.
- Power inverter itself allows time for the moment, due to differences in different models, ranging from 1 second to 2 seconds.
- When 07-00 = 0: instantaneous stop restoration, the inverter will not start.
- When 07-00 = 1: If the instantaneous setting stop time is less than 07-09, the drive will be 0.5 seconds in the restoration after the restart with speed search, and unlimited number of restarts.
- ※ Note: The parameters of 00-02=1 and 07-11 = 0, when the parameters of 07-00 = 1, in a long time after the power failure, to the power switch and run switch off, to avoid a sudden recovery after power on the machine or person cause harm.

07-10	Starting Method Selection
Range	【0】 : Normal start 【1】 : Enable Speed Search

- 07-10=0 : On starting, the inverter accelerates from 0 to target frequency in the set time.
- 07-10=1 : On starting, the inverter accelerates to target frequency from the detected speed of motor. ◦

07-11	Auto Restart Method:
Range	【0】 : Enable Speed Search 【1】 : Normal Start

- 07-11=0 : When auto-restarting the inverter will detect the rotating speed of the motor. The Motor will be controlled to accelerate from the present speed to the target speed.
- 07-11=1 : The inverter restart from 0 speed to set frequency in acceleration time when auto-restart.

07-12	Stopping Method Selection
Range	【0】 : Controlled Deceleration-to-Stop with DC Injection Braking (Rapid Stop) 【1】 : Coast to stop

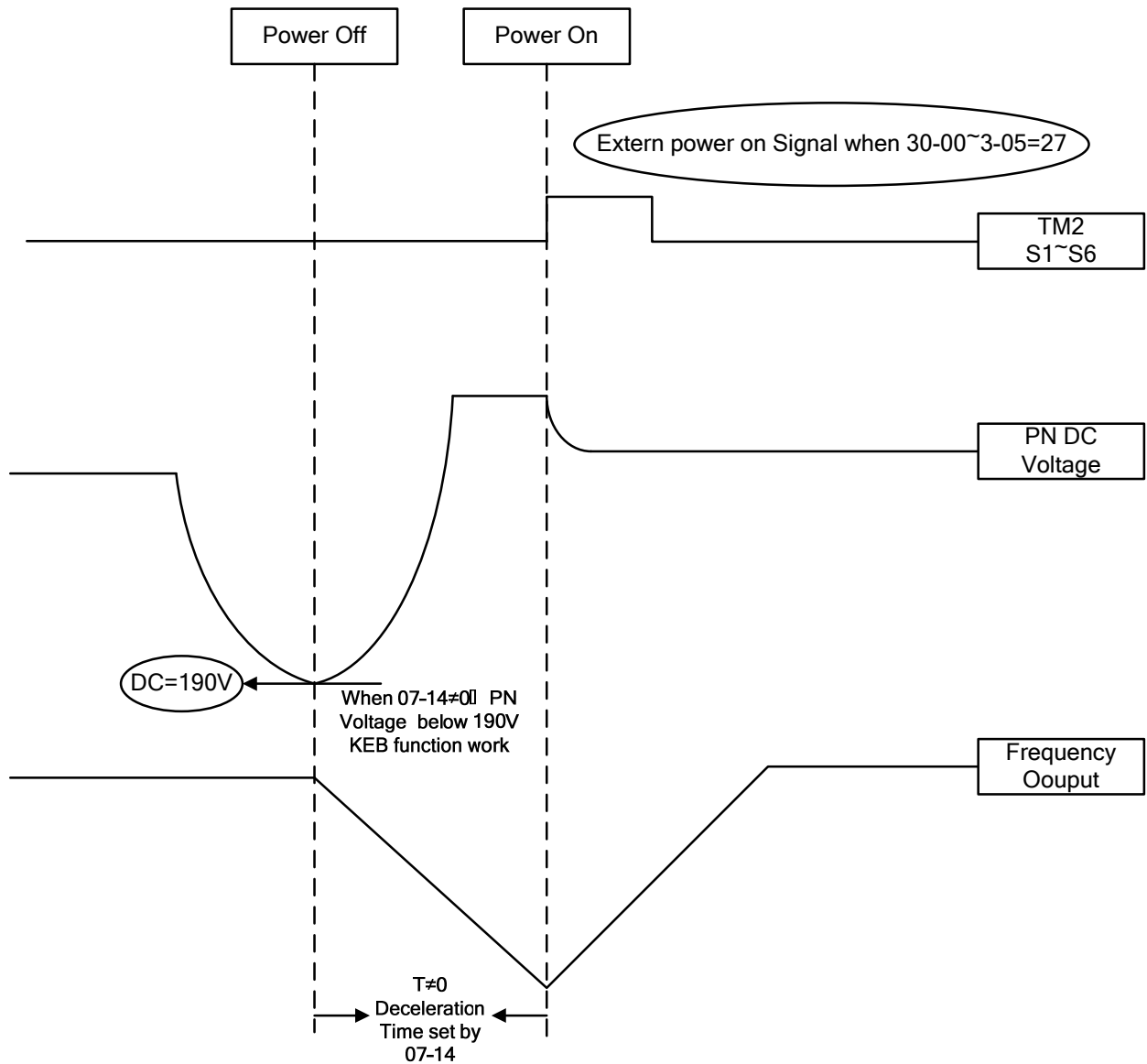
- 07-12=0 : the inverter will decelerate to 0Hz in preset deceleration time after receiving the stop command.
- 07-12=1 : the inverter will stop output as receiving the stop command. The motor will inertia Coast to stop.

07-13	Lower Limit of Power Voltage Detect
Range	【150.0~210.0】 【300.0~420.0】

07-14	Kinetic Energy Back-up Deceleration Time (KEB)
Range	【0.0】 : Disable 【0.1~25.0】 : KEB Deceleration Time

- **07-14** = 0 KEB function disable
- **07-14** ≠ 0 KEB function enables

Example : 220V system



※ Note :

1. When **07-14**≠0, the momentary power loss and Restart is disabled, the inverter will do KEB Function.
2. When input power is turned off, CPU detects the DC bus Voltage and as soon as DC bus Voltage becomes lower than 190V (220V system) or 380V (440V system), then the KEB function is activated.
3. When KEB function is enabled, the inverter decelerate to zero by **07-14**, and the inverter stop
4. IF the power on signal enabled during the KEB function, the inverter accelerate to original frequency.

08- Protection function group

08- 00	Trip Prevention Selection
Range	【xxxx0】 :Enable Trip Prevention During Acceleration 【xxxx1】 :Disable Trip Prevention During Acceleration 【xxx0x】 :Enable Trip Prevention During Deceleration 【xxx1x】 :Disable Trip Prevention During Deceleration 【xx0xx】 :Enable Trip Prevention in Run Mode 【xx1xx】 :Disable Trip Prevention in Run Mode 【x0xxx】 :Enable over voltage Prevention in Run Mode 【x1xxx】 :Disable over voltage Prevention in Run Mode

08- 01	Trip Prevention Level During Acceleration
Range	【50 ~ 200】 %

- In acceleration, the inverter will delay the acceleration time if the time is too short resulting in the over current in order to prevent the inverter trips.

08- 02	Trip Prevention Level During Deceleration
Range	【50 ~ 200】 %

- In deceleration, the inverter will delay the acceleration time if the time is too short resulting in the over voltage of DC BUS in order to prevent the inverter trips with 'OV' displayed.

08- 03	Trip Prevention Level In Run Mode
Range	【50 ~ 200】 %

- Some mechanical characteristics (such as press) or unusual breakdown (seize due to insufficient lubrication, uneven operation, impurities of processed materials, etc.) will cause the inverter to trip, thus inconvenience users. When the operating torque of the inverter exceeds the setting of 08-03, the inverter will lower the output frequency following the deceleration time, and return to the normal operation frequency after the torque get steady.

08- 04	Over voltage Prevention Level in Run Mode
Range	【350.0VDC~390.0VDC】 (200V class) 【700.0VDC~780.0VDC】 (400V class)

- While inverter is running, if DC voltage gets larger than 08-04 setting, over voltage stall option will be executed.

08- 05	Electronic Motor Overload Protection Operation Mod (OL1)
Range	【0】 :Enable Electronic Motor Overload Protection 【1】 :Disable Electronic Motor Overload Protection

08- 06	Operation After Overload Protection is Activated
Range	【0】 :Coast-to-Stop After Overload Protection is Activated 【1】 :Drive Will Not Trip when Overload Protection is Activated (OL1)

- When 08- 06= **【0】** :the inverter coast to stop as the thermal relay acts and flash OL1. Press the 'Reset' or the external reset terminal to continue to run.
- When 08- 06= **【1】** :the inverter continues to run as the thermal relay acts and flash OL1. Until the current decline to A value, OL1 will disappear.

08- 07	OH over heat Protection
Range	【0】 :Auto (Depends on temp.) 【1】 :Operate while in RUN mode 【2】 :Always Run 【3】 :Disabled

- When 08- 07=**【0】**:The fan runs as the inverter senses temperature rises. Thusly extend the service period.
- When 08- 07=**【1】** :The fan runs while the inverter is running.
- When 08- 07=**【2】** :The fan is continuously running regardless of the action of the inverter.

- When 08-07= **【3】** ;The fan is **Disabled**.

08-08	AVR function
Range	【0】 :AVR function enable 【1】 :AVR function disable 【2】 :AVR function disable for stop 【3】 :AVR function disable for Deceleration 【4】 :AVR function disable for stop and Deceleration 【5】 :when VDC>360/740V , AVR function disable for stop and Deceleration

- Automatic voltage regulator function is mainly to solve the problem that is the output voltage instability caused from the input voltage instability.
- When 08-08= **【0】** :When the input voltage has fluctuating, the output voltage will not fluctuate with the input voltage changing.
- When 08-08= **【1】** :When the input voltage fluctuates, the output voltage will vary with input voltage fluctuations.
- When 08-08= **【2】** :AVR is invalid while “stop” of inverter at work only, to increase the speed of braking at this time.
- When 08-08= **【3】** :AVR is invalid when the inverter slows down, from high speed to low speed only, it can be shortened the time of deceleration at this time.
- When 08-08= **【4】** :AVR function disable for stop and deceleration.
- When 08-08= **【5】** :when VDC>360V(200V class)or VDC>740V(400V class),AVR function disable for stop and deceleration.

08-09	Input phase lost protection
Range	【0】 :Disabled 【1】 :Enabled

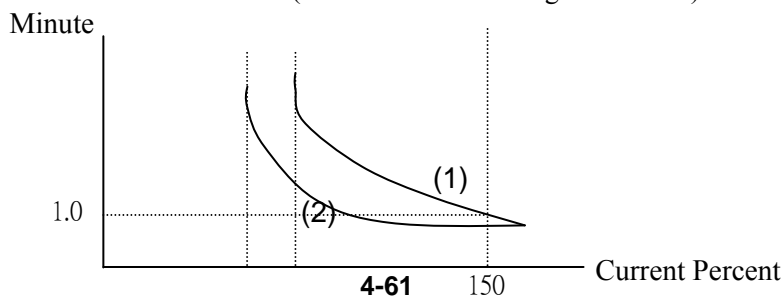
- When 08-09= **【1】** :When an exception occurs the main circuit DC voltage fluctuations, display a warning message PF.

08-10	Output phase lost protection
Range	【0】 :Disabled 【1】 :Enabled

- When 08-10= **【1】** :When the inverter output side of the phase lose, display a warning message LF.

08-11	Motor type selection:
Range	【0】 :Electronic Motor Overload Protection Set for Non-Inverter Duty Motor 【1】 : Electronic Motor Overload Protection Set for Inverter Duty Motor
08-12	Motor Overload Protection Curve Selection:
Range	【0】 :Constant Torque (OL =103 %) (150 % for 1 Minute) 【1】 :Variable Torque (OL = 113 %)(123 % for 1 Minute)

- When 08-11= **【0】** :Set 02-06 as the rated frequency of the serve motor.
- When 08-12= **【0】** : To protect the general mechanical load, as long as the load is less than 103% rated current, the motor continue to run. The load is larger than 150% rated current, the motor will run for 1 minute. (Refer to following curve (1)).
- When 08-12= **【1】** :To protect HVAC load(FAN、 PUMP...so on): as long as the load is less than 113% rated current, the motor continue to run. The load is larger than 123% rated current, the motor will run for 1 minute.
- The heat sinking function will not be as effective when the motor run at low speed. So the thermal relay action level will decline at the same time. (The curve 1 will change to curve 2).



08- 13	Over torque Detection Selection(OL3)
Range	【0】 : Disable Over torque Operation 【1】 : Enable Over torque Operation Only if at Set Frequency 【2】 : Enable Over torque Operation while the Drive is in Run Mode
08-14	Operation After Over torque Detection is Activated
Range	【0】 : Coast-to-Stop After Over torque is Activated 【1】 : Drive will Continue to Operate After Over torque is Activated
08- 15	Over torque Threshold Level
Range	【30 ~ 300】
08- 16	Over torque Activation Delay Time
Range	【0.0~25.0】
08- 17	Fire Mode
Range	【0】 :Disabled 【1】 :Enabled

- Over Torque is detected when the output torque level exceeds the level set in Parameter 08-15 (Inverter rated torque is 100%) and if it is detected for a duration of time which is set in parameter 08-16.
 - When 08-14= **【0】** : If there is over torque, the inverter coasts to stop and flashes OL3. It is necessary to press 'RESET' or external terminal to continue to run.
 - When 08-14=**【1】**: If there is over torque, the inverter can continue to run and flashes OL3 until the output torque is less than the 08-15 set value.
 - Parameter 03-11/12(Multifunction output terminal) = 12, the output terminal signal will be set for over torque condition.
- ※ Note: Over torque detection will be enabled only when parameter 08-13 is set to options 1or2.

! warning:

Fire Mode: This mode is the drive in order to ensure uninterrupted operation. This mode is set to active (08-17 = 1), most of the alarms and warnings will not cause the drive down, in order to ensure that people in the evacuation of smoke-free environment, it will extend the reliable operation of the time as much as possible until self destruction. If the drive is set to fire mode, the company for the error that occurred, failure, personal injury, or the drive itself and the other is not responsible for any loss of property.

09- Communication function group

09- 00	Assigned Communication Station Number
Range	【1 ~ 32】

- 09-00 to set the communication station codes which are suitable for driving more than one inverters situations.

09- 01	RTU code /ASCII code Selection
Range	【0】 :RTU 【1】 :ASCII
09- 02	Baud Rate Setting (bps)
Range	【0】 :4800 【1】 :9600 【2】 :19200 【3】 :38400
09- 03	Stop Bit Selection
Range	【0】 :1 stop bit 【1】 :2 stop bit
09- 04	Parity Selection
Range	【0】 :no parity

	【1】 :odd parity 【2】 :even parity
09- 05	Data Format Selection
Range	【0】 :8 bit data 【1】 :7 bit data

➤ Set 09-01~09-05 to configure communication format before communicating.

09- 06	Communication time-out detection time
Range	【0.0~25.5】 Sec
09- 07	Communication time-out operation selection
Range	【0】 :Stop in decelerating time 1 and show COT after communication timeout 【1】 : Stop in free run mode and show COT after communication timeout 【2】 :Stop in decelerating time 2 and show COT after communication timeout 【3】 : Keep running and show COT after Communication timeout

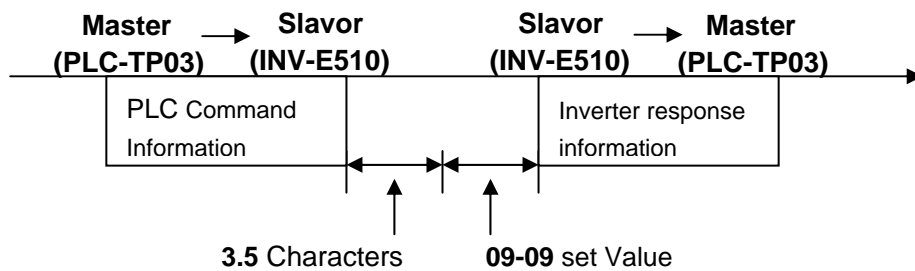
- Time-out detection time: 00.0~25.5sec; setting 00.0 sec: disable time-out function.
- Option of communication timeout checkout: After communication timeout, inverter works as this parameter setting.

09- 08	Err6 fault tolerance times
Range	【1~20】

➤ When communication error times ≥ 09-08 setting, display ERR6 on the keypad.

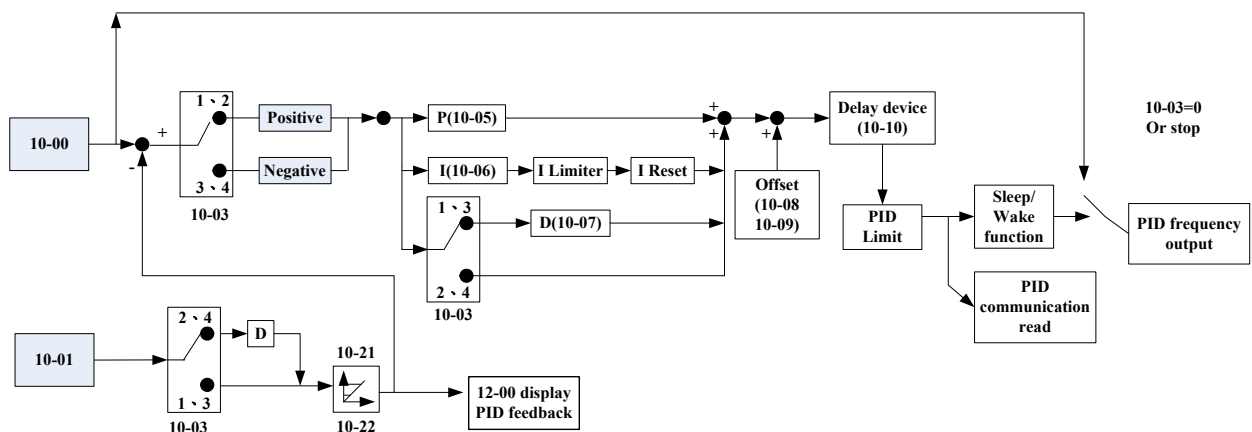
09- 09	Drive Transmit Wait Time
Range	【5~65】 mSec

➤ This parameter is used to set the converter to receive data from the sending date to the beginning of the time.



