TECHNICAL BULLETIN

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[Title] New additional functions for the Q64RD/Q64RD-G /Q64TD/Q64TDV-GH **[Date of Issue]** Apr., '06

[Relevant Models] Q64RD/Q64RD-G/Q64TD/Q64TDV-GH

Thank you for your continued support of Mitsubishi programmable logic controllers, MELSEC-Q series.

New function, "Conversion setting for disconnection detection" has been added to the Q64RD/Q64RD-G/Q64TD/Q64TDV-GH. Also, "Moving average" and "Primary delay filter" have enhanced the functionality of the Q64RD.
Refer to Section 1.1 for a list of the functions added, Section 1.2 for the serial No. and product information of supported modules, and Section 1.3 for relevant models. When replacing an old model by an upgraded one, modification of the existing programs may be required. Then, modify the programs referring to Section 1.4 "Changes arising from addition of the conversion setting for disconnection detection" and Section 1.5 "Compatibility with old models".

Contents

1. New functions

This section explains the new functions.

1.1 New functions

The following table lists the new functions.

Item	Description	Reference section
Conversion setting for disconnection detection	The corresponding set value is stored in the CH□ measured temperature buffer area, when disconnection detection occurs. The actual corresponding value can be selected from the following, "Up scale (each range's upper limit value +5%)", "Down scale (each range's lower limit value -5%)", "Given value" or "Value immediately before disconnection".	Section 2.1
Moving average	Digital output values that are measured for the specified number of times are averaged at sampling time intervals.	—
Primary delay filter	By setting a preset time constant, digital output values are less volatile (smoothed).	

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS:1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

1.2 Serial No. and product information of supported modules

The serial No. and product information of modules that support these new functions, and how to check them are shown below.

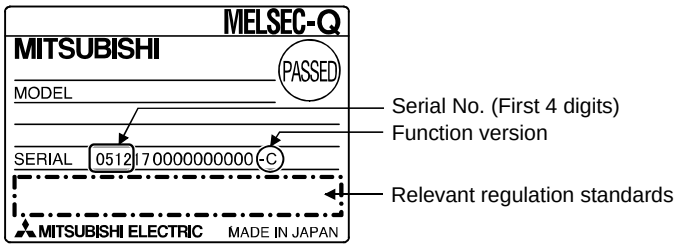
(1) Serial No. and product information of supported modules

The following table lists the serial No. and product information of the modules that support the new functions.

Model	Serial No.	Product information
Q64RD	First 4 digits are 0709 or later	First 5 digits are 07072 or later
Q64RD-G	First 4 digits are 0710 or later	
Q64TD	First 4 digits are 0709 or later	
Q64TDV-GH	First 4 digits are 0710 or later	

(2) How to check the serial No.

The serial No. can be checked from the “rating plate” located on the side of the module.



(3) How to confirm the product information

The product information can be confirmed by selecting the Q64RD/Q64RD-G/Q64TD/Q64TDV-GH detailed information in GX Developer system monitor.

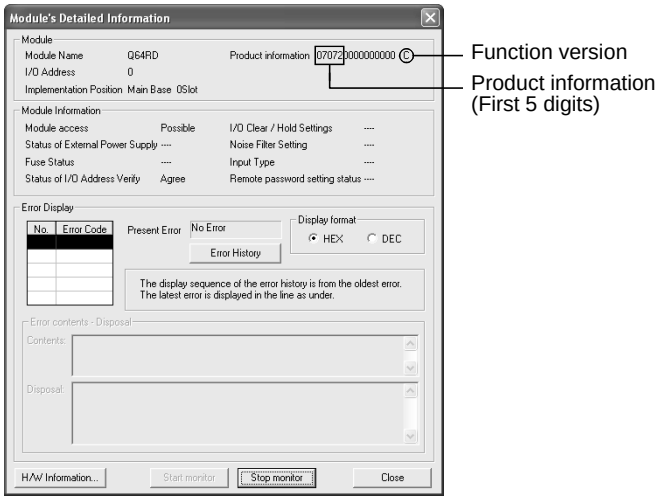
(a) Operating GX Developer

[Diagnostics] → [System monitor] → "Select Q64RD/Q64RD-G/Q64TD/Q64TDV-GH" →

Module Detailed Information

(b) Confirming the product information

The product information of the Q64RD/Q64RD-G/Q64TD/Q64TDV-GH is displayed in the Product information field.



