User's

LG Programmable Logic Controller

GLOFA G3F – RD3A G4F – RD2A

LG Industrial Systems

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PRECAUTIONS

Be sure to read carefully the safety precautions given in data sheet and user's manual before operating the module and follow them.

The precautions explained here only apply to the G3F-RD3A and G4F-RD2A.

For safety precautions on the PLC system, see the GLOFA GM3/4 User's Manuals.

A precaution is given with a hazard alert triangular symbol to call your attention, and precautions are represented as follows according to the degree of hazard.

WARNING ⇨ If not provided with proper prevention, it can cause death or fatal injury or considerable loss of property.

CAUTION ⇨ If not properly observed, it can cause a hazard situation to result in severe or slight injury or a loss of property.

However, a precaution followed with **CAUTION** can also result in serious conditions.

Both of two symbols indicate that an important content is mentioned, therefore, be sure to observe it.

Keep this manual handy for your quick reference in necessary.

Design Precautions

CAUTION

- Do not run I/O signal lines and compensation wires near to high voltage line or power line.
  Separate them as 100 mm or more as possible. Otherwise, noise can cause module malfunction.

Installation Precautions

CAUTION

- Operate the PLC in the environment conditions given in the general specifications.
- If operated in other environment not specified in the general specifications, it can cause an electric shock, a fire, malfunction or damage or degradation of the module
- Make sure the module fixing projections is inserted into the module fixing hole and fixed.
- Improper installation of the module can cause malfunction, disorder or falling.

Wiring Precautions

CAUTION

- When grounding a FG terminal, be sure to provide class 3 grounding which is dedicated to the PLC. If not grounded, It can cause malfunction.
- Before the PLC wiring, be sure to check the rated voltage and terminal arrangement for the module and observe them correctly.
  If a different power, not of the rated voltage, is applied or wrong wiring is provided, it can cause a fire or disorder of the module.
- Drive the terminal screws firmly to the defined torque.
  If loosely driven, it can cause short circuit, a fire or malfunction.
- Be careful that any foreign matter like wire scraps should not enter into the module.
  It can cause a fire, disorder or malfunction.

Test Run and Maintenance Precautions

WARNING

- Do not contact the terminals while the power is applied.
  It can cause malfunction.
- When cleaning or driving a terminal screw, perform them after the power has been turned off
- Do not perform works while the power is applied, which can cause disorder or malfunction.

CAUTION

- Do not separate the module from the printed circuit board(PCB), or do not remodel the module.
  They can cause disorder, malfunction, damage of the module or a fire.
  When mounting or dismounting the module, perform them after the power has been turned off.
- Do not perform works while the power is applied, which can cause disorder or malfunction.

Waste Disposal Precautions

CAUTION

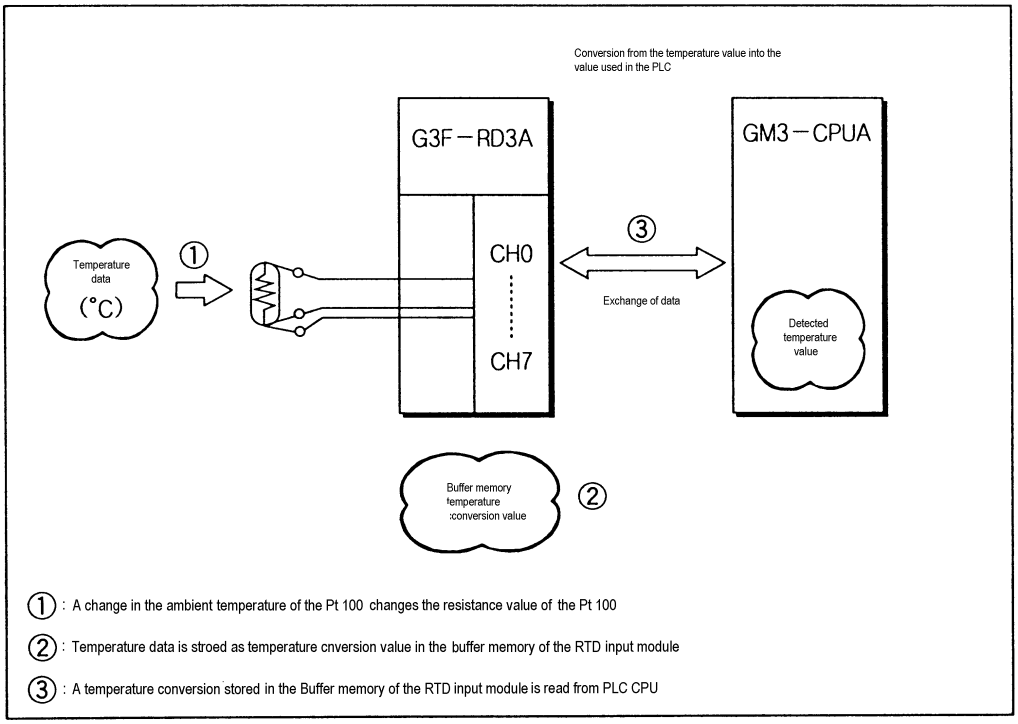
- When disposing the module, do it as an industrial waste.

Chapter 1. INTRODUCTION

These two units are called G3F-RD3A and G4F-RD2A. The G3F-RD3A is an Pt input module used with the CPU of GLOFA PLC GM1/2/3 series, and the G4F-RD2A is used with the CPU of GM4 series. Hereafter, the two units are called the RTD input module

The RTD input module is a module that converts the temperature data(°C) input by the Pt (Pt100 or JPt100) into a signed 16 bit digital binary data and outputs it.

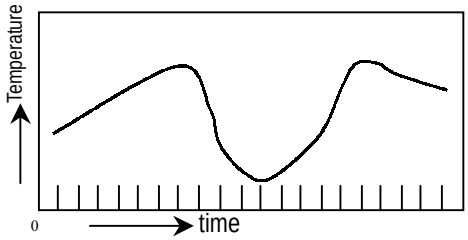
1.1 Features



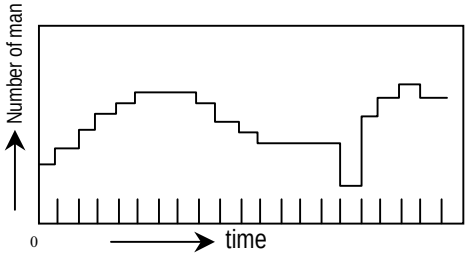
1) With direct connection of the RTD input module, the temperature data(°C) can be converted into a digital value to be processed in the PLC.
2) The temperature data(°C) input can be processed to one digit after the point as a digital value.
3) One module can be connected to G3F-RD3A 8-point or G4F-RD2A 4-point Pt100 or JPt100.
4) The RTD input module has Pt100, Jpt100 or cable burn-out function at their every channel.
5) The RTD input module detects the out-of-range temperature that is input by Pt100 or JPt100.
6) The 5 digit LED display included in the G3F-RD3A displays the temperature input value and error code.

1.2 Glossary

1.2.1 A - Analog Value



[Fig 1.1] Analog Value

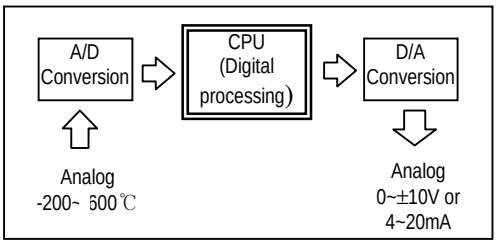


[Fig 1.2] Digital Value

The continuous changeable value such as voltage, current, temperature, velocity, pressure and flow is called analog value. For example, temperature changes continuously with time as shown in Fig. 1.1. The PLC can process that continuous changeable temperature by use of the RTD input module.

1.2.2 D - Digital Value

In Fig.1.2, the number of man can be counted as 0, 1, 2, 3. The non-continuous changeable value as such is called a digital value. On and Off signals can be denoted as a digital value 0 and 1, respectively.



Analog value cannot be directly input to the CPU module for digital processing. Therefore, analog value should be converted into a digital value to be input to the CPU module. In addition, for external output of analog value, digital value of the CPU module should be converted into analog value.

[Fig 1.3] Processing in the PLC

1.2.3 Pt

This is a sensor that detects temperature as the type of resistance.

The Pt 100 outputs the resistance value of 100.00 Ω for the temperature of 0 °C

1.2.4 Burn-out Function

If a part of the connected RTD or cable is disconnected, the out-of-range voltage is input by the internal burn-out circuit and the connection or disconnection is detected.

Chapter 2. SPECIFICATIONS

2.1 General Specifications

Table 2.1 shows general specifications of the GLOFA GM series.

<table>
<tr><th>No</th><th>Item</th><th colspan="6">Specifications</th><th>Reference specification</th></tr>
<tr><td>1</td><td>Operating ambient temperature</td><td colspan="6">0 ~ 55 °C</td><td></td></tr>
<tr><td>2</td><td>Storage ambient temperature</td><td colspan="6">-25 ~ +75 °C</td><td></td></tr>
<tr><td>3</td><td>Operating humidity</td><td colspan="6">5 ~ 95%RH, non-condensing.</td><td></td></tr>
<tr><td>4</td><td>Storage humidity</td><td colspan="6">5 ~ 95%RH, non-condensing.</td><td></td></tr>
<tr><td rowspan="8">5</td><td rowspan="8">Vibration</td><td colspan="5">Occasional vibration</td><td rowspan="8">IEC 1131-2</td></tr>
<tr><td>Frequency</td><td colspan="2">Acceleration</td><td>Amplitude</td><td>Sweep Count</td></tr>
<tr><td>10≤ f<57 Hz</td><td colspan="2">-</td><td>0.075 mm</td><td rowspan="5">10 times in each direction for X,Y,Z</td></tr>
<tr><td>57≤f≤150 Hz</td><td colspan="2">9.8 m/s ^{2} {1 G}</td><td>-</td></tr>
<tr><td colspan="4">Continuous vibration</td></tr>
<tr><td>Frequency</td><td colspan="2">Acceleration</td><td>Amplitude</td></tr>
<tr><td>10≤f <57 Hz</td><td colspan="2">-</td><td>0.035 mm</td></tr>
<tr><td>57≤f≤150 Hz</td><td colspan="2">4.9 m/s^2 {0.5G}</td><td>-</td></tr>
<tr><td>6</td><td>Shocks</td><td colspan="6">● Maximum shock acceleration: 147 m/s^2{15G}
● Duration time : 11ms
● Pulse wave: half sine pulse (3 times in each of X, Y and Z directions)</td><td>IEC 1131-2</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Noise Immunity</td><td>Square wave impulse noise</td><td colspan="5">± 1,500 V</td><td></td></tr>
<tr><td>Electrostatic discharge</td><td colspan="5">Voltage : 4 kV (contact discharge)</td><td>IEC 1131-2, IEC 801-2</td></tr>
<tr><td>Radiated electromagnetic field</td><td colspan="5">27 ~ 500 MHz, 10 V/m</td><td>IEC 1131-2, IEC 801-3</td></tr>
<tr><td rowspan="2">Fast transient/burst noise</td><td>Severity Level</td><td>All Power modules</td><td>Digital I/Os (Ue > 24 V)</td><td>Digital I/Os (Ue < 24 V) Analog I/Os interface communication I/Os</td><td rowspan="2">IEC 1131-2, IEC 801-4</td></tr>
<tr><td>Voltage</td><td>2 kV</td><td>1 kV</td><td>0.25 kV</td></tr>
<tr><td>8</td><td>Operating Atmosphere</td><td colspan="6">Free from corrosive gases and excessive dust.</td><td></td></tr>
<tr><td>9</td><td>Operation Altitude</td><td colspan="6">Up to 2,000m</td><td></td></tr>
<tr><td>10</td><td>Pollution degree</td><td colspan="6">2</td><td></td></tr>
<tr><td>11</td><td>Cooling method</td><td colspan="6">Self-cooling</td><td></td></tr>
</table>

[Table 2.1] General Specifications

REMARK

1) IEC(International Electromechanical Commission) : The international civilian organization which produces standards for electrical and electronic industry.
2) Pollution degree : It indicates a standard of operating ambient pollution level The pollution degree 2 means the condition in which normally, only con-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected.

2.2 Performance Specifications

Table 2.2 shows performance specifications of the RTD input module.

