■ Innovate for more, Win forever
■ Industry intelligence Energy saving Green power

Savch wechat service number

Shanghai Office
Room 1410-1411,4# Building, Yatai Plaza, Huaqiao international shopping mall
Tel: 021/59275902 Fax: 021/59275902

Quanzhou Factory:Quanzhou Sangchuan Electric Equipment Co.,Ltd
3# Zixin Road, Jiangnan Hi-Tech Industrial Park,
Quanzhou, Fujian, China
Tel:+86-0595/24678200 Fax:+86-0595/24678203

Business Hotline
North:+86-0595/2467 8266 +86-0575/8515 3392 +86-010/8085 4440
East:+86-0595/2467 8266 +86-0574/8711 8139 +86-0575/8515 3392
South:+86-0595/2467 8271 +86-0595/2467 8267
International:+86-0595/2467 8249
Fax:+86-0595/2467 8203
Savch Website: **www.savch.net**
E-mail: **kelan@savch.net**
Alibaba Website : **www.savch.com.cn**
Alibaba Store : **http://sanqidq.1688.com**

Received ISO 9001, ISO 14001 and OHSAS 18001 recognition

SAVCH
TAIWAN SAVCH ELECTRIC

S3100 Series Multi-function Vector Control Inverter

User Manual

创无限 Innovate for more Win forever 赢久迈
SAVCH

User Manual

S3100 Series Multi-function Vector Control Inverter

User Manual

File No. 520010310101
Vision No. V1.1
Filing time 2017-09-22

SAVCH electric provide a full range of technical support for our customers. All users could contact with the nearest SAVCH office or service center, also could contact with our headquarters directly.

Quanzhou Factory:
QUANZHOU SANGCHUAN ELECTRIC EQUIPMENT CO., LTD
Address: 3# Zixin Road, Jiangnan Hi-Tech Industrial Park, Quanzhou, Fujian, China
Tel: +86-595-24678200 Fax: +86-595-24678203

Shanghai Office:
SHANGHAI SAVCH ELECTRIC TECHNOLOGY CO., LTD
Room 1410-1411,4# Building, Yatai square, Huaqiao international Business City)
Tel: +86-21-59275902 Fax: +86-21-59275902

Service Hotline: 400-6161-619
Savch Website:www.savch.net
E-mail：kelan@savch.net
Alibaba Website：www.savch.com.cn
Alibaba Store：http://sanqidq.1688.com

CONTENTS

PREFACE

Thank you for choosing SAVCH inverter! This instruction manual, which includes operation descriptions and notes for maintenance, shall be delivered to the end-user.
For safety running and effective operation, this instruction manual shall be read thoroughly prior to use, which shall also be preserved for later use. Provided problems occur and solution is not provided in this instruction manual, contact your SAVCH ELECTRIC representative or contact with our company directly. Our professional technicians will serve for you actively. And please continue to adopt products of SAVCH, give valuable opinion and advice.

1. READING INSTRUCTIONS

Symbols of" DANGER" and" CAUTION" in the manual indicates that, for safety running or maintenance of inverters or other electrical products, attention shall be attached during delivering, installation, operation and checks for the inverter. And these notes shall be applied for a better and safer operation.

⚠ DANGER If not used correctly, personnel damage even death may be caused.

⚠ CAUTION If not used correctly, serious damage to inverter or machine may be resulted.

⚠ DANGER

- Never connect wires while power on. Do not check components or signal for circuit board during operation.
- Do not dismantle or change inner wire, circuit or components unnecessarily.
- Make sure grounding terminals are correctly grounded. 220V level: Grounding Ⅲ; 440V level: Special Grounding

⚠ CAUTION

- Do not perform a withstand voltage test for components of inverter, it can cause semiconductor components to be damaged by high voltage.
- Never connect the output terminals U, V, W to AC power supply.
- IC of CMOS on control circuit of the inverter shall be damaged by electrostatic influence. Do not touch main circuit board.

2. PRODUCTS RECEIVING

All products have been performed with strict test and inspection. After receiving the inverters, the following checks shall be performed.

- To check that SAVCH inverter, an instruction manual and a cover is inside of the package
- To check whether model number correspond with model and capacity your purchase order.
- To check whether there are damaged parts during transportation and delivering. If there are, do not connect with power supply.
- If any of the above checkpoints are not satisfactory, contact your SAVCH ELECTRIC representative for a quick resolution.

1.1 NOTES FOR OPERATION

Before wiring

⚠ CAUTION

- Specification of applying power supply shall correspond to input voltage of the inverter.

⚠ DANGER

- Main circuit terminals must be correct, R/L1, S/L2 and T/L3 is input terminals and it' s forbidden to use mixing with U/T1, V/T2 and W/T3. Failure to observe this may cause the inverter damaged.

Installation

⚠ DANGER

- When handling the inverter, do not draw front cover directly but handle it by the heat sink to prevent the cover from falling off and to avoid the falling of the inverter and causing personal injury or damage to the inverter.
- Install the inverter on a base made of metal or other non-flammable material, Do not place flammable object nearby to prevent fires.
- If several inverters are installed in a electric cabinet, add extra cooling fan to keep the temperature lower than 40 ℃ to prevent over-heating or fire.
- Operator shall be dismantled or refitted after power supply is off. Fixed operator shall be processed as diagram shows to prevent operator fault or no display.
- Confirm whether the input voltage is identical with the voltage in the nameplate on the right side of the inverter, Otherwise the malfunction could happen.

Operation

⚠ DANGER

- Never put in or take off the motor during operation, otherwise over-current even over burning the main circuit of the inverter may happen.
- Do not remove the cover while current is flowing. Failure to observe this may result in electrical shock to personnel.
- When auto-restart function is set, do not approach the machine since motor can be reset suddenly after being stopped.
- Since STOP button can be selected by function set, which is different from usage of emergency stop/on switch, attention shall be given to the usage.

⚠ CAUTION

- Never touch heat sink or discharging resistor since temperature may be very high.
- Since it is easy to change running speed from low to a high speed, verify safe working range of motor and machine before running.
- Pay attention to relative settings before using the brake.
- Do not check signals during running.
- All parameters of the inverter have been preset at the factory according to line frequency. Do not change the settings unnecessarily.
- Do not perform dismantling or checks while power supply and charging indicator" CHARGE" are still on.

Check and maintenance

⚠ CAUTION

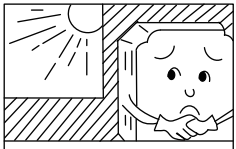
- Ambient temperature for operating the inverter shall be -10℃ to + 40℃ and 90%RH non condensation.
- After removing the dust-cover, ambient temperature for operating the inverter shall be -10℃ to + 50℃ and 95%RH non condensation. However under this condition, the ambient environment must be without drips of water or metal dust. If there are, the dust cover shall be refitted and check whether ambient temperature is within -10℃ to + 40℃ simultaneously.

Disposal precaution

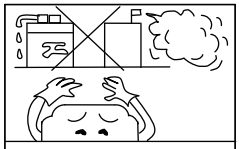
⚠ CAUTION

- Explosion may occur when burning the electrolytic capacitor of the main circuit and printing plate. Toxic gas may be generated when burning control panel and other plastic fittings.
- It shall be treated as Industrial waste when disposing of it.

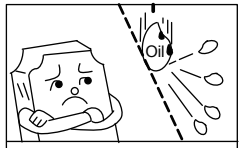
1.2 NOTES FOR OPERATION ENVIRONMENT



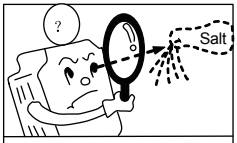
Direct sunlight.



Corrosive gas or fluids

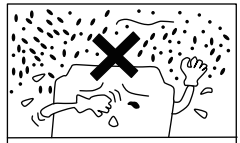


Oil

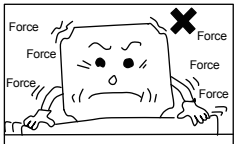


Salt or saline

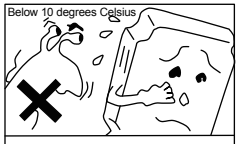
Rain, moisture



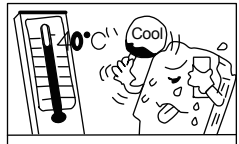
Iron chips and dust



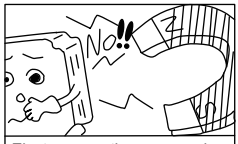
Large impelling



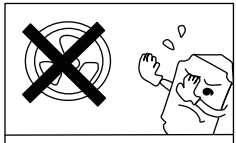
Extreme low temperatures



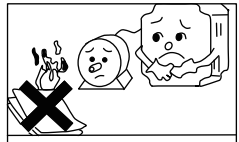
Extreme high ambient temperatures (Above 40°C)



Electromagnetic waves and ultra high-angle rays (For example: locations of welding machines and etc.)



Radioactive materials



Locations of inflammable materials

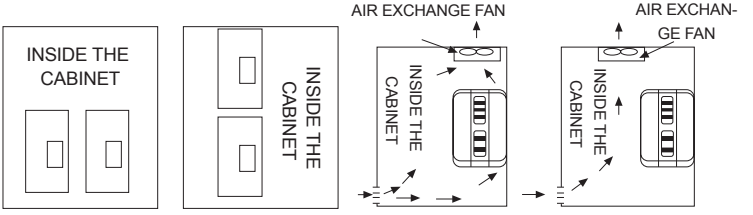
2.HARDWARE DESCRIPTION AND INSTALLATION

2.1 OPERATIONAL ENVIRONMENT

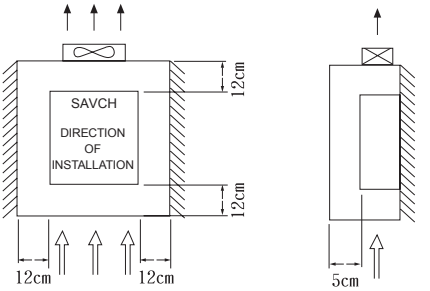
Since operation environment can directly influence functions and operation life, to ensure proper performance and long operation, follow the recommendations below when choosing allocation for installing the inverter:

- Use only with the ambient temperature range: -10℃ to + 40℃; -10℃ to + 50℃ applicable when dust cover is removed.
- Avoid Rain, moisture
- Avoid Direct sunlight.(Avoid using outdoors)
- Corrosion of oil sprays or salt
- Corrosive fluid and methane
- Dust or batting and metallic particles in the air
- Radioactive materials and inflammable materials
- Electromagnetic interference (Avoid using together with welding machine or dynamic machines.)
- Vibration. (If inverter must be used in this environment, an anti vibration pad is necessary).

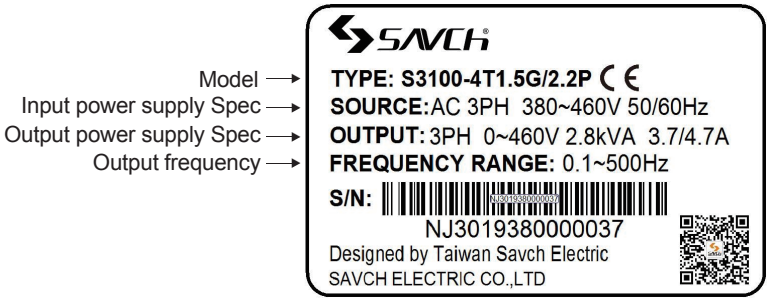
Attention shall be attached to clearance of inverters allocated closely. A fan shall be installed to make sure temperature is lower than 40℃



For cooling off, face shall be toward front and upper parts shall be upwards.
Clearance shall meet the following specifications: (If the inverter is installed inside the cabinet or environment is allowable, dust cover shall be available to be removed for ventilating.)



2.2 MODEL DESCRIPTION



S 3100 – 4T 1.5 G

SAVCH

Product series name

Input power source :
2T：3 ph 220V(Note:2T2.2G or below with compatibility of single phase)
4T：3 ph 440V

Applicable motor rating
0.4：0.4kW
0.75：0.75kW
1.5：1.5kW
2.2：2.2kW
⋮ ⋮
15：15kW
⋮ ⋮
400：400KW

G：General
P: Light load

2.3 INVERTER SPECIFICATIONS

2.3.1 Standard Specifications

220V single phase/Three phase Series

项目			Specifications						
Type(S3100–2T***G) (*1)			0.4	0.75	1.5	2.2	4.0	5.5	7.5
Nominal applied motor [kW] (rated output)			0.4	0.75	1.5	2.2	4.0	5.5	7.5
Rated Output	Rated power [kVA] (*2)		1.1	1.9	3.0	4.1	6.4	9.5	12
	Voltage [V]		3 ph 200~240V (With AVR function)						
	Rated current [A]		3	5	8	11	17	25	33
	Overload capability		150%–1min						
Input Power	Voltage, frequency		200 ~ 240V，50Hz /60Hz						
	Voltage, frequency variations		Voltage: ± 10%(Interphase unbalance rate is within 2%, frequency:+5~–5%)						
	Rated input current [A]	Three phase	3.1	5.3	9.5	13.2	22.2	31.5	42.7
		Single phase	5.4	9.7	16.4	24.8	—		
Braking	Braking transistor		Standard built–in						
Enclosure			IP20 closed type						
Cooling method			Fan cooling						

(*1) 2T2.2G and below the power can be compatible single, select any two power as input terminal.
(*2) Rated capacity is calculated by assuming the output rated voltage as 220V.

440V Three phase Series

Item		Specifications													
Type(S3100–4T***G)		0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
Nominal applied motor [kW] (rated output)		0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
Rated Output	Rated power [kVA](*1)	1.9	2.8	4.1	6.8	9.9	13	18	22	29	34	45	57	69	85
	Voltage [V]	3 ph 380~460V (With AVR function)													
	Rated current [A]	2.5 (3.2)	3.7 (4.7)	5.5 (6.5)	9.0 (11.8)	13 (15.0)	18 (21.7)	24 (28.5)	30 (35.4)	39 (45)	45 (60)	60 (75)	75 (91)	91 (112)	112 (150)
	Overload capability	150%–1min													
Input Power	Voltage, frequency	380 ~ 460V，50Hz /60Hz													
	Voltage, frequency variations	Voltage: ± 10%(Interphase unbalance rate is within 2%, frequency:+5~–5%)													
	Required power supply capacity (with DCR) (*2) [kVA]	—										40	48	58	71
	Rated input current (without DCR) [A]	3.1	5.9	8.2	13	17.3	23.2	33	43.8	52.3	60.6	—			
	Rated input current (with DCR) [A]	—										62	76	90	105
Braking	Braking transistor	Standard built–in										—			
DC reactor(DCR)		—										Standard built–in			
Enclosure		IP20 closed type										IP00			
Cooling method		Fan cooling													

Item		Specifications								
Type(S3100–4T***G)		75	90	110	132	160	200	220	280	315
Nominal applied motor [kW] (rated output)		75	90	110	132	160	200	220	280	315
Rated Output	Rated power [kVA](*1)	114	134	160	192	231	287	316	396	445
	Voltage [V]	3 ph 380~460V (With AVR function)								
	Rated current [A]	150 (176)	176 (210)	210 (253)	253 (304)	304 (377)	377 (415)	415 (520)	520 (585)	585 (650)
	Overload capability	150%–1min								
Input Power	Voltage, frequency	380 ~ 460V，50Hz /60Hz								
	Voltage, frequency variations	Voltage: ± 10%(Interphase unbalance rate is within 2%, frequency:+5~–5%)								
	Required power supply capacity(with DCR) [kVA](*2)	96	114	140	165	199	248	271	347	388
	Rated input current (without DCR) [A]	—								
	Rated input current (with DCR) [A]	140	160	210	240	290	370	410	500	559
Braking	Braking transistor	—								
	Built–in braking resistance	—								
DC reactor (DCR)		Standard built–in		Optional(*3)						
Enclosure		IP00								
Cooling method		Fan cooling								

(*1) Rated capacity is calculated by assuming the output rated voltage as 440V.

(*2) Obtained when a DC reactor (DCR) is used.

(*3)DC reactor (DCR) is optional part, inverter of 110KW or above must use together with the DC reactor (DCR).

(* 4) brackets "(****)" in the table is the content for the P–type machine rated current and overload c apacity

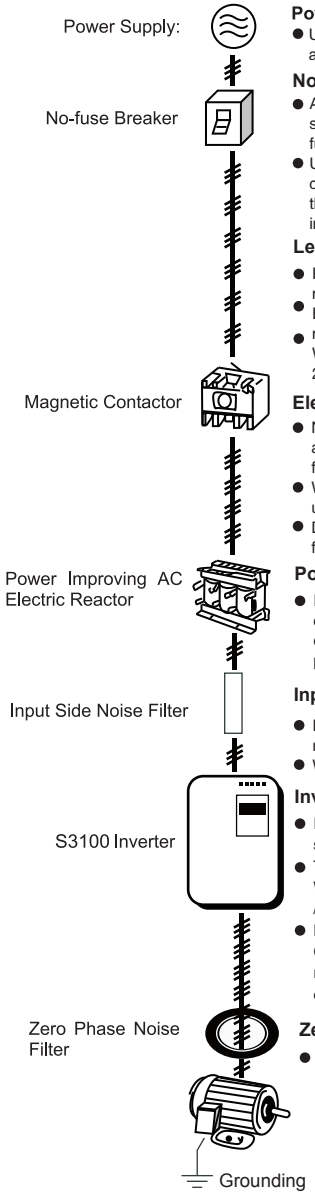
2.3.2 Common specifications

Item			Explanation
Output frequency	Setting range	Max frequency	25 to 500 Hz (changeable setting, Vector control maximum output frequency of 200Hz)
		Base frequency	25 to 500 Hz (changeable setting)
		Starting frequency	0.1 to 60.0 Hz (changeable setting)
		Carrier frequency	• 0.75～12kHz(The maximum carrier values of different power range will be variable) Note:The carrier frequency may automatically drop depending upon the surrounding temperature or output current to protect the inverter. (The automatic drop function can be disabled)
	Setting resolution		• Keypad setting: 0.01 Hz (99.99 Hz or less), 0.1 Hz (100.0 to 500.0 Hz) • Link operation setting: 1/20000 of maximum frequency or 0.01 Hz (fixed)
Control	Control method		• V/f control • Dynamic torque vector control
	Voltage /frequency characteristics		• Possible to set output voltage at base frequency and at maximum frequency • AVR control ON/OFF selectable. Non-linear V/F pattern with three arbitrary points
	Torque boost		• Auto torque boost (for constant torque load) • Manual torque boost: Desired torque boost (0.0 to 20.0%) can be set • Select application load with function (Constant torque load or variable torque load)
	Starting torque		• When the slip compensation and torque boost occurs, the torque can exceed 150%.
	Start/stop operation		• Keypad (RUN/STOP keys), external signals (run forward (run reverse) run/stop command etc.),Communications link (RS-485).
	Frequency Setting		• Keypad (Can use UP/DOWN keys to set) • Analog input:DC0 to +10V/0 to +100%(terminal AVI、AUI) ： DC 4 to 20mA/0 to 100% (terminal ACI) • UP/DOWN operation: Multi-frequency (16 steps) • Pulse train input (standard): Pulse input = MI7 terminal, Rotational direction = general terminals • Reference frequency switching, Auxiliary frequency setting, and Inverse operation.
	Acceleration/ deceleration time		• 0.00 to 3600 s,Linear/S-curve/curvilinear
	Stop control		• Running continued at the stop frequency, coast-to-stop, or force to stop • DC braking: Braking starting frequency (up to 60 Hz), time (up to 30.0 s), and operation level (up to 100%).
	Auto-restart after momentary power failure		• Trip immediately, trip after recovery from power failure • Restart at the frequency at which the power failure occurred, restart at the starting frequency
	Hardware current limiter		• Settable Current limiting action value • Over current limiting by hardware (it can be canceled)
	Torque limiter		• Torque limit value (200%) • Torque limiter 1/2, torque limiter enabled/disabled, analog torque limit value.
	Control functions		• Analog input adjustment (gain/offset/filter time constant), frequency limiter (high and low), bias frequency, jump frequency, 2nd, motor setting, universal DI, universal DO,universal AO, rotational direction limitation. • Overload prevention control, slip compensation, over voltage stall prevention, droop control, PID process control, PID dancer control, auto energy saving function. • Auto-tuning (Operating modes:motor load, do not connect the mechanical transmission parts.) • Fault restart, command loss detection.

Item		Explanation
Control	Digital input	Run/stop forward and reverse command, select multi-frequency , select ACC/DEC time, Enable 3-wire operation , Coast-to-stop command,reset alarm, enable external alarm trip, ready for jogging, select frequency command 2/1, select motor, enable DC braking, select torque limiter level, UP/DOWN command, enable data change with keypad, cancel PID control, switch normal/inverse operation, universal DI, force to stop, reset PID integral and differential components, hold PID integral component, pulse train input, pulse train sign, select droop control
	Transistor output	Inverter running, frequency arrival signal, frequency detected, under voltage detected (inverter stopped), inverter output limiting, auto-restarting after momentary power failure, motor overload early warning, keypad operation, inverter ready to run, inverter output limiting with delay, auto-resetting, universal DO, heat sink overheat early warning, reference loss detected, inverter operating, overload prevention control, current detected, PID alarm, Motor switch, brake signal, alarm relay contact output (for any fault)
	Analog output	• AFM:Output a selected signal with DC voltage (0 to +10 V) • DFM: output the selected signal by the way of pulse(the pulse of the highest frequency is 25~6000p/s). (FM terminal switches AFM/DFM by switch). Output frequency (before slip compensation, after slip compensation), output current, output voltage, output torque, load factor, input power, PIDfeedback amount, DC link bus voltage, universal AO, motor output, PID command , PID output
Indication	Running /stopping	Speed monitor (reference frequency (Hz), output frequency, motor speed, load shaft speed). Output current, output voltage, torque calculation value, input power, PID command value, PID feedback amount, PID output, load factor, motor output
	Alarm information	Alarm history: Saves and displays the last 4 alarm code and their detailed description
Others	Communications	RS-485 COM port 1 (for keypad connection), RS-485 COM port 2 (on terminal block)
	Protection against momentary power failure	Upon detection of a momentary power failure lasting more than 15 ms, this function stops the inverter output. If restart after momentary power failure is selected, this function invokes a restart process if power is restored within a predetermined period (allowable momentary power failure time).

2.4 Inverter using and the main circuit wiring, the basic wiring diagram

2.4.1 Peripheral equipment application and precautions



Power:

- Use the power supply in the permissible specifications of the inverter model to avoid damaging the drive.

No-fuse circuit Breaker(MCCB):

- A non–fuse circuit breaker (MCCB) must be installed between the AC power supply and the inverter, but do not use it as inverter's operation / stop switching function.
- Use a non–fuse circuit breaker (MCCB) that complies with the rated voltage and current rating of the inverter. When the capacity is selected, it is at least 2 times the sum of the rated output current of the inverter (mainly considering 150% of the inverter overload, 1min)

Leakage circuit breakers(RCD/ELCB):

- Please install the leakage circuit breaker, to prevent leakage caused by the malfunction and to protect the safety of the use of personnel;
- Each inverter should use a dedicated circuit breaker whose sensitive current is more than 30mA;

When using an ordinary circuit breaker, the current sensitivity must be more than 200mA, operation Time must be more than 0.1s.

Electromagnetic contactor:

- Normally, there is no need to add electromagnetic contactor, but it can be used as an external control protection, automatic restart after power failure and other functions;
- When using the brake unit, please connect to the thermal relay contact of the brake unit, close the electromagnetic contactor when overheating;
- Do not use the electromagnetic contactor as the inverter's operation / stop switching function, which will shorten the life of the inverter.

Power Improvement AC Reactor:

- If a large capacity (500KVA or more) is used for the inverter, an excessive peak current may flow into the input side of the inverter, and the rectifier element may be damaged. In this case, the AC reactor can also improve the power factor on the power supply side.

Input side noise filter:

- It is possible to remove the noise from the power supply line into the inverter and to reduce the noise from the inverter to the power supply line.
- When there is an inductive load around the inverter, please ensure to install it.

Inverter

- Input power terminals R / L1, S / L2, T / L3 are connected without any phase sequence.
- The output terminals U / T1, V / T2, W / T3 are connected to the U / T1, V / T2, W / T3 terminals of the motor. If the inverter is running forward, the motor is reversed. / T2, W / T3 terminal in any two can be adjusted.
- Do not connect output terminals U, V, W to AC power to avoid damage to the inverter. Ground terminal should be properly grounded, 220V level: grounding resistance should be below 100Ω, 440V class: grounding resistance should be10Ω or less.

Zero phase reactor:

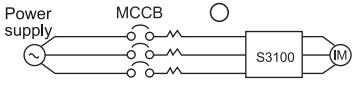
- When you want to reduce the electromagnetic interference caused by the inverter, it is effective in the range of 1MHz ~ 10MHz. The more the number of the motor wires are bypassed, the better!

Wiring shall be checked whether correct or not. Peripheral wiring shall fulfill the following requirements.

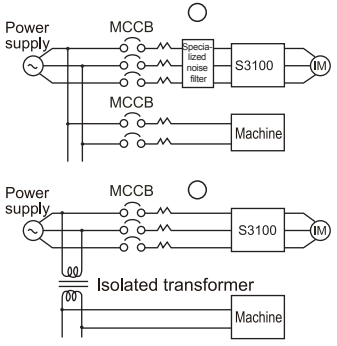
(Do not use a buzzer of control circuit to check wiring)

(A) Wiring for control circuit Power supply must be isolated or far from other high voltage wirings or high current power lines, thus electromagnetic interference can be avoided. See diagrams below:

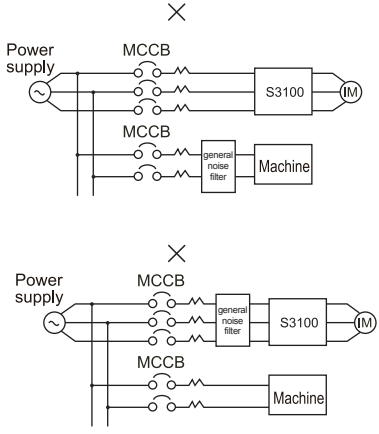
- Individual power supply bridge for inverter



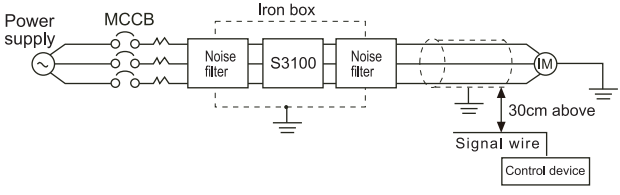
- If inverter power supply circuit is used commonly with other machines, inverter-specialized noise filter or isolating transformer shall be added.



- Good effect may not be received if general use noise filters are applied



- Interference during transmission can be prohibited by adding an inverter-specialized noise filter at main circuit output side. For preventing electromagnetic radiation, a metal tube shall be installed, and distance from signal wiring of other control machines shall be 30cm at least.

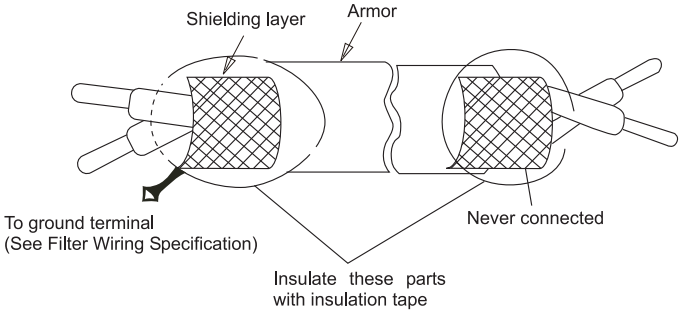


- Voltage drop of wiring shall be considered providing that inverter and motor are with an excessive distance. Voltage drop (V) =$3^{1/2}$× wiring resistance (Ω/km) × wire length (m) × current(A) ×10^{-3}, carrier frequency shall be modified according to wiring prepared.

Distance between inverter and motor wiring	Below 50M	Below 100M	Above 100M
Allowable carrier frequency	Below 12kHz	Below 9kHz	Below 6kHz
Set value for parameter 00.26	12	9	6

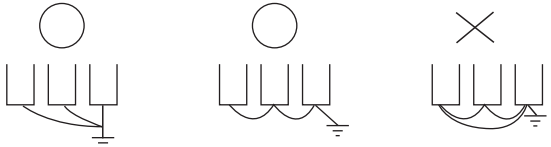
(B) Wiring for control circuit shall be isolated or far from main circuit wiring or other high voltage/current power lines, thus electromagnetic interference shall be avoided.

- For preventing electromagnetic interference and malfunction, shielding twisted pair shall be used for control circuit. Shielding wiring shall connect grounding terminals.
  Distance for wiring shall be 50m or less.



(C) Grounding terminal for inverters shall be grounded properly. 220V: Ground resistance below 100Ω, 440V: ground resistance below 10Ω

- AWG shall be taken as standard for ground wire. Ground wire shall be as short as possible.
- Never ground simultaneously for Inverter ground wire with other large current load (such as welding machine or large power motors). They shall be grounded separately.
- Ground circuit shall be avoided when several inverters are grounded simultaneously.



