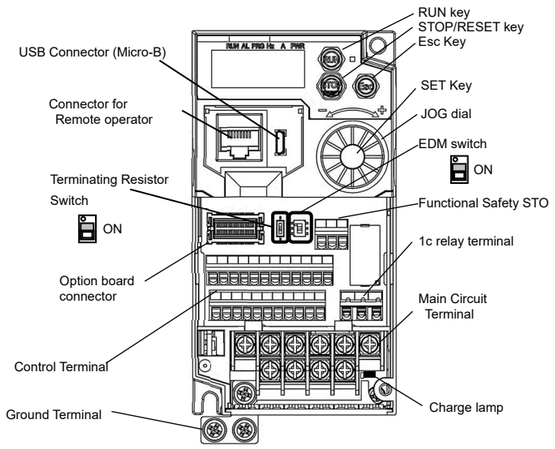
NT3611X

Basic Guide
Hitachi Inverter WJ-C1

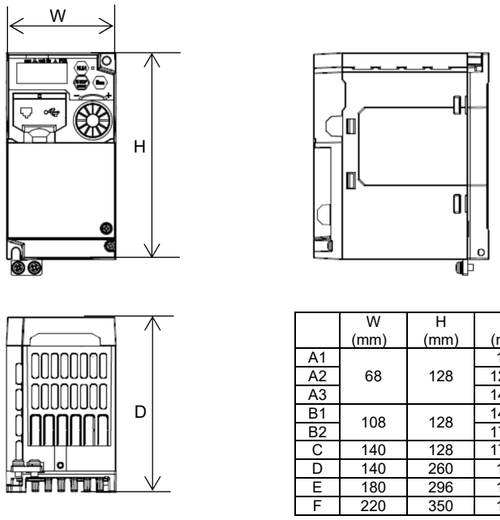
Thank you for purchasing WJ series C1 (WJ-C1) Inverter. This is a Basic Guide that explains the handling, maintenance, etc. of the WJ-C1. The Basic Guide contains only the minimum information for handling. Please be sure to read the Basic Guide, as well as the WJ-C1 User's Guide, which contains detailed instructions, to use it correctly. Please obtain the User's Guide from the one of those listed in Contact on the back side of this sheet.

Name of Parts



Installation and Wiring

Dimensions



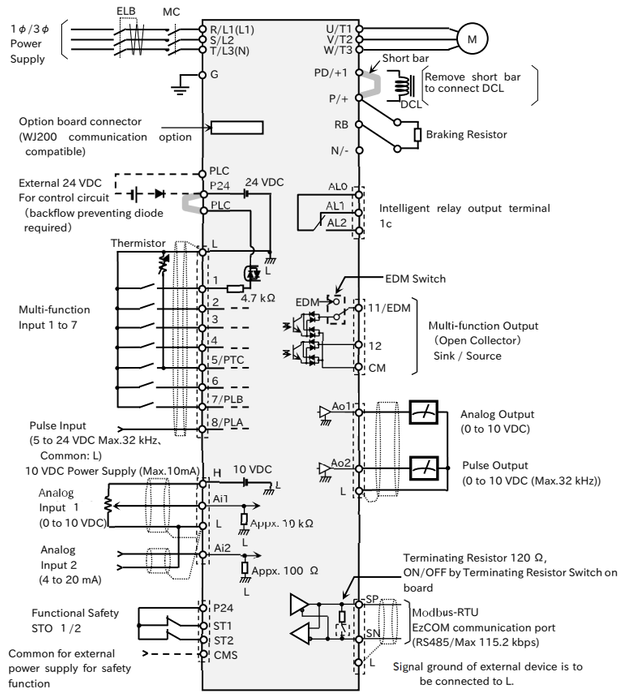
	W (mm)	H (mm)	D (mm)
A1	68	128	109
A2			122.5
A3			145.5
B1	108	128	143.5
B2			170.5
C	140	128	170.5
D	140	260	155
E	180	296	165
F	220	350	175

