

Panasonic[®]

PROGRAMMABLE CONTROLLER

FP0 RTD Unit

Technical Manual

BEFORE BEGINNING

Liability and Copyright for the Hardware

This manual and everything described in it are copyrighted. You may not copy this manual, in whole or part, without written consent of Panasonic Electric Works Europe AG.

Panasonic Electric Works Europe AG pursues a policy of continuous improvement of the design and performance of its products, therefore, we reserve the right to change the manual/product without notice. In no event will Panasonic Electric Works Europe AG be liable for direct, special, incidental, or consequential damage resulting from any defect in the product or its documentation, even if advised of the possibility of such damages.

We invite your comments on this manual. Please email us at:
tech-doc@eu.pewg.panasonic.com.

Please direct support matters and technical questions to your local Panasonic representative.

LIMITED WARRANTY

If physical defects caused by distribution are found, Panasonic Electric Works Europe AG will replace/repair the product free of charge. Exceptions include:

- When physical defects are due to different usage/treatment of the product other than described in the manual.
- When physical defects are due to defective equipment other than the distributed product.
- When physical defects are due to modifications/repairs by someone other than Panasonic Electric Works Europe AG.
- When physical defects are due to natural disasters.

©MS-DOS and Windows are registered trademarks of Microsoft Corporation.

©IBM Personal Computer AT is registered trademark of the International Business Machines Corporation.

Important Symbols

One or more of the following symbols may be used in this manual:



◆ **WARNING**

The warning triangle indicates especially important safety instructions. If they are not adhered to, the results could be:

- fatal or critical injury and/or
- significant damage to instruments or their contents, e.g. data



◆ **NOTE**

Contains important additional information.



◆ **EXAMPLE**

Contains an illustrative example of the previous text section.



◆ **PROCEDURE**

Indicates that a step-by-step procedure follows.



◆ **REFERENCE**

Indicates where you can find additional information on the subject at hand.



◆ **CAUTION**

Indicates that you should proceed with caution.



◆ **KEY POINTS**

Summarizes key points in a concise manner.



◆ **SHORTCUTS**

Provides helpful keyboard shortcuts.



◆ **EXPLANATION**

Provides brief explanation of a function, e.g. why or when you should use it.

Table of Contents

| | | |
|----------|---|-----------|
| 1 | Unit Outline | 1 |
| 1.1 | Functions | 1 |
| 1.2 | Product Number | 1 |
| 1.3 | Expansion Limit | 1 |
| 1.4 | Part Names and Functions..... | 2 |
| 2 | Input Range Setting Switch | 4 |
| 3 | Wiring | 5 |
| 4 | Conversion Characteristics | 6 |
| 4.1 | Pt100 | 6 |
| 4.2 | Pt1000 | 8 |
| 4.3 | Ni1000 | 10 |
| 4.4 | Resistor | 11 |
| 5 | I/O Allocation and Sample Programs | 13 |
| 5.1 | I/O Numbers | 13 |
| 5.2 | Programming with FPWIN Pro | 16 |
| 5.3 | Programming with FPWIN GR | 17 |
| 5.3.1 | RTD Types Pt100, Pt1000, Ni1000..... | 17 |
| 5.3.2 | RTD Type Resistor..... | 18 |
| 6 | When an Error Occurs | 19 |
| 6.1 | Troubleshooting..... | 19 |
| 6.2 | Digital Value When Out Of Measuring Range..... | 19 |
| 7 | Specifications | 20 |
| 8 | Dimensions | 23 |
| | Index | 25 |

Precautions Before Use

Accuracy

When extremely sensitive temperature data is required, use the temperature data obtained 15 minutes after turning ON the FP0 RTD unit. (The temperature data obtained in the first 15 minutes is, however, within the total accuracy range.)

A rapid temperature change in the FP0 RTD unit might change the temperature data temporarily.

A draft (air) created e.g. by a cooling fan built into the control panel and blowing on the FP0 RTD unit will lower accuracy. Avoid any kind of draft.

Programming

Between power ON and the first valid conversion data, the digital value will be 8191 or 16383. When programming, be sure not to use the data obtained during this period.

When the RTD is broken, the digital value will change to 8191 or 16383. When programming avoid any risks resulting from a broken RTD. A broken RTD needs to be replaced.

1 Unit Outline

1.1 Functions

RTD input unit for the FP0/FPΣ control unit.

The temperature data obtained using the RTD (Resistance Temperature Detector) is converted to the digital value to be read into the FP0/ FPΣ control unit.

Available RTD types

Pt100 (to IEC751), Pt1000 (to IEC751), Ni1000 (to DIN43760), and Resistor.

Temperature measurement ranges available

| RTD Type | °C | | °F | |
|----------|-------------------|-------------------|-------------------|-------------------|
| | Resolution 0.1K | Resolution 0.01K | Resolution 0.1°F | Resolution 0.01°F |
| Pt100 | -200.0 ... +500.0 | -80.00 ... +80.00 | -328.0 ... +800.0 | -80.00 ... +80.00 |
| Pt1000 | -200.0 ... +300.0 | -80.00 ... +80.00 | -328.0 ... +572.0 | -80.00 ... +80.00 |
| Ni1000 | -30.0 ... +150.0 | -30.00 ... +80.00 | -22.0 ... +302.0 | -22.00 ... +80.00 |

Resistor measurement ranges available

| RTD Type | Ω | |
|----------|----------------|------------------|
| | Resolution 1 Ω | Resolution 0.1 Ω |
| Resistor | 20 ... +2200 | 20.0 ... 1630.0 |

Conversion to degrees Celsius or degrees Fahrenheit possible

The temperature data measured using the sensor is converted to degrees Celsius or degrees Fahrenheit inside the FP0 RTD unit.

Broken-RTD detector attached

A broken RTD can be detected.

1.2 Product Number

| Product name | RTD input points | Product number | Part number |
|--------------|------------------|----------------|-------------|
| FP0 RTD unit | 6 points | FP0RTD6 | AFP0430 |

1.3 Expansion Limit

Number

Up to 3 expansion units can be connected to the control unit.