(D) Cable line width for main circuit and control circuit shall be selected according to power line standard.
(E) After completing of grounding and wiring, check for the following items: wiring is proper; wire is not broken and screws are securely tightened.

2.4.2 The Selection of Peripheral Devices

Moulded Case Circuit Breaker (MCCB) / Earth Leakage Circuit Breaker (ELCB)

Supply voltage	Applicable standard motor(kW)	Type of inverter	Rated Current (A) of MCCB, ELCB
Three phase 220V	0.4	S3100-2T0.4G	5
	0.75	S3100-2T0.75G	10
	1.5	S3100-2T1.5G	20
	2.2	S3100-2T2.2G	30
	4.0	S3100-2T4.0G	40
	5.5	S3100-2T5.5G	63
	7.5	S3100-2T7.5G	100
Three phase 440V	0.75	S3100-4T0.75G/1.5P	5
	1.5	S3100-4T1.5G/2.2P	10
	2.2	S3100-4T2.2G/4.0P	15
	4.0	S3100-4T4.0G/5.5P	20
	5.5	S3100-4T5.5G/7.5P	30
	7.5	S3100-4T7.5G/11P	40
	11	S3100-4T11G/15P	50
	15	S3100-4T15G/18.5P	63
	18.5	S3100-4T18.5G/22P	100
	22	S3100-4T22G/30P	125
	30	S3100-4T30G/37P	150
	37	S3100-4T37G/45P	150
	45	S3100-4T45G/55P	175
	55	S3100-4T55G/75P	200
	75	S3100-4T75G/90P	250
	90	S3100-4T90G/110P	315
	110	S3100-4T110G/132P	400
	132	S3100-4T132G/160P	500
	160	S3100-4T160G/200P	630
	200	S3100-4T200G/220P	630
	220	S3100-4T220G/280P	800
	280	S3100-4T280G/315P	1000
	315	S3100-4T315G/355P	1200

Note:

(1) In order to avoid the residual current circuit-breaker error, please choice the induction current with 200mA or above, and operation time with 0.1s or above.

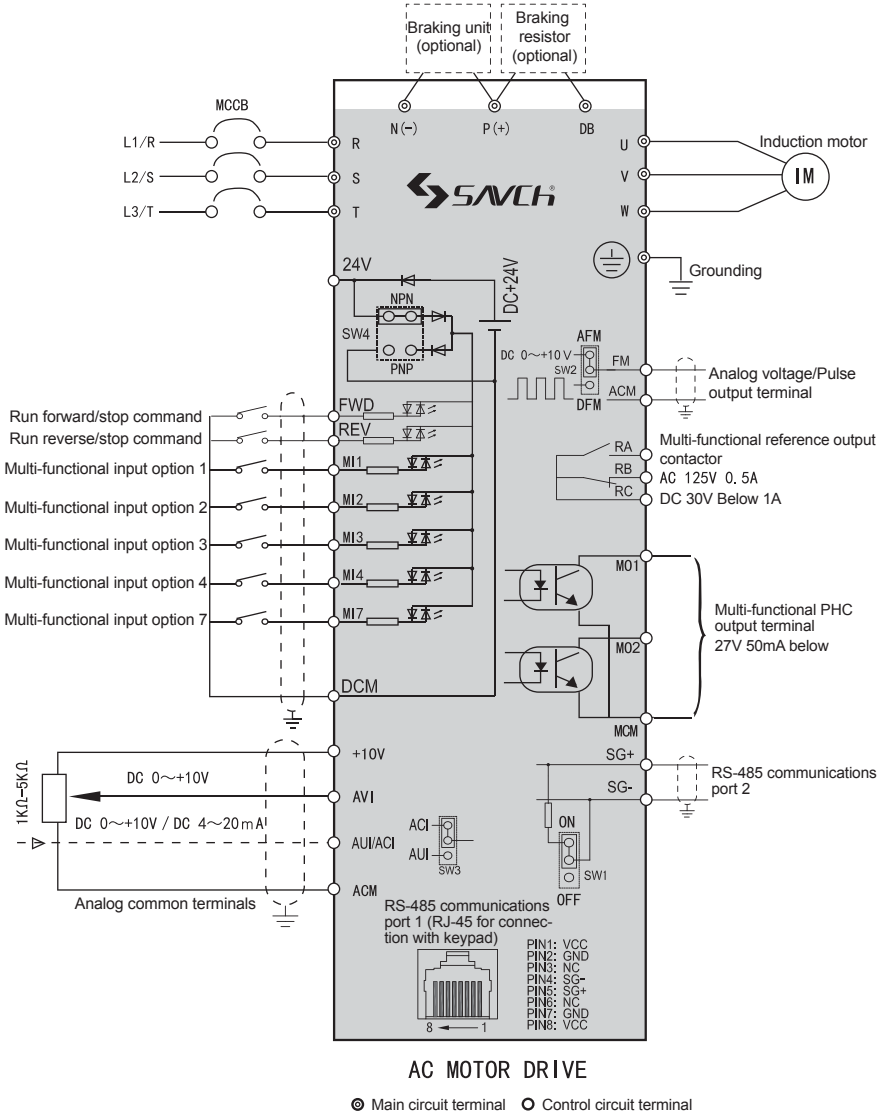
(2) Breaker rated current must be 2 ~ 4 times the rated input current of frequency inverter.

Recommended wire specification

Supply voltage	Applicable standard motor(kW) (kW)	Type of inverter	Recommended wire specification (mm2)		
			Input [L1/R,L2/S,L3/T]	Output [U,V,W]	Ground terminal [G]
Three phase 220V	0.4	S3100-2T0.4G	2.5		2.5
	0.75	S3100-2T0.75G	4		
	1.5	S3100-2T1.5G	4		
	2.2	S3100-2T2.2G	6		
	4.0	S3100-2T4.0G	6		3.5
	5.5	S3100-2T5.5G	6		
	7.5	S3100-2T7.5G	10		
Three phase 440V	0.75	S3100-4T0.75G /1.5P	2.5		2.5
	1.5	S3100-4T1.5G/1.5P	2.5		
	2.2	S3100-4T2.2G/4.0P	2.5		
	4.0	S3100-4T4.0G/5.5P	4		
	5.5	S3100-4T5.5G/7.5P	4		
	7.5	S3100-4T7.5G/11P	6		3.5
	11	S3100-4T11G/15P	6		
	15	S3100-4T15G/18.5P	6		
	18.5	S3100-4T18.5G/22P	10		5.5
	22	S3100-4T22G/30P	16		
	30	S3100-4T30G/37P	25		8
	37	S3100-4T37G/45P	25		
	45	S3100-4T45G/55P	38		
	55	S3100-4T55G/75P	38		14
	75	S3100-4T75G/90P	60		
	90	S3100-4T90G/110P	70		
	110	S3100-4T110G/132P	100		22
	132	S3100-4T132G/160P	150		
	160	S3100-4T160G/200P	185		38
	200	S3100-4T200G/220P	240		
	220	S3100-4T220G/280P	150*2		
	280	S3100-4T280G/315P	185*2		60
	315	S3100-4T315G/355P	240*2		

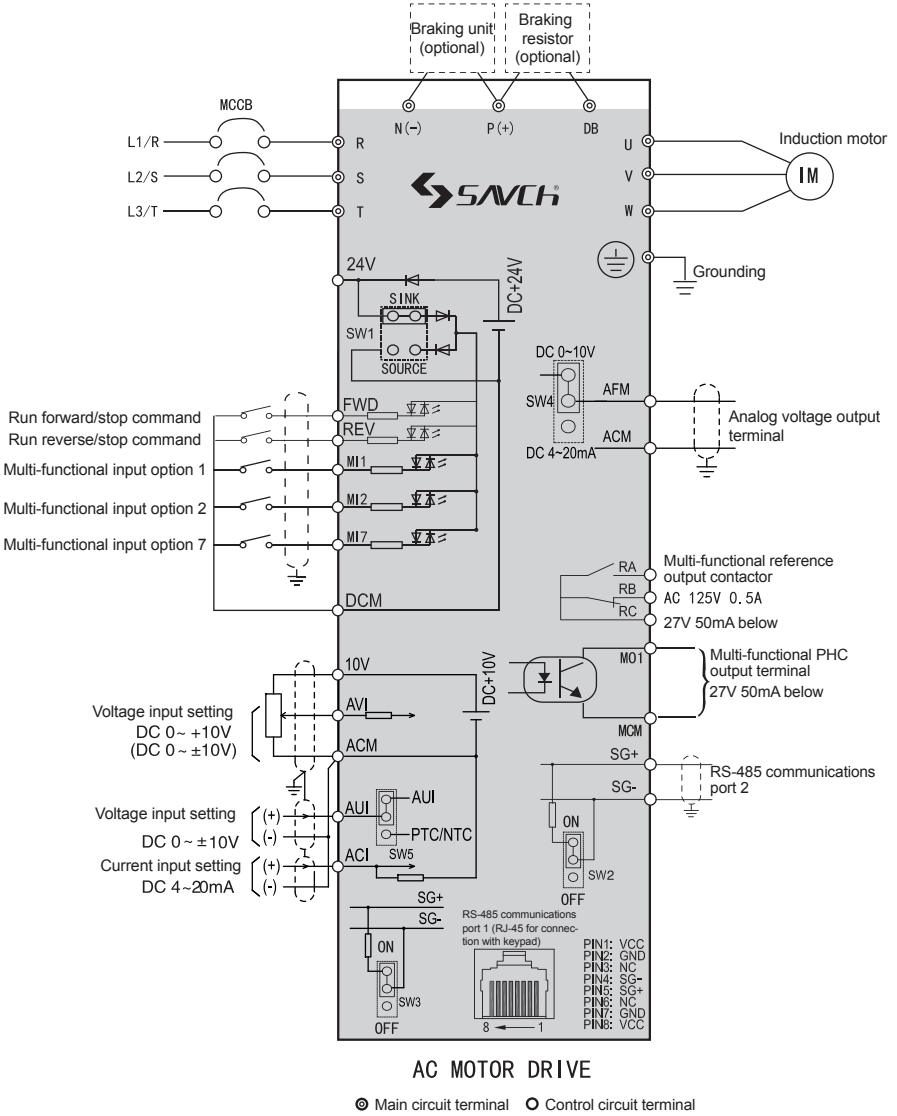
2.4.3 Wiring of main circuit terminal and grounding terminal

Wiring diagram(below 15kW (include 15kW))



2.4.3 Wiring of main circuit terminal and grounding terminal

Wiring diagram(above 18.5kW (include 18.5kW))



AC MOTOR DRIVE

◎ Main circuit terminal ○ Control circuit terminal

(Note 1) Remove the shorting chip between terminal P1 - P(+) before connecting if it' s used to connect DC reactor (DCR) (accessories). Inverter of 110KW or above must use DC reactor (DCR).

(Note 2) Built-in braking resistor is connected between terminals P (+) – DB in the inverter below a capacity of 22kW. Make sure to remove the connection to the built-in braking unit when connecting external braking resistor (accessories).Please must select modes according to user manual.
(Note 3)The motor operations are set by a variety of transfer switches on the electric panel. For details, see "Transfer of various switches in 2.4.5".

(1)The inverter's ground terminal [G]
It' s the inverter' sground terminal. Please make ground terminal properly grounded for safety and noise prevention. It' s obligatory construct the metal frame ground of electrical equipment in electrical equipment technical standard to prevent electric shock or fire accidents.
Connect the ground terminal in one side of the power supply as follows.

1) 440V series use special ground according to the technical standards for electrical equipment.
2) Ground wiring should connect the coarse wire with large surface area as short as possible.

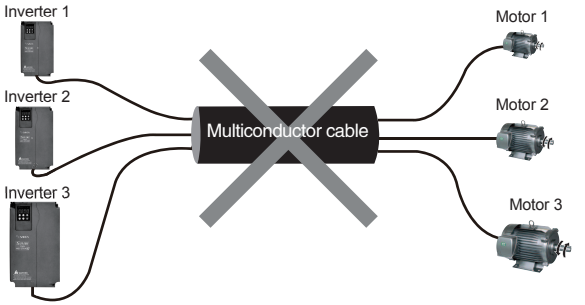
Table 2.7 Equipment Ground Specified in Electrical Equipment Technical Standards

Supply voltage	Types of ground	Ground resistance
440V	Special ground way	Below 10Ω
220V	Category Ⅲ ground way	Below 100Ω

(2)Inverter output terminals U, V, W and motor ground terminal G.

1) Connect the terminals U, V, W of 3-phase motor in the phase sequence.
2) Connect the ground wire of the output wires (U, V, W) to the ground terminal (G).

Note: When there is more than one combination of an inverter and motor, do not use a multiconductor cable for the purpose of running the leads together.



(3)DC reactor connection terminals P1, P (+).
Connect DC reactor (DCR) used for improving power factor.

1) Remove shorting chip from the terminal P1 - P (+).
2) Connect terminals P1, P (+) of DC reactor (option).

NOTE • Keep the length of wiring below 10m.
• Do not remove the shorting chip with no use of DC reactor.

⚠ Caution
Be sure to connect an optional DC reactor (DCR) when the capacity of the power supply transformer exceeds 500 kVA and is 10 times more than the inverter rated capacity (accessories). **Otherwise fire could happen.**

（4）Connect the brake resistorterminals P(+)、DB (22kW or below)

1) Connect the braking resistor terminals P (+), DB.
2) Keep the wiring distance between the inverter and braking resistor below 5m and two lines twisted or paralleled.

⚠ Danger
Do not connect to terminals other than terminals P (+) and DBwhen connecting the DC brake resistor. **Otherwise fire could happen.**

2.4.4 Control terminal wiring

Functions of control terminals are listed in Table 2.8. Control terminal connection methods are different due to different function parameter settings in line with use purpose of the inverter.
Perform wiring properly to reduce the noise caused by the main circuit wiring.

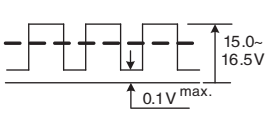
Table 2.8 Function of Control Terminals

Category	Terminal symbol	Terminal name	Functions
Analog input	10V	Power for speed setting	Power for external frequency setting (DC +10 V)
	AVI	Analog voltage input setting	(1) Analog voltage inputs the command value for frequency setting DC0~10V/0~100 (%)(positive running)，DC10~0V/0~100 (%) (reverse running) (2) Analog input for the PID instruction, PID control feedback signal, the frequency auxiliary setting (3) Hardware Specifications * Input Impedance: 22 (kΩ) * The maximum possible input DC + 15V. Apply DC + 10V when it exceeds DC + 10V. * set the function parameter 02.35 as "0" when inputting the analog voltage of positive and negative (DC0 ~ ± 10V) via terminal AVI (ps: only above 18.5kW (include 18.5kW) support negative polarity analog, selecting DC~±10V),
	ACI	Analog current input setting	(1)Analog current inputs the command value for frequency setting DC4~20mA/0~100 (%) (positive running)，DC20~4mA/0~100 (%) (reverse running) (2) Analog input for the PID instruction, PID control feedback signal, the frequency auxiliary setting, ratio setting, torque limit setting, and analog input monitor allocation. (3) Hardware Specifications * Input Impedance: 250 (kΩ)
	AUI	Analog voltage input setting	(1) Analog voltage inputs the command value for frequency setting DC0~10V/0~100 (%)(positive running)，DC10~0V/0~100 (%) (reverse running) (2) Analog input for the PID instruction, PID control feedback signal, the frequency auxiliary setting, ratio setting, torque limit setting, and analog input monitor allocation. (2) Hardware Specifications * Input Impedance: 22 (kΩ) * The maximum possible input DC +15V. Apply DC +10V when it exceeds DC + 10V. * set the function parameter 02.45 as "0" when inputting the analog voltage of positive and negative (DC0 ~ ± 10V) via terminal AUI (ps: only above 18.5kW (include 18.5kW) support negative polarity analog, selecting DC~±10V)
	ACM	Analog common terminals	Common terminals for the analog input and output signals (terminals 10V, AVI, ACI, AUI, AFM) are insulated for terminals DCM, MCM.

Table 2.8 Function of Control Terminals（continued）

<table>
<tr><th>Category</th><th>Terminal symbol</th><th>Terminal name</th><th>Functions</th></tr>
<tr><td rowspan="8">Digital input</td><td>MI1</td><td>Digital input 1</td><td rowspan="6">(1) Set various signals towards function parameters 01.01~01.07、01.98、01.99.
(2) Input modes of trigger: drain / source switching.
(3) Switch from [short circuit ON] to [short-circuit OFF] of the operation mode between each digital input terminals and terminals DCM.
(4) Digital input terminals MI7 is set to be pulse input terminal by modifying the function parameter.
Maximum wiring length is 20m
Maximum input pulse is 30kHz: pull the resistor up and down when connecting to a pulse generator of open collector output.
Refer to the digital input precautions.
100kHz: when connecting to a pulse generator of complementary outputs.
< Digital input circuit specifications >
<table><tr><th colspan="2">Item</th><th>Minimum</th><th>Maximum</th></tr><tr><td rowspan="2">Operating voltage（SINK/NPN）</td><td>ON Value</td><td>0V</td><td>2V</td></tr><tr><td>OFF Value</td><td>22V</td><td>27V</td></tr><tr><td rowspan="2">Operating voltage（SOURCE/PNP）</td><td>ON Value</td><td>22V</td><td>27V</td></tr><tr><td>OFF Value</td><td>0V</td><td>2V</td></tr><tr><td colspan="2">Operating current when ON (Input voltage 0V)(Input terminal MI7)</td><td>2.5mA (4.8mA)</td><td>5mA (8mA)</td></tr><tr><td colspan="2">Allowable leakage current when OFF</td><td>–</td><td>0.5mA</td></tr></table></td></tr>
<tr><td>MI2</td><td>Digital input 2</td></tr>
<tr><td>MI3</td><td>Digital input 3</td></tr>
<tr><td>MI4</td><td>Digital input 4</td></tr>
<tr><td>MI7</td><td>Digital input 7</td></tr>
<tr><td>FWD</td><td>Forward running • Stop command input</td></tr>
<tr><td>REV</td><td>Reverse running • Stop command input</td><td></td></tr>
<tr><td>24V</td><td>Auxiliary control power</td><td>(1) Connect output signal power of programmable controller.
(Rated voltage DC +24 V (supply voltage range: DC +22 ~ +27 V) Maximum 100mA)
(2) Use as load power for transistor output.</td></tr>
<tr><td>DCM</td><td>Digital common terminal</td><td>Common terminals for digital input signal are absolutely insulated for ACM. MCM terminals.</td></tr>
<tr><td rowspan="2">Analog output</td><td>AFM</td><td>Analog monitor</td><td>Output the monitor signal of current voltage DC0 ~ 10V or current voltage DC4 ~ 20mA. Output specification (VO / IO) switchesabove 18.5kW (include 18.5kW) through SW4 and functional parameters 00.29 (0:AFM,1:4~20mA output) on circuit board.
Output specification (VO / DFM) switches the power under 15kW (include 15kW) through SW2 and functional parameters 00.29(0:AFM,2:DFM pulse output) on circuit board.
Content of the signal can be chosen from the following through the setting of function parameter 00.31.
• Output frequency • Output current • Output Voltage
• Output torque • Load factor • Consumption power
• PID feedback value • DC bus voltage
• Universal AO • Motor output
• PID command value • PID output value
* Impedance can be connected: Minimum 5kΩ (DC0 ~ 10V output)
(Up to two analog voltmeter can be connected (DC0 ~ 10V, the input impedance is 10kΩ).)
* Impedance can be connected: Maximum 500Ω (DC4 ~ 20mA output)
* Gain adjustment range: 0 to 300%</td></tr>
<tr><td>ACM</td><td>Analog common terminals</td><td>Common terminals of analog input and output signals are insulated for DCM, MCM terminals.</td></tr>
</table>

Table 2.8 Function of Control Terminals（continued）

<table>
<tr><th>Categ-ory</th><th>Terminal symbol</th><th>Terminal name</th><th>Functions</th></tr>
<tr><td rowspan="2">Pulse output</td><td>DFM</td><td>Pulse monitor DFM function</td><td>Only the powers under 15kw(include15kw) have DFM output function. Content of the signal can be chosen from the same function as the AFM through the setting of function parameters 00.31.
* Impedance can be connected: Min 5kΩ
(Up to two analog voltmeter (DC0~10V can be connected, the input impedance is 10kΩ).
* Pulse working state: about 50%　Pulse rate: 25~ 6000p / s (full scale)
• Pulse output waveform　　• DFM output circuit example
 

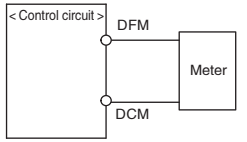
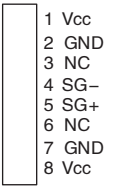
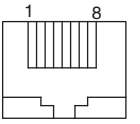

</td></tr>
<tr><td>DCM</td><td>Digital common terminals</td><td>Common terminals for analog input signals and terminal DFM output are insulated for ACM, MCM terminals.</td></tr>
<tr><td rowspan="3">Transistors Output</td><td>MO1</td><td>Transistors Output 1</td><td rowspan="2">(1) Output various signals set by 01.20 - 01.21 parameters
(2) Switch from "signal output ON" to "signal output OFF" of the operation mode between the transistor output terminal MO1~MO2 and the terminal MCM.
<Transistor output circuit specifications>
<table><tr><th colspan="2">Items</th><th>Maximum</th></tr><tr><td rowspan="2">Operating voltage</td><td>ON Value</td><td>2V</td></tr><tr><td>OFF Value</td><td>27V</td></tr><tr><td colspan="2">Maximum load current when ON</td><td>50mA</td></tr><tr><td colspan="2">Leakage current when OFF</td><td>0.1mA</td></tr></table>Note: ◆ Connect a surge-absorbing diode at both ends of the field coil when connecting control relay.
◆ Use terminal 24V as power supply terminal (DC24V (supply voltage range: DC22 ~ 27V), maximum 100mA) when turning the circuit on. Perform short-circuit between the terminals MCM-DCM.</td></tr>
<tr><td>MO2</td><td>Transistors Output 2</td></tr>
<tr><td>MCM</td><td>Transistor outputs common terminal</td><td>Common terminals output by the transistor are relatively insulated to the terminals DCM, ACM.</td></tr>
<tr><td>Contact output</td><td>RA-RB -RC</td><td>Relay contact output</td><td>(1) Perform output through relay contacts (1C) when the inverter alarm stops.
Contact capacity: AC250V 0.25A cosφ = 0.3, DC30V 1A
(2) Select and output various signals the same as terminals MO1 ~ MO2.
(3) Switch from “ON signal output” when turned on between terminals RA-RC to “ON signal output” when turned off between terminals RA-RC</td></tr>
</table>

Table 2.8 Function of Control Terminals（continued）

Category	Terminal symbol	Terminal name	Functions
communication	SG+/ SG	RS-485 communication terminal	Connect input and output terminals of computers and programmable controllers via RS-485 communication. (Refer to 2.4.5 for terminal resistor)
	RJ-45 connector for connection with keypad	RS-485 communications port 1 (for connection with keypad)	(1) Connect keypad use. (2) Remove keypad and connectors used for communication between RS-485, computers and programmable controllers. (Refer to 2.4.5 for terminal resistor)  RJ−45 connector  RJ−45 connector Figure 2.9 Pin definition of RJ-45 connector • Use 1, 2, 7, 8 pins for the power supply for the keypad. Connect the RJ-45 connector to other equipment and do not use these pins.

2.4.5 Transfer of various switches

⚠ Danger

Before proceeding to the transfer of various switches, turn OFF the power and wait at least five minutes for inverters of 22kW or below, or at least ten minutes for inverters of 30kW or above. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P(+) and N(-) has dropped to the safe level (+25 VDC or below)

Otherwise an electric shock could happen.

Functions of various switches are shown in Table 2.9

Table 2.9 Functions of various switches(below 15kW (include 15kW))

Switch symbol	Functions
SW1	<RS-485 Communication termination resistors switch (RS-485 Communicate Port 2 (Terminal block))> • Set shorted cap to ON for RS-485 communication when connecting the inverter to the terminal.
SW2	< voltage / current output switch of S3100 terminal AFM/DFM > Select the AFM output specification switch. Change the function parameters 00.29 when switching short circuit jumper.

Input specifications	SW2	00．29 data
Voltage output (factory state)	AFM side	0
Frequency output	DFM side	2

Table 2.9 Functions of various switches(below 15kW (include 15kW))

Switch symbol	Functions
SW3	<The input switch of AUI/ACI terminal> Select analog voltage input setting or analog current input setting. Switch them under SW.
SW4	< digital input terminals drain / source switch > • For the digital input terminals MI1 ~ MI4,MI7, FWD, REV drain / source switches for jumper selection. • The factory state is SINK/NPN side .

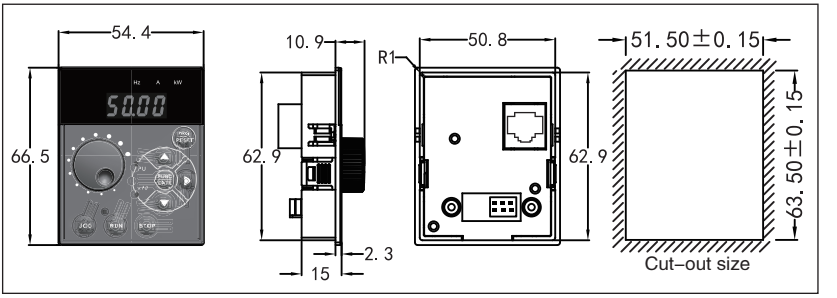
Table 2.9 Functions of various switches((above 18.5kW (include 18.5kW))

<table>
<tr><th>Switch symbol</th><th>Functions</th></tr>
<tr><td>SW1</td><td>< digital input terminals drain / source switch >
• For the digital input terminals MI1 ~ MI7, FWD, REV drain / source switches for jumper selection.
• The factory state is SINK side .</td></tr>
<tr><td>SW2</td><td><RS-485 Communication termination resistors switch (RS-485 Communicate Port 2 (Terminal block))>
• Set shorted cap to ON for RS-485 communication when connecting the inverter to the terminal.</td></tr>
<tr><td>SW3</td><td><RS-485 Communication termination resistors switch (RS-485 Communicate Port 1 (for connection with the keypad))>
Set it to OFF (Factory state) when connecting keypad,
•Set shorted cap to ON for RS-485 communication when connecting the inverter to the terminal.</td></tr>
<tr><td>SW4</td><td>< voltage / current output switch of terminal AFM >
Select the AFM output specification switch. Change the function parameters 00.29 when switching short circuit jumper.
<table>
<tr><th>Output specifications</th><th>SW5</th><th>00．29 data</th></tr>
<tr><td>Voltage output (factory state)</td><td>VO side</td><td>0</td></tr>
<tr><td>Current output</td><td>IO side</td><td>1</td></tr>
</table></td></tr>
<tr><td>SW5</td><td>< function switch of terminal AUI >
Select the analog voltage input setting or PTC / NTC thermistor input. Change function parameters 04.26 when switching short circuit jumper.
<table>
<tr><th>Input specifications</th><th>SW5</th><th>00．29 data</th></tr>
<tr><td>Analog voltage input setting (factory default)</td><td>V2 side</td><td>0</td></tr>
<tr><td>PTC thermistor input</td><td>PTC/NTC side</td><td>1 (alarm) or 2 (alarm)</td></tr>
<tr><td>NTC thermistor input</td><td>PTC/NTC side</td><td>3</td></tr>
</table></td></tr>
</table>

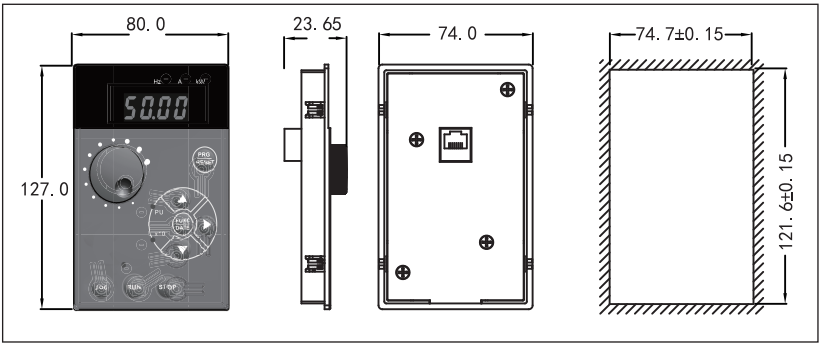
2.5 Keypad dimension figure

Below 15kW (include 15kW)

（Unit：mm）



Above 18.5kW (include 18.5kW)