Item	Specifications	
	G3F-RD3A	G4F-RD2A
Connectable RTD	Pt 100 (JIS C1640-1989, DIN 43760-1980) JPt100 (KS C1603-1991, JIS C1604-1981)	
Temperature input range	Pt100 : -200.0°C to 600°C (18.48 to 313.59Ω) JPt100 : -200.0°C to 600°C (17.14 to 317.28Ω)	
Digital output	Digital conversion value : 0 to 16,000 Detected temperature value : -2000 to 6000 (one digit after point × 10)	
Buffer memory	Each of three wires at every channel has detection function.	
Accuracy	±0.5 %(full scale)	
Maximum conversion speed	50ms per channel	
Number of temperature input device points	8 channels per module	4 channels per module
Insulation method	Photo-coupler insulation between the input terminal and the PLC power supply (non-insulation between channels)	
Connection terminal block	38-point terminal block	20-point terminal block
Internal current consumption	0.5 A	0.45A
Weight	630 g	350 g
LED display	Output of the temperature conversion value and error code	-

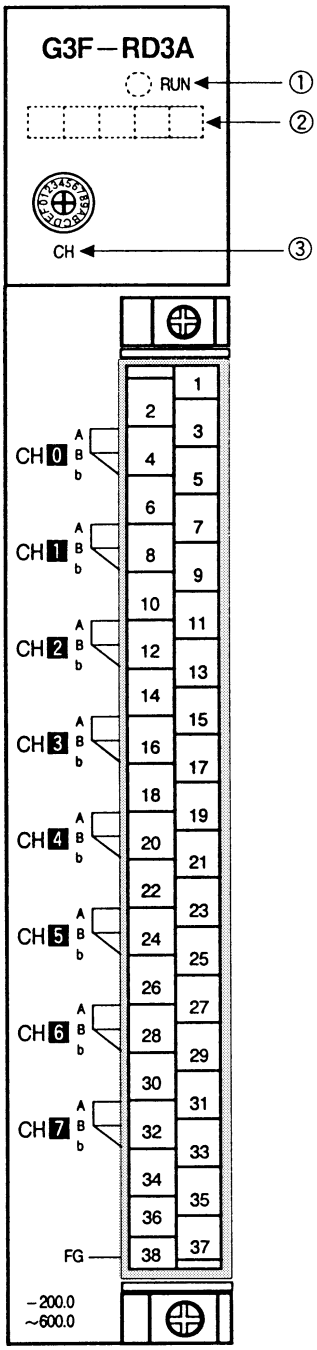
[Table. 2.2 Performance Specifications]

2.3 Names of Parts and Functions

The following gives names of parts.

2.3.1 G3F-RD3A

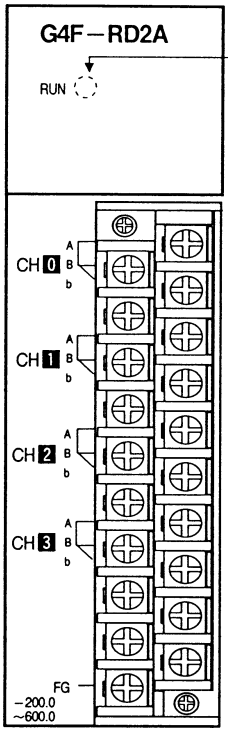
The following gives the names and functions of each part of the G3F-RD3A.



No.	Descriptions
①	RUN LED It displays the operating status of G3F-RD3A module ● On : Normal Operation ● Flickering : Error occurred (For more information, see Chapter 4.1 ● Off : DC 5V disconnection or the G3F-RD3A module error
②	LED display ● Detected temperature value indication - Indication the temperature conversion value of the channels enabled by the channel selection switch. - The detected temperature value is represented as 5-digit decimal number. (Down to one place of a decimal number is represented as a floating port number) (Representation range : - 210.0°C to 610.0°C) Representation example : -123.4°C | - | 1 | 2 | 3. | 4 | ● Error No. display | E | r | r | | | The rightmost one digit displays the number of error ● Stop Indication - This appears if a channel specified by the channel selection switch is not specified as the used channel in the program
③	Channel selection switch - Used to specify the channel for detected temperature value indication. - Setting range : 0 to 7 (8 to F are not used.)

2.3.2 G4F-RD2A

The following gives the names and functions of each part of the G4F-RD2A.



RUN LED

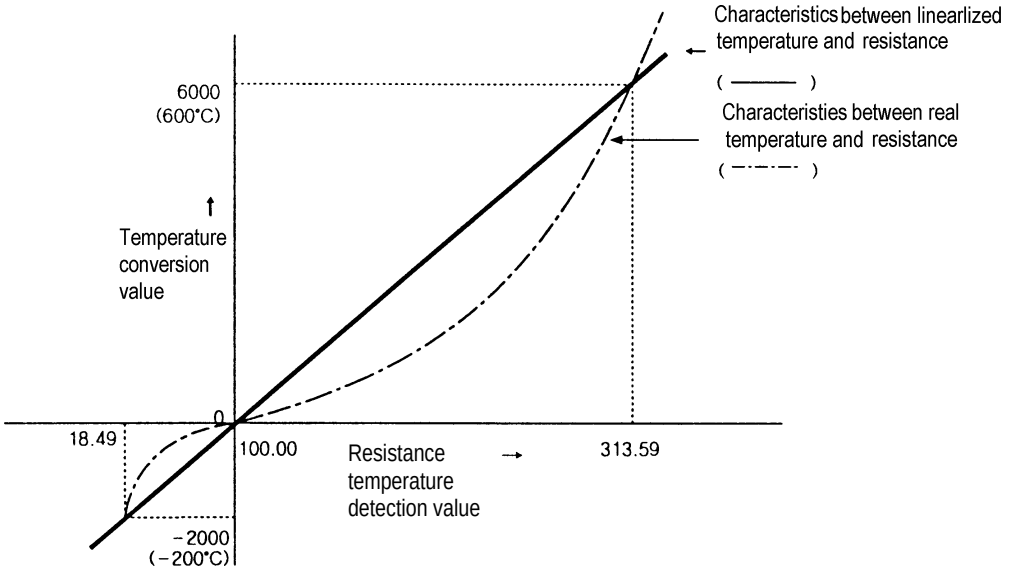
G4F-RD2A module operating status Indication

- On : Normal operation
- Flickering : Error occurred (For more information, see Section Common 4.1)
- Off : 5 VDC disconnection or G4F-RD2A module error

2.4 RTD Input Module Characteristics

2.4.1 Temperature Conversion Characteristics

The RTD input module, as shown in the Fig. 2.1, linearlizes the non-linear characteristic resistance input of the RTD.



[Fig. 2.1] Temperature conversion characteristics(Pt100)

2.4.2 Conversion speed

The conversion speed of the RTD input module is 50 ms per channel and its processing is processed sequentially, that is, one channel is processed and then another channel is processed.

Processing time = 50 ms × the number of the used channels

Example) When three channels are used
Processing time = 50 ms × 3 = 150 ms

2.4.3 Accuracy

The accuracy of RTD input module is within ±0.5 % of all of the measurable temperature range.

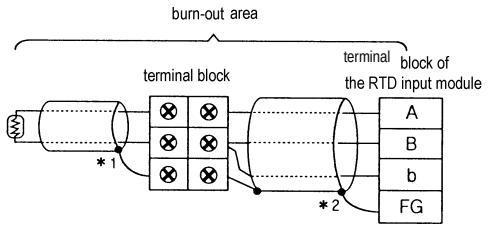
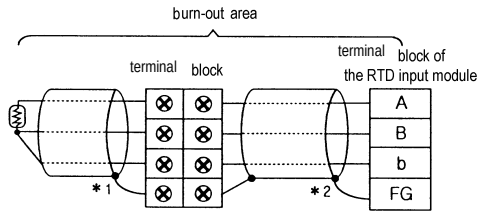
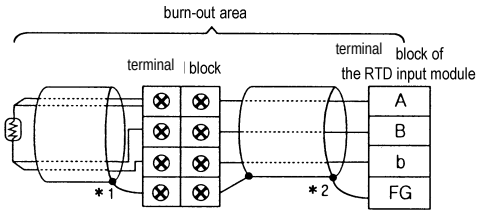
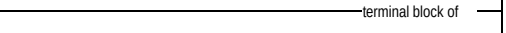
Example) When the RTD Pt100 is used, the conversion values of –100°C and 400°C are as below.

- Measurable temperature full range : 800°C (-200.0°C to 600.0°C)
- Accuracy : 800 × (±0.5%) = 800× (±0.005) = ±4°C
- Temperature conversion range : - 104 °C to – 96 °C when –100°C
  396°C to 404°C when 400°C

2.4.4 Burn-out Function

The RTD input module has the function of burn-out on the Pt100, JPt100 or cable.

1) As shown in the Fig. 2.2, if disconnection occurs in the RTD or cable then a voltage outside the measurable range voltage is inputted by the internal burn-out circuit and burn-out error code is generated.
2) The RTD input module can detect disconnection for each channel. But, burn-out is possible only in the channels enabled.
3) If disconnection is detected in two or more wires, first, disconnection error code '**b'** generated and then disconnection error code **a** or **b** is generated sequentially. If disconnection is detected simultaneously in A and B, only disconnection error code '**b'** is generated.

Connection Method	Connection Example	Burn-out Function	Remark
2-wire type			- In 4-wire type, only all wires marked '2' connected to the terminal block A are all detected as disconnection then the A disconnection error can be detected.
3-wire type			
4-wire type			
No wiring			*1 : Pt *2: Shield wire

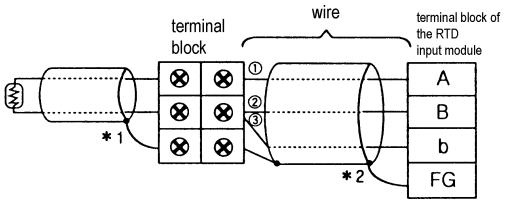
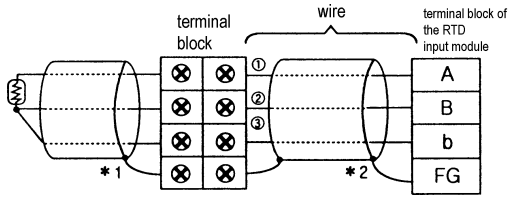
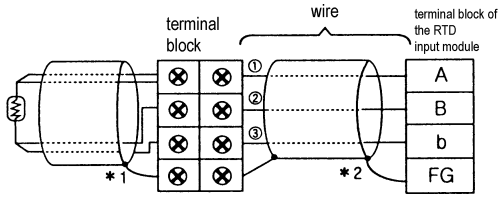
[Fig. 2.2] Burn-out Area

2.5 Connection between a Pt and RTD input module

- Number of method of connection between Pt and RTD input module are three, that is, 2-wired type, 3-wired type and 4-wired type.
- The resistance of the wires used to connect Pt to RTD input module should be 10 Ω or less per wire. The same wire (in thickness, length, and kind, etc.) should be used for each channel.

REMARK

✳ The difference between the resistance values of the wires used should be 1 Ω or less, or the accuracy shown in the Table 2.2 could not be satisfied.

Connection Method	Connection Example	Wire Conditions
2-wired type		① wire resistance ≤ 10Ω ② wire resistance ≤ 10Ω ③ wire resistance ≤ 10Ω
3-wired type		The difference between the resistance values of the wires ① and ② : 1Ω or less The difference between the resistance values of the wires ② and ③ : 1Ω or less The difference between the resistance values of the wires ③ and ① : 1Ω or less
4-wired type		

[Fig. 2.3] Method of Connection between Pt and RTD Input Module

*1: RTD (Pt100 or JPt1000)

*:2: Shielded wire

- The shields of the RTD and shields of wire should be connected to the FG of the RTD input module.

Chapter 3. INSTALLATION AND WIRING

3.1 Installation

3.1.1 Installation Ambience

This module has high reliability regardless of its installation environment, but be sure to check the following for system reliability and stability.

1) Ambience requirements

Avoid installing this unit in locations which are subjected or exposed to :

- Water leakage and dust.
- Continuous shocks or vibrations.
- Direct sunlight.
- Dew condensation due to rapid temperature change.
- Higher or lower temperatures outside the range of 0 to 55 °C

2) Precautions during installing and wiring.

- During drilling or wiring, do not allow any wire scraps to enter into the PLC.
- Install it on locations that are convenient for operation.
- Make sure that it is not located on the same panel that high voltage equipment located.
- Make sure that the distance from the walls of duct and external equipment be 50 mm or more.
- Be sure to be grounded to locations that have good ambient noise immunity.

3.1.2 Handling Precautions

From unpacking to installing the RTD input module, be sure to check the following:

1) Do not drop it off, and make sure that strong shock should not be applied.
2) Do not unload the PCB from its case. It can cause faults.
3) During wiring, be sure to check any foreign matter like wire scraps should not enter into the upper side of the PLC. If any foreign matter has entered into it, always eliminate it.
4) Do not load or unload the module while the power supply is being connected.

3.2 Wring Precautions

1) When connecting Pt with the RTD input module, refer to the Chapter 2.5 for wiring.
2) Be sure to separate the external input signal of the RTD input module from an alternating current so that surge or induction noise generated from the alternating current could not effect.
3) When wiring, locating this unit too near from high temperature generating devices or materials or contacting it with the material like oil can cause short-circuit and occur damage or disorder.
4) When wiring to the terminal block, wiring with high-pressure wire or power supply wire can occur flow inhibition and cause disorder or malfunction.
5) Make sure that electric wires do not pass before the LED display. It causes the digital values not to be identified.

