



Compact Vector Control Inverter

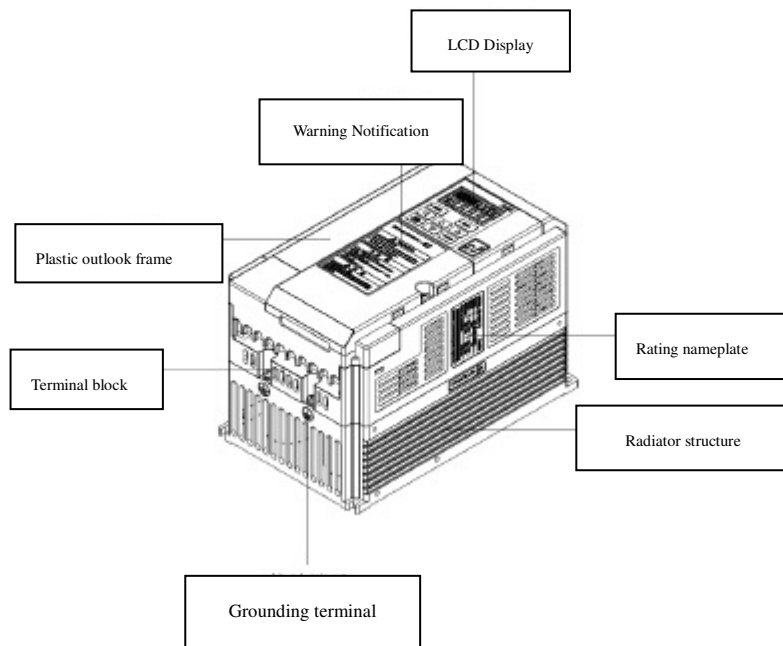
VVVF Inverter

SAMCO-NS series

Instruction Manual (Simple Version)



SANKEN ELECTRIC. CO., LTD.



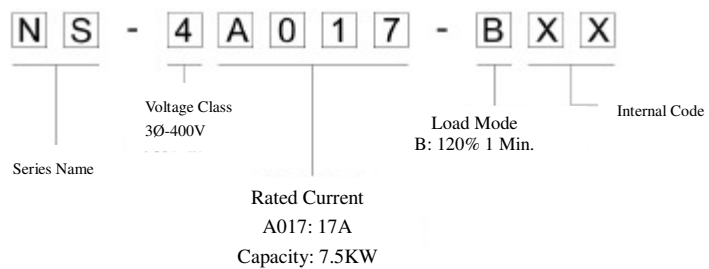
Checking the product and precautions on use

Checking the product

■ Product body:

NS Vector Control Inverter Body (For example: NS-4A017-B):

The contents of the model

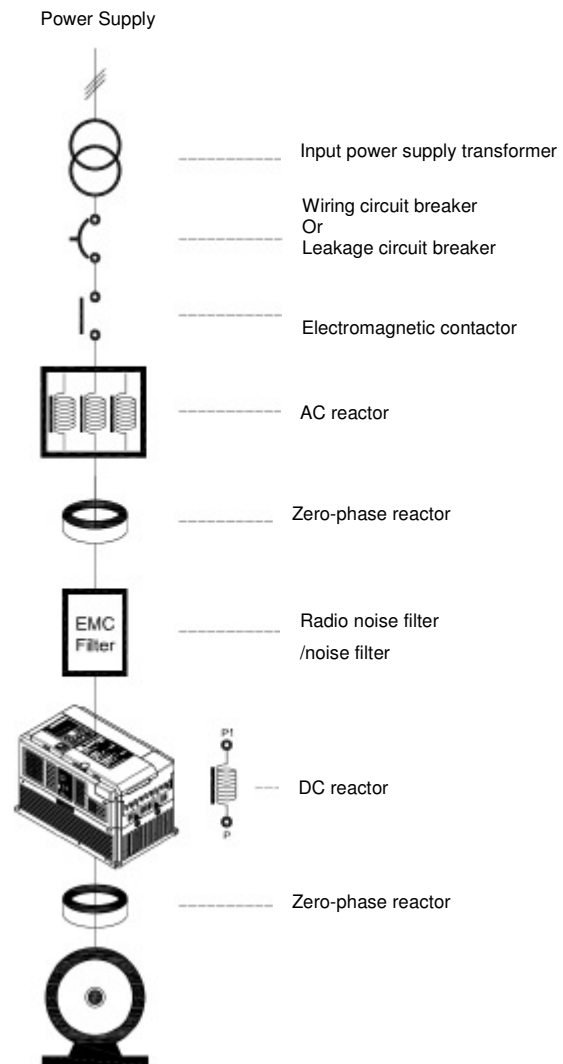


Rating nameplate

MODEL: NS-4A017-B 		
SOURCE	3PH 380-480V 50/60Hz	
OUTPUT	13.6A	17A
MOTOR	Max.5.5kW	Max.7.5kW
OVERLOAD	150% 1min.	120% 1min.
SERIAL No.:	C0123456789	MASS: 3kg
		
SANKEN L.D. ELECTRIC(JIANG YIN)CO.,LTD		

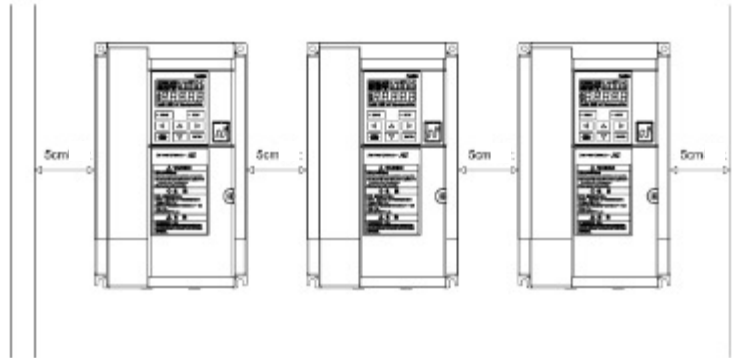
Connection with peripheral device

Draft for the connection with peripheral device



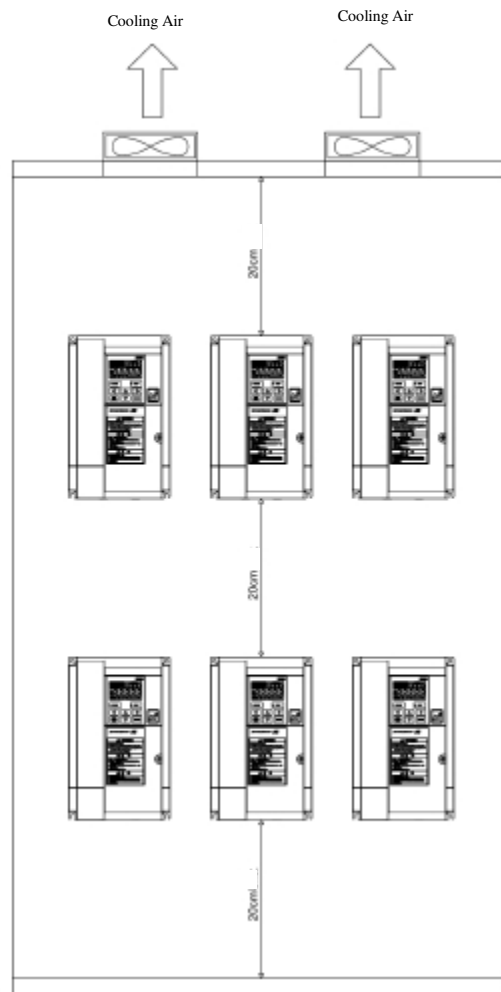
■ Installation in the side of left / right :

Pls. assure the space is above 5cm, whatever is between the inside of cabinet and the outlook frame of Inverter, or between Inverter's outlook frame while installed in the side of left/right
Or could be caused of not enough of heat dissipation for Inverter.



■ Installation more layers in the side of up/down:

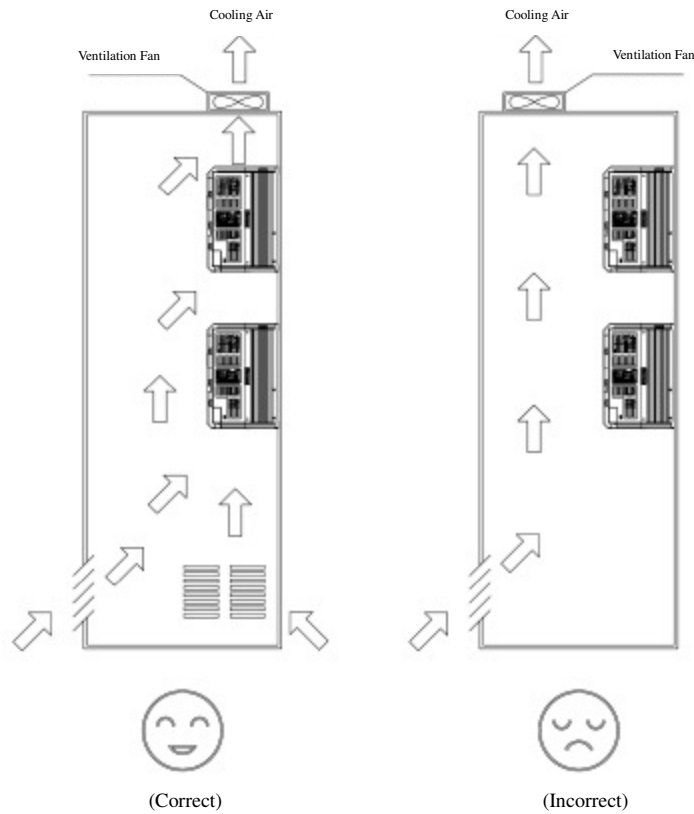
Pls. assure the distance is above 20cm, whatever is between the inside of cabinet and the outlook frame of Inverter, or between the Inverter's outlook frame, and ensure the ventilation and cooling for each Inverter, or will be caused of being not enough of heat dissipation.



■ Installment site for ventilation fan in the cabinet:

■ Notification:

- ◆ When several inverters are set in a control cabinet, be sure to local the ventilation fans properly to allow free air circulation.
- ◆ Ensure the air in the outside of cabinet flow to the Inverter's heat dissipation route, take those heat from the Inverter in operation away in efficient.
- ◆ If the ventilation fans are located properly, the ambient temperature will rise and affect the cooling of the Inverter.

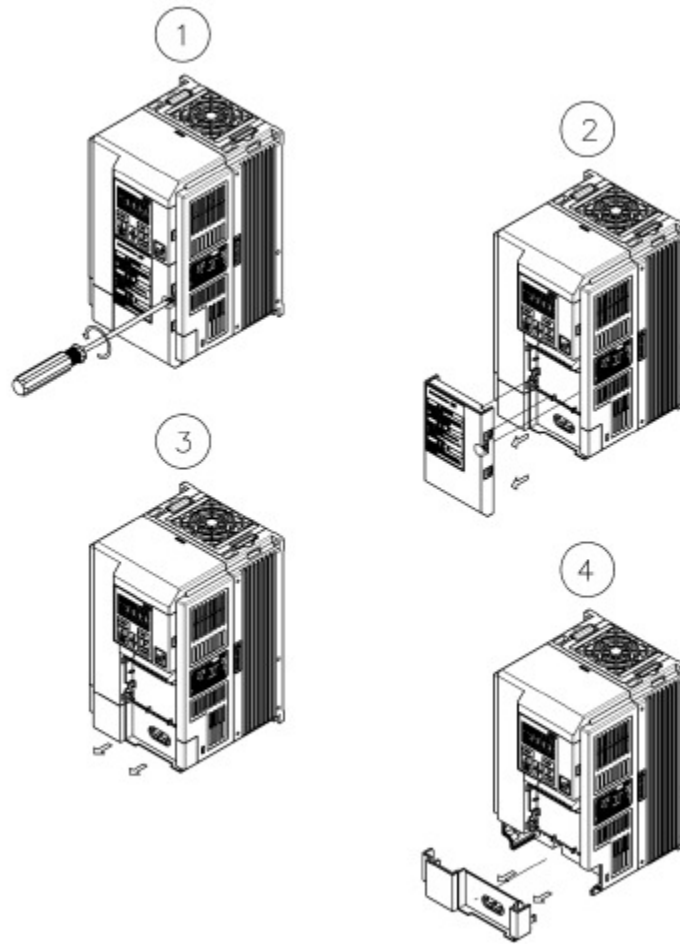


Removal and Installation of the front cover

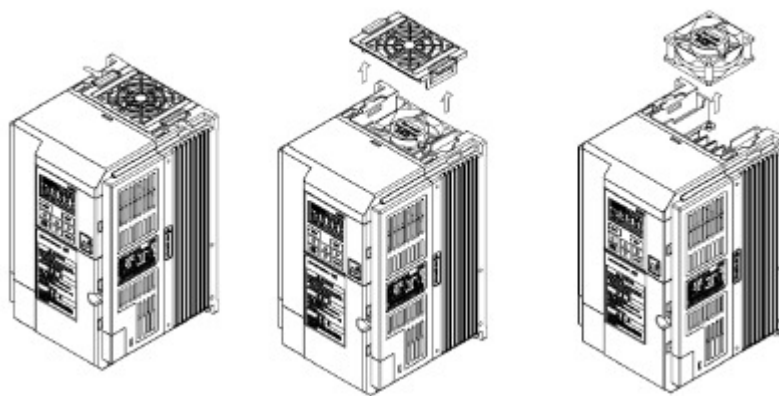
(1) Removal of front cover (Lower)

Unscrew the M4 screws, dismantle as the below Pic.