10-PID function group

PID block diagram



10- 00	PID target value selection
Range	【0】 :Potentiometer on Keypad 【1】 :External AVI Analog Signal Input 【2】 :External ACI Analog Signal Input 【3】 :Communication setting Frequency 【4】 :By 10-02

➤ This parameter is only used when 00 - 05 \ 00 - 06= 6.

10- 01	PID feedback value selection
Range	【0】 :Potentiometer on Keypad 【1】 :External AVI Analog Signal Input 【2】 :External ACI Analog Signal Input 【3】 :Communication setting Frequency

※ Note: 10-00 and 10-01 can not be set the same value.

10- 02	PID keypad input
Range	【0.0~100.0】 %

10- 03	PID operation selection
Range	【0】 :PID Function disable 【1】 :Deviation is D-controlled 【2】 :Feedback D-controlled 【3】 :D Reverse characteristic controlled 【4】 :Feedback D characteristic controlled

➤ 10- 03 = **【1】** ,D is the deviation of (target value –detected value) in the unit time (10- 07) ◦

➤ 10- 03 = **【2】** , D is the deviation of the detected values in unit time (10- 07) ◦

➤ 10- 03 = **【3】** D is the deviation of (target value – detected value) in the unit time(10- 07). If the deviation is positive, the output frequency decreases, vice versa.

➤ 10- 03 = **【4】** D is the deviation of detected value in unit time (10- 07). When the deviation is positive, the frequency decreases, vice versa.

10- 04	Feedback Gain coefficient
Range	【0.00 ~ 10.00】

➤ 10-04 is the calibration gain. Deviation = (set point –feedback signal)×10-04

10- 05	Proportional Gain
Range	【0.0 ~ 10.0】 %

➤ 10- 05 : Proportion gain for P control.

10- 06	Integration Time
Range	【0.0 ~ 100.0】 Sec

➤ 10- 06 : Integrate time for I control

10- 07	Differentiation Time
Range	【0.00 ~ 10.00】 Sec

➤ 10- 07 : Differential time for D control

10- 08	PID Offset
Range	【0】 : Positive Direction 【1】 : Negative Direction

10- 09	PID Offset Adjust
Range	【0 ~ 109】 %

➤ 10- 08 /10- 09: Calculated PID output is offset by 10-09 (the polarity of offset is according to10-08)

10-10	PID Output Lag Filter Time
Range	【0.0 ~ 2.5】 Sec

➤ 10-10 : Update time for output frequency.

10-11	Feedback Loss Detection Mode
--------------	-------------------------------------

Range	【0】 :Disable 【1】 :Enable – Drive Continues to Operate After Feedback Loss 【2】 :Enable – Drive “STOPS” After Feedback Loss
--------------	--

- 10-11= **【0】** :Disable; 10-11= **【1】** :detect, continue running, and display ‘PDER’;
- 10-11= **【2】** :detect, stop, and display ‘PDER’.

10-12	Feedback Loss Detection Level
Range	【0 ~ 100】

- 10-12 is the level for signal loss. Error = (Set point – Feedback value). When the error is larger than the loss level setting, the feedback signal is considered lost.

10-13	Feedback Loss Detection Delay Time
Range	【0.0 ~25.5】 Sec

- 10-13:The minimum time to consider the feedback signal lost.

10-14	Integration Limit Value
Range	【0 ~ 109】

- 10-14: the Limiter to prevent the PID from saturating.

10-15	Integration Value Resets to Zero when Feedback Signal Equals the Intended Value
Range	【0】 :Disable 【1】 :1 Sec 【30】 :30 Sec 1 ~ 30 Sec

- 10-15=0 , As PID feedback value reaches the set point, the integrator will not be reset to 0.
- 10-15=1~30: As PID feedback value reaches the set point, reset to 0 in 1~30 seconds and inverter stops. The inverter will run again when the feedback value differs from the set point value.

➤

10-16	Allowable Integration Error Margin (Unit) (1 Unit = 1/8192)
Range	【0 ~ 100】

- 10-16=0 ~ 100% unit value: Restart the tolerance after the integrator reset to 0.

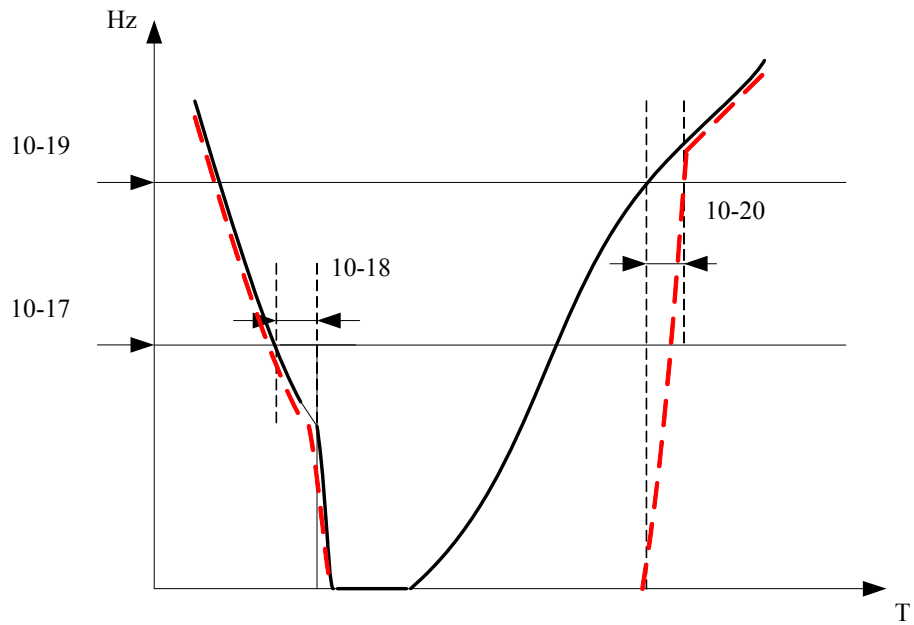
10-17	PID Sleep Frequency Level
Range	【0.00~650.00】 Hz

10-18	PID Sleep Function Delay Time
Range	【0.0 ~25.5】 Sec

10-19	PID Wake up frequency Level
Range	【0.00 ~ 650.00】 Hz

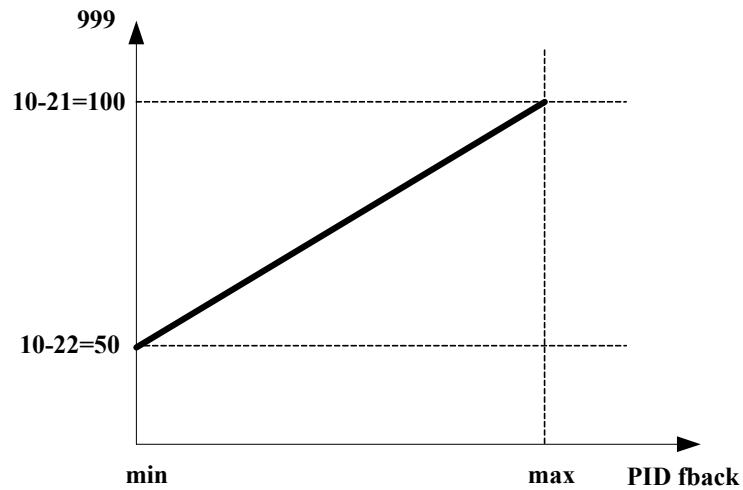
10-20	PID Wake up function Delay Time
Range	【0.0 ~ 25.5】 Sec

- When PID output frequency is less than the sleep threshold frequency and exceeds the time of sleep delay, the inverter will decelerate to 0 and enter PID sleep mode.
- When PID output frequency is larger than the Wake threshold frequency for Wake start the inverter will reactivate and enter PID wake mode. The time diagram is as follow:



10-21	Max PID Feedback Setting
Range	【0 ~ 999】
10-22	Min PID Feedback Setting
Range	【0 ~ 999】

Example: If set 10-21=100 and 10-22=50, When actual feedback value changes in a range of the smallest to the largest, feedback value read from keypad is limited between 50 and 100. Shown as below.



11 Assistant function group

11- 00	Prevention of Reverse operation
Range	【0】 :Reverse command is enabled 【1】 :Reverse command is disabled

- 11-00=1, the reverse command is disabled.

11- 01	Carrier Frequency
Range	【1~16】 KHz

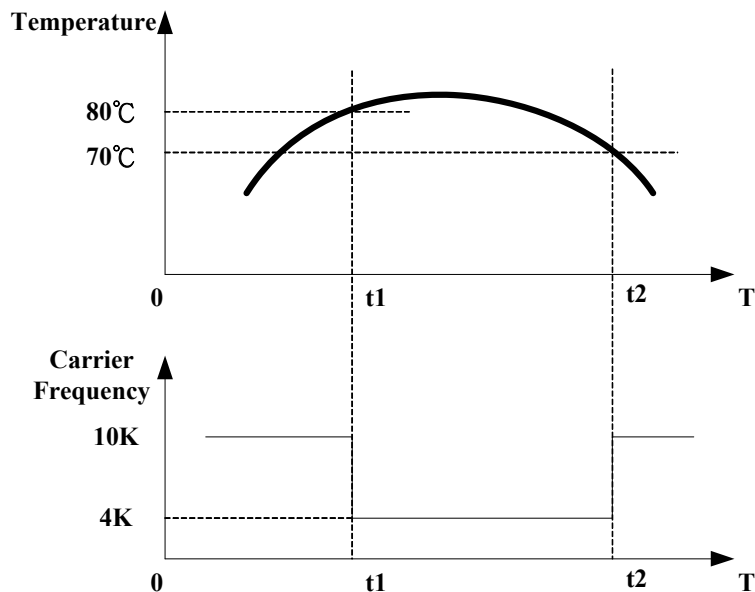
- While IGBT-driven inverter can provide low-noise working environment, the high frequency devices have carrier frequency waveform cutting, it may interfere with external electronic device, even caused vibration when connected with motor, then need to adjust the carrier frequency.

11- 02	Carrier mode selection
Range	【0】 :Carrier mode0 3-phase PW M modulation 【1】 :Carrier mode1 2-phase PW M modulation 【2】 :Carrier mode2 2-phase randomized PW M modulation

- Carrier mode0 is used in the occasion of low noise and good cooling.
- Carrier mode0 is used in the occasion of wind or water power.
- Carrier mode2 can improve Temperature rise and the life of IGBT, at the same time have a certain inhibitory effect of electromagnetic noise.

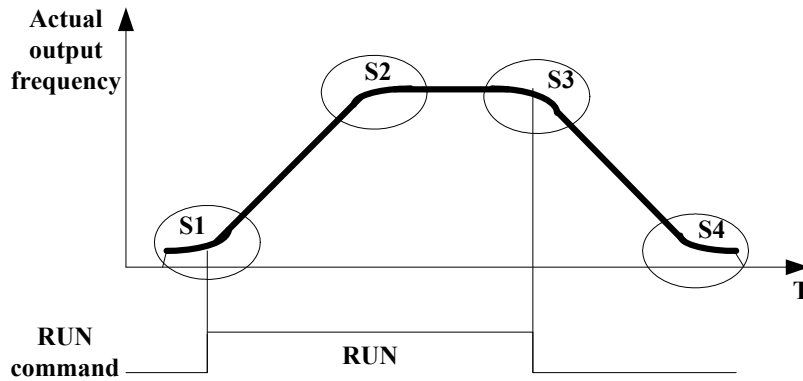
11- 03	Carrier Frequency reduced by temperature decreasing
Range	【0】 :disable 【1】 :Enable

- When inverter is temperature overrun 80°C on keypad display(11-00=01000), Carrier Frequency reduced to 4K. when inverter is temperature reduced less than 70°C, Carrier Frequency resume.



11- 04	S-Curve Acc 1
11- 05	S-Curve Acc 2
11- 06	S-Curve Dec 3
11- 07	S-Curve Dec 4
Range	【0.0 ~ 4.0】 Sec

- Use S Curve parameters where a smooth acceleration or deceleration action is required, this will prevent possible damage caused to machines by sudden acceleration/deceleration.



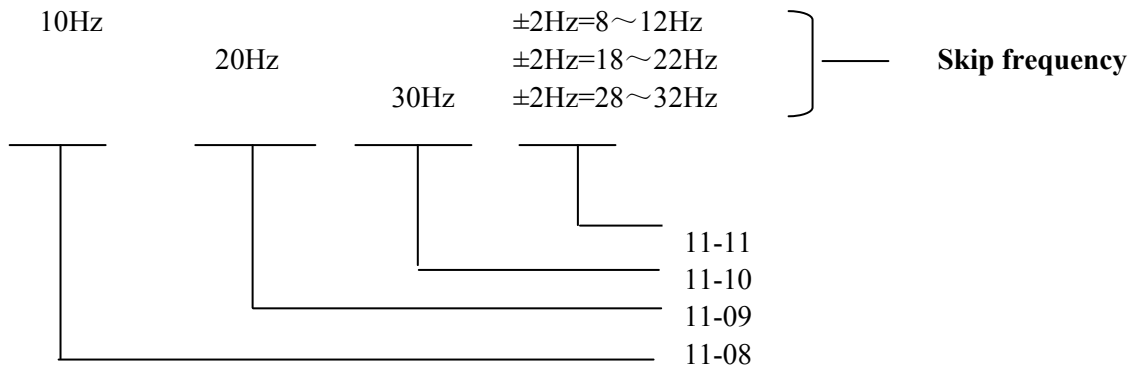
※ Note:

- Regardless of the stall prevention period, actual acceleration and deceleration time = preset acceleration / deceleration time + S curve time.
- Please set the S curve time separately in the parameter(11-04~11-07)
- When S curve time (11-04~11-07) is set as 0, the S curve function is disabled.
- The calculating of S curve time is based on the Maximum output frequency of motor (01-02), Please refer to the parameter (00-14/00-15).

11- 08	Skip frequency 1
11- 09	Skip frequency 2
11-10	Skip frequency 3
Range	【0.00 ~ 650.00】 Hz
11-11	Skip frequency range (±)
Range	【0.00 ~ 30.00】 Hz

Skip frequency parameters can be used to avoid mechanical resonance in certain applications.

Example: 11-08=10.00(Hz); 11-09=20.00(Hz); 11-10=30.00(Hz); 11-11=2.00(Hz).



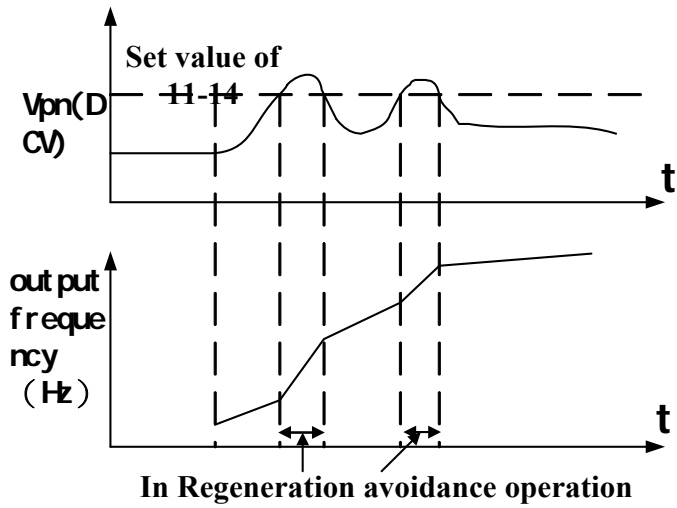
11- 12	V/F Energy Saving Gain (VF)
Range	【0 ~ 100】 %

11- 13	Regeneration avoidance operation selection
Range	【0】 : Regeneration avoidance function invalid 【1】 : Regeneration avoidance function is always valid 【2】 : Only in the constant, Regeneration avoidance function valid

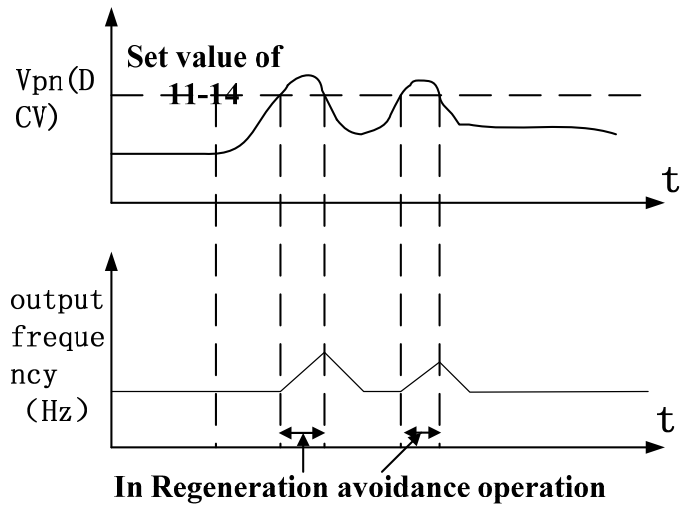
➤ Regeneration avoidance operation:

In the case of large Regeneration status, V_{pn} will Increase and lead to OV, when V_{pn} is over Regeneration avoidance operation level, Regeneration status can be avoided by increasing the frequency.

