

# Simple Operation Manual

# TECO INVERTER

**Class 380V: 0.75~400KW  
(1~535HP)**



# TECO INVERTER T310 Series

**Thank you for selecting T310 series inverter**

This manual will help you use the inverter quickly. For the details, please visit the official website of Taian Technology (Wuxi) Co., Ltd. (<http://www.taian-technology.com>) or scan the QR code on the bottom cover.


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# Chapter 1 Safety Precautions

## Safety definitions:


In this manual, safety precautions are classified into the following two categories:

 **Warning: Hazards caused by operation against the requirements may lead to serious injury and even death.**


 **Caution: Hazards caused by operation against the requirements may lead to moderate or minor injury and equipment damage.**

Users are requested to carefully read the safety precautions in this chapter before installation, test and maintenance of the system. The company will not be liable for any personal injury and equipment damage caused by operation against the rules.


## 1.1 Before power-on

 **Warning**


- The main circuit terminals must be correctly wired. The three phases (R/L1, S/L2, T/L3) should be used as input terminals, and never be mixed with U/T1, V/T2 and W/T3; otherwise, power transmission will cause damage to the inverter.

 **Caution**

- The selected supply voltage must be the same with input voltage of the inverter.
- When the inverter is handled, do not fetch the front cover directly, but the inverter body should be handled to prevent falling of the front cover and avoid personal injury or the inverter damage.
- Please mount the inverter on metal or other incombustible material; do not put it on or near combustible material to prevent fire.
- When multiple inverters are placed in the same control board, please provide a cooling fan to keep temperature inside the board below 40°C and prevent overheating or fire.
- Please remove or install the operator after power-off, and use the fixed operator as instructed in the drawing to avoid the operator or display failure caused by poor contact.
- Avoid collision during installation, transportation and use of the inverter.


 **Warning**

- The product is qualified for use in restricted areas according to IEC 61800-3. When used in certain environment, the product may cause electromagnetic interference; therefore, perform proper test and make sure the grounding before use.
- Provide the protection against motor overtemperature.

 **Caution**

- The product must be installed and used by the qualified electricians.
- The method of fixed wiring must be used for installation of the product.

## 1.2 Wiring

 **Warning**

- Before any inverter installation or wiring, be sure to turn off the main power to avoid electric shock and fire.
- The wiring engineers should have relevant professional knowledge to avoid electric shock and fire.
- Make sure the grounding wire is connected to the ground. Class 380V: ground impedance should be below 10Ω. Please ground the inverter according to EN61800-5-1. The wire diameter must be up to 10mm<sup>2</sup> (6AWG) to meet the standard of limit leakage current.

- Be sure to correctly ground the inverter grounding terminal; otherwise, the ground wire of control board must be removed to avoid damage to electronic parts caused by surge.
- RCD should be conforming to the protection specification for type B leakage current.
- Make sure the E-stop function is effective after wiring. (User is responsible for the wiring)
- Do not touch the input/output wire directly, and avoid any wire contact with the inverter housing and wire short-circuit.
- Do not perform withstand voltage test on the inverter to avoid damage to semiconductor parts.



### **Caution**

- Make sure the main input power is consistent with the inverter to avoid injury or fire.
- Connect the brake resistor and unit according to relevant wiring diagram to avoid fire.
- Check the main input power is consistent with the inverter to avoid injury or fire.
- Connect the brake resistor and unit according to relevant wiring diagram to avoid fire.
- Please lock the terminal screws as per the specified torque to avoid fire.
- Do not connect input power to output terminal of the inverter.
- Do not connect electromagnetic contactor and switch contact to the output terminal.
- Do not connect power capacitor or LC/RC filter to the output circuit.
- Make sure interference generated by the inverter and motor will not affect surrounding sensors or equipment.

## **1.3 Before operation**



### **Warning**

- Check the inverter capacity is the same with the setting of functional parameter 13- 00 before power-on.
- In case of wire length between the inverter and motor over 25m, reduce the carrier frequency (11-01) or mount an output filter to reduce oscillation and avoid overvoltage and motor damage.

## **1.4 Parameter setting**



### **Caution**

- Please do not connect the motor to load (machinery) during rotary auto adjustment.
- The motor turns during rotary auto adjustment. Check the motor surrounding to avoid danger.

## **1.5 Operation**




### **Warning**

- Please turn on power supply after the front outer cover is mounted.
- Do not cut in or off the motor unit during operation; otherwise, overcurrent trip and even main circuit damage of the inverter may be caused.
- Do not get close to the machine when the resetting function is used; the machine will restart after fault clearing.
- Do not operate the machine with wet hand.
- Provide an independent E-stop switch, which is enabled when the functional parameter is set (refer to 11-55).
- Provide an independent E-stop switch for external hardware, which is used to switch off the inverter output in emergency.
- Please confirm the running command is closed before reset warning.
- The inverter will start up automatically after power recovery if auto start (07-00) after power-on is selected.
- Before auto adjustment, check the peripheral system and machinery state to ensure personal safety.
- Avoid contact with relevant terminals whether the inverter is running or stopped to avoid danger.
- The fan may run continuously for certain period after power-off.



### **Caution**

- Do not touch the heat sink, brake resistor and other heating parts. 

- The inverter may easily speed up the motor. Please check permissible range of the motor and machinery.
- Please observe the rules for use of brake module and other accessories.
- Do not check signal of circuit board during operation of the inverter.



### **Warning**

- Avoid electric shock! DC capacitor inside the inverter can only be discharged completely 5 minutes after removal of power supply. Please perform disassembly or inspection 5 minutes after power-off. It is required to wait for over 15 minutes for product over 15HP.

## **1.6 Inspection, maintenance and replacement**



### **Warning**

- Please check power supply and indicator are off (DC voltage below 25V) before inspection and maintenance.
- Do not touch HV terminals of the inverter at will.
- Be sure to mount the protective cover when power is on; use the circuit breaker to turn off power after the cover is removed.
- Nobody other than the designated professionals is allowed for inspection, maintenance or replacement of parts.



### **Caution**

- Ambient temperature of the inverter should be ( $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$  (IP20) or  $10^{\circ}\text{C} \sim +50^{\circ}\text{C}$  (IP00)); if derated, the inverter may be used under temperature up to  $60^{\circ}\text{C}$  (to be derated over  $40^{\circ}\text{C}$ ); make sure the surrounding is free of water drop and metal dust when the inverter is used in 95%RH non-condensing environment. Clean the heat sink regularly according to the site environment.

## **Precautions for inverter scrapping**



### **Caution**

When the inverter is scrapped, please treat it as industrial waste and pay attention to the following:

- Explosion may be caused by burning of electrolytic capacitor in the main circuit and on the printed circuit board;
- Toxic gas may be caused by burning of the inverter housing and other plastic parts.



Equipment with electronic parts can not be treated together with domestic waste, and must be separately recycled with electrical and electronic wastes according to the existing local regulations.

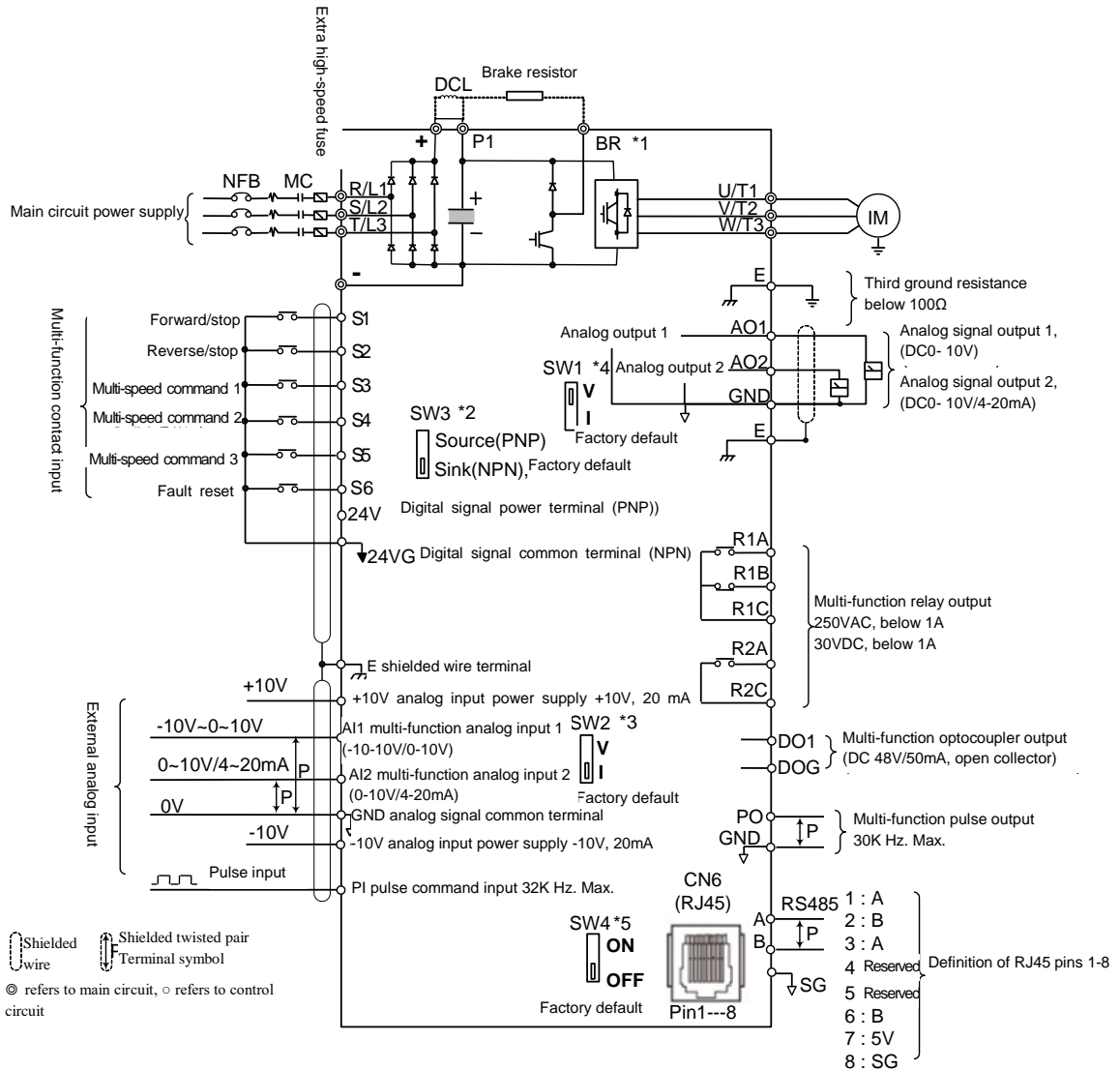
## **Exclusion of Liability for Guarantee**

Loss of chance caused by the product failure to your company or your customers, damage not caused by our product or compensation for other business is not covered by the scope of guarantee of our company, whether it is within the guarantee period or not.

# Chapter 2 Surrounding and Installation

## 2.1 Wiring diagram

The standard wiring diagram of T310 inverter is shown below (⊙ refers to main circuit terminal, ○ to control circuit terminal). The position and symbol of wiring terminals vary with T310 model. Refer to table 1 and table 2 for description of main circuit terminals and control circuit terminals.



Notes:

- \*1: 380V 1~30HP: Brake crystal is designed and directly used for connecting brake resistor between P1 and BR; external DCL is reserved (between + (P) and P1); 380V 40~535HP: built-in DCL; no brake crystal is provided, and external brake unit may be connected between + (P) and - (N).
- \*2: Multi-function digital input contact S1~S6 may be set as Source (PNP, with +24V common) or Sink (NPN, with 24VG common) by SW3.
- \*3: Multi-function analog input AI2 may be set as voltage command input (0~10V) or current command input (4~20mA) by SW2.
- \*4: Multi-function analog output AO2 may be set as voltage command output (0~10V) or current command output (4~20mA) by SW1(1~75HP) or SW6(100~535HP).
- \*5: RS485 terminal resistance switch: When multiple inverters are connected in parallel, the final inverter should be turned on and wired in reference to annex A. Ground signal of RS485 is SG isolated from GND of analog signal. A is equal to S+, and B to S-.

## 2.2 Terminal function description

Table 1 Main circuit terminals

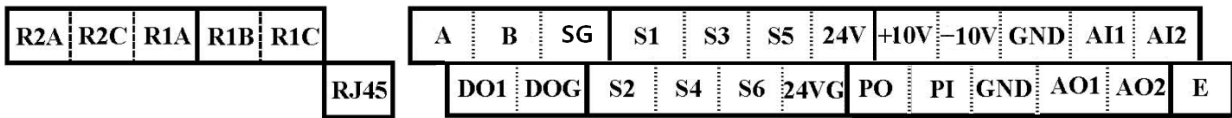
Terminal symbol	380V: 1~10HP	380V: 15~30HP	380V: 40~535HP
R/L1	Main circuit power input		
S/L2			
T/L3			
+ (P)	<ul style="list-style-type: none"> <li>• + (P)~ -(N): DC power input</li> <li>• + (P)~BR: External brake resistor</li> </ul>	<ul style="list-style-type: none"> <li>• + (P)~P1: External DCL *1</li> <li>• + (P)~ -(N): DC power input</li> <li>• P1~BR: External brake resistor</li> </ul>	<ul style="list-style-type: none"> <li>• + (P)~ -(N): DC power input or external brake resistor</li> </ul>
P1			
BR			
- (N)			
U/T1	Inverter output		
V/T2			
W/T3			
E	Ground terminal (third ground)		

Note:

15~30HP: + (P)~P1: Short-circuited at the time of delivery, removed only when external DCL connection is required.

### ■Control circuit terminal configuration

380V:1HP~75HP



380V:100HP~535HP

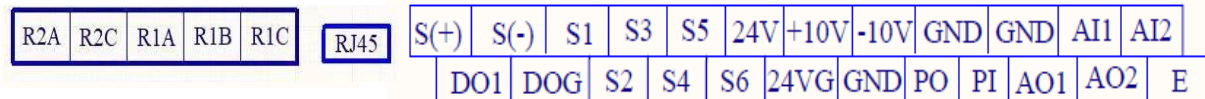




Table 2 Control circuit terminals

Type	Terminal	Terminal function	Signal level
<b>Digital input signal</b>	S1	Two-wire forward/ stop (preset), multi-function input terminal *1	24 VDC, 8 mA optical coupler isolation (max. voltage 30 Vdc , input impedance 4.22kΩ)
	S2	Two-wire forward/ stop (preset), multi-function input terminal *1	
	S3	Multi-speed command 1 (default), multi-function input terminal *1	
	S4	Multi-speed command 2 (default), multi-function input terminal *1	
	S5	Multi-speed command 3 (default), multi-function input terminal *1	
	S6	Fault reset (preset), multi-function input terminal *1	
<b>24V power supply (independent winding)</b>	24V	Common terminal of digital signal SOURCE (SW3 to SOURCE position)	±15%, max. output current 250mA (total of all loads)
	24VG	Common terminal of digital signal SINK (SW3 to SINK position)	
<b>Analog input signal</b>	+10V	Power supply for speed setting	+10V (max. current 20mA)
	-10V	Power supply for speed setting	-10V (max. current 20mA)
	AI1	Main voltage speed command (0-10V input)/(-10V~10V input)	0 to +10V, -10V to +10V (input impedance: 20kΩ) (11bit + 1 symbol, resolution)
	AI2	Multi-function analog input *2, SW2 used to switch voltage or current input(0~10V)/(4-20mA)	0 to +10V, (input impedance:200kΩ) 4 to 20 mA (input impedance: 250Ω) (11 bit + 1 symbol, resolution)
	GND	Common terminal of analog signal	----
	E	Shielded wire terminal (ground)	----
<b>Analog output signal</b>	AO1	Multi-function analog output terminal (0~10V output)	0 to 10V, (max. current :2mA) 4 to 20 mA (load< 500Ω) (PWM 10kHz resolution)
	AO2	Multi-function analog output terminal *3, SW1 (1~75HP) or SW6 (100~535HP) used to switch voltage or current output (0~10V output)/(4-20mA output)	
	GND	Common terminal of analog signal	
<b>Pulse output signal</b>	PO	Pulse output, maximum pulse frequency 32kHz	32kHz(max), open collector output
	GND	Common terminal of analog signal	----
<b>Pulse input signal</b>	PI	Pulse command input, maximum pulse frequency 32kHz	L: 0.0 to 0.5V H: 4.0 to 13.2V 0 - 32 kHz(max) Built-in pull-up resistor, not connected in series when open collector input is used
	GND	Common terminal of analog signal	----



Type	Terminal	Terminal function	Signal level
<b>Digital output</b>	DO1	Multi-function (open collector transistor) output: in operation, zero speed, consistent frequency, random frequency consistent, output frequency, preparation completed, low-voltage detected, output breaking, operation and frequency command, over-torque detected, abnormality, low voltage, overheat, motor overload, overload output of inverter; retesting, communication abnormality, timing function output unit...	48Vdc, 2 mA~50mA optical coupler output
	DOG	Common terminal of open collector transistor	----
<b>Relay output</b>	R1A	Relay A contact (multi-function output terminal)	Terminal capacity: Under 250Vac, 10 mA~1A Under 30Vdc, 10 mA~1A
	R1B	Relay B contact (multi-function output terminal)	
	R1C	Common terminal of relay Same function with DO1	
	R2A-R2C	Same function with DO1	Terminal capacity: Under 250Vac, 10 mA~1A Under 30Vdc, 10 mA~1A
<b>RS-485 interface</b>	A (S+)	RS485/MODBUS	Differential output/input
	B (S-)		
	SG	Ground signal *4*5	Zero level

\*1: Refer to group 03-digital input/output herein for multi-function digital input function;

\*2: Refer to group 04-analog input/output function of external terminals herein for multi-function analog input function;

\*3: Refer to group 04-analog input/output function of external terminals herein for multi-function analog output function;

\*4: Please note that ground signal of RS485 (SG) and the common terminal of analog signal (GND) are mutually isolated and can not be mixed.