Position

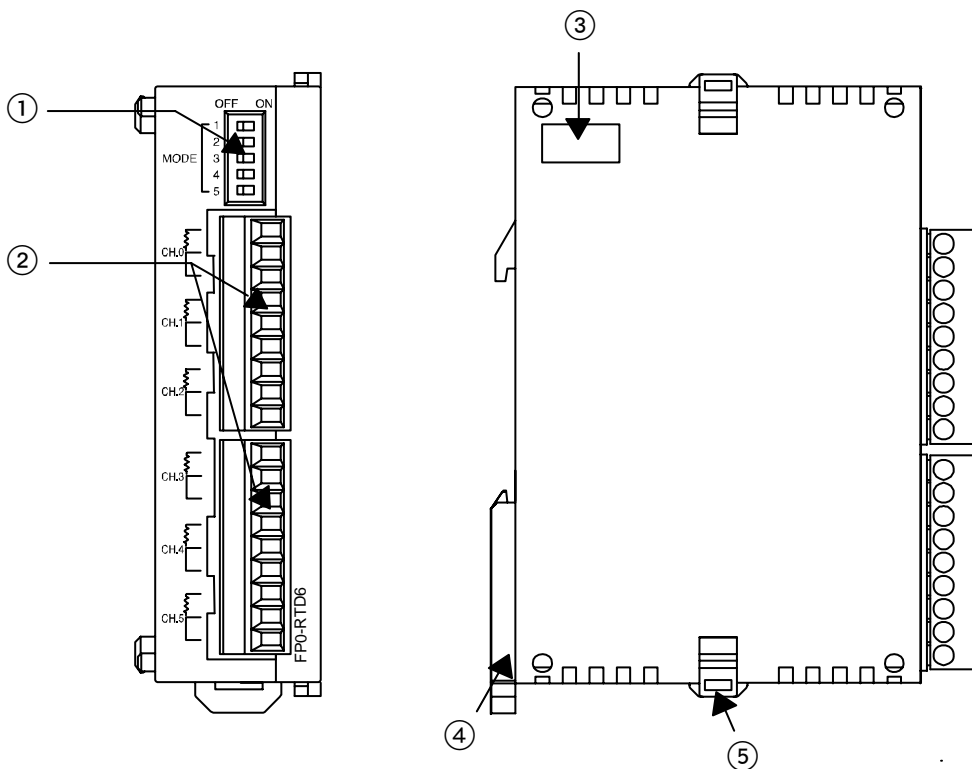
Always install the FP0 RTD unit the farthest to the right of the control unit.



◆ REFERENCE

For further information, see page 13, I/O Allocation and Sample Programs.

1.4 Part Names and Functions



FP0 RTD unit, front and left views

1. Input range setting switch

DIP switches to change between the input ranges (RTD types).



◆ REFERENCE

For further information, see page 4, Input Range Setting Switch

2. RTD input terminal block (9-pin)

Manufactured by Phoenix Contact Co. Model No: MC1.5/9-ST-3.5 (Product No.: 1840434).

Suitable wires

| Size | Nominal cross-sectional area |
|---------------|---|
| AWG# 28 to 16 | 0.08 mm ² to 1.25mm ² |



◆ REFERENCE

FP0 Hardware Manual “Wiring the Terminal Type”
FP Σ User’s Manual “Wiring of Terminal Block Type”

3. Expansion connector

Connects the expansion unit to the internal circuit of the control unit.



◆ REFERENCE

FP0 Hardware Manual: “Expansion I/O Units”
FP Σ User’s Manual: “Expansion”

4. DIN rail attachment lever

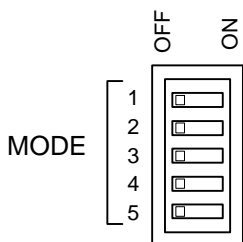
The unit can be installed to the DIN rail by one-touch operation. The DIN rail attachment lever is also used for installing the unit to the slim 30 type mounting plate (AFP0803).

5. Expansion hook

Used to secure expansion units.

2 Input Range Setting Switch

Input range setting switch



NOTE

The following switch settings are read once when the control unit is turned ON. Changes will not be reflected if they are performed while the control unit is turned ON.

Input range setting switch

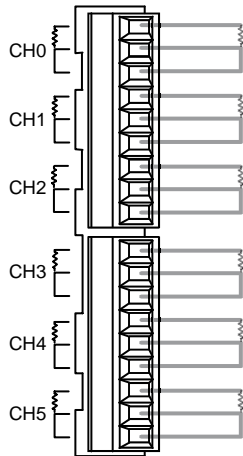
| | | OFF | ON | OFF | ON | OFF | ON | OFF | ON |
|---------------|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Mode switch | 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| CH0, CH1, CH2 | | Pt100 | | Pt1000 | | Ni1000 | | Resistor | |

| | | OFF | ON | OFF | ON | OFF | ON | OFF | ON |
|---------------|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Mode switch | 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | 4 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| CH3, CH4, CH5 | | Pt100 | | Pt1000 | | Ni1000 | | Resistor | |

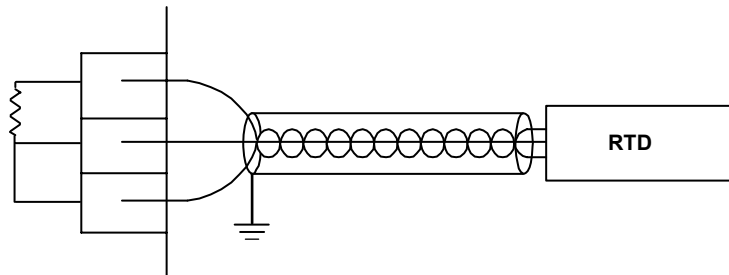
| | | OFF | ON | OFF | ON |
|----------------|---|--------------------------|--------------------------|--------------------------|--------------------------|
| Mode switch | 5 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Sampling cycle | | 0.1s | | 1s | |

3 Wiring

Wiring method



Input line wiring



RTD = resistance temperature detector



◆ NOTE

Keep a distance of more than 100mm between the input line and the power line/high-voltage line.

4 Conversion Characteristics

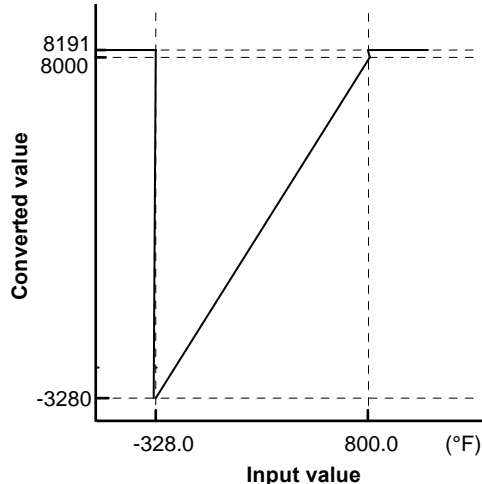
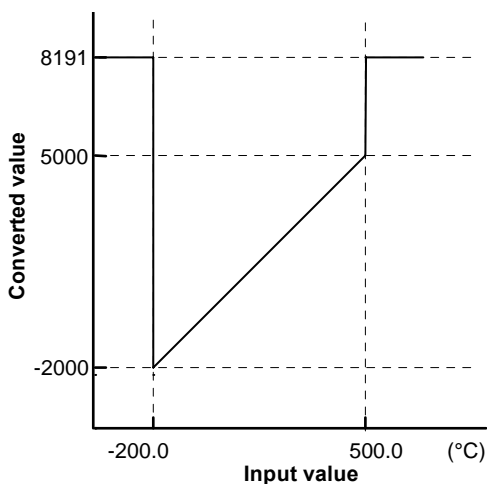


NOTE

The measurement range available for degrees Celsius is larger than for degrees Fahrenheit as the digital value (temperature value displayed) for °F is higher than the one for °C.