	0.1	0.2	0.4	0.75	1.5	2.2	3	3.7	4	5.5	7.5	11	15
1Φ200V	A1	A1	A2	B2	B2	B2	-	-	-	-	-	-	-
3Φ200V	A1	A1	A2	A3	B2	B2	-	C	-	D	D	E	F
3Φ400V	-	-	B1	B2	B2	B2	B2	-	C	D	D	E	E

Weight (kg)

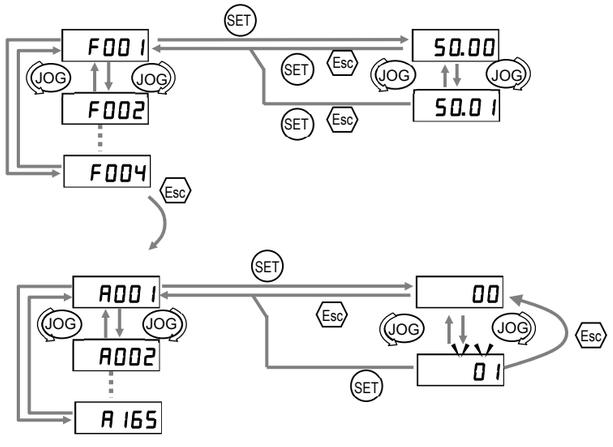
	0.1	0.2	0.4	0.75	1.5	2.2	3	3.7	4	5.5	7.5	11	15
1Φ200V	1.0	1.0	1.1	1.6	1.8	1.8	-	-	-	-	-	-	-
3Φ200V	1.0	1.0	1.1	1.2	1.6	1.8	-	2.0	-	3.5	3.5	4.5	6.5
3Φ400V	-	-	1.5	1.8	1.8	1.8	2.0	-	2.0	3.5	3.5	4.5	4.5

Standard Connection Diagram



Key and JOG dial

Name	Function Code display	Data display
Esc key	Moves to the next function code group.	Cancels and returns to the function code display.
SET key	Moves to the data display.	Fixes and saves the data and back to the function code display.
JOG dial	Increases or decreases the function code and data value.	



Name	Action
RUN key	RUN from keypad
STOP/RESET key	(in RUN mode) Decelerate and stop the inverter. (in TRIP mode) Reset from a tripped alarm of inverter.

Quick Start Essential Parameters

Parameters mentioned in the following instruction

F001	Output frequency setting
F002	Acceleration time 1
F003	Deceleration time 1
A001	Frequency source selection
A002	Run command source selection
A003	Base frequency setting
A004	Maximum frequency setting
A082	Motor rated voltage select
H003	Induction motor capacity
H004	Induction motor poles number setting
b012	Electronic thermal level setting
b091	STOP mode selection

To Set Motor Data

(1) Press Esc key repeatedly until H-group is displayed.
(2) Turn JOG dial to select “H003”.
(3) Press SET key.
(4) Turn JOG dial to select Motor Capacity.

0.1 / 0.2/ 0.4 / 0.55 / 0.75 / 1.1 / 1.5 / 2.2 / 3.0 / 3.7 / 4.0 / 5.5 / 7.5 / 11.0 / 15.0 / 18.5 [kW]

(5) Press SET key.
(6) Repeat the above to set the following parameter(s) listed below.

H003	Induction motor capacity
H004	Induction motor poles number setting
A003	Base frequency setting
A004	Maximum frequency setting
A082	Motor rated voltage select

To Set the Frequency Source

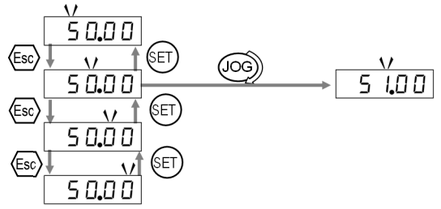
(1) Press Esc key repeatedly until A-group is displayed.
(2) Turn JOG dial to select “A001”.
(3) Press SET key.
(4) Turn JOG dial to select “Frequency Source”.

00	External operator POT
01	Control terminal
02	Parameter setting
03	Modbus communication
04	Option
06	Pulse input
07	Program function (EzSQ)
10	Calculation function result

(5) Press SET key.

