

## DC power supply connect to VF-AS1/PS1

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### Optional initial charger MCR-2550 Instruction manual

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#### NOTE



1. Make sure that this instruction manual is delivered to the end user of the optional initial charger.
2. Read this manual before installing or operating the inverter unit, and store it in a safe place for reference.

\* The data given in this manual are subject to change without notice.

## Safety precautions

On the inverter and in its instruction manual, important information is contained for preventing injuries to users and damages to assets and for proper use of the device. Read the instruction manual attached to the inverter along with this instruction manual for completely understanding the safety precautions and adhere to the contents of these manuals.




### Explanation of markings

Marking	Meaning of marking
 Warning	Indicates that errors in operation may lead to death or serious injury.
 Caution	Indicates that errors in operation may lead to injury (*1) to people or that these errors may cause damage to physical property. (*2)

(\*1) Such things as injury, burns or shock that will not require hospitalization or long periods of outpatient treatment.

(\*2) Physical property damage refers to wide-ranging damage to assets and materials.

### Meanings of symbols

Marking	Meaning of marking
	Indicates prohibition (Don't do it). What is prohibited will be described in or near the symbol in either text or picture form.
	Indicates something mandatory (must be done). What is mandatory will be described in or near the symbol in either text or picture form.
	Indicates danger or warning. What is dangerous, or what the warning should be applied to will be described in or near the symbol in either text or picture form.

## Introduction

This option is needed when connecting a DC power supply to the inverter VF-AS1 and VF-PS1 (PA/+ and PC/- terminals). combination between MCR-2550 and inverter VF-AS1 or VF-PS1.

Note 1: An optional initial charger MCR-2550 is needed for middle- and large-capacity VF-AS1 and VF-PS1 models.

Refer to Inverter model on page 5.

For 75kW and larger in 200V class and 132kW and larger in 400V class, MCR-2550 are needed parallel connection.

Refer to Section 2.2 "Parallel connection for large-capacity inverter".

Note 2: The inverter's cooling fans need to change the connection for large-capacity VF-AS1 and VF-PS1 models.




Refer to Section 4 "Power supply connection for inverter's cooling fan".



Note 3: A DC reactor does not need to be connected to the inverter when connecting a DC power supply.

Set the inverter parameter  $F508$  to  $0$ , input phase failure detection mode selection is disabled.

Select the inverter form (The form end is "- A5") of the DC power supply specification (no DC reactor) when you use the inverter of 355kW or more. Refer to Inverter model on page 6.

# 1. Installation

 <b>Warning</b>	
 Prohibited	<ul style="list-style-type: none"> <li>• Do not install or operate the option if it is damaged or any component is missing. This can result in electric shock or fire. Please consult your local sales agency for repairs.</li> <li>• Do not place any inflammable objects nearby. If a flame is emitted due to malfunction, it may result in a fire.</li> <li>• Do not install in any location where the option could come into contact with water or other fluids. This can result in electric shock or fire.</li> <li>• Do not open the front cover on the option while the inverter power is on. It may lead to electric shocks.</li> </ul>
 Mandatory	<ul style="list-style-type: none"> <li>• Must be used in the environmental conditions prescribed in the instruction manual. Use under any other conditions may result in malfunction.</li> <li>• Must be installed in non-inflammables such as metals. The rear panel gets very hot. If installation is in an inflammable object, this can result in fire.</li> <li>• Must be installed in non-inflammables such as metals.</li> </ul>





 <b>Caution</b>	
 Prohibited	<ul style="list-style-type: none"> <li>• Do not install in any area where the unit would be subject to large amounts of vibration. That could result in the unit falling, resulting in injury.</li> </ul>

- Do not install in any location of high temperature, high humidity, moisture condensation and freezing.
- Avoid locations where there is exposure to water and/or where there may be large amounts of dust and metallic fragments.
- Do not install the option where there are gases that corrode metal or solvents that adversely affect plastic.



