PREFACE

Thank for purchasing small general-purpose multi-functional inverter MOSCON-E7.
MOSCON-E7 is a small and easy to use inverter. This user's manual describes installation, maintenance and inspection, troubleshooting and specifications of the MOSCON-E7.
Read this user's manual thoroughly for safe operation of the system and retain for future reference.

Samsung Electronics Co., Ltd.

We will try our best to meet your demands with this manual.
Contact our office stated below in case of being a printing error, mistakes and improvement in this manual.

Contact Office : Samsung Electronics Co., Ltd.
416, Maetan-3 Dong, Paldal-Gu, Suwon City, Kyungki-Do, Korea
TEL : 82-31-200-2489
FAX : 82-31-200-2295

General precautions

- This manual may contain some drawings with the cover or protective shields removed for more detail and clear explanation of the device. Make sure to reassemble the device before operation.
- The information in this manual may be subject to change without a previous notice in case of modification or improvement, or changes in specifications. Such modifications are denoted by a revised manual number.
- Contact your Samsung representative or the nearest Samsung sales office to order a copy of this manual if it has been damaged or lost.
- Samsung is not responsible for any modification of the product made by the user, since that will void your guarantee.

This user's manual uses (Danger), (Caution) or (Note) for the safety precautions depending on the degree of precautions.

DANGER: Wrong handling may cause a dangerous situation, which can lead to death or a severe injury.

CAUTION: Wrong handling may cause a dangerous situation, which can lead to a severe injury, slight injury, or damage to the production, or faulty operation.

Safety precautions

Installation

DANGER

- Before starting wiring or inspection, switch power off, wait for more than 1 minutes, and check for residual voltage between terminal P/B and N with a meter etc, to avoid a hazard of electrical shock..

- Do not remove the operator from the main body. It may cause an electric shock.

- When using the digital operator away from the main body, use the separated operator(E7OPTR-S).

- Suitable for use in a circuit capable of delivering not more than 5kA rms symmetrical amperes.

CAUTION

- Do not carry the inverter by holding the plastic parts, but hold the heatsink.
  The heat sink may fall and cause injury.

- Use nonflammable materials such as metal for the part where the inverter is installed.

- When installing several inverters in a single enclosed space, install a cooling fan to keep the ambient temperature below 45℃

- Cover the inverter during installation to protect it from metal chip coming from drilling.

Wiring

DANGER

- Always turn OFF the input power supply before wiring.
  Otherwise, an electric shock or fire may occur.

- Wiring must be performed by qualified personnel.
- Always check if the bolts on the main circuit and control circuit terminals are properly tightened.

- Turn ON the inverter only after completely assembling the covers.
  Do not detach the cover when the power is ON.
  Otherwise, an electric shock or fire may occur.

- Ground the ground terminal (200V & 400V class: ground to 100Ω or less).
  Otherwise, an electric shock or fire may occur.

CAUTION

- Tighten all terminal screws of the main circuit and the control circuit.
- Check if the voltage of the inverter rated voltage satisfies with the AC power supply voltage.
  Otherwise, it may cause fire or injury
- Do not perform withstand voltage test on the inverter. It may damage the semi-conductor element.
- When wiring other devices read their manuals carefully. Samsung is not responsible for any accident resulting from user's carelessness.
  If not, it may cause injury or fire.
- Do not connect electromagnetic switches or contactors to the output circuits.
- Never connect an AC power supply to output terminals U/T1, V/T2, and W/T3.
  Otherwise, it may damage the internal circuits of the inverter.
- Never short or ground output terminals: the output terminals should not be touched with bare hands and also, the output wires should not have contact with the inverter case
  Otherwise, an electric shock or grounding may occur
- Do not connect a phase advancing capacitor or LC/RC noise filter to an output circuit.
  Otherwise, it may damage the inverter or cause a fire.
- Do not connect an electromagnetic switch or MC to an output circuit.
  Otherwise, it will actuate the over current protective circuit in the inverter.
- Do not disassemble the digital operator.
  Otherwise, it may cause a personal injury.

Parameter setting

CAUTION

- Set the appropriate parameter. If not, it will not operate or trigger the protection operation.
- Record the previous parameters (even though Moscon-E7 records the information of the last parameter), the records can be useful in case of malfunction or errors.
- When changing the parameters, make small change at a time especially when controlling the motor parameter, changing the V/f or max. output frequency. If not, it may damage the inverter and motor.

Maintenance and inspection

DANGER

- Do not remove the digital operator from the unit since it carries high voltages. Using the cable between operator and unit is also prohibited, since it is very dangerous.

- Do not touch the terminals since some of them carry high voltages and are extremely dangerous.
  Otherwise, it may cause an electric shock.

- Do not remove the cover when power is being supplied to the inverter. Always turn off the power to the inverter through the MCCB when detaching the cover.
  Otherwise, the charge remained in the capacitor may cause an electric shock.

- After turning off the main circuit power supply, wait for a while before maintenance or inspection since it may remain charged.
  Otherwise, it may cause an electric shock.

- Maintenance, inspection, and replacement of parts must be done only by authorized personnel.
  Otherwise, it may result an injury or an accident.

- Remove all metal objects, such as watches and rings, before the maintenance, inspection, and replacement of parts. Also, always use grounded tools.
  Otherwise, it may cause an electric shock.

- Always turn off the power supply before the inspection
  Otherwise, it may cause an electric shock.

CAUTION

- Do not touch the COMOS IC in the control board directly. Otherwise it can be damaged by static electricity.

- Do not change the wiring, or remove the digital operator or connectors, during operation.
  Otherwise, it may cause a personal injury.

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----------MEMO----------

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1.Overview

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----------MEMO----------

1. Overview

An overview of the MOSCON-E7 and its functions are described in this chapter**.**

1.1 Main features

Easy to use
- Digital operator with digital volume allows simplified and easy operation.
- Built-in automatic speed controller and many automatic functions provide a smooth and powerful operation.
- More than 150 parameters for configuring the functions of Moscon-E7 are segmented into 7 groups according to its function for convenience.

Small size & uniform height
- Small size & weight allows convenient installation and easy maintenance.
- The height of Moscon-E7 is 128mm regardless of its rating. This allows optimal utilization of installation area.

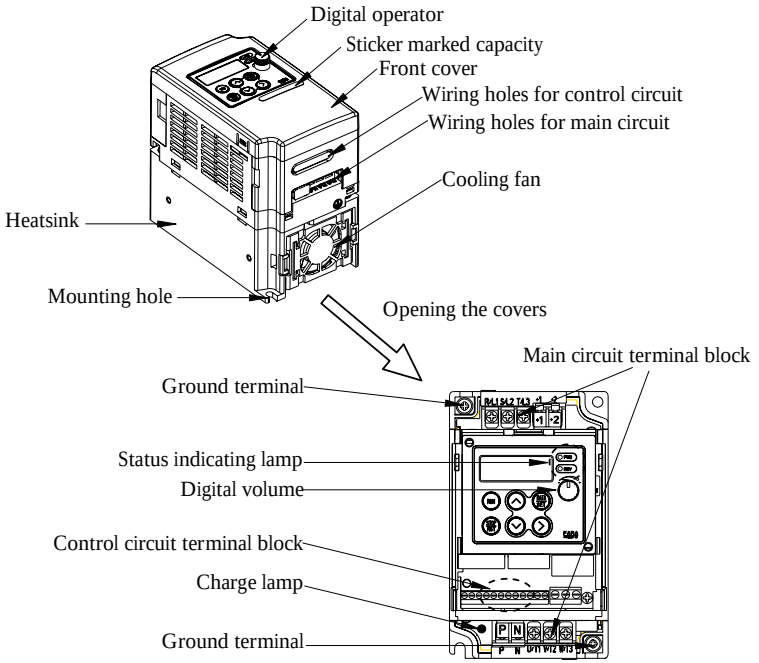
High performance
- Built-in digital speed controller adopting 32bit RISC micro-processor allows high precision & high performance frequency and voltage control. (Frequency resolution : 0.01Hz, Voltage resolution : 0.1V)
- Built-in automatic torque boost & speed control algorithm provides smooth and improved speed control characteristics.

Various operational functions
- Various built-in functions that are compatible to various operation method : Dwell, DC-Brake, Up/Down operation, etc.
- 4 multi-functional, and 2 fixed contact input terminals (19 input types)
- 2 multi-functional analog input terminals
- 1 multi-functional analog contact
- Multi-functional contact output (11 output functions)
- Application-specific function can be supported if needed.

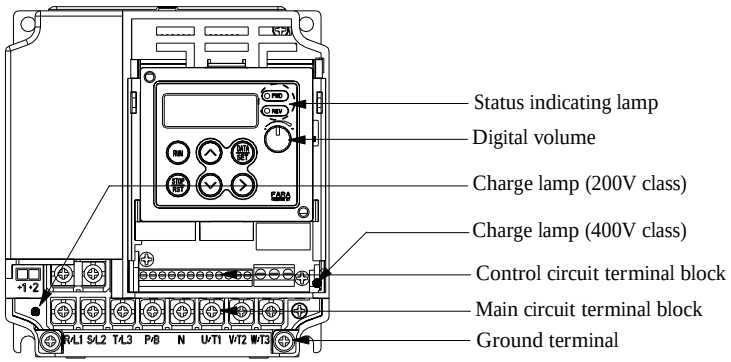
Various built-in input devices for command
- Keypad in digital operator
- Digital volume in digital operator
- Analog voltage (0~10V) & current (4~20mA) input through terminal block (Resolution : 1/1024 of maximum frequency)
- Communication supports (RS-485)

Practical and versatile protection function
- Prevents malfunctioning by detecting 17 types of errors.
- Recent 4 errors are reported.
- The last operational status of the inverter is provided.

1.2 System diagram



[1 phase 20P4S and 3 phase 20P4, 20P7]



[1 phase 20P7S, 21P5S, 22P2S and 3 phase 21P5, 22P2, 23P7, 40P4~43P7]

Figure 1.1 System diagram

1.3 Dimensions

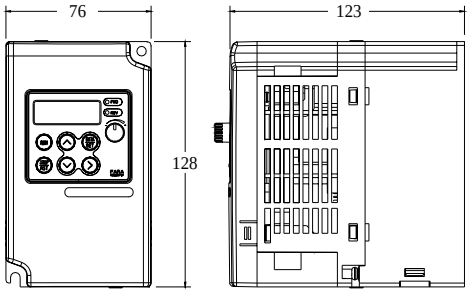


Figure 1.2 Dimensions of 1 phase 20P4 and 3 phase 20P4, 20P7

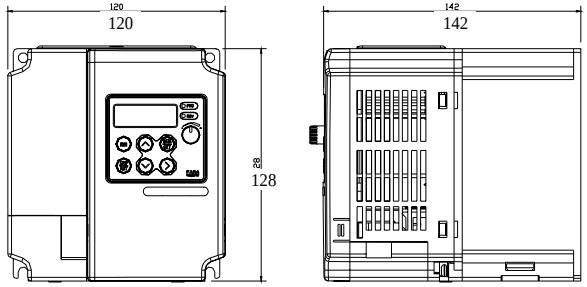


Figure 1.3 Dimensions of 1 phase 20P7, 21P5 and 3 phase 21P5, 22P2, 40P4~41P5

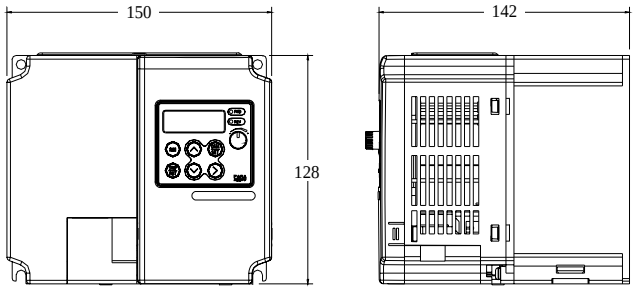


Figure 1.4 Dimension of 1 phase 22P2 and 3 phase 23P7, 42P2~43P7

Table 1.1 Dimensions of FARA MOSCON E-7

Type		MOSCON-E7			
		External Dimension (W×H ×D)	Installation Dimension W1×H1, Φ	Volume (㎜³)	Weight (kg)
200V 1phase	20P4S	76×128×123	66×118, M4	1,186,816	0.95
	20P7S	120×128×142	103×118, M4	2,150,400	1.6
	21P5S				
	22P2S	150×128×142	134×118, M4	2,150,400	2.0
200V 3phase	20P4	76×128×123	66×118, M4	1,186,816	0.95
	20P7				
	21P5	120×128×142	103×118, M4	2,150,400	1.6
	22P2				
	23P7	150×128×142	134×118, M4	2,150,400	2.0
400V 3phase	40P4	120×128×142	103×118, M4	2,150,400	1.6
	40P7				
	41P5				
	42P2	150×128×142	134×118, M4	2,688,000	2.0
	43P7				

1.4 Specifications

Table 1.2 Specifications for 200V class

SI-□□□□E7 3 phase		20P4	20P7	21P5	22P2	23P7
SI-□□□□E7S 1 phase		20P4S	20P7S	21P5S	22P2S	-
Output	Max. Applicable Motor Capacity[kW]*1	0.4	0.7	1.5	2.2	3.7
	Inverter Capacity[kVA] (1 phase)	1.1 (1.1)	1.9 (1.7)	3.0 (2.7)	4.2 (3.7)	6.7 (-)
	Rated Output Current[A] (1 phase)	3.2 (3.2)	5.0 (4.6)	8.0 (7.2)	11.0 (9.6)	17.5 (-)
	Rated Output Voltage[V]	3 phase, 200~230Vac (Proportional to input voltage)				
	Max. Output Frequency [Hz]	600Hz				
Input	Input Voltage and Frequency	3Phase, 200~230Vac, 50/60Hz				
		Single phase, 200~230Vac, 50/60Hz				
	Rated Input Current[A] (1 phase)	3.9 (6.4)	6.4 (11.0)	11.0 (15.1)	15.1 (24.0)	24.0 (-)
	Allowable Fluctuation	Voltage: -15% ~ +10%, Frequency: ±5%				
Control Characteristic	Control Method	Space vector PWM, VVVF method				
	Frequency Control Range	0.01 ~ 600Hz*2				
	Frequency Control Accuracy	Digital : ±0.01% (-10 ~ 50℃)*2 Analog : ±0.5% (25℃±10℃)				
	Frequency Setting Resolution	Digital (operator) : 0.01Hz Analog:0.06/60Hz(1/1,024:10-bit)				
	Output Frequency Resolution	0.01Hz				
	Overload Capacity	150% of rated current for 1min				
	Frequency Setting Signal	DC0~10V (Input impedence:20 kΩ) DC4~20mA (Input impedence:250Ω)				
	Accel/Decel Time	0.1~3000.0sec (unit of 0.1sec setting) 2 sets available				
	Continuous Regenerative Torque	20% of rated torque				
	V/f Pattern	15 of fixed pattern and 1 of optional pattern				

	Starting Torque	150%/3Hz
Protective Functions	Motor Overload	Motor stops in 1 minute at approx. 150% of motor rated current.
	Instantaneous Overcurrent	Motor stops immediately at 200% of inverter rated current.
	Inverter Overload	Motor coasts to stop in 1 minute at approx. 150% of inverter rated current.
	Overvoltage	Motor stops at 410V or higher.
	Undervoltage	Motor stops at 190V or lower.
	Cooling Fin Overheat	Motor stops if the temperature of the cooling fin is higher than approximately 90℃.
	Momentary Power Loss	Motor stops if power loss is 15ms or longer, by selecting the momentary power loss mode, operation can be continued if power is restored within 500ms.
	Stall Prevention	Automatic setting during acceleration, deceleration, and constant speed operation (Individual setting is possible).
	Power Charge Indication	LED is ON until the DC bus voltage becomes 50V or less.
Environmental condition	Location	Indoor (Free from corrosive gas, dust, or oil)
	Ambient Temperature	-10 ~ 40℃
	Humidity	90% RH or less
	Storage Temperature	-20 ~ 60℃*3
	Vibration	Normally 0.2G or less, less than 20Hz, 1G max.

*1. The maximum applicable motor capacity is for a standard 4-pole motor. When selecting the motor and inverter, make sure that the Inverter's rated current is applicable for the motor's rated current.

*2. Tuning may be required.

*3. The storage temperature refers to the temperature during the transportation for a short period of time.

Table 1.3 Specifications for 400V class

SI-□□□□ E7 3 phase		40P4	40P7	41P5	42P2	43P7
Output	Max. Applicable Motor Capacity[kW]*1	0.4	0.7	1.5	2.2	3.7
	Inverter Capacity[kVA]	1.4	2.6	3.7	4.2	6.5
	Rated Output Current[A]	1.8	3.4	4.8	5.5	8.6
	Rated Output Voltage[V]	3phase, 380~460Vac (Proportional to input voltage)				
	Max. Output Frequency [Hz]	600Hz				
Input	Input Voltage and Frequency	3 Phase, 380~460Vac, 50/60Hz				
	Rated Input Current[A]	2.4	4.7	7.0	8.1	12.0
	Allowable Fluctuation	Voltage: -15% ~ +10%, Frequency: ±5%				
Control Characteristics	Control Method	Space vector PWM, VVVF method				
	Frequency Control Range	0.01 ~ 600Hz*2				
	Frequency Accuracy	Digital : ±0.01% (-10 ~ 50℃)*2 Analog : ±0.5% (25℃±10℃)				
	Frequency Setting Resolution	Digital (operator): 0.01Hz Analog: 0.06/60Hz (1/1,024:10-bit)				
	Output Frequency Resolution	0.01Hz				
	Overload Capacity	150% of rated current for 1min				
	Frequency Setting Signal	DC0~10V(Input impedence:20 kΩ) DC4~20mA(Input impedence:250Ω)				
	Accel/Decel Time	0.1~3000.0sec (unit of 0.1sec setting) Includes 2-set each.				
	Continuous Regenerative Torque	20% of rated torque				
	V/f Pattern	15 of fixed pattern and 1 of optional pattern				
	Starting Torque	150%/3Hz				
Protective Function	Motor Overload Protection	Motor stops in 1 minute at approx. 150% of motor rated current.				
	Instantaneous Overcurrent	Motor stops immediately at 200% of inverter rated current.				

	Inverter Overload	Motor coasts to stop in 1 minute at approx. 150% of inverter rated current.
	Overvoltage	Motor stops at 820V or higher.
	Undervoltage	Motor stops at 380V or lower.
	Cooling Fin Overheat	Motor stops if the temperature of the cooling fin is higher than 90℃.
	Momentary Power Loss	Motor stops if power loss is 15ms or longer, by selecting the momentary power loss mode, operation can be continued if power is restored within 500ms.
	Stall Prevention	Automatic setting during acceleration, deceleration, and constant speed operation (individual setting is possible).
	Power Charge Indication	LED is ON until the DC bus voltage becomes 50V or less.
Environmental condition	Location	Indoor (Free from corrosive gas, dust, or oil)
	Ambient Temperature	-10 ~ 40℃
	Humidity	90% RH or less
	Storage Temperature	-20 ~ 60℃*3
	Vibration	Normally 0.2G or less, less than 20Hz, 1G max.

*1. The maximum applicable motor capacity is for a standard 4-pole motor. When selecting the motor and inverter, make sure that the inverter's rated current is applicable fro the motor's rated current.
*2. Tuning may be required.
*3. The storage temperature refers to the temperature during the transportation for a short period of time.

1.5 Short circuit rations

Suitable for use in a circuit capable of delivering not more than 5kA rms symmetrical amperes.

1.6 Fuse

The fuse used on the input side should be any of the UL Class K5 fuses having The ratings as listed below.

Model	Rated Voltage(V)	Rated Current(A)	Model	Rated Voltage(V)	Rated Current(A)
20P4	250	10	40P4	500	16
20P7		10	40P7		16
21P5		20	41P5		16
22P2		20	42P2	600	20
23P7		30	43P7		20
20P4S		20			
20P7S		20			
21P5S		20			
22P2S		30			

2. Installation

Nameplate information and installation site are described in this chapter.

2.1 Receiving

Confirm the following upon delivery of the Moscon-E7:

- Verify the model number to check if the correct item has been delivered.
- Check if any physical damage has occurred during shipping. If there is any damage or missing part, call the place where you purchased the product or sales office for service immediately.

CAUTION

- Don't install the inverter that there is any damage or missing part. It may be cause injury.

