Autonics
Sensors & Controllers

Multi-CH Modular Type Temperature Controller

TM-XGB (RS485)

Technical Support Manual

TM Series

Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

Preface

Thank you very much for selecting Autonics products.

Please familiarize yourself with the information contained in the **Safety Precautions** section before using this product.

This user manual contains information about the product and its proper use, and should be kept in a place where it will be easy to access.

Technical Support Manual Guide

- Please familiarize yourself with the information in this manual before using the product.
- This manual provides detailed information on the product's features. It does not offer any guarantee concerning matters beyond the scope of this manual.
- This manual may not be edited or reproduced in either part or whole without permission.
- This manual is not provided as part of the product package. Please visit our home-page (www.autonics.com) to download a copy.
- The manual's content may vary depending on changes to the product's software and other unforeseen developments within Autonics, and is subject to change without prior notice. Upgrade notice is provided through our homepage.
- We contrived to describe this manual more easily and correctly. However, if there are any corrections or questions, please notify us these on our homepage.

Technical Support Manual Symbols

Symbol	Description
 Note	Supplementary information for a particular feature.
 Warning	Failure to follow instructions can result in serious injury or death.
 Caution	Failure to follow instructions can lead to a minor injury or product damage.
 Ex.	An example of the concerned feature's use.
※1	Annotation mark.

Safety Precautions

- Following these safety precautions will ensure the safe and proper use of the product and help prevent accidents, as well as minimizing possible hazards.
- Safety precautions are categorized as Warnings and Cautions, as defined below:

Warning	Warning	Failure to follow the instructions may lead to a serious injury or accident.
Caution	Caution	Failure to follow the instructions may lead to a minor injury or accident.

Warning

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
  Failure to follow this instruction may result in personal injury, fire, or economic loss.
- The unit must be installed on a device panel before use.
  Failure to follow this instruction may result in electric shock.
- Do not connect, repair, or inspect the unit while connected to a power source.
  Failure to follow this instruction may result in electric shock.
- Check the input power specifications and terminal polarity for correct connecting the power source.
  Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit. Please contact us if necessary.
  Failure to follow this instruction may result in electric shock or fire.

Caution

- Do not use the unit outdoors.
  Failure to follow this instruction may result in shortening the life cycle of the unit, or electric shock.
- When connecting the power input and relay output cables, use AWG20 (0.5mm^2) cables.
  Failure to follow this instruction may result in fire due to contact failure.
- Use the unit within the rated specifications.
  Failure to follow this instruction may result in shortening the life cycle of the unit, or fire.
- Do not use loads beyond the rated switching capacity of the relay contact.
  Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.
- Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.
  Failure to follow this instruction may result in electric shock or fire.
- Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, or impact may be present.
  Failure to follow this instruction may result in fire or explosion.
- Keep dust and wire residue from flowing into the unit.
  Failure to follow this instruction may result in fire or product damage.

- Check the polarity of the measurement input contact before wiring the temperature sensor. Failure to follow this instruction may result in fire or explosion.
- For installing the unit with reinforced insulation, use the power supply unit which basic level is ensured.