Chapter 4. TROUBLESHOOTING

The followings explain errors that could occur during operating the RTD input module and their troubleshooting.

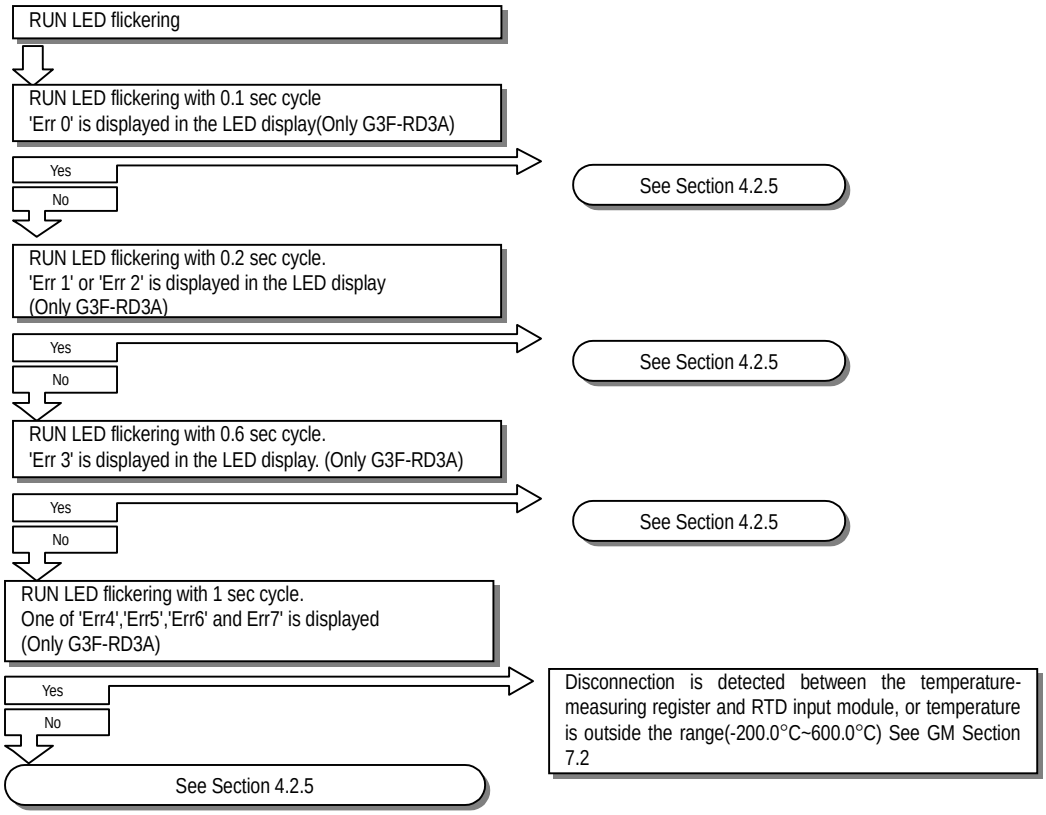
4.1 Errors Indicated by RUN LED Flickering

Errors indicated by the flickering RUN LED of RTD input module are given below.

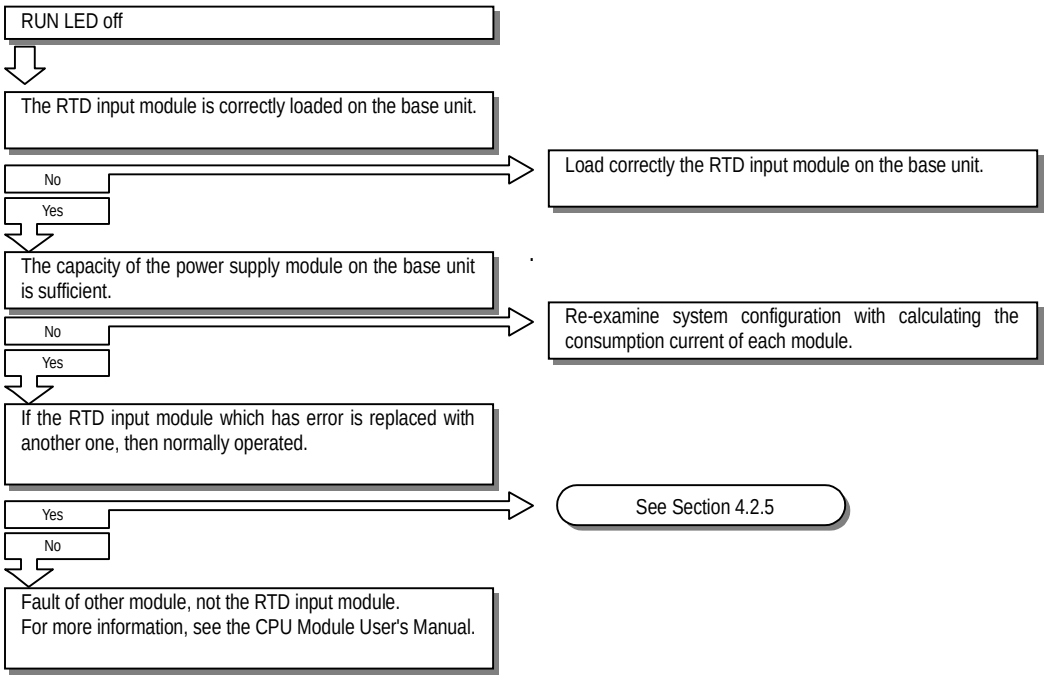
RUN LED Status	Descriptions	G3F-RD3A LED display	Remark
Flickering (cycle: 0.1 sec)	WDT error	Err 1	
Flickering (cycle: 0.2 sec)	System error	Err 0	
	Internal memory error	Err 2	
Flickering (cycle: 0.6 sec)	A/D conversion error	Err 3	
Flickering (cycle: 1.0 sec)	A disconnection detected	Err 4	The data before error has occurred is maintained.
	B disconnection detected	Err 5	
	b disconnection detected	Err 6	
	Outside the upper or lower bound of the range	Err 7	

4.2 Troubleshooting Procedure

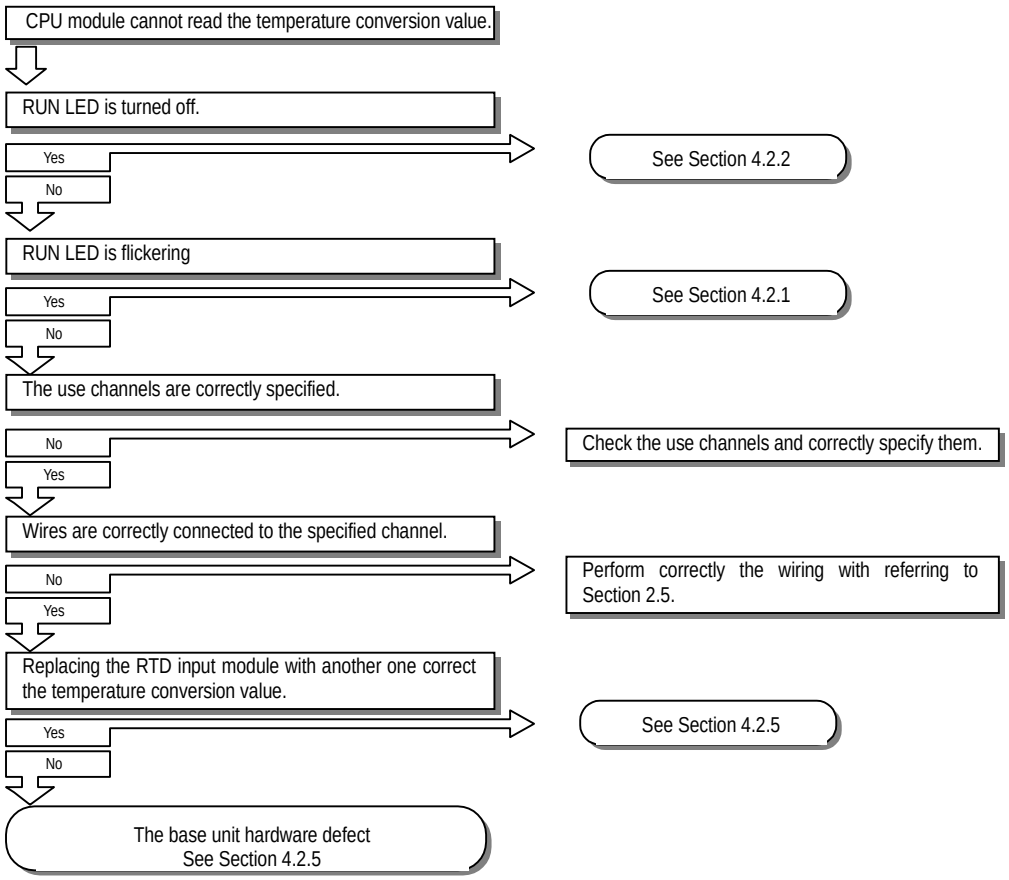
4.2.1 RUN LED Flickering



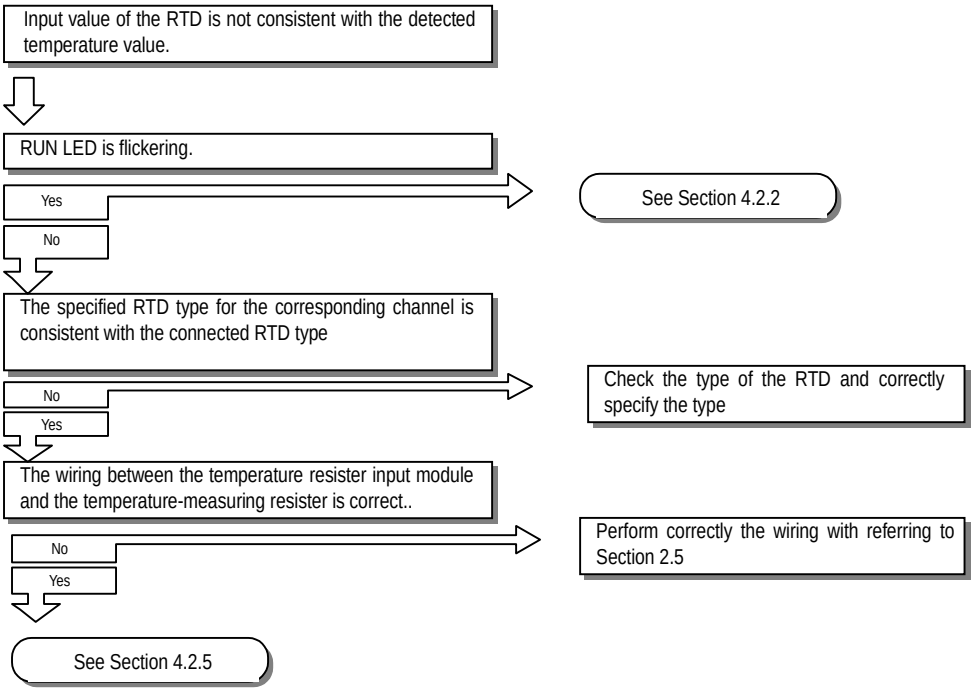
4.2.2 RUN LED Off



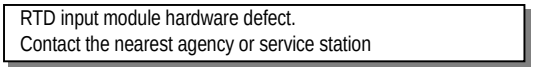
4.2.3 Detected Temperature Value Unreadable from the CPU Module.



