# VARIABLE FREQUENCY DRIVE
# L300P Series

## for Fan and Pump Applications

# Hitachi's L300P Series Variable Fre
# Increased Energy Savings for Your

### ●AUTOMATIC ENERGY-SAVING FUNCTION

With its Automatic Energy-saving Function, the L300P delivers "real-time" energy-saving operation for your fan and pump applications. The function insures that motor operates at minimum current in response to the torque required by the load.



■Example of Energy Savings (Fan)
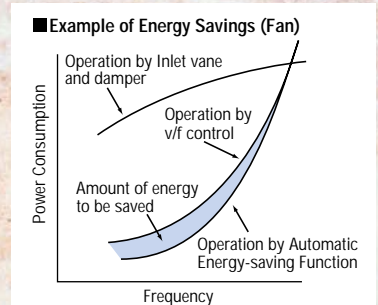
### ●ENHANCED INPUT/OUTPUT TERMINALS

Three relay output terminals are provided as standard for flexible interface to external control systems.
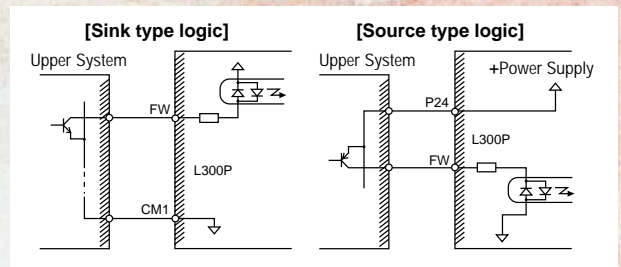


■INTELLIGENT RELAY OUTPUTS

| 12C | 12A | 11C | 11A | AL0 | AL1 | AL2 |

NO contact × 2          NO-NC contact × 1
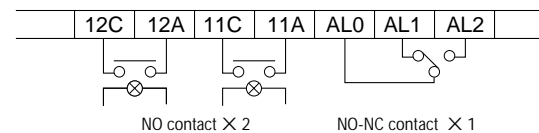
### ●ANALOG OUTPUT MONITOR

In addition to PWM monitor(FM), programmable analog output monitors are also available for both voltage(0−10VDC) and current(4−20mA) at AM and AMI terminals of the L300P.

### ●INTELLIGENT INPUT/OUTPUT TERMINAL SYSTEM

The L300P features an intelligent control terminal system, which allows necessary drive I/O functions to be freely programmed. Input terminals can be selected for either sink or source type logic.



[Sink type logic]          [Source type logic]

### ●EASY-TO-USE OPERATOR PANEL
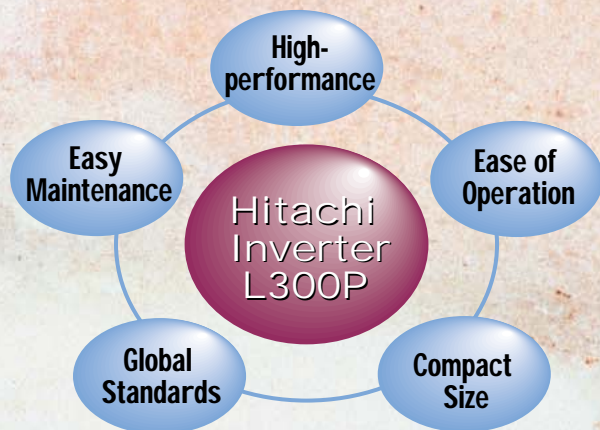
L300P's digital operator panel supports various monitoring functions.

- ●Output frequency
- ●Output current
- ●Rotation direction
- ●Process variable, PID feedback
- ●Intelligent input terminal status

- ●Intelligent output terminal status
- ●Scaled output frequency
- ●Output voltage
- ●Power
- ●Cumulative RUN time

- ●Cumulative power-on time
- ●Trip event
- ●Trip history
- ●Warning code

# quency Drive Delivers Fan and Pump Applications!

## FOR OPTIMAL OPERATION

High-performance

Easy Maintenance

Ease of Operation

**Hitachi Inverter L300P**

Global Standards

Compact Size

L300P

L300P

**ISO 14001**
EC97J1095

ISO 14001 JACO
JAPAN AUDIT AND CERTIFICATION ORGANIZATION FOR ENVIRONMENT AND QUALITY

NATIONAL ACCREDITATION OF CERTIFICATION BODIES

**ISO 9001**
JQA-1153

Hitachi variable frequency drives (inverters) in this brochure are produced at the factory registered under the ISO 14001 standard for environmental management system and the ISO 9001 standard for inverter quality management system.
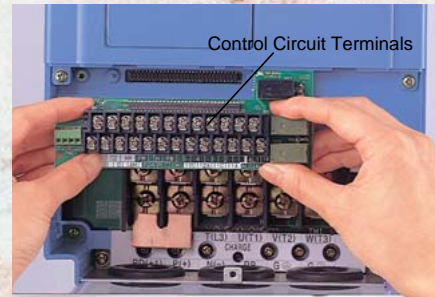
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# EASE OF MAINTENANCE

## ●EASY-REMOVABLE COOLING FAN AND DC BUS CAPACITOR

Cooling fan(s) and DC bus capaci-tors can be easily changed in the field. A fan ON/OFF function can be activated to provide longer cooling fan life.

## ●REMOVABLE CONTROL CIRCUIT TERMINALS

Eliminates control rewiring when field replacing the L300P.

Control Circuit Terminals

# COMPACT DESIGN

The L300P's compact size helps economize panel space. Installation area is reduced by approximately 30% from that of our previous series.
(Comparison of 11kW (15HP))

# USER-FRIENDLY OPERATION

## ●EASE OF OPERATION WITH DIGITAL OPERATOR (OPE-SR)

Output frequency can be controlled by the integral potentiometer provided as standard on the OPE-SR.
The OPE-SR can be removed for remote control, and has an easy-to-see 4-digit display and LEDs to indicate the unit being monitored (i.e. frequency, amps, power, etc.).
A multilingual operator (English, French, German, Italian, Spanish, and Portuguese) with copy function (SRW-0EX) and a digital operator without potentiometer (OPE-S) are also available as options.

## ●USER SELECTION OF COMMAND FUNCTIONS ("Quick Menu")

You can select frequently used commands and store them for fast reference.

## ●BUILT-IN RS485

RS485 is provided as standard for ASCII serial communication.

## ●PROGRAMMING SOFTWARE

Optional PC drive configuration software which runs on Windows® Operating System.

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# ENVIRONMENTAL FRIENDLINESS

## ● EMI FILTER

EMI filters to meet European EMC (EN61800-3, EN55011) and low-voltage directive (EN50178) are available for system conformance.

## ● REDUCED NOISE FROM MAIN CIRCUIT POWER SUPPLY AND CONTROL CIRCUIT POWER SUPPLY

Disturbance voltage of the main circuit power supply and of the control circuit power supply has been improved by approximately 15dB(μV) and 20dB(μV) respectively compared to our previous model(J300), resulting in significant reductions to noise interference with sensors and other peripheral devices.

● Disturbance voltage of the main circuit power supply
(It does not comply with European EMC directive. To meet the EMC directive, please use an EMI filter.)
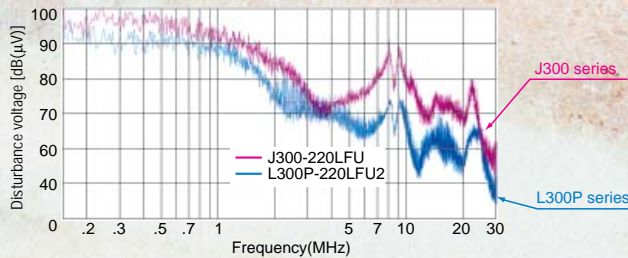


● Disturbance voltage of the control circuit power supply
(Disturbance voltage of terminal L or CM1)
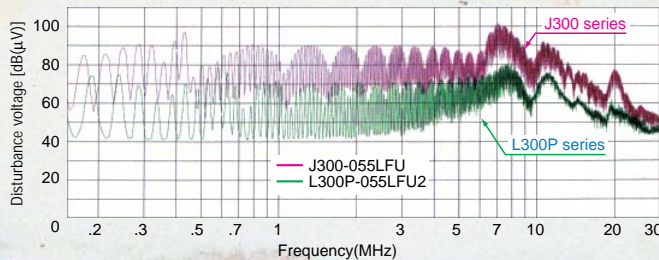


## ● HARMONICS MITIGATION

Terminals for the connection of a DC Reactor are provided as standard for harmonics suppression.

## ● CONTROL OF VOLTAGE OF MICRO SERGE

Suppressing the motor terminal voltage less than *2xE [V]* by improving the control method of PWM output.
Input voltage: 400VAC (In the case)
Motor terminal voltage: 1,131V(400V× 2×2

## ● IMPROVEMENT OF ENVIRONMENT

The printed circuit board inside an inverter is varnish coating specification as standard.

# PROTECTION FOR VARIOUS INSTALLATION ENVIRONMENTS

Standard enclosure protection for the L300P is IP20 (NEMA1*). For IP54 (NEMA12), please contact Hitachi sales office.

*NEMA 1 applies up to 30kW. An optional wire-entry conduit box is required for 37kW to 75kW models to meet NEMA 1 rating.

# GLOBAL PERFORMANCE

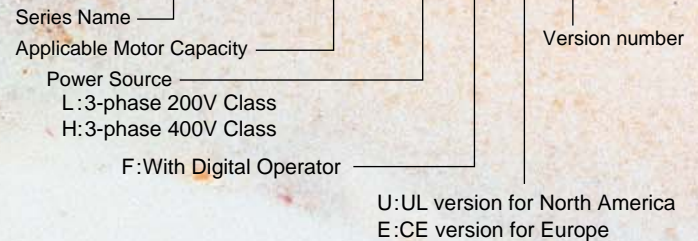## ● CONFORMITY TO GLOBAL STANDARDS

CE, UL, c-UL, C-Tick approvals.

## ● NETWORK COMPATIBILITY

The L300P can communicate with DeviceNet™, PROFIBUS®, LONWORKS®, Modbus® RTU*1, and Ethernet™*2 with communication options.

*1, *2: Being planned

### ■ MODEL NAME INDICATION

**L300P - 015 L F U 2**

Series Name
Applicable Motor Capacity
Power Source
　L: 3-phase 200V Class
　H: 3-phase 400V Class
F: With Digital Operator
U: UL version for North America
E: CE version for Europe
Version number

### ■ MODEL CONFIGURATION

| Applicable Motor Capacity in kW (HP) | 3-phase 200V class | 3-phase 400V class |
|---|---|---|
| 1.5(2) | L300P-015LFU2 | L300P-015HFU2/E2 |
| 2.2(3) | L300P-022LFU2 | L300P-022HFU2/E2 |
| 3.7(5) | L300P-037LFU2 | L300P-040HFU2/E2 |
| 5.5(7.5) | L300P-055LFU2 | L300P-055HFU2/E2 |
| 7.5(10) | L300P-075LFU2 | L300P-075HFU2/E2 |
| 11(15) | L300P-110LFU2 | L300P-110HFU2/E2 |
| 15(20) | L300P-150LFU2 | L300P-150HFU2/E2 |
| 18.5(25) | L300P-185LFU2 | L300P-185HFU2/E2 |
| 22(30) | L300P-220LFU2 | L300P-220HFU2/E2 |
| 30(40) | L300P-300LFU2 | L300P-300HFU2/E2 |
| 37(50) | L300P-370LFU2 | L300P-370HFU2/E2 |
| 45(60) | L300P-450LFU2 | L300P-450HFU2/E2 |
| 55(75) | L300P-550LFU2 | L300P-550HFU2/E2 |
| 75(100) | L300P-750LFU2 | L300P-750HFU2/E2 |
| 90(125) | | L300P-900HFU2/E2 |
| 110(150) | | L300P-1100HFU2/E2 |
| 132(175) | | L300P-1320HFU2/E2 |

● Windows is a registered trademark of Microsoft Corp. in the U.S. and other countries.
● DeviceNet is a trademark of Open DeviceNet Vendor Association.
● PROFIBUS is a registered trademark of Profibus Nutzer Organization.

# STANDARD SPECIFICATIONS

| Item | | 200V Class | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model L300P-XXX | UL version | 015LFU2 | 022LFU2 | 037LFU2 | 055LFU2 | 075LFU2 | 110LFU2 | 150LFU2 | 185LFU2 | 220LFU2 | 300LFU2 | 370LFU2 | 450LFU2 | 550LFU2 | 750LFU2 |
| | CE version | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Enclosure (*2) | | IP20 (NEMA 1) (*1) | | | | | | | | | | | | | |
| Applicable motor (4-pole, kW(HP)) (*3) | | 1.5(2) | 2.2(3) | 3.7(5) | 5.5(7.5) | 7.5(10) | 11(15) | 15(20) | 18.5(25) | 22(30) | 30(40) | 37(50) | 45(60) | 55(75) | 75(100) |
| Rated capacity (kVA) | 200V | 2.5 | 3.6 | 5.7 | 8.3 | 11 | 15.2 | 20.0 | 25.2 | 29.4 | 39.1 | 48.4 | 58.5 | 72.7 | 93.5 |
| | 240V | 3.1 | 4.3 | 6.8 | 9.9 | 13.3 | 18.2 | 24.1 | 30.3 | 35.3 | 46.9 | 58.1 | 70.2 | 87.2 | 112.2 |
| Rated input voltage | | 3-phase (3-wire) 200–240V (±10%), 50/60Hz | | | | | | | | | | | | | |
| Rated input current (A) | | 8.3 | 12 | 18 | 26 | 35 | 48 | 64 | 80 | 94 | 124 | 154 | 186 | 231 | 297 |
| Required power supply capacity (kVA) | | 3 | 4.4 | 7.4 | 11 | 15 | 22 | 30 | 37 | 44 | 60 | 74 | 90 | 110 | 150 |
| Rated output voltage (*4) | | 3-phase (3-wire) 200–240V (Corresponding to input voltage) | | | | | | | | | | | | | |
| Rated output current (continuous)(A) | | 7.5 | 10.5 | 16.5 | 24 | 32 | 44 | 58 | 73 | 85 | 113 | 140 | 169 | 210 | 270 |
| Control method | | Line to line sine wave PWM | | | | | | | | | | | | | |
| Output frequency range (*5) | | 0.1–400Hz | | | | | | | | | | | | | |
| Frequency accuracy | | Digital: ±0.01% of the maximum frequency, Analog: ±0.2%(25±10℃) | | | | | | | | | | | | | |
| Frequency resolution | | Digital setting: 0.01Hz, Analog setting: (Maximum frequency)/4,000 (O terminal: 12-bit 0–10V, O2 terminal: 12-bit–10–+10V) | | | | | | | | | | | | | |
| V/f characteristics | | V/f optionally variable, V/f control (Constant torque, reduced torque) | | | | | | | | | | | | | |
| Overload capacity | | 120% for 60sec., 150% for 0.5sec. | | | | | | | | | | | | | |
| Acceleration/deceleration time | | 0.01–3,600sec. (Linear/curve, accel./decel. selection), Two-stage accel./decel. | | | | | | | | | | | | | |

| Braking | Dynamic braking (Short-time) (*6) | Built-in BRD circuit(optional resistor) | External dynamic braking unit (option) |
|---|---|---|---|
| | DC braking | Performs at start; under set frequency at deceleration, or via an external input (braking force, time, and operating frequency). | |

| Input signal | Frequency setting | Operator | Up and Down keys |
|---|---|---|---|
| | | Potentiometer | Potentiometer |
| | | External signal | DC 0–10V, −10–+10V (input impedance 10kΩ), 4–20mA (input impedance 100Ω) |
| | | External port | RS-485 interface |
| | Forward/ reverse Start/stop | Operator | Run key/Stop key (FW/RV can be set by function command.) |
| | | External signal | FW RUN/STOP (NO contact), RV set by terminal assignment (NO/NC selection), 3-wire input available |
| | | External port | Set by RS-485 |
| | Intelligent input terminals (Assign five functions to terminals) | | RV(Reverse), CF1-CF4(Multispeed command), JG(Jogging), DB(External DC braking), SET(Second motor constants setting), 2CH(Second accel./decel.), FRS(Free-run stop), EXT(External trip), USP(Unattended start protection), CS(Change to/from commercial power supply),SFT(Software lock), AT(Analog input selection), RS(Reset), STA(3-wire start), STP(3-wire stop), F/R(3-wire fwd./rev.), PID(PID On/Off), PIDC(PID reset), UP/DWN(Remote-controlled accel./decel.) UDC(Remote-controlled data clearing), SF1-SF7(Multispeed bit command 1-7), OLR(Overload limit change), ROK(RUN Permissive) and NO(Not selected) |
| | Thermistor input | | One terminal(PTC) |

| Output signal | Intelligent output terminals | Assign three functions to two NO contacts and one NO-NC combined contact (RUN, FA1, FA2, OL, OD, AL, FA3, IP, UV, RNT, ONT RMD and THM) |
|---|---|---|
| | Intelligent monitor output terminals | Analog voltage, analog current, PWM output |

| Display monitor | Output frequency, output current, scaled value of output frequency, trip history, I/O terminal condition, input power, output voltage |
|---|---|
| Other user-settable parameters | V/f free-setting (up to 7 points), frequency upper/lower limit, frequency jump, accel./decel. curve selection, manual torque boost value and frequency adjustment, analog meter tuning, starting frequency, carrier frequency, electronic thermal protection level, external frequency output zero/span reference, external frequency input bias start/end, analog input selection, retry after trip, reduced voltage soft start, overload restriction, automatic energy-saving |
| Carrier frequency range | 0.5–12kHz |
| Protective functions | Over-current protection, overload protection, braking resistor overload protection, over-voltage protection, EEPROM error, under-voltage error, CT(Current transformer) error, CPU error, external trip, USP error, ground fault, input over-voltage protection, instantaneous power failure, option 1 connection error, option 2 connection error, inverter thermal trip, phase failure detection, IGBT error, thermistor error |

| Environmental conditions | Ambient operating /storage temperature(*7)/humidity | −10–40℃(*9) / −20–65℃ / 25–90%RH (No condensation) | |
|---|---|---|---|
| | Vibration (*8) | 5.9m/s² (0.6G), 10–55Hz | 2.9m/s² (0.3G), 10–55Hz |
| | Location | Altitude 1,000m or less, indoors (no corrosive gases or dust) | |

| Color | Blue | Gray (Bezel for digital operator is blue) |
|---|---|---|
| Options | EMI filters, input/output reactors, DC reactors, radio noise filters, braking resistors, braking units, LCR filter, communication cables, Network interface cards | |
| Operator | OPE-SR(4-digit LED with potentiometer) / OPE-SRE(4-digit LED with potentiometer, English overlay) Optional: OPE-S(4-digit LED), SRW-0EX(Multilingual (English,French, German, Italian, Spanish, and Portuguese) operator with copy function), ICS-1,3(Cable for operators(1m, 3m)) | |

| Weight kg (lbs.) | 3.5 (7.7) | 3.5 (7.7) | 3.5 (7.7) | 3.5 (7.7) | 5 (11) | 5 (11) | 5 (11) | 12 (26.4) | 12 (26.4) | 12 (26.4) | 20 (44) | 30 (66) | 30 (66) | 50 (110) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

*1: Up to 30kW.
    An optional conduit box is required for 37kW to 55kW to meet NEMA 1 .
*2: The protection method conforms to JEM 1030 / NEMA(U.S.).
*3: The applicable motor refers to Hitachi standard 3-phase motor (4-pole).
    To use other motors, care must be taken to prevent the rated motor current (50Hz) from exceeding the rated output current of the inverter.

*4: The output voltage decreases as the main power supply voltage decreases except for the use of AVR function.
*5: To operate the motor beyond 50/60Hz, please consult with the motor manufacturer about the maximum allowable rotation speed.
*6: Braking resistor is not integrated in the inverter. Please install optional braking resistor or dynamic braking unit when large braking torque is required.