2.2 Nameplate information

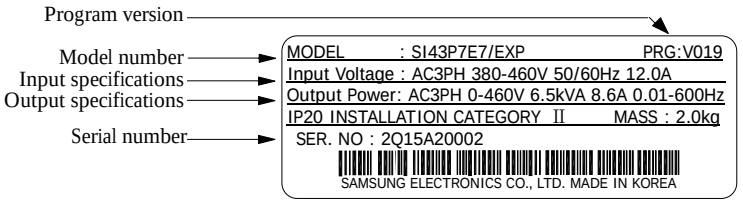
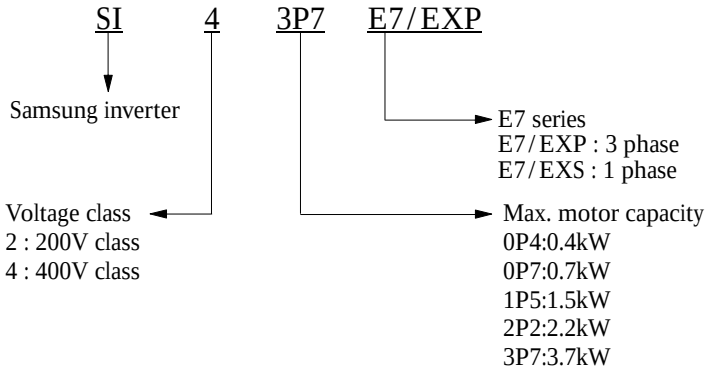
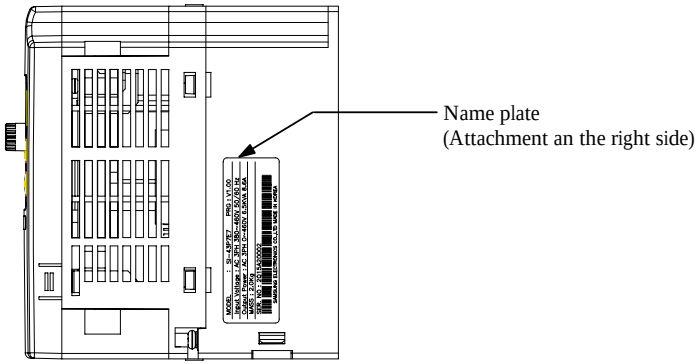


Figure 2.1 Example of nameplate

Inverter model number



Name plate location



2.3 Installation

2.3.1 Precautions for delivery and installation

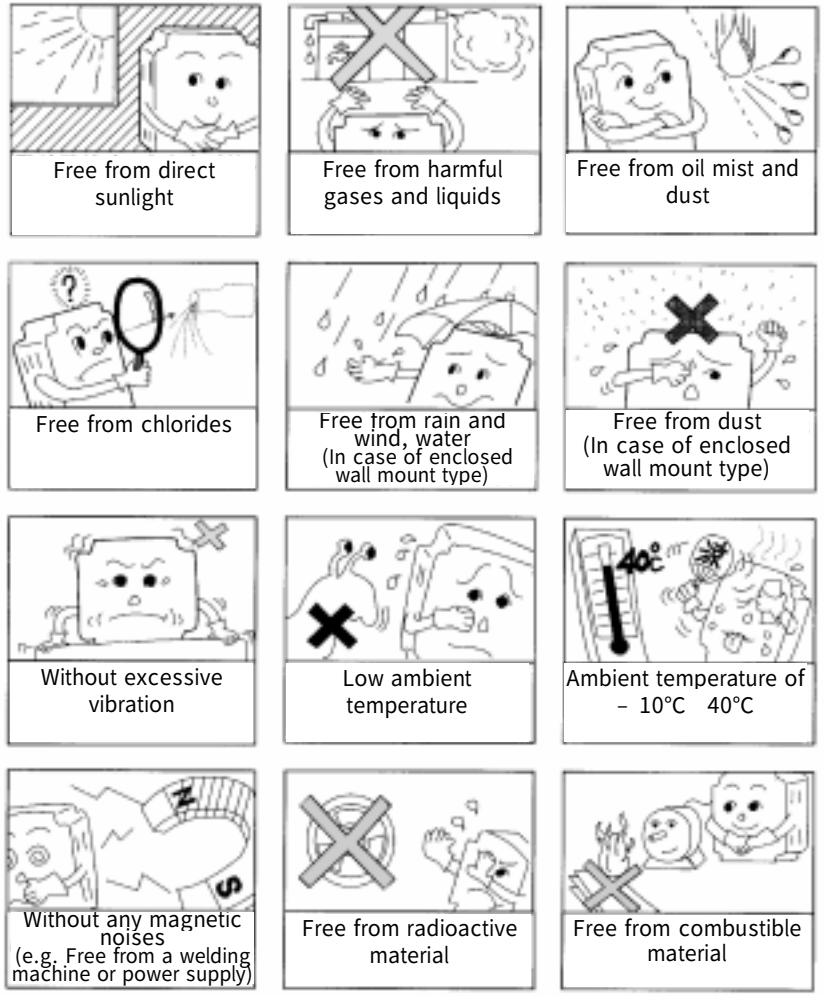
DANGER

- Do not inspect components unless inside "Charge" lamp is off. It may cause an electric shock.
- Do not remove the operator from the main body. It may cause an electric shock.
- When using the digital operator away from the main body, use the separated operator (E7OPTR-S).

CAUTION

- Be careful not to be damaged the inverter in delivering.
- Do not carry the inverter by holding the plastic parts, but hold the heat sink. Otherwise, the heat sink may fall and cause injury.
- Use nonflammable materials such as metal for the part where the inverter is installed.
- When installing several inverters in a single enclosed space, install a cooling fan to keep the ambient temperature below 45℃.
- Cover the inverter during installation to protect it from metal chip coming from drilling.

2.3.2 Installation site

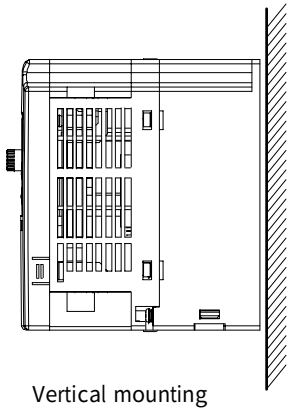


2.3.3 Controlling the ambient temperature

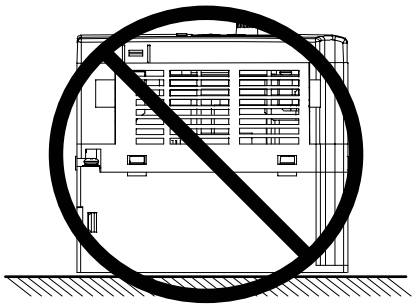
To maintain the optimum condition, the inverter should be installed at the ambient temperature of –10℃~40℃. If installed in a closed environment (e.g. enclosed panel), install a cooling fan or air conditioner to avoid any extreme temperature increases and to maintain the internal air temperature within the range.

CAUTION

- If installed in a closed environment (e.g. enclosed panel), we strongly recommend the inverter to be installed on a vertical space. If it is installed on a horizontal space, its internal temperature may increase excessively and thus, reducing its durability.



Vertical mounting



Herizontal mounting

2.3.4 Installation space

Install the inverter on a vertical surface to enhance the cooling effect. When installing the inverter, always leave enough space around it to provide normal heat dissipation.

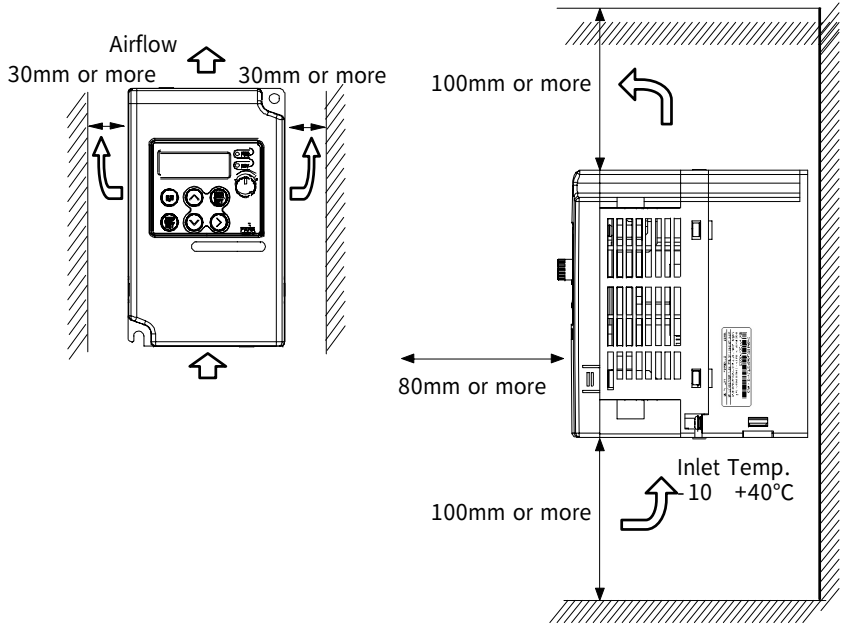


Figure 2.2 Installation space

Table 2.1 Cabinet Size

Inverter	Cabinet (enclosure) Size(Unit:mm)	Vent Hole Area	Cooling Fan
23P7	270x328x222	· 55% of both the side of the cabinet · width of each slit : 3.2mm · To be provided on each of the upper side areas	Installed at the enclosure top to suck air from inside the enclosure to the outside. (Fan air flow : 2x0.59 m^3/min or more

3. Wiring

Wiring specifications, terminals, main circuit terminal connection, peripheral device connection and precautions in wiring are described in this chapter.

DANGER

- Always turn OFF the input power supply before wiring. Otherwise, an electric shock or fire may occur.
- Wiring must be performed by a qualified personnel.
- Always check if the volts on the main circuit and control circuit terminals are properly tightened.
- Be sure to ground the ground terminal. Otherwise, an electric shock or fire may occur.
- Turn ON the inverter only after completely assembling the covers. Do not detach the cover when the power is ON. Otherwise, an electric shock or fire may occur.
- Ground the ground terminal (200V & 400V class: ground to 100Ω or less). Otherwise, an electric shock or fire may occur.

CAUTION

- Tighten all terminal screws of the main circuit and the control circuit.
- Check if the voltage of the inverter rated voltage satisfies with the AC power supply voltage. Otherwise, it may cause fire or injury.
- Do not perform withstand voltage test on the inverter. It may damage the semi-conductor element.
- When wiring other devices, read their manuals carefully. Samsung is not responsible for any accident resulting from user's carelessness. If not, it may cause injury or fire.
- Do not connect AC power to output terminal U, V and W. Otherwise, it may damage the inverter.
- Do not connect electromagnetic switches or contactors to the output circuits.

3.1 Connection diagram

The connection diagram of the Moscon-E7 is shown below.
When using the digital operator, the motor can be operated by wiring only the main circuits.

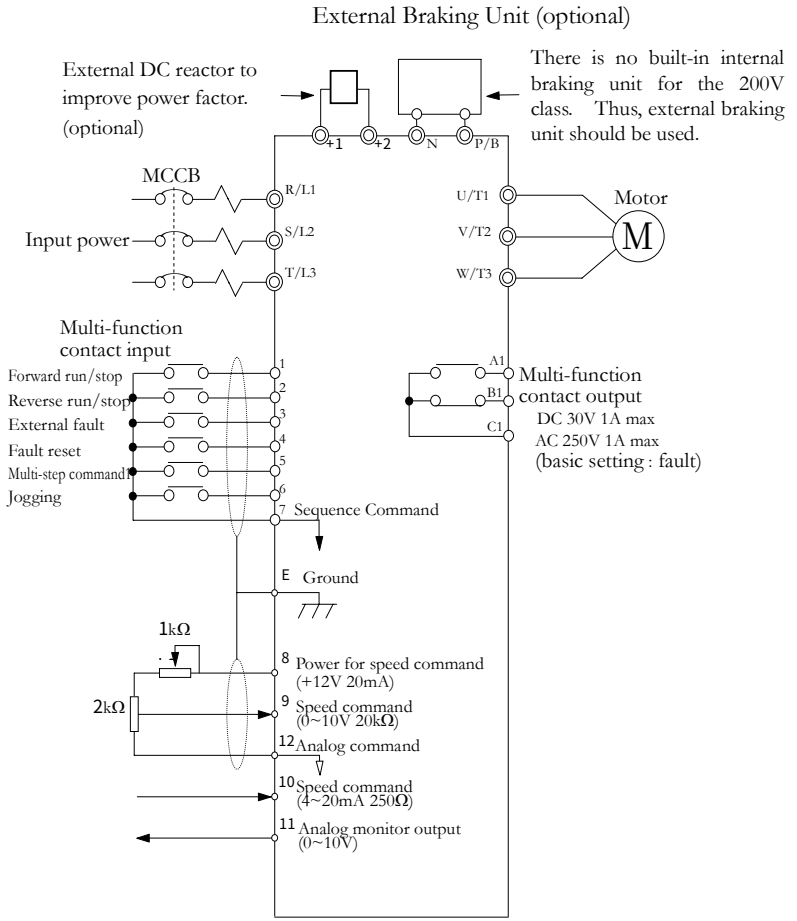


Figure 3.1 Connection diagram (200V class)

Note 1) : Shield wire, : Twisted pair shield wire.
2) ◎ : Main circuit terminal, ○ : Control circuit terminal.
3) Max. current value for +12V voltage of the control circuit terminal No.8 is 20mA.

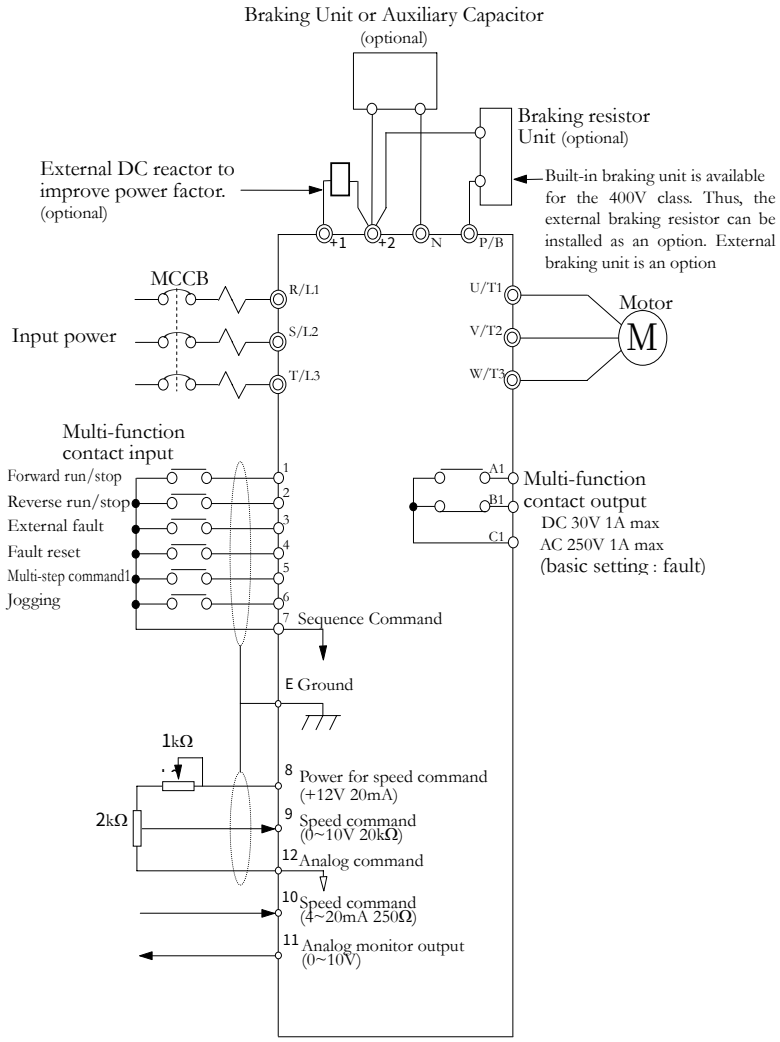


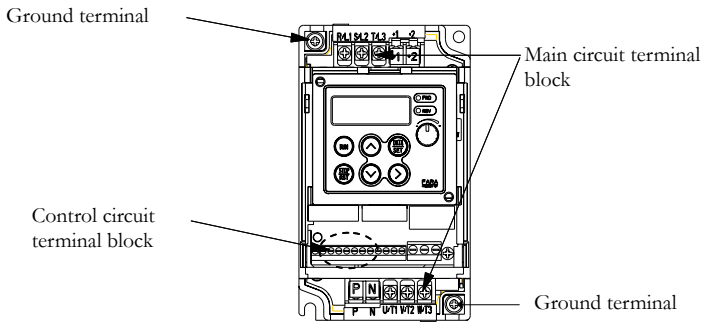
Figure 3.2 Connection diagram (400V class)

Note 1) : Shield wire, : Twisted pair shield wire.

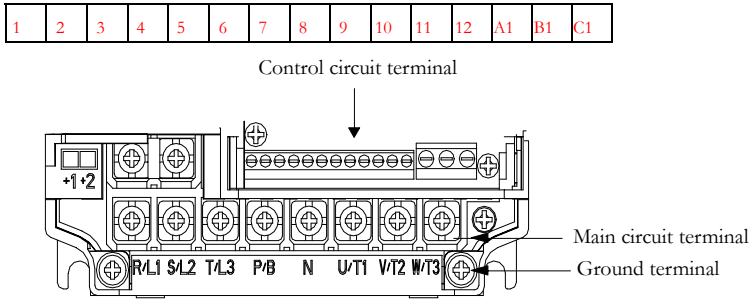
2) ◎ : Main circuit terminal, ○ : Control circuit terminal.

3) Max. current value for +12V voltage of the control circuit terminal No.8 is 20㎃.

3.2 Terminal block configuration



[20P4, 20P7]



[21P5 – 23P7, 40P4 – 43P7]

Figure 3.3 Terminal configuration

3.3 Main circuit terminal functions

Table 3.1 200V class main circuit terminal functions

Purpose	Symbol
Main circuit power input	R/L1, S/L2, T/L3
Inverter outputs	U/T1, V/T2, W/T3
DC power input	+1, N
DC reactor connection	+1, +2 (Remove short-bar)*
Braking unit connection	P/B, N (No internal braking unit)
Auxiliary capacitor	(+): P/B (-):N
Ground	⏚

*Short-bar must be removed when connecting the DC reactor.

Table 3.2 400V class main circuit terminal functions

Purpose	Terminal Symbol
Main circuit power input	R/L1, S/L2, T/L3
Inverter output	U/T1, V/T2, W/T3
DC power input	+2, N (Additional circuit is needed to prevent the damage caused by inrush current.)
DC reactor connection	+1, +2(Remove short-bar)*
Braking resistor unit	+2, P/B (used for the internal braking unit)
Braking unit	+2, N
Auxiliary capacitor	(+) : +2 (-) : N
Ground	⏚

*Short-bar must be removed when connecting the DC reactor.

3.4 Control circuit terminal functions

Table 3.3 Control circuit terminal block

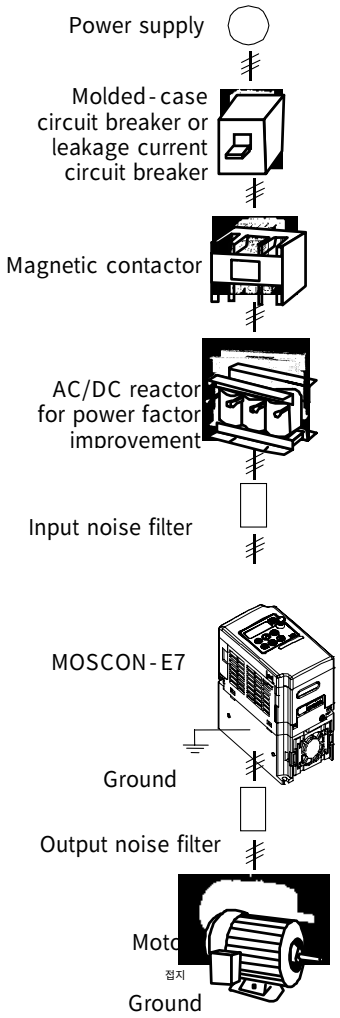
Terminal	Function	Signal level	Default setting
1	Forward run/stop command	Photo-Coupler input +24V, 10mA	-
2	Reverse run/stop command		-
3	Multi-function input 1		External fault
4	Multi-function input 2		Fault reset
5	Multi-function input 3		Multi-step speed1 command
6	Multi-function input 4		Jogging command
7	Sequence control input common	+24V Ground	Sequence 0V
8	Power for freq. command	+12V(Max 20mA)	-
9	Voltage command for output frequency	DC 0 +10V(25Ω)	-
10	Current command for output frequency	4 20mA(250Ω)	-
11	Analog monitor output	0V	-
12	Common for control	DC 0 +10V	(Output frequency)
A1	Multi-function output	Contact : AC 250V, 1A or below DC 30V, 1A or below	Fault occurred
B1			
C1			

Note) Be attentive to below mention when changing output frequency in using the external frequency command terminal.

- Voltage command input terminal is set only in factory setting.
- Change setting value of parameter H2.01 from 0 to 1 in using the current command input terminal.
- In setting the function of contact input, H0.02~H0.05, parameter H2.01 is regardless if voltage current command transfer(14) is set.

3.5 Connections to peripheral devices

Examples of connections between the Moscon-E7 and peripheral devices are shown in the figure below.



Power supply
Follow the specification on power supply.

Molded-case circuit breaker or leakage current circuit breaker
Large inrush current flows when power is supplied thus, use appropriate breaker, which is tolerant to high frequency.

Magnetic contactor
Installed to remote control the supply/block of the power. Frequent start/stop of the inverter through this device reduces durability of the inverter. Install the surge absorber on the coil.

AC/DC reactor for power factor improvement
AC/DC reactor is required when improving the power factor or when the inverter is connected to a large-capacity power transformer whose capacity is 600kVA or more. If not, invert may be damaged.

Input noise filter
Install it close to the inverter to reduce the noise from the wire.

Input wiring
Inappropriate wiring damages the inverter. Do not connect input power R, S, and T to output U/T1, V/T2, and W/T3. Keep enough distance between the control signal line and main circuit to prevent the effect of noise.

Installation area
Install in a place free from gas and dust. Maintain the ambient temperature within the specified range.

Output noise filter
Install the output noise filter close to the inverter to reduce the noise from output wire of the inverter.

Motor
Follow the specification when running the motor.

Grounding
Ground the inverter and motor to prevent any electric shock.

Wiring between the inverter and motor
Keep the wire between the inverter and motor short. If not, it may decrease the carrier frequency. Leakage current from the cable affects the inverter and other peripheral devices.

Figure 3.4 Peripheral devices

3.6 Wiring the main circuits

3.6.1 Wiring on the input side of main circuit

3.6.1.1 Installing a molded-case circuit breaker

- Always connect the input power terminals (R/L1, S/L2 and T/L3) via an appropriate MCCB.
- Large inrush current flows when power-up, thus, use appropriate breaker. Use the one that is tolerant to high frequency.
- MCCB with a capacity of 1.5 to 2 times greater than the rated current of the inverter should be used.
- When one MCCB is used for more than one device (e.g. inverter), the sequence must be set up so that the power supply is turned off by a fault output.

3.6.1.2 Installing a magnetic contactor (MC)

- The inverter is able to use without the magnetic contactor of power supply side.
- In case of installing the magnetic contactor to input power supply in order to prevent an accident occurred by the automatic restart operation after the recovery from a power interruption, frequent start/stop of the inverter through this device reduces durability of the inverter.
- When the digital operator is used, unless the inverter operation mode is set to the automatic start operation, it cannot be automatically started after the recovery rom a power interruption.
- Install the surge absorber on the coil.

Table 3.4 MCCB and magnetic contactor

Model	Capacity (kVA)	Rated Output Current(A)	MCCB		Magnetic Contactor Rated Current(A)
			AF	AT	
20P4	1.1	3.2	30A	5A	10A
20P7	1.9	5.0	30A	10A	10A
21P5	3.0	8.0	30A	20A	10A
22P2	4.2	11.0	30A	20A	20A
23P7	6.7	17.5	30A	30A	20A
40P4	1.4	1.8	30A	5A	10A
40P7	2.6	3.4	30A	5A	10A
41P5	3.7	4.8	30A	10A	10A
42P2	4.2	5.5	30A	10A	10A
43P7	6.5	8.6	30A	20A	10A

3.6.1.3 Installing an AC reactor/DC reactor

• Two options are available when the inverter is connected to a large-capacity power transformer whose capacity is 600kVA or higher:

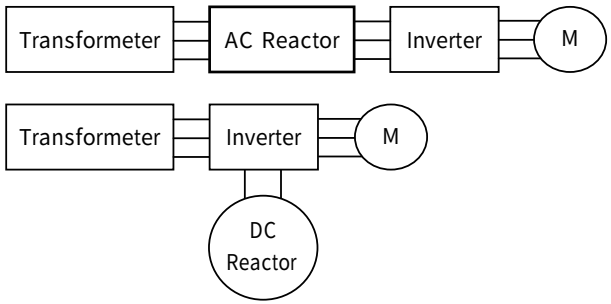


Figure 3.5 Reactor installation

• If not, inverter may be damaged due to an excessive peak current flow through the input power circuit.
• AC reactor/DC reactor also can be used to improve the power factor on input power supply side.

