SAVCH ELECTRIC

S200 Series Inverter

VF General Type

User Manual

创无限 Innovate for more 赢久远 Win forever

SAVCH

User Manual

S200 Series Inverter

VF General Type

User Manual

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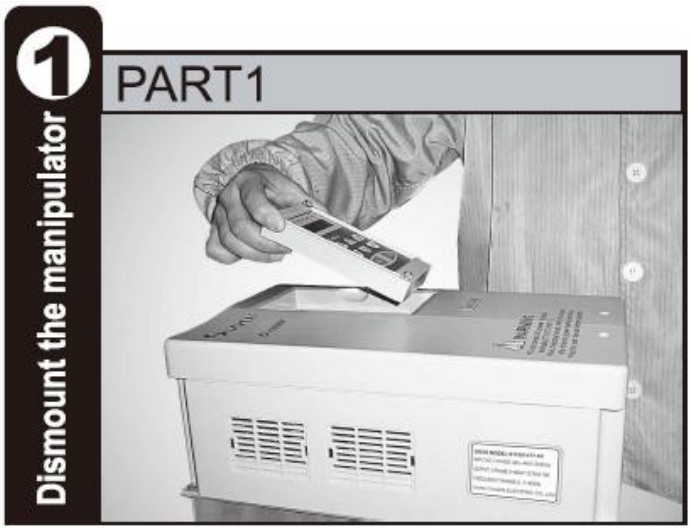
SAVCH electric provide a full range of technical support for our customers.

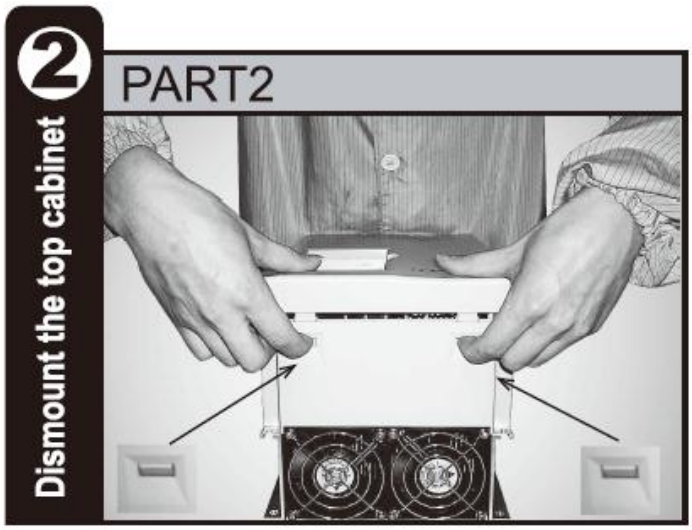
All users could contact with the nearest SAVCH office or service center,

also could contact with our headquarters directly.

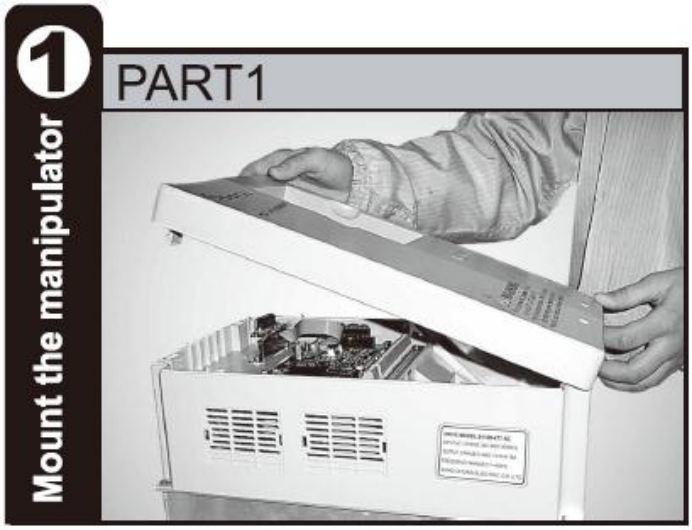
S200-4T7.5G~4T15P Diagram for removing and mounting the front cover

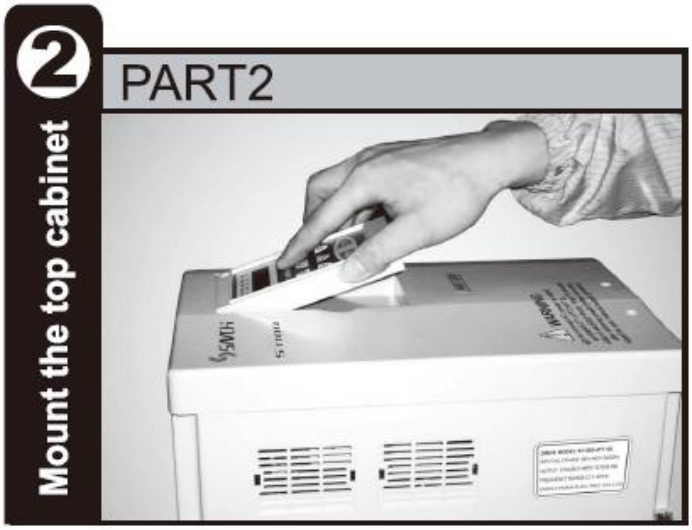
Remove the front cover according to the following steps:





Assemble the front cover according to the following steps:





CONTENT

PREFACE 1
1. SAFETY INSTRUCTIONS 2
1.1 Notes for Operation 2
1.2 Notes for Operation Environment 4
2. DESCRIPTIONS FOR SAVCH AND INSTALLATION 5
2.1 Operation Environment 5
2.2 Model Description 6
2.3 Product Specification 7
2.4 Wiring 13
2.5 External Dimensions 15
3. DESCRIPTION OF OPERATORS 17
3.1 Keyboard Description for IP03/IP05 Digital Operator 17
3.2 LED Monitor Descriptions 18
3.3 Preliminary Operation-Not Connecting With Motor 19
4. LIST OF DESCRIPTIONS FOR FUNCTIONAL PARAMETERS 21
5. DESCRIPTION OF FUNCTIONAL PARAMETERS 28
0 System parameters 28
1 Basic Parameters 29
2 External Terminal Parameters 34
3 Analog output / input function parameters 39
4 Multi-step Speed and Program Operation Parameters 41
5 Special Parameters 41
6 Motor setting parameters 45
7 Protection Parameters 45
8 Communication Parameters 49
11 Special Parameters 56
12 Special Parameters 56
13 Special Parameters 57
14 Factory Parameters 58
6. TROUBLE SHOOTING 59
6.1 Fault and Corrective Measures 59
6.2 Troubleshooting for Faults In General 61
7. MAINTENANCE AND AMBIENT ELEMENTS 62

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:rounding Ⅲ; 440V level:Special Grounding

⚠ CAUTION
●Do not perform a withstand voltage test for components of inverter, it can cause semi-conductor 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. SAFETY INSTRUCTIONS

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.

⚠ CAUTION
●When delivering the inverter, do not take the cover directly. Take the air fan seat to prevent the cover got off. Inverters getting off which may cause damage to personal or machine shall be avoided. ●Install the inverter on metal or other non-inflammable materials. Do not fix it on inflammable materials which may cause a fire hazard. ●In case of several inverters are installed together in one control panel, a fan shall be prepared to make sure temperature lower than 40℃, thus over-heating or a fire hazard shall be avoided. ●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.

⚠ CAUTION
Make sure applied power supply comply with label showed on the right of the machine. Failure to observe this may cause action failure.

During 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.

⚠ CAUTION
Do not perform dismantling or checks while power supply and charging indicator" CHARGE" are still on.

During check and maintenance

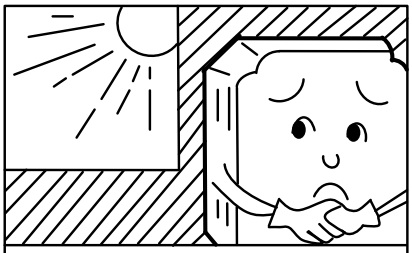
⚠ CAUTION
Ambient temperature for operating the inverter shall be -10℃ to + 40℃ and 90%RH non moistring condensation.

⚠ CAUTION
After removing the dust-cover, ambient temperature for operating the inverter shall be -10℃ to + 50℃ and 95%RH non moistring 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.

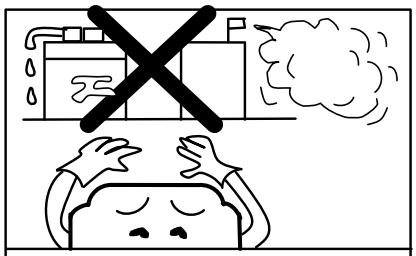
During rejection

⚠ 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.

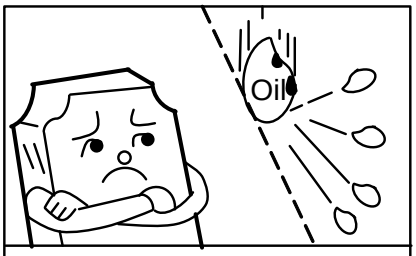
1.2 Notes for Operation Environment



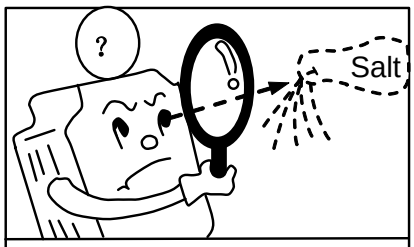
Direct sunlight



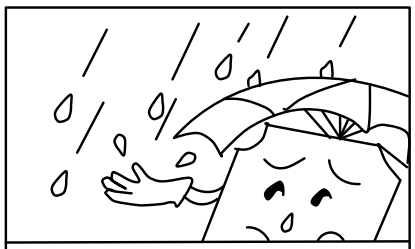
Corrosive gas or fluids



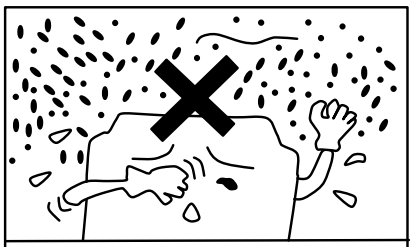
Oil



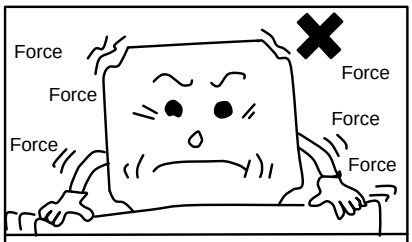
Salt or saline



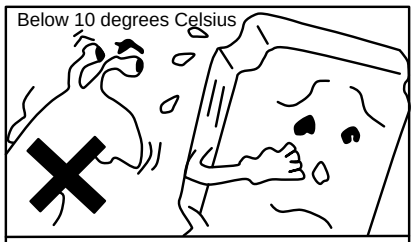
Rain, moisture



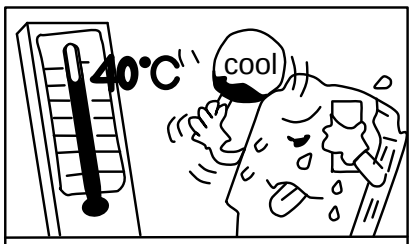
Iron chips and dust



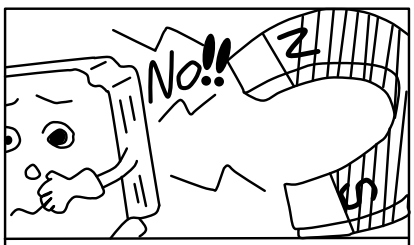
Large impelling



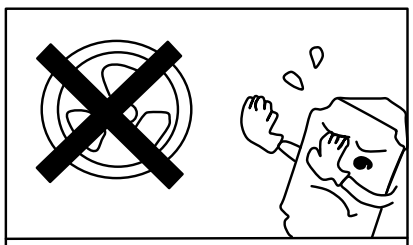
Extreme low temperatures



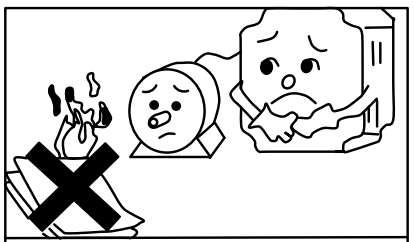
Extreme high ambient temperatures (Above 40℃)



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



Radioactive materials



Locations of inflammable materials

2. DESCRIPTIONS FOR SAVCH AND INSTALLATION

2.1 Operation 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.

Rain, moisture

Direct sunlight.(Avoid using outdoors)

Corrosion of oil sprays or salt

Corrosive fluid and methane

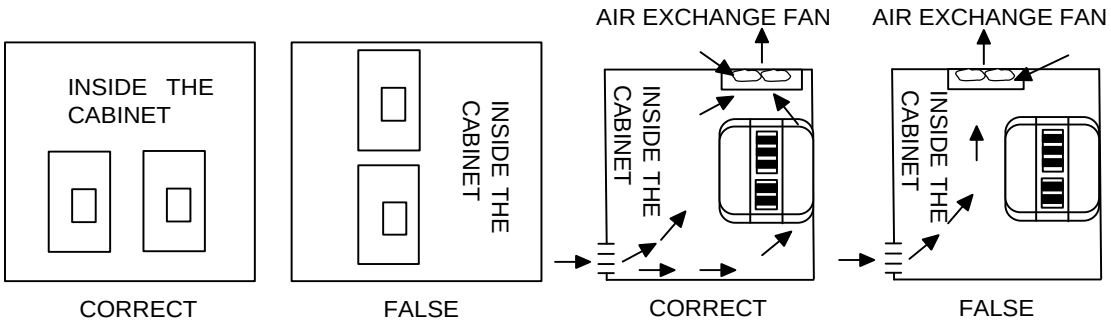
Dust or metallic particles in the air

Radioactive materials and inflammable materials

Electromagnetic interference (Avoid using together with welding machine or dynamic machines.)

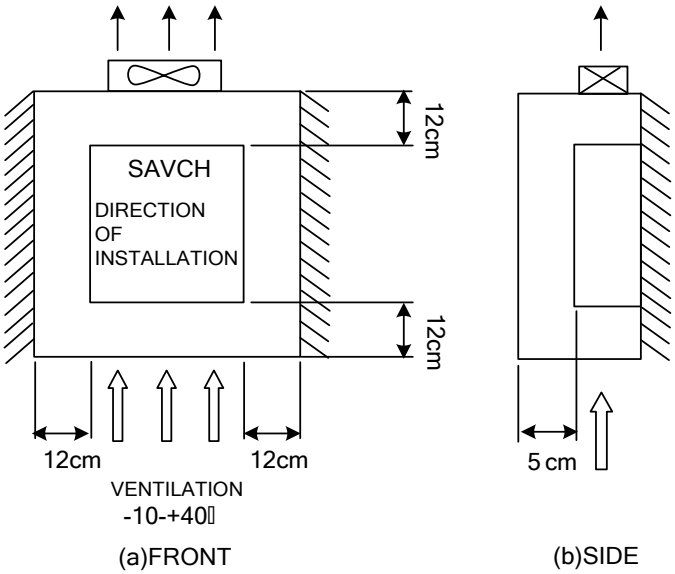
Vibration. (If inverter must be used in this environment, an anti vibration pad is necessary).

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

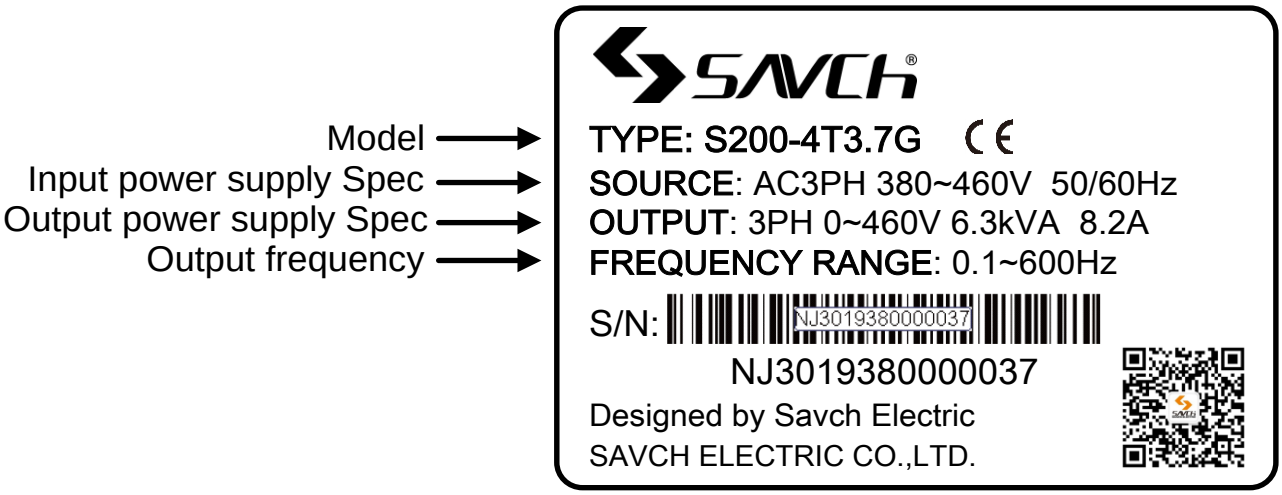


For cooling off, face shall be toward front and upper parts shall be upwards.

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



S200	-	4T	3.7	G
Product series		4T: 440V Three phase	0.75：0.75kW 1.5：1.5kW 2.2：2.2kW 3.7：3.7kW 5.5：5.5kW 7.5：7.5kW 11：11kW 15：15kW	G: Constant torque load (For general use) P: Variable torque load

2.3 Product Specification

Individual Specification

■**440V** Three phase Series

Model S200-4T□□□G		0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15
Output	Max applicable motor output power(kW)	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15
	Max applicable motor output power(HP)	1	2	3	5	5.5	7.5	10	15	20
	Output rated capacity(kVA)	2.3	3.2	4.2	6.3	7.4	9.9	13.7	18.3	24.4
	Output rated current (A)	3.0	4.2	5.5	8.2	9.7	13	18	24	32
	Output frequency range	0.01～600Hz								
	Over load capacity	150% of rated output current and run for 65sec.								
	Max output voltage	Correspond to input power supply								
Input	Phase number. Voltage. Frequency	Three phase·380-460V ·50/60Hz								
	Allowable variation range for Voltage. Frequency	Voltage:±15% Frequency:±5%								
	Input current (A)	4.2	6.0	7.2	8.5	11.2	14	20.6	28	30
Cooling System		Forced air cooling								

■Standard Specification

Controlling Characteristics	Control mode	Adopting SVPWM modulating techniques
	Output frequency range	0.01～600.00Hz
	Frequency setting analyzing degree	0.01 Hz
	Output frequency analyzing degree	0.01 Hz
	PWM load wave frequency	Available to modulate from 2 to 15kHz.
	Torque increase	Auto torque-increase and auto slip compensation,at 2Hz the starting torque can reach 150% of rated torque.
	Jump frequency	3 points can be set from 0.01 to 600.0Hz
	Acceleration/deceleration time	0.10 to 400seconds. (2 steps of accel/decel time can be set separately.)
	Stall Prevention Level	According to the load characteristics of motor, it's available to be set as 20 to 200% of rated current of the drive
	DC braking	Available to be operated from 0.01 to 50.0Hz from STOP, braking 0 to 100% of the rated current. Starting time 0.0 to 5.0 sec. Stopping time 0.0 to 25.0 sec.
	Braking torque	20%(125% shall be available if connected with purchased braking resistor externally) (for 1 to 25HP, equipped within the electric crystals, for 30HP, braking unit module shall be connected externally.)

	V/F curve		V/F curve available to be set
Operation Characteristics	Frequency setting signal	Digital Operator	Set by UP and DOWN
		External terminals	0-10VDC,4-20mADC,Serial Communication Board (RS485)
	Running operating signal	Digital Operator	Available to be operated by RUN, STOP and JOG keys
		External terminals	2 wire style (Fwd/Stop, Rev/Stop, Run/Stop and Fwd/Rev)/ 3 wire operation, JOG running, Serial Communication Board(RS485)
	Intelligent Input Terminal		Switching of 7 step pre-set available speed; Switching of First/Second acceleration/deceleration time; prohibiting acceleration/deceleration and external interrupt input; Jog running UP/DOWN frequency terminal setting; Count terminals
	Intelligent Output Terminal		During running, frequency agreement output, non-zero,count agreement output, over torque output, external interrupt reference, low voltage detection, operation mode reference, fault output and external fault interruption.
	Analog signal output		Correspond to actual output frequency or output current.
	Fault signal contact		Contact of ON at AC motor drive fault (Relay with one C contact or two open collector output.)
Built-in Function			Setting max/min output frequency; momentary power off restarting; fault restarting; setting of S curve acceleration/deceleration time; auto-voltage stabilizing output modulation; digital frequency output signal; fault records; parameters locking; reset to factory setting; inhibiting reverse run; over current stalling prevention, over voltage stalling prevention, electrical thermal relay.
Protection Function			Over current; over voltage, low voltage, external fault interruption input; motor over load; GFF:grounding protection(For optional use); over load of the drive and drive overheating
Digital operator			Consisting of 8 functional keys, 7 step LED in 5 digits; 5 status LED indicators. Available to set frequency, display actual output frequency, output current, self-determined unit parameter overview of users, modify settings and for parameter locking, fault displaying. Available to perform running, stop, reset, fwd/rev run and jog run.
Environment	Operational Environment temperature		-10℃to +50℃(+40℃～+50℃ available when the dust cover is removed)
	Storing temperature		-20℃ to +60℃
	Operational Environment dampness		Below 90%RH (No condensation)
	Installation height		Lower than 1000m, without corrosive gas, fluid and dust.
	Vibration		Below 20Hz 以下 9.80665m/s^2(1g),20～50Hz 5.88m/s^2(0.6g)
	Enclosure		IP20(Determined by the installation environment of the end-users)

Applicable electromagnetic contactor and wiring specifications

Non-fuse breaker/Magnetic contactor

SAVCH ELECTRIC shall not be responsible for faults due to the following:

(1) Absence or inapplicable or over large non fuse breakers was put between the power supply and the inverter, which results in the inverter fault

(2) Magnetic contactors or advance capacitor or Surge Absorber were connected in series between the inverter and motor

● A three phase Squirrel-cage induction motor which corresponds with the capacity of the inverter shall be adopted.

