

Basic Manual of Hitachi NE-S1 series inverter

Thank you for purchasing the Hitachi NE-S1 series inverter.

Please read this document and Quick Reference Guide (QRG), and understand perfectly how to handle properly and the safety cautions of the product before operation, for safety and proper usage.

Note that this Manual is intended for each product and should be delivered to the end user of the inverter.

NT341HX

Safety precautions

Be sure to read this Basic Manual and appended documents thoroughly before installing, operating the inverter.

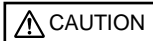
Maintenance and service items in this manual are only caution related items. Read QRG carefully before starting the maintenance and service. (QRG can be downloaded from our website(Hitachi Industrial Equipment Systems Co., Ltd.) or please contact Hitachi distributor.)

In the Basic Manual, safety instructions are classified into two levels, namely WARNING and CAUTION.



WARNING

: Indicates that incorrect handling may cause hazardous situations, which may result in serious personal injury or death.



CAUTION

: Indicates that incorrect handling may cause hazardous situations, which may result in moderate or slight personal injury or physical damage alone.

Note that even a **CAUTION** level situation may lead to a serious consequence according to circumstances. Be sure to follow every safety instruction, which contains important safety information. Also focus on and observe the items and instructions described under "Notes" in the text.



CAUTION

Many of the drawings in the Basic Manual show the inverter with covers and/or parts blocking your view being removed.

Do not operate the inverter in the status shown in those drawings. If you have removed the covers and/or parts, be sure to reinstall them in their original positions before starting operation, and follow all instructions in the Basic Manual when operating the inverter.

I . Installation



CAUTION

- Install the inverter on a non-flammable surface, e.g., metal. Otherwise, you run the risk of fire.
- Do not place flammable materials near the installed inverter. Otherwise, you run the risk of fire.
- When carrying the inverter, do not hold its front cover. Otherwise, you run the risk of injury and damage by dropping the inverter.
- Prevent foreign matter (e.g., cut pieces of wire, sputtering welding materials, iron chips, wire, and dust) from entering the inverter. Otherwise, you run the risk of fire.
- Install the inverter on a structure able to bear the weight specified in the Basic Manual. Otherwise, you run the risk of injury due to the inverter falling.
- Install the inverter on a vertical wall that is free of vibrations. Otherwise, you run the risk of injury due to the inverter falling.
- Do not install and operate the inverter if it is damaged or its parts are missing. Otherwise, you run the risk of injury.
- Install the inverter in a well-ventilated indoor site not exposed to direct sunlight. Avoid places where the inverter is exposed to high temperature, high humidity, condensation, dust, explosive gases, corrosive gases, flammable gases, grinding fluid mist, or salt water. Otherwise, you run the risk of fire.
- The inverter is precision equipment. Do not allow it to fall or be subject to high impacts, step on it, or place a heavy load on it. These may cause the inverter to fail.
- When touching the inverter, be aware of the electrostatic charge. It may cause the inverter to fail.

II . Wiring



WARNING

- Be sure to ground the inverter. Otherwise, you run the risk of electric shock or fire.
- Commit wiring work to a qualified electrician. Otherwise, you run the risk of electric shock or fire.
- Before wiring, make sure that the power supply is off. Otherwise, you run the risk of electric shock or fire.
- Perform wiring only after installing the inverter. Otherwise, you run the risk of electric shock or injury.
- The inverter must be powered OFF before you change any of the slide switch settings. Otherwise, you run the risk of electric shock or injury.



CAUTION

- Make sure that the voltage of AC power supply matches the rated voltage of your inverter. Otherwise, you run the risk of injury or fire.
- Do not input single-phase power into the three-phases input type inverter. Otherwise, you run the risk of fire.
- Do not connect AC power supply to any of the output terminals (U (T1), V (T2), and W (T3)) and ground terminal. Otherwise, you run the risk of injury or fire.
- NE-S1 series inverter do not have terminals for braking resistor. Do not connect the resistor. Otherwise there is a risk of fire.
- Connect an earth-leakage breaker to the power input circuit. Otherwise, you run the risk of fire.
- Use only the power cables, earth-leakage breaker, and magnetic contactors that have the specified capacity (ratings). Otherwise, you run the risk of fire.
- Do not use the magnetic contactor installed on the primary and secondary sides of the inverter to stop its operation.
- Tighten each screw to the specified torque. No screws must be left loose. Otherwise, you run the risk of fire.
- Make sure that earth or ground screw is tighten properly and completely.
- First, check the screws of output terminal (U (T1), V (T2) and W (T3)) are properly tighten, and then tighten the screws of input terminal (R (L1), S (L2) and T (L3))

III. Operation

WARNING

- While power is supplied to the inverter, do not touch any terminal or internal part of the inverter, check signals, or connect or disconnect any wire or connector. Otherwise, you run the risk of electric shock or fire.
- Be sure to close the front cover before turning on the inverter power. Do not open the front cover while power is being supplied to the inverter or voltage remains inside. Otherwise, you run the risk of electric shock.
- Do not operate switches with wet hands. Otherwise, you run the risk of electric shock.
- While power is supplied to the inverter, do not touch the terminal of the inverter, even if it has stopped. Otherwise, you run the risk of injury or fire.
- If the retry mode has been selected, the inverter will restart suddenly after a break in the tripping status. Stay away from the machine controlled by the inverter when the inverter is under such circumstances. (Design the machine so that human safety can be ensured, even when the inverter restarts suddenly.) Otherwise, you run the risk of injury.
- Do not select the retry mode for controlling an elevating or traveling device because output free-running status occurs in retry mode. Otherwise, you run the risk of injury or damage to the machine controlled by the inverter.
- If an operation command has been input to the inverter before a short-term power failure, the inverter may restart operation after the power recovery. If such a restart may put persons in danger, design a control circuit that disables the inverter from restarting after power recovery. Otherwise, you run the risk of injury.
- Prepare the additional emergency stop switch in addition to the stop key of the integrated operator and/or the optional operator. Otherwise, there is a danger of injury.
- If an operation command has been input to the inverter before the inverter enters alarm status, the inverter will restart suddenly when the alarm status is reset. Before resetting the alarm status, make sure that no operation command has been input.
- While power is supplied to the inverter, do not touch any internal part of the inverter or insert a bar in it. Otherwise, you run the risk of electric shock or fire.
- Run/Stop/Reset are integrated in one key, before you press the key, please make sure that the machine (facility) can be operated. Otherwise, you run the risk of injury or damage to the machine controlled by the inverter.

CAUTION

- Do not touch the heatsink, which heats up during the inverter operation. Otherwise, you run the risk of burn injury.
- The inverter allows you to easily control the speed of motor or machine operations. Before operating the inverter, confirm the capacity and ratings of the motor or machine controlled by the inverter. Otherwise, you run the risk of injury.
- Install an external brake system if needed. Otherwise, you run the risk of injury.
- When using the inverter to operate a standard motor at a frequency of over 60 Hz, check the allowable motor speeds with the manufacturers of the motor and the machine to be driven and obtain their consent before starting inverter operation. Otherwise, you run the risk of damage to the motor and machine.
- During inverter operation, check the motor for the direction of rotation, abnormal sound, and vibrations. Otherwise, you run the risk of damage to the machine driven by the motor.
- Regardless run command source (A002/A202) if the RUN/STOP/RESET key is pressed, the inverter starts running. Therefore, if you have selected Run command such as operator or terminal, please handle the RUN/STOP/RESET key after you made sure that the machine/facility can be operated safely.

IV. Maintenance, inspection, and parts replacement

WARNING

- Before inspecting the inverter, be sure to turn off the power supply and wait for 10 minutes or more. Otherwise, you run the risk of electric shock. (Before inspection, confirm that the charge lamp on the inverter is off.)
In case the power indication of the operator does not turn ON after power-up, inverter may be damaged. In that case, the inspection must be done after waiting two hours or more of the power OFF. Otherwise there is a danger of electric shock and/or injury.
- Commit only a designated person to maintenance, inspection, and the replacement of parts.
(Be sure to remove wristwatches and metal accessories, e.g., bracelets, before maintenance and inspection work and to use insulated tools for the work.) Otherwise, you run the risk of electric shock and injury.

V. Others

WARNING

- Never modify the inverter. Otherwise, you run the risk of electric shock and injury.

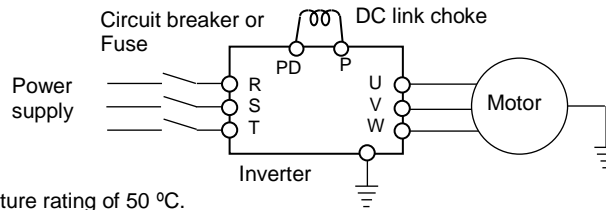
CAUTION

- Do not discard the inverter with household waste. Contact an industrial waste management company in your area who can treat industrial waste without polluting the environment.

Precautions Concerning Compliance with UL and cUL Standards

(Standard to comply with: UL508C, CSA C22.2 No.14-05)

Wiring diagram of inverter



- a) Maximum surrounding air temperature rating of 50 °C.
- b) Solid state motor overload protection reacts with max. 150 % of FLA.
- c) Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes, 240 Volts maximum. For models 200 V class.
Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes, 480 Volts maximum. For models 400 V class.
- d) Drive has no provision for motor over temperature protection.
- e) When protected by J, CC, G or T Class Fuses. Or when protected by a circuit breaker having an interrupting rating not less than 100,000 rms symmetrical amperes, 240 Volts maximum. For models 200 V class.
When protected by J, CC, G or T Class Fuses. For models 400 V class.
- f) Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.
- g) Install device in pollution degree 2 environment.
- h) Branch circuit short circuit protection can use fuse or circuit breaker only. For models 200 V class.
Branch circuit short circuit protection can use fuse only. For models 400 V class.
- i) Use 60/75 °C CU wire only.
- j) Tightening torque and wire range as shown in the table below.