- ◆ Pls. carry out this work during the main circuit wiring、 control circuit wiring.



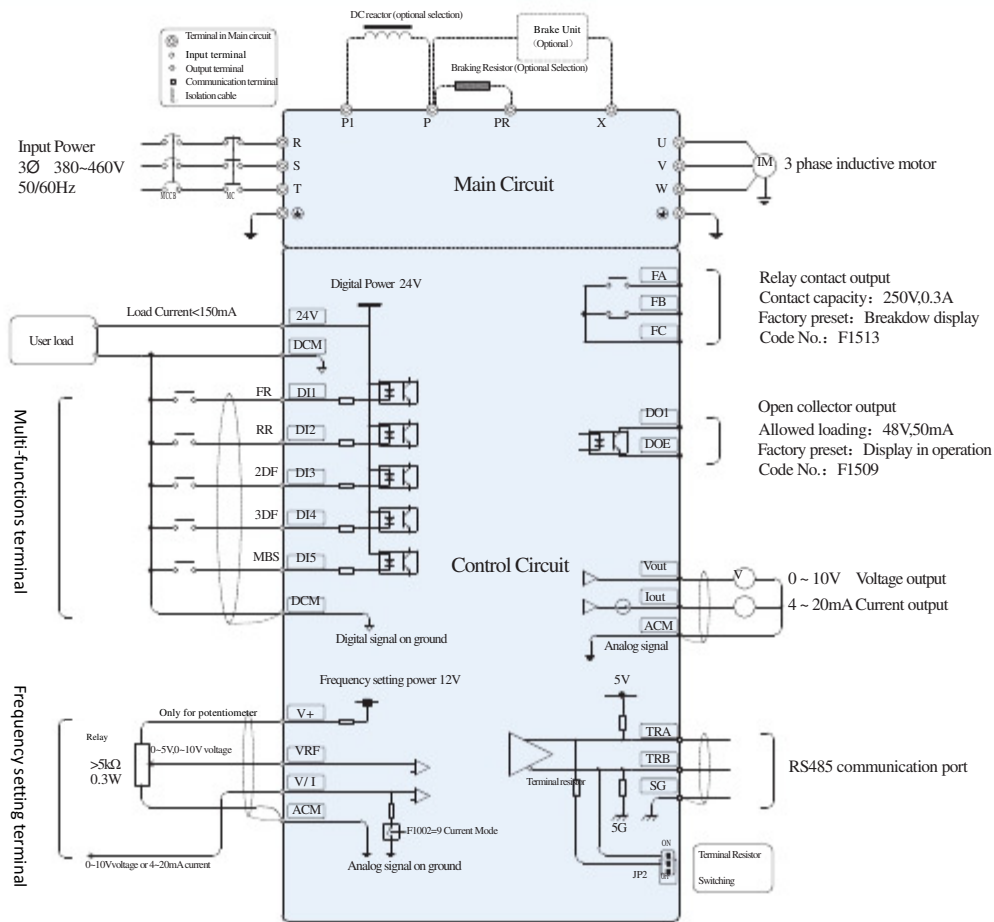
(2) Changed fan



Carry out this work only under changing fan.

(3) Installation

On installation, carry out this work as the reverse procedures.



Outlook dimensions

Mode No.	Outlook Frame	Dimension							
		H	H1	W	W1	D	d	t	
NS-4A003-B		130	121	115	106	166	4.5	5	
NS-4A004-B									
NS-4A006-B									
NS-4A009-B		225	214	140	129	150	5.5	6	
NS-4A013-B									
NS-4A017-B									
NS-4A024-B		300	285	200	185	175	6.5	6	
NS-4A032-B									
NS-4A038-B									

Composition of Main Circuit Terminals

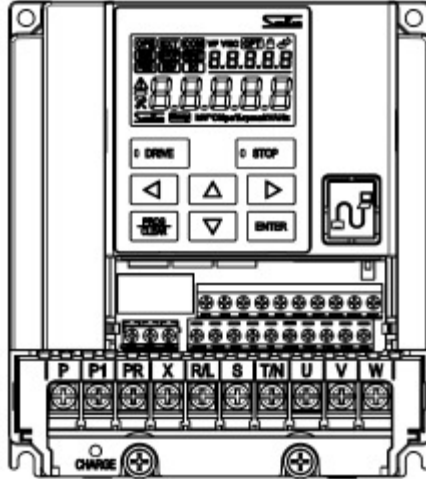
Description of Main Circuit Terminals

Terminal Symbol	Name	Description
R,S,T	Input Power Terminals	Terminals connected to 3 phase commercial power supply
U,V,W	Inverter output terminals	Terminals connected to 3 phase induction motor
P,P1	DC reactor connection Terminals	Terminals connected to DC reactor *1
P,PR	Brak Resistor connection terminals	Terminals connected to brake resistor between P-PR
P,X	DC side voltage terminals	Terminals connected to brake unit P is DC positive, X is DC negative
	Ground Terminal	Terminal for grounding of inverter casing

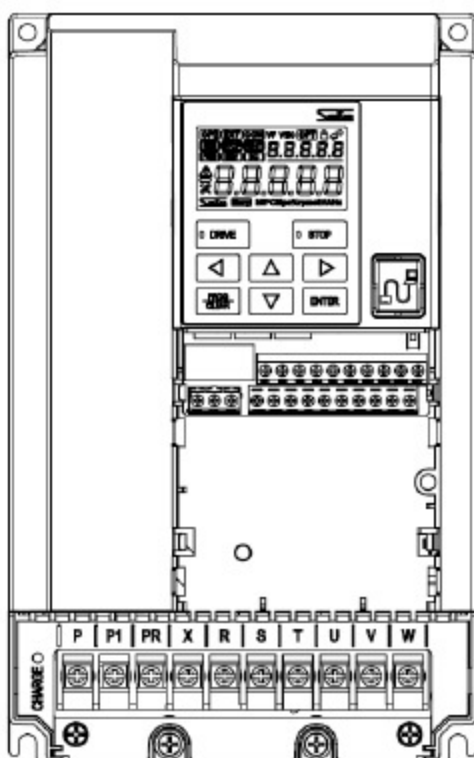
*1 When connecting the reactor, pls. remove the jumper P1 and P

Distribution Terminal For Main Circuit

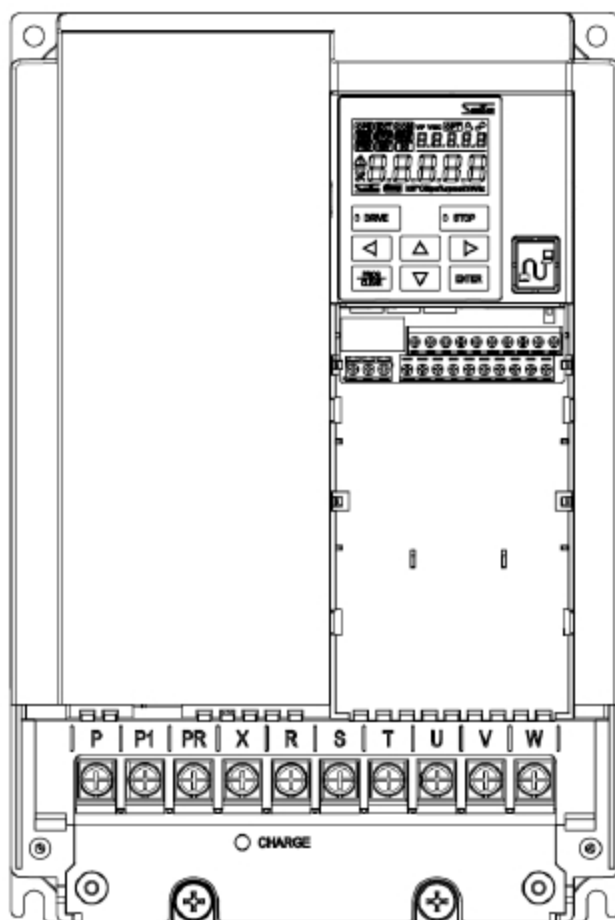
1. NS-4A003-B、NS-4A004-B、NS-4A006-B



2. NS-4A009-B、NS-4A013-B、NS-4A017-B



3. NS-4A024-B、NS-4A032-B、NS-4A038-B



Shorten Plate

DC Reactor

Optional Accessory

Braking Resistor

MC

MCCB

Power Supply

3Ø 380-460V
50/60Hz

Motor

Model No.	MCCB (Leakage circuit breaker) [A]	MC (Electromagnetic contactor)	
		Rated Current [A]	Rated making current [A]
NS-4A003-B	5	7	20
NS-4A004-B	5	7	20
NS-4A006-B	15	7	20
NS-4A009-B	20	7	20
NS-4A013-B	30	7	20
NS-4A017-B	30	17	32
NS-4A024-B	50	25	50
NS-4A032-B	60	25	50
NS-4A038-B	70	32	60

Recommend Wire Size

Main Circuit							
Recommended wire size[mm ²]					Screw diameter	Tightening Torque N·m	Max. Wire size mm ²
Input Wire	R、S、T	P、P1 PR、X	U、V、W	Grounding wire			
NS-4A003-B	2.0 (2.0)	2.0 (2.0)	2.0 (2.0)	5.5	M4	1.2	5.5
NS-4A004-B	2.0 (2.0)	2.0 (2.0)	2.0 (2.0)	5.5			
NS-4A006-B	2.0 (2.0)	2.0 (2.0)	2.0 (2.0)	5.5			
NS-4A009-B	2.0 (2.0)	2.0 (2.0)	2.0 (2.0)	5.5			
NS-4A013-B	3.5 (2.0)	3.5 (2.0)	2.0 (2.0)	5.5			
NS-4A017-B	5.5 (2.0)	5.5 (2.0)	3.5 (2.0)	5.5			
NS-4A024-B	5.5 (2.0)	5.5 (2.0)	5.5 (2.0)	5.5	M5	2.0	14
NS-4A032-B	8.0 (3.5)	8.0 (3.5)	8.0 (3.5)	14			
NS-4A038-B	14 (5.5)	14 (5.5)	8.0 (3.5)	14			

Note 1: The value for wires in the main circuit are for 600V IV PVC-insulated wires (60℃) When the inverter ambient temperature is 40℃

The value in () are for 600V bridged-polyethylened insulated wires (90℃)

Note 2: The maximum wire size indicates the maximum wire cross-sectional are that can be used with the terminal block

Model No.	External brake resistor (Recommend)		External brake resistor (limit value)	
	Resistor value	Capacity ※ 1	Resistor value	Capacity ※ 1
NS-4A003-B	700Ω or above	100W	420Ω or above	300W
NS-4A004-B	700Ω or above	100W	420Ω or above	300W
NS-4A006-B	320Ω or above	200W	190Ω or above	300W
NS-4A009-B	160Ω or above	400W	130Ω or above	500W
NS-4A013-B	120Ω or above	600W	80Ω or above	800W
NS-4A017-B	80Ω or above	800W	52Ω or above	1100W
NS-4A024-B	60Ω or above	1000W	38Ω or above	1500W
NS-4A032-B	40Ω or above	1500W	32Ω or above	1800W
NS-4A038-B	40Ω or above	1500W	32Ω or above	1800W

※ 1 The above brake resistor is selected by the max. use rate 10%ED.

Composition of Control Circuit Terminals

Wire size

Terminal screw diameter: M3

Recommend wire size: 0.75[mm²]

Tightening torque: 0.5[N•m]

The arrangement of control circuit terminals is as shown in the following

			DI1	DI2	DI3	DI4	DI5	DCM	DO1	DOE	DCM	24V
FA	FB	FC	ACM	Vout	Iout	V+	V/I	ACM	VRF	TRA	TRB	SG

■ Most Attention:

- ▲ Don't input stronger voltage to the control terminal! Or control board burnt
- ▲ Pls. move the control cable far away to power cable in avoid of intervenue or noise.