*7: Storage temperature refers to the temperature in transportation.
*8: Conforms to the test method specified in JIS C0040(1999).
*9: When using the inverter from 40º to 50ºC ambient, the output current of the inverter must be derated (see the next section on derating curves).

| Item | | 400V Class | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Model L300P-XXX | UL version | 015HFU2 | 022HFU2 | 040HFU2 | 055HFU2 | 075HFU2 | 110HFU2 | 150HFU2 | 185HFU2 | 220HFU2 | 300HFU2 |
| | CE version | 015HFE2 | 022HFE2 | 040HFE2 | 055HFE2 | 075HFE2 | 110HFE2 | 150HFE2 | 185HFE2 | 220HFE2 | 300HFE2 |
| Enclosure (*2) | | IP20 (NEMA 1) (*1) | | | | | | | | | |
| Applicable motor (4-pole, kW(HP)) (*3) | | 1.5(2) | 2.2(3) | 4.0(5) | 5.5(7.5) | 7.5(10) | 11(15) | 15(20) | 18.5(25) | 22(30) | 30(40) |
| Rated capacity (kVA) | 400V | 2.6 | 3.6 | 5.9 | 8.3 | 11 | 15.2 | 20.0 | 25.6 | 29.7 | 39.4 |
| | 480V | 3.1 | 4.4 | 7.1 | 9.9 | 13.3 | 18.2 | 24.1 | 30.7 | 35.7 | 47.3 |
| Rated input voltage | | 3-phase (3-wire) 380–480V (±10%), 50/60Hz | | | | | | | | | |
| Rated input current (A) | | 4.2 | 5.8 | 9.5 | 13 | 18 | 24 | 32 | 41 | 47 | 63 |
| Required power supply capacity (kVA) | | 3 | 4.4 | 8 | 11 | 15 | 22 | 30 | 37 | 44 | 60 |
| Rated output voltage (*4) | | 3-phase (3-wire) 380–480V (Corresponding to input voltage) | | | | | | | | | |
| Rated output current (continuous)(A) | | 3.8 | 5.3 | 8.6 | 12 | 16 | 22 | 29 | 37 | 43 | 57 |
| Control method | | Line to line sine wave PWM | | | | | | | | | |
| Output frequency range (*5) | | 0.1–400Hz | | | | | | | | | |
| Frequency accuracy | | Digital: ±0.01% of the maximum frequency, Analog: ±0.2%(25±10°C) | | | | | | | | | |
| Frequency resolution | | Digital setting: 0.01Hz, Analog setting: (Maximum frequency)/4,000 (O terminal: 12-bit 0–10V, O2 terminal: 12-bit –10–+10V) | | | | | | | | | |
| V/f characteristics | | V/f optionally variable, V/f control (Constant torque, reduced torque) | | | | | | | | | |
| Overload capacity | | 120% for 60sec., 150% for 0.5sec. | | | | | | | | | |
| Acceleration/deceleration time | | 0.01–3,600sec. (Linear/curve, accel./decel. selection), Two-stage accel./decel. | | | | | | | | | |

| Braking | Dynamic braking (Short-time) (*6) | Built-in BRD circuit(optional resistor) | External dynamic braking unit (option) |
|---|---|---|---|
| | DC braking | Performs at start; under set frequency at deceleration, or via an external input (braking force, time, and operating frequency). | |

| Input signal | Frequency setting | Operator | Up and Down keys |
|---|---|---|---|
| | | Potentiometer | Potentiometer |
| | | External signal | DC 0–10V, –10–+10V (input impedance 10kΩ), 4–20mA (input impedance 100Ω) |
| | | External port | RS-485 interface |
| | Forward/ reverse Start/stop | Operator | Run key/Stop key (FW/RV can be set by function command.) |
| | | External signal | FW RUN/STOP (NO contact), RV set by terminal assignment (NO/NC selection), 3-wire input available |
| | | External port | Set by RS-485 |
| | Intelligent input terminals (Assign five functions to terminals) | | RV(Reverse), CF1-CF4(Multispeed command), JG(Jogging), DB(External DC braking), SET(Second motor constants setting), 2CH(Second accel./decel.), FRS(Free-run stop), EXT(External trip), USP(Unattended start protection), CS(Change to/from commercial power supply),SFT(Software lock), AT(Analog input selection), RS(Reset), STA(3-wire start), STP(3-wire stop), F/R(3-wire fwd./rev.), PID(PID On/Off), PIDC(PID reset), UP/DWN(Remote-controlled accel./decel.) UDC(Remote-controlled data clearing), SF1-SF7(Multispeed bit command 1-7), OLR(Overload limit change), ROK(RUN Permissive) and NO(Not selected) |
| | Thermistor input | | One terminal(PTC) |

| Output signal | Intelligent output terminals | Assign three functions to two NO contacts and one NO-NC combined contact (RUN, FA1, FA2, OL, OD, AL, FA3, IP, UV, RNT, ONT RMD and THM) |
|---|---|---|
| | Intelligent monitor output terminals | Analog voltage, analog current, PWM output |

| Display monitor | Output frequency, output current, scaled value of output frequency, trip history, I/O terminal condition, input power, output voltage |
|---|---|
| Other user-settable parameters | V/f free-setting (up to 7 points), frequency upper/lower limit, frequency jump, accel./decel. curve selection, manual torque boost value and frequency adjustment, analog meter tuning, starting frequency, carrier frequency, electronic thermal protection level, external frequency output zero/span reference, external frequency input bias start/end, analog input selection, retry after trip, reduced voltage soft start, overload restriction, automatic energy-saving |
| Carrier frequency range | 0.5–12kHz |
| Protective functions | Over-current protection, overload protection, braking resistor overload protection, over-voltage protection, EEPROM error, under-voltage error, CT(Current transformer) error, CPU error, external trip, USP error, ground fault, input over-voltage protection, instantaneous power failure, option 1 connection error, option 2 connection error, inverter thermal trip, phase failure detection, IGBT error, thermistor error |

| Environmental conditions | Ambient operating /storage temperature(*7)/humidity | –10–40°C(*9) / –20–65°C / 25–90%RH (No condensation) |
|---|---|---|
| | Vibration (*8) | 5.9m/s² (0.6G), 10–55Hz |
| | Location | Altitude 1,000m or less, indoors (no corrosive gases or dust) |

| Color | Blue |
|---|---|
| Options | EMI filters, input/output reactors, DC reactors, radio noise filters, braking resistors, braking units, LCR filter, communication cables, Network interface cards |
| Operator | OPE-SR(4-digit LED with potentiometer) / OPE-SRE(4-digit LED with potentiometer, English overlay) Optional: OPE-S(4-digit LED), SRW-0EX(Multilingual (English,French, German, Italian, Spanish, and Portuguese) operator with copy function), ICS-1,3(Cable for operators(1m, 3m)) |

| Weight kg (lbs.) | 3.5 (7.7) | 3.5 (7.7) | 3.5 (7.7) | 3.5 (7.7) | 5 (11) | 5 (11) | 5 (11) | 12 (26.4) | 12 (26.4) | 12 (26.4) |
|---|---|---|---|---|---|---|---|---|---|---|

*1: Up to 30kW.
  An optional conduit box is required for 37kW to 55kW to meet NEMA 1 .
*2: The protection method conforms to JEM 1030 / NEMA(U.S.).
*3: The applicable motor refers to Hitachi standard 3-phase motor (4-pole).
  To use other motors, care must be taken to prevent the rated motor current (50Hz) from exceeding the rated output current of the inverter.

*4: The output voltage decreases as the main power supply voltage decreases except for the use of AVR function.
*5: To operate the motor beyond 50/60Hz, please consult with the motor manufacturer about the maximum allowable rotation speed.
*6: Braking resistor is not integrated in the inverter. Please install optional braking resistor or dynamic braking unit when large braking torque is required.

*7: Storage temperature refers to the temperature in transportation.
*8: Conforms to the test method specified in JIS C0040(1999).
*9: When using the inverter from 40° to 50°C ambient, the output current of the inverter must be derated (see the next section on derating curves).

# STANDARD SPECIFICATIONS

| Item | | 400V Class | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Model L300P-XXX | UL version | 370HFU2 | 450HFU2 | 550HFU2 | 750HFU2 | 900HFU2 | 1100HFU2 | 1320HFU2 |
| | CE version | 370HFE2 | 450HFE2 | 550HFE2 | 750HFE2 | 900HFE2 | 1100HFE2 | 1320HFE2 |
| Enclosure (*2) | | IP20 (NEMA 1) (*1) | | | | IP00 | | |
| Applicable motor (4-pole, kW(HP)) (*3) | | 37(50) | 45(60) | 55(75) | 75(100) | 90 (125) | 110 (150) | 132 (175) |
| Rated capacity (kVA) | 400V | 48.4 | 58.8 | 72.7 | 93.5 | 110.8 | 135.0 | 159.3 |
| | 480V | 58.1 | 70.1 | 87.2 | 112.2 | 133.0 | 162.1 | 191.2 |
| Rated input voltage | | 3-phase (3-wire) 380–480V (±10%), 50/60Hz | | | | | | |
| Rated input current (A) | | 77 | 94 | 116 | 149 | 176 | 215 | 253 |
| Required power supply capacity (kVA) | | 74 | 90 | 110 | 150 | 180 | 220 | 264 |
| Rated output voltage (*4) | | 3-phase (3-wire) 380-480V (Corresponding to input voltage) | | | | | | |
| Rated output current (continuous)(A) | | 70 | 85 | 105 | 135 | 160 | 195 | 230 |
| Control method | | Line to line sine wave PWM | | | | | | |
| Output frequency range (*5) | | 0.1–400Hz | | | | | | |
| Frequency accuracy | | Digital: ±0.01% of the maximum frequency, Analog: ±0.2%(25±10℃) | | | | | | |
| Frequency resolution | | Digital setting: 0.01Hz, Analog setting: (Maximum frequency)/4,000 (O terminal: 12-bit 0–10V, O2 terminal: 12-bit–10–+10V) | | | | | | |
| V/f characteristics | | V/f optionally variable, V/f control (Constant torque, reduced torque) | | | | | | |
| Overload capacity | | 120% for 60sec., 150% for 0.5sec. | | | | | | |
| Acceleration/deceleration time | | 0.01–3,600sec. (Linear/curve, accel./decel. selection), Two-stage accel./decel. | | | | | | |
| **Braking** | Dynamic braking (Short-time) (*6) | External dynamic braking unit (option) | | | | | | |
| | DC braking | Performs at start; under set frequency at deceleration, or via an external input (braking force, time, and operating frequency). | | | | | | |
| **Input signal** | Frequency setting — Operator | Up and Down keys | | | | | | |
| | Frequency setting — Potentiometer | Potentiometer | | | | | | |
| | Frequency setting — External signal | DC 0–10V, −10–+10V (input impedance 10kΩ), 4–20mA (input impedance 100Ω) | | | | | | |
| | Frequency setting — External port | RS-485 interface | | | | | | |
| | Forward/reverse Start/stop — Operator | Run key/Stop key (FW/RV can be set by function command.) | | | | | | |
| | Forward/reverse Start/stop — External signal | FW RUN/STOP (NO contact), RV set by terminal assignment (NO/NC selection), 3-wire input available | | | | | | |
| | Forward/reverse Start/stop — External port | Set by RS-485 | | | | | | |
| | Intelligent input terminals (Assign five functions to terminals) | RV(Reverse), CF1-CF4(Multispeed command), JG(Jogging), DB(External DC braking), SET(Second motor constants setting), 2CH(Second accel./decel.), FRS(Free-run stop), EXT(External trip), USP(Unattended start protection), CS(Change to/from commercial power supply),SFT(Software lock), AT(Analog input selection), RS(Reset), STA(3-wire start), STP(3-wire stop), F/R(3-wire fwd./rev.), PID(PID On/Off), PIDC(PID reset), UP/DWN(Remote-controlled accel./decel.) UDC(Remote-controlled data clearing), SF1-SF7(Multispeed bit command 1-7), OLR(Overload limit change), ROK(RUN Permission) and NO(Not selected) | | | | | | |
| | Thermistor input | One terminal(PTC) | | | | | | |
| **Output signal** | Intelligent output terminals | Assign three functions to two NO contacts and one NO-NC combined contact (RUN, FA1, FA2, OL, OD, AL, FA3, IP, UV, RNT, ONT, RMD and THM) | | | | | | |
| | Intelligent monitor output terminals | Analog voltage, analog current, PWM output | | | | | | |
| Display monitor | | Output frequency, output current, scaled value of output frequency, trip history, I/O terminal condition, input power, output voltage | | | | | | |
| Other user-settable parameters | | V/f free-setting (up to 7 points), frequency upper/lower limit, frequency jump, accel./decel. curve selection, manual torque boost value and frequency adjustment, analog meter tuning, starting frequency, carrier frequency, electronic thermal protection level, external frequency output zero/span reference, external frequency input bias start/end, analog input selection, retry after trip, reduced voltage soft start, overload restriction, automatic energy-saving | | | | | | |
| Carrier frequency range | | 0.5–12kHz | | | | 0.5–8kHz | | |
| Protective functions | | Over-current protection, overload protection, braking resistor overload protection, over-voltage protection, EEPROM error, under-voltage error, CT(Current transformer) error, CPU error, external trip, USP error, ground fault, input over-voltage protection, instantaneous power failure, option 1 connection error, option 2 connection error, inverter thermal trip, phase failure detection, IGBT error, thermistor error | | | | | | |
| **Environmental conditions** | Ambient operating /storage temperature(*7)/humidity | −10–40℃(*9) / −20–65℃ / 25–90%RH (No condensation) | | | | | | |
| | Vibration (*8) | 2.9m/s² (0.3G), 10–55Hz | | | | | | |
| | Location | Altitude 1,000m or less, indoors (no corrosive gases or dust) | | | | | | |
| Color | | Gray (Bezel for digital operator is blue) | | | | | | |
| Options | | EMI filters, input/output reactors, DC reactors, radio noise filters, braking resistors, braking units, LCR filter, communication cables, Network interface cards | | | | | | |
| Operator | | OPE-SR(4-digit LED with potentiometer) / OPE-SRE(4-digit LED with potentiometer, English overlay) Optional: OPE-S(4-digit LED), SRW-0EX(Multilingual (English,French, German, Italian, Spanish, and Portuguese) operator with copy function), ICS-1,3(Cable for operators(1m, 3m)) | | | | | | |
| Weight kg (lbs.) | | 20 (44) | 30 (66) | 30 (66) | 30 (66) | 60 (132) | 60 (132) | 80 (176) |

*1: Up to 30kW.
　　An optional conduit box is required for 37kW to 55kW to meet NEMA 1 .
*2: The protection method conforms to JEM 1030 / NEMA(U.S.).
*3: The applicable motor refers to Hitachi standard 3-phase motor (4-pole).
　　To use other motors, care must be taken to prevent the rated motor current (50Hz) from exceeding the rated output current of the inverter.

*4: The output voltage decreases as the main power supply voltage decreases except for the use of AVR function.
*5: To operate the motor beyond 50/60Hz, please consult with the motor manufacturer about the maximum allowable rotation speed.
*6: Braking resistor is not integrated in the inverter. Please install optional braking resistor or dynamic braking unit when large braking torque is required.

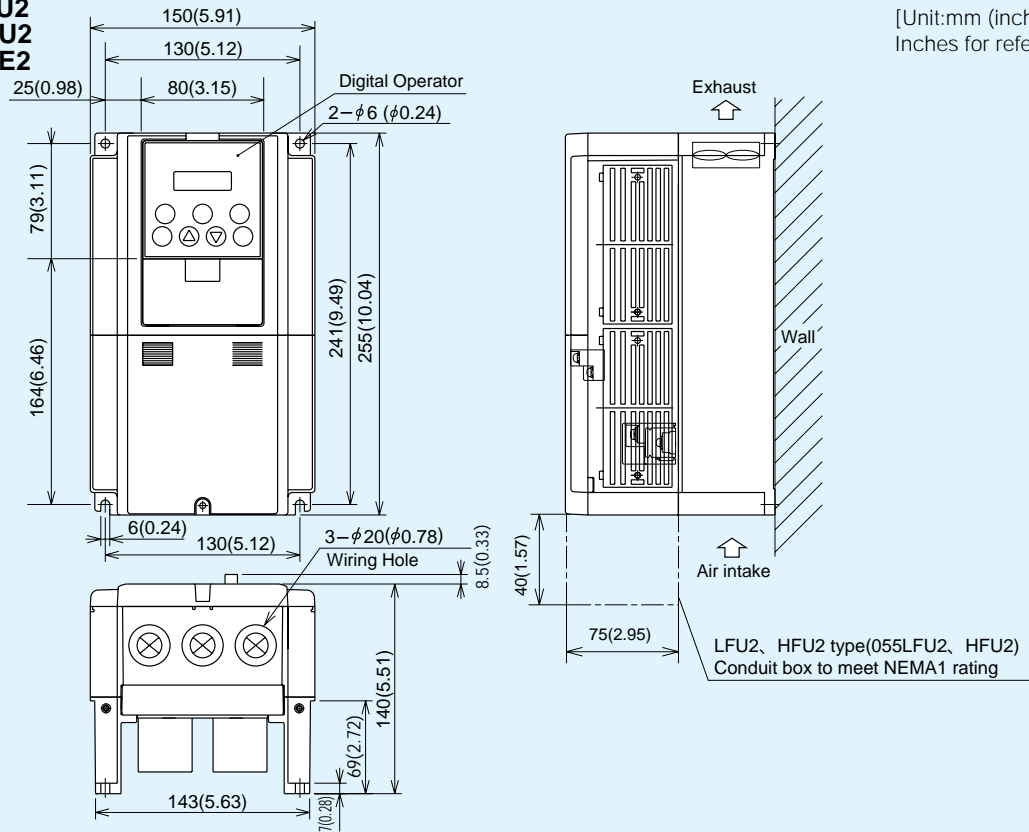*7: Storage temperature refers to the temperature in transportation.
*8: Conforms to the test method specified in JIS C0040(1999).
*9: When using the inverter from 40º to 50ºC ambient, the output current of the inverter must be derated (see the next section on derating curves).