● If more than one motor were driven simultaneously by one inverter, the current of these motors when running shall below capacity of the inverter. And each motor shall be prepared with a thermal relay in appropriate capacity.

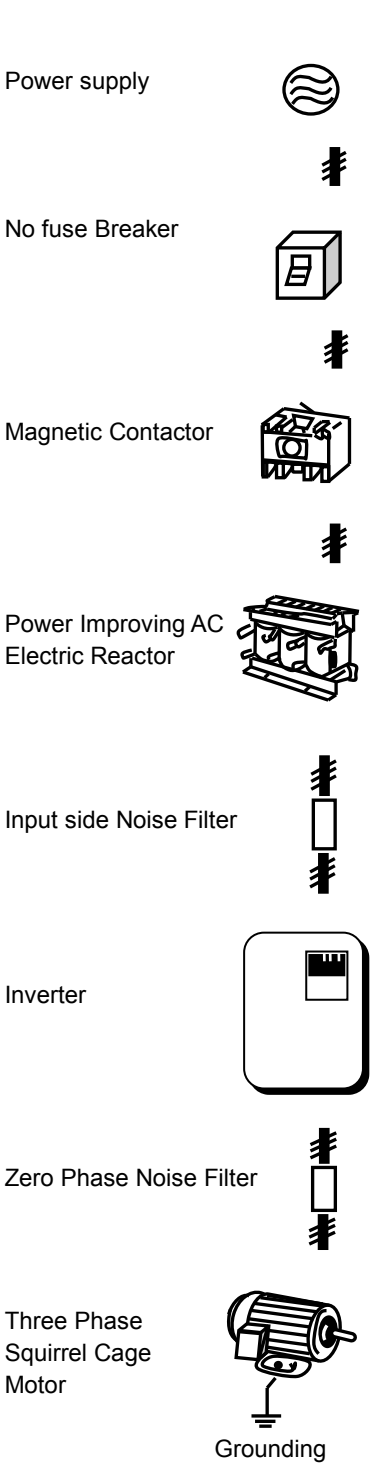
● Phase advance capacitors and other capacity elements such as LC or RC shall not be fixed between the inverter and motor.

List of applicable no-fuse breaker for S200 series

440V Series

S200- SERIES MODEL	Rated Input Current(A)	Rated Output Current(A)	Motor Output(kW)	Non-fuse Switch Rated Current(A)
S200-4T0.75G	4.2	3.0	0.75	5
S200-4T1.5G	5.8	4.2	1.5	10
S200-4T2.2G	7.2	5.5	2.2	15
S200-4T3.7G	8.5	8.2	3.7	20
S200-4T4.0G	11.2	9.7	4.0	20
S200-4T5.5G	14	13	5.5	20
S200-4T7.5G	20.6	18	7.5	30
S200-4T11G/P	28	24	11	50
S200-4T15G/P	30	32	15	60

Application and description for ambient equipments



Power supply:

●Make sure voltage class is correct, otherwise inverter may be damaged.

●A no fuse breaker (air circuit breaker) shall be provided between AC supply and inverter.

No fuse Breaker:

●Circuit breaker which complies with rated voltage and current of inverter shall be applied as ON/OFF control for inverter. And it shall also be protective to the inverter.

●Never use circuit breaker as ON/OFF switch for inverter.

Leakage Breaker:

●A leakage breaker shall be installed to prevent mal-functioning and to ensure the safety of operators; to prevent the mal-functions, those of which the sensitivity current above 220mA and action time above 0.1 sec shall be applied.

Magnetic Contactor:

●Inverters can be used without a magnetic contactor (MC) installed at the power supply side. However, when used for external control or automatically restart after power off, or when braking control is used, a magnetic contactor shall be applied.

●Does not use the magnetic contactor as RUN/STOP switch for inverter.

Power Improving AC Electric Reactor:

●If power supply of large capacity (Above 600k VA) is used, an AC reactor can be added to inverters which is below 220/440V 15Kw, thus the power of power supply shall be improved.

Input side Noise Filter:

●The Input side Noise Filter must be applied if inverter has electronic induction load around.

S200 Inverter:

●Input Power supply terminals R/L1, S/L2 and T/L3 can be connected without phase sequence.

●Connect output terminals U/T1, V/T2 and W/T3 to U/T1, V/T2 and W/T3 of motors, if the inverter is forward run reference, while motor reverse runs, change any two of U/T1, V/T2 or W/T3.

●Never connect U, V, W to AC Power supply otherwise inverter may be damaged.

●Grounding terminals shall be grounded correctly. Category Ⅲ Grounding: below 100Ω,Special grounding: below 10Ω.

Zero Phase Noise Filter:

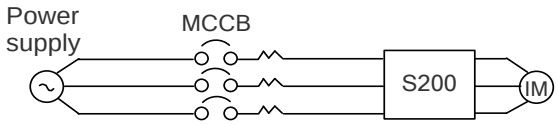
●If specialized noise filters are fit at inverter output side, radiation interference and induction noise shall be decreased.

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

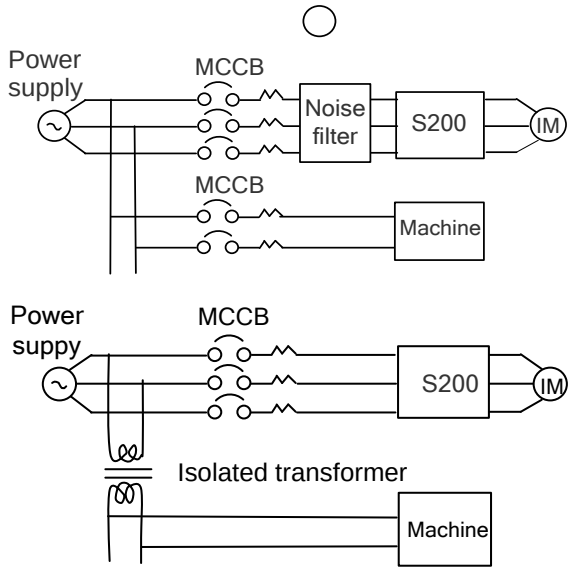
(Do not use a buzzer of control circuit to check wiring)

(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:

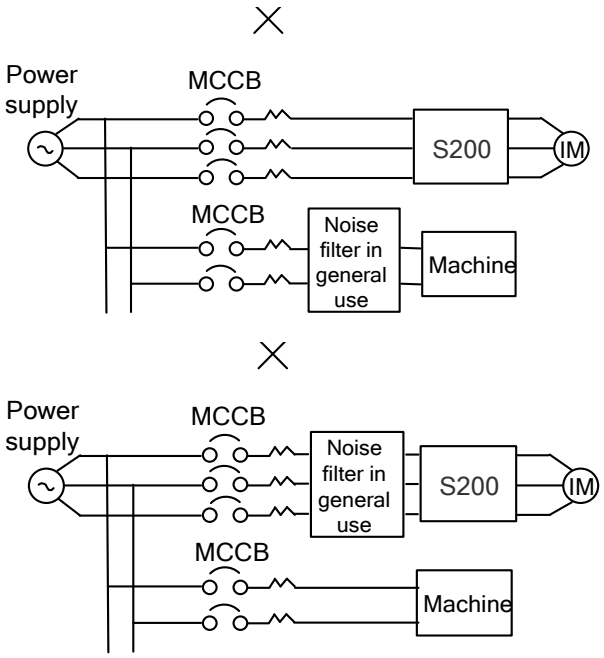
●Individual power supply bridge for inverter



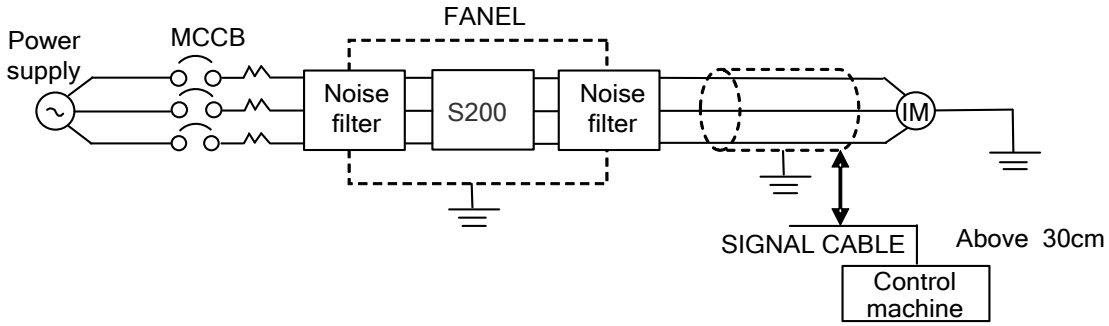
●If inverter power supply circuit is used commonly with other machines, inverter-specialized noise filter or isolating transformer shall be added.



●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



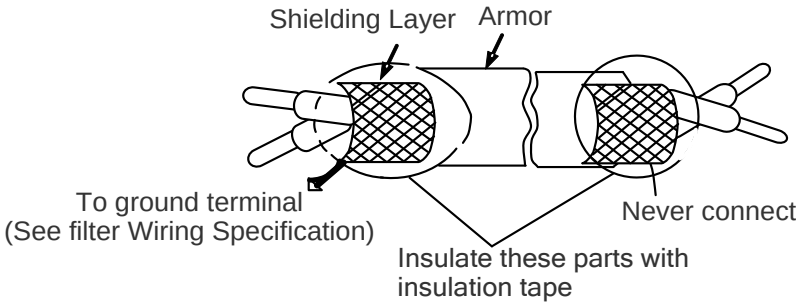
● Voltage drop of wiring shall be considered providing that inverter and motor are with an excessive distance.Voltage drop (V) = $\sqrt{3}$ × wiring resistance (Ω/km) × wire length (m) × current × 10^{-3}, load wave frequency shall be modified according to wiring prepared.

Distance between inverter and motor wiring	Below 50M	Below 100M	Above 100M
Allowable load wave no.	Below 12kHz	Below 9kHz	Below 6kHz
Set value for parameter 01-17	4	2	1

(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 false sequence, shielding wiring shall be used for control circuit. Shielding wiring shall connect grounding terminals.

Distance for wiring shall be 50m or less.

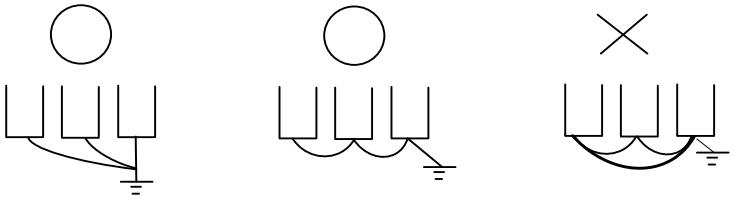


(C) Grounding terminal for inverters shall be grounded properly. Below 100Ω:Category Ⅲ; Below 10Ω:Special

●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.

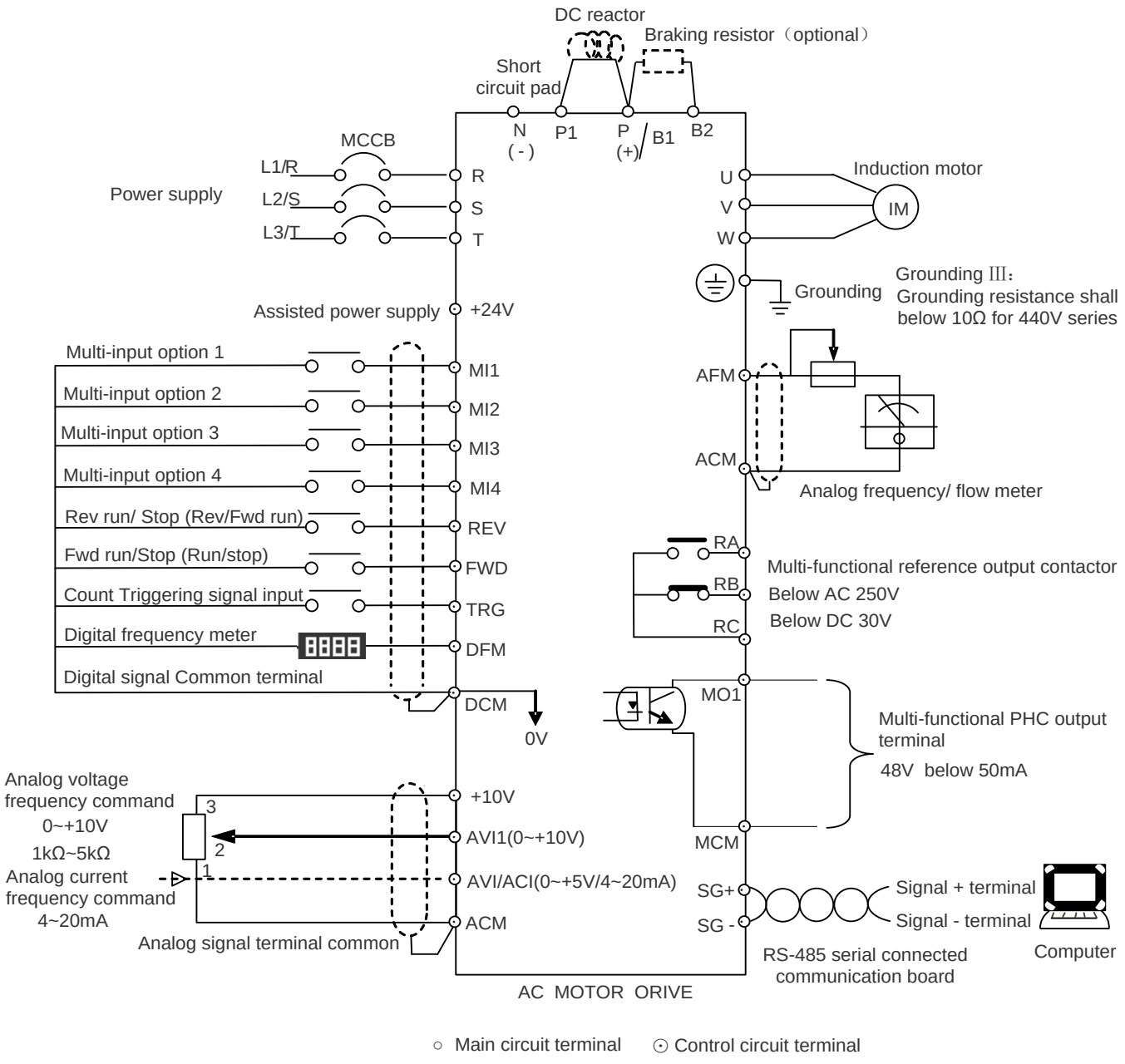
(E) After completing of grounding and wiring, check for the following items:wiring is proper; wire is not broken and screws are securely tightened.

2.4 Wiring

■ Basic Wiring Diagram

Wiring of AC motor drive can be divided into two parts, the main circuit and control circuit. After removing the cover of inverter, terminals of main circuit and control circuit shall be discovered. Users must connect terminals as diagram shows.

Below is a standard wiring diagram for S200 series AC motor drive. If only digital control panel was used, only main circuit terminal wiring applicable.



NOTES:

1. In the diagram, "○"indicates the main circuit, and "⊙"indicates the control circuit;
2. ACI can be selected to input the voltage or current signals, which is switched by the position of J3 Jumper on the control panel;
3. Included internal brake unit, it need to connect braking resistor between P(+)/B1,B2 when using the dynamic braking.
4. Using control terminal block, refer parameters in "02-XX" .

Main circuit terminal descriptions

Description for S200 Series inverter terminals

Terminal symbols	Function
L1/R,L2/S,L3/T	Main circuit AC power supply input (For single phase input, connect to R and T.)
U/T1,V/T2,W/T3	Connect to motor
P/B1,B2	Braking resistor(optional) connecting terminal
P/B1,N	Connecting to braking module
⏚	For grounding (High voltage wave impact and noise interference shall be avoided.)

Terminal Symbol Description

S200-4T0.75G~5.5G

TB1

RA	RB	RC	⊠	+10V	AVI1	AVI ACI	ACM	AFM	SG+	SG-	
	MI1	MI2	MI3	FWD	REV	TRG	DFM	DCM	MO1	MCM	+24V

Above S200-4T7.5G

TB1

RA	RB	RC

TB2

MI1	MI2	MI3	MI4	⊠	FWD	REV	TRG	DCM	DCM	MO1	MCM
+24V	⊠	AVI1	AVI ACI	ACM	AFM	+10V	SG+	SG-			

Relay output terminal RA, RB, RC wiring:

RB-RC:normally closed;RA-RC:normally opened

If it drives inductive load (such as electromagnetic relay, contactor), should be installed an absorbing circuit of surge voltage; Such as:RC absorption circuit (notes:the leakage current should be less than the control contactor and relay to maintain current), MOV or freewheel diode (used for DC electromagnetic circuit, Be sure to confirm the polarity when installing).Absorption circuit components to be installed on both ends of relay or contactor coil.

Terminal symbols	Function of Terminal	Specification
RA-RC	Multifunctional reference signal output contactor	See Description 2-12 for RELAY CONTACTOR OUTPUT
RB-RC		

Terminal symbols	Function of Terminal	Specification
MI1-DCM	Multifunctional input option 1	See Description 2-00~2-03
MI2-DCM	Multifunctional input option 2	
MI3-DCM	Multifunctional input option 3	
REV-DCM	Rev run/ Stop	Stop when OPEN and rev run when CLOSED.
FWD-DCM	Fwd run/ Stop	Stop when OPEN and Fwd run when CLOSED.
DFM-DCM	Digital frequency meter	Digital frequency output (0,+10V)
TRG-DCM	Count triggering input terminal	Count add 1 for operation from OPEN to CLOSED:
MO1-MCM	Multifunctional output terminal 1	See description of 2-09 (Open collector output)
+10V-ACM	Power supply for speed setting	Speed reference power supply (+10V)
AVI-ACM	Analog voltage frequency reference	0～+10V/ Max output frequency
ACI-ACM	Analog current frequency reference	4～20mA/ Max output frequency
AFM-ACM	Analog frequency/ current meter	0～+10V/ Max output frequency
SG+ -SG-	Serial connected communication board	RS485 Serial connected communication connector
+24V -DCM	Assisted control power supply	DC 20V-24V(50mA Max.)

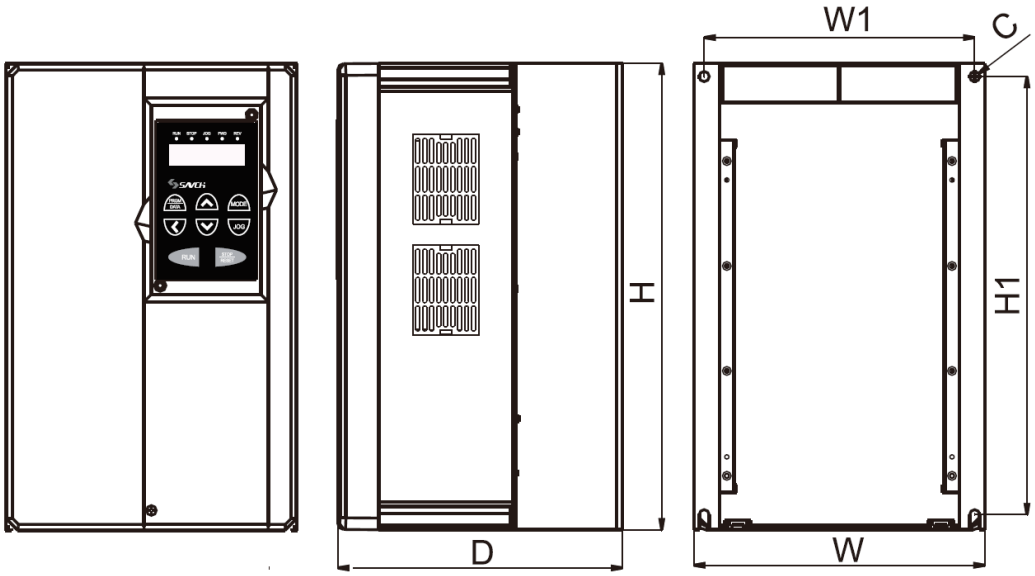
Pay attention to insulate the control signal wire with insulation tape.