4.1 Pt100

Input range: -200.0°C to 500.0°C / -328.0°F to 800.0°F, resolution: 0.1K/0.1°F



A/D conversion table

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -200.0 | -2000 |
| +500.0 | +5000 |

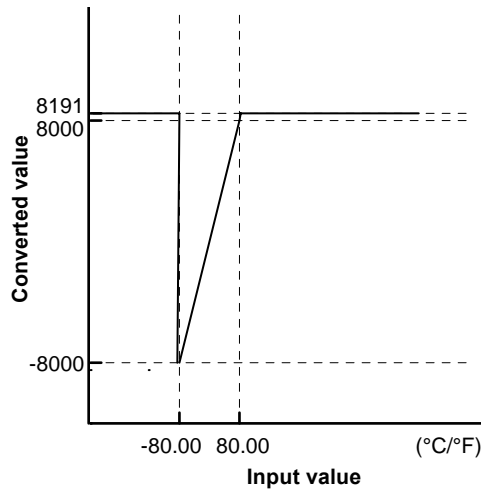
| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -328.0 | -3280 |
| +800.0 | +8000 |

Processing if the input value range is exceeded

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -200.1 or less | 8191 |
| +500.1 or more | |
| RTD broken | |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -328.1 or less | 8191 |
| +800.1 or more | |
| RTD broken | |

Input range: -80.00°C to 80.00°C/-80.00°F to 80.00°F, resolution: 0.01K/0.01°F



A/D conversion table

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -80.00 | -8000 |
| +80.00 | +8000 |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -80.00 | -8000 |
| +80.00 | +8000 |

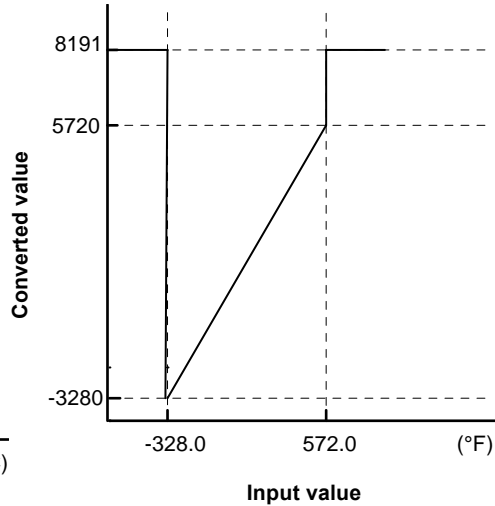
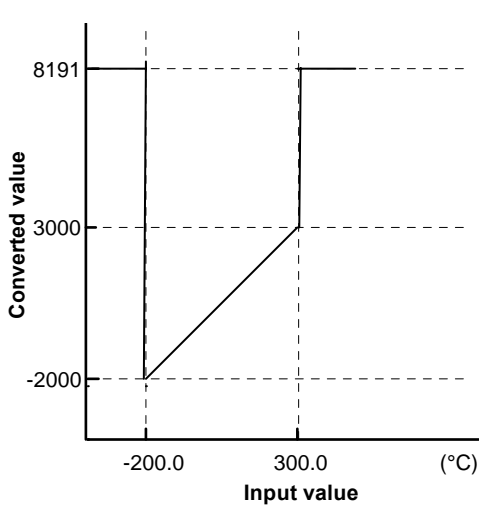
Processing if the input value range is exceeded

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -80.01 or less | 8191 |
| +80.01 or more | |
| RTD broken | |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -80.01 or less | 8191 |
| +80.01 or more | |
| RTD broken | |

4.2 Pt1000

Input range: -200.0°C to 300.0°C/-328.0°F to 572.0°F, resolution: 0.1K/0.1°F



A/D conversion table

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -200.0 | -2000 |
| +300.0 | +3000 |

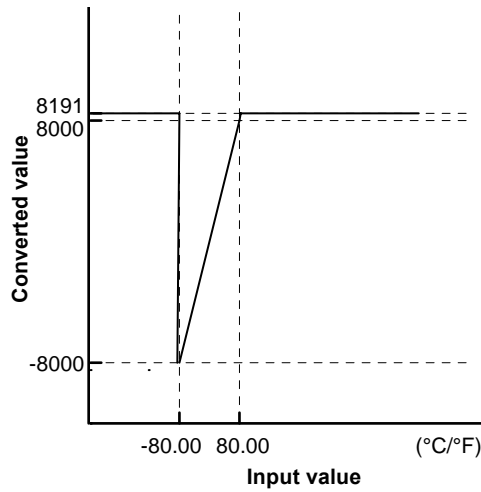
| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -328.0 | -3280 |
| +572.0 | +5720 |

Processing if the input value range is exceeded

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -200.1 or less | 8191 |
| +300.1 or more | |
| RTD broken | |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -328.1 or less | 8191 |
| +572.1 or more | |
| RTD broken | |

Input range: -80.00°C to 80.00°C/-80.00°F to 80.00°F, resolution: 0.01K/0.01°F



A/D conversion table

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -80.00 | -8000 |
| +80.00 | +8000 |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -80.00 | -8000 |
| +80.00 | +8000 |

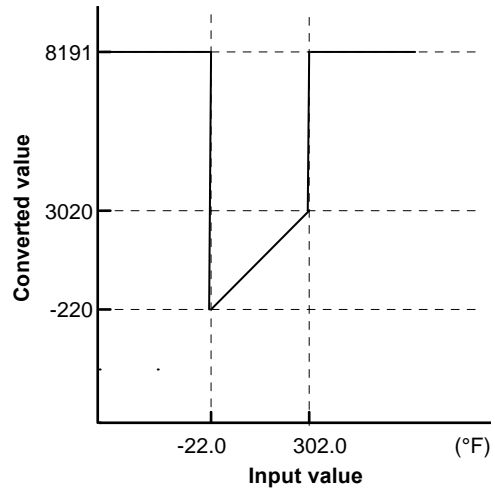
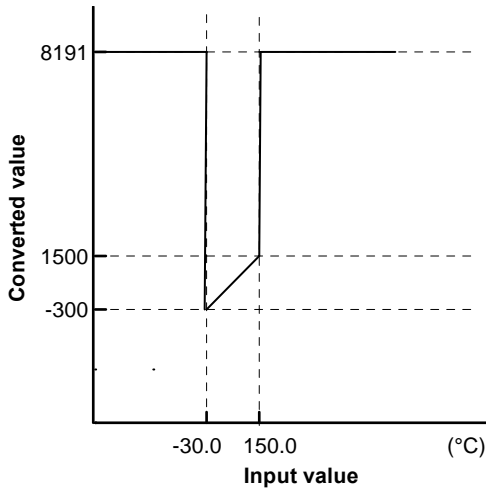
Processing if the input value range is exceeded