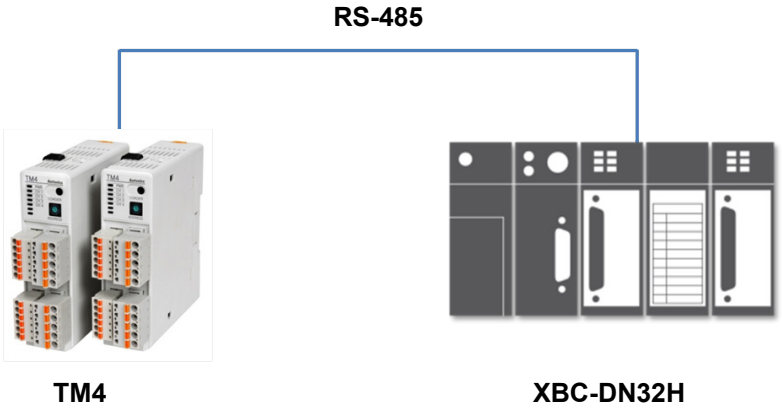
Table of Contents

1 System

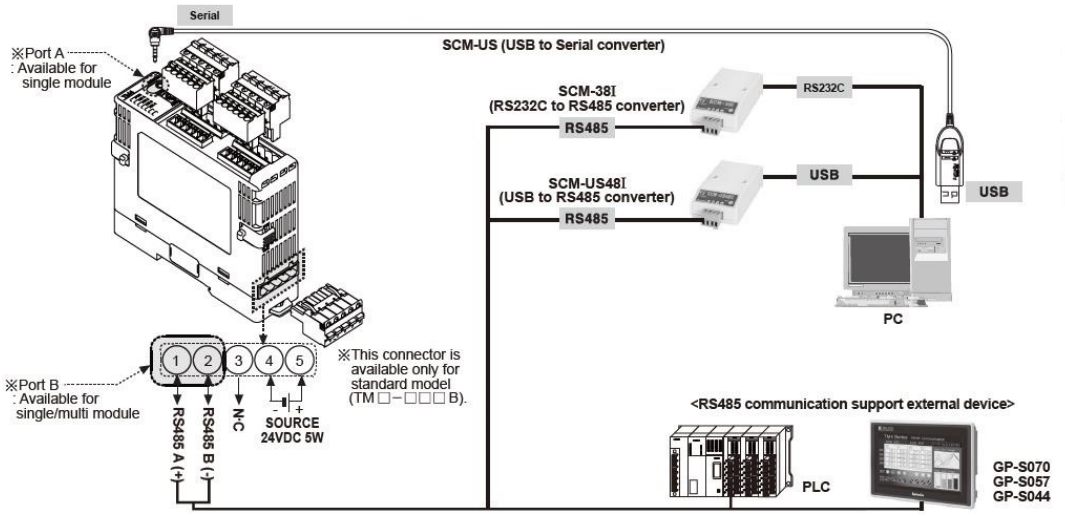
1.1 Version

Software	Version	Note
Operating system	Windows 7	—
XG 5000	V4.07	Release : 2016.03.29

1.2 Connections



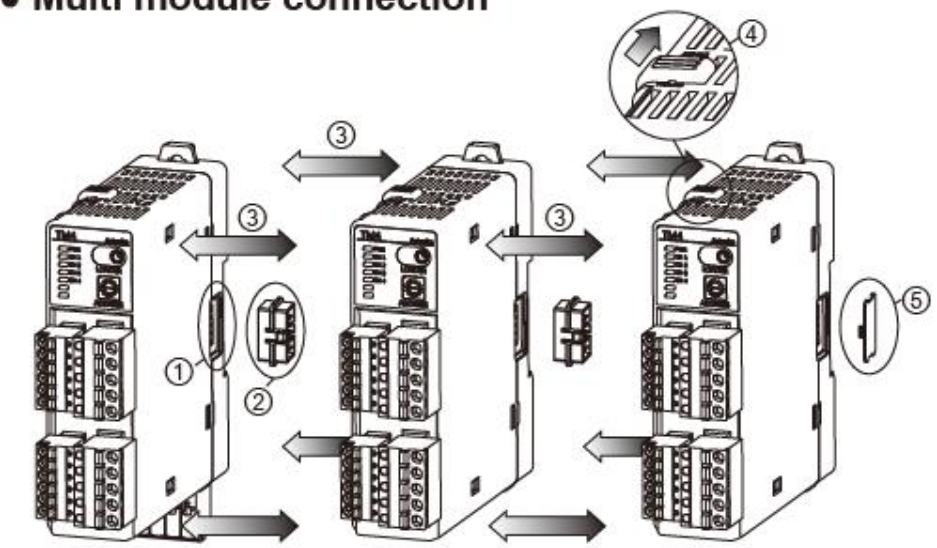
1.3 Communication connection and multi module connection



When using the port A, only single module is available.

For using single/multi module, use the port B.

• Multi module connection



2 TM4 Communication Setting

2.1 TM4 Setting

1st TM4 is multi-channel temperature controller. You can set the parameter settings by DAQMaster, the dedicated comprehensive device management program. (address setting is available to adjust by the communication address setting switch (SW1), communication address group switch (SW2) of the unit)

2nd Indicators for initial power ON

Status / Indicator	Initial power ON	Control output	Auto-tuning
PWR (green)	ON	ON	ON
CH1 (red)	Flash (2400bps)	ON	Flash
CH2 (red)	Flash (4800bps)	ON	Flash
CH3 (yellow)	Flash (9600bps)	ON	Flash
CH4 (yellow)	Flash (19200bps)	ON	Flash
	Flash (38400bps)	-	-