Table 3.5 DC Reactor

Inverter capacity(kW)		0.4	0.7	1.5	2.2	3.7
200V Class	Current[A]	5.4	5.4	18	18	18
	Inductance[mH]	8	8	3	3	3
400V Class	Current[A]	3.2	3.2	5.7	5.7	12
	Inductance[mH]	28	28	11	11	6.3

Table 3.6 AC Reactor

Inverter capacity(kW)		0.4	0.7	1.5	2.2	3.7
200V Class	Current[A]	2.5	5	10	15	20
	Inductance[mH]	4.1	2.1	1.1	0.71	0.53
400V Class	Current[A]	1.3	2.5	5	7.5	10
	Inductance[mH]	28	8.4	4.2	3.6	2.2

3.6.1.4 Connecting input power supply

• Input power supply can be connected to any terminal R/L1, S/L2, or T/L3 on the terminal block; the phase sequences of input power supply are irrelevant.

3.6.1.5 Installing a surge absorber

• A surge absorber must be used for inductive loads near the FARA MOSCON-E7. Otherwise, it may damage the devices or cause malfunctioning.
• These inductive loads includes:
  - MC,
  - Electromagnetic relay,
  - Solenoid valves and solenoids,
  - MCCB

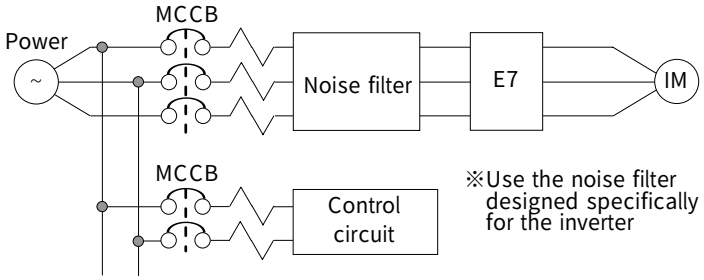
Table 3.7 Application of the surge absorber

Description		Model	Specification
200 ~230V	Large Capacity Coil except Relay	DCR2-50A 22E	AC250V 0.5u μF 200Ω
	Control Relay	DCR2-10A 25C	AC250V 0.1 μF 100Ω
380~460V Devices		DCR2-50D 100B	DC 1000V 0.5 μF 220Ω

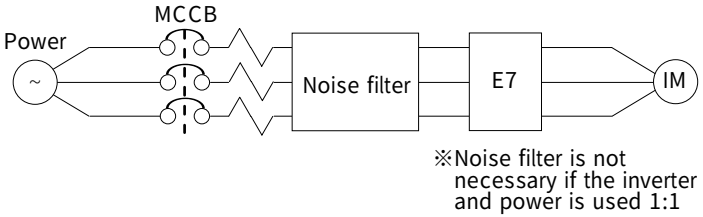
Note) The above surge absorbers are the product of MARCON. Use the recommend product or equivalents.

3.6.1.6 Installing a noise filter on power supply side

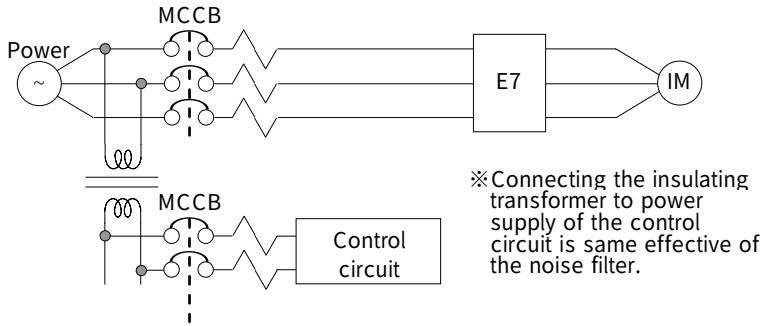
• Install the noise filter in order to eliminate noise transmitted from the power line to the inverter.



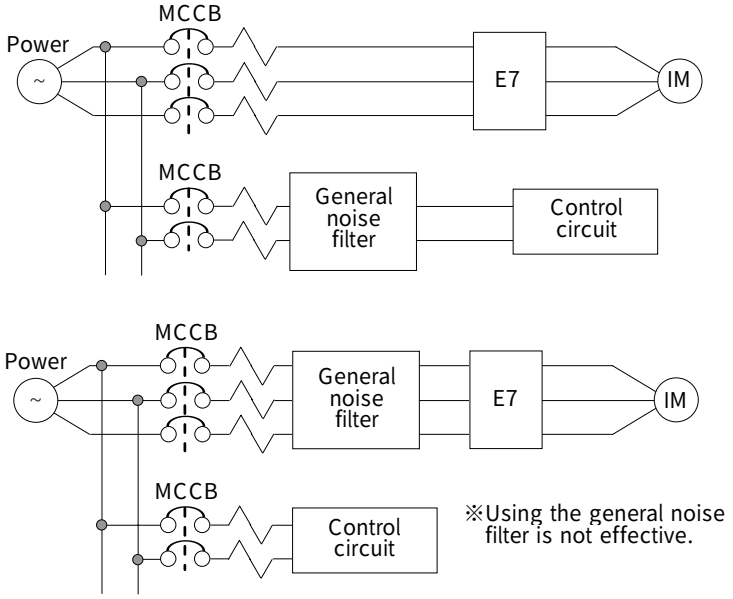
(a) Wiring example 1 (Correct)



(b) Wiring example 2



(c) Wiring example 3



(d) Incorrect wiring example

Figure 3.6 Power supply noise filter installation

3.6.2 Wiring on the output side of main circuit

3.6.2.1 Precautions when wiring on the output side of main circuit

DANGER

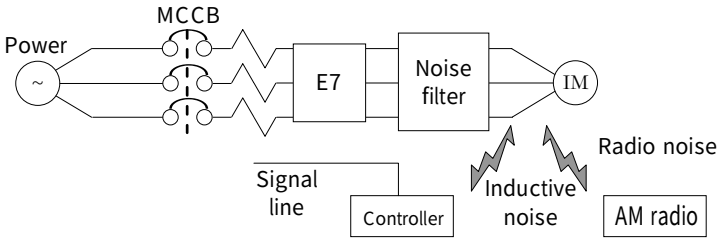
- Never connect a power supply to output terminals U/T1, V/T2, and W/T3.
  Otherwise, it may damage the internal circuits of the inverter.
- Never short or ground output terminals.
- The output wires should not have contact with the inverter heatsink.
- **Do not connect a phase advancing capacitor or LC/RC noise filter to an output circuit.**
  Otherwise, it may damage the inverter or cause a fire.
- **Do not connect an electromagnetic switch or MC to an output circuit.**
  Otherwise, it will actuate the overcurrent protection circuit of the inverter.

3.6.2.2 Connecting the inverter and motor

- Connect output terminals U/T1, V/T2, and W/T3 to motor wires U, V, and W respectively.
- Check if the motor rotates in correct direction according to the command. If not (motor rotating in reverse with the forward run command), switch any of two output terminals to each other and reconnected them.

3.6.2.3 Installing a noise filter on the output side

Install a noise filter to reduce radio noise and inductive noise.



Inductive noise: Noise generated on the signal line by electromagnetic induction. It causes the controller to malfunction.
Radio noise: High-frequency noise generated from the inverter and cables.

Figure 3.7 Noise filter on the output side

3.6.3 Dealing with inductive noises

- As mentioned previously, noise filter can be used to prevent the inductive noise generated on the output side.
- As an option, cables can be routed through a grounded metal pipe to prevent inductive noise.
- If the metal pipe and the signal line are at least 30cm apart, the inductive noise can be considerably reduced.

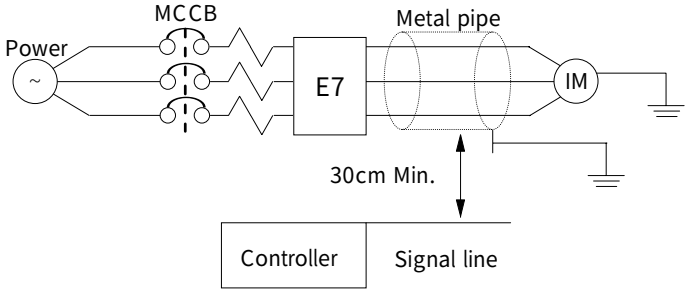


Figure 3.8 Dealing with inductive noise

3.6.4 Dealing with radio interference (RFI)

- Radio noise is generated from the inverter as well as the input/output lines.
- The radio noise can be reduced by installing the noise filters on both input and output sides, and also installing the inverter in an enclosed and grounded steel box.
- Make the cable between the inverter and motor as short as possible.

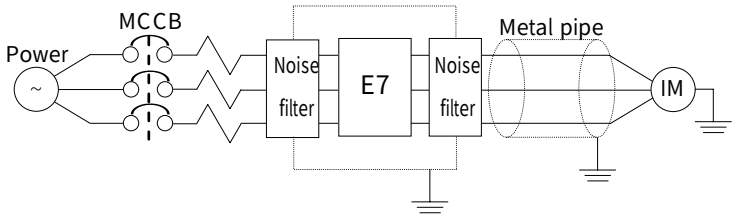


Figure 3.9 Dealing with radio interference

3.6.5 Cable length between inverter and motor

- If the cable between the inverter and motor is long and the carrier frequency is high, high-frequency current is leaked from the cable and peripheral devices. This may damage the inverter and peripheral devices.
- Adjust the carrier frequency as shown in table below.
- To change the setting related to the carrier frequency, refer to the parameter setting of C1-01.

Table 3.8 Cable length.vs. carrier frequency

Cable length	30m max.	50m max.	100m max.	More than 100m
Carrier frequency	Less than 10kHz	Less than 8kHz	Less than 4kHz	Less than 1kHz
C1.01	10	8	4	1

3.7 Precautions when wiring

3.7.1 Control circuit wiring precautions

- Separate the control circuit wiring (terminals 1 to 11) from main circuit wiring (terminals P/B, N, R/L1, S/L2, T/L3, U/T1, V/T2, W/T3, +1, and +2) and other high-power lines.
- Separate the control circuit terminals A1, B1 and C1 (contact outputs) from wiring for control circuit terminals (terminals 1 to 11).
- Use twist-pair or shielded twisted-pair to prevent operating faults due to noise. The maximum cable length is 50cm.

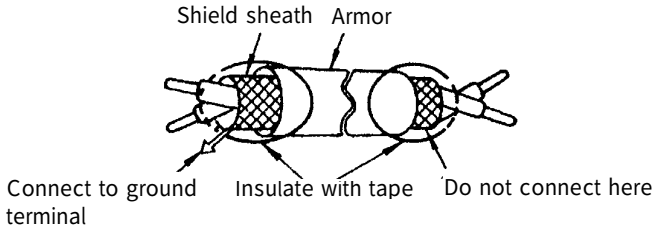


Figure 3.10 Ends of twisted-pair cables

3.7.2 Main circuit input/output wiring

- Do not connect the main circuit power to output terminal U/T1, V/T2, and W/T3.
- When the output terminals U/T1, V/T2, and W/T3 and motor terminals U, V, and W are connected, the forward rotation command causes the motor to rotate counter-clockwise from the view of load side. To change the direction, switch any of two wires of U, V and W.

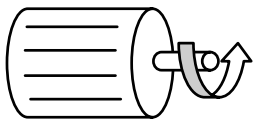


Figure 3.11 Direction of motor's rotation

• Output wiring should not touch with case.
  Otherwise, it may cause an GND-fault or a short-circuit.
• Do not connect the phase advanced capacitor, LC, or RC noise filter to the output side of Moscon-E7.

3.8 Grounding

• Ground the ground terminal. ⏚
• Never ground the MOSCON-E7 in common with welding machines, motors, or other electrical equipment. Separate the ground cable from the high voltage equipment wiring.
• Use the GND cable specified in the technical standards for electrical facilities. Wire the cable as short as possible.
• When several MOSCON-E7 are used, ground each unit as shown below. Do not loop the ground as example ⓒ.

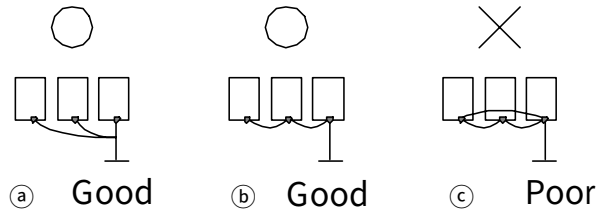


Figure 3.12 Multiple grounding

3.9 Cable specification

Determine the cable size for the main circuit. The line voltage drop should be within 2% of the rated voltage. The line voltage drop is calculated as below:

Line voltage drop(V) = $\sqrt{3}$ × cable resistance(Ω/km) × wiring length (m) × current (A) × 10^{-3}

Table 3.9 Cable size

Circuit	Model	Terminal Screw	Tightening Torque Nm	Crimping Terminal	Cable Size		Kind of Cable
					mm²	AWG	
Main Power (R/L1, S/L2, T/L3, +1,+2, P/B,N U/T1, V/T2, W/T3)	20P4	M3.5	0.8-1.0	2-3.5	2	14	Power cable (600V Vinyl-sheathed wire or equivalent)
	20P7	M3.5	0.8-1.0	2-3.5	2	14	
	21P5	M4	1.2-1.5	2-4	3.5	12	
	22P2	M4	1.2-1.5	2-4	3.5	12	
	23P7	M4	1.2-1.5	5.5-4	5.5	10	
	20P4S	M3.5	0.8-1.0	2-3.5	2	14	
	20P7S	M4	1.2-1.5	2-4	3.5	12	
	21P5S	M4	1.2-1.5	2-4	3.5	12	
	22P2S	M4	1.2-1.5	5.5-4	5.5	10	
	40P4	M4	1.2-1.5	2-4	2	14	
	40P7	M4	1.2-1.5	2-4	2	14	
	41P5	M4	1.2-1.5	2-4	2	14	
	42P2	M4	1.2-1.5	2-4	2	14	
	43P7	M4	1.2-1.5	2-4	2	14	
Control	All	M2	0.22-0.25	-	0.5 ~ 1.25	20-16	Shielded twisted-pair

Note : The wire size is set for copper wires at 75℃

3.10 Wiring check

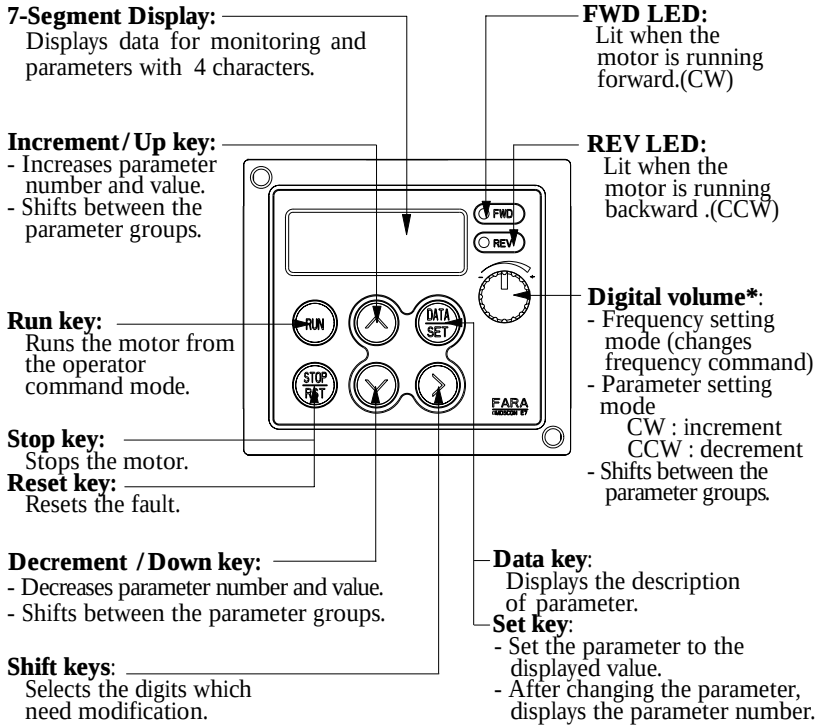
CAUTION

- After wiring has been complete, check the following. Do not perform a buzzer check on control circuit.

- Check if all wiring is correct.
  Especially check if the power supply is connected the U/T1, V/T2, W/T3 terminal.
- Check if any wire clippings, screws or other foreign material are left.
- Check if all screws are tight.
- Check if the load status is good.
- Check if any wire ends are contacting other terminals.

4 Digital operator

All functions of the MOSCON-E7 are controlled by the digital operator. Descriptions of the display and the modes are described in this chapter.



***** Using the digital volume, a displayed data or parameter number can be changed in different rate.

4.1 Usage of digital operator

- Digital operator can be used for:
  - basic command (RUN, STOP, Error reset, etc.),
  - monitoring the operational status and errors of the inverter,
  - programming the parameters.

- In Figure 4.1, the monitoring functions of digital operator in its default status are presented. As described, the UP/DOWN key can be used to navigate between monitor parameters. Note that, unless you monitor U0.01, digital volume has the same function with UP/DOWN key.

- In Figure 4.2, the example of test run using digital operator is shown. In this example, at first, the motor is run and stopped with the frequency command 60Hz. And then, the acceleration time (F2.01) is changed from 10sec to 3sec. Finally, the output voltage in U0.04 is monitored.

DANGER

- Do not disassemble the digital operator.
  Otherwise, it may cause a personal injury.
- When using the digital operator away from the main body, use the separated operator (E7IOTR-S).

4.2 Monitoring functions of digital operator

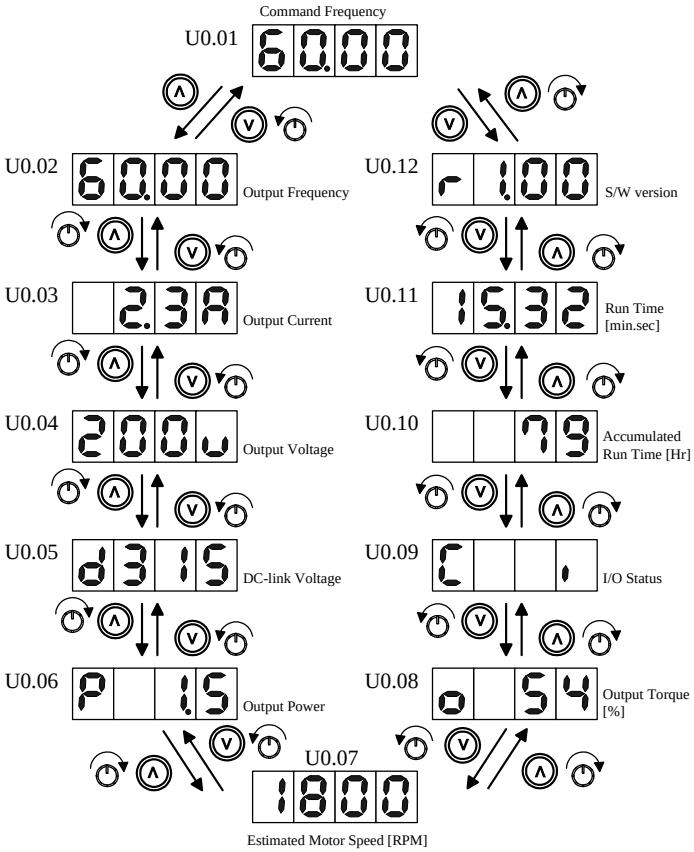
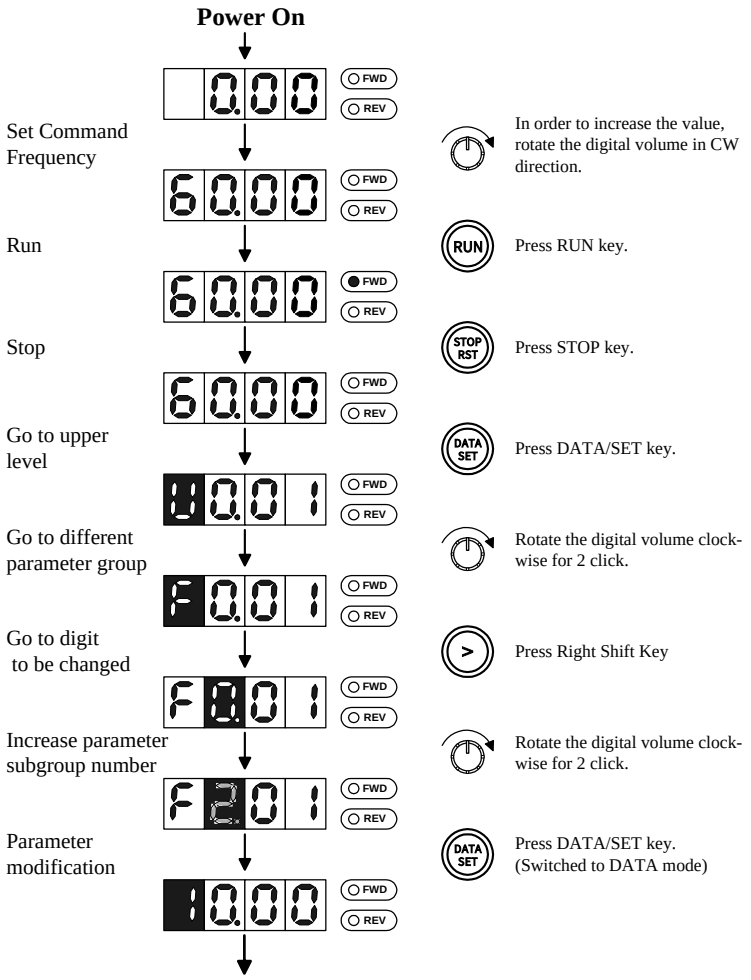


Figure 4.1 Monitoring functions of digital operator

4.3 Test run



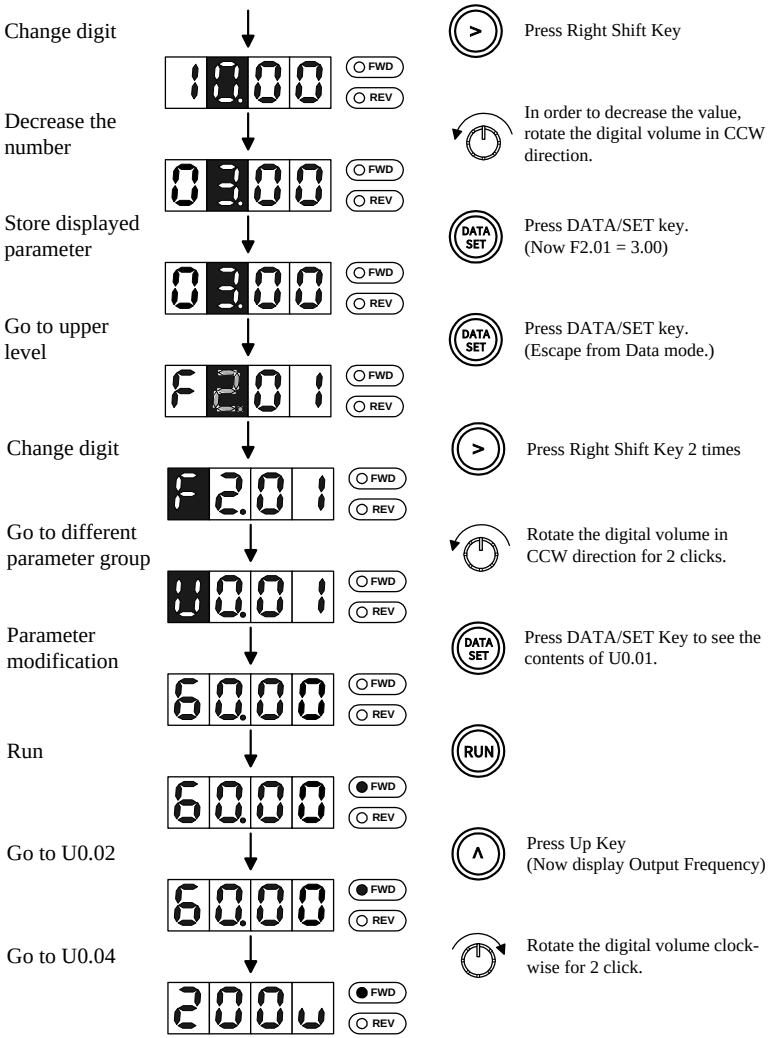


Figure 4.2 Test run using digital operator (when the inverter is in its default status)

----------MEMO----------

5 Parameters

In this chapter, parameters of MOSCON-E7 and drive functions associated with them are presented.