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -80.01 or less | 8191 |
| +80.01 or more | |
| RTD broken | |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -80.01 or less | 8191 |
| +80.01 or more | |
| RTD broken | |

4.3 Ni1000

Input range: -30.0°C to 150.0°C/-22.0°F to 302.0°F), resolution: 0.1K/0.1°F



A/D conversion table

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -30.0 | -300 |
| +150.0 | +1500 |

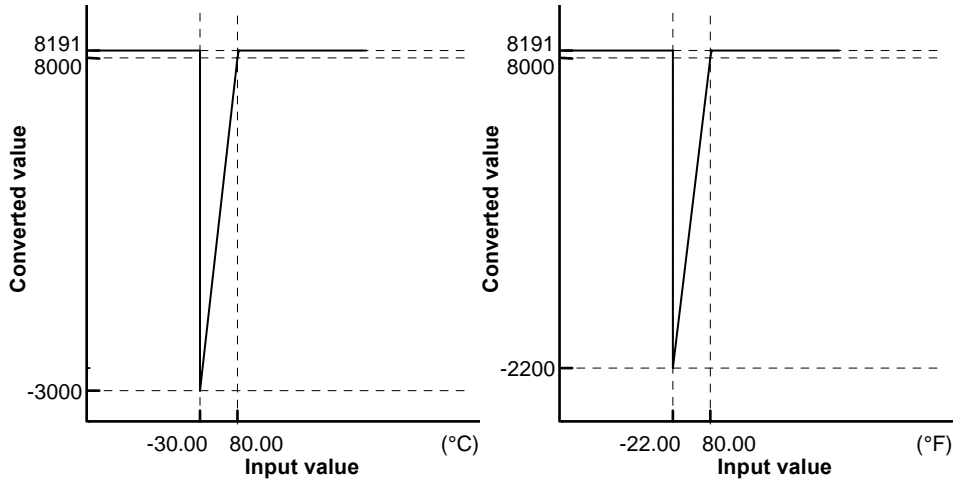
| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -22.0 | -220 |
| +302.0 | +3020 |

Processing if the input value range is exceeded

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -30.1 or less | 8191 |
| +150.1 or more | |
| RTD broken | |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -22.1 or less | 8191 |
| +302.1 or more | |
| RTD broken | |

Input range: -30.00°C to 80.00°C/-22.00°F to 80.00°F, resolution: 0.01K/0.01°F



A/D table

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -30.00 | -3000 |
| +80.00 | +8000 |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -22.00 | -2200 |
| +80.00 | +8000 |

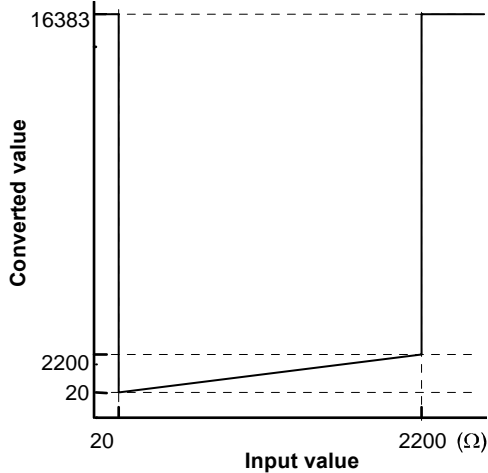
Processing if the input value range is exceeded

| Analog input value (°C) | Digital output value |
|-------------------------|----------------------|
| -30.01 or less | 8191 |
| +80.01 or more | |
| RTD broken | |

| Analog input value (°F) | Digital output value |
|-------------------------|----------------------|
| -22.01 or less | 8191 |
| +80.01 or more | |
| RTD broken | |

4.4 Resistor

Input range: 20Ω to 2200Ω, resolution: 1Ω



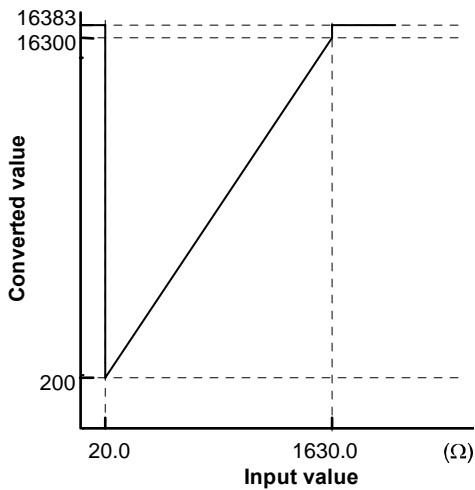
A/D conversion table

| Analog input value (Ω) | Digital output value |
|---------------------------------|----------------------|
| +20 | +20 |
| +2200 | +2200 |

Processing if the input value range is exceeded

| Analog input value (Ω) | Digital output value |
|---------------------------------|----------------------|
| +19 or less | 16383 |
| +2201 or more | |
| Resistor broken | |

Input range: 20.0 Ω to 163.0 Ω , resolution: 0.1 Ω



A/D conversion table

| Analog input value (Ω) | Digital output value |
|---------------------------------|----------------------|
| +20.0 | +200 |
| +1630.0 | +16300 |

Processing if the input value range is exceeded

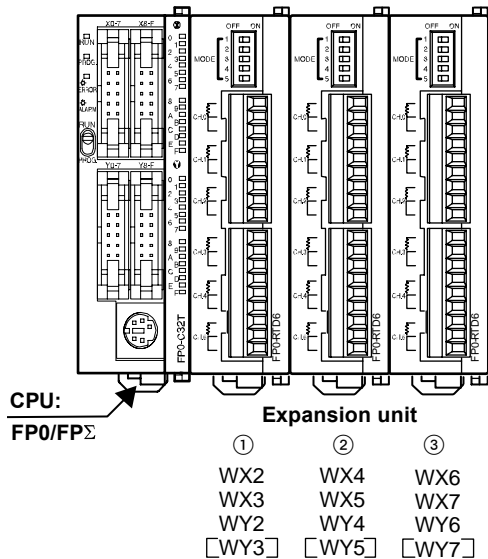
| Analog input value (Ω) | Digital output value |
|---------------------------------|----------------------|
| +19.9 or less | 16383 |
| +1630.1 or more | |
| Resistor broken | |

5 I/O Allocation and Sample Programs

5.1 I/O Numbers

Up to three expansion units including the FP0 RTD unit can be connected to the CPU (2 words [2x16 bits] are assigned to each WX and WY).

I/O Numbers



WY3, WY5, and WY7 are allocated but not used.