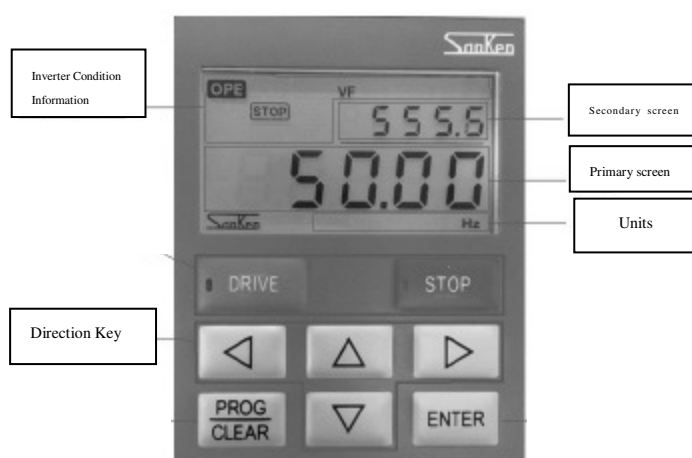
Function of control circuit terminals

Type	Terminal Symbol	Terminal Name	Function Description	Rated Specification
Multi function input	DCM	Digital signal common terminals	Common terminals for digital input output signals and 24V power supply	Total current consumed: 100mA or less
	DII ~ DI5	Multi-Functional input terminals	Signals valid while the short-circuited between DIX and DCM	Input resistor: about 6.6kΩ When short-circuited: about 3~5mA
Analog value input	ACM	Analog signal common terminals	Common terminals for analog Input and output	Total current consumed: 100mA or less
	+V	Frequency setting power supply	Connected to a potentiometer of 5kΩ, 0.3W or above	DC 10~12V ※ it can not be connected to any Element other than the potentiometer
	VRF	Analog voltage input terminal	Setting frequency through input voltage	Input resistor: about 34kΩ Max. allowed voltage: DC12V
	V/I	Analog voltage or input Current terminal	This way of current/voltage switching independely	Voltage input is the same spec. as VRF current input resisto: about 250Ω, Max.allowed current:30mA
Power Supply	24V	24V client's power supply	DC24V Power supply for customer	Max. allowable output current for DC 24V 150mA
Multifunctional output	DO1 DOE	Multifunctional collector output terminals	Sending signals for function through selected fuction code.	Open collector output Allowable loading: DC48V 、 50mA
Analog value output	Vout	0~10V voltage output terminal	voltage output for setting internal signal	0~10V
	Iout	4~20mA current output terminal	Current output for setting Internal signal	4~20mA
Communication terminals	TRA	RS485 communication sending/receiving (+)	RS485“+” signal	Communication speed:1200-57600bps
	TRB	RS485 communication sending/receiving (-)	RS485“-” signal	Total Length: 500m
	SG	RS485 common communication terminals	SG terminal for connected communicated equipment while RS485 on communication	※ selected on site for Inverter side Communication equipment side Single-end earthed
	JP2	Terminal resistor switching selected	The selection of whethe connected 100Ω terminal resistor	OFF Resistor Open ON Resistor Connection
Contact output	FA FB FC	Abnormal alarm signal Output and multifunctional Contact output	The default of that terminal is Inverter warning and stop contact output signal, which is selected the others function through setting function code of F1513、 F1504	Contact capacity: AC250V/0.3A The selection of warning contact Normal: FA-FC opened Abnormal: FA-FC closed

LCD Operation Panel

Status Display	Inverter status during operation /stop <Frequency> <Output Current> <Roatation Speed> <load factor> <Output Voltage> <Pressure Value>
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Name and Function for each part of panel



Description:

Primary Screen 5 digit 7 segment LCD : Shown the following data through changing Left/Right direction key or parameters setting, "Current operation frequency、Output current、RPM、Load factor、Output voltage、Voltage value、Set value and warning content".

Secondary Screen 5 digit 7 segment LCD: Shown the data of "Current output voltage、DC Voltage、Active power、Apparent power、Radiator temperature and the others content" by setting parameters.

"Units" is only for primary screen, mainly display "Frequency(Hz)、Output current(A)、Speed roation(Rpm)、Load factor(%)、Output voltage(V)、Pressure value(MPa)".

Function Code Display	Code No. and data For example: Push 【PR/CL】 Key, secondary screen shown F1001, Primary screen show the value of F1001 Push 【ENTER】 Key, Primary screen flashing, and revise data through 【^】 , 【v】 , 【<】 , 【>】 Push 【ENTER】 Key, parameters setting successfully
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Operation panel display mode:

Primary screen and Secondary screen classified by **【Status Display】** and **【Function Code Display】** two Modes, and switched that through **【PROG】** Key

Status display mode for Inverter statis monitor、Alarm display、Output frequency setting and run/ stop Inverter and so on.

5-3-1 Version Display

Turn on the power supply in a while, Primary monitor show the Inverter Version.

Such as: VER 1.00 as the below:

U0100

LCD Inverter Status Information

List of each status description

Display content	Description
	Operation panel control
	External terminal control
	Remote communication control
	Operation
	Stop
	Standby
	Forward
	Reverse
	DC braking

Display Content	Description
	V/f control mode
	Vector control mode
	Operational parts
	Parameters locked
	Communication
	Inverter alarm
	Inverter brake-down

Inverter status mode

Display Inverter status.

Display Inverter each status in operation and stop.

Operation mode display

Action status	Display content
Stop	Operation lamp “off”, Stop lamp “on”
Operation	Operation lamp “on”, Stop lamp “off”
Fault	Operation lamp “flashing”, Stop lamp “flashing”

Monitor mode display

Display content	Unit	7-Segments LCD display
Frequency	Hz	On operation: That is output frequency At stop: That is setting frequency
Output current	A	Output Current
Rotation speed	rpm	Speed
Load factor	%	Load factor
Output Voltage	V	Output voltage
Pressure	MPa	Pressure feedback

Speed display content

Motor control mode	Operation	Stop
V/f control mode	Motor synchronized speed	Set speed
Sensorless vector control Mode	Motor estimated speed	Set speed

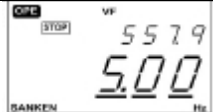
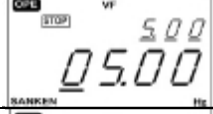
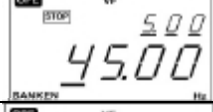
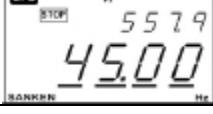
During Inverter status monitor display, press 【<】 key or 【>】 key one times, switching the display content on the primary screen at one times, the display content on primary screen can also be switched by the function code. As for the details, pls. referring the function code: F2303.

When the alarm is stopped, alarm type will be shown on the primary screen.

- ※ During alarm display, even press 【<】 Key or 【>】 Key, it can't be switched the display on primary screen.
- ※ It can be switched to the function code display mode through press 【PROG】 key during alarm display.

During status monitor display, frequency setting as the below method whatever is on operation or at stop

For Example: From 5Hz to 45Hz

Operation	Display	Description
		Status monitor display (Frequency display)
【ENTER】		Input value display the last right digit. (Revise the value while this digit flashing) (※ 1)
【<】*3		Press 【<】 key one time, flahsing position will move to the left on one digit. Press 【<】 key 3 times, ten digits flashing. (※1)
【^】*4		Press 【^】 key every one time, value added 1 Press 【v】 key every one time, value minus 1 Press 【^】 key 4 times, ten digits value will be changed to “4”
【ENTER】		Press 【ENTER】 , frequency setting finished, and then back to the status monitor interface.

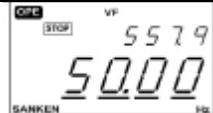
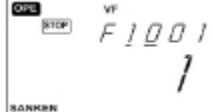
※ 1 While no needing the frequency setting, press 【PR/CL】 key return to status monitor display Mode.

Basic operation

Function code setting

Normal operation used for the changing the value of function code.

For example: set F1414=10

Operation	Display	Description
		Status monitor display (frequency display)
【PR/CL】		Press 【PR/CL】 key show function code input interface. Second display parameters number10 flashing, and the value could be revised.

【△】*4		Press 【△】 key, changing number to 14, second display parameters number 14 flashing, may be revised again.
【>】		Press 【>】 key switch to parameters number revised mode, second display parameters number 01 flashing, the value could be revised
【△】*13		Press 【△】 Key, parameters number revise to 14, Secondary monitor parameters number 14 flashing, may be revised.
【ENTER】		Press 【ENTER】 Key, switch to parameters modify mode, primary monitor F1414 value 1 flashing, may be amended.
【△】*9		Press 【△】 key, revised the parameters value to 10, primary monitor F1414 revised value 10 flashing, and can be amended.
【ENTER】		Press 【ENTER】 key, confirm the changing value, secondary monitor parameter number 14 flashing, may be modified. Parameter value revised finished.

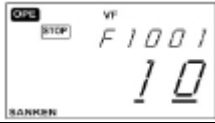
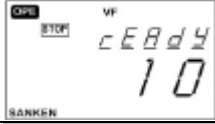
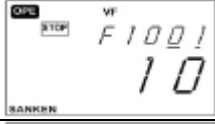
※ 1 When no needing to set the new value, return to parameter number setting interface through 【PROG】 Key.Parameter numble in the second monitor flashing.

Confirmation

Some function codes need to re-confirm for the prevent of wrong operation which could be caused of data re-written.

For example: set F1001=10

Operation	Display	Description
		Status monitor display (Frequency display)
【PR/CL】		Press 【PR/CL】 key show display function code input interface, secondary monitor parameter no: 10 flashing, may be amended.

【ENTER】		Primary monitor parameter value 1 flashing, that is meaning to be revised the current value.
【^】		Press 【^】 key, to change the revised value to 10
【ENTER】		Press 【ENTER】 key, primary monitor show the setting value, second monitor show rEAdy flashing, remind to the final confirmation for the setting value. (※1)
【^】		Press 【^】 again, new setting confirmed, and display return to the function code selection interface. (※2)
【PR/CL】		Press 【PROG】 key, return to status monitor display interface.

※ 1 ready flashing, press 【PROG/ CLEAR】 key return to function code selection interface while found out some wrong on operation, and interrupt the action of input.

※ 2 Press 【PROG/ CLEAR】 key could also return to status monitor display mode interface.

5-5 Special Functions

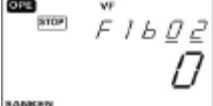
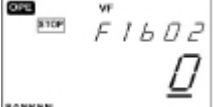
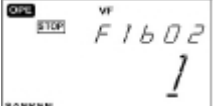
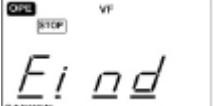
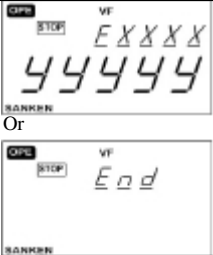
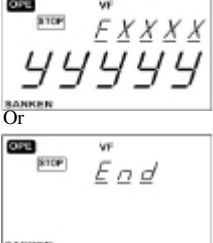
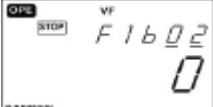
5-5-1 Changed code display function

Due to the data in the current function code is different with the factory presets and user's initial value, therefore, it displays the function code for which data values have changed.

This is an effective function for finding out the difference between the current function code and factory presets or user's initial value.

Repair and maintenance functions such as confirmation of codes etc, can be easily executed.

For example: Display the disfference with the factory preset

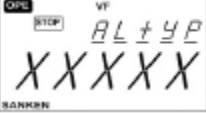
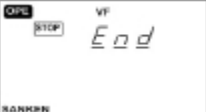
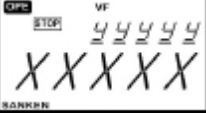
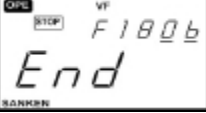
Operation	Display	Description
		Select function code F1602 (Changed code display function)
【ENTER】		Press 【ENTER】 Key, entered into the parameters setting condition.
【^】/【v】 Or digit keyboard (Optional selection)		Press 【^】/【v】 or digit keyboard, select 1. F1602=1, this will compare the factory presets with current function code data.
【ENTER】		Press 【ENTER】 key, starting to search the function code, which is the value changed compared with the factory presets. Primary monitor 7 segments display F ind in flashing.
Searching Ending		Searching ending, secondary monitor display the changed code, and flashing. No changed code found, secondary monitor display End on flashing, primary monitor show the current value for related parameter.
【^】/【v】		Browse the page of different parameter code and its current value through 【^】/【v】 key.
【PR/CL】		Press 【PR/CL】 Key, back to the selection of function code interface.