1.3 Relevant models

The models that support the new functions are listed in the following table.

◎: Available on upgraded models only (See Section 1.2 (1).)
○: Available on all standard models
—: N/A

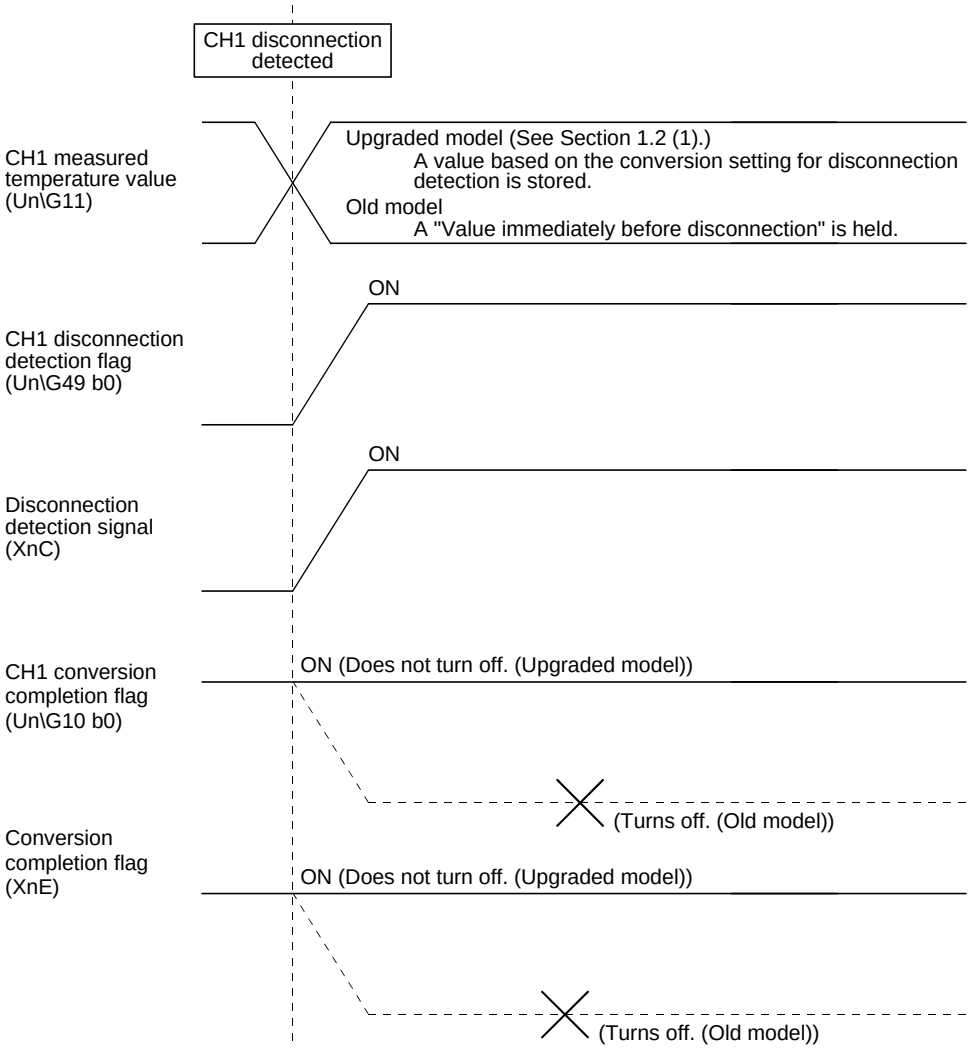
Item	Relevant models			
	Q64RD	Q64RD-G	Q64TD	Q64TDV-GH
Conversion setting for disconnection detection	◎	◎	◎	◎
Moving average	◎	○	—	—
Primary delay filter	◎	○	—	—

1.4 Changes arising when using the conversion setting for disconnection detection

The following describes the changes arising when using the conversion setting for disconnection detection.