4.2.4 Input value of the RTD is not consistent with the detected temperature value.

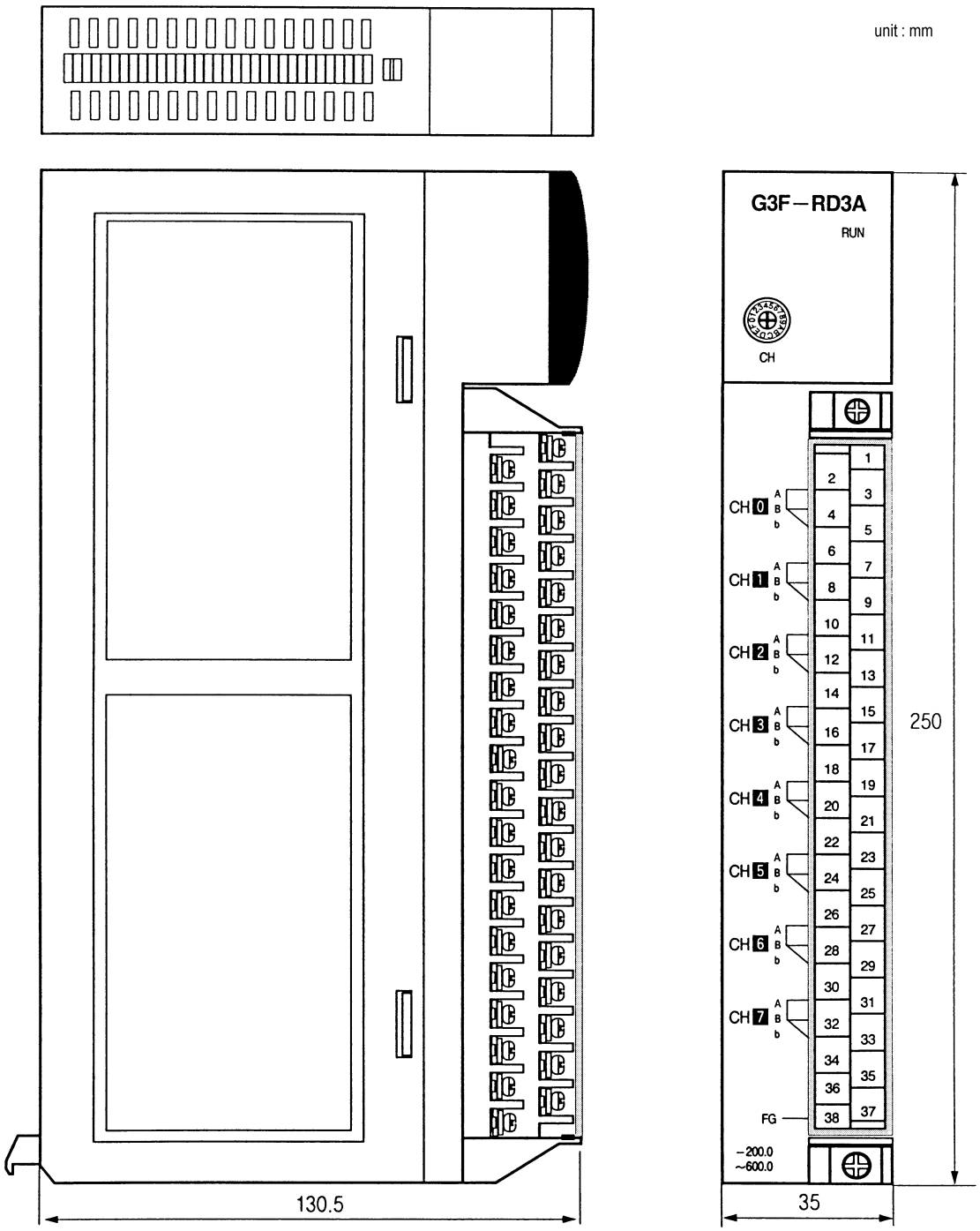


4.2.5 RTD Input Module Hardware Defect



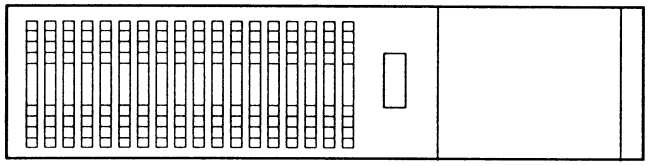
Chapter 5. DIMENSIONS

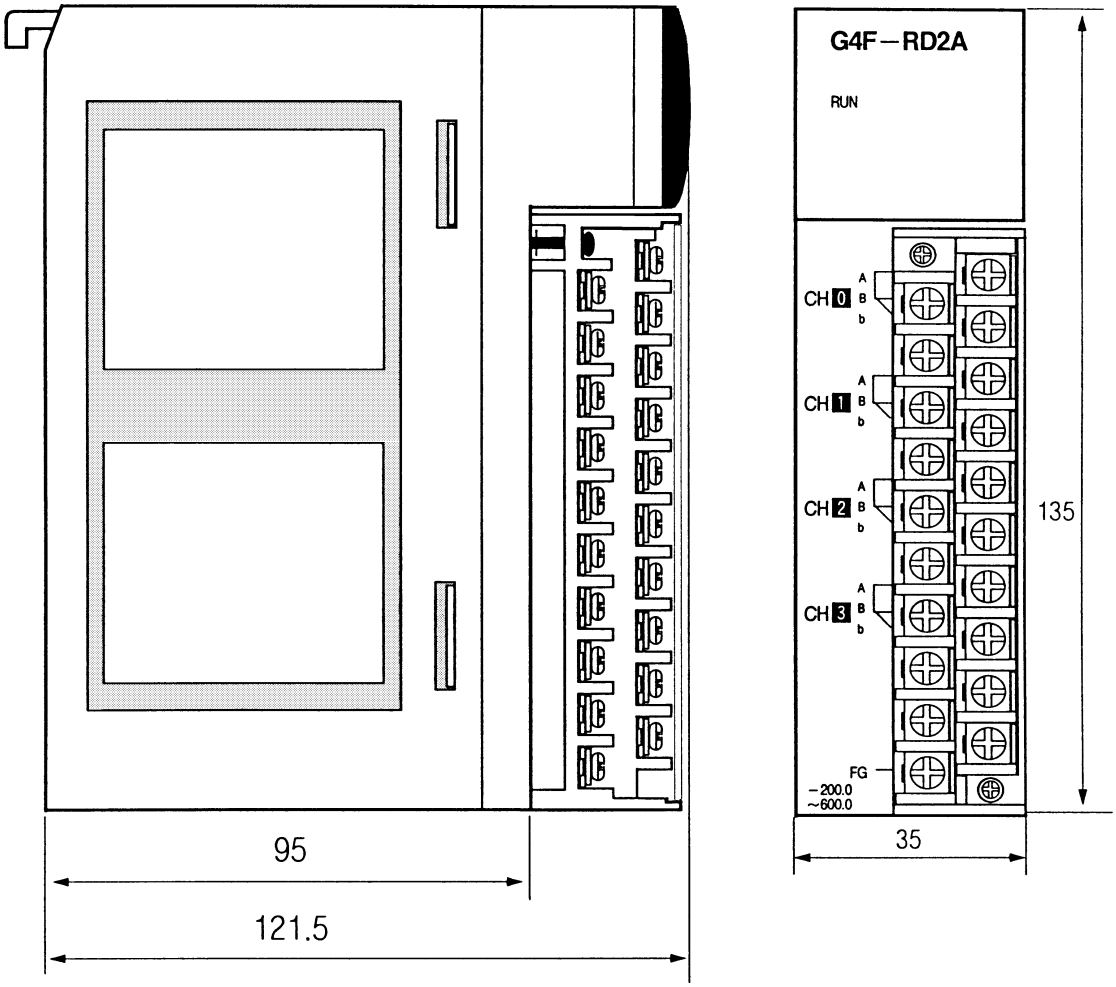
5.1 G3F-RD3A Dimensions



5.2 G4F-RD2A Dimensions

unit : mm





Chapter 6. Standard Resistance Value of Pt/RTD

Pt 100Ω Unit : Ω

-200	-100	-0	Temperature (°C)	Temperature (°C)	0	100	200	300	400	500	600
18.49	60.25	100.00	-0	0	100.00	138.50	175.84	212.02	247.04	280.90	313.59
	56.19	96.09	-10	10	103.90	142.29	179.51	215.57	250.48	284.22	
	52.11	92.16	-20	20	107.79	146.06	183.17	219.12	253.90	287.53	
	48.00	88.22	-30	30	111.67	149.82	186.82	222.65	257.32	290.83	
	43.87	84.27	-40	40	115.54	153.58	190.45	226.17	260.72	294.11	
	39.71	80.31	-50	50	119.40	157.31	194.07	229.67	264.11	297.39	
	35.53	76.33	-60	60	123.24	161.04	197.69	233.17	267.49	300.65	
	31.32	72.33	-70	70	127.07	164.76	201.29	236.65	270.86	303.91	
	27.08	68.33	-80	80	130.89	168.46	204.88	240.13	274.22	307.15	
	22.80	64.30	-90	90	134.70	172.16	208.45	243.59	277.56	310.38	

Jpt 100Ω Unit : Ω

-200	-100	-0	Temperature (°C)	Temperature (°C)	0	100	200	300	400	500	600
17.14	59.57	100.00	-0	0	100.00	139.16	177.13	213.30	249.56	284.02	317.28
	55.44	96.02	-10	10	103.97	143.01	180.86	217.54	253.06	284.40	
	51.29	92.02	-20	20	107.93	146.85	184.58	221.15	256.55	290.77	
	47.11	88.01	-30	30	111.88	150.67	188.29	224.74	260.02	294.12	
	42.91	83.99	-40	40	115.81	154.49	191.99	228.32	263.49	297.47	
	38.68	79.96	-50	50	119.73	158.29	195.67	231.89	266.94	300.80	
	34.42	75.91	-60	60	123.64	162.08	199.35	235.45	270.38	304.12	
	30.12	71.85	-70	70	127.54	165.86	203.01	238.99	273.80	307.43	
	25.80	67.77	-80	80	131.42	169.63	206.66	242.53	277.22	310.72	
	21.46	63.68	-90	90	135.30	173.38	210.30	246.05	280.63	314.01	

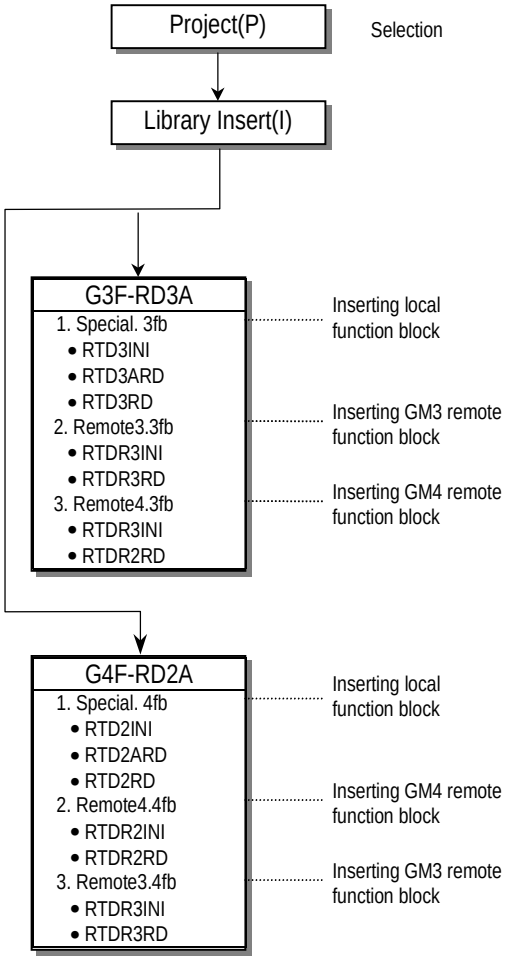
Chapter 7. FUNCTION BLOCKS

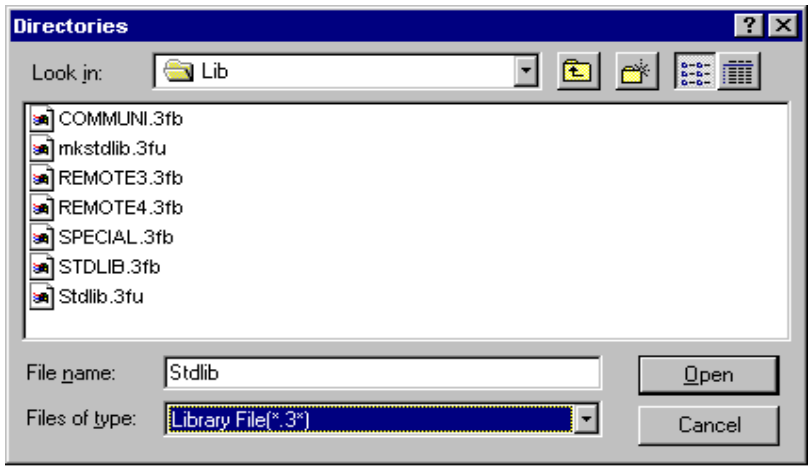
The followings explain the function blocks for the RTD input module used in GMWIN
The types of function block are given here.

No.	G3F-RD3A		G4F-RD2A		Function
	Local	Remote	Local	Remote	
1	RTD3INI	RTDR3INI	RTD2INI	RTDR2INI	Module Initialization
2	RTD3ARD	RTDR3RD	RTD2ARD	RTDR2RD	Reading the detected temperature value (Array type)
3	RTD3RD	-	RTD2RD	-	Reading the detected temperature value (Single type)

7.1 Inserting Function Blocks for the RTD Input Module in GMWIN.

Function blocks can be registered with the following procedure while the GMWIN is running.
Registering function blocks is only possible when a project is open.

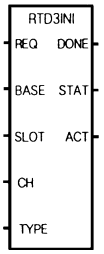
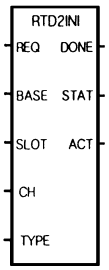




7.2 Local Function Blocks

7.2.1 Module Initialization (G3F-RD3A: RTD3INI, G4F-RD2A:RTD2INI)

Module initialization function block specifies RTD input module base location, slot location, run channel enable/disable and the type of RTD for use in program.