Model No.	Required Torque (N·m)	Wire Range(AWG)
NES1-002S, 004S	0.8 to 1.0	16 to 14
NES1-007S	1.8	14 to 12
NES1-015S	1.8	12 to 10
NES1-022S	1.8	10
NES1-002L, 004L, 007L	0.8 to 1.0	16 to 14
NES1-015L	1.8	14
NES1-022L	1.8	12
NES1-004H, 007H, 015H	1.8	16
NES1-022H, 040H	1.8	14

- k) Distribution fuse and circuit breaker size marking is included in the manual to indicate that the unit shall be connected with a listed cartridge nonrenewable fuse or inverse time circuit breaker, rated 600 VAC with the current ratings as shown in the table below.

Model No.	Fuse		Circuit Breaker	
	Type	Maximum Rating	Type	Maximum Rating
NES1-002S, 004S	Class J, CC, G or T	10 A	Inverse Time	15 A
NES1-007S		20 A		
NES1-015S, 022S		30 A		
NES1-002L*, 004L*	Class J, CC, G or T	10 A	Inverse Time	15 A
NES1-007L*, 015L		15 A		
NES1-022L		20 A		
NES1-004H, 007H, 015H, 022H, 040H	Class J, CC, G or T	15 A	-	-

* In case of using Circuit Breaker, an additional 5 A external protector is needed.

Supplement of Cautions for UL and cUL

Note (* mark) of item k): when a breaker is used in NES1-002L/004L/007L, a breaker of 15 A and a protector (breaker) of 5 A in series is additionally required by the NEC (National Electrical code) standard in US.

Precautions Concerning Electromagnetic Compatibility (EMC)

Please refer to "Chapter1 Safety Instructions" of QRG (NT3411*X) for the detail. (***) shows QRG Version No.)

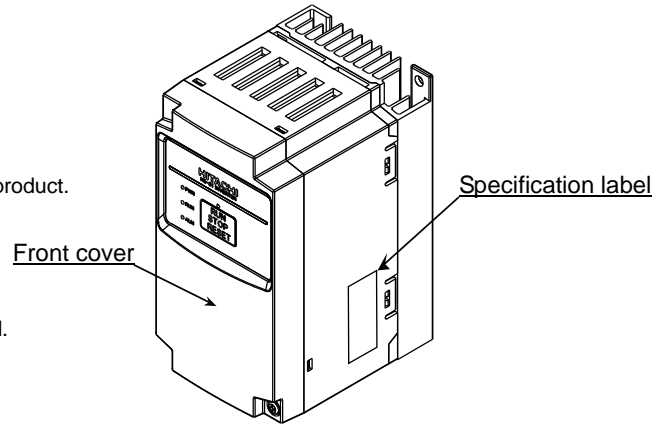
1. Overview

1.1 Inspection at unpacking

Please check the followings after unpacking.

Please contact distributors if there are any problems such as noted below on the product.

- (1) Check the product for damage caused during transportation.
- (2) Check the product package contains an inverter set and this Basic Manual (English and Japanese).
- (3) Check the specification label to confirm that the product is the one you ordered.



Model name, Ver.No. (NES1-002SB example) *** Restricted Distribution C: China E: Europe None: Other	
Input	Frequency Voltage Phase Current
Output	Frequency Volt. & phase Current
Manufacturing number	

HITACHI		INVERTER
Model: NES1-002SB*		Ver. 2.0
Input : 50Hz, 60Hz	200-240 V 1Ph	3.1 A
	50Hz, 60Hz	V 3Ph
Output : 0, 5-400Hz	200-240 V 3Ph	1.4 A
MFG No. 5816200716000001		Date: 1508
Hitachi Industrial Equipment Systems Co., Ltd.	HINC	NE18158-011

Example of the specification label

1.2 Basic Manual (this document)

This Basic Manual is for NE-S1 series inverters.

Read this manual carefully for the proper operation of the product. Please keep this manual for future usage.

Please refer to QRG for the further detailed information. QRG can be downloaded from below website.

HP address: <https://www.hitachi-ies.co.jp/english/products/inv/nes1/>

When you use any options, please refer to the manual of each option.

The contents of this manual are subject to change without prior notice.

1.3 In case of contact

For an inquiry about product damage or faults or a question about the product, notify your supplier of the following information.

- (1) Model name of the inverter
- (2) Version number (If there is no version number on the specification label, then Ver.1.0.)
- (3) Manufacturing number (MFG No.)
- (4) Date of purchase
- (5) Contents of your inquiry
 - Damaged portion and condition, and else

1.4 Warranty Terms

The warranty period under normal installation and handling conditions shall be two (2) years from the date of manufacture, or one (1) year from the date of installation, whichever occurs first. The warranty shall cover the repair or replacement, at Hitachi's sole discretion, of ONLY the inverter that was installed.

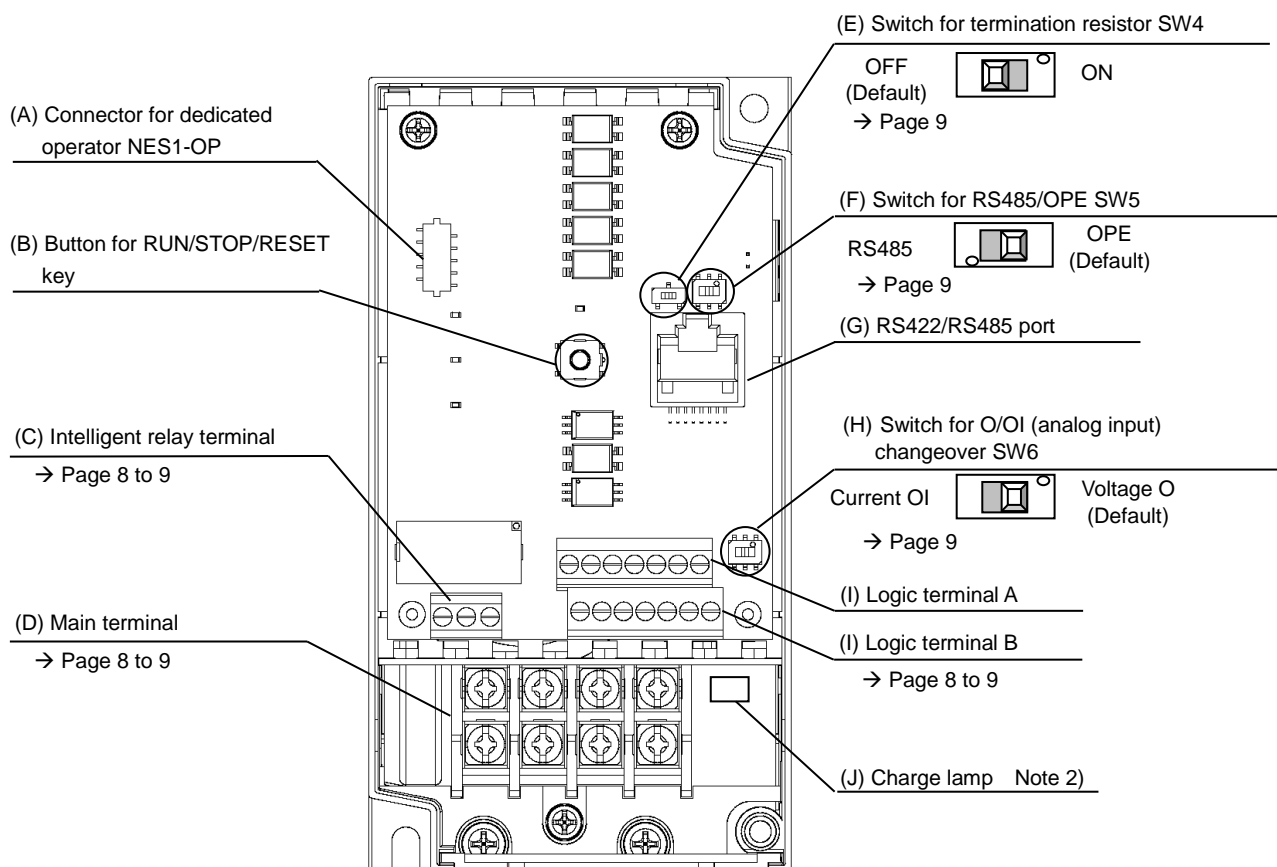
1. Service in the following cases, even within the warranty period, shall be charged to the purchaser:

- a. Malfunction or damage caused by miss-operation or modification or improper repair
- b. Malfunction or damage caused by a drop after purchase and transportation
- c. Malfunction or damage caused by fire, earthquake, flood, lightening, abnormal input voltage, contamination, or other natural disasters

2. When service is required for the product at your work site, all expenses associated with field repair shall be charged to the purchaser.

3. Always keep this manual handy; please do not lose it. Please contact your Hitachi distributor to purchase replacement or additional manuals.

2. Name of each portion (removed the front cover)



Name	Description
(A) Connector for dedicated operator NES1-OP	Dedicated operator for NE-S1 (NES1-OP) can be connected on this connector.
(B) Button for RUN/STOP/RESET key	Button for RUN/STOP/RESET key on the standard panel. Note 1)
(C) Intelligent relay terminal	Output terminal for intelligent relay (1c-contact).
(D) Main terminal	For connecting power supply, motor output and DC link choke.
(E) Switch for termination resistor SW4 Note 5)	Switch for integrated termination resistor (120 Ω) for RS485. Integrated resistor of 120 Ω is connected when switched ON.
(F) Switch for RS485/OPE SW5	RS485 communication or OPE (RS422) communication can be selected using this changeover switch.
(G) RS422/RS485 port (RJ45) Note 3) Note 4)	Connector for RS422 communication (external operator) or RS485 communication (Modbus-RTU).
(H) Switch for O/OI (analog input) changeover SW6	Voltage input (O) or current input (OI) can be selected using this changeover switch.
(I) Logic terminal A,B	Terminal for connecting input/output signals (digital/analog) for the inverter control.
(J) Charge lamp	Turns ON when the internal DC bus voltage is 45 V or more. In case of wiring, maintenance or else, please be sure to check that this lamp is turned OFF after waiting 10 minutes of power OFF.