Item	Description		Reference section
	Old model	Upgraded model (See Section 1.2 (1).)	
Conversion completion flag (XnE)	The conversion completion flag (XnE) turns OFF when disconnection is detected, and the value immediately before the detection is held in the CH□ measured temperature value buffer area.	When disconnection is detected, the conversion completion flag (XnE) does not turn OFF and the corresponding conversion set value (see Section 1.1.) for disconnection detection (buffer memory address 148: Un\G148) is stored in the CH□ measured temperature area.	Section 2.1
	The conversion completion flag (XnE) turns OFF when disconnection is detected. Upon recovery of the connection, the temperature conversion value update is restarted independently of the disconnection detection signal (XnC) reset. After the first update, the conversion completion flag (XnE) turns ON again.	When disconnection is detected, the conversion completion flag (XnE) does not turn OFF. Upon recovery of the connection, the temperature conversion value refresh is restarted independently of the disconnection detection signal (XnC) reset.	
Conversion completion flag (buffer memory address10: Un\G10)	When disconnection is detected, the conversion completion flag (buffer memory address: Un\G10) for the channel disconnected turns OFF (0).	When disconnection is detected, the conversion completion flag (buffer memory address 10: Un\G10) for the channel disconnected does not turn OFF (0).	

Example) Time chart for disconnection of Channel 1



The background of the changes is explained below.

(1) The Up and Down scale functions have been added, by which a measured temperature value is changed to the highest or lowest value in the case of cable disconnection.
To utilize these functions, the measured temperature value needs to be read from the sequence program when disconnection is detected.
Therefore, the previous specifications have been changed so that the conversion completion flag (XnE) and conversion completion flag (buffer memory address 10: Un\G10), which will be used as interlocks in read programs, do not turn off in such application.

(2) In older models, the conversion completion flag (XnE) turns off when a channel is disconnected.
If the conversion completion flag (XnE) is used as an interlock in a read program, measured temperature values of other channels are unable to be read.
In the upgraded models, the conversion completion flag (XnE) does not turn off at the time of disconnection, and thereby measured temperature values of other channels can be read.

(3) In other analog modules, signals indicating conversion completion (equivalent to XnE and Un\G10) do not turn off when cable disconnection is detected. Therefore, the relevant upgraded models have been designed to behave the same as those analog modules.

1.5 Compatibility with old models

When replacing an old model with an upgraded one (See Section 1.2 (1)), please pay attention to the following and modify existing programs as necessary.

- The default for the additional function, conversion setting for disconnection detection, is "Value immediately before detection" which is the same as for old models.
- There is compatibility within the allowable setting range of the Averaging processing specification (buffer memory address 9: Un\G9).

Note that, in the upgraded models, the conversion completion flag (XnE) and conversion completion flag (buffer memory address 10: Un\G10) do not turn off when disconnection is detected.
Modifying a program with reference to Section 2.1.1 enables to use both the old and upgraded models. If the conversion completion flag (XnE) is not used as an interlock for disconnection detection, both the old and upgraded models can be used without program modification.

2. Details of the new functions

The details of the new functions are explained in this section.

2.1 Conversion setting for disconnection detection (Q64RD/Q64RD-G/Q64TD/Q64TDV-GH)

(1) The corresponding set value is stored in the CH□ measured temperature buffer area, when disconnection detection occurs. The actual corresponding value can be selected from the following, "Up scale (each range's upper limit value +5%)", "Down scale (each range's lower limit value -5%), "Given value" or "Value immediately before disconnection".

(2) This function can be utilized only for channels where temperature conversion is enabled.

(3) When "Up scale" or "Down scale" is set, an Up scale value (each range's upper limit value + 5%) or a Down scale value (each range's lower limit value - 5%) of the individual range is stored respectively.

[Q64RD]

Mode	Set value	Measurement range	Up scale	Down scale
New JIS	0	-200 to 850℃	902.5℃	-252.5℃
	1	-20 to 120℃	127.0℃	-27.0℃
Old JIS	2	-180 to 600℃	639.0℃	-219.0℃
	3	-20 to 120℃	127.0℃	-27.0℃

[Q64RD-G]

Mode	Set value	Measurement range	Up scale	Down scale
New JIS	0	-200 to 850℃	902.5℃	-252.5℃
	1	-20 to 120℃	127.0℃	-27.0℃
	4	0 to 200℃	210.0℃	-10.0℃
Old JIS	2	-180 to 600℃	639.0℃	-219.0℃
	3	-20 to 120℃	127.0℃	-27.0℃
	5	0 to 200℃	210.0℃	-10.0℃
Ni100 Ω	8	-60 to 180℃	192.0℃	-72.0℃