# DIMENSIONS

● **L300P-015−055LFU2**
   **015−055HFU2**
   **015−055HFE2**

[Unit:mm (inch)]
Inches for reference only

Digital Operator

150(5.91)
130(5.12)
25(0.98)    80(3.15)
2−φ6 (φ0.24)

79(3.11)
164(6.46)
241(9.49)
255(10.04)

6(0.24)
130(5.12)
3−φ20(φ0.78)
Wiring Hole
8.5(0.33)

140(5.51)
69(2.72)
143(5.63)
7(0.28)

Exhaust

Wall

Air intake

40(1.57)
75(2.95)

LFU2   HFU2 type(055LFU2   HFU2)
Conduit box to meet NEMA1 rating

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● **L300P-075−150LFU2, 075−150HFE2, 075−150HFU2**

[Unit:mm (inch)]
Inches for reference only

210(8.27)
189(7.44)
24.5(0.97)    80(3.15)
Digital Operator
2-φ7(φ0.28)

79(3.11)
170(6.69)
246(9.69)
260(10.24)

7(0.28)
189(7.44)

8.5(0.33)
3-φ25(φ0.98)
Wiring hole
170(6.69)
7(0.28)
82(3.23)
203(7.99)

Exhaust

Wall

Air intake

70(2.76)
80(3.15)

LFU2   HFU2 type
Conduit box to meet NEMA1 rating

8
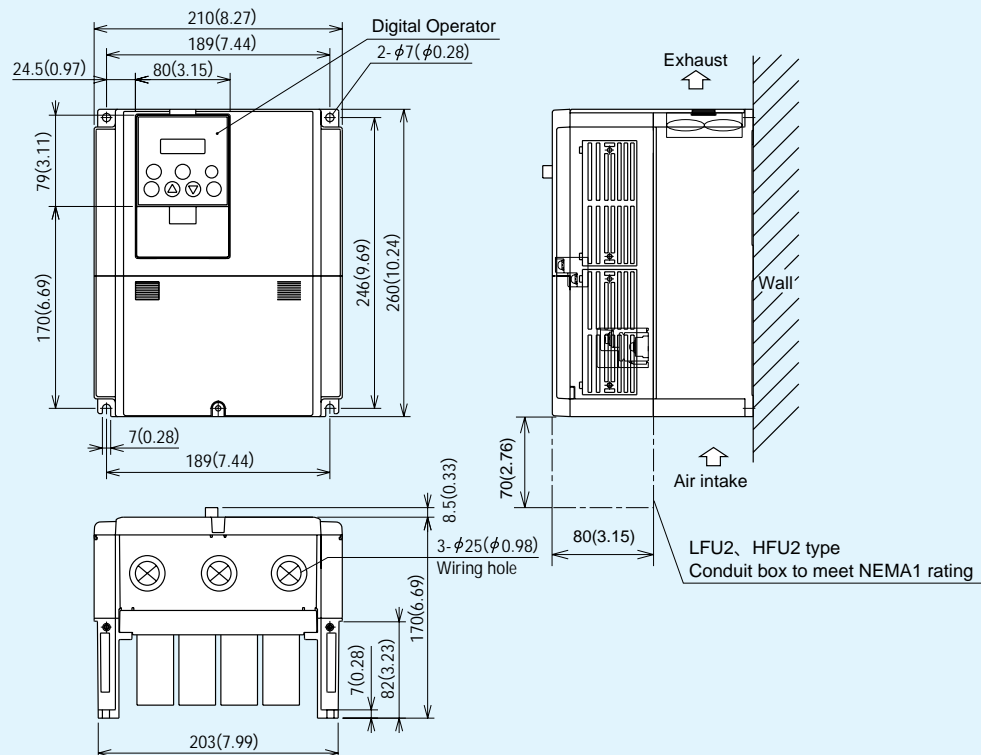
# DIMENSIONS

● **L300P-185〜300LFU2,**
　　　　**185〜300HFE2,**
　　　　**185〜300HFU2**

250(9.84)
229(9.02)
24.5(0.97)　80(3.15)

Digital Operator

2-φ7(φ0.28)

79(3.11)

273(10.75)

376(14.80)
390(15.35)

7(0.28)
229(9.02)

8.5(0.33)

Exhaust

Wall

147(5.79)

Air intake

4-φ29.5(φ1.16)
Wiring hole

104(4.09)

190(7.48)

9.5(0.37)
83(3.27)

244(9.61)

LFU2　HFU2 type
Conduit box to meet NEMA1 rating
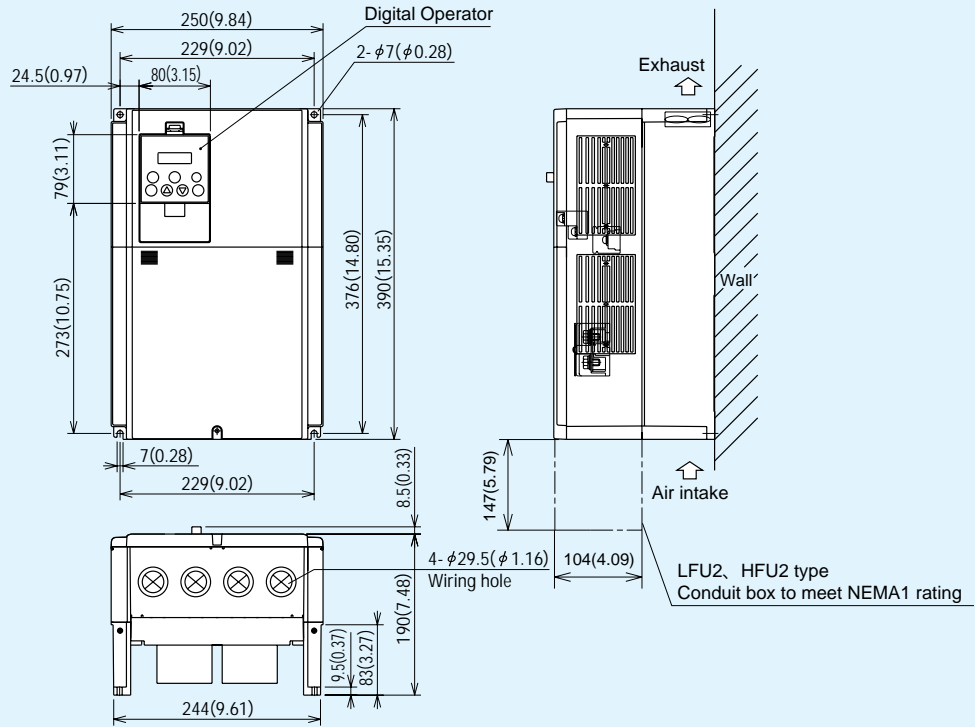
● **L300P-370LFU2,**
　　　　**370HFE2,**
　　　　**370HFU2**

45(1.77)　80(3.15)

Digital Operator

2-φ10(φ0.39)

79(3.11)

271(10.67)

φ

510(20.08)
540(21.26)

2-10(0.39)
265(10.43)
310(12.20)

145(5.71)

8.5(0.33)

195(7.68)

Exhaust

Wall

175(6.89)

Air intake

74(2.91)

Conduit box to meet NEMA1 rating (Optional)
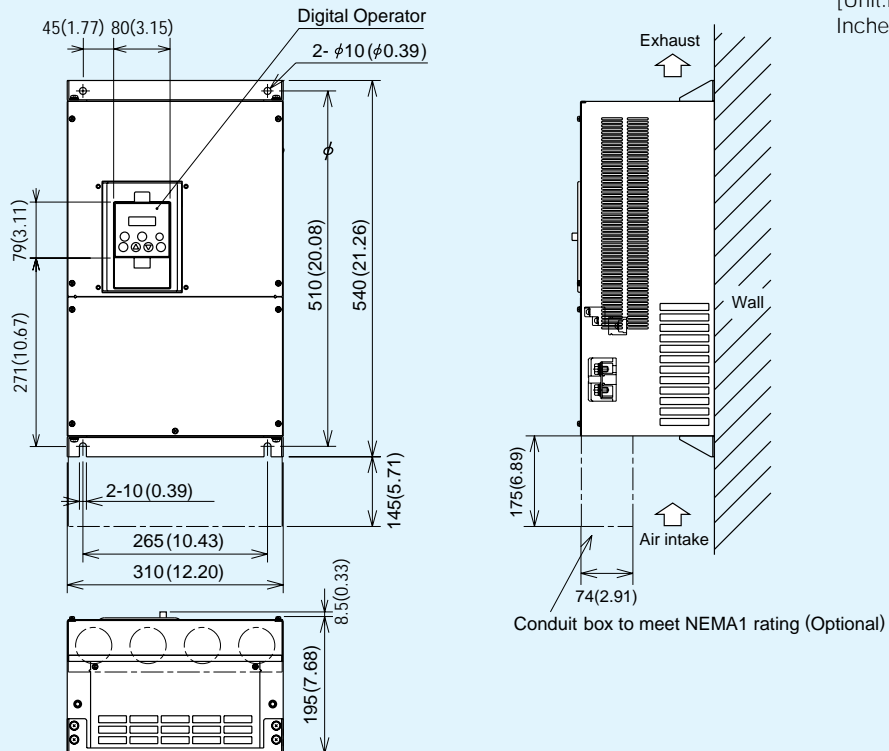
● **L300P-450−550LFU2,**
        **450−750HFE2,**
        **450−750HFU2**
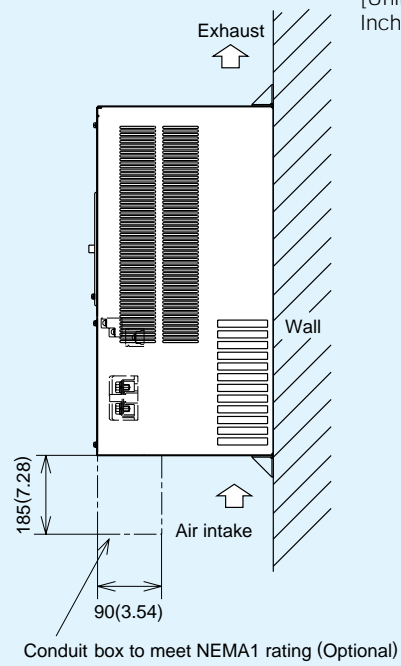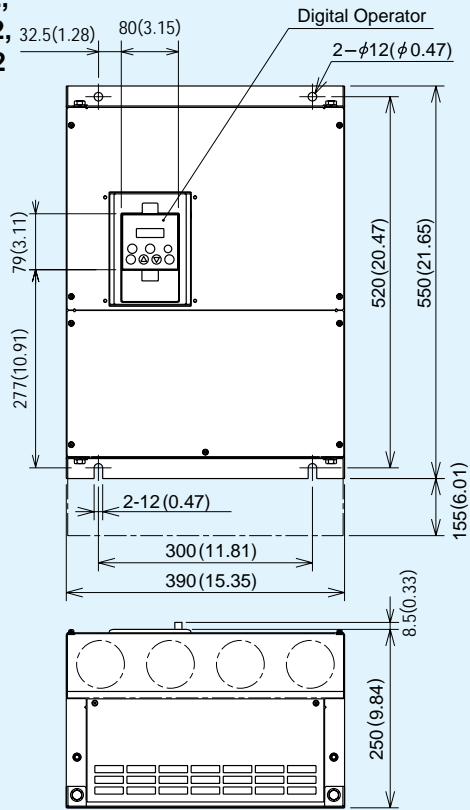
32.5(1.28)  80(3.15)

Digital Operator

2−φ12(φ0.47)

520(20.47)
550(21.65)
79(3.11)
277(10.91)
155(6.01)
2-12(0.47)
300(11.81)
390(15.35)
8.5(0.33)
250(9.84)

[Unit:mm (inch)]
Inches for reference only

Exhaust

Wall

185(7.28)

Air intake

90(3.54)

Conduit box to meet NEMA1 rating (Optional)

●**L300P-750LFU2**

125(4.92)  80(3.15)

Digital Operator

2−φ12(0.47)

670(26.38)
700(27.56)
79(3.11)
352(13.87)
160(6.30)
2−12(0.47)
380(14.96)
480(18.90)
8.5(0.33)
250(9.84)

[Unit:mm (inch)]
Inches for reference only

Exhaust

Wall

190(7.48)

Air intake

104(4.09)

Conduit box to meet NEMA 1 rating
(Optional)

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# DIMENSIONS

● **L300P-900HFE2, HFU2**
     **-1100HFE2, HFU2**
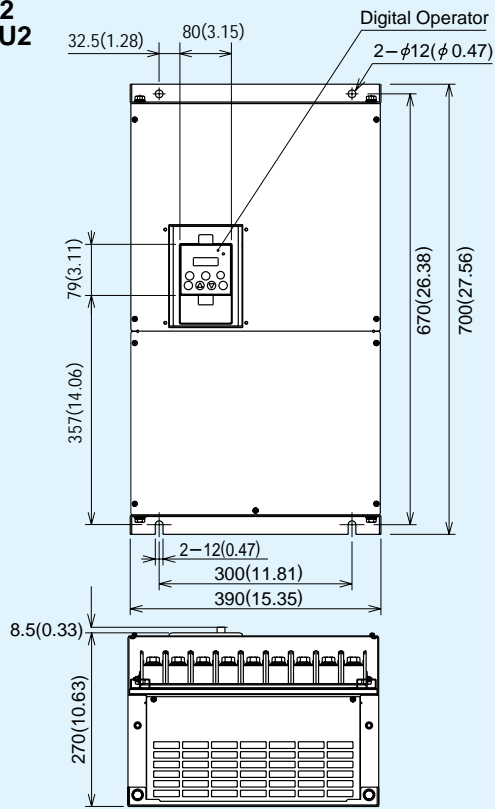
Digital Operator

32.5(1.28)  80(3.15)

2−φ12(φ 0.47)

79(3.11)

357(14.06)

670(26.38)

700(27.56)

2−12(0.47)
300(11.81)
390(15.35)

8.5(0.33)

270(10.63)

Exhaust

Wall

Air intake

---

● **L300P-1320HFE2, HFU2**

Digital Operator

62.5(2.46)  80(3.15)

2−φ12(0.47 )

79(3.11)

480(18.91)

710 (27.95)

740 (29.13)

2−12 (0.47)

380 (14.76)
480 (18.90)

8.5 (0.33)

270 (10.63)

Exhaust

Wall

Air intake
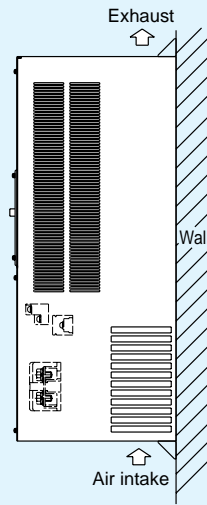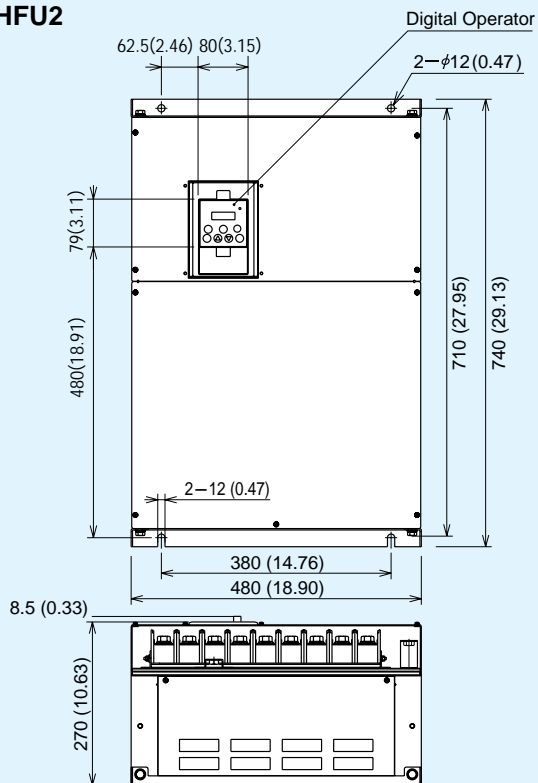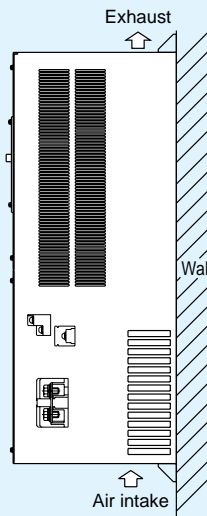
# OPERATION and PROGRAMMING

L300P Series can be easily operated with the digital operator (OPE-SR) provided as standard. The Digital operator can also be detached and used for remote-control. A multilingual (English, French, German Italian, Spanish, and Portuguese) operator with copy function (SRW-0EX) or a digital operator without potentiometer(OPE-S) is also available as an option. (For US version, OPE-SRE (English overlay with potentiometer) is provided as standard.)

**Parameter Display**

Displays frequency, motor current, rotational speed of the motor, and an alarm code.

**Monitor LEDs**

Shows drive's status.

**RUN Key**

Press to run the motor.

**STOP/RESET Key**

Press to stop the drive or reset an alarm.

**Function Key**

Press to set or monitor a parameter value.

**Power LED**

Lights when the power input to the drive is ON.

**Display Unit LEDs**

Indicates the unit associated with the parameter display.

**Potentiometer**

**Store Key**
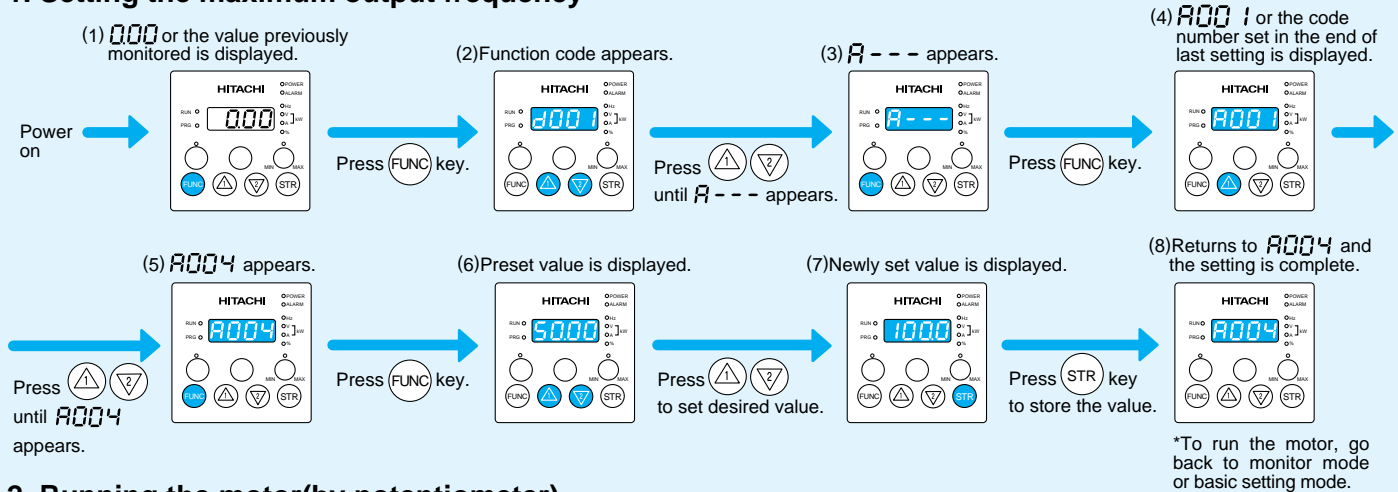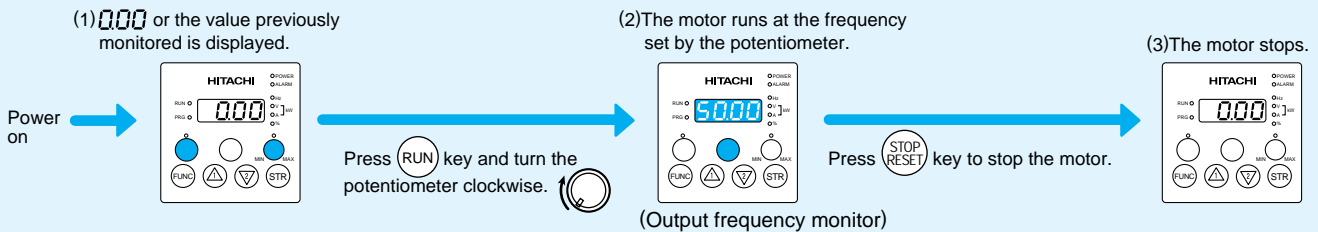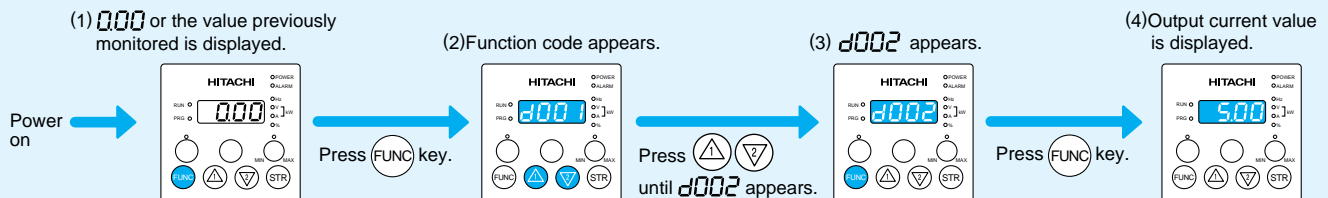
Press to write the new value to the EEPROM.

**Up/Down Keys**

Press up or down to sequence through parameters and functions shown on the display, and increment/decrement values.

## 1. Setting the maximum output frequency

(1) 0.00 or the value previously monitored is displayed.

Power on

Press FUNC key.

(2) Function code appears.

Press until A - - - appears.

(3) A - - - appears.

Press FUNC key.

(4) A001 or the code number set in the end of last setting is displayed.

(5) A004 appears.

Press until A004 appears.

Press FUNC key.

(6) Preset value is displayed.

Press to set desired value.

(7) Newly set value is displayed.

Press STR key to store the value.

(8) Returns to A004 and the setting is complete.

*To run the motor, go back to monitor mode or basic setting mode.

## 2. Running the motor(by potentiometer)

(1) 0.00 or the value previously monitored is displayed.

Power on

Press RUN key and turn the potentiometer clockwise.

(2) The motor runs at the frequency set by the potentiometer.

(Output frequency monitor)

Press STOP/RESET key to stop the motor.