2.6 External Dimensions

2.6.1 External Dimensions

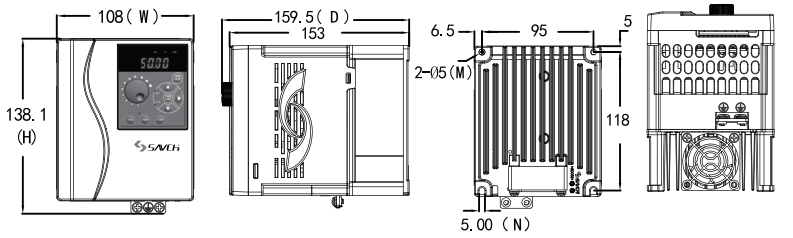
Unit:mm

Inverter type	W	W1	W2	H Hanging (Standing)	H1	H2	D	M	N
S3100–2T0.4G	108	95	95	138.1	118		159.5	5	5
S3100–2T0.75G									
S3100–2T1.5G									
S3100–4T0.75G/1.5P									
S3100–4T1.5G/2.2P									
S3100–4T2.2G/4.0P									
S3100–2T2.2G	130	108	108	209	198		169.8	5	5
S3100–2T4.0G									
S3100–4T4.0G/5.5P									
S3100–4T5.5G/7.5P									
S3100–2T5.5G	180	160	160	298	284		180	6.5	6.5
S3100–2T7.5G									
S3100–4T7.5G/11P									
S3100–4T11G/15P									
S3100–4T15G/18.5P									
S3100–4T18.5G/22P	250	160	160	386	370		201	9	9
S3100–4T22G/30P									
S3100–4T30G/37P	298	176	176	470	454.5		215	6.5	12
S3100–4T37G/45P	383	115	115	580	564		270	10.5	10.5
S3100–4T45G/55P									
S3100–4T55G/75P									
S3100–4T75G/90P	468	160	160	778	745	744	330	12.5	18
S3100–4T90G/110P									
S3100–4T110G/132P									
S3100–4T132G/160P	490	270	270	1274 (1491.5)	1231		403	13	23
S3100–4T160G/200P									
S3100–4T200G/220P	750	245	250	1363 (1668)	1327		415	13	18
S3100–4T220G/280P									
S3100–4T280G/315P									
S3100–4T315G/355P									

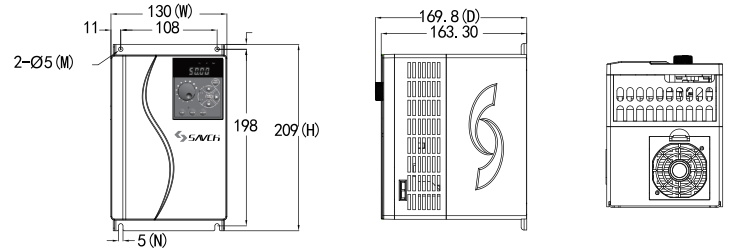
2.6.2 Inverter Main body figure

Inverter main body Unit:mm

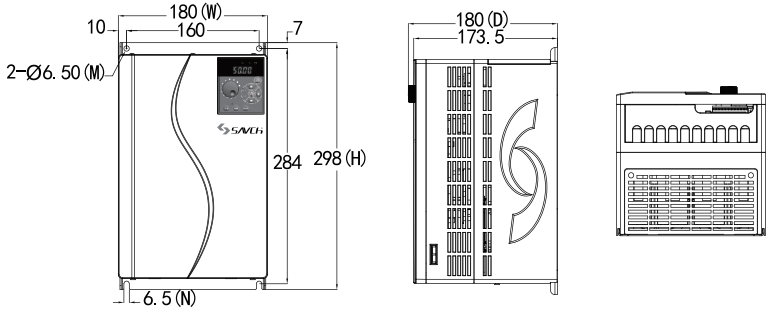
S3100-2T0.4G~1.5G/4T0.75G/1.5P~4T2.2G/4.0P



S3100-2T2.2G~4.0G/4T4.0G/5.5P~4T5.5G/7.5P



S3100-2T5.5G~7.5G/4T7.5G/11P~4T15G/18.5P

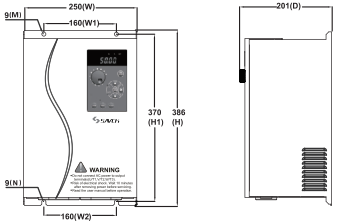


2.6.2 Inverter Main body figure

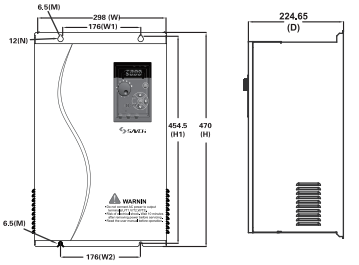
Inverter main body

Unit:mm

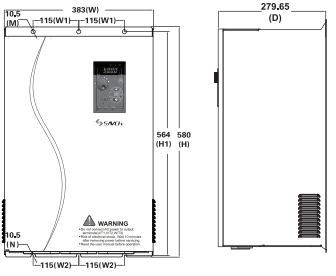
S3100–4T18.5G/22P~4T22G/30P



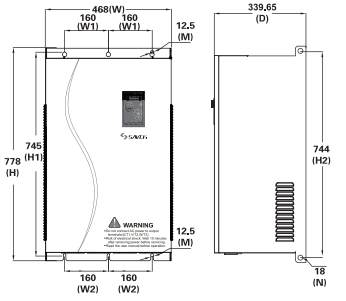
S3100–4T30G/37P



S3100–4T37G/45P~4T55G/75P



S3100–4T75G/90P~110G/132P



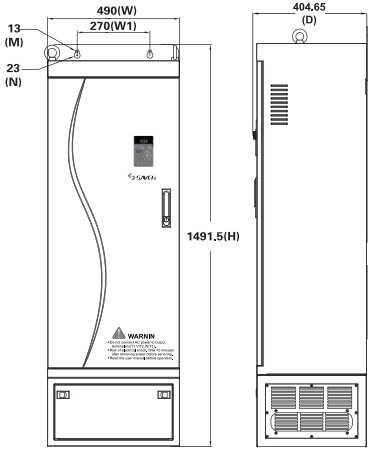
2.6.2 Inverter Main body figure

Inverter main body

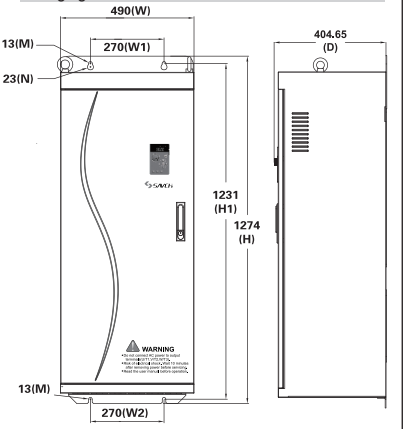
Unit:mm

S3100-4T132G/160P~4T160G/200P

Standing

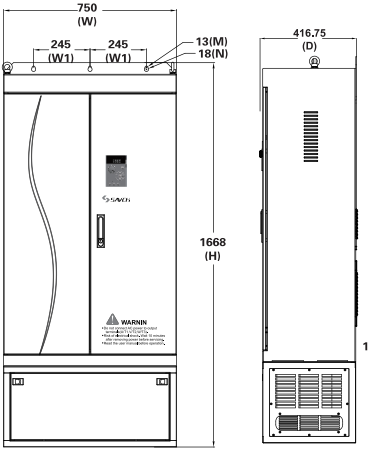


Hanging

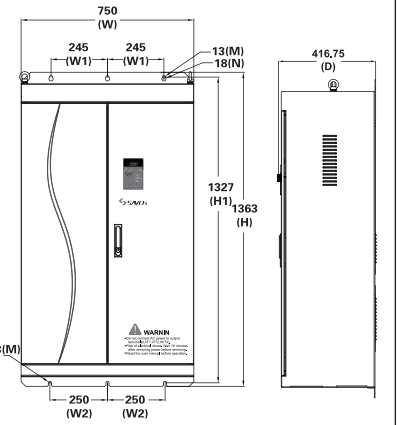


S3100-4T200G/220P~4T315G/355P

Standing



Hanging



3.1 Overview of Keypad Functions

The keypad could be divided into two parts, i.e. display area and key control area. Display area displays parameter settings and indicates different operation status. Key control area is convenient for the user to take operation for the inverter.

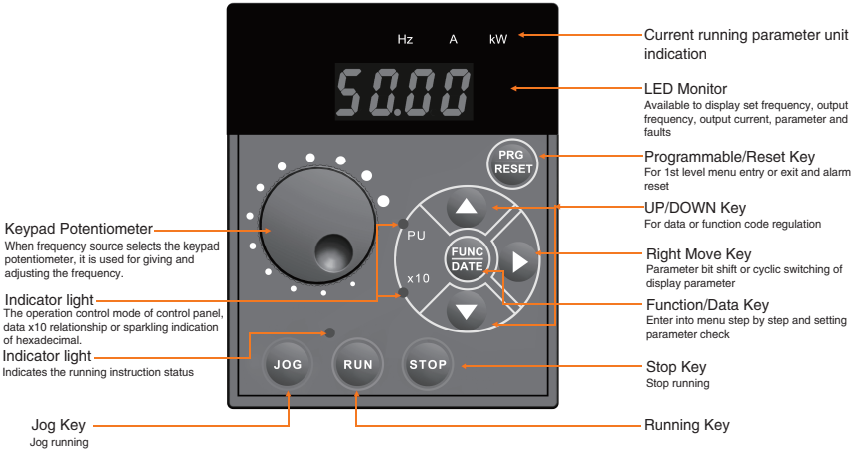


Table 3-1 Overview of Keypad Functions

Monitors and Key	Functions Overview
50.00	Displays output frequency, current, voltage and other Running status information Function parameters and data, Alarm codes
PRG RESET	Switches the operation modes of inverter : Running mode, Programming mode and Alarm mode When alarm codes appears, pressing this key to clear the alarming information.
FUNC DATA	Switches the monitoring item of running status. Displays the functional parameter and establishes the newly entered data Switches to display the alarm information.
JOG	Jog mode switching
RUN	Run key
STOP	Stop Key
∧ / ∨	Selects the setting items or change the function parameter data.
>	Shift right key(select data shift right to next number)

Table 3-1 Overview of Keypad Functions

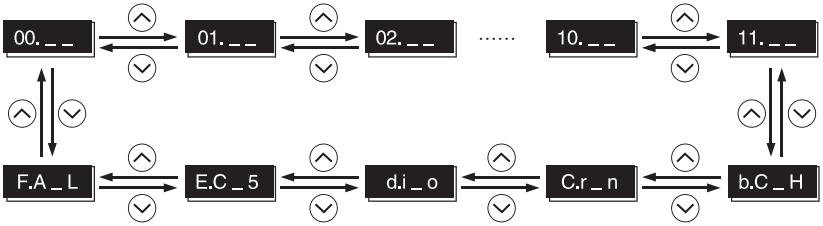
Monitors and Key	Functions Overview
RUNNING LED lamp	The indicator lamp is on when it has run command status.
PU LED	When the (RUN) key of keypad as run command is valid, the indicator is on. In the programming mode and alarming mode, it cannot take (RUN) key operation when the indicator is on.
Unit of LED lamp (3)	Hz，A，kW It means these indexes show the unit of the number displayed and the running status by the combination of 3 LED lamps. Refer to “3.1 Monitoring Item Under Run Mode” on detailed contents.
×10 LED	If the displayed data is exceeding 9999, ×10 LED lamp is on, and the “displayed data ×10” is actual data.When the data is hexadecimal, the indicator light of ”x10” flickers.

Operation using the Keypad

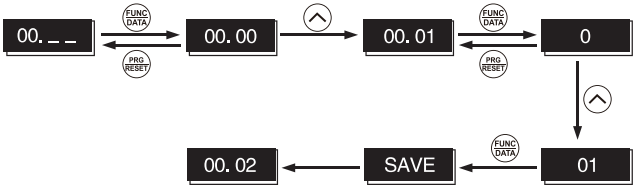
Operation Modes Selection

Tips: Double key operation means: operation by pressing 2 keys simultaneously and the sign is “+”.

Menu switching under programming mode

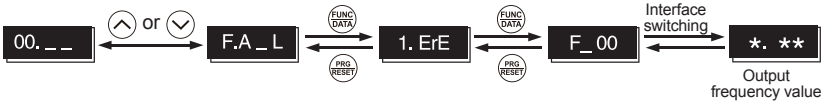


Functional parameter setting or modification



Tips: Cursor moving: When functional parameter data is changed, press PRG RESET key for more than 1s continuously. It enables move the flashing position and the data on the position could be changed.

Alarming information query



Run information query

I/O Signal Checking

3.2 Overview of Operation Modes

The S3100 features the following three operation modes

Table 3.2 Operation Modes

Operation Mode	Description
Running Mode	It is the mode enters into automatically after power on. It colud take frequency setting, PID setting, specify run/stop commands in regular operation. It could monitor the running status in real time. If a light alarm occurs, the “L-AL” appears on the LED monitor.(Above 18.5kW (include 18.5kW))
Programming Mode	It could allow you to configure function parameter data and check a variety of information relating to the inverter status and maintenance.
Alarm Mode	If an alarm condition arises, the inverter automatically enters the Alarm mode in which you can view the corresponding alarm code and its related information.

3.3 Running Mode

3.3.1 Monitoring Item under Run Mode

Under run mode, it could monitor 14 items which listed in the following table. Immediately after the power is turned ON, the monitor item specified by function code 01.43 is displayed. Pressing the FUNC DATA key in Running mode switches between monitor items in the sequence shown in Table 3.3.

Table 3.3 Monitored Items

	Monitored Items	Example	LED Display	Unit	Description of Display Value	01.43 Function parameter
Speed Monitor	Function parameter 01.48 specifies what to be displayed					
	Output Frequency before Slip Compensation	50.00	■Hz □A □kW	Hz	Display value = Output frequency (Hz)	0
	Output Frequency after Slip Compensation	50.00	■Hz □A □kW	Hz	Display value = Output frequency (Hz)	(01. 48 = 0)
	Setting Frequency	50.00	■Hz □A □kW	Hz	Display value = Setting frequency (Hz)	(01. 48 = 1) (01. 48 = 2)
	Motor Speed	1500	■Hz ■A □kW	r/min	Display value = Output frequency (Hz)× $\frac{120}{03.\ 01}$	(01. 48 = 3) (01. 48 = 4)
	Load shaft speed	200.0	■Hz ■A □kW	r/min	Display value = Output frequency (Hz) × 01. 50	(01. 48 = 5)
	Line Speed	200.0	□Hz ■A ■kW	m/min	Display value = Output frequency (Hz) × 01. 50	(01. 48 = 7)
	Speed (%)(*1)	60.0	□Hz □A □kW	%	Display value = $\frac{\text{Output frequency}}{\text{ax. frequency}} \times 100$	

■ ON □ OFF

Monitored Items	Example	LED Display	Unit	Description of Display Value	01.43 Function parameter
Output Current	13.50	□Hz ■A □kW	A	Current output from the inverter in RMS	3
Output Voltage	380U	□Hz □A □kW	V	Voltage output from the inverter in RMS	4
Output Torque	50	□Hz □A □kW	%	Calculated output torque	8
Input power	8.60	□Hz □A ■kW	kW	Input power to the inverter	9
PID command	10.00.	□Hz □A □kW	–	PID command/feedback amount transformed to that of physical value of the object to be controlled, Refer to function parameters 01.40 and 01.41 for details. When a PID command is displayed, the dot at the lowest digit on the LED monitor blinks.	10
PID Feedback amount	9.00.	□Hz □A □kW	–		12
PID Output	100.0.	□Hz □A □kW	%	Display the PID value in max output frequency (00.03) as percentage of 100%. When PID is output, the dot at the lowest digit on the LED monitor blinks.	14
Load factor	50L	□Hz □A □kW	%	Load factor of the motor in % as the rated output being at 100%	15
Motor output power	9.85	□Hz □A ■kW	kW	Motor output in kW, LED blinks	16
Analog Input (*1)	90.00	□Hz □A □kW	–	Analog input to the inverter in a format suitable for a desired scale Refer to function parameters 01.40 and 01.41 for details The analog input monitor appears only when the analog input monitor is enabled by any of function parameters 01.61 to 01.63. (Select terminal function).	17
Torque Current (*1)	48	□Hz □A □kW	%	Torque current command value	23
Magnetic flux command (*1)	50	□Hz □A □kW	%	Magnetic flux command value (Available only under vector control) When it is V/f control, it displays 0 (zero).	24
Input watt-hour (*1)	100.0	□Hz □A □kW	kWh	Display value $= \frac{\text{Input watt hour (kWh)}}{100}$	25

(*1) Adapt to above 18.5kW (include 18.5kW). ■ ON □ OFF

3.3.2 Monitoring light alarms on keypad(above 18.5kW (include 18.5kW))

Inverter failure is divided into Alarm, and Light alarm. If the former occurs, which appears the inverter immediately trips, if the latter occurs, which the L-AL appears and PU LED blinks on the LED monitor, but the inverter continues to run. The Light alarm object should defined with function codes 04.81 and 04.82 beforehand. If the Light alarm [mLALM](data = 98) is distributed to general output terminal (function parameters 01．20~01．24、01．27), enables the inverter to output the LALM signal on that terminal upon occurrence of a light alarm.

Please refer to **Chapter 7 Failure Indication and Countermeasures** on the causes of minor failure.

■ Check a light alarm

If a light alarm appears, it displays L-AL on the LED monitor. If the light alarm would be required to check, enter programming mode by pressing (PRG RESET) key and check on "Maintenance Information" E_36. Additionally, To check the past light alarm ,it's also possible to check on E_37 (light alarm (previous)) ~E_39(light alarm (previous 3)) simultaneously. Refer to "4.4 Maintainance Information"

■ Remove the current light alarm

After checking the current light alarm, to switch the keypad from the L-AL indication back to the running status display, press the (FUNC DATA) key in Running mode If the light alarm has been removed, the PU LED doesn't blink,and general output signal[mLALM] turns OFF. If not, PU LED and general output [mLALM] will keep showing "Light alarm" status.

3.4 Preliminary operation-not-connected with motor

■ About the setting method of keypad giving the frequency

The frequency setting is made via the operation panel(**00.01=0** factory default)

(1) parameter 00.01 data is set to 0, that is to use the keyboard ⌃ / ⌄ to set the frequency (if there is integrated potentiometer, the potentiometer is priority)

(2) After pressing the button ⌃ / ⌄ ,the frequency is displayed, and the last bit of the set frequency flashes

(3) You can change the setting frequency by pressing ⌃ / ⌄ again

(4) If you want to save the setting frequency, please press (FUNC DATA) within **3s** after the frequency adjustment is feed, it will display **"SAUE"** means being saved.

Note: If the operation panel is an integrated potentiometer and it is necessary to switch to the feed method of the keyboard ⌃ / ⌄. It needs to set the function parameter **11.50** Function switch bit (hexadecimal display)

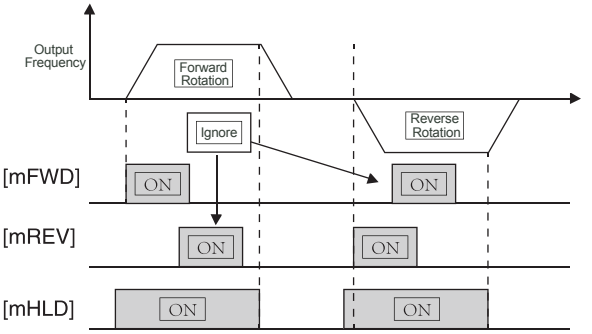
1: Potentiometer panel switch to key reference (**0 :** Potentiometer, **1:** function up and down key)

The last factory default bit of parameter **11.50** is changed from **0** to **2** that is switched to the operation panel to a feed frequency mode via up and down keys

The saving of up and down keys operation, please refer to the description of above **(4)** point

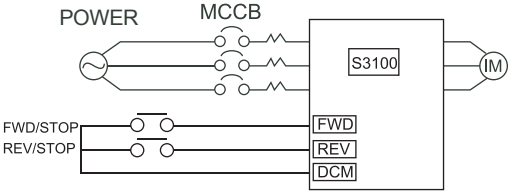
■ On the three-wire operation controlled by an external signa

The external signal of the terminal **[mFWD] [mREV]** is a two-wire operation in the initial state, but by assigning **"mHLD"**, it can be used as a Self-locking holding signal when the three-wire operation controlled by **[mFWD] [mREV] [mHLD]**. When **[mHLD]** is **ON**, the self-locking holding **[mFWD]** or **[mREV]** signal, when **OFF**, is released. There is no assigning to **[mHLD]** function, only there are **[mFWD] [mREV]** two-wire operation

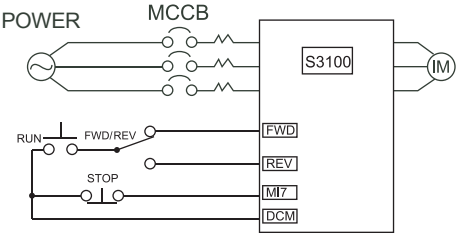


The wiring of the external signal control operation is as below

Two-wire operation control “forward rotation/reverse rotation” and “reverse rotation/stop” (00.02=1)



Three-wire operation control mode（00.02=1）（01.07=6 Self-locking hold[mHLD]）



3.5 Programming Mode

Programming mode provides you with these functions--setting and checking function code data, monitoring maintenance information and checking input/output (I/O) signal status. These functions can be easily selected with a menu-driven system. Table 3.4 lists menus available in Programming mode.

When the inverter enters Programming mode from the second time on, the menu selected last in Programming mode will be displayed.

Table 3.4 Program Mode Menu

No.	Menu	LED Display on keypad	Main Functions	
1	DataSetting	00.__	00 Group Parameters (Basic Function)	Display/change the data of the selectable function code
		01.__	01 Group Parameters(External Terminal Function)	
		02.__	02 Group Parameters(Control Function)	
		03.__	03 Group Parameters(Motor 1 Parameter)	
		04.__	04 Group Parameters(Advanced Function)	
		05.__	05 Group Parameters(Motor 2 Parameter)	
		06.__	06 Group Parameters(Motor 3 Parameter) (*1)	
		07.__	07 Group Parameters(Motor 4 Parameter) (*1)	
		08.__	08 Group Parameters(Application Function 1)	
		09.__	09 Group Parameters(Application Function 2) (*1)	
		10.__	10 Group Parameters(Application Function 3) (*1)	
		11.__	11 Group Parameters(Serial Communication Function)	
2	Data Checking	b.C_H	Displays the function code selected and its data on the same screen. Also this menu is used to change the function code data or check whether the data has been changed from the factory default.	
3	Run Monitoring	C.r_n	Displays the running information required for maintenance or test running.	
4	I/O Checking	d.i_o	Displays external interface information.	
5	Maintenance Information	E.C_S	Displays maintenance information including cumulative run time.	
6	Alarm Information	F.A_L	Displays the recent four alarm codes. Also this menu is used to view the information on the running status at the time the alarm occurred.	

(*1) Adapt to above 18.5kW (include 18.5kW).

3.5.1 Checking changed function codes

Changed Function codes could be checked by menu code “b” in programming mode: “b.C_H ” shall be check. The keypad monitor shows the function codes whose data has been changed from the factory defaults, in Programming mode allows you to check function codes and their data that has been changed.

3.5.2 Monitoring the running status

Menu C "Drive Monitoring" in Programming mode allows you to monitor the running status during maintenance and test running. The display content of “Drive Monitoring” is listed in Table 3.5.

Table 3.5 “Drive Monitoring Items”

Keypad Display	Item	Unit	Description
C_00	Output Frequency	Hz	Output frequency before slip compensation
C_01	Output Frequency	Hz	Output frequency after slip compensation
C_02	Output Current	A	Output Current
C_03	Output Voltage	V	Output Voltage
C_04	Output Torque	%	Output Torque
C_05	Setting Frequency	Hz	Setting Frequency
C_06	Running Direction	None	Display the output run direction. F: Forward, r: Reverse, ----: Stopped
C_07	Running Status	None	Display the run status with 4-bit in hexadecimal. Refer to ■Run Status (C_07) and Display Method of Run Status 2 (C_23) on the following page on detailed information.
C_08	Motor Speed	r/min	Display Value =Output Frequency(Hz)× 120/ P01(motor pole) When display value is more than 10000, ×10 LED is on ,and motor speed= display value × 10.
C_09	Load shaft Speed	r/min	Display Value =(Output Frequency Hz) × Functional Parameter 01. 50 (Speed display factor) When display value is more than 10000, ×10 LED is on .and load speed= display value × 10.
C_10	PID command value	None	The PID command value is displayed after conversion to the virtual physical values (e.g., temperature or pressure) of the object to be controlled using function parameter 01． 40 and 01．41 data (PID display coefficients A and B). Display value = (PID command value) ×(Coefficient A - B) + B When PID control is set as no action, it displays “----”.

Keypad Display	Item	Unit	Description
C_11	PID Feedback amount	None	The PID feedback amount is displayed after conversion to the virtual physical values (e.g., temperature or pressure) of the object to be controlled using function parameter 01．40 and 01．41 data (PID display coefficients A and B). Display value = (PID feedback amount) ×(Coefficient A - B) + B When PID control is set as no action, it displays “----”.
C_12	Torque Limit Value	%	Driving torque limit value A (based on motor rated torque)
C_13	Torque Limit Value	%	Braking torque limit value B (based on motor rated torque)
C_14	Ratio setting(*1)	–	When this setting is 100%, the LED monitor shows 1.00 time of the value to be displayed. When no rate setting value is selected, it displays “----”.
C_15	Line Speed (*1)	m/min	Display Value=(Output Frequency Hz) × Functional Parameter 01.50 (speed display coefficient) When display value is more than 10000, ×10 LED is on and line speed= display value × 10.
C_16	Reserved (*1)	–	—
C_17	Reserved (*1)	–	—
C_18	Reserved (*1)	–	—
C_19	Reserved (*1)	–	—
C_20	Reserved (*1)	–	—
C_21	PID Output Value(*1)	%	Display PID output value, displayed in % (assuming the maximum frequency as 100%). When PID control is set as no action, it displays “----”.
C_22	Magnetic flux command value (*1)	%	It displays Flux command value in %.
C_23	Running Status 2(*1)	None	Display the run status 2 in 4-bit in hexadecimal. Refer to ■ Run Status (C_07) and Display Method of Run Status 2 (C_23) on the following page on detailed information.
C_24	Motor Temperature (*1)	℃	Temperature detected by the NTC thermistor built in the motor. When it is not connected NTC thermistor setting, it displays
C_25	Reserved (*1)	–	—
C_26	Reserved (*1)	–	—
C_27	Reserved (*1)	–	—
C_28	Reserved (*1)	–	—

(*1) Adapt to above 18.5kW (include 18.5kW).

■ Run Status (C_07) and Display Method of Run Status 2(C_23)

To display the run status /run status 2 in 4-bit in hexadecimal, as in Table 3.6 and Table 3.7, it distributes the run status into 0-15 bits. The relation of run status distribution and display in keypad is as in Table 3.8.

Table 3.9 is a table on converting 4-bit binary system number into hexadecimal number system of monitor.

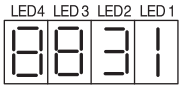
Table 3.6 Bit Distribution of Run Status (C_07)

Bit	Mark	Content	Bit	Mark	Content
15	mBUSY	Writing functional parameter data is 1.	7	mVL	Voltage in limiting is 1.
14	Reserved	0	6	mTL	Torque in limiting is 1.
13		0	5	mNUV	DC bus voltage> Low voltage level is1
12	mRL	Valid communication (run instruction, setting frequency status) is 1.	4	mBRK	Braking is 1.
11	mALM	Alarming is 1.	3	mINT	Output open circuit of inverter is 1.
10	mDEC	Speed reducing is 1.	2	mEXT	DC in braking is 1.
9	mACC	Speed accelerating is 1.	1	mREV	Reverse rotation is 1.
8	mIL	Current in limiting is 1.	0	mFWD	Forward rotation is 1.

Table 3.7 Bit Distribution of Run Status (C_23)

Bit	Mark	Content	Bit	Mark	Content
15	–	Reserved	7	–	Speed in Limiting (in Torque Control)
14			6	–	Reserved
13			5	–	Motor Selection
12			4	–	00：Motor 1 01：Motor 2 10：Motor 3 11：Motor 4
11			3	–	
10			2	–	
9			1	–	
8			0	–	Control Method 0000: V / f control with slip compensation inactive 0001: Dynamic torque vector control 0010:V/f Control with Slip Compensation active

Table 3.8 Display Example of Run Status

LED No.		LED4				LED3				LED2				LED1			
Bit		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Mark		mBUSY	mWR	mRL		mALM	mDEC	mACC	mIL	mVL	mTL	mNUV	mBRK	mINT	mEXT	mREV	mFWD
Display Example	Binary System	1	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1
	LED keypad In hexad-ecimal																

■ Hexadecimal conversion table

Use binary system 4 bit unit to be converted into hexadecimal. The conversion table is as the following.

Table 3.9 Conversion of Binary and Hexadecimal

Binary				Hexadecimal	Binary				Hexadecimal
0	0	0	0	0	1	0	0	0	8
0	0	0	1	1	1	0	0	1	9
0	0	1	0	2	1	0	1	0	A
0	0	1	1	3	1	0	1	1	b
0	1	0	0	4	1	1	0	0	c
0	1	0	1	5	1	1	0	1	d
0	1	1	0	6	1	1	1	0	E
0	1	1	1	7	1	1	1	1	F

3.5.3 Checking I/O signal status

Menu #d "I/O Checking" in Programming mode allows you to check the I/O states of digital and analog signals. It is used to check the running status during maintenance or test running.