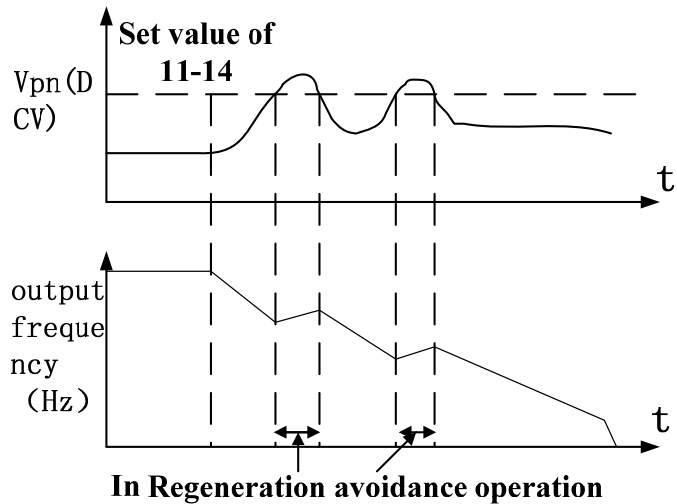
regeneration avoiding action have three kind: regeneration avoidance action when accelerating, regeneration avoidance action when constant speed, regeneration avoidance action when deceleration. For example when accelerating regeneration avoiding action:



For example when constant speed regeneration avoiding action:



For example when decelerating regeneration avoiding action:



11- 14	Regeneration avoidance operation level
Range	【300~800V】

- Regeneration avoidance actions bus voltage level, if the bus voltage level set low, and is not prone to over-voltage error, but the actual deceleration time will be extended.

11- 15	Regeneration avoidance frequency limit of compensation
Range	【0.00 ~ 15.00Hz】

- The frequency of start-up limit when regeneration avoidance function started.

11- 16	Regeneration avoidance voltage gain
Range	【0~200】

11- 17	Regeneration avoidance Frequency gain
Range	【0~200】

- 11-16/11-17 Representative responsiveness of Regeneration avoidance action, increase the set value, will improve the response to voltage changes on the bus, but the output frequency may be unstable.
- If you set the settings 11-16 smaller, still unable to suppress vibration, set 11-17 and then set the settings.

12 Monitor function group

12- 00	Display Mode
Range	0 0 0 0 0 high Low 00000~88888 Each of the range of 0 to 8 【0】 :Disable display 【1】 :output Current 【2】 :output Voltage 【3】 :DC voltage 【4】 :Temperature 【5】 :PID feedback 【6】 :AVI 【7】 :ACI 【8】 :count

- ※ Note: The highest bit of 12-00 sets the power on destined menu, other bits set user setting menus (prefer P4-4)

12- 01	PID Feedback Display Mode
Range	【0】 :Displayed in Integer (xxx) 【1】 :Displayed with One Decimal Place (xx.x) 【2】 :Displayed with Two Decimal Places (x.xx)
12- 02	PID Feedback Display Unit Setting
Range	【0】 :xxx-- 【1】 :xxxpb(pressure) 【2】 :xxxfl(flow)

12- 03	Custom Units (Line Speed) Display Mode
Range	【0~65535】 Rpm

- The max preset line value of 12-03 is equal to the Maximum output frequency of the motor. For instance, given line speed 1800 is equal to display 900 when output is 30Hz while the operation frequency is 60Hz.

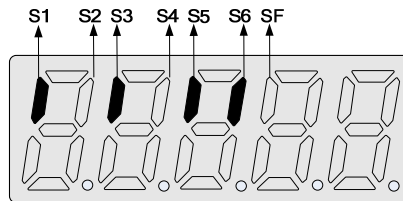
12- 04	Custom Units (Line Speed) Display Mode
Range	【0】 :Drive Output Frequency is Displayed 【1】 :Line Speed is Displayed in Integer (xxxxx) 【2】 :Line Speed is Displayed with One Decimal Place (xxxx.x) 【3】 :Line Speed is Displayed with Two Decimal Places (xxx.xx) 【4】 :Line Speed is Displayed with Three Decimal Places (xx.xxx)

- **12- 04≠0**, line speed is displayed while the inverter is running or stopped.

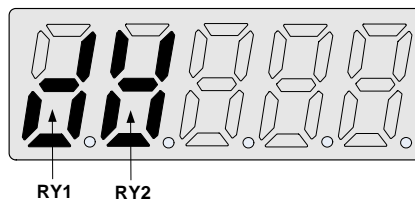
12- 05	Input and output terminal status display
Range	Read only(Panel read only)

- When any of S1 ~ SF is turned on, corresponding tube in 12 - 05 lights, or all quench.
- When relays act, corresponding tubes light, or all quench.

Example 1: The following figure shows 12 - 05 display state when S1, S3, S5, S6,SFturns ON and S2, S4 turns OFF and RY1, RY2 does not act.



Example 2: The following figure shows 12 - 05 display state when S2, S3, S4 turns ON and S1, S5, S6, SFturns OFF and RY1,RY2 acts.



12- 06	Display of life alarm status
Range	xxxx0 : life alarm of inrush current suppression circuit is invalid
	xxxx1 : life alarm of inrush current suppression circuit is valid
	xxx0x : life alarm of control circuit capacitors is invalid
	xxx1x : life alarm of control circuit capacitors is valid
	xx0xx : life alarm of main circuit capacitors is invalid
xx1xx : life alarm of main circuit capacitors is valid	

Example:set 12- 06=00111,if inrush current suppression circuit or control circuit capacitors or main circuit capacitors is damaged,display LIFE1,LIFE2,LIFE3 respectively. Alert the user needs repair inverter.

12- 08	Display of inrush current suppression circuit
Range	0~100

- Inrush current suppression circuit shows the degree of poor

12- 09	Display of control circuit capacitors
Range	0~100

- Display control circuit degree of the bad capacitors.

12- 10	Display of main circuit capacitors
Range	Reserved

- Display main circuit degree of the bad capacitors.

12- 11	Output current when Fault appeared
Range	----
12- 12	Output voltage when fault appeared
Range	----
12- 13	Output frequency when fault appeared
Range	----
12- 14	DC bus voltage when fault appeared
Range	----
12- 15	Frequency command when fault appeared
Range	----

- In addition to the main circuit capacitors above, the theoretical value of life diagnosis are only for reference.

13 Maintenance function group

13- 00	Drive Horsepower Code
Range	----

Inverter Model:	13- 00 show	Inverter Model:	13- 00 show
E510-2P5-XXX	2P5	E510- 401-XXX	401
E510-201-XXX	201	E510- 402-XXX	402
E510-202-XXX	202	E510- 403-XXX	403
E510-203-XXX	203	E510- 405-XXX	405
E510-205-XXX	205	E510- 408-XXX	408
E510-208-XXX	208	E510- 410-XXX	410
E510-210-XXX	210	E510- 415-XXX	415
E510-215-XXX	215	E510- 420-XXX	420
E510-220-XXX	220	E510- 425-XXX	425

13- 01	Software Version
Range	----

13- 02	Fault Log (Latest 3 times)
Range	----

- When the inverter trips on a fault, the previous fault log stored in 2.xxx will be transferred to 3.xxx, the one in 1.xxx to 2.xxx. The present fault will be stored in the empty register 1.xxx. The fault stored in 3.xxx is the last one of the most recent three, while the one 1.xxx is the latest.
- When pressing 'ENTER' at 13-02, the fault 1.xxx will be displayed first. Press ▲, to read 2.xxx→3.xxx→1.xxx press ▼ and the order is 3.xxx→2.xxx→1.xxx→3.xxx.
- When pressing 'Reset' at 13-02, the three fault log will be cleared when the reset key is pressed. The log content will change to 1. ---, 2. ---, 3. ---.
- E.g. the fault log content is '1.OC-C'; this indicates the latest fault is OC-C, etc.

13- 03	Accumulated Operation Time 1
Range	【0~23】 Hours
13- 04	Accumulated Operation Time 2
Range	【0~65535】 Days

13- 05	Accumulated Operation Time Mode
Range	【0】 :Power on time 【1】 :Operation time

- When the operation time is to23 as the elapsed time 1 is set. The next hour will be carried to operation13-04. Meanwhile, the recorded value will be cleared to 0000, and the record value of operation duration 2 will be 01.

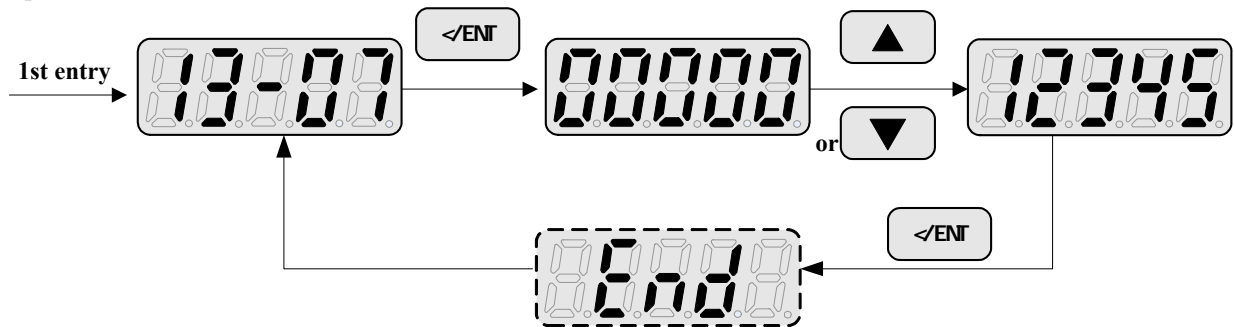
13- 06	Parameter lock
Range	【0】 :Enable all Functions 【1】 :05- 01~05- 16 cannot be changed 【2】 :All Functions cannot be changed Except 05- 01~05- 16 【3】 :Disable All Function Except13-06

- When the 13 - 07 = 00000 (not set a password) may be from the 13 - 06 set the parameters of 05 - 01 ~ 05 - 16 can be modified or can not be modified.

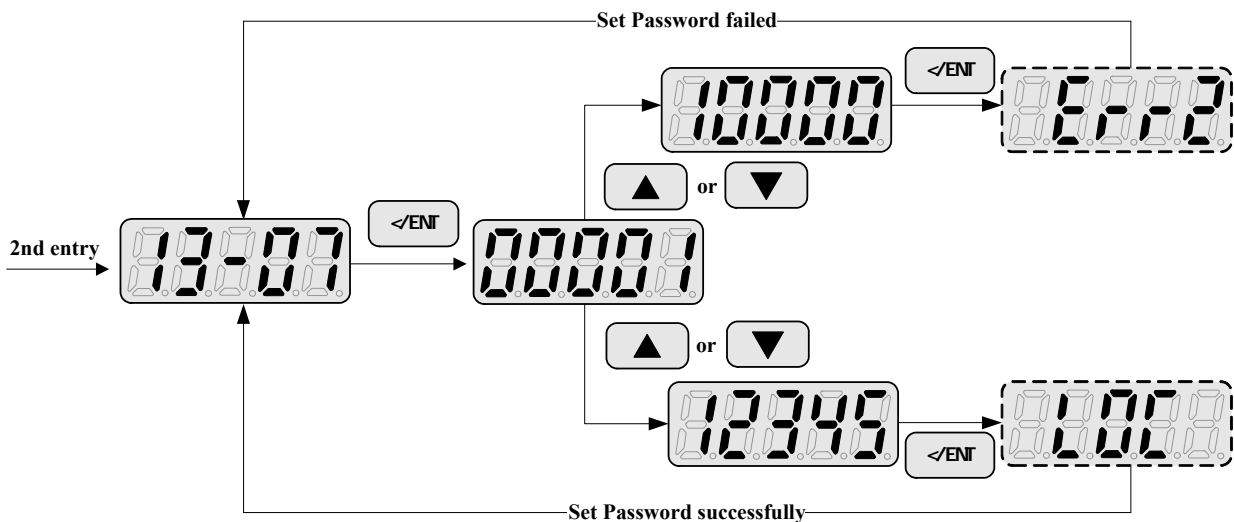
13- 07	Parameter password
Range	【00000~65535】

- When the 13-07 set the password is valid, all parameters can not be changed, only the lifting of a password to modify the parameters.
- Set Password:

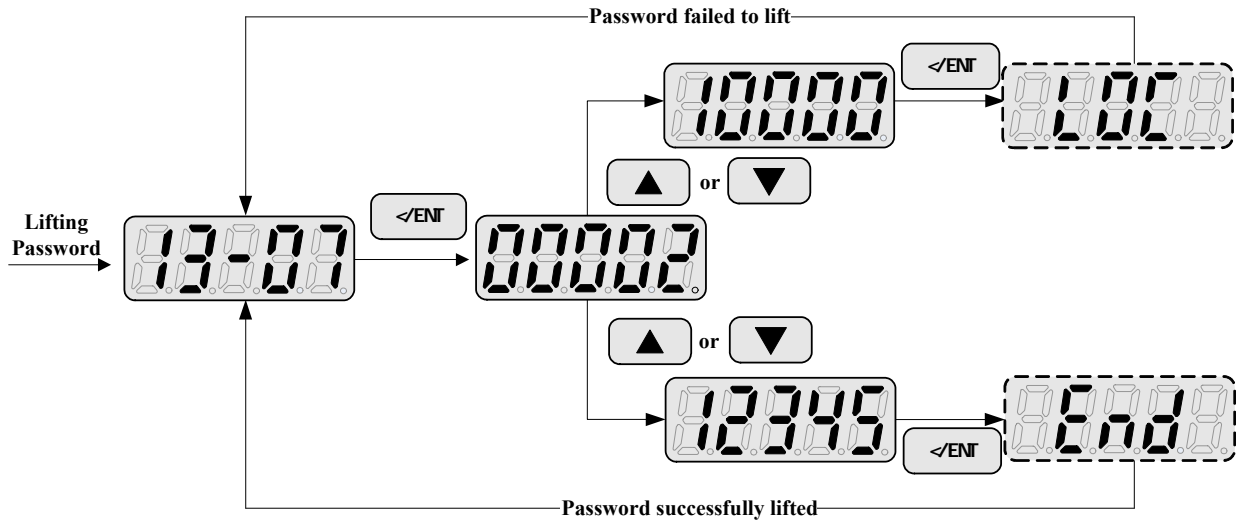
Step1:



Step2:



Lifting Password:



13- 08	Reset Drive to Factory Settings
Range	【1150】 :Reset to the 50Hz factory setting 【1160】 :Reset to the 60Hz factory setting

- When the parameter value is not set then for some reason, this parameter can be used to restore the default setting.
- When the 13 - 07 password set valid, must be lifted only after the password to restore factory settings.

14 PLC Setting function group

14- 00	Setting value1 of T1
14- 01	Setting value1 of T1 (mode 7)
14- 02	Setting value1 of T2
14- 03	Setting value1 of T2 (mode 7)
14- 04	Setting value1 of T3
14- 05	Setting value1 of T3 (mode 7)
14- 06	Setting value1 of T4
14- 07	Setting value1 of T4 (mode 7)
14- 08	Setting value1 of T5
14- 09	Setting value1 of T5 (mode 7)
14- 10	Setting value1 of T6
14- 11	Setting value1 of T6 (mode 7)
14- 12	Setting value1 of T7
14- 13	Setting value1 of T7 (mode 7)
14- 14	Setting value1 of T8
14- 15	Setting value1 of T8 (mode 7)
Range	【0~9999】

- T1~T8 is 8 TIMER of build-in PLC.

14- 16	Setting value1 of C1
14- 17	Setting value1 of C2
14- 18	Setting value1 of C3
14- 19	Setting value1 of C4

14- 20	Setting value1 of C5
14- 21	Setting value1 of C6
14- 22	Setting value1 of C7
14- 23	Setting value1 of C8
Range	【0~65535】

➤ C1~C8 is 8 COUNTER of build-in PLC.

14- 24	Setting value1 of AS1
14- 25	Setting value2 of AS1
14- 26	Setting value3 of AS1
14- 27	Setting value1 of AS2
14- 28	Setting value2 of AS2
14- 29	Setting value3 of AS2
14- 30	Setting value1 of AS3
14- 31	Setting value2 of AS3
14- 32	Setting value3 of AS3
14- 33	Setting value1 of AS4
14- 34	Setting value2 of AS4
14- 35	Setting value3 of AS4
Range	【0~65535】

➤ AS1~AS4 is 4 Modified modules of build-in PLC.