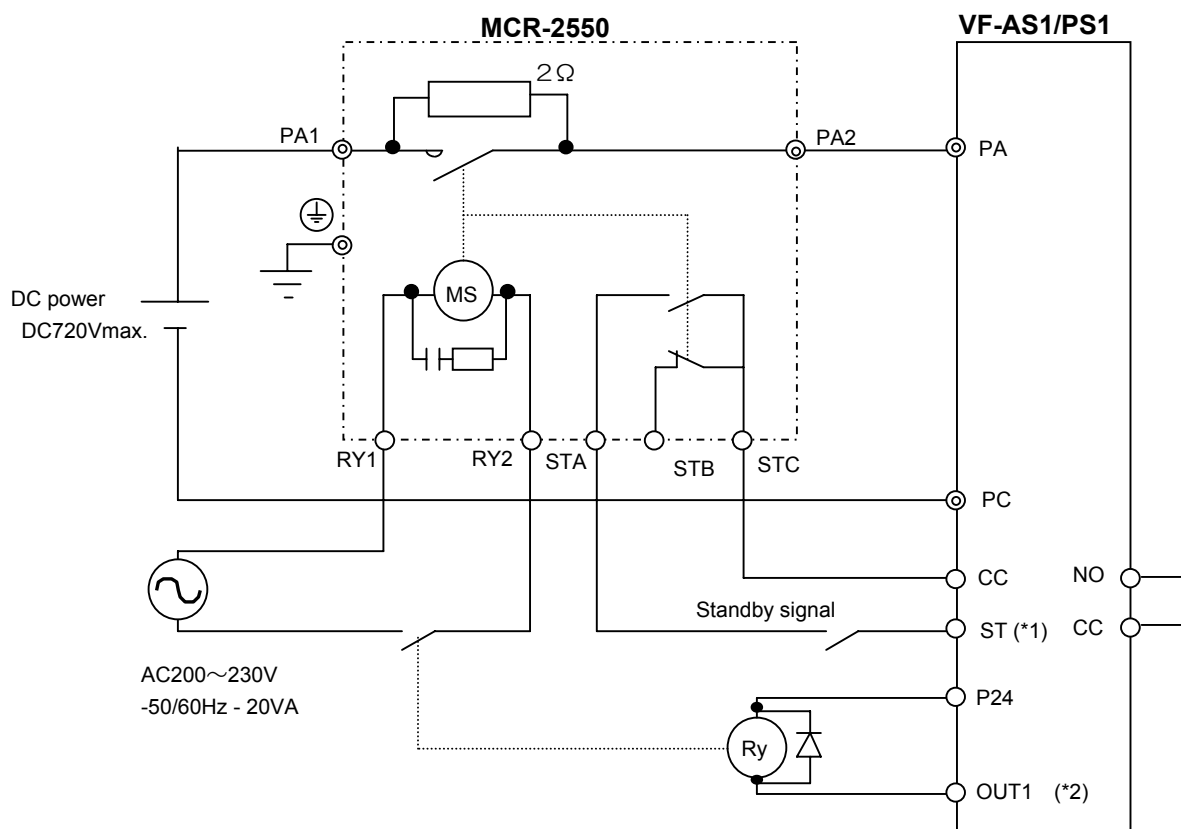
- Operate in areas where ambient temperature ranges from -10°C to 50°C.
- Install the option in a well-ventilated indoor place and mount it on a flat metal plate in portrait orientation.