\*5: There is no RS485 ground signal (SG) for product over 100HP (inclusive).



#### Caution

- Maximum capacity of output current of terminal  $\pm 10V$  is 20ma.
- Multi-function analog outputs AO1 and AO2 are analog output specially for ammeter connection, which can not be used as analog output signal for feedback control.
- 24V and  $\pm 10V$  power sources of control board are for internal control only, and can not be connected with other external device.

## 2.3 Inverter specification

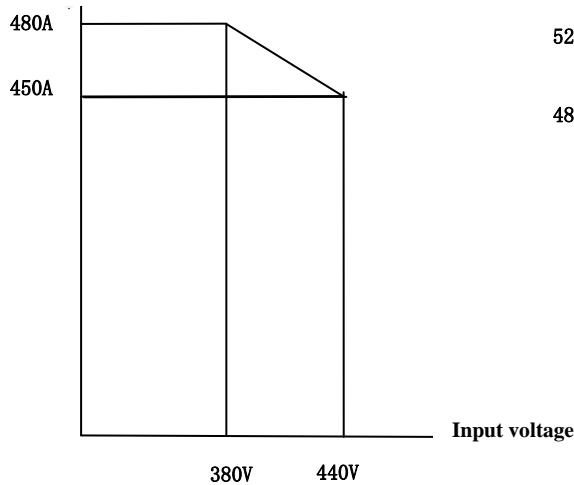
Inverter capacity (HP)			1	2	3	5	8	10	15	20	25	30	40	50	60	75	
Output rating	Heavy duty H.D. (150%/min)	Rated output capacity (KVA)	2.6	3.2	4.2	7	11.3	13.7	18.3	23.6	29.7	34.3	45.7	57.2	69.3	89.9	
		Rated output current (A)	2.3	4.2	5.5	9.2	13	18	24	31	39	45	60	75	91	118	
		Max. applicable motor *1HP (KW)	1 (0.75)	2 (1.5)	3 (2.2)	5 (3.7)	7.5 (5.5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)	40 (30)	50 (37)	60 (45)	75 (55)	
	Normative duty N.D. (120%/min)	Rated output capacity (KVA)				8.5	13.3	17.5	23.6	29.0	33.5	44.2	54.9	67.1	78.5	111	
		Rated output current (A)				13	18	23	31	39	45	60	75	91	118	145	
		Max. applicable motor *1HP (KW)				7.5 (5.5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)	40 (30)	50 (37)	60 (45)	75 (55)	100 (75)	
	Max. output voltage (V)		Three-phase 380V~440V														
Max. output frequency (Hz)		Parameter setting 0.1~599.0 Hz															
Power supply	Rated voltage, frequency		Three-phase 380V ~ 440V, 50/60Hz														
	Allowable voltage variation		-15% ~ +10%														
	Allowable frequency variation		±5%														

Inverter capacity (HP)			100	125	150	175	215	250	270	300	335	375	425	475	535		
Output rating	Heavy duty H.D. (150%/min)	Rated output capacity (KVA)	114	137	165	198	232	282	290	343	343	398	446	495	552		
		Rated output current (A)	150	180	216	260	304	370	380	450	480	523	585	650	725		
		Max. applicable motor *1HP (KW)	100 (75)	125 (90)	150 (110)	175 (132)	215 (160)	250 (185)	270 (200)	300 (220)	335 (250)	375 (280)	425 (315)	475 (355)	535 (400)		
	Normative duty N.D. (120%/min)	Rated output capacity (KVA)	137	159	198	232	250	332	332	366	366	446	488	552	625		
		Rated output current (A)	180	208	260	304	328	435	435	480	523	585	640	725	820		
		Max. applicable motor *1HP (KW)	125 (90)	150 (110)	175 (132)	215 (160)	250 (185)	300 (220)	300 (220)	335 (250)	375 (280)	425 (315)	475 (355)	535 (400)	600 (450)		
	Max. output voltage (V)		Three-phase 380V~440V														
Max. output frequency (Hz)		Parameter setting 0.1~599.0 Hz															
Power supply	Rated voltage, frequency		Three-phase 380V ~ 440V, 50/60Hz														
	Allowable voltage variation		-15% ~ +10%														
	Allowable frequency variation		±5%														

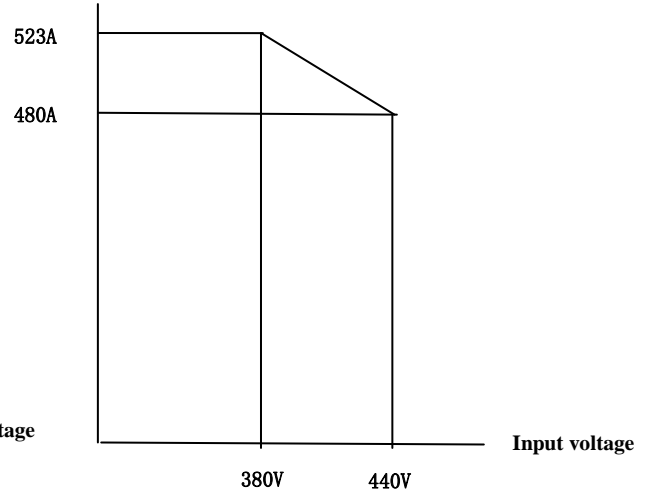
\*1. 4-pole inductor motor of TECO standard is used for reference.

\*2. Derating is required when 335HP is used up to 440V. The voltage derating curve is shown below.

**Output current (Iout) HD**



**Output current (Iout) ND**



\*3. T310 is designed for use under heavy duty. The factory default is H.D. (heavy duty type as standard), and overload capacity is 150%/min. Carrier and factory default are listed below.

H.P	Carrier range of heavy duty (HD) mode	Factory default of carrier of heavy duty mode (HD)	Carrier range of normative duty (ND) mode	Factory default of carrier of normative duty (ND) mode
<b>Class 380V</b>				
<b>1~3HP</b>	2~16KHz	8KHz		
<b>5HP/8HP/10HP</b>	2~16KHz	5KHz	2~16KHz	4KHz
<b>15~30HP</b>	1~16KHz	8KHz	1~16KHz	4KHz
<b>40~50HP</b>	1~12KHz	5KHz	1~12KHz	4KHz
<b>60~75HP</b>	1~10KHz	5KHz	1~10KHz	4KHz
<b>100HP</b>	1~8KHz	5KHz	1~8KHz	2KHz
<b>125HP</b>	1~8KHz	4KHz	1~8KHz	2KHz
<b>150HP/175HP</b>	1~5KHz	4KHz	1~5KHz	2KHz
<b>215-535HP</b>	1~5KHz	3KHz	1~5KHz	2KHz

Load mode	Control mode	Other setting	Max. frequency
Heavy duty (00-27=0)	V/F SLV2	Max. frequency selected as 599Hz	599Hz
	SLV	380V 1~15HP	150Hz
		380V 20HP	110Hz
		380V 25~30HP	100Hz
		380V 40~75HP, carrier (11-01) set at 8K or below	100Hz
		380V 40~75HP, carrier (11-01) set over 8K	80Hz
	380V 100~535HP, carrier (11-01) set at 8K or below	100Hz	
PMSLV	Unlimited	Fundamental frequency	
Normative duty (00-27=1)	V/F	Max. frequency selected as 120Hz	120Hz
	SLV SLV2	No normative duty mode	-

\*4. Carrier setting should be no higher than 2KHz when motor wire of 100m or above is used (for T310-1HP/2HP/3HP/5HP/8HP/10HP type, carrier can only be set as 2KHz in case of motor wire over 100m).

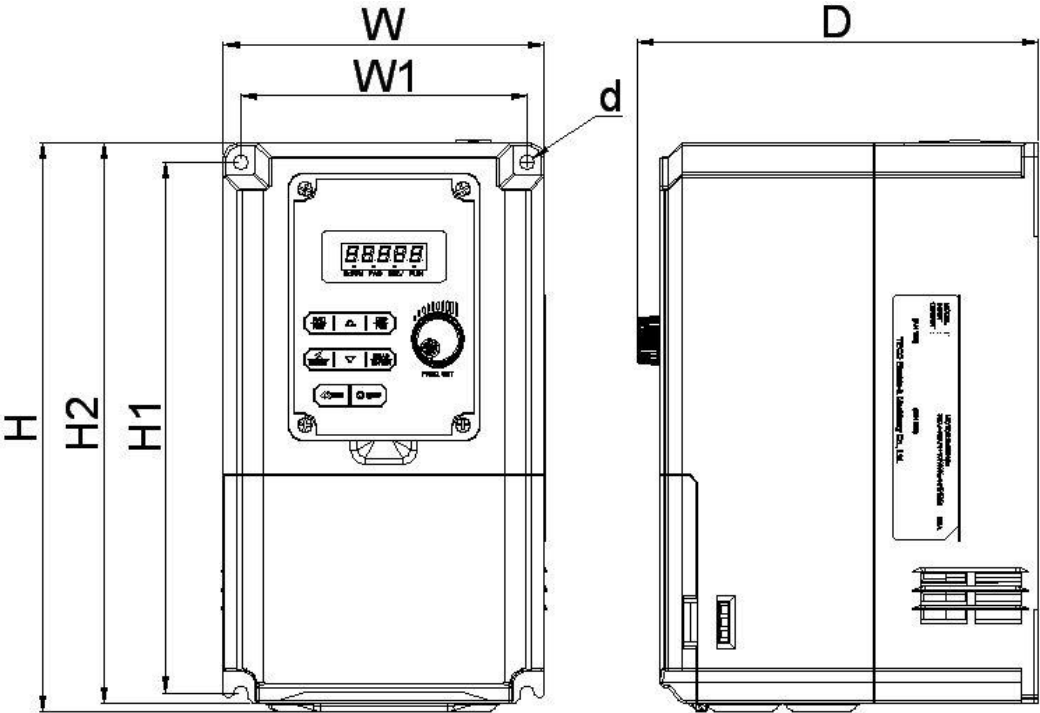
\*5. Digital operator can be removed from the inverter body, and its extension cord can be used for remote operation. Extension cord over 5m can only be used after approval by FAE.

\*6. SLV mode can not be selected in ND mode; carrier range is limited to 4~8kHz when the control mode is SLV and maximum frequency (01-02) is set over 80Hz.

\*7. 1HP and 0.5HP motors can only be used in SLV mode of T310-1HP.

\*8. For instantaneous stop of T310-1HP/2HP, 07-25 (low voltage detection delay) should be set as 0, and the allowable instantaneous stop is 1s to the maximum.

2.4 Product dimensions



Inverter model	Overall dimensions (mm)								Remarks
	W	H	D	W1	H1	H2	d	Net weight (kg)	
T310-4001-H3C(IP20)	120	213	150	107	199	210	M5	1.7	Recommended range of locking pound force in position d 15~18kgf.cm
T310-4002-H3C(IP20)	120	213	150	107	199	210	M5	1.75	
T310-4003-H3C(IP20)	120	213	150	107	199	210	M5	1.8	
T310-4005-H3C(IP20)	144	263	170	132	248	260	M5	2.8	
T310-4008-H3C(IP20)	144	263	170	132	248	260	M5	2.85	
T310-4010-H3C(IP20)	215	315	212	198	284	300	M5	6.2	
T310-4015-H3C(IP20)	215	315	212	198	284	300	M5	6.2	
T310-4020-H3C(IP20)	215	315	212	198	284	300	M5	6.2	
T310-4025-H3C(IP20)	256	378	234	218	360		M6	15	
T310-4030-H3C(IP20)	256	378	234	218	360		M6	15	
T310-4040-H3C(IP20)	284	535	270	220	515		M8	30	
T310-4050-H3C(IP20)	284	535	270	220	515		M8	30	
T310-4060-H3C(IP20)	323	575	292	220	553		M8	40	
T310-4075-H3C(IP20)	323	575	292	220	553		M8	40	
T310-4100-H3C(IP00)	344	600	315	250	560		M10	42	
T310-4125-H3C(IP00)	344	600	315	250	560		M10	42	
T310-4150-H3C(IP00)	459	790	333	320	760		M10	81	
T310-4175-H3C(IP00)	459	790	333	320	760		M10	81	
T310-4215-H3C(IP00)	459	790	333	320	760		M10	81	
T310-4250-H3C(IP00)	540	822	378	360	795		M10	110	
T310-4270-H3C(IP00)	540	822	378	360	795		M10	110	
T310-4300-H3C(IP00)	540	822	378	360	795		M10	110	
T310-4335-H3C(IP00)	540	822	378	360	795		M10	110	
T310-4375-H3C(IP20)	709	896	417	530	855		M12	150	
T310-4425-H3C(IP20)	709	896	417	530	855		M12	150	
T310-4475-H3C(IP20)	806	1015	420	530	975		M12	175	
T310-4535-H3C(IP20)	806	1015	420	530	975		M12	175	
T310-4010-H3C(IP20)	215	347	212	198	284		M5	6.7	
T310-4015-H3C(IP20)	215	347	212	198	284		M5	6.7	
T310-4020-H3C(IP20)	215	347	212	198	284		M5	6.7	
T310-4100-H3C(IP20)	344	762	315	250	560		M10	46	Accessory JN3-NK-A07 to be purchased
T310-4125-H3C(IP20)	344	762	315	250	560		M10	46	
T310-4150-H3C(IP20)	459	990	333	320	760		M10	85	Accessory JN3-NK-A08 to be purchased
T310-4175-H3C(IP20)	459	990	333	320	760		M10	85	
T310-4215-H3C(IP20)	459	990	333	320	760		M10	85	
T310-4250-H3C(IP20)	540	984	378	360	795		M10	118	Accessory JN3-NK-A09 to be purchased
T310-4270-H3C(IP20)	540	984	378	360	795		M10	118	
T310-4300-H3C(IP20)	540	984	378	360	795		M10	118	
T310-4335-H3C(IP20)	540	984	378	360	795		M10	118	

# Chapter 3 Software Index

## 3.1 List of parameters

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Group 24	Quick parameter group of special machine application

Parameter attribute	
*1	Parameter modifiable during operation
*3	Parameter value (user setting) not restored to the factory default at the time of factory setting
*4	Parameter readable but not modifiable
*6	Displayed only when LED digital operator is used
*8	Parameter setting varying with 13-08 setting
*9	T1.0 software not designed with the function or option

Group 00 Basic function group				
Code	Name	Range	Factory setting	Attribute
00-00	Motor control mode	0: V/F	0	*3
		1: Reserved		
		2: SLV		
		3: Reserved		
		4: Reserved		
		5: PM SLV		
00-01	Motor rotation direction	0: Forward	0	*1
		1: Reverse		
00-02	Main operation command source selection	0: Keypad	1	
		1: External control		
		2: Communication control		
00-03	Secondary operation command source selection	0: Keypad	0	
		1: External control		
		2: Communication control		
		3: Reserved		
00-04	Reserved			
00-05	Main frequency command source selection	0: Keypad	1	
		1: External control (analog AI1)		
		2: Terminal UP/DOWN		
		3: Communication control		
		4: Pulse input		
		5: Reserved		
		6: Reserved		
		7: AI2 auxiliary frequency		
00-06	Secondary frequency command source selection	0: Keypad	0	
		1: External control (analog AI1)		
		2: Terminal UP/DOWN		
		3: Communication control		
		4: Pulse input		
		5: Reserved		
		6: Reserved		
		7: AI2 auxiliary frequency		
00-07	Frequency source combination mode selection	0: Main frequency source	0	
		1: Main frequency source + secondary frequency source		
00-08	Communication frequency command	0.00~599.00	0.00	
00-09	Frequency command memory mode	0: Communication frequency command (00-08) before power-off not memorized	0	
		1: Communication frequency command (00-08) before power-off memorized		

Group 00 Basic function group				
Code	Name	Range	Factory setting	Attribute
00-10	Min. frequency test	0: Warning of frequency below the min. value	0	
		1: Running under min. frequency if below the value		
		2: No stop0 warning, output frequency command		
		3: No stop0 warning, output 0 if below min. frequency		
00-11	PID lower frequency limit selection	0: PID Lower limit of sleep limit frequency	0	
		1: PID sleep limit 0Hz		
00-12	Upper frequency limit	0.1~109.0	100.0	
00-13	Lower frequency limit	0.0~109.0	0.0	
00-14	Acceleration time 1	0.1~6000.0	*	*1
00-15	Deceleration time 1	0.1~6000.0	*	*1
00-16	Acceleration time 2	0.1~6000.0	*	*1
00-17	Deceleration time 2	0.1~6000.0	*	*1
00-18	Inching frequency	0.00~599.00	6.00	*1
00-19	Inching acceleration time	0.1~0600.0	*	*1
00-20	Inching deceleration time	0.1~0600.0	*	*1
00-21	Acceleration time 3	0.1~6000.0	*	*1
00-22	Deceleration time 3	0.1~6000.0	*	*1
00-23	Acceleration time 4	0.1~6000.0	*	*1
00-24	Deceleration time 4	0.1~6000.0	*	*1
00-25	Acceleration/ deceleration switching frequency	0.0~599.0	0.0	
00-26	E-stop time	0.1~6000.0	5.0	
00-27	HD/ND selection	0:HD mode 1:ND mode	0	*3
00-28	Main frequency command attribute selection	0: Positive attribute (0~10V/4~20mA corresponding to 0~100%)	0	
		1: Negative attribute (0~10V/4~20mA corresponding to 100~0%)		
00-29~00-31 reserved				
00-32	Application adjustment *Note 1	0: General	0	
		1: Pump parameter		
		2: Conveyor parameter		
		3:Exhaust fan parameter		
		4:HVA fan parameter		
		5: Air compressor parameter		
		6~9: Reserved		
		10: Injection machine application parameter		
		11: Injection machine 2 application parameter		
		20: Punch application parameter		
		30: Air compressor application parameter		
00-34	Two-wire/ three-wire selection	0: Two-wire	0	
		1: Three-wire		



\*Note 1: Initial setting of 13-08 is required before 00-32 application adjustment.