Alarm status confirmation

Alarm status confirmation is the function shown the Inverter status in case of a Alarm.

It could be confirmed for alarm status during the latest 5 times through function code F1806~F1810
New alarm happened, the earliest alarm will be deleted. That is latest alarm in F1806, and the earliest one in F1810.

For example: While the latest alarm occurs, the confirmation for Inverter's status.

Operation	Display	Description
	 Or 	Select function code F1806 (Alarm status confirmation)
【ENTER】	 Or 	Press 【ENTER】, alarm name in 1 st Monitor XXXXXX , 2 nd Monitor show the current display alarm name ALtYP If the alarm isn't recorded, display End
【^】/【v】		Alarm saving, press 【^】/【v】, switching the shown content. Secondary monitor display the name YYYYYY (※1), primary monitor show the value during alarm happened XXXXXX(※2)
【PR/CL】	 Or 	Press 【PR/CL】 Key, which is back to the selection of function code

Function code F1805=9 is set. all alarm record will be deleted. At this moment, the data records in F1806 t~ F1810 will be erased.

※ 1: Display name as below:

Display	Content	Unit
ALtYP	Alarm Name	-
FrE	Output Frequency	Hz
IoUt	Output current	A
uoUt	Output Voltage	V
udC	Dc Voltage	V
P	Output Power	kW
t	Radiator Temperature	°C

※2 The value displayed is the status before the occurrence of an alarm. Therefore, if an alarm is caused by transient over-current, over voltage the stored value is the different from the current value, voltage value on the alarm.

Monitor display list

Monitor Display	Description
in it	The Data is on flashing during initialization.
in itY	During initialization of user data, the data is displayed flashing.
dEC id	The data is on flashing on the confirmation of user data.
rEAdY	Display shown that needs to reconfirm the operation by function code.
F ind	During search of the function code, of which user data is discrepant from the default settings, the display is on flashing status.
SEnd	The display is flashing during the trasfer of host function code data to the operation panel.
rEAd	During the trasfer of the operation panel function code to host, it is displayed flashing.
End	It is displayed flashing, while the desired data can't be found through the function code search and alarm history record.
tUnE	Indicates auto turning.

Function Code

Representation and Description of Function Code
By changing the function code, Inverter action can be changed

Function code are functionally classified into “function blocks”

Function	Function Block	Function Block Name
Basic operation function F10xx~F13xx	F10xx	Basic function
	F11xx	Starting• Braking function
	F12xx	Display function
	F13xx	Auxiliary functions
Input/output-related function F14xx~F15xx	F14xx	Input function
	F15xx	Output function
System-related functions F16xx~F18xx	F16xx	System function
	F17xx	Protective function
	F18xx	Information function
Special function F19xx~F20xx	F19xx	Energy-saving function
	F20xx	V/f characteristics
Scheduled operation functions F21xx~Fxx	F21xx	Multi-speed function
	Fxx	Scheduled operation function
Display function F23xx	F23xx	LCD display function
PID function F30xx~F33xx	F30xx	Basic PID1 Function
	F31xx	Basic PID2 Function
	F32xx	Combined function of PID1, PID2
	F33xx	PID control parameter reading
Water supply function F34xx	F34xx	Water supply function
Communication functions F40xx~F41xx	F40xx	Serial communication functions
	F41xx	MODBUS communication function
Motor parameter F5xxx	F5xxx	Motor parameter
Vector Control F60xx	F60xx	Vector Control Function

Function Code List

Basic Operation Function F10xx~F13xx

Runing Function F10xx~F13xx				
Code	Function Name	Data Content	Setting resolution	Factory preset
1001	Motor control mode selection	1: V/f Control Mode 2: Speed Control(Speed sensorless vector control) 3: Speed Control(Speedy sensor vector control) 10: Auto tuning mode 1 11: Auto tuning mode 2 40: V•f separation control	1	1
1002	1st Speed frequency Setting selection	1: Operation Panel 2: External analog VRF voltage (0~5V) 3: External analog VRF voltage(0~10V or potentiometer) 4: External analog V/I Voltage (0~5V) 5: External analog V/I voltage(0~10V or potentiometer) 9: External analog V/I current (4~20mA) 11: External analog VRF voltage+V/I voltage 14: External analog VRF voltage-V/I voltage 15: External analog V/I voltage-VRF voltage 18: External analog VRF voltage+V/I current 19: External analog VRF voltage-V/I current 20: External analog V/I current-VRF voltage 21: Terminal block stepping 22: Communication 25: Pulse Train Input 26: External analog VRF forward/reverse run operation (0~10V、5V reference) 27: External analog V/I forward/reverse run operation (0~10V、5V reference)	1	1
1003	V/f patten selection	1: Linear patten 2: Square-law decreasing patten (weak) 3: Square-law decreasing patten (strong)	1	1
1004	Torque boost	0~20% (Maximum voltage ratio)	0.1%	※ 1
1005	Base Voltage	400V series 0: No AVR 50~460V	1V	※ 1
1006	Base Frequency	0.1~600Hz	0.01Hz	※ 1

Code	Function Name	Data Content	Setting resolution	Factory preset
1007	Upper frequency limit	5~600Hz	0.01Hz	60
1008	Lower frequency limit	0.05~200Hz	0.01Hz	0.05
1009	Carrier frequency adjustment	5~130 1: Random Soft Carrier Mode 1 2: Random Soft Carrier Mode 2 3: Random Soft Carrier Mode 3 4: Random Soft Carrier Mode 4	1	※ 1
1010	Acceleration/ Deceleration Curve	1: Linear 2: S-shaped 3: Reduction of acceleration/deceleration	1	1
1011	Reference frequency for acceleration/deceleration	1~120Hz	0.01Hz	※ 1
1012	1 st acceleration time	0~6500 sec.	0.1 sec.	※ 2—1
1013	2 nd acceleration time	0~6500 sec.	0.1 sec.	※ 2—2
1014	3 rd acceleration time	0~6500 sec.	0.1 sec.	※ 2—3
1015	4 th acceleration time	0~6500 sec.	0.1 sec.	※ 2—4
1016	1 st deceleration time	0~6500 sec.	0.1 sec.	※ 2—5
1017	2 nd deceleration time	0~6500 sec.	0.1 sec.	※ 2—6
1018	3 rd deceleration time	0~6500 sec.	0.1 sec.	※ 2—7
1019	4 th deceleration time	0~6500 sec.	0.1 sec.	※ 2—8
1020	JOG acc./dec.time	0~20 sec.	0.1 sec.	0.1
1021	JOG frequency	0~60Hz	0.01Hz	5
1022	1 st start of S-shaped Acceleration	0~200%	1%	50
1023	1 st end of S-shaped Acceleration	0~200%	1%	50
1024	Gradient of middle of 1 st S-shaped acceleration	0~100%	1%	0
1025	1 st start of S-shaped Deceleration	0~200%	1%	50
1026	1 st end of S-shaped Deceleration	0~200%	1%	50
1027	Gradient of middle of 1 st S-shaped Deceleration	0~100%	1%	0

Code	Function Name	Data Content	Setting resolution	Factory preset
1028	2 nd Start of S-shaped Acceleration	0~200%	1%	50
1029	2 nd End of S-shaped Acceleration	0~200%	1%	50
1030	Gradient of middle of 2 nd S-shaped acc.	0~100%	1%	0
1031	2 nd Start of S-shaped Deceleration	0~200%	1%	50
1032	2 nd End of S-shaped Deceleration	0~200%	1%	50
1033	Gradient of middle of 2 nd S-shaped dec.	0~100%	1%	0
1034 1035 1036	1 st speed frequency selection A 1 st speed frequency selection B 1 st speedy frequency selection C	1: Operation Panel 2: External analog VRF voltage (0~5V) 3: External analog VRF Voltage(0~10V or potentiometer) 4: External analog V/I voltage (0~5V) 5: External analog V/I voltage (0~10V or potentiometer) 9: External analog V/I current (4~20mA) 21: Terminal block stepping 22: Communication 25: Pulse train input 26: External analog VRF forward/reverse run (0~10V 5V Reference) 27: External analog V/I forward/reverse run (0~10V 5V Reference)	1	1 1 1
1037	Terminal block stepping Frequency varied	0.1~10Hz/sec	0.1Hz	2.5
1038	Terminal block stepping Frequency clear	0: Clear No(Frequency Maintain) 1: Power OFF clear 2: Stop Clear	1	0
1101	Operation command selection	1: Operation Panel 2: External Terminal 3: Communication 4: External Terminal (Three Wired)	1	1
1102	Starting Method	1: Starting frequency 2: Flying Start 3: Starting frequency after DC braking	1	1

Code	Function Name	Data Content	Setting resolution	Factory preset
1103	Starting frequency	0.05~60Hz	0.01Hz	1
1104	Operation start frequency	0~20Hz	0.01Hz	0
1105	Start delay time	0~5 sec.	0.1sec.	0
1106	Start standby time	0~120 sec.	0.1sec.	0
1107	Start standby frequency	0.05~60Hz	0.01Hz	5
1108	Restart after momentary Power failure	0: Do not start 1: Restart 2: Compensation for momentary power failure	1	0
1109	Direction of rotation of Motor	1: Forward and reverse run 2: Forward run only 3: Reverse run only	1	1
1110	Direction of rotation of Motor (Setting through Operation panel)	1: Forward 2: Reverse	1	1
1111	Braking method	1: Deceleration to stop 2: Deceleration to stop + DC braking 3: Free run stop 4: Deceleration to stop + continuously DC braking	1	1
1112	DC braking start frequency	0.05~20Hz	0.01Hz	0.5
1113	DC braking time	1~25 Sec.	0.1 Sec.	2
1114	DC braking force	1~10	1	5
1115	Duty cycle of brake resistor	0: No brake resistor 2~25%ED 98: No discharge resistor protection (with discharge) 99: External brake unit	1%ED	※ 1
1116	Discharge resistor on signal Output time	0.01~10.00 sec.	0.01sec.	0.1
1117	Parameters setting Continuously DC braking	0: Braking invalid 1: Braking Valid 2: Valid for braking time	1	1

Code	Function Name	Data Content	Setting resolution	Factory preset
1118	DC braking start Frequency on stop	0.05~60Hz	0.01Hz	1
1119	DC braking time T1	0.1~6500.0 sec.	0.1sec.	2
1120	DC braking time T2	0.1~6500.0 sec.	0.1sec.	2
1121	DC braking time T3	0.1~6500.0 sec.	0.1sec.	2
1122	DC braking force F1	1~10	1	5
1123	DC braking force F2	1~10	1	5
1124	Overexcited deceleration Rate	0.01~4.00	1	1
1201	Monitor display selection (Optional Parts)	1: Frequency [Hz] 2: Output Current [A] 3: Speed of rotation [rpm]. 4: Load factor [%] 5: Pressure[MPa] 6: No unit display	1	1

Code	Function Name	Data Content	Setting resolution	Factory preset
1202	State display selection	1: No units (Multiple of F1203) 2: Output voltage [V] 3: Dc voltage [V] 4: Active power [kW] 5: Apparent power [kVA] 6: Radiator Temperature [°C] 7: Command Speed [rpm] 8: PID1 feedback value [Hz] 9: PID2 feedback value [Hz] 10: VRF analog input value [Hz] 11: V/I analog input value [Hz] 14: Partial excitation current [A] 15: Partial torque current [A] 17: Setting pressure[MPa] 18: Command pressure[MPa] 19: Pressure feedback[MPa] 20: Regular pump switching calculating time 29: Command frequency [Hz] 35: Detect speed of rotation[rpm] 44: Target frequency[Hz] 45: Output frequency[Hz]	1	3
1203	Multiple for no unit display	0~100 times (multiple of output frequency)	0.01 times	1
1301	1 st jump bottom frequency	0~600 [Hz]	0.01 [Hz]	0
1302	1 st jump top frequency	0~600 [Hz]	0.01 [Hz]	0
1303	2 nd jump bottom frequency	0~600 [Hz]	0.01 [Hz]	0
1304	2 nd jump top frequency	0~600 [Hz]	0.01 [Hz]	0
1305	3 rd jump bottom frequency	0~600 [Hz]	0.01 [Hz]	0
1306	3 rd jump top frequency	0~600 [Hz]	0.01 [Hz]	0
1307	Auto alarm recovery	0: No Auto reset function 1: Auto reset function	1	0
1308	Instability elimination	0~20	1	※