Communication cable of RS485 shall be provided with double Null Modem cable.

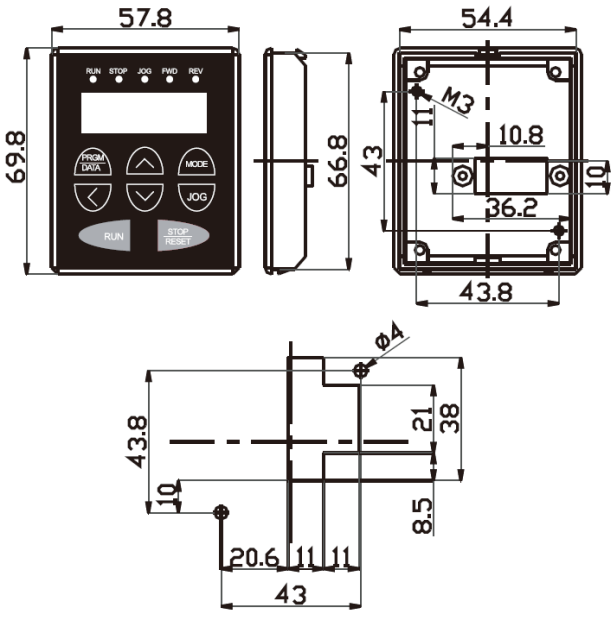
2.5 External Dimensions

Model	W	W1	H	H1	D	C	Quantity (Kg)	Remarks
S200-4T0.75G	126.5	113.5	174	160	144.5	5.5	1.6	Use IP03 exerciser
S200-4T1.5G								
S200-4T2.2G								
S200-4T3.7G	132	119.5	236	205	171	5.5	3.7	Use IP05
S200-4T4.0G								
S200-4T5.5G								
S200-4T7.5G	202.2	186.2	320	300.6	196.1	6.5	6.0	
S200-4T11G							6.4	
S200-4T11P								
S200-4T15P								

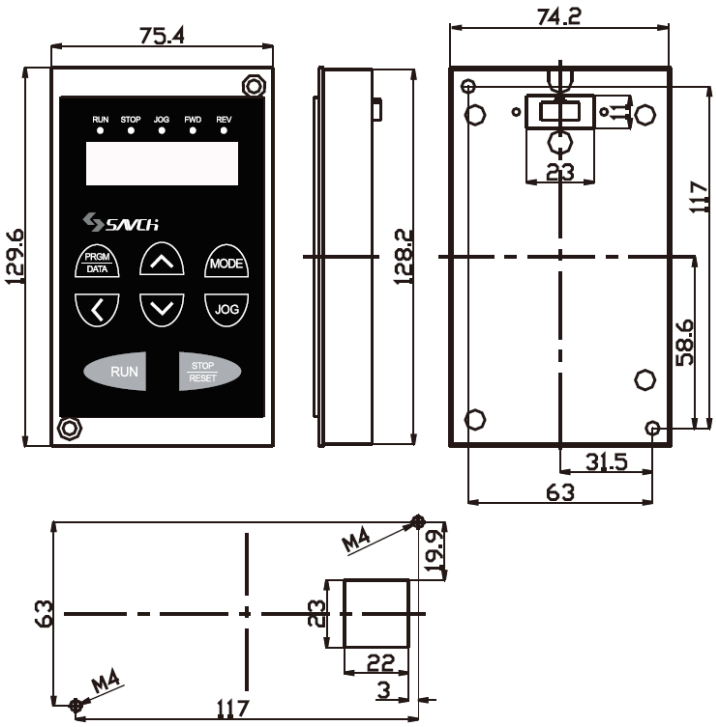
Inverter Main body figure



◆Small power keypad(IP03) External dimensions and Installation dimensions



◆Large power keypad(IP05) External dimensions and Installation dimensions

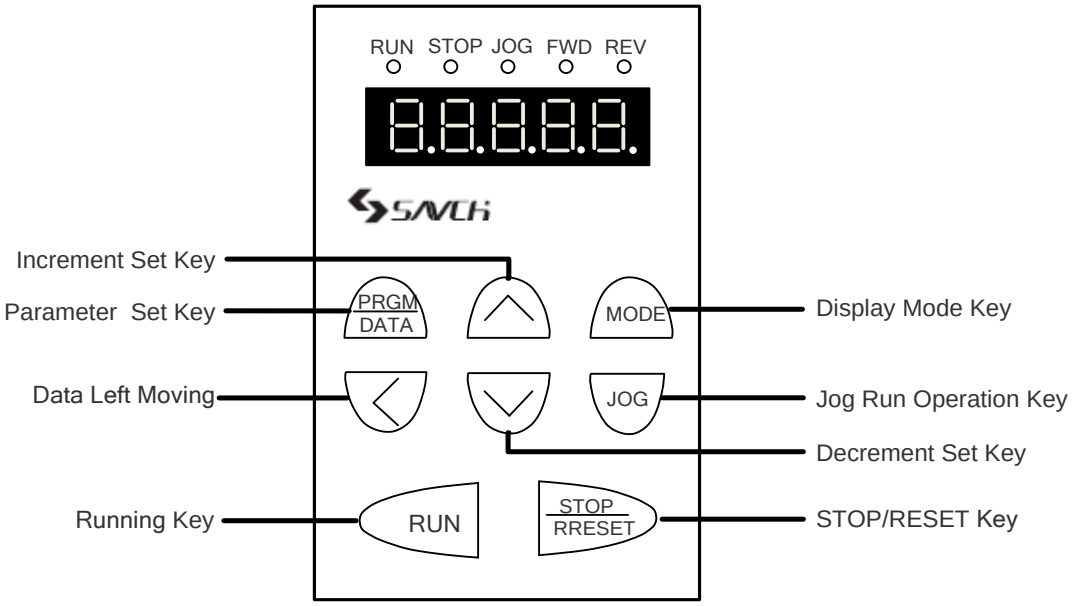


3. DESCRIPTION OF OPERATORS

3.1 Keyboard Description for IP03/IP05 Digital Operator

Descriptions and functions of the keyboard

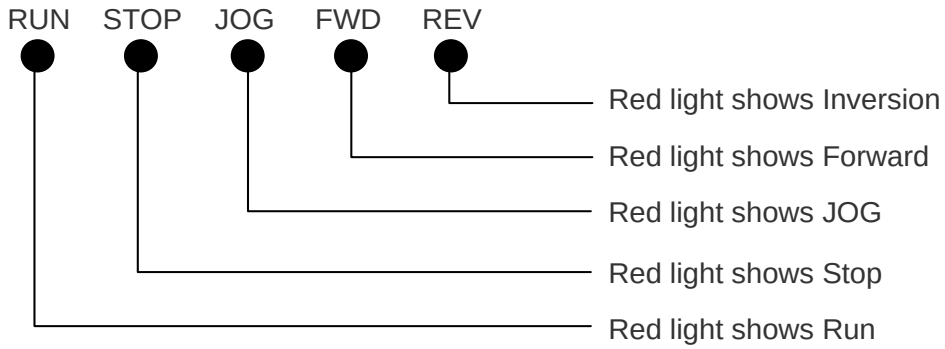
Locating on AC motor drive, the digital operator IP03/IP05 has two spaces:display space and operating space. Programmed mode and different operation states shall be displayed on the display space, while for the operating space, it is an interface for communication of the operators and AC motor drive



Key	Using name in manual	Function Descriptions
PRGM / DATA	PRGM / DATA Key (Parameter Set Key)	For reading the modified parameters setting of the drive
MODE	MODE Key (Display Mode Key)	Click this key to display the successive changing items for selection
JOG	JOG Key (JOG Key)	Click this key to perform JOG running
<	Data Left Moving	Convenient to modify the big setting value
∧	Increment Set Key (INCREMENT)	For using when change parameter number and setting value (Increasing)
∨	Decrement Set Key (DECREMENT)	For using when change parameter number and setting value (Decreasing)
RUN	RUN Key (Running Key)	It could be operated to run the drive
STOP	STOP Key (Stop/Reset Key)	It could be operated to stop the drive and resetting.

Display Project	Description
F60.00	Showing the current set frequency of AC motor drive. Reference of this frequency may from [Master Frequency Setting], [Jog Run Frequency] or [Multi-step Reference 1 to 7] controlled by external terminals 1, 2 and 3. If frequency reference comes from digital control panel, frequency can be set directly by depressing ▲/▼.
400.00 u 123.4 c 1234	Displaying actual frequency output from AC motor drive to motor Displaying physical quantity(u) defined by users Displaying count value(C) of internal counter
A 5.0	Displaying output current of U, V and W at output side of the AC motor drive
00-04	Displaying parameter project. Content of this parameter shall be displayed by depressing PRGM/DATA.
40.0.00	Displaying parameter content value. Modified materials shall be stored by depressing PRGM/DATA.
-End-	If END information (as diagram left shows) lasts for about 1 sec, it means that data has been received and memorized automatically. If data needs modifying, it shall be completed by acting directly with ▲/▼ and depress PRGM/DATA key again.

3.2 LED Monitor Descriptions

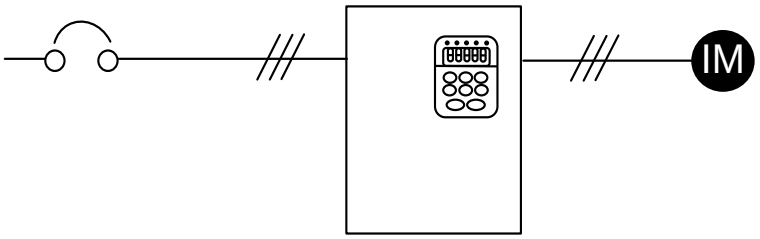


3.3 Preliminary Operation-Not Connecting With Motor

- Prior to connecting power supply with AC motor drive, check and make sure that AC power supply voltage is within input voltage range of the drive.
- Connect power supply to R, S and T input terminals of the AC motor drive.
- Operation mode control selection

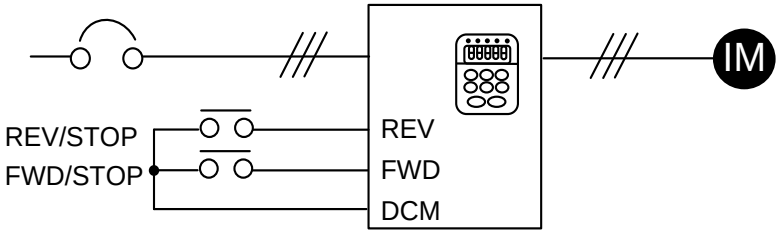
Operation mode of SAVCH can be divided into the following categories:

□ Both frequency and operation reference are controlled by keyboard. (1-01=1) (Factory setting)



□ Operation reference is controlled by external terminals. STOP key on keyboard available.

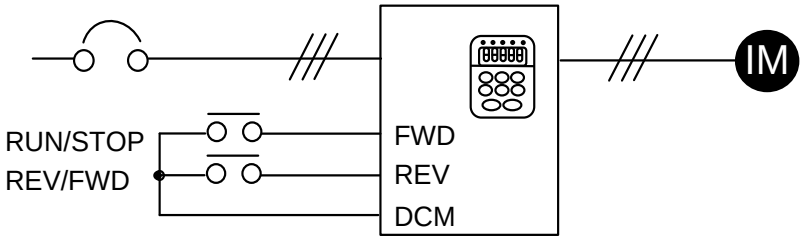
Two line operation control, “REV/STOP” and “FWD/STOP” (2-00=0)



□ Frequency reference is controlled by keyboard.

Operation reference is controlled by external terminals. STOP key on keyboard available.

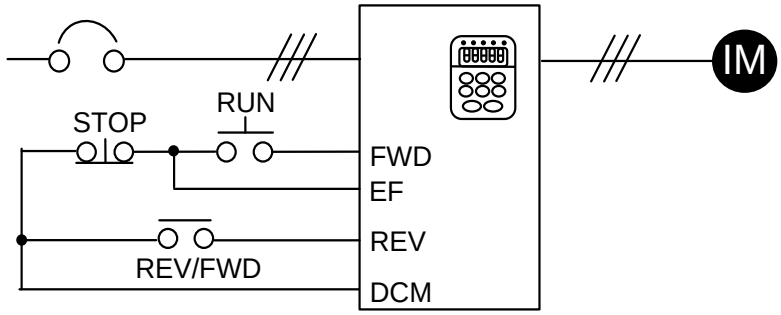
Two line operation control, “REV/FWD” and “OPERATION/STOP” control configuration. (2-00=1)



□ Frequency reference is controlled by keyboard.

Three line operation control mode Configuration 1

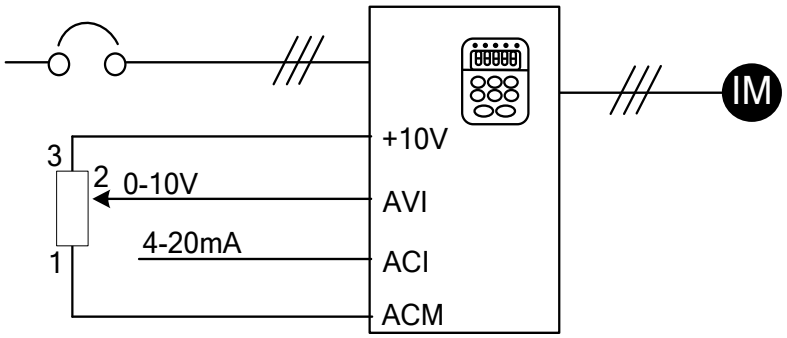
(2-00=2, this time 2-03 default 2, Other functions can not be used)



□ Frequency reference is input by analog signals.

(DC 0 to +10V)+(DC 4 to 20mA)

Operation reference is controlled by keyboard. (1-00=2 or 3)



4. LIST OF DESCRIPTIONS FOR FUNCTIONAL PARAMETERS

00:System parameters ↗Set during running available * the values of different machine models are different.				
	Parameter	Parameter functions	Setting range	Factory setting
	00-00	Machine Model Recognition	Display according to machine model	Type Setting
	00-01	Rated Voltage Display	Display according to machine model	
	00-02	Rated Current Display	Display according to machine model	
	00-03	Parameter Lock/Reset Setting	0:All parameters set to read/write mode 1:All parameters set to read only mode 2～9:Reserved 10:All parameters reset to factory setting	0
↗	00-04	Machine ON Display Selection	0:F (frequency reference) 1:H (output frequency) 2:U (Display multi-function contents 00-05) 3:A (output current) 4:S (FWD/REV rotation reference)	0
	00-05	Determining multifunctional display	0:Displaying output voltage 1:Displaying DC-BUS voltage 2:Displaying count value 3:Displaying rotating speed	0

01:Basic Parameters ↗Set during running available * the values of different machine models are different.				
	Parameter	Parameter functions	Setting range	Factory setting
	01-00	Master Frequency Input Setting	0:The master frequency input is controlled by digital exerciser 1:Reserved (panel potentiometer input) 2:Master frequency is input by analog signals AVI1(DC0 to +10V) 3:Master frequency is input by analog signals ACI (DC 4 to 20mA) /(DC 0 to +5V) 4:Master frequency is controlled by RS485 communication interface 5:External UP/DOWN pin control 6:Reserved	0
	01-01	Operation Comman source setting	0:Operated by digital exerciser 1:Operated by external terminals. STOP on keyboard available 2:Operated by the control keyboard of the external terminals. STOP on keyboard unavailable 3:Operated by Communication Interface RS485. STOP on keyboard available 4:Operated by Communication Interface RS485. STOP on keyboard unavailable	0
	01-02	Max operation frequency setting	50.00～600.00 Hz	50.00

01:Basic Parameters		↗Set during running available * the values of different machine models are different.		
	Parameter	Parameter functions	Setting range	Factory setting
	01-03	Max voltage frequency setting	10.00～600.00 Hz	50.00
	01-04	Max output voltage setting	200.0～500.0*V	380.0*
	01-05	Intermediate frequency setting	1.00～600.00Hz	1.50
	01-06	Intermediate voltage setting	2.0～500.0*V	12.0*
	01-07	Min output frequency setting	0.00～20.00Hz	1.50
	01-08	Min output voltage setting	2.0～100.0*V	12.0*
	01-09	Upper limitation of output frequency setting	1.00～ 600.00 Hz	600.00
	01-10	Lower limitation of output frequency setting	0.00～600.00 Hz	0.00
↗	01-11	1st acceleration time setting	0.10～400.00 Sec	10.00
↗	01-12	1st deceleration time setting	0.10～400.00 Sec	10.00
↗	01-13	2nd acceleration time setting	0.10～400.00 Sec	10.00
↗	01-14	2nd deceleration time setting	0.10～400.00 Sec	10.00
	01-15	Motor Stop mode selection	0:Deceleration and stop 1:Coast to a stop	0
	01-16	Inhibit REV rotation function setting	0:REV rotation available 1:REV rotation inhibited	0
	01-17	Carrier frequency selection	0:fc=3kHz 1:fc=6 kHz 2:fc=8 kHz 3:fc=10 kHz 4:fc=12 kHz 5:fc=15 kHz	2

02:External Terminal Parameters		↗Set during running available * the values of different machine models are different.		
	Parameter	Parameter functions	Setting range	Factory setting
	02-00	2 wire style/3 wire operation control	0:Fwd run/stop, Rev run/stop 1:Run/stop, Rev run/fwd run 2:Three wire operation control	0
	02-01	Multi-functional input option 1	0:Multi-step speed command 1	3
	02-02	Multi-functional input option 2	1:Multi-step speed command e 2	1
	02-03	Multi-functional input option 3	2:Multi-step speed command 3(EF) 3:Jog frequency command 4:Acceleration/Deceleration inhibition command 5:Switching of 1ST and 2nd acceleration/deceleration time 6:reserved 7:reserved 8:Up command 9:Down command 10:RST input 11:EF input 12:Set frequency in the keypad while select the specified ACI frequency.	2

02:External Terminal Parameters

✓Set during running available * the values of different machine models are different.

	Parameter	Parameter functions	Setting range	Factory setting
✓	02-04	External terminal frequency UP/DN key constant speed rate	0.01～1.00 Hz/ms	0.01
✓	02-05	Digital input response time	2～2000 ms	20
	02-06	Appointed count setting	1～9999	1
	02-07	Count value agreement setting	1～9999	1
	02-08	Multiplier setting for digital output frequency	1～20	1
	02-09	Multifunctional output terminal 1(MO1)	0:Reference during running 1:Set frequency agreement reference 2:Random frequency agreement reference 3:Count agreement reference 4:non-zero speed 5:Over-torque detection reference 6:reserved 7:Low voltage detection reference 8:Operation mode of AC motor drive 9:Fault reference	0
	02-10	Multifunctional output terminal 2(MO2)(reserved)		1
	02-11	Random frequency agreement setting	0.00～600.00 Hz	0
	02-12	Multifunctional output contactor indication Normally Open Contactor(RA-RC) Normally Closed Contactor(RB-RC)	0:Fault reference 1:Reference during running 2:Set frequency agreement reference 3:Random frequency agreement reference 4:non-zero speed 5:Over-torque detection reference 6:reserved 7:Low voltage detection reference(LU)	7
	02-13	Analog output signal setting	0:Analog frequency meter(0 to max operation frequency) 1:Analog current meter(0 to 200% of rated current)	0
✓	02-14	Analog output gain setting	1～200%	100

03:Analog output / input function parameters

✓Set during running available * the values of different machine models are different.

	Parameter	Parameter functions	Setting range	Factory setting
✓	03-00	Upper frequency analogue voltage setting	0.0～10.0 V	9.5
✓	03-01	Lower frequency analogue voltage setting	0.0～10.0 V	0.3
✓	03-02	Analogue input filter time	0.01～2.00 Sec	0.05
	03-03	Given gain for analog	0～200%	100

04:Multi-step Speed and Program Operation Parameters

✓Set during running available * the values of different machine models are different.

	Parameter	Parameter functions	Setting range	Factory setting
✓	04-00	No.1 section of the frequency selection	0.0～600.00 Hz	0
✓	04-01	No.2 section of the frequency selection	0.0～600.00 Hz	0
✓	04-02	No.3 section of the frequency selection	0.0～600.00 Hz	0
✓	04-03	No.4 section of the frequency selection	0.0～600.00 Hz	0
✓	04-04	No.5section of the frequency selection	0.0～600.00 Hz	0
✓	04-05	No.6section of the frequency selection	0.0～600.00 Hz	0
✓	04-06	No.7 section of the frequency selection	0.0～600.00 Hz	0

05:Special Parameters

✓Set during running available * the values of different machine models are different.

	Parameter	Parameter functions	Setting range	Factory setting
	05-00	DC braking current level setting	0～100%	0
	05-01	DC braking time setting at starting	0.0～5.0 Sec	0.0
	05-02	DC braking time setting at stopping	0.0～25.0 Sec	0.0
	05-03	DC braking starting frequency at stopping	0～50.00 Hz	0
	05-04	Restarting after momentary blackout	0:unavailable 1:tracking down 2:tracking up	0
	05-05	Max allowable time for blackout	0.3～5.0 Sec	2.0
	05-06	After power is recovered, tracking time	0.3～5.0 Sec	0.5
	05-07	Max current setting for speed tracking	30～200	150
	05-08	Jog running frequency setting	0.10～600.00 Hz	7.00
✓	05-09	Jog acceleration/deceleration time setting	0.10～400.00 S	3.00
	05-10	Setting of S curve acceleration/deceleration time(reserved)	0～100	0
	05-11	Hopping frequency 1	0.00～600.00 Hz	0
	05-12	Hopping frequency 2		
	05-13	Hopping frequency 3		
	05-14	Hopping frequency width setting	0.10～20.00 Hz	0.10

06:Motor setting parameters

↗Set during running available * the values of different machine models are different.