14- 36	Setting value1 of MD1
14- 37	Setting value2 of MD1
14- 38	Setting value3 of MD1
14- 39	Setting value1 of MD2
14- 40	Setting value2 of MD2
14- 41	Setting value3 of MD2
14- 42	Setting value1 of MD3
14- 43	Setting value2 of MD3
14- 44	Setting value3 of MD3
14- 45	Setting value1 of MD4
14- 46	Setting value2 of MD4
14- 47	Setting value3 of MD4
Range	【0~65535】

➤ MD1~MD4 is 4 Multiplication modules of build-in PLC.

15 PLC Monitoring function group

15- 00	Current value of T1
15- 01	Current value of T1(mode 7)
15- 02	Current value of T2
15- 03	Current value of T2(mode 7)
15- 04	Current value of T3
15- 05	Current value of T3(mode 7)
15- 06	Current value of T4
15- 07	Current value of T4(mode 7)
15- 08	Current value of T5
15- 09	Current value of T5(mode 7)
15- 10	Current value of T6
15- 11	Current value of T6(mode 7)
15- 12	Current value of T7
15- 13	Current value of T7(mode 7)
15- 14	Current value of T8
15- 15	Current value of T8(mode 7)
Range	【0~9999】

15-16	Current value of C1
15-17	Current value of C2
15-18	Current value of C3
15-19	Current value of C4
15-20	Current value of C5
15-21	Current value of C6
15-22	Current value of C7
15-23	Current value of C8
Range	【0~65535】






15-24	Current value of AS1
15-25	Current value of AS2
15-26	Current value of AS3
15-27	Current value of AS4
15-28	Current value of MD1
15-29	Current value of MD2
15-30	Current value of MD3
15-31	Current value of MD4
15-32	Current value of TD
Range	【0~65535】

※ Note: TD(15-32) displays the current value of the current PLC program execution time spent in units of μs .

4.4 Specification Description on Built-in PLC Function



E510 can download Ladder Diagram from PC (Windows base software) or PDA (WinCE base software). Namely, it has ease built-in PLC function.

4.4.1 Basic Instruction





				P			NO / NC
Input Instruction					l	i	I1~I6 / i1~i6
Output Instruction	Q	Q	Q	Q	Q	q	Q1~Q2 / q1~q2
Auxiliary Instruction	M	M	M	M	M	m	M1~MF / m1~mF
Special Register							V1~V7
Counter Instruction	C				C	c	C1~C8 / c1~c8
Timer Instruction	T				T	t	T1~T8 / t1~t8
Analog Comparing Instruction	G				G	g	G1~G8 / g1~g8
Encoder Comparing Instruction	F				F	f	F1~F8 / f1~f8
ADD-DEC Instruction	AS						AS1~4
Mul-DIV Instruction	MD						MD1~4

Description for Special Register

V1 : Setting Frequency	Range: 0.1~650.0Hz
V2 : Operation Frequency	Range: 0.1~650.0Hz
V3 : AI1 Input Value	Range: 0~1000
V4 : AI2 Input Value	Range: 0~1000
V5 : Keypad VR Input Value	Range: 0~1000
V6 : Operation Current	Range: 0.1~999.9A
V7 : Torque Value	Range: 0.1~200.0%

	Upper differential	Lower differential	Other Instruction Symbol
Differential Instruction	D	d	
SET Instruction			
RESET Instruction			
P Instruction			P

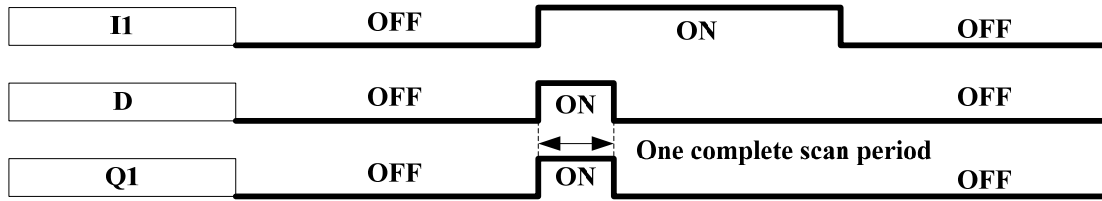
Open circuit (On status)	“ “	
Short circuit (Off status)	“ -- ”	

Connection symbol	Description
	Connecting left and right Components
	Connecting left, right and upper Components
	Connecting left, right, upper and lower Components
	Connecting left, right and lower Components

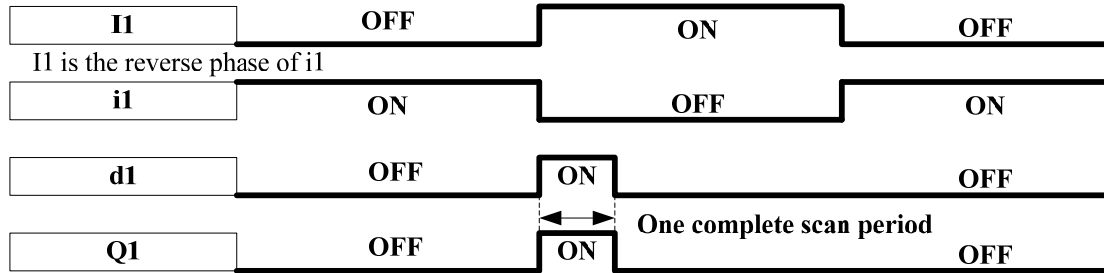
4.4.2 Function of Basic Instruction

◎ Function D (d) Command

Sample 1: I1 - D - [Q1

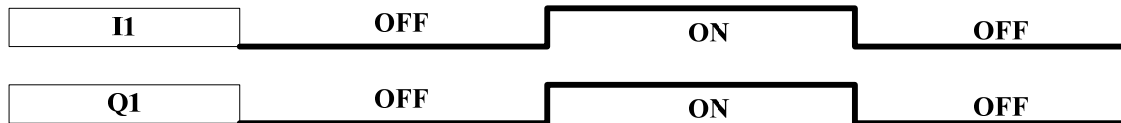


Sample 2: i1 - d - [Q1



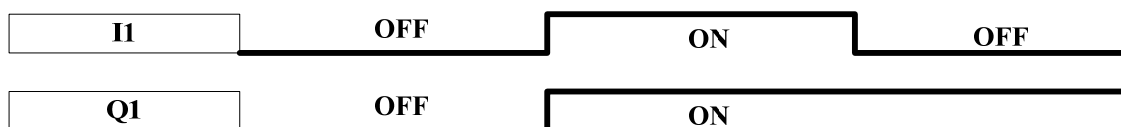
◎ ◎ NORMAL (- [] Output

I1 - [Q1



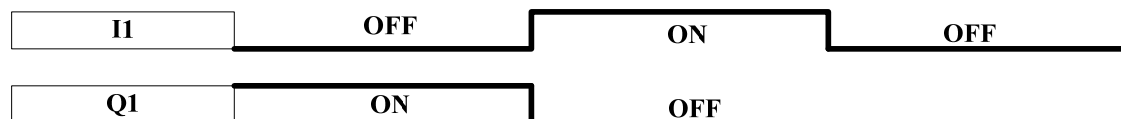
◎ SET (^) Output

I1 - ^ Q1



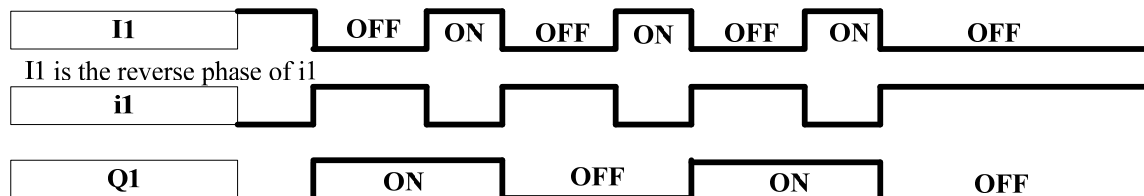
◎ RESET (v) Output

I1 - v Q1



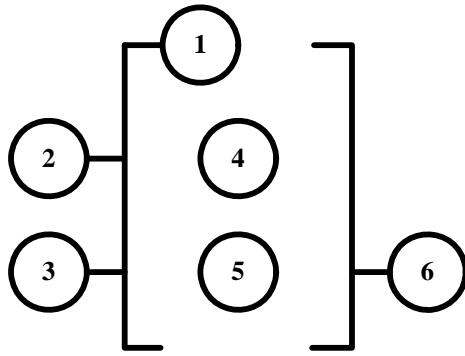
◎ P Output

i1 - PQ1



4.4.3 Application Instructions

1. Counter



Symbol	Description
①	Counting Mode (1-4)
②	Use (I1 ~ f8) to set counting up or counting down
	OFF: counting up (0, 1, 2, 3, 4....) ON : counting down (...3, 2, 1, 0)
③	Use (I1 ~ F8) to RESET the counting value
	ON : the counter is initialized to zero and⑥OFF OFF: the counter continues to count
④	Present Counting Value
⑤	Target (Setting) Value(AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7,count)(0~65535)
⑥	Code of the counter (C1 ~ C4 total: 4 groups).

Mode 1:

The count value is locked to the set value, Off electricity didn't keep

Mode 2:

Count value unlocked, Off electricity didn't keep

Mode 3:

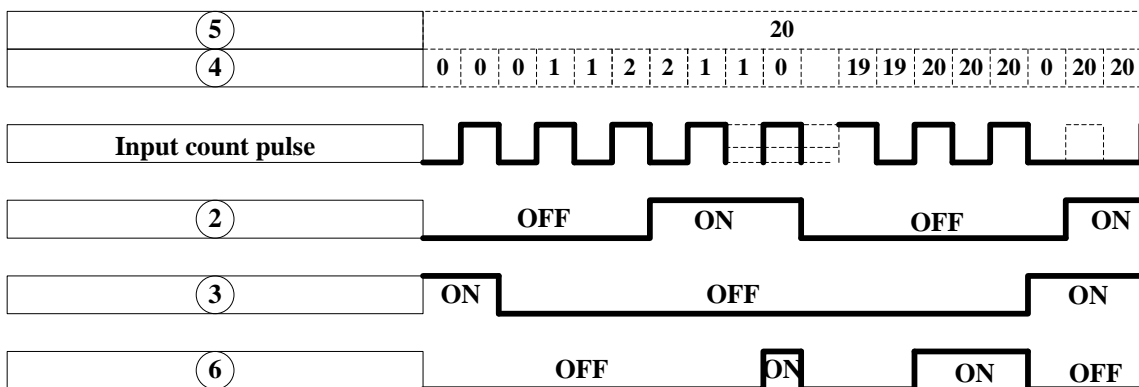
Count value locked, Off electricity keep

Mode 4:

Count value unlocked, Off electricity keep

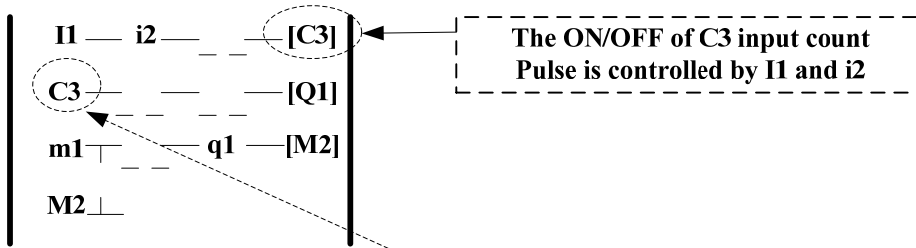
(1) Counter Mode 1

① =1

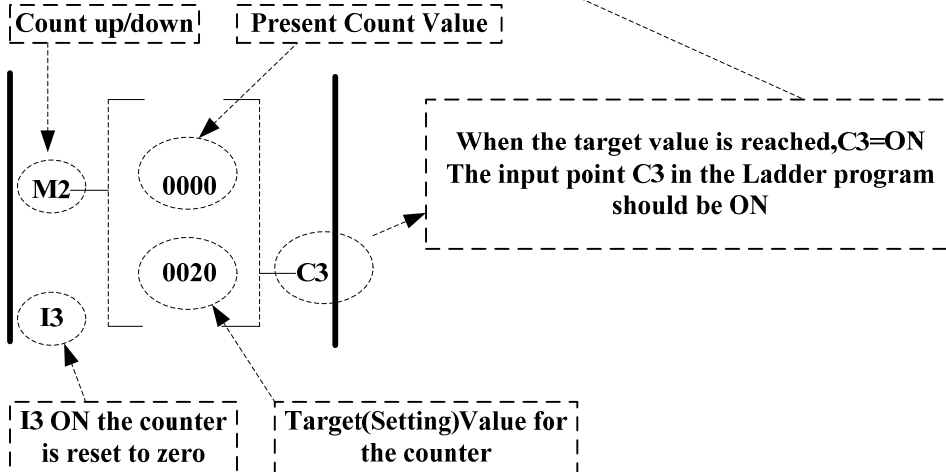


Sample:

Input under the Ladder Program Mode

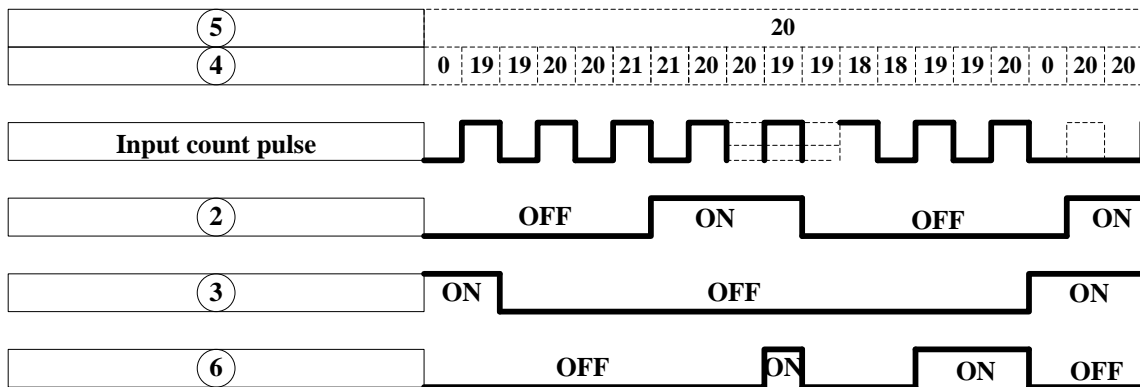


Input under the function Program Mode



(2) Counter Mode 2

① =2



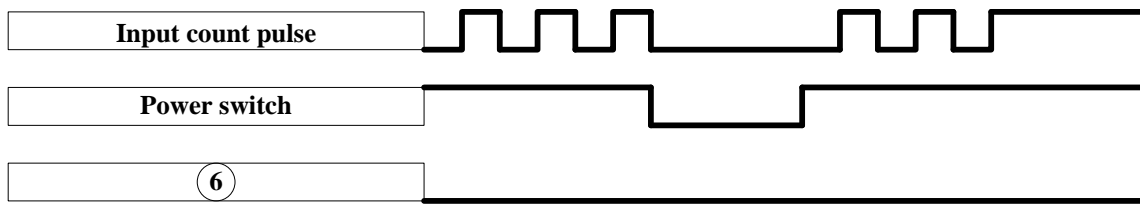
Note:

※Under this Mode, the counting present value appeared will be greater than 20, unlike the Mode 1 in which the value is locked at 20.

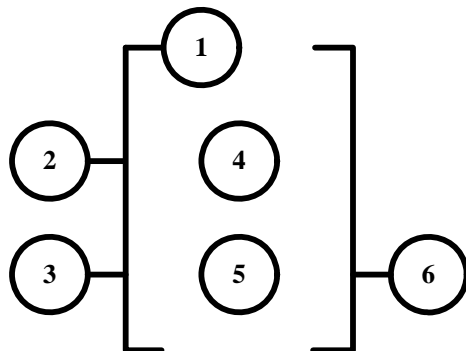
(1) The counter Mode 3 is similar to the counter Mode 1 except that the former can memory the recorded value after the power is cut off and continued counting when the power is turned on at the next time

(2) The counter Mode 4 is similar to the counter Mode 2 except that the former can memory the recorded value after the power is cut off and continued counting when the power is turned on at the next time.

⑤	20												
④ Mode1&2	1	1	2	2					0	1	1	2	2
④ Mode3&4	1	1	2	2	3				3	4	4	5	5

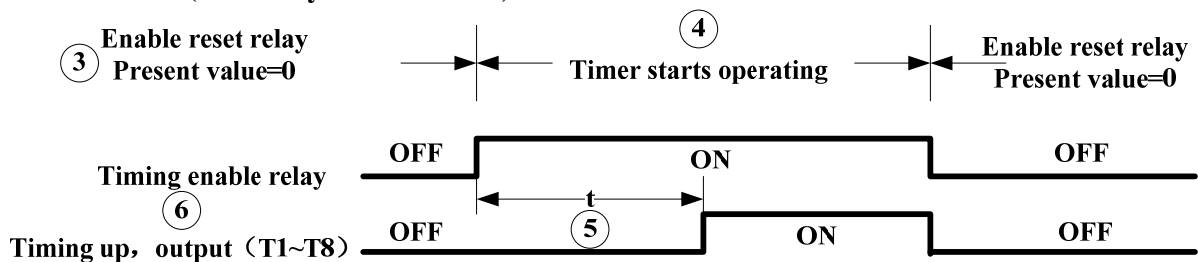


2. Timer



Symbol	Description
①	Timing Mode (1-7)
②	Timing unit: 1: 0.0 – 999.9 sec
	2: 0 – 9999 sec
	3: 0 – 9999 min
③	Use (I1 ~ f8) to RESET the timing value. ON: the counter is reset to zero and ⑥ OFF OFF: the counter continues to count
	④ Present Timing Value
⑤	Target (setting) Timing Values(AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7,count)
⑥	The code of the Timer (T1 ~T8 total: 8 groups).