Refer to the following tables and figures to program the inverter for a specific application.

5.1 Main Feature

MOSCON-E7's parameters are divided into seven groups and each group is divided into several subgroups for easier manipulation as described in Table 5.1.

Table 5.1 Functions of each group

Function (Group)	Parameter No.	Function
Monitoring (U)	U0	Monitors inverter operational status.
	U1	Monitors the inverter status on the last fault.
	U2	Monitors the previous faults histories.
	U3	Monitors parameter check lists..
Basic Setup (B)	B0	Controls basic settings of the inverter.
	B1	Controls the system initialization and password protection.
	B2	Sets the capacity of inverter & motor.
Frequency Control (F)	F0	Sets the frequency /speed command.
	F1	Sets the limit of output frequency. Controls jump frequency and frequency detection.
	F2	Sets the acceleration/deceleration time.
	F3	Sets the S-curve accel/decel time.
System Adjustment (S)	S0	Controls the DC braking function.
	S1	Controls the speed search function.
	S2	Controls the Dwell function.
	S3	Controls the energy saving operation.
	S4	Controls the slip compensation.
	S5	Controls the torque compensation.
	S6	Controls the system performance.
H/W Functionality (C)	C0	Selects the V/f pattern.
	C1	Controls carrier frequency.
	C2	Sets the parameters of the motor in use.

I/O Control (H)	H0	Controls the multi-function contact inputs.
	H1	Controls the multi-function contact outputs.
	H2	Controls the multi-function analog inputs.
	H3	Controls the multi-function analog outputs.
	H4	Controls the settings of digital operator.
Protective Function (P)	P0	Controls the motor protective functions.
	P1	Controls the protective functions related to momentary power failure.
	P2	Controls the stall prevention function.
	P3	Controls the over-torque etection/protection.
	P4	Controls the fault retry.
	P5	Controls the other protective options.

5.1.1 U-Parameter : Monitoring Function

Table 5.2 Operation status

	Name	Unit	Display
U0.01	Effective Command Frequency	0.01Hz	xx.xx~xxx.x
U0.02	Current Output Frequency	0.01Hz	xx.xx~xxx.x
U0.03	Output Current in RMS	0.01A	xx.xA
U0.04	Output Voltage in RMS	1V	xxxu
U0.05	DC Link Voltage	1V	dxxx
U0.06	Output Power in 0.1kW	0.1kW	Pxx.x
U0.07	Motor Speed in RPM	1rpm	xxxx
U0.08	Percentage Output Torque	1%	oxxx
U0.09	I/O Status	bit	
U0.10	Cumulative Power On Time	10Hr	xxxx
U0.11	Elapsed Time since Power On	Min.Sec	mm.ss
U0.12	S/W Version		r.xxx

Table 5.3 Inverter operation status on last fault

	Name	Unit	Display
U1.01	Command Frequency	0.01Hz	xx.xx~xxx.x
U1.02	Output Frequency	0.01Hz	xx.xx~xxx.x
U1.03	Output Current	0.01A	xx.xA
U1.04	Output Voltage	1V	xxxu
U1.05	DC Voltage	1V	dxxx
U1.06	Output Power	0.1kW	Pxx.x
U1.07	Motor rpm	1rpm	xxxx
U1.08	Output Torque	1%	oxxx
U1.09	I/O Status	bit	
U1.10	Cumulative Power On Time	10Hr	xxxx

Table 5.4 Fault list

	Name	Unit	Display
U2.01	Fault 1 (recent one)	-	*
U2.02	Fault 2	-	*
U2.03	Fault 3	-	*
U2.04	Fault 4	-	*

Table 5.5 Parameter Check list

	Name	Unit	Display
U3.01	Modified Parameter List	-	"----" (None)
U3.02	Fault Parameter List	-	"----" (None)

- The commonly used drive operating conditions are monitored from U0-group. All parameters except U0.01 in this group are read-only.
- Note that unless the source of frequency command is changed, the data in U0.01 (frequency command) is not changed even though the power is off.

- U3.01 and U3.02 have the function of list reference. Here, Up/Down (⊙ , ⊙) keys are used in shifting between the items internally. Also, the number of next item is displayed.
  Shift(⊙) key is used in shifting between the content and number of the item.

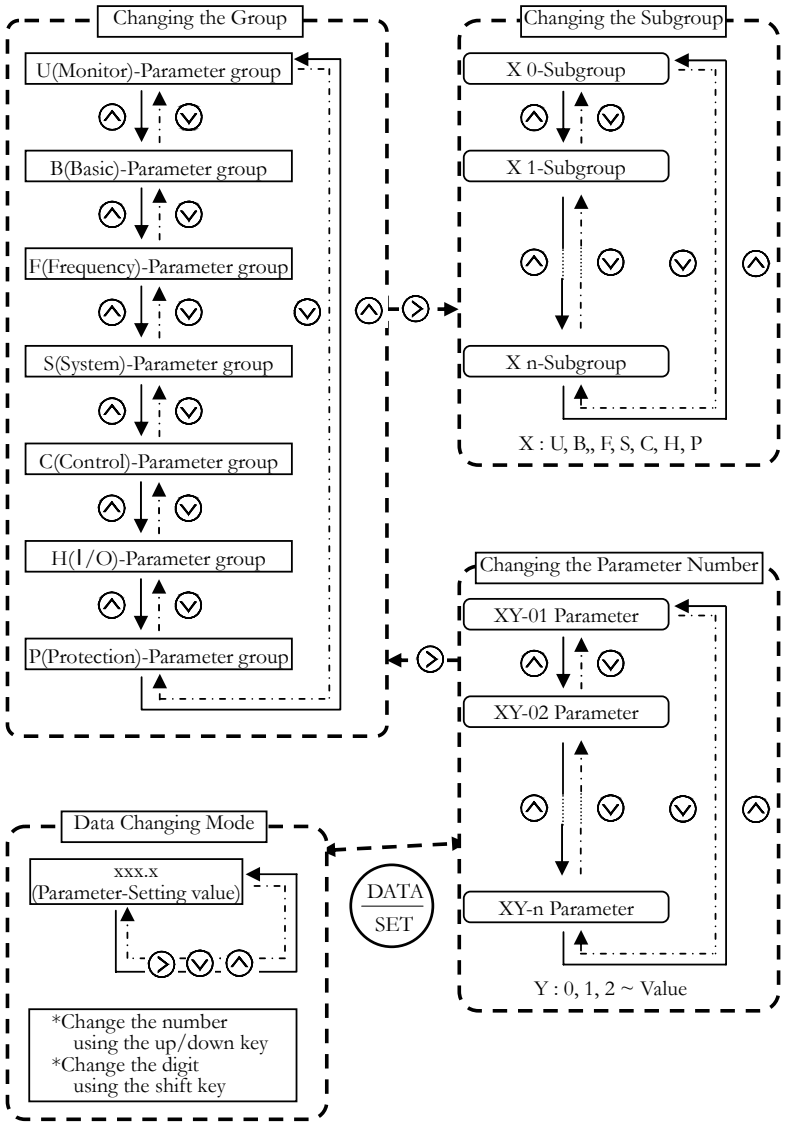


Figure 5.1 Parameter setting method

5.1.2 Monitoring function setting

Letter or number in bold on display indicates that it is blinking. Only the blinking letter or number can be changed. Next digit has to be selected using the shift key (⊙) to move to another group and subgroup.

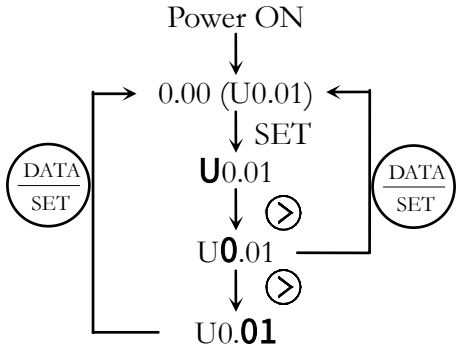
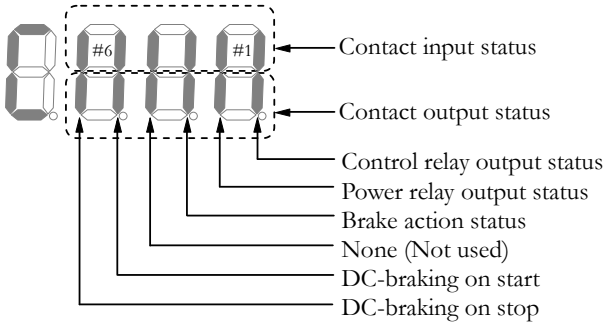


Figure 5.2 Selecting monitoring group (U)

When ⊙ or ⊙ is pressed from group U, next or previous subgroup is displayed.
Since U has a monitoring function and the setting can not be altered, ⊙ can not be functioned to change the constant as in other groups.

5.2 Terminal status LED

When command is input to a terminal, corresponding LED is turned on.



5.3 B-Parameter

The B-parameters are used in order to change the basic settings related to the operation modes of the inverter, capacity of the inverter & the motor, and to control the initialization.

5.3.1 Basic setup

5.3.1.1 Selecting the source of frequency command : B0.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B0.01	Active source of frequency command	-	00~23	00	X

	Digit1	Digit0
B0.01	Active source of frequency command in local mode (0~2)	Active source of frequency command in remote mode (0~3)

• B0.01 is used to select the source of the frequency command.
• Active source of frequency command in local and remote mode can be selected independently. Normally, unless the local mode is selected, the source of frequency command in remote mode is the active one.
• Setting

Setting constant	Source of command frequency
0	Operator (Digital volume)
1	Operator (Keypad)
2	Analog frequency command (Voltage or current: terminal 9 or 10)
3	Communion (RS-485)

5.3.1.2 Selecting the source of RUN command : B0.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B0.02	Active source of RUN command	-	00~12	00	X

• B0.02 is used to select the source of the run command.

• Active source of RUN command in local and remote mode can be selected independently as follows.

	Digit1	Digit0
B0.02	Active source of RUN command in local mode (0~1)	Active source of RUN command in remote mode (0~2)

• Setting

Setting constant	Reference source
0	Operator (RUN/STOP key on keypad)
1	Contact input (contact 1 or 2 on terminal block)
2	Communication (RS-485)

5.3.1.3 Selecting stopping method : B0.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B0.03	Stopping method	-	0~1	0	X

• B0.03 is used to select the stopping.

• Setting

Setting constant	Function
0	Ramp to stop
1	Free run stop

5.3.1.4 Prohibiting the reverse rotation : B0.04

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B0.04	Prohibiting Reverse Rotation	-	0~1	0	X

• B0.04 is used to prohibit the reverse run

• Setting

Setting constant	Function
0	Reverse rotation enabled
1	Reverse rotation disabled

5.3.1.5 Setting the motor direction : B0.05

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B0.05	Default Motor Direction	-	0~1	0	O

• B0.05 is used to select the direction of the motor's rotation

• It is only applicable when B0.02 = 0 (operator)

• Setting

Setting	Function
0	Forward (CCW from the axis view)
1	Reverse (CW from the axis view)

• If B0.04=1, it is automatically changed to 0(forward).

5.3.1.6 Setting the monitor default : B0.06

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B0.06	Default Monitor Item	-	1~10	0	O

• B0.06 is used to sets the monitor item to be displayed when the power is turned on.

• If B0.06=5, U0.05 is displayed at power-up.

5.3.1.7 Setting the automatic start operation : B0.07

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B0.07	Automatic start after power on	-	0~1	0	O

• B0.07 is set to 1, if the motor is to be started automatically at power-up.

• The automatic start option (B0.07=1) is valid only when the active source of run command is the digital operator. (B0.02=0)

• Setting

Setting constant	Function
0	Does not use the automatic start operation.
1	Motor runs automatically without RUN command.

DANGER

• If B0.07 is set as 1 the motor starts automatically at power-up. It may cause a serious accident. Thus, pay extra caution when using automatic start operation.

5.3.2 System initialization

5.3.2.1 Controlling the inverter initialization : B1.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B1.01	Inverter initialization	-	0~9999	0000	X

• B1.01 is used to initialize the parameters of the inverter . When the inverter is initialized, all the changed parameters are deleted and initialized to factory-setting values.

• Setting

Setting constant	Function
1010	Complete initialization
1111	Partial initialization (exclude multi-functional I/O terminal setting)

5.3.2.2 Setting and verifying the password : B1.02, B1.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B1.02	Check password	-	0~9999	0000	X
B1.03	Set password	-	0~9999	0000	X

• B1.02 is used to check and verify the password when a password has been set in B1.03(i.e. B1.03 ≠ 0000).
• B1.03 is used to set the new password.
• When the new password is entered and saved in B1.03, not blinking 0000 is displayed immediately regardless of the input password.

5.3.3 Setting power capacity

5.3.3.1 Setting the inverter and motor capacity : B2.01, B2.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
B2.01	Power capacity of the inverter	-	20P4 ~43P7	-	X
B2.02	Power capacity of the motor	-	20P4 ~43P7	-	X

• Parameter B2.01 is used to set the power capacity of the inverter.
• Parameter B2.02 is used to set the power capacity of the motor.

Capacity (Motor & Inverter)	0.4kW	0.75 kW	1.5 kW	2.2 kW	3.7 kW
200V	20P4	20P7	21P5	22P2	23P7
400V	40P4	40P7	41P5	42P2	43P7

NOTE

• The power capacity of the motor can not be set bigger than the power capacity of the inverter.
• B2.01 and B2.02 can not be set to different voltage class.

5.4 F-Parameter

5.4.1 Frequency control functions

5.4.1.1 Setting the frequency/speed command : F0.01~F0.09

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F0.01	Main frequency command of operator mode & communication mode	0.01Hz	0.00 ~600.00	0.00	O
F0.02 ~F0.08	Frequency 2~8	0.01Hz	0.00 ~600.00	0.00	O
F0.09	Jog Frequency	0.01Hz	0.00 ~ 600.00	6.00	O

- Parameters F0.01~F0.09 are frequency commands used for multi-step speed operation as shown in Fig 5.3.
- In multi-step speed operation, JOG command has the top priority. Thus, when JOG command is on, the frequency command is changed to F0.09 regardless of terminal status of multi-step speed reference 1~3.
- In keypad mode (B0.01=1) and communication mode (B0.01=3), the value in F0.01 becomes the active frequency command.

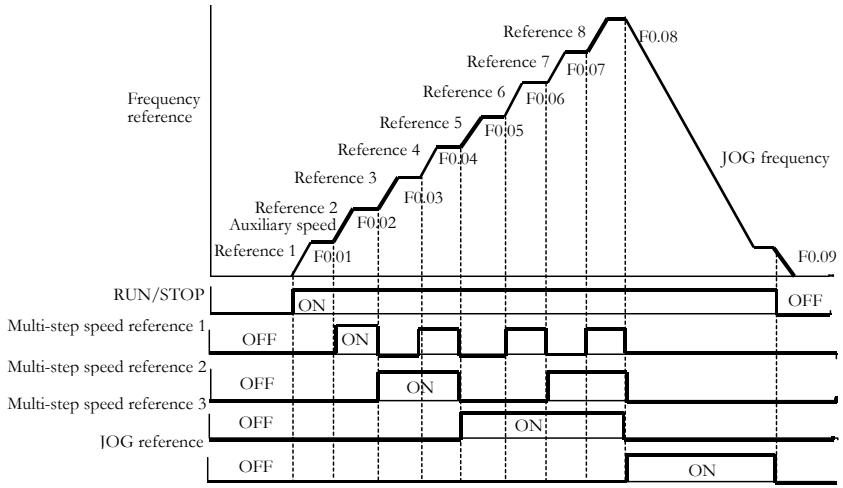


Figure 5.3 Timing chart for multi-step and JOG operation

5.4.2 Frequency limit

5.4.2.1 Setting lower/upper frequency limit : F1.01,F1.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F1.01	High Speed Limit	0.1%	0.1~100.0	100.0	O
F1.02	Low Speed Limit	0.1%	0~99.9	0.0	O

- Parameter F1.01 and F2.02 are used to set the upper and lower limit of output frequency respectively.
- The setting unit of F1.01 and F1.02 is the percentage of the maximum utput frequency (C0.02).

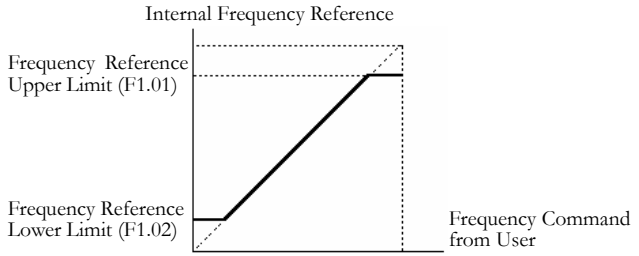


Figure 5.4 Upper and lower limits of the frequency reference

5.4.3 Jump frequency to avoid mechanical resonant oscillation

5.4.3.1 Setting jump frequency : F1.03~F1.06

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F1.03	Jump Frequency1	0.01Hz	0.00 ~600.00	0.00	O
F1.04	Jump Frequency2	0.01Hz	0.00 ~600.00	0.00	O
F1.05	Jump Frequency3	0.01Hz	0.00 ~600.00	0.00	O
F1.06	Jump Frequency Width	0.01Hz	0.00 ~20.00	0.50	O

• F1.03~F1.05 are used to prohibit the inverter from producing output voltages of certain frequency ranges, in order to prevent the mechanical vibration caused by mechanical structure as shown in Figure 5.5.
• Set F1.03~F1.05 as 0.00Hz to disable the jump frequencies.
• F1.03~F1.05 set the center values of the frequency to be jumped.
• Jump frequencies should be set so that F1.05 ≤ F1.04 ≤ F1.03
• F1.06 is used to control the jump frequency bandwidth.
• Jump frequency range = jump frequency ±jump frequency bandwidth

5.4.3.2 Selecting the jump mode : F1.07

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F1.07	Jump Mode	-	0~1	0	X

• F1.07 is used to fix the output frequency inside the jump frequency region
• Setting

Setting constant	Function
0	Output frequency is fixed to lower limit of jump frequency region
1	Output frequency is fixed to upper limit of jump frequency region

• During accel/decel operation, output frequency changes smoothly without jump even though jump frequencies are activated.

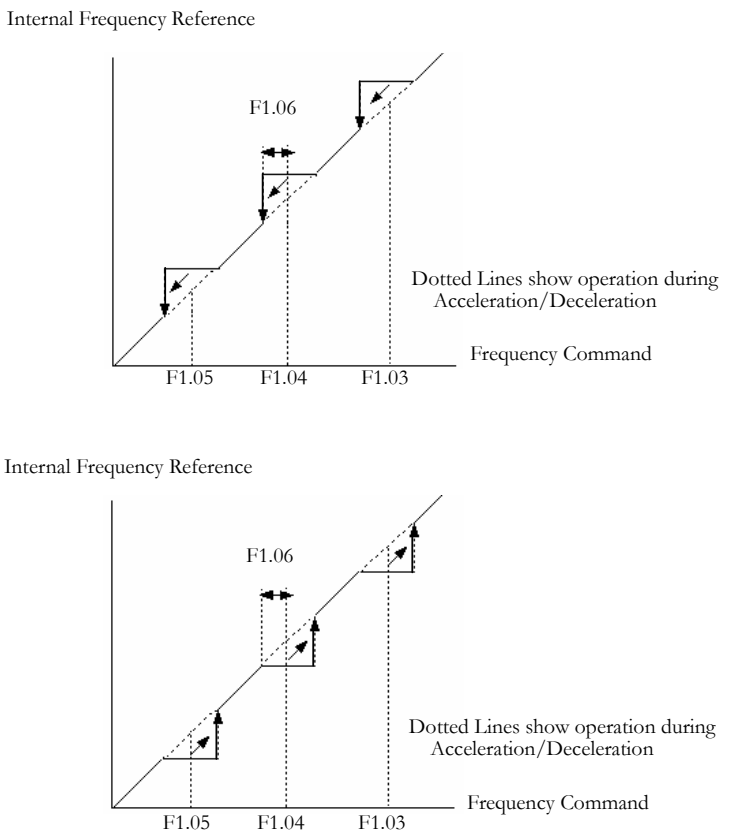


Figure 5.5 Starting jumping frequencies

5.4.4 Frequency match detection

5.4.4.1 Controlling the frequency detection : F1.08. F1.09

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F1.08	Frequency of Match Detection	0.01Hz	0.00 ~600.00	0.00	O
F1.09	Frequency Match Detection Width	0.01Hz	0.00 ~20.00	0.50	O

• F1.08 and F1.09 are used to generate the frequency matching signal, which is used for the operation of multi-function output in section 5.7.2.2. For more details, see section 5.7.2.2.