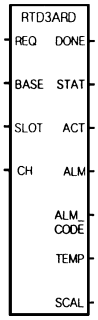
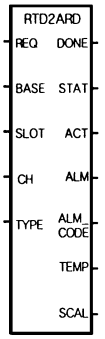
Function Block	I/O	Variable	Data Type	Descriptions
G3F – RD3A 	I	REQ	BOOL	Function block execution request area - Used to request an execution of the initialization function block - If the conditions connected with this area are established while program is running and input condition changes from low to high, the initialization function block is executed
		BASE	USINT	Base location No. - Used to write the number of the base where the RTD input module is loaded. - Setting range: GM1 series(0~31), GM2 series(0~7), GM3/4 series(0-3)
		SLOT	USINT	Slot location No. - Used to write the number of the slot where the RTD input module is loaded. - Setting range: 0~7
		CH	BOOL [Array] *Note 1	Run channel enable/disable specification - Used to enable or disable a channel for run. - Specify “1” for enabling, and “0” for disabling
		TYPE	BOOL [Array] *Note 1	Specifying the type of RTD for use - Used to specify the type of “0” for Pt100 and “1” for JPt100 for each channel "0" :Pt100 "1" : JPt100
G4F – RD2A 	O	DONE	BOOL	Function block execution complete status - “1” is output when the initialization function block is finished with no error and “1” remains until next execution. If an error occur, ‘0’ is displayed and the operation enters into the stop state.
		STAT	USINT	Error status indication area - Used to output the number of an error when it occurs during initialization function block execution. - For description of errors, see GM Section 7.4
		ACT	BOOL [Array] *Note 1	Run channel status indication area - After the initialization function block is finished with no error, “1” is output if the channel is in normal state. But “0” is output for the disabled channels.

REMARK

Note 1: The numbers of Array are 8 in G3F-RD3A, 4 in G4F-RD2A.

7.2.2 Reading the Detected Temperature Value of the Module (Array Type) (G3F-RD3A : RTD3ARD, G4F-RD2A : RTD2ARD)

The Array type temperature conversion value reading function block executes all channels of the RTD input module in a batch processing. If a channel is enabled then the function block outputs the detected temperature value and its digital conversion value that is usable as a PV in the PID control module.

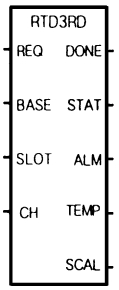
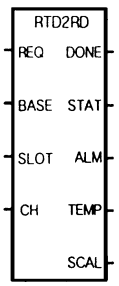
Function Block	I/O	Variable	Data Type	Descriptions
G3F－RD3A  G4F－RD2A 	I	REQ	BOOL	Function block execution request area - Used to request an execution of the reading function block - If the conditions connected with this area are established while the program is running and “0” changes into “1”, the reading function block is executed.
		BASE	USINT	Base location No. - Used to write the number of the base where the RTD input module is loaded. - Setting range: GM1 series(0~31), GM2 series(0~7), GM3/4 series(0-3)
		SLOT	USINT	Slot location No. - Used to write the number of the slot where the RTD input module is loaded. - Setting range: 0~7
		CH	BOOL [Array] *Note 1	Run channel enable/disable specification - Used to enable or disable a channel for run. - Specify “1” for enabling, and “0” for disabling
	O	DONE	BOOL	Function block execution complete status - “1” is output when the reading function block is finished with no error and “1” remains until next execution. If an error occur, ‘0’ is displayed and the operation enters into the stop state.
		STAT	USINT	Error status indication area - Used to output the number of an error when it occurs during reading function block execution. - For description of errors, see GM Section 7.4
		ACT	BOOL [Array] *Note 1	Run channel status indication area - After the reading function block is finished with no error, “1” is output if the channel is in normal state. But “0” is output for the disabled channels.
		ALM	BOOL [Array] *Note 1	Run channel error indication area - “1” is outputted when error occurs for each run channel.
		ALM_ CODE	USINT [Array] *Note 1	Run channel error code area - Used to output the code of error occurred during run for each channel. - For error description, see GM Section 7.4.
		TEMP	INT [Array] *Note 1	Detected temperature value output area - The CPU module reads the detected temperature value(-200.0°C to +600.0°C) of the corresponding channel from the RTD input module and outputs it to this area. - The detected temperature value of each channel is 10 times than the real temperature value. - (Example: Detected temperature value 1234 → real temperature value 123.4°C)
		SCAL	INT [Array] *Note 1	Digital conversion value output area - The CPU module reads the digital conversion of the corresponding channel from the RTD input module and outputs it to this area. - The detected temperature value (-200.0°C to +600.0°C) of each channel is converted into the a digital value within 0 to 16000 and it is output to this area. - Value to be read from the output variable. • SCAL =(the value to be read from the output variable TEMP + 2000) × 2 • Example: Where a temperature is 234.5°C. The value to be read from the TEMP is (temperature × 10), then 2345 is the detected temperature value. The value to be read from the SCAL is (2345 + 2000) × 2, i.e., 8690. - The output value converted into a digital value can be used as the PV of the PID control module.

REMARK

Note 1: The numbers of Array are 8 in G3F-RD3A, 4 in G4F-RD2A.

7.2.3 Reading the Detected Temperature Value of the Module (Single Type) (G3F-RD3A : RTD3RD, G4FRD2A : RTD2RD)

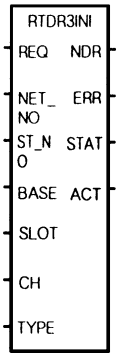
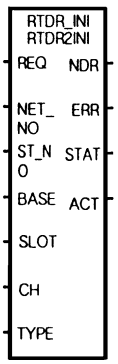
The stand-alone type Temperature conversion value reading function block processes only one channel of the RTD input module. If a channel is enabled then the function block outputs the detected temperature value and its digital conversion value that is usable as a PV in the PID control module.

Function Block	I/O	Variable	Data Type	Descriptions
G3F－RD3A 	I	REQ	BOOL	Function block execution request area - Used to request an execution of the reading function block - If the conditions connected with this area are established while the program is running and “0” changes into “1”, the reading function block is executed.
		BASE	USINT	Base location No. - Used to write the number of the base where the RTD input module is loaded. - Setting range: GM1 series(0~31), GM2 series(0~7), GM3/4 series(0-3)
		SLOT	USINT	Slot location No. - Used to write the number of the slot where the RTD input module is loaded. - Setting range: 0~7
		CH	USINT	Area for specifying the used channel. Settings : G3F-RD3A: 0 to 7, G4F-RD2A: 0 to 3
	O	DONE	BOOL	Function block execution complete status - “1” is output when the reading function block is finished with no error and “1” remains until next execution. If an error occur, ‘0’ is displayed and the operation enters into the stop state.
		STAT	USINT	Error status indication area - Used to output the number of an error when it occurs during reading function block execution. - For description of errors, see GM Section 7.4
G4F－RD2A 		ALM	BOOL	Run channel error indication area - “1” is output if error occurs for each run channel.
		TEMP	IN T	Detected temperature value output area - The CPU module reads the detected temperature value(-200.0°C to +600.0°C) of the corresponding channel from the RTD input module and outputs it to this area. - The detected temperature value of each channel is 10 times than the real temperature value. (Example: Detected temperature value 1234 → real temperature value 123.4°C)
		SCAL	INT	Digital conversion value output area - The CPU module reads the digital conversion of the corresponding channel from the RTD input module and outputs it to this area. - The detected temperature value (-200.0°C to +600.0°C) of each channel is converted into a digital value within 0 to 16000 and it is output to this area. - Value to be read from the output variable. • SCAL =(the value to be read from the output variable TEMP + 2000) × 2 • Example: Where a temperature is 234.5°C. The value to be read from the TEMP is (temperature × 10), then 2345 is the detected temperature value. The value to be read from the SCAL is (2345 + 2000) × 2, i.e., 8690. - The output value converted into a digital value can be used as the PV of the PID control module.

7.3 Remote Function Block

7.3.1 Module Initialization (G3F-RD3A : RTDR3INI, G4F-RD2A : RTDR2INI)

The module initialization function block specifies, for use in the program, the location No. of the slot where the communication module loaded in the receiving station, the station No. of the communication module loaded in the remote I/O station, the No. of the base where the RTD input module is loaded, the use channels and the type of the RTD.

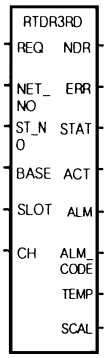
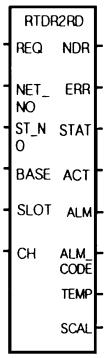
Function Block	I/O	Variable	Data Type	Descriptions
G3F－RD3A  	I	REQ	BOOL	Function block execution request area at rising edge. - Used to request an execution of the reading function block - If the conditions connected with this area are established while the program is running and “0” changes into “1”(rising edge), the module initialization function block is executed.
		NET_NO	USINT	Location No. of the slot where the communication module of the station to which the function block will be sent is loaded. - Setting range: 0 ~ 7
		ST-NO	USINT	Station No. of the communication module loaded in the remote I/O station. - Setting range: 0 ~ 63
		BASE	USINT	Base module location No. - Used to write the number of the base where the RTD input module is loaded. - Setting range: 0 ~ 3
		SLOT	USINT	Slot location No. - Used to write the number of the slot where the RTD input module is loaded. - Setting range: 0~7
		CH	BOOL [Array] *Note 1	Run channel enable/disable specification - Used to enable or disable a channel for run. - Specify “1” for enabling, and “0” for disabling
		TYPE	BOOL [Array] *Note 1	Specifying the type of RTD for use - Used to specify the type of “0” for Pt100 and “1” for JPt100 for each channel
G4F－RD2A  	O	NDR	BOOL	“1” when the function block is finished without error. “1” remains during the scan where the execution condition is being satisfied and it changes into “0” at the next scan.
		ERR	BOOL	Error information indication area - If error occurs during initialization function block execution “1” is output and the module enter into the stop state. “1” remains during the scan where the execution condition is being satisfied and it changes into “0” at the next scan.
		STAT	USINT	Error status indication area - Used to output the number of an error when it occurs during reading function block execution. - For description of errors, see GM Section 7.4
		ACT	BOOL [Array] *Note 1	Run channel status indication area - After the initialization function block is finished with no error, “1” is output if the channel is in normal state. But “0” is output for the disabled channels.

REMARK

Note 1: The numbers of Array are 8 in G3F-RD3A, 4 in G4F-RD2A.

7.3.2 Reading the Detected Temperature Value of the Module (G3F-RD3A : RTDR3RD, G4F-RD2A : RTDR2RD)

The module temperature conversion value reading function block specifies the location No. of the slot where the communication module loaded in the receiving station, the station No. of the communication module loaded in the remote I/O station If also processes all channels in block. The enabled channel outputs the temperature conversion value and its digital conversion value that can be used as the PV in the PID control module, and the two values are used in the program.

Function Block	I/O	Variable	Data Type	Descriptions
G3F－RD3A  	I	REQ	BOOL	Function block execution request area (at the ascending edge) - Used to request an execution of the reading function block - If the conditions connected with this area are established while the program is running and “0” changes into “1(rising edge)”, the module reading function block is executed.
		NET_NO	USINT	Location No. of the slot where the communication module of the station to which the function block will be sent is loaded. - Setting range: 0 ~ 7
		ST-NO	USINT	Station No. of the communication module loaded in the remote I/O station. -Setting range: 0 ~ 63
		BASE	USINT	Base module location No. - Used to write the number of the base where the RTD input module is loaded. - Setting range: 0 ~ 3
		SLOT	USINT	Slot location No. - Used to write the number of the slot where the RTD input module is loaded. - Setting range: 0~7
		CH	BOOL [Array] *Note 1	Run channel enable/disable specification - Used to enable or disable a channel for run. - Specify “1” for enabling, and “0” for disabling
G4F－RD2A  	O	NDR	BOOL	“1” when the function block is finished without error. “1” remains during the scan where the execution condition is being satisfied and changes into “0” at next scan.
		ERR	BOOL	Error information indication area - If error occurs during reading function block execution “1” is outputted and the module enter into the stop state. “1” remains during the scan where the execution condition is being satisfied and it changes into “0” at the next scan.
		STAT	USINT	Error status indication area - Used to output the number of an error when it occurs during reading function block execution. - For description of errors, see GM Section 7.4
		ACT	BOOL [Array] *Note 1	Run channel status indication area - After the reading function block is finished with no error, “1” is output if the channel is in normal state. But “0” is output for the disabled channels.
		ALM	BOOL [Array] *Note 1	Run channel error indication area - “1” is outputted when error occurs for each run channel.
		ALM_CODE	USINT [Array] *Note 1	Run channel error code area - Used to output the code of error occurred during run for each channel. - For error description, see GM Section 7.4.
		TEMP	INT [Array] *Note 1	Detected temperature value output area - The CPU module reads the detected temperature value(-200.0°C to +600.0°C) of the corresponding channel from the RTD input module and outputs it to this area. - The detected temperature value of each channel is 10 times than the real temperature value. - (Example: Detected temperature value 1234 → real temperature value 123.4°C)
		SCAL	INT [Array] *Note 1	Digital conversion value output area - The CPU module reads the digital conversion of the corresponding channel from the RTD input module and outputs it to this area. - The detected temperature value (-200.0°C to +600.0°C) of each channel is converted into the a digital value within 0 to 16000 and it is outputted to this area. - Value read from the output variable, SCAL = (the value read the output variable TEMP + 2000) × 2 • Example: Where a temperature is 234.5°C. The value read from the TEMP Is (temperature × 10), then 2345 is the detected temperature value. The value read form the SCAL is (2345 + 2000) × 2, i.e., 8690. - The output value converted into a digital value can be used as the PV of the PID control module.