(Tips)
Press and hold SET key to be in the mode to edit digits by digits.

Press Esc to increment and
SET to decrement to select digit and then JOG to set that digit.



To Set the Run Command Source

(1) Press Esc key repeatedly until A-group is displayed.
(2) Turn JOG dial to select “A002”.
(3) Press SET key.
(4) Turn JOG dial to select “Run Command Source”.

01	Control terminal
02	Keypad (RUN-key)
03	Modbus communication
04	Option

(5) Press SET key.

To Set the Output Frequency Using JOG dial

(1) Press Esc key repeatedly until F-group is displayed.
(2) Turn JOG dial to select “F001”.
(3) Press SET key.
(4) Turn JOG dial to set output frequency.

0.00 / “start frequency” to “maximum frequency”

(5) Press SET key.

To Set the Acceleration and Deceleration time

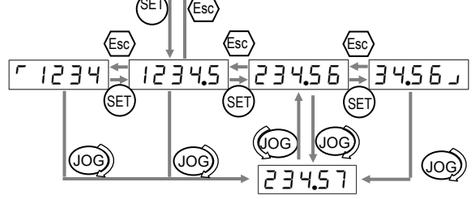
(1) Press Esc key repeatedly until F-group is displayed.
(2) Turn JOG dial to select “F002”.
(3) Press SET key.
(4) Turn JOG dial to set acceleration time.

0.0 - 999.99 / 1000.0 - 3600 [s]

(5) Press SET key.
(6) Repeat the above to set following the parameter listed below.

F003	Deceleration time 1

(Tips)
For numbers with 5 digits or more, Esc key and SET key can switch the digits to be displayed.



To Set the Stop Mode

(1) Press Esc key repeatedly until b-group is displayed.
(2) Turn JOG dial to select “b091”.
(3) Press SET key.
(4) Turn JOG dial to set stop mode.

00	Deceleration stop
01	Free run stop

(5) Press SET key.

To Set the Electronic thermal level

(1) Press Esc key repeatedly until b-group is displayed.
(2) Turn JOG dial to select “b012”.
(3) Press SET key.
(4) Turn JOG dial to set electric thermal level.

20 to 100 [% of rated current]

(5) Press SET key.

Safety Precautions

■ Indications and meanings of safety information

Be sure to read this basic guide and all other guides before installation, wiring, operation, maintenance and inspection

■ Display meaning

⚠ DANGER	Indicates that incorrect handling may cause hazardous situations, which have a high chance of resulting in serious personal injury or death and may result in major physical loss or damage.
⚠ WARNING	Indicates that incorrect handling may cause hazardous situations, which may result in serious personal injury or death, and may result in major physical loss or damage.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous situations, which may result in moderate or slight personal injury or damage and may result in only physical loss or damage.

■ Description of Safety Symbols

△	Indicates a danger, warning or caution notice for fire, electric shock and high temperature in the operation of the product. Details are indicated in or near △ by pictures or words.
⚠	The drawing on the left indicates "a non-specific and general danger or caution".
⚠	The drawing on the left indicates "a possible damage due to electric shock".
🚫	Indicates "what you must not do" to prohibit the described acts in the operation of the product.
❗	Indicates "what you must do" according to the instructions in the operation of the product.

■ Caution!

DANGER
Incorrect handling may result in personal death or severe injury, or may result in damage to the inverter, motor or the whole system.
Be sure to read the Guide and appended documents thoroughly before installing, wiring, operating, maintaining, inspecting or using the inverter.
Notes for possible causes of danger or damage are also provided for each explanation in other sections.
Be sure to read the corresponding explanation thoroughly before installing, wiring, operating, maintaining, inspecting or using the inverter.
Many of the drawings in the Guide show the inverter with covers and/or parts blocking your view removed to illustrate the details of the product.
Do not operate the inverter in the status shown in those drawings. If you have removed the covers and/or parts, be sure to reinstall them in their original positions before starting operation, and follow all the instructions in this guide when operating the inverter.