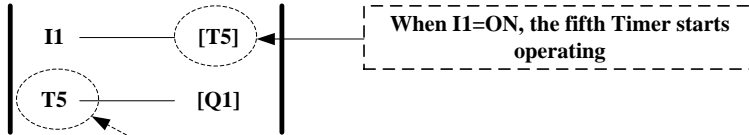
(1) Timer Mode 1(ON-Delay Timer Mode1)



t=Target value set in the timer

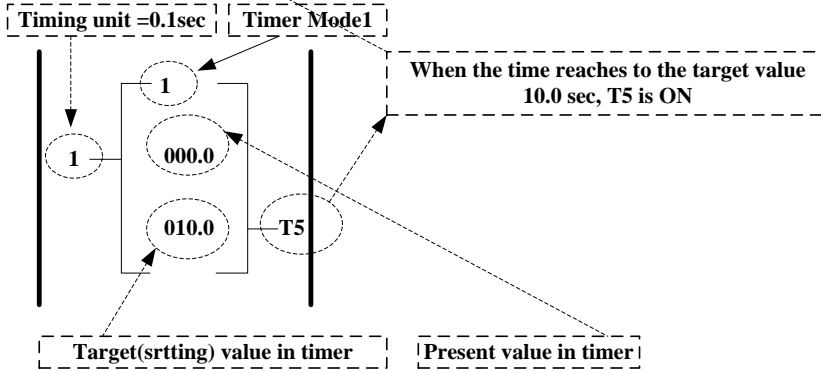
Sample:

Input under the Ladder Program Mode

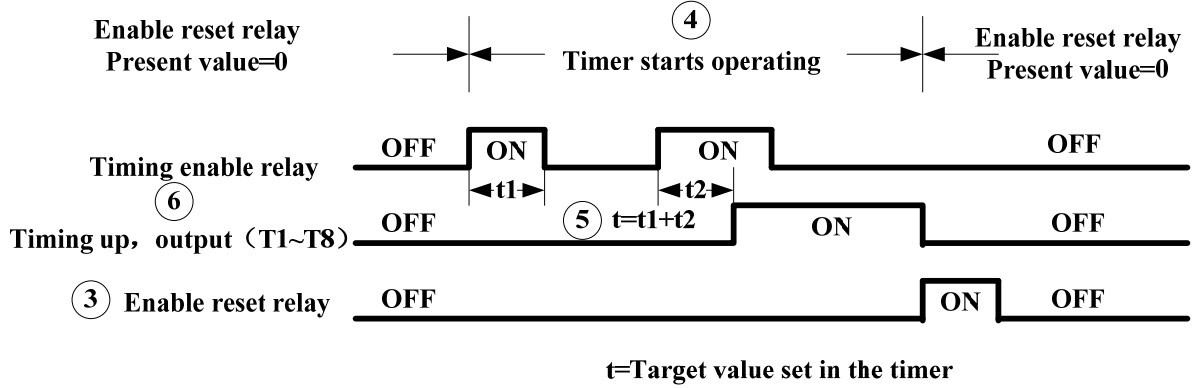


When I1=ON, the fifth Timer starts operating

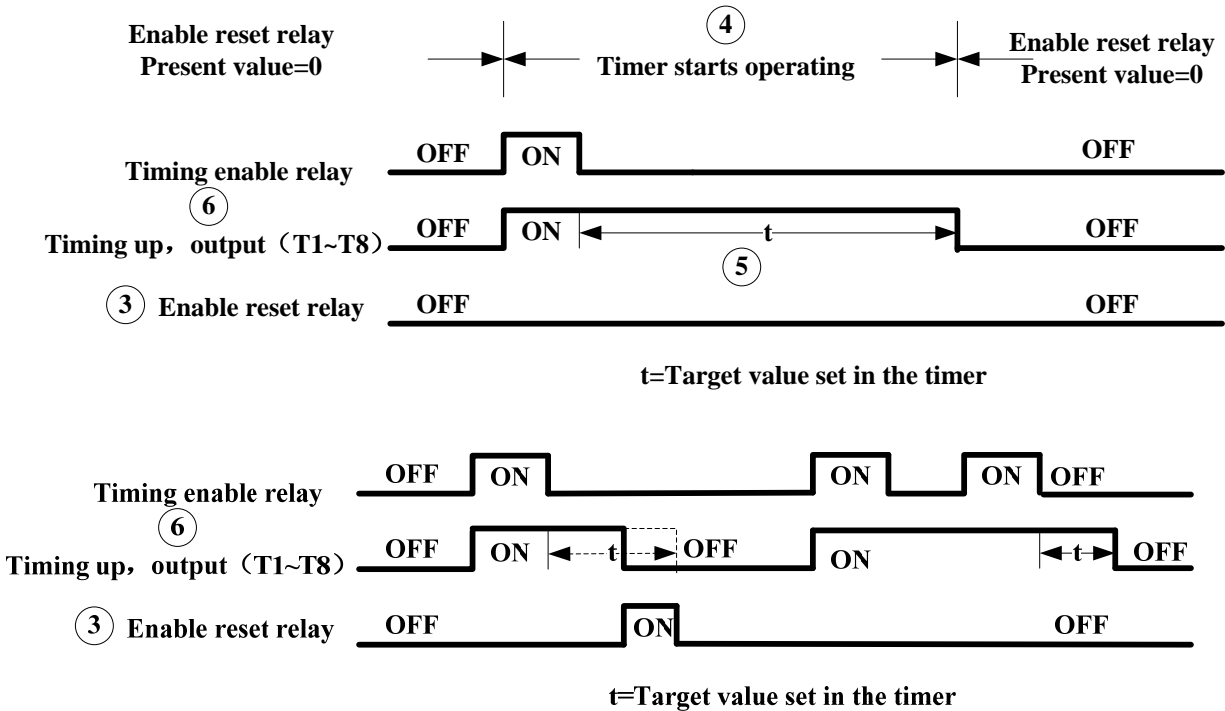
Input under function Program Mode



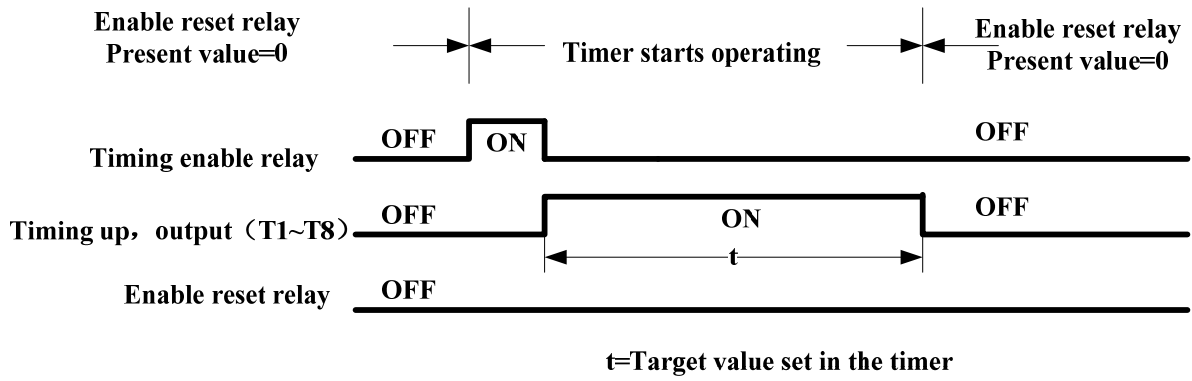
(2) Timer Mode 2(ON-Delay Timer Mode2)



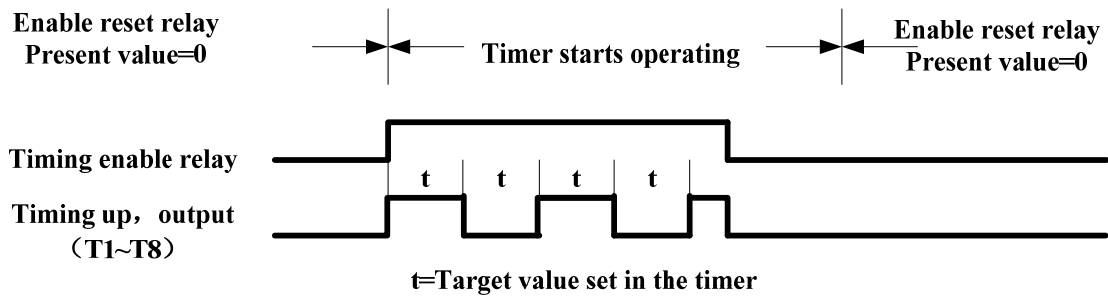
(3) Timer Mode 3 (OFF-Delay Timer Mode1)



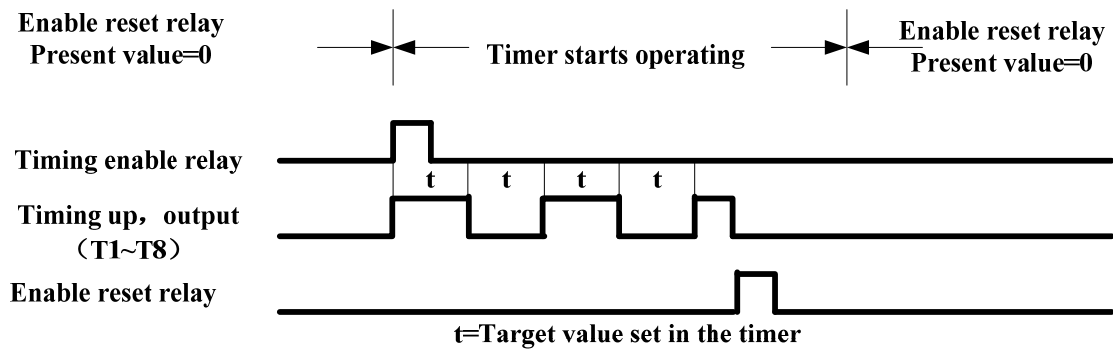
(4) Timer Mode 4(OFF-Delay Timer Mode2)



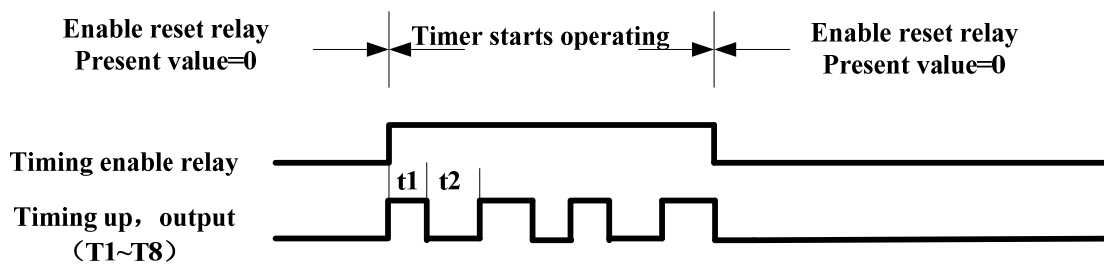
(5) Timer Mode 5 (FLASH Timer Mode 1)



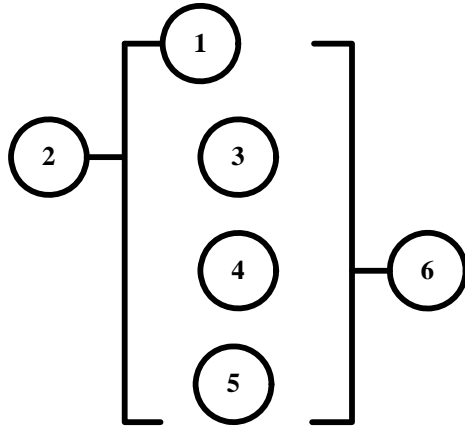
(6) Timer Mode 6(FLASH Timer Mode 2)



(7) Timer Mode 7 (FLASH Timer Mode 3)



3. Analog comparator

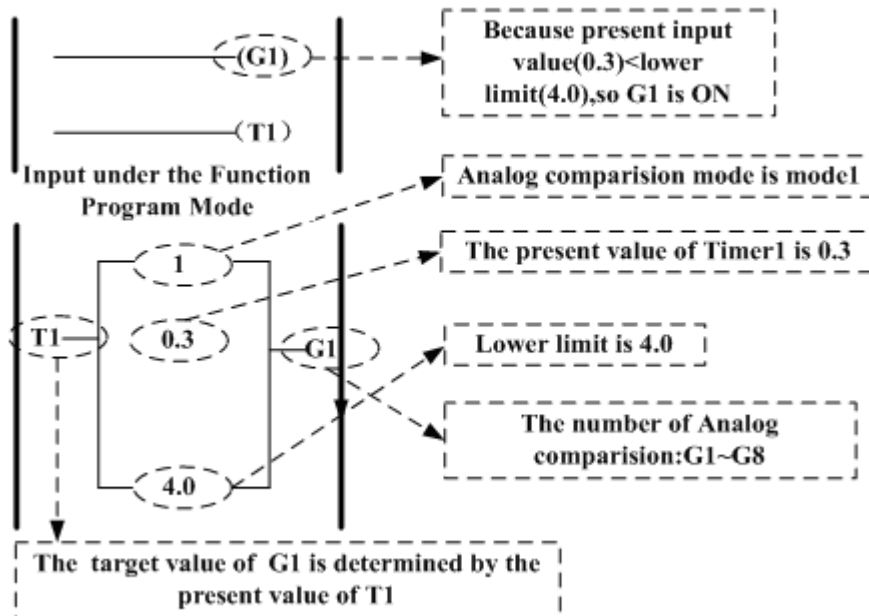


Symbol	Description
①	Analog comparison mode (1-3)
②	Selection of the input comparison value (AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7)
③	Setting reference comparison value (up limit)
④	Setting reference comparison value (Upper Limit) (AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7,count)
⑤	Setting reference comparison value (Lower Limit) (AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7,count)
⑥	Output terminals of analog comparator(G1~G4)

Analog Comparison Mode (1-3)

(1) Analog comparator mode 1 (③ ≤ ⑤, ⑥ ON)

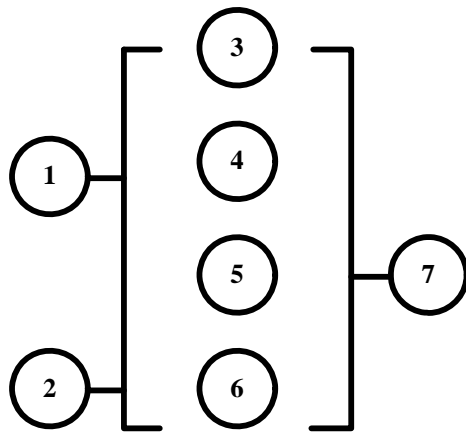
Input under the Ladder Program Mode



(2) Analog comparator mode 2 (③ ≥ ④, ⑥ ON)

(3) Analog comparator mode 3 (⑤ ≤ ③ ≤ ④, ⑥ ON)

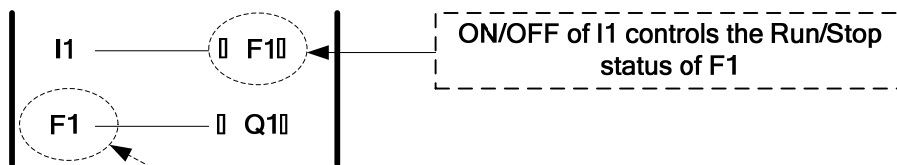
4. Running Instruction



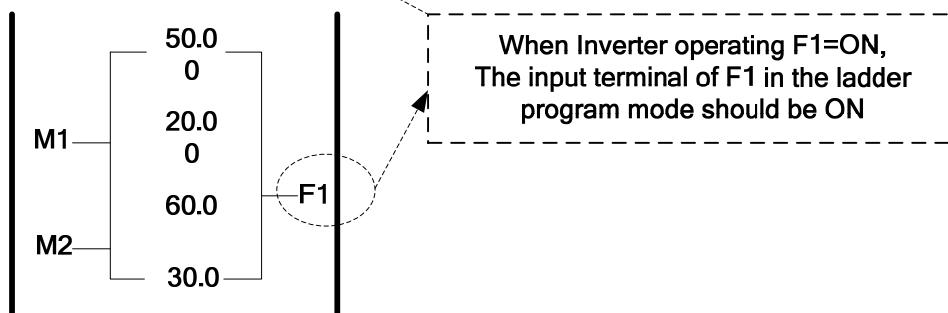
Symbol	Description
①	Running mode could be set via I1~f8 OFF: (FWD) ON: (REV)
②	Preset Speed could be set via I1~f8 OFF: Operating at the frequency set on ③ ON: Operating at the frequency set on ④
③	Selected frequency for constant or V3, V4, V5
④	Selected Preset frequency for constant or V3, V4, V5
⑤	Acceleration Time (ACC Time)
⑥	Deceleration Time(DEC Time)
⑦	Instruction code of operation (F1~F8, Total: 8Groups)

Sample:

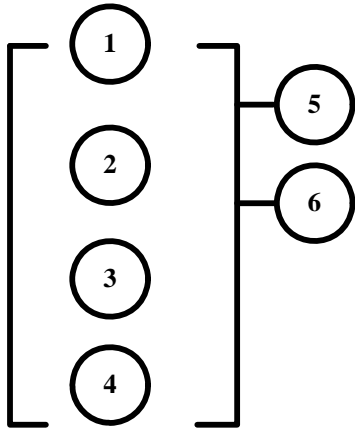
Input under the Ladder Program Mode



Input under the Function Program Mode



5. ACC- DEC module

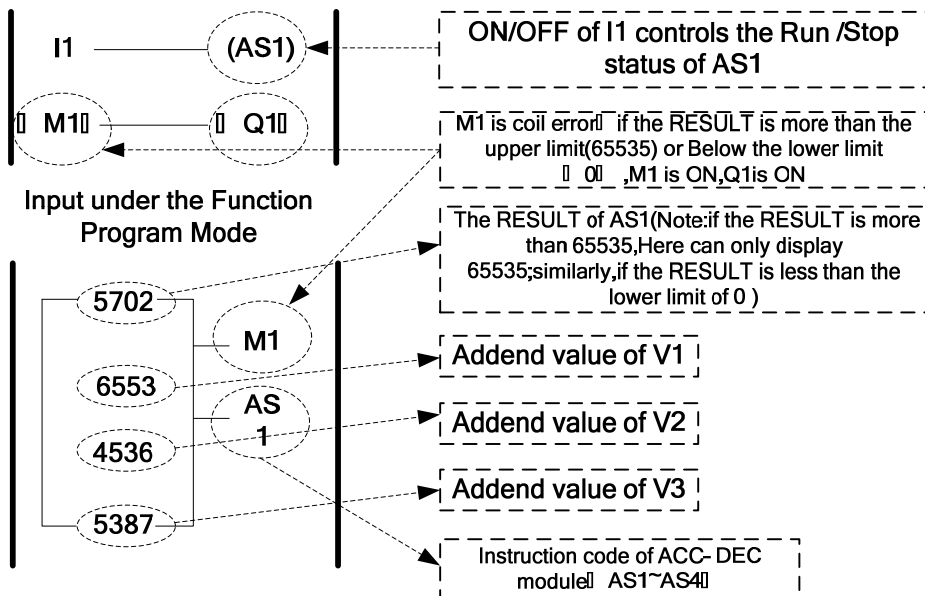


symbol	Description
①	Calculation results RESULT
②	addend V1(AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7, constant)
③	addend V2(AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7, constant)
④	filamentous V3(AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7, constant)
⑤	Error signal coil output (NOP /M1~MF)
⑥	Instruction code of ACC- DEC module

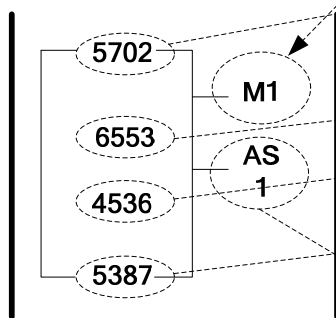
RESULT= V1+V2-V3

Sample:

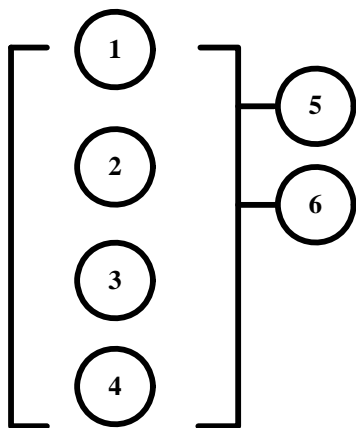
Input under the Ladder Program Mode



Input under the Function Program Mode



6. MUL- DIV module

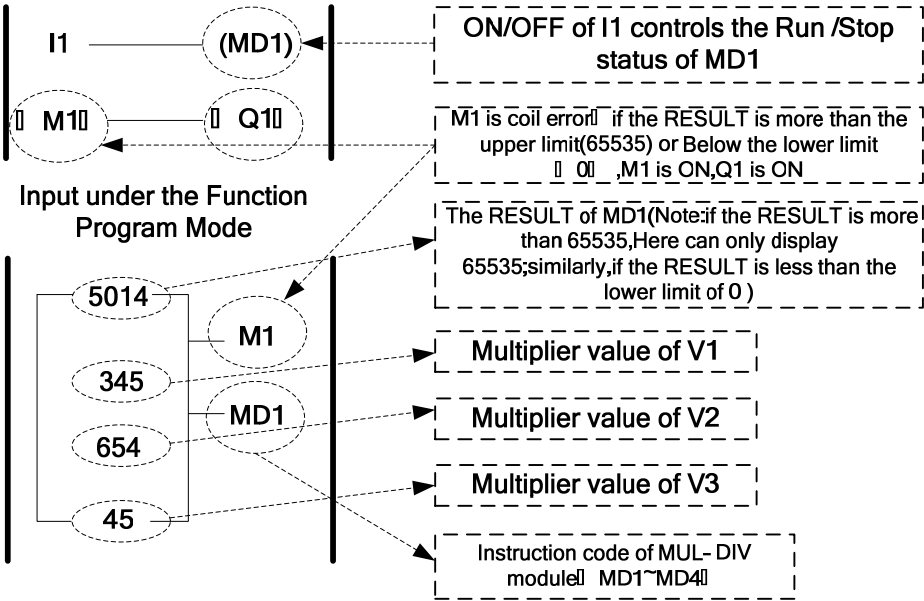


symbol	Description
①	Calculation results RESULT
②	multiplierA(AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7, constant)
③	multiplierB (AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7, constant)
④	divisor (AS1~AS4,MD1~MD4,T1~T8,C1~C8,V1~V7, constant)
⑤	Error signal coil output (NOP /M1~MF)
⑥	Instruction code of MUL- DIV module

$RESULT = V1 * V2 / V3$

Sample:

Input under the Ladder Program Mode



Chapter 5 Troubleshooting and Maintenance

5.1 Error display and corrective action

5.1.1 Manual Reset and Auto-Reset

Faults which can not be recovered manually			
Display	content	Cause	Corrective action
-OV- -OU-	Voltage too high when stopped	Detection circuit malfunction	Return the inverter
-LV- -LU-			
-OH- -OH-	The inverter is overheated when stopped	1. Detection circuit malfunction 2. Ambient temperature too high or bad ventilation	1. Return the inverter 2. Improve ventilation conditions
EPr EPr			
COt COt	Communication error	Communications disruption	Check the wiring
CtEr CtEr			
Faults which can be recovered manually and automatically			
Display	content	Cause	Corrective action
OC-A OC-A	Over-current at acceleration	1. Acceleration time too short 2. The capacity of the motor exceeds the capacity of the inverter 3. Short circuit between the motor coil and the case 4. Short circuit between motor wiring and ground 5. the IGBT module damaged	1. Set a longer acceleration time 2. Replace inverter with one that has the same rating as that of the motor 3. Check the motor 4. Check the wiring 5. Replace the IGBT module
OC-C OC-C			
OC-d OC-d	Over-current at deceleration	The preset deceleration time is too short.	Set a longer deceleration time
OC-S OC-S	Over current at start	1. Short circuit between the motor coil and the case 2. Short circuit between motor coil and ground 3. the IGBT module damaged	1. Inspect the motor 2. Inspect the wiring 3. Replace the transistor module
OV-C OU-C			
OV-C OU-C	Excessive Voltage during operation/ deceleration	1. Deceleration time setting too short or excessive load inertia 2. Power voltage varies widely	1. Set a longer deceleration time 2. Add a brake resistor or brake module

		(fluctuates)	3.Add a reactor at the power input side
Err4	CPU Illegal interrupt	External noise	If often occurs, please contact the company
Err4			
PF	Input lacking phase	Abnormal fluctuations in the main circuit voltage	1. Check the main circuit power supply wiring is disconnected or the connection error occurred 2. Check whether the terminals are loose Check the power supply voltage
PF			
ud-C	Low current detection	Input current < Low current detection level	Setting level according to the actual situation
ud-C			
LF	output lacking phase	Occurrence of lacking phase at Inverter output side	(1) Check Output cables wiring is disconnected or the connection error occurred (2) Determining resistance between the lines (3) Check whether the terminals are loose
LF			
Faults which can be recovered manually but not automatically			
Display	content	Cause	Corrective action
OC	Over-current during stop	Detection circuit malfunction	Return the inverter for repair
OC			
OL1	Motor overload	loading too large	Increase the Motor capacity
OL1			
OL2	Inverter overload	Excessive Load	Increase the inverter capacity
OL2			
OL3	Over torque	1. Load too large 2.the setting of (8-15、 8-16) too small	1. Increase the inverter capacity 2. Settings(8-15、 8-16) as needed
OL3			
LV-C	Voltage too low during operation	1.Power voltage too low 2.Power voltage varies widely (fluctuates)	1.Improve power quality 2.Add a reactor at the power input side
LV-C			
OVSP	Motor rotating too fast	Rotation speed and setting value is different too large	1.whether the load is too large 2.whether the setting signal of frequency is correct
OVSP			
LIFE1	The life of the inrush current suppression circuit alarm	Inrush current suppression circuit is damaged	Return the inverter for repair
LIFE1			
LIFE2	The life of Capacitor Control Circuit alarm	Capacitor Control Circuit is damaged	Return the inverter for repair
LIFE2			
LIFE3	The life of Capacitor Main Circuit alarm	Capacitor Main Circuit is damaged	Return the inverter for repair
LIFE3			

5.1.2 Keypad Operation Error Instruction

Display	content	Cause	Corrective action
LOC	1. Parameter already locked 2. Motor direction locked 3. Parameter password(13 - 07) enabled	1. Attempt to modify frequency parameter while 13-06>0. 2. Attempt to reverse direction when 11- 00=1 3. Parameter (13 - 07) enabled, set the correct password will show LOC.	1. Adjust 13-06 2. Adjust 11-00
Err1	Keypad operation error	1. Press ▲ or ▼ while 00-05/00-06>0 or running at preset speed. 2. Attempt to modify the Parameter. Can not be modified during operation (refer to the parameter list).	1. The ▲ or ▼ is available for modifying the parameter only when 00-05/00-06=0 2. Modify the parameter in STOP mode.
Err2		Parameter setting error	1. 00-13 is within the range of (11-08 ± 11-11) or (11-09 ± 11-11) or (11-10 ± 11-11) 2. 00- 12 ≤ 00-13
Err5	Modification of parameter is not available in communication	1. Control command sent during communication. 2. Attempt to modify the function 09-02 ~ 09-05 during communication	1. Issue enable command before communication 2. Set parameters 09-02 ~ 09-05 function before communication
Err6		Communication failed	1. Wiring error 2. Communication parameter setting error. 3. Incorrect communication protocol
Err7	Parameter conflict	1. Attempt to modify the function 13-00/13-08. 2. Voltage and current detection circuit is abnormal.	If Reset is not possible, please Return the inverter.
Err7			

5.1.3 Special conditions

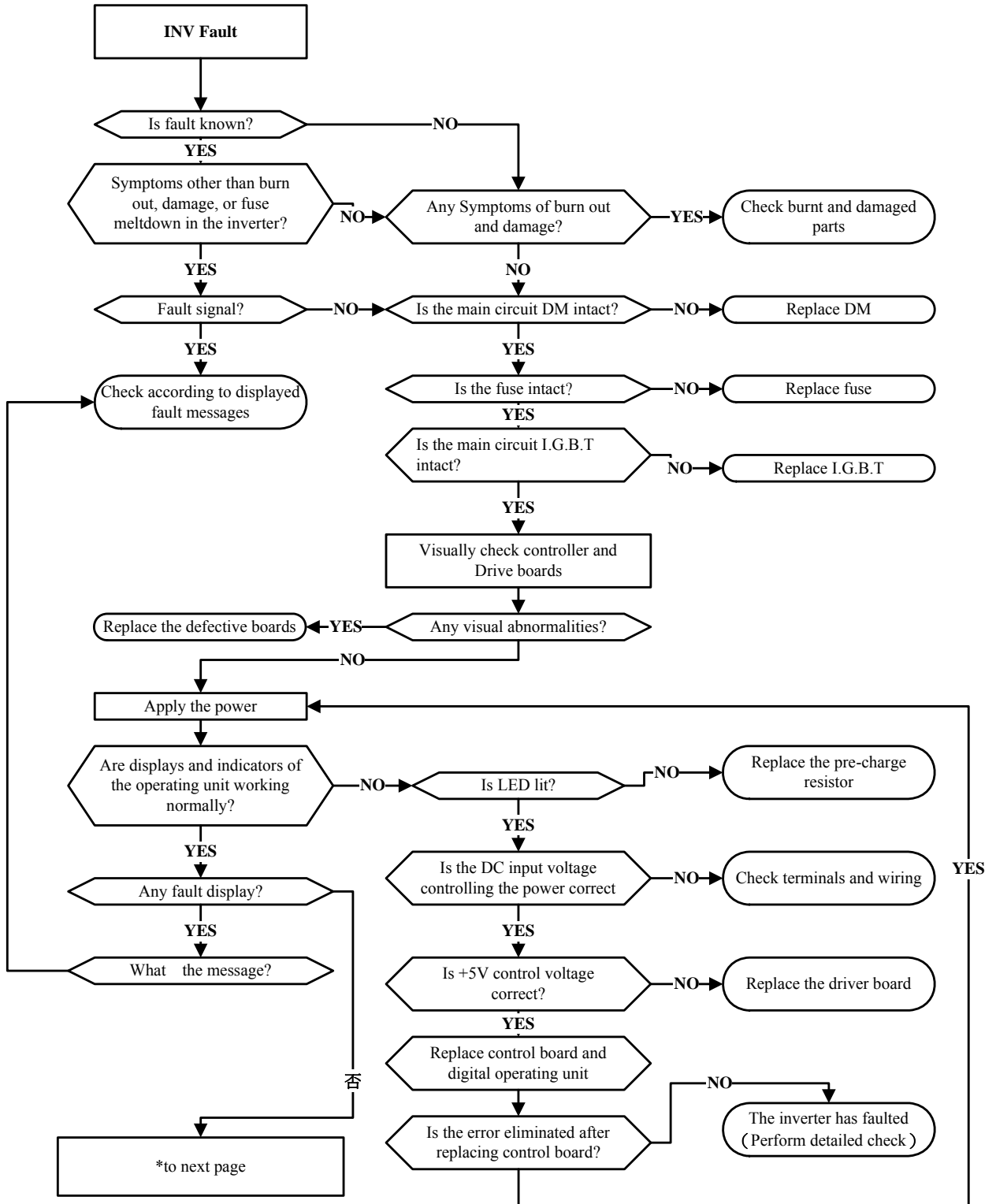
Display	Fault	Description
StP0 StP0	Zero speed at stop	Occurs when preset frequency <0.1Hz
StP1 StP1	Fail to start directly On power up.	If the inverter is set for external terminal control mode (00-02/00-03=1) and direct start is disabled (07-04=1) The inverter cannot be started and will flash STP1. The run input is active at power-up, refer to descriptions of (07-04).
StP2 StP2	Keypad Stop Operated when inverter in external Control mode.	If the Stop key is pressed while the inverter is set to external control mode (00-02/00-03=1) then 'STP2' flashes after stop. Release and re-activate the run contact to restart the inverter.
E.S. E.S.	External Rapid stop	The inverter will decelerate to stop and then flash E.S., when input external Rapid stop signal via the multifunctional input terminal activates
b.b. b.b.	External base block	The inverter stops immediately and then flashes b.b., when external base block is input by the multifunctional input terminals.
PdEr PdEr	PID feedback loss	PID feedback loss detect
AtEr AtEr	Parameter self-learning error	(1) Motor nameplate Input errors, leading the failure of automatic parametric detection (2) emergency stop in executive Parameter self-learning