Note 1) Refer to page 13 for the description of the standard panel display and key operation.

Note 2) Position of (J) charge lamp depends on the model. Refer to page 11 for the details.

Note 3) Pay attention when operating by PC via (G) RS422/RS485 port, as the operation can also be done from the panel of the inverter.

Note 4) Be sure to turn power OFF the inverter when connecting or disconnecting the operator such as OPE-SRmini, OPE-S/SR/SBK, SOP, SOP-VR, WOP to the (G) RS422/RS485 port.

Note 5) When RS485 communication becomes unstable, Please do not use the termination resistor of the inverter. Please use a termination resistor suitable for your environment.

3. Cautions for installation

(1) Caution during transportation

Please pay attention when carrying the product as it is covered by a plastic case.

Especially, do not put pressure onto the front cover. Otherwise there is a risk of damaging the product.

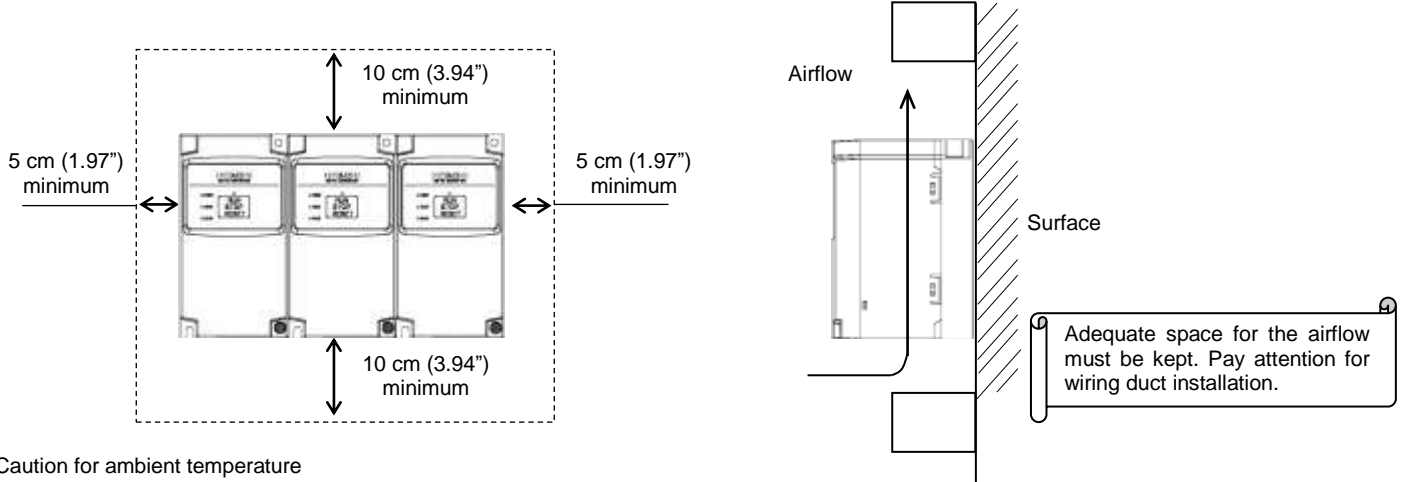
Please do not use products that are damaged, and/or lacking components.

(2) Ensuring Adequate Ventilation

The inverter has heat (up to about 150°C). Since there is a risk of fire, install it on the vertical wall surface of the iron plate. As shown in the figure below, secure a space of 10 cm in the vertical direction and 5 cm in the horizontal direction so as not to block the ventilation of cooling. In particular, if a heating element (reactor, etc.) is nearby, keep it far enough away.

It is possible to install multiple NE-S1 inverters side by side in the cabinet (* side-by-side installation), at this time, the ambient temperature of the installation location is 40°C or less, and derating of carrier frequency and output current for the inverter is required.

(This installation of the method of "Side-by-Side" cannot be performed at the time of the UL standards to comply.)



(3) Caution for ambient temperature

Verify ambient temperature at installation site is within the standard specification range (-10 to 50 °C, refer to page 15). Measure ambient temperature 5 cm (1.97") from the bottom center of inverter main body and confirm that it is within the allowable temperature range.

Using the inverter at higher temperature than allowable temperature may result in shortening of lifetime of inverter (especially of electrolytic capacitors and cooling fan). A derating curve is shown on QRG (Please refer to the website).

(4) Caution for ambient humidity

Use the inverter within the allowable humidity range (20 to 90 %RH) described in standard specifications (refer to page 15).

Especially, please use it in place where no condensation occurs. If condensation occurs and beading is generated inside the inverter, electronic parts are short-circuited each other to cause a failure.

(5) Caution for installation environment

Please avoid installing the inverter in such places where dust, corrosive gas, explosive gas, flammable gas, mist of grinding fluid, or salt pollution, etc. exists. Also, please avoid installing the inverter in direct sunlight.

Invasion of dust, dirt etc. into the inverter may cause a failure. So, when you use it in dusty place by necessity, please devise a countermeasure such as putting it into a closed type cabinet.

WARNING

- Do not open the front cover during operation.

CAUTION

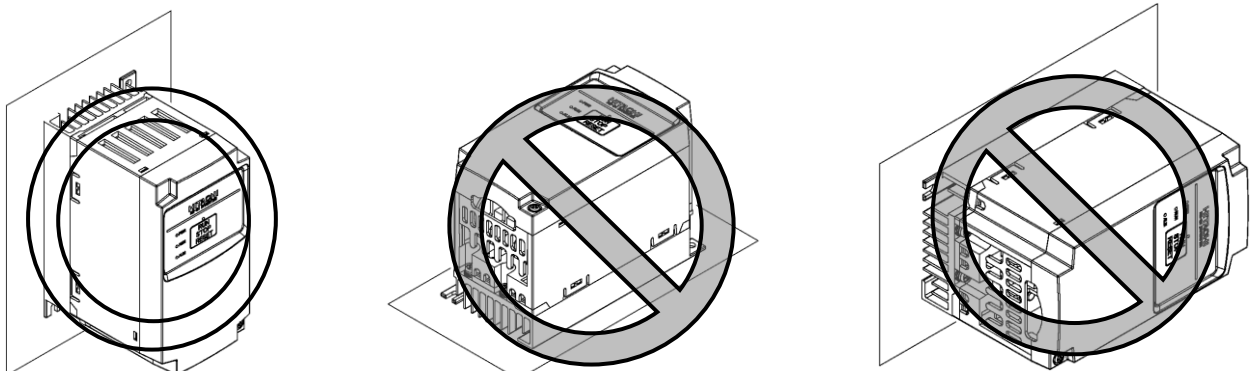
- Reduction of the carrier frequency or using bigger kW model is required if depends on the load or ambient temperature.

(6) Cautions for installation direction

Surface of the installation must be no vibration, and should be capable of holding the weight of the product. And the product must be fixed to the surface with proper screws in a vertical direction. Be sure to screw using all the screw holes for the installation.

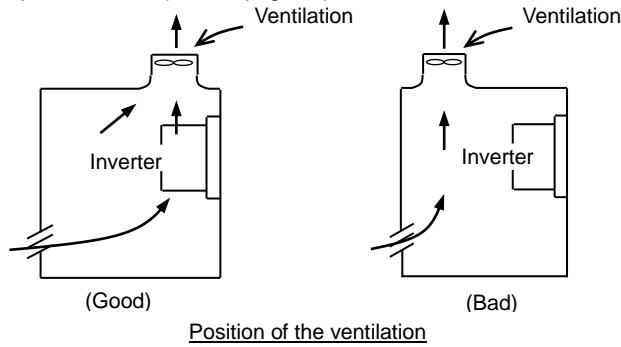
(002L/S, 004L/S, 007L : 2 positions, 007S, 015L/S, 022L/S, 004H, 007H, 015H, 022H, 040H : 4 positions)

There is a risk of performance failure, and/or breakdown when the product is not installed vertical direction.



(7) Cautions for installation into the cabinet

Please pay attention to the location of the ventilation holes of the inverter and the cabinet, in case of side-by-side installation and using ventilation fan. Cooling performance of the inverter highly depends on the location of the holes. Please pay high attention to the ambient temperature of the inverter to be less than the specified value (refer to page 15).