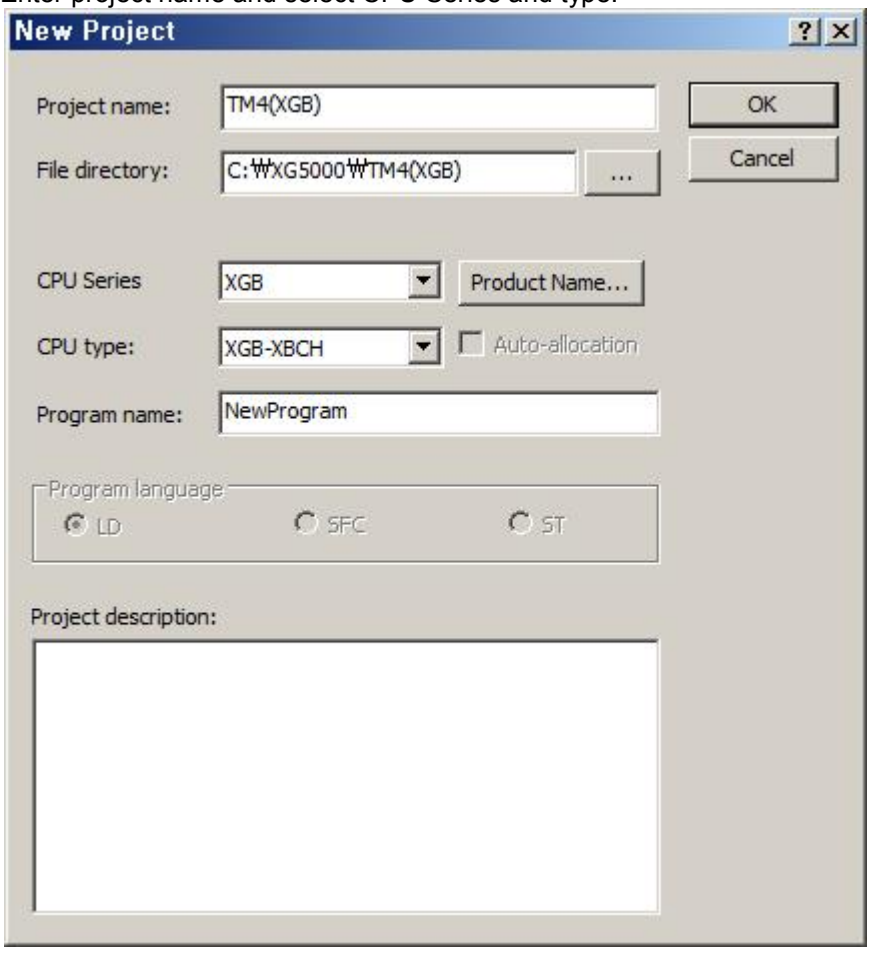
* When power is supplied initially, the set communication speed LED flashes for 5 sec.
* The auto-tuning CH LED flashes for 1 sec in turn.
* The PWR LED flashes during communication for 1 sec in turn.

3rd Communication settings are available at Communication Setting of at DAQMaster.

Item	Setting	Note
Baudrate	38400	User setting
Parity Bit	None	User setting
Stop Bit	2	User setting
Response Waiting Time	20	User setting
Communication Write	Enable	Fixed

2.2 XGB Setting

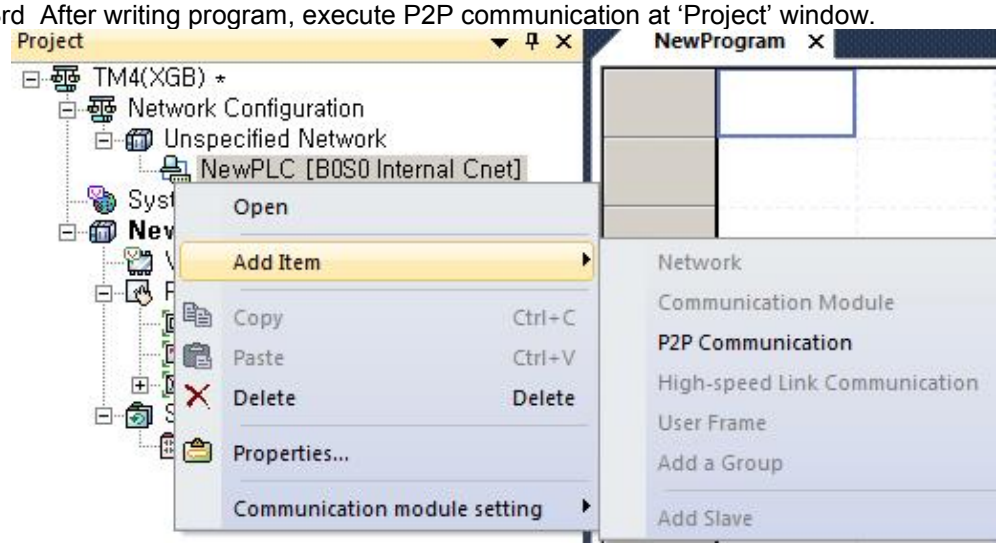
1st Run XG5000, and select [Project] – [New Project] on menu.
Enter project name and select CPU Series and type.