Code	Function Name	Data Content	Setting resolution	Factory preset
1309	Operation direction Switching in v/f control mode	0: Start from the direction opposite to current direction after a stop 1: Continuous Operation	1	0
1315	Shotest operation time function	0~99.99 sec.	0.01 sec.	0
1316	2 nd upper frequency	5~600Hz [Hz]	0.01 [Hz]	60
1317	3 rd upper frequency	5~600Hz [Hz]	0.01 [Hz]	60
1318	Cooling fan ON/OFF control	0: 0N/OFF control 1: Normally ON	1	0
1319	Functions corresponding to high altitude areas	1: 1000m or below 2: 1000m~1500m or below 3: 1500m~2000m or below 4: 2000m~2500m or below 5: 2500m~3000m	1	1
1320	Rating Selection	1: A Mode (Heavy Loading) 150% 1 min. 2: B Mode (Light loading) 120% 1 min.	1	2

Function Code List-Input/Output Functions F14xx~F16xx

Input/Output Functions F14xx~F16xx				
Code	Function Name	Data Content	Setting resolution	Factory preset
1401	Bias frequency (VRF)	0~±600 [Hz] (Frequency at 0V)	0.1 [Hz]	0
1402	Gain frequency (VRF)	0~±600 [Hz] (frequency at 5V / 10V)	0.1 [Hz]	60
1403	Bias frequency (V/I)	0~±600 [Hz] (Frequency at 0V / 4mA)	0.1 [Hz]	0
1404	Gain frequency (V/I)	0~±600 [Hz] (frequency at 5V or 10V or 20mA)	0.1 [Hz]	60
1407	External analog input Filter time (VRF)	1~500 (set value 1=10ms)	1	10
1408	External analog input Filter time (V/I)	1~500 (set value 1=10ms)	1	10
1410	Set frequency gain	0~100	1	0
1411	Analog input switching For set frequency gain	0: No analog input 1: External analog VRF voltage (0~5V) 2: External analog VRF voltage (0~10V or potentiometer) 3: External analog V/I voltage (0~5V) 4: External analog V/I voltage (0~10V or potentiometer) 8: External analog V/I current (4~20mA)	1	0
1412	MBS terminal input Method	1: Level triggered 2: Edge triggered	1	1
1413	ES input signal Functions	1: Normally open 2: Normally close	1	1

Code	Function Name	Data Content		Setting resolution	Factory preset
1414	Input terminal DI1	0: Unused	1: FR,	1	1
1415	Definition	2: RR,	3: 2DF,		
1416	Input terminal DI2	4: 3DF	5: MBS,		
1417	Definition	6: ES,	7: RST,		
1418	Input terminal DI3	8: AD2,	9: AD3		
	Definition	10: JOG,	11: 5DF,		
	Input terminal DI4	12: 9DF,	13: FR+JOG,		
	Definition	14: RR+JOG,	15: FR+AD2,		
	Input terminal DI5	16: RR+AD2,	17: FR+AD3,		
	Definition	18: RR+AD3,	19: FR+2DF,		
		20: RR+2DF,	21: FR+3DF,		
		22: RR+3DF,	23:FR+2DF+3DF,		
		24: RR+2DF+3DF,	25:FR+AD2+2DF,		
		26: RR+AD2+2DF,	27:FR+AD2+3DF,		
		28: RR+AD2+3DF,	32:RR+AD3+2DF,		
		29: FR+AD2+2DF+3DF,	34:RR+AD3+3DF,		
		30: RR+AD2+2DF+3DF,	39: FR+5DF,		
		31: FR+AD3+2DF,	47: PC,		
		33: FR+AD3+3DF,	58: FR+CCL,		
		35: FR+AD3+2DF+3DF,	64: FR+MBS,		
		36: RR+AD3+2DF+3DF,	67: 2DF+AD2,		
		37: PTR,	69: 3DF+AD2,		
		40: HD,	74: 2MAX,		
		46: CCL,	76: VFPID,		
		57: P0,	83: For factory		
		59: FR+RCCL,	Adjustment		
		65: RR+MBS,	85: PIDL,		
		68: 2DF+AD3,	87: RPID1,		
		70: 3DF+AD3,	89: PID2EX,		
		75: 3MAX,	92: ICLEAR		
		77: PIDLCK,	114: 1DFA,		
		79: Terminal selection for	116 :		
		continuous DC braking	1DFA+1DFB,		
		84: S2,	118: RCOM,		
		86: PIDH,	120: 1DFA+ROPE,		
		88: PID1EX,	122: 1DFA+1DFB		
		91: IHOLD,	+ROPE+RCOM,		
		109: RCCL,			
		115: 1DFB,			
		117: ROPE,			
		119: ROPE+RCOM,			
		121: 1DFB+RCOM,			
		130: RUN			
		131: STOP			
		135: FR/RR			
		136: R3W			
		137: ROPE+RCOM+R3W			
		138: Valid for high speed pulse			
		train			
		253~255: for factory			
		adjustment			

Code	Function Name	Data Content	Setting resolution	Factory preset
1422	Reference frequency for pulse input	1000~60000	1Hz	1000
1423	Effective number of bits for VRF detection	7~10bit	1bit	10
1424	Effective number of bits V/I detection	7~10bit	1bit	10
1501	Internal analog output function 1	0: No Function 1: Set frequency [Hz] 2: Output frequency [Hz] 3: PID1 feedback value [Hz] 4: PID2 feedback value [Hz] 5: Output current [A] 6: Output voltage [V] 7: DC voltage [V] 8: Radiator temperature [°C] 9: Load factor [%] (electric thermistor integrated value) 10: Load factor [%] (Ratio to rated current) 11: VRF analog input value [V] 12: V/I analog input value [V] 14: Speed [rpm] 15: Active power [kW] 16: Apparent power [kVA] 17: PID1 command value [Hz] 18: PID1 input deviation value [Hz] 19: PID2 command value [Hz] 20: PID2 input deviation value [Hz] 24: External PID1 output value [Hz] 25: External PID2 output value [Hz] 35: command frequency [Hz] 36: command torque [%]	1	0
1502	Internal analog output Coefficient 1	0~20	0.01	1
1503	Internal analog output Bias 1	0~±10.0V	0.1V	0

Code	Function Name	Data Content	Setting resolution	Factory preset
1504	Internal analog output Function 2	0: No function 1: Set frequency [Hz] 2: Output frequency [Hz] 3: PID1 feedback value [Hz] 4: PID2 feedback value [Hz] 5: Output current [A] 6: Output voltage [V] 7: DC voltage [V] 8: Radiator temperature [°C] 9: Load factor [%] (accumulated value of electric thermistor) 10: Load factor [%] (Ratio to rated current) 11: VRF analog input value [V] 12: V/I analog input value [V] 14: Speed [rpm] 15: Active power [kW] 16: Apparent power [kVA] 17: PID1 command value [Hz] 18: PID1 input deviation value [Hz] 19: PID2 command value [Hz] 20: PID2 input deviation value [Hz] 24: External PID1 output value [Hz] 25: External PID2 output value [Hz] 35: Command frequency [Hz] 36: Command torque [%]	1	0
1505	Internal analog output coefficient 2	0~20	0.01	1
1506	Internal analog output Bias 2	4~±20.0mA	0.1mA	0
1507	Approach frequency	0~600Hz	0.01Hz	10
1508	Frequency matching range	0~10Hz	0.01Hz	0

Code	Function Name	Data Content	Setting resolution	Factory preset
1509	Selection of output terminal DO1	0: Unused 1: In operation 1 2: Undervoltage 3: End of simple scheduled operation 4: In operation 2 5: Frequency matching (1 st speed frequency) 6: Frequency matching (1 st ~16 th speed frequency) 7: Frequency approach 8: Overload alarm level setting signal (the value of F1704) 9: Electric thermistor pre-alarm signal(80% of electric thermistor) 10: Radiator overheat pre-alarm signal 13: Excitation and DC braking signals 14: Lower frequency limit matching signal 15: Upper frequency limit matching signal 18: FR signal 19: RR signal 20: 2DF signal 21: 3DF signal 22: 5DF signal 23: 9DF signal 24: AD2 signal 25: AD3 signal 26: JOG signal 27: MBS signal 28: ES signal 29: RST signal 32: Discharge resistor on signal 34: Frequency counter (output frequency) 35: Frequency counter (command frequency) 36: Overload alarm level setting signal (Including Acceleration/Deceleration) 43: Low speed detection signal 47: Motor speed counter 48: Forward run detection signal 49: Reverse run detection signal 60: breakdown output 61: In forward run (only for three wired) 62: In reverse run (only for three wired)	1	1
1512	Counter output multiple	1~100 times	1 times	1

Code	Function Name	Data Content	Setting resolution	Factory preset
1513	Relay contact output Selection	0: Alarm contact 1: In operation 1 2: Undervoltage 3: End of simply scheduled operation 4: In operation 2 5: Frequency matching (1 st speed frequency) 6: Frequency matching(1 st ~16 th speed frequency) 7: Frequency approach 8: Overload alarm level setting signal (the value of F1704) 9: Electric thermistor pre-alarm signal (80% of electric thermistor) 10: Radiator overheat pre-alarm signal 13: Excitation and DC braking signals 14: Lower frequency limit matching signal 15: Upper frequency limit matching signal 16: Servo on ready signal 17: Zero servo completion signal 18: FR signal 19: RR signal 20: 2DF signal 21: 3DF signal 22: 5DF signal 23: 9DF signal 24: AD2 signal 25: AD3 signal 26: JOG signal 27: MBS signal 28: ES signal 29: RST signal 32: Discharge resistor on signal 36: Overload alarm level setting signal (Including in Acceleration/Deceleration) 43: Low speed detection signal 48: Forward run detection signal 49: Reverse run detection signal	1	0
1518	Low speed matching Level	0~2000rpm	1rpm	100
1519	Low speed matching Range	0~100rpm	1rpm	10

Function Code List – System-Related Functions F16xx~F18xx

System-related Functions F16xx~F18xx				
Code	Function Name	Data content	Setting resolution	Factory preset
1601	Copy Function (Optional accessories)	0: No function 1: Transfer current code data to the operation panel 2: Transfer the contents stored by operation panel to the inverter (Excluding motor parameters measured) 3: Transfer the contents stored by operation panel to the inverter (Including motor parameters measured)	1	0
1602	Changing code display Function	0: No Function 1: Display differences from factory preset 2: Display differences from user's initial value	1	0
1603	Function Lock	0: Code data changeable (No lock function) 1: Code data unchangeable (except F1603) 2: Code data (except frequency setting-related) unchangeable (except F1603、F1021、F2101~ F2116) 3: Code data unchangeable (except F1603 and function code using communication)	1	0
1604	Data initialization	0: No function 1: Initialize factory presets 2: Invalid parameters by auto tuning 3: Initialize user's data 99: set user's initial value	1	0
1701	Output current limiting Function	A Mode 0: No function 50~200%	1%	150%
		B Mode 0: No function 50~150%		120%
1702	Electric thermal setting	0: No function 20~105%	1%	100

Code	Function name	Data content	Setting resolution	Factory preset
1703	Output current limit at constant speed	0: No function 1: Yes, V/f mode(Current acceleration/deceleration time) 2: Yes, V/f mode(1 st acceleration/deceleration time) 3: Yes, V/f mode(2 nd acceleration/deceleration time) 4: Yes, V/f mode (3 rd acceleration/deceleration time) 5: Yes, V/f mode (4 th acceleration/deceleration time) 6: Yes, V/f mode and speed vector control mode (1 st acceleration/deceleration time) 7: Yes, V/f mode and speed vector control mode (2 nd acceleration/deceleration time) 8: Yes, V/f mode and speed vector control mode (3 rd acceleration/deceleration time) 9: Yes, V/f mode and speed vector control mode (4 th acceleration/deceleration time)	1	0
1704	Overload alarm level Setting value	A Mode 20%~200%	1%	150
		B Mode 20%~150%	1%	120
1705	Motor Type	1: General-purpose motor 2: Exclusive motor for Inverter	1	1
1706	Function to switch "OV" And "LV" alarms when stopped	0: "ov"enabled; "Lv"disabled when stopped 1: "ov"disabled; "Lv"enabled when stopped 2: "ov"disabled; "Lv"disabled when stopped 3: "ov"enabled; "Lv"enabled when stopped	1	0
1707	Missing phase detection Function	0: No input phase loss, No output phase loss 1: Input phase loss, No output phase loss 2: No input phase loss, output phase loss 3: Input phase loss, output phase loss	1	3
1708	Overvoltage stalling prevention functions	0: No overvoltage stalling prevention functions 1: Overvoltage stalling prevention functions	1	1
1709	Feedback signal disconnection detection time	0: Only warning 0.01~119.99 sec. 120: No disconnection detection	0.01sec.	5