REMARK

Note 1: The numbers of Array are 8 in G3F-RD3A, 4 in G4F-RD2A.

7.4 Errors on Function Block

7.4.1 Errors Indicated by the Output Variable STAT

Errors indicated the output variable STAT and their corrective actions are explained.

STAT No.	Item	Descriptions	Function Block			Corrective Action
			Initialization	Reading		
				Array	Stand-alone	
0	Local	Normal run status	O	O	O	—
1		Base location No. outside the setting range	O	O	O	Adjust it within the setting range (See GM Section 7.2)
2		The corresponding base unit hardware defect	O	O	O	Contact a service station
3		Slot location No. outside the setting range	O	O	O	Specify correctly the numbers of the slot where the RTD module is loaded .
4		The specified slot has no RTD input module	O	O	O	Load RTD input module on the specified slot.
5		A module other than RTD input module is loaded on.	O	O	O	Load RTD input module on the specified slot.
6		Channel No. outside the setting range	—	—	O	Specify correctly the No. of the run channel.
7		RTD input module hardware defect	O	O	O	Contact a service station.
8		RTD input module memory defect	O	O	O	Contact a service station.
9		The run channel was not specified in the Initialization function block.	—	O	O	Specify correctly run channels in the initialization function block.
10		Disconnection detected at one or more of the use channels, or temperature outside the range.	—	O	—	See GM Section 7.4.2.
16		A disconnection detected at the use channels	—	—	O	Fix the A terminal disconnection between the RTD input module and the temperature-measuring resistor
17		B disconnection detected at the use channels	—	—	O	Fix the B terminal disconnection between the RTD input module and the temperature-measuring resistor
18		b disconnection detected at the use channels. A and B disconnection detected simultaneously.	—	—	O	Fix the disconnection between the b terminal RTD input module and the temperature-measuring resistor. Or, Fix A and B terminals disconnection.
19		Temperature outside the range at the use channels	—	—	O	Correctly specify the type of the temperature-measuring resistor, or use the temperature within the range (-200.0°C ~ 600.0)°
128	Re-mote	Remote communications module H/W defect	O	O	—	See Remote communications module User's Manual
129		Base location No. outside the setting range	O	O	—	Adjust it within the setting range (See GM Section 7.2)
131		Slot location No. outside the setting range	O	O	—	Specify correctly the numbers of the slot where the RTD Input module is loaded.
133		Other module, not RTD input module, is loaded	O	O	—	Load RTD input module on the specified slot.
135		RTD input module hardware defect	O	O	—	Contact a service station.
136		RTD input module memory defect	O	O	—	Contact a service station.
137		The run channel was not specified in the Initialization function block.	—	O	—	Specify correctly run channels in the initialization function block.
138		Disconnection detected at one or more of the use channels, or temperature outside the range.	—	O	—	See GM Section 7.4.2.

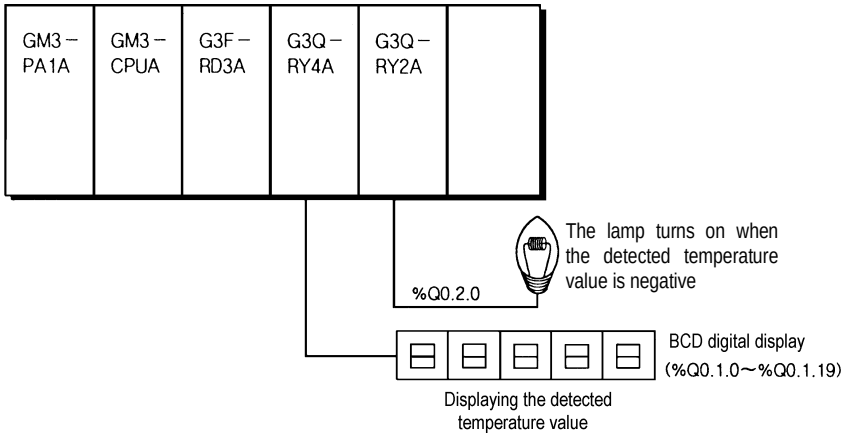
7.4.2 Errors Indicated by the Output Variable ALM_CODE in the Array Type Detected Temperature Value Reading Function Block. (G3F-RD3A : RTD3ARD, RTDR3RD. G4F-RD2A : RTD2ARD, RTDR2RD)

ALM_CODE No.	Descriptions	Corrective Action
0	Normal run status	—
16	A disconnection detected	Fix the A disconnection between RTD input module and RTD.
17	B disconnection detected	Fix the A disconnection between RTD input module and RTD
18	b disconnection detected, A and B disconnection detected simultaneously.	Fix the A disconnection between RTD input module and RTD. Or, Fix the A and B disconnection.
19	Temperature outside the range	Correctly specify the type of the RTD, or use the temperature within the range (-200.0°C ~ 600.0°C)

Chapter 8. PROGRAMMING

8.1 A Program for Output of the Detected Temperature Value as a BCD Value

1) System Configuration



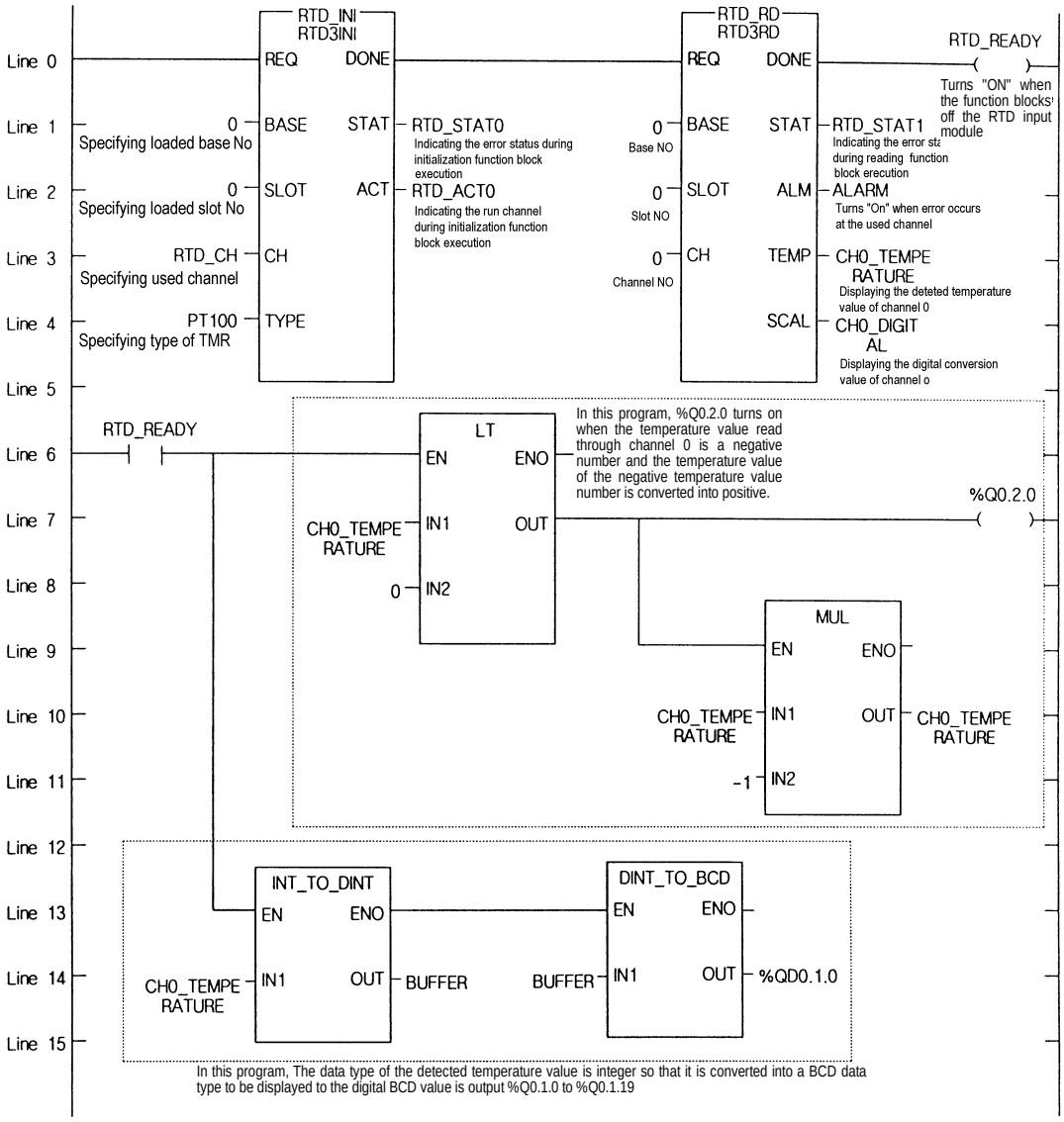
2) Initial Settings

(1) Specifying the used channel: channel 0
(2) Specifying the type of the RTD : Pt 100

3) Descriptions of the Program

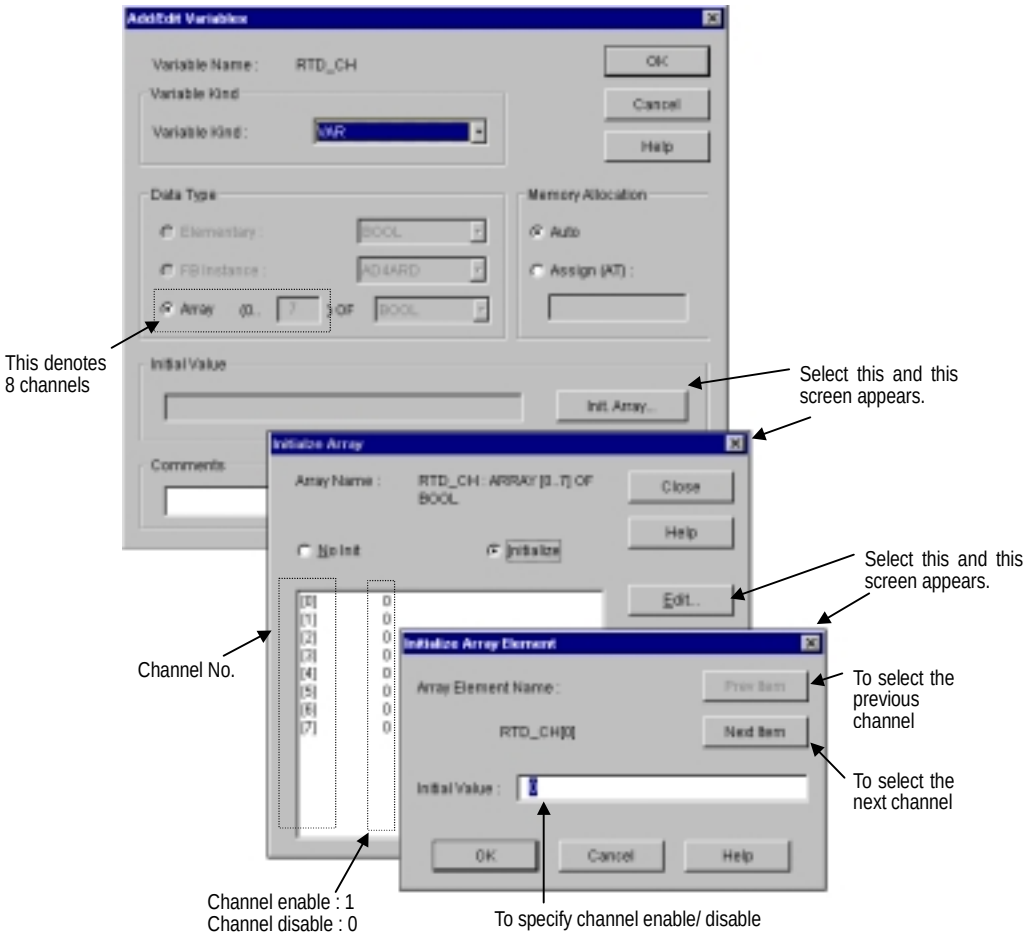
The present A/D conversion value of the detected temperature value which is detected from the temperature-measuring resistor Pt 100 is displayed on the BCD digital display by use of channel 0 of the temperature-measuring resistor input module. The lamp turns on when the detected temperature value is a negative number and turns off when it is a positive number.