	Parameter	Parameter functions	Setting range	Factory setting
↗	06-00	Motor rated current setting	30～120%	100
	06-01	Motor no load current setting	0～99%	40
↗	06-02	Torque compensation increment	0～20%	0
↗	06-03	Slip compensation increment	0～10.0	0
	06-07	Automatic measurement of motor parameters	0:No function 1:Auto measure(R1,R2,LC) motor stopping 2:Auto measure(R1,R2,LM,LC,LM, unload current) motor running	0
	06-08	Motor Pole-pairs	1~10	2
	06-09	Motor R1(stator resistor)	0.00~30.00	Type Setting
	06-18	Motor Rated Slip (vector control)	0.00~10.00Hz	2.00
	06-19	Slip compensation limitation	0.00~10.00Hz	2.00
	06-20	Torque compensation filtering time	0.0~2.0S	0

07:Protection Parameters ↗Set during running available * the values of different machine models are different.

	Parameter	Parameter functions	Setting range	Factory setting
	07-00	Over voltage stall prevention function setting	0:Unavailable 1:Available	1
	07-01	Over current stall prevention level setting in acceleration	50～200%	160
	07-02	Over current stall prevention level setting during running	50～200%	160
	07-03	Electrical thermal relay selection	0:Act in standard motor 1:Act in special motor 2:No action	2
	07-04	Thermal relay action time selection	30～300 Sec	60
	07-05	Over-torque detection function option	0:No detection 1:Over torque detection (oL2) during constant speed running, stop running after detection 2:Over torque detection (oL2) during constant speed running, continue to run after detection 3:Detect over-torque when motor running , after detected over-load,(oL2)it could stop. 4:Detect torque when motor running , after detected over-torque,(oL2)it could run continuously.	0
	07-06	Over torque detection level	30～200%	150
	07-07	Over torque detection time	0.1～10.0 Sec	0.1
	07-08	Unusual restart times	0～2	0

07:Protection Parameters ✓Set during running available * the values of different machine models are different.				
	Parameter	Parameter functions	Setting range	Factory setting
	07-09	Recent 1st fault record	1:SC IGBT short-circuit protection 2:OU (Over voltage) 3:OC (Over current) 4:OL (Inverter over load) 5:OH (Over heating) 6:EF (External fault) 7:OCA the acceleration current is over the double rated current 8:OCn the constant speed current is over the double rated current 9:OCd the deceleration current is over the double rated current 10:CF1 (Writing EEPROM error) 11:CF2 (Reading EEPROM error) 12:CF3 (Drive internal hardware error) 13:OL2 (Motor overload) 14:PHL (Phase loss protection) 15:AUE (Automatic measurement of motor parameters failed) 16:CODER (Code Error) 17:OL1 (Electrical thermal relay)	0
	07-10	Recent 2nd fault record		
	07-11	Recent 3rd fault record		

08:Communication Parameters ✓Set during running available * the values of different machine models are different.				
	Parameter	Parameter functions	Setting range	Factory setting
	08-00	Communication address	0～254	1
	08-01	Communication transmitting speed	4.8～115.2 kbits/s	9.6
	08-02	Transmitting fault treatment	0:Warning and running continuously 1:Warning and deceleration to stop 2:Warning and coasting to a stop 3:No warning and running continuously	3
	08-03	Time out detected	0:Not detected 1～100 Sec	0
	08-04	Communication Material Format	0:7,N,1 FOR ASCII 9:8,O,1 FOR ASCII 1:7,N,2 FOR ASCII 10:8,E,2 FOR ASCII 2:7,E,1 FOR ASCII 11:8,O,2 FOR ASCII 3:7,O,1 FOR ASCII 12:8,N,1 FOR RTU 4:7,E,2 FOR ASCII 13:8,N,2 FOR RTU 5:7,O,2 FOR ASCII 14:8,E,1 FOR RTU 6:8,N,1 FOR ASCII 15:8,O,1 FOR RTU 7:8,N,2 FOR ASCII 16:8,E,2 FOR RTU 8:8,E,1 FOR ASCII 17:8,O,2 FOR RTU	0

11:Special Parameters		↗Set during running available * the values of different machine models are different.		
	Parameter	Parameter functions	Setting range	Factory setting
	11-00	Motor control method	0:V/F control 1:V/F control + Auto slip Compensation 2:Vector control	1

12:Special Parameters		↗Set during running available * the values of different machine models are different.		
	Parameter	Parameter functions	Setting range	Factory setting
	12-00	Low voltage level (LU)	320～440VDC	390
	12-01	Over voltage stall prevention level setting	700～900V	720
	12-03	Automatic voltage regulator function(AVR)	0:Start AVR 1:Cancel AVR 2:Deceleration cancel AVR	0
↗	12-07	Rotation speed displayed coefficient	0~300%	100%

13:Special Parameters		↗Set during running available * the values of different machine models are different.		
	Parameter	Parameter functions	Setting range	Factory setting
	13-00	Parameter protection code input	0～9999 0～4:Record code error time	0
	13-01	Parameter protection code setting	0～9999 0:No coded lock or 13-00 code input success 1:Parameter locked	0

14:Factory Parameters		↗Set during running available * the values of different machine models are different.		
	Parameter	Parameter functions	Setting range	Factory setting
	14-06	Keypad test parameters(manufacturer)	0:No function 1:Keypad monitor fully display 8	0
	14-07	Software Version		*
	14-08	Reserved		*
	14-09	Reserved		*

5. DESCRIPTION OF FUNCTIONAL PARAMETERS

0 System parameters

00-00	Machine Model Recognition		Factory setting	Type Setting
	Setting range	Display according to machine model		

The parameter displays a drive's model code. Capacity of the drive, rated current, rated voltage and Max. carrier frequency are related to the setting model code . User may refer to the following table to check drive's model.

Drive capacity 、Machine type code、Rated Current:

440V Series Power kW	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15
HP	1	2	3	5	5.4	7.5	10	15	20
Machine Model Recognition code	05	07	09	11	12	13	15	17	19
Rated Voltage	440V								
Rated Current	3.0	4.2	5.5	8.2	9.7	13	18	24	32
Max carrier frequency	15kHz								

00-01	Rated Voltage Display		Factory setting	Type Setting
	Setting range	Display according to machine model		

This parameter displays the rated output voltage of drive. User can view this parameter display value to check the drive is correct or not..

00-02	Rated Current Display		Factory setting	Type Setting
	Setting range	Display according to machine model		

This parameter displays the rated output current of drive. User can view this parameter display value to check the drive is correct or not.

00-03	Parameter Lock/Reset Setting		Factory setting	0
	Setting range	0 All parameters set to read/write mode		
		1 All parameters set to read only mode		
		2~9 Reserved		
		10 All parameters reset to factory setting(50Hz)		

This parameter is to remove alarm history; Cause some reasons or wildly set parameter leads to abnormal, recover factory setting, then reset it.

Remove alarm history or recover factory setting, then the parameter will be reset to 0 automatically.

00-04	Machine ON Display Selection		Factory setting	0
	Setting range	0:Displaying setting frequency (F)		
		1:Displays current running frequency (H)		
		2:Display multi-function contents(00-05)(U)		
		3:Displays running current (A)		
		4:FWD/REV RUN reference		

This parameter can be set the default display ,"2" optional contents is set and displayed according to 00-05.

00-05	Determining multifunctional display		Factory setting	0
	Setting range	0:Displaying output voltage		
		1:Displaying DC-BUS voltage		
		2:Displaying count value		
		3:Displaying rotating speed		

This parameter is displaying content , when the boot screen selection is 00-04 parameter, and this parameter is set to 02.

1 Basic Parameters

01-00	Master Frequency Input Setting(simulation feedback input estimated frequency)		Factory setting	0
	Setting range	0:The master frequency input is controlled by digital exerciser		
		1:Reserved		
		2:Master frequency is input by analog signals AVI1(DC0 to +10V)		
		3:Master frequency is input by analog signals ACI (DC 4 to 20mA) /(DC 0 to +5V)		
		4:Master frequency is controlled by RS485 communication interface		
		5:Master frequency is controlled by external UP/DOWN pin		
		6:Reserved		

This parameter is used to set the AC drive main frequency source. However, the actual AC drive running frequency would be control by [Jogging frequency], [Multi-step speed 1-7] or [Up / Down frequency], using the Multi-function inputs 1, 2, and 3. Refer to 02-01,02,03.

01-01	Operation Command Source Setting		Factory setting	0
	Setting range	0:Operated by digital exerciser		
		1:Operated by external terminals. STOP on keyboard available		
		2:Operated by the control keyboard of the external terminals. STOP on keyboard unavailable		
		3:Operated by Communication Interface RS485. STOP on keyboard available		
		4:Operated by Communication Interface RS485. STOP on keyboard unavailable		

This parameter is used to set the source of the AC Drive operating instructions.

01-02	Max operation frequency setting		Factory setting	50.00
	Setting range	50.00 ～ 600.00 Hz		

This parameter sets the max output frequency of the AC motor drive. Range of this frequency is corresponded to all the analog input frequency setting signals (0～+10V,4～20mA,0～+5V)

01-03	Max voltage frequency setting		Factory setting	50.00
	Setting range	10.00 ～ 600.00 Hz		

This setting shall be in accordance with rated operation frequency of the motor explained on the nameplate.

01-04	Max output voltage setting		Factory setting	380.0
	Setting range	200.0 ～ 500.0 V		

It is used to set Max output voltage of AC motor drive. The max output voltage setting must be smaller than or equal to the rated voltage of the motor as indicated on the motor nameplate.

01-05	Intermediate frequency setting		Factory setting	1.50
	Setting range	1.00 ～ 600.00 Hz		

This parameter shall be used to set intermediate frequency for a random V/f curve. V/f ratio of Min frequency to Intermediate frequency shall be determined by this setting.

01-06	Intermediate voltage setting		Factory setting	12.0
	Setting range	2.0 ～ 500.0 V		

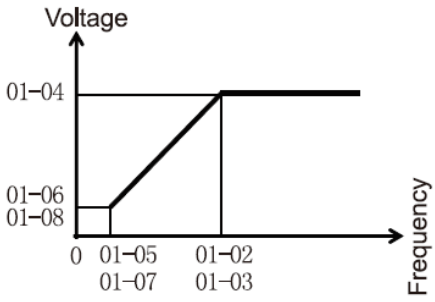
This parameter shall be used to set intermediate voltage for a random V/f curve. V/f ratio of Min frequency to Intermediate frequency shall be determined by this setting.

01-07	Min output frequency setting		Factory setting	1.50
	Setting range	0.00 ～ 20.00 Hz		

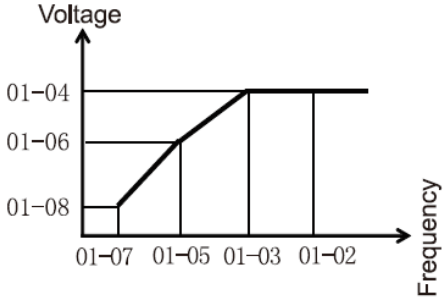
For setting min output frequency of the AC Drive.

01-08	Min output voltage setting		Factory setting	1.50
	Setting range	2.0 ～ 100.0V		

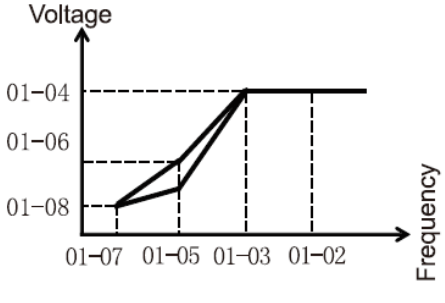
For setting min output voltage of the AC Drive.



Standard V/f curve setting



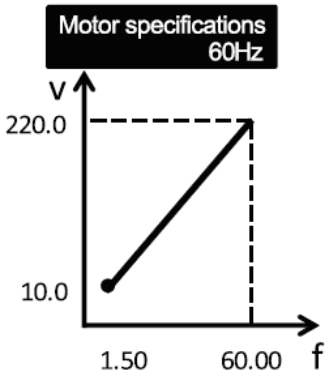
Arbitrary V/f curve setting



Custom V/f curve setting

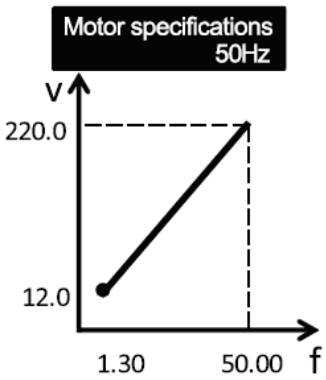
Commonly used V/f curve settings

(1)General purpose



Factory setting

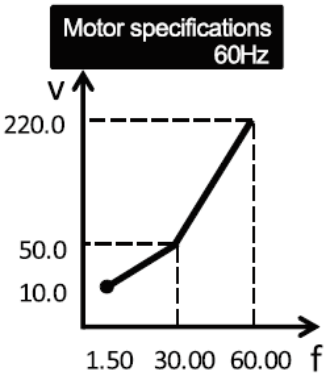
N0.	Setting value
01-02	60.00
01-03	60.00
01-04	220.0
01-05	1.50
01-06	10.0
01-07	1.50
01-08	10.0



Factory setting

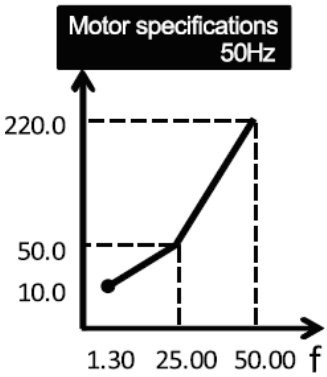
N0.	Setting value
01-02	50.00
01-03	50.00
01-04	220.0
01-05	1.30
01-06	12.0
01-07	1.30
01-08	12.0

(2)Fans and Pumps



Factory setting

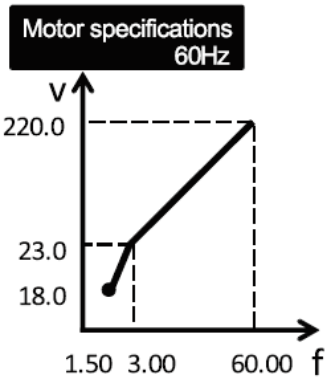
N0.	Setting value
01-02	60.00
01-03	60.00
01-04	220.0
01-05	30.00
01-06	50.0
01-07	1.50
01-08	10.0



Factory setting

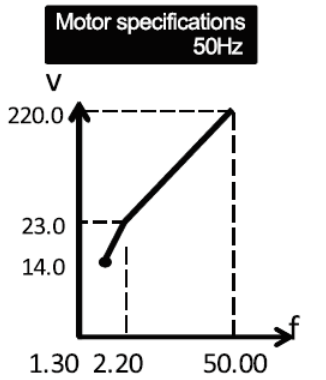
N0.	Setting value
01-02	50.00
01-03	50.00
01-04	220.0
01-05	25.00
01-06	50.0
01-07	1.30
01-08	10.0

(3)High Starting Torque



Factory setting

N0.	Setting value
01-02	60.00
01-03	60.00
01-04	220.0
01-05	3.00
01-06	23.0
01-07	1.50
01-08	18.0



Factory setting

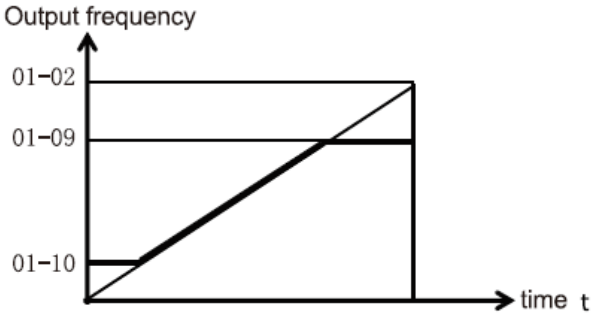
N0.	Setting value
01-02	50.00
01-03	50.00
01-04	220.0
01-05	2.20
01-06	23.0
01-07	1.30
01-08	14.0

01-09	Upper limitation of output frequency setting		Factory setting	600.00
	Setting range	1.00 ～ 600.00 Hz		

For setting max allowable output frequency of the AC Drive.Unit:0.01Hz.

01-10	Lower limitation of output frequency setting		Factory setting	0.00
	Setting range	0.00 ～ 600.00 Hz		

For setting min allowable output frequency of the AC Drive.Unit:0.01Hz.

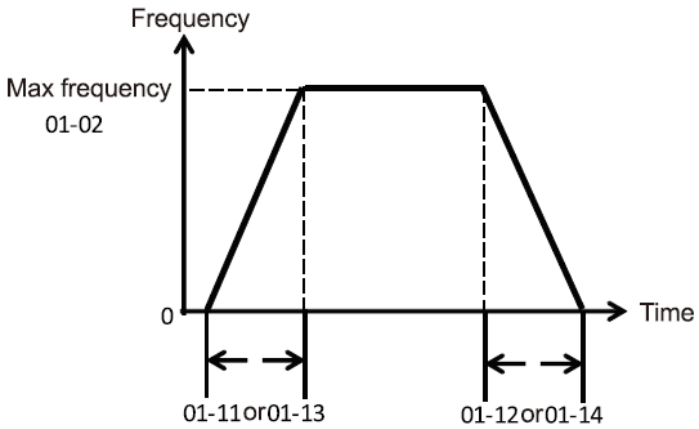


01-11	1st acceleration time setting		Factory setting	10.00
↗	Setting range	0.10 ～ 400.00 Sec		

The multi-function input terminal is set to be used to switch the Acc/Dec time, but in this time , It does not work(“open”) or never to be set to this function for switching Acc/Dec time, then the AC drive will accelerate according to the 1st Acc. time. This parameter is determined by the time which the AC motor drive required when it accelerate from 0 Hz to [max. frequency] (01-02). The rate is linear unless S Curve is “Enabled”.

01-12	1st deceleration time setting		Factory setting	10.00
↗	Setting range	0.10 ～ 400.00 Sec		

The multi-function input terminal is set to be used to switch the Acc/Dec time, but in this time , It does not work(“open”) or never to be set to this function for switching Acc/Dec time, then the AC drive will decelerate according to the 1st Dec. time. This parameter is determined by the time which the AC motor drive required when it decelerate from [max. frequency] (01-02) to 0 Hz. The rate is linear unless S Curve is “Enabled.



01-13	2nd acceleration time setting		Factory setting	10.00
↗	Setting range	0.10 ～ 400.00 Sec		

When the multi-function input terminal is set to be used to switch 1st and 2nd Acc/Dec time and can work, then the AC drive will Accelerate according to the 2st Acceleration time.This parameter is determined by the time which the AC motor drive required when it accelerate from 0 Hz to [max. frequency] (01-02). The rate is linear unless S Curve is “Enabled”.

01-14	2nd deceleration time setting		Factory setting	10.00
↗	Setting range	0.10 ～ 400.00 Sec		

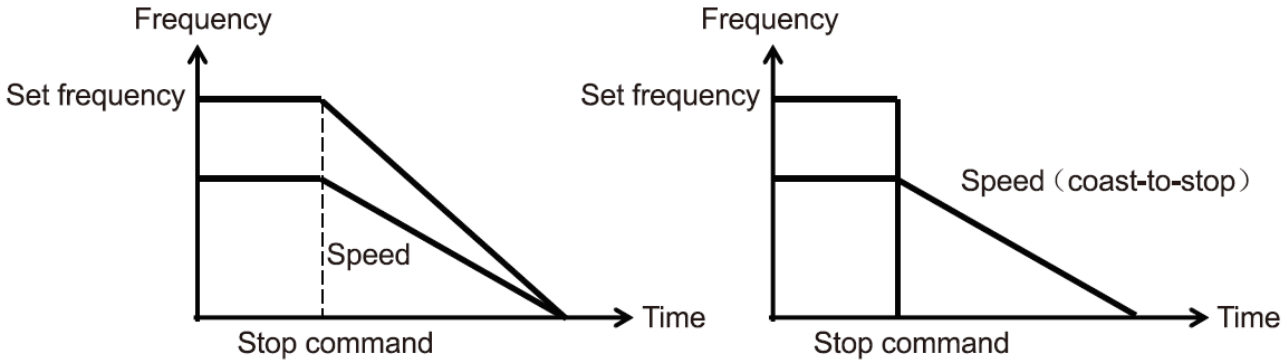
When the multi-function input terminal is set to be used to switch 1st and 2nd Acc/Dec time and can work, then the AC drive will decelerate according to the 2st Deceleration time.This parameter is determined by the time which the AC motor drive required when it decelerate from [max. frequency] (01-02) to 0 Hz. The rate is linear unless S Curve is “Enabled.