■ Precautions for installation

WARNING
Risk of Fire!
•Do not place flammable materials near the installed inverter. □Prevent foreign matter (e.g., cut pieces of wire, sputtering welding materials, iron chips, wire, and dust) from entering the inverter.
•Install the inverter on a non-flammable surface, e.g., metal. •Install the inverter in a well-ventilated indoor site not exposed to direct sunlight. Avoid places where the inverter is exposed to high temperature, high humidity, condensation, dust, explosive gases, corrosive gases, flammable gases, grinding fluid mist, hydrogen sulfide or salt water.
Risk of Injury!
Do not install or operate the inverter if it is damaged or parts are missing.
Risk of injury due to the inverter falling!
•When carrying the inverter, do not hold its parts to cover terminals or connectors.
•Install the inverter on a structure able to bear the weight specified in the User's Guide. •Install the inverter on a vertical wall that is free of vibrations.
Risk of failure of the inverter!
•The inverter is precision equipment. Do not allow it to fall or be subject to high impacts. •Also do not step on it, or place a heavy load on it. •Avoid places where static electricity discharges often occur (for example, on a rug) for the operation of the product.
• In order to discharge static electricity from your body, touch a safe metal surface first before starting the operation.

■ Precautions for Wiring

DANGER
Risk of an electric shock and/or fire!
•Be sure to ground the inverter. •Entrust wiring work to a qualified electrician. •Before the wiring work make sure to turn off the power supply and wait for more than 10 minutes. (Confirm that the voltage between terminals P/+ and N/- is 45 VDC or less.)
Risk of failure of the inverter!
Do not pull the wire after wiring.
Risk of an electric shock and/or injury!
Perform the wiring only after installing the inverter.
WARNING
Risk of injury or fire!
•Do not connect AC power supply to any of the output terminals (U, V, and W).
•Make sure that the voltage and frequency of AC power supply match the rated voltage (AC input voltage) and frequency of your inverter.
Risk of electric shock and injury!
•Before operating the slide switch in the inverter, be sure to turn off the power supply. •Since the inverter supports two modes of cooling-fan operation, the inverter power is not always off, even when the cooling fan is stopped. •Before operating the switch, be sure to turn off the power supply and wait for more than 10 minutes. (Confirm that the DC voltage between terminals P/+ and N/- is 45 VDC or less.) •Prevent the distribution cable from being compressed or getting caught to avoid damage to the cable.
Risk of fire!
•Do not use a single-phase input for 3 phase models. •Do not connect a resistor directly to between PD/+1 and N/- or P/+ and N/-. •Do not use the magnetic contactor installed on the primary and secondary sides of the inverter to stop its operation.
•Tighten the screws and bolts with the specified torque. •No screws or bolts must be left loose. •Connect an earth-leakage breaker to the power input circuit. •Use only the power cables, earth-leakage breaker, and magnetic contactors that have the specified capacity (ratings).
Risk of damage to the inverter and burnout of the motor!
Do not operate the inverter when an output phase is lost (output phase loss).

