

# Resistance Temperature Detector Input Card "OPC-PT"

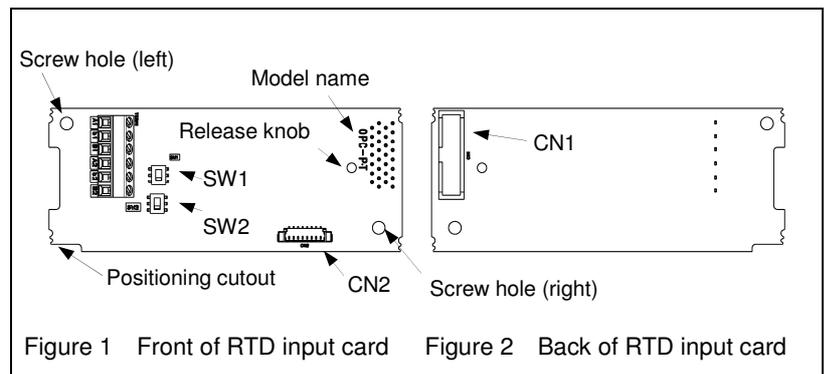
Thank you for purchasing this two channel Resistance Temperature Detector input card (herein after called RTD input card) "OPC-PT". Mounting this RTD input card to your FRENIC-HVAC/AQUA series allows you to temperature of RTD sensor value can be converted to the digital value.

**Note** RTD input card can be connected in one option connection port of an inverter, and cannot connect the two or more same option cards. Connecting of the two or more same option cards will display "Er4" error. Refer to "4.PROTECTIVE FUNCTION" for an error display. This product can not be applied to FRENIC-MEGA.

## 1. Check that :

- (1) A RTD input card and two screws (M3 × 8) are contained in the package.
- (2) The RTD input card is not damaged during transportation --- no defective devices, dents or warps.
- (3) The model name "OPC-PT" is printed on the RTD input card. (See Figure 1.)

If you suspect the product is not working properly or if you have any questions about your product, contact the shop where you bought the product or your local Fuji branch office.



## 2. Installation

### ⚠ WARNING ⚠

Before starting installation and wiring, turn OFF the power and wait at least 10 minutes. Further, make sure charging lamp is turned OFF and check that the DC link bus voltage between the terminals P(+) and N(-) has dropped to the safe level (+25 VDC or below) using a multimeter or a similar instrument.

**Otherwise, electric shock could occur.**

- (1) Remove the front cover from the inverter and expose the control printed circuit board (control PCB). (Figure 3)
  - 📖 To remove the front cover, refer to the FRENIC-HVAC/AQUA Instruction Manual, Section 2.2.
- (2) Insert connector CN1 on the back of the RTD input card (Figure 2) into the A-port (CN4), B-port (CN5) or C-port (CN6) on the inverter's control PCB. Then tighten the screws that come with the RTD input card. (Figure 4)
  - Note** Check that the positioning cutout (Figure 1) is fitted on the tab (① in Figure 4) and connector CN1 is fully inserted (② in Figure 4). Figure 5 shows the RTD input card correctly mounted.
- (3) Perform wiring on the RTD input card.
  - 📖 Refer to Section 3 "Wiring".
- (4) Put the front cover back into place.
  - 📖 To put back the front cover, refer to the FRENIC-HVAC/AQUA Instruction Manual, Section 2.2.