Warning: The setting function of input/output terminal will automatically vary with the set value if the parameter 00-32 (application adjustment) is set. Make sure input of the inverter before test run.

Group 01 Basic function group				
Code	Name	Range	Factory setting	Attribute
01-00	V/F curve selection	0~FF	F	*3
01-01	Reserved			
01-02	Max. output frequency of motor 1	4.8~599.0	50.0/ 60.0	*8
01-03	Max. output voltage of motor 1	380V: 0.2~480.0	380.0/440	*8
01-04	Intermediate output frequency 2 of motor 1	0.0~599.0	0.0	
01-05	Intermediate output voltage 2 of motor 1	380V: 0.0~480.0	0.0	*8
01-06	Intermediate output frequency 1 of motor 1	0.0~599.0	2.5	
01-07	Intermediate output voltage 1 of motor 1	380V: 0.0~480.0	*	*8
01-08	Min. output frequency of motor 1	0.0~599.0	VF: 1.3	
			SLV:0.5	
			SLV2:1.3	
01-09	Min. output voltage of motor 1	380V: 0.0~480.0	*	*8
01-10	Torque compensation gain	0.0~2.0	0.5	*1
01-11	Torque compensation mode selection	0: Torque compensation mode 0	0	
		1: Torque compensation mode 1		
01-12	Base frequency of motor 1	4.8~599.0	50.0/ 60.0	*8
01-13	Base output voltage of motor 1	380V: 0.0~480.0	380.0/440	*8
01-14	Input voltage setting	380V: 310.0~480.0	380.0/440	*8
01-15	Torque compensation time	0~10000	200	
01-16	Max. output frequency of motor 2	4.8~599.0	50.0/ 60.0	*8
01-17	Max. output voltage of motor 2	380V: 0.2~480.0	380.0/440	*8
01-18	Intermediate output frequency 2 of motor 2	0.0~599.0	0.0	
01-19	Intermediate output voltage 2 of motor 2	380V: 0.0~480.0	0.0	
01-20	Intermediate output frequency 1 of motor 2	0.0~599.0	2.5	

Group 01 Basic function group				
Code	Name	Range	Factory setting	Attribute
01-21	Intermediate output voltage 1 of motor 2	380V: 0.0~480.0	KVA *Note 1	
01-22	Min. output frequency of motor 2	0.0~599.0	1.3	
01-23	Min. output voltage of motor 2	380V: 0.0~480.0	KVA * Note 1	
01-24	Base frequency of motor 2	4.8~599.0	50.0/ 60.0	
01-25	Base output voltage of motor 2	380V: 0.0~480.0	380.0/440	*8
01-26	V/F curve selection of motor 2	0~FF	F	

\*Note 1: KVA: The parameter varies with inverter capacity.

\*: Based on delivery VF curve.

Group 02 IM motor parameter group				
Code	Name	Range	Factory setting	Attribute
02-00	No-load current of motor 1	0.01~600.00	KVA	
02-01	Rated current of motor 1	25%~200% rated current of inverter	KVA	
02-02	Reserved			
02-03	Rated speed of motor 1	0~60000	KVA	
02-04	Rated voltage of motor 1	380V: 100.0~480.0	380.0/ 440	*8
02-05	Rated power of motor 1	0.01~600.00	-	
02-06	Rated frequency of motor 1	4.8~599.0	50.0/ 60.0	*8
02-07	Number of poles of motor 1	2~16(even)	4	
02-08	Reserved			
02-09	Exciting current of motor 1	15%~70% rated current of motor	-	
02-10	Iron core saturation factor 1 of motor 1	1~100	-	
02-11	Iron core saturation factor 2 of motor 1	1~100	-	
02-12	Iron core saturation factor 3 of motor 1	80~300	-	
02-13	Iron core loss of motor 1	0.0~15.0	-	
02-14	Reserved			
02-15	Line resistance of motor 1	0.001~60.000	-	
02-16~02-18 reserved				
02-19	No-load voltage of motor 1	380V: 100~480	-	
02-20	No-load current of motor 2	0.01~600.00	-	
02-21	Rated current of motor 2	25%~200% rated current of inverter	-	

Group 02 Basic function group				
Code	Name	Range	Factory setting	Attribute
02-22	Rated speed of motor 2	0~60000	-	
02-23	Rated voltage of motor 2	380V: 100.0~480.0	380.0/ 440	
02-24	Rated power of motor 2	0.01~600.00	-	
02-25	Rated frequency of motor 2	4.8~599.0	50.0/ 60.0	
02-26	Number of poles of motor 2	2~16 (even)	4	
02-27~02-31 reserved				
02-32	Line resistance of motor 2	0.001~60.000	-	
02-33	leakage inductance ratio of motor	0.1~15.0	KVA	
02-34	Slip frequency of motor	0.10~20.00	KVA	
02-35~02-37 reserved				

Group 03 Digital I/O function group of external terminal				
Code	Name	Range	Factory setting	Attribute
03-00	Function setting of multi-function terminal S1	0: Two-wire forward/stop 1: Two-wire reverse/stop 2: Multi-speed setting command 1 3: Multi-speed setting command 2 4: Multi-speed setting command 3 5: Multi-speed setting command 4 6: Inching forward command	0	
03-01	Function setting of multi-function terminal S2	7: Inching reverse command 8:UP frequency command 9:DOWN frequency command 10: Accelerate/deceleration time selection 1 11: Accelerate/deceleration disabled 12: Main/secondary operation switching 13: Main/secondary frequency switching 14:E-stop (speed down to zero) 15: Breaking stop (auto-run stop)	1	
03-02	Function setting of multi-function terminal S3	16:PID function disabled 17: Fault reset (RESET) 18: Reserved 19: Speed search 1 (from max. frequency) 20: Manual energy saving 21:PID integral reset 22~24: Reserved 25: External fault 26: Three-wire forward/stop 27: Body/remote selection 28: Remote mode selection 29: Inching frequency selection 30: Accelerate/deceleration time selection 2	2	
03-03	Function setting of multi-function terminal S4	31: Inverter overheat warning 32: Syn. command 33: DC brake 34: Speed search 2(from frequency command) 35:Timing input 36:PID soft-start disabled 37: Wobble frequency running 38: Wobble frequency up	3	

Group 03 Digital I/O function group of external terminal				
Code	Name	Range	Factory setting	Attribute
03-04	Function setting of multi-function terminal S5	39: Wobble frequency down 40: Motor 1/motor 2 switching 41: PID sleep 42: Reserved 43: Reserved 44: Reserved 45: Reserved 46: Reserved 47: Fire mode (forced run) 48: KEB speed-up 49: Parameter writing enabled 50: Direct running protection after power-on (USP) 51: Reserved 52: Reserved 53: Two-wire self-protection (stop command) 54: Reserved 55: Reserved	4	
03-05	Function setting of multi-function terminal S6	56: Reserved 57: Reserved 58: Safety function 59: Reserved 60: Reserved 61: Reserved 62: EPS input 63: Switch to pressure error range of group II 64: Reserved 65: Short-circuit brake 66: PID function disabled 67: Reserved 68: External fault 2	17	
03-06~03-07 reserved				

Group 03 Digital I/O function group of external terminal				
Code	Name	Range	Factory setting	Attribute
03-08	(S1~S6) DI scanning time	0: Scanning time 4ms 1: Scanning time 8ms	1	
03-09	Type selection of multi-function terminal S1-S4	xxx0b:S1 contact A xxx1b:S1 contact B xx0xb:S2 contact A xx1xb:S2 contact B x0xxb:S3 contact A x1xxb:S3 contact B 0xxxb:S4 contact A 1xxxb:S4 contact B	0000b	
03-10	Type selection of multi-function terminal S5-S6	xxx0b:S5 contact A xxx1b:S5 contact B xx0xb:S6 contact A xx1xb:S6 contact B	0000b	
03-11	Relay (R1A-R1C) output	0: Running 1: Fault indication 2: Frequency arrived 3: Any frequency arrived (03-13±03-14) 4: Frequency detection 1 (output frequency ≧ (03-13+03-14)) 5: Frequency detection 2 (output frequency ≧ (03-13+03-14)) 6: Auto restart 7: Reserved 8: Reserved 9: Breaking stop 10: Reserved 11: Reserved 12: Over-torque detection 13: Current arrived 14: Mechanical brake control (03-17~18) 15: Reserved 16: Reserved 17: Reserved 18: Reserved 19: Reserved 20: Zero speed 21: Inverter standby 22: LV detection 23: Running command source 24: Frequency command source 25: Low torque detection	1	

Group 03 Digital I/O function group of external terminal				
Code	Name	Range	Factory setting	Attribute
03-11	Relay (R1A-R1C) output	26: Frequency off-line 27: Timing output 28: Wobble frequency UP 29: Wobble frequency on 30: Select motor 2 31: Reserved 32: Communication control 33: Reserved 34: Reserved 35: Reserved 36: Reserved 37: PID feedback off detection output 38: Brake release 39: Frequency detection 1 (for crown block) 40: Reserved 41: Reserved	1	
03-12	Relay (R2A-R2C) output	42: Too high pressure 43: Too low pressure 44: Pressure loss detection 45: PID sleep 46: Too high flow 47: Too low flow 48: Insufficient low suction 49: Reserved 50: Frequency detection 3 (output frequency ≧ (03-44+03-45)) 51: Frequency detection 4 (output frequency ≧ (03-44+03-45)) 52: Frequency detection 5 (output frequency ≧ (03-46+03-47)) 53: Frequency detection 6 (output frequency ≧ (03-46+03-47)) 54: Reserved 55: Reserved 56: Reserved 57: Low current detection 58: Frequency down detection 59: Over-temperature detection	0	

Group 03 Digital I/O function group of external terminal				
Code	Name	Range	Factory setting	Attribute
03-13	Frequency detection level	0.0~599.0	0.0	
03-14	Frequency detection width	0.1~25.5	2.0	
03-15	Current arrival level	0.1~999.9	0.1	
03-16	Current arrival detection delay	0.1~10.0	0.1	
03-17	*Mechanical brake release level setting	0.00~599.00	0.00	
03-18	* Mechanical brake action level setting	0.00~599.00	0.00	
03-19	Relay (R1A-R2C) type selection	xxx0b: R1 contact A xxx1b: R1 contact B	0000b	
		xx0xb: R2 contact A xx1xb: R2 contact B		
03-20~03-21 reserved				
03-22	Relay optocoupler output delay time	0.0~60.0	0	
03-23~03-26 Reserved				
03-27	UP/DOWN frequency holding selection	0: UP/DOWN frequency held when stop	0	
		1: UP/DOWN frequency cleared when stop		
		2: Frequency UP/DOWN allowed when stop		
		3.Frequency updated when speed up		
03-28	Optocoupler output	Range and definition same with 03-11 and 03-12	0	
03-29	Optocoupler output type selection	xxx0b: Optocoupler contact A xxx1b: Optocoupler contact B	0000b	
03-30	Pulse input selection	0: General pulse input	0	
		1:PWM mode		
03-31	Pulse input scale	Adjust as per 03-30 setting 03-30 setting 0: 50~32000Hz 03-30 setting 1:10~1000Hz	1000	
03-32	Pulse input gain	0.0~1000.0	100	*1
03-33	Pulse input bias	-100.0~100.0	0.0	*1
03-34	Pulse input filter time	0.00~2.00	0.1	*1

Group 03 Digital I/O function group of external terminal				
Code	Name	Range	Factory setting	Attribute
03-35	Pulse output setting	1: Frequency command	2	*1
		2: Output frequency		
		3: Output frequency after soft start		
		4: Motor speed		
		5: PID feedback		
		6: PID input		
		7: Reserved		
03-36	Pulse output scale	1~32000	1000	*1
03-37	Timer ON delay (DI/DO)	0.0~6000.0	0.0	
03-38	Timer OFF delay (DI/DO)	0.0~6000.0	0.0	
03-39	Reserved			
03-40	Up/Down frequency width setting	0.00~5.00	0.00	
03-41	Torque detection level	0~150	10	
03-42	Brake action delay time	0.00~65.00	0.00	
03-43	Speed UP/DOWN selection	0: UP/DOWN time 1	0	
		1: UP/DOWN time 2		
03-44	Frequency detection level 2	0.0~599.0	0.0	
03-45	Frequency detection width 2	0.1~25.5	2.0	
03-46	Frequency detection level 3	0.0~599.0	0.0	
03-47	Frequency detection width 3	0.1~25.5	2.0	
03-48	Low current detection level	0.0~999.9	0.1	
03-49	Low current detection delay time	0.00~655.34	0.01	
03-50	Frequency detection level 4	0.0~599.0	0	
03-51	Frequency detection level 5	0.0~599.0	0	
03-52	Frequency detection level 6	0.0~599.0	0	
03-53	Current arrival level 2	0.0~999.9	0.0	Note 1.1
03-54	Frequency detection points	0: 1 point 1: 2 points	0	

Note 1.1: V1.07, 1.09 and 1.21 versions added with 03-00~03-05 as 65~69 function, relay output 58,59 and parameter 03-53.

Group 04 Analog I/O function group of external terminal				
Code	Name	Range	Factory setting	Attribute
04-00	AI input signal type	0: AI1:0~10V AI2: 0~10V	1	
		1: AI1:0~10V AI2: 4~20mA		
		2: AI1: -10~10V AI2: 0~10V		
		3: AI1: -10~10V AI2: 4~20mA		
04-01	AI1 signal scanning filter time	0.00~2.00	0.03	
04-02	AI1 gain value	0.0~1000.0	100.0	*1
04-03	AI1 bias value	-100.0~100.0	0	*1
04-04	AI negative attribute	0: Invalid 1: Valid	0	注 1.2
04-05	AI2 function setting	0: Auxiliary frequency	10	
		1: Frequency gain		
		2: Frequency bias		
		3: Voltage bias		
		4: Acceleration/Deceleration shortening coefficient		
		5: DC brake current		
		6: Over-torque detection level		
		7: Running stall level		
		8: Lower frequency limit		
		9: Hopping frequency 4		
		10: Up to AI1		
		11: Positive torque limit		
		12: Negative torque limit		
		13: Recovery torque limit		
		14: Positive/negative torque limit		
		15: Reserved		
		16: Torque command/compensation		
17: PTC overheat protection				
04-06	AI2 signal scanning filter time	0.00~2.00	0.03	
04-07	AI2 gain value	0.0~1000.0	100.0	*1
04-08	AI2 bias value	-100.0~100.0	0	*1
04-09~04-10 reserved				

Group 04 Analog I/O function group of external terminal								
Code	Name	Range	Factory setting	Attribute				
04-11	AO1 function setting	0: Output frequency	0					
		1: Frequency command						
		2: Output voltage						
		3: DC voltage						
		4: Output current						
		5: Output power						
		6: Motor speed						
		7: Output power factor						
		8: AI1 input						
		9: AI2 input						
		10: Torque command						
		11: q shaft current						
		12: d shaft current						
		13~16: Reserved						
		17: q shaft voltage						
		18: d shaft voltage						
		19~20: Reserved						
		21: PID input						
		22: PID output						
		23: PID target value						
		24: PID feedback value						
		25: Soft starter output frequency						
		26~27: Reserved						
		28: Communication control						
		04-12			AO1 gain value	0.0~1000.0	100.0	*1
		04-13			AO1 bias value	-100.0~100.0	0	*1
		04-12			AO1 gain value	0.0~1000.0	100.0	*1
		04-13			AO1 bias value	-100.0~100.0	0	*1
04-14~04-15 reserved								
04-16	AO2 function setting	Range and definition same with 04-11	4					
04-17	AO2 gain value	0.0~1000.0	100.0	*1				
04-18	AO2 bias value	-100.0~100.0	0	*1				
04-19	AO output signal type	0: AO1: 0~10V AO2: 0~10V	0					
		1: AO1: 0~10V AO2 4~20mA						
04-20	AO signal scanning filter time	0.00~0.50	0.00	*1				
04-24	Frequency display filter	0.00~3.00	0.00					
04-25	AI1 filter parameter	0.00~3.00	0.00					

Note 1.2: Added parameter of V1.21 version; frequency output is AI1+AI2 if 04-05 is 10.