(3) The motor stops.
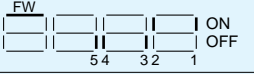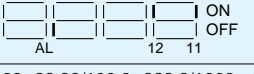
## 3. Monitoring output current value

(1) 0.00 or the value previously monitored is displayed.

Power on

Press FUNC key.

(2) Function code appears.

Press until d002 appears.

(3) d002 appears.

Press FUNC key.

(4) Output current value is displayed.

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# FUNCTION LIST

## ●Monitoring Functions and Main Profile Parameters

[○ = Allowed / × = Not permitted]

| | Code | Name | Description | Default Setting -FE(CE) | Default Setting -FU2(UL) | Run-time Setting | Run-time Data Edit (Enabled at b031) |
|---|---|---|---|---|---|---|---|
| Monitor Mode | d001 | Output frequency monitor | 0.00–99.99/100.0–400.0Hz | – | – | – | – |
| | d002 | Output current monitor | 0.0–999.9A | – | – | – | – |
| | d003 | Motor rotational direction monitor | F(Forward) / o(Stop) / r(Reverse) | – | – | – | – |
| | d004 | Process variable (PV), PID feedback monitor | 0.00–99.99/100.0–999.9/1000.–9999./1000–9999/⌈100–⌉999(10,000–99,900) | – | – | – | – |
| | d005 | Intelligent input terminal status | (Example) Terminal FW, 2 and 1 : ON / Terminal 5, 4, and 3 : OFF | – | – | – | – |
| | d006 | Intelligent output terminal status | (Example) Terminal 12 and 11 : ON / AL :OFF | – | – | – | – |
| | d007 | Scaled output frequency monitor | 0.00–99.99/100.0–999.9/1000.–9999./1000–3996(10,000–39,960) | – | – | – | – |
| | d013 | Output voltage monitor | 0.0–600.0V | – | – | – | – |
| | d014 | Power monitor | 0.0–999.9kW | – | – | – | – |
| | d016 | Cumulative RUN time monitor | 0.–9999./1000–9999/⌈100–⌉999 (10,000–99,900)hr | – | – | – | – |
| | d017 | Cumulative power-on time monitor | 0.–9999./1000–9999/⌈100–⌉999 (10,000–99,900)hr | – | – | – | – |
| | d080 | Trip count monitor | 0.–9999./1000–6553(10,000–65,530) | – | – | – | – |
| | d081 I d086 | Trip monitor 1–6 | Displays trip event information | – | – | – | – |
| | d090 | Warning monitor | Warning code | – | – | – | – |
| Setting Mode | F001 | Output frequency setting | 0.0, Starting frequency to maximum frequency / maximum frequency for second motor | 0.00Hz | 0.00Hz | ○ | ○ |
| | F002 | Acceleration time (1) setting | 0.01–99.99/100.0–999.9/1000.–3600. sec. | 30.00s | 60.00s | ○ | ○ |
| | F202 | Acceleration time (1) setting for second motor | 0.01–99.99/100.0–999.9/1000.–3600. sec. | 30.00s | 60.00s | ○ | ○ |
| | F003 | Deceleration time (1) setting | 0.01–99.99/100.0–999.9/1000.–3600. sec. | 30.00s | 60.00s | ○ | ○ |
| | F203 | Deceleration time (1) setting for second motor | 0.01–99.99/100.0–999.9/1000.–3600. sec. | 30.00s | 60.00s | ○ | ○ |
| | F004 | Motor rotational direction setting | 00(Forward) / 01 (Reverse) | 00 | 00 | × | × |
| Expanded Function | A--- | A Group: Standard functions | | | | | |
| | b--- | b Group: Fine tuning functions | | | | | |
| | C--- | C Group: Intelligent terminal functions | | | | | |
| | H--- | H Group: Motor constants functions | | | | | |
| | P--- | P Group: Expansion card functions | | | | | |
| | U--- | U Group: User-selectable menu functions | | | | | |

## ●A Group: Standard Functions

[○ = Allowed / × = Not permitted]

| | Code | Name | Description | Default Setting -FE(CE) | Default Setting -FU2(UL) | Run-time Setting | Run-time Data Edit (Enabled at b031) |
|---|---|---|---|---|---|---|---|
| Basic Setting | A001 | Frequency source setting | 00(Potentiometer) / 01(Terminals) / 02(Operator) / 03(RS485) / 04 (Expansion card 1) / 05(Expansion card 2) | 01 | 01 | × | × |
| | A002 | Run command source setting | 01(Terminals) / 02(Operator) / 03(RS485) / 04 (Expansion card 1) / 05(Expansion card 2) | 01 | 01 | × | × |
| | A003 | Base frequency setting | 30.00Hz-Maximum frequency | 50. | 60. | × | × |
| | A203 | Base frequency setting for second motor | 30.00Hz-Maximum frequency for second motor | 50. | 60. | × | × |
| | A004 | Maximum frequency setting | 30.00–400.0Hz | 50. | 60. | × | × |
| | A204 | Maximum frequency setting for second setting | 30.00–400.0Hz | 50. | 60. | × | × |
| Analog Input Setting | A005 | AT selection | 00(Selection between O and OI at AT) / 01(Selection between O and O2 at AT) | 00 | 00 | × | × |
| | A006 | O2 selection | 00(Independent) / 01(Only positive) / 02(Both positive and negative) | 00 | 00 | × | × |
| | A011 | O-L input active range start frequency | 0.00–400.0Hz | 0.00 | 0.00 | × | ○ |
| | A012 | O-L input active range end frequency | 0.00–400.0Hz | 0.00 | 60.00 | × | ○ |
| | A013 | O-L input active range start voltage | 0.–100.% | 0. | 0. | × | ○ |
| | A014 | O-L input active range end voltage | 0.–100.% | 100. | 100. | × | ○ |
| | A015 | O-L input start frequency enable | 00(External frequency output zero reference) / 01(0Hz) | 01 | 01 | × | ○ |
| | A016 | External frequency filter time constant | 1.–30. (Sampling time = 2 msec.) | 8. | 8. | × | ○ |
| Multispeed and Jogging Frequency Setting | A019 | Multispeed operation selection | 00(Binary: up to 16-stage speed at 4 terminals) / 01(Bit: up to 6-stage speed at 5 terminals) | 00 | 00 | × | × |
| | A020 | Multispeed frequency setting (0) | 0.00, Starting frequency to maximum frequency | 0.00 | 0.00 | ○ | ○ |
| | A220 | Multispeed frequency setting (0) for second motor | 0.00, Starting frequency to maximum frequency for second motor | 0.00 | 0.00 | ○ | ○ |
| | A021 I A035 | Multispeed frequency setting (1–15) | 0.00, Starting frequency to maximum frequency | 0.00 | 0.00 | ○ | ○ |
| | A038 | Jog frequency setting | 0.00, Starting frequency to 9.99Hz | 1.00 | 1.00 | ○ | ○ |
| | A039 | Jog stop mode | 00(Free-run stop/disable during RUN) / 01(Deceleration to stop/ disable during RUN) / 02(DC braking to stop/ disable during RUN) / 03(Free-run stop/ enable during RUN) / 04(Deceleration to stop/ enable during RUN) / 05(DC braking to stop/ enable during RUN) | 00 | 00 | × | ○ |

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| Code | | Name | Description | Default Setting -FE(CE) | Default Setting -FU2(UL) | Run-time Setting | Run-time Data Edit (Enabled at b031) |
|---|---|---|---|---|---|---|---|
| V/f Characteristic | A041 | Torque boost method selection | 00(Manual torque boost) / 01(Automatic torque boost) | 00 | 00 | × | × |
| | A241 | Torque boost method selection for second motor | 00(Manual torque boost) / 01(Automatic torque boost) | 00 | 00 | × | × |
| | A042 | Manual torque boost value | 0.0–20.0% | 1.0 | 1.0 | ○ | ○ |
| | A242 | Manual torque boost value for second motor | 0.0–20.0% | 1.0 | 1.0 | ○ | ○ |
| | A043 | Manual torque boost frequency adjustment | 0.0–50.0% | 5.0 | 5.0 | ○ | ○ |
| | A243 | Manual torque boost frequency adjustment for second motor | 0.0–50.0% | 5.0 | 5.0 | ○ | ○ |
| | A044 | V/f characteristic curve selection | 00(VC) / 01(VP 1.7th power) / 02(V/f free-setting) | 00 | 01 | × | × |
| | A244 | V/f characteristic curve selection for second motor | 00(VC) / 01(VP 1.7th power) / 02(V/f free-setting) | 00 | 01 | × | × |
| | A045 | V/f gain setting | 20.–100. | 100. | 100. | ○ | ○ |
| DC Braking | A051 | DC braking enable | 00(Disabled) / 01(Enabled) | 00 | 00 | × | ○ |
| | A052 | DC braking frequency setting | 0.00–60.00Hz | 0.50 | 0.50 | × | ○ |
| | A053 | DC braking wait time | 0.0–5.0sec. | 0.0 | 0.0 | × | ○ |
| | A054 | DC braking force setting | 0.–70.% | 0. | 0. | × | ○ |
| | A055 | DC braking time setting | 0.0–60.0sec. | 0.0 | 0.0 | × | ○ |
| | A056 | DC braking edge or level detection | 00(Edge) / 01(Level) | 01 | 01 | × | ○ |
| | A057 | DC braking force setting at the starting point | 0.–70.% | 0. | 0. | × | ○ |
| | A058 | DC braking time setting at the starting point | 0.0–60.0sec. | 0.0 | 0.0 | × | ○ |
| | A059 | DC braking carrier frequency setting | 0.5–12kHz (To be derated) {0.5–8kHz}[*1] | 3.0 | 3.0 | × | × |
| Upper/Lower Limit and Jump Frequency | A061 | Frequency upper limit setting | 0.00, Starting frequency to maximum frequency | 0.00 | 0.00 | × | ○ |
| | A261 | Frequency upper limit setting for second motor | 0.00, Starting frequency to maximum frequency for second motor | 0.00 | 0.00 | × | ○ |
| | A062 | Frequency lower limit setting | 0.00, Starting frequency to maximum frequency | 0.00 | 0.00 | × | ○ |
| | A262 | Frequency lower limit setting for second motor | 0.00, Starting frequency to maximum frequency for second motor | 0.00 | 0.00 | × | ○ |
| | A063 | Jump frequency (1) setting | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | ○ |
| | A064 | Jump frequency width (1) setting | 0.00–10.00Hz | 0.50 | 0.50 | × | ○ |
| | A065 | Jump frequency (2) setting | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | ○ |
| | A066 | Jump frequency width (2) setting | 0.00–10.00Hz | 0.50 | 0.50 | × | ○ |
| | A067 | Jump frequency (3) setting | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | ○ |
| | A068 | Jump frequency width (3) setting | 0.00–10.00Hz | 0.50 | 0.50 | × | ○ |
| | A069 | Acceleration hold frequency setting | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | ○ |
| | A070 | Acceleration stop time setting | 0.0–60.0sec. | 0.0 | 0.0 | × | ○ |
| PID Control | A071 | PID function enable | 00(Disable) / 01(Enable) | 00 | 00 | × | ○ |
| | A072 | PID proportional gain | 0.2–5.0 | 1.0 | 1.0 | ○ | ○ |
| | A073 | PID integral gain | 0.0–3600.0sec. | 1.0 | 1.0 | ○ | ○ |
| | A074 | PID differential gain | 0.0–100.0sec. | 0.0 | 0.0 | ○ | ○ |
| | A075 | Process variable scale conversion | 0.01–99.99% | 1.00 | 1.00 | × | ○ |
| | A076 | Process variable source setting | 00(at OI) / 01(at O) | 00 | 00 | × | ○ |
| AVR Function | A081 | AVR function selection | 00(Always ON) / 01(Always OFF) / 02(OFF during deceleration) | 00 | 00 | × | × |
| | A082 | AVR voltage selection | 200/215/220/230/240, 380/400/415/440/460/480V | 230/400 | 230/460 | × | × |
| Operation Mode and Accel./Decel. Function | A085 | Operation mode selection | 00(Normal operation) / 01(Energy-saving operation) | 00 | 00 | × | × |
| | A086 | Energy saving mode tuning | 0.0–100.0sec. | 50.0 | 50.0 | ○ | ○ |
| | A092 | Acceleration time (2) | 0.01–99.99/100.0–999.9/1000.–3600.sec. | 15.00 | 15.00 | ○ | ○ |
| | A292 | Acceleration time (2) for second motor | 0.01–99.99/100.0–999.9/1000.–3600.sec. | 15.00 | 15.00 | ○ | ○ |
| | A093 | Deceleration time (2) | 0.01–99.99/100.0–999.9/1000.–3600.sec. | 15.00 | 15.00 | ○ | ○ |
| | A293 | Deceleration time (2) for second motor | 0.01–99.99/100.0–999.9/1000.–3600.sec. | 15.00 | 15.00 | ○ | ○ |
| | A094 | Select method to switch to second accel./ decel. profile | 00(2CH input from terminal) / 01(Transition frequency) | 00 | 00 | × | × |
| | A294 | Select method to switch to second accel./ decel. profile for second motor | 00(2CH input from terminal) / 01(Transition frequency) | 00 | 00 | × | × |
| | A095 | Accel(1) to Accel(2) frequency transition point | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | × |
| | A295 | Accel(1) to Accel(2) frequency transition point for second motor | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | × |
| | A096 | Decel(1) to Decel(2) frequency transition point | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | × |
| | A296 | Decel(1) to Decel(2) frequency transition point for second motor | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | × |
| | A097 | Acceleration curve selection | 00(Linear)/ 01(S-curve)/ 02(U-shape)/ 03(Reverse U-shape) | 00 | 00 | × | × |
| | A098 | Deceleration curve selection | 00(Linear)/ 01(S-curve)/ 02(U-shape)/ 03(Reverse U-shape) | 00 | 00 | × | × |
| External Frequency Tuning | A101 | OI-L input active range start frequency | 0.00–400.0Hz | 0.00 | 0.00 | × | ○ |
| | A102 | OI-L input active range end frequency | 0.00–400.0Hz | 0.00 | 60.00 | × | ○ |
| | A103 | OI-L input active range start voltage | 0.–100.% | 20 | 20 | × | ○ |
| | A104 | OI-L input active range end voltage | 0.–100.% | 100 | 100 | × | ○ |
| | A105 | OI-L input start frequency enable | 00(External frequency output zero reference) / 01(0Hz) | 01 | 01 | × | ○ |
| | A111 | O2-L input active range start frequency | −400.0–400.0Hz | 0.00 | 0.00 | × | ○ |
| | A112 | O2-L input active range end frequency | −400.0–400.0Hz | 0.00 | 0.00 | × | ○ |
| | A113 | O2-L input active range start voltage | −100.–100.% | −100 | −100 | × | ○ |
| | A114 | O2-L input active range end voltage | −100.–100.% | 100 | 100 | × | ○ |
| Accel./Decel. Curve | A131 | Acceleration curve constants setting | 01(Smallest deviation)-10(Largest deviation) | 02 | 02 | × | ○ |
| | A132 | Deceleration curve constants setting | 01(Smallest deviation)-10(Largest deviation) | 02 | 02 | × | ○ |

(*1) 90kW and over

## ● B Group : Fine Tuning Functions

$$\left[\begin{array}{l}\bigcirc = \text{Allowed} \\ \times = \text{Not permitted}\end{array}\right]$$

| Code | | Name | Description | Default Setting -FE(CE) | Default Setting -FU2(UL) | Run-time Setting | Run-time Data Edit (Enabled at b031) |
|------|------|------|-------------|:---:|:---:|:---:|:---:|
| Restart after Instantaneous Power Failure | b001 | Selection of automatic restart mode | 00(Alarm output after trip, automatic restart disable) / 01(Restart at 0Hz) / 02(Resume operation after frequency matching) / 03(Resume previous frequency after frequency matching, then decelerate to stop and display trip information) | 00 | 00 | × | ○ |
| | b002 | Allowable instantaneous power failure time | 0.3–25.0sec. | 1.0 | 1.0 | × | ○ |
| | b003 | Time delay enforced before motor restart | 0.3–100.0sec. | 1.0 | 1.0 | × | ○ |
| | b004 | Instantaneous power failure and under-voltage trip enable | 00(Disable) / 01(Enable) / 02(Disable during stop and ramp to stop) | 00 | 00 | × | ○ |
| | b005 | Number of restarts after instantaneous power failure and under-voltage trip | 00(16 times) / 01(Always restart) | 00 | 00 | × | ○ |
| | b006 | Phase loss detection enable | 00(Disable) / 01(Enable) | 01 | 01 | × | ○ |
| | b007 | Restart frequency setting | 0.00–99.99/100.0–400.0Hz | 0.00 | 0.00 | × | ○ |
| Electronic Thermal | b012 | Level of electronic thermal setting | 0.20*rated current-1.20*rated current | Rated current | Rated current | × | ○ |
| | b212 | Level of electronic thermal setting for second motor | 0.20*rated current-1.20*rated current | Rated current | Rated current | × | ○ |
| | b013 | Electronic thermal characteristics | 00(Reduced torque) / 01(Constant torque) / 02(V/f free-setting) | 01 | 00 | × | ○ |
| | b213 | Electronic thermal characteristics for second motor | 00(Reduced torque) / 01(Constant torque) / 02(V/f free-setting) | 01 | 00 | × | ○ |
| | b015 | Free-setting electronic thermal frequency (1) | 0.–400.Hz | 0. | 0. | × | ○ |
| | b016 | Free-setting electronic thermal current (1) | 0.0–1000.A | 0.0 | 0.0 | × | ○ |
| | b017 | Free-setting electronic thermal frequency (2) | 0.–400.Hz | 0. | 0. | × | ○ |
| | b018 | Free-setting electronic thermal current (2) | 0.0–1000.A | 0.0 | 0.0 | × | ○ |
| | b019 | Free-setting electronic thermal frequency (3) | 0.–400.Hz | 0. | 0. | × | ○ |
| | b020 | Free-setting electronic thermal current (3) | 0.0–1000.A | 0.0 | 0.0 | × | ○ |
| Overload Restriction | b021 | Overload restriction operation mode | 00(Disable) / 01(Enable during accel./constant speed) / 02(Enable during constant speed) | 01 | 01 | × | ○ |
| | b022 | Overload restriction setting | 0.50*rated current-1.50*rated current | Rated current* 1.20 | Rated current* 1.10 | × | ○ |
| | b023 | Deceleration rate at overload restriction | 0.10–30.00 | 1.00 | 15.00 | × | ○ |
| | b024 | Overload restriction operation mode (2) | 00(Disable) / 01(Enable during accel./ constant speed) / 02(Enable at constant speed) | 01 | 01 | × | ○ |
| | b025 | Overload restriction setting (2) | 0.50*rated current–1.50*rated current | Rated current* 1.20 | Rated current* 1.20 | × | ○ |
| | b026 | Deceleration rate at overload restriction (2) | 0.10–30.00 | 1.00 | 1.00 | × | ○ |
| Software Lock | b031 | Software lock mode selection | 00(All parameters except b031 are locked when SFT from terminal is on) / 01(All parameters except b031 and output frequency F001 are locked when SFT from terminal is on) / 02(All parameters except b031 are locked) / 03(All parameters except b031 and output frequency F001 are locked) / 10(Run-time data edit mode) | 01 | 01 | × | ○ |
| Others | b034 | RUN/ power-on warning time | 0.–9999./1000–6553(10,000–65,5300)hr (Output to intelligent terminal) | 0. | 0. | × | ○ |
| | b035 | Rotational direction restriction | 00(Enable for both directions) / 01(Enable for forward) / 02(Enable for reverse) | 00 | 00 | × | × |
| | b036 | Reduced voltage soft start selection | 00(Short)–06(Long) | 06 | 06 | × | ○ |
| | b037 | Function code display restriction | 00(All) / 01(Utilized functions) / 02(User-selected functions only) | 00 | 00 | × | ○ |
| | b080 | AM terminal analog meter adjustment | 0–255 | 180 | 180 | ○ | ○ |
| | b081 | FM terminal analog meter adjustment | 0–255 | 60 | 60 | ○ | ○ |
| | b082 | Start frequency adjustment | 0.10–9.99Hz | 0.50 | 0.50 | × | ○ |
| | b083 | Carrier frequency setting | 0.5–12.0kHz (To be derated) {0.5–8kHz}(*1) | 3.0 | 3.0 | × | ○ |
| | b084 | Initialization mode | 00(Trip history clear) / 01(Parameter initialization) / 02(Trip history clear and parameter initialization) | 00 | 00 | × | × |
| | b085 | Country code for initialization | 00(Japanese version) / 01(European version) / 02(North American version) | 01 | 02 | × | × |
| | b086 | Frequency scaling conversion factor | 0.1–99.9 | 1.0 | 1.0 | ○ | ○ |
| | b087 | STOP key enable | 00(Enable) / 01(Disable) | 00 | 00 | × | ○ |
| | b088 | Resume on free-run stop cancellation mode | 00(Restart at 0Hz) / 01(Resume operation after frequency matching) | 00 | 00 | × | ○ |
| | b090 | Dynamic braking usage ratio | 0.0–100.0% | 0.0 | 0.0 | × | ○ |
| | b091 | Stop mode selection | 00(Deceleration and stop) / 01(Free-run stop) | 00 | 00 | × | × |
| | b092 | Cooling fan control | 00(Fan is always ON) / 01(Fan is ON during RUN including 5min. after power-on and stop) | 00 | 00 | × | × |
| | b095 | Dynamic braking control | 00(Disable) / 01(Enable during run) / 02(Enable during stop) | 00 | 00 | × | ○ |
| | b096 | Dynamic braking activation level | 330-380/660-760V | 360/720 | 360/720 | × | ○ |
| | b098 | Thermistor for thermal protection control | 00(Disable) / 01(PTC enable) / 02(NTC enable) | 00 | 00 | × | ○ |
| | b099 | Thermistor for thermal protection level setting | 0.0–9999Ω | 3000 | 3000 | × | ○ |
| Free-setting V/f pattern | b100 | Free-setting V/f frequency (1) | 0.–Free-setting V/f frequency (2) | 0.0 | 0.0 | × | × |
| | b101 | Free-setting V/f voltage (1) | 0.0–800.0V | 0.0 | 0.0 | × | × |
| | b102 | Free-setting V/f frequency (2) | 0.–Free-setting V/f frequency (3) | 0.0 | 0.0 | × | × |
| | b103 | Free-setting V/f voltage (2) | 0.0–800.0V | 0.0 | 0.0 | × | × |
| | b104 | Free-setting V/f frequency (3) | 0.–Free-setting V/f frequency (4) | 0.0 | 0.0 | × | × |
| | b105 | Free-setting V/f voltage (3) | 0.0–800.0V | 0.0 | 0.0 | × | × |
| | b106 | Free-setting V/f frequency (4) | 0.–Free-setting V/f frequency (5) | 0.0 | 0.0 | × | × |
| | b107 | Free-setting V/f voltage (4) | 0.0–800.0V | 0.0 | 0.0 | × | × |
| | b108 | Free-setting V/f frequency (5) | 0.–Free-setting V/f frequency (6) | 0.0 | 0.0 | × | × |
| | b109 | Free-setting V/f voltage (5) | 0.0–800.0V | 0.0 | 0.0 | × | × |
| | b110 | Free-setting V/f frequency (6) | 0.–Free-setting V/f frequency (7) | 0.0 | 0.0 | × | × |
| | b111 | Free-setting V/f voltage (6) | 0.0–800.0V | 0.0 | 0.0 | × | × |
| | b112 | Free-setting V/f frequency (7) | 0.–400.Hz | 0.0 | 0.0 | × | × |
| | b113 | Free-setting V/f voltage (7) | 0.0–800.0V | 0.0 | 0.0 | × | × |