4) Program

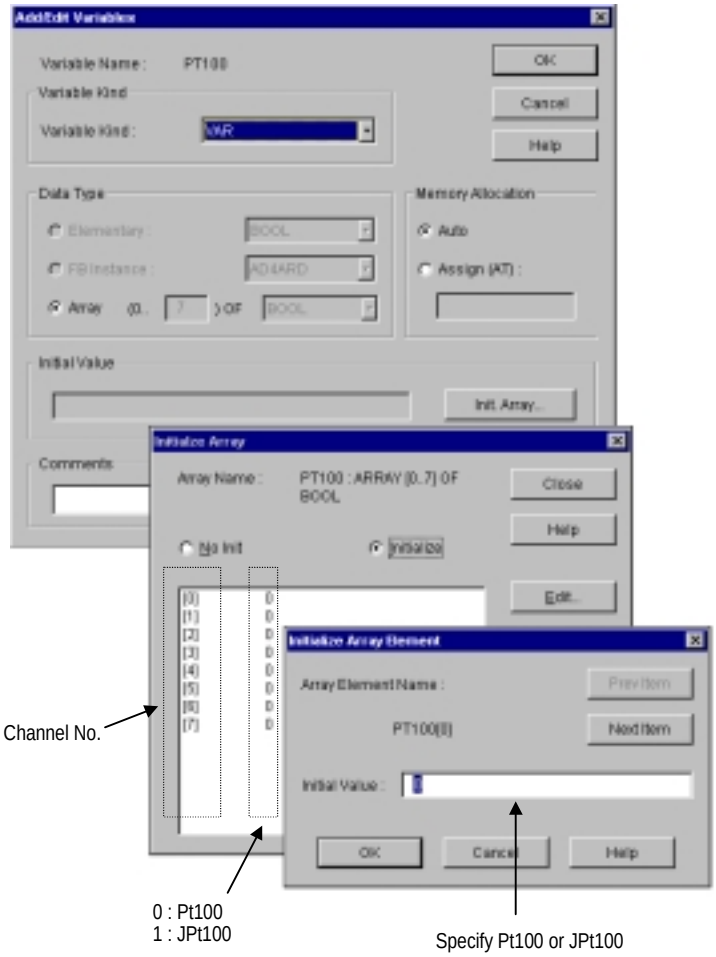

Line 0
Line 1
Line 2
Line 3
Line 4
Line 5
Line 6
Line 7
Line 8
Line 9
Line 10
Line 11
Line 12
Line 13
Line 14
Line 15
RTD_INI
RTD3INI
REQ
DONE
BASE
STAT
SLOT
ACT
CH
TYPE
0
Specifying loaded base No
0
Specifying loaded slot No
RTD_CH
Specifying used channel
PT100
Specifying type of TMR
RTD_STAT0
Indicating the error status during initialization function block execution
RTD_ACT0
Indicating the run channel during initialization function block execution
RTD_RD
RTD3RD
REQ
DONE
BASE
STAT
SLOT
ALM
CH
TEMP
SCAL
0
Base NO
0
Slot NO
0
Channel NO
RTD_READY
Turns "ON" when the function blocks
off the RTD input module
RTD_STAT1
Indicating the error st
during reading function block erecution
ALARM
Turns "On" when error occurs at the used channel
CH0_TEMPE RATURE
Displaying the deteted temperature value of channel 0
CH0_DIGIT AL
Displaying the digital conversion value of channel o
RTD_READY
LT
EN
ENO
IN1
OUT
IN2
CH0_TEMPE RATURE
0
In this program, %Q0.2.0 turns on when the temperature value read through channel 0 is a negative number and the temperature value of the negative temperature value number is converted into positive.
%Q0.2.0
MUL
EN
ENO
IN1
OUT
IN2
CH0_TEMPE RATURE
-1
CH0_TEMPE RATURE
INT_TO_DINT
EN
ENO
IN1
OUT
CH0_TEMPE RATURE
BUFFER
DINT_TO_BCD
EN
ENO
IN1
OUT
BUFFER
%QD0.1.0
In this program, The data type of the detected temperature value is integer so that it is converted into a BCD data type to be displayed to the digital BCD value is output %Q0.1.0 to %Q0.1.19

5) Setting the initial values of I/O variables

(1) specifying channel



(2) Specifying the type of the RTD

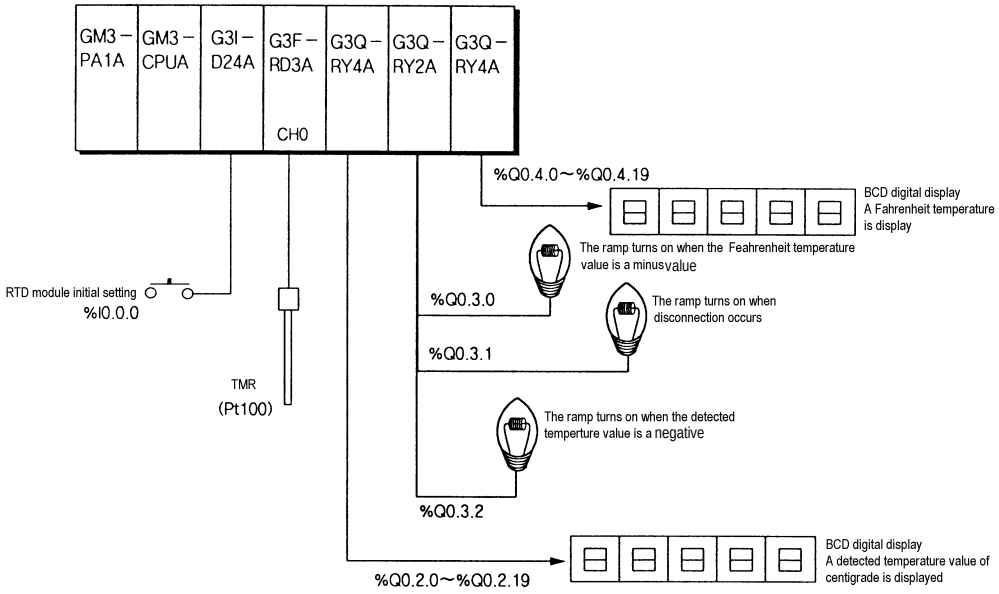


6) I/O variables used in the program

Variable Name	Var_Kind	Data Type	(AT Address) (Initial Value)
ALARM	: VAR	: BOOL	
BUFFER	: VAR	: DINT	
CHO_DIGITAL	: VAR	: INT	
CHO_TEMPERATURE	: VAR	: INT	
PT100	: VAR	ARRAY[0..7] OF BOOL	: = { 0, 0, 0, 0, 0, 0, 0, 0}
RTD_ACTO	: VAR	ARRAY[0..7] OF BOOL	
RTD_CH	: VAR	ARRAY[0..7] OF BOOL	: = { 1, 0, 0, 0, 0, 0, 0, 0}
RTD_INI	: VAR	FB Instance	
RTD_RD	: VAR	FB Instance	
RTD_READY	: VAR	: BOOL	
RTD_STATO	: VAR	: USINT	
RTD_STAT1	: VAR	: USINT	

8.2 A Program for Conversing the Detected Temperature Value(°C) into Fahrenheit(°F) and Output as a BCD Value

1) System



2) Initial Settings

(1) Specifying the used channel : channel 0
(2) Specifying the type of a temperature - measuring resistor : Pt 100

3) The Expression that Converts the Detected Temperature Value into a Fahrenheit

Detected temperature value = real temperature value x 10
Fahrenheit temperature = real temperature x 1.8 + 32

$$= \frac{\text{Detected temperature value}}{10} \times 1.8 + 32$$

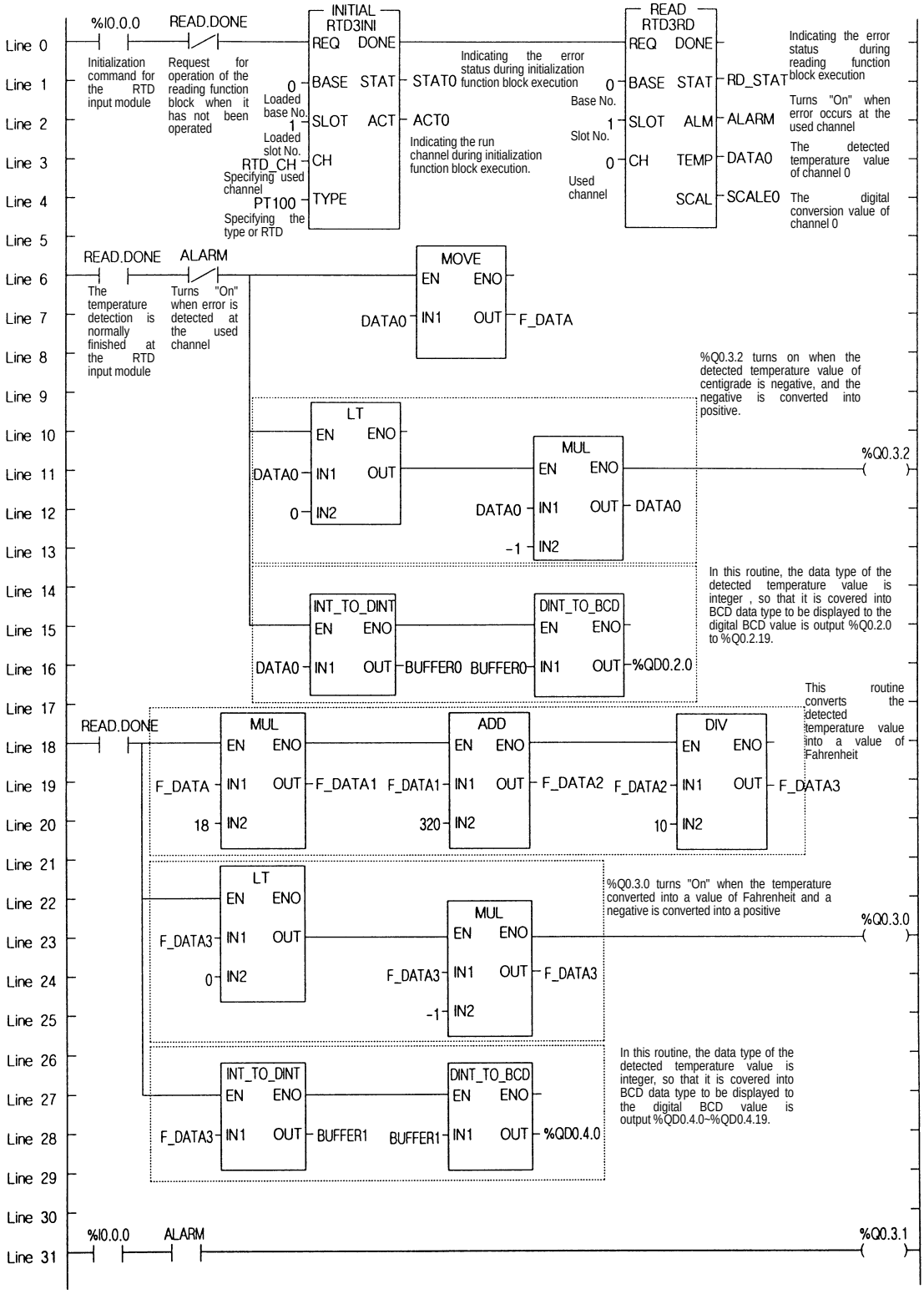
$$= \frac{\text{Detected temperature value} \times 18 + 320}{10}$$

∴ If the Fahrenheit temperature displayed on the BCD digital display is represented as 'the real Fahrenheit temperature x 10', "the detected temperature x 18 + 320" be processed into the program.

4) Descriptions of the Program

(1) If %10.0.0 turns on then the initialization of the RTD input module is executed.
(2) The detected temperature value is displayed on %Q0.2.0 to %Q0.2.19 of the BCD digital display when it is negative the ramp %Q0.3.2 turns on
(3) The detected temperature value is converted into a Fahrenheit temperature value and displayed on %Q0.4.0 to %Q0.4.19 of the BCD digital display when it is negative the ramp %Q0.3.0 turns on.
(4) If disconnection is detected during temperature conversion at channel 0, The Lamp %Q0.3.1 turns on.