Table 3.10 “I/O Checking” Items

Keypad Display	Item	Description
d_00	Input signals on the control circuit terminals(Input/output)	Display ON/OFF status of I/O signals on the control circuit terminal block. refer to the next page“■ I/O Display of Control Terminal” for related details.
d_01	Reserved	—
d_02	Terminal AVI Input Voltage	Display terminal AVI input voltage. Unit: V
d_03	Terminal ACI Input Current	Display terminal AVI input current. Unit: mA
d_04	Terminal AFM Output Voltage	Display terminal AFM output voltage. Unit: V
d_05	Terminal DFM Output Voltage(*1)	Display terminal DFM output voltage. Unit: V
d_06	Terminal DFM Output Frequency	Display terminal DFM output pulse count in unit time. Unit: p/s
d_07	Terminal AUI Input Voltage	Display terminal AUI input voltage. Unit: V
d_08	Terminal AFM Output Current (*1)	Display terminal AFM output current. Unit: mA
d_10	Reserved	—

Table 3.10 “I/O Checking” Items

Keypad Display	Item	Description
d_11	Terminal MI7 Pulse Input Monitor	Display pulse count of input terminal MI7 pulse train signal.
d_15	Reserved	—
d_16	Reserved	—
d_17	Reserved	—
d_18	Reserved	—
d_19	Reserved	—
d_20	Reserved	—
d_21	Reserved	—
d_22	Reserved	—
d_23	Reserved	—
d_24	User Timing Sequence Timer Monitoring(*1)	Monitor functional parameter 10.91 set user timing sequence timer and counter values.

(*1) Adapt to above 18.5kW (include 18.5kW).

■ I/O Display of Control Terminal

I/O signal status of control terminal displays the I/O status of terminal block in two ways, “LED Each Segment On/Off “Display in Hexadecimal”.

• LED Each Segment On/Off Display

As in Table 3.11 and the following Fig, the segments a~dp of LED1 and LED2 are on when the digital output terminals (FWD、REV、MI1~MI7) are on, and off when OFF. The segments a~e of LED 3 are on when output terminals MO1~MO2-MCM are closed, and off when disconnected. The segment a of LED 4 is used to represent terminal RA/RB/RC. When terminal RC and terminal RA appear short circuit, segment a of LED 4 is on and is off when it is disconnected.

Tips: When all signals are disconnected, all segments g of (LED1~LED4) are on("----").

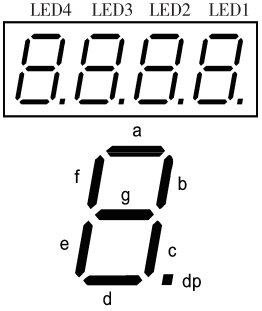


Table 3.11 Segment Displays of External Signal Information

Segment	LED4	LED3	LED2	LED1
a	RA/RB/RC	MO1–MCM	MI7	FWD
b	—	MO2–MCM	—	REV
c	—	—	—	MI1
d	—	—	—	MI2
e	—	—	—	MI3
f	—	—	—	MI4
g	—	—	—	—
dp	—	—	—	

● Display in Hexadecimal

Distribute all I/O terminals as 16-bit binary system from 0 bit to 15-bit. It is viewed as “0” when there is no distribution. Distributed data is displayed as 4-bit hexadecimal number system number in keypad (0~ F).

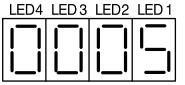
Digital input terminals FWD and REV are distributed to bit 0 and bit 1. MI1~MI7 are distributed to bits 2~8. In all bits, when all input terminals are ON, it I set as “1”, and it is set as ‘0” when OFF. E.g., when terminals FWD and MI1 are ON and the rest are OFF, the display of LED4~LED1 is 0005.

Digital output terminals MO1~MO2 are distributed to 0-1. When output terminals MO1~MO2-MCM are ON (short circuit), it is set as “1”. When OFF (disconnected), it is set as “0”.

The status of contact output terminals RA/RB/RC is distributed to bit 8. When the output terminals RA-RC are closed, it is set as “1”. When RA-RC is disconnected, it is set as “0”. E.g. when the terminal MO1 is ON, MO2 is OFF, RA-RC is closed, the display of LED4~LED1 is 0101.

Terminals distributed as 0-15 bits and 7-segment LED hexadecimal display examples are as the following.

Table 3.12 Hexadecimal Display of 7-segment LED (Examples)

LED No.		LED4				LED3				LED2				LED1			
Bit		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Input terminal		—	—	—	—	—	—	—	MI7	—	—	MI4	MI3	MI2	MI1	REV	FWD
Output terminal		—	—	—	—	—	—	—	RA/RB/RC	—	—	—	—	—	—	MO2	MO1
Display Example (Input terminal)	Binary System	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
	LED keypad In hexadecimal																

3.5.4 Reading maintenance Information

Menu code E" Maintenance Information: E.C_S" of program mode displays necessary information in inverter maintenance.

Table 3.13 maintenance Information items

Keypad Display	Item	Display Contents
E_00	Cumulative run time	Displays the content of the accumulative power-on time counter of the inverter. Measurement Range: 0~65,535 h Display: Divided the accumulative run time into interactive display of front 2 bits and back 3 bits. E.g. 0 ⇔ 535h (535 h) 65 ⇔ 535h (65,535 h) When the back 3 bits are displayed, it displays h (hour) at the final bit. When the count exceeds 65,535 hours,the counter will be reset to "0" and start over again.
E_01	DC link bus voltage	Displays the DC link bus voltage of main circuit of inverter. Unit: V
E_02	Max. Temperature inside the Inverter(*1)	Displays the max temperature –inside of the inverter for per hour. Unit: ℃ (it displays 20 ℃ when it is below 20 ℃.)
E_03	Max. Temperature of cooler	Displays the max temperature of –cooler for per hour. Unit: ℃ (it displays 20 ℃ when it is below 20 ℃.)
E_04	Max. effective current	Displays the maximum current in RMS for per hour. Unit: A
E_05	Reserved	—
E_06	Reserved	—
E_07	Cumulative running time of the cooling fan	Displays the content of the cumulative running time of the cooling fan. When the cooling fan ON-OFF control (functioncode 04.06) is valid and the fan stops, the counter does not work. Displays method is the same with E_06.
E_08	Number of startups for the 1st motor	Cumulative starting times of the 1st motor and display value Measurement Range: 0~65,530 times Display: 0~9999 If it is beyond 10,000 times, ×10 LED is on. It displays by dividing the times by 10. When it is beyond 65,530 times, it will be reset to"0" and start over again
E_09	Input watt hour	Displays Input watt hour Displays: 0.001~9999 Input watt hour= "Display" × 100kWh It can reset Input watt hour and accumulative power data through setting functional parameter 01．51 as "0.000" When it is beyond 999,900kWh, it will be reset to"0" and start over again.

Table 3.13 Maintenance Information items(continued)

Keypad Display	Item	Display Contents
E_10	Cumulative power data	Cumulative power data means the data of Input watt hour(kWh)×functional parameter 01．51. The setting range of functional parameter 01．51 is 0.000~9999. Displays Unit: None (Display: 0.001~9999. it will be reset to"0" when it is more than 9999. (fixed at 9999)) According to the accumulative power data, move the decimal point, and change the display resolution. It can reset accumulative power data through setting functional parameter 01．51 as "0.000".
E_11	RS-485 error times (communication port 1)	Cumulated error times in RS-485 communication (communication port 1: connection of keypad). When it is beyond 9,999 times, it will be reset to"0" and start over again
E_12	RS-485 error content (communication port 1)	Latest error appears in RS-485 communication (communication port 1). It displays in decimal system code form.
E_13	Reserved	—
E_14	TheInverter ROM version	The ROM version of inverter is displayed in 4 bits form.
E_16	Keypad ROM version	The ROM version of keypad is displayed in 4 bits form.
E_17	RS-485 error times (communication port 2)	Accumulated error times in RS-485 communication (communication port 2: terminal block). When it is beyond 9,999 times, it will be reset to"0" and start over again
E_18	RS-485 error content (communication port 2)	Latest error appears in RS-485 communication (communication port 2: terminal block). It displays in decimal system code form.
E_19	Reserved	—
E_20	Reserved	—
E_21	Reserved	—
E_23	Cumulative running time of motor 1	Displays cumulative power-ON time counter of the 1st motor. Measurement Range: 0~99,990 h Display: 0~9999×10 LED on (Accumulative running time of motor = display value × 10 h) If it is beyond 99,990 hours, it will be reset to"0" and start over again.
E_24	temperature value inside the inverter(*1)	Displays the -current temperature inside the inverter. Unit:℃
E_25	Temperature value of the cooler(*1)	Displays the current temperature of cooler inside the inverter. Unit: ℃
E_26	Reserved(*1)	—
E_27	Reserved(*1)	—
E_28	Cumulative running time of motor2(*1)	Displays cumulative power-ON time counter of the 2nd motor. Display method is the same with E_23.
E_29	Cumulative running time of motor 3(*1)	Displays cumulative power-ON time counter of the 3rd motor. Display method is the same with E_23.
E_30	Cumulative running time of motor 4(*1)	Displays cumulative power-ON time counter of the 4th motor. Display method is the same with E_23.
E_31	Remaining time before the next maintenance for motor 1(*1)	Displays the time remaining before the next maintenance, which is estimated by subtracting the cumulative run time of motor 1 from the maintenance interval specified by 04．78 Display: 0~9999 ×10 LED on (remaining time for maintenance = display value × 10 h/)

Table 3.13 Maintenance Information items(continued)

Keypad Display	Item	Display Contents
E_32	Number of startups for the 2nd motor (*1)	Displays cumulative starting times of the 2nd motor. Display method is the same with E_08
E_33	Number of startups for the 3rd motor (*1)	Displays cumulative starting times of the 3rd motor. Display method is the same with E_08
E_34	Number of startups for the 4th motor (*1)	Displays cumulative starting times of the 4th motor. Display method is the same with E_08
E_35	Remaining startup times before the next maintenance for the 1st motor (*1)	Displays the startup times remaining before the next maintenance, which is estimated by subtracting the number of startups from the preset startup count for maintenance specified by 04．79 Display method is the same with E_08
E_36	Latest Light alarm (*1)	Displays Latest Light alarm content as an alarm code.
E_37	Last Light alarm (*1)	Displays the last light alarm as an alarm code. For the details, refer to “Chapter 7 Failure Indication and Countermeasures”
E_38	2nd Last Light alarm (*1)	Displays the 2nd last light alarm as an alarm code. For the details, refer to “Chapter 7 Failure Indication and Countermeasures”
E_39	3rd Last Light alarm (*1)	Displays the 3rd last light alarm as an alarm code. For the details, refer to “Chapter 7 Failure Indication and Countermeasures”
E_40	Reserved (*1)	—
E_41	Reserved (*1)	—
E_42	Reserved (*1)	—
E_43	Reserved (*1)	—
E_44	Reserved (*1)	—

(*1) Adapt to above 18.5kW (include 18.5kW)

3.4.5 Reading Alarm Information

Menu code F “Alarm Information” in programming mode displays cause of the past 4 alarms information as an alarm code, It is also possible to display the related alarm information on the current inverter conditions detected when the alarm happened. The display content of “Alarm Information” is listed in Table 3.14.

Table 3.14 Alarm Information items

Keypad Display	Display Content	Description
F_00	Output frequency	Output frequency before slip compensation
F_01	Output current	Output current
F_02	Output voltage	Output voltage
F_03	Calculated torque	Calculated motor output torque
F_04	Setting frequency	Setting frequency
F_05	Rotational direction	Displays the output run direction. F: : Forward \, r: Reverse, ----: Stopped
F_06	Running status	Displays the running status with 4-bit in hexadecimal. Refer to ■Running Status (C_07) and Display Method of Running Status 2(C_23) of “4.2 Run Status Monitoring Item” on detailed information.

Table 3.14 Alarm Information items(continued)

Keypad Display	Display Content	Description
F_07	Cumulative running time	Displays the cumulative time of power-ON time counter of the inverter. Measurement Range: 0~65,535 h Display: Divided the accumulative run time into interactive display of front 2 bits and back 3 bits. E.g. 0⇔ 535h (535 h) 65⇔ 535h (65,535 h) When the back 3 bits are displayed, it displays h (hour) at the final bit. If it is beyond 65,535 hs, it will be reset to "0" and start over again.
F_08	Number of startups	Displays the content of the motor startup counter. Measurement range: 0~65,530 times Display: 0~9999 When the count is more than 10,000 times, the ×10 LED is on. It displays the times value of divided by 10. When the count is beyond 65,530 times, it will be reset to "0" and start over again.
F_09	DC link bus voltage	Displays the DC link bus voltage of main circuit of inverter.Unit: V
F_10	Temperature inside the Inverter(*1)	Displays the temperature inside inverter. Unit: ℃
F_11	Max. temperature of cooler	Displays the max. temperature of the cooler. Unit: ℃
F_12	Terminal I/O signal status	Displays ON/OFF status of digital I/O terminal. refer to "■ I/O Display of Control Terminal" of "4.3 Detection I/O Signal Status" on related display contents.
F_13	Terminal input signal status (Display in Hexadecimal)	
F_14	Terminal output signal status (Display in Hexadecimal)	
F_15	Continuous appearance times	The continuous appearance time of the same alarm.
F_16	Multiple alarm 1	Appear the 1st alarm codes simultaneously (it displays " --- " when there is no alarm has appeared.)
F_17	Multiple alarm 2	Appear the 2nd alarm codes simultaneously (it displays " --- " when there is no alarm has appeared .)
F_18	Reserved	–
F_19	Reserved	
F_20	Reserved	
F_21	Error sub code	Secondary error code for alarms.
F_22	Run status 2 (*1)	Displays the run status 2 in 4-bit in hexadecimal. Refer to ■Run Status (C_07) and Display Method of Run Status 2(C_23) of "4.2 Run Status Monitoring Item" on detailed information.
F_23	Speed detection value	Displays speed detection value.

(*1) Adapt to above 18.5kW (include 18.5kW).

3.6 Alarm Mode

When an alarm appears, then is the inverter switches to alarm mode automatically, and it displays the alarm code in the keypad.

■ Resetting alarm

After the alarm cause is removed and key (PRG RESET) is pressed, the alarm condition will be reset, and the inverter will go back to the Running mode.

■ Displays alarm history

In addition to the current (latest) alarm, we can view past 3 alarms and multiple alarms,press (∧) / (∨) keyswhen the current(latest) one is dispalyed.

■ Display of running status information at the time of alarm

When displaying alarm code, press (FUNC DATA) key and you can confirm the output frequency, output current and all kinds of running information. The item No. and data of all kinds of running information can be displayed alternatively.

Note: After the alarm cause is removed and key (PRG RESET) is pressed, the alarm condition will be reset, the motor will be operated immediately if there is running instruction. Be careful!

■ Transition to Programming mode

If double key operation of (STOP) key + (PRG RESET) key is executed under alarm information is displayed, it is switched to programming mode and it can take modification for function-code data.

4 Running

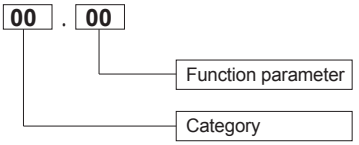
For the above chapters, please refer to the complete vasion of S3800 English user mannual Please scan QR code or click the below link:

Download URL:http://www.savch.net/en/downloads/manual/s3800_manual.html

5.FUNCTION PARAMETERS LIST

5.1 Function Parameters List

Users can set the function parameter values to control and apply various functions of S3100 series inverter. Before starting to narrate this chapter, first describe function parameter format as follows:



Then function parameters are classified as follows:

Parameters	Function
00	Basic functions
01	External terminal functions
02	Control functions
03	Motor 1 parameters
04	Advanced functions
05	Motor 2 parameters

Parameters	Function
06	Motor 3 parameters (*1)
07	Motor 4 parameters(*1)
08	Application function 1
09	Application function 2(*1)
10	Application function 3(*1)
11	Serial communication function

(*1) Adapt to above 18.5kW (include 18.5kW).

■ Changing, validating, and saving function parameters data when the inverter is running
Function parameters are indicated by the following based on whether they can be changed or not when the inverter is running: The following table shows the symbolic meaning of "change when running" column in the function parameter list after the next page.

Mark	Change when running	Validating and saving function parameters data
↝	possible (current state)	If the data of the parameters marked with ↝ is changed with ∧ and ∨ keys, the change will immediately take effect; however, the change is not saved into the inverter's memory. To save the change, press the FUNC DATA key. If you press the RESET key without pressing the FUNC DATA key to exit the current state, then the changed data will be discarded and the previous data will take effect for the inverter operation.
↝	possible (after confirmation)	Even if the data of the parameters marked with ↝ is changed with ∧ and ∨ keys, the change will not take effect. Pressing the FUNC DATA key will make the change take effect and save it into the inverter's memory.

■ Using negative logic for programmable I/O terminals
To set the negative logic system for an input or output terminal, enter data of 1000s (by +1000 to the data for the normal logic) in the corresponding function parameters.
For example, Terminal MI1in the case of selecting Jogging command [mJOG] through function parameter 01.01, the relationship between the setting parameter and the corresponding action is as follows:

Function parameter 01.01 data value	Action
10	When the terminal MI1 is ON, the jogging is actived
1010	When the terminal MI1 is ON, the jogging is actived

00 Basic functions parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
↝	00. 00	Setting Data protection	0: Disable both keypad parameter protection and digital reference protection 1: Enable keypad parameter and disable digital reference protection . 2: Disable keypad parameter protection and enable digital reference protection 3: Enable both keypad parameter and digital reference protection	0	○	○
	00. 01	Dominant frequency 1 source selection	0: keypad (▲/▼key) 1: Analog voltage input (terminal AVI) (DC0 ~ + 10V) 2: Analog current input (terminal ACI) (DC4 ~ 20mA) 3: Analog voltage input (terminal AVI) + analog current input (terminal ACI) 5: Analog voltage input (terminal AUI) (DC0 ~ + 10V) 7: UP / DOWN control input 12: Pulse train input	0	○	○

00 Basic functions parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	00. 02	Operation command source selection	1: External terminal command mode 2: keypad forward command mode 3: keypad reverse command mode	2	○	○
	00. 03	Maximum output frequency 1	25.0 ~ 500.0Hz	50.0	○	○
	00. 04	Base frequency 1	25.0 ~ 500.0Hz	50.0	○	○
	00. 05	Rated Voltage at Base Frequency 1	0: AVR invalid (Output a voltage in proportion to input voltage) 80~ 240V: AVR action (220V series) 160~ 500V: AVR action (440V series)	220/ 380	○	○
	00. 06	Maximum output voltage 1	80~ 240V: AVR action(220V series) 160~ 500V: AVR action(440V series)	220/ 380	○	○
∿	00. 07	Acceleration time 1	0.00~ 3600s ※ 0.00 Entering 0.00 cancels the acceleration time, requiring external soft-start.	Type Setti-ng	○	○
∿	00. 08	Deceleration time 1			○	○
∿	00. 09	Torque boost 1	0.0~ 20.0% (percentage with respect to "Rated Voltage at Base Frequency 1")	Type Setti-ng	○	○
∿	00. 10	Electronic Thermal Overload (Protection for Motor)1 Select motor chara-cteristics	1: action (For a general-purpose motor with shaft-driven cooling fan) 2: action (For non-ventilated motor or motor with separately powered cooling fan, an inverter-driven motor,)	1	○	○
∿	00. 11	Electronic Thermal Overload (Protection for Motor)1 Detection level	0.00 (invalid); 1% to 135% of the rated current (allowable continuous drive current) of the motor	Type Setti-ng	○	○
∿	00. 12	Electronic Thermal Overload (Protection for Motor)1 Thermal time constant	0.5~ 75.0min	Type Setti-ng	○	○
∿	00. 14	Restart Mode after Momentary Power Failure (Mode selection)	0: Alarm LU immediately 1: Alarm LU after recovery from power failure 2: Alarm LU after decelerate-to-stop(*1) 3: Continue to run (for heavy inertia or general loads)(*1) 4: Restart at the frequency at which the power failure occurred (for general load) 5: Restart at the starting frequency	1	○	○
∿	00. 15	Upper limit of output frequency	0.0~ 500.0Hz	70.0	○	○
∿	00. 16	Lower limit of output frequency	0.0~ 500.0Hz	0.0	○	○
	00. 18	Dominant frequency 1 bias setting	–100.00~ 100.00%	0.00	○	○
∿	00. 20	DC braking 1 starting frequency	0.0~ 60.0Hz	0.0	○	○
∿	00. 21	DC braking 1 braking action level	0~ 80%	0	○	○

00 Basic functions parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
↗	00. 22	DC braking 1 braking time	0.00(invalid)；0.01~30.00s	0.00	○	○
↗	00. 23	Starting frequency 1	0.0~60.0Hz	0.5	○	○
↗	00. 24	Starting frequency 1 holding time	0.00~10.00s	0.00	○	○
↗	00. 25	Stop frequency	0.0 ~ 60.0Hz	0.2	○	○
↗	00. 26	Carrier frequency setting(Motor Sound)	0.75 ~ 12kHz	2	○	○
↗	00. 27	Motor running tone	0: Tone level 0 (invalid) 1: Tone level 1 2: Tone level 2 3: Tone level 3	0	○	○
↗	00. 29	AFM terminal action selection	0: Voltage output (DC0 ~ +10 V) 1: Current output (DC4 ~ 20mA)(*1) 2: DFM output (*2)	0	○	○
↗	00. 30	AFM terminal output gain (Voltage adjustment)	0~300%	100	○	○
↗	00. 31	AFM terminal functi-on selection (*2)	0:Output frequency before slip compensa-tion 1:Output frequency after slip compensation 2:Output Current 3:Output Voltage 4:Output torque 5:Load factor 6:Input power 7:PID feedback amount 9:DC link bus voltage 10:Universal AO 13:Motor output power 15:PID command value (SV) 16:PID output value (MV)	0	○	○
↗	00. 33	DFM terminal pulse rate	25~6000p / s (100% of pulse count)	1440	○	○
↗	00. 34	DFM terminal output gain (*1)	0%: Pulse frequency output (50% of fixed amplitude); 1~ 300%: Output voltage adjustment (2000p / s fixed pulse amplitude adjustment)	0	×	○
↗	00. 35	DFM terminal funct-ion selection (*1)	0: Output frequency before slip compensa-tion 1: Output frequency after slip compensation 2: Output Current 3: Output Voltage 4: Output torque 5: Load factor 6: Input power 7: PID feedback amount 9: DC link bus voltage 10: Universal AO 13: Motor output power 15: PID command value (SV) 16: PID output value (MV)	0	×	○

00 Basic functions parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	00. 37	Load Selection Automatic torque boost Automatic energy saving operation 1	0: Variable torque load (general fan and water pump loads) 1: Constant torque load 2: Auto torque boost 3: Auto energy saving :Variable torque load during ACC/DEC (general fan and water pump loads) 4: Auto energy saving :Constant torque load during ACC/DEC (constant torque load) 5: Auto energy saving operation (automatic torque boost during ACC/DEC)		○	○
∿	00. 39	Stop frequency holding time	0.00~10.00s	0.00	○	○
∿	00. 40	Torque limiter level 1-1	20~200%; 999(invalid)	999	○	○
∿	00. 41	Torque limiter level 1-2	20~200%; 999(invalid)	999	○	○
	00. 42	Drive Control mode selection 1	0: V / f control with slip compensation inactive 1:dynamic torque vector control 2:V / f control with slip compensation active 5:Vector control without speed sensor(*2)	0	○	○
∿	00. 43	Current limiter action selection	0: Invalid (No current limiter works) 1: Constant speed (invalid in acceleration and deceleration) 2: Acceleration and constant speed (invalid in deceleration)	2	○	○
∿	00. 44	Current limiter action level	20~200% (level: rated output current of inverter for 100%)	160	○	○
∿	00. 50	Electronic Thermal Overload Discharging capability(Protection for Braking Resistor)	1~9000kWs, OFF (canceled)	Type Setti-ng	○	○
∿	00. 51	Electronic Thermal Overload Allowable aver-age loss(protection for braking resistor)	0.001~50.00kW	0.001	○	○
∿	00. 52	Electronic Thermal Overload braking resistance (protection for bra-king resistor) (*1)	0.01~999Ω	0.01	×	○
	00. 80	G/P switch	0:G Specification 1:P Specification	0	×	○

(*1) Adapt to above 18.5kW (include 18.5kW).
(*2) The mode function selection of AFM/DFM under 15kW (include 15kW).

01 External terminal function parameters

Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
				~15kW	18.5kW~
01. 01	MI1 terminal function selection	0(1000):Multi-step speed command 1 (0-1 step) [mSS1]	0	○	○
01. 02	MI2 terminal function selection	1(1001):Multi-step speed command 2 (0- 3 steps) [mSS2]	1	○	○
01. 03	MI3 terminal function selection	2(1002):Multi-step speed command 3 (0-7 steps) [mSS4]	2	○	×
01. 04	MI4 terminal function selection	3(1003):Multi-step speed command 4 (0-15 steps) [mSS8]	3	○	×
01. 07	MI7 terminal function selection	4(1004):Select ACC/DEC time (2 steps) [mRT1]	6	○	○
		5(1005):Select ACC/DEC time (4 steps) [mRT2]		×	○
		6(1006):Enable 3-wire operation [mHLD]		○	○
		7(1007):Coast to a stop [mBX]		○	○
		8(1008):Reset alarm (abnormal) [mRST]		○	○
		9(1009):Enable External alarm trip[mTHR] (9＝Active OFF、1009＝Active ON)		○	○
		10(1010):Ready for Jogging [mJOG]		○	○
		11(1011):Select frequency command 2/1 [mHz2/mHz1]		○	○
		12(1012):Motor 2 selection [mM2]		○	○
		13:DC braking command [mDCBRK]		○	○
		14(1014):Torque limiter level2 / torque limiter level 1[mTL2/mTL1]		○	○
		17(1017):UP command (Increase output frequency)[mUP]		○	○
		18(1018):DOWN command (Decrease output frequency)[mDOWN]		○	○

01 External terminal function parameters

Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
				~15kW	18.5kW~
		19(1019) :Enable data change with keypad (data can be changed) [mWE-KP]		○	○
		20(1020): Cancel PID control[mHz/PID]		○	○
		21(1021):Switch Forward & reverse[mIVS]		○	○
		24(1024):Communication link via selection (RS-485)[mLE]		○	○
		25(1025):Universal DI [mU-DI]		○	○
		26(1026):Enable auto search for idling motor speed at starting [mSTM]		○	○
		30(1030): Force to stop [mSTOP] (30＝Active OFF、1030＝Active ON)		○	○
		33(1033): Reset PID integral and differential components[mPID-RST]		○	○
		34(1034):Hold PID integral component [mPID-HLD]		○	○
		36(1036):Motor 3 selection [mM3]		×	○
		37(1037):Motor 4 selection [mM4]		×	○
		39:Prevent condensation [mDWP]		×	○
		48: Pulse train input (available only for terminal MI7 (01.07)) [mPIN]		○	○
		49(1049): Pulse train symbol [mSIGN](The terminals except of MI7 have this function)		○	○
		52: Forward JOG［mFJOG］		○	○
		53: Reverse JOG［mRJOG］		○	○
		59(1059):Battery operation valid command [mBATRY]		×	○
		76(1076):Droop control [mDROOP]		×	○
		80(1080): Cancel customizable logic timers [mCLC]		×	○
		81(1081): Clear all customizable logic timers [mCLTC]		×	○
		100: No function assigned [mNONE]		○	○
		※ Setting the value in parentheses()shown above assigns a negative logic output to a terminal.(True if OFF)			

01 External terminal function parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
∿	01.10	Acceleration time 2	0.00~3600s ※ Enter 0.00 cancels the ACC/DEC. time (requiring external soft-start and -stop)	Type Setti-ng	○	○
∿	01.11	Deceleration time 2			○	○
∿	01.12	Acceleration time 3			×	○
∿	01.13	Deceleration time 3			×	○
∿	01.14	Acceleration time 4			×	○
∿	01.15	Deceleration time 4			×	○
∿	01.16	Torque limiter level 2-1	20~200% ; 999(invalid)	999	○	○
∿	01.17	Torque limiter level 2-2	20~200% ; 999(invalid)	999	○	○
	01.20	MO1 terminal funct-ion selection	0(1000):Inverter running [mRUN]	0	○	○
	01.21	MO2 terminal funct-ion selection	1(1001):Frequency (speed) arrival signal [mFAR]	1	○	○
	01.27	RA/RB/RC terminal function selection	2(1002):Frequency (speed) detection [mF DT]	99	○	○
			3(1003):Undervoltage detected (When Inverter stopped)[mLU]		○	○
			4(1004):Torque polarity detection[mB/D]		○	○
			5(1005):Inverter output limiting[mIOL]		○	○
			6(1006):Auto-restarting after momentary power failure[mIPF]		○	○
			7(1007):Motor overload early warning[mOL]		○	○
			8(1008):Keypad operation enabled[mKP]		×	○
			10(1010):Inverter ready to run[mRDY]		○	○
			15(1015):AX terminal function[mAX]		×	○
			21(1021): Frequency (speed) arrival signal 2[mFAR2]		○	×
			22(1022):Inverter output limiting (with delay)[mIOL2]		○	○
			25(1025):Cooling fan ON-OFF in operation [mFAN]		×	○
			26(1026):Auto-resetting[mTRY]		○	○
			27(1027): Universal DO [mU-DO]		○	○
			28(1028):Cooler overheat early warning [mOH]		○	○
			30(1030):Lifetime alarm[mLIFE]		○	○
			31(1031):Frequency (speed) detection 2 [mFDT2]		×	○
			33(1033):Reference loss detected[mREF OFF]		○	○
			35(1035): Inverter output on[mRUN2]		○	○
			36(1036):In overload prevention control [mOLP]		○	○
			37(1037):Current detected[mID]		○	○
			38(1038):Current detected 2[mID2]		○	○
			39(1039):Current detected[mID3]		×	○