## 2. Connection

 <b>Warning</b>	
 Prohibited	<ul style="list-style-type: none"> <li>• Do not connect this option to the inverter doesn't have the DC terminals (PA/+, PC/-). That will destroy both the inverter and the option, and may result in fire.</li> <li>• Connect correctly the DC terminals, PA1 and PA2, of the option to the DC terminals, PA/+ and PC/-, of inverter. That will destroy both the inverter and the option, and may result in fire.</li> <li>• Do not connect AC power supply to the DC terminals, PA1 and PA2, of the option or the DC terminals, PA/+ and PC/-, of inverter. That may cause a fire.</li> <li>• Within 10 minutes after turning off input power, do not touch wires of devices (MCCB) connected to the input side of the inverter or the DC terminals of both inverter and option. That could result in electric shock.</li> </ul>
 Mandatory	<ul style="list-style-type: none"> <li>• Electrical construction work must be done by a qualified expert. Connection of input power by someone who does not have that expert knowledge may result in fire or electric shock.</li> <li>• Wiring must be done after installation. If wiring is done prior to installation that may result in injury or electric shock.</li> <li>• The following steps must be performed before wiring.             <ol style="list-style-type: none"> <li>(1) Turn off all input power to the inverter.</li> <li>(2) Wait at least 10 minutes and check to make sure that the charge lamp of inverter is no longer lit.</li> <li>(3) Use a tester that can measure DC voltage 800VDC or more, and check to make sure that the voltage to the DC main circuits (between PA/+ and PC/-) is 45V or less. If these steps are not properly performed, the wiring will cause electric shock.</li> </ol> </li> <li>• Tighten the screws on the terminal board to specified torque. If the screws are not tightened to the specified torque, it may lead to fire.</li> <li>• Check to make sure that the input power voltage is +10% of the rated power voltage written on the rating label <math>\times \sqrt{2}</math> (<math>\pm 10\%</math> when the load is 100% in continuous operation). If the input DC power voltage is over the rated power voltage described above, this may result in fire.</li> <li>• Connect the output signal of standby, STA, ATB and STC, to the inverter's control system. If inverter drives in case of the output signal of standby OFF, this may result in fire</li> </ul>
 Be Grounded	<ul style="list-style-type: none"> <li>• Ground must be connected securely. If the ground is not securely connected, it could lead to electric shock or fire when a malfunction or current leak occurs.</li> </ul>

## 2.1 Standard Connection

### ■ Standard connection diagram




(\*1) When an inverter is VFPS1, set up parameter  $F110$  to  $0$ , and assign and use ST operation preparation terminal (setting value 6) for an unused programmable contact input terminal.

(\*2) Set the terminal OUT1 of the inverter (parameter  $F130$ ) or the terminal OUT2 (Parameter  $F131$ ) to  $114$  (External rely output function).

The figure indicates the case of using the OUT1 terminal.

Note: Set the parameter  $F508$  to  $0$ . (input phase failure detection mode selection: disabled).

### ■ Description of terminals

Symbol	Terminal function	Size of terminal	Recommended tightening torque for screws
PA1 PA2	DC + connection terminals DC720V-290A	M10	16 Nm
STA STB STC	Standby signal output terminal Terminal rating 250Aac-3A, 30Vdc-3A STA-STC closing when ready to run STB-STC opening when ready to run	M4	1.2 Nm
RY1 RY2	Power input terminal for operation circuit AC200V~230V -50Hz/60Hz-20VA	M4	1.2 Nm
	Earth terminal	M8	8.0 Nm