[Q64TD]

Input type	Set value	Measurement range	Up scale	Down scale
Thermocouple K	0	-270 to 1370℃	1452.0℃	-352.0℃
Thermocouple E	1	-270 to 1000℃	1063.5℃	-333.5℃
Thermocouple J	2	-210 to 1200℃	1270.5℃	-280.5℃
Thermocouple T	3	-270 to 400℃	433.5℃	-303.5℃
Thermocouple B	4	0 to 1820℃	1911.0℃	-91.0℃
Thermocouple R	5	-50 to 1760℃	1850.5℃	-140.5℃
Thermocouple S	6	-50 to 1760℃	1850.5℃	-140.5℃
Thermocouple N	7	-270 to 1300℃	1378.5℃	-348.5℃

[Q64TDV-GH]

Input type	Set value	Measurement range	Up scale	Down scale
Thermocouple K	0	-270 to 1370℃	1452.0℃	-352.0℃
Thermocouple E	1	-270 to 1000℃	1063.5℃	-333.5℃
Thermocouple J	2	-210 to 1200℃	1270.5℃	-280.5℃
Thermocouple T	3	-270 to 400℃	433.5℃	-303.5℃
Thermocouple B	4	0 to 1820℃	1911.0℃	-91.0℃
Thermocouple R	5	-50 to 1760℃	1850.5℃	-140.5℃
Thermocouple S	6	-50 to 1760℃	1850.5℃	-140.5℃
Thermocouple N	7	-270 to 1300℃	1378.5℃	-348.5℃
Micro voltage input	8	-30000 to 30000	32767*	-32768*

* For the Up scale and Down scale of the micro voltage input, the maximum and minimum of the micro voltage conversion values are applied.

(4) When "Given value" is selected, specify a value for CH□ conversion setting value for disconnection detection. This value is stored in CH□ measured temperature value area when disconnection is detected.

(5) This function allows disconnection detection only by checking the CH□ measured temperature value. Select "Up scale", "Down scale" or "Given value", and read the value out to CH□ measured temperature value.

(6) For the buffer memory related to this function (Conversion setting for disconnection detection, CH□ conversion setting value for disconnection detection), refer to the following manuals.

Model	Manual name	IB/SH number
Q64RD/Q64RD-G	RTD Input Module, Channel Isolated RTD Input Module User's Manual	SH-080142-H or later
Q64TD/Q64TDV-GH	Thermocouple Input Module, Channel Isolated Thermocouple/Micro Voltage Input Module User's Manual	SH-080141-H or later

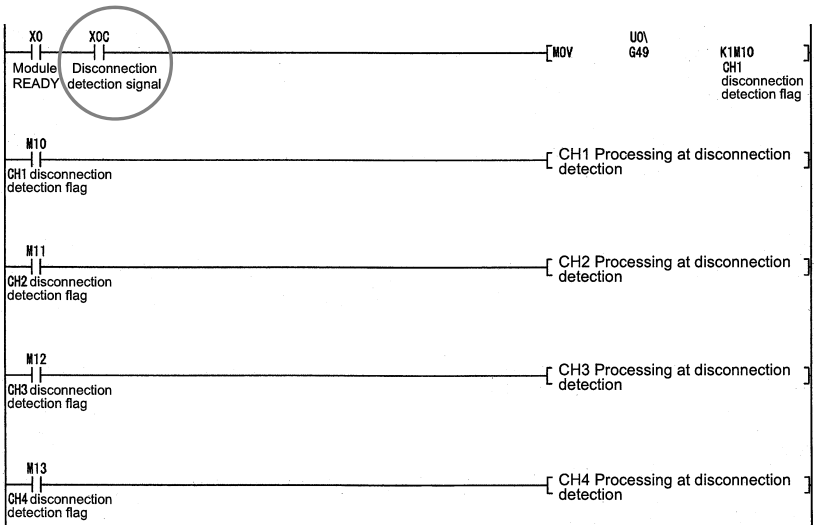
2.1.1 Precautions when replacing old models

(1) Disconnection detection

Use the disconnection detection signal (XnC) and disconnection detection flag (buffer memory address 49: Un\G49) for disconnection detection (Refer to Figure A).