**Group 04 Analog I/O function group of external terminal**

Code	Name	Range	Factory setting	Attribute
04-26	All average filter	0 ~255	0	
04-27	Average output frequency filter	0 ~255	0	

**Group 05 Multi-speed function group**

Code	Name	Range	Factory setting	Attribute
05-00	Multi-speed up/down mode selection	0: Stage speed up/down time set by acceleration/deceleration time 1-4 1: Stage speed up/down time independently set	0	
05-01	*Stage 0 speed frequency setting	0.00~599.00	5.00	*1
05-02	* Stage 1 speed frequency setting	0.00~599.00	5.00	*1
05-03	* Stage 2 speed frequency setting	0.00~599.00	10.00	*1
05-04	* Stage 3 speed frequency setting	0.00~599.00	20.00	*1
05-05	* Stage 4 speed frequency setting	0.00~599.00	30.00	*1
05-06	* Stage 5 speed frequency setting	0.00~599.00	40.00	*1
05-07	* Stage 6 speed frequency setting	0.00~599.00	50.00	*1
05-08	* Stage 7 speed frequency setting	0.00~599.00	50.00	*1
05-09	* Stage 8 speed frequency setting	0.00~599.00	5.00	*1
05-10	* Stage 9 speed frequency setting	0.00~599.00	5.00	*1
05-11	* Stage 10 speed frequency setting	0.00~599.00	5.00	*1
05-12	* Stage 11 speed frequency setting	0.00~599.00	5.00	*1
05-13	* Stage 12 speed frequency setting	0.00~599.00	5.00	*1
05-14	* Stage 13 speed frequency setting	0.00~599.00	5.00	*1
05-15	* Stage 14 speed frequency setting	0.00~599.00	5.00	*1
05-16	* Stage 15 speed frequency setting	0.00~599.00	5.00	*1
05-17	Multi-speed 0 acceleration time setting	0.1~6000.0	10.0	
05-18	Multi-speed 0 deceleration time setting	0.1~6000.0	10.0	
05-19	Multi-speed 1 acceleration time setting	0.1~6000.0	10.0	
05-20	Multi-speed 1 deceleration time setting	0.1~6000.0	10.0	
05-21	Multi-speed 2 acceleration time setting	0.1~6000.0	10.0	
05-22	Multi-speed 2 deceleration time setting	0.1~6000.0	10.0	



Group 05 Multi-speed function group				
Code	Name	Range	Factory setting	Attribute
05-23	Multi-speed 3 acceleration time setting	0.1~6000.0	10.0	
05-24	Multi-speed 3 deceleration time setting	0.1~6000.0	10.0	
05-25	Multi-speed 4 acceleration time setting	0.1~6000.0	10.0	
05-26	Multi-speed 4 deceleration time setting	0.1~6000.0	10.0	
05-27	Multi-speed 5 acceleration time setting	0.1~6000.0	10.0	
05-28	Multi-speed 5 deceleration time setting	0.1~6000.0	10.0	
05-29	Multi-speed 6 acceleration time setting	0.1~6000.0	10.0	
05-30	Multi-speed 6 deceleration time setting	0.1~6000.0	10.0	
05-31	Multi-speed 7 acceleration time setting	0.1~6000.0	10.0	
05-32	Multi-speed 7 deceleration time setting	0.1~6000.0	10.0	
05-33	Multi-speed 8 acceleration time setting	0.1~6000.0	10.0	
05-34	Multi-speed 8 deceleration time setting	0.1~6000.0	10.0	
05-35	Multi-speed 9 acceleration time setting	0.1~6000.0	10.0	
05-36	Multi-speed 9 deceleration time setting	0.1~6000.0	10.0	
05-37	Multi-speed 10 acceleration time setting	0.1~6000.0	10.0	
05-38	Multi-speed 10 deceleration time setting	0.1~6000.0	10.0	
05-39	Multi-speed 11 acceleration time setting	0.1~6000.0	10.0	
05-40	Multi-speed 11 deceleration time setting	0.1~6000.0	10.0	
05-41	Multi-speed 12 acceleration time setting	0.1~6000.0	10.0	
05-42	Multi-speed 12 deceleration time setting	0.1~6000.0	10.0	
05-43	Multi-speed 13 acceleration time setting	0.1~6000.0	10.0	
05-44	Multi-speed 13 deceleration time setting	0.1~6000.0	10.0	
05-45	Multi-speed 14 acceleration time setting	0.1~6000.0	10.0	
05-46	Multi-speed 14 deceleration time setting	0.1~6000.0	10.0	

Group 05 Multi-speed function group				
Code	Name	Range	Factory setting	Attribute
05-47	Multi-speed 15 acceleration time setting	0.1~6000.0	10.0	
05-48	Multi-speed 15 deceleration time setting	0.1~6000.0	10.0	

Group 06 Auto run function group				
Code	Name	Range	Factory setting	Attribute
06-00	Auto run mode selection	0: Invalid	0	
		1: Single cycle running mode executed, continuous running under pre-stop speed after stop		
		2: Continuous cycle running mode, continuous running under pre-stop speed after stop		
		3: Continuous running under final-stage speed after the end of single cycle, continuous running under pre-stop speed after stop		
		4: Single cycle running mode executed, running from zero-stage speed after stop		
		5: Continuous cycle running mode, running from zero-stage speed after stop		
		6: Continuous running under final-stage speed after the end of single cycle, running from zero-stage speed after stop		
06-01	*Stage 1 running frequency setting	0.00~599.00	5.00	*1
06-02	*Stage 2 running frequency setting	0.00~599.00	10.00	*1
06-03	*Stage 3 running frequency setting	0.00~599.00	20.00	*1

Group 06 Auto run function group				
Code	Name	Range	Factory setting	Attribute
06-04	*Stage 4 running frequency setting	0.00~599.00	30.00	*1
06-05	*Stage 5 running frequency setting	0.00~599.00	40.00	*1
06-06	*Stage 6 running frequency setting	0.00~599.00	50.00	*1
06-07	*Stage 7 running frequency setting	0.00~599.00	50.00	*1
06-08	*Stage 8 running frequency setting	0.00~599.00	5.00	*1
06-09	*Stage 9 running frequency setting	0.00~599.00	5.00	*1
06-10	*Stage 10 running frequency setting	0.00~599.00	5.00	*1
06-11	*Stage 11 running frequency setting	0.00~599.00	5.00	*1
06-12	*Stage 12 running frequency setting	0.00~599.00	5.00	*1
06-13	*Stage 13 running frequency setting	0.00~599.00	5.00	*1
06-14	*Stage 14 running frequency setting	0.00~599.00	5.00	*1
06-15	*Stage 15 running frequency setting	0.00~599.00	5.00	*1
06-16	Stage 0 running time setting	0.0~6000.0	0.0	*1
06-17	Stage 1 running time setting	0.0~6000.0	0.0	*1
06-18	Stage 2 running time setting	0.0~6000.0	0.0	*1
06-19	Stage 3 running time setting	0.0~6000.0	0.0	*1
06-20	Stage 4 running time setting	0.0~6000.0	0.0	*1
06-21	Stage 5 running time setting	0.0~6000.0	0.0	*1
06-22	Stage 6 running time setting	0.0~6000.0	0.0	*1
06-23	Stage 7 running time setting	0.0~6000.0	0.0	*1
06-24	Stage 8 running time setting	0.0~6000.0	0.0	*1
06-25	Stage 9 running time setting	0.0~6000.0	0.0	*1
06-26	Stage 10 running time setting	0.0~6000.0	0.0	*1

Group 06 Auto run function group				
Code	Name	Range	Factory setting	Attribute
06-27	Stage 11 running time setting	0.0~6000.0	0.0	*1
06-28	Stage 12 running time setting	0.0~6000.0	0.0	*1
06-29	Stage 13 running time setting	0.0~6000.0	0.0	*1
06-30	Stage 14 running time setting	0.0~6000.0	0.0	*1
06-31	Stage 15 running time setting	0.0~6000.0	0.0	*1
06-32	Stage 0 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-33	Stage 1 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-34	Stage 2 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-35	Stage 3 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-36	Stage 4 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-37	Stage 5 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-38	Stage 6 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-39	Stage 7 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-40	Stage 8 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-41	Stage 9 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-42	Stage 10 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-43	Stage 11 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-44	Stage 12 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-45	Stage 13 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-46	Stage 14 running direction selection	0: Stop 1:Forward 2: Reverse	0	
06-47	Stage 15 running direction selection	0: Stop 1:Forward 2: Reverse	0	

Group 07 Stop function group				
Code	Name	Range	Factory setting	Attribute
07-24	Bi-directional speed search selection	0: Invalid 1: Valid	0	
07-25	LV detection time	0.00~1.00	0.02	
07-26	Starting mode selection after SLV free stop	0: Speed search start	0	
		1: Normal start		
07-27	Starting mode selection after SLV fault	0: Speed search start	0	
		1: Normal start		
07-28	Starting mode selection after breaking	0: Speed search start	0	
		1: Normal start		
07-29	Running command selection after DC brake action	0: Start disabled	0	
		1: Start enabled		
07-30	LV level selection	0: Invalid	0	
		1: Valid		
07-32	Speed search mode selection	0: Invalid	0	
		1: Speed search after power-on		
		2: Speed search after each start		
07-33	Speed search start frequency selection	0: Max. output frequency of motor	0	
		1: Frequency command		
07-34	Short-circuit brake time when start	0.00~100.00	0.00	
07-35	Short-circuit brake time when stop	0.00~100.00	0.5	
07-36	Short-circuit brake current limit	0.0~200.0	100.0	
07-42	Voltage limit gain	0.0~50.0	0	
07-43	Short-circuit brake time of PM speed search	0.00~100.00	0.00	
07-44	DC brake time of PM speed search	0.00~100.00	0.00	
07-45	STP2 function selection	0: STP2 enabled	0	
		1: STP2 cancelled		
07-47	DC brake selection at ES	0: Without DC brake	0	
		1: With DC brake		
07-48	PM speed switching frequency mode	0: Invalid	0	
		1: Mode 1		
		2: Mode 2		

Group 07 Stop function group				
Code	Name	Range	Factory setting	Attribute
07-00	Restart selection after instantaneous stop	0: Invalid	0	
		1: Valid		
07-01	Restart time after auto reset	0~7200	0	
07-02	Restart number after auto reset	0~10 (Note 1.3)	0	
07-03	Reserved			
07-04	Direct start after power-on	0: Direct start after power-on when external running command is valid	1	
		1: Not started directly after power-on when external running command is valid		
07-05	Direct start delay after power-on	1.0~300.0	3.5	
07-06	Brake start frequency	0.0~10.0	0.5	
07-07	DC brake current level	0~100	50	
07-08	DC brake time at stop	0.00~100.00	0.50	
07-09	Stop mode selection	0: Deceleration stop	0	
		1: Free running stop		
		2: All-range DC brake stop		
		3: Free running stop with timer		
07-10~07-12 reserved				
07-13	LV detection level	380V type: 250~600 * Note 1	380	
07-14	Pre-exciting limit time	0.00~10.00	2.00	
07-15	Pre-exciting level	50~200	100	
07-16	DC brake time after power-on	0.00~100.00	0.00	
07-17	Reserved			
07-18	Min. breaking time	0.1~5.0	KVA	
07-19	Steering search current	0~100	50	
07-20	Speed search current	0~100	20	
07-21	Speed search integral time	0.1~10.0	2.0	
07-22	Speed search delay time	0.0~20.0	0.2	
07-23	Voltage recovery time	0.1~5.0	2.0	

Group 07 Stop function group				
Code	Name	Range	Factory setting	Attribute
07-24	Bi-directional speed search selection	0: Invalid 1: Valid	0	
07-25	LV detection time	0.00~1.00	0.02	
07-26	Starting mode selection after SLV free stop	0: Speed search start	0	
		1: Normal start		
07-27	Starting mode selection after SLV fault	0: Speed search start	0	
		1: Normal start		
07-28	Starting mode selection after breaking	0: Speed search start	0	
		1: Normal start		
07-29	Running command selection after DC brake action	0: Start disabled	0	
		1: Start enabled		
07-30	LV level selection	0: Invalid	0	
		1: Valid		
07-32	Speed search mode selection	0: Invalid	0	
		1: Speed search after power-on		
		2: Speed search after each start		
07-33	Speed search start frequency selection	0: Max. output frequency of motor	0	
		1: Frequency command		
07-34	Short-circuit brake time when start	0.00~100.00	0.00	
07-35	Short-circuit brake time when stop	0.00~100.00	0.5	
07-36	Short-circuit brake current limit	0.0~200.0	100.0	
07-42	Voltage limit gain	0.0~50.0	0	
07-43	Short-circuit brake time of PM speed search	0.00~100.00	0.00	
07-44	DC brake time of PM speed search	0.00~100.00	0.00	
07-45	STP2 function selection	0: STP2 enabled 1: STP2 cancelled	0	
07-47	DC brake selection at ES	0: Without DC brake 1: With DC brake	0	
07-48	PM speed switching frequency mode	0: Invalid 1: Mode 1 2: Mode 2	0	

Group 08 Protection function group				
Code	Name	Range	Factory setting	Attribute
08-00	Stall prevention function	xxx0b: Acceleration stall prevention valid	0000b	
		xxx1b: Acceleration stall prevention invalid		
		xx0xb: Deceleration stall prevention valid		
		xx1xb: Deceleration stall prevention invalid		
		x0xxb: Running stall prevention valid		
		x1xxb: Running stall prevention invalid		
		xxx0b: Acceleration stall prevention valid		
		0xxxb: Running stall prevention as per stage 1 deceleration time 1xxxb: Running stall prevention as per stage 2 deceleration time		
08-01	Acceleration stall prevention level	20~200	HD:150 ND:120	
08-02	Deceleration stall prevention level	660V~820V	380V:680 440V:770	
08-03	Running stall prevention level	30~200	HD:160 ND:120	
08-04	Reserved			
08-05	Motor overload (OL1) protection selection	xxx0b: Motor overload invalid	0101b	
		xxx1b: Motor overload valid		
		xx0xb: Motor overload cold start		
		xx1xb: Motor overload hot start		
		x0xxb: Standard motor		
		x1xxb: VF motor		
		0xxxb: Reserved		
1xxxb: Reserved				
08-06	Start mode of overload (OL1) protection	0: Output stop after overload protection	0	
		1: Continuous running after overload protection		
		1: Motor overload (OL1) protection 1		
		2: Motor overload (OL1) protection 2		

Note: 07-43~07-45 is added in V1.07, and 07-47~07-48 in V1.21. For the type of 07-13 LV detection level 440V, 07-30 LV level selection should be set as valid and lower limit adjusted to 250V. This is applied to EPS (emergency power supply) system for elevator.

\*Frequency resolution is 0.1Hz when max. output frequency of motor is over 300Hz.