## ■ Wiring sizes

### 18.5 kW to 55 kW in 200V class and 22 kW to 110kW in 400V class

Voltage class	Applicable motor (kW)	Inverter model		Main circuit terminal		Earth terminal	
		VFAS1 series	VFPS1 series	AWG	mm <sup>2</sup>	AWG	mm <sup>2</sup>
200V	18.5	VFAS1-2185PM	VFPS1-2185PM	1/0	35	6	16
	22	VFAS1-2220PM	VFPS1-2220PM	2/0	35	6	16
	30	VFAS1-2300PM	VFPS1-2300PM	4/0	70	4	25
	37	VFAS1-2370PM	VFPS1-2370PM	250MCM	95	2	35
	45	VFAS1-2450PM	VFPS1-2450PM	300MCM	95	2	35
	55	VFAS1-2550P	VFPS1-2550P	4/0×2	95×2	2/0	70
	75,90	Refer to Section 2.2					
400V	22	VFAS1-4220PL	VFPS1-4220PL	4	16	8	10
	30	VFAS1-4300PL	VFPS1-4300PL	2	25	6	16
	37	VFAS1-4370PL	VFPS1-4370PL	1	35	6	16
	45	VFAS1-4450PL	VFPS1-4450PL	2/0	50	6	16
	55	VFAS1-4550PL	VFPS1-4550PL	3/0	70	4	25
	75	VFAS1-4750PL	VFPS1-4750PL	250MCM	95	2	35
	90	VFAS1-4900PC	VFPS1-4900PC	1/0×2	95	2/0	70
	110	VFAS1-4110KPC	VFPS1-4110KPC	2/0×2	120	2/0	70
	132 to 630	Refer to Section 2.2					

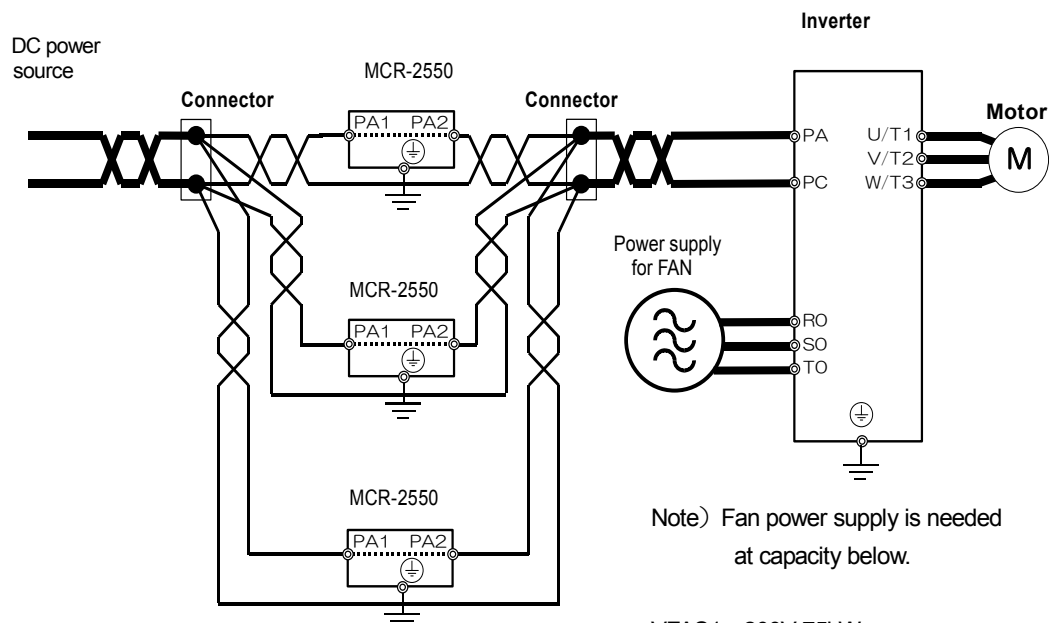
Note 1 :

- The recommended cable size is that of the cable (e.g. 600V class, HIV cable) with continuous maximum permissible temperature of 75°C.
- For the control circuit, use shielded wires whose size is 0.75mm<sup>2</sup> or more, and for the operation power supply, use the electric wires whose size is 2.0mm<sup>2</sup> or more.

## 2.2 Parallel connection for large-capacity inverter

For 75kW and larger in 200V class and 132kW and larger in 400V class, MCR-2550 are needed parallel connection.

### ■ Main circuit connection



Note) Fan power supply is needed at capacity below.