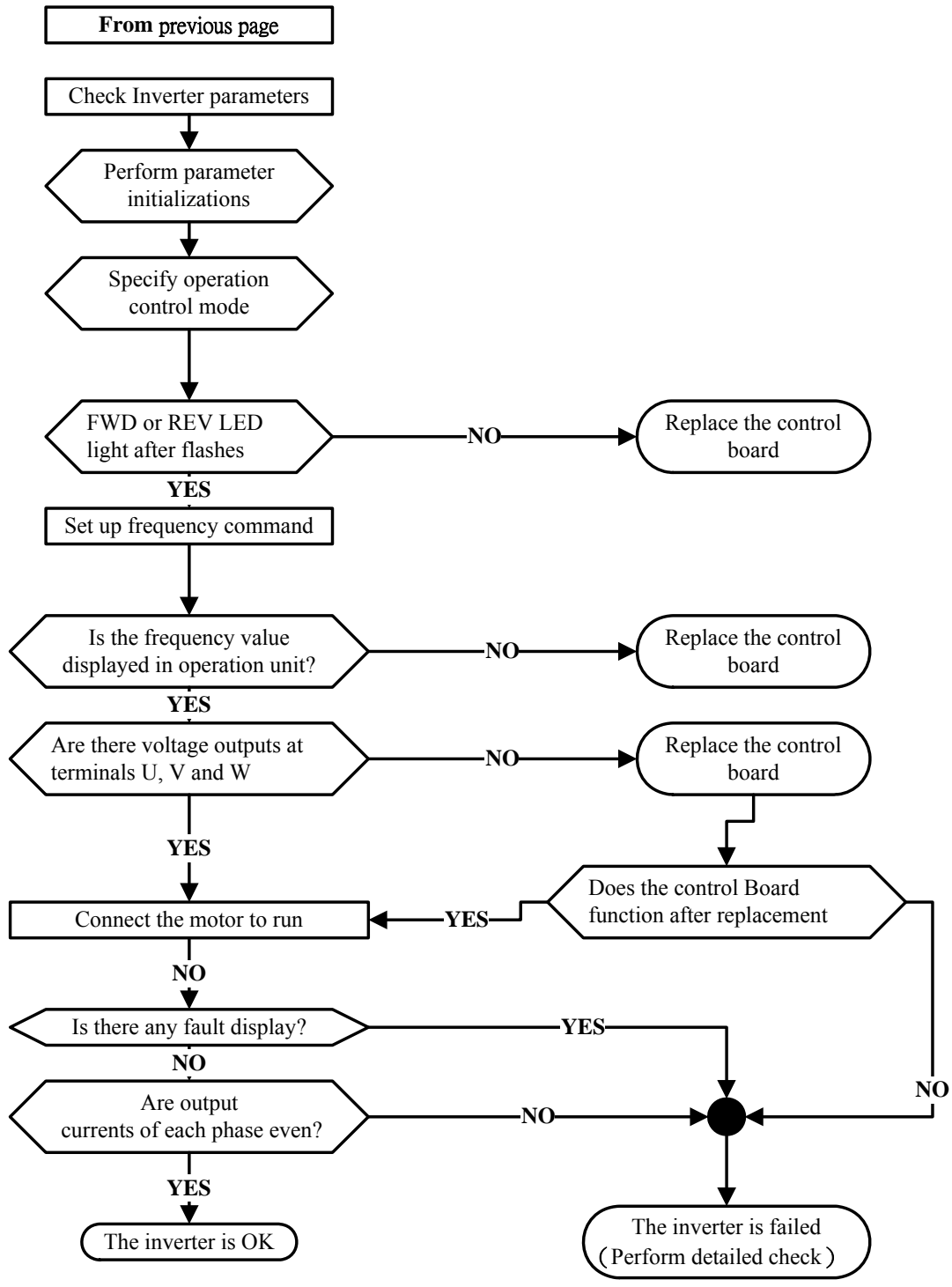
5.2 General troubleshooting

Status	Checking point	Remedy
Motor runs in wrong direction	Are wiring for output terminals is correct?	Wiring must match U, V, and W terminals of the motor.
	Are wiring for forward and reverse signals correct?	Check for correct wiring.
The motor speed can not be regulated.	Is the wiring for the analog frequency inputs correct?	Check for correct wiring.
	Is the setting of operation mode correct?	Check the operation mode of the operator.
	Is the load too excessive?	Reduce the load.
Motor running speed too high or too low	Check the motor specifications (poles, voltage...) correct?	Confirm the motor specifications.
	Is the gear ratio correct?	Confirm the gear ratio.
	Is the setting of the highest output frequency correct?	Confirm the highest output frequency
Motor speed varies unusually	Is the load too excessive?	Reduce the load.
	Does the load vary excessively?	Minimize the variation of the load. • Increase capacities of the inverter and the moto
	Is the input power erratic or is a phase loss occurring?	1. Add an AC reactor at the power input side if using single-phase power 2. Check wiring if using three-phase power
Motor can not run	Is power applied to L1, L2, and L3 terminals (is the charging indicator lit)?	1 Is the power applied 2. Turn the power OFF and then ON again. 3. Make sure the power voltage is correct 4. Make sure screws are secured firmly
	Is there voltage across the output terminals T1, T2, and T3?	Turn the power OFF and then ON again.
	Is overload causing the motor to stall?	Reduce the load so the motor will run.
	Are there any abnormalities in the inverter?	See error descriptions to check wiring and correct if necessary.
	Is forward or reverse run command issued?	
	Has the analog frequency signal been input?	1. Is analog frequency input signal wiring correct? 2. Is voltage of frequency input correct?
	Is the operation mode setting correct?	Operate through the digital keypad

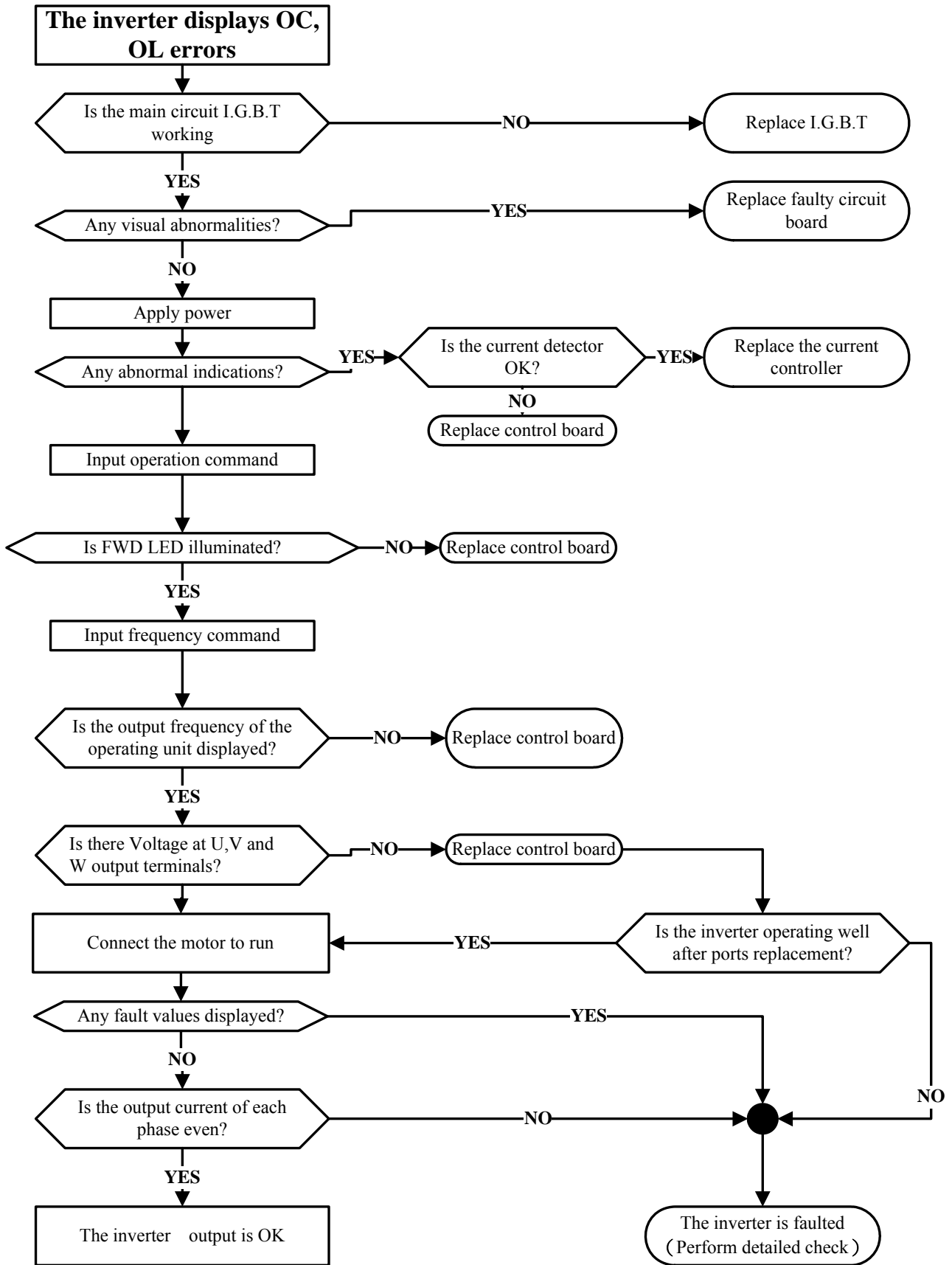
5.3 Troubleshooting of INV

5.3.1 Quick troubleshooting of INV

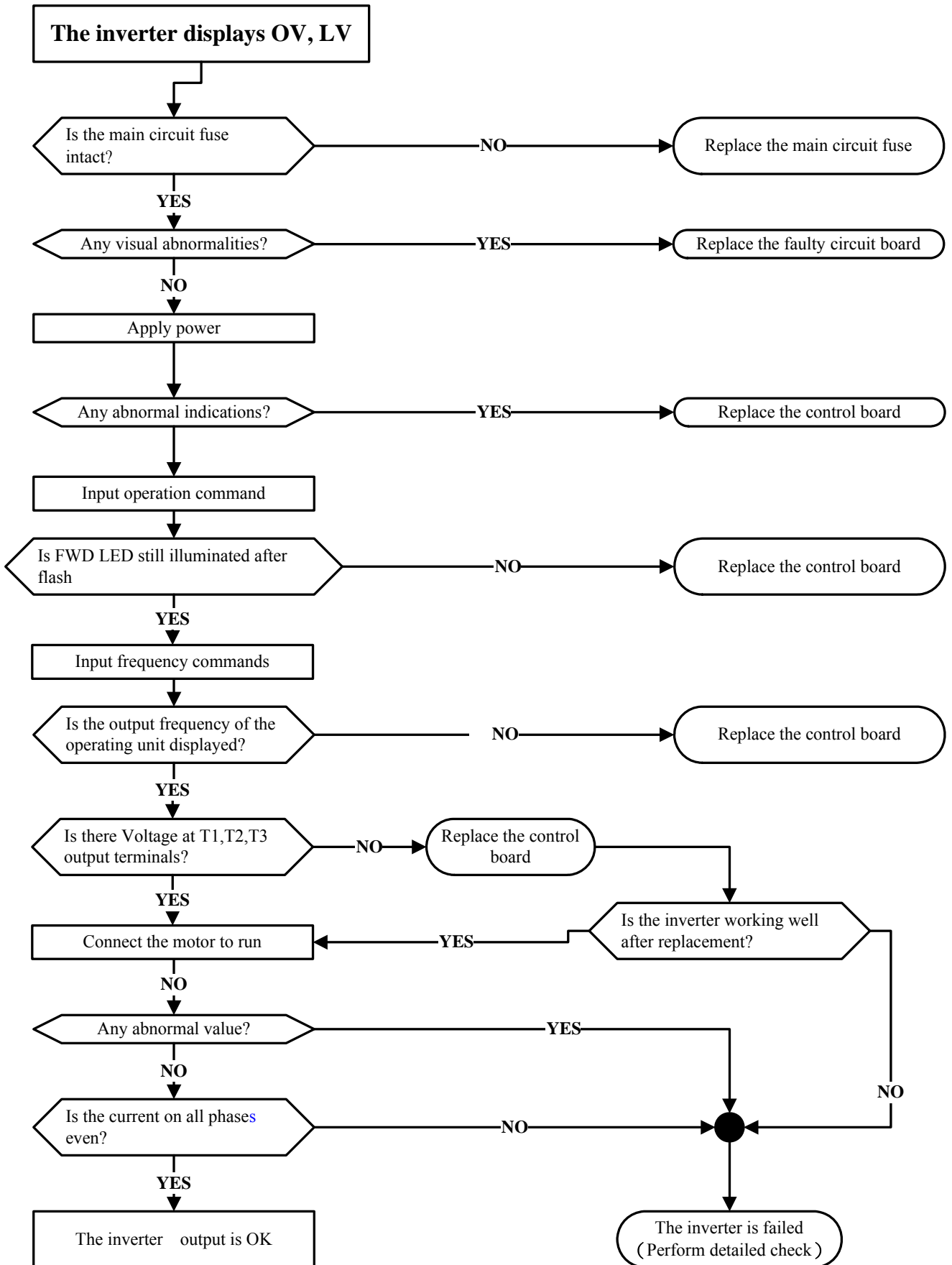




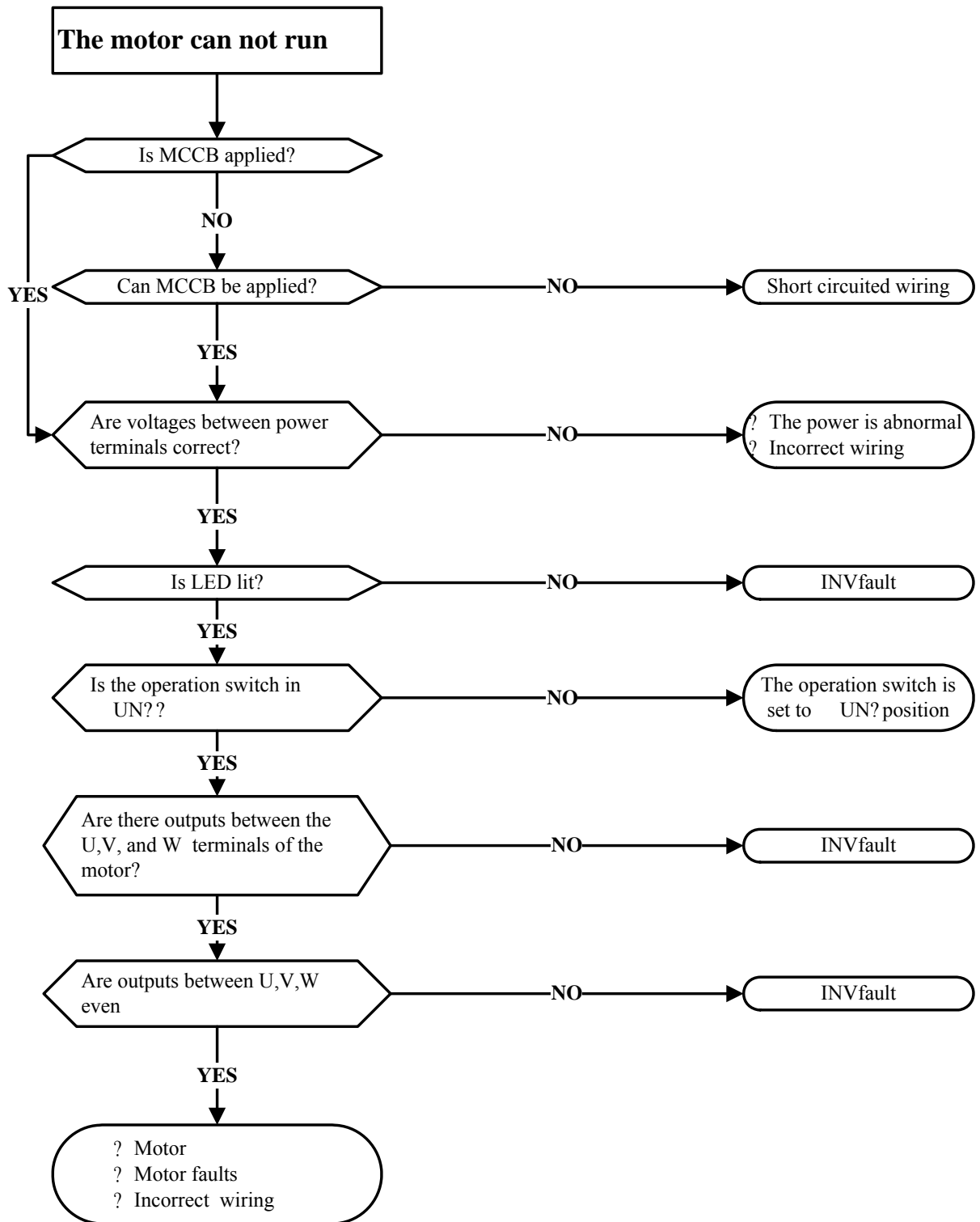
5.3.2 Troubleshooting for OC, OL error displays