01 External terminal function parameters

Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
				~15kW	18.5kW~
		41(1041):Low current detected[mIDL]		×	○
		42(1042):PID alarm output [mPID-ALM]		○	○
		43(1043):In PID control[mPID-CTL]		×	○
		44(1044):Motor stopped due to slow flowrate under PID control[mPID-STP]		×	○
		45(1045):Low output torque detection [mU-TL]		×	○
		46(1046):Torque detection 1[mTD1]		×	○
		47(1047):Torque detection 2[mTD2]		×	○
		48(1048):Motor 1 selected[mSWM1]		×	○
		49(1049):Motor 2 selected[mSWM2]		○	○
		50(1050):Motor 3selected[mSWM3]		×	○
		51(1051):Motor 4 selected[mSWM4]		×	○
		52(1052):Running Forward Signal[mFRUN]		×	○
		53(1053):Running Reversal signal[mRRUN]		×	○
		54(1054):In Remote operation[mRMT]		×	○
		56(1056):Motor overheat detected by thermistor[mTHM]		×	○
		57(1057):Brake signal[mBRKS]		○	○
		58(1058):Frequency (speed) detection 3 [mFDT3]		×	○
		59(1059):ACI terminal wire break detected [mACIOFF]		×	○
		70(1070):Speed valid[mDNZS]		×	○
		71(1071):Speed agreement[mDSAG]		×	○
		72(1072):Frequency (speed) arrival signal 3 [mFAR3]		×	○
		76(1076):Speed error detected[mPG-ERR]		×	○
		84(1084):Maintenance timer[mMNT]		×	○
		90(1090):Alarm contents 1 [mAL1]		×	○
		91(1091):Alarm contents 2[mAL2]		×	○
		92(1094):Alarm contents 4[mAL4]		×	○
		93(1093):Alarm contents 8[mAL8]		×	○
		98(1098):Light alarm [mL-ALM]		×	○
		99(1099):Alarm output (for any alarm) [mALM]		○	○
		105(1105):Braking transistor broken [mDBAL]		×	○
		111 (1111):Customizable logic output signal 1 [mCLO1]		×	○
		112 (1112):Customizable logic output signal 2 [mCLO2]		×	○
		113 (1113):Customizable logic output signal 3 [mCLO3]		×	○
		114 (1114):Customizable logic output signal 4 [mCLO4]		×	○

01 External terminal function parameters

	Parameter	Parameter Functions	Setting Range	Factory Default	Model	
					~15kW	18.5kW~
			115 (1115):Customizable logic output signal 5 [mCLO5] ※ Setting the value in parentheses()shown above assigns a negative logic output to a terminal.(True if OFF)		×	○
↗	01. 29	Frequency arrival delay (FAR2)	0.01~10.0s	0.10	○	×
↗	01. 30	Frequency Arrival (Hysteresis width)	0.0~10.0Hz	2.5	○	○
↗	01. 31	Frequency detection value	0.0~500.0Hz	50.0	○	○
↗	01. 32	Frequency detection hysteresis width	0.0~500.0Hz	1.0	○	○
↗	01. 34	Overload Early Warning / current detection level	0.00 (invalid); Current value of 1% to 200% of the inverter rated current	Type Setting	○	○
↗	01. 35	Overload Early Warning / current detection timer	0.01~600.00s	10.00	○	○
↗	01. 36	Frequency detection 2 value	0.0~500.0Hz	50.0	×	○
↗	01. 37	Current detection 2 / Low current detection level	0.00 (invalid); Current value of 1% to 200% of the inverter rated current	Type Setting	○	○
↗	01. 38	Current detection 2 / Low current detection timer	0.01~600.00s	10.00	○	○
↗	01. 40	PID display coefficient A	－999~0.00~9990	100	○	○
↗	01. 41	PID display coefficient B	－999~0.00~9990	0.00	○	○
↗	01. 42	Display filter time constant	0.0~5.0s	0.5	○	○
↗	01. 43	Keypad display selection	0: Speed monitor (selected by 01.48) 3: Output current 4: Output voltage 8: Calculated torque 9: Input power 10: PID command value 12: PID feedback amount 14: PID output 15: Load factor 16: Motor output power 17: Analog input monitor(*1) 23: Torque current (%)(*1) 24: Magnetic flux command (%)(*1) 25: Input watt–hour (*1)	0	○	○
↗	01. 44	Display when stopped	0: Specified value 1: Display output value	0	×	○

01 External terminal function parameters

	Parameter	Parameter Functions	Setting Range	Factory Default	Model	
					~15kW	18.5kW~
∿	01. 48	Speed monitoring selection	0: Output frequency before slip compensation 1: Output frequency after slip compensation 2: Reference frequency 3: Motor speed 4: Load shaft speed 5: Line speed 7: Display speed (%)(*1)	0	○	○
∿	01. 50	Coefficient for Speed Indication	0.01~200.00	30.00	○	○
∿	01. 51	Display Coefficient for Input Watt–hour Data	0.000(cancel and reset)，0.001~9999	0.010	○	○
∿	01. 52	Reserved	Reserved	0	○	○
∿	01. 54	Frequency detection 3 value	0.0~500.0Hz	50.0	×	○
∿	01. 55	Current detection 3 level	0.00 (invalid); Current value of 1% to 200% of the inverter rated current	Type Setting	×	○
∿	01. 56	Current detection 3 timer	0.01~600.00s	10.00	×	○
	01. 61	Terminal AVI extension function selection	0: None 1: Auxiliary frequency 1 2: Auxiliary frequency 2 3: PID command 1 5: PID feedback amount 6: Ratio setting(*1) 7: Analog torque limit value A(*1) 8: Analog torque limit value B(*1) 10: Torque command(*1) 11: Torque current command(*1) 17: Forward (FWD) speed limit value(*1) 18: Reverse (REV) speed limit value(*1) 20: Analog input monitor(*1)	0	○	○
	01. 62	Terminal ACI extension function selection		0	○	○
	01. 63	Terminal AUIextension function selection		0	○	○
∿	01. 65	Reference loss detection(continue running frequency)	0: Decelerate to stop, 20 to 120% , 999 : Cancel	999	○	○
∿	01. 78	Torque detection 1 level	0 ~ 300%	100	×	○
∿	01. 79	Torque detection 1 timer	0.01 ~ 600.00s	10	×	○
∿	01. 80	Torque detection 2 / low torque detection level	0 ~ 300%	20	×	○
∿	01. 81	Torque detection 2 / low torque detection timer	0.01 ~ 600.00s	20.00	×	○
∿	01. 98	FWD terminal function selection	98:Run forward [mFWD]	98	○	○

01 External terminal function parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
↗	01. 99	REV terminal functi–on selection	99:Run reverse [mREV]	99		
			100:No function assigned [mNONE]		○	○
			For other distribution functions, please refer to 01,01		○	○
			※Setting the value in parentheses()shown above assigns a negative logic output to a terminal.(True if OFF)			

02 Control functions parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
↗	02. 01	Jump frequency 1	0.0~500.0Hz	0.0	○	○
↗	02. 02	Jump frequency 2		0.0	○	○
↗	02. 03	Jump frequency 3		0.0	○	○
↗	02. 04	Jump frequency range	0.0~30.0Hz	3.0	○	○
↗	02. 05	Multi–speed frequency 1	0.00~500.00Hz	0.00	○	○
↗	02. 06	Multi–speed frequency 2		0.00	○	○
↗	02. 07	Multi–speed frequency 3		0.00	○	○
↗	02. 08	Multi–speed frequency 4		0.00	○	○
↗	02. 09	Multi–speed frequency 5		0.00	○	○
↗	02. 10	Multi–speed frequency 6		0.00	○	○
↗	02. 11	Multi–speed frequency 7		0.00	○	○
↗	02. 12	Multi–speed frequency 8		0.00	○	○
↗	02. 13	Multi–speed frequency 9		0.00	○	○
↗	02. 14	Multi–speed frequency 10		0.00	○	○
↗	02. 15	Multi–speed frequency 11		0.00	○	○
↗	02. 16	Multi–speed frequency 12		0.00	○	○
↗	02. 17	Multi–speed frequency 13		0.00	○	○
↗	02. 18	Multi–speed frequency 14		0.00	○	○
↗	02. 19	Multi–speed frequency 15		0.00	○	○
↗	02. 20	Jogging frequency		5.00	○	○

02 Control functions parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	02. 30	Dominant frequency 2 source selection	0: Enable(⌃ / ⌄) keys on the Keypad 1: Analog voltage input (terminal AVI) (DC0 ~ ± 10V) 2: Analog current input (terminal ACI) (DC4 ~ 20mA) 3: Sum of Analog voltage and current inputs to terminals (terminal AVI) and (terminal ACI) 5: Analog voltage input (terminal AUI) (DC0 ~ + 10V) 7: UP / DOWN control input 12: Pulse train input	2	○	○
ⓟ	02. 31	Analog input adjust–ment for offset (AVI terminals)	－5.0 ~ 5.0%	0.0	○	○
ⓟ	02. 32	Analog input adjust–ment for gain (AVI terminals)	0.00 ~ 200.00%	100.00	○	○
ⓟ	02. 33	Analog input adjust–ment for filter time co–nstant (AVI terminals)	0.00 ~ 5.00s	0.05	○	○
ⓟ	02. 34	Analog input adjust–ment for gain base point (AVI terminals)	0.00 ~ 100.00%	100.00	○	○
ⓟ	02. 35	Analog input adjust–ment for polarity sele–ction (AVI terminal)	0: Bipolar (*1) 1: unipolar	1	×	○
ⓟ	02. 36	Analog input adjustm–ent for offset (ACI terminals)	－5.0 ~ 5.0%	0.0	○	○
ⓟ	02. 37	Analog input adjustm–ent for gain (ACI terminals)	0.00 ~ 200.00%	100.00	○	○
ⓟ	02. 38	Analog input adjustm–ent for filter time cons–tant (ACI terminals)	0.00 ~ 5.00s	0.05	○	○
ⓟ	02. 39	Analog input adjustm–ent for gain base point (ACI terminals)	0.00 ~ 100.00%	100.00	○	○
ⓟ	02. 41	Analog input adjustm–ent for offset (AUI terminals)	－5.0 ~ 5.0%	0.0	○	○
ⓟ	02. 42	Analog input adjustm–ent for gain (AUI terminals)	0.00 ~ 200.00%	100.00	○	○
ⓟ	02. 43	Analog input adjustm–ent for filter time const–ant (AUI terminals)	0.00 ~ 5.00s	0.05	○	○
ⓟ	02. 44	Analog input adjustm–ent for gain base point (AUI terminals)	0.00 ~ 100.00%	100.00	○	○
ⓟ	02. 45	Analog input adjustm ent for polarity selection (AUI terminal)	0: positive and negative polarity 1: positive polarity	1	×	○

02 Control functions parameters

	Parameter	Parameter Functions	Setting Range	Factory Default	Model	
					~15kW	18.5kW~
◎	02. 50	Bias base point (Dominant frequency 1)	0.00 ~ 100.00%	0.00	○	○
◎	02. 51	Bias value (PID command 1)	－100.00 ~ 100.00%	0.00	○	○
◎	02. 52	Bias base point (PID command 1)	0.00 ~ 100.00%	0.00	○	○
∿	02. 53	Normal/Inverse action selection (Dominant frequency 1)	0: Normal operation 1: Inverse operation	0	○	○

03 Motor 1 parameters

	Parameter	Parameter Functions	Setting Range	Factory Default	Model	
					~15kW	18.5kW~
	03. 01	Motor 1 (No. of poles)	2 to 22 poles	4	○	○
	03. 02	Motor 1 rated capacity	0.01 ~ 1000kW	Type Setting	○	○
	03. 03	Motor 1 rated current	0.00 ~ 2000A		○	○
	03. 04	Motor 1 auto–tuning	0: Invalid 1: Tune while the motor stops. (% R1,% X, rated slip) 2: Tune while the motor is rotating under V/f control (% R1,% X, rated slip frequency,, no-load current , magnetic saturation factors and magnetic saturation extension factors :1 ~ 5 and a ~ c) 3:Tune while the motor is rotating under vector control (% R1,% X, rated slip frequency, no-load current , magnetic saturation factors 1 ~ 5, and magnetic saturation extension factors "a" to "c." Valid when the vector control is enabled)(*1)	0	○	○
∿	03. 05	Motor 1 (Online tuning)	0: Invalid 1: Action	0	○	○
	03. 06	Motor 1 no-load current	0.00~2000A	Type Setting	○	○
∿	03. 07	Motor 1 %R1	0.00~50.00%		○	○
∿	03. 08	Motor 1 %X	0.00~50.00%		○	○
◎	03. 09	Motor 1 Slip compensation gain for (driving)	0.0~200.0%	100.0	○	○
∿	03. 10	Motor 1 slip compensation response time	0.01~10.00s	0.12	○	○
◎	03. 11	Motor 1 slip compensation gain for (braking)	0.0~200.0%	100.0	○	○
	03. 12	Motor 1 rated slip frequency	0.00~15.00Hz	Type Setting	○	○
∿	03. 13	Motor 1 iron loss factor 1	0.00~20.00%		×	○
∿	03. 14	Motor 1 iron loss factor 2		0.00	×	○
∿	03. 15	Motor 1 iron loss factor 3		0.00	×	○

03 Motor 1 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
∿	03. 16	Motor 1 magnetic saturation factor 1	0.0~300.00%	Type Setti-ng	×	○
∿	03. 17	Motor 1 magnetic saturation factor 2			×	○
∿	03. 18	Motor 1 magnetic saturation factor 3			×	○
∿	03. 19	Motor 1 magnetic saturation factor 4			×	○
∿	03. 20	Motor 1 magnetic saturation factor 5			×	○
∿	03. 21	Motor 1 magnetic saturation expansion factor a			×	○
∿	03. 22	Motor 1 magnetic saturation expansion factor b			×	○
∿	03. 23	Motor 1 magnetic saturation expansion factor c			×	○
∿	03. 53	Motor 1% X correction factor 1	0~300%	100	×	○
∿	03. 54	Motor 1% X correction factor 2		100	×	○
	03. 99	Reserved	Reserved	0	○	○

04 Advanced functions Parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	04. 03	Data initialization	0: Manual settings 1: Initialize all function parameters data (factory setting) 2: Initialize Motor 1 constant parameters 3: Initialize Motor 2 constant parameters 4: Initialize Motor 3 constant parameters(*1) 5: Initialize Motor 4 constant parameters(*1)	0	○	○
∿	04. 04	Auto-reset Times	0: Invalid; 1-10 reset times	0	○	○
∿	04. 05	Auto-reset (Reset interval time)	0.5-20.0s	5.0	○	○
∿	04. 06	Cooling fan ON-OFF control	0: Invalid (always in operation) 1: valid action (ON / OFF controllable)	0	○	○
∿	04. 07	Acceleration/Decel-eration Pattern	0: Inactive (linear acceleration and deceleration) 1: S curve acceleration and deceleration (weak) 2: S curve acceleration and deceleration (Enhancement type)(*3) 3: Curvilinear acceleration and deceleration	0	○	○
	04. 08	Rotation direction Limitation	0: Invalid 1: Valid Action (Reverse rotation inhibited) 2: Valid Action (Forward rotation inhibited)	0	○	○

04 Advanced functions Parameters						
	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	04. 09	Starting Auto search Mode	0: Invalid 1: Valid Action (At restart after momentary power failure) 2: Valid Action (At restart after momentary power failure and at normal start)	0	×	○
∿	04. 11	Deceleration mode	0: Normal deceleration 1: Coast-to-stop	0	○	○
∿	04. 12	Instantaneous overcurrent limiting mode selection	0: Invalid 1: Valid Action	1	○	○
∿	04. 13	Restart mode after momentary power failure (restart time)	0.1~10.0s	Type Setti-ng	○	○
∿	04. 14	Restart mode after momentary power failure (frequency fall rate)	0.00: deceleration time selected, 0.01 ~ 100.00Hz / s, 999 (according to the current limit command)	999	○	○
∿	04. 15	Restart mode after momentary power failure (continuous running level)	200~300V:(220V series) 440~600V:(440V series)	235/ 470	×	○
∿	04. 16	Restart mode after momentary power failure (allowable momentary power failure time)	0.0~30.0s，999 (the inverter can determine automatically)	999	○	○
∿	04. 26	Thermistor (for motor) action selection	0: Invalid 1: PTC: The inverter immediately trips with “OH4” displayed 2: PTC: The inverter issues output signal [mTHM], and continues to run 3: NTC: when connected	0	×	○
∿	04. 27	Thermistor (for motor) action value	0.00~5.00V	0.35	×	○
∿	04. 28	Droop control	–60.0~0.0Hz	0.0	○	○
∿	04. 30	Communication link mode selection	Frequency command Run command 0:00．01 00．02 1: RS-485 communications (port 1) 00．02 2:00．01 RS-485 communications (port 1) 3:RS-485 communications (port 1) RS-485 communications (port 1) 4:RS-485 communications (port 2) 00．02 5:RS-485 communications (port 2) RS-485 communications (port 1) 6:00．01 RS-485 communications (port 2) 7:RS-485 communications (port 1) RS-485 communications (port 2) 8:RS-485 communications (port 2) RS-485 communications (port 2)	0	○	○

04 Advanced functions Parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
∿	04. 42	Capacitance of Main circuit(DC link bus) capacitor	Reserved	–	○	○
∿	04. 43	Cumulative running time for fan	Indication of cumulative run time of fan for replacement (10 hours)	–	○	○
∿	04. 44	Startup Counter for Motor 1	For adjustment in replacement (0000 ~ FFFF (hexadecimal)	–	○	○
∿	04. 45	Mock Alarm	0: Invalid 1: trigger a mock alarm	0	○	○
∿	04. 46	Starting Mode Auto search delay time 2	0.1~20.0s	Type Setti-ng	×	○
∿	04. 47	Initial Capacitance of Main circuit (DC Link Bus) capacitor	Reserved	–	○	○
∿	04. 48	Cumulative run time of capacitors on PCB	For adjusting cumulative running time (resettable) in replacement (In 10 hours)	–	○	○
∿	04. 49	Starting Mode (Auto search delay time 1)	0.0~10.0s	0.0	×	○
	04. 50	Non-linear V/f Pattern 1 (Frequency)	0.0(canceled), 0.1~500.0Hz	Type Setti-ng	○	○
	04. 51	Non-linear V/f Pattern 1 (Voltage)	0~ 240V: AVR action (220V series) 0~ 500V: AVR action (440V series)		○	○
	04. 52	Non-linear V/f Pattern 2 (Frequency)	0.0(canceled), 0.1~500.0Hz	0.0	○	○
	04. 53	Non-linear V/f Pattern 2 (Voltage)	0~240V: AVR action (220V series) 0~500V: AVR action (440V series)	0	○	○
∿	04. 54	Jogging acceleration time (*4)	0.00~3600s	Type Setti-ng	○	○
∿	04. 55	Jogging deceleration time			×	○
∿	04. 56	Deceleration time for forced stop			○	○
∿	04. 57	1st S-curve acceleration range (Leading edge)	0~100%	10	×	○
∿	04. 58	2nd S-curve acceleration range (Trailing edge)		10	×	○
∿	04. 59	1st S-curve deceleration range (Leading edge)		10	×	○
∿	04. 60	2nd S-curve deceleration range (Trailing edge)		10	×	○
	04. 61	UP / DOWN control initial frequency setting selection	0: take 0.00Hz as the initial frequency. 1: take the final frequency command value as the initial frequency in the last UP / DOWN control	1	○	○
∿	04. 63	Frequency lower limiter action selection	0: limit by 00.16 (Frequency limiter: Low) and continue to run 1: If the output frequency lowers below the one limited by 00.16(Frequency limiter: Low), decelerate to stop the motor.	0	○	○

04 Advanced functions Parameters

	Parameter	Parameter Functions	Setting Range	Factory Default	Model	
					~15kW	18.5kW~
∿	04. 64	Frequency lower limiter lower action value	0.0: Depends on 00.16 (Frequency limiter, Low) 0.1 to 60Hz.	1.6	○	○
	04. 65	Non-linear V/f Pattern 3 (Frequency)	0.0(canceled)，0.1~500.0Hz	0.0	×	○
	04. 66	Non-linear V/f Pattern 3 (Voltage)	0~240V: AVR action (220V series) 0~500V: AVR action (440V series)	0	×	○
∿	04. 67	Automatic energy saving operation mode selection	0: Valid only at constant speed running 1: Valid in all modes	0	×	○
	04. 68	Slip compensation 1 Operating conditions selection	0: valid in acceleration and deceleration; valid at base frequency or above 1 : invalid in acceleration and deceleration; valid at base frequency or above 2: valid in acceleration and deceleration; invalid at base frequency or above 3: invalid in acceleration and deceleration; invalid at base frequency or above	0	○	○
∿	04. 69	Overvoltage Automatic Deceleration action selection	0: Invalid 2: Torque limit control:with Force-to-stop if actual deceleration time exceeds three times the specified one 3: DC link bus voltage control:with Force-to-stop if actual deceleration time exceeds three times the specified One 4: Torque limit control:with Force-to-stop invalid. 5: DC link bus voltage control with Force-to-stop invalid.	0.0	○	○
∿	04. 70	Overload prevention control	0.00: Follow the deceleration time selected, 0.01~100.00 Hz / s, 999 (cancel)	999	○	○
∿	04. 71	Deceleration characteristics	0 : Invalid 1 : valid action	0	○	○
	04. 73	Torque Limiter operating conditions selection	0: valid in acceleration and deceleration, valid at constant speed 1: invalid in acceleration and deceleration, valid at constant speed 2: valid in acceleration and deceleration, invalid at constant speed	0	×	○
∿	04. 76	Torque Limiter : Frequency increment limit for braking	0.0~500.0Hz	5.0	○	○
∿	04. 77	Service Life of DC link bus capacitor remaining time)	0~8760 (10 hours as a unit)	–	×	○
∿	04. 78	Maintenance Interval setting (M1)	0 (invalid) ; 1 to 9999 (10 hours as a unit))	8760	×	○
∿	04. 79	Preset Startup Count for Maintenance(M1)	0000 (invalid); 0001~FFFF (hexadecimal)	0	×	○
∿	04. 80	Output Current Fluctuation Damping Gain for Motor 1	0.00~1.00	0.20	○	○
∿	04. 81	Light alarm selection 1	0000~FFFF (hexadecimal)	0	×	○
∿	04. 82	Light alarm selection 2	0000~FFFF (hexadecimal)	0	×	○

04 Advanced functions Parameters						
	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
↗	04. 91	PID Feedback Wire Break Detection	0.0(invalid alarm detection); 0.1~60.0s	0	○	○
↗	04. 92	Continuity of Running (P)	0.000~10.000 times; 999	999	×	○
↗	04. 93	Continuity of Running (I)	0.010~10.000s; 999	999	×	○
	04. 94	Cumulative motor run time 1	0~9999 The cumulative run time can be modified or reset(resettable). (10 hours as a unit)	–	○	○
↗	04. 95	DC braking characte-ristics selection(Braki-ng response mode)	0: Slow response 1: Quick response	1	○	○
↗	04. 96	Stop key Priority/ Start Check function	0: STOP key priority is invalid, Start Check function is valid 1: STOP key priority is valid, Start Check function is valid 2: STOP key priority is invalid, Start Check function is invalid 3: STOP key priority is valid, Start Check function is invalid	0	○	○
↗	04. 97	Clear alarm data	0: Invalid 1: Setting "1" clears alarm data and then returns to "0."	0	○	○
↗	04. 98	Protection/Maintena-nce Function (Mode selection)	0 to 255 (the data is displayed in hex, with each meaning 0: invalid; 1: valid) Bit 0: Lower the carrier frequency automatically (0: invalid; 1: valid) Bit 1: Input phase loss protection (0: invalid; 1: valid) Bit 2: Output phase loss protection (0: invalid; 1: valid) Bit 3: Reserve (0: based on factory default level 1: based on User setup level) Bit 4: Reserve (0: invalid; 1: valid)	0013H(hexadecimal)	○	○

(*3) The user can set based on 04.57-04.60 above 18.5kW (include 18.5kW).
(*4) The parameter under 15kW (include 15kW) is also inching deceleration time.