VFAS1 200V-75kW or  
400V-110kW and larger

VFPS1 200V-90kW or  
400V-132kW and larger

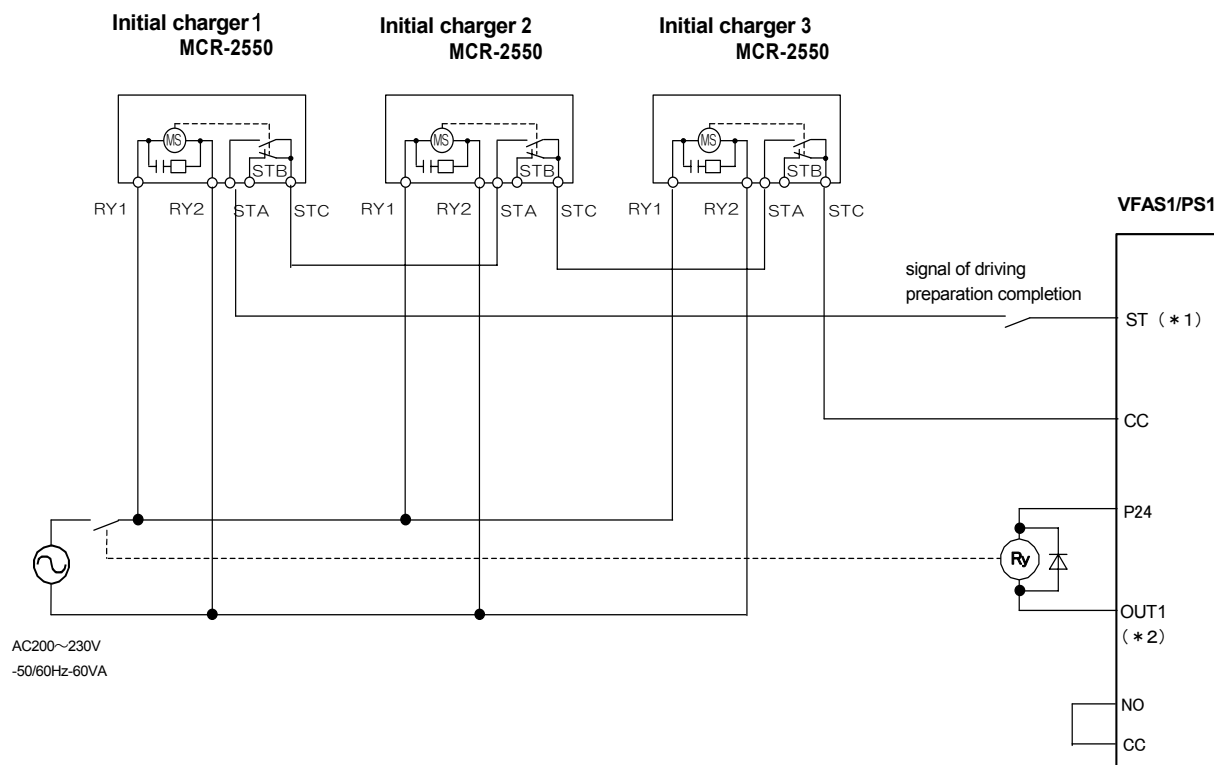
### ■ Wiring sizes

Voltage class	Applicable motor (kW)	Inverter model		Number of optional initial charger (pcs)	Wiring size between connectors		Wiring size between connector and inverter, DC terminal PA,PC		Wiring size for ground terminal of optional initial charger	
		VFAS1-	VFPS1-		AWG	mm <sup>2</sup>	AWG	mm <sup>2</sup>	AWG	mm <sup>2</sup>
200V	75	2750P	2750P	2	2/0	70	2/0×2	70×2	2	35
	90	-	2900P	2	300MCM	150	4/0×2	100×2	2/0	70
400V	132	4132KPC	4132KPC	2	2/0	70	300MCM	150	2	35
	160	4160KPC	4160KPC	2	4/0	100	4/0×2	100×2	2/0	70
	200	4200KPC	4220KPC	2	4/0	100	4/0×2	100×2	2/0	70
	220	4220KPC	4220KPC	2	300MCM	150	300MCM×2	150×2	2/0	70
	250	4280KPC	4250KPC	3	300MCM	150	300MCM×2	150×2	2/0	70
	280	4280KPC	4280KPC	3	300MCM	150	300MCM×2	150×2 (*2)	2/0	70
	315	4355KPC-A5 (*3)	4315KPC	3	300MCM	150	300MCM×2	150×2 (*2)	2/0	70
	355	4355KPC-A5 (*3)	4400KPC-A5 (*3)	4	300MCM	150	4/0×3	100×4	2/0	70
	400	4400KPC-A5 (*3)	4400KPC-A5 (*3)	4	300MCM	150	300MCM×4	150×4	2/0	70
	500	4500KPC-A5 (*3)	4500KPC-A5 (*3)	5	300MCM	150	300MCM×4	150×4	2/0	70
630	-	4630KPC-A5 (*3)	6	300MCM	150	300MCM×4	150×4 (*2)	2/0	70	