Code	Function Name	Data content	Setting resolution	Factory preset
1710	Carrier frequency varied by lowering temperature (Active when only A mode selected)	0: Disabled 1: Enabled	1	0
1801	Inverter host software Version query	Read only		Version
1802	Memory version query	Read only		Version
1803	Operation panel software Version query	Read only		Version
1804	Operation time display	Read only	1 hr.	---
1805	Reading alarm data	0: No function 1: Read start 9: Record erase	1	0
1806	Alarm status confirmation 1	Read only	---	---
1807	Alarm status confirmation 2	Read only	---	---
1808	Alarm status confirmation 3	Read only	---	---
1809	Alarm status confirmation 4	Read only	---	---
1810	Alarm status confirmation 5	Read only	---	---

Special Functions F19xx~F20xx

Special Functions F19xx~F20xx				
Code	Function Name	Data Content	Setting resolution	Factory preset
1901	Energy-saving mode selection	0: No function 1: Simple energy-saving mode (V/f mode) 2: Auto energy-saving mode	1	0
1902	Simple energy-saving rate	0~50%	1%	0
1903	Simple energy-saving time	0~65000 sec,	1sec.	10
2001	V·f separation function selection	1: V·f proportional separation 2: Complete separation	1	1
2002	V·f separation command voltage	0: No function (command given by VRF) 0.01~10.23V	0.01V	0
2003	Arbitrary V/f patten Intermediate voltage 1	0~460V	1V	0
2004	Arbitrary V/f patten Intermediate voltage 2	0~460V	1V	0
2005	Arbitrary V/f patten Intermediate frequency 1	0.05~600Hz	0.01Hz	20
2006	Arbitrary V/f patten Intermediate frequency 2	0.05~600Hz	0.01Hz	40
2007	Automatic torque boost selection	0: No automatic torque boost 1: Voltage compensation function 2: Slip frequency compensation	1	0
2008	Slip compensation response time constant	0~1000 (set value 1=10ms)	1	10
2009	Slip compensation multiple	0.01~2	0.01	1

Graph operation function F21xx~Fxx

Graph operation function F21xx~Fxx				
Code	Function Name	Data Content	Setting resolution	Factory preset
2101	1 st frequency	0~600Hz	0.01Hz	0
2102	2 nd frequency	0~600Hz	0.01Hz	10
2103	3 rd frequency	0~600Hz	0.01Hz	20
2104	4 th frequency	0~600Hz	0.01Hz	30
2105	5 th frequency	0~600Hz	0.01Hz	40
2106	6 th frequency	0~600Hz	0.01Hz	50
2107	7 th frequency	0~600Hz	0.01Hz	60
2108	8 th frequency	0~600Hz	0.01Hz	0
2109	9 th frequency	0~600Hz	0.01Hz	0
2110	10 th frequency	0~600Hz	0.01Hz	5
2111	11 th frequency	0~600Hz	0.01Hz	15
2112	12 th frequency	0~600Hz	0.01Hz	25
2113	13 th frequency	0~600Hz	0.01Hz	35
2114	14 th frequency	0~600Hz	0.01Hz	45
2115	15 th frequency	0~600Hz	0.01Hz	55
2116	16 th frequency	0~600Hz	0.01Hz	0
2201	Selection of scheduled operation	0: Normal operation 1: Simple scheduled operation 2: Disturbed operation	1	0
2202	Simple scheduled operation repetition	0: Continuous 1~250: Repetition count	1	1
2203	Operation timer T1	0~65000 sec.	1sec.	10
2204	Operation timer T2	0~65000 sec.	1sec.	10
2205	Operation timer T3	0~65000 sec.	1sec.	10
2206	Operation timer T4	0~65000 sec.	1sec.	10
2207	Operation timer T5	0~65000 sec.	1sec.	10
2208	Operation timer T6	0~65000 sec.	1sec.	10
2209	Operation timer T7	0~65000 sec.	1sec.	10
2210	Operation timer T8	0~65000 sec.	1sec.	10
2211	Operation timer T9	0~65000 sec.	1sec.	10
2212	Operation timer T10	0~65000 sec.	1sec.	10
2213	Operation timer T11	0~65000 sec.	1sec.	10

Code	Function Name	Data Content	Setting resolution	Factory preset
2214	Operation timerT12	0~65000 sec.	1sec.	10
2215	Operation timerT13	0~65000 sec.	1sec.	10
2216	Operation timerT14	0~65000 sec.	1sec.	10
2217	Operation timerT15	0~65000 sec.	1sec.	10
2218	Operation stop timer T0	0~65000 sec.	1sec.	10
2219	Midway stop deceleration time	1: 1 st deceleration time (value of F1016) 2: 2 nd deceleration time (value of F1017) 3: 3 rd deceleration time (value of F1018) 4: 4 th deceleration time (value of F1019)	1	1
2220	Midway start acceleration time	1: 1 st acceleration time (value of F1012) 2: 2 nd acceleration time (value of F1013) 3: 3 rd acceleration time (value of F1014) 4: 4 th acceleration time (value of F1015)	1	1
2221	Forward/reverse and Acceleration /deceleration in T1	X Y X...1: Forward 2: Reverse Y...1~4: Acceleration/deceleration time specified	---	11
2222	Forward/reverse and acceleration/deceleration in T2		---	11
2223	Forward/reverse and Acceleration/deceleration in T3		---	11
2224	Forward/reverse and Acceleration/deceleration in T4		---	11
2225	Forward/reverse and Acceleration/deceleration in T5		---	21
2226	Forward/reverse and Acceleration/deceleration in T6		---	21
2227	Forward/reverse and Acceleration/deceleration in T7		---	21
2228	Forward/reverse and Acceleration/deceleration in T8		---	11
2229	Forward/reverse and Acceleration/deceleration in T9		---	11
2230	Forward/reverse and Acceleration/deceleration in T10		---	11

Code	Function Name	Data Content	Setting resolution	Factory preset
2231	Forward/reverse and Acceleration/deceleration in T11		---	11
2232	Forward/reverse and Acceleration/deceleration in T12		---	21
2233	Forward/reverse and Acceleration/deceleration in T13		---	21
2234	Forward/reverse and Acceleration/deceleration in T14		---	21
2235	Forward/reverse and Acceleration/deceleration in T15		---	21
2236	Disturb modulation analog input switching	0: No analog input 1: External analog VRF voltage (0~5V) 2: External analog VRF voltage (0~10V or potentiometer) 3: External analog V/I voltage (0~5V) 4: External analog V/I voltage (0~10V or potentiometer) 8: External analog V/I current (4~20mA)	1	0
2237	Disturb modulation rate	0~50%	1%	0

Display Function F23xx

Display Function F23xx				
Code	Function Name	Data Content	Setting resolution	Factory preset
2301	LCD contrast adjustment	1~16	1	8
2303	LCD 's 1 st screen display parameters setting(1-5)	0: No display 1: Frequency[Hz] 2: Output current[A] 3: Speed[rpm] 4: Load factor[%] 5: Output voltage[V] 6: DC voltage[V] 7: Active power[kW] 8: Apparent power[kVA] 9: Radiator Temperature[°C] 10: Command speed[rpm] 11: PID1 feedback value[Hz] 12: PID2 feedback value[Hz] 13: VRF analog input value 14: V/I analog input value 17: Partial excitation current[A] 18: Partial torque current[A] 20: Set pressure[Mpa] 21: Command pressure[Mpa] 22: Feedback pressure[Mpa] 32: Command frequency[Hz] 33: Command torque[%] 42: Target frequency[Hz] 43: Output frequency[Hz] 99: Factory adjustment	1	1

Code	Function Name	Data Content	Setting resolution	Factory preset
2304	LCD 's 2 nd screen display parameters setting	1: No unit (Multiple of F1203) 2: Output voltage [V] 3: DC voltage[V] 4: Active power [kW] 5: Apparent power [kVA]. 6: Radiator temperature [°C] 7: Command speed [rpm] 8: PID1 feedback value [Hz] 9: PID2 feedback value [Hz] 10: VRF analog input value [Hz] 11: V/I analog input value [Hz] 14: Partial excitation current [A] 15: Partial torque current [A] 17: Set pressure[MPa] 18: Command pressure[MPa] 19: Feedback pressure[MPa] 20: Regular pump to switch calculating time 29: Command frequency [Hz] 35: Detection speed [rpm] 44: Target frequency [Hz] 45: Output frequency [Hz]	1	2
2306	LCD backlight out time	0: off 1~600: the time until it goes off 999: Normally on	1min.	10

PID Function F30xx~F33xx

PID Function F30xx~F33xx				
Code	Function Name	Data Content	Setting resolution	Factory preset
3001	PID1 command value input switching	1: Frequency 2: External analog VRF voltage (0~5V) 3: External analog VRF voltage(0~10V or potentiometer) 4: External analog V/I voltage (0~5V) 5: External analog V/I voltage(0~10V or potentiometer) 9: External analog V/I current (4~20mA) 11: Function code setting (F3017)	1	1
3002	PID1 Feedback input switching	0: No input 1: External analog VRF voltage (0~5V) 2: External analog VRF voltage(0~10V or potentiometer) 3: External analog V/I voltage (0~5V) 4: External analog V/I voltage (0~10V or potentiometer) 8: External analog V/I current (4~20mA) 10: Communication mode	1	0
3003	PID1 control proportion gain	0~100	0.01	0.1
3004	PID1 control integral time	0.01~100 sec.	0.01 sec.	1
3005	PID1 control differential time	0~100 sec.	0.01 sec.	0
3006	PID1 control integral separation judgement value	5~100% (upper frequency limit reference)	0.1%	100
3007	PID1 feedback signal Input filter time constant	1~500 (set value 1=10ms)	1	10
3008	Indirect PID1 input reference	5~100% (Target value reference)	0.1%	20
3009	PID1 deviation limit value	0: No limit 1~100% (Upper frequency limit reference)	0.1%	100
3010	PID1 output limit value	0: No limit 1~100% (Upper frequency limit reference)	0.1%	100

Code	Function Name	Data Content	Setting resolution	Factory preset
3011	PID1 operation polarity switching	1: Command value-feedback value 2: Feedback value-command value	1	1
3012	PID1 gain polarity switching	1: The positive or negative deviation indicates the same gain 2: The positive or negative deviation indicates the different gain	1	1
3013	PID1 command value gain	0~50	0.01	1
3014	PID1 feedback value gain	0~50	0.01	1
3015	PID1 control proportional gain(negative F3012=2)	0~100	0.01	0.1
3016	PID1 control integral time (negative : F3012=2)	0.01~100 sec.	0.01 sec.	0.1
3017	PID1 control command value	0~6000	0.1	0
3018	PID1 control feedback value (communication function)	0~6000	0.1	0
3019	Frequency corresponding to PID1 control max. command value	0~600Hz	0.01Hz	60
3101	PID2 command value Input switching	1: Frequency 2: External analog VRF voltage (0~5V) 3: External analog VRF voltage (0~10V or potentiometer) 4: External analog V/I voltage (0~5V) 5: External analog V/I voltage (0~10V or potentiometer) 9: External analog V/I current (4~20mA) 11: Function code setting (F3117)	1	0

Code	Function Name	Data Content	Setting resolution	Factory preset
3102	PID2 Feedback input switching	0: No input 1: External analog VRF voltage (0~5V) 2: External analog VRF voltage (0~10V or potentiometer) 3: External analog V/I voltage (0~5V) 4: External analog V/I voltage (0~10V or potentiometer) 8: External analog V/I current (4~20mA) 10: Communication mode	1	0

Code	Function Name	Data Content	Setting resolution	Factory preset
3103	PID2 control proportional gain	0~100	0.01	0.1
3104	PID2 control integral Time	0.01~100 sec.	0.01 sec.	1
3105	PID2 control dividential Time	0~100 sec.	0.01 sec.	0
3106	PID2 control integral speparation judgement value	5~100% (Upper frequency limit reference)	0.1%	100
3107	PID2 feedback signal Input filter time constant	1~500 (set value 1=10ms)	1	10
3108	Indirect PID2 input Reference	5~100% (Target value reference)	0.1%	20
3109	PID2 deviation limit value	0: No limit 1~100% (Upper frequency limit reference)	0.1%	100
3110	PID2 output limit value	0: No limit 1~100% (Upper frequency limit reference)	0.1%	100
3111	PID2 operation polarity switching	1: command value-feedback value 2: feedback value-command value	1	1
3112	PID2 gain polarity Switching	1: The plus or minus deviation indicates the same gain 2: The plus or minus deviation indicates the different gain	1	1
3113	PID2 command value gain	0~50	0.01	1
3114	PID2 Feedback value Gain	0~50	0.01	1
3115	PID2 control proportional gain (Negative : F3012=2)	0~100	0.01	0.1
3116	PID2 control integral time (negative : F3012=2)	0.01~100 sec.	0.01sec.	0.1
3117	PID2 control command Value	0~6000	0.1	0
3118	PID2 control feedback value (communication function)	0~6000	0.1	0