(8) Watt Loss

single phase / three phases 200 V class, three phases 400 V class

Model name	002S/L	004S/L	007S/L	015S/L	022S/L	004H	007H	015H	022H	040H
Watt Loss (100 % load)(W)	22	30	48	79	104	35	56	96	116	167
Efficiency at rated load (%)	90	93	94	95	95.5	92	93	94	95	96

4. Wiring

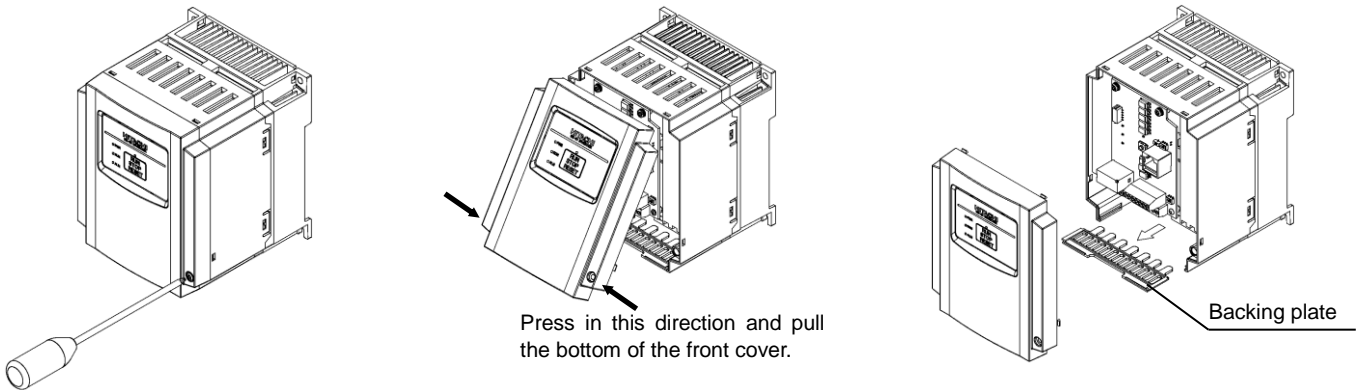
4.1 How to attach and remove the front cover

(1) How to remove

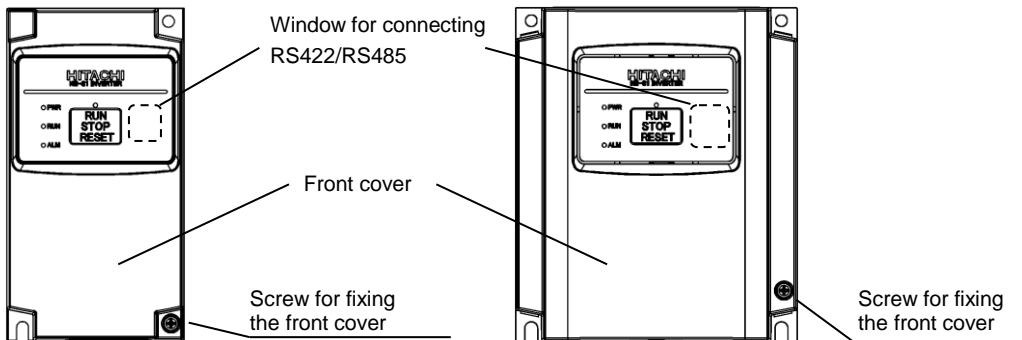
1. Loosen up the screw for fixing the front cover.

2. Remove the front cover by pressing the bottom side of the cover to the direction shown below.

3. Remove the backing plate like shown below in case of wiring.



Screw for fixing the front cover is located at right-bottom side



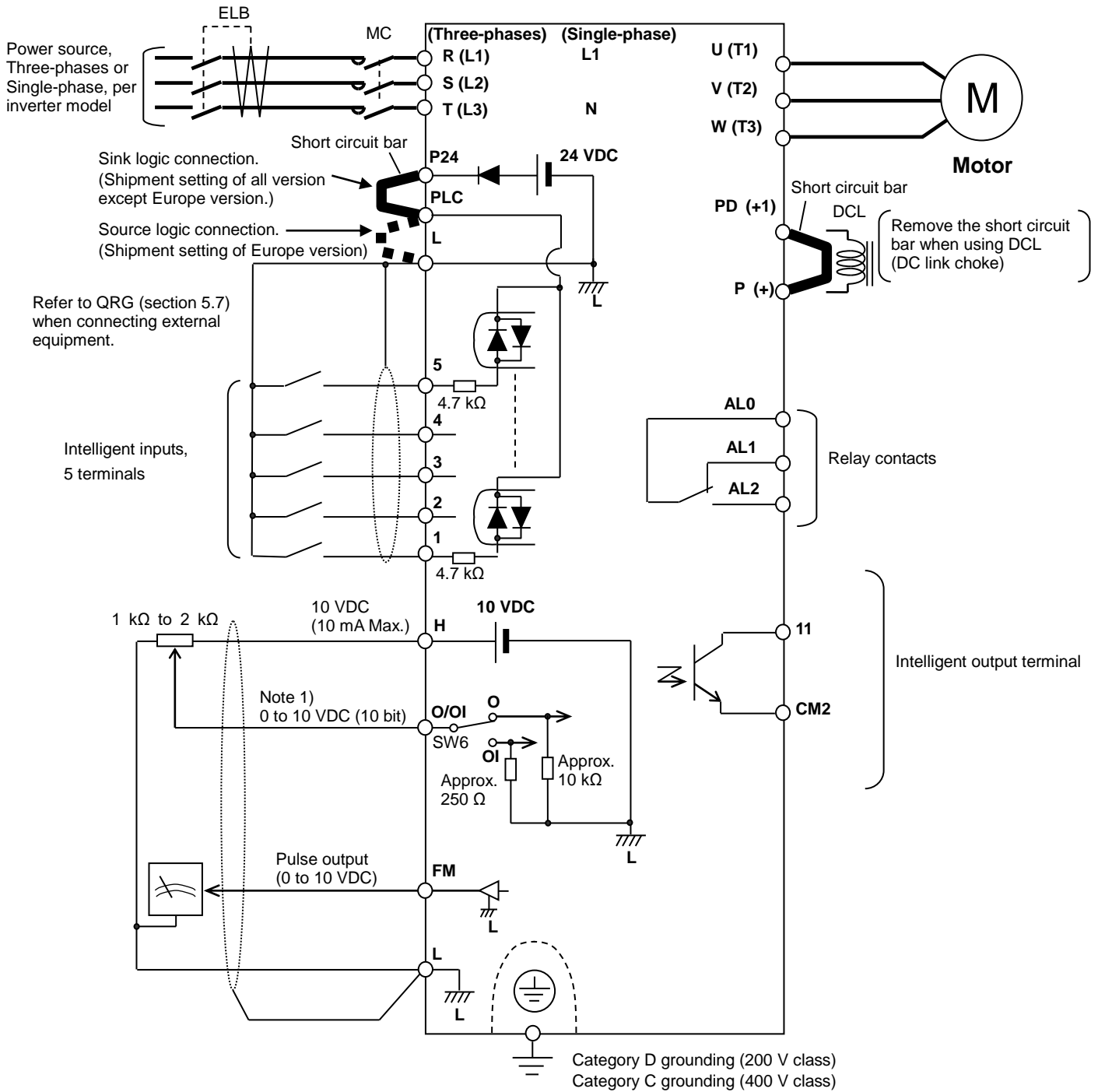
(2) It is necessary to make window on the front cover when using remote operator (OPE-SRmini, OPE-S/SR/SBK, SOP, SOP-VR, WOP), Modbus-RTU, or PC software (ProDriveNext). See above for the position of the window.

- Be sure to make window after removing the front cover.
- There are cutouts at the window, so it can be removed easily by pressing up side and bottom side of the window alternatively.
- The window cannot be restored if it is once opened. Please use commercially supplied RJ45 connector cap or the like if necessary.

(3) How to attach

- On the reverse step of removing the cover, press the front cover to the main body until there is a click sound.
- Do not tighten the screw for fixing the front cover too much.

4.2 Wiring and terminal description



Note 1) Above shows an example of voltage (O) input. Changeover of SW6 must be done in case of current (OI) input. (Refer to page 9).

(1) Main terminal description

Symbol	Name	Description
R (L1) (single phase : L1)	Power input terminals	Connect power supply. - Use [L1] and [N] terminal in case of single phase 200 V model power supply.
S (L2)		
T (L3) (single phase : N)		
U (T1)	Inverter output terminals	Connect three phases motor.
V (T2)		
W (T3)		
PD (+1)	DC link choke connection terminals	First, remove the short circuit bar between PD (+1) and P (+) terminals. Then connect optional DC link choke for improving the input harmonics.
P (+)		
G (⊕)	Ground terminal	To make grounding. Be sure to make this grounding to avoid electric shock, and for improving the EMC performance. The terminal is located on the heatsink.

(2) Control terminal description

Category	Symbol	Name	Description	Electrical characteristics	
Analog	Power supply	L	Common for input signals	Common for internal control power supply, digital inputs, analog inputs, digital pulse output.	
		H	Power supply for external potentiometer	10 VDC power supply. Used with variable resistor for O/OI input.(SW6 needs to be on the voltage side)	Max.10 mA withdraw
	Freq. set	O/OI	Analog voltage (Use SW6 for changeover)	Frequency set via 0 to 10 VDC input.	Input impedance approx.10 kΩ Allowable range : -0.3 to +12 VDC
			Analog current (Use SW6 for changeover)	Frequency set via 0 to 20 mA input. Parameter adjustment should be done in case of 4 to 20 mA.	Input impedance approx.250 Ω Allowable range : 0 to 24 mA
Digital	Power supply	L	Common for input signals	Common for internal control power supply, digital inputs, analog inputs, digital pulse output (sink logic).	
		P24	Power supply for digital inputs	24 VDC power supply for contact input signals. (Common terminal in case of source logic)	Max.100 mA output
		PLC	Power supply terminal for input terminals	Sink logic : connected to P24 Source logic : connected to L Remove the short circuit bar when using external power supply for controlling the dry contact inputs. (Refer to QRG 5.7)	

Category	Symbol	Name	Description	Electrical characteristics	
Digital	Input	Contact	5	Intelligent input terminals	Select 5 input functions from 35 available input functions when can be assigned to any terminal 1 to 5. Sink or source logic can be selected. Refer to section 7.3 of QRG for the details.
			4		
			3		
			2		
			1		
	Output	Open-collector	11	Intelligent output terminal	One output function from 28 available output functions can be assigned. Refer to section 7.3 of QRG for the details.
CM2			Common for intelligent output terminal	Common for the intelligent output terminal 11.	Max. allowable current 50 mA
Relay		AL0 AL1 AL2	Intelligent relay outputs	One function from 28 available output functions can be assigned. (1c-contact) Refer to section 7.3 of QRG for the details.	Max. contact capacity AL1-AL0 : 250 VAC, 30 VDC AC : 2 A(resistive), 0.2 A(inductive) DC : 3 A(resistive), 0.6 A(inductive) AL2-AL0 : 250 VAC, 30 VDC AC : 1 A(resistive), 0.2 A(inductive) DC : 1 A(resistive), 0.2 A(inductive) Min. contact capacity 100 VAC, 10 mA 5 VDC, 100 mA

(3) Changeover switch description

Refer to page 5 for the location of the switches.