- (\*1): The recommended cable size is that of the cable (e.g. 600V class, HIV cable) with continuous maximum permissible temperature of 75°C.
- (\*2): The recommended cable is 600V class HIV cable with permissible temperature of 90°C.
- (\*3): Select the inverter form (The form end is "- A5") of the DC power supply specification (no DC reactor) when you use the inverter of 355kW or more.

## ■ Operation circuit connection

Connect the STA-STC point of contact inline straight with the signal of driving preparation completion between ST-CC Inverter.  
The cable of the control circuit must use the shield line 0.75mm<sup>2</sup> and above and the cable of the operation power supply must use the electric wire 2.0mm<sup>2</sup> and above.



### <Optional initial charger \*3set parallel connection circuit>

- (\*1) When an inverter is VFPS1, set up parameter  $F 110$  to  $0$ , and assign and use ST operation preparation terminal (setting value 6) for an unused programmable contact input terminal.
- (\*2) Set the terminal OUT1 of the inverter (parameter  $F 130$ ) or the terminal OUT2 (Parameter  $F 131$ ) to  $114$  (External rely output function).  
The figure indicates the case of using the OUT1 terminal.



## 3. Specification

### ■ Environment Specification

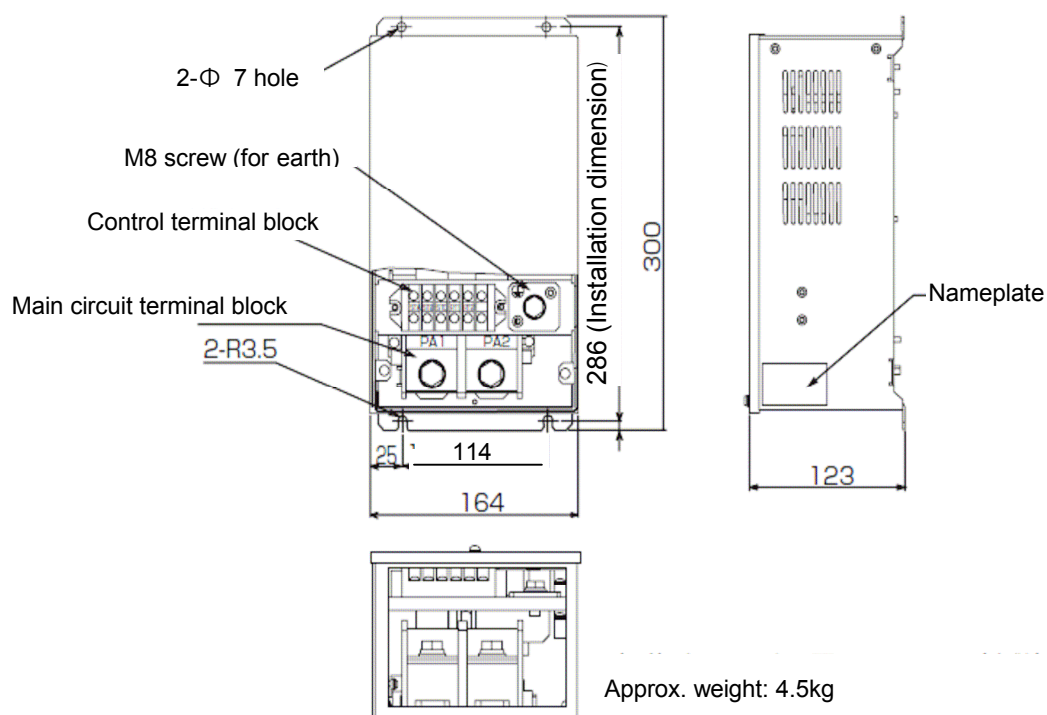
Applicable Inverter : TOSVERT VF-AS1, VF-PS1