When a program is created as the Figure A, both the old and upgraded models (Refer to Section 1.2 (1).) can be used without program modification.

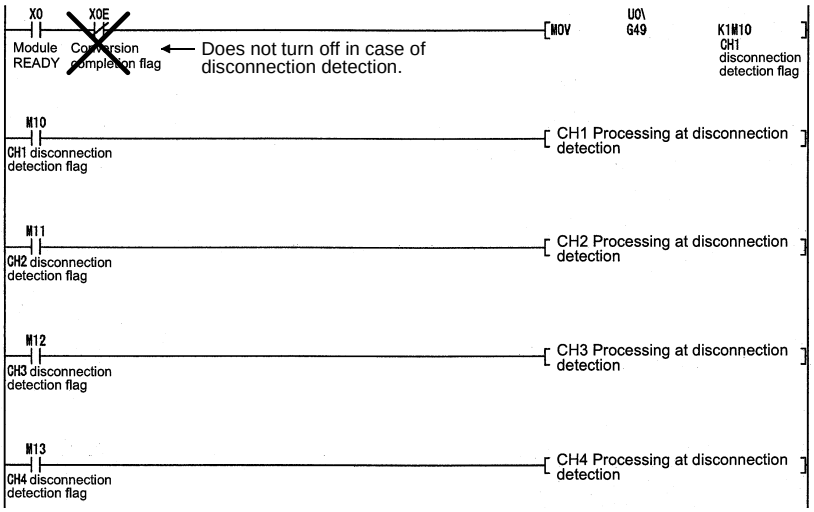
Figure A



Note that, in the upgraded models (Refer to Section 1.2 (1).), the conversion completion flag (XnE) and conversion completion flag (buffer memory address 10: Un\G10) do not turn off when disconnection is detected. Moreover, when the conversion completion flag (XnE) is used for disconnection detection as the Figure B, it does not turn off when disconnection is detected. Therefore, the detection will not be correctly performed. Since the conversion completion flag (XnE) and conversion completion flag (buffer memory address 10: Un\G10) are not fault finding signals, modify the program so that the disconnection detection signal (XnC) and disconnection detection flag (buffer memory address 49: Un\G49) are included.

Modifying the program as the Figure A enables to use both the old and upgraded models.

Figure B

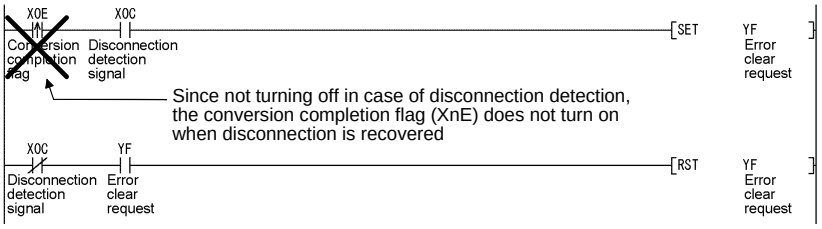

X0
X0E
Module READY
Conversion completion flag
Does not turn off in case of disconnection detection.
MOV
U0\G49
K1M10
CH1 disconnection detection flag
M10
CH1 disconnection detection flag
CH1 Processing at disconnection detection
M11
CH2 disconnection detection flag
CH2 Processing at disconnection detection
M12
CH3 disconnection detection flag
CH3 Processing at disconnection detection
M13
CH4 disconnection detection flag
CH4 Processing at disconnection detection

(2) Resetting the disconnection detection signal (XnC)/disconnection detection flag (buffer memory address 49: Un\G49)

After confirming the disconnection has been recovered, reset the disconnection detection signal (XnC)/disconnection detection flag (buffer memory address 49: Un\G49) using an external signal.
When they have been reset using an external signal, both the old and upgraded models (Refer to Section 1.2 (1).) can be used without program modification.