NOTE

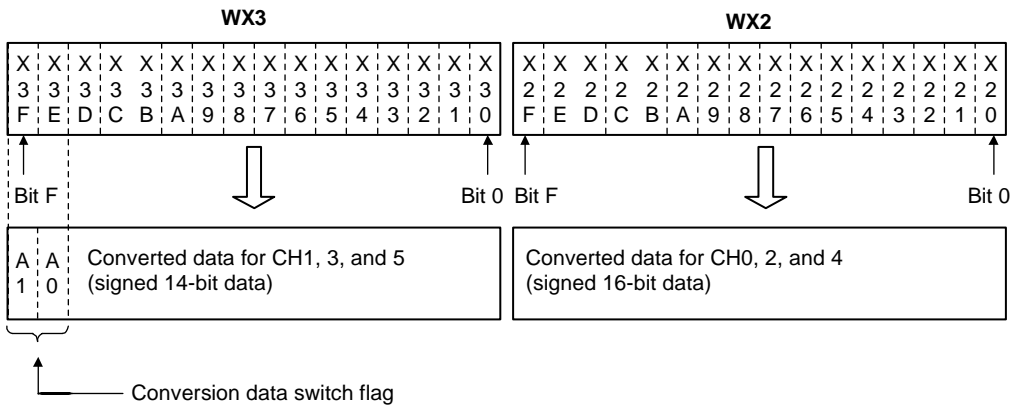
Always install the FP0 RTD unit the farthest to the right of the control unit.

With the setup illustrated above, the I/O data is allocated as in the table below.

| | | Expansion unit no.1 | Expansion unit no.2 | Expansion unit no.3 |
|---------------|-----------|---------------------|---------------------|---------------------|
| Input channel | CH0, 2, 4 | WX2 | WX4 | WX6 |
| | CH1, 3, 5 | WX3 | WX5 | WX7 |
| Output | | WY2 | WY4 | WY6 |

Example for address assignment

The figure below shows the conversion data for the different channels. The I/O addresses vary depending on the position of the RTD unit. In this example, the RTD unit is installed directly next to the control unit as expansion unit no. 1, and WX2 and WX3 are allocated.



| A1 | A0 | WX3 | WX2 |
|----|----|----------|----------|
| 0 | 0 | CH1 data | CH0 data |
| 0 | 1 | CH3 data | CH2 data |
| 1 | 0 | CH5 data | CH4 data |

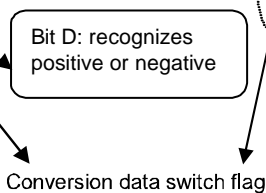
Conversion data switch flags

The analog unit has a 12-bit resolution. Before the data from the FP0 RTD unit is transferred to the control unit, the data for WX3 is converted to 16-bit data as bits E and F are used as conversion data switch flags. Data for WX2 need not be converted. (WX2 and WX3 apply if the FP0 RTD unit is installed as expansion no. 1).

When the conversion data is negative, the data from WX2 and WX3 is represented as two's complement: bits C to F of WX2 and bits C to D of WX3 will be "1".

After saving the channel information, the conversion data switch flags need to be masked. They must be converted to "00" when the data is positive and to "11" when it is negative.

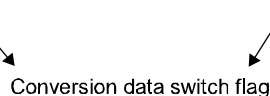
| Data for CH3 | WX3 | → | Data after masking |
|--------------|------------------|---|--------------------|
| 1 | 0100000000000001 | → | 0000000000000001 |
| -1 | 0111111111111111 | → | 1111111111111111 |



As resistor data is only positive, bit 0 to bit F for WX2 and bit 0 to bit D for WX3 can be used to represent the resistance values.

Bit E and bit F for WX3 are used as conversion data switch flags. After saving the channel information, the conversion data switch flags need to be masked. They must be converted to "00" as the data is positive.

| Data for CH3 | WX3 | → | Data after masking |
|--------------|------------------|---|--------------------|
| 1 | 0100000000000001 | → | 0000000000000001 |

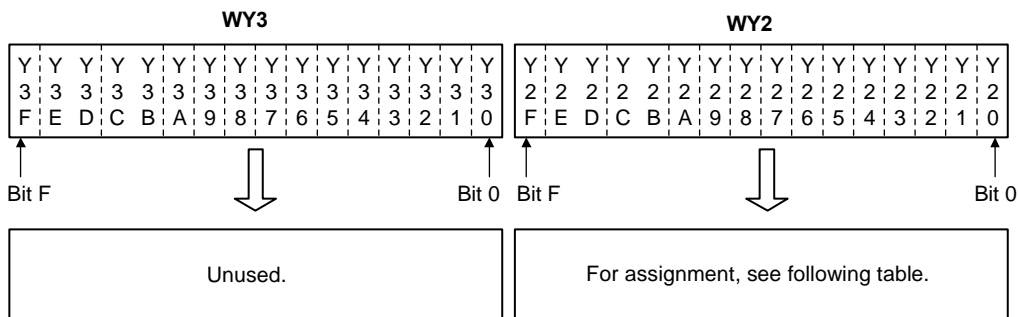




NOTE

A simple way of processing positive and negative data is shown in the programming examples on the following pages.

Assignment of outputs Y20...Y27

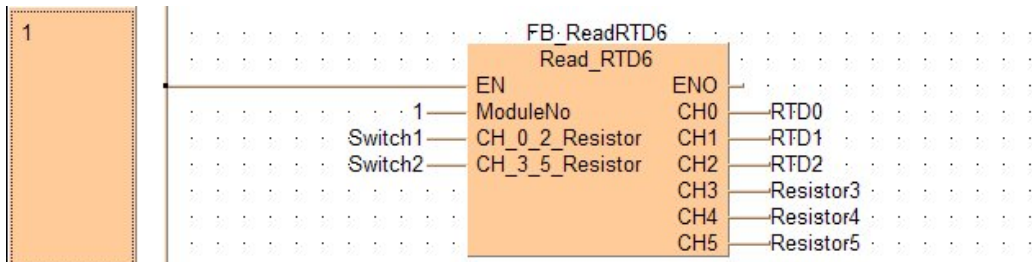


| | Off | On |
|------------------|---------------|----------------|
| Y20 | °C | °F |
| Y21 | CH0: 0.1°C/°F | CH0: 0.01°C/°F |
| Y22 | CH1: 0.1°C/°F | CH1: 0.01°C/°F |
| Y23 | CH2: 0.1°C/°F | CH2: 0.01°C/°F |
| Y24 | CH3: 0.1°C/°F | CH3: 0.01°C/°F |
| Y25 | CH4: 0.1°C/°F | CH4: 0.01°C/°F |
| Y26 | CH5: 0.1°C/°F | CH5: 0.01°C/°F |
| Y27 | Always off | Always off |
| Y28...Y2F | Unused | |

5.2 Programming with FPWIN Pro

Control FPWIN Pro provides the convenient function block "Read_RTD6" to read data from the input channels. It can be used by the FP0 RTD unit for all RTD types (Pt100, Pt1000, Ni1000, and Resistor).