2nd After executing, enter the below contents at XG5000.

* This communication program is only for test. Before using it at field, review and test the program fully.

3rd After writing program, execute P2P communication at 'Project' window.



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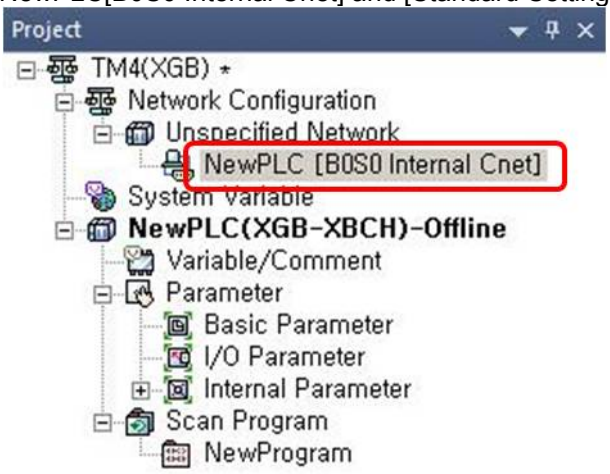
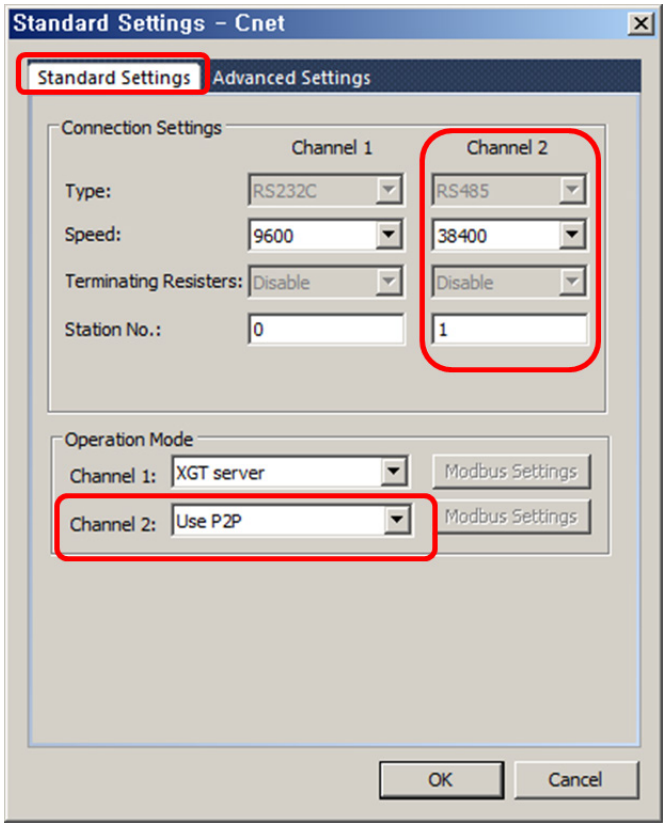
4th You can check the added P2P setting window below standard network. Doulble-click NewPLC[B0S0 Internal Cnet] and [Standard Settings – Cnet] dialog box is available.



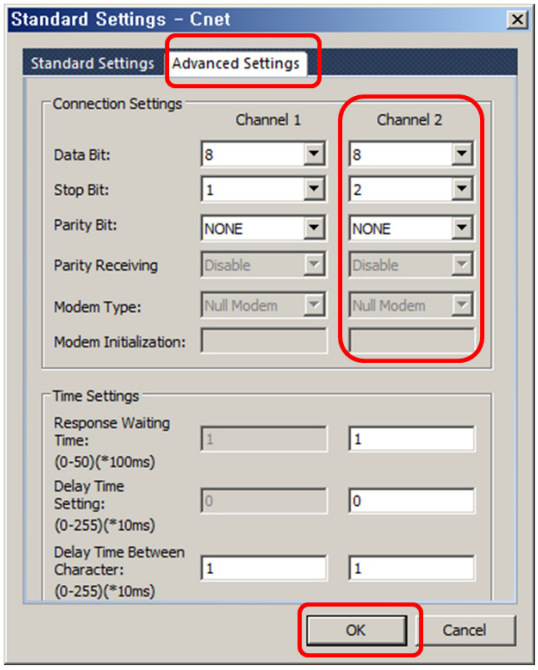
5th [Standard Settings-Cnet] dialog box appears. At standard settings, set as below.