5) Program

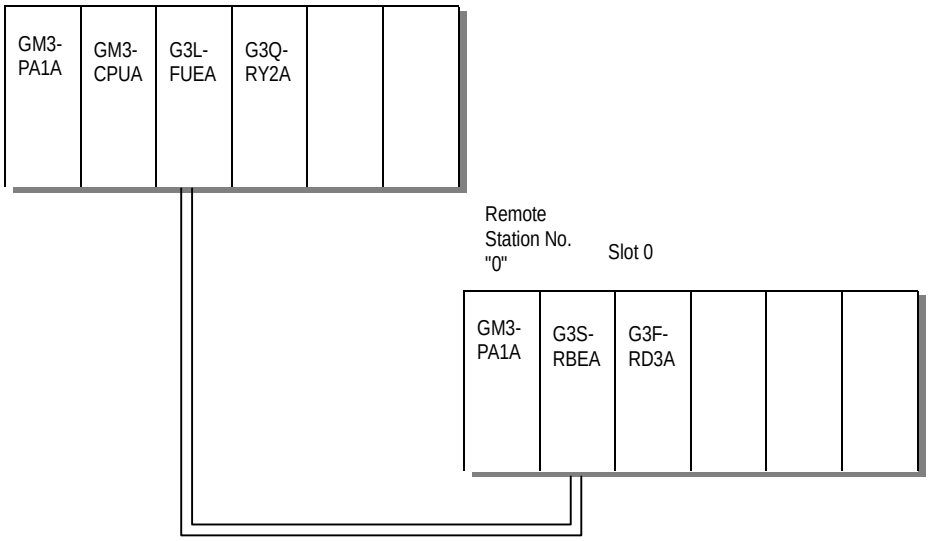

Line 0
Line 1
Line 2
Line 3
Line 4
Line 5
Line 6
Line 7
Line 8
Line 9
Line 10
Line 11
Line 12
Line 13
Line 14
Line 15
Line 16
Line 17
Line 18
Line 19
Line 20
Line 21
Line 22
Line 23
Line 24
Line 25
Line 26
Line 27
Line 28
Line 29
Line 30
Line 31
%I0.0.0
READ.DONE
INITIAL
RTD3INI
REQ DONE
BASE STAT
SLOT ACT
CH
TYPE
Initialization command for the RTD input module
Request for operation of the reading function block when it has not been operated
0
Loaded base No.
1
Loaded slot No.
RTD_CH
Specifying used channel
PT100
Specifying the type or RTD
STAT0
Indicating the error status during initialization function block execution
ACT0
Indicating the run channel during initialization function block execution.
READ
RTD3RD
REQ DONE
BASE STAT
SLOT ALM
CH TEMP
SCAL
Base No.
Slot No.
Used channel
RD_STAT
ALARM
DATA0
SCALE0
Indicating the error status during reading function block execution
Turns "On" when error occurs at the used channel
The detected temperature value of channel 0
The digital conversion value of channel 0
READ.DONE
ALARM
The temperature detection is normally finished at the RTD input module
Turns "On" when error is detected at the used channel
MOVE
EN ENO
DATA0 IN1 OUT F_DATA
%Q0.3.2 turns on when the detected temperature value of centigrade is negative, and the negative is converted into positive.
LT
MUL
DATA0
0
-1
%Q0.3.2
In this routine, the data type of the detected temperature value is integer , so that it is covered into BCD data type to be displayed to the digital BCD value is output %Q0.2.0 to %Q0.2.19.
INT_TO_DINT
DINT_TO_BCD
BUFFER0
%QD0.2.0
This routine converts the detected temperature value into a value of Fahrenheit
READ.DONE
MUL
ADD
DIV
F_DATA
18
F_DATA1
320
F_DATA2
10
F_DATA3
%Q0.3.0 turns "On" when the temperature converted into a value of Fahrenheit and a negative is converted into a positive
%Q0.3.0
In this routine, the data type of the detected temperature value is integer, so that it is covered into BCD data type to be displayed to the digital BCD value is output %QD0.4.0~%QD0.4.19.
BUFFER1
%QD0.4.0
%I0.0.0
ALARM
%Q0.3.1

6) I/O variables used in the Program

Variable Name	Var_Kind	Data Type	(AT Address) (Initial Value)
ACTO	: VAR	: ARRAY [0..7] OF BOOL	
ALARM	: VAR	: BOOL	
BUFFER0	: VAR	: DINT	
BURRER1	: VAR	: DINT	
DATAO	: VAR	: INT	
F_DATA	: VAR	: INT	
F_DATA1	: VAR	: INT	
F_DATA2	: VAR	: INT	
F_DATA3	: VAR	: INT	
INTIAL	: VAR	: FB Instance	
PT100	: VAR	: ARRAY [0..7] OF BOOL	: = { 0, 0, 0, 0, 0, 0, 0, 0}
RD_STAT	: VAR	: USINT	
READ	: VAR	: FB Instance	
RTD_CH	: VAR	: ARRAY [0.77] OF BOOL	: = { 1, 0, 0, 0, 0, 0, 0, 0}
SCALEO	: VAR	: INT	
STATO	: VAR	: USINT	

8.3 A Program when Loading the RTD Input Module onto the Remote I/O Station

1) System Configuration



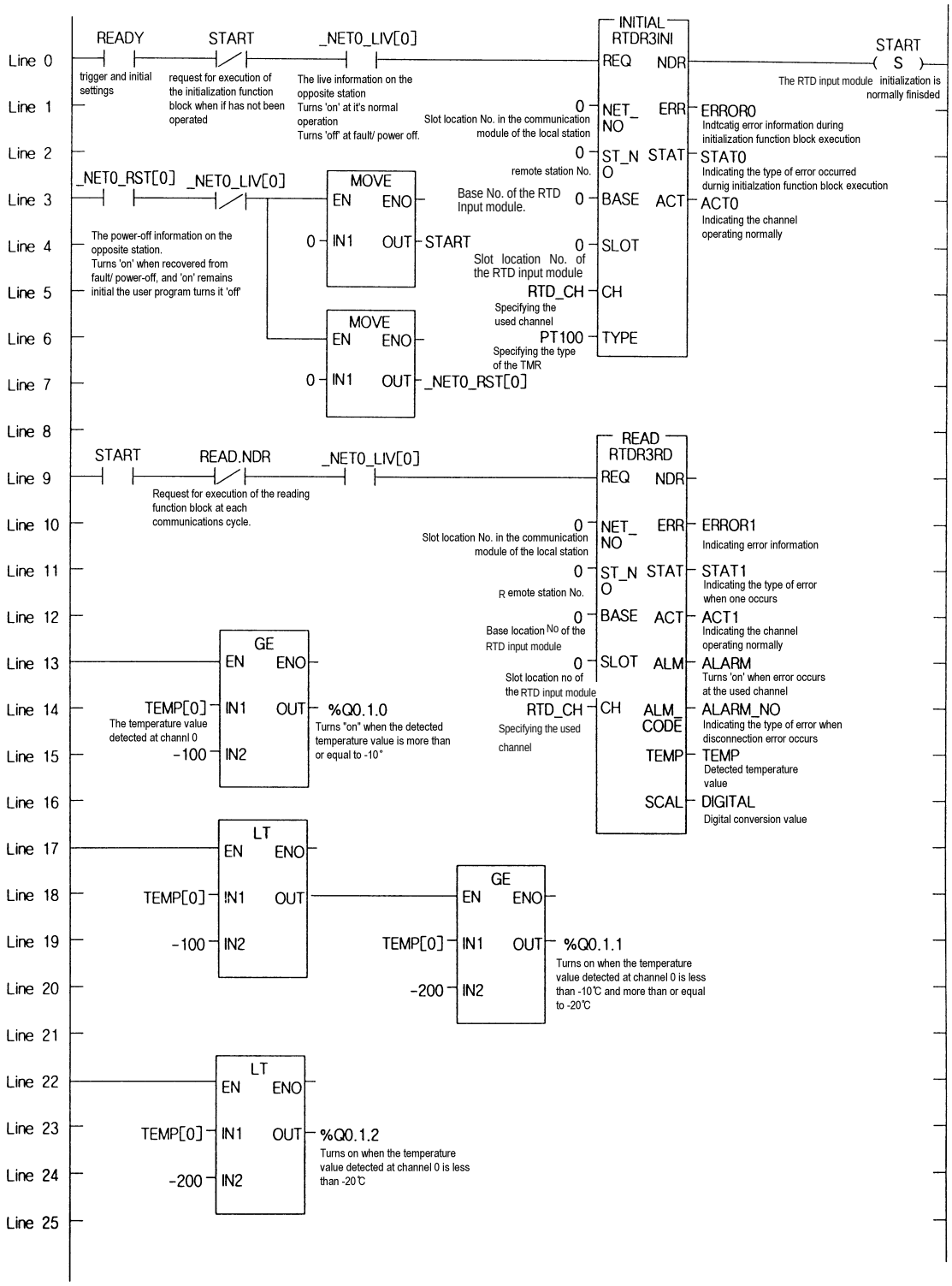
2) Initial Settings

(1) Specifying the used channel : channel 0
(2) Specifying the type of a RTD : Pt 100

3) Descriptions of the Program

(1) %Q0.1.0 turns on when the temperature value detected at channel 0 is more than or equal to -10°C
(2) %Q0.1.1 turns on when the temperature value detected at channel 0 is less than -10°C and more than or equal to -20°C
(3) %Q0.1.2 turns on when the temperature value detected at channel 0 is less than -20°C

4) Program


Line 0
READY
trigger and initial settings
START
request for execution of the initialization function block when if has not been operated
_NET0_LIV[0]
The live information on the opposite station
Turns 'on' at it's normal operation
Turns 'off' at fault/ power off.
INITIAL
RTDR3INI
REQ
NDR
START
(S)
The RTD input module initialization is normally finisded
Line 1
0
Slot location No. in the communication module of the local station
NET_NO
ERR
ERROR0
Indtcatig error information during initialization function block execution
Line 2
0
remote station No.
ST_NO
STAT
STAT0
Indicating the type of error occurred durnig initialzation function block execution
Line 3
_NET0_RST[0]
_NET0_LIV[0]
MOVE
EN
ENO
Base No. of the RTD Input module.
0
BASE
ACT
ACT0
Indicating the channel operating normally
Line 4
The power-off information on the opposite station.
Turns 'on' when recovered from fault/ power-off, and 'on' remains initial the user program turns it 'off'
0
IN1
OUT
START
0
Slot location No. of the RTD input module
SLOT
Line 5
RTD_CH
Specifying the used channel
CH
Line 6
MOVE
EN
ENO
PT100
Specifying the type of the TMR
TYPE
Line 7
0
IN1
OUT
_NET0_RST[0]
Line 8
Line 9
START
READ.NDR
_NET0_LIV[0]
READ
RTDR3RD
REQ
NDR
Request for execution of the reading function block at each communications cycle.
Line 10
0
Slot location No. in the communication module of the local station
NET_NO
ERR
ERROR1
Indicating error information
Line 11
0
R emote station No.
ST_NO
STAT
STAT1
Indicating the type of error when one occurs
Line 12
0
Base location No of the RTD input module
BASE
ACT
ACT1
Indicating the channel operating normally
Line 13
GE
EN
ENO
0
Slot location no of the RTD input module
SLOT
ALM
ALARM
Turns 'on' when error occurs at the used channel
Line 14
TEMP[0]
The temperature value detected at channl 0
IN1
OUT
%Q0.1.0
Turns "on" when the detected temperature value is more than or equal to -10°
RTD_CH
Specifying the used channel
CH
ALM_CODE
ALARM_NO
Indicating the type of error when disconnection error occurs
Line 15
-100
IN2
TEMP
TEMP
Detected temperature value
Line 16
SCAL
DIGITAL
Digital conversion value
Line 17
LT
EN
ENO
Line 18
TEMP[0]
!N1
OUT
GE
EN
ENO
Line 19
-100
IN2
TEMP[0]
IN1
OUT
%Q0.1.1
Turns on when the temperature value detected at channel 0 is less than -10℃ and more than or equal to -20℃
Line 20
-200
IN2
Line 21
Line 22
LT
EN
ENO
Line 23
TEMP[0]
IN1
OUT
%Q0.1.2
Turns on when the temperature value detected at channel 0 is less than -20℃
Line 24
-200
IN2
Line 25

7) I/O variables used in the Program

Variable Name	Var_Kind	Data Type	(AT Address) (Initial Value)
ACTO	: VAR	: ARRAY [0..7] OF BOOL	
ACT1	: VAR	: ARRAY [0..7] OF BOOL	
ALARM	: VAR	: ARRAY [0..7] OF BOOL	
ALARM_NO	: VAR	: ARRAY [0..7] OF BOOL	
DIGITAL	: VAR	: ARRAY [0..7] OF BOOL	
ERROR0	: VAR	: BOOL	
ERROR1	: VAR	: BOOL	
INITIAL	: VAR	: FB Instance	
PT100	: VAR	: ARRAY [0..7] OF BOOL	: = { 0, 0, 0, 0, 0, 0, 0, 0}
READ	: VAR	: FB Instance	
READY	: VAR	: BOOL	
RTD_CH	: VAR	: ARRAY [0..7] OF BOOL	: = { 0, 0, 0, 0, 0, 0, 0, 0}
START	: VAR	: BOOL	
STAT0	: VAR	: USINT	
STAT1	: VAR	: USINT	
TEMP	: VAR	: ARRAY [0..7] OF INT	