You may download it free of charge from Panasonic Electric Works Europe AG's Web site at: www.panasonic-electric-works.com.



Function block "Read_RTD6"



◆ NOTES

Select a data range with or without sign for **Switch1** and **Switch2**:

Switch1,2 = FALSE: Pt100, Pt1000, Ni1000 (with sign)

Switch1,2 = TRUE: Resistor (without sign)

5.3 Programming with FPWIN GR

5.3.1 RTD Types Pt100, Pt1000, Ni1000

Ladder program to read data from input channels

This program shows you how to store temperature data for CH0 to CH5 of the FP0 RTD unit installed as expansion unit no.1 in data registers DT0 to DT5.



◆ EXAMPLE



◆ REFERENCE

For further information, see page 13, I/O Allocation and Sample Programs.

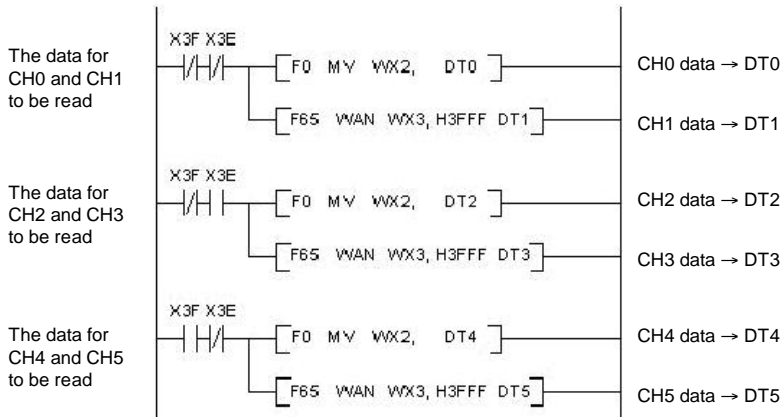
5.3.2 RTD Type Resistor

Ladder program to read data from input channels

This program shows you how to store temperature data for CH0 to CH5 of the FP0 RTD unit installed as expansion unit no.1 in data registers DT0 to DT5.



◆ EXAMPLE



◆ REFERENCE

For further information, see page 13, I/O Allocation and Sample Programs.

6 When an Error Occurs

6.1 Troubleshooting



◆ PROCEDURE

1. **Check whether the input signal lines are connected properly.**

When the RTD is not connected properly or broken, K8191 is displayed for RTD types Pt100, Pt1000, and Ni1000. K16383 is displayed for the RTD type Resistor.

2. **Check whether the input range setting switch is set properly.**

It specifies the allowed temperature range and the RTD type.

3. **Use the programs described above.**



◆ REFERENCE

For further information, see page 4, Input Range Setting Switch and page 13, I/O Allocation and Sample Programs.

6.2 Digital Value When Out Of Measuring Range

When the input of the FP0 RTD unit is out of the measuring range, the following digital values are displayed:

| | Pt100 [°C/°F] | | Pt1000 [°C/°F] | | Ni1000 [°C/°F] | | Resistor [Ω] | |
|--|---------------|------|----------------|------|----------------|------|--------------|-----|
| Resolution [K/°F] | 0.1 | 0.01 | 0.1 | 0.01 | 0.1 | 0.01 | 1 | 0.1 |
| Temperature measured > upper-limit | 8191 | | | | | | 16383 | |
| Temperature measured < lower-limit | | | | | | | | |
| RTD connected improperly or broken | | | | | | | | |

7 Specifications

General specifications

| Parameter | Specifications |
|--|--|
| Increase of current consumption in control unit | 25mA or less (24V DC) |
| Operating temperature | 0°C to +55°C |
| Storage temperature | -20°C to +70°C |
| Operating humidity | 30%RH to 85%RH (no condensing) |
| Storage humidity | 30%RH to 85%RH (no condensing) |
| Vibration resistance | 10Hz to 55Hz, 1 cycle/min: double amplitude of 0.75mm for 10 min. on 3 axes (toward X, Y and Z directions) |
| Shock resistance | 98m/s ² for 4 times on 3 axes (toward X, Y and Z directions) |
| Noise immunity | 1000V [P-P] with pulse widths 50ns and 1μs (using noise simulator) |
| Operating conditions | Free from corrosive gases and excessive dust. |
| Weight | Approx. 75g |

Input specifications

| Parameter | Specification | | | | |
|--|---------------------------|---|---|---|---|
| Input channels | Up to 6 channels per unit | | | | |
| Input range | Pt100 | Resolution 0.1 | -200.0°C to 500.0°C -328.0°F to 800.0°F (see note 1) | | |
| | | Resolution 0.01 | -80.00°C to 80.00°C -80.00°F to 80.00°F (see note 1) | | |
| | Pt1000 | Resolution 0.1 | -200.0°C to 300.0°C -328.0°F to 572.0°F (see note 1) | | |
| | | Resolution 0.01 | -80.00°C to 80.00°C -80.00°F to 80.00°F (see note 1) | | |
| | Ni1000 | Resolution 0.1 | -30.0°C to 150.0°C -22.0°F to 302.0°F (see note 1) | | |
| | | Resolution 0.01 | -30.00°C to 80.00°C -22.00°F to 80.00°F (see note 1) | | |
| | Resistor | Resolution 1 | 20Ω to 2200Ω | | |
| | | Resolution 0.1 | 20.0Ω to 1630.0Ω | | |
| | Digital output | Pt100 | Resolution 0.1 | -200.0 to 500.0°C: -328.0 to 800.0°F: | -2000 to 5000 -3280 to 8000 |
| | | | Resolution 0.01 | -80.00 to 80.00°C: -80.00 to 80.00°F: | -8000 to 8000 -8000 to 8000 |
| Pt1000 | | Resolution 0.1 | -200.0 to 300.0°C: -328.0 to 572.0°F: | -2000 to 3000 -3280 to 5720 | |
| | | Resolution 0.01 | -80.00 to 80.00°C: -80.00 to 80.00°F: | -8000 to 8000 -8000 to 8000 | |
| Ni1000 | | Resolution 0.1 | -30.0 to 150.0°C: -22.0 to 302.0°F: | -300 to 1500 -220 to 3020 | |
| | | Resolution 0.01 | -30.00 to 80.00°C: -22.00 to 80.00°F: | -3000 to 8000 -2200 to 8000 | |
| Resistor | | Resolution 1 | 20 to 2200Ω: | 20 to 2200 | |
| | | Resolution 0.1 | 20.0Ω to 1630.0Ω: | 200 to 16300 | |
| When out of range or RTD is broken: 8191 or 16383 (see note 2) Until temperature can be measured at initial startup: see note 3 | | | | | |
| Resolution | | 0.1K/°F, 0.01K/°F | | | |
| Sampling cycle | | 0.1 or 1s for all channels (see note 4) | | | |
| Accuracy | | Pt100 | Cycle 1s | Ambient temp.: 25°C | 0.3K (-10°C to +30°C) 0.2%/1.4K (-200°C to +500°C) |
| | Whole temp. range | | | 0.35%/2.5K | |
| | Cycle 0.1s | | Whole temp. range | 0.5%/3.5K | |
| | Pt1000 | Cycle 1s | Ambient temp.: 25°C | 0.3K (-10°C to +30°C) 0.2%/1.0K (-200°C to +300°C) | |
| | | | Whole temp. range | 0.35%/1.7K | |
| | | Cycle 0.1s | Whole temp. range | 0.5%/2.5K | |
| | Ni1000 | Cycle 1s | Whole temp. range | 1K | |
| | | Cycle 0.1s | Whole temp. range | 2K | |