- Adjustment of the switch must be done during power off. Otherwise there is a risk of electric shock.
 - Power ON must be done after closing the front cover. Do not open the front cover during power up, or when there is a remaining voltage.
- There is a risk of electric shock.

Symbol	Name	Description
SW4	Switch for termination resistor	Select able/disable of the termination resistor of RS485 port (RJ45)
		OFF (left side) Termination resistor (120 Ω) Disable (Default)
		ON (right side) Termination resistor (120 Ω) Able
SW5	Switch for RS485/OPE	Select depending on the options and communication method, connected to RS422/RS485 port.
		OFF (right side) For remote operator (OPE-SRmini, OPE-S/SR/SBK, SOP, SOP-VR, WOP), ProDriveNext (Default)
		ON (left side) For RS485 communication (Modbus-RTU)
SW6	Switch for O/OI (analog input) changeover	Select analog input method either voltage input (O) or current input (OI).
		OFF (left side) Current input (0 to 20 mA) OI
		ON (right side) Voltage input (0 to 10 VDC) O (Default)

4.3 Mains wiring

(1) Cautions on wiring

Be sure to confirm that the charge lamp is turned OFF before the wiring work.

Once it is powered up, there will be a remaining voltage at the DC bus capacitor for a certain period regardless the motor operation.

Wiring work must be done 10 minutes after the power OFF, and after confirming the safety of personnel.

In case the power indication of the operator does not turn ON after power-up, inverter may be damaged. In that case, the wiring must be done after waiting two hours or more of the power OFF. Otherwise there is a danger of electric shock and/or injury.

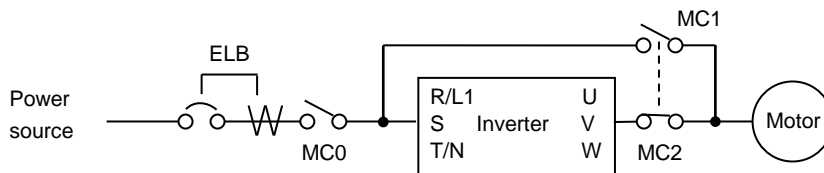
1. Main input terminals (R/L1, S, T/N)

- Use earth leakage breaker (ELB) for protection between power supply and input terminals (R/L1, S, T/N).
- The ELB is recommended to have bigger capability for the high frequency sensitivity, so to avoid malfunction.

Distance between inverter and motor	Cutoff current of ELB
100 m or less	30 mA
300 m or less	100 mA
800 m or less	200 mA

[Rough indication of earth leakage current] 30 mA/km: use CV cable with metallic tube. Leakage current will be approximately 8 times more when using HIV cable. Therefore, it is recommended to use the ELB of which the rated sensitivity current is 8 times as high as that given in the left table. Previously mentioned "leakage current" is based on the RMS value of fundamental wave, excluding harmonic current.

- There is a possibility that the malfunction or failure of the customer's system when the protection circuit of the inverter is activated. Please use magnetic contactor to shutoff the inverter power supply.
- Do not turn power ON and OFF by the magnet contactor at the primary side or secondary side of the inverter to start and stop the motor. Use operation command (FW, RV) from the control input terminal in case of using external signal.
- Do not use the three phases input type inverter with single phase input (phase loss). Otherwise there is a risk of inverter failure. Single phase input to the three phases type inverter will result in an undervoltage, overcurrent, or will result in a damage of the inverter. DC bus capacitor will be charged even under phase loss and it is dangerous. Refer to "(1) Cautions on wiring" for the wiring.
- There is a risk of breakdown of the internal converter module, and/or shortening drastically the lifetime of DC bus capacitors due to an increase of the ripple current. Especially, if high reliability is required on the system, use AC reactor between power supply and inverter. And if bad weather, such as thunderstorms are expected, use appropriate lightning protection equipment.
 - Unbalance at the input voltage (3 % or more)
 - The power supply capacity is 500kVA or more, and 10 times more than the inverter capacity
 - Rapid voltage change is expected
- (Example)
 - 2 or more inverters are connected at the same net with short cable.
 - Inverter is connected in parallel with the thyristor equipment with short cable.
 - Phase-advancing capacitor is switching on a same net
- Frequency of the power ON/OFF must be once/3 minutes or longer interval. Otherwise there is a danger of inverter failure.
- An inverter run by a private power generator may overheat the generator or suffer from a deformed output voltage waveform of the generator. Generally, the generator capacity should be 5 times greater than that of the inverter (kVA) in a PWM control system, or 6 times greater than that of the inverter (kVA) in a PAM control system.
- In the case of important equipment, to shorten the non-operational time of inverter failure, please provide a backup circuit by commercial power supply or spare inverter.
- In case of commercial power source switching functionality, the contacts of MC1 and MC2 must be mechanically interlocked with each other. Otherwise you may damage the inverter and the danger of injury and/or fire. Please refer to following diagram.



2. Inverter output terminals (U (T1), V (T2), and W (T3))

- Use larger gauge cable leads than the specified applicable cable (refer to following "(3) Recommended cable gauges and accessories") for the wiring of output terminals to prevent the output voltage drop between the inverter and motor. Especially at low frequency output, a voltage drop due to cable resistance will cause the motor torque to decrease.
- Do not connect a phase-advancing capacitor or surge absorber on the output side of the inverter. If connected, the inverter may trip or the phase-advancing capacitor or surge absorber may be damaged.
- If the cable length between the inverter and motor exceeds 20 m (especially in the case of 400 V class models), the stray capacitance and inductance of the cable may cause a surge voltage at motor terminals, resulting in a motor burnout. A special filter to suppress the surge voltage is available. If you need this filter, contact your supplier or local Hitachi Distributor.
- When connecting multiple motors to the inverter, connect a thermal relay to the inverter output circuit for each motor.
- The RC rating of the thermal relay must be 1.1 times as high as the rated current of the motor. The thermal relay may go off too early, depending on the cable length. If this occurs, connect an AC reactor to the output of the inverter.

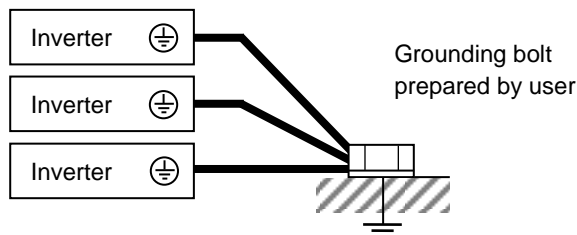
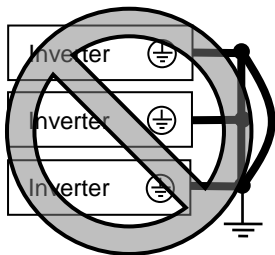
3. DC link choke connection terminals (PD (+1) and P (+))

- Use these terminals to connect the optional DC link choke (DCL).
As the factory setting, terminals P (+) and PD (+1) are connected by a short circuit bar. Remove this to connect the DCL.
- The cable length between the inverter and DCL must be 5 m or less.

Remove the short circuit bar only when connecting the DCL.
If the short circuit bar is removed and the DCL is not connected, power is not supplied to the main circuit of the inverter, and the inverter will not operate.

4. Ground terminal (G ⊕)

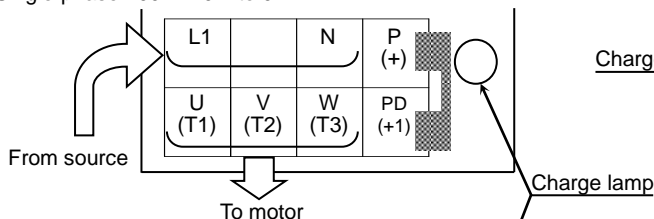
- Be sure to ground the inverter and motor to prevent electric shock.
- When grounding the inverter, refer to the relevant regulations such as IEC60364.
- Use a grounding cable thicker than the specified applicable cable (refer to following “(3) Recommended cable gauges and accessories”), and make the ground wiring as short as possible.
- When grounding multiple inverters, avoid a multi-drop connection of the grounding route and formation of a ground loop, otherwise the inverter may malfunction.



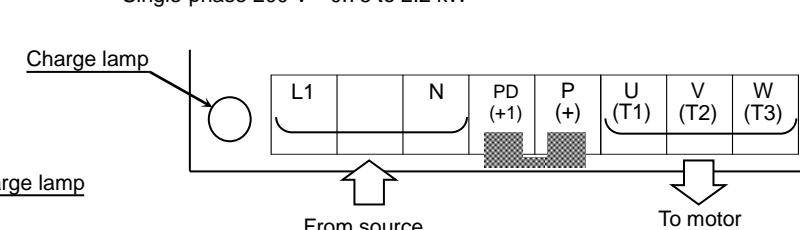
(2) Layout of main terminal

The figures below show the terminals layout on the main terminal block of the inverter.
In case of wiring to the main terminal block, open the front cover and remove the backing plate.