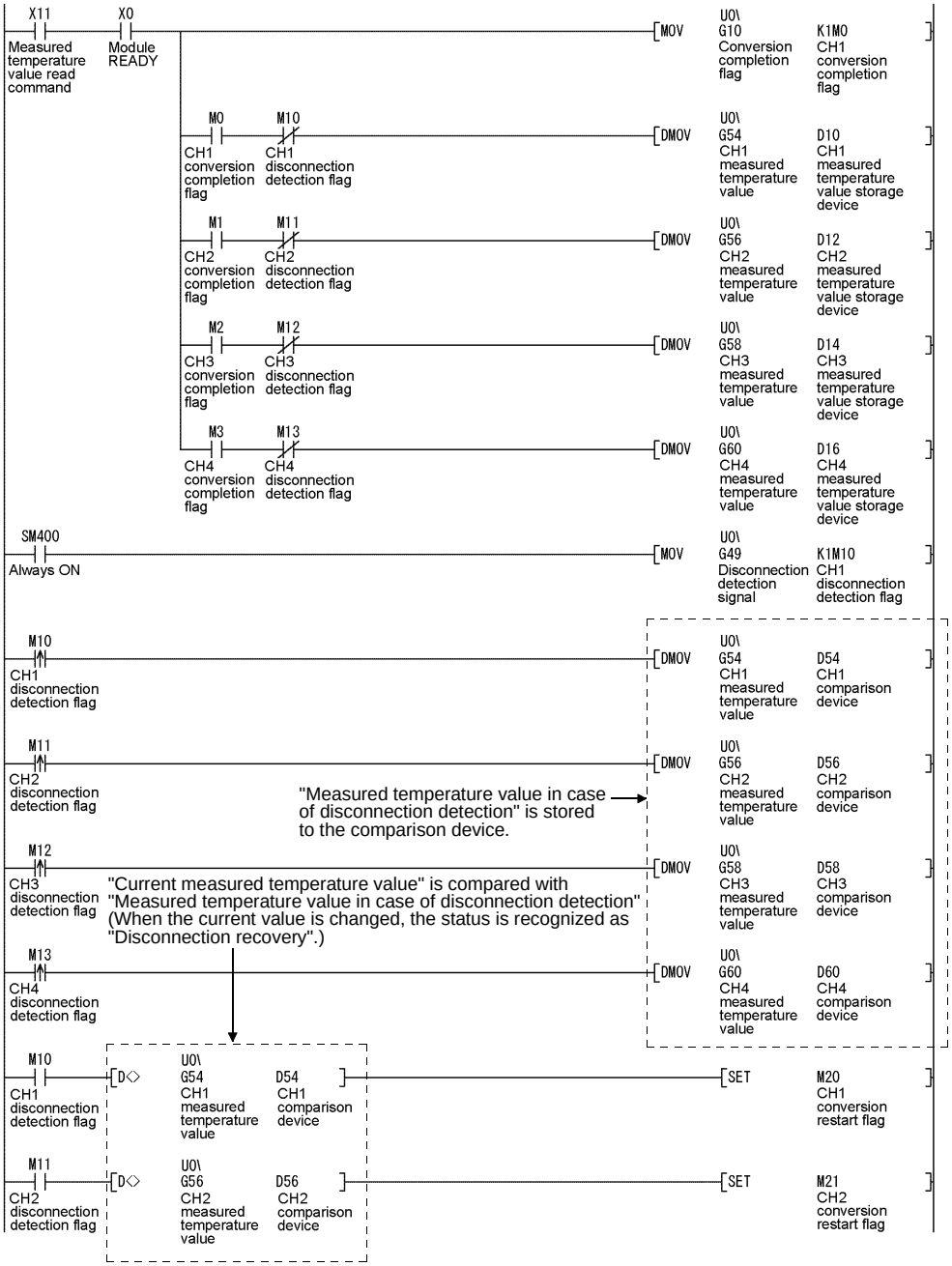
When using the upgraded model, the conversion completion flag (XnE) does not turn off in case of disconnection detection. Accordingly, if the program is for performing the Error Clear Request (YnF) at the start-up of conversion completion flag (XnE) as the Figure C, the program does not operate normally.
Create the program as the Figure D to automatically clear the disconnection detection signal (XnC) and disconnection detection flag (buffer memory address 49: Un\G49) on the sequence program of both the old and upgraded models.