Group 08 Protection function group				
Code	Name	Range	Factory setting	Attribute
08-07	Motor overload (OL1) protection level	0: (OL1) protection 0	0	
		1: (OL1) protection 1		
		2: (OL1) protection 2		
		1: Valid		
08-08	Auto voltage regulation (AVR)	0: Valid		
		1: Invalid		
08-09	Input phase failure protection selection	0: Invalid		
		1: Valid		
08-10	Output phase failure protection selection	0: Invalid	0	
		1: Valid		
08-11~08-12 reserved				
08-13	Overtorque detection selection	0: Overtorque detection invalid	0	
		1: Detection start under set frequency		
		2: Detection during running		
08-14	Overtorque action selection	0: Deceleration stop after detection	0	
		1: Warning displayed and continuous running after detection		
		2: Free running stop after detection		
08-15	Overtorque detection level	0~300	150	
08-16	Overtorque detection time	0.0~10.0	0.1	
08-17	Low torque detection selection	0: Low torque detection invalid	0	
		1: Start detection as set		
		2: Detection during running		
08-18	Low torque action selection	0: Deceleration stop after detection	0	
		1: Warning displayed and continuous running after detection		
		2: Free running stop after detection		
08-19	Low torque detection level	0~300	30	
08-20	Low torque detection time	0.0~10.0	0.1	
08-21	Acceleration stall prevention limit	1~100	50	
08-22	Running stall detection time	2~100	100	
08-23	Ground fault (GF) selection	0: Invalid	0	
		1: Valid		

Group 08 Protection function group				
Code	Name	Range	Factory setting	Attribute
08-24	External fault operation selection	0: Invalid	0	
		1: Valid		
08-25	External fault detection selection	0: Deceleration stop	0	
		1: Free running stop		
		2: Continuous running		
		1: Free running stop		
08-26~08-29 reserved				
08-30	Safety function selection	0: Deceleration stop	0	
		1: Free running stop		
08-31~08-34 reserved				
08-35	Motor overheat fault selection	0: Invalid		
		1: Deceleration stop		
		2: Free running stop		
		3: Continuous running		
08-36	PTC input filter time constant	0.00 ~ 5.00		
08-37	Fan control	0: Start in operation	0	
		1: Permanent start		
		2: Start under high temperature		
08-38	Fan off delay time	0~600	180	
08-39	Motor overheat protection delay time	1~300	60	
08-40	Motor 2 acceleration stall prevention level	20~200	HD:150 ND:120	
08-41	Motor 2 acceleration stall prevention limit	1~100	50	
08-42	PTC protection level	0.1~10.0V	0.7	
08-43	PTC reset level	0.1~10.0V	0.3	
08-44	PTC warning level	0.1~10.0V	0.5	
08-45 reserved				
08-46	Over-temperature protection level	0~254	0	
08-47	Over-temperature reset level	0~254	0	
08-48	OC reset function	0: Invalid, resettable 1: Valid, reset 1min later	1	Note 1.3
08-49	Keypad selection	0: T310 1: A510S 2: T310&A510S	0	
08-50	OL3 function selection	0: Invalid 1: Valid	0	
08-51	OL3 reset time	0~300s	0	

Note 1.3: 08-48 is added in V1.21;

Set 08-48=0 when immediate OC reset is required or auto OC fault reset is allowed

### Group 09 Communication function group

Code	Name	Range	Factory setting	Attribute
09-00	Inverter communication station	1~31	1	*3
09-01	Communication mode selection	0: MODBUS	0	*3
		1: Reserved		
		2: Reserved		
		3: PUMP parallel communication		
		4: Reserved		
09-02	Baud rate setting (bps)	0: 1200	4	*3
		1: 2400		
		2: 4800		
		3: 9600		
		4: 19200		
		5: 38400		
09-03	Stop bit selection	0: Stop bit 1	0	*3
		1: Stop bit 2		
09-04	Parity bit selection	0: No parity bit	0	*3
		1: Even bit selection		
		2: Odd bit selection		
09-05	Communication data bit selection	0: 8-bit data	0	*3
		1: 7-bit data		
09-06	Communication abnormality detection time	0.0~25.5	0.0	*3
09-07	Fault stop selection	0: Deceleration stop as per deceleration time 1 after communication fault	3	*3
		1: Free running stop after communication fault		
		2: Deceleration stop as per deceleration time 2 after communication fault		
		3: Continuous running after communication fault		
09-08	Communication fault-tolerant number	1~20	1	*3
09-09	Waiting time	5~65	5	*3

3: Group 09 is not affected by 13-08 initialization.

Group 10 PID function group				
Code	Name	Range	Factory setting	Attribute
10-00	PID target value source setting	0:PUMP or HVAC setting	4	
		1:AI1 setting		
		2:AI2 setting		
		3: Pulse setting		
		4:10-02 setting		
		5: Reserved		
10-01	PID feedback value source setting	1:AI1 setting	2	
		2:AI2 setting		
		3: Pulse setting		
10-02	PID target value	0.00~100.00	0.00	*1
10-03	PID control mode	xxx0b:PID invalid	0000b	
		xxx1b:PID valid		
		xx0xb: PID positive		
		xx1xb: PID negative		
		x0xxb: PID error D control		
		x1xxb: PID feedback D control		
		0xxxb: PID output		
1xxxb: PID output + frequency command				
10-04	Feedback gain	0.01~10.00	1.00	*1
10-05	Proportional gain (P)	0.00~10.00	1.00	*1
10-06	Integral time (I)	0.00~100.00	1.00	*1
10-07	Differential time (D)	0.00~10.00	0.00	*1
10-08	AI1 frequency limit	0.00~599.00	0	
10-09	PID bias	-100.0~100.0	0	*1
10-10	PID output delay time	0.00~10.00	0.00	*1
10-11	PID feedback off detection	0: Invalid	0	
		1: Warning		
		2: Fault		
10-12	PID feedback off detection level	0~100	0	
10-13	PID feedback off detection time	0.0~10.0	1.0	
10-14	PID integral limit	0.0~100.0	100.0	*1
10-15	PID change mode	0~2	0	
10-16	PID change scale	0~100	100	*1
10-17	*PID sleep start frequency	0.00~599.00	0.00	

Group 10 PID function group				
Code	Name	Range	Factory setting	Attribute
10-18	PID sleep delay time	0.0~255.5	0.0	
10-19	*PID wake start frequency	0.00~599.00	0.00	
10-20	PID wake delay time	0.0~255.5	0.0	
10-21~10-22	Reserved			
10-23	PID output limit	0.00~100.0	100.0	*1
10-24	PID output gain	0.0~25.0	1.0	
10-25	PID reverse output selection	0: Reverse output disabled	0	
		1: Reverse output enabled		
10-26	PID target acceleration/deceleration time	0.0~25.5	0.0	
10-27	PID feedback display bias	0~9999	0.00	
10-28	Reserved			
10-29	PID sleep selection	0: Invalid	1	
		1: Valid		
		2: Set by DI		
10-30	Upper limit of PID target	0.0 ~ 100.0	100.0	
10-31	Lower limit of PID target	0.0 ~ 100.0	0.0	
10-32	Reserved			
10-33	Max. PID feedback value	1 ~ 10000	999	
10-34	PID decimal width	0 ~ 4	1	
10-35	Reserved			
10-36	PID2 proportional gain (P)	0.00~10.00	3.00	*1
10-37	PID2 integral time (I)	0.00~100.00	0.50	*1
10-38	PID2 differential time (D)	0.00~10.00	0.00	*1
10-39	*PID off output frequency setting	00.00~599.00	30.00	
10-40	PID sleep compensation frequency selection	0: Invalid		
		1: Valid		
10-41	PID mode switching	0: General PID		
		1: D type PID		



Group 11 Auxiliary function group				
Code	Name	Range	Factory setting	Attribute
11-00	Motor direction locking command	0: Forward/reverse allowed	0	
		1: Forward only		
		2: Reverse only		
11-01	Carrier frequency	0: Adjusted with output frequency 1~16: 1~16KHz Min. set carrier frequency: V/F, SLV2 min. carrier setting 1k SLV min. carrier setting 4k	*注 1	*1
11-02	Soft modulation selection	0: Invalid	0	
		1: Soft modulation 1		
		2: Soft modulation 2 <sup>*9</sup>		
11-03	Auto carrier reduction selection	0: Invalid	0	
		1: Valid		
11-04	Acceleration start S curve time setting	0.00~2.50	0.20	
11-05	Acceleration end S curve time setting	0.00~2.50	0.20	
11-06	Deceleration start S curve time setting	0.00~2.50	0.20	
11-07	Deceleration end S curve time setting	0.00~2.50	0.20	
11-08	Hopping frequency 1	0.0~599.0	0.0	
11-09	Hopping frequency 2	0.0~599.0	0.0	
11-10	Hopping frequency 3	0.0~599.0	0.0	
11-11	Hopping frequency width	0.0~25.5	1.0	
11-12	Manual energy saving gain	0~100	80	
11-13	Auto return time	0~120	60	*1
11-14~11-17 reserved				
11-18	Manual energy saving frequency	0.0~599.0	0.00	
11-19	Manual energy saving function	0: Auto saving invalid	0	
		1: Auto saving valid		
11-20	Manual energy saving filter time	0~200	140	
11-21	Upper limit of energy saving adjustment voltage	0~100	100	
11-22	Energy saving adjustment time	0~5000	20	*1
11-23	Energy saving detection level	0~100	10	
11-24	Auto energy saving factor	0.00~655.34	KVA	
11-26	Upper frequency limit of carrier switching	10%~100%	80%	*9
11-27	Lower frequency limit of carrier switching	2%~100%	20%	*9

Group 11 Auxiliary function group				
Code	Name	Range	Factory setting	Attribute
11-28	Over-voltage prevention 2 frequency gain	1~200	100	
11-29	Auto output frequency reduction selection	0: Invalid	0	
		1: Valid		
11-30	Max. limit of variable carrier frequency	2~16	KVA	
11-31	Min. limit of variable carrier frequency	1~16	KVA	
11-32	Variable carrier frequency gain	00~99	00	
11-33	DC voltage filter rise	0.1~10.0	0.1	
11-34	DC voltage filter drop	0.1~10.0	5.0	
11-35	DC voltage filter dead space level	0.0~99.0	10.0	
11-36	Over-voltage prevention frequency gain	0.000~1.000	0.050	
11-37	** Over-voltage prevention frequency limit	*0.00~599.00	5.00	
11-38	Start voltage of over-voltage prevention deceleration	380V: 400~800V	700	
11-39	Stop voltage of over-voltage prevention deceleration	380V: 600~800V	750	
11-40	Over-voltage prevention selection	0: Invalid	V/F SLV2:0; SLV:1	
		1: Over-voltage prevention 1		
		2: Over-voltage prevention 2		
		3: Over-voltage prevention 3		
		4: Overexcitation Deceleration		
11-41	Reference frequency disappearance detection selection	0: Deceleration stop when reference frequency disappears	0	
		1: Running as per 11-42 setting when reference frequency disappears		
11-42	Frequency command when reference frequency disappears	0.0~100.0	80.0	
11-43	Locking frequency when start	0.0~599.0	0.0	
11-44	Frequency locking time when start	0.0~10.0	0.0	
11-45	Locking frequency when stop	0.0~599.0	0.0	
11-46	Frequency locking time when stop	0.0~10.0	0.0	
11-47	KEB deceleration time	0.0~25.5	0.0	*1
11-48	KEB detection level	380V:380~420	400	

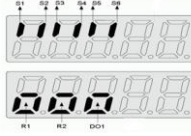
Note: 11-26~11-27: The auto variable carrier function can only be used when 00-00=5, 22-26=2 and 11-01=0.

Group 11 Auxiliary function group				
Code	Name	Range	Factory setting	Attribute
11-49~11-50 reserved				
11-51	Zero-speed brake selection	0: Zero-speed DC brake invalid 1: Zero-speed DC brake valid	0	
11-52	Droop control level	0.0~100.0	0.0	*1
11-53	Droop control delay	0.01~2.00	0.2	*1
11-54	Cumulative energy initialization	0: Not cleared 1: Cleared	0	*1
11-55	STOP key selection	0: Stop key invalid when running command is not provided by operator 1: Stop key valid when running command is not provided by operator	1	
11-56	UP/DOWN selection	0: Operator UP/DOWN is valid only when ENTER is pressed after frequency change 1: Operator UP/DOWN becomes valid upon frequency change	0	
11-57	Reserved			
11-58	Reference frequency record	0: Invalid 1: Valid	0	*1
11-59	Oscillation prevention gain	0.00~2.50	0.05	
11-60	Upper limit of oscillation prevention	0~100	KVA	
11-61	Time parameter of oscillation prevention	0~100	0	
11-62	Oscillation prevention selection	0: Mode 1 1: Mode 2 2: Mode 3	0	
11-63	Strong magnet selection	0: Invalid 1: Valid	1	
11-64	Acceleration rate adjustment gain	0.1~10.0	1.0	
11-65	Target main circuit voltage	380V:400V~800V	740	
11-66	Start frequency of modulation mode switching	6.00~60.00	20	
11-67	Soft modulation 2 detection range	0~12000	0	*9
11-68	Start frequency of soft modulation 2 detection	6.00~60.00	20	*9

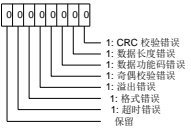
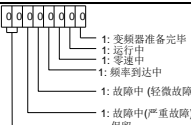
Group 11 Auxiliary function group				
Code	Name	Range	Factory setting	Attribute
11-69	Oscillation prevention gain	0.00~200.00	5.00	
11-70	Upper limit of oscillation prevention	0.01~100.00	5.00	
11-71	Time constant of oscillation prevention	0~30000	100	
11-72	Switching frequency 1 of oscillation prevention gain	0.01~300.00	30.00	
11-73	Switching frequency 2 of oscillation prevention gain	0.01~300.00	50.00	
11-74~11-75 reserved				
11-76	Droop frequency level 1	0.00~599.00	0.00	*4
11-77	Droop frequency level 2	0.00~599.00	0.00	*4
11-78	Droop torque offset	0.00~100.00	0.00	*4
11-79	Carrier modulation mode	0 and 2: Two-phase modulation 1: Three-phase modulation	0	
11-81	Overexciting current limit level	1.00~2.00	1.1	
11-82	Overexciting current gain factor %	0~256	64	

\*Note 1: In reference to page 4-45, Attachment I, carrier frequency adjustment range in operation 11-01 is 1~16KHz; 11-79 is added in V1.21, which may be set as 1 for reduction of motor noise; operation in the full frequency range is three-phase modulation mode.

Group 12 Monitoring function group				
Code	Name	Range	Factory setting	Attribute
12-00	Display selection (LED)	00000~88888 Screen displayed after DSP is pressed from the leftmost bit: 0: No display 1: Output current 2: Output voltage 3:DC bus voltage 4:Heatsink temperature* 5:PID feedback 6:A11 value 7:A12 value 8: Frequency command	00321	*1 *6
12-01	PID feedback display mode (LED)	0: Feedback value displayed in integer (xxx) 1: Feedback value displayed in 1 decimal place (xx.x) 2: Feedback value displayed in 2 decimal places (x.xx)	0	*6
12-02	PID feedback display unit setting (LED)	0:xxxxx (no unit) 1:xxxPb (pressure) 2:xxxFL (flow)	0	*6

Group 12 Monitoring function group				
Code	Name	Range	Factory setting	Attribute
12-03	Linear speed display (LED)	0~60000	1500/ 1800	*1 *6
12-04	Linear speed display mode (LED)	0: Inverter output frequency displayed 1: Linear speed displayed in integer (xxxxx) 2: Linear speed displayed 1 decimal place (xxxx.x) 3: Linear speed displayed in 2 decimal places (xxx.xx) 4: Linear speed displayed in 3 decimal places (xx.xxx)	0	*1 *6
12-05	Display digital I/O terminal state (LED)	Input/ output correspondence  Refer to the diagram in P35 for the detail	-	*4
12-06~12-10 reserved				
12-11	Output current of the last fault	Output current of the last fault displayed	-	*4
12-12	Output voltage of the last fault	Output voltage of the last fault displayed	-	*4
12-13	Output frequency of the last fault	Output frequency of the last fault displayed	-	*4
12-14	DC voltage of the last fault	DC voltage of the last fault displayed	-	*4
12-15	Frequency command of the last fault	Frequency command of the last fault displayed	-	*4
12-16	Frequency command	Frequency command monitored only when LED enters the parameter	-	*4
12-17	Output frequency	Current output frequency displayed	-	*4
12-18	Output current	Current output current displayed	-	*4
12-19	Output voltage	Current output voltage displayed	-	*4
12-20	DC voltage (Vdc)	Current DC voltage displayed	-	*4
12-21	Output power (kw)	Current output power displayed	-	*4