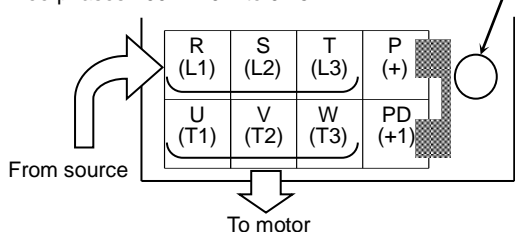
Single-phase 200 V 0.2 to 0.4 kW



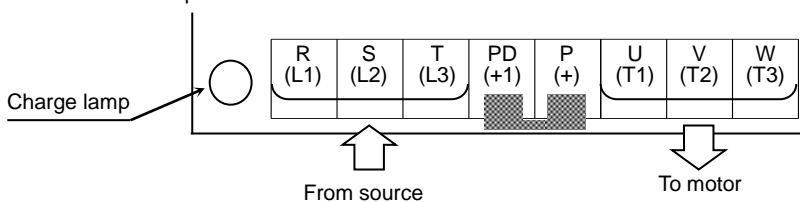
Single-phase 200 V 0.75 to 2.2 kW



Three-phases 200 V 0.2 to 0.75 kW



Three-phases 200 V 1.5, 2.2 kW
Three-phases 400 V 0.4 to 4.0 kW



(3) Recommended cable gauges and accessories

The table below lists the specifications of cables, crimp terminals, and terminal screw tightening torques for reference.

Input Voltage	Motor output (kW)	Applicable inverter model NES1-□□□□** Note8)	Wiring			Accessories Note1)		
			Gauge of power line cable (mm ²) Note3), Note4), Note6)	Size of terminal screw (Terminal width (mm))	Tightening torque (N·m) Note6)	Earth-leakage breaker (ELB) Note2), Note5), Note6)	Magnetic contactor (MC) Note2)	Fuse (UL-rated, class J, 600 V) Note6)
Single-phase 200V	0.2	002S	AWG14 (2.0)	M3.5 (7.6)	1.0	EB-30E (5 A)	HS10	10 A
	0.4	004S	AWG14 (2.0)	M3.5 (7.6)	1.0	EB-30E (10 A)	HS10	10 A
	0.75	007S	AWG14 (2.0)	M4 (10)	1.4	EB-30E (15 A)	HS10	15 A
	1.5	015S	AWG10 (5.5)	M4 (10)	1.4	EB-30E (20 A)	HS20	20 A
	2.2	022S	AWG10 (5.5)	M4 (10)	1.4	EB-30E (20 A)	HS20	30 A
Three-phases 200V	0.2	002L	AWG16 (1.25)	M3.5 (7.6)	1.0	EB-30E (5 A)	HS10	10 A
	0.4	004L	AWG16 (1.25)	M3.5 (7.6)	1.0	EB-30E (10 A)	HS10	10 A
	0.75	007L	AWG16 (1.25)	M3.5 (7.6)	1.0	EB-30E (10 A)	HS10	15 A
	1.5	015L	AWG14 (2.0)	M4 (10)	1.4	EB-30E (15 A)	HS10	15 A
	2.2	022L	AWG14 (2.0)	M4 (10)	1.4	EB-30E (20 A)	HS20	20 A
Three-phases 400V	0.4	004H	AWG16 (1.25)	M4 (10)	1.4	RXK60-S (5 A)	HS10	10 A
	0.75	007H	AWG16 (1.25)	M4 (10)	1.4	RXK60-S (10 A)	HS10	10 A
	1.5	015H	AWG16 (1.25)	M4 (10)	1.4	RXK60-S (10 A)	HS10	10 A
	2.2	022H	AWG14 (2.0)	M4 (10)	1.4	RXK60-S (15 A)	HS10	15 A
	4.0	040H	AWG14 (2.0)	M4 (10)	1.4	RXK60-S (15 A)	HS10	15 A

- Note 1) The accessories described here are applicable when the inverter connects a standard Hitachi three-phases, 4-pole squirrel-cage motor.
 Note 2) Select breakers that have proper capacity. (Use breakers that comply with inverters.) Select above proper ELB capacity following above table for the 1pc inverter. Only 1 inverter must be supplied by the above proper ELB.
 Note 3) If the power line exceeds 20 m, cable that is thicker than the specified applicable cable must be used for the power line.
 Note 4) Use copper electric wire (HIV cable) of which the maximum allowable temperature of the insulation is 75 °C.
 Note 5) Use earth-leakage breakers (ELB) to ensure safety.
 Note 6) To comply UL, please refer to page 3 “1.3 Precautions Concerning Compliance with UL and cUL Standards”.
 Note 7) The ground or earthed line should be a larger gauge than electric supply wire diameter used in the power line.
 Note 8) The “**” part depends on the option equipment and destination.

5. Operation

5.1 Confirmation before power up the inverter

Please confirm the followings before operation.

- (1) Connection of the power input (three-phases: R (L1), S (L2), T (L3), single-phase: L1, N) and power output (U (T1), V (T2), W (T3)) are correctly connected. Otherwise there is a risk of inverter failure.
- (2) There must be no incorrect-connection of the control wiring. Otherwise there is a risk of inverter failure.
- (3) Make sure the ground terminal is securely grounded. Otherwise there is a risk of electric shock.
- (4) Make sure that all terminals other than the ground terminal are not grounded. Otherwise there is a risk of inverter failure.
- (5) There must be no short circuit such as wire strands or chips etc., there must be no tools left inside the inverter. Otherwise there is a risk of inverter failure.
- (6) There must be no short circuit or ground fault at the output side. Otherwise there is a risk of inverter failure.
- (7) The front cover must be closed. When using the RS422/RS485 port, please use to open the window of the front cover. Otherwise there is a risk of inverter failure.

5.2 Changing parameters

One of the followings is required when changing parameters on NE-S1 series inverters.

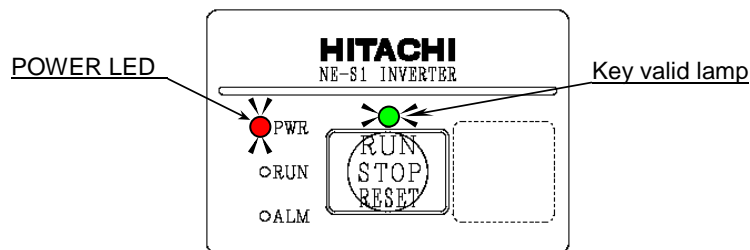
- (1) Dedicated operator (NES1-OP)
The operator (NES1-OP) is used with integration onto the inverter. It is not possible to use the operator external with cable.
- (2) Digital operator (OPE-SRmini, OPE-S/SR/SBK, SOP, SOP-VR)
Digital operator can be used with connector cable (ICS-1, 3) and connected to the RS422/RS485 port (RJ45) in the inverter. Turn the changeover switch SW5 to the operator side (OFF side) in that case (See page 9). Refer to the manual for each operator for the detailed information.
- (3) 5-line LCD operator (WOP)
WOP having serial number of "16918938000081" or later (2011/07 production) are applied to NE-S1 series inverter. (English only)
WOP can be used with connector cable (ICS-1, 3) and connected to the RS422/RS485 port (RJ45) in the inverter. Turn the changeover switch SW5 to the operator side (OFF side) in that case (See page 9). Refer to the manual for WOP for the detailed information.
- (4) Inverter setting software (ProDriveNext)
ProDriveNext Version "Hitachi Inverter tool 1.2.33.010" and later are applied to the NE-S1 series inverter.
ProDriveNext Version "Hitachi Inverter tool 2.2.6.2" and later are applied to the NE-S1 series inverter Ver.2.0.
PC can be used with USB/RS422 conversion cable and connected to the RS422/RS485 port (RJ45) in the inverter. Turn the changeover switch SW5 to the operator side (OFF side) in that case (See page 9). Refer to the manual for ProDriveNext for the detailed information.

NOTE: It is necessary to turn power off to store the changed data.

5.3 Power up the inverter

Following this chapter, we will introduce a driving example when the standard is connected. For dedicated operator (NES1-OP), digital operators, WOP, Modbus Communication, and operating procedure with ProDriveNext, refer to QRG 6.4 and later.

- (1) Power up the inverter after confirming the items shown in above section "5.1 Confirmation before power up the inverter".
- (2) Confirm both POWER LED and Key valid lamp are emitting like shown below.
- (3) Refer to section "5.4 How To Operate the Inverter" and then refer to section "5.5 Motor operation".

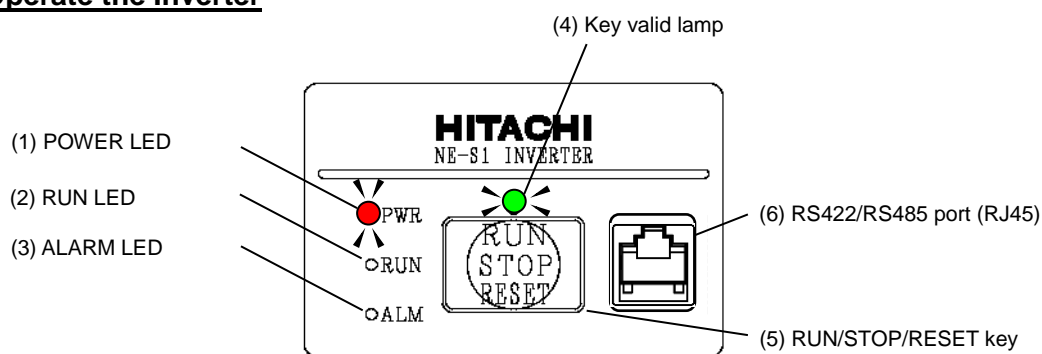


LED emitting condition with normal startup.
(Standard panel)

Note 1) It will take around 1.5 seconds for the inverter to be ready (each LED emits). Please take in account this delay for applications, for which this delay will be important.