01-15	Motor Stop mode selection		Factory setting	0
	Setting range	0:Deceleration and stop		
		1:Coast to a stop		

After STOP reference received, the AC motor drive shall control the motor to stop as parameter set.

Deceleration and stop:according to deceleration time set by 1-12 or 1-14, AC motor drive decelerate to min output frequency(1-07) and then machine stops.

Coast to a stop:AC motor drive stops output immediately and motor runs freely in load inertia and then stops



01-16	Inhibit REV rotation function setting		Factory setting	0
	Setting range	0:REV rotation available		
		1:REV rotation inhibited		

This parameter is set to the AC motor drive whether can perform the function of reverse operation.

01-17	Carrier frequency selection		Factory setting	2
	Setting range	0:fc=3kHz		
		1:fc=6kHz		
		2:fc=8kHz		
		3:fc=10kHz		
		4:fc=12kHz		
		5:fc=15kHz		

This parameter determines the PWM (Pulse Width Modulation) output carrier frequency .

Carrier frequency	Electromagnetic noise	Noise,Spill current	Heat dissipation	Current Waveform
1 kHz	big	small	small	
8 kHz				
15 kHz	small	big	big	

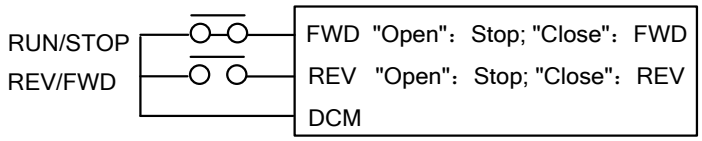
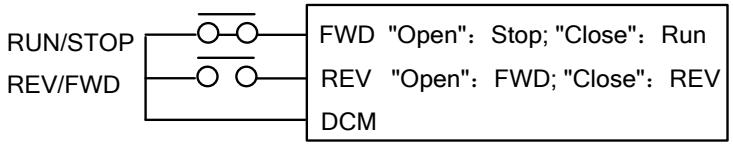
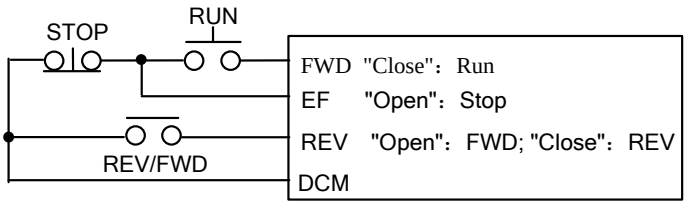
The above table suggests that carrier frequency shall influence electromagnetic noise. the drive's heat dissipation as well as interference to the environment of motor; thus, decreasing the carrier frequency shall help the motor drive to decrease temperature rise if ambient noise exceeds noise of the motor; in case of high load wave frequency, although operation noise shall be eliminated to a large degree, attention shall be paid to the interference and protection of the machine.

Note:7.5 kW and above, if the carrier frequency is higher than 8 kHz, it can allow max. current output will be slightly reduced, at the same time, if the carrier frequency is higher , then inverter and motor heating will be higher, in the case of noise does not affect ,the carrier shall be reduced.

2 External Terminal Parameters

02-00	2 wire style/3 wire operation control		Factory setting	0
	Setting range	0:Forward run/stop, Reverse run/stop		
		1:Run/stop, Reverse run/forward run		
		2:Three line operation control		

This parameter sets the external control operation configuration of AC moter drive, there are three different control modes:

02-00	External terminal control circuit
0 2 wire FWD /Stop REV/ Stop	
1 2 wire FWD / Stop REV /Fwd	
2 3 wire style	

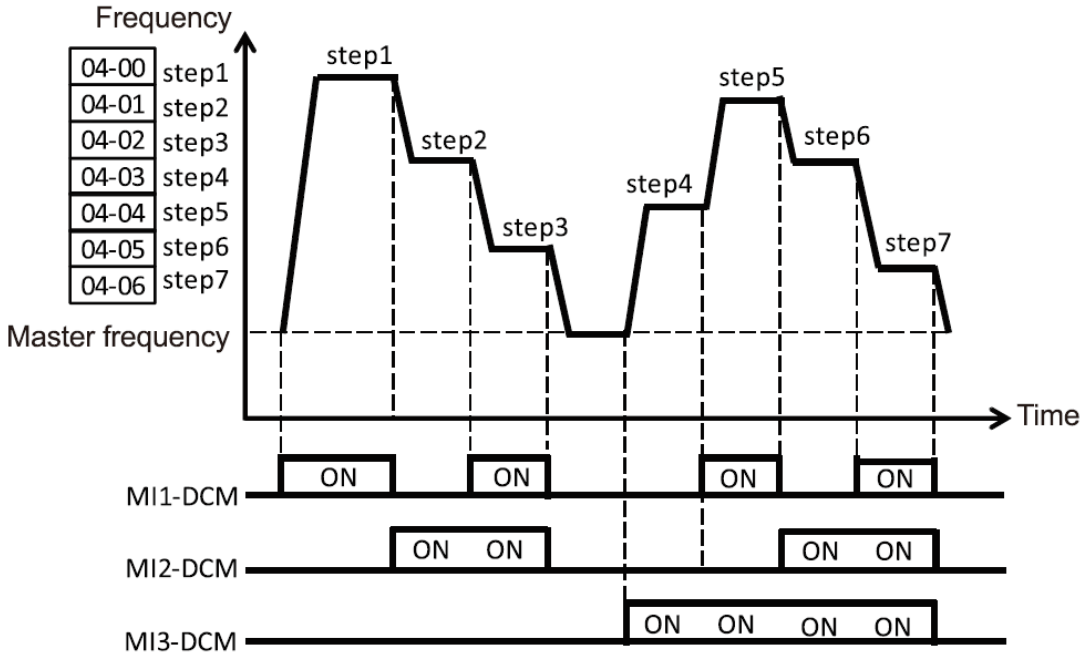
02-01	Multi-functional input option 1		Factory setting	3
02-02	Multi-functional input option 2			1
02-03	Multi-functional input option 3			2
	Setting range	0:Multi-step speed command 1		
		1:Multi-step speed command 2		
		2:Multi-step speed command 3		

02-01	Multi-functional input option 1	Factory setting	3
02-02	Multi-functional input option 2		1
02-03	Multi-functional input option 3		2

3:Multi-step speed command 4	
4:Acceleration/Deceleration inhibition command	
5:Switching of 1ST and 2nd acceleration/deceleration time	
6:Reserved	
7:Reserved	
8:Up command	
9:Down command	
10:RST input	
11:EF input	
12:Set frequency in the keypad while select the specified ACI frequency.	

Description:

(1)0~2:The multi-step speed commands 1 to 3 groups are used to determine a command frequency via the multi-step speed settings (04-00 to 04-06).



(2)3:When “Closed,” the jogging frequency is selected and performed.

(3)4:When “Closed,” the output frequency remains constant

(4)5:When “Open,” the AC drive accelerates / decelerates according to the values set by ACCEL. time 1 and DECEL. time 1 (01-11, 12). When “Closed,” the AC drive accelerates / decelerates according to the values set by in ACCEL. time 2 and DECEL. time 2 (01-13,14).

(5)6:Reserved

(6)7:Reserved

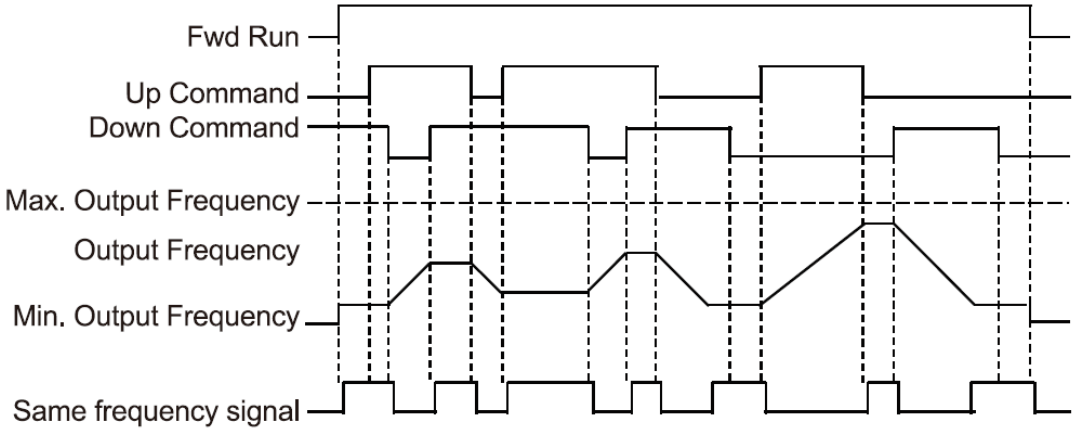
(7)8:When “Closed,” the AC Drive output frequency is increased.

(8)9:When “Closed,” the AC Drive output frequency is decreased.

(9)10:When “Closed”,the AC Drive reset

(10)11:When “Closed”, the AC Drive EF alarm.

(11)12:When1-00 select 0,if this terminal function is available ,the frequency is specified by ACI terminal.



Note:When both the Up and Down command terminals are “closed”, the AC drive neither accelerates or decelerates. The output frequency is also held constant.

02-04	External terminal frequency UP/DN key constant speed rate		Factory setting	0.01
↗	Setting range	0.01 ～ 1.00 Hz/ms		

02-05	Digital input response time		Factory setting	20
↗	Setting range	2 ～ 2000 ms		

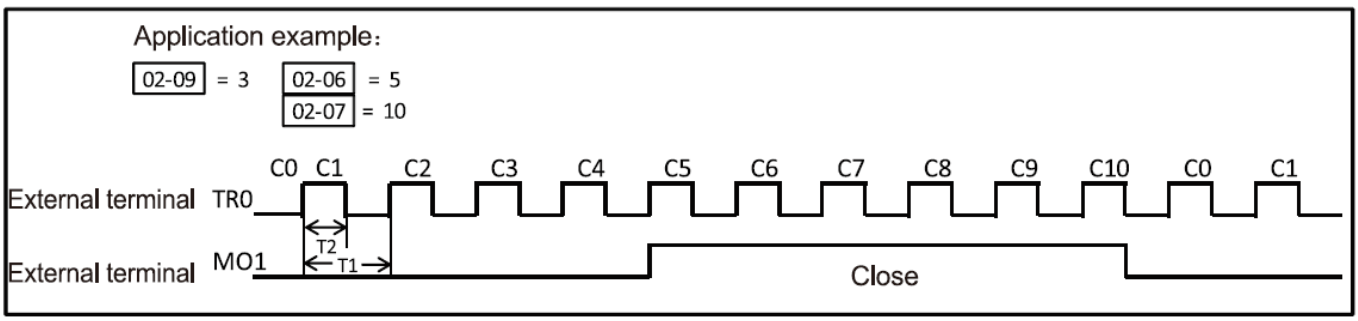
02-06	Appointed count setting		Factory setting	1
	Setting range	1 ～ 9999		

This parameter sets a specified count value, When the internal counter which external terminal TRG is located in the control circuit ,it starts to count from bottom to the count value, the specified output signal terminal (MO1) will be closed (assuming 02-09 is set to 3), until the count value (02-07) opened upon arrival.

02-07	Count value agreement setting		Factory setting	1
	Setting range	1 ～ 9999		

This parameter determines the max. value of the internal counter. The internal counter may be triggered by the external terminal TRG which is located in the control circuit.

The timing diagram is illustrated as following:

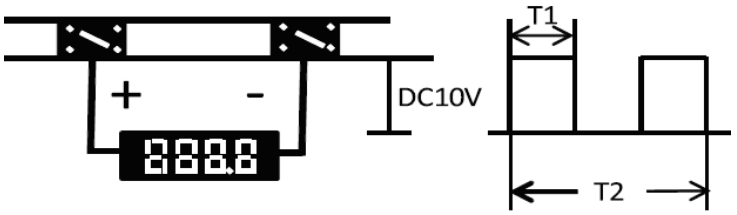


Note1:The min. On time for T2:2ms or more. The min. cycle time for T1:6 ms. or more.

Note2:When arrive MO1 set to count function, the initial status is "ON".

02-08	Multiplier setting for digital output frequency		Factory setting	1
	Setting range	1 ～20		

This parameter sets the multiple of digital output frequency (pulse 0, +10V work cycle=50%) of AC motor drive digital output terminal (DFM, DCM). Output pulse for each second + output frequency×[02-08]



Digital frequency meter

T1/T2(work cycle) =50% of pulse output in each second=Output frequency of AC motor drive×[02-08].

Notes:Max of digital output frequency shall not exceed 1.2kHz

02-09	Multifunctional Output Terminal 1(MO1)		Factory setting	0
02-10	Multifunctional Output Terminal 2(MO2)(reserved)			1
	Setting range	0:Reference during running		
		1:Set frequency agreement reference		
		2:Random frequency agreement reference		
		3:Count agreement reference		
		4:Non-zero speed		
		5:Over-torque detection reference		
		6:Reserved		
		7:Low voltage detection reference		
		8:Operation mode of AC motor drive		
		9:Fault reference		

Set 2-09 and 2-10 according to above table. MO1、MO2 shall have a different system mark output.

Terminal	Parameter
External terminal M01,MCM(open collector output)	2-09
External terminal M02,MCM(open collector output)	2-10

Action description for contactor:

0. Reference during running :This contactor shall be “CLOSED” during AC motor drive output or FWD/REV run reference input.

1. Set frequency agreement reference :This contactor shall be “CLOSED” when output frequency of AC motor drive is in agreement with appointed frequency.

2. Desired frequency attained :This contactor shall be “CLOSED” after output frequency of AC motor drive is in agreement with appointed frequency (02-11) .

3. Count agreement reference:This terminal will be “closed” when the AC drive’s internal counter, triggered by the external input TRG, starts countdown and reaches 1.Set the countdown value using 02-06~07.

4. Non-zero speed:This contactor shall be “CLOSED” when output frequency of AC motor drive exceeds Min output frequency setting.

5. Over-torque reference:This contactor shall be “CLOSED” when over torque is detected by AC motor drive. Over-torque detection level is set in 07-06 and Over-torque detection time is set in 07-07.

6.Reserved

7. Low voltage detection reference:This contactor shall be CLOSED when input voltage over-low is detected by motor drive.

8. Operation mode of AC motor drive:This contactor shall be CLOSED when AC motor drive reference is controlled by external terminals or RS485 interface.

9. Fault reference :This contactor shall be CLOSED when fault is detected by AC motor drive.

02-11	Random frequency agreement setting		Factory setting	0
	Setting range	0.00 ～ 600.00 Hz	Unit	0.01Hz

When output frequency of AC motor drive meets a random appointed frequency value, multifunction external terminal contactor shall be “Closed” if this terminal is set to 2(02-09,10).

02-12	Multifunctional output contactor indication RA-RC(NO),RB-RC(NC)		Factory setting	7
	Setting range	0:Fault reference		
		1:Reference during running		
		2:Set frequency agreement reference		
		3:Random frequency agreement reference		
		4:Non-zero speed		
		5:Over-torque detection reference		
		6:Reserved		
		7:Low voltage detection reference(LU)		

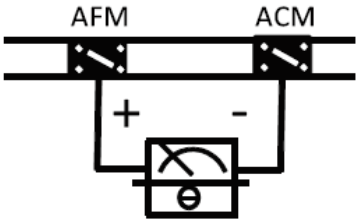
Set 02-12 according to the above table, can choose multi-function instructions output action signals in different systems.

02-13	Analog output signal setting		Factory setting	0
	Setting range	0:Analog frequency meter(0 to max operation frequency)		
		1:Analog current meter(0 to 200% of rated current)		

This parameter select analog signal voltage (0 to 10V DC) output to correspond with output frequency or output current of AC motor drive

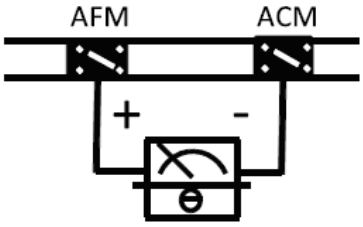
02-14	Analog output gain setting		Factory setting	100
	Setting range	1～20%		

This parameter adjusts voltage level of AC motor drive analog signal (frequency or current) output terminal AFM output to analog meter head.



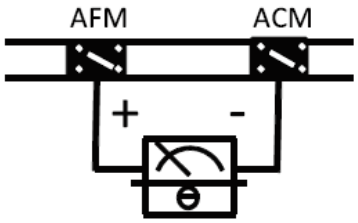
Analog frequency meter

Analog output voltage is proportional to output frequency of AC motor drive; max operation frequency (1-02) of AC motor drive shall be equivalent to +10VDC analog voltage output (Actual voltage is slightly higher than +10VDC, and can be adjusted by 02-14).



Analog current meter

Analog output voltage is proportional to output current of AC motor drive; the 2 times of rated output current of AC motor drive shall be equivalent to +10VDC analog voltage output (Actual voltage is slightly higher than +10V, and can be adjusted by 02-14).



Analog voltage meter

Analog output voltage is proportional to output voltage of AC motor drive; max operation frequency (1-04) of AC motor drive shall be equivalent to +10VDC analog voltage output (Actual voltage is slightly higher than +10VDC, and can be adjusted by 02-14).

You can use on any type of voltmeter. If the full scale of less than 10 v meter. Parameter 02-14 setting way , refer to the following formula;

Parameter 02-14 = [(full scale voltage meter) / 10] * 100%

Example:

When using a full scale for 5 v voltage meter, adjust the parameters of 02-14 to 50%. If the parameter 02-13 is set to "0", the VDC will be corresponding to the max. output frequency

3 Analog output / input function parameters

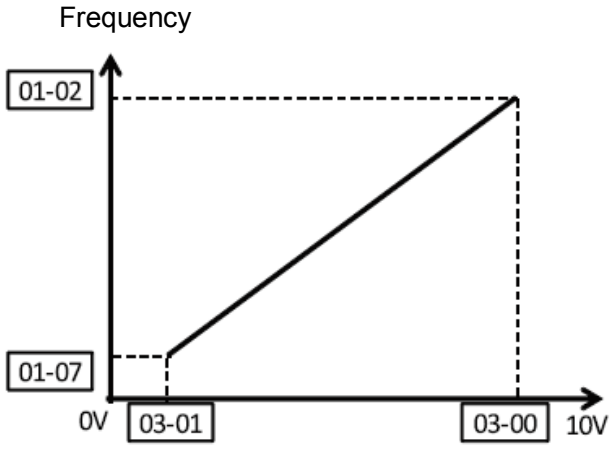
03-00	Upper Frequency Analogue Voltage Setting		Factory setting	9.5
↗	Setting range	0.0 ～ 10.0 V		

This parameter is set the highest operating frequency (01-02) of the analog frequency command input signal voltage level. 03-01 setting analog input/frequency curve instruction set.

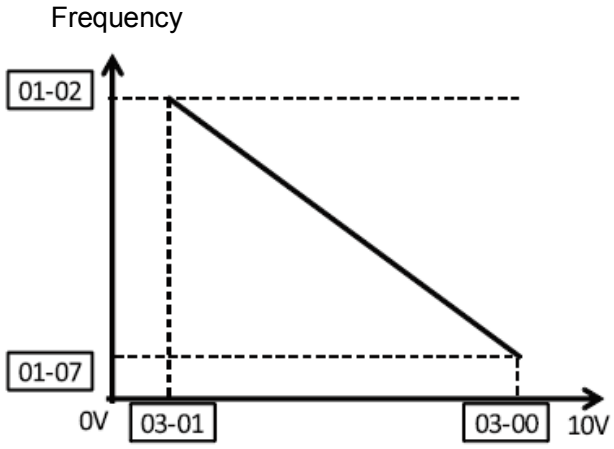
03-01	Lower Frequency Analogue Voltage Setting		Factory setting	0.3
↗	Setting range	0.0 ～ 10.0 V		

This parameter is set the minimum output frequency (01-07) corresponds to the analog frequency command input signal voltage level.

Note:Parameters 03-00 and 03-01 setting value subtract each other, the absolute value of the difference must be greater than or equal to 3V.