Group 12 Monitoring function group				
Code	Name	Range	Factory setting	Attribute
12-22	Motor speed (RPM)	Current motor speed displayed. In VF/SLV mode, motor speed= output frequency x120/pole number ( <b>upper limit of motor speed (RPM) 65535</b> )	-	*4
12-23	Output power factor (Pfo)	Current output power factor displayed	-	*4
12-24	Control mode	Control mode displayed 0:VF 2:SLV 6:SLV2	-	*4
12-25	AI1 input	AI1 input (-10V corresponding to -100%, 10V to 100%)	-	*4
12-26	AI2 input	Current AI2 input displayed (0V or 4mA corresponding to 0%, 10V or 20mA to 100%)	-	*4
12-27	Motor torque	Current torque command displayed (100% corresponding to motor torque)	-	*4
12-28	Motor torque current (Iq)	Current q shaft current displayed	-	*4
12-29	Motor exciting current (Id)	Current d shaft current displayed	-	*4
12-30~12-35 reserved				
12-36	PID control input	Error input of PID controller displayed (PID target-PID feedback) (100% corresponding to max. frequency setting of 01-02 or 01-16)	-	*4
12-37	PID output	PID controller output displayed (100% corresponding to max. frequency setting of 01-02 or 01-16)	-	*4
12-38	PID setting	PID controller target value displayed (100% corresponding to max. frequency setting of 01-02 or 01-16)	-	*4
12-39	PID feedback	PID controller feedback value displayed (100% corresponding to max. frequency setting of 01-02 or 01-16)	-	*4
12-40	Reserved			
12-41	Inverter temperature display	Heat sink or IGBT temperature displayed	-	*4

Group 12 Monitoring function group				
Code	Name	Range	Factory setting	Attribute
12-42	RS-485 error code	 Refer to the diagram in P31 for detail	-	*4
12-43	Inverter state	 Refer to the diagram in P31 for detail	-	*4
12-44	Pulse input frequency	Pulse input frequency displayed	-	*4
12-45	Current fault message	Current fault message displayed	-	*4
12-46	Last fault message	Last fault message displayed	-	*4
12-47	Last 2 fault message	Last 2 fault message displayed	-	*4
12-48	Last 3 fault message	Last 3 fault message displayed	-	*4
12-49	Last 4 fault message	Last 4 fault message displayed	-	*4
12-50	DI/DO state of last (new) fault	DI/DO state of last fault displayed, as instructed for 12-05	-	*4
12-51	Inverter state of last (new) fault	Inverter state of last fault displayed, as instructed for 12-43	-	*4
12-52	Tripping time 1 of last (new) fault	Running time of last fault displayed; 12-53 refers to days,	-	*4
12-53	Tripping time 2 of last (new) fault	12-52 to hours	-	*4
12-54	Frequency command of previous (old) fault	Frequency command of previous fault displayed	-	*4
12-55	Output frequency of previous (old) fault	Output frequency of previous fault displayed	-	*4
12-56	Output current of previous (old) fault	Output current of previous fault displayed	-	*4
12-57	Output voltage of previous (old) fault	Output voltage of previous fault displayed	-	*4
12-58	DC voltage of previous (old) fault	DC voltage of previous fault displayed	-	*4
12-59	DI/DO state of previous (old) fault	DI/DO state of previous fault displayed, as instructed for 12-05	-	*4

Group 12 Monitoring function group				
Code	Name	Range	Factory setting	Attribute
12-60	Inverter state of previous (old) fault	Inverter state of previous fault displayed, as instructed for 12-43	-	*4
12-61	Tripping time 1 of previous fault	Running time of last fault displayed;	-	*4
12-62	Tripping time 2 of previous fault	12-62 refers to days, 12-61 to hours	-	*4
12-63	Last warning message	Current warning message displayed	-	*4
12-64	Previous warning message	Previous warning message displayed	-	*4
12-65~12-66 reserved				
12-67	Cumulative energy (KWh)	0.0 ~ 999.9		*4
12-68	Cumulative energy (MWh)	0 ~ 60000		*4
12-69~12-75 reserved				
12-76	Actual no-load voltage	0.0~600.0	-	*4
12-77~12-78 reserved				
12-79	Pulse input percent	0.0~100.0	-	*4
12-80	All frequency command	0.0~599.0	0	*4
12-82	Motor load	0~200.0	-	*4
12-85	Temperature value of last (new) fault	Temperature of last fault displayed	-	*4
12-86	Temperature value of previous (old) fault	Temperature of previous fault displayed	-	*4
12-87	Fault state	Source of UV, CF08 fault	-	*4

Group 13 Maintenance function group				
Code	Name	Range	Factory setting	Attribute
13-00	Inverter H.P	----	-	*4
13-01	Software version	0.00-9.99	-	*4
13-02	Cumulative working time clearing	0: Cumulative working time not cleared	0	*1
		1: Cumulative working time cleared		
13-03	Cumulative working time 1	0~23	-	*4
13-04	Cumulative working time 2	0~65535	-	*4
13-05	Cumulative working time selection	0: Cumulative time at power-on	0	*1
		1: Cumulative time during operation		
13-06	Parameter lock	0: All parameters other than 13-06 and main page frequency 05-01 not writable	2	*1
		1: Reserved		
		2: All parameters writable		
13-07	Password function	00000~65534	00000	
13-08	Restore factory setting	0: Not initialized	-	
		2: 2-wire initialization (60Hz) (440V)		
		3: 3-wire initialization (60Hz) (440V)		
		4: Reserved		
		5: Reserved		
		6: 2-wire initialization (50Hz) (380V)		
		7: 3-wire initialization (50Hz) (380V)		

Group 13 Maintenance function group				
Code	Name	Range	Factory setting	Attribute
13-09	Fault history clearing	0: Fault history not cleared	0	*1
		1: Fault history cleared		
13-10	State function	0 ~ 9999	0	
13-11	C/B CPLD software version (for CLPLD type)	0.00~9.99	-	*9
13-14	Fault storage selection	0: Fault message of restart after auto reset not stored in fault history	1	
		1: Fault message of restart after auto reset stored in fault history		
13-15	Reserved			
13-21	Last fault message	Last fault message displayed	-	
13-22	Last 2 fault message	Last 2 fault message displayed	-	
13-23	Last 3 fault message	Last 3 fault message displayed	-	
13-24	Last 4 fault message	Last 4 fault message displayed	-	
13-25	Last 5 fault message	Last 5 fault message displayed	-	
13-26	Last 6 fault message	Last 6 fault message displayed	-	
13-27	Last 7 fault message	Last 7 fault message displayed	-	
13-28	Last 8 fault message	Last 8 fault message displayed	-	

Group 13 Maintenance function group				
Code	Name	Range	Factory setting	Attribute
13-29	Last 9 fault message	Last 9 fault message displayed	-	
13-30	Last 10 fault message	Last 10 fault message displayed	-	
13-31	Last 11 fault message	Last 11 fault message displayed	-	
13-32	Last 12 fault message	Last 12 fault message displayed	-	
13-33	Last 13 fault message	Last 13 fault message displayed	-	
13-34	Last 14 fault message	Last 14 fault message displayed	-	
13-35	Last 15 fault message	Last 15 fault message displayed	-	
13-36	Last 16 fault message	Last 16 fault message displayed	-	
13-37	Last 17 fault message	Last 17 fault message displayed	-	
13-38	Last 18 fault message	Last 18 fault message displayed	-	
13-39	Last 19 fault message	Last 19 fault message displayed	-	
13-40	Last 20 fault message	Last 20 fault message displayed	-	
13-41	Last 21 fault message	Last 21 fault message displayed	-	
13-42	Last 22 fault message	Last 22 fault message displayed	-	
13-43	Last 23 fault message	Last 23 fault message displayed	-	
13-44	Last 24 fault message	Last 24 fault message displayed	-	
13-45	Last 25 fault message	Last 25 fault message displayed	-	
13-46	Last 26 fault message	Last 26 fault message displayed	-	
13-47	Last 27 fault message	Last 27 fault message displayed	-	
13-48	Last 28 fault message	Last 28 fault message displayed	-	
13-49	Last 29 fault message	Last 29 fault message displayed	-	
13-50	Last 30 fault message	Last 30 fault message displayed	-	

Group 17 Auto-tuning function group				
Code	Name	Range	Factory setting	Attribute
17-00	*Auto-tuning mode selection	0: Rotational auto-tuning	VF:2 SLV:6 SLV2:6	-
		1: Static auto-tuning		
		2: Stator resistance measurement		
		3: Reserved		
		4: Circuit adjustment		
		5: Rotational auto-tuning integration (option: 4+2+0)		
		6: Static auto-tuning integration (option: 4+2+1)		
17-01	Rated output power of motor	25%~120% rated current of inverter	KVA *Note 1	
17-02	Rated current of motor	0.1~1200.0	KVA * Note 1	
17-03	Rated voltage of motor	380V: 100.0~480.0	380/ 440	*8
17-04	Rated frequency of motor	4.8~599.0	50.0/60.0	*8
17-05	Rated speed of motor	0~24000	KVA	
17-06	Pole number of motor	2~16 (even)	4	
17-07	Reserved			
17-08	No-load voltage of motor	380V:100~480	Depending on type	
17-09	Exciting current of motor	15%~70% rated current of motor	-	
17-10	Auto-tuning ON	0: Invalid	0	
		1: Valid		
17-11	Auto-tuning error history	0: No error	0	*4
		1: Motor data error		
		2: Stator resistance adjustment error		
		3: Leakage inductance adjustment error		
		4: Rotor resistance adjustment error		
		5: Mutual inductance adjustment error		
		6: DT error		
		7: Encoder error		
		8: Motor Acceleration error		
9: Warning				
17-12	Motor leakage inductance ratio	0.1~15.0	3.4	
17-13	Motor slip frequency	0.10~20.00	1.00	
17-14	Rotational adjustment type selection	0: VF rotational auto-tuning	0	
		1: Vector rotational auto-tuning		

Group 18 Slip compensation function group				
Code	Name	Range	Factory setting	Attribute
18-00	Low speed slip compensation gain	0.00~2.50	VF:0.00	*1
			SLV: *Note 1	
18-01	High speed slip compensation gain	-1.00~1.00	0.0	*1
18-02	Slip compensation limit	0~250	200	
18-03	Slip compensation filter time	0.0~10.0	1.0	
18-04	Recovery slip compensation selection	0: Invalid	0	
		1: Valid		
18-05	FOC delay time	1~1000	100	
18-06	FOC gain	0.00~2.00	0.1	

\*Note 1: Refer to Attachment I.

Group 19 Wobble frequency function group				
Code	Name	Range	Factory setting	Attribute
19-00	Wobble frequency center frequency	5.00~100.00	20.00	*1
19-01	Wobble frequency amplitude	0.1~20.0	10.0	*1
19-02	Wobble frequency hopping frequency	0.0~50.0	0.0	*1
19-03	Wobble frequency hopping time	0~50	0	*1
19-04	Wobble frequency cycle	0.0~1000.0	10.0	*1
19-05	Wobble frequency ratio	0.1~10.0	1.0	*1
19-06	Wobble frequency UP amplitude	0.0~20.0	0.0	*1
19-07	Wobble frequency DOWN amplitude	0.0~20.0	0.0	*1

\* Note 1: KVA: The parameter varies with inverter capacity.

Note: In vector mode, factory setting of 17-00 is 6; static auto-tuning integration (option:4+2+1): 5: rotational auto-tuning integration (option 4+2+0) is recommended if rotational adjustment is available when motor is not loaded.



Group 20 Speed control function group				
Code	Name	Range	Factory setting	Attribute
20-00	ASR gain 1	0.00~250.00	-	*1
20-01	ASR integral time 1	0.001~10.000	-	*1
20-02	ASR gain 2	0.00~250.00	-	*1
20-03	ASR integral time 2	0.001~10.000	-	*1
20-04	ASR integral time limit	0~300	200	
20-05~20-06	reserved			
20-07	Acceleration/Deceleration P/PI selection	0:PI speed control is valid only under constant speed; P control is used during acceleration/deceleration 1:PI speed control is valid during constant speed and acceleration/deceleration	0	
20-08	ASR delay time	0.000~0.500	0.004	
20-09	Speed observation gain 1	0.00~2.55	0.61	*1
20-10	Speed observation integral time 1	0.01~10.00	0.05	*1
20-11	Speed observation gain 2	0.00~2.55	0.61	*1
20-12	Speed observation integral time 2	0.01~10.00	0.06	*1
20-13	Low-pass filter constant 1 of speed feedback	1~1000	4	
20-14	Low-pass filter constant 2 of speed feedback	1~1000	30	
20-15	ASR gain change frequency 1	0.0~599.0	4.0	
20-16	ASR gain change frequency 2	0.0~599.0	8.0	
20-17	Low-speed torque compensation gain	0.00~2.50	1.00	*1
20-18	High-speed torque compensation gain	-10~10	0	*1
20-19~20-32 reserved				
20-33	Constant speed detection level	0.1~5.0	1.0	*1
20-34	Speed DOWN compensation gain	0~25600	0	*1
20-35	Speed DOWN compensation time	0~30000	100	*1

Group 21 Torque and position control function group				
Code	Name	Range	Factory setting	Attribute
21-00~21-04 reserved				
21-05	Positive torque limit	0~300	*Note 1	
21-06	Negative torque limit	0~300	*Note 1	
21-07	Forward UP torque limit	0~300	*Note 1	
21-08	Reverse UP torque limit	0~300	*Note 1	

Group 22 PM motor group				
Code	Name	Range	Factory setting	Attribute
22-00	Rated power of PM motor	0.00~600.00	KVA	
22-01	Rated voltage of motor	100.0~480.0	380.0	
22-02	Rated current of PM motor	25%~200% rated current of inverter	KVA	
22-03	Pole number of PM motor	2~96	6	
22-04	Rated speed of PM motor	6~60000 (set either 22-04 or 22-06, the other calculated by program)	1500	
22-05	Max. speed of PM motor	6~60000	1500	
22-06	Rated frequency of PM motor	4.8~599.0	75.0	
22-07	PM type selection	0:SPM 1:IPM	1	
22-10	PM SLV starting current	0 ~ 200% rated current of motor	30	
22-11	Start frequency switching point of I/f mode	2~100%	10	
22-14	Armature resistance of PM motor	0.001 ~ 30.000	1.000	
22-15	D shaft inductance of PM motor	0.01 ~ 300.00	10.00	
22-16	Q shaft inductance of PM motor	0.01 ~ 300.00	10.00	
22-17	PM no-load voltage	380V:0.0~500.0	300.0 Note 1.1	
22-18	Weak magnetic limit	0~120	90	
22-21	PM motor adjustment	0: Invalid 1: Auto parameter adjustment 2: Pole alignment and circuit adjustment 3: Dynamic self-learning	0	
22-22	PM motor adjustment failure history	0: No error 1: Static pole alignment failure 2: No PG option card 3: Forced stop of rotational pole alignment 4: Encoder feedback direction error 5: Circuit adjustment timeout 6: Reserved 7: Other motor adjustment error	0	

Group 22 PM motor group				
Code	Name	Range	Factory setting	Attribute
22-22	PM Motor adjustment failure history	8: Abnormal current during rotational pole alignment 9: Abnormal current during circuit adjustment 10: Reserved 11: Stator resistance measurement timeout	0	*4
22-25	Initial pole detection method selection	0: Use angle before stop 1: 6 pulse angle measurement 2: High frequency angle measurement 3: 12 pulse angle measurement	2	
22-26	Estimator mode	0: I/F start 1: High frequency start 2: Full closed-loop start	2	
22-27	Voltage command of method 2 (22-25=2)	5~120 (22-25=2 or 22-26=1 valid)	50	
22-28	Frequency division ratio of method 2 (22-25=2)	0~8 (22-25=2 or 22-26=1 valid)	2	
22-29	Weak magnetic voltage limit	80~110	100	
22-30	SPM estimation gain	1~150	85	Note 1.1
22-31	SPM estimation frequency	1~2000HZ	60	Note 1.1
22-32	MTPA selection	0: Invalid 1: Method	0	Note 1.1
22-33	MTPA gain	000~400%	200	Note 1.1
22-34	IPM estimation gain	1~300	180	Note 1.1
22-36	PM motor type	0: General PM motor 1: DVEN60HZ motor 2: DVEN50HZ motor	0	
22-37	PM motor H.P	0~34	0	
22-38	Start frequency switching width of I/F mode	1.0~40.0	5.0	
22-39	DC excitation time	0~20.0	0.00	
22-40	High-frequency angle measurement time	0.01~1.00	0.05	
22-41	Stop speed control ratio	0: 1: 10 1: 1: 50	0	
22-42	D-shaft inductance factor 1	64~8192	200	
22-43	D-shaft inductance factor 2	64~8192	500	
22-44	Speed integral filter time	1~256	4	
22-45	Linkage coefficient	0.001~10.000	0.600	
22-46	System rotational inertia (kg*cm^2)	1~30000	10	
22-47	Coefficient of viscosity	0.0001~3.0000	0.1000	