Code	Function Name	Data Content	Setting resolution	Factory preset
3119	Frequency corresponding to PID2 control max. command value	0~600Hz	0.01Hz	60
3123	PID start mode selection	1: Direct input mode 2: Condition input mode	1	1
3124	PID end mode selection	1: Direct end mode 2: Condition end mode	1	1
3125	PID end setting value	1~100% (upper frequency limit standard)	0.1%	20
3127	PID feedback signal abnormal detection time	0: Only warning 0.01~119.99 sec. 120: No abnormal detection	0.01 sec.	2
3201	PID control action selection	0: Open loop control 1: PID1 control 2: PID2 control 4: External terminal switching PID control 5: Timing switch PID control	1	0
3203	External PID control selection	0: No external PID control 1: PID1 external control 2: PID2 external control 4: PID1 and PID2 external control	1	0
3204	External PID operation mode selection	1: Operation interlock with Inverter operation 2: PID output after power input 3: PID output controlled by external terminals	1	1
3205	PID constitution selection	0: without command value addition calculation 1: with command value addition calculation	1	0
3206	Command value addition Calculation PID control gain	0.01~100	0.01	1
3207	PID1/PID2 switching time	0.1~6000 min.	0.1 min.	0.1
3301	Reading PID1 command Value	Ready only	1	---
3302	Reading PID1 feedback Value	Ready only	1	---

Code	Function Name	Data Content	Setting resolution	Factory preset
3303	Reading PID1 input Deviation	Read only	1	---
3304	Reading PID1 output Value	Read only	1	---
3305	Reading PID2 command Value	Read only	1	---
3306	Reading PID2 feedback Value	Read only	1	---
3307	Reading PID2 input Deviation	Read only	1	---
3308	Reading PID2 output Value	Read only	1	---

Water Supply Function F34xx

Water Supply Function F34xx				
Code	Function Name	Data Content	Setting resolution	Factory preset
3401	Water supply mode Selection	0: Water supply function disabled 1: Single Pump Mode	1	0
3402	Lower limit range continued time T1	0.1~10 Min.	0.1min.	5
3403	Sleep wake up ratio K	30~95%	1%	50
3404	Sleep wake up Judgement time Tp	0.1~10 min.	0.1min.	5
3405	Pressure command Pref	0~9.999MPa	0.001MPa	0
3406	Analog feedback upper pressure limit	0~±9.999MPa	0.001MPa	0
3407	Analog feedback lower Pressure limit	0~±9.999MPa	0.001MPa	0
3408	Upper pressure value limit Ph	0.001~9.999MPa	0.001MPa	1
3409	Lower pressure value limit PL	0~9.999MPa	0.001MPa	0
3410	The slip of pressure in Acceleration /Deceleration	0.001~9.999MPa	0.001MPa	0.1
3411	Allowed deviation on Motor switching	0.0-20.0%	0.1%	0.0

Communication Functions F40xx~F41xx

Communication Functions F40xx~F41xx				
Code	Function Name	Data Content	Setting resolution	Factory preset
4001	Message checksum	0: No 1: Yes	1	1
4003	Pull up/Down function	0: No 1: Yes	1	1
4004	Communication response time	10~6000ms	1ms	10
4005	Serial communication function	0: No function 1: Dedicated protocol communication function 2: ModBus communication function	1	1
4006	Inverter No.	0~254; for Modbus only (1~32; RS485 communication)	1	1
4007	Communication speed	1: 1200bps 5: 19200bps 2: 2400bps 6: 38400bps 3: 4800bps 7: 57600bps 4: 9600bps	1	4
4008	Parity bit	0: No 1: Odd 2: Even	1	1
4009	Stop bit	1: 1 bit 2: 2 bits	1	1
4010	End bit	0: CR+LF 1: CR	1	0
4011	Inverter response to specified commands	0: Sent 1: No sent (Error response sent) 2: No sent (No error response sent)	1	0
4101	ModBus communication timeout setting	0: No function 0.01~600 sec.	0.01 sec.	0
4102	ModBus communication timeout action	0: Keep the status 1: Stop alarms	1	0
4103	Modbus register address switching	1: Register No. A 2: Register No. B	1	1

Motor Parameters F5xxx

Motor Parameters F5xxx				
Code	Function Name	Data Content	Setting resolution	Factory preset
5001	Motor poles voltage capacity	X Y ZZZ X: Poles Y: Rated Voltage Z: Motor Capacity	—	※ 1
5002	Motor current rating	0.1~999.9A About 30~110% of the Inverter current rating	0.1A	※ 1
5003	Motor frequency rating	10~600Hz	1Hz	※ 1
5004	Motor speed rating	0~24000 rpm	1rpm	※ 1
5005	Motor insulation type	1: Type A 2: Type E 3: Type B 4: Type F 5: Type H	1	※ 1
5006	Motor's rated voltage during auto tuning of parameters	0: The voltage selected by F5001 100~460V	1V	0
5007	Rated motor slip ratio	0~50%	0.1%	2
5008	The setting of motor parameters auto tuning range	0: No range 50~300%	0.1%	200
5009	Motor stator resistance	55kW or below	0.001 ~ 65 Ω	0.001Ω
		75kW or above	0.01~650m Ω	0.01mΩ
5010	Motor rotor resistance	55kW or below	0.001 ~ 65 Ω	0.001Ω
		75kW or below	0.01~650m Ω	0.01mΩ
5011	Motor stator inductance	55kW or below	0.1 ~ 6000mH	0.1mH

		75kW or above	0.01 ~ 600mH	0.01mH
5012	Motor rotator inductance	55kW or below	0.1 ~ 6000mH	0.1mH
		75kW or above	0.01 ~ 600mH	0.01mH
5013	Motor's mutual inductance	55kW or below	0.1 ~ 6000mH	0.1mH
		75kW or above	0.01 ~ 600mH	0.01mH
5014	Motor excitation current	0.01~650A	0.01A	※ 1
5015	Motor's moment of inertia	0~65kgm ²	0.001kgm ²	※ 1
5016	Load's inertia moment ratio	1~200 times	0.01 times	1

Vector Control F60xx

Vector Control F60xx				
Code	Function Name	Data Content	Setting resolution	Factory preset
6001	Torque limiter (Power running)	A Mode	0~200%	0.1%
		B Mode	0~150%	0.1%
6002	Torque limiter analog Input function (Power running)	0: F6001 1: External analog VRF voltage (0~5V) 2: External analog VRF voltage (0~10V or potentiometer) 3: External analog V/I voltage (0~5V) 4: External analog V/I voltage (0~10V or potentiometer) 8: External analog V/I current (4~20mA)	1	0
6003	Torque limiter (Regeneration)	A Mode	0~200%	0.1%
		B Mode	0~150%	
6004	Torque limiter analog Input function (Regeneration)	0: F6003 1: External analog VRF voltage (0~5V) 2: External analog VRF voltage (0~10V or potentiometer) 3: External analog V/I voltage (0~5V) 4: External analog V/I voltage (0~10V or potentiometer) 8: External V/I current (4~20mA)	1	0
6005	Multiple for starting excitation current	0.1~2 times (for applicable motor)	0.01 times	1
6006	Starting excitation time	0: No starting excitation 0.1~10 sec.	0.1 sec.	※ 1
6007	Multiple for braking excitation current	0.1~2 times (for applicable motor)	0.01 times	1
6008	Braking Excitation time	0: No braking excitation 0.1~10 sec.	0.1 sec.	1
6009	Current control gain compensation	0.5~1.5	0.01	1
6010	Speed control ASR Proportional gain	0.01~150%	0.01%	※ 1
6011	Speed control ASR Integral time	0~20 sec.	0.001 sec.	※ 1

Code	Function Name	Data Content	Setting resolution	Factory preset
6014	Motor vibration reduction rate	0: No Function 1: 75% 2: 50% 3: 25%	1	0
6015	Lower frequency limit for motor vibration reduction function	0~240Hz	0.01Hz	0
6016	Upper frequency limit For motor vibration reduction	0~240Hz	0.01Hz	0
6017	Starting Torque	0~100%	0.1%	30
6018	Starting torque Duration time	0~6500 sec.	0.1sec.	1
6019	Variable 2 nd gain for Speed control	0: No variable gain function 0.01~150%	0.01%	15
6020	Frequency top of variable gain for speed control	0~240Hz	0.01Hz	10
6021	Frequency bottom of variable gain for speed control	0~240Hz	0.01Hz	30

■ Water supply function code description

F3401	Water Supply Mode
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■ F3401=0, Water supply function disabled

■ F3401=1, Selected single pump water supply

Please set the related code with pressure as the actual needing: F3405 (pressure command)、F3406 (analog feedback: pressure bias)、F3407 (analog feedback: pressure gain)

F3402	Lower limit range continued time T l
-------	--------------------------------------

Pls. set the judging time from Inverter output frequency to the lower frequency limit till to reduce the motor driving.

The reference for the code setting value is varied with the time of pressure changing, the shortest time is the better under the range of no oscillation.

F3403	Sleep wake up ratio K
-------	-----------------------

F3403 is available with only using auxiliary pump, which is judge whether is needing to switch the auxiliary pump to Inverter pump

Judgement equation:

$$K \cdot F^* \geq F_f \dots (1)$$

F^* is frequency command, F_f is frequency feedback value, $k(\leq 1)$ is auxiliary pump switch ratio.

While using pressure command, frequency command turns into pressure command, and frequency feedback value turned into pressure feedback value. The larger K , the slower switching to Inverter pump. By the way, that function code also used for main pump sleep wake up, the same method as the above.

F3404	Sleep wake up decision time T_p
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This function code is used in the main pump sleep wake up

F3404 is availability with only using auxiliary pump, Pls. set the decision time to switch to Inverter

Pump under the condition of meeting F3403. The reference time to set is the shorter the best without Oscillation.

F3405	Pressure command P_{ref}
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F3405 is used for set pressure command value through operation panel, While $F3405 \neq 0$, even setting $F3001=2、3、4、5、9$, it is invalid for analog reference pressure value. Action as the pressure command setted by F3405.

While $F3405=0$, If set code $F3001=2、3、4、5、9$, which is analog reference. Pressure command decided by analog value.

While $F3405=0$, and $F3001=1$ (frequency reference), run as the frequency mode.

F3406	Analog feedback upper pressure limit
-------	--------------------------------------

F3406 is valid code under the control mode of pressure command given
 While F3002=1、3、5 : Set pressure value at 5V
 While F3002=2、4、6 : Set pressure value at 10V
 While F3002=7、8、9 : Set pressure value at 20mA

F3407	Analog feedback lower pressure limit
-------	--------------------------------------

F3407 is valid code under pressure command given control mode.
 While F3002=1~6 : Pressure value setting as at 0V
 While F3002=7~9 : Pressure value setting as at 4mA

F3408	Upper pressure value limit PH
-------	-------------------------------

F3408 is valid code under the control mode of pressure command given.
 While F3001=2、4 : Pressure value setting as at 5V
 While F3001=3、5 : Pressure value setting as at 10V
 While F3001=9 : Pressure value setting as at 20mA
 While F3405>F3408 , Pressure value is limited to the upper limit setting value of F3408

F3409	Lower pressure value limit PL
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F3409 is valid code under the control mode of pressure command given.
 While F3001=2、3、4、5 : Set pressure value at 0V
 While F3001=9 : Set pressure value at 4mA
 While F3405<F3409 , Pressure command is limited to the lower setting value of F3409 limit

F3410	The slop of pressure acceleration/deceleration
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F3407 is the ratio of setting pressure variations under the control mode of pressure command given
 Higher setting value, the faster change of speed.

F3411	Allowable deviation for Motor switching
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This code for setting the allowable deviation for Motor switching, 1% of pressure value for setting unit. The suitable value in setting will be improved the stabilities of system, and in avoid of frequently switching action.

F1901	Energy-saving mode selection
F1902	Simple energy saving rate
F1903	Simple energy saving time

These codes are for the selection of energy saving mode, parameters setting for the operation of energy saving.