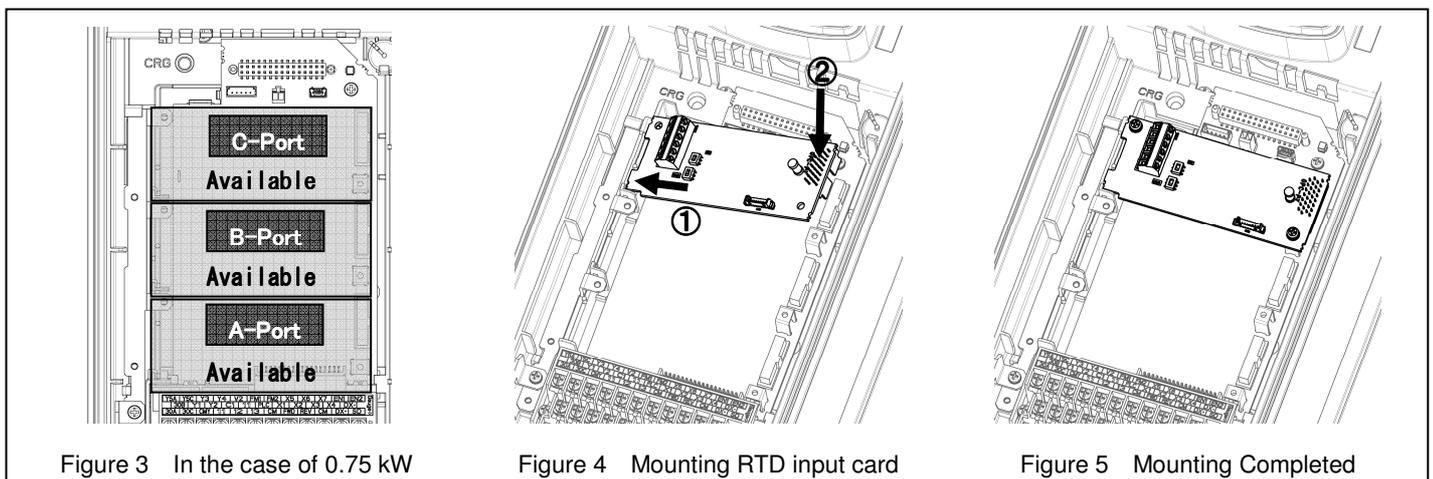


Figure 3 In the case of 0.75 kW

Figure 4 Mounting RTD input card

Figure 5 Mounting Completed

### 3. Wiring

## ⚠ WARNING ⚠

In general, the covers of the control signal wires are not specifically designed to withstand a high voltage (i.e., reinforced insulation is not applied). Therefore, if a control signal wire comes into direct contact with a live conductor of the main circuit, the insulation of the cover might break down, which would expose the signal wire to a high voltage of the main circuit. Make sure that the control signal wires will not come into contact with live conductors of the main circuit.

**Failure to observe this precaution could cause electric shock or an accident.**

## ⚠ CAUTION ⚠

Noise may be emitted from the inverter, motor and wires.

Take appropriate measures to prevent the nearby sensors and devices from malfunctioning due to such noise.

**An accident could occur.**

- (1) Perform wiring properly, referring to the "Terminal Allocation and Symbol Diagram" and "Terminal Specifications" shown below.

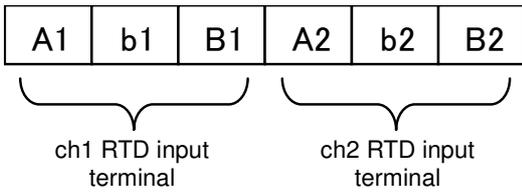


Figure 6 Terminal Allocation and Symbol Diagram

Table 1 Terminal Specifications

Terminal Size	M2
Tightening Torque	0.22 N·m
Recommended Wire Gauge *	AWG26~AWG16 (0.14mm <sup>2</sup> ~1.5mm <sup>2</sup> )

\* Twisted pair cable

\* When it has influence of noise, the measure which uses a shielded wire may be needed.

- (2) Wire layout

Pass the wires from the RTD input card between the control circuit terminal block and the left side cover, and between the control circuit terminal block and the front cover.

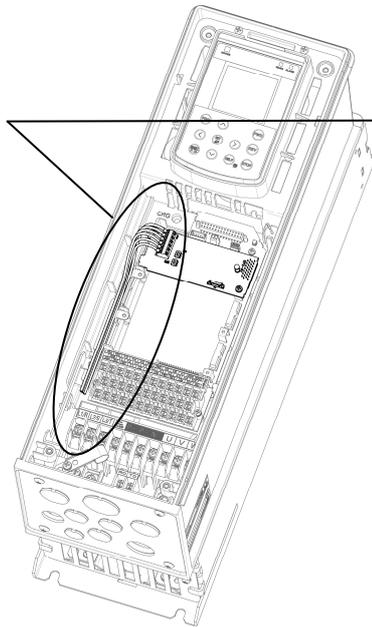


Figure 7 In the case of 0.75 kW

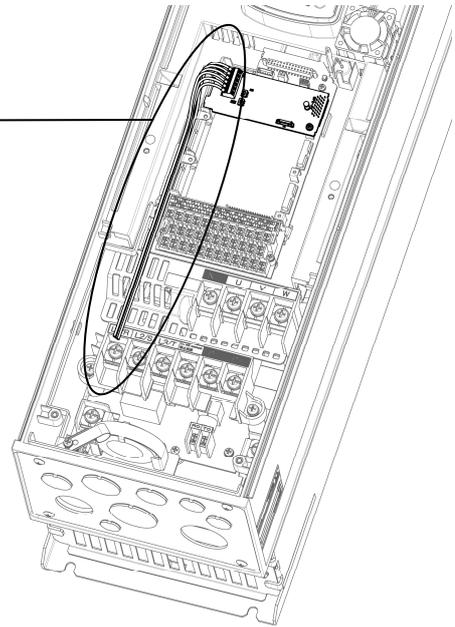


Figure 8 In the case of 37 kW

#### ■ Terminal Functions

The terminal function of a RTD input card is shown below.

Symbol	Name	Descriptions
	A1	RTD input terminal ch1
	b1	
	B1	
	A2	RTD input terminal ch2
	b2	
	B2	

For details of RTD input functions available, refer to the FRENIC-HVAC/AQUA User's Manual, Section 6.1.