Item		Setting	Note
Standard Settings Channel 2	Communication type	RS-485	Fixed
	Communication speed	38400	User setting
	Terminating resisters	Disable	User setting
	Station No.	1	User setting
Operation mode	Channel 2	Use P2P	

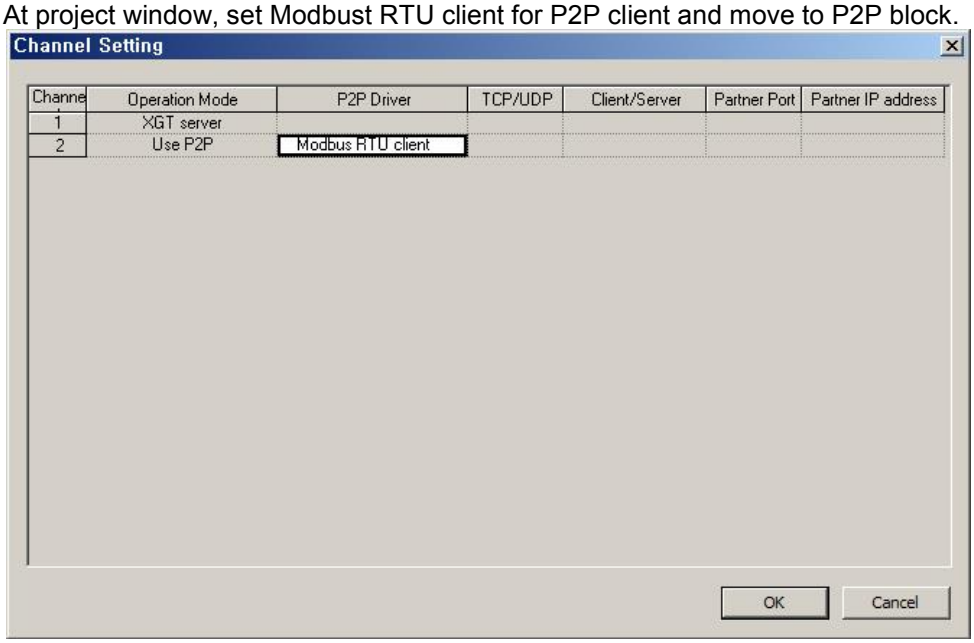


6th At advanced settings, set as below.

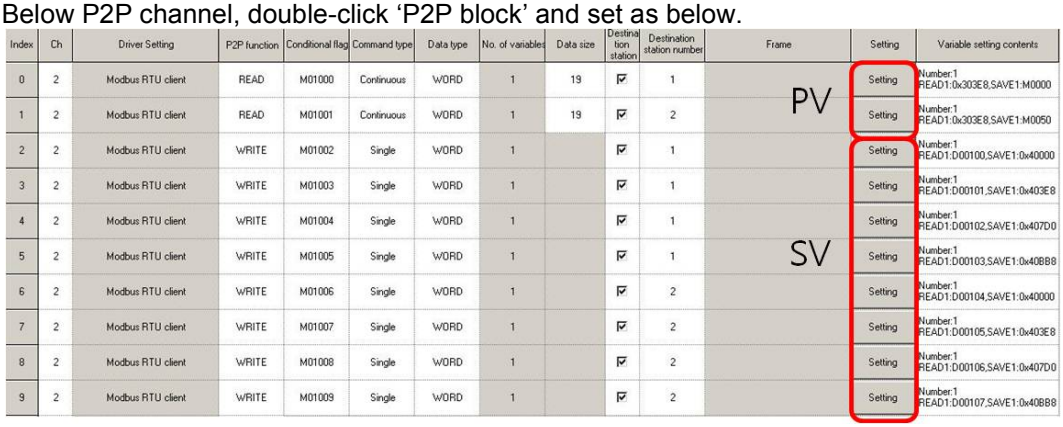
Item		Channel 2
Advanced settings	Data bit	8
	Stop bit	2
	Parity bit	NONE



7th At project window, set Modbust RTU client for P2P client and move to P2P block.



8th Below P2P channel, double-click ‘P2P block’ and set as below.