5.4.4.2 Automatic activation of 2nd accel/decel time : F1.10

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F1.10	Frequency of Accel/Decel Time Switching.	0.01Hz	0.00 ~600.00	0.00	O

• F1.10 is used to automatically activate 2nd set of accel/decel times. By setting F1.10 other than 0, 2nd set of accel/decel times (F2.03 and F2.04) are automatically applied if the output frequency is higher than the value specified in F1.10.

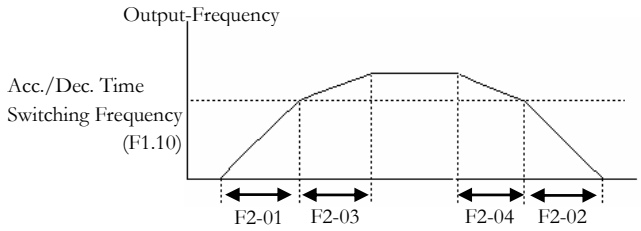


Figure 5.6 Acceleration/Deceleration time switching frequency

5.4.5 accel/decel time

5.4.5.1 Setting the accel/decel time : F2.01~F2.04

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F2.01	AccelTime1	0.01Sec	0.00 ~600.00	10.00	O
F2.02	DecelTime1	0.01Sec	0.00 ~600.00	10.00	O
F2.03	AccelTime2	0.01Sec	0.00 ~600.00	10.00	O
F2.04	DecelTime2	0.01Sec	0.00 ~600.00	10.00	O

• Acceleration time: Time required to go up to 100% of the maximum output frequency from 0%.
• Deceleration time: Time required to go down to 0% of the maximum output frequency from 100%.
• F2.01~F2.02 can be used to set the acceleration and deceleration time in normal status.
• F2.03 and F2.04 are activate when :
  i) F1.10 > 0 and
  ii) Output frequency > F1.10.
• The possible setting ranges for the acce/decel times depends on the setting in F2.05.

5.4.5.2 Setting the time unit of accel/aecel time : F2.05

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F2.05	Accel/Decel Time Base	-	0~1	0	X

• F2.05 can be used to set the time base of accel/decel time.
• If F2.05 is set to "1" the setting range will be 0.0 to 6000.0s.
• Setting

Setting constant	Function
0	Sets the accel/decel time unit to 0.01sec
1	Sets the accel/decel time unit to 0.1sec

5.4.6 Configuring S-curve time : F3.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
F3.01	S-Curve time	0.01sec	0.00~2.50	0.20	O

• F3.01 can be used to set the S-curve pattern time of the accel/decel changing points to reduce shock caused by abrupt stopping and starting.

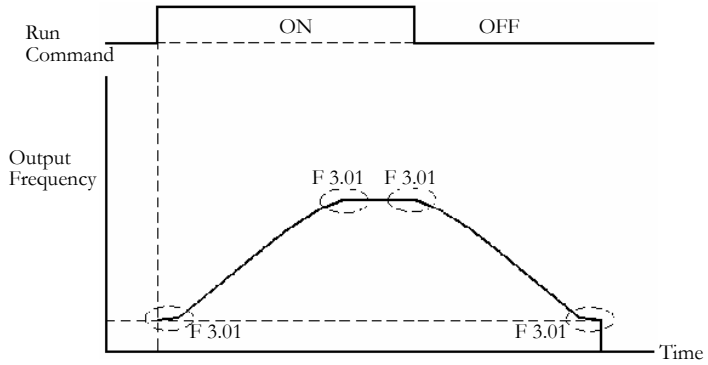


Figure 5.7 Setting S-curve characteristics

5.5 S-Parameter

5.5.1 DC Braking

5.5.1.1 Controlling DC breaking : S0.01~S0.04

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S0.01	DC Brake Starting Frequency	0.01Hz	0.00 ~10.00	1.50	X
S0.02	DC Brake Current	1%	0~ 100	50	X
S0.03	DC Braking Time at Start	0.1sec	0.0~ 25.0	0.0	X
S0.04	DC Braking Time at Stop	0.1sec	0.0~ 25.0	0.5	X

• **S0.01 :** The frequency where the DC braking starts.
It is valid only for deceleration.
• **S0.02 :** The level of output DC current during DC braking.
(in the percentage of rated inverter output current)
• **S0.03 :** Set the DC braking operation time before the motor is started.
• **S0.04 :** Set the DC braking operation time before the motor is stopped.
• In order to decrease the stopping time, increase DC braking current in S0.02.
• To disable the DC braking, set DC braking time (S0.03 and S0.04) to 0.

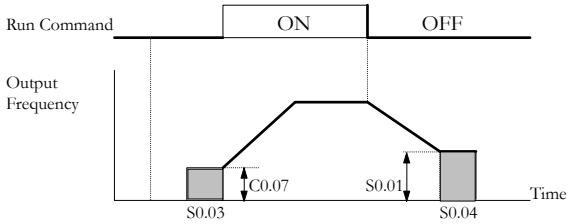


Figure 5.8 DC braking timing chart

5.5.2 Speed search

5.5.2.1 Controlling the speed search operation: S1.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S1.01	Speed Search at Start	-	0~1	0	X

• S1.01 finds the speed of a rotating motor and runs up smoothly from the searched speed.
• This function is useful when the smooth operation is required in case of momentary power loss.
• Setting

Setting constant	Function
0	Disables speed search operation: Motor starts from minimum output frequency.
1	Enables speed search operation: Speed search is performed from command frequency. Speed search is done every time the run command is input.

5.5.2.2 Speed search level, current, and deceleration time

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S1.02	Speed Search Start Frequency	0.01Hz	0.00 ~600.00	0.00	X
S1.03	Speed Search Current	1%	0~200	100	X
S1.04	Speed Search Deceleration Time	0.1sec	0~10.0	2.0	X

• S1.02 is used to set the frequency where the speed search is started
• S1.03 sets the operating current for the speed search.
Lower the setting if restarting is not possible.
Setting unit is the percentage of inverter's rated output current.

• S1.04 sets the output frequency deceleration time during the speed search operation.

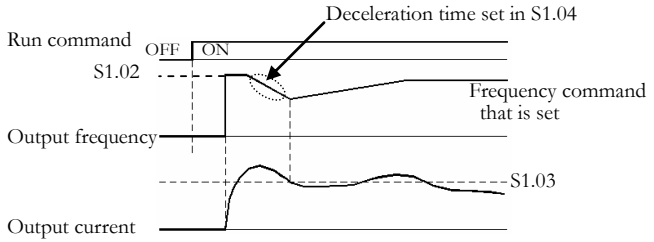


Figure 5.9 Speed search timing chart

5.5.3 Dwell operation

5.5.3.1 Controlling the dwell operation : S2.01~S2.04

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S2.01	Dwell Frequency at Start	0.01Hz	0.00 ~600.0	0.00	X
S2.02	Dwell Time at Start	0.01Sec	0.00 ~25.00	0.00	X
S2.03	Dwell Frequency at Stop	0.01Hz	0.00 ~600.0	0.00	X
S2.04	Dwell Time at Stop	0.01Sec	0.00 ~25.00	0.00	X

• Dwell function is used to temporarily hold the output frequency when starting and stopping a motor with heavy load.

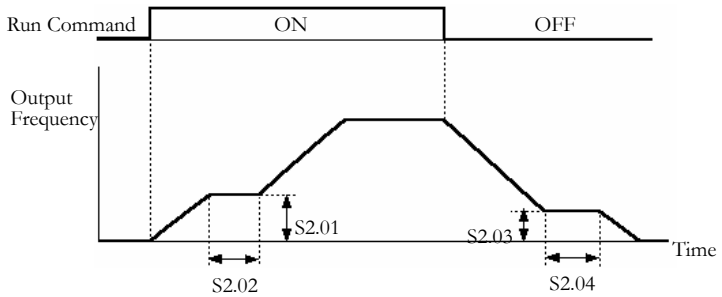


Figure 5.10 Timing chart for dwell operation

5.5.4 Energy saving operation

Energy can be saved by decreasing the output voltage of the inverter in steady-state under a light load condition.
Do not use the energy-saving function in normal situation.

5.5.4.1 Setting the energy saving level : S3.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S3.01	Energy Saving Voltage Level	1%	0~100	80	X

• If S3.01=80, the output voltage in energy saving mode will be 80% of the previous value.

5.5.4.2 Setting the energy-saving frequency : S3.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S3.02	Energy Saving Frequency Level	0.01Hz	0.00 ~600.0	0.00	X

• S3.02 sets the minimum frequency for the effective energy saving operation
• Energy-saving command is enabled when output frequency is higher than the energy-saving frequency and motor speed is within the "speed match" range or energy saving command is triggered from a external input terminal.

5.5.5 Slip compensation

• Slip compensation function improves speed control accuracy when the motor is operating with a load by calculating the motor torque according to the output current.

5.5.5.1 Setting the slip compensation gain : S4.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S4.01	Slip Compensation Gain	1%	0 ~S4.03	0	O

5.5.5.2 Setting the slip compensation delay : S4.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S4.02	Slip Compensation Delay Time	1msec	0~9999	200	X

• Normally S4.02 does not need to be adjusted.
• Lower the value in S4.02 if the response time of slip compensation is too slow.

5.5.5.3 Slip compensation limit : S4.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S4.03	Slip Compensation Limit	1%	0 ~250	200	X

• The setting unit of S4.03 is the percentage of motor rated slip(C2.05).
• Raise the slip compensation limit in S4.03 if the speed is lower than the target value and no changes takes place even after the adjustment of slip compensation gain.

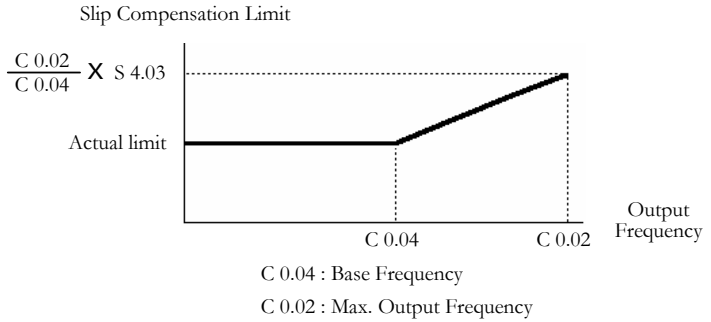


Figure 5.11 Slip compensation limit

NOTE

• Sum of the reference frequency and the slip compensation limit does not exceed the speed capacity of the system.
• Raise the value in S4.02 if speed control characteristics are unstable.

5.5.6 Automatic torque boost

MOSCON-E7 automatically adjust the output torque by detecting the variation in a load, to provide better speed control performance.

5.5.6.1 Torque compensation gain : S5.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S5.01	Torque Compensation Gain	1%	0~250	100	X

- Normally adjustment of S5.01 is not required.
- Raise the value in S5.01 if the output wiring between inverter and motor is long, or when the capacity of installed motor is quite smaller than the maximum motor capacity of the inverter.
- Decrease the value in S5.01, if the excessive mechanical vibration occurs.

5.5.6.2 Torque compensation delay : S5.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S5.02	Torque Compensation Delay Time	1msec	0 ~9999	20	X

- Normally adjustment of S5.02 is not required.
- Raise the value in S5.02 if the mechanical vibration occurs.
- Decrease the value in S5.02 if the performance of speed regulation is poor.

5.5.7 System function compensation

5.5.7.1 Hunting prevention gain : S6.01/S6.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S6.01	Hunting Prevention Gain	%	0~100	20	O
S6.03	Current ripple restraint (1 phase only)	-	0~1	1	X

- Normally adjustment of S6.01 is not required.
- Raise the value in S6.01 if mechanical vibration occurs under a light load condition.
- Decrease the value in S6.01 if stall occurs.
- S6.03 is used in restraining from the unique current ripple in 1 phase only(Invalidness in 3 phase).

5.5.7.2 Boosting brake performance : S6.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
S6.02	Enable Brake Boosting	-	0 ~ 1	0	X

- If S6.02=1, the performance of braking is increased. However, since frequent braking under this condition may damage the inverter, use this function carefully.

5.6 C-Parameter : H/W Functionality setup

5.6.1 V/f Setting

5.6.1.1 Setting V/f : C0.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C0.01	V/f pattern	-	0~15	15	X

• C0.01 can be set to one of the following:
- One of 15 preset patterns (settings 0~14)
- A user-programmable pattern (setting 15)

• C0.01 is not changed by initialization (set B1.01= '1010' or '1111'). However, if C0.01=15, C0.02~C0.08 are changed to the values associated with the case "C0.01=1" by initialization.

• If C0.01=15, the arbitrary V/f pattern can be generated by properly setting the values in C0.02~C0.08 as shown in Fig 5.14.

• Normally high starting torque is not necessary except the following cases:
- Long wiring
- Large voltage drop when started
- AC reactor is connected to the input/output of the inverter
- Running with a motor smaller than the maximum applicable motor.
- Needs large starting torque (like as in elevator)

• When using preset V/F patterns, consider the rated voltage & frequency of the motor and load characteristics as shown in the following table.

• Setting

Setting constant	Max. Frequency	Specification	Application
0	50Hz		General-purpose
1	60Hz	60Hz saturation	
2		50Hz saturation	
3	72Hz		
4	50Hz	Square decreased	Fans/Pumps Decreased torque
5		Cubic decreased	
6	60Hz	Square decreased	
7		Cubic decreased	
8	50Hz	Smaller starting torque	High start-up torque
9		Large starting torque	
10	60Hz	Smaller starting torque	
11		Larger starting torque	
12	90Hz		Rated output operation
13	120Hz		
14	180Hz		

V/f pattern: 0.4~1.5kW

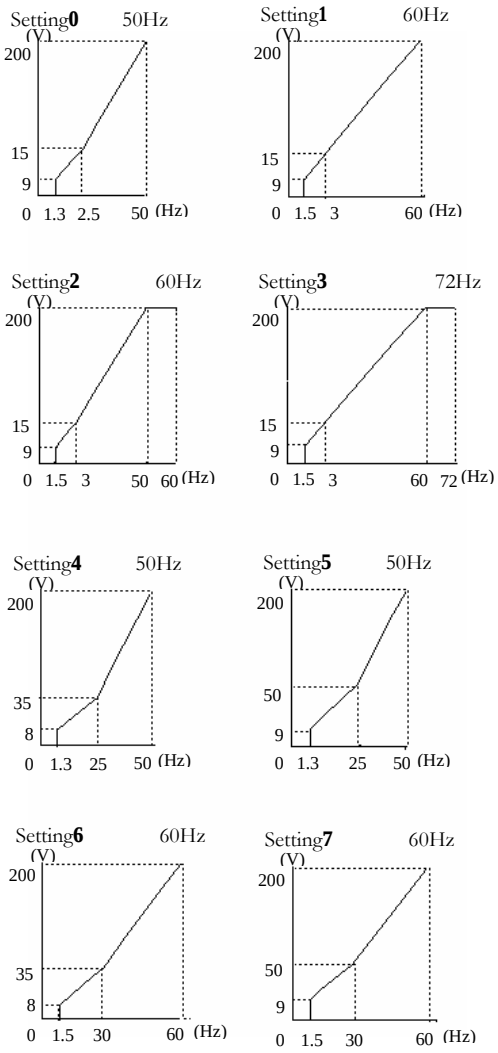


Figure 5.12.1 V/f pattern : settings 0~14 & setting15
(For 400V class, doubles the voltage in Figure)

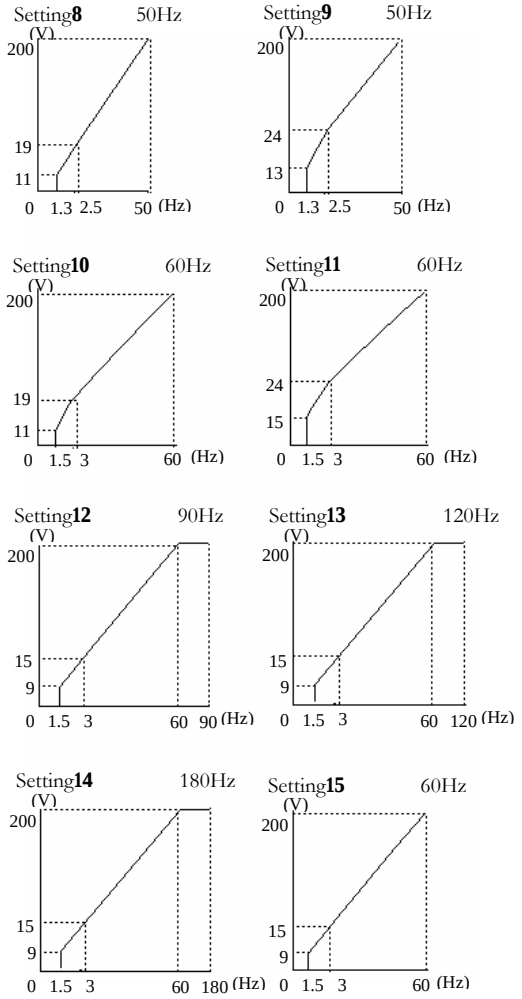


Figure 5.12.2 V/f pattern : settings 0~14 & setting15
(For 400V class, doubles the voltage in Figure)

V/f pattern: 2.2~3.7kW

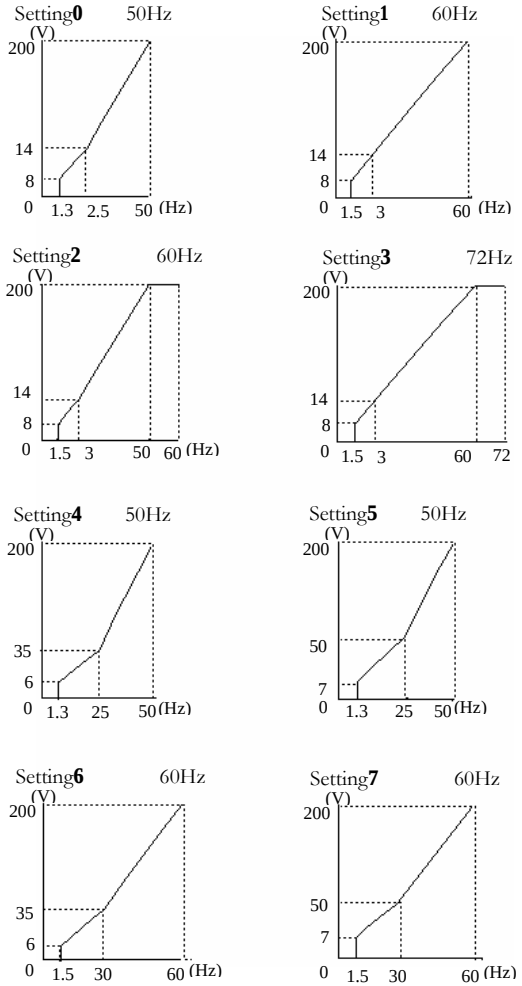


Figure 5.13.1 V/f pattern: settings 0~14 & setting15
(For 400V class, doubles the voltage in Figure)

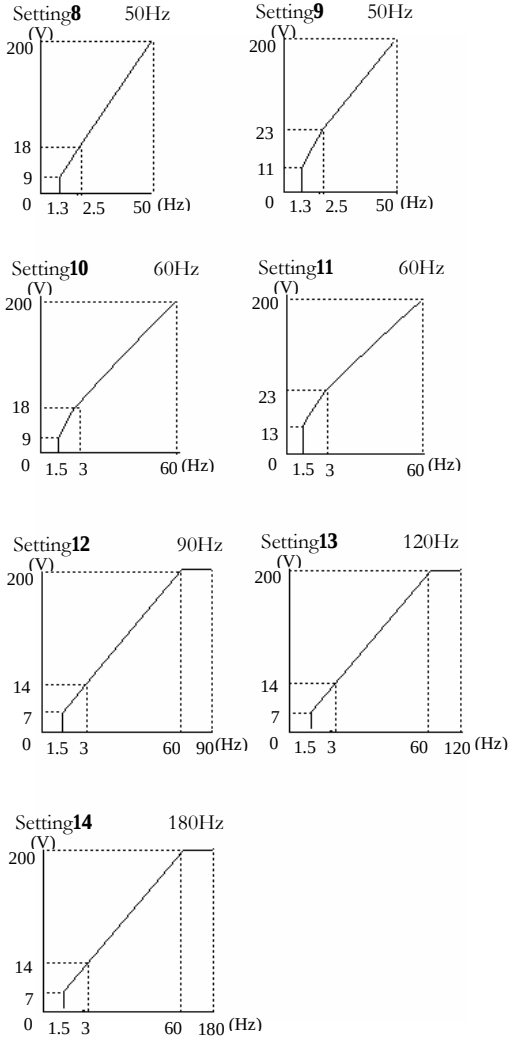


Figure 5.13.2 V/f pattern : settings 0~14 & setting15
(For 400V class, doubles the voltage in Figure)

5.6.1.2 Setting user-programmable V/f pattern

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C0.02	Max Output Frequency	0.01Hz	30 ~600.00	60.00	X
C0.03	Max Output Voltage	0.1V	0.0 ~250.0	200.0	X
C0.04	Base Frequency	0.01Hz	30.00 ~600.00	60.00	X
C0.05	Mid Output Frequency	0.01Hz	0.00 ~600.00	3.00	X
C0.06	Mid Output Voltage	0.1V	0.0 ~250.0	14.0	X
C0.07	Min Output Frequency	0.01Hz	0.00 ~600.00	1.50	X
C0.08	Min Output Voltage	0.1V	0.0 ~250.0	8.0	X

NOTE

• The following four frequency setting must be as follows:
C0.02 ≥ C0.04 ＞C0.05 ≥ C0.07

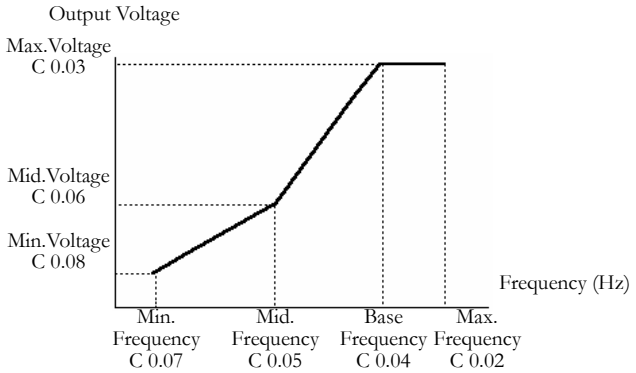


Figure 5.14 User-defined V/f Pattern

5.6.2 Carrier frequency setting

• Default setting depends on the inverter capacity.(Refer to Appendix 2)

5.6.2.1 Setting the carrier frequency : C1.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C1.01	Carrier Frequency	0.01kHz	1.50 ~10.00	10.00	X

5.6.3 Main motor constants

5.6.3.1 Setting the Motor line-to-line resistance : C2.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C2.01	Stator Resistance	0.01Ω	0.00 ~99.99	*	X

• C2.01 is used as a reference value for the torque compensation.
• Default value depends on the inverter capacity.
• If motor's terminal resistance is not printed on the motor nameplate, contact the motor manufacturer for the terminal resistance at the insulation class temperature.