05 Motor 2 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	05. 01	Maximum output frequency 2	25.0~500.0Hz	50.0	○	○
	05. 02	Base frequency 2	25.0~500.0Hz	50.0	○	○
	05. 03	Rated Voltage at Base frequency voltage 2	0: AVR invalid (Output a voltage in proportion to input voltage) 80~ 240V: AVR action (220V series) 160~ 500V: AVR action (440V series)	220/ 380	○	○
	05. 04	Maximum output voltage 2	80~240V: AVR action (220V series) 160~500V: AVR action (440V series)	220/ 380	○	○
↗	05. 05	Torque boost 2	0.0 to 20.0% (percentage with respect to rated voltage at base frequency 2")	Type Setti-ng	○	○
↗	05. 06	Electronic Thermal Overload (Protection for Motor) 2 Select motor charact-eristics	1: Action (For a general-purpose motor with shaft-driven cooling fan) 2 : Action (For an inverter-driven motor, non-ventilated motor, or motor with separately powered cooling fan)	1	○	○
↗	05. 07	Electronic Thermal Overload (Protection for Motor) 2 Detection level	0.00 (invalid) ; 1% to 135% of the rated current of the motor	Type Setti-ng	○	○
↗	05. 08	Electronic Thermal Overload (Protection for Motor) 2 Thermal time constant	0.5~75.0min		○	○
↗	05. 09	DC braking 2 starting frequency	0.0~60.0Hz	0.0	○	○
↗	05. 10	DC braking 2 braking level	0~80%	0	○	○
↗	05. 11	DC braking 2 braking time	0.00(invalid)；0.01~30.00s	0.00	○	○
↗	05. 12	Starting frequency 2	0.0~60.0Hz	0.5	○	○
	05. 13	Load Selection / Auto Torque Boost / Auto Energy Saving Operation 2	0: Variable torque load (general fan and pump load) 1: constant torque load 2: Auto torque boost 3: Auto energy saving operation (general fan and pump load) 4: Auto energy saving operation (constant torque load) 5: Auto energy saving operation (automatic torque boost)	1	○	○
	05. 14	Drive Control mode selection 2	0 : V / f control 1 : dynamic torque vector control 2 :V / f control with slip compensation active 5 :Vector control without speed sensor(*1)	0	○	○
	05. 15	Motor 2 (No. of poles)	2~22 poles	4	○	○
	05. 16	Motor 2 rated capacity	0.01~1000kW	Type Setti-ng	○	○
	05. 17	Motor 2 rated current	0.00~2000A		○	○

05 Motor 2 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	05. 18	Motor 2 auto-tuning	0: Invalid 1: Tune while the motor stops. (% R1,% X, rated slip) 2: Tune while the motor is rotating under V/f control (% R1,% X, rated slip frequency,, no-load current , magnetic saturation factors and magnetic saturation extension factors :1 ~5 and a~c) 3:Tune while the motor is rotating under vector control (% R1,% X, rated slip frequency, no-load current , magnetic saturation factors 1~5, and magnetic saturation extension factors "a" to "c." Valid when the vector control is enabled) (*1)	0	○	○
∿	05. 19	Motor 2 (Online tuning)	0: Invalid 1: Action	0	○	○
	05. 20	Motor 2 no-load current	0.00~2000A	Type Setti-ng	○	○
∿	05. 21	Motor 2 %R1	0.00~50.00%		○	○
∿	05. 22	Motor 2 %X	0.00~50.00%		○	○
ⓦ	05. 23	Motor 2 Slip compen-sation gain for (driving)	0.0~200.0%	100.0	○	○
∿	05. 24	Motor 2 slip compen-sation response time	0.01~10.00s	0.12	○	○
ⓦ	05. 25	Motor 2 slip compens-ation gain for (braking)	0.0~200.0%	100.0	○	○
	05. 26	Motor 2 rated slip frequency	0.00~15.00Hz	Type Setti-ng	○	○
∿	05. 27	Motor 2 iron loss factor 1	0.00~20.00%		×	○
∿	05. 28	Motor 2 iron loss factor 2		0.00	×	○
∿	05. 29	Motor 2 iron loss factor 3		0.00		
∿	05. 30	Motor 2 magnetic saturation factor 1	0.0~300.0%	Type Setti-ng	×	○
∿	05. 31	Motor 2 magnetic saturation factor 2				
∿	05. 32	Motor 2 magnetic saturation factor 3				
∿	05. 33	Motor 2 magnetic saturation factor 4				
∿	05. 34	Motor 2 magnetic saturation factor 5				
∿	05. 35	Motor 2 magnetic saturation expansion factor a				
∿	05. 36	Motor 2 magnetic saturation expansion factor b				
∿	05. 37	Motor 2 magnetic saturation expansion factor c				
	05. 39	Reserved	Reserved	0	○	○

05 Motor 2 parameters

	Parameter	Parameter Functions	Setting Range	Factory Default	Model	
					~15kW	18.5kW~
	05. 40	Slip Compensation 2 (Operating conditions)	0:Valid in acceleration and deceleration; valid at base frequency or above 1:Invalid in acceleration and deceleration; valid at base frequency or above 2:Valid in acceleration and deceleration; invalid at base frequency or above 3:Invalid in acceleration and deceleration; invalid at base frequency or above	0	○	○
↗	05. 41	Output Current Fluctuation Damping Gain for Motor 2	0.00~0.40	0.20	○	○
↗	05. 42	Motor/Parameter Switching 2 (Mode selection)	0: Motor switch (switch to the 2nd motor) 1: Parameter switch (switch to particular 05)	0	×	○
Ⓜ	05. 45	Speed control 2 P term (gain)	0.1~200.0 times	10.0	○	×
Ⓜ	05. 46	Speed control 2 I item (integral time)	0.001~9.999s 999: Integral action is invalid	0.100	○	×
	05. 51	Cumulative Motor run time 2	0~9999 The cumulative run time can be modified or reset(resettable)(10 hours as a unit)	–	×	○
↗	05. 52	Startup Counter for Motor 2	Adjustment in replacement (0000 ~ FFFF (hexadecimal))	–	×	○
↗	05. 53	Motor 2% X correction factor 1	0~300%	100	×	○
↗	05. 54	Motor 2% X correction factor 2	0~300%	100	×	○

06 Motor 3 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	06. 01	Maximum output frequency 3	25.0~500.0Hz	50.0	×	○
	06. 02	Base frequency 3	25.0~500.0Hz	50.0	×	○
	06. 03	Rated Voltage at Base frequency voltage 3	0: AVR invalid (Output a voltage in proportion to input voltage) 80~240V: AVR action (220V series) 160~500V: AVR action (440V series)	220/ 380	×	○
	06. 04	Maximum output voltage 3	80~240V: AVR action (220V series) 160~500V: AVR action (440V series)	220/ 380	×	○
↗	06. 05	Torque boost 3	0.0 to 20.0% (percentage with respect to rated voltage at base frequency 3")	Type Setti-ng	×	○
↗	06. 06	Electronic Thermal Overload (Protection for Motor) 3 Select motor characteristics	1: Action (For a general-purpose motor with shaft-driven cooling fan) 2: Action (For an inverter-driven motor, non-ventilated motor, or motor with separately powered cooling fan)	1	×	○
↗	06. 07	Electronic Thermal Overload (Protection for Motor)3 Detection level	0.00 (invalid) ; 1% to 135% of the rated current of the motor	Type Setti-ng	×	○
↗	06. 08	Electronic Thermal Overload (Protection for Motor)3 Thermal time constant	0.5~75.0min		×	○
↗	06. 09	DC braking 3 starting frequency	0.0~60.0Hz	0.0	×	○
↗	06. 10	DC braking 3 braking level	0~80%	0	×	○
↗	06. 11	DC braking 3 braking time	0.00(invalid):0.01~30.00s	0.00	×	○
↗	06. 12	Starting frequency 3	0.0~60.0Hz	0.5	×	○
	06. 13	Load Selection / Auto Torque Boost / Auto Energy Saving Oper-ation 3	0: Variable torque load (general fan and pump load) 1: constant torque load 2: Auto torque boost 3: Auto energy saving operation (general fan and pump load) 4: Auto energy saving operation (constant torque load) 5: Auto energy saving operation (automatic torque boost)	1	×	○
	06. 14	Drive Control mode selection 3	0 :V / f control 1 :Dynamic torque vector control 2: V / f control with slip compensation active 5: Vector control without speed sensor(*1)	0	×	○
	06. 15	Motor 3 (No. of poles)	2~22 poles	4	×	○
	06. 16	Motor 3 rated capacity	0.01~1000kW	Type Setti-ng	×	○
	06. 17	Motor 3 rated current	0.00~2000A		×	○

06 Motor 3 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	06. 18	Motor 2 auto-tuning	0: Invalid 1: Tune while the motor stops. (% R1,% X, rated slip) 2: Tune while the motor is rotating under V/f control (% R1,% X, rated slip frequency,, no-load current , magnetic saturation factors and magnetic saturation extension factors :1 ~5 and a~c) 3: Tune while the motor is rotating under vector control (% R1,% X, rated slip frequency, no-load current , magnetic saturation factors 1~5, and magnetic saturation extension factors "a" to "c." Valid when the vector control is enabled)	0	×	○
∿	06. 19	Motor 3 (Online tuning)	0: Invalid 1: Action	0	×	○
	06. 20	Motor 3 no-load current	0.00~2000A	Type Setti-ng	×	○
∿	06. 21	Motor 3 %R1	0.00~50.00%		×	○
∿	06. 22	Motor 3 %X	0.00~50.00%		×	○
ⓦ	06. 23	Motor 3 Slip compens-ation gain for (driving)	0.0~200.0%	100.0	×	○
∿	06. 24	Motor 3 slip compens-ation response time	0.01~10.00s	0.12	×	○
ⓦ	06. 25	Motor 3 slip compens-ation gain for (braking)	0.0~200.0%	100.0	×	○
	06. 26	Motor 3 rated slip frequency	0.00~15.00Hz	Type Setti-ng	×	○
∿	06. 27	Motor 3 iron loss factor 1	0.00~20.00%		×	○
∿	06. 28	Motor 3 iron loss factor 2		0.00	×	○
∿	06. 29	Motor 3 iron loss factor 3		0.00	×	○
∿	06. 30	Motor 3 magnetic saturation factor 1	0.0~300.0%	Type Setti-ng	×	○
∿	06. 31	Motor 3 magnetic saturation factor 2				
∿	06. 32	Motor 3 magnetic saturation factor 3				
∿	06. 33	Motor 3 magnetic saturation factor 4				
∿	06. 34	Motor 3 magnetic saturation factor 5				
∿	06. 35	Motor 3 magnetic saturation expansion factor a				
∿	06. 36	Motor 3 magnetic saturation expansion factor b				
∿	06. 37	Motor 3 magnetic saturation expansion factor c				
	06. 39	Reserved	Reserved	0	×	○

06 Motor 3 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	06. 40	Slip Compensation 3 (Operating conditions)	0: valid in acceleration and deceleration; validat base frequency or above 1: invalid in acceleration and deceleration; valid at base frequency or above 2: valid in acceleration and deceleration; invalid at base frequency or above 3: invalid in acceleration and deceleration; invalid at base frequency or above	0	×	○
∾	06. 41	Output Current Fluctuation Damping Gain for Motor 3	0.00~0.40	0.20	×	○
∾	06. 42	Motor/Parameter Switching 3 (Mode selection)	0: Motor switch (switch to the 3nd motor) 1: Parameter switch (switch to particular 06)	0	×	○
∾	06. 52	Startup Counter for Motor 3	Adjustment in replacement (0000~FFFF (hexadecimal))	–	×	○
∾	06. 53	Motor 3% X correction factor 1	0~300%	100	×	○
∾	06. 54	Motor 3% X correction factor 2	0~300%	100	×	○

07 Motor 4 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	07. 01	Maximum output frequency 4	25.0~500.0Hz	50.0	×	○
	07. 02	Base frequency 4	25.0~500.0Hz	50.0	×	○
	07. 03	Rated Voltage at Base Frequency 4	0: AVR invalid (Output a voltage in proportion to input voltage) 80 ~ 240V: AVR action (220V series) 160 ~ 500V: AVR action (440V series)	220/ 380	×	○
	07. 04	Maximum output voltage 4	80~240V: AVR action (220V series) 160~500V: AVR action (440V series)	220/ 380	×	○
∿	07. 05	Torque boost 4	0.0 to 20.0% (percentage with respect to rated voltage at base frequency 4")	Type Setti-ng	×	○
∿	07. 06	Electronic Thermal Overload (Protection for Motor)4 Select motor characteristics	1: Action (For a general-purpose motor with shaft-driven cooling fan) 2: Action (For an inverter-driven motor, non-ventilated motor, or motor with separately powered cooling fan)	1	×	○
∿	07. 07	Electronic Thermal Overload (Protection for Motor)4 Detection level	0.00 (invalid) ; 1% to 135% of the rated current of the motor	Type Setti-ng	×	○
∿	07. 08	Electronic Thermal Overload (Protection for Motor) 4 Thermal time constant	0.5~75.0min		×	○
∿	07. 09	DC braking 4 starting frequency	0.0~60.0Hz	0.0	×	○
∿	07. 10	DC braking 4 braking level	0~80%	0	×	○
∿	07. 11	DC braking 4 braking time	0.00(invalid); 0.01~30.00s	0.00	×	○
∿	07. 12	Starting frequency 4	0.0~60.0Hz	0.5	×	○
	07. 13	Load Selection / Auto Torque Boost / Auto Energy Saving Operation 4	0: Variable torque load (general fan and pump load) 1: constant torque load 2: Auto torque boost 3: Auto energy saving operation (general fan and pump load) 4: Auto energy saving operation (constant torque load) 5: Auto energy saving operation (automatic torque boost)	1	×	○
	07. 14	Drive Control mode selection 4	0 : V / f control 1 : dynamic torque vector control 2 :V / f control with slip compensation active 5 :Vector control without speed sensor(*1)	0	×	○
	07. 15	Motor 4 (No. of poles)	2~22 poles	4	×	○
	07. 16	Motor 4 rated capacity	0.01~1000kW	Type Setti-ng	×	○
	07. 17	Motor 4 rated current	0.00~2000A		×	○

07 Motor 4 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	07. 18	Motor 4 auto-tuning	0: Invalid 1: Tune while the motor stops. (% R1,% X, rated slip) 2: Tune while the motor is rotating under V/f control (% R1,% X, rated slip frequency,, no-load current , magnetic saturation factors and magnetic saturation extension factors :1 ~5 and a~c) 3:Tune while the motor is rotating under vector control (% R1,% X, rated slip frequency, no-load current , magnetic saturation factors 1~5, and magnetic saturation extension factors "a" to "c." Valid when the vector control is enabled)	0	×	○
∿	07. 19	Motor 4 (Online tuning)	0: Invalid 1: Action	0	×	○
	07. 20	Motor 4 no-load current	0.00~2000A	Type Setti-ng	×	○
∿	07. 21	Motor 4 %R1	0.00~50.00%		×	○
∿	07. 22	Motor 4 %X	0.00~50.00%		×	○
ⓦ	07. 23	Motor 4 Slip compens-ation gain for (driving)	0.0~200.0%	100.0	×	○
∿	07. 24	Motor 4 slip compens-ation response time	0.01~10.00s	0.12	×	○
ⓦ	07. 25	Motor 4 slip compens-ation gain for (braking)	0.0~200.0%	100.0	×	○
	07. 26	Motor 4 rated slip frequency	0.00~15.00Hz	Type Setti-ng	×	○
∿	07. 27	Motor 4 iron loss factor 1	0.00~20.00%		×	○
∿	07. 28	Motor 4 iron loss factor 2		0.00	×	○
∿	07. 29	Motor 4 iron loss factor 3		0.00	×	○
∿	07. 30	Motor 4 magnetic saturation factor 1	0.0~300.0%	Type Setti-ng	×	○
∿	07. 31	Motor 4 magnetic saturation factor 2				
∿	07. 32	Motor 4 magnetic saturation factor 3				
∿	07. 33	Motor 4 magnetic saturation factor 4				
∿	07. 34	Motor 4 magnetic saturation factor 5				
∿	07. 35	Motor 4 magnetic saturation expansion factor a				
∿	07. 36	Motor 4 magnetic saturation expansion factor b				
∿	07. 37	Motor 4 magnetic saturation expansion factor c				
	07. 39	Reserved	Reserved	0	×	○

07 Motor 4 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	07. 40	Slip Compensation 4 (Operating conditions)	0: valid in acceleration and deceleration; valid at base frequency or above 1: invalid in acceleration and deceleration; valid at base frequency or above 2: valid in acceleration and deceleration; invalid at base frequency or above 3: invalid in acceleration and deceleration; invalid at base frequency or above	0	×	○
∾	07. 41	Output Current Fluctuation Damping Gain for Motor 4	0.00~0.40	0.20	×	○
∾	07. 42	Motor/Parameter Switching 4 (Mode selection)	0: Motor switch (switch to the 4nd motor) 1: Parameter switch (switch to particular 07)	0	×	○
	07. 51	Cumulative Motor run time 4	0~9999 The cumulative run time can be modified or reset（resettable) (10 hours as a unit)	–	×	○
∾	07. 52	Startup Counter for Motor 4	Adjustment in replacement (0000 ~ FFFF (hexadecimal))	–	×	○
∾	07. 53	Motor 4 % X correction factor 1	0~300%	100	×	○
∾	07. 54	Motor 4 % X correction factor 2	0~300%	100	×	○

08 Application function 1 parameters

	Parameter	Parameter Functions	Setting Range	Factory Default	Model	
					~15kW	18.5kW~
	08. 01	PID control action	0: Invalid 1: PID output is normal characteristics, Process control, 2: PID output is inverse characteristics, Process control 3: Speed control (Dancer control)	0	○	○
	08. 02	PID control command	0: (▲/▼) keys on Keypad 1: PID command 1 (analog input terminals AVI, ACI, AUI) 3: UP / DOWN 4: Command via communications link	0	○	○
∿	08. 03	PID control P term (gain)	0.000~30.000 times	0.100	○	○
∿	08. 04	PID control I item (integral time)	0.0~3600.0s	0.0	○	○
∿	08. 05	PID control item D (differential time)	0.00~600.00s	0.00	○	○
∿	08. 06	PID control feedback signal filter	0.0~900.0s	0.5	○	○
∿	08. 08	PID control Pressurization starting frequency	0.0~500.0Hz	0.0	×	○
∿	08. 09	PID control Pressurizing time	0~60s	0	×	○
∿	08. 10	PID control anti-integral windup level	0~200%	200	○	○
∿	08. 11	PID control Select alarm output	0: Absolute value alarm 1: Absolute value alarm (with hold) 2: Absolute value alarm (with latch) 3: Absolute value alarm (with hold and latch) 4: Deviation alarm 5: Deviation alarm (with hold) 6: Deviation alarm (with latch) 7: Deviation alarm (with hold and latch)	0	○	○
∿	08. 12	PID control Upper level alarm (AH)	–100%~100%	100	○	○
∿	08. 13	PID control Lower level alarm (AL)	–100%~100%	0	○	○
∿	08. 15	PID control Stop frequency for slow flowrate	0.0(invalid)；1.0~500.0Hz	0.0	×	○
∿	08. 16	PID control Slow flowrate level stop latency	0~60s	30	×	○
∿	08. 17	PID control starting frequency	0.0~500.0Hz	0.0	×	○
∿	08. 18	PID control:Upper limit of PID process output	–150%~150%; 999(Depends on setting of 00．15)	999	○	○
∿	08. 19	PID control:Lower limit of PID process output	–150%~150%; 999(Depends on setting of 00．16)	999	○	○
∿	08. 21	Dew Condensation Prevention (duty cycle)	1~50%	1	×	○
	08. 22	Commercial Power Switching Sequence	0: Keep inverter operation(Stop due to alarm) 1: Automatically switch to commercial-power operation	0	×	○
∿	08. 56	PID control speed command filter	0.00~5.00s	0.10	○	○

08 Application function 1 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	08. 57	PID control Dancer reference position	–100~0~100%	0	○	○
	08. 58	PID control Detection width of dancer position deviation	0: invalid PID constant switching; 1 ~ 100%: manual set value	0	○	○
	08. 59	PID control P term (gain) 2	0.000~30.000 times	0.100	○	○
	08. 60	PID control I item (integral time) 2	0.0~3600.0s	0.0	○	○
	08. 61	PID control item D (differential time) 2	0.00~600.00s	0.00	○	○
	08. 62	PID control block selection	0~3 Bit 0: PID output polarity; 0 = plus(add); 1 = minus(subtract) Bit 1: Select compensation factor for PID output 0 = Ratio (relative to the main setting) 1 = Speed command (relative to maximum frequency)	0	○	○
	08. 68	Brake signal Brake-OFF current	0~300%	100	○	○
	08. 69	Brake signal Brake-OFF frequency/speed	0.0~25.0Hz	1.0	○	○
	08. 70	Brake signal Brake-OFF timer	0.0~5.0s	1.0	○	○
	08. 71	Brake signal Brake-ON frequency/speed	0.0~25.0Hz	1.0	○	○
	08. 72	Brake signal Brake-ON timer	0.0~5.0s	1.0	○	○
	08. 95	Brake signal Brake-ON torque	0~300%	100	×	○
	08. 96	Brake signal Speed condition selection	0~31 Bit 2:Response for brake-OFF current (0:Slow response 1:Quick response)	0	×	○

09 Application function 2 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	09. 01	Speed control 1 Speed command filter	0.000~5.000s	0.020	×	○
	09. 02	Speed control 1 Speed detection filter	0.000~0.100s	0.005	×	○
	09. 03	Speed control 1 P item (gain)	0.1~200.0 times	10.0	×	○
	09. 04	Speed control 1 I item (integral time)	0.001~9.999s 999: Integral action is invalid	0.100	×	○
	09. 06	Speed control 1 output filter	0.000~0.100s	0.002	×	○

09 Application function 2 parameters						
	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
∿	09. 09	Speed control (JOG) Speed command filter	0.000~5.000s	0.020	×	○
ⓦ	09. 10	Speed control (JOG) Speed detection filter	0.000~0.100s	0.005	×	○
ⓦ	09. 11	Speed control (JOG) P item (gain)	0.1~200.0 times	10.0	×	○
ⓦ	09. 12	Speed control (JOG)I item (integral time)	0.001~9.999s 999: Integral action is invalid	0.100	×	○
∿	09. 13	Speed control (JOG) output filter	0.000~0.100s	0.002	×	○
∿	09. 21	Speed Agreement/ Error Hysteresis width	0.0~50.0%	10.0	×	○
∿	09. 22	Speed Agreement/ Error Detection timer	0.00~10.00s	0.50	×	○
∿	09. 23	Speed Error Process-ing	0: Continue to run 1: Stop running with alarm 1 2: Stop running with alarm 2 3: Continue to run 2 4: Stop running with alarm 3 5: Stop running with alarm 4	0	×	○
	09. 24	Zero speed control	0: Zero speed control is invalid when it's at startup 1: Zero speed control is valid when it's at startup	0	×	○
∿	09. 25	Automatic speed regu-lator switching time	0.000~1.000s	0.000	×	○
∿	09. 32	Torque control speed limit 1	0~110%	100	×	○
∿	09. 33	Torque control speed limit 2	0~110%	100	×	○
∿	09. 35	Overspeed detection level	0~120% 999: based on 09.33 to 09.32 or parameter values	999	×	○
∿	09. 61	Command filter time constant	0.000~5.000s	0.005	×	○
	09. 62	Command pulse count factor 1	1~9999	1	×	○
	09. 63	Command pulse count factor 2	1~9999	1	×	○
	09. 67	Starting Auto search Mode	0: Invalid 1: Action (At restart after momentary power failure) 2: Action (At restart after momentary power failure and at normal start)	0	×	○

PS:The function parameter 2 of 9th group is the senseless vector extra control parameter of above 18.5kw (include 18.5kw)

10 Application function 3 parameters

Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
				~15kW	18.5kW~
10. 00	Customizable Logic (Mode selection)	0: Invalid 1: Valid Action (Customizable logic	0	×	○
10. 01	Customizable Logic: (Input 1) step 1	0(1000): Inverter running [mRUN]	0	×	○
10. 02	Customizable Logic: (Input 2) step 1	1(1001): Frequency (speed) arrival signal [mFAR]	0	×	○
		2(1002): Frequency (speed) detection [mFDT]		×	○
		3(1003): Undervoltage detected(When Inverter stopped) [mLU]		×	○
		4(1004): Torque polarity detection [mB/D]		×	○
		5(1005): Inverter output limiting [mIOL]		×	○
		6(1006): Auto-restarting after momentary power failure [mIPF]		×	○
		7(1007): Motor overload early warning [mOL]		×	○
		8(1008): Keypad operation enabled [mKP]		×	○
		10(1010): Inverter ready to run [mRDY]		×	○
		11: Switch motor drive source between commercial power / inverter output [mSW88]		×	○
		12: Switch motor drive source between commercial power / inverter output [mSW52-2]		×	○
		13: Switch motor drive source between commercial power / inverter output [mSW52-1		×	○
		15(1015): AX terminal function [mAX]		×	○
		22(1022): Inverter output limiting (with delay) [mIOL2]		×	○
		25(1025): Cooling fan ON-OFF in operation [mFAN]		×	○
		26(1026): Auto-resetting [mTRY]		×	○
		28(1028): Cooler overheat early warning [mOH]		×	○
		30(1030): Lifetime alarm [mLIFE]		×	○
		31(1031): Frequency (speed) detection 2 [mFDT2]		×	○
		33(1033): Reference loss detected [mREF OFF]		×	○
		35(1035): Inverter output on [mRUN2]		×	○
		36(1036): In overload prevention control[mOLP]		×	○
		37(1037): Current detected [mID]		×	○
		38(1038): Current detected 2 [mID2]		×	○
		39(1039): Current detected 3 [mID3]		×	○
		41(1041): Low current detected [mIDL]		×	○
		42(1042): PID alarm output [mPID-ALM]		×	○

10 Application function 3 parameters

Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
				~15kW	18.5kW~
		43(1043): In PID control [mPID-CTL]		×	○
		44(1044): PID Motor stopped due to slow flowrate under PID control [mPID-STP]		×	○
		45(1045): Low output torque detection [mU-TL]		×	○
		46(1046): Torque detection 1 [mTD1]		×	○
		47(1047): Torque detection 2 [mTD2]		×	○
		48(1048): Motor 1 selected [mSWM1]		×	○
		49(1049): Motor 2 selected [mSWM2]		×	○
		50(1050): Motor 3 selected [mSWM3]		×	○
		51(1051): Motor 4 selected [mSWM4]		×	○
		52(1052): Running Forward signal [mFRUN]		×	○
		53(1053): Running Reversal signal [mRRUN]		×	○
		56(1056): Motor overheat detected by thermistor [mTHM]		×	○
		57(1057): Brake signal [mBRKS]		×	○
		58(1058): Frequency (speed) detection 3 [mFDT3]		×	○
		59(1059): ACI terminal wire break detected [mC1OFF]		×	○
		70(1070): Speed valid [mDNZS]		×	○
		71(1071): Speed agreement [mDSAG]		×	○
		72(1072): Frequency (speed) arrival signal 3 [mFAR3]		×	○
		84(1084): Maintenance timer [mMNT]		×	○
		90(1090): Alarm contents 1 [mAL1]		×	○
		91(1091): Alarm contents 2 [mAL2]		×	○
		92(1092): Alarm contents 4 [mAL4]		×	○
		93(1093): Alarm contents 8 [mAL8]		×	○
		98(1098): Light alarm [mL-ALM]		×	○
		99(1099): Alarm output (for any alarm) [mALM]		×	○
		105(1105): Braking transistor broken [mDBAL]		×	○
		2001(3001): Output of step 1 [mSO01]		×	○
		2002(3002): Output of step 2 [mSO02]		×	○
		2003(3003): Output of step 3 [mSO03]		×	○
		2004(3004): Output of step 4 [mSO04]		×	○
		2005(3005): Output of step 5 [mSO05]		×	○
		2006(3006): Output of step 6 [mSO06]		×	○
		2007(3007): Output of step 7 [mSO07]		×	○
		2008(3008): Output of step 8 [mSO08]		×	○
		2009(3009): Output of step 9 [mSO09]		×	○
		2010(3010): Output of step 10 [mSO10]		×	○
		4001(5001): MI1 terminal input signal [mMI1]		×	○
		4002(5002): MI2 terminal input signal [mMI2]		×	○
		4003(5003): MI3 terminal input signal[mMI3]		×	○
		4004(5004): MI4 terminal input signal[mMI4]		×	○
		4005(5005): MI5 terminal input signal[mMI5]		×	○
		4006(5006): MI6 terminal input signal[mMI6]		×	○

10 Application function 3 parameters

Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
				~15kW	18.5kW~
		4006(5006): MI6 terminal input signal[mMI6]		×	○
		4007(5007): MI7 terminal input signal[mMI7]		×	○
		4008(5008): MI8 terminal input signal[mMI8]		×	○
		4009(5009): MI9 terminal input signal[mMI9]		×	○
		4010(5010): FWD terminal input signal[mFWD]		×	○
		4011(5011): REV terminal input signal[mREV]		×	○
		6000(7000): RUN Final run command [mFL_RUN]		×	○
		6001(7001): FWD Final FWD run command [mFL_FWD]		×	○
		6002(7002): REV Final REV run command [mFL_REV]		×	○
		6003(7003): During acceleration [mDACC]		×	○
		6004(7004): During deceleration [mDDEC]		×	○
		6005(7005): Under anti-regenerative control [mREGA]		×	○
		6006(7006): Within dancer reference position [mDR_REF]		×	○
		6007(7007): Alarm factor presence [mALM_ACT]		×	○
		※ Setting the value in parentheses(⇔)shown above assigns a negative logic output to a terminal.(True if OFF)			
	10. 03	Customizable Logic: Step 1 Logic circuit	0: No function assigned 1: Through output + general-purpose timer 2: Logic and (ANDing) + general-purpose timer 3: Logic or (ORing) + general-purpose timer 4: Logical XOR (XORing) + general-purpose timer 5: Set priority flip-flop+general-purpose timer 6: Reset priority flip-flop+general-purpose timer 7: Rising edge detector+general-purpose timer 8: Falling edge detector+general-purpose timer 9: Rising and falling edge detector + general -purpose timer 10: Input hold + general-purpose timer 11: Increment counter 12: Decrement counter 13: Timer with reset input	0	×	○
	10. 04	Customizable Logic: Step 1 Type of timer	0: No timer 1: ON-delay timer 2: Off-delay timer 3: Pulse 4: Retriggerable timer 5: Pulse Train Output	0	×	○
	10. 05	Customizable Logic: Step 1 time setting	0.00~600.00	0.00	×	○
	10. 06	Customizable Logic: Step 2 input 1	Same with 10．01	0	×	○
	10. 07	Customizable Logic: Step 2 input 2	Same with 10．02	0	×	○
	10. 08	Customizable Logic: Step 2 Logic circuit	Same with 10．03	0	×	○
	10. 09	Customizable Logic: Step 2 Type of timer	Same with 10．04	0	×	○

10 Application function 3 parameters						
	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	10. 10	Customizable Logic: Step 2 time setting	Same with 10．05	0.00	×	○
	10. 11	Customizable Logic: Step 3 input 1	Same with 10．01	0	×	○
	10. 12	Customizable Logic: Step 3 input 2	Same with 10．02	0	×	○
	10. 13	Customizable Logic: Step 3 Logic circuit	Same with 10．03	0	×	○
	10. 14	Customizable Logic: Step 3 Type of timer	Same with 10．04	0	×	○
	10. 15	Customizable Logic: Step 3 time setting	Same with 10．05	0.00	×	○
	10. 16	Customizable Logic: Step 4 input 1	Same with 10．01	0	×	○
	10. 17	Customizable Logic: Step 4 input 2	Same with 10．02	0	×	○
	10. 18	Customizable Logic: Step 4 Logic circuit	Same with 10．03	0	×	○
	10. 19	Customizable Logic: Step 4 Type of timer	Same with 10．04	0	×	○
	10. 20	Customizable Logic: Step 4 time setting	Same with 10．05	0.00	×	○
	10. 21	Customizable Logic: Step 5 input 1	Same with 10．01	0	×	○
	10. 22	Customizable Logic: Step 5 input 2	Same with 10．02	0	×	○
	10. 23	Customizable Logic: Step 5 Logic circuit	Same with 10．03	0	×	○
	10. 24	Customizable Logic: Step 5 Type of timer	Same with 10．04	0	×	○
	10. 25	Customizable Logic: Step 5 time setting	Same with 10．05	0.00	×	○
	10. 26	Customizable Logic: Step 6 input 1	Same with 10．01	0	×	○
	10. 27	Customizable Logic: Step 6 input 2	Same with 10．02	0	×	○
	10. 28	Customizable Logic: Step 6 Logic circuit	Same with 10．03	0	×	○
	10. 29	Customizable Logic: Step 6 Type of timer	Same with 10．04	0	×	○
	10. 30	Customizable Logic: Step 6 time setting	Same with 10．05	0.00	×	○
	10. 31	Customizable Logic: Step 7 input 1	Same with 10．01	0	×	○
	10. 32	Customizable Logic: Step 7 input 2	Same with 10．02	0	×	○
	10. 33	Customizable Logic: Step 7 Logic circuit	Same with 10．03	0	×	○
	10. 34	Customizable Logic: Step 7 Type of timer	Same with 10．04	0	×	○
	10. 35	Customizable Logic: Step 7 time setting	Same with 10．05	0.00	×	○
	10. 36	Customizable Logic: Step 8 input 1	Same with 10．01	0	×	○
	10. 37	Customizable Logic: Step 8 input 2	Same with 10．02	0	×	○