■ Electrical Specifications

Items	Specifications	
Channels	Two channels	
Applicable RTD	JPt100, Pt100, Ni100, Pt1000, Ni1000 / Three-wire * The type of RTD can be set by function code.	
RTD excited current	JPt100, Pt100, Ni100 : 1 mA Pt1000, Ni1000 : 0.5 mA * Switched by switch.	
Measurable temperature range	253 to 373 K / -20 to +100 °C / -4 °F to 212 °F	
Resolution	0.01 K / 0.01 °C / 0.01 °F	
Accuracy	±0.3% FS (The ambient temperature of inverter is at 23 °C (73.4 °F, 296 K)) ±0.7% FS (All range of ambient temperature of inverter) * RTD errors does not including.	
Sampling period	max. 700 ms / two channels	
Input filter time *1	Hardware (time constant) : 50 ms or less Digital filter time : 0.0 to 100.0 s (Configurable by 0.1 s unit (default : 1.0 s))	
Isolating method	Between sensor input terminal and internal logic.	Optocoupler isolated.
	Between sensor input terminal and CM, 11 and CMY.	Transformer isolated.
	Between sensor input terminals.	None
Failure detection	Detectable sensor break, short circuit and incorrect setting of switches. *2	

\*1 The Input filter time does not affect to the display value.

\*2 The setting of "Sensor selection (o10, o15)" should be same setting as applied sensor.

And also, it prohibits to wire across channels. (it may not detect the failure.) When failure is detected , the display might be "-30 °C".

■ Function code setting

1) Display unit

o09	Unit	Default setting
60	Kelvin (K)	61
61	Celsius (°C)	
62	Fahrenheit (°F)	

2) Sensor selection

Channel 1 : o10 Channel 2 : o15	Sensor type	Connected sensor	Default setting
0	JPt100	JIS C 1604-1981	0
1	Pt100	JIS C 1604-1989 / IEC 60751	
2	Ni100	DIN 43760	
3	Pt1000	IEC 60751	
4	Ni1000	DIN 43760	

3) Extended functions

Channel 1 : o11 Channel 2 : o16	Extended functions	Default setting
0	No extended function assigned	0
5	PID feedback value 1	
30	PID feedback value 2	
42	External PID feedback value 1	
45	External PID feedback value 2	
48	External PID feedback value 3	

4) Digital filters

Function code	Contents	Data setting range	Default setting
o12	Filter time for channel 1.	0.0 ~ 100.0 s	1.0 s
o17	Filter time for channel 2.	0.0 ~ 100.0 s	1.0 s

5) Temperature display

Display the detected temperature on I/O monitor of keypad panel.

■ Setting the switches

Switching the slide switches located on the input card is needed to find the correct temperature value.

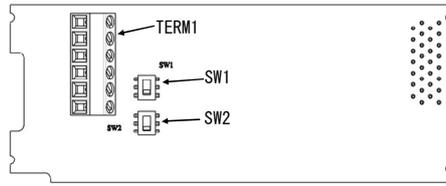


Figure 9 Switches

	Sensor type	Switch setting	Default setting
SW1 : Channel 1 SW2 : Channel 2	JPt100		
	Pt100		
	Ni100		
	Pt1000		
	Ni1000		

**Note** To move a switch slider, use a tool with a narrow tip (e.g., a tip of tweezers). Be careful not to touch other electronic parts, etc. If the slider is in an ambiguous position, the circuit is unclear whether it is turned ON or OFF and the digital input remains in an undefined state. Be sure to place the slider so that it contacts either side of the switch.  
In "Switch setting" different from "Sensor type" connected to "TERM1", the correct temperature indication cannot be performed.

Slider in the correct position	
Slider in an ambiguous position	

#### 4. PROTECTIVE FUNCTION

##### Option communications error (Er4)

Problem a communications error occurred between the RTD input card and the inverter.

Possible Causes	What to Check and Suggested Measures
(1)There is a problem with the connection between the RTD input card and the inverter.	Check whether the connector on the RTD input card is firmly engaged with that of the inverter. →Reload the RTD input card into the inverter.
(2)Strong electrical noise.	Check whether appropriate noise control measures have been implemented (e.g. correct grounding and routing of signal wires, communications cables, and main circuit wires). →Implement noise control measures.
(3)Two or more RTD input cards of the same type are mounted.	Check whether two or more RTD input cards of the same type are mounted. →Limit the number of RTD input cards of the same type on an inverter to only one.

##### Option error (Er5)

Problem an error occurred on the RTD input card.

Possible Causes	What to Check and Suggested Measures
(1)An error occurred on the RTD input card mounted on the inverter.	Check whether this error is due to the RTD input card itself. →The CPU or its printed circuit board (PCB) is defective. Contact your Fuji Electric representative.

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