■ Precautions for Running and Test Running

DANGER
Risk of electric shock or fire!
□While power is supplied to the inverter, do not touch any internal part or the terminal of the inverter. Also do not check signals, or connect or disconnect any wire or connector. □While power is supplied to the inverter, do not touch any internal part of the inverter. Also do not insert a bar in it.
Risk of electric shock!
•Be sure to close the terminal block cover before turning on the inverter power. Do not open the terminal block cover while power is being supplied to the inverter or voltage remains inside. Do not touch the internal PCB, terminal block or connector while power is being supplied to the inverter or voltage remains inside. •Do not operate switches in the inverter or on the board with wet hands.
Risk of injury or fire!
While power is supplied to the inverter, do not touch the terminal of the inverter, even if it has stopped.
Risk of injury and damage to machine!
•Do not select the retry mode for controlling an elevating or traveling device because free-running status occurs in retry mode. •If you use the EzSQ program, before operating the inverter, verify that secure operation of the program is ensured.
Risk of injury!
•If the retry mode has been selected, the inverter will restart suddenly after a break upon detection of an error. Stay away from the machine controlled by the inverter when the inverter is under such circumstances. (Design the machine so that human safety can be ensured, even when the inverter restarts suddenly.) •The [STOP/RESET] key on the operator keypad can be enabled/disabled using the [STOP/RESET] key enable [b087] and It is effective only when there is no connection abnormality between the keypad and the main unit. Prepare an emergency stop switch separately. •If an operation command has been input to the inverter before a short-term power failure, the inverter may restart operation after the power recovery. If such a restart may put persons in danger, design a system configuration that disables the inverter from restarting after power recovery. •If an operation command has been input to the inverter before the inverter enters alarm status, the inverter will restart suddenly when the alarm status is reset (by terminal, key operation or communication). Before resetting the alarm status, make sure that no operation command has been input. •When an unexpected event occurs, do not touch the inverter or cable. •Make sure to understand and check the functions the inverter provides to ensure safety. Be careful that operation commands or resetting operation do not cause an unexpected restart. •When an error (alarm) occurs, before moving to the next operation (resetting the alarm status or reapplying the power), make sure that no operation command has been input. If the inverter has received an operation command, it will restart automatically.
WARNING
Risk of injury and damage to machine!
•The inverter allows you to easily control the speed of the motor or machine operations. Before operating the inverter, confirm the capacity and ratings of the motor or machine controlled by the inverter.
Risk of burn injury!
•Do not touch the heat sink, which heats up during the inverter operation.
Risk of injury!
•Install an external brake system if needed

■ Precautions for Maintenance/Daily Inspection

DANGER
Risk of electric shock!
•Entrust only a designated person for maintenance, inspection, and the replacement of parts. (Be sure to remove wristwatches and metal accessories, e.g., bracelets, before maintenance and inspection work and to use insulated tools for the work.)
Before inspecting the inverter, be sure to turn off the power supply and more than 10 minutes. (Confirm that the Charge lamp on the inverter is off and the DC voltage between terminals P/+ and N/- is 45 VDC or less..)

■ Precautions for Disposal

DANGER
Risk of injury and explosion!
•For disposal of the inverter, outsource to a qualified industrial waste disposal contractor. Disposing of the inverter on your own may result in an explosion of the capacitor or produce poisonous gas. •Contact your supplier or local Hitachi Industrial Equipment Systems sales office for fixing the inverter.
•A qualified industrial waste disposal contractor includes industrial waste collector/ transporter and industrial waste disposal operator. Follow the laws and regulations of each country for disposing of the inverter.

■ Other Cautions

DANGER
Risk of electric shock, fire and injury!
•Never modify the inverter.
CAUTION
Risk of significantly shortening the life cycle of the product!
•If wood materials for packaging need to be sterilized and disinfected, make sure to use a means other than the wood fumigation method. If the product is included in the fumigation treatment, electronic parts could receive critical damage from the emitted gases or vapors. Especially, halogen disinfectants (including fluorine, chlorine, bromine and iodine) can cause corrosion in the capacitor.

■ Information Security

In the control system, recently, the connection and cooperation with the information communication system have progressed and security risks including cyber attacks are growing.
A system applying this product needs to take physical security measures mainly in the installation location and security measures for use via information network are needed.
[Security risk example via the information network]
- Abnormal operation, performance degradation, information leakage and data tampering by attacks from outside
- Communication error and malfunction by overloading a communication network
- Malfunction, harm and damage occurrence due to programs and/or data tampering from outside

The customer needs to make security measures, because the required security level in the control system is different depending on system.
In addition, continuous improvement measures will be required to maintain the security level, because the assumed security risk is not fixed and it will be changing on a daily basis.
In a system using this product, whether or not applying security protection support functions, Hitachi Industrial Equipment Systems will not be able to bear responsibility for any trouble, accident or damage caused by unauthorized external access.
The customer needs to clarify the target of the security protection in the system and take measures including the following examples for the construction and operation of the system.
- Take measures in the operational management, such as to lock the location of devices or grant access only to limited persons.
- Update antivirus of network device to connect to the control system.
- Utilize the security functions of the device configuring the network.
- Monitor the system and make a self-assessment for security periodically.