10 Application function 3 parameters

Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
				~15kW	18.5kW~
10. 38	Customizable Logic: Step 8 Logic circuit	Same with 10．03	0	×	○
10. 39	Customizable Logic: Step 8 Type of timer	Same with 10．04	0	×	○
10. 40	Customizable Logic: Step 8 time setting	Same with 10．05	0.00	×	○
10. 41	Customizable Logic: Step 9 input 1	Same with 10．01	0	×	○
10. 42	Customizable Logic: Step 9 input 2	Same with 10．02	0	×	○
10. 43	Customizable Logic: Step 9 Logic circuit	Same with 10．03	0	×	○
10. 44	Customizable Logic: Step 9 Type of timer	Same with 10．04	0	×	○
10. 45	Customizable Logic: Step 9 time setting	Same with 10．05	0.00	×	○
10. 46	Customizable Logic: Step 10 input 1	Same with 10．01	0	×	○
10. 47	Customizable Logic: Step 10 input 2	Same with 10．02	0	×	○
10. 48	Customizable Logic: Step 10 Logic circuit	Same with 10．03	0	×	○
10. 49	Customizable Logic: Step 10 Type of timer	Same with 10．04	0	×	○
10. 50	Customizable Logic: Step 10 time setting	Same with 10．05	0.00	×	○
10. 71	Customizable Logic output signal 1 output selection	0: Invalid 1: Step 1 Output [mSO01]	0	×	○
10. 72	Customizable Logic output signal 2 output selection	2: Step 2 Output [mSO01] 3: Step 3 Output [mSO01] 4: Step 4 Output [mSO01]	0	×	○
10. 73	Customizable Logic output signal 3 output selection	5: Step 5 Output [mSO01] 6: Step 6 Output [mSO01]	0	×	○
10. 74	Customizable Logic output signal 4 output selection	7: Step 7 Output [mSO01] 8: Step 8 Output [mSO01]	0	×	○
10. 75	Customizable Logic output signal 5 output selection	9: Step 9 Output [mSO01] 10: Step 10 Output [mSO01]	0	×	○
10. 81	Customizable Logic Output Signal 1 function selection	0(1000):Multi-step speed command 1 (0-1 step) [mSS1]	100	×	○
		1(1001):Multi-step speed command 2 (0- 3 steps) [mSS2]		×	○
10. 82	Customizable Logic Output Signal 2 function selection	2(1002):Multi-step speed command 3 (0-7 steps) [mSS4]	100	×	○
10. 83	Customizable Logic Output Signal 3 function selection	3(1003):Multi-step speed command 4 (0-15 steps) [mSS8]	100	×	○
10. 84	Customizable Logic Output Signal 4 function selection	4(1004):Select ACC/DEC time (2steps) [mRT1]	100	×	○
10. 85	Customizable Logic Output Signal 5 function selection	5(1005):Select ACC/DEC time (4steps)[mRT2]	100	×	○
		6(1006):Enable 3-wire operation [mHLD]		×	○
		7(1007):Coast to a stop [mBX]		×	○

10 Application function 3 parameters

Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
				~15kW	18.5kW~
		8(1008):Reset alarm (abnormal) [mRST]		×	○
		9(1009):Enable External alarm trip [mTHR] (9= Active OFF / 1009= Active ON)		×	○
		10(1010): Ready for Jogging [mJOG]		×	○
		11(1011):Select frequency command 2/1 [mHz2/mHz1]		×	○
		12(1012):Motor 2 selection [mM2]		×	○
		13:DC braking command [mDCBRK]		×	○
		14(1014):Torque limiter level2 / torque limiter level 1 [mTL2/mTL1]		×	○
		15:Switch to commercial power (50Hz) [mSW50]		×	○
		16:Switch to commercial power (60Hz) [mSW60]		×	○
		17(1017):UP command (Increase output frequency) [mUP]		×	○
		18(1018): DOWN command (Decrease output frequency) [mDOWN]		×	○
		20(1020):Cancel PID control [mHz/PID]		×	○
		21(1021):Switch Forward & reverse [mIVS]		×	○
		22(1022):Interlock [mIL]		×	○
		24(1024):(RS-485)Communication link via selection (RS-485) [mLE]		×	○
		25(1025):Universal DI [mU-DI]		×	○
		26(1026):Enable auto search for idling motor speed at starting [mSTM]		×	○
		30(1030):Force to stop [mSTOP] (30 = Active OFF/1030 = Active ON)		×	○
		33(1033):Reset PID integral and differential components [mPID-RST]		×	○
		34(1034):Hold PID integral component [mPID-HLD]		×	○
		35(1035):Select local (keypad) operation[mLOC]		×	○
		36(1036):Motor 3 selection [mM3]		×	○
		37(1037):Motor 4 selection [mM4]		×	○
		39:Prevent condensation [mDWP]		×	○
		40:Enable integrated sequence to switch to commercial power (50Hz) [mISW50]		×	○
		41:Enable integrated sequence to switch to commercial power (60Hz) [mISW60]		×	○
		49(1049):Pulse train symbol [mSIGN]		×	○
		59(1059):Battery operation valid command [mBATRY]		×	○
		70(1070):Cancel constant peripheral speed control [mHz/LSC]		×	○
		71(1071):Hold the constant peripheral speed control frequency in the memory [mLSC-HLD]		×	○
		72(1072):Count the run time of (commercial power-driven) motor 1 [mCRUN-M1]		×	○
		73(1073):Count the run time of (commercial power-driven motor) 2[mCRUN-M2]		×	○

10 Application function 3 parameters

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
			74(1074):Count the run time of (commercial power-driven motor) 3[mCRUN-M3]		×	○
			75(1075):Count the run time of (commercial power-driven motor) 4 [mCRUN-M4]		×	○
			76(1076):Droop control [mDROOP]		×	○
			81(1081):Clear all customizable logic timers[mCLTC]		×	○
			98:Run forward [mFWD]		×	○
			99:Run reverse [mREV]		×	○
			100:No function assigned [mNONE]		×	○
			※ Setting the value in parentheses(⇔)shown above assigns a negative logic output to a terminal.(True if OFF)			
	10. 91	Customizable Logic: monitor Timer (step selection)	1: Step 1 2: Step 2 3: Step 3 4: Step 4 5: Step 5 6: Step 6 7: Step 7 8: Step 8 9: Step 9 10: Step 10	1	×	○

11 Serial communication function Parameter

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
	11. 01	RS-485 communicat-ion 1 communication Station address	1~255	1	○	○
↝	11. 02	RS-485 communicat-ion 1: Communicati-ons error processing	0: Immediately trip with alarm Er8 1: Trip with alarm Er8after running for the period specified by timer 2: Retry during the period specified by timer. If the retry fails, trip with alarm Er8 3: Continue to run	0	○	○
↝	11. 03	RS-485 communicat-ion 1: timer	0.0~60.0s	2.0	○	○
↝	11. 04	S-485 communicat-ion 1: baud rate	0: 2400bps 1: 4800bps 2: 9600bps 3: 19200bps 4: 38400bps	2	○	○
↝	11. 05	RS-485communicat-ion1:data length selection	0:8 Bit 1:7 Bit	0	○	○
↝	11. 06	RS-485 communicat-ion 1: parity check selection	0: No (Stop bit : 2) 1: Even parity (Stop bit : 1) 2: Odd parity (Stop bit : 1) 3: No (Stop bit : 1)	0	○	○

11 Serial communication function Parameter

	Parameter	Parameter Functions	Setting Range	Factory Default	Model	
					~15kW	18.5kW~
∿	11. 07	RS-485 communication 1: stop bit selection	0: 2 bit 1: 1 bit	0	○	○
∿	11. 08	RS-485 communication 1: No-response error detection time	0: No detection 1~60s	0	○	○
∿	11. 09	RS-485 communication 1 response interval	0.00~1.00s	0.01	○	○
∿	11. 10	RS-485 communication 1 protocol selection	0: Modbus RTU protocol 5: Modbus ASCII protocol	0	○	○
	11. 11	RS-485 communication 2 communication Station address	1~255	1	○	○
∿	11. 12	RS-485 communication 2: Communications error processing	0: Immediately trip with alarm Erp 1: Trip with alarm Erp after running for the period specified by timer 2: Retry during the period specified by timer. If the retry fails, trip with alarm Erp 3: Continue to run	0	○	○
∿	11. 13	RS-485 communication 2: timer	0.0~60.0s	2.0	○	○
∿	11. 14	RS-485 communication 2: baud rate	0: 2400bps 1: 4800bps 2: 9600bps 3: 19200bps 4: 38400bps	2	○	○
∿	11. 15	RS-485 communication 2:data length selection	0: 8 Bit 1: 7 Bit	0	○	○
∿	11. 16	RS-485 communication 2: parity check selection	0: No (Stop bit : 2) 1: Even parity (Stop bit: 1) 2: Odd parity (Stop bit: 1) 3: No (Stop bit : 1)	0	○	○
∿	11. 17	RS-485 communication 2: stop bit selection	0: 2 bit 1: 1 bit	0	○	○
∿	11. 18	RS-485 communication 2: No-response error detection time	0: No detection 1~60s	0	○	○
∿	11. 19	RS-485 communication 2 response interval	0.00~1.00s	0.01	○	○
∿	11. 20	RS-485 communication 2 protocol selection	0:Modbus RTU protocol 5: Modbus ASCII protocol	0	○	○
	11. 50	Function switch bit (Hexadecimal)	Bit 0: Keypad control the broken stop during operation(0: enabled, 1:disabled) Bit 1:potentiometer keypad switch to button feed(0: potentiometer, 1:button)	0	○	○

11 Serial communication function Parameter

	Para-meter	Parameter Functions	Setting Range	Fact-ory Defa-ult	Model	
					~15kW	18.5kW~
↝	11. 97	Communication Data Storage Selection	0: Save into nonvolatile storage (Rewritable times limited) 1: Write into temporary storage (Rewritable times unlimited) 2: Save all data from RAM storage to EEPROM (After saving data, the 11.97 data automatically returns to "1.")	0	×	○
↝	11. 98	Communication function (mode selection)	Frequency command 0: Follow 04.30 Running command Follow 04.30	0	○	○
↝	11. 99	Auxiliary communica-tion function (mode selection)	Frequency command 0: Follow 04.30,11.98 Running command Follow 04.30,11.98	0	○	○

04. 03	Data initialization	Factory default	0

Initializes the current function parameter data to the factory defaults or initializes the motor parameters.

To change the parameter04．03 data, it is necessary to press the (STOP) + (∧) keys or (STOP) + (∨) keys" simultaneously.

04．03 Setting value	Function Description
0	Disable initialization (Settings manually made by the user will be retained.)
1	Initial value (Initialize all function parameter data to the factory defaults)
2	Initialize motor 1 parameters
3	Initialize motor 2 parameters
4	Initialize motor 3 parameters
5	Initialize motor 4 parameters

• Upon completion of the initialization, the 04．03 data reverts to "0" (factory default).

Notes: When accessing function parameter 03． 02 with the keypad, take into account that 03． 02 data automatically updates data of function parameters 03．03,03．06 to 03．23 ,03．53 to 03．56 and 04．46 , Similarly, when accessing function parameters 05． 16, 06． 16 and 07． 16 of the second –fourth motor, data of related function parameters for each are automatically updated.

00.80	Data initialization		Factory default	0
	Setting Range	0:G Specification 1:P Specification		1

Set 18.5kW and above power range general G specifications, and light load P specifications When changing the data of parameter 00.80, a double key operation is required. At the same time， set motor series, power, rated current and other parameter values of 03 group according to the motor nameplate. Note: For 15kw and below the power range, if you need to use P-type, only need to set motor series, power, rated current and other parameter values of 03 group according to the motor nameplate.

For the above chapters, please refer to the complete vasion of S3800 English user mannual Please scan QR code or click the below link:

Download URL:http://www.savch.net/en/downloads/manual/s3800_manual.html

6.1 About serial communication parameter

It is the definition of communication data address, and used to control inverter, obtain the status information of the transducer and set the relative function parameters of the inverter.
(1) Presentation rule of function code parameter address
Take parameter set+ function number as the register address of corresponding parameters, but it should be converted to hexadecimal, for example as for addresses of 05.05 and 09.12, the function code addresses are 0505H and 090CH with hexadecimal.

(2) Address description of other function s:

Function Description	Address Definition	Description	R / W Charact-eristics
Reset command of reserved alarm	0E0EH	Write 1 to do RST action of alarm reset	W
Communication control command	0E06H	BIT0：mFWD forward run	W/R
		BIT1：mREV reverse run	
Inverter status	0F0EH	BIT0：mFWD in forward run	R
		BIT1：mREV in reverse run	
		BIT2：mEXT DC braking	
		BIT3：mINT output open circuit of transducer	
		BIT4：mBRK braking	
		BIT5：mNUV busbar voltage in the normal range	
		BIT6：mTL torque limit	
		BIT7：mVL voltage limit	
		BIT8：mIL current limit	
		BIT9：mACC acceleration	
		BIT10：mDEC deceleration	
		BIT11：mALM alarm occurs	
		BIT12：mRL communicate valid (communication controls operation, set the frequency command)	
		BIT15：mBUSY parameter data is being written	
Communication set data address	0E01H	Pay attention to communication setting range (0 to 20000): When set as the frequency source, the oppos-ite is the max. frequency values (00.03).	W/R
Run / Stop param-eter address description	0F01H	Setting frequency (-20000~20000 corresponding to the max. output frequency)	R
	0F06H	Operating frequency (-20000~20000 corresponding to the max. output frequency)	R
	0F15H	Busbar voltage (0~1000V)	R
	0F0CH	Output voltage (0.0 ~ 1000.0V)	R
	0F0BH	Output current (0.00 ~399.99%, the rating is 100%)	R
	1008H	The speed of the motor (0.00~99990 r/min) note1	R
	1016H	Output power (0.00~9999KW) note1	R
	1007H	Output torque (-999~999%)	R
	100BH	PID set value (999~9990)	R
	100CH	PID feedback amount (999~9990)	R
	0F47H	Terminal input status (b0:FWD,b1:REV,b2:MI1,b3: MI 2,b4: MI 3,b5: MI 4, b6: MI 5,b7: MI 6,b8: MI 7,b9: MI 8,b10: MI 9)	R
	0F0FH	Terminal output status(b0:MO1,b1: MO2,b2: MO3,b3: MO4,b4:MRA/C, b8:RA/C)	R
	0F31H	AVI analog value (-20000~ 20000 corresponding to 10V)	R
	0F32H	ACI analog value (0 ~ 20000 corresponding to 20mA)	R
	0F36H	AUI analog value (-20000 ~ 20000 corresponds to 10V)	R
Fault address of inverter	1100H	The code value of fault information represents information described in the table below.	R

Note: The comparasion table between figures read from 1100H with the actual fault:

Value	Fault Type
0	No fault
1	Overcurrent occurred during acceleration (OC1)
2	Overcurrent occurred during deceleration (OC2)
3	Overcurrent occurred during running at a constant speed (OC3)
4	Reserved
5	Reserved
6	Overvoltage occurred during acceleration (OU1)
7	Overvoltage occurred during deceleration (OU2)
8	Overvoltage occurred during running at constant speed (OU3)
9	Reserved
10	Undervoltage fault (LU)
11	Input phase loss (Lin)
12	Reserved
13	Reserved
14	Reserved
15	Reserved
16	Charger circuit fault (OH3)
17	Cooler Overheat (OH1)
18	External alarm (OH2)
19	Inverter internal overheat (OH3)
20	Motor overheating (PTC/NTC detection) (OH4)
21	Reserved
22	Braking resistor overheated (dbH)
23	Overload of motor 1 (OL1)
24	Overload of motor 2 (OL2)
25	Inverter overload (OLU)
26	Reserved
27	Overspeed (OS)
28	Reserved
29	NTC wire break error (nrb)
30	Reserved

Value	Fault Type
31	Memory error (Er1)
32	Keypad communications error (Er2)
33	CPU error (Er3)
34	Reserved
35	Reserved
36	Operation error (Er6)
37	Auto-tuning error (Er7)
38	RS-485 communications error (COM port 1) (Er8)
39	Reserved
40	Reserved
41	Reserved
42	Reserved
43	Reserved
44	Overload of motor 3 (OL3)
45	Overload of motor 4 (OL4)
46	Output phase loss (OPL)
47	Speed mismatch or excessive speed deviation (ErE)
48	Reserved
49	Reserved
50	Reserved
51	Data saving error during undervolta-ge(ErF)
52	Reserved
53	RS-485 communications error(COM port 2) (ErP)
55	Reserved
56	Reserved
57	Reserved
58	PID feedback wire break (CoF)
59	Braking transistor error (dbA)
60	Reserved

Note 1:
Floating-point data (eg: the speed of the motor)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Exponent	Mantissa														

Exponent: 0~3
Mantissa: 1~9999
Value represented by this form = mantissa × square of 10 (exponent -2)

Value	Mantissa	Exponent	Mantissa × square(exponent -2) of 10
0.01~99.99	1~9999	0	0.01
100.0~999.9	1000~9999	1	0.1
1000~9999	1000~9999	2	1
10000~99990	1000~9999	3	10

11. Response of Error Information

When responding from the device, it uses parameters and fault address to indicate a normal response (errorless) or occurrence of some kind of error (called response of objection). For normal response, responsive parameters, data addresses or sub-function codes respond from the device. For response of objection, a code equivalent to the normal code returns from the device with logical 1in the first place.

For example: a message from the host device to the subordinate equipment requires reading a set of data address of transducer function code, which will generate the following parameters:

00000011 (hexadecimal 03H)

For normal response, the same function code responds from the device. For objection response, it returns:

10000011 (hexadecimal 83H)

After receiving the objection response from the host application, the typical process is resending message, or modifying a command for the responsive fault.

Up to two ports of RS-485 communications link are available as listed below.

Port	Connection Route	Parameter	The machine can be connected
1	RS-485 communications link (COM 1)(via the RJ-45 connector prepared for keypad connection)	11.01~11.10	Keypad
2	RS-485 communications link (COM 2)(via terminals SG＋, SG–, and SCM on the control PCB)	11.11~11.20	Host equipment

To connect any of the applicable devices, follow the procedures shown below.

(1) Keypad

The keypad allows you to run and monitor the inverter. It can be used independent of the 11 group function parameters setting.

(2) Host equipment

The inverter can be managed and monitored by connecting host equipment such as a PC and PLC to the inverter. Modbus RTU and SAVCH Electric general-purpose inverter protocol are available for communications protocols.

Failure Indication and Countermeasures

Inverter itself has various alarm data, like overvoltage, undervoltage, and over-current, as protective functions. the "alarm" detection function which, upon detection of an abnormal state, displays the alarm code on the LED monitor and causes the inverter to trip, the "light alarm" detection function which displays the alarm code but lets the inverter continue the current operation, Alarm history are stored in the memory of inverter, and can be read by the keypad. If any problem arises, understand the protective functions listed below table and onwards for troubleshooting.

Protection functions	Description	Related parameters
"Alarm" detection	This function detects an abnormal state, displays the corresponding alarm code, and causes the inverter to trip. The "alarm" codes are check-marked in the "Alarm" object column in Table 7.1. For details of each alarm code, see the corresponding item in the troubleshooting. The inverter retains the last four alarm codes and their factors together with their running information applied when the alarm occurred, so it can display them.	04.98
Light Alarm	This function detects an abnormal state categorized as a "light alarm" displays L-AL,and lets the inverter continue the current operation without tripping. without raising alarm. The "light alarm" codes are check-marked in the "Light alarm" object column in Table 7.2.	04.81 04.82
Stall prevention	When the output current exceeds the current limiter level (00. 44) during acceleration/ deceleration or constant speed running, this function decreases the output frequency to avoid an overcurrent trip.	00.44
Overload prevention control	Before the inverter trips due to a heat sink overheat (OH1) or inverter overload (OLU), this function decreases the output frequency to reduce the load.	04.70
Automatic deceleration (Anti-regenerative control)	If regenerative energy returned exceeds the inverter's braking capability, this function automatically increases the deceleration time or controls the output frequency to avoid an overvoltage trip.	04.69
Deceleration characteristics (Excessive regenerative energy proof braking capability)	During deceleration, this function increases the motor energy loss and decreases the regenerative energy returned to avoid an overvoltage trip (OU).	04.71
Reference loss detection	This function detects a reference frequency loss (due to a broken wire, etc.), continues the inverter operation at the specified frequency, and issues the "Command loss detected" alarm signal.	01.65
Automatic lowering of carrier frequency	Before the inverter trips due to an abnormal surrounding temperature or output current, this function automatically lowers the carrier frequency to avoid a trip.	04.98
Dew condensation prevention	Even when the inverter is in stopped state, this function feeds DC current across the motor at certain intervals to raise the motor temperature for preventing dew condensation.	08.21
Motor overload early warning	When the inverter output current has exceeded the specified level protection,this function issues the "Motor overload early warning" signal by the thermal overload protection function before inverter raise alarm (This function exclusively applies to the 1st motor.)	01.34 01.35

Protection functions	Description	Related parameters
Auto-reset	When the inverter has stopped because of a trip, this function allows the inverter to automatically reset and restart itself,The number of retries and the latency between stop and reset can be specified.	04.04 04.05
Forced stop	Upon receipt of the "Force to stop" terminal command [mSTOP], this function interrupts the run and other commands currently applied in order to forcedly decelerate the inverter to a stop.	04.56

Table 7.1 "Alarm" object

Code	Name	Code	Name
OOC1，OC2，OC3	overcurrent	Er1	Memory error
EF	Ground fault	Er2	Keypad communications error
OU1，OU2，OU3	Overvoltage	Er3	CPU error
LU	Undervoltage	Er4	Option communications error
Lin	Input phase loss	Er5	Option error
OPL	Output phase loss	Er6	Operation error
OH1	Cooler Overheat	Er7	Auto-tuning error
OH2	External alarm	Er8 Erp	RS-485 communications error(COM port 1) RS-485 communications error(COM port 2)
OH3	Inverter internal overheat	ErF	Data saving error during undervoltage
OH4	Motor protection (PTC/NTC thermistor)	ErE	Speed mismatch or excessive speed deviation
dbH	Braking resistor overheated	nrb	NTC wire break error
OH3	Charger circuit fault	Err	Mock alarm
OL1~OL4	Overload of motor 1~4	CoF	PID feedback wire break
OLU	Inverter overload	dbA	Braking transistor error
OS	Overspeed		

Table 7.2 “Light Alarm" Objects

Code	Name	Code	Name
OH1	Cooler Overheat	Er5	Option error
OH2	External alarm	Er8 Erp	RS-485 communications error(COM port 1) RS-485 communications error(COM port 2)
OH3	Inverter internal overheat	ErE	Speed mismatch or excessive speed deviation
dbH	Braking resistor overheated	Pid	PID alarm output
OL1~OL4	Overload of motor 1~4	UTL	Low torque output
CoF	PID feedback wire break	PTC	PTC Thermistor activated
OL	Motor overload early warning	rTE	Inverter life (Motor cumulative run time)
OH	Cooler overheat early warning	CnT	Inverter life (Number of startups)
rEF	Reference command loss detected	LiF	Lifetime alarm
Er4	Option communications error		

7.1 PROBLEMS AND TROUBLESHOOTING PROCEDURE

Code	Description for problem and Possible Causes	Checking	Suggested Measures
OC1 (Overcurrent occurred during acceleration.) OC2 (Overcurrent occurred during deceleration) OC3 (Overcurrent occurred during running at a constant speed)	(1)The inverter output lines were short-circuited.	Disconnect the wiring from the inverter output terminals ([U], [V] and [W]) and measure the interphase resistance of the motor wiring. Check if the resistance is too low	Remove the short-circuited part (including replacement of the wires, relay terminals and motor).
	(2)Ground faults have occurred at the inverter output lines.	Disconnect the wiring from the output terminals ([U], [V] and [W]) and perform a Megger test.	Remove the grounded parts (including replacement of the wires, relay terminals and motor).
	(3) Overload	Measure the motor current with a measuring device to trace the current trend. Then, use this data to judge if the trend is over the calculated load value for your system design.	If the load is too heavy, reduce it or increase the inverter capacity
		Trace the current trend and check if there are any sudden changes in the current	①If there are any sudden changes, make the load fluctuation smaller or increase the inverter capacity. ②Enable instantaneous overcurrent limiting (04.12 = 1)
	(4) Excessive torque boost specified. (00.37=0,1,3,4))	Check whether decreasing the torque boost (00.09) decreases the output current but does not stall the motor.	If no stall occurs, decrease the torque boost 00.09.
	(5)The acceleration/deceleration time was too short	Check that the motor generates enough torque required during acceleration or deceleration.That torque is calculated from the moment of inertia for the load and the acceleration/deceleration time.	①Increase the acceleration /deceleration time(00.07,00.08,01.10~01.15,04.56) ②Enable the current limiter (00.43)and torque limiter(00.40、00.41、01.16、01.17) ③Increase the inverter capacity.
	(6) Malfunction caused by noise.	Check if noise control measures are appropriate (e.g., correct grounding and routing of control and main circuit wires)	①Implement noise control measures. ②Enable the Auto-reset (04.04). ③Connect a surge absorber to magnetic contactor's coils or other solenoids (if any) causing noise.
EF (Ground fault)	Inverter output terminal(s) grounded (ground fault)	Disconnect the wiring from the output terminals ([U], [V], and [W]) and perform a Megger test.	Remove the grounded parts (including replacement of the wires, relay terminals and motor).
OU1 (Overvoltage occurred during acceleration) OU2 (Overvoltage occurred during deceleration)	(1) The power supply voltage exceeded the inverter's specification range	Measure the input voltage.	Decrease the voltage to within the specified range.
	(2) A surge current entered the input power supply	In the same power line, if a phase-advancing capacitor is turned ON/OFF or a thyristor converter is activated, a surge (momentary large increase in the voltage or current) may be caused in the input power	Install a DC reactor.

Code	Description for problem and Possible Causes	Checking	Suggested Measures
OU1 (Overvoltage occurred during acceleration) OU2 (Overvoltage occurred during deceleration) OU3 (Overvoltage occurred during running at constant speed)	(3) The deceleration time was too short for the moment of inertia for load	Recalculate the deceleration torque based on the moment of inertia for the load and the deceleration time.	①Increase the deceleration time (00.08,01.11,01.13,01.15, 04.56). ②Enable the automatic deceleration (anti-regenerative control) (04.69), or deceleration characteristics(04.71). ③Enable torque limiter(00.40、00.41、01.16、01.17、04.73). ④Set the rated voltage (at base frequency) (00.05) to "0" to improve the braking capability. ⑤Consider the use of a braking resistor.
	(4) The acceleration time was too short.	Check if the overvoltage alarm occurs after rapid acceleration.	①Increase the acceleration time (00.07,01.10,01.12,01.14). ②Select the S-curve pattern(04.07). ③Consider the use of a braking resistor.
	(5)Braking load was too heavy.	Compare the braking torque of the load with that of the inverter.	①Set the rated voltage (at base frequency) (00.05) to "0" to improve the braking capability. ②Consider the use of a braking resistor.
	(6) Malfunction caused by noise	Check if the DC link bus voltage was below the protective level when the overvoltage alarm occurred.	①Implement noise control measures. ②Enable the auto-reset (04.04). ③Connect a surge absorber to magnetic contactor's coils or other solenoids (if any) causing noise.
LU (Undervoltage)	(1) A momentary power failure occurred	①Release the alarm. ②If you want to restart running the motor without treating this condition as an alarm, set 00.14 to "3," "4," or "5," depending on the load type.	
	(2)The power to the inverter was switched back to ON too soon (when 00.14=1)	Check if the power to the inverter was switched back to ON while the control power was still alive. (Check whether the LEDs on the keypad light.)	Turn the power ON again after all LEDs on the keypad go off.
	(3) The power supply voltage did not reach the inverter's specification range	Measure the input voltage.	Increase the voltage to within the specified range.
	(4) Peripheral equipment for the power circuit malfunctioned, or the connection was incorrect.	Measure the input voltage to find which peripheral equipment malfunctioned or which connection is incorrect.	Replace any faulty peripheral equipment, or correct any incorrect connections.
	(5) Any other loads connected to the same power supply has required a large starting current, causing a temporary voltage drop.	Measure the input voltage and check the voltage fluctuation.	Reconsider the power supply system configuration.