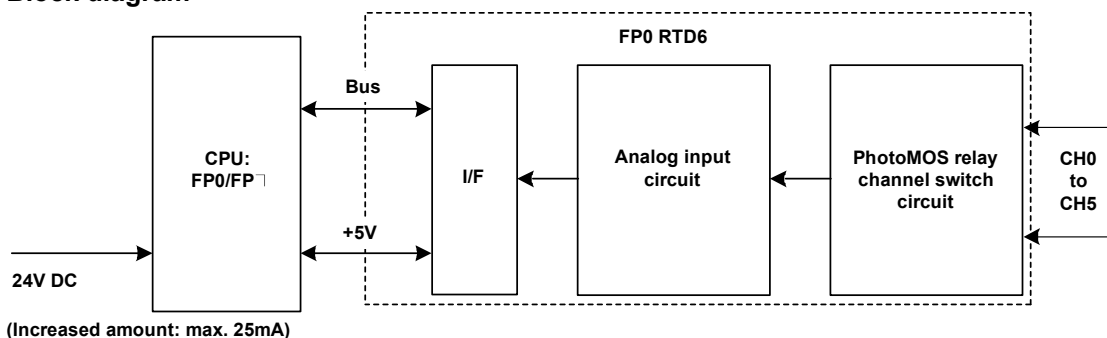
| Parameter | Specification | | | |
|---------------------|---------------|--------------------------|-------------------------|--|
| | Resistor | Cycle 1s | Whole temp. range | 1Ω (20 to 2200Ω) |
| | | Cycle 0.1s | Whole temp. range | 2Ω (20 to 2200Ω) |
| Insulation method | none | | | |
| Input/output points | Input | 32 points: | 16 points for WX2, 4, 6 | Analog input CH0, 2, 4 (WX2) (see notes 5 and 6) |
| | | | 16 points for WX3, 5, 7 | Analog input CH1, 3, 5 (WX3) (see notes 5 and 6) |
| | Output | 8 + 24 points (reserved) | | |



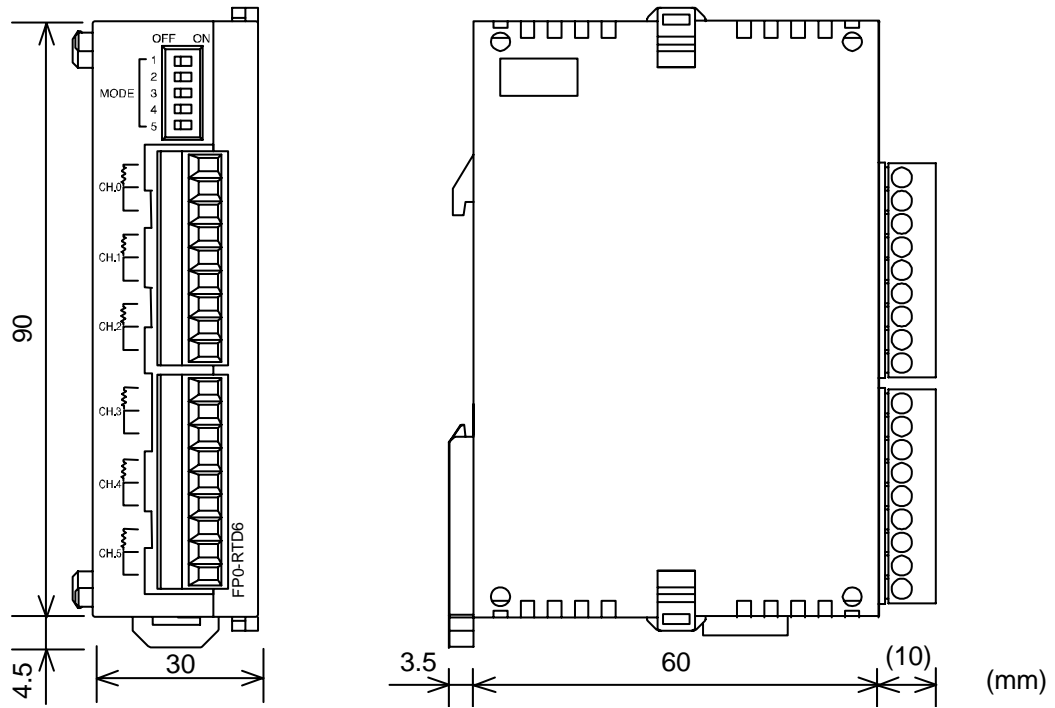
◆ NOTES

1. The measurement range available for degrees Celsius is larger than for degrees Fahrenheit as the digital value (temperature value displayed) for °F is higher than the one for °C.
2. When the RTD is broken, the digital value will change to 8191 or 16383. Use a program to avoid risks resulting from a broken RTD. A broken RTD needs to be replaced.
3. Until conversion data is ready after the initial startup, the digital value shows 8191 or 16383. These are not temperature data. Program in such a way that these values are not interpreted as temperature data.
4. These are the settings of the input channel selection switch.
5. The control unit reads data from 2 channels in one scan. Read data by using the programs described above.
6. This address applies when the FP0 RTD unit is installed as expansion unit no. 1.