5.4 How To Operate the Inverter

Standard panel



Name	Description
(1) POWER LED	- Turns ON (red) during the inverter is powered up.
(2) RUN LED	- Turns ON (green) during inverter operation. (This turns ON either RUN command is given, or the inverter is giving out power. Therefore it keeps turning ON during 0 Hz driving, or keeps turning ON during deceleration period even after the RUN command is OFF.)
(3) ALARM LED	- Turns ON (red) when the inverter is in trip status. - Refer to section 6.8 of QRG how to reset the trip status.
(4) Key valid lamp	- Turns on (green) when the RUN/STOP/RESET is ready. It turns off when there is a RUN command. If the run command is being given from the RUN/STOP/RESET key, the lamp is being on during deceleration period even after the run command is OFF. While Run command is given such as FW(RV) terminal, if "RUN/STOP/RESET key" was pressed, even Run command is OFF, the "Key valid lamp" is OFF until inverter is Stopped.
(5) RUN/STOP/RESET key	- Makes inverter run, stop and reset. RUN/STOP/RESET key is set valid in default settings and it can be made invalid by the button sensitivity selection (C151) to "no". - Restores from the trip state if the inverter is in trip state. - If the ModBus communication is selected, it can be temporary changed to a remote operator mode if the inverter is powered up with pressing the RUN/STOP/RESET key and keep it pressing 5seconds, and take off from the key. Changeover switch must be changed later on. Note 1)
(6) RS422/RS485 port (RJ45)	- This is a port for external operator, Modbus connection, or ProDriveNext (RS485/operator changeover switch must be operated). In case of Modbus communication, it is necessary to set the changeover switch and parameter (C070). Display of NES1-OP will be according to the parameter set of b150 continuously, if the external operator is connected while the dedicated operator (NES1-OP) is integrated. Note2)

Note 1) It is necessary to set changeover switch SW5 and the parameter C070 for releasing the Modbus communication. If the parameter C070 is set to "01(Modbus)", external operator via the RS422/RS485 port (RJ45) cannot be used.

Note 2) Connecting to the RS422/RS485 port (RJ45) must be done during the inverter power OFF.

5.5 Motor operation

Both "RUN command" and "frequency command" are necessary to run the motor. Motor does not run if one of each is missing. For example, if a frequency command is 0 Hz, motor will not run even if a RUN command is given. Additionally, the motor will not run if a FRS (free run stop) signal (and the like) is being given.

NE-S1 series inverter has following way to set the RUN command and frequency command. (This is an example of sink logic and uses internal control power supply.)

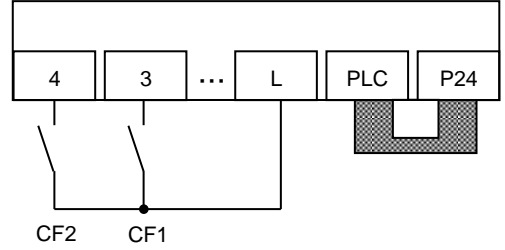
RUN/STOP/RESET key on the standard panel is effective regardless of the setting of the RUN command source (A002).

Thus, the following operation methods (1) to (3) are possible without an option if it is an initial value.

(1) Method to perform driving in RUN/STOP/RESET key and perform frequency setting in multi-speed select

This is the operation method using RUN command is given by "RUN/STOP/RESET key" & frequency setting is given by fixed value such as 20/40/60 Hz, Accel&Decel times are 10 seconds. (If you don't need to change parameters such as Accel&Decel times, the optional operator is not required.) To use the frequency setting, use the multi-speed frequency 1 (60 Hz), frequency 2 (40 Hz) and frequency 3 (20 Hz) in default setting.

Control circuit terminals wiring (Example of the sink logic)



Example of use (default)

	Intelligent input terminal [4]	Intelligent input terminal [3]
60 Hz order	OFF	ON
40 Hz order	ON	OFF
20 Hz order	ON	ON

Setup

Function Name	Code	Data	Note
Intelligent input [3] function	C003	02 (CF1)	Default
Intelligent input [4] function	C004	03 (CF2)	

The initial value of Accel&Decel times are 10 sec.

Please change the following parameters as needed.

Function Name	Code	Setting Range	Note
Acceleration time (1)	F002	0.00 to 3600.00 sec.	Default:10.00 sec.
Deceleration time (1)	F003	0.00 to 3600.00 sec.	Default:10.00 sec.

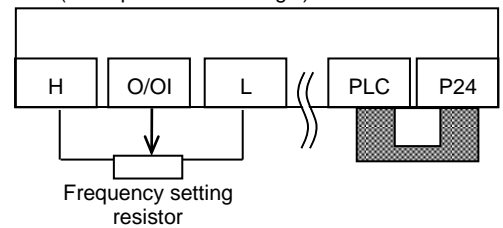
One of the following is required when changing parameters on NE-S1 series inverters.

- (A) Dedicated operator (NES1-OP), (B) Digital operator, (C) WOP,
- (D) Modbus communication, (E) Inverter setting software (ProDriveNext)

(2) Method to perform driving in RUN/STOP/RESET key and perform frequency setting in volume resistor

This is the operation method using RUN command is given by "RUN/STOP/RESET key" & Frequency setting is given by analog input such as O/OI-L voltage, Accel&Decel times are 10 seconds. (If you don't need to change parameter such as Accel&Decel times, the optional operator is not required.) Below diagram is to set the external frequency setting connecting H-O/OI-L volume to supply O/OI-L voltage.

Control circuit terminals wiring (Example of the sink logic)



Note)
The above is a method to perform analog input (O/OI) by voltage input. It is necessary for SW6 on the board to be set for voltage input (default). →Page 9

Setup

Function Name	Code	Data	Note
Frequency source	A001	01 (Control terminal)	Default

The initial value of Accel&Decel times are 10 sec.

Please change the following parameters as needed.

Function Name	Code	Setting Range	Note
Acceleration time (1)	F002	0.00 to 3600.00 sec.	Default:10.00 sec.
Deceleration time (1)	F003	0.00 to 3600.00 sec.	Default:10.00 sec.

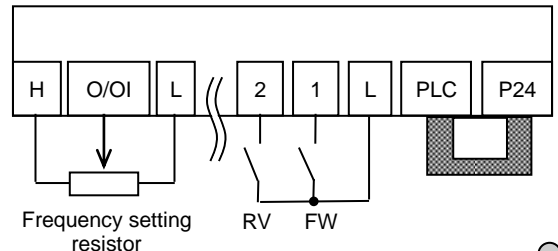
One of the following is required when changing parameters on NE-S1 series inverters.

- (A) Dedicated operator (NES1-OP), (B) Digital operator, (C) WOP,
- (D) Modbus communication, (E) Inverter setting software (ProDriveNext)

(3) Method to perform driving in FW/RV terminal and perform frequency setting in volume resistor

This is the operation method using RUN command is given by intelligent input terminal such as FW(RV) function & Frequency setting is given by analog input such as O/OI-L voltage, Accel&Decel times are 10 seconds. (If you don't need to change such as Accel&Decel times, optional operator is not required.) Below diagram is to set the external frequency setting connecting H-O/OI-L volume to supply O/OI-L voltage.

Control circuit terminals wiring (Example of the sink logic)



Note)
The above is a method to perform analog input (O/OI) by voltage input. It is necessary for SW6 on the board to be set for voltage input (default). →Page 9

Setup

Function Name	Code	Data	Note
Frequency source	A001	01 (Control terminal)	Default
Run command source	A002	01 (Control terminal)	Default
Intelligent input [1] function	C001	00(FW)	Default
Intelligent input [2] function	C002	01(RV)	

The initial value of Accel&Decel times are 10 sec.

Please change the following parameters as needed.

Function Name	Code	Setting Range	Note
Acceleration time (1)	F002	0.00 to 3600.00 sec.	Default:10.00 sec.
Deceleration time (1)	F003	0.00 to 3600.00 sec.	Default:10.00 sec.

One of the following is required when changing parameters on NE-S1 series inverters.

- (A) Dedicated operator (NES1-OP), (B) Digital operator, (C) WOP,
- (D) Modbus communication, (E) Inverter setting software (ProDriveNext)

6. Specifications

6.1 Specifications

Item		Three-phases 200 V class					Single-phase 200 V class					Three-phases 400 V class				
Model (NES1-□□□□**) Note7)		002L	004L	007L	015L	022L	002S	004S	007S	015S	022S	004H	007H	015H	022H	040H
Applicable motor size Note1)	kW	0.2	0.4	0.75	1.5	2.2	0.2	0.4	0.75	1.5	2.2	0.4	0.75	1.5	2.2	4.0
	HP	1/4	1/2	1	2	3	1/4	1/2	1	2	3	1/2	1	2	3	5
Rated capacity (kVA)	200/380 V	0.4	0.9	1.3	2.4	3.4	0.4	0.9	1.3	2.4	3.4	0.9	1.6	2.6	3.6	6.0
	240/480 V	0.5	1.0	1.6	2.9	4.1	0.5	1.0	1.6	2.9	4.1	1.2	2.0	3.4	4.5	7.6
Rated input voltage		Three-phases : 200 V -15 % to 240 V +10 %, 50/60 Hz ± 5%					Single-phase : 200 V -15 % to 240 V +10 %, 50/60 Hz ± 5%					Three-phases : 380 V -15 % to 480 V +10 %, 50/60 Hz ± 5%				
Rated output voltage Note2)		Three-phases : 200 to 240 V (proportional to input voltage)										Three-phases : 380 to 480 V (proportional to input voltage)				
Rated output current (A)		1.4	2.6	4.0	7.1	10	1.4	2.6	4.0	7.1	10	1.5	2.5	4.1	5.5	9.2
Cooling method		Self-cooling			Force ventilation		Self-cooling			Force ventilation		Self-cooling	Force ventilation			
Braking (regenerative braking) Note3)		Approx.50 %			Approx.20 to 40 %		Approx.50 %			Approx.20 to 40 %		Approx.50 %		Approx.20 to 40 %		
Weight	(kg)	0.7	0.8	0.9	1.2	1.3	0.7	0.8	1.0	1.2	1.3	0.9	0.9	1.0	1.1	1.2
	(lb)	1.6	1.8	2.0	2.7	2.9	1.6	1.8	2.2	2.7	2.9	2.0	2.0	2.2	2.4	2.7