Compliance to UL standards

·This section summarizes the items required for UL standard compliant inverter installation.
GENERAL:
WJ series C1 inverter is open type AC Inverter with three/single phase input and three phase output. It is intended to be used in an enclosure. It is used to provide both an adjustable voltage and adjustable frequency to the AC motor. The inverter automatically maintains the required volts-Hz ratio allowing the capability through the motor speed range. It is multi-rated device, and the ratings are selectable according to load types by operator with keypad operation.
Markings:
Maximum Surrounding Temperature:
·ND (Normal Duty): 50 deg C
·LD (Low Duty) : 40 deg C
Storage Environment rating:
· - 65 deg C (for transportation)
Instruction for installation:
·Pollution degree 2 environment and Overvoltage category 3
Electrical Connections:
·See section [5.2 Main Circuit Terminal] of user's guide.
Interconnection and wiring diagrams:
·See section [5.4 Control Circuit Terminal] of user's guide.
Short circuit rating and overcurrent protection device rating:
·C1-S series, C1-001SF to C1-022SF models.
- [Non-semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes, 240 V maximum.
- [Semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes, 240 V maximum.
·C1-L series, C1-001LF to C1-037LF models.
- [Non-semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes, 240 V maximum.
·C1-L series, C1-055LF and C1-075LF models.
- [Non-semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes, 240 V maximum.
·C1-L series, C1-110LF and C1-150LF models.
- [Non-semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes, 240 V maximum.
·C1-L series, C1-001LF to C1-150LF models.
- [Semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes, 240 V maximum.
·C1-H series, C1-004HF to C1-075HF models.
- [Non-semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes, 480 V maximum.
·C1-H series, C1-110HF and C1-150HF models.
- [Non-semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes, 480 V maximum.
·C1-H series, C1-004HF to C1-150HF models.
- [Semiconductor Fuses]
Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes, 480 V maximum.
Integral:
· Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.
Integral:
· Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the Canadian Electrical Code, Part 1.
(For Canada)

■ Field wiring conductor size and torque values making for wiring terminal

Model	Screw Size	Required torque	Wire Range
C1-001S	M3.5	1.0	AWG16 (1.3mm²)
C1-002S	M3.5	1.0	AWG16 (1.3mm²)
C1-004S	M3.5	1.0	AWG16 (1.3mm²)
C1-007S	M4	1.4	AWG12 (3.3mm²)
C1-015S	M4	1.4	AWG10 (5.3mm²)
C1-022S	M4	1.4	AWG10 (5.3mm²)
C1-001L	M3.5	1.0	AWG16 (1.3mm²)
C1-002L	M3.5	1.0	AWG16 (1.3mm²)
C1-004L	M3.5	1.0	AWG16 (1.3mm²)
C1-007L	M3.5	1.0	AWG16 (1.3mm²)
C1-015L	M4	1.4	AWG14 (2.1mm²)
C1-022L	M4	1.4	AWG12 (3.3mm²)
C1-037L	M4	1.4	AWG10 (5.3mm²)
C1-055L	M5	3.0	AWG6 (13mm²)
C1-075L	M5	3.0	AWG6 (13mm²)
C1-110L	M6	3.9 to 5.1	AWG4 (21mm²)
C1-150L	M8	5.9 to 8.8	AWG2 (34mm²)

Model	Screw Size	Required torque	Wire Range
C1-004H	M4	1.4	AWG16 (1.3mm²)
C1-007H	M4	1.4	AWG16 (1.3mm²)
C1-015H	M4	1.4	AWG16 (1.3mm²)
C1-022H	M4	1.4	AWG14 (2.1mm²)
C1-030H	M4	1.4	AWG14 (2.1mm²)
C1-040H	M4	1.4	AWG12 (3.3mm²)
C1-055H	M5	3.0	AWG10 (5.3mm²)
C1-075H	M5	3.0	AWG10 (5.3mm²)
C1-110H	M6	3.9 to 5.1	AWG6 (13mm²)
C1-150H	M6	3.9 to 5.1	AWG6 (13mm²)