(*1) 90kW and over

## ●C Group: Intelligent Terminal Functions

[○ = Allowed / × = Not permitted]

| Code | | Name | Description | Default Setting -FE(CE) | Default Setting -FU2(UL) | Run-time Setting | Run-time Data Edit (Enabled at b031) |
|---|---|---|---|---|---|---|---|
| Intelligent Input Terminal Setting | C001 | Terminal (1) function | 01(RV:Reverse) / 02(CF1:Multipeed(1)) / 03(CF2:Multispeed(2)) / 04(CF3:Multi-speed(3)) / 05(CF4:Multispeed(4)) / 06(JG:Jogging) / 07(DB:External DC braking) / 08(SET:Second motor constants setting) / 09(2CH:Second accel./decel.) / 11(FRS:Free-run stop) / 12(EXT:External trip) / 13(USP:Unattended start protection) / 14(CS:Change to/from commercial power supply) / 15(SFT:Software lock) / 16(AT:Analog input selection) /18(RS:Reset) / 20(STA:3-wire start) / 21(STP:3-wire hold) / 22(F/R:3-wire fwd./rev.) / 23(PID:PID On/Off) / 24(PIDC:PID reset) / 27(UP:Remote-controlled accel.) / 28(DWN:Remote-controlled decel.) / 29(UDC:Remote-controlled data clearing) / 31(OPE:Operator control) / 32(SF1:Multi-speed bit command(1) / 33(SF2:Multispeed bit command(2) / 34(SF3:Multispeed bit command(3) / 35(SF4:Multispeed bit command(4) / 36(SF5:Multispeed bit com-mand(5) / 37(SF6:Multispeed bit command(6) / 38(SF7:Multispeed bit command(7) / 39(OLR:Overload limit change) / 49(ROK: RUN permissive)(*1) / 255(NO:Not selected) | 18 | 18 | × | ○ |
| | C002 | Terminal (2) function | | 16 | 16 | × | ○ |
| | C003 | Terminal (3) function | | 03 | 13 | × | ○ |
| | C004 | Terminal (4) function | | 02 | 02 | × | ○ |
| | C005 | Terminal (5) function | | 01 | 01 | × | ○ |
| Intelligent Input Terminal State Setting | C011 | Terminal (1) active state | 00(NO) / 01(NC) | 00 | 00 | × | ○ |
| | C012 | Terminal (2) active state | 00(NO) / 01(NC) | 00 | 00 | × | ○ |
| | C013 | Terminal (3) active state | 00(NO) / 01(NC) | 00 | 01 | × | ○ |
| | C014 | Terminal (4) active state | 00(NO) / 01(NC) | 00 | 00 | × | ○ |
| | C015 | Terminal (5) active state | 00(NO) / 01(NC) | 00 | 00 | × | ○ |
| | C019 | Terminal FW active state | 00(NO) / 01(NC) | 00 | 00 | × | ○ |
| Intelligent Output Terminal Setting | C021 | Terminal (11) function | 00(RUN:Run signal) / 01(FA1:Frequency arrival signal (at the set frequen-cy))/ 02(FA2:Frequency arrival signal (at or above the set frequency)) / 03(OL:Overload advance notice signal) / 04(OD:Output deviation for PID control) / 05(AL:Alarm signal) / 06(FA3:Frequency arrival signal (only at the set frequency)) / 08(IP:Instantaneous power failure signal) / 09(UV:Under-voltage signal)/ 11(RNT:RUN time over) / 12(ONT:Power-on time over) / 13(THM:Thermal alarm) / 27(RMD: Operator RUN command signal)(*1) | 01 | 01 | × | ○ |
| | C022 | Terminal (12) function | | 00 | 00 | × | ○ |
| | C026 | Alarm relay terminal function | | 05 | 05 | × | ○ |
| Intelligent Output Terminal State and Output Level setting | C027 | FM signal selection | 00(Output frequency) / 01(Output current) / 03(Digital output frequency-only at C027) / 04(Output voltage) / 05(Power) / 06(Thermal load ratio) / 07(LAD fre-quency) | 00 | 00 | × | ○ |
| | C028 | AM signal selection | | 00 | 00 | × | ○ |
| | C029 | AMI signal selection | | 00 | 00 | × | ○ |
| | C031 | Terminal (11) active state | 00(NO) / 01(NC) | 00 | 00 | × | ○ |
| | C032 | Terminal (12) active state | 00(NO) / 01(NC) | 00 | 00 | × | ○ |
| | C036 | Alarm relay terminal active state | 00(NO) / 01(NC) | 01 | 01 | × | ○ |
| | C040 | Overload signal output mode | 00(During accel./decel.) / 01(At constant speed) | 01 | 01 | × | ○ |
| | C041 | Overload level setting | 0.00*rated current-2.00*rated current | Rated current | Rated current | × | ○ |
| | C042 | Arrival frequency setting for acceleration | 0.00–99.99/100.0–400.0Hz | 0.0 | 0.0 | × | ○ |
| | C043 | Arrival frequency setting for deceleration | 0.00–99.99/100.0–400.0Hz | 0.0 | 0.0 | × | ○ |
| | C044 | PID deviation level setting | 0.0–100.0% | 3.0 | 3.0 | × | ○ |
| | C061 | Electronic thermal warning level setting | 0.–100.% | 80 | 80 | × | ○ |
| Serial Communi-cation | C070 | Data command method | 02(Operator) / 03(RS485) / 04 (Expansion card 1) / 05(Expansion card 2) | 02 | 02 | × | × |
| | C071 | Communication speed selection | 03(2400bps) / 04(4800bps) / 05(9600bps) / 06(19200bps) | 04 | 04 | × | ○ |
| | C072 | Node allocation | 1.–32. | 1. | 1. | × | ○ |
| | C073 | Communication data length selection | 7(7-bit) / 8(8-bit) | 7 | 7 | × | ○ |
| | C074 | Communication parity selection | 00(No parity) / 01(Even) / 02(Odd) | 00 | 00 | × | ○ |
| | C075 | Communication stop bit selection | 1(1-bit) / 2(2-bit) | 1 | 1 | × | ○ |
| | C078 | Communication wait time | 0.–1000.msec. | 0.0 | 0.0 | × | ○ |
| Analog Meter Setting | C081 | O input span calibration | 0.– 9999./1000– 6553(10,000–65,530) | Factory set | Factory set | ○ | ○ |
| | C082 | OI input span calibration | 0.– 9999./1000– 6553(10,000–65,530) | Factory set | Factory set | ○ | ○ |
| | C083 | O2 input span calibration | 0.– 9999./1000– 6553(10,000–65,530) | Factory set | Factory set | ○ | ○ |
| | C085 | Thermistor input tuning | 0.0–1000. | 105 | 105 | ○ | ○ |
| | C086 | AM terminal offset tuning | 0.0–10.0V | 0.0 | 0.0 | ○ | ○ |
| | C087 | AMI terminal meter tuning | 0.–255. | 80 | 80 | ○ | ○ |
| | C088 | AMI terminal offset tuning | 0.–20.0mA | Factory set | Factory set | ○ | ○ |
| Others | C091 | Debug mode enable | 00(No display) / 01(Display) | 00 | 00 | × | ○ |
| | C101 | UP/DOWN memory mode selection | 00(Clear previous frequency) / 01(Keep previous frequency) | 00 | 00 | × | ○ |
| | C102 | Reset mode selection | 00(Cancel trip state when reset signal turns ON) / 01(Cancel trip state when reset signal turns OFF) / 02(Cancel trip state when reset signal turns ON(En-able during trip state)) | 00 | 00 | ○ | ○ |
| | C103 | Restart frequency after reset | 00(Restart at 0Hz) / 01(Resume operation after frequency matching) | 00 | 00 | × | ○ |
| | C121 | O input zero calibration | 0.– 9999./1000– 6553(10,000–65,530) | Factory set | Factory set | ○ | ○ |
| | C122 | OI input zero calibration | 0.– 9999./1000– 6553(10,000–65,530) | Factory set | Factory set | ○ | ○ |
| | C123 | O2 input zero calibration | 0.– 9999./1000– 6553(10,000–65,530) | Factory set | Factory set | ○ | ○ |

## ●H Group: Motor Constants Functions

| Code | | Name | Description | -FE(CE) | -FU2(UL) | Run-time Setting | Run-time Data Edit |
|---|---|---|---|---|---|---|---|
| | H003 | Motor capacity | 0.20–75.0(kW) {–160(kW)}(*2) | Factory set | Factory set | × | × |
| | H203 | Motor capacity for second motor | 0.20–75.0(kW) {–160(kW)}(*2) | Factory set | Factory set | × | × |
| | H004 | Motor poles setting | 2/4/6/8 | 4 | 4 | × | × |
| | H204 | Motor poles setting for second motor | 2/4/6/8 | 4 | 4 | × | × |
| | H006 | Motor stabilization constant | 0.–255. | 100. | 100. | ○ | ○ |
| | H206 | Motor stabilization constant for second motor | 0.–255. | 100. | 100. | ○ | ○ |

## ●P Group: Expansion Card Functions

| Code | | Name | Description | -FE(CE) | -FU2(UL) | Run-time Setting | Run-time Data Edit |
|---|---|---|---|---|---|---|---|
| | P001 | Operation mode on Expansion card 1 error | 00(Trip) / 01(Continuous operation) | 00 | 00 | × | ○ |
| | P002 | Operation mode on Expansion card 2 error | 00(Trip) / 01(Continuous operation) | 00 | 00 | × | ○ |
| | P031 | Accel/deccel time input selection | 00(operation)/01(option1)/02(option2) | 00 | 00 | × | × |
| | P044 | DeviceNet comm watchdog timer | 0.00-99.99s | 1.00 | 1.00 | × | × |
| | P045 | Inverter action on DeviceNet comm error | 00(trip)/01(trip after deceleration stop)/02(invalid)/03(free-run)/04(deceleration stop) | 01 | 01 | × | × |
| | P046 | DeviceNet polled I/O:Output instance number | 20,21,100 | 21 | 21 | × | × |
| | P047 | DeviceNet polled I/O:Input instance number | 70,71,101 | 71 | 71 | × | × |
| | P048 | Input action on DeviceNet idle mode | 00(trip)/01(trip after deceleration stop)/02(invalid)/03(free-run)/04(deceleration stop) | 01 | 01 | × | × |
| | P049 | Motor poles setting for RPM | 0-38(even only) | 0 | 0 | × | × |
| | P050 | Output frequency on analog reference signal loss | 00(Output freq.forced to 0Hz; 500ms wait to recover)/01(Output forced 0Hz; no wait to recover)/02(Output freq.forced to max.freq.A004)/03(Output ferq.forced to A020/A220) | 00 | 00 | × | × |

## ●U Group: User-selectable Menu Functions

| Code | | Name | Description | -FE(CE) | -FU2(UL) | Run-time Setting | Run-time Data Edit |
|---|---|---|---|---|---|---|---|
| | U001 I U012 | User selected functions | no / d001-P002 | no | no | × | ○ |

(*1) For UL version only  (*2) 90kW and over

# TERMINALS

## Main Circuit Terminals

### ● Terminal Description

| Terminal Symbol | Terminal Name |
|---|---|
| R(L1), S(L2), T(L3) | Main power supply input terminals |
| U(T1), V(T2), W(T3) | Inverter output terminals |
| PD(+1), P(+) | DC reactor connection terminals |
| P(+), RB(RB) | External braking resistor connection terminals |
| P(+), N(−) | External braking unit connection terminals |
| ⏚(G) | Ground connection terminal |
| R0(R0), T0(T0) | Control power supply input terminals |

### ● Terminal Arrangement

■015−055 LFU2, HFU2, HFE2

| R (L1) | S (L2) | T (L3) | U (T1) | V (T2) | W (T3) |
|---|---|---|---|---|---|

| R0 (R0) | T0 (T0) |
|---|---|

| PD (+1) | P (+) | N (−) | RB (RB) | ⏚(G) | ⏚(G) |
|---|---|---|---|---|---|

■110−150HFE2, 075−150HFU2/LFU2

| R (L1) | S (L2) | T (L3) | U (T1) | V (T2) | W (T3) |
|---|---|---|---|---|---|
| PD (+1) | P (+) | N (−) | RB (RB) | ⏚(G) | ⏚(G) |

| R0 (R0) | T0 (T0) |
|---|---|

■185−370LFU2
185−750HFE2, HFU2

| R0 (R0) | T0 (T0) |
|---|---|

| ⏚(G) | R (L1) | S (L2) | T (L3) | PD (+1) | P (+) | N (−) | U (T1) | V (T2) | W (T3) | ⏚ |
|---|---|---|---|---|---|---|---|---|---|---|

■220, 300, 450, 550, 750LFU2
900−1320HFE2/HFU2

| R0 (R0) | T0 (T0) |
|---|---|

| R (L1) | S (L2) | T (L3) | PD (+1) | P (+) | N (−) | U (T1) | V (T2) | W (T3) |
|---|---|---|---|---|---|---|---|---|

⏚(G)                    ⏚(G)

### ● Screw Diameter and Terminal Width

| Main Circuit Terminals | | | | | | | | | | R0,T0 Terminals |
|---|---|---|---|---|---|---|---|---|---|---|
| Model | 015−037 LFU2 HFE2/HFU2 | 055LFU2 HFE2/HFU2 | 075LFU2 HFE2/HFU2 | 110−150LFU2 HFE2/HFU2 | 185LFU2,185−370 HFE2/HFU2 | 220−370LFU2, 450−750HFE2/HFU2 | 450−550 LFU2 | 750LFU2, 1320HFE2/HFU2 | 900−1100 HFE2/HFU2 | All models |
| Screw diameter | M4 | M5 | M5 | M6 | M6 | M8 | M10 | M10 | M10 | M4 |
| Terminal width (mm) | 13 | 13 | 17.5 | 17.5 | 18 | 23 | 35 | 40 | 29 | 9 |

*For ground screw of 200, 300, 450, 550 LFU2, M6 is used. For 900−1320HFE/HFU2, M8 is used.
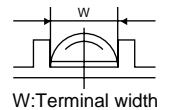
W:Terminal width

## Control Circuit Terminals
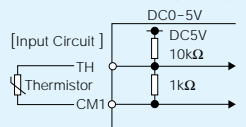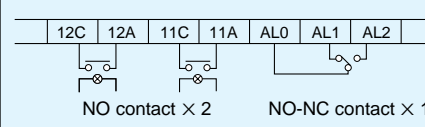
### ● Terminal Arrangement

| H | O2 | AM | FM | TH | FW | 5 | 4 | 3 | 2 | 1 | AL1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | O | OI | AMI | P24 | PLC | CM1 | 12C | 12A | 11C | 11A | AL0 | AL2 |