Block diagram



8 Dimensions



Index

1

16383
digital output value..... 12

8

8191
digital output value.....6, 7, 8, 9, 10, 11

A

A/D conversion values See Conversion characteristics
Accuracy iv, 21
Addresses 13

B

Block diagram 22
Broken-RTD detector 1, 22

C

Celsius 1
Conversion characteristics
 Ni1000 10
 Pt100 6
 Pt1000 8
 Resistor..... 11
Conversion data switch flag..... 13
Current consumption increase..... 20

D

Digital output 21
Dimensions 23
DIN rail attachment lever 3

E

Expansion 1, 13
Expansion connector 3
Expansion hook 3

F

Fahrenheit..... 1
FPWIN GR
 Programming 17
FPWIN Pro

Programming 16
Function block..... 16

I

I/O allocation 13
I/O numbers 13
Input channels 13, 21
Input range..... 21
Input range setting switch 2, 4
Input/output points 22
Insulation method 22

M

Measurement ranges..... 1
Mode switch..... 4

N

Ni1000
 Conversion characteristics 10
 Measurement range 1
Noise immunity 20

O

Operating conditions..... 20
Operating humidity..... 20
Operating temperature 20
Output assignments..... 15

P

Product number 1
Programming
 FPWIN GR..... 17
 FPWIN Pro 16
Pt100
 Conversion characteristics 6
 Measurement range 1
Pt1000
 Conversion characteristics 8
 Measurement range 1

R

Read_RTd6..... 16
Resistor
 Conversion characteristics 11
 Measurement range 1
Resolution 21

RTD types 1

S

Sampling cycle.....21

Shock resistance.....20

Specifications.....20

Storage humidity20

Storage temperature.....20

T

Troubleshooting 19

V

Vibration resistance20

W

Weight.....20

Wires.....2

Wiring.....5

North America

Europe

Asia Pacific

China

Japan

Panasonic Electric Works Global Sales Companies



Europe

| | | |
|---------------------------|--|--|
| ▶ Headquarters | Panasonic Electric Works Europe AG | Rudolf-Diesel-Ring 2, 83607 Holzkirchen, Tel. +49(0)8024648-0, Fax +49(0)8024648-111, www.panasonic-electric-works.com |
| ▶ Austria | Panasonic Electric Works Austria GmbH | Rep. of PEWDE, Josef Madersperger Str. 2, 2362 Biedermannsdorf, Tel. +43(0)223626846, Fax +43(0)223646133, www.panasonic-electric-works.at |
| | PEW Electronic Materials Europe GmbH | Ennschafenstraße 9, 4470 Enns, Tel. +43(0)7223883, Fax +43(0)722388333, www.panasonic-electronic-materials.com |
| ▶ Benelux | Panasonic Electric Works Sales Western Europe B.V. | De Rijn 4, (Postbus 211), 5684 PJ Best, (5680 AE Best), Netherlands, Tel. +31(0)499372727, Fax +31(0)499372185, www.panasonic-electric-works.nl |
| ▶ Czech Republic | Panasonic Electric Works Czech s.r.o. | Prumtyslová 1, 34815 Planá, Tel. (+420)-374799990, Fax (+420)-374799999, www.panasonic-electric-works.cz |
| ▶ France | Panasonic Electric Works Sales Western Europe B.V. | French Branch Office, B.P. 44, 91371 Verrières le Buisson CEDEX, Tel. +33(0)16013 5757, Fax +33(0)1 6013 5758, www.panasonic-electric-works.fr |
| ▶ Germany | Panasonic Electric Works Deutschland GmbH | Rudolf-Diesel-Ring 2, 83607 Holzkirchen, Tel. +49(0)8024648-0, Fax +49(0)8024648-555, www.panasonic-electric-works.de |
| ▶ Hungary | Panasonic Electric Works Europe AG | Magyarországi Közvetlen Kereskedelmi Képviselet, 1117 Budapest, Neumann János u. 1., Tel. +36(0)14829258, Fax +36(0)14829259, www.panasonic-electric-works.hu |
| ▶ Ireland | Panasonic Electric Works UK Ltd. | Dublin, Tel. +353(0)14600969, Fax +353(0)14601131, www.panasonic-electric-works.co.uk |
| ▶ Italy | Panasonic Electric Works Italia s.r.l. | Via del Commercio 3-5 (Z.I. Ferlina), 37012 Bussolengo (VR), Tel. +390456752711, Fax +390456700444, www.panasonic-electric-works.it |
| | PEW Building Materials Europe s.r.l. | Piazza della Repubblica 24, 20154 Milano (MI), Tel. +39022900-5391, Fax +39022900-3466, www.panasonic-building-materials.com |
| ▶ Nordic Countries | Panasonic Electric Works Nordic AB PEW Fire & Security Technology Europe AB | Sjöängsvägen 10, 19272 Sollentuna, Sweden, Tel. +4659476680, Fax +46859476690, www.panasonic-electric-works.se |
| ▶ Poland | Panasonic Electric Works Polska sp. z o.o. | Jungmansgatan 12, SE-211 19 Malmö, Tel. +46406977000, Fax +46406977099, www.panasonic-fire-security.com |
| | | Przedstawicielstwo w Polsce, Al. Krakowska 4/6, 02-284 Warszawa, Tel. +48 22 338-11-33, Fax +48 22 338-12-00, www.panasonic-electric-works.pl |
| ▶ Portugal | Panasonic Electric Works España S.A. | Portuguese Branch Office, Avda Adelino Amaro da Costa 728 R/C J, 2750-277 Cascais, Tel. +351 214812520, Fax +351 214812529 |
| ▶ Spain | Panasonic Electric Works España S.A. | Barajas Park, San Severo 20, 28042 Madrid, Tel. +34 91 3293875, Fax +34 91 3292976, www.panasonic-electric-works.es |
| ▶ Switzerland | Panasonic Electric Works Schweiz AG | Grundstrasse 8, 6343 Rotkreuz, Tel. +41(0)417997050, Fax +41(0)417997055, www.panasonic-electric-works.ch |
| ▶ United Kingdom | Panasonic Electric Works UK Ltd. | Sunrise Parkway, Linford Wood, Milton Keynes, MK14 6LF, Tel. +44(0) 1908 231555, +44(0) 1908 231599, www.panasonic-electric-works.co.uk |

North & South America

| | | |
|--------------|-----------------------------------|---|
| ▶ USA | PEW Corporation of America | 629 Central Avenue, New Providence, N.J. 07974, Tel. +1-908-464-3550, Fax +1-908-464-8513, www.pewa.panasonic.com |
|--------------|-----------------------------------|---|

Asia Pacific/China/Japan

| | | |
|--------------------|--|--|
| ▶ China | Panasonic Electric Works (China) Co., Ltd. | 2013, Beijing Fortune, Building No. 5, Dong San Huan Bei Lu, Chaoyang District, Beijing Tel. +86-10-6590-8646, Fax +86-10-6590-8647, www.pewc.panasonic.cn |
| ▶ Hong Kong | Panasonic Electric Works (Hong Kong) Co., Ltd. | RM1205-9, 12/F, Tower 2, The Gateway, 25 Canton Road, Tsimshatsui, Kowloon, Hong Kong, Tel. +852 2956-3118, Fax +852 2956-0398 |
| ▶ Japan | Panasonic Electric Works Co., Ltd. | 1048 Kadoma, Kadoma-shi, Osaka 571-8686, Japan, Tel. +81-6-6908-1050, Fax +81-6-6908-5781 http://panasonic-electric-works.net |
| ▶ Singapore | Panasonic Electric Works Asia Pacific Pte. Ltd. | 101 Thomson Road, #25-03/05, United Square, Singapore 307591, Tel. +65-6255-5473, Fax +65-6253-5689 |