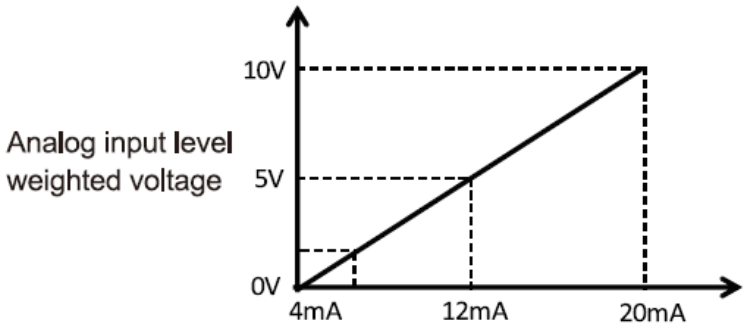


Analog Input Level



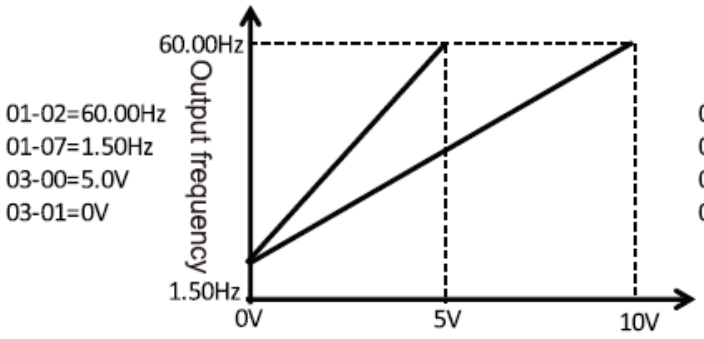
Analog Input Level

Analog input level must depend the adding analogy instruction input signal frequency AVI1 (0 ~ + 10 v), AC (I 4 ~ 20 ma)/AV (I 0 ~ + 5 v) signal. The analogy to the current frequency instruction (4 ~ 20 ma) for analog input level weighted voltage as shown in the figure below :

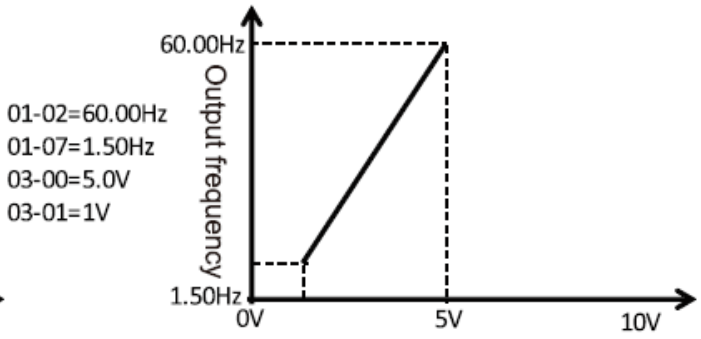


Analog current frequency instruction

Application diagram is as follow:



Analog Input Level



Analog Input Level

03-02	Analogue Input Filter Time		Factory setting	0.05
↗	Setting range	0.01 ～ 2.00 Sec		

Control terminal AVI, ACI input analog signals, often contain noise. Noise will affect the stability of the control. the input filter filter out the noise. Setting time constant is too large, stably control, but control response is poor; conversely, quick response, but it may not be able to control stably. If you don't know the best value, you can suitably co figurate the setting value according to the instability of control or response delays .

03-03	Given gain for Analog		Factory setting	100
	Setting range	0 ～ 200 %		

4 Multi-step Speed and Program Operation Parameters

04-00	No.1 section of the frequency selection	Factory setting	0
04-01	No.2 section of the frequency selection		0
04-02	No.3 section of the frequency selection		0
04-03	No.4 section of the frequency selection		0
04-04	No.5 section of the frequency selection		0
04-05	No.6 section of the frequency selection		0
04-06	No.7 section of the frequency selection		0
↗	Setting range	0 ～ 600.00Hz	

The multi-function input terminals (refer to parameters 02-01,02,03) are used to select one of seven Multi-Speed output frequencies. The frequency is determined by 04-00 to 06.

5 Special Parameters

05-00	DC braking current level setting	Factory setting	0
	Setting range	0 ～ 100%	

When AC motor drive stopped mode is set to decelerate and stop, this parameter setting brake into DC brake motor current level. Set dc braking current composition ratio:1%. Ac motor drive current rating of 100%.

When this parameter is set, begin at a lower current level then increase the value until sufficient holding torque is achieved. The rated motor current cannot be exceeded.

05-01	DC braking time setting at starting	Factory setting	0.0
	Setting range	0.0 ～ 5.0 Sec	

This parameter is to set time lasting of DC braking voltage input to motor during start of AC motor drive.

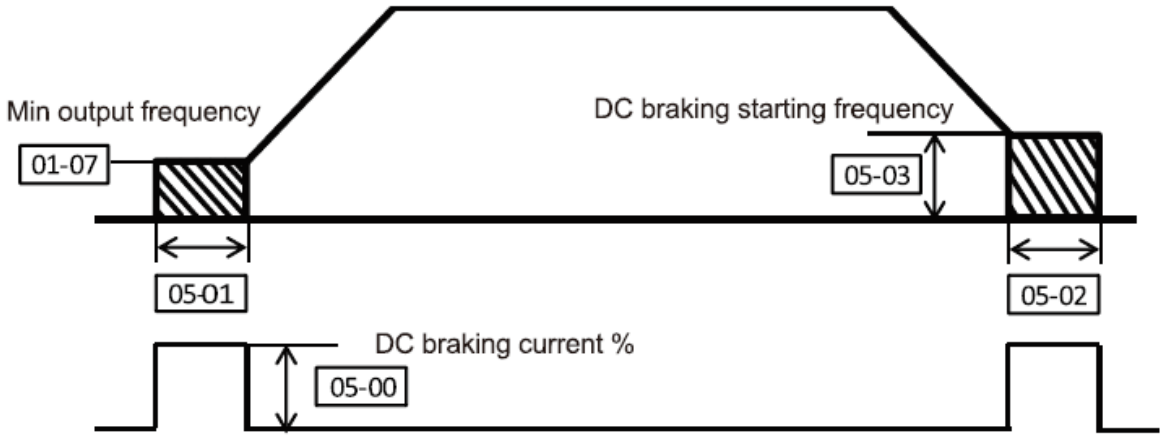
05-02	DC braking time setting at stopping	Factory setting	0.0
	Setting range	0.0 ～ 25.0 Sec	

When the AC motor drive stop method is set to ramp stop,this parameter is to set time lasting of DC braking voltage input to motor during braking.

05-03	DC braking starting frequency at stopping	Factory setting	0.00
	Setting range	0.00 ～ 50.00 Hz	

This parameter is to set DC braking starting frequency from deceleration to stop of AC motor drive.

Unit:0.01Hz.When set value is below min frequency (1-07), starting frequency of DC braking shall begin from min frequency.



05-04	Restarting after momentary blackout		Factory setting	0
	Setting range	0:Operation stops after momentary blackout		
		1:Restarting after momentary blackout, tracking downwards from before the blackout of Inverter		
		2:Restarting after momentary blackout, tracking upwards from the min starting frequency of Inverter.		

Note:After momentary blackout, during the period of AC motor drive restart, abnormal contact does not act.

This parameter defines the AC drive mode of operation after recovery from a momentary blackout.

05-05	Max allowable time for blackout		Factory setting	2.0
	Setting range	0.3 ～ 5.0 Sec		

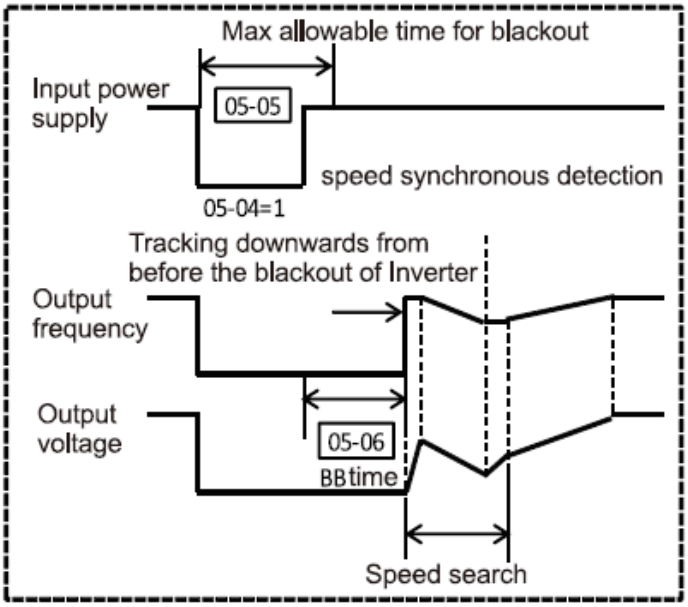
This parameter shall set Max allowable time for blackout in case of momentary blackout and if function of Restarting after momentary blackout is started. If power supply breaking time exceeds Max allowable time(05-05), output of AC motor drive shall stop after power resupplied.

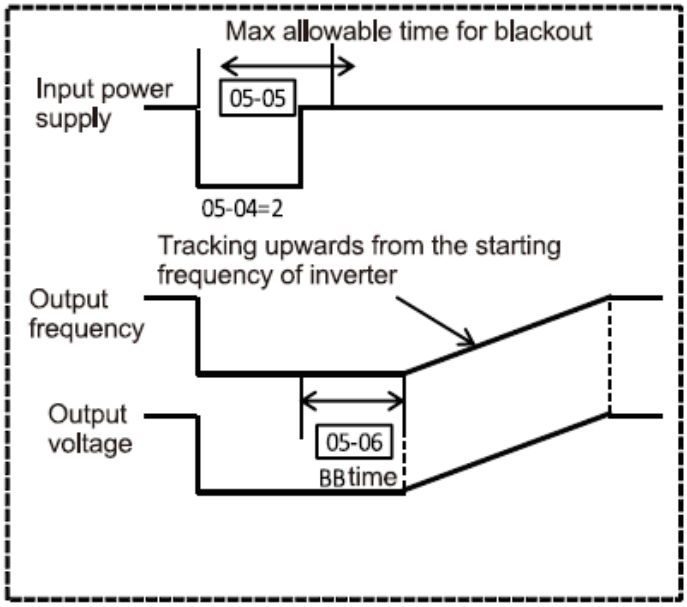
05-06	After power is recovered, tracking time(B.B time)		Factory setting	0.5
	Setting range	0.3 ～ 5.0 S		

If power supply interruption is detected, AC motor drive shall stop output and shall not be re-started until after set time by this parameter. It's preferred to provide output side residual voltage to be approximately 0V prior to AC motor drive starting.

05-07	Max current setting for speed tracking		Factory setting	150
	Setting range	30 ～ 200%		

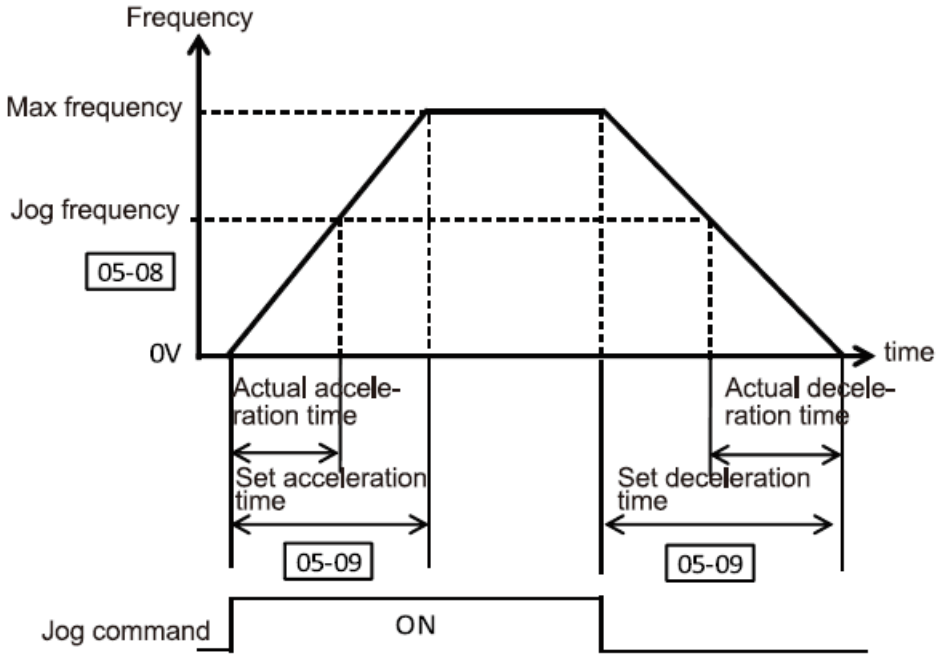
Following a blackout, the AC drive will restart and perform searching speed, if the output current is more than the setting value by 05-07.When the output current is less than the setting value by 05-07(the AC drive output frequency is at a "speed synchronization). The AC motor drive will start to accelerate or decelerate back to the operating frequency at which it was running prior to a blackout.





05-08	Jog running frequency setting		Factory setting	7.00
	Setting range	0.10 ～ 600.00Hz		

When the AC motor drive receives the Jogging command , this parameter is set output Jogging frequency value of the AC motor drive.

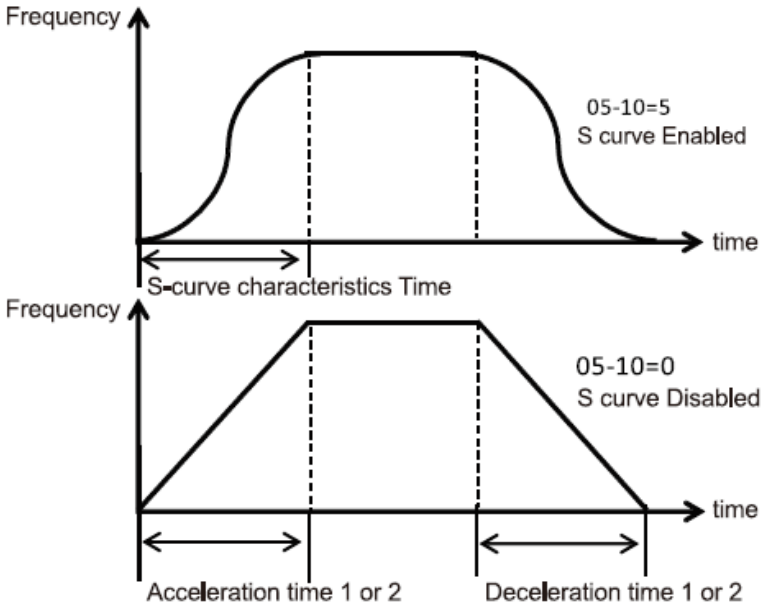


05-09	Jog acceleration/deceleration time setting		Factory setting	3.00
	Setting range	0.10 ～ 400.00S		

This parameter determines this time(Jogging acceleration/deceleration time) required for the AC Drive to ramp from 0 Hz to the max. output frequency (01-02) and this time(Jogging acceleration/deceleration time) required to ramp from the max. output frequency(01-02) to 0 Hz.

05-10	Setting of S curve acceleration/deceleration time(reserved)		Factory setting	0
	Setting range	0 ～ 100		

This parameter can be used to set the AC motor drive in start accelerated when make a soft start, the curve can be in different degrees as settings vary from1 to 100. To start a slow accel/decel, the curve in different speed rate shall be provided by the AC motor drive according to the orientated Accle/decel time.

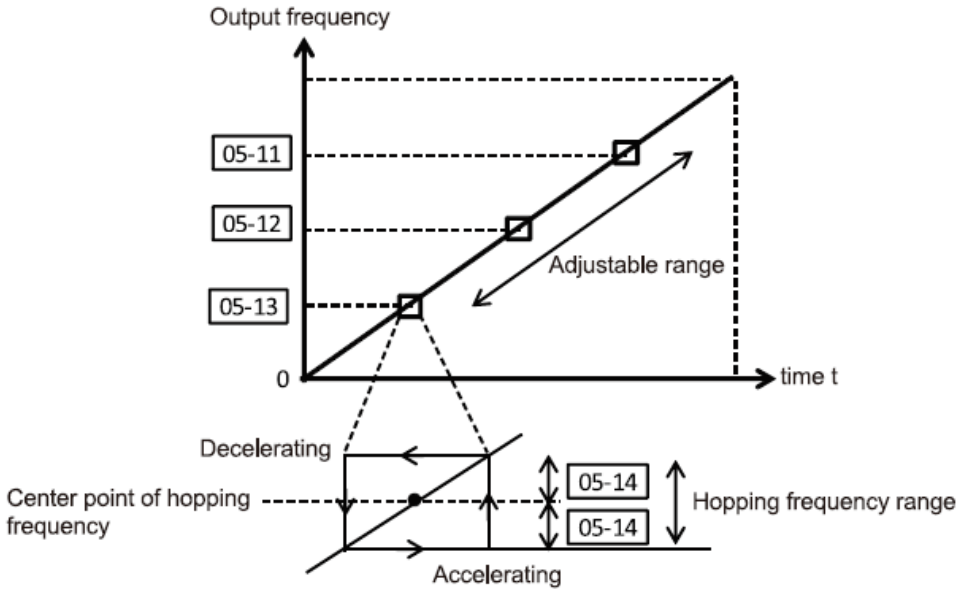


05-11	Hopping frequency 1	Factory setting	0.00
05-12	Hopping frequency 2		0.00
05-13	Hopping frequency 3		0.00
	Setting range	0.00 ～ 600.00 Hz	

This parameter determines the three hopping frequencies, which in conjunction with 05-14 [Hopping frequency width] will cause the AC drive to skip operation at these frequency ranges.

05-14	Hopping frequency width setting	Factory setting	0.10
	Setting range	0.1 ～ 20.0 Hz	

This parameter determines the frequency band of a given [Hopping frequency]. The actual band is 2 x Skip frequency band, half of which is above and the other half is below the [hopping frequency] setting. Setting this parameter to 0.1 to disable all hopping frequencies



6 Motor setting parameters

06-00	Motor rated current setting		Factory setting	100
↗	Setting range	30 ～ 120%		

This parameter must be set according to specifications on nameplate of the motor. Factory setting shall be set according to rated current of AC motor drive. By this parameter, output current of AC motor drive shall be controlled to prevent motor overheat. Provided that current of motor exceeds this setting, output frequency shall decrease until current draws below setting value.

Note:This parameter can be programmed while the drive is running.

06-01	Motor no-load current setting		Factory setting	40
	Setting range	0 ～ 99%		

This parameter sets the motor no-load current in 1% increments. Rated current of the AC motor shall be 100%.

06-02	Torque compensation increment		Factory setting	0
↗	Setting range	0 ～ 20%		

This parameter may be set so that the AC drive will increase the voltage output during startup to obtain a higher initial starting torque. This additional torque will be present until the master operating frequency is attained.

Be careful while setting the value for 06-02. If the value is too high, the motor might overheat or be damaged.

06-03	Slip compensation increment		Factory setting	0.0
↗	Setting range	0.0 ～ 10.0		

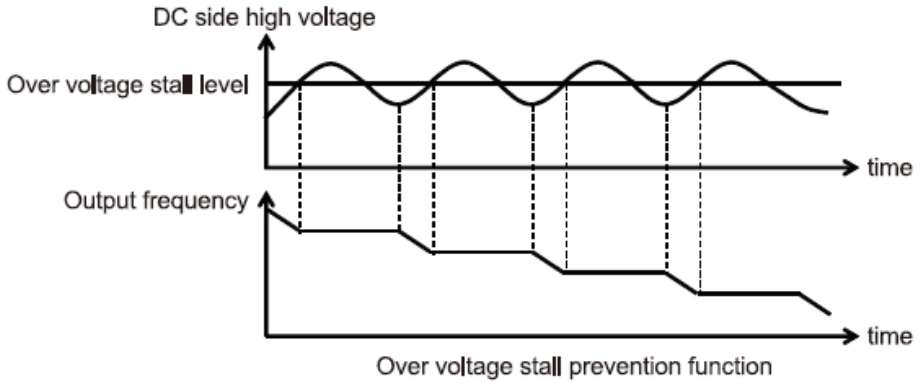
Since load and slip shall increase when AC motor drives induction motor, this parameter(set value:0.0-10.0) can set compensation frequency to decrease slip and provide the motor running speed under rated current approach synchronous rotating speed.

When output current of AC motor drive exceeds motor no load current (06-01 set value), the motor drive shall compensate frequency in accordance with 06-03 parameter.

7 Protection Parameters

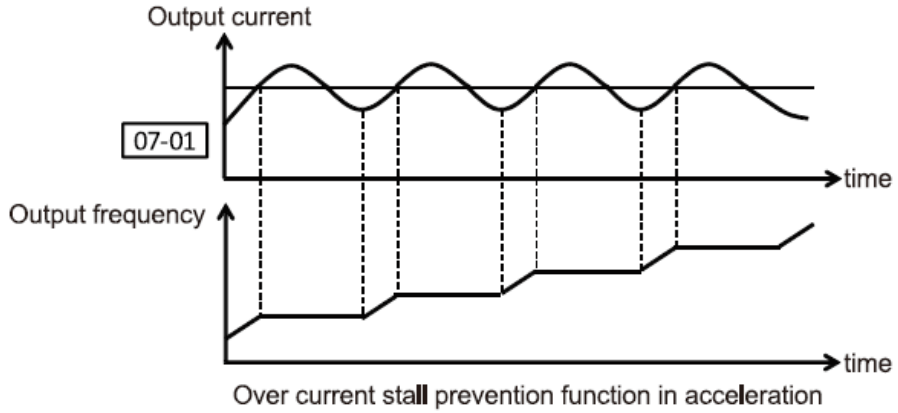
07-00	Over voltage stall prevention function setting		Factory setting	1
	Setting range	0:Unavailable		
		1:Available		

When deceleration is performed, back-up energy may be generated in AC motor drive due to inertia of motor load, and DC side voltage may rise to max value. Thus, when over voltage stall prevention is started, over voltage at DC side shall be detected, and deceleration shall be interrupted (output frequency shall be kept), which will not be performed again by AC motor drive until voltage is below setting value. It need a very short time for deceleration, we should cancel this function, at the same time equipped with braking resistor.