Figure C



The following shows the example of a program that stores "Measured temperature value in case of disconnection detection" to a comparison device for comparing it with the "Current measured temperature value", then turns on the Error Clear Request (YnF) if the current value is changed and the status is recognized as "Disconnection recovery"
(An example when using conversion enabled channel from CH1 to CH4 with the Q64RD)

Figure D



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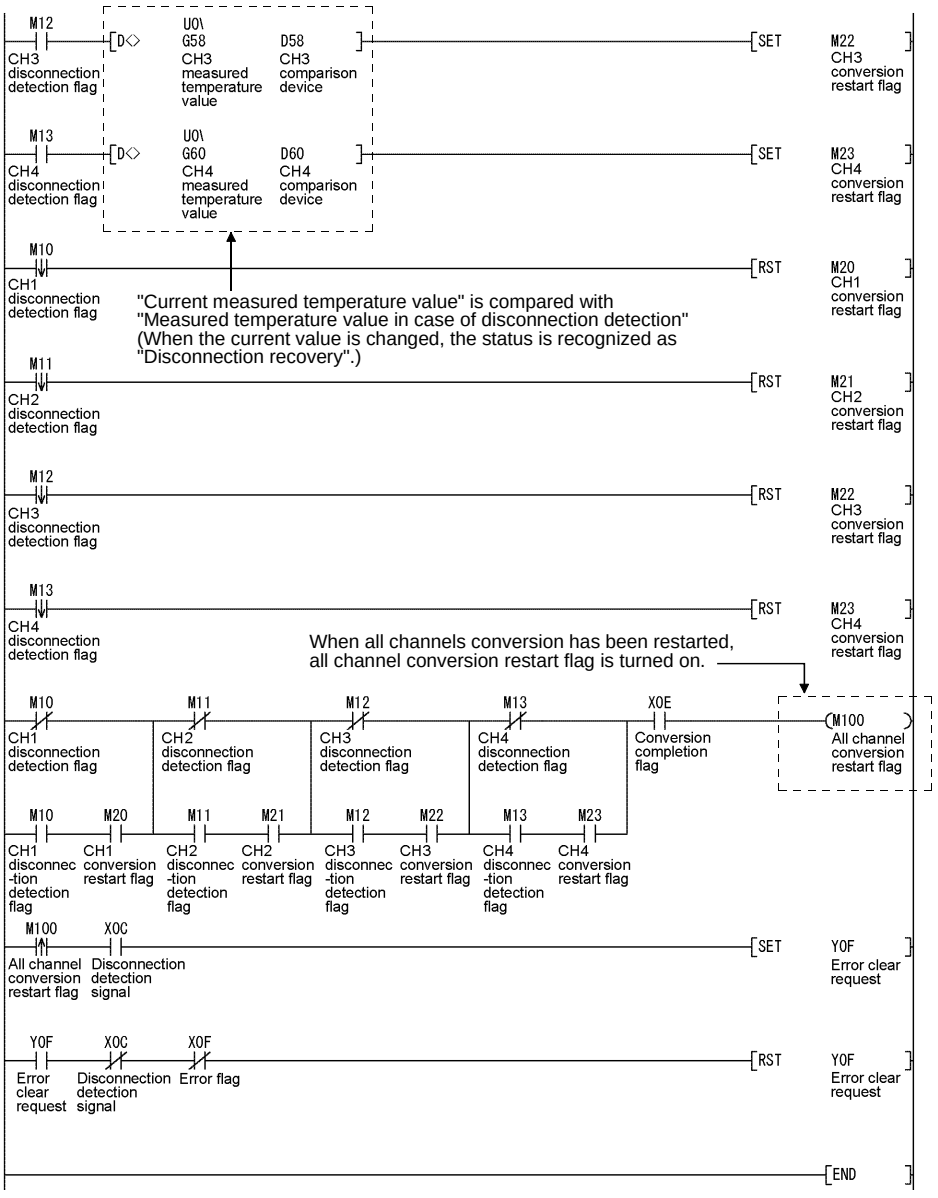
HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS:1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN



2.2 Moving average, Primary delay filter (Q64RD)

For details of the moving average and primary delay filter, refer to the RTD Input Module, Channel Isolated RTD Input Module User's Manual (SH-080142-H).

3. Compatible software

This section explains GX Configurator-TI software versions that support these new functions and how to confirm the version.

3.1 Compatible software version

Use GX Configurator-TI Version 1.21X or later.

3.2 How to confirm the GX Configurator-TI software version

The GX Configurator-TI software version can be checked from GX Developer's "Product information" screen.

[Operation procedure]

GX Developer → "Help" → Product information