5.6.3.2 Setting the iron loss : C2.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C2.02	Iron Loss	1W	0~9999	*	X

• Default value depends on the inverter capacity.

5.6.3.3 Setting the motor rated current : C2.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C2.03	Rated Output Current	0.1A	0.0 ~999.9	*	X

- C2.03 is used to set the rated current (A) shown on the motor nameplate.
- Default value depends on the inverter capacity.

5.6.3.4 Motor no-load current : C2.04

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C2.04	No Load Current	0.1A	0.0 ~999.9	*	X

- C2.04 is used as a reference value for the torque compensation.
- Default value depends on the inverter capacity.
- If rated voltage and rated frequency are not printed on the motor nameplate, contact the motor manufacturer.

5.6.3.5 Setting the motor rated slip : C2.05

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C2.05	Rated Slip	0.01Hz	0.00 ~600.0	*	X

- C2.05 is used as a reference value for the torque compensation.
- Default value depends on the inverter capacity.
- Calculate C2.05 from the value printed on the motor nameplate:
  Rated slip=rated frequency(Hz) - rated speed(r/min) × number of poles/120

5.6.4 H/W Adjusting data : C3.01~C3.06

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
C3.01	DC Voltage Compensation	-	-	*	X
C3.02	Analog Output Compensation Coefficient	-	-	*	X
C3.03	Current Detector Compensation Coefficient 1	-	-	*	X
C3.04	Current Detector Compensation Coefficient 2	-	-	*	X
C3.05	Analog Command Compensation Coefficient	-	-	*	X
C3.06	Current Terminal Gain Compensation Coefficient	-	-	*	X
C3.07	Current Detector Compensation Coefficient	-	-	*	X

CAUTION

- C3.01~C.07 are set from the factory and the user is not allowed to change the setting. (Modification may influence to system performance)

5.7 H-parameter : I/O Control functions

5.7.1 Multi-function contact input

5.7.1.1 Set input type of multi-function contact input: H0.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H0.01	Select Terminal Input Type	-	00~3F (Hexa-decimal)	00	X

• H0.01 is used to set the input type of each terminal.

•The definition of each bit in H0.01

	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
H0.01	0	0	Terminal no. 6	Terminal no. 5	Terminal no. 4	Terminal no. 3	Terminal no. 2	Terminal no. 1

•Setting

Setting constant	Function
0	Each bit is set as 'a' contact (NO)
1	Each bit is set as 'b' contact (NC)

5.7.1.2 Setting the function of contact input : H0.02~H0.05

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H0.02	Function of Terminal3	-	0~19	1	X
H0.03	Function of Terminal4	-	0~19	2	X
H0.04	Function of Terminal5	-	0~19	3	X
H0.05	Function of Terminal6	-	0~19	6	X

• Refer to the table on the next page for the function settings of the multi-function input terminal.

• Note that H0.02~H0.05 should be different from each other.

•Setting

Setting constant	Function	Description	Reference
0	3-Wire Sequence	Uses 3-wire operation when operating with the external terminal	5-43
1	External Fault	External fault signal input.	-
2	Fault Reset	Resets the fault when turned on	5-43
3	Multi-step Speed 1	Runs in selecting the set speed(Using the binary code)	5-44
4	Multi-step Speed 2		5-44
5	Multi-step Speed 3		5-44
6	Jog Frequency Command Selection	Higher priority than multi-step speed commands	5-44
7	Reverse Jogging	ON: Clockwise run at jog frequency F0.09.	5-44
8	Forward Jogging	OFF: Counterclockwise run at jog frequency F0.09.	5-44
9	Accel/Decel Time Switching Command	Change the accel/decel rate from F2.01/F2.02 to F2.03/F2.04	5-45
10	Holding Accel/Decel	ON: accel/decel stopped, frequency on hold	5-45
11	External Base block Command	Blocks the output voltage of the inverter(Frequency on hold)	-
12	Frequency Up Command	Always set with the frequency down command.	5-46
13	Frequency Down Command	Always set with the frequency up command.	5-46
14	Current Analog Command Selection	Uses the external current analog command to the command frequency	5-46
15	DC Braking	Valid in stopping only : outputs DC current	5-48
16	Speed Search Command 1	Searches the speed to the output frequency	5-48
17	Speed Search Command 2	Searches the speed to the input frequency	5-48
18	Energy-Saving Operation	ON: energy-saving control set for S3.01, S3.02	-
19	Remote → Local Selection	Switches to the set speed/Run command in local mode	5-49

3-wire sequence (Setting : 0)

• When 0 is set for multi-function inputs H0.02~H0.05, 3-wire sequence control is used and terminal 1 becomes run command, terminal 2 becomes stop command. And if terminal 5 has setting 0, it becomes terminal for forward/reverse run command as shown in Figure 5.15.

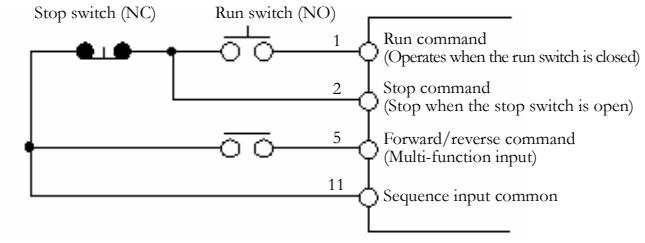


Figure 5.15 3-wire sequence wiring example

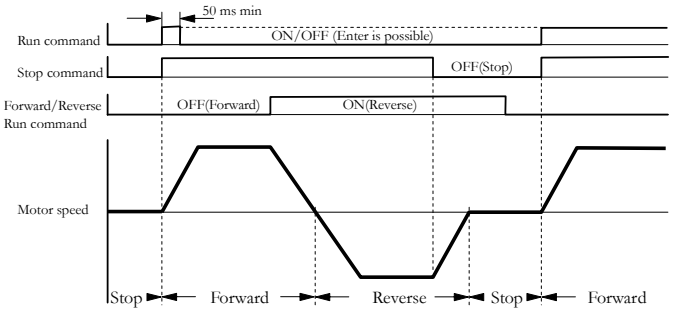


Figure 5.16 Time chart for 3-wire sequence

Fault reset (Setting : 2)

OFF	Normal operation
ON	Resets the faults when input goes from OFF to ON.

• With the fault reset function, the faults can be reset by the contact input.

• When a fault occurs, find out the cause of the fault and correct it before restarting the inverter. The inverter may be damaged if a fault is reset repeatedly without correcting the cause of fault.

• Method to resume the operation after a fault:

1.Turn OFF the run command.

2.Turn the fault reset input from ON to OFF since a fault can not be reset with the run command ON.

3. Turn the run command ON again.

Multi-step speed 1~3 and JOG frequency command (Setting : 3~6)

• 8 frequency commands and 1 JOG frequency command can be used.

• 8-step speed operation: (Refer to the Figure 5.3)

B0.02=1(Select the active source of RUN command)
B0.01=1(Select the active source of frequency command)
F0.01=(Frequency1, Main frequency)
F0.02=(Frequency2)
F0.03=(Frequency3)
F0.04=(Frequency4)
F0.05=(Frequency5)
F0.06=(Frequency6)
F0.07=(Frequency7)
F0.08=(Frequency8)

Forward and reverse jogging (Setting : 7~8)

The jogging can be run clockwise or counterclockwise.

Setting	Function
7	Reverse jog command: Runs clockwise at the jog frequency.
8	Forward jog command: Runs counterclockwise at the jog frequency.

• Forward and reverse jog commands have priority over other frequency commands (e.g. F0.01~F0.08).

• Do not turn on both the forward and reverse jog command. If the setting 7 and 8 are both ON for more than 500ms, then the inverter will stop with the stopping method set in B0.03.

• It is not necessary to input the forward/reverse run command since these jog command alone can operate the inverter.

• These functions run/stop immediately when set on ON/OFF. At this time, the accel/decel is not applied.

Accel/Decel time switching command (Setting : 9)

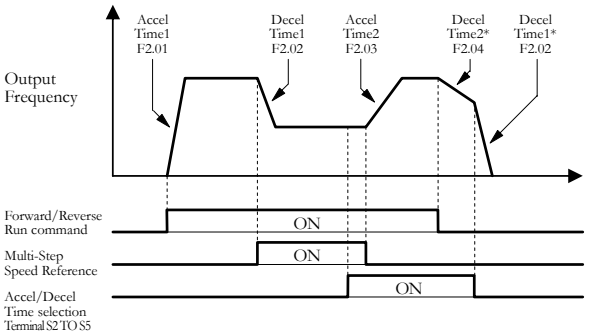


Figure 5.17 Using two accel/decel time

• Set of accel/decel times can be switched by turning ON/OFF the accel/decel command terminals if input terminal function selection (H0.02~H0.05) is set to "accel/decel command".

When OFF: F2.01 (accel time 1), F2.02 (decel time 1)
When ON : F2.03 (accel time 2), F2.04 (decel time 2)

Acceleration time: Time required for output frequency to reach from 0% to 100%.
Deceleration time: Time required for output frequency to reach from 100% to 0%.

Holding accel/decel (Setting : 10)

OFF	Normal operation or restart accel/decel.
ON	Holds accel/decel and maintain the present frequency.

• The output frequency can be hold when the accel/decel holding terminal is ON.
• The output frequency can be kept when the accel/decel holding terminal is OFF.

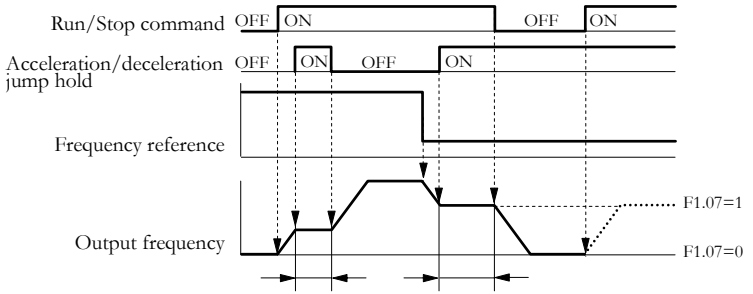
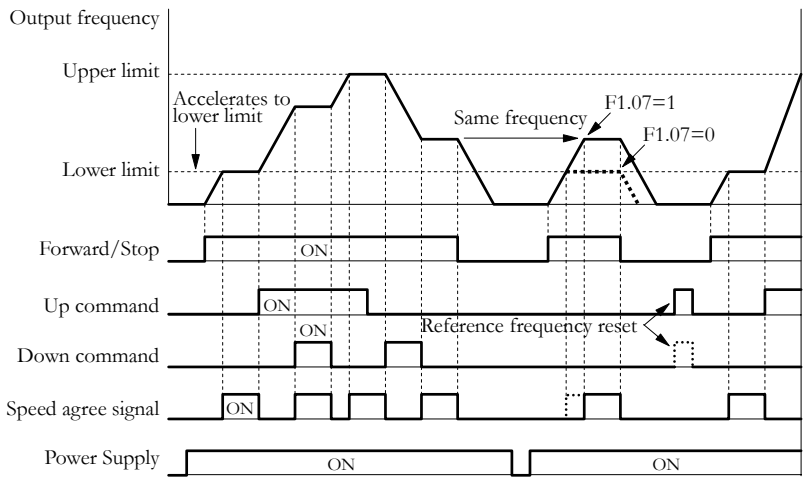


Figure 5.18 Acceleration/deceleration Jump hold

Frequency up and down command (Setting : 12~13)

Operation	Acceleration	Deceleration	Hold	Hold
Up command	ON	OFF	ON	OFF
Down command	OFF	ON	ON	OFF

• With these settings, the inverter's output frequency can be controlled by the multi-function inputs.
• Both setting 12 and 13 must be set when using this function.
• This function will operate only when B0.02(Operation mode) is set to 1(Contact input: contact 1 or 2 on terminal block).
• The upper and lower limits for the output frequency with the up/down commands are as follows:
- Upper limit=Max. output frequency(C0.02)×High speed limit(F1.01)/100
- Lower limit=Max. output frequency(C0.02)×Low speed limit(F1.02)/100
• If a run command is input, the output frequency will be accelerated to the lower limit when this function is used.
• If the up/down function is set, the multi-step commands 1 to 8 are disabled.



The speed Agree signal remains ON while the run command is ON and the motor is not accelerating or decelerating

Figure 5.19 Timing chart for up and down commands

DC braking (Setting : 15)

OFF	Normal operation
ON	Applies DC injection braking if the inverter is stopped.

- This function is used to prevent the motor from rotating due to inertia or external forces at stop.
- Inputting a run command or jog command (jog, clockwise jog, or counterclockwise jog) clears the DC injection braking causing the motor to start.

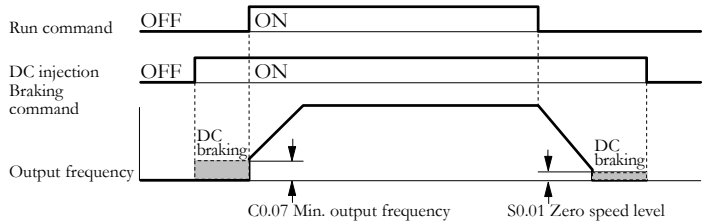


Figure 5.20 Timing chart for DC injection braking command

Speed search command 1 (Setting :16)

OFF	Normal operation.
ON	Starts a speed search from the output frequency command.

Speed search command 2 (Setting :17)

OFF	Normal operation.
ON	Starts a speed search from the pre-defined frequency.

- Only one of the search functions can be selected.
- When switching the operation from a commercial power supply and the inverter or starting a coasting motor, this function can be used to run the motor without tripping.

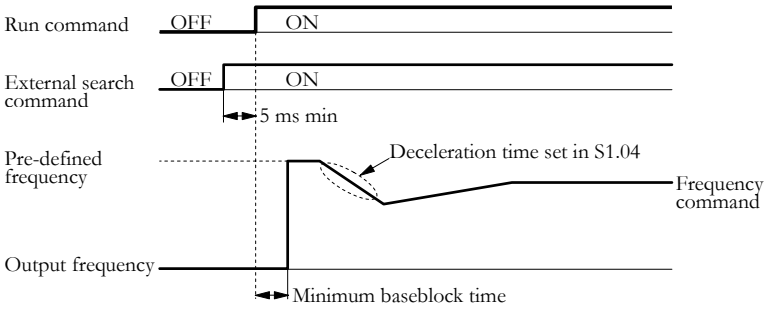


Figure 5.21 Timing chart for the external speed search command

Remote → local selection (Setting : 19)

OFF	Operates with the frequency command and run command specified in remote mode. For more detail, see B0.01 (reference source) and B0.02 (operation mode).
ON	Operates with the frequency command and run command specified in local mode.

• With this setting, the multi-function input selects the input method for the frequency command and run command.

5.7.2 Multi-function contact output

5.7.2.1 Set output type of multi-function output: H1.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H1.01	Select Terminal Output Type	-	0~ 1	0	X

• H1.01 is used to set the output type of each terminal.

• Setting

Setting constant	Function
0	Contact output is set as 'a' contact (NO)
1	Contact output is set as 'b' contact (NC)

5.7.2.2 Setting the function of multi-function output: H1.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H1.02	Function of Output Terminal	-	0~11	0	X

• Refer to the table below for the setting of the multi-function input terminal.

• Setting

Setting constant	Function (The contact output is activated by the definition specified in H1.02 when the following situation occurs.)	Description
0	Fault occurred	
1	Running	
2	Matching command frequency	Output frequency matches with command frequency. U0.01 – F1.09 ≤U0.02 ≤ U0.01 + F1.09
3	Matching temporary frequency	Output frequency matches with command frequency of match detection. F1.08 – F1.09 ≤U0.02, U0.02 ≤F1.08 + F1.09
4	Defeated matching frequency or higher	Output frequency is higher than the frequency detection level. U0.02 ≥F1.08
5	Defeated matching frequency or lower	Output frequency is lower than the frequency detection level. U0.02 ≤F1.08
6	Base blocking	Blocking the output(during the contact in putting).
7	Over torque detection	Occurring the over torque (OL3).
8	Reverse RUN	
9	Current limiting	Occurring the current(torque) limiting.
10	Speed searching	Searching the speed.
11	Zero speed	

5.7.3 Multi-function analog input

H2.01~H2.07 are used to configure the function of analog inputs.

5.7.3.1 Analog input form : H2.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H2.01	Analog Input Type	-	0~3	0	X

• H2.01 is used to configure the function of the analog input when H2.05=0(frequency command).

• Setting

Setting constant	Function
0	Frequency Command Vin(Voltage input) (terminal 9)
1	Frequency Command Ain(Current input) (terminal 10)
2	Frequency Command Vin + Ain (9+10) ≤ Fmax
3	Frequency Command Vin – Ain (9-10) ≥ 0

5.7.3.2 Analog input filter time constant : H2.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H2.02	Analog Input Time Constant	1ms	0~100	20	X

• H2.02 is useful when there are noises in the analog input signal.

• As the value in H2.02 is increased, the noise immunity and the response time to analog input are increased.

5.7.3.3 Adjusting analog inputs : H2.03, H2.04, H2.06, H2.07

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H2.03	Voltage Input Gain (Terminal 9)	0.1%	0.0 ~200.0	100.0	O
H2.04	Voltage Input Bias (Terminal 9)	0.1%	-100.0 ~100.0	0.0	O
H2.06	Current Input Gain (Terminal 10)	0.1%	0.0 ~200.0	100.0	O
H2.07	Current Input Bias (Terminal 10)	0.1%	-100.0 ~100.0	0.0	O

- Adjust gain and bias of analog inputs, as shown in Figure 5.22 if there are undesirable offset and gain changes in the analog inputs.
- The setting unit of gain and bias changes according to the values in H2.05. For more details, see the paragraph 5.7.3.4.

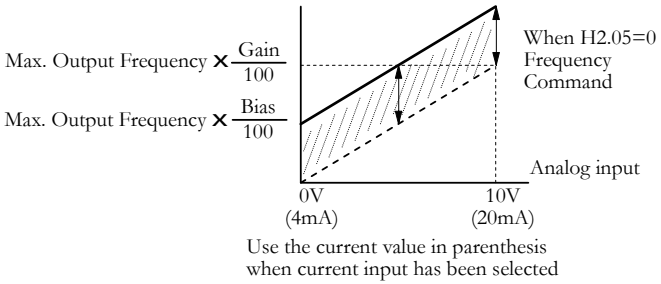


Figure 5.22 Gain and Bias

5.7.3.4 Setting the multi-function analog input terminal function : H2.05

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H2.05	Function of Current Input Terminal	-	0~ 7	0	X

- H2.05 is used to set the function of Ain(no. 10) terminal.
- Constants and function for multi-function analog input

- Setting

Setting constant	Function	Setting unit is the percentage of
0	Frequency command	Max. output frequency
1	Frequency gain	Max. output frequency
2	Voltage bias	Max. output voltage
3	DC breaking current	Max. output current
4	Over torque detection level	Max. output current
5	Stall prevention level during operation	Max. output current
6	Minimum frequency command level	Max. output frequency
7	Jump frequency	Max. output frequency

5.7.4 Multi-function analog output : H3.01~H3.03

5.7.4.1 Setting multi-function analog output : H3.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H3.01	Analog Monitor Function Setting	-	0~7	1	X

• H3.01 is used to select the function of the analog monitor output terminal.

• Setting

Setting constant	Function	Reference
0	Frequency command	U0.01
1	Output frequency	U0.02
2	Output current	U0.03
3	Output voltage	U0.04
4	DC voltage	U0.05
5	Output power	U0.06
6	Motor speed	U0.07
7	Estimated torque	U0.08

5.7.4.2 Adjusting the monitor output : H3.02, H3.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H3.02	Analog Monitor Gain setting	0.1%	0.0 ~200.0	100.0	O
H3.03	Analog Monitor Bias setting	0.1%	-100.0 ~100.0	0.0	O

• H3.02 and H3.03 are used to set the gain and bias of monitor output.

• H3.02 : set what multiple of 10V will correspond to a 100% output of the monitored item.

• H3.03: set the amount that the output characteristic will be shifted vertically. Set this amount as a percentage, with 10V corresponding to 100%.

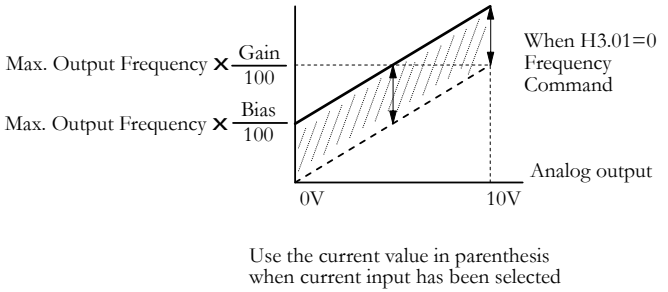


Figure 5.23 Monitor output adjustments

5.7.5 Digital operator setting

5.7.5.1 Setting the display format in U0.07 : H4.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H4.01	Display Format of U0.07	-	0~3999	30	O

• H4.01 is used to set the display format of U0.07.

	Digit 3	Digit 2	Digit 1	Digit 0	Range
H4.01	Position of Decimal Point (0~3)	Number to be multiplied to the frequency			0000~3999

5.7.5.2 Setting the STOP key enable/disable : H4.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H4.02	Digital Operator Stop	-	0~1	1	X

• H4.02 is used to enable or disable the stop key during operation using input terminals.

• Setting

Setting constant	Function
0	The stop key is disabled when the run command is input from the external terminal.
1	The stop key is enabled at all times during operation.

5.7.5.3 Setting the operation when switching REMOTE→LOCAL : H4.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H4.03	Operation when Change Local Remote	-	0~1	0	X

• H4.03 is used to set the interlock operation to be used after switching REMOTE→LOCAL.

• Setting

Setting constant	Function
0	Operate according to the RUN signal after switching to local.
1	No operation even if the Run signal is on after switching to local

5.7.5.4 Setting the device ID : H4.04

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H4.04	Device ID	-	1~253	1	O

• H4.04 is used to set the number to identify the node address of the inverter during communication.

• Setting

Setting constant	Function
1	Representative receiver: perform and response to command to #1 and #255
2~253	Normal receiver: perform command to itself and #255, but response only to command to itself.
254	Not selectable: entire inverters on network respond (remote operation)
255	Not selectable: only representative inverter on network responds (broadcast)

5.7.5.5 Select frequency unit : H4.05

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H4.05	Select Frequency Unit of Digital Volume	-	0~1	1	O

• H4.05 is used to set the frequency unit when using the digital volume.