Index	Ch	Driver Setting	P2P function	Conditional flag	Command type	Data type	No. of variables	Data size	Destination station	Destination station number	Frame	Setting	Variable setting contents
0	2	Modbus RTU client	READ	M01000	Continuous	WORD	1	19	☑	1		Setting	Number:1 READ1:0x303E8,SAVE1:M0000
1	2	Modbus RTU client	READ	M01001	Continuous	WORD	1	19	☑	2		Setting	Number:1 READ1:0x303E8,SAVE1:M0050
2	2	Modbus RTU client	WRITE	M01002	Single	WORD	1		☑	1		Setting	Number:1 READ1:D00100,SAVE1:0x40000
3	2	Modbus RTU client	WRITE	M01003	Single	WORD	1		☑	1		Setting	Number:1 READ1:D00101,SAVE1:0x403E8
4	2	Modbus RTU client	WRITE	M01004	Single	WORD	1		☑	1		Setting	Number:1 READ1:D00102,SAVE1:0x407D0
5	2	Modbus RTU client	WRITE	M01005	Single	WORD	1		☑	1		Setting	Number:1 READ1:D00103,SAVE1:0x40BB8
6	2	Modbus RTU client	WRITE	M01006	Single	WORD	1		☑	2		Setting	Number:1 READ1:D00104,SAVE1:0x40000
7	2	Modbus RTU client	WRITE	M01007	Single	WORD	1		☑	2		Setting	Number:1 READ1:D00105,SAVE1:0x403E8
8	2	Modbus RTU client	WRITE	M01008	Single	WORD	1		☑	2		Setting	Number:1 READ1:D00106,SAVE1:0x407D0
9	2	Modbus RTU client	WRITE	M01009	Single	WORD	1		☑	2		Setting	Number:1 READ1:D00107,SAVE1:0x40BB8

CH	P2P function	Conditional flag	Command type	Data type	Data size	Destination station number
2	READ (PV)	M1000	2. Continuous	WORD	19	1
2	READ (PV)	M1001	2. Continuous	WORD	19	2
2	WRITE (SV)	M1002 to M1005	1. Single	WORD	1	1
2	WRITE (SV)	M1006 to M1009	1. Single	WORD	1	2

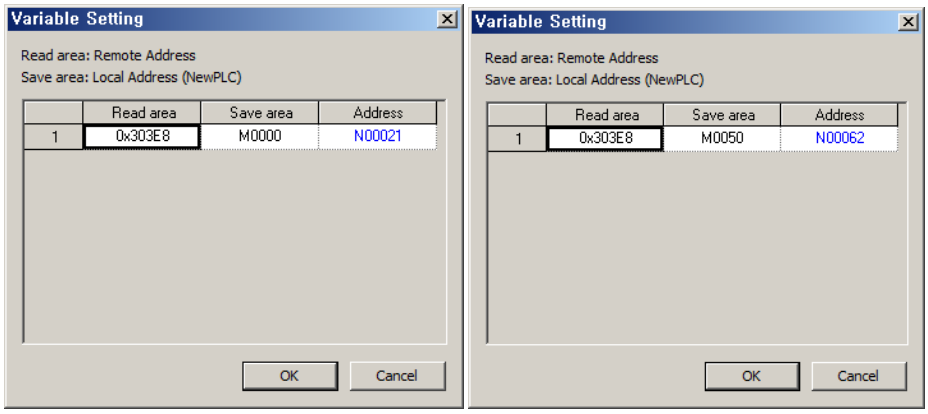
* Device matching

TM4	PLC	Description
①03E8	M0000	CH1 present value
②03E9	M0001	CH1 sensor decimal point position
…	…	
⑦03EE	M0006	CH2 present value
…	…	
⑬03F4	M0012	CH3 present value
…	…	
⑲03FA	M0018	CH4 present value

9th Variable settings
* PV setting

Station	Read area (setting)	Save area (setting)	Address (fixed)
Station 1	0x303E8	M0000	N00021
Station 2	0x303E8	M0050	N00062

Address	Type	Note
301001 (03E8)	PV	Present value



- Read Input Register (Func : 04, RW : R)