Group 22 PM motor group				
Code	Name	Range	Factory setting	Attribute
22-48	Torque feedforward compensation current selection	0: Invalid 1: Valid	0	
22-49	Torque feedforward compensation current ratio	0~32	12	
22-50	Speed feedforward selection	0: Invalid 1: Valid	0	
22-51	Speed feedforward ratio	1~1024	400	
22-52	Full closed-loop correction factor $\beta_{low}$ speed stage	3000~60000	4000	
22-53	Low-speed position filter factor of full closed-loop	1~256	32	
22-54	Voltage rating	50.0~600.0	300.0	*9
22-55	High-speed position filter factor of full closed-loop	1~256	32	*9
22-56	Low-speed filter factor of full closed-loop	1~256	64	*9
22-57	Number of zero voltage pulse cycles	3~20	4	*9
22-58	Optimizing current amplitude limit of zero voltage pulse width	1~50	10	*9
22-59	Zero voltage adding enabling	0: Not added 1: Added	1	*9
22-60	Optimizing value of zero voltage pulse cycle	4000~40000	4000	*9

Group 23 Pump and HVAC group				
Code	Name	Range	Factory setting	Attribute
23-00	Function selection	0: Invalid	0	
		1: Pump selection		
23-01	Single/multiple pump, main and auxiliary machine selection	0: Single pump	0	
		1: Main machine		
		2: Auxiliary 1		
		3: Auxiliary 2		
23-02	Operating pressure setting	0.10 ~ 650.00	4.00	
23-03	Max. pressure of pressure transmitter	0.10 ~ 650.00	10.00	
23-04	Pump pressure command source	0: Set by parameter 23-02	0	
		1: Set by AI		
23-05	Display mode selection	0: Target pressure and feedback pressure displayed (23-03 required to be below 9.9PSI if LED operator is used)	0	
		1: Target pressure only		
		2: Feedback pressure only		
23-06	Proportional gain (P)	0.00~10.00	1.00	*1
23-07	Integral time (I)	0.00~100.00	1.00	*1
23-08	Differential time (D)	0.00~10.00	0.00	*1
23-09	Constant pressure error range	23-20=0:0.01 ~ 650.00 23-20=1:1~100	5	
23-10	Constant pressure sleep frequency	0.00 ~ 599.00	30.00	
23-11	Constant pressure sleep time	0.0~255.5	0.0	
23-12	Max. pressure limit	23-20=0:0.00 ~ 650.00	50	
		23-20=1:0~100		
23-13	High pressure warning time	0.0 ~ 600.0	10.0	
23-14	High-pressure stop time	0.0 ~ 600.0	20.0	
23-15	Min. pressure limit	23-20=0:0.00 ~ 650.00	5	
		23-20=1:0~100		
23-16	Low pressure warning time	0.0 ~ 600.0	0.0	
23-17	Low pressure downtime	0.0 ~ 600.0	0.0	
23-18	Pressure loss detection time	0.0 ~ 600.0	0.0	
23-19	Pressure loss detection ratio	0 ~ 100	0	

Group 23 Pump and HVAC group				
Code	Name	Range	Factory setting	Attribute
23-20	Pressure percentage switching	0: Pressure 1: Percentage	1	
23-21	Reserved			
23-22	Auxiliary tripping frequency	0.00 ~ 599.00	45.00	
23-23	Water detection direction	0: Up 1: Down	1	
23-24	Water detection pressure range	23-20=0:0.00 ~ 65.00 23-20=1:0~10	1	
23-25	Water detection cycle	0.0 ~ 200.0	30.0	
23-26	Water detection acceleration time	0.1 ~ 6000.0 (acceleration time II)	Based on H.P	
23-27	Water detection deceleration time	0.1 ~ 6000.0 (deceleration time II)	Based on H.P	*1
23-28	Forced operation frequency	0.00~ 599.00	0.00	*1
23-29	Alternating time of multiple pumps in parallel	0~240	3	
23-30	Auxiliary pumping detection time of multiple pumps in parallel	0.0 ~ 30.0	0.0	
23-31	Synchronization selection of multiple pumps in parallel	0 : Off 1 : Pressure setting and Run/Stop synchronization 2 : Pressure setting synchronization 3 : Run/Stop synchronization	1	
23-32	Reserved			
23-33	Reserved			
23-34	Constant pressure error range 2	23-20=0:0.01 ~ 650.00 23-20=1:1~100	5	
23-35	Switching selection of multiple sets in parallel (range 2, 3 and 4 for V1.05 and above)	0: Invalid 1:Timer alternating selection 2: Sleep stop alternating selection 3: Alternating selection of timer and sleep stop 4. Parallel test mode of multiple sets	1	
23-37	Leakage detection time	0.0~100.0	0	

Group 23 Pump and HVAC group				
Code	Name	Range	Factory setting	Attribute
23-38	Leakage detection restart pressure variation	23-20=0:0.01 ~ 65.00 23-20=1:1~10	1	
23-39	Leakage detection restart error range	23-20=0:0.01 ~ 650.00 23-20=1:1~100	5	
23-40	Reserved			
23-41	Local/remote key	0: Invalid 1: Valid	1	*9
23-42	Energy recalculation	0: Invalid (continuous energy calculation) 1: Valid (energy recalculation)	0	*9
23-43	Electricity fee per KWh	0.000~5.000	0.000	*9
23-44	Accumulated energy pulse output unit selection	0: Accumulated energy pulse output invalid 1: in 0.1kWh 2: in 1kWh 3: in 10kWh 4: in 100kWh 5: in 1000kWh	0	*9
23-45	Flowmeter feedback setting method	0: Invalid 1: Analog input 2: Pulse input	1	*9
23-46	Max. value of flowmeter	1~50000	10000	*9
23-47	Target value of flowmeter	1~50000	5000	*9
23-48	Max. flow fed back	0.01~99.00	80	*9
23-49	Max. flow warning time fed back	0.0~255.0	3.0	*9
23-50	Max. flow stop time fed back	0.0~255.0	6.0	*9
23-51	Min. flow fed back	0.01~99.00	10.00	*9
23-52	Min. flow warning time fed back	0.0~255.0	3.0	*9
23-53	Min. flow stop time fed back	0.0~255.0	6.0	*9

Group 23 Pump and HVAC group				
Code	Name	Range	Factory setting	Attribute
23-54	Low suction detection function	0: Invalid	0	*9
		1: PID error value		
		2: Current		
		3: Current and PID error		
23-55	Low suction detection time	0.0 ~ 30.0	10.0	*9
23-56	PID error level of low suction	0 ~ 30	10	*9
23-57	Current level of low suction	0 ~ 100	10	*9
23-58	Reaction to low suction	0: Invalid	0	*9
		1: Warning		
		2: Fault		
		3: Fault and restart		
23-59	HVAC pressure command source	0: Set by parameter 23-47	0	*9
		1: Set by AI		
		1: FPM		
		2: CFM		
23-66	Derating current level	10~200	110	*9
23-67	Derating delay time	1.0~20.0	10	*9
23-68	Derating frequency gain	1~100	90	*9
23-69	OL4 current level	10~200	120	*9
23-70	OL4 delay time	0.0~20.0	5	*9
23-71	Max. pressure setting	0.10~650.00	10	
23-72	Parallel alternating time switching	0: Hour	0	
		1: Minute		
23-73	Auxiliary wake selection	0: Invalid	0	
		1: Valid		
23-74	High-pressure action setting	0: Invalid	2	
		1: High pressure warning only		
		2: All high pressure warning errors valid		
23-75	Low-pressure action setting	0: Invalid	0	
		1: Low pressure warning only		
		2: All low pressure warning errors valid		
23-76	High-flow action setting	0: Invalid	2	*9
		1: High flow warning only		
		2: All high flow warning errors valid		
23-75	Low-pressure action setting	0: Invalid	0	
		1: Low pressure warning only		
		2: All low pressure warning errors valid		

Group 23 Pump and HVAC group				
Code	Name	Range	Factory setting	Attribute
23-55	Low suction detection time	0.0 ~ 30.0	10.0	*9
23-56	PID error level of low suction	0 ~ 30	10	*9
23-57	Current level of low suction	0 ~ 100	10	*9
23-58	Reaction to low suction	0: Invalid	0	*9
		1: Warning		
		2: Fault		
		3: Fault and restart		
23-59	HVAC pressure command source	0: Set by parameter 23-47	0	*9
		1: Set by AI		
		1: FPM		
		2: CFM		
23-66	Derating current level	10~200	110	*9
23-67	Derating delay time	1.0~20.0	10	*9
23-68	Derating frequency gain	1~100	90	*9
23-69	OL4 current level	10~200	120	*9
23-70	OL4 delay time	0.0~20.0	5	*9
23-71	Max. pressure setting	0.10~650.00	10	
23-72	Parallel alternating time switching	0: Hour	0	
		1: Minute		
23-73	Auxiliary wake selection	0: Invalid	0	
		1: Valid		
23-74	High-pressure action setting	0: Invalid	2	
		1: High pressure warning only		
		2: All high pressure warning errors valid		
23-75	Low-pressure action setting	0: Invalid	0	
		1: Low pressure warning only		
		2: All low pressure warning errors valid		
23-76	High-flow action setting	0: Invalid	2	*9
		1: High flow warning only		
		2: All high flow warning errors valid		

**Group 23 Pump and HVAC group**

Code	Name	Range	Factory setting	Attribute
23-76	High-flow action setting	0: Invalid	2	*9
		1: High flow warning only		
		2: All high flow warning errors valid		
23-77	Low-flow action setting	0: Invalid	2	*9
		1: Low flow warning only		
		2: All low flow warning errors valid		
23-78	Pressure loss detection selection	0: Invalid	0	
		1: Pressure loss warning		
		2: Pressure loss fault		

Note: 23-74~23-78 are reserved for the versions earlier than V1.04 (inclusive), and enabled for V1.05 and above.

**Group 24 Quick parameter group of special machine application**

Code	Name	Range	Factory setting	Attribute
24-00	Special machine application parameter	0~30 (same with 00-32) The group includes application parameters for setting 10, 20, 30	0	
24-01	Control mode	0: V/F 2: SLV 5: PMSLV 6: SLV2	0	
24-02	Main operation command source selection	0: Keypad 1: External control 2: Communication control	1	
24-03	Main frequency command source selection	0: Keypad 1: External control AI 2: Terminal UP/down 3: Communication control 4: Pulse input 5~6: Reserved 7: Auxiliary frequency 8: Knob setting	1	
24-04	Upper frequency limit	0.1~109.0	100.0	
24-05	Lower frequency limit	0.1~109.0	0.0	
24-06	Acceleration time 1	0.1~6000.0	KVA	*1
24-07	Deceleration time 1	0.1~6000.0	KVA	*1
24-08	VF curve selection	00~FF	F	
24-09	Max. output frequency of motor 1	4.8~599.0	50.0/60.0	
24-10	Max. output voltage of motor 1	380V: 0.2~480.0	380.0/440	*8
24-11	Intermediate output frequency 2 of motor 1	0.0~599.0	0.0	
24-12	Intermediate output voltage 2 of motor 1	380V: 0.2~480.0	0.0	
24-13	Intermediate output frequency 1 of motor 1	0.0~599.0	2.5	
24-14	Intermediate output voltage 1 of motor 1	380V: 0.0~480.0	-	
24-15	Min. output frequency of motor 1	0.0~599.0	-	
24-16	Min. output voltage of motor 1	380V:0.0~480.0	-	*8
24-17	Base frequency of motor 1	4.8~599.0	50.0/60.0	*8
24-18	Base output voltage of motor 1	380V:0.0~480.0	380.0	*8
24-19	Rated current of motor 1	25%~200%	KVA	
24-20	Function setting of multi-function terminal S1	Same with 03-00 setting	0	
24-21	Function setting of multi-function terminal S2		1	
24-22	Function setting of multi-function terminal S3		2	
24-23	Relay R1A -RIC output		1	

**Group 24 Quick parameter group of special machine application**

Code	Name	Range	Factory setting	Attribute
24-24	Pulse output scale	1~32000	1000	*1
24-25	AI input signal type	0~3 (same with 04-00)	1	
24-26	AI2 function setting	0~17 (same with 04-05)	10	
24-27	AO1 function setting	0~28 (same with 04-11)	0	
24-28	AO2 function setting		4	
24-29	AO output signal type	0~3	0	
24-30	Direct start after power-on	When external operation command is valid: 0: Direct start after power-on enabled 1: Direct start after power-on disabled	1	
24-31	DC brake time after stop	0.00~100.00	0.5	
24-32	Stop mode selection	0~3	0	
24-33	Pre-exciting level	50~200	100	
24-34	Speed search mode selection	0~2	0	
24-35	Stall prevention	Same with 08-00 setting		
24-36	Carrier frequency	0: Adjusted with output frequency 1~16: 1~16KHz	Based on mode	*1
24-37	Display screen selection	Same with 12-00 setting	00321	*1
24-38	ASR gain 1	0.00~250.00	Based on mode	*1
24-39	ASR integral time 1	0.001~10.000	Based on mode	*1
24-40	ASR gain 2	0.00~250.00	Based on mode	*1
24-41	ASR integral time 2	0.001~10.000	Based on mode	*1
24-42	Speed DOWN compensation gain	0~25600	0	*1
24-43	Speed DOWN compensation time	0~30000	100	*1
24-44	Positive torque limit	0~300	200	
24-45	Negative torque limit	0~300	200	
24-46	Forward UP torque limit	0~300	200	
24-47	Reverse UP torque limit	0~300	200	
24-48	Auto-tuning mode selection	Same with 17-00	VF: 0 SLV: 6 SLV2: 6	
24-49	Rated output power of motor	0.00~600.00	Based on H.P	
24-50	Rated current of motor	0.1~1200.0	Based on H.P	
24-51	Rated voltage of motor	380V: 100.0~480.0	380/440 V	*8
24-52	Rated frequency of motor	4.8~599.0	50/60HZ	
24-53	Rated speed of motor	0~24000	Based on H.P	
24-54	Pole number of motor	2~16(even)	4	
24-55	Auto-tuning ON	0~1	0	

# Chapter 4 Troubleshooting

## 4.1 General

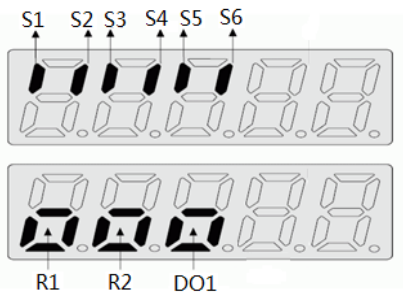
The inverter is designed with troubleshooting, warning/self-diagnosis function. When fault is detected and the fault code is displayed on the digital operator, the fault contact output is actuated, and inverter output is cut off to make the motor freely run and stop (optional stop methods for certain faults).

When warning/self-diagnosis is detected, the digital operator will display the warning/self-diagnosis code, but fault output of the contact is not actuated. The system will automatically restore to the original state upon elimination of warning.

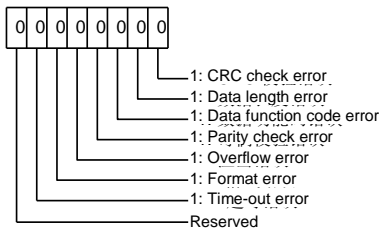
## 4.2 Fault detection function

In case of fault, find the causes in table 4.1 and take proper measures. Please stop the machine firstly, and use one of the following methods for restart:

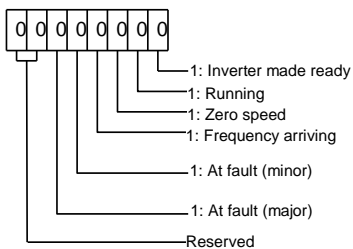
1. Set one of the multi-function digital input terminals (03-00, 03-05) to 17 (fault reset) to put fault reset signal ON.
  2. Press the Reset key on the digital operator.
  3. Cut off power supply for the main circuit and then switch on.
- Upon occurrence of fault, the fault message is stored (group 12 parameters).