Code	Description for problem and Possible Causes	Checking	Suggested Measures
LU (Underv-oltage)	(6) Inverter's inrush current caused the power voltage drop because the power supply transformer capacity was insufficient.	Check if the alarm occurs when a molded case circuit breaker (MCCB), residual-current-operated protective device (RCD)/earth leakage circuit breaker (ELCB) (with overcurrent protection) or magnetic contactor (MC) is turned ON.	Reconsider the capacity of the power supply transformer.
Lin (Input phase loss)	(1) Breaks in wiring to the main power input terminals.	Measure the input voltage	Repair or replace the main circuit power input wires or input devices (MCCB, MC, etc.).
	(2) The screws on the main power input terminals are loosely tightened.	Check if the screws on the main power input terminals have become loose.	Tighten the terminal screws to the recommended torque.
	(3) Interphase voltage unbalance between three phases was too large	Measure the input voltage.	①Connect an AC reactor (ACR) to lower the voltage unbalance between input phases. ②Increase the inverter capacity.
	(4) Overload cyclically occurred	Measure the ripple wave of the DC link bus voltage.	If the ripple is large, increase the inverter capacity.
	(5) Single-phase voltage was input to the three-phase input inverter.	Check the inverter settings and service condition.	Correct inverter for single-phase use to meet the power supply(on single-phase input)
OPL (Output phase loss)	(1) Inverter output wires are broken	Measure the output current.	Replace the output wires.
	(2) The motor winding is broken	Measure the output current.	Replace the motor.
	(3) The terminal scre ws for inverter output were not tight enough	Check if any screws on the inverter output terminals have become loose.	Tighten the terminal screws to the recommended torque.
	(4) A single-phase motor has been connected		Single-phase motors cannot be used. Note that (S3800 inverter only drives 3-phase induction motors)
OH1 (Cooler Overheat)	(1) Temperature around the inverter exceeded the inverter's specification range.	Measure the temperature around the inverter.	E.g., ventilate the panel where the inverter is mounted, Lower the temperature around the inverter.
	(2) Ventilation path is blocked.	Check if there is sufficient clearance around the inverter.	Change the mounting place to ensure the clearance.
		Check if the cooler is not clogged.	Clean the cooler.
	(3) Cooling fan's airflow volume decreased due to the service life expired or failure.	Check the cumulative run time of the cooling fan.	Replace the cooling fan.
	(4) Overload	Measure the output current.	①Reduce the load (use cooler's overheat early warning (01.01~01.09)/ or overload early warning (01.34) and reduce the load before the overload protection is activated). ②Decrease the motor sound (carrier frequency) (00.26). ③Enable the overload prevention control (04.70).

Code	Description for problem and Possible Causes	Checking	Suggested Measures
OH2 (External alarm)	(1) An alarm function of external equipment was activated	Check the operation of external equipment.	Remove the cause of the alarm that occurred.
	(2) Wrong connection or poor contact in external alarm signal wiring.	Check if the external alarm signal (dada= 9) wiring is correctly connected to the terminal to which the "Enable external alarm trip" terminal command has been assigned.	Connect the external alarm signal wire correctly.
	(3) Incorrect setting of function parameter data	Check whether the "Enable external alarm trip" terminal command has been assigned to an unavailable terminal 01.01~01.09，01.98，01.99.	Correct the assignment.
		Check whether the logic (normal/negative) of the external signal matches that of the [mTHR] command specified by 01.01~01.09，01.98，01.99	Ensure the matching of the normal/negative logic.
OH3 (Inverter internal overheat)	The surrounding temperature exceeded the inverter's specification limit.	Measure the surrounding temperature.	E.g., ventilate the panel where the inverter is mounted ,Lower the temperature around the inverter.
OH4 (Motor protection (PTC/NTC thermistor))	(1) The temperature around the motor exceeded the motor's specification range.	Measure the temperature around the motor.	Lower the temperature.
	(2) Cooling system for the motor defective	Check if the cooling system of the motor is operating normally.	Repair or replace the cooling system of the motor.
	(3) Overload.	Measure the output current.	①Reduce the load (e.g. Use the overload early warning early（01.34）and reduce the load before the overload protection is activated.) (In winter, the load tends to increase.) ②Lower the temperature around the motor. ③Increase the motor sound (Carrier frequency) (00.26)
	(4) The activation level (04.27) of the PTC thermistor for motor overheat protection was set inadequately.	Check the PTC thermistor specifications and recalculate the detection voltage.	Modify the data of function parameter data.
	(5) Settings for the PTC/NTC thermistor are improper	Check the setting of the thermistor mode selection (04.26) and the slider position of terminal AUI property switch SW5.	Change the 04. 26 data in accordance with the thermistor used and set the SW5 to the PTC/NTC position.
	(6) Excessive torque boost specified. (00.09)	Check whether decreasing the torque boost (00.09) does not stall the motor.	If no stall occurs, decrease the 00.09 data.
	(7) The V/f pattern did not match the motor	Check if the base frequency (00.04) and the rated voltage at base frequency (00.05) match the values on the motor's nameplate.	Match the function parameter data with the values on the motor's nameplate.
	(8) Incorrect setting of function parameter data.	Although no PTC/NTC thermistor is used, the thermistor mode is enabled (04.26) is still in action.	Set the 04.26 data to "0" (Disable)

Code	Description for problem and Possible Causes	Checking	Suggested Measures
dbH (Braking resistor overheated)	(1) Braking load is too heavy.	Reconsider the relationship between the braking load estimated and the real load.	①Lower the real braking load. ②Review the selection of the braking resistor and increase the braking capability.(Parameters (00. 50, 00. 51, 00. 52) data is also required to be modified)
	(2) Specified deceleration time is too short.	Recalculate the deceleration torque and time needed for the load currently applied, based on a moment of inertia for the load and the deceleration time.	①Increase the deceleration time (00.08,01.11,01.13,01.15,04.56). ②Review the selection of the braking resistor and increase the braking capability. (Parameters (00.50, 00.51, 00.52) data is also required to be modified)
	(3) Incorrect setting of function parameters (00.50,00.51,00.52) data	Recheck the specifications of the braking resistor.	Review data of function parameters 00.50, 00.51, 00.52, then modify it.
OH3 (Charger circuit fault)	(1) The control power was not supplied to the magnetic contactor intended for short-circuiting the charging resistor.	Check whether you quickly turned the circuit breaker ON and OFF to confirm safety after cabling/wiring.	Wait until the DC link bus voltage has dropped to a sufficiently low level and then release the current alarm. After that, turn ON the power again. (Do not turn the circuit breaker ON and OFF quickly.) (Turning ON the circuit breaker supplies power to the control circuit to the operation level (lighting the LEDs on the keypad) in a short period. Immediately turning it OFF even retains the control circuit power for a time, while it shuts down the power to the magnetic contactor intended for short-circuiting the charging resistor since the contactor is directly powered from the main power. Under such conditions, the control circuit can issue a turn-on command to the magnetic contactor, but the contactor not powered can produce nothing. This state is regarded as abnormal, causing an alarm.)
OL1~OL4 (Overload of motor 1~4)	(1) The electronic thermal characteristics do not match the motor overload characteristics.	Check the motor characteristics.	①Reconsider the data of function parameters(00.10*,00.12*). ② Use an external thermal relay.
	(2) Activation level for the electronic thermal protection was inadequate	Check the continuous allowable current of the motor.	Reconsider and change the data of function parameter (00. 11*), and make change accordingly.

Code	Description for problem and Possible Causes	Checking	Suggested Measures
OL1~OL4 (Overload of motor 1~4)	(3) The specified acceleration/ deceleration time was too short.	Recalculate the acceleration/deceleration torque and time needed for the load, based on the moment of inertia for the load and the acceleration/deceleration time.	Increase the acceleration/ deceleration time (00.07，00.08，01.10~01.15，04.56).
	(4) Overload	Measure the output current.	Reduce the load (e.g. Use the overload early warning (01.34) and reduce the load before the overload protection is activated.). (In winter, the load tends to increase.)
	(5) Excessive torque boost specified (00.09)	Check whether decreasing the torque boost (00.09) does not stall the motor.	If no stall occurs, decrease the 00.09* data.
OLU (Inverter overload)	(1) Temperature around the inverter exceeded the inverter's specification range.	Measure the temperature around the inverter.	E.g., ventilate the panel where the inverter is mounted, Lower the temperature.
	(2) Excessive torque boost specified (00.09)	Check whether decreasing the torque boost (00.09) does not stall the motor.	If no stall occurs, decrease the 00.09 data.
	(3) The specified acceleration/ deceleration time was too short.	Recalculate the acceleration/deceleration torque and time needed for the load, based on the moment of inertia for the load and the acceleration/deceleration time.	Increase the acceleration /deceleration time (00.07，00.08，01.10~01.15，04.56).
	(4) Overload	Measure the output current.	①Reduce the load (e.g., Use the overload early warning (01.34) and reduce the load before the overload protection is activated.). (In winter, the load tends to increase.) ②Decrease the motor sound (Carrier frequency) (00.26) ③Enable overload prevention control (04.70).
	(5) Ventilation paths are blocked.	Check if there is sufficient clearance around the inverter.	Change the mounting place to ensure the clearance.
		Check if the cooler is not clogged.	Clean the cooler.
	(6) Cooling fan's airflow volume decreased due to the service life expired or failure.	Check the cumulative run time of the cooling fan.	Replace the cooling fan.
		Visually check that the cooling fan rotates normally.	Replace the cooling fan.
	(7) The wires to the motor are too long, causing a large leakage current from them.	Measure the leakage current.	Insert an output circuit filter (OFL)
OS (Overspeed)	(1)Incorrect setting of function parameter data.	Check the motor parameter "Number of poles" (03.01).	Specify the 03.01 data in accordance with the motor to be used. according to the motor used.
		Check the max. frequency setting (00.03).	Specify the 00.03 data in accordance with the output frequency.
		Check the setting of speed limit function (09.32, 09.33).	Disable the speed limit function (09.32, 09.33).

Code	Description for problem and Possible Causes	Checking	Suggested Measures
OS (Overspeed)	(2) Insufficient gain of the speed controller	Check whether the actual speed overshoots the commanded one in higher speed operation.	Increase the speed controller gain (09.03) (Depending on the situations, reconsider the setting of the filter constant or the integral time)
	(3) Noises superimposed on the PG wire.	Check whether appropriate noise control measures have been implemented (e.g., correct grounding and routing of signal wires and main circuit wires).	Implement noise control measures.
Er1 (Memory error)	(1) When writing data (especially initializing or copying data), the inverter was shut down so that the voltage to the control PCB has dropped	Initialize the function parameter data with (04.03); After initialization, check if pressing the PRG RESET key releases the alarm .	Revert the initialized function code data to their previous settings, then restart the operation.
	(2) Inverter affected by strong electrical noise when writing data (especially initializing or copying data)	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires). Also, perform the same check as described in (1) above.	Implement noise control measures. Revert the initialized function code data to their previous settings, then restart the operation.
	(3) The control PCB failed.	Initialize the function code data by setting (04.03) to "1," then reset the alarm by pressing the PRG RESET key and check that the alarm goes on.	The control PCB (on which the CPU is mounted) is defective.Contact your SANCH Electric representative.
Er2 (Keypad communications error)	(1) Broken communications cable or poor contact.	Check continuity of the cable, contacts and connections.	①Re-insert the connector firmly ②Replace the cable.
	(2) Connecting many control wires hinders the front cover from being mounted, lifting the keypad.	Check the mounting condition of the front cover.	①Use wires of the recommended size (0.75mm²) for wiring. ②Change the wiring layout inside the unit so that the front cover can be mounted firmly.
	(3) Inverter affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of communication cables and main circuit wires).	Implement noise control measures.
	(4) A keypad failure occurred	Replace the keypad with another one and check whether a keypad communications error (Er2) occurs.	Replace the keypad.
Er3 (CPU error)	(1) Inverter affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g. correct grounding and routing of signal wires, communications cables, and main circuit wires)	Implement noise control measures.

Code	Description for problem and Possible Causes	Checking	Suggested Measures
Er4 (Option communications error)	(1) There was a problem with the connection between the option card and the inverter.	Check whether the connector on the option card is properly engaged with that of the inverter.	Reload the option card into the inverter.
	(2) Strong electrical noise.	Check whether appropriate noise control measures have been implemented (e.g. correct grounding and routing of signal wires,communications cables, and main circuit wires).	Implement noise control measures.
Er5	Option error	An error detected by the option card.	Refer to the instruction manual of the option card for details.
Er6 (Operation error)	(1)The STOP key was pressed when (04.96 = 1, 3)	Check that the STOP key was pressed when a run command had been entered from the input terminal or through the communications port.	If this was not intended, check the setting of 04.96 .
	(2) The start check function was activated when 04.96 = 2, 3	Check that any of the following operations has been performed with a run command being entered. • Turning the power ON • Releasing the alarm	Review the running sequence to avoid input of a Run command when this error (Er6) occurs. If this was not intended, check the setting of 04.96 (Turn the run command OFF before releasing the alarm.)
	(3) The forced stop digital input [mSTOP] was turned OFF	OFF Check that turning the [mSTOP] OFF decelerated the inverter to stop.	If this was not intended, check the settings of 01.01 ~01.09 terminals MI1~MI9.
Er7 (Auto-tuning error)	(1) A phase was missing (There was a phase loss) in the connection between the inverter and the motor.		Properly connect the motor to the inverter.
	(2) V /f or the rated current of the motor was not properly set.	Check whether the data of function parameter (00.04,00.05,04.50, 04.51,04.52,04.53,04.65,04.66, 03.02,03.03) matches the motor specifications.	Check whether the data of function parameter (00.04,00.05,04.50,04.51,04.52,04.53, 04.65,04.66,03.02,03.03) matches the motor specifications.
	(3) The wiring length between the inverter and the motor was too long.	Check whether the wiring length between the inverter and the motor exceeds 164 ft (50 m). (Small capacity inverters are greatly affected by the wiring length.)	①Review, and if necessary, change the layout of the inverter and the motor to shorten the connection wire. Alternatively, minimize the wiring length without changing the layout. ②Disable both auto-tuning and auto-torque boost (set as 00.37 = 1).
	(4) The rated capacity of the motor was significantly different from that of the inverter.	Check whether the rated capacity of the motor is three or more ranks lower, or two or more ranks higher than that of the inverter.	①Replace the inverter with one with an appropriate capacity ②Manually specify the values for the motor parameter (03.06,03.07,03.08). ③Manually specify the values for the motor parameter (set as 00.37 = 1).

Code	Description for problem and Possible Causes	Checking	Suggested Measures
Er7 (Auto-tuning error)	(5) The motor was a special type such as a high-speed motor.		Disable both auto-tuning and auto-torque boost (set as 00.37 = 1).
	(6) A tuning operation involving motor rotation (03.04 = 2 or 3) was attempted while the brake was applied to the motor.		①Specify the tuning that does not involve the motor rotation (03.04 = 1). ②Release the brake before tuning that involves the motor rotation (03.04 = 2 or 3).
Er8 (RS-485 communications error (COM port 1)) Erp (RS-485 communications error (COM port 2))	(1) Communications conditions of the inverter do not match that of the host equipment.	Compare the settings of the 11.01~11.10/11.11~11.20 with those of the host equipment	Correct any settings that differ.
	(2) Even though no-response error detection time (11.08, 11.18) has been set, communications is not performed within the specified cycle.	Check the host equipment.	Change the settings of host equipment software or disable the no-response error detection (11.08/11.18 = 0).
	(3) The host equipment did not operate due to defective software, settings, or defective hardware.	Check the host equipment (e.g., PLCs and computers).	Remove the cause of the equipment error.
	(4) The RS-485 converter did not operate due to incorrect connections and settings, or defective hardware.	Check the RS-485 converter (e.g., check for poor contact).	Change the various RS-485 converter settings, reconnect the wires, or replace hardware with recommended devices as appropriate.
	(5) Broken communications cable or poor contact.	Check the continuity of the cables, contacts and connections.	Replace the cable.
	(6) Inverter affected by strong electrical noise.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of communications cables and main circuit wires).	①Implement noise control measures. ②Implement noise reduction measures on the host side. ③Replace the RS-485 converter with a recommended insulated one.
	(7) Terminating resistor not properly configured.	Check that the inverter serves as a terminating device in the network.	Configure the terminating resistor switch(es) (SW2/SW3) for RS-485 communication correctly. (That is, turn the switch(es) to ON.)
ErF (Data saving error during undervoltage)	(1) During data saving performed when the power was turned OFF, the voltage fed to the control PCB dropped in an abnormally short period due to the rapid discharge of the DC link bus.	Check how long it takes for the DC link bus voltage to drop to the preset voltage when the power is turned OFF.	Remove whatever is causing the rapid discharge of the DC link bus voltage. After pressing the PRG/RESET key and releasing the alarm, return the data of the relevant function parameters the frequency commands and PID commands (specified through the keypad) or the output frequencies modified by the [mUP]/[DOWN] terminal commands) back to the original values and then restart the operation.

Code	Description for problem and Possible Causes	Checking	Suggested Measures
ErF (Data saving error during undervoltage)	(2) Inverter operation affected by strong electrical noise when the power was turned OFF.	Check if appropriate noise control measures have been implemented (e.g., correct grounding and routing of control and main circuit wires).	Implement noise control measures. After pressing the RESET key and releasing the alarm, return the data of the relevant function codes (such as the frequency commands and PID commands (specified through the keypad) or the output frequencies modified by the [mUP]/[DOWN] terminal commands) back to the original values and then restart the operation.
	(3) The control circuit failed.	Check if ErF occurs each time the power is turned ON.	The control PCB (on which the CPU is mounted) is defective. Contact your SANCH Electric representative.
ErE (Speed mismatch or excessive speed deviation)	(1) Incorrect setting of function parameter data	Check the following function parameter data; Motor (No. of poles) (03.01), (09.15)Feedback encoder pulse count/rev ,and Feedback pulse correction factor 1 and 2 (09.16, 09.17).	Specify data of function parameters 03.01,09.15,09.16,09.17 in accordance with the motor and PG.
	(2)overload	Measure the output current.	Reduce the load.
		Check whether any mechanical brake is working.	Release the mechanical brake.
	(3) The motor speed does not rise due to the current limiter operation.	Check the data of function parameter (00.44) (Current limiter (Level)).	Change the 00.44 data correctly. Or, set the 00.43 data to "0" (Disable) if the current limiter operation is not needed.
		Check the data of function parameter 00.04,00.05,03.01~03.12 to ensure that the V/f pattern setting is right.	① Match the V/f pattern setting with the motor ratings. ② Change the function parameter data in accordance with the motor parameters.
	(4) Function parameter settings do not match the motor characteristics.	Check whether the data of 03.01,03.02,03.03,03.06,03.07,03.08,03.09,03.10,03.12 match the parameters of the motor.	Perform auto-tuning of the inverter, using the function parameter 03.04.
	(5) Wrong wiring between the pulse generator (PG) and the inverter.	Check the wiring between the PG and the inverter.	Correct the wiring.
		Check that the relationships between the PG feedback signal and the run command are as follows: • For the FWD command: the B phase pulse is in the High level at rising edge of the A phase pulse • For the REV command: the B phase pulse is in the Low level at rising edge of the A phase pulse	If the relationship is wrong, interchange the A and B phase wires.
	(6) Wiring to the motor is incorrect.	Check the wiring to the motor.	Connect the inverter output terminals U, V, and W to the motor input terminals U, V, and W, respectively.
	(7) The motor speed does not rise due to the torque limiter operation.	Check the data of Torque limiter (00.40).	Correct the 00.40 data. Or, set the 00.40 data to "999" (Disable) if the torque limiter operation is not needed

Code	Description for problem and Possible Causes	Checking	Suggested Measures
nrb (NTC wire break error)	(1)The NTC thermistor cable is broken.	Check whether the motor cable is broken.	Replace the motor cable.
	(2) The temperature around the motor is extremely low (lower than -30°C)	Measure the temperature around the motor.	Reconsider the use environment of the motor.
	(3) The NTC thermistor is broken.	Measure the resistance of the NTC thermistor.	Replace the motor.
Err (Mock alarm)	Set the function parameter 04.45 data to “1” for performing this alarm.		Press RESET key for recovery.
Cof (PID feedback wire break)	(1) The PID feedback signal wire is broken.	Check whether the PID feedback signal wires are connected correctly.	①Check whether the PID feedback signal wires are connected correctly. Or, tighten up the related terminal screws. ②Check whether any contact part bites the wire sheath.
	(2) PID feedback related circuit affected by strong electrical noise.	Check if appropriate noise control measures have been implemented(e.g ., correct grounding and routing of signal wires, communication cables, and main circuit wires).	①Implement noise control measures. ②Separate the signal wires from the main power wires as far as possible.
dbA (Braking transistor error)	(1) The braking transistor is broken.	Check whether resistance of the braking resistor is correct or there is a misconnection of the resistor.	Repair the inverter.

8 Maintenance And Inspection

For the above chapters, please refer to the complete vasion of S3800 English user mannual
Please scan QR code or click the below link:

Download URL:http://www.savch.net/en/downloads/manual/s3800_manual.html

9.1 Braking resistor list

S3100 220V braking resistor list

Voltage	Applicable motor		Full load output torque(Nm)	Applied resistor specification	Braking unit	Quantity	Braking torque 10%ED%	Min resistance
	HP	kW			Quantity			
220V Series	0.5	0.4	2.22	RXHG-80W-400R-J (80W 400Ω)	X	1	125	150Ω
	1	0.75	4.15	RXHG-80W-200R-J （80W 200Ω）	X	1	125	80Ω
	2	1.5	8.31	RXHG-300W-100R-J （300W 100Ω）	X	1	125	55Ω
	3	2.2	12.19	RXHG-300W-70R-J （300W 70Ω）	X	1	125	35Ω
	5.4	4.0	22.16	RXHG-400W-40R-J （400W 40Ω）	X	1	125	25Ω
	7.5	5.5	30.46	RXHG-1KW-20R-J （1000W 20Ω）	X	1	125	12Ω
	10	7.5	41.54	RXHG-1KW-20R-J （1000W 20Ω）	X	1	125	12Ω

4.

S3100 440V braking resistor list

Voltage	Applicable motor		Full load output torque(Nm)	Applied resistor specification	Braking unit	Quantity	Braking torque 10%ED%	Min resistance
	HP	kW			Quantity			
440V Series	1	0.75	4.15	RXHG-80W-750R-J (80W 750Ω)	X	1	125	260
	2	1.5	8.31	RXHG-300W-400R-J (300W 400Ω)	X	1	125	190Ω
	3	2.2	12.19	RXHG-300W-250R-J （300W 250Ω）	X	1	125	145Ω
	5	4.0	22.16	RXHG-400W-150R-J （400W 150Ω）	X	1	125	95Ω
	7.5	5.5	30.46	RXHG-500W-100R-J （500W 10Ω）	X	1	125	60Ω
	10	7.5	41.54	RXHG-1KW-75R-J （1000W 75Ω）	X	1	125	50Ω
	15	11	60.93	RXHG-1KW-50R-J （1000W 50Ω）	X	1	125	40Ω
	20	15	83.09	RXHG-1.5KW-40R-J （1500W 40Ω）	X	1	125	40Ω
	25	18.5	102.47	BRU-4.8KW-32R-J （4800W 32Ω）	X	1	125	32Ω
	30	22	121.86	BRU-4.8KW-27R-J （4800W 27.2Ω）	X	1	125	27.2Ω

Volt-age	Applicable motor		Full load output torque(Nm)	Applied resistor specification	Braking unit	Quantity	Braking torque 10%ED%	Min resistance
	HP	kW			Quantity			
440V Series	40	30	166.17	BRU-6KW-20R-J (6000W 20Ω)	X	1	100	20Ω
	50	37	204.94	BRU-9.6KW-13R6-J (9600W 13.6Ω)	DBU-4045 1	1	100	13.6Ω
	60	45	249.26	BRU-9.6KW-13R6-J (9600W 13.6Ω)	DBU-4045 1	1	100	13.6Ω
	75	55	304.65	BRU-9.6KW-13R6-J (9600W 13.6Ω)	DBU-4045 2 (parallel connection)	1	100	13.6Ω
	100	75	415.43	BRU-9.6KW-13R6-J (9600W 13.6Ω)	DBU-4045 2 (parallel connection)	2 (parallel connection)	100	6.8Ω
	120	90	498.51	BRU-9.6KW-13R6-J (9600W 13.6Ω)	DBU-4045 2 (parallel connection)	2 (parallel connection)	100	6.8Ω
	150	110	609.29	BRU-9.6KW-13R6-J (9600W 13.6Ω)	DBU-4220 1	2 (parallel connection)	100	6.8Ω
	180	132	731.15	PRU-30KW-4R0-J (30000W 4Ω)	DBU-4220 1	1	100	4Ω
	215	160	886.24	PRU-30KW-4R0-J (30000W 4Ω)	DBU-4220 1	1	100	4Ω
	270	200	1107.08	PRU-30KW-4R0-J (30000W 4Ω)	DBU-4220 1	1	100	3Ω
	300	220	1218.58	PRU-30KW-4R0-J (30000W 4Ω)	DBU-4220 1	1	100	3Ω
	380	280	1550.92	PRU-60KW-2R0-J (60000W 2Ω)	DBU-4300 1	1	100	2Ω
	430	315	1744.79	PRU-60KW-2R0-J (60000W 2Ω)	DBU-4220 2 (parallel connection)	2 (parallel connection)	100	2Ω

9.2 Input/output AC/DC reactor specifications list for S3100 series inverter

S3100 220V Input/output AC reactor and DC reactor specification list

Inverter model	Applied input AC reactor	Applied output AC reactor	Applied DC reactor
S3100-2T0.4G	ACL-0005-EISC-E2M8C	OCL-0005-EISC-E1M4C	×
S3100-2T0.75G	ACL-0005-EISC-E2M8C	OCL-0005-EISC-E1M4C	×
S3100-2T1.5G	ACL-0010-EISC-E1M4C	OCL-0010-EISC-EM70C	×
S3100-2T2.2G	ACL-0015-EISC-EM93C	OCL-0015-EISC-EM47C	×
S3100-2T4.0G	ACL-0020-EISC-EM70C	OCL-0020-EISC-EM35C	×
S3100-2T5.5G	ACL-0030-EISCL-EM47C	OCL-0030-EISCL-EM23C	×
S3100-2T7.5G	ACL-0040-EISCL-EM35C	OCL-0040-EISCL-EM18	×

S3100 440V Input/output AC reactor and DC reactor specification list

Inverter model	Applied input AC reactor	Applied output AC reactor	Applied DC reactor
S3100-4T0.75G/1.5P	ACL-0005-EISC-E2M8C	OCL-0005-EISC-E1M4C	×
S3100-4T1.5G/2.2P	ACL-0005-EISC-E2M8B	OCL-0005-EISC-E1M4C	×
S3100-4T2.2G/4.0P	ACL-0007-EISC-E2M0C	OCL-0007-EISC-E1M0C	×
S3100-4T4.0G/5.5P	ACL-0010-EISC-E1M4C	OCL-0010-EISC-EM70C	×
S3100-4T5.5G/7.5P	ACL-0015-EISC-EM93C	OCL-0015-EISC-EM47C	×
S3100-4T7.5G/11P	ACL-0020-EISC-EM70C	OCL-0020-EISC-EM35C	×
S3100-4T11G/15P	ACL-0030-EISCL-EM47C	OCL-0030-EISC-EM23C	×
S3100-4T15G/18.5P	ACL-0040-EISCL-EM35C	OCL-0040-EISC-EM18	×
S3100-4T18.5G/22P	ACL-0050-EISCL-EM28C	OCL-0050-EISC-EM14C	×
S3100-4T22G/30P	ACL-0060-EISCL-EM24C	OCL-0060-EISC-EM12C	×
S3100-4T30G/37P	ACL-0090-EISCL-EM16	OCL-0080-EISC-E87U	×
S3100-4T37G/45P	ACL-0090-EISCL-EM16	OCL-0090-EISC-E78U	×
S3100-4T45G/55P	ACL-0120-EISCL-EM12C	OCL-0120-EISC-E58U	×
S3100-4T55G/75P	ACL-0150-EISH-E95UC	OCL-0150-EISH-E47U	×
S3100-4T75G/90P	ACL-0200-EISH-E70UC	OCL-0200-EISH-E35U	x
S3100-4T90G/110P	ACL-0250-EISH-E56UC	OCL-0250-EISH-E28U	x
S3100-4T110G/132P	ACL-0250-EISH-E56UC	OCL-0250-EISH-E28U	DCL-0250-UIDH-EM26
S3100-4T132G/160P	ACL-0290-EISH-E48UC	OCL-0290-EISH-E24UC	DCL-0250-UIDH-EM26
S3100-4T160G/200P	ACL-0330-EISH-E42UC	OCL-0330-EISH-E21UC	DCL-0340-UIDH-EM17
S3100-4T200G/220P	ACL-0490-EISH-E28UC	OCL-0490-EISH-E14UC	DCL-0460-UIDH-EM09
S3100-4T220G/280P	ACL-0490-EISH-E28UC	OCL-0490-EISH-E14UC	DCL-0460-UIDH-EM09
S3100-4T280G/315P	ACL-0600-EISH-E23UC	OCL-0600-EISH-E12UC	DCL-0650-UIDH-E72U
S3100-4T315G/355P	ACL-0660-EISH-E25UC	OCL-0660-EISH-E11U	DCL-0650-UIDH-E72U

Appendix:

A:User manual upgrade record

Date	After upgrade	Upgrade content
2017-05	V1.0	1st version
2017-09	V1.1	1. Add the seventh chapter part of the abnormal occurrence and removal methods 2. to add some of the details of the chapter description