Common specification

Item		Specifications
Protective housing (JIS C 0920, IEC60529)		IP20
Control	Control method	Pulse Width Modulation (PWM) control
	Output frequency range Note4)	0.01 to 400.00 Hz
	Frequency accuracy Note5)	Digital command : ± 0.01 % of the maximum frequency Analog command : ± 0.2 % of the maximum frequency (25 °C ± 10 °C)
	Frequency setting resolution	Digital input : 0.01 Hz Analog input : Maximum output frequency / 1000
	Volt. / Freq. characteristic	V/f control (constant torque, variable torque), PM sensorless vector control
	Overload capacity	150 % / 60 seconds
	Acceleration / deceleration time	0.00 to 3,600.00 seconds (in linear or curved pattern), 2nd motors settings are possible
Input signal	Freq. setting	External signal : adjustable resistor / 0 to +10 VDC / 0 to 20 mA, Modbus communication, Option operator, Dedicated operator
	RUN/STOP Order	External digital input signal (3-wire input possible), Modbus communication, Option Operator, Dedicated Operator
	Intelligent input terminal	5 terminals
	Analog input	1 terminal (O/OI terminal : Voltage input 10 bit / 0 to 10 V, Current input 10 bit / 0 to 20 mA, selected with a changeover switch SW6)
Output signal	Intelligent output terminal	1 open-collector output terminal, 1 relay (1c-contact) output terminal
	Pulse Output	1 terminal
connection	RS-422	RJ45 Connector (Common with RS485 : selecting it with a changeover switch SW5) For option operator, Inverter setting software (ProDriveNext)
	RS-485	RJ45 Connector (Common with RS422 : selecting it with a changeover switch SW5) For Modbus-RTU
General specification	Temperature Note6)	Operating (ambient) : -10 to 50 °C (with derating), / Storage : -20 to 65 °C, The storage temperature refers to the short-term temperature during transport.
	Humidity	20 to 90 % humidity (non-condensing)
	Vibration	5.9 m/s ² (0.6 G), 10 to 55 Hz The vibration tolerance was tested in compliance with JIS C 60068-2-6:2010 (IEC 60068-2-6:2007)
	Location	Altitude 1,000 m or less, indoors (no corrosive gasses or dust)
	Standards Compliance	UL, CE, c-UL, c-tick

Note1) The applicable motor refers to Hitachi standard three-phases motor (4-pole). When using other motors, care must be taken to prevent the rated motor current (50/60 Hz) from exceeding the rated output current of the inverter.

Note2) The output voltage decreases as the main supply voltage decreases (except when using the AVR function). In any case, the output voltage cannot exceed the input power supply voltage.

Note3) The regenerative braking torque is the average deceleration torque at the shortest deceleration (stopping from 50/60 Hz as indicated). It is not continuous regenerative braking torque. The average deceleration torque varies with motor loss. This value decreases when operating beyond 50 Hz.

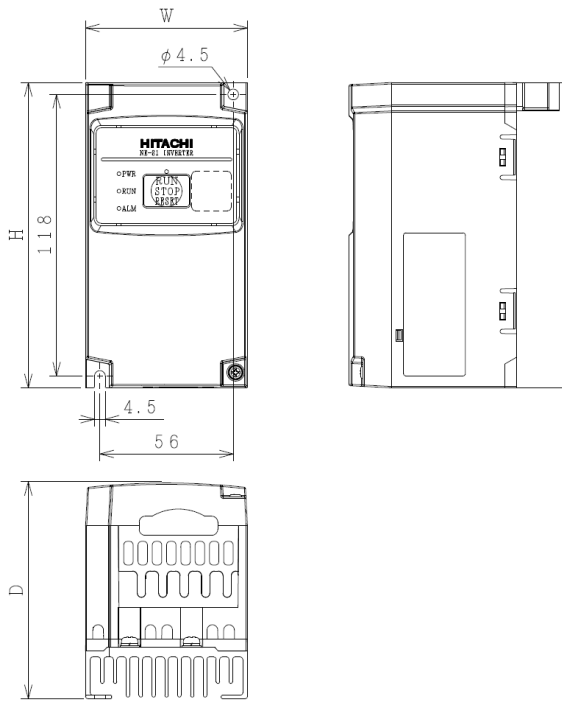
Note4) To operate the motor beyond 50/60 Hz, consult the motor manufacturer for the maximum allowable rotation speed.

Note5) To get motor stabilized operation, inverter output Frequency might exceeds preset maximum frequency (A004/A204).

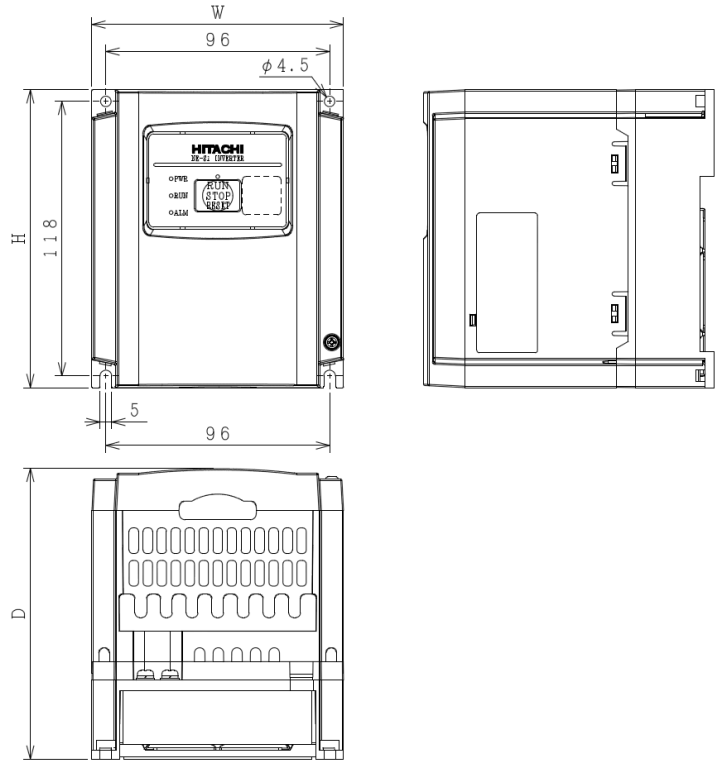
Note6) Derating curve is shown on QRG (Refer to section 12.3).

Note7) The “**” part depends on the option equipment and destination.

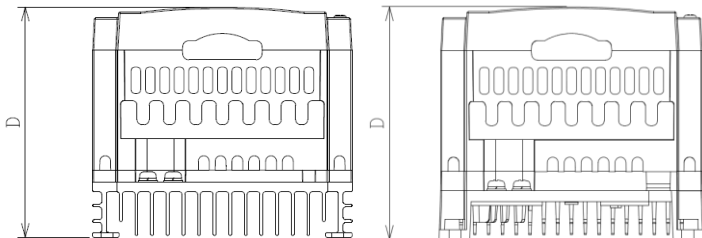
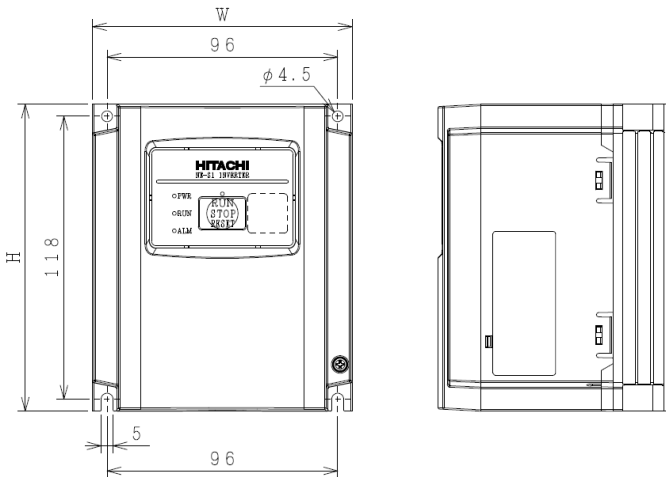
6.2 Dimensions



Model Note 1)	W (mm)	H (mm)	D (mm)
NES1-002SB*	68	128	76
NES1-004SB*			91
NES1-002LB*			76
NES1-004LB*			91
NES1-007LB*			115



Model Note 1)	W (mm)	H (mm)	D (mm)
NES1-015SB*	108	128	107
NES1-022SB*			125
NES1-015LB*			107
NES1-022LB*			125
NES1-007HB*			96
NES1-015HB*			111
NES1-022HB*			125
NES1-040HB*			135



Model Note 1)	W (mm)	H (mm)	D (mm)
NES1-007SB*	108	128	96
NES1-004HB*			96

Note 1) “*” Restricted Distribution

C: China

E: Europe

None: other

SUITABILITY FOR USE

Hitachi Industrial Equipment Systems Co., Ltd. shall not be responsible for conformity with any standard, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

Take all necessary steps to determine the suitability of the product for the Systems, machines, and equipment with which it will be used.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE HITACHI INDUSTRIAL EQUIPMENT SYSTEMS PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

See also product catalogs.

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