12-05 diagram



12-42 diagram



12-43 diagram

Table 4.1 Error message and corrective measures



LED display	Corrective action	LED display	Corrective action
<b>OC</b> <b>overcurrent</b>	.Extend acceleration/deceleration time. .Check load wiring. .Remove motor and try to run the inverter. .Inverter repair.	<b>OCA</b> <b>overcurrent</b>	.Set longer acceleration time. .Replace with an inverter of equal capacity. .Perform motor inspection. .Check the wiring. .Inverter repair.
<b>OC</b>		<b>OCA</b>	
OCC overcurrent	.Increase the inverter capacity. .Mount a reactor on the power input side. . Inverter repair.	<b>OCD</b> <b>overcurrent</b>	. Set longer deceleration time. . Inverter repair.
<b>OCC</b>		<b>OCD</b>	
LED display	Corrective action	LED display	Corrective action
<b>SC</b> <b>short-circuit</b>	.Check load wiring. . Inverter repair.	EF0 External fault 0	Check the cause of external fault. .Reset bit 2 of the communication position 0x2501.
<b>SC</b>		<b>EF0</b>	
GF ground fault	.Check motor wiring and impedance. . Inverter repair.	<b>EF1</b> <b>External fault (S1)</b>	.Check external causes. .Reset external fault of multi-function digital input.
<b>GF</b>		<b>EF1</b>	
OV overvoltage	.Extend deceleration time. .Check input circuit and reduce input voltage to specification. .Remove the power factor correction capacitor. . Mount a brake resistor.	<b>EF2</b> <b>External fault (S2)</b>	
<b>OU</b>		<b>EF2</b>	
UV undervoltage	.Check input circuit and supply voltage. .Extend acceleration time. . Inverter repair.	<b>EF3</b> <b>External fault (S3)</b>	
<b>UU</b>		<b>EF3</b>	
IPL input phase loss	.Check power supply wiring of main circuit is correct. .Check whether terminal screws are loose. .Check supply voltage and take measures for voltage stabilizing, or close IPL. . Inverter repair.	<b>EF4</b> <b>External fault (S4)</b>	
<b>IPL</b>		<b>EF4</b>	
OPL output phase loss	.Check motor wiring. .Check capacity of motor and inverter.	<b>EF5</b> <b>External fault (S5)</b>	
<b>OPL</b>		<b>EF5</b>	
<b>OH1</b> <b>Heat sink overheat</b>	.Check ambient temperature of inverter. .Check dust and dirt of fan or heat sink. .Check carrier frequency setting.	<b>EF6</b> <b>External fault (S6)</b>	
<b>OH1</b>		<b>EF6</b>	
OL1 Motor overload	.Check V/F mode. .Check rated current of motor. .Check load size and running cycle.	<b>CF07</b> <b>Motor control failure</b>	.Perform rotational motor parameter test (rotational auto-tuning) .Otherwise, perform static motor parameter test or increase 01-08 set value
<b>OL1</b>		<b>CF07</b>	
OL2 Inverter overload	.Check V/F mode. .Replace with inverter of higher capacity. .Check load size and running cycle.	CF08 Motor control failure	. Properly increase 22-10 and 22-23 set values. .Perform auto-tuning of 22-21

<b>OL2</b>		<b>CF08</b>	again. .Check whether load is too high and whether it is required to increase the output torque limit.
<b>OT</b> Overtorque detection	.Check APP or operating state. .Check whether 08-15 and 08-16 values are appropriate.	<b>FU</b> <b>Fuse open-circuit</b>	.Check whether motor and cable are short-circuited or insulation is damaged. .Repair/replace the inverter.
<b>OL</b>		<b>Fu</b>	
<b>UT</b> Undertorque detection	. Check APP or operating state. .Check whether 08-19 and 08-20 values are appropriate.	<b>CF00</b> <b>Operator communication failure</b>	.Unplug the digital operator connector and then plug in. .Replace the control board.
<b>UL</b>		<b>CF00</b>	
<b>run</b> Motor 1/motor 2 switching	.Correct sequence control for motor switching after stop.	<b>CF01</b> <b>Operator communication failure 2</b>	.Unplug the digital operator connector and then plug in. .Replace the control board.
<b>run</b>		<b>CF01</b>	
<b>FB</b> PID feedback off-line	.Check the set PID feedback mode is correct. .Ensure correct installation and PID feedback signal is normal.	<b>CT fault</b>	.Check input voltage signal and control board voltage.
<b>Fb</b>		<b>CTEr</b>	
<b>LOPBT</b> Low flow fault	.Check whether feedback signal is correct and connected. .Check whether feedback flow is lower than the minimum flow limit (parameter 23-51).	<b>Communication error</b>	.Check only one communication mechanism is used currently.
<b>LOPbt</b>		<b>CF20</b>	

LED display	Corrective action	LED display	Corrective action
<b>HIPBT</b> High flow fault	.Check whether feedback signal is correct. . Check whether feedback flow is higher than the maximum flow limit (parameter 23-48)。	<b>OPBFT</b> High pressure fault	. Check whether feedback signal is correct. . Check whether feedback pressure is higher than the maximum pressure limit (parameter 23-12).
<b>HI Pbt</b>		<b>OPbft</b>	
<b>LPBFT</b> Low pressure fault	. Check whether feedback signal is correct and connected. .Check whether feedback pressure is lower than the minimum pressure limit (parameter 23-15)。	<b>LSCFT</b> Low suction fault	.Check whether effluent trough is insufficient and water supply is normal. .Check PID error is higher than PID error level or current is lower than the output current level of low suction.
<b>LPbft</b>		<b>LSCft</b>	
<b>FBLSS</b> PID feedback signal loss	. Check whether the set 23-19 pressure loss ratio is correct. . Ensure correct installation and PID signal is normal.		
<b>Fblss</b>			














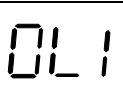


### 4.3 Warning/self-diagnosis function







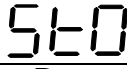
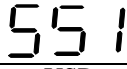








When a warning is detected by the inverter, the digital operator will display the warning code (flickering), and the fault output contact is not actuated; the system automatically restores to the original state upon elimination of warning.



When a self-diagnosis function is detected by the inverter (for instance, an invalid setting or two inconsistent parameter settings), the digital operator will display the self-diagnosis code, and the fault output contact is not actuated; the inverter is unable to execute running command till the parameters are correctly set.







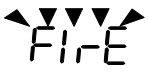













In case of warning or self-diagnosis error, please refer to table 4.2 to check and correct the error.


Table 4.2 Warning/self-diagnosis and corrective measures

LED display	Corrective action	LED display	Corrective action
HPErr Type selection error	.Check the inverter capacity setting (13-00) is consistent with hardware voltage class.	bb1 (flickering) External breaking	. Remove the cause of external breaking.
			
OV (flickering) Overvoltage	.Check input voltage.	bb2 (flickering) External breaking	
			
UV (flickering) Undervoltage	. Check input voltage. . Check input circuit. . Check main circuit MC.	bb3 (flickering) External breaking	
			
OH1 Heat sink overheat	.Check ambient temperature of inverter. . Check dust and dirt of fan and heat sink. . Check carrier frequency setting.	bb4 (flickering) External breaking	
			
OH2 (flickering) Inverter overheat warning	.Check external conditions.	bb5 (flickering) External breaking	
			
LED display	Corrective action	LED display	Corrective action
OT (flickering) Overtorque detection	.Check application or machine running status. .Check 08-15 and 08-16 settings.	bb6 (flickering) External breaking	. Remove the cause of external breaking.
			
UT (flickering) Undertorque detection	.Check application or machine running status. . Check 08-19 and 08-20 settings.	<b>OL1</b> <b>Motor overload</b>	. Check V/F mode. Check rated current of motor. . Check load size and running cycle.
			
<b>OL2</b> <b>Inverter overload</b>	.Check V/F mode. .Replace with inverter of higher capacity. . Check load size and running cycle.	<b>EF5 (flickering)</b> <b>External fault (S5)</b>	. Remove the cause of external fault. . Reset external fault of multi-function digital input.
			
<b>CE</b> <b>(flickering)</b> <b>Communication error</b>	. Check all connections and verify all client software settings.	<b>EF6 (flickering)</b> <b>External fault (S6)</b>	

			
<b>CLA</b> Current protection level A	Check load size and running cycle.	<b>EF9 (flickering)</b> Forward/reverse error	. Check external program logic.
			
<b>CLB</b> Current protection level B	Check load size and running cycle.	<b>FB (flickering)</b> PID feedback off-line	.Check whether the set PID feedback mode is correct. .Ensure correct installation and normal feedback signal.
			
<b>STO</b> Safety switch	Inverter safety switch, 08-30 is set as 1 for auto running and stop, and digital terminal switch (58) is put on. Check whether digital terminal (58) is turned on.	<b>SS1</b> Safety switch	Inverter safety switch, 08-30 is set as 0 for deceleration stop, and digital terminal switch (58) is put on. Check whether digital terminal (58) is turned on.
			
<b>Retry (flickering)</b> Retest	Disappear after the restart time of auto reset.	<b>USP (flickering)</b> Unattended protection	. Run command for closing, or perform terminal resetting (03-00 to 03-05 as 3), or use the RESET key on digital operator for resetting. .Close USP signal and turn on/off power again.
			
<b>ES (flickering)</b> External E-stop	.Remove the cause of external E-stop. . Run command for closing, and reset external E-stop command of multi-function digital input.	<b>SE01</b> Setting range error	. Check parameter setting.
			
<b>EF1 (flickering)</b> External fault (S1)	.Remove the cause of external fault. . Reset external fault of multi-function digital input.	<b>SE02</b> Digital input terminal error	. Check parameter setting.
			
<b>EF2 (flickering)</b> External fault (S2)		<b>SE03</b> V/f curve error	.Check V/F parameter setting.
			

LED display	Corrective action	LED display	Corrective action
<b>EF3 (flickering)</b> External fault (S3)	.Remove the cause of external fault. . Reset external fault of multi-function digital input.	<b>SE05</b> PID selection error	.Check 10-00 and 10-01 settings. .Check 10-29 and 10-25 settings. <b>.Check 10-29 and 10-03 settings.</b>
			

EF4 (flickering) External fault (S4)		SE09 PI setting error	
			. Check inverter PI option (03-30), and select PID source (10-00 and 10-01).
Parameter setting error	.Refer to setting in the manual or represent this option is invalid.	<b>Zero-speed stop warning</b>	.Adjust frequency command. Note: It is required to adjust stage 0 frequency setting of 05-01 if frequency source 00-05 is set as digital operator.
			
Direct start warning	.Check external running terminal, disconnect and then connect; wait for the setting time of 07-05 after power-on.	<b>External control stop warning</b>	. Remove external running command.
			
FIRE Forced running mode	Check whether there is fire around the equipment; in case of false triggering, turn off power for clearing.	<b>Wrong running direction warning</b>	. Correct 11-00 motor direction locking command to the existing external control DI or JOG and three-wire forward or reserve command direction.
			
ADC voltage error	. Check input voltage signal and control board voltage.	<b>Parameter lock</b>	. Enter the correct password in parameter 13-07.
			
EEPROM Storage error	Power off and on after initialization; replace the circuit board if warning appears again.	Password setting error	. The password entered for the second time should be the same with that entered for the first time when the password lock function is enabled.
			
Control board error	. Control board is inconsistent with program; replace the control board.	LFPB Low flow error	. Check whether feedback signal is correct and connected. . Check whether feedback flow is lower than the minimum flow limit.
			
L0PB Low voltage error	. Check whether feedback signal is correct and connected. . Check whether feedback pressure is lower than the minimum pressure limit.	HFPB High flow error	. Check whether feedback signal is correct. . Check whether feedback flow is lower than the maximum flow limit.
			
HIPB High voltage error	. Check whether feedback signal is correct. . Check whether feedback pressure is lower than the maximum pressure limit.	LSCFT Low suction error	.Check whether effluent trough is insufficient and water supply is normal. .Check PID error is higher than PID error level or current is lower than the output current level of low suction.
			
SE10 PUMP/HVAC Setting error	.Check inverter PUMP option (23-02), and select the maximum pressure (23-03) setting. . Check inverter HVAC option (23-46), and select the maximum pressure (23-47) setting.	COPUP PUMP communication off-line error	Check whether communication fails or is not properly connected.
			

LED display	Corrective action
Air compressor overload	Check whether compressor load exceeds the standard.
	

## 4.4 Auto-tuning errors

In the event of auto-tuning error, the fault “AtErr” is displayed on the digital operator, motor is stopped, and fault message is displayed in 17-11. The faulty digital output contact is not actuated. Refer to table 4.3 to check and correct the faults occurred.

Table 4.3 Auto-tuning errors and corrective measures

Error	Description	Cause	Corrective action
01	Motor data input error	.Data error of input auto-tuning. . Wrong relation between output current and rated current of motor.	. Check input data of auto-tuning (17-00 to 17-09). . Check inverter capacity.
02	Motor line resistance R1 adjustment error	.Auto-tuning is not completed in certain time. . Auto-tuning result exceeds the parameter setting. . Rated current of motor is exceeded. . Three-phase output of inverter is broken.	. Check input data of auto-tuning (17-00 to 17-09). .Check motor wiring. .Disconnect motor load. .Check inverter current detection circuit, including current sensor. . Check motor wiring. . Check motor installation.
03	Motor leakage inductance adjustment error		
04	Motor rotor resistance R2 adjustment error		
05	Motor mutual inductance Lm adjustment error		
07	Deadtime compensation detection error		
08	Motor acceleration error (applicable to rotational auto-tuning only)	Motor is not speeded up successfully in the set time (00-14= 20sec).	. Increase acceleration time (00-14). . Disconnect motor load.
09	Other auto-tuning error	Other auto-tuning errors (except ATE-01~ATE-0 error, such as no-load current over 70% rated current or torque 100% higher than the reference value)	.Check motor wiring. .Check input data of auto-tuning.

## 4.5 Auto-tuning errors of PM motor

In case of auto-tuning error of PM motor, the fault message “IPErr” (PM motor adjustment failure) is displayed on the digital operator, motor is stopped, and fault message is displayed in 22-22. The faulty digital output contact is not actuated. Refer to table 4.4 to check and correct the faults occurred.

Table 4.4

Error	Description	Cause	Corrective action
01	Static pole alignment failure	Wrong relation between output current and rated current of motor	. Check input data of auto-tuning (22-02). . Check inverter capacity. . Check motor wiring.
02~04	Reserved		
05	Circuit adjustment time-out	System abnormality during circuit adjustment	Check whether the system enters other protection procedure.
06	Reserved		
07	Other motor adjustment errors	Other errors of auto-tuning	.Check motor wiring. . Check input data of auto-tuning.
08	Reserved		
09	Abnormal current during circuit adjustment	Wrong relation between output current and rated current of motor	. Check input data of auto-tuning (22-02). . Check inverter capacity.
10	Reserved		

11	Parameter testing time-out	Wrong relation of voltage and current	<ul style="list-style-type: none"> <li>. Check the parameter (22-11) is set too small, but the maximum setting should not exceed 100% of the inverter.</li> <li>. Check motor wiring.</li> </ul>
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## Annex

### Name and Content of Hazardous Substances in the Product

Part name		Hazardous and noxious substance or element					
		Lead and its compound (Pb)	Mercury and its compound (Hg)	Cadmium and its compound (Cd)	Chromium VI compound (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Electronic parts	Electronic parts and components	X	O	O	O	O	O
	Electromagnetic contactor	O	O	X	O	O	O
Display		O	O	O	O	O	O
Wire and cable	Terminal	X	O	O	O	O	O
	Conductor	O	O	O	O	O	O
	Insulated parts	O	O	O	O	O	O
Mechanical parts	Conductive copper post, fan, temperature controlled switch	X	O	O	O	O	O
	Others	O	O	O	O	O	O

This table is prepared according to SJ/T 11364.

O: It means content of the hazardous and noxious substance in all homogeneous materials of the part is below the limit specified in GB/T 26572.

X: It means content of the hazardous and noxious substance in at least one homogeneous material of the part is over the limit specified in GB/T 26572.

Definitions of main parts:

Electronic parts – Including electronic components, welded PCB and etc.

Display – Including the display unit, its electronic parts and components or touch screen.

Wire and cable – Including terminal, wire, shielded wire, sheath and electronic parts.

Mechanical parts – Parts other than the defined electronic parts, display, wire and cable.

Over-limit explanation:

Electronic parts and components: Lead content in some electronic parts is higher than 1000ppm but conforming to RoHS exemption rules.

7 (a): Lead in welding flux of high melting temperature (for example: lead content in lead base alloy  $\geq 85\%$ );

7 (c)-I: Lead in glass or ceramics of electronic and electrical parts (except lead in intermediate electroceramics of capacitor), or lead in glass or ceramic composite materials (for example: piezoelectric ceramic parts)

Electromagnetic contactor: Cadmium content in some electromagnetic contactors is higher than 100ppm but conforming to RoHS exemption rules.

8 (b) Cadmium and its compounds are used in electronic contacts

Terminal, conductive post, fan, temperature controlled switch: Lead content in some parts of wire, cable and mechanical components is higher than 100ppm but conforming to RoHS exemption rules.


6 (a) As an alloy element, lead is below 0.35% (Wt) in finished steel and galvanized steel;

6 (b) The maximum allowable content of lead in aluminum alloy is 0.4%;

6 (c) The maximum allowable content of lead in copper alloy is 4%;

Environment-friendly use period (EFUP) explanation:

Within EFUP, the product is not subject to hazardous substance leakage, precipitation and other health-harming problems during normal use, and can be used by consumers securely.

EFUP of the product is 10 years, which is effective only under normal conditions as described herein. 

Disclaimer: The information regarding substance content in the product disclosed by the **Company** only represents our understanding and knowledge of the product when the information is provided. These knowledge and understanding of the **Company** are based on information provided by third party, the accuracy of which is not committed or guaranteed by the **Company**. In addition, the **Company** may not have performed destructive test or chemical analysis

of the materials or chemicals used. Use of the above-mentioned product and relevant liability of the **Company** are governed by standard contract provisions of the company.





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The company reserves the right to change design specifications to continuously improve products.