Rated Input : DC720Vmax. - 290A

Power supply for operation : AC200~230V-50/60Hz

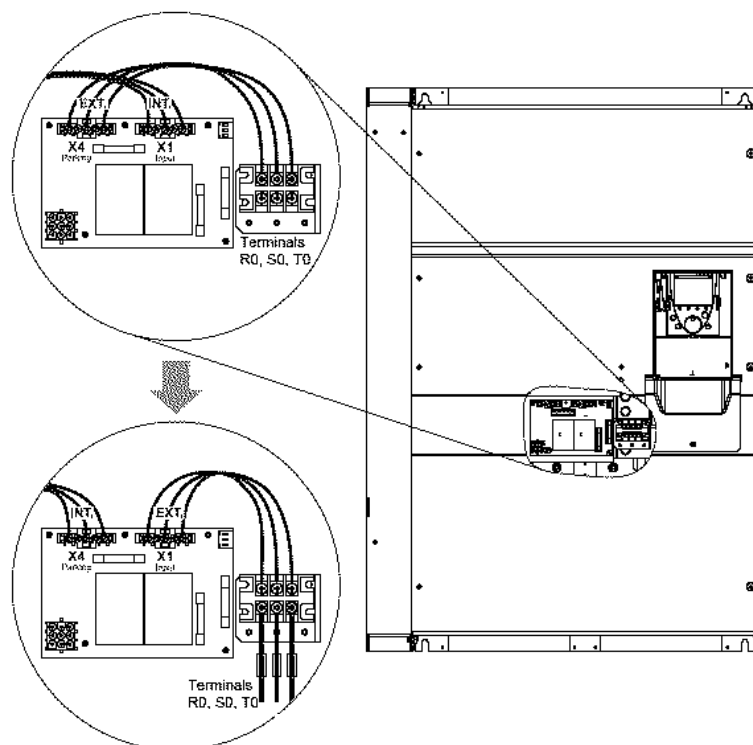
Item	Specification	
Environments	Use environments	Indoor, Altitude: 1000m or less Place not exposed to direct sunlight and free of corrosive and explosive gases.
	Ambient temperature	-10~+50°C
	Storage temperature	-25~+65°C
	Relative humidity	20~93% (free from condensation and vapor)
	Vibration	5.9m/s <sup>2</sup> {0.6G}or less(10 to 55Hz) (Compliant with JIS C60068-2)

### ■ Outline



## 4. Power supply connection for inverter's cooling fan

In inverter VF-AS1 and VF-PS1 in the table below, it is necessary to supply the 3-phase power supply as inverter cooling fan power supply. When VF-AS1 or PS1 is used with a DC power supply, the Connectors X1 and X4 on the inverter PCBA board have to exchange each other. And after that please connect the 3-phase power supply to terminal R0, S0, and T0.



Voltage class	Inverter model	Fan power supply voltage (R0, S0, T0 terminal)
200V	VFAS1-2750P, VFPS1-2900P	3-phase 200~240V -50/60Hz
400V	VFAS1-4110KPC - 4500KPC	3-phase 380~440V-50Hz
	VFPS1-4132KPC – 4630KPC	3-phase 380~480V-60Hz