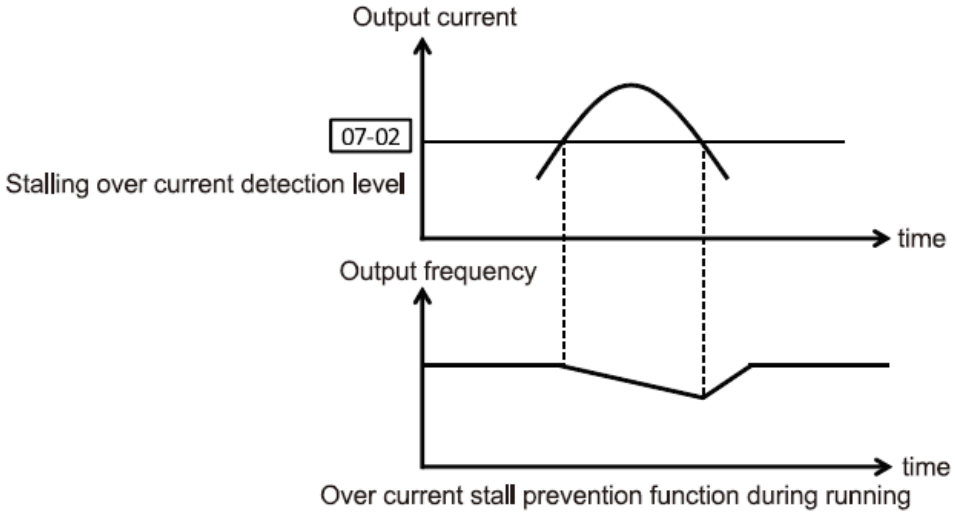
07-01	Over current stall prevention level setting in acceleration		Factory setting	160
	Setting range	50 ～ 200%		

During periods of rapid acceleration or excessive load on the motor, the AC drive output current may increase abruptly and exceed the value specified by 07-01(Over current stall prevention level setting in acceleration). The AC drive will cease to accelerate and will maintain a constant output frequency, the drive will only resume acceleration when the current is less than the setting value.



07-02	Over current stall prevention level during running		Factory setting	160
	Setting range	50 ～ 200%		

During operation of AC motor drive, provided that output current exceeds set value of 7-02 (Over current stall prevention level during running), output frequency shall be decreased by AC motor drive to prevent motor stalling. AC motor drive shall perform acceleration again to frequency command when output current is below setting of 7-02. Set unit shall be percentage of rated output current (100%) of the AC motor drive.



07-03	Electrical thermal relay selection		Factory setting	2
	Setting range	0:Act in standard motor		
		1:Act in special motor		
		2:No action		

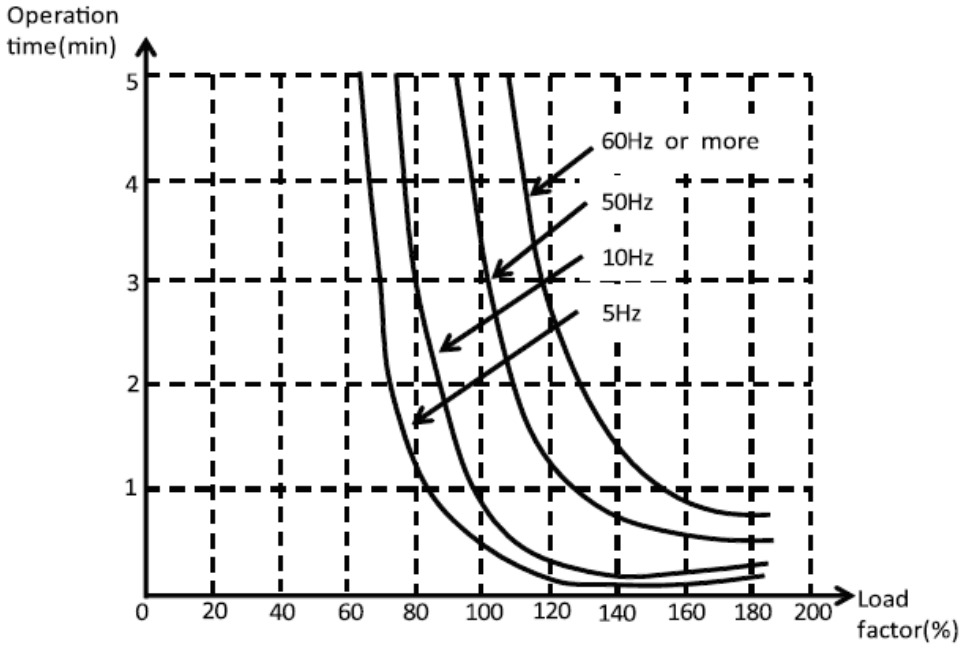
To prevent natural air cooling motor is over-heating when it is running at low speed , users shall set electric relay to control the output frequency of AC motor drive within allowable range.

0:The electronic thermal characteristics behave in accordance with a reduced torque motor (standard motor).

1:The electronic thermal characteristics behave in accordance with a constant torque motor (special motor).

07-04	Thermal relay action time selection		Factory setting	60
	Setting range	30 ～ 300 Sec		

This parameter sets time of I^2t protection relay characteristics of electric relay, with three categories available:Short-time rated, standard rated and long-time rated.



07-05	Over-torque detection function option		Factory setting	0
	Setting range	0:No detection		
		1:Over torque detection (oL2) during constant speed running, stop running after detection.		
		2:Over torque detection (oL2) during constant speed running, continue to run after detection		
		3:Detect over-torque when motor running , after detected over-load,(oL2)it could stop.		
		4:Detect torque when motor running , after detected over-torque,(oL2)it could run continuously.		

After setting over-torque detection, the continuing running mode of AC motor drive.Over-torque detection is based on the following methods:if output current exceeds over torque detection level (07-06 set value; factory setting:150%) and 07-06 setting for over torque detection time (Factory setting:0.1 sec) and if multifunctional output terminal is set to over torque detection reference. Refer to 02-09,10.

07-06	Over torque detection level		Factory setting	150
	Setting range	30 ～ 200%		

Set over torque detection level, unit shall be percentage of rated current (100%) of AC motor drive.

07-07	Over torque detection time		Factory setting	0.1
	Setting range	0.1～10.0 S	Unit	0.1 S

Set over-torque detection time.

07-08	Unusual restart times		Factory setting	0
	Setting range	0～2		

Times of auto restarting of AC motor drive shall be set to 2 times after fault (for fault allowable situations:OC (over current) and OV (over voltage)). If it is set to 0, auto-reset/restarting function shall not be performed.

07-09	Recent 1st fault record		Factory setting	0
07-10	Recent 2nd fault record			0
07-11	Recent 3rd fault record			0
	Display contents	0:No abnormal		
		1:(SC) IGBT short-circuit protection		
		2:(OV)Over voltage		
		3:(OC) Over current		
		4:(OL) Inverter over load		
		5:(OH) Over heating		
		6:(EF) External fault		
		7:(OCA) the acceleration current is over the double rated current		
		8:(OCN) the constant speed current is over the double rated current		
		9:(OCD) the deceleration current is over the double rated current		
		10:(CF1) Writing EEPROM error		
		11;(CF2) Reading EEPROM error		
		12:(CF3) Drive internal hardware error		
		13:(OL2) Motor overload		
		14:(PHL) Phase loss protection		
		15:(AUE) Automatic measurement of motor parameters failed		
		16:(CODER) Code Error		
		17;(OL1) Electrical thermal relay		

These parameters(7-09～7-10)store records of the three most recent faults that have occurred.

8 Communication Parameters

08-00	Communication address		Factory setting	1
	Setting range	0～254		

If the system is set to RS485 series communication interface control or monitoring, each drive shall set its individual address in this parameter. And each address in a same connection net shall be ONLY, shall not be repeated.

08-01	Communication transmitting speed		Factory setting	9.6
	Setting range	4.8～115.2 kbits/s		

A personal computer may be connected to the AC drive via its RS485 serial port. The PC may then be used to set or modify the internal parameters of the AC drive, or to control and monitor the AC drive operation. and operation status of the motor drive shall also be monitored by this parameter. This parameter is to set communication transmission speed.

08-02	Transmitting fault treatment		Factory setting	3
	Setting range	0:Warning and running continuously		
		1:Warning and deceleration to stop		
		2:Warning and coasting to a stop		
		3:No warning and running continuously		

A personal computer may be connected to the AC drive via its RS485 serial port. The PC may then be used to set or modify the internal parameters of the AC drive, or to control and monitor the AC drive operation. and operation status of the motor drive shall also be monitored by this parameter. This parameter is to set communication transmission speed.

08-03	Time out detected		Factory setting	0
	Setting range	0 :Not detected		
		1～100 s		

This parameter is used to set the communication and Keypad transmission timeout time.

08-04	Communication Material Format		Factory setting	0
	Setting range	0:7,N,1 FOR ASCII 1:7,N,2 FOR ASCII		
		2:7,E,1 FOR ASCII 3:7,O,1 FOR ASCII		
		4:7,E,2 FOR ASCII 5:7,O,2 FOR ASCII		
		6:8,N,1 FOR ASCII 7:8,N,2 FOR ASCII		
		8:8,E,1 FOR ASCII 9:8,O,1 FOR ASCII		
		10:8,E,2 FOR ASCII 11:8,O,2 FOR ASCII		
		12:8,N,1 FOR RTU 13:8,N,2 FOR RTU		
		14:8,E,1 FOR RTU 15:8,O,1 FOR RTU		
		16:8,E,2 FOR RTU 17:8,O,2 FOR RTU		

Computer Link:For RS485 series communication interface, each S200 shall be prepared with individual communication address in Parameter 8-00, thus inverter shall control it based on the individual communication addresses..

Communication protocol MODBUS ASCII (American Standard Code for Information Interchange) mode:each byte is made up by two ASCII characters. For example:the value is 64 hex and ASCII expression of "64", it's constituted of the "6" (36 hex) 、"4" (34 hex) .

1.Code Meaning of Modes:

Communication protocols belonging to 16 carry system, message ASCII character meaning:"0"... "9", "A"... "F" every 16 carry on behalf of each message ASCII characters. Such as:

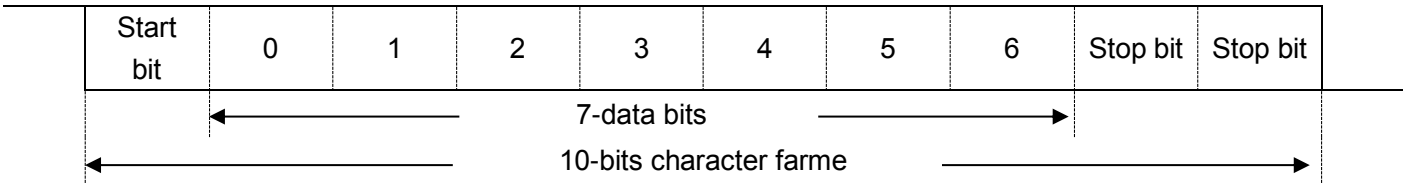
character	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'
ASCII code	30H	31H	32H	33H	34H	35H	36H	37H

character	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
ASCII code	38H	39H	41H	42H	43H	44H	45H	46H

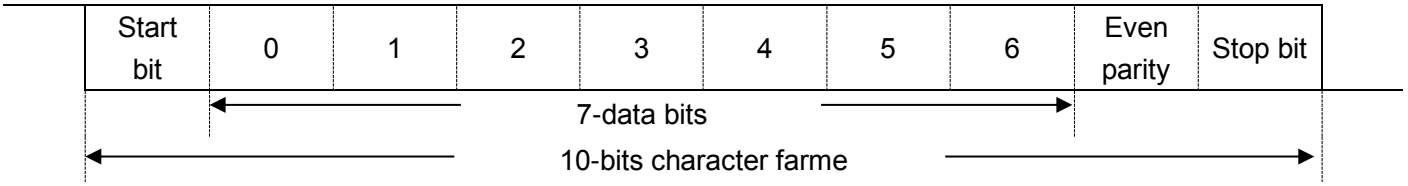
2.Structure of characters:

2.1 10-bit character frame (For ASCII)

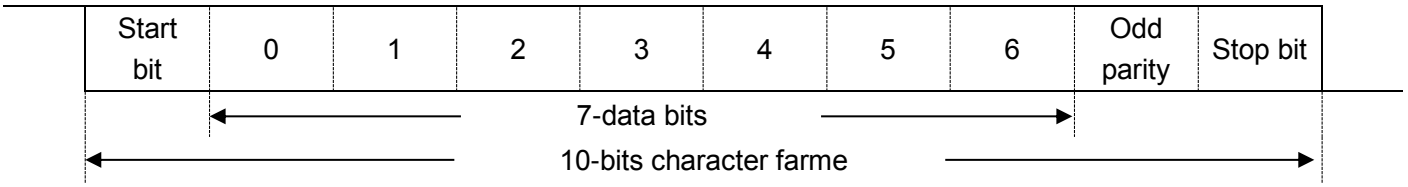
Data format 7.N.2



Data format 7.E.1

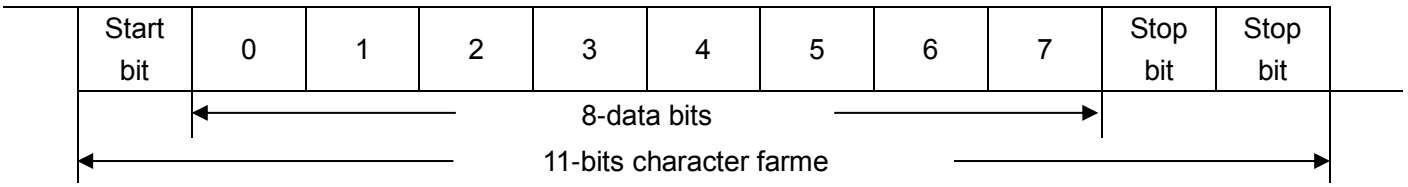


Data format 7.O.1

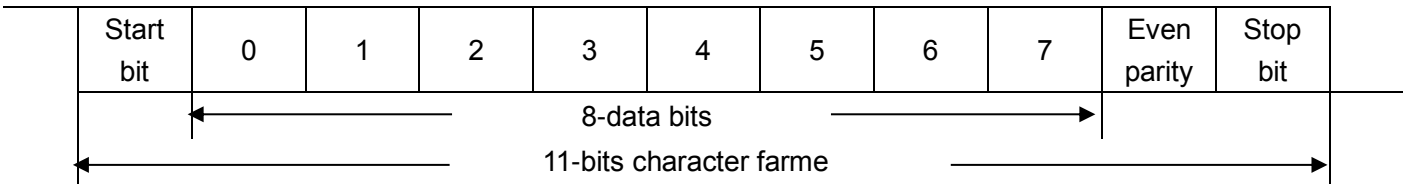


2.2 11-bit character frame (For RTU)

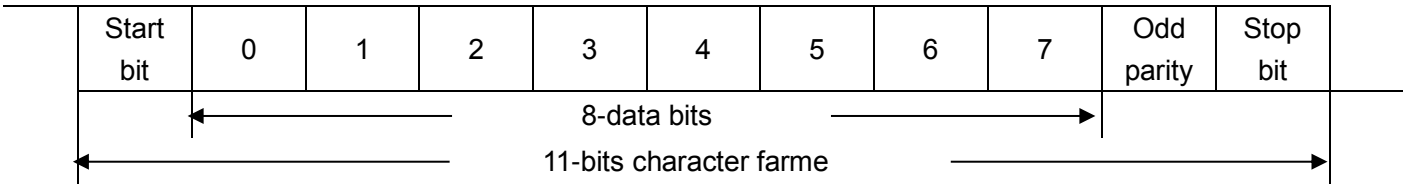
Data format 8.N.2



Data format 8.E.1



Data format 8.O.1



3.Communication data structure

3.1 Data form format

ASCII Mode:

STX	Starting character =':'(3AH)
Address Hi	Communication address:
Address Lo	8-bit address consists of 2 ASC Ⅱ codes
Function Hi	Function code:
Function Lo	8-bit function code consists of 2 ASC Ⅱ codes
DATA(n-1)	Data:
.....	N ×8-bit data consists of 2n ASC Ⅱ codes.
DATA 0	N≤16, 32 ASC Ⅱ codes at most
LRC CHK Hi	LRC Check:
LRC CHK Lo	8-bit LRC consists of 2 ASC Ⅱ codes.
END Hi	END character:
END Lo	END Hi=CR(0DH),END Lo=LF(0AH)

RTU Mode:

START	Keeping no input signal ≥ 10ms
Address	Communication address:8-bit address
Function	Function code:8-bit address
DATA(n-1)	Data:
.....	n×8-bit data, n<=16
DATA 0	
CRC CHK Low	CRC Check:
CRC CHK High	16-bit CRC consists of two 8-bit characters
END	Keeping no input signal ≥ 10ms

3.2 Communication address (Address)

00H:All drives Broadcast

01H:Drive to the 01 address

0FH:Drive to the 15 address

10H:Drive to the 16 address, and so on..max.254(FEH)

3.3 Function code (Function) and (Data Characters)

03H:Read cache content

06H:Write a WORD to the cache, function code 03 h:read cache content

3.3.1 Function code 03H:Read cache content

For example, to drive address 01 h, read 2 consecutive within the cache information content is as follows, said:starting cache address 2102H.

ASCII Mode:

Query message string format:

STX	':'
Address	'0' '1'
Function	'0' '3'
Starting address	'2' '1' '0' '2'
Number of data (count by word)	'0' '0' '0' '2'
LRC check	'D' '7'
END	CR LF

Response message string format:

STX	':'
Address	'0'
	'1'
Function	'0'
	'3'
Number of data	'0'
count by byte	'4'
Content of Starting address 2102H	'1'
	'7'
	'7'
	'0'
Content of Address 2103H	'0'
	'0'
	'0'
	'0'
LRC Check	'7'
	'1'
END	CR
	LF

RTU Mode:

Query message string format:

Address	01H
Function	03H
Starting data	21H
	02H
Number of data	00H
	02H
CRC CHK Low	6FH
CRC CHK High	F7H

Response message string format:

Address	01H
Function	03H
Number of data Count by byte	04H
Content of data address 2102H	17H
	70H
Content of data address 2103H	00H
	00H
CRC CHK Low	FEH
CRC CHK High	5CH

3.3.2 Function code 06H:Write a WORD to the cache

For example, to drive address 01 h, enter 6000 (1770 h) into the drive and set the parameters of 0100 H.

ASCII Mode:

Query message string format:

STX	':'
Address	'0' '1'
Function	'0' '6'
Data address	'0' '1' '0' '0'
Data content	'1' '7' '7' '0'
LRC Check	'7' '1'
END	CR LF

Response message string format:

STX	':'
Address	'0' '1'
Function	'0' '6'
Data address	'0' '1' '0' '0'
Data content	'1' '7' '7' '0'
LRC Check	'7' '1'
END	CR LF

RTU Mode:

Query message string format:

Address	01H
Function	06H
Data address	01H 00H
Data content	17H 70H
CRC CHK Low	86H
CRC CHK High	22H

Response message string format:

Address	01H
Function	06H
Data address	01H 00H
Data content	17H 70H
CRC CHK Low	86H
CRC CHK High	22H

3.4 ASCII mode checking code(LRC Check)

Checking code (LRC Check) is an accumulated value from Address to the Data Content. Such as 3.3.1 above query message checking code:01 h + 03 02 of h + 21 h + h + h + 00 02 h = 29 h, then take 2's complement = D7H

3.5 RTU mode checking code(CRC Check)

Checking code is from the Address to the end of the Data content. The algorithm is as follows:

Procedure 1:The 16 - bit cache (CRC cache) = FFFFH.

Procedure 2:XOR first 8-bit byte message instructions and low 16 - bit CRC cache, XOR, will result in the CRC in the cache.

Procedure 3:Another CRC cache, the 0 will be filled in the high place.

Procedure 4:Check moves to the right value, if it is 0, the new value of the Procedure3 will be saved in the CRC , otherwise ,the XOR A001H(CRC) ,Its result will be saved in the CRC.

Procedure 5:Repeat the Procedure 3,4, fully finish 8-bit operation .

Procedure 6:Repeat the Procedure2,5, take the next command for 8-bit, until finished all the commands operation. Finally, it get the value of CRC, which is the CRC checking code. It is worth noting that the CRC checking code must be placed in the message command code.