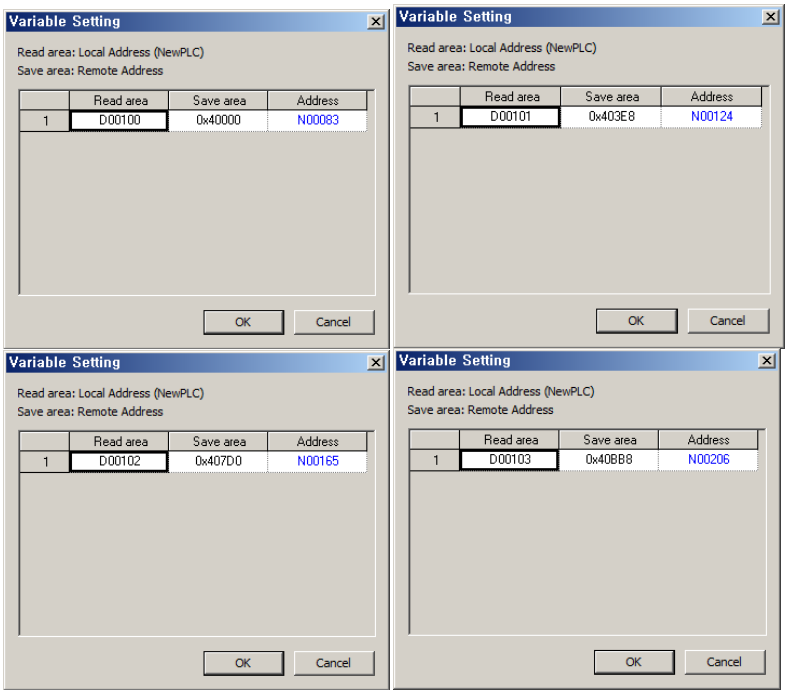
No(Address) TM2	No(Address) TM4	Parameter	Description	Setting Range	Unit	Factory Default
301001(03E8)	301001(03E8)	CH1 Present Value	Present Value	Input range by sensor type 31000: OPEN 30000: HHHH -30000: LLLL	℃/℉	-
301002(03E9)	301002(03E9)	CH1 Dot	Sensor's Decimal Point	0: 0 1: 0.0	-	0
301003(03EA)	301003(03EA)	CH1 Unit	Sensor's Temperature Unit	0: ℃ 1: ℉	-	0
301004(03EB)	301004(03EB)	CH1 Set Value	Temperature Setting Value controlled currently	SV Low Limit~SV High Limit	℃/℉	0
301005(03EC)	301005(03EC)	CH1 Heating_MV	Heating MV	0.0~100.0	%	-
301006(03ED)	301006(03ED)	CH1 Cooling_MV	Cooling MV	0.0~100.0	%	-
301007(03EE) ~301012(03F3)	301007(03EE) ~301012(03F3)	CH2 Parameter - the same as above CH1				
-	301013(03F4) ~301018(03F9)	CH3 Parameter - - the same as above CH1				
-	301019(03FA) ~301024(03FF)	CH4 Parameter - - the same as above CH1				

First Address — Number of consecutive reading : 19

First address : 03E8 , Number of consecutive reading : 03E8 to 03FA (19)

* SV setting

Address	Type	Note
400001 (0000)	SV	Setting value

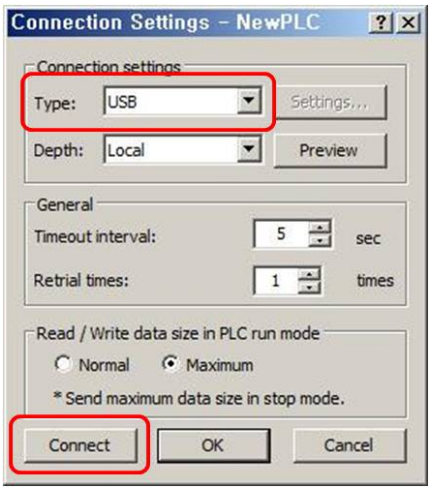


No(Address) TM2	No(Address) TM4	Parameter	Description	Setting Range	Unit	Factory Default
400001(0000)	400001(0000)	CH1 SV	Temperature Setting Value controlled currently	SV Low Limit~SV High Limit	℃/℉	0
400002(0001)	400002(0001)	CH1 Heating_MV	Heating MV	0.0~100.0	%	-
400003(0002)	400003(0002)	CH1 Cooling_MV	Cooling MV	0.0~100.0	%	-
400004(0003)	400004(0003)	CH1 Auto-Manual Control	Auto/Manual Control	0: AUTO 1: MANUAL	-	AUTO
400005(0004) ~400050(0031)	400005(0004) ~400050(0031)	CH1 Reserved				
401001(03E8) ~401050(0419)	401001(03E8) ~401050(0419)	CH2 Parameter – the same as above CH1				
-	402001(07D0) ~402050(0801)	CH3 Parameter - the same as above CH1				
-	403001(0BB8) ~403050(0BE9)	CH4 Parameter - the same as above CH1				

Enter the settings by each channel after checking the address.