• Setting

Setting constant	Function
0	Frequency is decreased/increased by 0.01Hz.
1	Frequency is decreased/increased by 0.05Hz

5.7.5.6 Setting the parameter setting mode : H4.06

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H4.06	Parameter setting mode	-	0~1	1	X

• H4.06 can be used to set the parameter setting method.

• Setting

Setting constant	Function
0	Changes group/subgroup at the same time (ex: Divides into 'U0' or '01')
1	Changes group/subgroup individually (ex: Divides into 'U', '0' or '01')

5.7.5.7 Setting the fan operating method : H4.07

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
H4.07	Fan Operation Mode	-	0~1	1	X

• H4.07 can be used to set the fan operation method.

• Setting

Setting constant	Function
0	Rotates continuously
1	Stops when the motor is stopped

5.8 P-Parameter : Protective functions

5.8.1 Motor overload protection

Motor overload protection function monitors temperature of the motor based on the output current of the inverter in order to protect the motor from overheating.

5.8.1.1 Select motor protection : P0.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P0.01	Select Motor Protection	-	0~1	1	X

• Setting

Setting constant	Function
0	Disabled
1	Enabled

• P0.01 can be used to enable or disable the motor overload protection function.

• The rated current setting (C2.03) is used as a basis for overload detection.

CAUTION

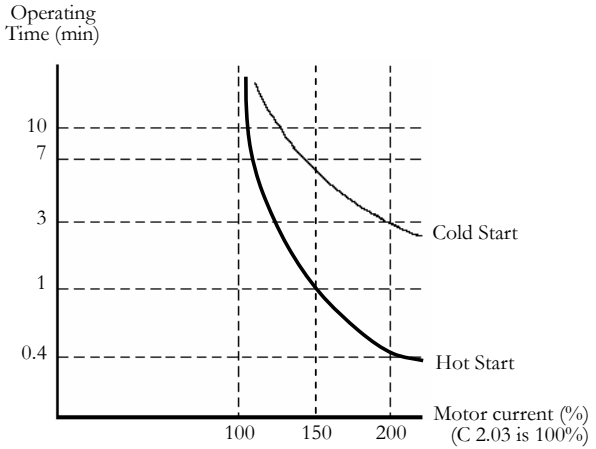
A motor may not be protected when the power supply is turned on and off frequently, because the thermal value is reset each time the power is turned off.

• When two or more motors are connected to a single inverter:
  - Disable the motor protection function (setting 0)
  - Use another method for overload protection to each motor (e.g. connect to a thermal overload relay to the power line of each motor)

5.8.1.2 Motor protection time constants: P0.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P0.02	Motor Protection Time Constants	min	0.0~60.0	8.0	X

- P0.02 can be used to set the time when the motor protection function is started.
- Normally it is not necessary to change P0.02.
- Set P0.02 if a 150% overload is applied after operating continuously at the motor's rated current (hot start).
- For known motor's overload capacity, set the hot-start overload resistance level, but allow some margin for safety.



This is the example when P0.02 is set to 1min and the motor is operating at 60Hz.

Figure 5.24 Motor protection operating time

5.8.1.3 Motor selection: P0.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P0.03	Motor Selection	-	0~1	0	X

- P0.03 can be used to set the motor protection characteristic.
- Induction motors (i.e. general-purpose motor and inverter motor) are classified based on their cooling capabilities thus, the motor overload function operates differently between them.

* General-purpose motor : When the motor is rotating at a low speed, the motor's temperature rises faster than the inverter motor, therefore torque must be limited to protect the motor from overheating.

* Inverter motor : Motor's temperature rise relatively slower if it is rotating at a low speed, therefore electronic thermal overload protection is not activated. Thus, use an inverter motor for continuous operation at low speed.

- Setting

Setting constant	Function
0	Applied to general-purpose motor
1	Applied to inverter motor

5.8.2 Momentary power failure

5.8.2.1 Operation at power loss : P1.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P1.01	Operation at Power Loss	-	0~2	1	X

• P1.01 can be used to set the operation when the power is supplied after the momentary power failure.

• Setting

Setting constant	Function
0	Stops with the error display.
1	Restarts if power is restored within the compensation time of power loss (P1.02).
2	Restarts if power is restored as long as the bus voltage is high enough to maintain logic.

• When setting 2 is chosen, speed search will be performed automatically if the power is restored within the allowed time interval.
• When setting 0 is chosen, an under voltage fault will be detected if power is interrupted for more than 15ms.

5.8.2.2 Compensation time of power loss : P1.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P1.02	Compensation Time of Power Loss	0.1sec	0.0~2.0	0.5	X

• P1.02 can be used to set the time of recovery after the power loss
• The factory setting depends on the inverter capacity.
• P1.02 is valid only when P1.01 is set to 1.

5.8.2.3 V/f recovery time : P1.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P1.03	V/f Recovery Time	0.1sec	0.0 ~2.0	0.5	X

• P1.03 can be used to set the V/f recovery time until reaching the maximum output voltage after the blocking of output.
i.e. -For 200V class inverter: Time for voltage to be restored from 0 VAC to 200VAC.
- For 400V class inverter: Time for voltage to be restored form 0 VAC to 400VAC.
• P1.03 is valid for speed searched after:
- momentary power loss
- regular speed searches
- voltage changes with energy-saving control
- voltage changes with baseblock clearing.

5.8.2.4 : Undervoltage level : P1.04

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P1.04	Undervoltage Level	1V	0~250	190	X

• P1.04 can be used to when adding an AC reactor and lower the main circuit undervoltage detection level.
• Set a main circuit DC voltage value that will detect a main circuit undervoltage.
• Normally it isn't necessary to change P1.04.

5.8.3 Stall prevention

• Stall occurs when the rotor cannot keep up with the rotating magnetic field on the motor start side.
e.g. a large load is applied to the motor and sudden acceleration or deceleration is performed, etc.

5.8.3.1 Stall prevention at start : P2.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P2.01	Stall Prevention at Start	-	0~1	1	X

• P2.01 can be used to set the stall prevention function at start.

• Setting

Setting constant	Function
0	Disabled (The motor with excessive load is possibly stalled. Then a longer acceleration time and reduced load is required.)
1	Enabled

• When setting 1 is selected, acceleration is stopped if the motor current exceeds the acceleration stall prevention level(P2.02). Acceleration is started again when the current falls below this level. The actual acceleration time can be longer than the set value (at F2.01) depending on the load.

5.8.3.2 Stall prevention level at start : P2.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P2.02	Stall Prevention Level at Start	1%	0~200	170	O

• P2.02 can be used to set the output current limit level as a percentage of rated current of the inverter at start.
(i.e. 100% corresponds to the rated current of the inverter)
• This setting is valid when P2.01 is let to 1.
• Normally it isn't necessary to change this setting.

• Decrease this setting when:
- The motor capacity is small compared to the inverter capacity
- Stall occurs when the motor is operated with the factory setting

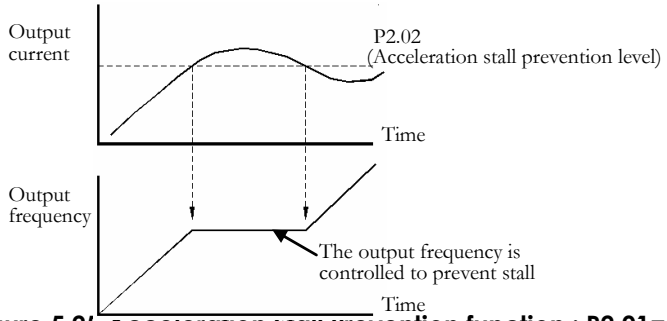


Figure 5.25 Acceleration Stall Prevention function : P2.01=1

5.8.3.3 Stall prevention limit during acceleration : P2.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P2.03	Stall Prevention at Acc. Limit	1%	0~100	50	O

• P2.03 can be used to set the stall prevention limit when high-speed motor is being used in the high-speed range
(the high frequency range above the base frequency)
• Normally it isn't necessary to change this setting.
• The standard target setting is the motor's rated current.
• Set P2.03 as a percentage of the inverter's rated current.
(i.e. 100% corresponds to the inverter's rated current)

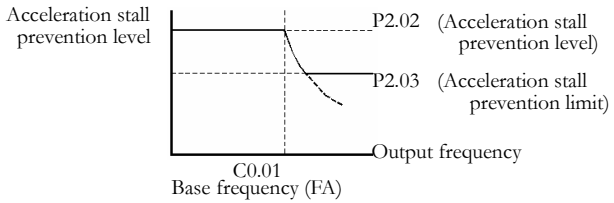


Figure 5.26 Stall prevention limit during acceleration

• When the motor is used in the high-speed range, the acceleration stall prevention level is automatically lowered to provide smoother acceleration.
• P2.03 limits how much the acceleration stall prevention level is lowered so that it isn't lowered any more than necessary.

5.8.3.4 Stall prevention at stop : P2.04

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P2.04	Stall Prevention at Stop	-	0~1	1	X

• P2.04 can be used to set the stall prevention selection during stop.

• Setting

Setting constant	Function
0	Disabled (when braking device is used)
1	Enabled (when braking device is not used)

• When setting1 is selected, the deceleration time is extended automatically so that a main circuit over voltage fault doesn't occur.
• Braking device used :
  - braking resistor unit (for 400V class only)
  - braking unit
• When braking device is NOT used, deceleration time should be long enough to prevent the over voltage.

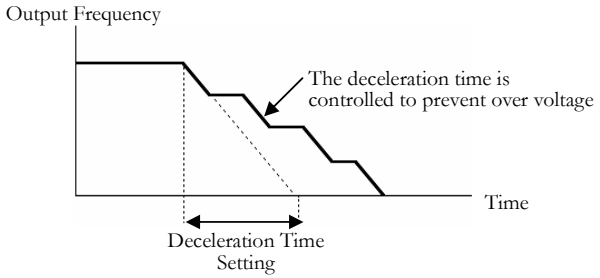


Figure 5.27 Deceleration stall prevention function : P2.04=1

5.8.3.5 Stall prevention when the motor is running : P2.05

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P2.05	Stall Prevention in Running	-	0~2	1	X

• P2.05 can be used to set the stall prevention function during running.

• Setting

Setting constant	Function
0	Disabled (run according to the setting. Stalls may occur with excessive loads)
1	Enabled (use deceleration time in F2.02 for stall prevention function)
2	Enabled (use deceleration time in F2.04 for stall prevention function)

• When setting 1 is selected, deceleration is started if the phase current continues to be higher than the stall prevention level for more than 100ms. The motor is accelerated back to the reference frequency again when the current falls below this level.

5.8.3.6 Stall prevention when the motor is running at the desired frequency : P2.06

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P2.06	Stall Prevention Level in Running	1%	0~200	170	O

• P2.06 can be used to set the stall prevention level during running
• This setting is valid when P2.05 =1 or 2
• Normally it isn't necessary to change this setting.
• Decrease this setting when:
  - The motor capacity is small compared to the inverter capacity
  - Stall occurs when the motor is operated with the factory setting
• Set this value as a percentage of the inverter' s rated current (i.e. 100% corresponds to the inverter's rated current)

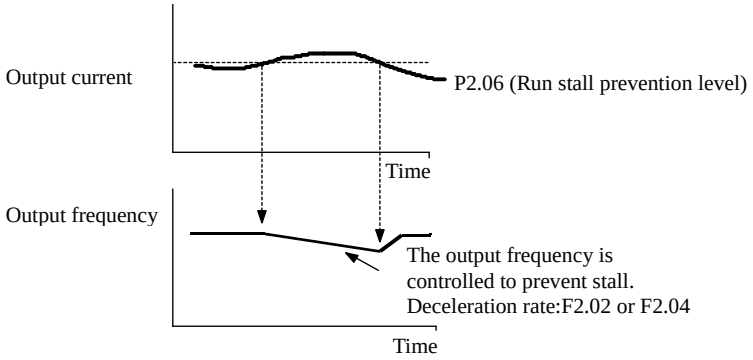


Figure 5.28 Run stall prevention function : P3.05=1 or 2

5.8.4 Overtorque detection : P3.01~P3.03

5.8.4.1 Overtorque detection : P3.01

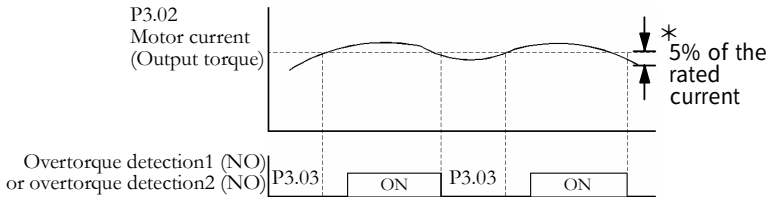
Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P3.01	Overtorque Detection	-	0~4	0	X

- P3.01 can be used to detect an excessive mechanical load from an increase in the output current (or output torque)
- The setting in P3.01 determine:
  - whether overtorque conditions will be detected
  - what kind of processing will be performed if a overtorque condition is detected.

- Setting

Setting constant	Function
0	Disabled
1	Enabled only during speed matching. Continues operation even after detection.
2	Detect overtorque at any time. Continues operation even after detection
3	Detect only during speed matching. Stops output after detection
4	Detect overtorque at any time. Stops output after detection.

- When overtorque detection is enabled, set the overtorque detection level P3.02
- Overtorque is detected when the current exceeds the overtorque detection level for longer than the overtorque detection time.



*The overtorque detection is cleared when the current drops about 5% of the inverter's rated current (or the motor's rated torque)

Figure 5.29 Timing chart for overtorque detection

5.8.4.2 Overtorque detection level & overtorque delay time : P3.02,P3.03

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P3.02	Overtorque Detection Level	1%	0~300	180	O
P3.03	Overtorque Delay Time	1sec	0.0~10.0	0.1	X

- P3.02 and P3.03 can be used to detect an excessive mechanical load from an increase in the output current (or output torque)

5.8.5 Fault retry

5.8.5.1 Number of fault retry : P4.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P4.01	Number of Fault Retry	-	0~10	0	X

- P4.01 can be used to restart the inverter automatically even when an internal fault occurs during inverter operation.
- Use P4.01 only when continuing operation is more important than possibly damaging the inverter.

NOTE

- The inverter may be damaged when using the fault retry function too frequently.
- Since the inverter might be damaged, be sure to take the following precautions:
  - Always set up a molded-case circuit breaker
  - Set up a sequence that will stop peripheral equipment when an inverter fault occurs

- The fault retry function is effective with the following faults. With others, the protective operation will engage immediately without attempting to restart operation:
  - overcurrent
  - motor overload
  - inverter overload
  - main circuit overvoltage
  - main circuit undervoltage
- The counter which counts the number of the past fault is cleared when:
  - -normal operation is maintained for 10 minutes.
  - -the fault reset input from digital operator or input terminal is received after the protection operation.
  - -the input power supply is off.

5.8.5.2 Output terminal function during fault retry : P4.02

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P4.02	Output Terminal Function at Retry	-	0~1	0	X

P4.02 can be used when the multi-function output terminal setting function is 'default output' (H1.01)

• Setting

Setting constant	Function
0	Do not output fault restart (fault contact does not operate)
1	Output fault restart (fault contact operates)

5.8.5.3 Fan error : P5.01

Parameter No.	Name	Unit	Setting range	Factory Setting	Changeable during operation
P5.01	Fan Error	-	0~1	0	X

P5.02 can be used to enable or disable the fan error detecting function.

• Setting

Setting constant	Function
0	Enabled (fan error is detected)
1	Disabled (fan error is not detected)

5.9 Error Monitoring

Information on the previous error can be monitored from U1 and U2

• U1-displays the information on the last error.

• U2-displays up to last four errors.

(refer to parameter description for more details)

6. Troubleshooting

Trouble shootings as well as protective and diagnostic functions of the MOSCON-E7 are described in this chapter.

6.1 Protective function/error description

In case of the wrong parameter setting or faulty writing, the inverter and/or the motor may not function as commanded.
The MOSCON-E7 has many protective functions, which is displayed on the digital operator when the fault occurs.
When the fault is detected, the fault contact output operates and the inverter output to be shut off causing the motor to stop. The stopping method can be selected for some faults.

- Refer to the table below for the fault display, cause and corrective actions.
- To reset the fault, use one of the followings:
  - Press the reset key on the digital operator.
  - Turn the power supply off and on again.
  - Turn on the fault reset terminal.

Table 6.1 Fault display and contents (Faults in inverter)

Code	Meaning	Cause	Corrective action
OC2 Short circuit Error	The inverter output or load was short-circuited.	• A short-circuit or ground fault (caused by motor damage, worn insulation, or a damaged cable) at the inverter output.	Reset the fault after correcting.
OC1 Over current	The inverter output current exceeded 200% of the rated current instantly.	• A short-circuit or ground fault (caused by motor damage, worn insulation, or a damaged cable) at the inverter output. • Too large load or too short accel/decel time. • A magnetic switch was switched at the inverter output. • A special-purpose motor with too large capacity for the inverter is used.	Reset the fault after correcting.

Code	Meaning	Cause	Corrective action
FAN Fan stopped.	Fan at the bottom of the inverter is not operating.	• Defective cooling fan or fan cable.	Check the wiring and replace the fan if necessary.
OH2 Inverter Over-Heated.	The temperature of the inverter's cooling fin exceeded approximately95°C.	• Too high ambient temperature.	Install a cooling unit.
		• Heat source nearby the inverter.	Remove the heat source.
		• Inverter cooling fan is malfunctioning.	Replace the cooling fan.(Contact Samsung)
OV Main Over-Voltage.	The main circuit DC voltage exceeded the over voltage detection level. 200V class:410V. 400V class:820V.	• Too short deceleration time. • Too large regenerative energy from the motor.	Increase the deceleration time or connect a braking resistor (or unit).
		• Too high power supply voltage.	Decrease the voltage within specification.
UV1 Main Under-Voltage.	The main circuit DC voltage is below the under voltage detection level. 200Vclass:190V. 400Vclass:380V.	• A open-phase occurred with the input power supply. • A momentary power loss. • Too large voltage fluctuation in the input power supply.	Reset the fault after Correction.
OL3 Over-torque Det.	There was output of 180% of the rated current instantly.	• Too heavy load or too rapid acceleration.	• Set P3.02 and P3.03 appropriately. • Check the mechanical system and correct the cause of the over torque.

Code	Meaning	Cause	Corrective action
OL2 Inverter Over-load.	150% output current of inverter rating lasted more than 1 minute, or equivalent situation.	• Too heavy load. Too short accel/decel time and cycle time	Check the size of the load, length of the accel/decel and cycle times.
		• Too high V/f pattern	Check the V/f Pattern.
		• Too low inverter capacity	Replace the inverter with larger capacity.
OL1 Motor Over-load.	Output of 150% of the motor's rating lasted more than 1 minute or equivalent situation.	• Too heavy load. Too short accel/decel time and cycle time	Check the size of the load, length of the accel/decel and cycle times.
		• Too high V/f pattern	Check the V/f pattern.
		• Incorrect C2.03 (motor's rated current)	Check C2.03 (motor's rated current).
CB3 Analog Speed command failure.	Wire of the external analog speed control is disconnected.	-	Replace the wire. (Contact Samsung)
CB2Parameter range over.	Input parameter is out of max/min value.	-	Input the value within the max/min value.
CB1 EEPROM failure.	Error during recalling of the preset parameter	-	Contact Samsung
EF4 External Fault. (Terminal 4)	Fault in external Input (Terminal 4)	• An "external fault" was input from a multi-function input.	• Check if the multi-function input is properly selected. •Remove the cause of the external fault.
EF3 External Fault. (Terminal 3)	Fault in external Input (Terminal 3)		
EF2 External Fault. (Terminal 2)	Fault in external Input (Terminal 2)		
EF1External Fault. (Terminal 1)	Fault in external input (Terminal 1)		
CB0 Parameter Fault.	Error in leading the parameter when power is applied.	The check of the parameters stored in EEPROM is failed. (The detected parameters can be confirmed in U3.02, max. 32)	Contact Samsung.

Table 6.2 Fault display and contents (Warning on inverter) : Blinking display

Code	Meaning	Cause	Corrective action
UV Main under-Voltage.	The main circuit DC voltage was below: 200Vclass: 190V 400Vclass: 380V	• A open-phase occurred with the input power supply. • A momentary power loss. • Too large voltage fluctuation in the input power supply.	Reset the fault after correction.
OL3 Over torque detection.	There was output of180% of the rated current instantly.	• Too large load. • Too low inverter's capacity.	• Set P3.02 and P3.03 appropriately. • Check the mechanical system and correct the cause of the over torque.
SE Warning.	Forward/reverse run commands input at the same time.	• The forward and reverse run command input at the same time.	Check the sequence of the forward and reverse run commands.
BB Base block.	Output block command was input from external.	• The base block command input.	
STP Local Stopped in Remote Mode.	Motor stopped by the stop key in remote mode.	• In the remote mode, the local stop command input.	

Table 6.3 Fault display and contents (Communication fault)

Code	Meaning	Cause	Corrective action
FMT Abnormal Format.	Input command is different from the normal format.	• The communications command arrangement is different from the reguration protocol.	
SUM Check Sum Error.	Part of the information has been changed during transmission.	• The error caused by noise, etc occurred to the data on communication.	
MEM Memory Fault.	Error in the EEPROM parameter	• An error occurred in the EEPROM.	
WRE Rejection in Running.	Modification of the unchangeable parameter during running was rejected.	• This command can not be used in running..	
EEP EEPROM Busy.	Operation is being input on EEPROM. (Other input command is ignored)	• EEPROM is operating at present.	
MOD Invalid Frequency / Run command mode.	Remote mode is not selected.	• Invalid command in this mode.	Set the appropriate mode. Refer to B0.02.

----------MEMO----------

7. Maintenance and Inspection

Basic maintenance and inspection for the MOSCON-E7 are describes in this chapter.

DANGER

- Do not remove the digital operator from the unit since it carries high voltages and are extremely dangerous. Using the cable between operator and unit is also prohibited.
- Do not touch the terminals since some of them carry high voltages and are extremely dangerous.
  Otherwise, it may cause an electric shock.
- Do not remove the cover when power is being supplied to the inverter. Always turn off the power to the inverter through the MCCB when detaching the cover.
  Otherwise, the capacitor remained charged may be very dangerous.
- After turning off the main circuit power supply, wait for a while before maintenance or inspection since it may remain charged.
  Otherwise, it may cause an electric shock.
- Maintenance, inspection, and replacement of parts must be done only by authorized personnel.
  Otherwise, it may result an injury or an accident.
- Remove all metal objects, such as watches and rings, before the maintenance, inspection, and replacement of parts. Also, always use grounded tools.
  Otherwise, it may cause an electric shock.

CAUTION

- Do not touch the CMOS IC in the control board directly.
  Otherwise it can be damaged by static electricity.
- Do not change the wiring, or remove the digital operator or connectors, during operation.
  Otherwise, it may cause a personal injury.