Screw diameter M3, Terminal width 6.4mm

# Control Circuit Terminals

## ● Terminal Description  [  ]: Default setting (CE/UL)

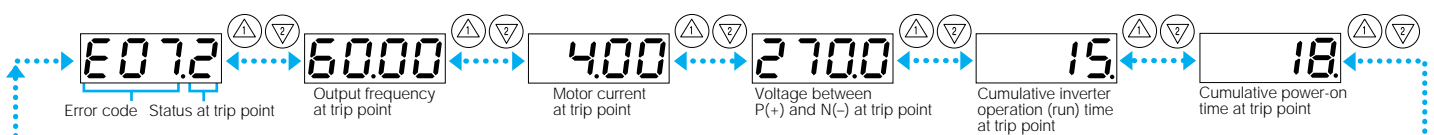| | | Symbol | Name | Explanation of Terminals | Ratings |
|---|---|---|---|---|---|
| **Analog** | Power Supply | L | Common Terminal for Analog Power Source | Common terminal for H, O, O2, OI, AM, and AMI. Do not ground. | — |
| | | H | Power Source for Frequency Setting | Power supply for frequency command input | DC 10V, 20mA max. |
| | Frequency Setting | O | Frequency Command Terminal | Maximum frequency is attained at DC 10V in DC 0-10V range. Set the voltage at A014 to command maximum frequency below DC 10V. | Input impedance: 10kΩ, Allowable input voltage range: DC −0.3-+12V |
| | | O2 | Frequency Command Extra Terminal | O2 signal is added to the frequency command of O or OI in DC 0-±10V range. By changing configuration, frequency command can be input also at O2 terminal. | Input impedance:10kΩ, Allowable input voltage range: DC 0-±12V |
| | | OI | Frequency Command Terminal | Maximum frequency is attained at DC 20mA in DC 4-20mA range. When the intelligent terminal configured as AT is on, OI signal is enabled. | Input impedance: 100Ω, Allowable input voltage range: DC 0-24mA |
| | Monitor Output | AM | Analog Output Monitor (Voltage) | Selection of one function from: Output frequency, output current, torque, output voltage, input power, electronic thermal load ratio, and LAD frequency. | DC 0-10V, 2mA max. |
| | | AMI | Analog Output Monitor (Current) | | DC 4-20mA, 250Ω max. |
| | Analog Input / Sensor | TH | Thermistor Input Terminals | The inverter trips when the external thermistor detects abnormal temperature. Common terminal is CM1. [Recommended thermistor characteristics] Allowable rated power: 100mW or over. Impedance in the case of abnormal temperature: 3kΩ Note: Thermal protection level can be set between 0 and 9999Ω. | Allowable input voltage range<br>[Input Circuit] DC0-5V DC5V 10kΩ / TH / Thermistor / CM1 1kΩ |
| **Digital** | Monitor Output | FM | Digital Monitor (Voltage) | [DC0-10V output (PWM output)]  Selection of one function from: Output frequency, output current, torque, output voltage, input power, electronic thermal load ratio, and LAD frequency. [Digital pulse output (Pulse voltage DC 0/10V)] Outputs the value of output frequency as digital pulse (duty 50%) | Digital output frequency range: 0-3.6kHz, 1.2mA max. |
| | Power Supply | P24 | Power Terminal for Interface | Internal power supply for input terminals. In the case of source type logic, common terminal for contact input terminals. | DC 24V, 100mA max. |
| | | CM1 | Common Terminal for Interface | Common terminal for P24, TH, and FM. In the case of sink type logic, common terminal for contact input terminals. Do not ground. | — |
| | Contact Input / Run Command | FW | Forward Command Input | The motor runs forward when FW terminal is ON, and stops when FW is OFF. | [Input ON condition] Voltage between each terminal and PLC: DC 18V min.<br><br>[Input OFF condition] Voltage between each terminal and PLC: DC 3V max.<br><br>Input impedance between each terminal and PLC: 4.7Ω |
| | Contact Input / Functions | 1 [RS/RS]<br>2 [AT/AT]<br>3 [CF2/USP]<br>4 [CF1/CF1]<br>5 [RV/RV] | Intelligent Input Terminals | Assign 5 functions to terminals. (Refer to the standard specifications for the functions.) | |
| | Contact Input / Common Terminal | PLC | Common Terminal for Intelligent Input Terminals, Common Terminal for External Power Supply for PLCs, etc. | Select sink or source logic with the short-circuit bar on the control terminals. Sink logic: Short P24 to PLC / Source logic: Short CM1 to PLC. When applying external power source, remove the short-circuit bar and connect PLC terminal to the external device. | Allowable maximum voltage between each terminal and PLC: DC 27V |
| | Relay Output / State/ Alarm | 12C [RUN/RUN]<br>12A [RUN/RUN]<br>11C [FA1/FA1]<br>11A [FA1/FA1]<br>AL0 [AL/AL]<br>AL1 [AL/AL]<br>AL2 [AL/AL] | Intelligent Output Terminals | Assign 3 functions to two NO contacts and one NO-NC contact. (Refer to the standard specifications for the functions.)<br><br>Intelligent relay output terminals<br><br>12C 12A 11C 11A AL0 AL1 AL2<br><br>NO contact × 2    NO-NC contact × 1 | Maximum capacity of relays 11,12: AC 250V, 5A(R load)/1A(I load) DC 30V, 5A(R load)/1A(I load) AL1-AL0: AC 250V, 2A(R load)/0.2A(I load) DC 30V, 8A(R load)/0.6A(I load) AL2-AL0: AC 250V, 1A(R load)/0.2A(I load) DC 30V, 1A(R load)/0.2A(I load) Minimum capacity of relays 11,12: DC 1V, 1mA AL1-AL0, AL2-AL0: AC100V, 10mA DC5V, 100mA |

# PROTECTIVE FUNCTIONS

| Name | Cause(s) | | Display on digital operator | Display on remote operator/copy unit ERR1**** |
|------|----------|---|---|---|
| Over-current protection | The inverter output was short-circuited, or the motor shaft is locked or has a heavy load. These conditions cause excessive current for the inverter, so the inverter output is turned off. | While at constant speed | E 01 | OC.Drive |
| | | During deceleration | E 02 | OC.Drive |
| | | During acceleration | E 03 | OC.Accel |
| | | Others | E 04 | Over.C |
| Overload protection(*1) | When a motor overload is detected by the electronic thermal function, the inverter trips and turns off its output. | | E 05 | Over.L |
| Braking resistor overload protection | When the regenerative braking resistor exceeds the usage time allowance or an over-voltage caused by the stop of the BRD function is detected, the inverter trips and turns off its output. | | E 06 | OL.BRD |
| Over-voltage protection | When the DC bus voltage exceeds a threshold, due to regenerative energy from the motor, the inverter trips and turns off its output. | | E 07 | Over.V |
| EEPROM error(*2) | When the built-in EEPROM memory has problems due to noise or excessive temperature, the inverter trips and turns off its output. | | E 08 | EEPROM |
| Under-voltage error | A decrease of internal DC bus voltage below a threshold results in a control circuit fault. This condition can also generate excessive motor heat or cause low torque. The inverter trips and turns off its output. | | E 09 | Under.V |
| CT(Current transformer) error | If a strong source of electrical interference is close to the inverter or abnormal operations occur in the built-in CT(Current transformer), the inverter trips and turns off its output. | | E 10 | CT |
| CPU error | When a malfunction in the built-in CPU has occurred, the inverter trips and turns off its output. | | E 11 | CPU1 |
| External trip | When a signal to an intelligent input terminal configured as EXT has occurred, the inverter trips and turns off its output. | | E 12 | EXTERNAL |
| USP error | An error occurs when power is cycled while the inverter is in RUN mode if the Unattended Start Protection (USP) is enabled. The inverter trips and does not go into RUN mode until the error is cleared. | | E 13 | USP |
| Ground fault | The inverter is protected by the detection of ground faults between the inverter output and the motor during power-up tests. This feature protects the inverter only. | | E 14 | GND.Flt. |
| Input over-voltage protection | When the input voltage is higher than the specified value, it is detected 60 seconds after power-up and the inverter trips and turns of its output. | | E 15 | OV.SRC |
| Instantaneous power failure | When power is cut for more than 15msec., the inverter trips and turns off its output. If power failure continues, the error will be cleared. The inverter restarts if it is in RUN mode when power is cycled. | | E 16 | Inst.P-F |
| Inverter thermal trip | When the inverter internal temperature is higher than the specified value, the thermal sensor in the inverter module detects the higher temperature of the power devices and trips, turning off the inverter output. | | E 21 | OH FIN |
| Gate array error | Communication error has occured between CPU and gate array. | | E 23 | GA |
| Missing phase | One of three lines of 3-phase power supply is missing. | | E 24 | PH.Fail |
| IGBT error | When instantaneous over-current has occurred, the inverter trips and turns off its output to protect main circuit element. | | E 30 | IGBT |
| Thermistor error | When the thermistor inside the motor detects temperature higher than the specified value, the inverter trips and turns off its output. | | E 35 | TH |
| Expansion card 1 connection error | An error has been detected in an expantion card or at its connecting terminals. | | E 60 – E 69 | OP1 0-9 |
| Expansion card 2 connection error | | | E 70 – E 79 | OP2 0-9 |
| Out of operation due to under-voltage | Due to insufficient voltage, the inverter has turned off its output and been trying to restart. If it fails to restart, it goes into the under-voltage error. | | _ _ U | UV.WAIT |

(*1)You can clear the error by pressing the Start / Reset key 10 seconds after the trip occurred.
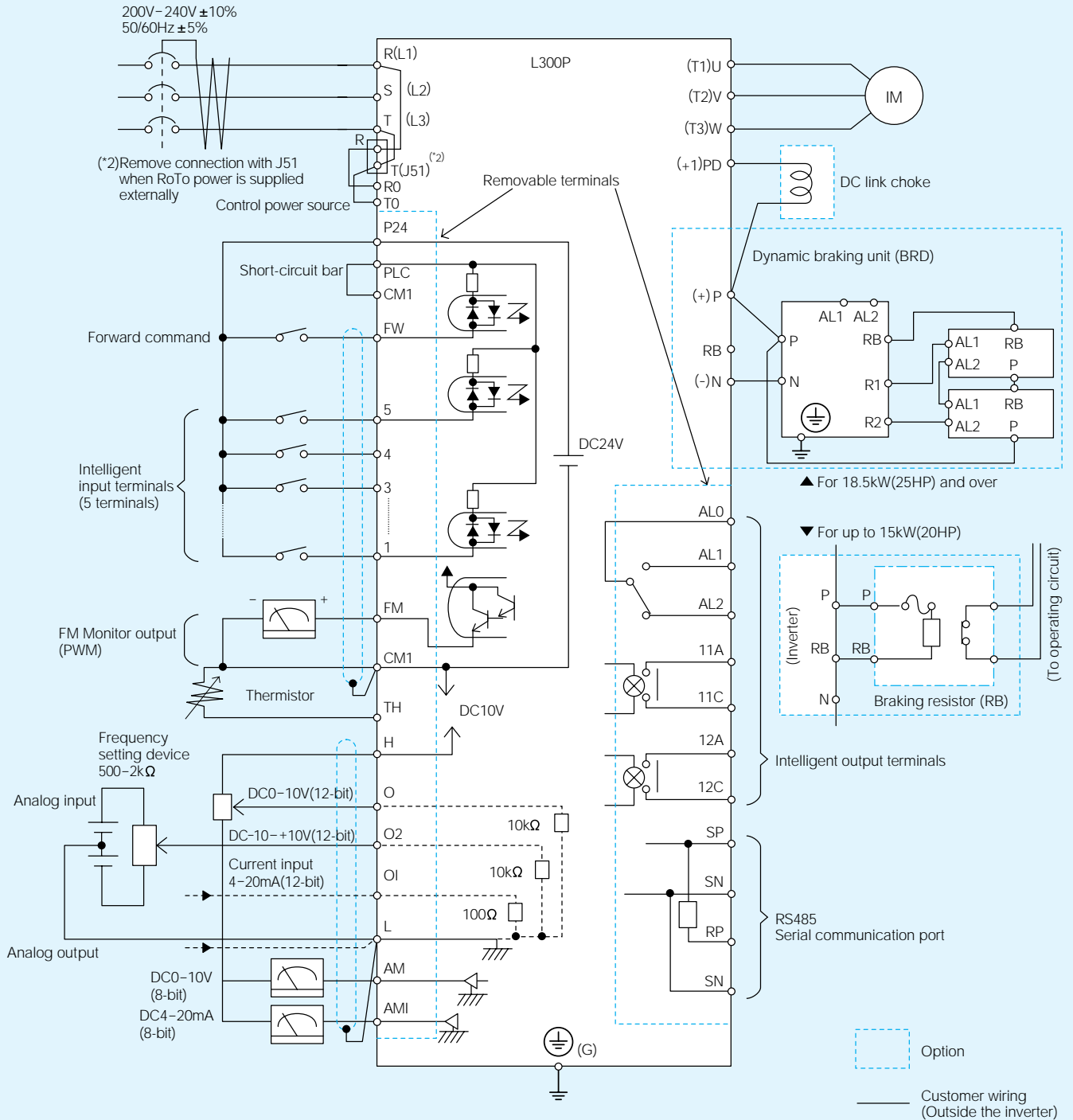(*2)If an EEPROM error E08 occurs, be sure to confirm the parameter data values are still correct.

## 〈How to access the details about the present fault〉



| E 07.2 | 60.00 | 4.00 | 270.0 | 15. | 18. |
|--------|-------|------|-------|-----|-----|
| Error code   Status at trip point | Output frequency at trip point | Motor current at trip point | Voltage between P(+) and N(–) at trip point | Cumulative inverter operation (run) time at trip point | Cumulative power-on time at trip point |

# CONNECTING DIAGRAM

## ■ SOURCE TYPE LOGIC

In case of 400V class,
place a transformer for operating circuit
to receive 200V.



200V～240V± 10%
50/60Hz± 5%

(*2)Remove connection with J51
when RoTo power is supplied
externally

Control power source

L300P

(*2)

Removable terminals

DC link choke

Dynamic braking unit (BRD)

▲ For 18.5kW(25HP) and over

▼ For up to 15kW(20HP)

Braking resistor (RB)

Short-circuit bar

Forward command

Intelligent
input terminals
(5 terminals)

FM Monitor output
(PWM)

Thermistor

Frequency
setting device
500～2kΩ

Analog input

Current input
4～20mA(12-bit)

Analog output

DC0～10V
(8-bit)

DC4～20mA
(8-bit)

DC24V

DC10V

DC0～10V(12-bit)

DC-10～+10V(12-bit)

Intelligent output terminals

RS485
Serial communication port

Option

Customer wiring
(Outside the inverter)

| Terminal Name | FW, 1, 2, 3, 4, 5 | FM, TH | H, O, O2, OI, AM, AMI |
|---|---|---|---|
| Common | P24 | CM1 | L |

# ■SINK TYPE LOGIC

In case of 400V class,
place a transformer for operating circuit
to receive 200V.
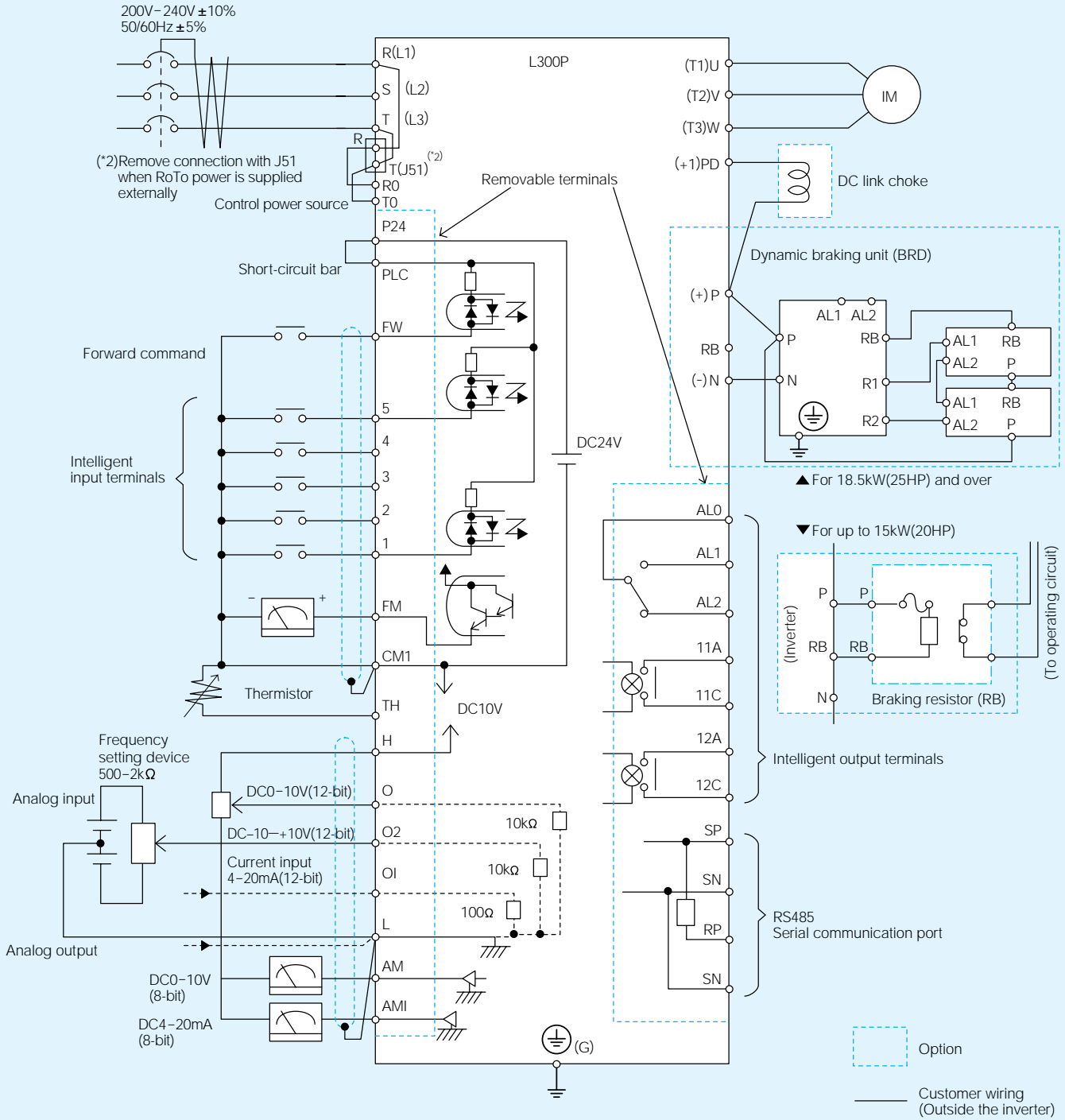


| Terminal Name | FW, 1, 2, 3, 4, 5, FM, TH | H, O, O2, OI, AM, AMI |
|---|---|---|
| Common | CM1 | L |

# CONNECTING TO PLC

## 1. USING INTERNAL POWER SUPPLY OF THE INVERTER

### (1) Sink type logic
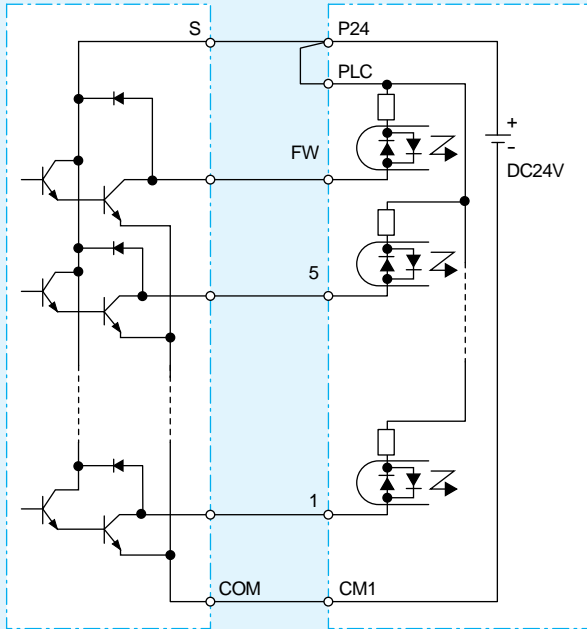


Hitachi EH-150 series PLC
Output Module
EH-YT16

L300P

### (2) Source type logic
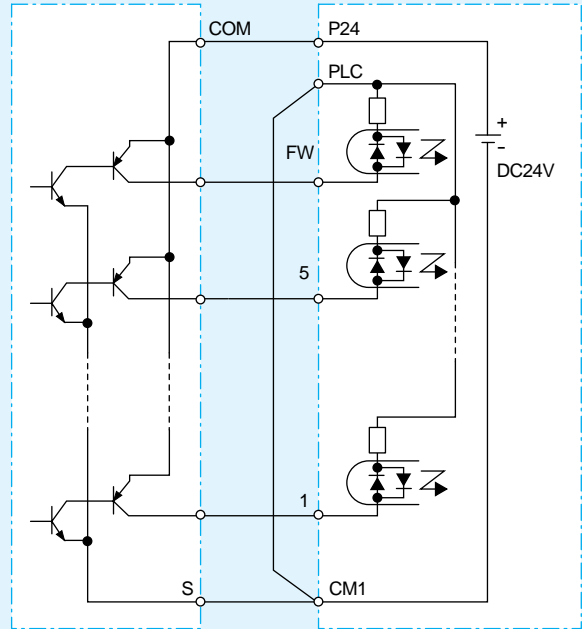


Hitachi EH-150 series PLC
Output Module
EH-YTP16

L300P

(Note:Place short-circuit bar between PLC and CM1 instead of P24 and PLC.)