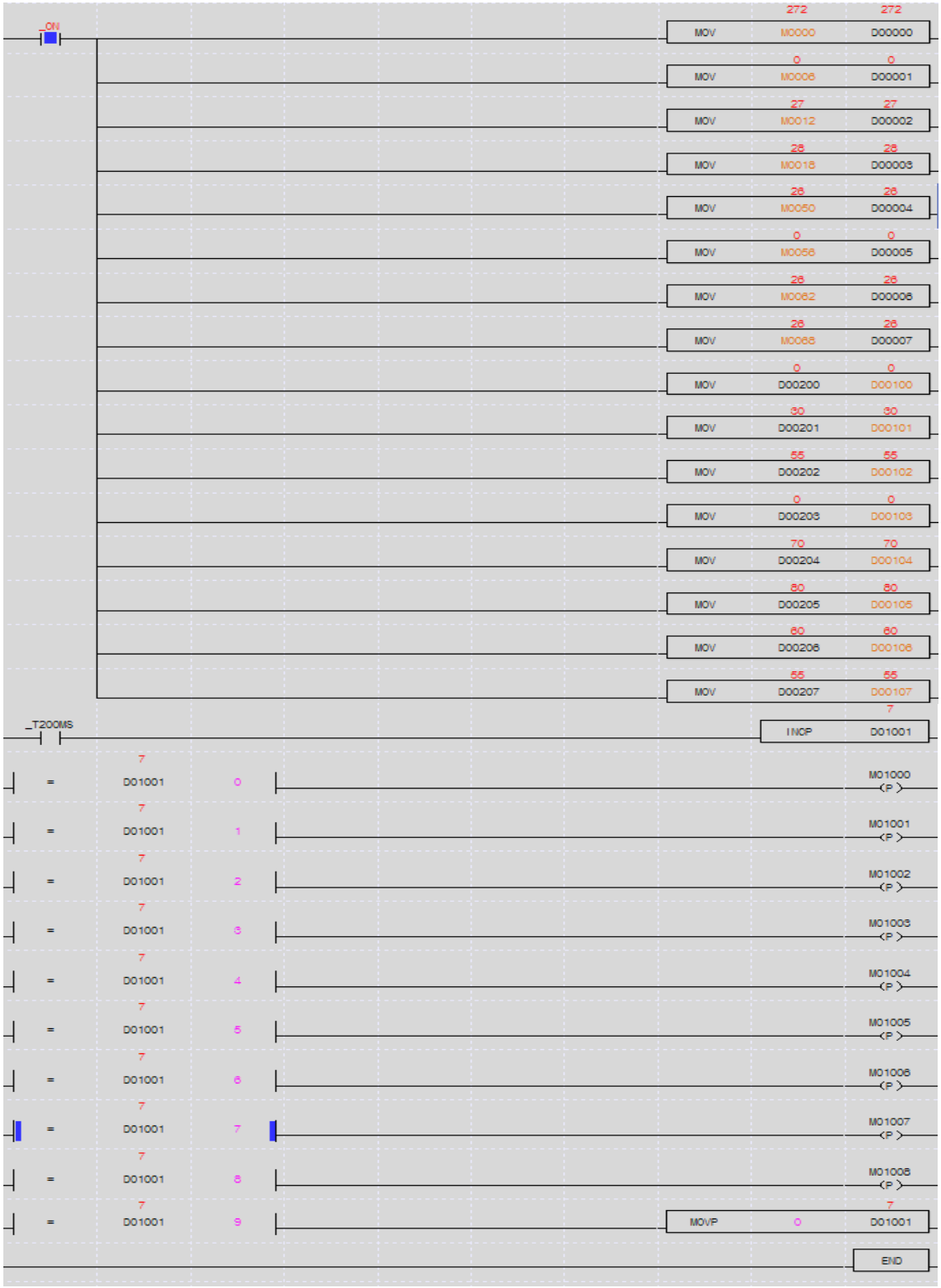
Station (CH)	Address	Station (CH)	Address
Station 1 (CH1)	0000	Station 2 (CH1)	0000
Station 1 (CH2)	03E8	Station 2 (CH2)	03E8
Station 1 (CH3)	07D0	Station 2 (CH3)	07D0
Station 1 (CH4)	0BB8	Station 2 (CH4)	0BB8

10th At [Online] – [Connection Settings], select connection type.



11th Select [Online] – [Write] to execute download.

3 Operation Check



D00000 to D00003 are present temperature values of CH1 to CH4 at station 1.
D00004 to D00007 are present temperature values of CH1 to CH4 at station 2.
D00100 to D00103 are setting values of CH1 to CH4 at station 1.
D00104 to D00107 are setting values of CH1 to CH4 at station 2.

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