NOTE

Periodically inspect the MOSCON-E7 within 18 months of shipping from the factory or within a year of being delivered to the user, whichever comes first. Regular inspection will prevent accident and ensure high-performance with higher-reliability.

7.1 Daily inspection

Check the system in operation if:

- the motor vibrates or makes unusual noises.
- there are any abnormal heat generation
- the ambient temperature is too high
- the output current value shown on the monitor display is higher than normal
- the cooling fan is operating normally.

7.2 Periodic inspection

Refer to the table below for the periodic inspection.

DANGER

- Always turn off the power supply before the inspection.
  Otherwise, it may cause an electric shock.
- After turning off the main circuit power supply, wait for a while before maintenance or inspection since it may remain charged.
  Otherwise, it may cause an electric shock.

Table7.1 Periodic inspection

Item	Inspection	Solution
Terminals, mounting bolts, connectors, etc.	Are all connection hardware properly seated and bolts tightened?	Reconnect the loose connectors and tighten the bolts.
Cooling fins	Are the fins dirty or dusty?	Clean with dry compressed air: 39.2×10^4 to 58.8×10^4 Pa (4 to 6 kg ㆍ㎠)
PCB	Is there any accumulation of conductive material or oil mist?	Clean with dry compressed air: 39.2×10^4 to 58.8×10^4 Pa (4 to 6kg ㆍ㎠) Replace the inverter if the board can not be cleaned,
Cooling fan	Is there any abnormal noise or vibration?	Replace the cooling fan
Power element	Is there any accumulation of conductive material or oil mist?	Clean with dry compressed air: 39.2×10^4 to 58.8×10^4 Pa (4 to 6 kg ㆍ㎠)
Smoothing capacitor	Is there any abnormal odor or discoloration?	Replace the capacitor.

7.3 Part replacement

Inverter is composed of many parts and these parts must function properly for normal operation of the inverter.

To maintain normal operation of the inverter for a long period of time, it is recommended to perform a regular inspection and replace parts.

Inspection period may vary depending on the installation environment and usage conditions.

CAUTION

Usage condition
- Ambient temperature(yearly average of 30℃)
- Load factor: 80% max.
- Operating rate: 12hrs max/day

Refer to the table below for the periodic inspection of the MOSCON-E7.

Table 7.2 Part replacement

Part	Standard Replacement Period	Method
Cooling fan	2~5 yrs	Replace with new part.
Breaker relays	-	Inspect to determine if the replacement is required.
Aluminum capacitors on PCBs	5yrs	Replace with new board. Inspect to determine if inspection is required.
Fuses	10yrs	Replace with new part.

Appendix A

Factory setting that change with the motor capacity

	C2.01 Motor terminal resistance (Ω)	C2.02 Motor iron loss (Watt)	C2.03 Motor rated current (A)	C2.04 Motor no load current (A)	C2.05 Motor rated slip (Hz)
20P4	10.50	25	2.40	1.40	3.83
20P7	7.50	30	3.80	2.20	3.66
21P5	2.60	75	6.60	4.30	3.00
22P2	1.80	90	9.00	4.40	2.67
23P7	0.90	200	14.30	7.00	2.33
40P4	26.00	30	1.40	0.90	3.83
40P7	18.00	45	2.20	1.30	3.66
41P5	9.70	83	3.80	2.20	3.00
42P2	4.60	150	5.20	2.50	2.67
43P7	3.00	230	8.30	4.00	2.33

Appendix B

Monitors

	Name	Unit	Display	Page
U0.01	Effective Frequency Command	0.01Hz	xx.xx~xxx.x	5-4
U0.02	Current Output Frequency	0.01Hz	xx.xx~xxx.x	5-4
U0.03	Output Current in RMS	0.01A	xx.xA	5-4
U0.04	Output Voltage in RMS	1V	xxxu	5-4
U0.05	DC link Voltage	1V	dxxx	5-4
U0.06	Output Power in 0.1kW	0.1kW	Pxx.x	5-4
U0.07	Motor speed in RPM	1rpm	xxxx	5-4
U0.08	Percentage Output Torque	1%	oxxx	5-4
U0.09	I/O Status	bit		5-4
U0.10	Cumulative Power On Time	10Hr	xxxx	5-4
U0.11	Elapsed Time since Power On	min.sec	mm.ss	5-4
U0.12	S/W Version		r.xxx	5-4

Last Fault

	Name	Unit	Display	Page
U1.01	Command Frequency	0.01Hz	xx.xx~xxx.x	5-5
U1.02	Output Frequency	0.01Hz	xx.xx~xxx.x	5-5
U1.03	Output Current	0.01A	xx.xA	5-5
U1.04	Output Voltage	1V	xxxu	5-5
U1.05	DC Voltage	1V	dxxx	5-5
U1.06	Output Power	0.1kW	Pxx.x	5-5
U1.07	Motor rpm	1rpm	xxxx	5-5
U1.08	Output Torque	1%	oxxx	5-5
U1.09	I/O Status	bit		5-5
U1.10	Cumulative Power On Time	10Hr	xxxx	5-5

Fault List

	Name	Unit	Display	Page
U2.01	Fault 1 (recent)	-	*	5-5
U2.02	Fault 2	-	*	5-5
U2.03	Fault 3	-	*	5-5
U2.04	Fault 4	-	*	5-5

Parameter Check List

	Name	Unit	Display	Page
U3.01	Modified Parameter List	-	"----" (None)	5-5
U3.02	Fault Parameter List	-	"----" (None)	5-5

B-parameter

Basic Setup

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
B0.01	Active Source of Frequency Command	-	00~23	00	X	5-10
B0.02	Active Source of RUN Command	-	00~12	00	X	5-10
B0.03	Stopping Method	-	0~1	0	X	5-11
B0.04	Prohibiting Reverse Rotation	-	0~1	0	X	5-11
B0.05	Default Motor Direction	-	0~1	0	O	5-12
B0.06	Default Monitor Item	-	1~10	0	O	5-12
B0.07	Automatic Start after Power On	-	0~1	0	O	5-12

System Initialization

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
B1.01	Inverter Initialization	-	0~9999	0000	X	5-13
B1.02	Check Password	-	0~9999	0000	X	5-14
B1.03	Set Password	-	0~9999	0000	X	5-14

System Capacity Setup

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
B2.01	Power Capacity of the Inverter	-	20P4~43P7	-	X	5-14
B2.02	Power Capacity of the Motor	-	20P4~43P7	-	X	5-14

F-parameter

Frequency/Speed Command

	Name	Unit	Setting Range	Factory Setting	Changeable During operation	Page
F0.01	Main Frequency Command of Operator Mode & Communication Mode	0.01Hz	0.00~600.00	0.00	○	5-15
F0.02	Frequency2	0.01Hz	0.00~600.00	0.00	○	5-15
F0.03	Frequency3	0.01Hz	0.00~600.00	0.00	○	5-15
F0.04	Frequency4	0.01Hz	0.00~600.00	0.00	○	5-15
F0.05	Frequency5	0.01Hz	0.00~600.00	0.00	○	5-15
F0.06	Frequency6	0.01Hz	0.00~600.00	0.00	○	5-15
F0.07	Frequency7	0.01Hz	0.00~600.00	0.00	○	5-15
F0.08	Frequency8	0.01Hz	0.00~600.00	0.00	○	5-15
F0.09	Jog Frequency	0.01Hz	0.00~600.00	6.00	○	5-15

Frequency Limit

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
F1.01	High Speed Limit	0.1%	0.1~100.0	100.0	○	5-16
F1.02	Low Speed Limit	0.1%	0.0~99.9	0.0	○	5-16

Jump Frequency Limit

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
F1.03	Jump Frequency1	0.01Hz	0.00~600.00	0.00	○	5-16
F1.04	Jump Frequency2	0.01Hz	0.00~600.00	0.00	○	5-16
F1.05	Jump Frequency3	0.01Hz	0.00~600.00	0.00	○	5-16
F1.06	Jump Frequency Width	0.01Hz	0.00~20.00	0.50	○	5-16
F1.07	Jump Mode	-	0~1	0	X	5-17

Frequency Detection

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
F1.08	Frequency of Match Detection	0.01Hz	0.00~600.00	0.00	○	5-19
F1.09	Frequency Match Detection Width	0.01Hz	0.00~20.00	0.50	○	5-19
F1.10	Frequency of Accel/Decel Time Switching	0.01Hz	0.00~600.00	0.00	○	5-19

Accel/Decel Time

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
F2.01	Accel Time 1	0.01sec	0.00~600.00	10.00	○	5-20
F2.02	Decel Time 1	0.01sec	0.00~600.00	10.00	○	5-20
F2.03	Accel Time 2	0.01sec	0.00~600.00	10.00	○	5-20
F2.04	Decel Time 2	0.01sec	0.00~600.00	10.00	○	5-20
F2.05	Accel/Decel Time Base	-	0~1	0	X	5-20

S-Curve Accel/Decel Time

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
F3.01	S-Curve Time	0.01sec	0.00~2.50	0.20	○	5-21

S-parameter

DC Braking

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
S0.01	DC Brake Starting Frequency	0.01Hz	0.00~10.00	1.50	X	5-22
S0.02	DC Brake Current	1%	0~100	50	X	5-22
S0.03	DC Braking Time at Start	0.1sec	0.0~25.0	0.0	X	5-22
S0.04	DC Braking Time at Stop	0.1sec	0.0~25.0	0.5	X	5-22

Speed Search

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
S1.01	Speed Search at Start	-	0~1	0	X	5-23
S1.02	Speed Search Start Frequency	0.01Hz	0.00~600.00	0.00	X	5-23
S1.03	Speed Search Current	1%	0~200	100	X	5-23
S1.04	Speed Search Deceleration Time	0. 1sec	0~10.0	2.0	X	5-23

Dwell Operation

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
S2.01	Dwell Frequency at Start	0.01Hz	0.00~600.0	0.00	X	5-25
S2.02	Dwell Time at Start	0.01sec	0.00~25.00	0.00	X	5-25
S2.03	Dwell Frequency at Stop	0.01Hz	0.00~600.0	0.00	X	5-25
S2.04	Dwell Time at Stop	0.01sec	0.00~25.00	0.00	X	5-25

Energy Save Function

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
S3.01	Energy Saving Voltage Level	1%	0~100	80	X	5-26
S3.02	Energy Saving Frequency Level	0.01Hz	0.00~600.00	0.00	X	5-26

Slip Compensation

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
S4.01	Slip Compensation Gain	1%	0~S4.03	0	○	5-27
S4.02	Slip Compensation Delay Time	1msec	0~9999	200	X	5-27
S4.03	Slip Compensation Limit	1%	0~250	200	X	5-27

Torque Compensation

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
S5.01	Torque Compensation Gain	1%	0~250	100	X	5-29
S5.02	Torque Compensation Delay time	1msec	0~9999	20	X	5-29

System function Compensation

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
S6.01	Hunting Prevention Gain	%	0~100	20	○	5-30
S6.02	Enable Brake Boosting	-	0~1	0	X	5-30
S6.03	Current ripple restraint (1 phase only)	-	0~1	1	X	5-30

C-parameter

V/f Setting

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
C0.01	V/f Pattern	-	0~15	15	X	5-31
C0.02	Max Output Frequency	0.01Hz	30.00~600.00	60.00	X	5-37
C0.03	Max Output Voltage	0.1V	0.0~250.0	200.0	X	5-37
C0.04	Base Frequency	0.01Hz	30.00~600.00	60.00	X	5-37
C0.05	Mid Output Frequency	0.01Hz	0.00~600.00	3.00	X	5-37
C0.06	Mid Output Voltage	0.1V	0.0~250.0	14.0	X	5-37
C0.07	Min Output Frequency	0.01Hz	0.00~600.00	1.50	X	5-37
C0.08	Min Output Voltage	0.1V	0.00~250.0	8.0	X	5-37

Carrier Frequency/ Modulation Related Setting

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
C1.01	Carrier Frequency	0.01Hz	1.50~10.00	10.00	X	5-38

Motor Data

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
C2.01	Stator Resistance	0.01Ω	0.00~99.99	*	X	5-38
C2.02	Iron Loss	1W	0~9999	*	X	5-38
C2.03	Rated Output Current	0.1A	0.0~999.9	*	X	5-39
C2.04	No Load Current	0.1A	0.0~999.9	*	X	5-39
C2.05	Rated Slip	0.01Hz	0.00~600.0	*	X	5-39

H/W Adjusting Data

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
C3.01	DC Voltage Compensation	-	-	*	X	5-40
C3.02	Analog Output Compensation Coefficient	-	-	*	X	5-40
C3.03	Current Detector Compensation 1	-	-	*	X	5-40
C3.04	Current Detector Compensation 2	-	-	*	X	5-40
C3.05	Analog Command Compensation Coefficient	-	-	*	X	5-40
C3.06	Current Terminal Gain Compensation Coefficient	-	-	*	X	5-40
C3.07	Current Detector Compensation Coefficient	-	-	*	X	5-40

H-parameter

Multi-Function Inputs

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
H0.01	Select Terminal Input Type	-	00~3F (Hexa -Decimal)	00	X	5-41
H0.02	Function of Terminal 3	-	0~19	1	X	5-41
H0.03	Function of Terminal 4	-	0~19	2	X	5-41
H0.04	Function of Terminal 5	-	0~19	3	X	5-41
H0.05	Function of Terminal 6	-	0~19	4	X	5-41

Multi-Function Output

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
H1.01	Select Terminal Output Type	-	0~1	0	X	5-50
H1.02	Function of Output Terminal	-	1~11	0	X	5-50

Multi-Function Analog Input

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
H2.01	Analog Input Type	-	0~3	0	X	5-52
H2.02	Analog Input Time Constant	1ms	0~100	20	X	5-52
H2.03	Voltage Input Gain (Terminal 9)	0.1%	0.0~200.0	100.0	○	5-53
H2.04	Voltage Input Bias (Terminal 9)	0.1%	-100~100	0.0	○	5-53
H2.05	Function of Current Input Terminal	-	0~7	0	X	5-54
H2.06	Current Input Gain (Terminal 10)	0.1%	0.0~200.0	100.0	○	5-53
H2.07	Current Input Bias (Terminal 10)	0.1%	-100~100	0.0	○	5-53

Multi-Function Analog Monitor Output Terminal

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
H3.01	Analog Monitor Function Setting	-	0~7	1	X	5-55
H3.02	Analog Monitor Gain Setting	0.1%	0.0~200.0	100	○	5-56
H3.03	Analog Monitor Bias Setting	0.1%	-100~100	0.0	○	5-56

Digital Operator Setting

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
H4.01	Motor Speed Form	-	0~3999	30	○	5-57
H4.02	Digital Operator Stop	-	0~1	1	X	5-57
H4.03	Operation when Change Local Remote	-	0~1	0	X	5-57
H4.04	Device ID	-	1~253	1	○	5-58
H4.05	Select Frequency Unit of Digital Volume	-	0~1	1	○	5-58
H4.06	Parameter Setting Method	-	0~1	1	X	5-59
H4.07	Fan Operation Mode	-	0~1	1	X	5-59

P-parameter

Motor Protection

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
P0.01	Select Motor Protection	-	0~1	1	X	5-60
P0.02	Motor Protection Time Constants	min	0.0~60.0	8.0	X	5-61
P0.03	Motor Selection	-	0~1	0	X	5-62

Momentary Power Failure

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
P1.01	Operation at Power Loss	-	0~2	1	X	5-63
P1.02	Compensation Time of Power Loss	0.1sec	0.0~2.0	0.5	X	5-63
P1.03	V/f Recovery Time	0.1sec	0.0~2.0	0.5	X	5-64
P1.04	Undervoltage Level	1V	0~250	190	X	5-64

Stall Prevention

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
P2.01	Stall Prevention at Start	-	0~1	1	X	5-65
P2.02	Stall Prevention Level at Start	1%	0~200	170	○	5-65
P2.03	Stall Prevention at Acc Limit	1%	0~100	50	○	5-66
P2.04	Stall Prevention at Stop	-	0~1	1	X	5-67
P2.05	Stall Prevention in Running	-	0~2	1	X	5-68
P2.06	Stall Prevention Level in Running	1%	0~200	170	○	5-68

Over Torque Detection

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
P3.01	Overtorque Detection	-	0~4	0	X	5-70
P3.02	Overtorque Detection Level	1%	0~300	180	○	5-71
P3.03	Overtorque Delay Time	1sec	0.0~10.0	0.1	X	5-71

Retry Fault

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
P4.01	Number of Fault Retry	-	0~10	0	X	5-72
P4.02	Output Terminal Function at Retry	-	0~1	0	X	5-73

Fan Error

	Name	Unit	Setting Range	Factory Setting	Changeable During Operation	Page
P5.01	Fan Error	-	0~1	0	X	5-73

Appendix C

E7 Dynamic Brake User's Manual

1. Mounting

For the optimal performance of the dynamic brake, mount it in a place, which satisfies the conditions listed below.

- Refer to the figure 1 for the dimensions and installation space.
- A dynamic brake and braking resistor generate heat, thus install the peripheral devices, which are not tolerant to heat, far away from them.
- Refer to the figure 1 for the mounting method.

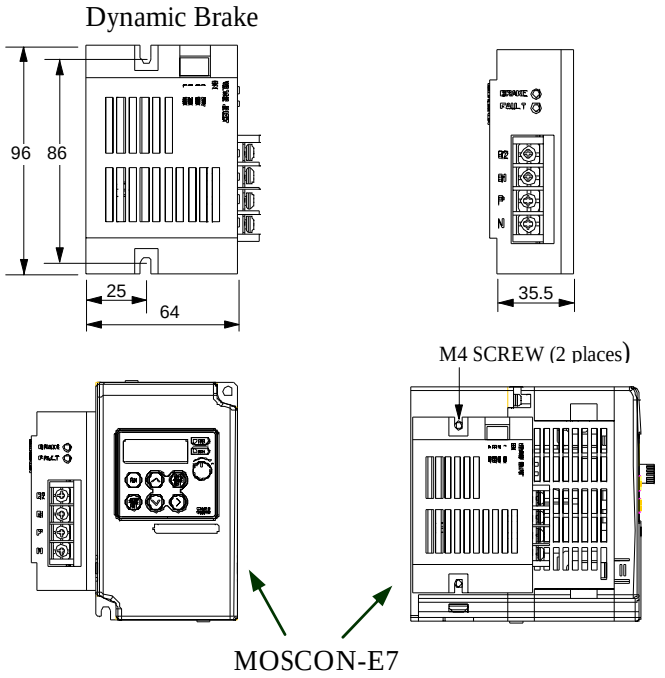
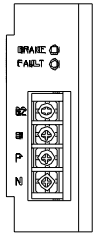


Figure 1. Mounting method

2. Identifying each part



BRAKE : Braking indicating LED
FAULT : Fault indicating LED
B2 : Connect to braking resistor
B1 : Connect to braking resistor
P : Connect to P/B of inverter
N : Connect to N of inverter

Figure 2 Part names of dynamic brake

3. Wiring

1) Precaution when wiring the signal line
The dynamic brake and braking resistor may generate strong noise, thus wire separately the signal lines, which are not tolerant to noise.

2) Wiring method and distance
Follow the wiring methods and distances of the dynamic brake, Braking resistor and inverter as shown on the figure 3.

3) Wiring specification

Type	Terminal name	Wire size ㎟ (AWG)	Wire type	Terminal volt size
DYNAMIC BRAKE (SIBR-23P7)	P, N, B1, B2	3.5~5.5 (12~10)	600V vinyl wire	M3.5

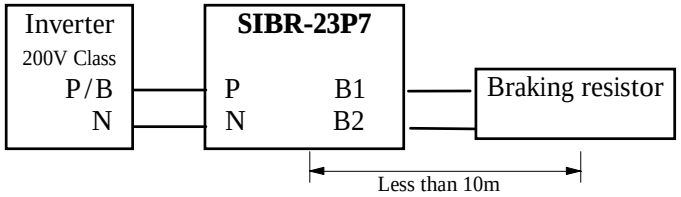


Figure 3. Wiring

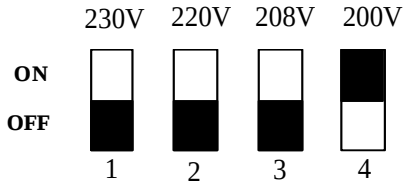
4. Braking voltage

1) Controlling the braking start voltage
The dynamic brake is related to the braking start voltage.
Refer to the Table 1. When setting the braking start voltage.

Table 1. Braking start voltage for each source voltage

Source Voltage	Braking Start Voltage (DC LINK voltage)
230V	380V
220V	365V
208V	345V
200V	330V
Note: The variance of source voltage is ±10V.	

The voltage-selection switch, 4P DIP SW., is located on the front of the dynamic brake. Turn on only one of the switch corresponding to desired braking start voltage, and turn off the rest of them.



Example of selecting 200V

5. Operation

1) Check if the required braking characteristic can be obtained.
2) Dynamic brake is operated when the inverter is starting to decelerate and the BRAKE LED (yellow) is ON at this time.
3) If the FAULT LED is ON, 1) braking resistance is higher than the rated value, or 2) output wire short occurred, or 3) the error has occurred in the braking unit.
Check the problem before restarting.

Note: High voltages in the dynamic brake may cause electric shock. Be sure to keep the cover closed when operating.

6. Specification

1) Dynamic brake and braking resistor

Inverter (CLASS 200V)	Braking resistor (unit)		Braking torque (10%ED)
Capacity HP (kW)	Specification (1 SET)	Quantity (SET)	
0.5(0.4)	70W, 200Ω	1	220%
1(0.75)	70W, 200Ω	1	125%
2(1.5)	260W, 100Ω	1	125%
3(2.2)	260W, 70Ω	1	120%
5(3.7)	390W, 40Ω	1	125%

2) Specifications of dynamic brake

Model name / Specification		SIBR-23P7 / 0.4~3.7kW 200V
Motor capacity kW (HP)		3.7 (5)
Output characteristic	Max. discharge peak current (A)	10
	Rated discharge current (A)	4
	Braking starting voltage	330/345/365/380V± 3V
	Max. hysteresis voltage error	Approximately 8V
Power	VDC	243~400V
Protection	Overcurrent protection	Protects overcurrent fuse
LED	BRAKE	Turns on when braking (Yellow LED).
	FAULT	Turns on when there is a fault (Red LED)
Installation condition	Installation site	Indoor installation to protect form corrosive gases and dust.
	Ambient temperature	+14 ~ +104°F or –10 ~ +40°C (no dew formation)
	Storage temperature	+4 ~ +140°F or –20 ~ +60°C
	Humidity	90% RH
	Vibration	1G (10 ~ 20Hz), 0.2G (20 ~ 50Hz)
Protective structure		Closed-type panel

----------MEMO----------

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