## 2. USING EXTERNAL POWER SUPPLY

### (1) Sink type logic
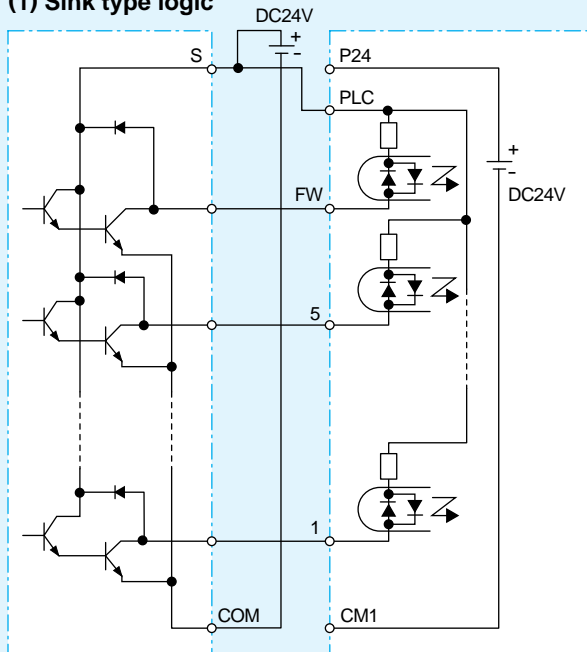


Hitachi EH-150 series PLC
Output Module
EH-YT16

L300P

(Note:Remove short-circuit bar between P24 and PLC.)

### (2) Source type logic
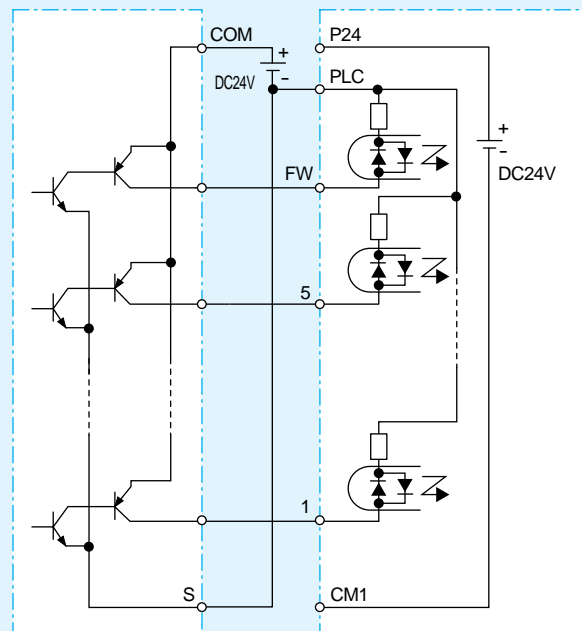


Hitachi EH-150 series PLC
Output Module
EH-YTP16

L300P

(Note:Remove short-circuit bar between P24 and PLC.)

(Note:Be sure to turn on the inverter after turning on the PLC and its external power supply to prevent the parameters in the inverter from being modified.)

# WIRING and ACCESSORIES

**Power Supply**

**Fuse**

**Inverter**

R (L1)  S (L2)  T (L3)  PD (+1)

P (+)

R0  T0  RB (−)N

(T1)  (T2)  (T3)

U  V  W

**IM  Motor**
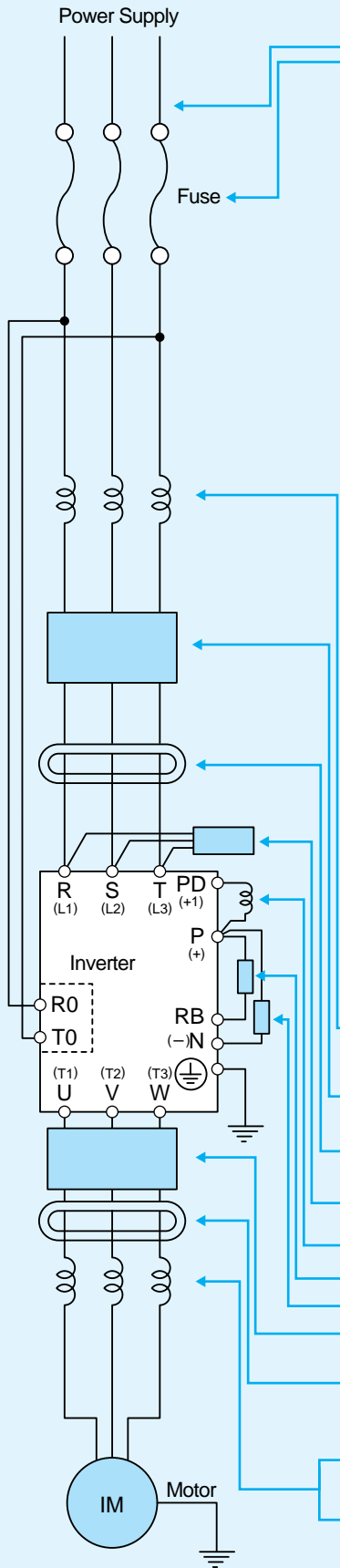
| Input Voltage | Motor Output (kW(HP)) | Model | Wiring | | Signal Lines | Fuse (Class J) |
|---|---|---|---|---|---|---|
| | | | Power Lines | | | |
| | | | AWG | mm² | | |
| 200V | 1.5(2) | L300P-015LFU2 | AWG 14 | 2.1 | 0.75mm² shielded wire | 10 |
| | 2.2(3) | L300P-022LFU2 | AWG 14 | 2.1 | | 15 |
| | 3.7(5) | L300P-037LFU2 | AWG 10 | 5.3 | | 20 |
| | 5.5(8) | L300P-055LFU2 | AWG 8 | 8.4 | | 30 |
| | 7.5(10) | L300P-075LFU2 | AWG 6 | 13.3 | | 40 |
| | 11(15) | L300P-110LFU2 | AWG 4 | 21.2 | | 60 |
| | 15(20) | L300P-150LFU2 | AWG 2 | 33.6 | | 70 |
| | 18.5(25) | L300P-185LFU2 | AWG 4 *2 | 21.2 *2 | | 90 |
| | 22(30) | L300P-220LFU2 | AWG 1/0 | 53.5 | | 100 |
| | 30(40) | L300P-300LFU2 | AWG 2 *2 | 33.8 *2 | | 150 |
| | 37(50) | L300P-370LFU2 | AWG 1 *2 | 42.4 *2 | | 175 |
| | 45(60) | L300P-450LFU2 | AWG 1 *2(75°C) | 42.4 *2 | | 200 |
| | 55(75) | L300P-550LFU2 | AWG 2/0 *2 | 67.4 *2 | | 250 |
| | 75(100) | L300P-750LFU2 | AWG 3/0 *2 | 85.0 *2 | | 300 |
| 400V | 1.5(2) | L300P-015HFU2 | AWG 18 | 0.8 | 0.75mm² shielded wire | 10 |
| | 2.2(3) | L300P-022HFU2 | AWG 16 | 1.3 | | 10 |
| | 3.7(5) | L300P-040HFU2 | AWG 14 | 2.1 | | 15 |
| | 5.5(8) | L300P-055HFU2 | AWG 12 | 3.3 | | 15 |
| | 7.5(10) | L300P-075HFU2 | AWG 10 | 5.3 | | 20 |
| | 11(15) | L300P-110HFU2 | AWG 8 | 8.4 | | 30 |
| | 15(20) | L300P-150HFU2 | AWG 6 | 13.3 | | 35 |
| | 18.5(25) | L300P-185HFU2 | AWG 6 | 13.3 | | 50 |
| | 22(30) | L300P-220HFU2 | AWG 4 | 21.2 | | 50 |
| | 30(40) | L300P-300HFU2 | AWG 3 | 26.7 | | 70 |
| | 37(50) | L300P-370HFU2 | AWG 4 *2 | 21.2 *2 | | 80 |
| | 45(60) | L300P-450HFU2 | AWG 1 | 42.4 | | 100 |
| | 55(75) | L300P-550HFU2 | AWG 2 *2 | 33.8 *2 | | 125 |
| | 75(100) | L300P-750LFU2 | AWG 1 *2 | 42.4 *2 | | 150 |
| | 90(125) | L300P-900LFU2 | AWG 1 *2(75°C) | 42.4 *2 | | 200 |
| | 110(150) | L300P-1100LFU2 | AWG 2/0 *2 | 67.4 *2 | | 225 |
| | 132(175) | L300P-1320LFU2 | AWG 2/0 *2 | 67.4 *2 | | 300 |

Note 1: Field wiring connection must be made by a UL and c-UL listed closed-loop terminal connector sized for the wire gauge involved. Connector must be fixed using the crimping tool specified by the connector manufacturer.
Note 2: Be sure to use bigger wires for power lines if the distance exceeds 20m(66ft).

| Name | Function |
|---|---|
| Input side AC reactor | This is useful in suppressing harmonics induced on the power supply lines, or when the main power voltage imbalance exceeds 3% (and power source capacity is more than 500kVA), or to smooth out line fluctuations. It also improves the power factor. |
| EMI filter | This filter reduces the conducted noise in the power supply wiring between the inverter and the power distribution system. Connect it to the inverter primary (input side). |
| Radio noise filter | Electrical noise interference may occur on nearby equipment such as a radio receiver. This magnetic choke filter helps reduce radiated noise (can also be used on output). |
| Radio noise filter (Capacitive filter) | This capacitive filter reduces radiated noise from the main power wires in the inverter input side. |
| DC link choke | The choke suppresses harmonics generated by the inverter. However, it will not protect the input diode bridge rectifier. |
| Braking resistor | Braking components are useful for increasing the inverter's control torque for high duty-cycle (on-off) applications, and improving the decelerating capability. |
| Braking unit | |
| Output side noise filter | Reduces radiated noise from wiring in the inverter output side. |
| Radio noise filter | Electrical noise interference may occur on nearby equipment such as a radio receiver. This magnetic choke filter helps reduce radiated noise (can also be used on input). |
| AC reactor | This reactor reduces the vibration in the motor caused by the inverter's switching waveforms, by smoothing the waveforms to approximate commercial power quality. It is also useful when wiring from the inverter to the motor is more than 10m in length, to reduce harmonics. |
| LCR filter | Sine wave shaping filter for the output side. |

Note: An EMI filter is required for European EMC directive and C-Tick, but the others are not for this purpose.

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# ACCESSORIES

## ●OPERATOR

| Model | Potentiometer | Remote Control | Installation in L300P | | Copy Function | Multilingual |
|---|---|---|---|---|---|---|
| OPE-S | | ◯ | ◯ | | | |
| OPE-SR/SRE | ◯ | ◯ | ◯ (Standard for L300P) | (OPE-SRE: Standard for L300P UL version) | | |
| SRW-0EX | | ◯ | ◯ | | ◯ | ◯ |

＊OPE-SRE: English overlay

## ●CABLE FOR OPERATOR

| Model | Cable Length |
|---|---|
| ICS-1 | 1m (3.3ft) |
| ICS-3 | 3m (9.8ft) |

## ■REMOTE OPERATOR SRW-0EX(Optional)



## ■DIMENSIONS

[Unit:mm (inch)]
Inches for reference only

### ●OPE-S(R)



13(0.51) 8(0.31)

80(3.15)

79(3.11)
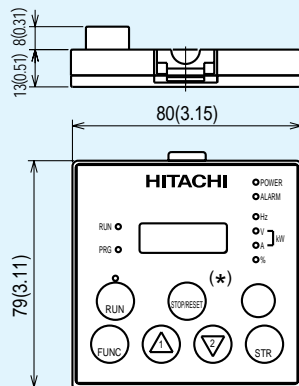
＊Potentiometer is installed only in ORE-SR/SRE.

26.5(1.04)
18(0.71) 2(0.08)
18(0.71)
59(2.32)
2-φ4(0.16)

Mounting holes

### ● SRW-0EX



13(0.51) 8(0.31)

80(3.15)

123(4.84)

103(4.06)

6.5(0.26)

2-M3 depth5
(Reverse side)

26.5(1.04)
18(0.71) 2(0.08)
18(0.71)
103(4.06)
2-φ4(φ0.16)

Mounting holes
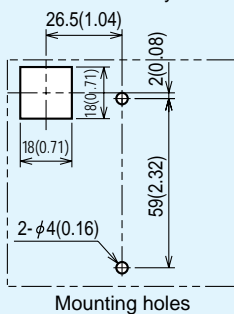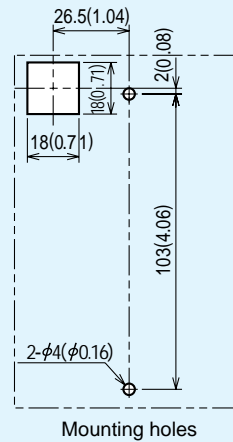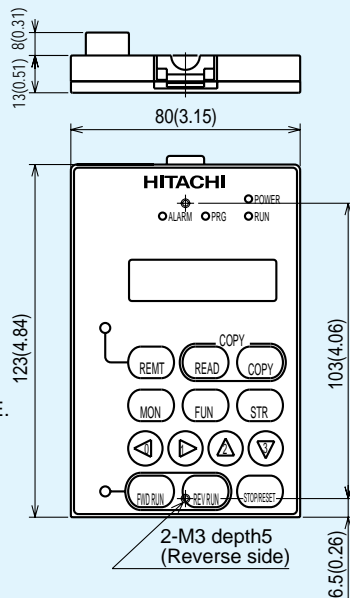
### ●ICS-1, 3
(Cables for OPE-S/SR/SRE and SRW-0EX)



L
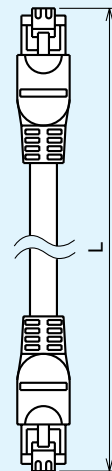
| Model Name | Cable Length |
|---|---|
| ICS-1 | 1m (3.3ft) |
| ICS-3 | 3m (9.8ft) |

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## ■ EXPANSION CARD

Up to two expansion cards can be installed inside the L300P.

### Digital Input Expansion Card
#### SJ-DG

Output frequency, acceleration time, deceleration time, and torque limit can be set by a digital output device such as PLC, etc. (Binary or BCD)

#### ● Connecting Diagram
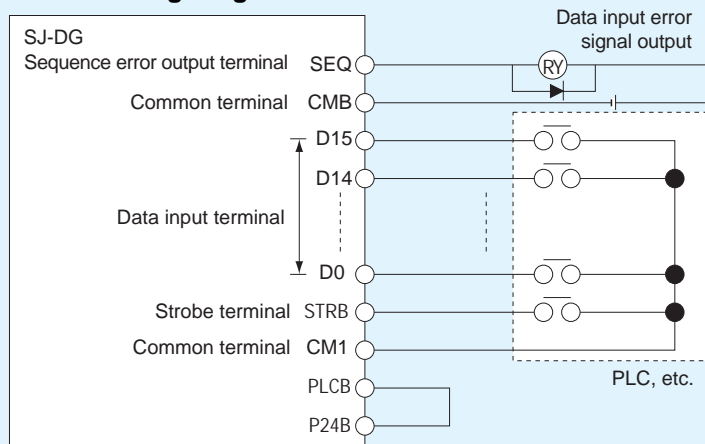


#### ● Data Bit Configuration

| Item | Mode 1 | Mode 2 |
|---|---|---|
| D15 | Data classification code | Setting data |
| D14 | | |
| D13 | | |
| D12 | | |
| D11 | | |
| D10 | | |
| D9 | | |
| D8 | | |
| D7 | Setting data | Data can be set by either 16-bit binary or 4-digit BCD. |
| D6 | Data can be set by either 16-bit binary or 4-digit BCD. | |
| D5 | | |
| D4 | | |
| D3 | [Input data is divided into upper 8-bit and lower 8-bit.] | |
| D2 | | |
| D1 | | |
| D0 | | |

∗Data input mode is selected by the dip switch on the expansion card.

#### ● Standard Specifications

| Item | | Specification | |
|---|---|---|---|
| Input | Data setting signal | NO contact input (sink/ source compatible) | D0,D1, … between D15 and PLCB |
| | Strobe signal | | Between STRB and PLCB |
| Output | Sequence error signal (Data input error signal) | Open collector output (sink/ source compatible) | DC+27V 50mA max., between SEQ and CMB |
| Power supply | Power supply for interface | DC+24V 90mA max., between P24B and CM1 | |

### DeviceNet™ Expansion Card
#### SJ-DN

#### ● Specifications

| | | | |
|---|---|---|---|
| General data | Applicable DeviceNet specification | Volume 1-Relesse 2.0 | Volume 2-Relesse 2.0 |
| | Vendor name | Hitachi, Ltd. | Vendor ID=74 |
| | Device profile name | Slave DC Drive | Profile No.=13 |
| Physical conformance data | Network consumption current | 50mA | |
| | Connector type | Open connector | |
| | Isolation of physical layer | Yes | |
| | Support LED | Module status / network status | |
| | MAC ID setting | By digital operator | |
| | Default MAC ID | 63 | |
| | Transmission baud rate setting | By digital operator | |
| | Support transmission baud rate | 125k/250k/500k | |
| Communication data | Pre-defined master/slave connection set | Group 2 only server | |
| | UCMM Support | None | |
| | Support connection | Explicit message connection, Polled I/O connection | |
| | Explicit message fragmentation | Yes | |

#### ● Connector specifications

| Manufacturer | Model Code |
|---|---|
| Phoenix Contact | MSTB 2.5/5-ST-5.08AU |

#### ● Cable connection

| No | Signal | Cable color |
|---|---|---|
| 1 | V− | Black |
| 2 | CAN_L | Blue |
| 3 | Drain | — |
| 4 | CAN_H | White |
| 5 | V+ | Red |
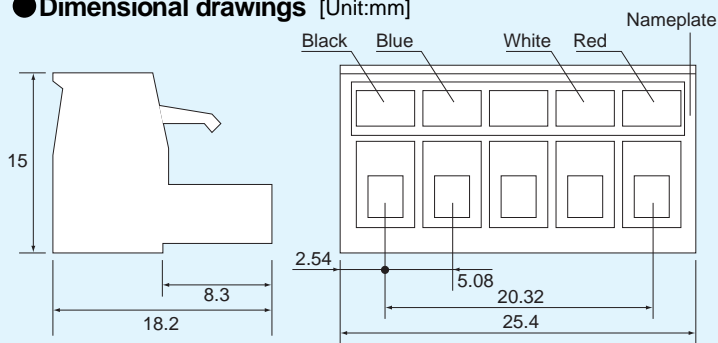
Note: Communication power supply (24VDC) is required in system configuration.

#### ● Dimensional drawings [Unit:mm]



DeviceNet is a trademark of Open DeviceNet Vendor Association.

## PROFIBUS® Expansion Card
### SJ-PBT

### ● Specifications

| | |
|---|---|
| Support profile | Variable Speed Drive (Order no. 3.072) |
| Transmission method | RS-485 |
| Connector type | Open connector (6 poles) |
| Support file | GSD file |
| ASIC chip | VPC3+ (Made by Profichip) |
| Maximum bus length | 100m at 12Mbps, 1200m at 9.6kbps(No rooter used for both conditions) |
| Maximum number of connectable nodes | 126 (Rooter used), 32(No rooter used) |
| Termination support | Yes (Bus topology termination enable) |
| Support baud rate | 9.6kbps to 12Mbps (Baud rate auto-detecting function equipped) |
| Communication specification | Master/slave |
| Support LED | Fieldbus ON/Off-line<br>Fieldbus diagnosis<br>Communication Status |

### ● Connector specifications

| Manufacturer | Model Code |
|---|---|
| Phoenix Contact | MC 1.5/6-ST-3.81 |

### ● Cable connection

| No | Signal name | Function |
|---|---|---|
| 1 | NET-A | NET-A input connection |
| 2 | NET-B | NET-B input connection |
| 3 | Shield | Cable shield connection |
| 4 | NET-A | NET-A input connection |
| 5 | NET-B | NET-B input connection |
| 6 | Shield | Cable shield connection |

Note: PROFIBUS is a registered trademark of
Profibus Nutzer Organization.