Field wiring Terminal marking for wire type:
Use copper conductors only
Temperature rating of field wiring installed conductor:
For models C1-001S, C1-002S, C1-004S, C1-007S, C1-015S, C1-001L, C1-004L, C1-007L, C1-015L, C1-004H, C1-007H, C1-015H, C1-022H, C1-030H and C1-040H - 60 degree C only.
Except above models - 75 degree C only.

■ Required protection by Fuse

Model No.	Non-Semiconductor Fuse			Semiconductor Fuse
	Type	Maximum Rating		Manufacturer: Cooper Bussmann LLC
		Voltage	Current	
C1-001S	Class J Class CC Class G Class T	600V	3 A	FWH-10A14F
C1-002S			6 A	FWH-15A14F
C1-004S			10 A	FWH-15A14F
C1-007S			20 A	FWH-60B
C1-015S			30 A	FWH-60B
C1-022S			30 A	FWH-60B
C1-001L		600 V	3 A	FWH-10A14F
C1-002L			6 A	FWH-15A14F
C1-004L			10 A	FWH-15A14F
C1-007L			15 A	FWH-25A14F
C1-015L			15 A	FWH-25A14F
C1-022L			20 A	FWH-60B
C1-037L			30 A	FWH-60B
C1-055L			60 A	FWH-150B
C1-075L			60 A	FWH-150B
C1-110L			80 A	FWH-200B
C1-150L			80 A	FWH-200B
C1-004H		600 V	6 A	FWH-15A14F
C1-007H			10 A	FWH-25A14F
C1-015H			10 A	FWH-25A14F
C1-022H			10 A	FWH-25A14F
C1-030H			15 A	FWH-25A14F
C1-040H			15 A	FWH-25A14F
C1-055H			30 A	FWH-60B
C1-075H			30 A	FWH-60B
C1-110H			50 A	FWH-150B
C1-150H			50 A	FWH-150B

Conformance to EU Directives

· It is necessary to use optional EMC filter to comply with EMC directive (EN61800-3).
· For earthing, selection of cable, and any other conditions for EMC compliance, please refer to the User's Guide.
· This is a class A product in residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

■ Hitachi Industrial Equipment Systems Co., Ltd.

Address: 1-1, Higashinarashino 7-chome, Narashino-shi, Chiba, Japan

■ Hitachi Europe GmbH

Address: Niederkasseler Lohweg 191, 40547 Düsseldorf, Germany

Functional Safety

For use of this product as a safety device, to meet the requirements of the ISO13849-1, please refer to safety function guide obtained from below address.

Contact

Hitachi Industrial Equipment & Solutions America, LLC
6901 Northpark Blvd. Suite A, Charlotte, NC 28216, USA
TEL : +1(704) 494-3008
https://www.hitachi-iesa.com/

Hitachi Industrial Equipment Systems (CHINA) Co., Ltd.
Room 2201, Rui jin Building, No.205 Maoming Road(S),
Shanghai 200020, China
TEL : +86-21-5489-2378
https://www.hitachi-iec.cn/

Hitachi Asia Ltd.
Industrial Components & Equipment Division
30 Pioneer Crescent #10-15,
West Park Bizcentral, Singapore
TEL : +65-6305-7400
https://www.hitachi.com.sg/ice/

Hitachi Europe GmbH
Industrial Components & Equipment Group
Niederkasseler Lohweg 191, 40547 Düsseldorf, Germany
TEL : +49(211) 5283 0
https://hitachi-industrial.eu/

Hitachi Industrial Equipment Systems Co., Ltd.
Sumitomo Fudosan Akihabara First Building,
1-5-1 Sotokanda, Chiyoda-ku, Tokyo, 101-0021, Japan
https://www.hitachi-ies.co.jp/english/