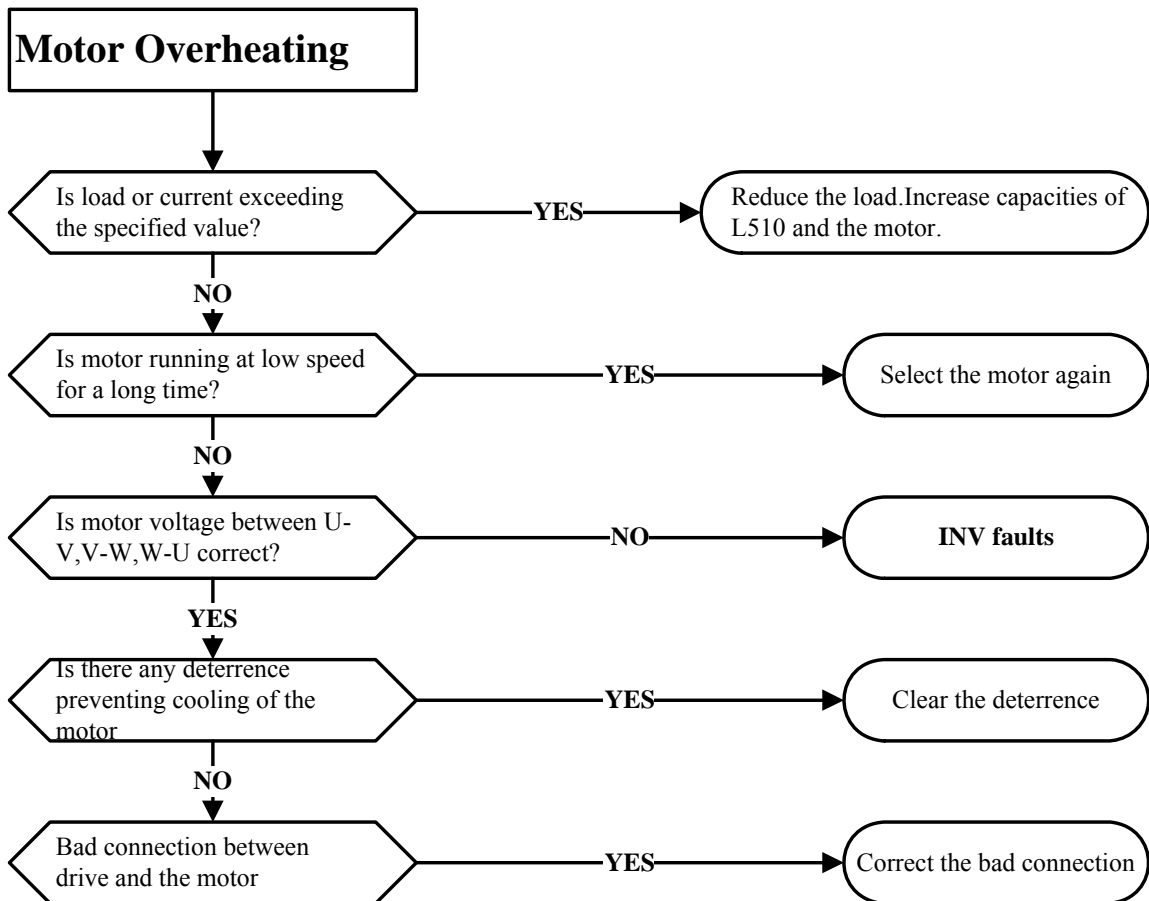
5.3.3 Troubleshooting for OV, LV error



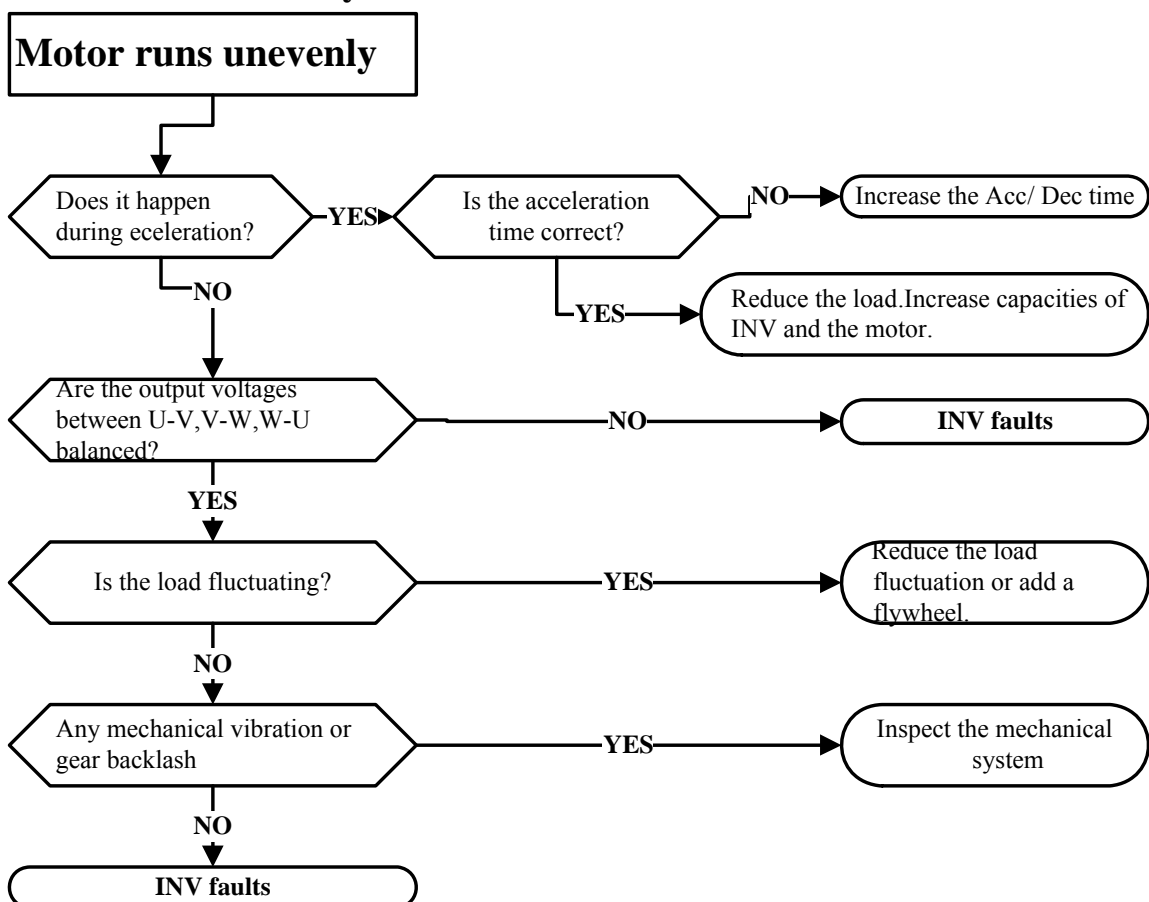
5.3.4 The motor can not run



5.3.5 Motor Overheating



5.3.6 Motor runs unevenly



5.4 Routine and periodic inspection

To ensure stable and safe operations, check and maintain the inverter at regular intervals.

The table below lists the items to be checked to ensure stable and safe operations. Check these items 5 minutes after the “Charge” indicator goes out to prevent injury to personnel by residual electric power.

Items	Details	Checking period		Methods	Criteria	Remedies
		Daily	1Year			
Environment						
Ambient conditions around the machine	Confirm the temperature and humidity at the machine	○		Measure with thermometer and hygrometer	Temperature: -10 – 40oC (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	Keep area clear	Secure screws
	Is the grounding resistance correct?		○	Measure the resistance with a multi-tester	200Vclass: below 100Ω	Improve the grounding
External terminals						
External terminals	Are secure parts loose?		○	Visual check	Secure terminals and no rust	Secure or send back for repair
	Is the terminal base damaged?		○	Check with a screwdriver		
	Visual rust stains present?		○			
internal mounting screws of the inverter	Any unusual bends or breaks?		○	Visual check	No abnormalities	Replace or send back for repair
	Any damage of the wire insulation?		○			
voltage						
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
Circuit boards and components						
Printed circuit board	Excessive conductive metal shavings or oil sludge		○	Visual check	No abnormalities	Clean or replace the circuit board
	Discolored, overheated, or burned parts		○			
Capacitor	Any unusual odor or leakage	○		Visual check	No abnormalities	Replace capacitor or inverter
	Any deformity or protrusion	○				
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
Peripheral device						
Rheostat	Whether something smells stench or insulator breaks		○	Nose, Visual check	No abnormalities	Replacement rheostat
	Whether rheostat wiring or connector are damaged		○	Visual check	No abnormalities	
Electromagnetic Contactor	Whether contact with the connector is normal	○			No abnormalities	Replacement Contactor
	Unusual vibration and noise	○		hearing check	No abnormalities	
Reactor	Is there any unusual smell or sound	○		Nose, hearing check	No abnormalities	Replacement Reactor

Cooling System						
Cooling fan	Unusual vibration and noise		○	Visual or hearing check	No abnormalities	Replace the cooling fan
	Excessive dust or debris	○		Visual check	No abnormalities	Clean fan
Heat sink	Excessive dust or debris	○		Visual check	No abnormalities	Clean up debris or dust
Ventilation Road	Is the entrance or exit of the ventiduct choked by something	○		Visual check	No abnormalities	Clean

5.5 Maintenance

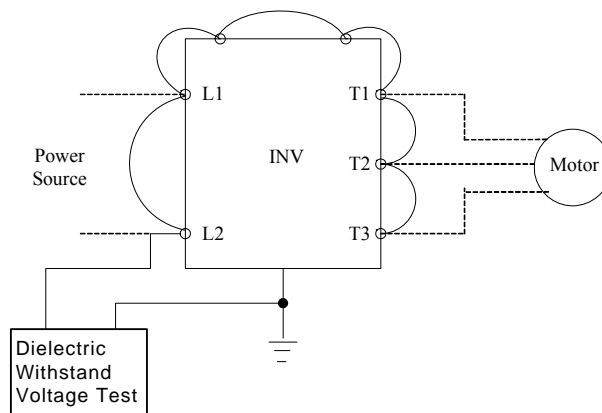
To ensure long-term reliability, follow the instructions below to perform regular inspection. Turn the power off and wait for the charge indicator (LED) to go out before inspection to avoid potential shock hazard from the charge stored in high-capacity capacitors.

1. Maintenance projects as follow

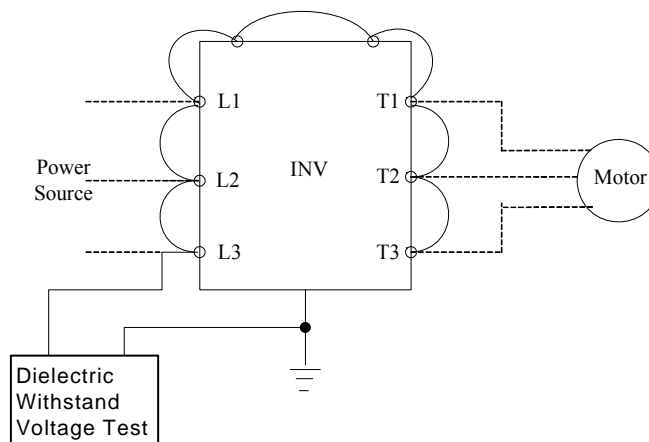
➤ Ensure that temperature and humidity around inverters is suitable, and there is good ventilation, also keeps away from heat sources
➤ Check the inside of the inverter, replace aged or damaged elements in time.
➤ Clean up the accumulation of any dust inside the inverter.
➤ Check the ground, ensure to connect properly.
➤ Terminal screws must be tight, especially the power input and output of the inverter.
(Do not perform this test against the control circuit.)

2. Method of Dielectric Withstand Voltage Test

Single Phase



Three Phase



Chapter6 Peripherals Components

6.1 Reactor Specifications

Model: E510-□□□-XXX	Specification	
	Current (A)	Inductance (mH)
2P5	5.0	2.1
201	5.0	2.1
202	19.0	1.1
203	25.0	0.71
205	20	0.53
208	30.0	0.35
210	40.0	0.265
215	60	0.18
220	80	0.13

Model: E510-□□□-XXX	Specification	
	Current (A)	Inductance (mH)
401	2.5	8.4
402	5.0	4.2
403	7.5	3.6
405	10	2.2
408	16.0	1.42
410	20.0	1.06
415	30.0	0.7
420	40	0.53
425	50	0.42

6.2 Electromagnetic Contactor and No fuse circuit breaker

Model: E510-□□□-XXX	Molded-case circuit breaker made by TECO	Magnetic contactor (MC) made by TECO
2P5	TO-50E 10A	CN-11
201	TO-50E 20A	
202/203/205	TO-50E 30A	
208	TO-50E 50A	CN-18
210	TO-100S 60A	CN-25
215	TO-100S 100A	CN-50
220	TO-100S 100A	CN-60
401/402/403/405	TO-50E 15A	CN-11
408	TO-50E 20A	CN-16
410	TO-50E 30A	CN-18
415	TO-50E 50A	CN-25
420	TO-100S 50A	CN-35
425	TO-100S 75A	CN-50

6.3 Fuse Specification

Model: E510-□□□-XXX	Fuse types
2P5/201	15A, 600VAC
202/203	20A, 600VAC
205	30A, 600VAC
208/210	60A, 600VAC
215/220	100A,600VAC,100KA I.R.
401/402	5/10A, 600VAC
403/405	15/20A, 600VAC
408/210	40A, 600VAC
415	70A, 600VAC
420	70A,600VAC,100KA I.R.
425	100A,600VAC,100KA I.R.

6.4 Brake Resistance

Model: E510-□□□- XXX	Brake Cell		Horse (HP)	Motor Capacity (KW)	Specification			ED(%)	Brake Torque(%)
	Model	Parallel Number			(W)	(Ω)	Parallel Number		
2P5	-	-	0.5	0.4	60	200	-	8	214
201	-	-	1	0.75	60	200	-	8	117
202	-	-	2	1.5	150	100	-	10	117
203	-	-	3	2.2	200	70	-	9	112
205	-	-	5	3.7	300	40	-	8	117
208	-	-	7.5	5.5	500	25	-	8	123
210	-	-	10	7.5	600	20	-	8	117
215	-	-	15	11	2400	17	-	10	100
220	-	-	20	15	3000	13	-	10	100
401	-	-	1	0.75	60	750	-	8	123
402	-	-	2	1.5	150	400	-	10	117
403	-	-	3	2.2	200	250	-	8	123
405	-	-	5	3.7	300	150	-	8	123
408	-	-	7.5	5.5	500	100	-	8	123
410	-	-	10	7.5	600	80	-	8	117
415	-	-	15	11	1500	40	-	8	149
420	-	-	20	15	1600	50	-	10	100
425	TBU-430	1	25	18.5	4800	32	1	10	120

Appendix: E510 parameter setting list

Customer				Inverter Model			
Site Location				Contact Phone			
Address							
Parameter code	Setting content	Parameter code	Setting content	Parameter code	Setting content	Parameter code	Setting content
00-00		02-08		04-02		05-27	
00-01		02-09		04-03		05-28	
00-02		02-10		04-04		05-29	
00-03		02-11		04-05		05-30	
00-04		02-12		04-06		05-31	
00-05		02-13		04-07		05-32	
00-06		02-14		04-08		05-33	
00-07		02-15		04-09		05-34	
00-08		02-16		04-10		05-35	
00-09		02-17		04-11		05-36	
00-10		02-18		04-12		05-37	
00-11		02-19		04-13		05-38	
00-12		03-00		04-14		05-39	
00-13		03-01		04-15		05-40	
00-14		03-02		05-00		05-41	
00-15		03-03		05-01		05-42	
00-16		03-04		05-02		05-43	
00-17		03-05		05-03		05-44	
00-18		03-06		05-04		05-45	
00-19		03-07		05-05		05-46	
00-20		03-08		05-06		05-47	
01-00		03-09		05-07		05-48	
01-01		03-10		05-08		06-00	
01-02		03-11		05-09		06-01	
01-03		03-12		05-10		06-02	
01-04		03-13		05-11		06-03	
01-05		03-14		05-12		06-04	
01-06		03-15		05-13		06-05	
01-07		03-16		05-14		06-06	
01-08		03-17		05-15		06-07	
01-09		03-18		05-16		06-08	
01-10		03-19		05-17		06-09	
01-11		03-20		05-18		06-10	
01-12		03-21		05-19		06-11	
02-00		03-22		05-20		06-12	
02-01		03-23		05-21		06-13	
02-02		03-24		05-22		06-14	
02-04		03-25		05-23		06-15	
02-05		03-26		05-24		06-16	
02-06		04-00		05-25		06-17	
02-07		04-01		05-26		06-18	

Parameter code	Setting content	Parameter code	Setting content	Parameter code	Setting content	Parameter code	Setting content
06-19		08-05		11-02		14-08	
06-20		08-06		11-03		14-09	
06-21		08-07		11-04		14-10	
06-22		08-08		11-05		14-11	
06-23		08-09		11-06		14-12	
06-24		08-10		11-07		14-13	
06-25		08-11		11-08		14-14	
06-26		08-12		11-09		14-15	
06-27		08-13		11-11		14-16	
06-28		08-14		11-12		14-17	
06-29		08-15		11-13		14-18	
06-30		08-16		11-14		14-19	
06-31		08-17		11-15		14-20	
06-32		09-00		11-16		14-21	
06-34		09-01		11-17		14-22	
06-35		09-02		12-00		14-23	
06-36		09-03		12-01		14-24	
06-37		09-04		12-02		14-25	
06-38		09-05		12-03		14-26	
06-39		09-06		12-04		14-27	
06-40		09-07		12-05		14-28	
06-41		09-08		12-06		14-29	
06-42		09-09		12-07		14-30	
06-43		10-00		12-08		14-31	
06-44		10-01		12-09		14-32	
06-45		10-02		12-10		14-33	
06-46		10-03		12-11		14-34	
06-47		10-04		12-12		14-35	
07-00		10-05		12-13		14-36	
07-01		10-06		12-14		14-37	
07-02		10-07		12-15		14-38	
07-03		10-08		13-00		14-39	
07-04		10-09		13-01		14-40	
07-05		10-10		13-02		14-41	
07-06		10-11		13-03		14-42	
07-07		10-12		13-04		14-43	
07-08		10-13		13-05		14-44	
07-09		10-14		13-06		14-45	
07-10		10-15		13-07		14-46	
07-11		10-16		13-08		14-47	
07-12		10-17		14-00		15-00	
07-13		10-18		14-01		15-01	
07-14		10-19		14-02		15-02	
08-00		10-20		14-03		15-03	
08-01		10-21		14-04		15-04	
08-02		10-22		14-05		15-05	
08-03		11-00		14-06		15-06	

Parameter code	Setting content	Parameter code	Setting content	Parameter code	Setting content	Parameter code	Setting content
15-08		15-20		15-32			
15-09		15-21					
15-10		15-22					
15-11		15-23					
15-12		15-24					
15-13		15-25					
15-14		15-26					
15-15		15-27					
15-16		15-28					
15-17		15-29					
15-18		15-30					
15-19		15-31					



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