### ● Dimensional drawings [Unit: mm]



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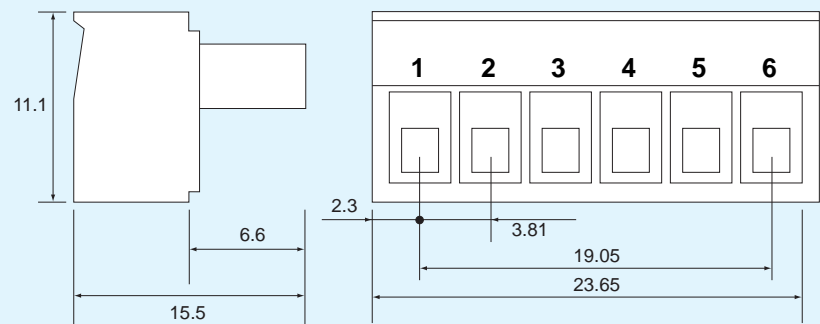
## LONWORKS® Expansion Card
### SJ-LW

### ● Specifications

| | |
|---|---|
| Device Class | Variable Speed Drive |
| Transmission method | FTT-10A (Free Topology Twisted Pair Transceiver) |
| Connector type | Open connector |
| LonMark Object Support | 0000-Node Object<br>6010-Variable Speed Motor Drive |
| Support file | XIF |
| Neuron Chip | TMPN3120FE5M |
| Max. bus length | 2700m |
| Max. length between nodes | 500m |
| Max. nodes number | 32,385 |
| Termination support | FT (Free topology termination enable)<br>NO (Termination disable)<br>BUS (Bus topology termination enable) |
| Support transmission baudrate | 78kbps (Fixed) |
| Data type | Pier to Pier |
| Support LED | Power /Inverter<br>LON diagnosis/ Service<br>Communication Status |

### ● Connector specifications

| Manufacturer | Model Code |
|---|---|
| Phoenix Contact | MC 1.5/3-ST-3.81 |

### ● Dimensional drawings [Unit: mm]
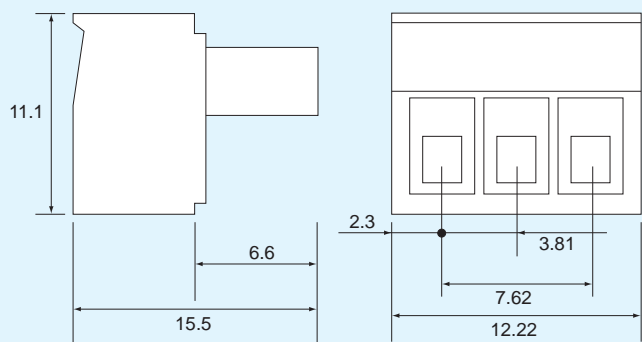


● LONWORKS is a registered trademark of Echelon Corporation

### ● Cable connection

| No | Signal name | Function |
|---|---|---|
| 1 | Shield | Cable shield connection |
| 2 | NET-A | NET-A input connection |
| 3 | NET-B | NET-B input connection |

Note: Network function must be supported by the software of the inverter
used with SJ-DN, SJ-PBT, or SJ-LW.
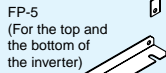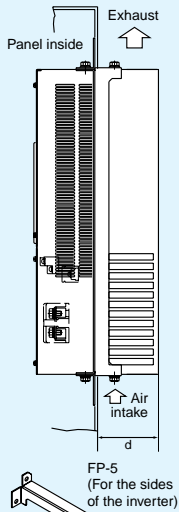For the detail, please contact Hitachi sales office.

# FOR COMPACT PANEL

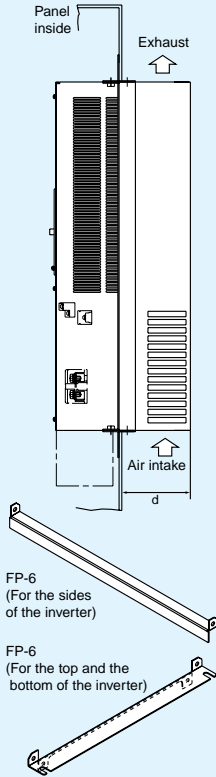Heat accumulation in the panel can be reduced by arranging inverter heat sink outside.

● L300P-015−055LFU2,HFU2/E2



Panel inside | Exhaust

Air intake
d

FP-1
(For the top and the bottom of the inverter)

● L300P-075−150LFU2, HFU2
-110−150HFE2



Panel inside | Exhaust

Air intake
d

FP-2
(For the top and the bottom of the inverter)

● L300P-185−300LFU2, HFU2/E2



Panel inside | Exhaust

Air intake
d

FP-3
(For the top and the bottom of the inverter)

● L300P-370LFU2, HFU2/E2



Panel inside | Exhaust

Air intake
d

FP-4
(For the sides of the inverter)

FP-4
(For the top and the bottom of the inverter)

● L300P-450−550LFU2
-450−750HFU2/E2



Panel inside | Exhaust

Air intake
d

FP-5
(For the sides of the inverter)

FP-5
(For the top and the bottom of the inverter)

● L300P-750LFU2



Panel inside | Exhaust

Air intake
d

FP-6
(For the sides of the inverter)

FP-6
(For the top and the bottom of the inverter)

● L300P-900−1100HFU2/E2



Panel inside | Exhaust

Air intake
d

FP-7
(For the side of the inverter)

FP-7
(For the top and the bottom of the inverter)

● L300P-1320HFU2/E2



Panel inside | Exhaust

Air intake
d

FP-8
(For the side of the inverter)

FP-9
(For the top and the bottom of the inverter)

● **Panel cutout**



4-Screw

H1 | H

W1

W

[Unit: mm]

| Model | W | W1 | H | H1 | Screw | d |
|---|---|---|---|---|---|---|
| L300P-015−055LFU2, HFU2/E2 | 146 | 130 | 280 | 260 | M6 | 62 |
| L300P-075−150LFU2, HFU2 -110−150HFE2 | 206 | 189 | 285 | 265 | M6 | 82 |
| L300P-185−300LFU2, HFU2/E2 | 249 | 229 | 415 | 395 | M6 | 83 |
| L300P-370LFU2, HFU2/E2 | 320 | 300 | 524 | 505 | M8 | 92 |
| L300P-450−550LFU2, HFU2/E2 -450−750HFU2/E2 | 400 | 380 | 550 | 520 | M10 | 102.7 |
| L300P-750LFU2 | 490 | 510 | 710 | 670 | M10 | 131 |
| L300P-900−1100HFU2/E2 | 400 | 420 | 710 | 690 | M10 | 141 |
| L300P-1320HFU2/E2 | 490 | 510 | 750 | 710 | M10 | 137 |

# TORQUE CHARACTERISTICS

● **Typical torque performance based on V/f pattern (top) is shown below.**

**V/f pattern**

Maximum torque
(for short time period,
maximum torque boosting)

(Continuous
operating torque)

(Base frequency 60Hz)

(Base frequency 50Hz)

Output torque (%)

Frequency (Hz)
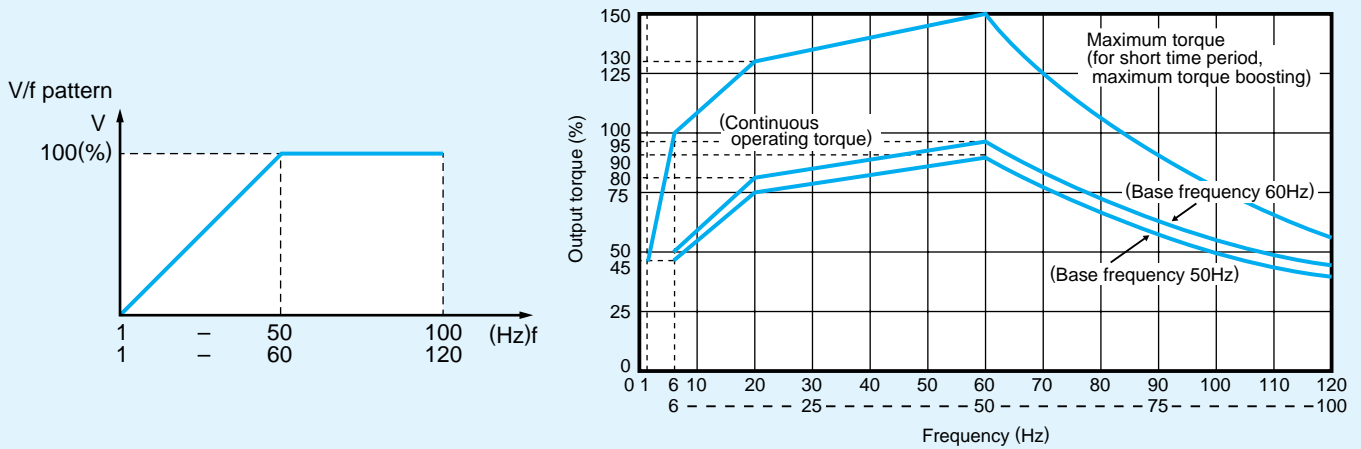
# DERATING DATA

The L300P series can be used at ambient temperature of −10℃ to 50℃.
However, when using at 40℃ or over, derating is required.

(1) Ambient temperature 40°C

**(200V class)**

015–150LFU2
450LFU2
185LFU2
370LFU2
220LFU2
550LFU2
300, 750LFU2

Output current
(Ratio to the rating: %)

Carrier frequency (kHz)

**(400V class)**

900HFU2/E2
015–220HFU2/E2
450,550HFU2/E2
300HFU2/E2
370HFU2/E2
1100, 1320HFU2/E2
750HFU2/E2

Output current
(Ratio to the rating: %)

Carrier frequency (kHz)

(2) Ambient temperature 50°C

**(200V class)**

015-075LFU2
450LFU2
185LFU2
220LFU2
370LFU2
150LFU2
550LFU2
110LFU2
300LFU2
750LFU2

Output current
(Ratio to the rating: %)

Carrier frequency (kHz)

**(400V class)**

1100, 1320HFU2/E2
900HFU2/E2
015–075HFU2/E2
185HFU2/E−220HFU2/E2
550HFU2/E
450HFU2/E2
150HFU2/E2
370HFU2/E2
110HFU2/E2
300HFU2/E2
750HFU2/E2

Output current
(Ratio to the rating: %)

Carrier frequency (kHz)

# FOR CORRECT OPERATION

## ● Application to Motors

### [Application to general-purpose motors]

| | |
|---|---|
| Operating frequency | The overspeed endurance of a general-purpose motor is 120% of the rated speed for 2 minutes (JIS C4,004). For operation at higher than 60Hz, it is required to examine the allowable torque of the motor, useful life of bearings, noise, vibration, etc. In this case, be sure to consult the motor manufacturer as the maximum allowable rpm differs depending on the motor capacity, etc. |
| Torque characteristics | The torque characteristics of driving a general-purpose motor with an inverter differ from those of driving it using commercial power (starting torque decreases in particular). Carefully check the load torque characteristic of a connected machine and the driving torque characteristic of the motor. |
| Motor loss and temperature increase | An inverter-driven general-purpose motor heats up quickly at lower speeds. Consequently, the continuous torque level(output) will decrease at lower motor speeds. Carefully check the torque characteristics vs speed range requirements. |
| Noise | When run by an inverter, a general-purpose motor generates noise slightly greater than with commercial power. |
| Vibration | When run by an inverter at variable speeds, the motor may generate vibration, especially because of (a) unbalance of the rotor including a connected machine, or (b) resonance caused by the natural vibration frequency of a mechanical system. Particularly, be careful of (b) when operating at variable speeds a machine previously fitted with a constant speed motor. Vibration can be minimized by (1) avoiding resonance points using the frequency jump function of the inverter, (2) using a tire-shaped coupling, or (3) placing a rubber shock absorber beneath the motor base. |
| Power transmission mechanism | Under continued, low-speed operation, oil lubrication can deteriorate in a power transmission mechanism with an oil-type gear box (gear motor) or reducer. Check with the motor manufacturer for the permissible range of continuous speed. To operate at more than 60 Hz, confirm the machine's ability to withstand the centrifugal force generated. |

### [Application to special motors]

| | |
|---|---|
| Gear motor | The allowable rotation range of continuous drive varies depending on the lubrication method or motor manufacturer. (Particularly in case of oil lubrication, pay attention to the low frequency range.) |
| Brake-equipped motor | For use of a brake-equipped motor, be sure to connect the braking power supply from the primary side of the inverter. |
| Pole-change motor | There are different kinds of pole-change motors (constant output characteristic type, constant torque characteristic type, etc.), with different rated current values. In motor selection, check the maximum allowable current for each motor of a different pole count. At the time of pole changing, be sure to stop the motor. |
| Submersible motor | The rated current of a submersible motor is significantly larger than that of the general-purpose motor. In inverter selection, be sure to check the rated current of the motor. Also see: Application to the 400V-class motor. |
| Explosion-proof motor | Inverter drive is not suitable for a safety-enhanced explosion-proof type motor. The inverter should be used in combination with a pressure-proof explosion-proof type motor.<br>*Explosion-proof verification is not available for L300P Series. For explosion-proof operation, use other series of motors. |
| Synchronous (MS) motor High-speed (HFM) motor | In most cases, the synchronous (MS) motor and the high-speed (HFM) motor are designed and manufactured to meet the specifications suitable for a connected machine. As to proper inverter selection, consult the manufacturer. |
| Single-phase motor | A single-phase motor is not suitable for variable-speed operation by an inverter drive. Therefore, use a three-phase motor. |

### [Application to the 400V-class motor]

A system applying a voltage-type PWM inverter with IGBT may have surge voltage at the motor terminals resulting from the cable constants including the cable length and the cable laying method. Depending on the surge current magnification, the motor coil insulation may be degraded. In particular, when a 400V-class motor is used, a longer cable is used, and critical loss can occur, take the following countermeasures:
(1) install the LCR filter between the inverter and the motor,
(2) install the AC reactor between the inverter and the motor, or
(3) enhance the insulation of the motor coil.

## ● Notes on Use

### [Drive]

| | |
|---|---|
| Run/Stop | Run or stop of the inverter must be done with the keys on the operator panel or through the control circuit terminals.<br>Do not operate by installing a electromagnetic contactor (Mg) in the main circuit. |
| Emergency motor stop | When the protective function is operating or the power supply stops, the motor enters the free run stop state. When an emergency stop is required or when the motor should be kept stopped, use of a mechanical brake should be considered. |
| High-frequency operation | A max. 400Hz can be selected on the L300P Series. However, a two-pole motor can attain up to approx. 24,000 rpm, which is extremely dangerous. Therefore, carefully make selection and settings by checking the mechanical strength of the motor and connected machines. Consult the motor manufacturer when it is necessary to drive a standard (general-purpose) motor above 60 Hz. |

### [Installation location and operating environment]

Avoid installation in areas of high temperature, excessive humidity, or where moisture can easily collect, as well as areas that are dusty, subject to corrosive gasses, mist of liquid for grinding, or salt. Install the inverter away from direct sunlight in a well-ventilated room that is free of vibration. The inverter can be operated in the ambient temperature range from –10 to 50°C. (Carrier frequency and output current must be reduced in the range of 40 to 50°C.)

## [Main power supply]

| | |
|---|---|
| Installation of an AC reactor on the input side | In the following examples involving a general-purpose inverter, a large peak current flows on the main power supply side, and may destroy the converter module. Where such situations are foreseen or the connected equipment must be highly reliable, install an AC reactor between the power supply and the inverter. Also, where influence of indirect lightning strike is possible, install a lightning conductor.<br>(A) The unbalance factor of the power supply is 3% or higher. (Note)<br>(B) The power supply capacity is at least 10 times greater than the inverter capacity (the power supply capacity is 500 kVA or more).<br>(C) Abrupt power supply changes are expected.<br>Examples:<br>   (1) Several inverters are interconnected with a short bus.<br>   (2) A thyristor converter and an inverter are interconnected with a short bus.<br>   (3) An installed phase advance capacitor opens and closes.<br>In cases (A), (B) and (C), it is recommended to install an AC reactor on the main power supply side.<br>Note: Example calculation with $V_{RS}$ = 205V, $V_{ST}$ = 201V, $V_{TR}$ = 200V<br>   $V_{RS}$ : R-S line voltage, $V_{ST}$ : S-T line voltage, $V_{TR}$ : T-R line voltage<br><br>$$\text{Unbalance factor of voltage} = \frac{\text{Max. line voltage (min.)} - \text{Mean line voltage}}{\text{Mean line voltage}} \times 100$$<br>$$= \frac{V_{RS} - (V_{RS} + V_{ST} + V_{TR})/3}{(V_{RS} + V_{ST} + V_{TR})/3} \times 100 = \frac{205 - 202}{202} \times 100 = 1.5\ (\%)$$ |
| Using a private power generator | 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 five times that of the inverter (kVA) in a PWM control system, or six times greater in a PAM control system. |

## ●Notes on Peripheral Equipment Selection

| | | |
|---|---|---|
| Wiring connections | | (1)Be sure to connect main power wires with R(L1), S(L2), and T(L3) (input) terminals and motor wires to U(T1), V(T2), and W(T3) terminals (output). (Incorrect connection will cause an immediate failure.)<br>(2)Be sure to provide a grounding connection with the ground terminal ($\oplus$). |
| Wiring between inverter and motor | Electro-magnetic contactor | When an electromagnetic contactor is installed between the inverter and the motor, do not perform on-off switching during running operation. |
| | Thermal relay | When used with standard applicable output motors (Hitachi standard three-phase squirrel-cage four-pole motors), the L300P Series does not need a thermal relay for motor protection due to the internal electronic protective circuit. A thermal relay, however, should be used:<br>●during continuous running outside a range of 30 to 60 Hz.<br>●for motors exceeding the range of electronic thermal adjustment (rated current).<br>●when several motors are driven by the same inverter; install a thermal relay for each motor.<br>●The RC value of the thermal relay should be more than 1.1 times the rated current of the motor. Where the wiring length is 10 m or more, the thermal relay tends to turn off readily. In this case, provide an AC reactor on the output side or use a current sensor. |
| Installing a circuit breaker | | Install a circuit breaker on the main power input side to protect inverter wiring and ensure personal safety. Choose an inverter-compatible circuit breaker. The conventional type may malfunction due to harmonics from the inverter. For more information, consult the circuit breaker manufacturer. |
| Wiring distance | | The wiring distance between the inverter and the remote operator panel should be 20 meters or less. When this distance is exceeded, use CVD-E (current-voltage converter) or RCD-E (remote control device). Shielded cable should be used on the wiring. Beware of voltage drops on main circuit wires. (A large voltage drop reduces torque.) |
| Earth leakage relay | | If the earth leakage relay (or earth leakage breaker) is used, it should have a sensitivity level of 15 mA or more (per inverter). |
| Phase advance capacitor | | Do not use a capacitor for power factor improvement between the inverter and the motor because the high-frequency components of the inverter output may overheat or damage the capacitor |

## ●High-frequency Noise and Leakage Current

(1) High-frequency components are included in the input/output of the inverter main circuit, and they may cause interference in a transmitter, radio, or sensor if used near the inverter. The interference can be minimized by attaching noise filters (option) in the inverter circuitry.
(2) The switching action of an inverter causes an increase in leakage current. Be sure to ground the inverter and the motor.

## ●Lifetime of Primary Parts

Because a smoothing capacitor deteriorates as it undergoes internal chemical reaction, it should normally be replaced every five years. Be aware, however, that its life expectancy is considerably shorter when the inverter is subjected to such adverse factors as high temperatures or heavy loads exceeding the rated current of the inverter.
The approximate lifetime of the capacitor is as shown in the figure at the right when it is used 12 hours daily (according to the "Instructions for Periodic Inspection of General-Purpose Inverter" (JEMA)).
Also, such moving parts (cooling fan) should be replaced. Maintenance inspection and parts replacement must be performed by only specified trained personnel.



Ambient temperature (°C) vs Capacitor lifetime (years)

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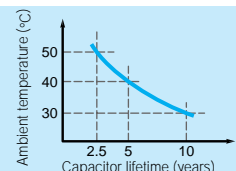
### Precaution for Correct Usage

●Before use, be sure to read through the Instruction Manual to insure proper use of the inverter.
●Note that the inverter requires electrical wiring; a trained specialist should carry out the wiring.
●The inverter in this catalog is designed for general industrial applications. For special applications in fields such as aircraft, outer space, nuclear power, electrical power, transport vehicles, clinics, and underwater equipment, please consult with us in advance.
●For application in a facility where human life is involved or serious losses may occur, make sure to provide safety devices to avoid a serious accident.
●The inverter is intended for use with a three-phase AC motor. For use with a load other than this, please consult with us.

Information in this brochure is subject to change without notice.