Code	Function Name	Data Content	Setting resolution	Factory preset
F1901	Energy-saving selection Mode	0: No Function 1: Simple energy-saving Mode (V/f Mode) 2: Auto energy-saving mode	1	0
F1902	Simple energy-saving rate	0~50%	1%	0
F1903	Simple energy-saving time	0~65000 Sec.	1 Sec.	10

■ F1901=1 Simple energy-saving Mode (V/f)

This code can execute energy saving with the setting of F1902、F1903.

Details for the references of F1902 和 F1903 description

■ F1901=2 Inverter operates on the conditions of auto energy saving.

After selecting this mode, No need to set the others parameters, Inverter can enter into the auto saving operation.

It performs obviously on the stable output, especially for the loading of fan and pump. The energy saving still enabled, even if the loading is slightly changed.

■ F1902=0~50% Simple energy-saving rate.

This code used for setting the recommend rate of voltage dropped under energy-saving mode.

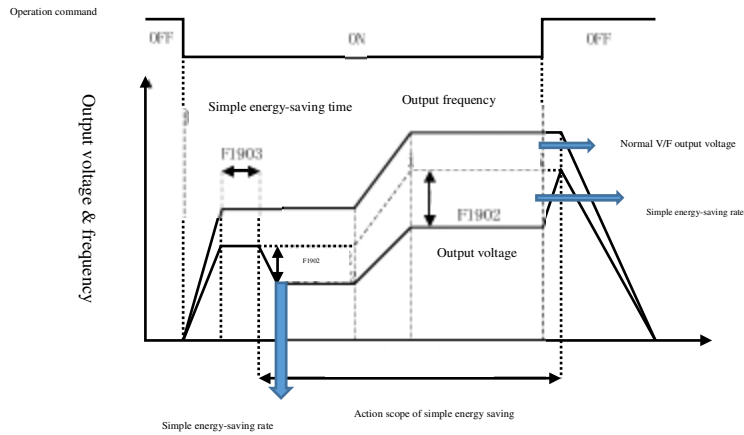
For example: Rated output voltage: 300V, and F1902=20%, The output voltage will decrease to $300 \times (1 - 20\%) = 240V$, operation frequency no changing on the conditions of energy-saving mode.

Simple energy saving function can be adjusted by hand, making the related Voltage/Frequency in compliant with the load characteristics and torque characteristics in order to get the best performance of energy-saving.

■ F1903=0~65000

This code is used for setting the delay time of running energy-saving while the conditions are ready.

While Inverter finished accelerating and running stable, is satisfied to simple energy saving, set the value of F1903 in order to find the suitable time into the operation of simple energy-saving mode.



■ Complemental descriptions for operation of energy-saving function:

◆ While inverter were on the conditions of energy-saving, output voltage satisfied with voltage decrease rate to execute V/F control, even under frequency command changing. But, while Inverter stop command given, the original output voltage slowly increased till to completely recovery, and then turned into deceleration procedure.

◆ Turned into simple energy-saving action, the voltage decreased slowly in avoid of drastically changing for the torque of loading, should be kept the slope around 10 sec. for Max. output voltage value.

For example: Inverter Max. output voltage is 440V, Normally run at 22.7Hz, and output voltage is 200V,

Simple energy-saving rate is 50%, so, approximately it could take around 2.3 sec. to drop the voltage to 100V.

◆ Disabled simple energy-saving condition through using stop command, needs the fast recovery of voltage in avoid of not enough torque for loading, and causing the decline for control capacity. It should make slope of 1 sec. for Max. output voltage.

For example: Inverter max. output voltage is 440V run at 22.7Hz output voltage 200V, and simple energy-saving rate is 50%, it is needing 0.23 sec. from 100V up to 200V when exited from the simple energy-saving action, and then do the action of deceleration while the voltage was recovered.

■ Note for the application of simple energy-saving mode:

- ◆ Simple energy-saving function decreased the output voltage of Inverter. Therefore, the voltage dropped caused the decreased rotation speed due to the different conditions of loading. If some equipments are not permitted to reduce the rotation speed, it is needing the complimentary of energy-saving and rotation in accordance with auto energy-saving mode (Speed Control) and the combination of PID control.
- ◆ Do not use this method, if the performance of energy-saving is not good even through decreasing the voltage.
- ◆ Re-judge the condition and start the simple energy-saving, while starting through flying、 Alarm auto recovery、 Momentary stop and re-start.
- ◆ The stop action during the simple energy-saving is the output voltage returned to the original value, and then into the action of deceleration, so, the stop time could be slightly changed. The recovery time is needed under the occasion of existing the sequency control.

■ Description for auto energy-saving function:

- ◆ Action of auto energy-saving is on the basis of V/f control method and speed control method, pls. use the function code F1001 for selection.
- ◆ This function could automatically calculate voltage value in higher efficiency, and play a role of stability and energy-saving functions.
- ◆ V/f patten for auto energy-saving mode is linear patten
- ◆ Even auto energy-saving mode is set, it also work at normal control method during the action of acceleration/deceleration.
- ◆ Stop action in Auto energy saving, which is different with that of simple energy-saving. Stop command and action of deceleration is at the same time, therefore, stop time is also the same as the normal action. But, while reclaimed energy can't be completely absourbed, and torque limiter needed in some occassions, the pronlong deceleration time as referring the protective function.

- ◆ Auto saving control is effective during constant torque operation. When rated speed has been exceeded during constant power operation, a weak magnetic control will be adopted as normal modes.

■ Compliment description for energy-saving functions

- ◆ On the occasion of energy-saving、 Motor speed control、 the others feedback control using at the same time, energy-saving function could be executed with PID control function if the system was installed sensor.
- ◆ The better performance for the square torque loading, such as fan、 pump and the others light load, but it is not valuable in energy-saving for constant torque loading of heavy load.
- ◆ Re-set auto energy-saving function under re-start through Flying function、 Alarm auto-recovery function、 Momentary re-starting function.
- ◆ Action of energy-saving is effective during constant speed operation of stable loading torque(frequency matching condition). Therefore, on the occasions of frequency setting through analog frequency input, Energy-saving is effective for slowly change of frequency setting through increasing frequency matching range (F1508) .
- ◆ On the occasions of F1001=2、 3 (Speed Control Mode), the speed should be compensated during energy saving.

Alarm list

7-segment monitor display	Alarm description	Check points	Actions
AL1	Memory Abnormality	Turn off the power, while CHARGE Lamp turn off, turn the power on again, And check the alarm.	Contact the supplier
AL2 AL3	System Abnormality	Excessive external noise? Are the signal and power lines separated far enough?	Install a noise collector or filter Keep the signal line far away from the power line
AL4	System Abnormality	Abrupt capacitor discharge? turn off the power, so, the CHARGE Lamp turn off, turn the power on again and check the alarm.	Reconfirm the modified code data. Turn the power on/off several times, if the alarm is still on, pls. reset the system, using F1604=1, and then turn power on and off again, All the function data is initialized to the factory preset.
AL5 AL9	System Abnormality	Excessive external noise? Are the signal and power lines separated far enough?	Install the noise collector and filter. Keep the signal line far away from the power line

AL10	System Abnormality	Turn off the power, while CHARGE lamp turns of, turn the power on again and check the alarm again.	Contact the local supplier
ACER	Overload prevention during acceleration	Setting for output current limiting function is too small?	Increase the setting value of F1701 Prolong acceleration/deceleration time
CnEr	Overload Prevention during constant speed		
dCEr	Overload prevention during deceleration		
ES	External Thermistor alarm	Motor overheated? Function setting are correct?	Reduce the load Re-set the function codes correctly (F1413)

7 segments monitor display	Alarm Description	Check points	Actions
oH	Radiator temperature abnormally	Fans stopped? Ambient temperature too high?	Check fan operation. Increase the ventilation.
LuA	Under voltage during acceleration	Whether power supply conditions is good? Whether voltage dropped?	Improve the power supply conditions.
Lun	Under voltage during constant speed		
Lud	Under voltage during deceleration		
oCH	Main switch element temperature abnormality	Fans stopped? Ambient temperature too high?	Checking fan operation. Increase the ventilation.
oCA	Overcurrent during acceleration	Abrupt acceleration/deceleration Operation?	Extended acceleration/deceleration time Correct short-circuited or ground fault
oCn	Overcurrent during constant speed	Output short-circuited or ground fault? Main switch elements abnormality?	Contact the local supplier when the alarms are issued repeatedly .
oCd	Overcurrent during deceleration		
oCPA	Momentary overload during acceleration	Excessive acceleration rate? Setting for current limiting function (F1701) too high?	Extend the acceleration time. Decrease the setting value.
oCPn	Momentary overload during constant speed.	Abrupt change in load? (Increase) Setting for current limiting function (F1701) too high?	Eliminate the abrupt change(Increase) Decrease the setting value.

7- segment monitor display	Alarm description	Check points	Actions
oCPd	Momentary overload during deceleration	Excessive deceleration rate with GD ²⁷ setting for current limiting function (F1701) too high?	Extend the deceleration time. Decrease the setting value.
oLA	Overload during acceleration	Motor operated with an excessive load? Electrothermal level set properly? Load GD ² too larger?	Reduce the load.
oLn	Overload during constant speed		Increase the capacity of Inverter and Motor.
old	Overload during deceleration		
ouA	Overvoltage during acceleration	Whether start-up occur during idle run.	Change to flying start mode.
ouN	Overvoltage during constant speed	Whether motor is turned by Other force?	Redesign the system so that the motor is not driven by external force.
oud	Overvoltage during deceleration	Excessive deceleration	Extened the deceleration time. (so that GD ² of the load is met)
ouP	Brake resistor overvoltage protection	Whether the frequency of braking is too high?	Reduce the braking frequency. Increase the brake resistor capacity.
GAL1	Disconnection of feedback signal cable (during PID control action)	Feedback signal cable disconnected? Feedback signal correct? Gain frequency correct? (F1402、F1404)	Checking feedback signal cable and connected securely. Set gain frequency properly. (F1402、F1404)

7- segment monitor display	Alarm description	Check points	Actions
GAL 2	Overspeed	Over-shoot or under-shoot happened?	Confirm speed command value or torque command value.
GAL 3	Modbus communication timeout	Communication cable disconnected?	Confirm communication cables are connected securely.
PonG	Power supply abnormality	+24V power supply output from the control circuit overloaded or shortened?	Check the +24V output power supply for load conditions.
oPn o	Missing output phase	Missing an output phase?	Connect the output cables securely.
oPn i	Missing input phase	Missing an in input phase?	Check and improve the input current..
Gnd F	Check grounding short-circuit current	Short-circuited when grounding?	Confirm output cable and motor insulation performance.
FAn L	Cooling fan abnormality	Cooling fan is working?	Check the fan performance
rYoFF	Main relay abnormality	Turn of power and wait untill CHARGE lamp turns off, turn the power on again and check the alarm?	Contact the supplier.

Fault Analysis

Problem		Check points
Motor does not rotate	Main circuit	Voltage at input terminals R、S、T are normal? Whether is the motor wired correctly?
	Load side	Load too heavy? Motor locked?
	Operator panel	Starting frequency setting too high (F1103)? Operation start frequency (F1104) setting too high? Operation command selected for control by external signal (F1102=2)? Upper frequency limit set too low (F1007) ? 2 nd upper frequency limit(F1316)and 3 rd upper frequency limit selected by multi-function input signal are setting too low? Checking whether is no setting for the direction of rotationof motor (F1109)
	Input signal	Whether operation signals (FR、RR) is input? FR and RR signals are input simultaneously? Idle run stop signal (MBS)? Analog frequency for frequency setting is zero?
Rotation direction reversed what it should be.		Wrong wiring of output U、V、W terminals? Wrong wiring of forward、reverse?
Rotation speed does not increase		Upper frequency limit (F1007) activated? Output current limiting function activated? F1701 setting too low? Torque increased is too high (F1004)? Load too heavy?
Rotation is not stability		Load fluctuating? Frequency setting (analog) signal fluctuating? Whether is correct setting for the capacity of Inverter ; number of poles and capacity of motor under sensorless speed control mode?
Unstability during acceleration/deceleration		Setting time for acceleration/deceleration too short? Output current limiting function activated? Load too heavy?
Motor heating up		Wrong setting for V/f Mode? Torque compensation too high?
Rotation speed changed abnormally during operation		Whether is the load fluctuating? Output current limiting function activated F1701 setting too low?
No display on the surface operator panel		Voltage at R、S、T terminal are normal? Whether the connection between Inverter and operation panel is the standard

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