The following examples are for CRC checking code computing , they are written in C language.

```
Unsigned char* data ← // Signal reference index
Unsigned char length ← // Length of reference index
Unsigned int crc_chk ( unsigned char* data, unsigned char length)
{
int j;
unsigned int reg_crc=0Xffff;
while ( length--){
reg_crc ^=*data++;
for(j=0; j<8; j++){
if (reg_crc & 0x01) {/*LSB(b0)=1*/
reg_crc=(reg_crc>>1) ^0Xa001;
} else {
Reg_crc=reg_crc>>1;
}
}
}
return reg_crc; //Final value fit with CRC Cache memory
}
```

4、Definition of address in communication agreement:

Definition	Address	Function	
Parameters setting of drive	GGnnH	GG:indicates parameter group, nn:indicates parameter.For example:0401H indicates parameter (4-01).	
Command	2000H	Bit0～3	0:No function 1:Stop 2:Start 3:JOG Start
		Bit4～5	00B:No function 01B:Fwd reference 10B:REV reference 11B:Changing direction
		Bit8～9	Reserved
		Bit6～7	Reserved
		Bit12～15	Reserved
	2001 H	Frequency / torque command	
Monitor status	2100H	Error code (Error code):referenc 07-09~07-11	
Parameters Reading	2102H	Frequency / torque reference (F)	
	2103H	Output frequency / torque (H)	
	2104H	Output Current (XX.XX)	
	2105H	DC-BUS Voltage (XXX.X)	
	2106H	Output Voltage (XXX.XX)	

Definition	Address	Function
	2107H	Current Step speed for multi-step speed reference
	2108H	1:FWD 2:REV 3:Inverter standby 4:Failure
	2109H	Reserved
	2116H	Multi-Function Display (00—04)
	2120H 2122H 217EH	Output Voltage (00-05=0) DC-BUS Voltage (00-05=1) TRG Count value (00-05=2)

5. Extraneous response of communication error:

When the drive connections for the communication, if an error is happened, the drive will response error code and the Function code OR 80 h responses to the main control system, let master system know there is an error. And the keypad of drive displays CE - XX, as an alarm, XX means the current error code. For the details, refer to communication error code.

Such as:

ASCII Mode:

STX	':'
Address	'0'
	'1'
Function	'8'
	'6'
Exception code	'0'
	'2'
LRC CHK	'7'
	'7'
END	CR
	LF

Error code meaning:

Error code	Meaning
CE-01	Data content error:: Data content value is too big, drive cannot identify it..
CE-02	Parameters error address:driver can't identify it
CE-03	Locked password:parameters cannot be changed.
CE-04	Parameters cannot be changed when it's running.
CE-05	Parameter is error, when it's written in the E^2PROM
CE-06	Data length error
CE-07	Parameters is constant value, it can only be read not changed.
CE-08	LV parameters can be read not changed.
CE-09	Locked parameter:parameter cannot be read (00-02 bit 2).
CE-10	Transmission timeout
CE-11	Frame Error

11 Special Parameters

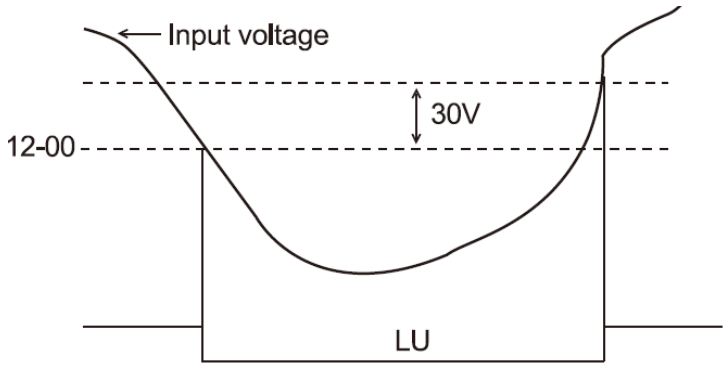
11-00	Motor control method		Factory setting	1
	Setting range	0:V/F control		
		1:V/F control + Auto slip Compensation		
		2:Vector control		

This parameter determines the control mode of the AC motor drive.

12 Special Parameters

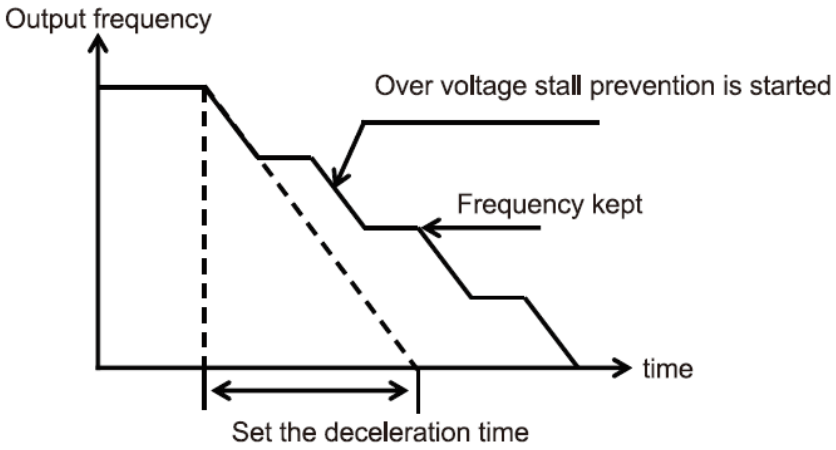
12-00	Low voltage level (LU)		Factory setting	390
	Setting range	320～440VDC		

This parameter is used to set the LU standard.



12-01	Over voltage stall prevention level setting		Factory setting	720
	Setting range	700～900V		

When deceleration is performed, back-up energy may be generated in AC motor drive due to inertia of motor load, and DC side voltage may rise to max value. Thus, when over voltage stall prevention is started, over voltage at DC side shall be detected, and deceleration shall be interrupted (output frequency shall be kept), which will not be performed again by AC motor drive until voltage is below setting value.



12-03	Automatic voltage regulator function(AVR)		Factory setting	0
	Setting range	0:Start AVR		

12-03	Automatic voltage regulator function(AVR)		Factory setting	0
		1:Cancel AVR		
		2:AVR Deceleration Cancel AVR		

Auto voltage stabilizing function of AC motor drive shall stabilize automatically output power supply to rated voltage of motor when input power supply exceeds rated voltage of the motor. For example, if V/F curve is set to AC 220V/50Hz and input power supply is in a range of AC200 to 264V, voltage output to motor shall be stabilizing automatically to AC 220V/50Hz, not exceeding the set voltage. If input power supply varies from AC 180 to 200V, voltage output to motor shall be proportional to input power supply.

It has been discovered that in deceleration to stop, time of deceleration shall be decreased when AVR function is closed.

12-07	Rotation speed displayed coefficient		Factory setting	100
	Setting range	0~300%		

This parameter is for boot screen display speed adjusting proportion coefficient.

13 Special Parameters

13-00	Parameter protection code input		Factory setting	0
	Setting range	0～9999		
	Display contents	0～4 Record code error time		

When parameters 13-00 has been set by password protection, you enter the previous password, it can be unlocked the password protection, you can modify the setting all parameters. This password has three times to enter, do not try randomly, it will be shown "codEr" after the continuously enter three times wrongly . it must be restarted, then you can enter password again. So when you set your password, and be sure to remember this password to avoid some inconvenience in the future. If the user forget the setting password, it must be returned to factory and make decoding gesture.

13-01	Parameter protection code setting		Factory setting	0
	Setting range	0～9999		
	Display contents	0:No coded lock or 13-00 code input success		
		1:Parameter locked		

This parameter is set password protection, it can be directly set password for the first time, after the setting value will be 1, it means the password protection will be available .Otherwise, when the content value is 0 ,it means no password protection function, you can modify the settings of various parameters (including this parameters, namely reset password to protect parameter). When the content value is 1, you would like to change any parameters, firstly it is important to enter the correct password in the parameter 13-00 . after unlock password, this parameter will become 0,namely you can set any parameters.

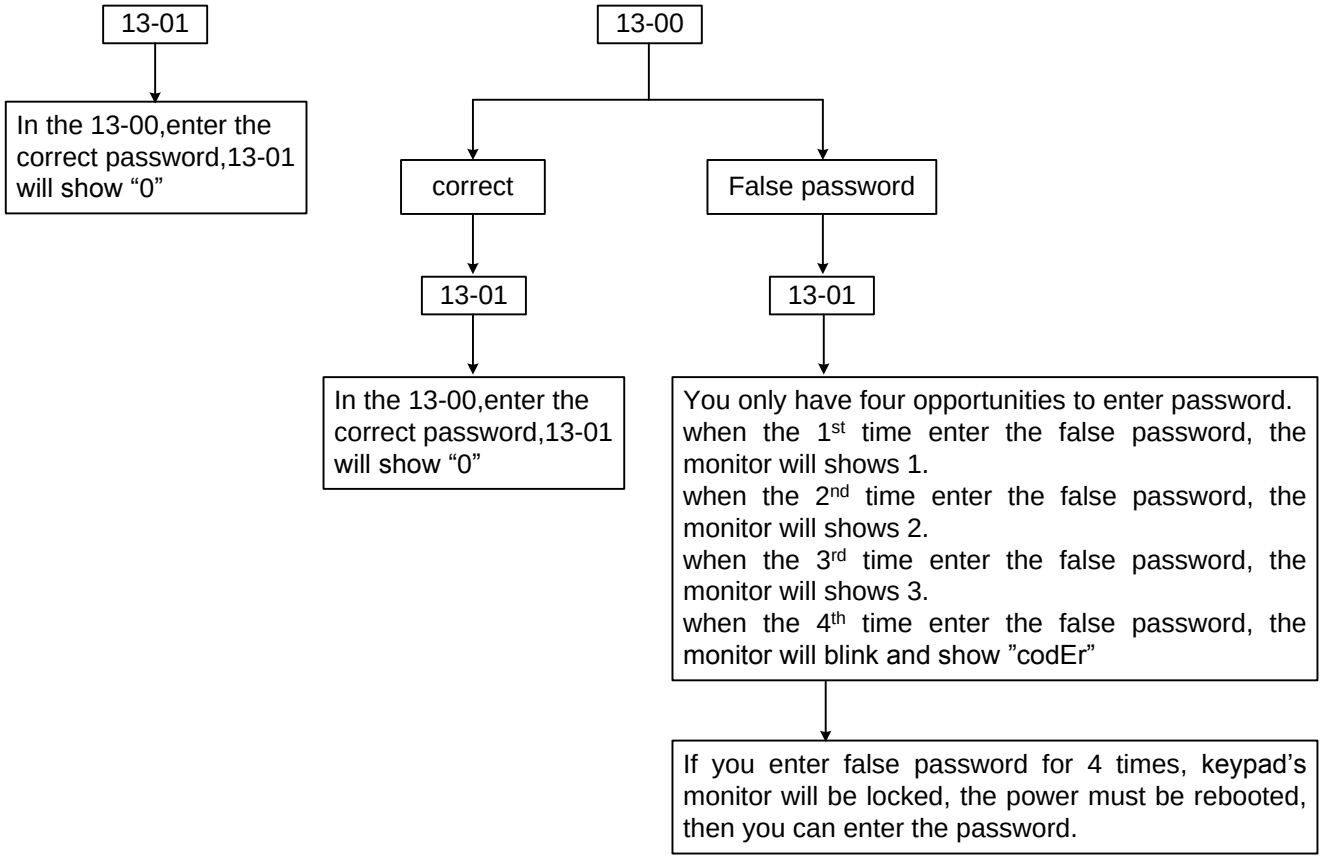
If this parameter is reset ,the password is 0, it means you cancel the password protection.Later there will be no password protection. Conversely, you set a non-zero password which is available permanently, every boot is available .after boot you need to change any parameter, refer to 13-00 parameters, enter the correct password and unlock password, you can set any parameters.

This parameter purpose is to prevent unprofessional operator to set other parameters wrongly.

1 way:Retype password in the original parameter (if you don't enter the original password it means you will change it be sure to write down the original password)

2 way:restart the AC drive, Password protection immediately restore the default .

3 way:in the 13-00 enter one false password (Parameter 13-00 will show "-End-" ,no matter enter the password correctly or falsely)



14 Factory Parameters

14-06	Keypad test parameters(manufacturer)		Factory setting	0
	Setting range	0 :No function		
		1:Keypad monitor fully display 8		

This parameter is used to detect keypad LED monitor is damaged or not.

14-07	Software version		Factory setting	*****
	Setting range	0~65535		

This parameter is DSP software version number, set by the manufacturer.

6. TROUBLE SHOOTING

AC motor drive is provided with functions of warning and protection such as over voltage, low voltage and over current. Once fault occurs, protection function shall act, AC motor drive output stop, fault contactor act and also free running of motor shall stop. For causes and corrective measures of fault, display of fault shall be taken for reference. Fault records shall be stored into computer memory inside AC motor drive (fault records for recent six times shall be available), and records shall be read at digital control panel.

Attention shall be paid that, depressing RESET after fault shall only be available after fault has been eliminated.

6.1 Fault and Corrective Measures

Display code	Descriptions of fault	Possible cause of fault	Corrective measures
oc	AC motor drive detects Over current at output side.	Overloaded	Check rated current of motor complies with that of AC motor drive.
			Check that there is no short circuit in U/t1-V/t2-W/T3.
			Check that no short circuit or grounding occur to connection of motor.
			Check that screws are securely tightened to AC motor drive.
			Increase acceleration time (01-11, 01-12).
			Check there is no over load to motor.
ocA	Over current during acceleration of the Inverter	The acceleration time is too short.	Increase acceleration time
		V/F curve is not proper.	Adjust the V/F curve setting, manual torque increase amount, or the motor parameter in order to ensure the auto-torque upgrade is normal.
		Momentary power failure happened and the motor is still running when restarted.	Restart the motor when it's totally stopped.
		The voltage of the power supply is too low.	Check the input power supply.
		Inverter output capacity is too small.	Replace with Inverter with larger output capacity.
ocd	Over current during deceleration of the Inverter	The deceleration time is too short.	Increase deceleration time.
		Potential energy load or load inertia torque is large.	Add proper dynamic braking components.
		The capacity of Inverter is too small.	Replace with Inverter with larger output capacity.
ocn	Over current during running of the Inverter	Load mutation.	Minish the mutation.
		Acceleration/deceleration time setting is too short.	Prolong the acceleration/deceleration time.
		Abnormal load	Check the load.
		The voltage of the power supply is	Check the input power supply.

Display code	Descriptions of fault	Possible cause of fault	Corrective measures
		too low.	
		The capacity of Inverter is too small.	Replace with Inverter with larger output capacity.
ou	Inverter detects over voltage at DC high voltage side.	The deceleration time is too short.	Increase deceleration time.
		Potential energy load or load inertia torque is large	Add proper dynamic braking components.
oH	Radiator overheating	The ambient environment is over heat.	Check that ambient environment is not over heat.
		The wind hole is blocked.	Clean the wind hole.
		The air fan is broken.	Replace the air fan.
		Converter Module is abnormal.	Seek services.
oL	Inverter is overloaded.	The acceleration time is too short.	Prolong acceleration time.
		DC braking amount is too large.	Decrease DC braking current and prolong braking time.
		V/F curve is not proper.	Adjust V/F curve and torque upgrade amount.
		The voltage of the power supply is too low.	Check the voltage of the power supply.
		Overloaded.	Select AC motor drive with larger capacity.
oL2	Motor load overlarge	V/F curve is not proper.	Adjust V/F curve and torque upgrade amount.
EF	External equipment fault	The voltage of the power supply is too low.	Check the voltage of the power supply.
		General-purpose machine is running in a long-term low-speed with heavy load.	Select special purpose motor for long-term low-speed running.
		Incorrect motor overload protection coefficient setting	Set motor overload protection coefficient correctly.
		Motor stalled or load mutation become larger.	Check motor load is not over-large.
		External terminal EF-DCM closed	External fault occurs
cF1	Inner memory IC data writing fault	Inner memory IC data writing fault	1. Supply power again after power off. 2.Factory maintenance and overhaul
cF2	Inner memory IC data reading fault	Inner memory IC data reading fault	1.Depress RESET key and reset parameter to factory setting. 2.If unavailable, search for factory maintenance and overhaul.
cF3	AC motor drive detects wiring fault	Interconnector of AC motor drive is abnormal.	External troubleshooting, then disconnect the external terminal
			Check the input power supply, restart after it returns normal.

6.2 Troubleshooting for Faults In General

Fault	Check points	Treatment
Motor doesn't run	Check connection of power supply to terminals R, S, T, (check charging LED is ON)	Input power supply Supply power again after power firstly interrupted. Verify voltage class of power supply Tighten screws for terminals
	Check voltage output from output terminals U, V, W.	Supply power again after power firstly interrupted.
	Check motor is not blocked due to load over-large	Decrease load to make motor running available
	Check fault of inverters	Check wiring and correct it if necessary in accordance with reference for fault.
	Check fwd/rev run reference achieved	
	Check input of Analog frequency setting	Verify wiring for analog frequency input signal Verify frequency input set voltage
	Verify operation mode setting	Controlled by digital operator
Contrary rotation direction of motor	Check wiring for output terminals U, V, W.	Match correctly with terminals U, V, W of motor
	Check wiring for FWD/REV run	Verify wiring and correct if necessary
Velocity variation unavailable for motor running	Check wiring for analog frequency input	Verify wiring and correct if necessary
	Check operation mode setting	Check and verify operation mode setting
	Check motor is free from overload.	Decrease load
Motor running speed over high or over low	Check specification(number of poles and voltage)of motor	Confirm specification of motor
	Check gear proportion	Confirm gear proportion
	Check Max output frequency setting	Confirm Max output frequency setting
	Check voltage is not dropping at motor side	Verify V/F curve setting
Speed variation fault during motor running	Check motor overload	Decrease load
	Check load is not in sharp variation	Decrease load variation Increase capacity of inverter and motor.
	Check no phase failure occur to power supply	For single phase mode, fix AC reactor to power supply side Verify wiring for Three phase mode.

7. MAINTENANCE AND AMBIENT ELEMENTS

For safety and normal operation, the inverter shall be provided with daily as well as periodical maintenance.

Diagram below shows items that must be checked.

Check shall only performed 5 minutes after charging LEDs of the inverter go off, to prevent injury to operators caused by residual power of inverter condenser.

Inspection item	Inspection content	Inspection period		Inspection method	Assessment base	Corrective measures to fault
		Daily	Annual			
Machine ambient environment	Verify ambient temperature and humidity	○		Measure with temperature or humidity meter in accordance with notes for installation	Temperature:-10 to 40℃; humidity:below 95%RH	Improve environments
	Check stacking with inflammable materials	○		View inspection	No foreign materials	
Inverter installing and grounding	Check abnormal vibration to machine	○		View and auditory inspection	No foreign materials	Tighten securing screws
	Check grounding resistance complies with specification		○	Measure resistance with three-functional meter	220V Class:below 100Ω;440V Class:below 100Ω	Modify grounding
Input power supply voltage	Check main circuit voltage	○		Measure resistance with three-functional meter	Voltage value complies with specifications	Modify input power supply
External terminal securing screws of the inverter	Check security of screwed parts		○	View inspection and check screws are secured tightly with screwdriver	All OK	Tighten or sent for factory maintenance and overhaul
	Check terminal board is not damaged		○			
	Check no clear rust exists		○			
Inverter inner wiring	Check no distortion appears		○	View inspection	All OK	Replace or sent for factory maintenance and overhaul
	Check outer shielding is not broken		○			

Inspection item	Inspection content	Inspection period		Inspection method	Assessment base	Corrective measures to fault
		Daily	Annual			
Radiator	Check no dust or chipping stacked	○		View inspection	All OK	Remove stacking such as dust
Printing circuit board	Check no inductive metal or oil stacked		○	View inspection	All OK	Remove or replace electric board
	Check elements are exclusive of color changing or burning due to overheat		○			
Cooling fan	Check abnormal vibration or noise		○	View inspection and auditory inspection	All OK	Replace cooling fan
	Check no dust or chipping stacked	○		View inspection		Remove
Power elements	Check no dust or chipping stacked		○	View inspection	All OK	Remove
	Check resistance between terminals		○	Check using three-functional meter	No short circuit or circuit break for three phase output	Replace power elements or inverter
Condenser	Check for odor or leakage	○		View inspection	All OK	Replace condenser or inverter
	Check for expansion or distortion	○				

Always inspection and maintenance is not necessary for S200.

For long time safety operation, periodical inspection shall be prepared to the inverter in accordance with descriptions below. Inspection shall only performed after power supply is off and charging LEDs off (since residual voltage may exist in the large capacity condensers.)

(1) Remove dirty stacking inside the machine

(2) Check screws securing terminals or elements are securely tightened; if not, tighten the screws

Braking resistor list

Voltage	Applicable motor		Full load output torque(Nm)	Applied resistor specification	Braking unit	Quantity	Braking torque 10%ED%	Min resistance
	HP 4P	kW						
440V series	1	0.75	4.187	80W 750Ω	×	1	125	260Ω
	2	1.5	8.326	300W 400Ω	×	1	125	190Ω
	3	2.2	12.376	300W 250Ω	×	1	125	145Ω
	5	3.7	20.398	400W 150Ω	×	1	125	95Ω
	7.5	5.5	30.508	500W 100Ω	×	1	125	60Ω
	10	7.5	11.258	1000W 75Ω	×	1	125	45Ω
	15	11	60.664	1000W 50Ω	×	1	125	50Ω
	20	15	80.885	1500W 40Ω	×	1	125	40Ω

Notes:

1. Watts of voltage value and frequency applied(ED %) shall be in accordance with specifications of this company.
2. This company shall not be responsible for damaging of inverter or other devices, which shall be caused by braking resistor or braking module that were not produced by this company.
3. When installing braking resistor, great care shall be given to safety or inflammability of the ambient environments
4. In case of Min resistance shall be used, contact your SAVCH ELECTRIC for suggestion of watts calculating.
5. “○”Refers to that fixing braking unit is necessary.
6. “×”Refers to that fixing braking unit unnecessary.

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Qualification

Received ISO9001 and CE recognition

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