Temperature Controrl Module FB Library

Reference Manual

Applicable modules:

Q64TCTT, Q64TCTTBW, Q64TCRT, Q64TCRTBW, Q64TCTTN, Q64TCTTBWN, Q64TCRTN, Q64TCRTBWN, L60TCTT4, L60TCTT4BW, L60TCRT4, L60TCRT4BW

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Reference Manual Revision History

Version	Date	Description
FBM-M064-A	2011/09/16	First edition

1. Overview

1.1. Overview of the FB Library

This FB library is for using the MELSEC-Q temperature control module Q64TCTT(BW), Q64TCRT(BW), Q64TCTT(BW)N, Q64TCRT(BW)N, or the MELSEC-L temperature control module L60TCTT4(BW), L60TCRT4(BW).

1.2. Function of the FB Library

Item	Description			
M+TC4_SetBPARAM	Sets the basic settings.			
M+TC4_SetCNTBPARAM	Sets the control basic parameters setting.			
M+TC4_SetCNTDPARAM	Set the control detailed parameters setting.			
M+TC4_SetAlertsfunction	Sets the alert function setting.			
M+TC4_SetOtherSettings	Sets the other settings.			
M+TC4_SetConversion	Sets the conversion enable/disable setting.			
M+TC4_SetProcessAlarm	Sets the process alarm setting.			
M+TC4_SetRateAlarm	Sets the rate alarm.			
M+TC4_SetPVScaling	Sets the process value (PV) scaling function.			
M.TCA Manife Temperature	Sets the cold junction temperature compensation and reads the cold junction			
M+1C4_MonicJ temperature	temperature process value.			
M+TC4_Autotuning Sets and executes auto tuning.				
M+TC4_Selftuning	Sets the self tuning setting and monitors the self tuning flag.			
M+TC4_PIDControl	Reads the PID constants and executes a forced PID control stop.			
MuTCA HasterDissensetion	Sets the heater disconnection detection and monitors the heater			
M+1C4_HeaterDisconnection	disconnection.			
M+TC4_LoopDisconnection	Sets the loop disconnection detection and monitors the loop disconnection.			
M+TC4 SimultaneousTemperature	Sets simultaneous temperature rise function setting and monitors the status			
	of the simultaneous temperature rise.			
M+TC4_SetPeakCurrentSuppress	Sets the peak current limit control setting.			
M+TC4_AlertStatus	Monitors an alert that has occurred.			
M+TC4_ErrorOperation	Monitors an error code and perform an error reset.			
M+TC4_ReadVal	Reads the values to the specified devices.			
MuTCA ParamPaakup	Backs up the setting value or executes the default setting registration			
мттС4_гагашваскир 	command.			

- 1.3. System Configuration Example
- (1) Q series system configuration Example



(2) L series system configuration Example



1.4. Relevant manual
Temperature Control Module User's Manual
MELSEC-Q Temperature Control Module User's Manual
QCPU User's Manual(Hardware Design, Maintenance and Inspection)
MELSEC-L Temperature Control Module User's Manual
MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
GX Works2 Version 1 Operating Manual (Common)

1.5. Note

Please make sure to read user's manuals for the corresponding products before using the products.

2. Details of the FB Library

2.1. M+TC4_SetBPARAM (Basic settings)

FB Name

M+TC4_SetBPARAM

Function Overview

Item	Description				
Function overview	Sets the basic settings.				
Symbol		M+TC4_SetBPAR	RAM]	
	Execution command —— B	: FB_EN	FB_ENO : B	Execution status	
	Module start XYaddress—— w	′: i_StartJO_No	FB_OK : B	Completed without error	
	Target CH—— W	': i_OH	FB_ERROR : B	Error flag	
	Input range — W	′: iJnputRange	ERRORJD : W	Error code	
	Set value (SV) setting — w	: i_SVSetting			
	Unused channel setting — w	′: i_UnusedCH			
				1	
Applicable hardware	Temperature control		1		
and software	module	Series	Model		
		MELSEC-Q series	Q64TCTT(BW),	Q64TCRT(BW),	
			Q64TCTT(BW)N	N, Q64TCRT(BW)N	
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)		
	Hardware details				
		Series		Model	
		MELSEC-Q series *1	Basic model		
			High performance	ce model	
			Universal model		
		MELSEC-L series	LCPU		
		*1 Not applicable to QCF	ble to QCPU (A mode)		
	Compatible software	GX Works2 *1	[*] 1		
		Language	Softw	are version	
		English version Version1.24		later	
		Chinese version Version1.49B or later		later	
		*1 For software versions	applicable to the	modules used, refer to	
		"Relevant manuals".			

Item	Description				
Programming	Ladder				
language					
Number of steps	197 steps (for MELSEC-L series CPU)				
	*The number of steps of the FB in a program depends on the CPU model that is used and				
	input and output definition.				
Function description	1) By turning ON FB_EN (Execution command), the basic settings are written to the buffer				
	memory.				
	2) To enable the setting values, turn the setting change command (YnB) OFF, ON and then				
	OFF in the setting mode.				
	3) FB operation is one-shot only, triggered by the FB_EN signal.				
	4) When the setting value of the target channel is out of range, the FB_ERROR output				
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error				
	code).				
	Refer to the error code explanation section for details.				
Compiling method Macro type					
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery				
Precautions	processing separately in accordance with the required system operation.				
	2) The FB cannot be used in an interrupt program.				
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do				
	not use this FB in programs that are only executed once such as a subroutine,				
	FOR-NEXT loop, etc. because it is impossible to turn OFF.				
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of				
	the target channel.				
	5) To execute this FB, the setting/operation mode command (Yn1) must be turned OFF.				
	6) This FB uses index registers Z9, Z8 and Z7. Please do not use these index registers in				
	an interrupt program.				
	7) Every input must be provided with a value for proper FB operation.				
	8) If the parameters are set using the configuration function of GX Works 2, using this FB is				
	unnecessary.				
	9) Perform the setting using the GX Works2 intelligent function module switch setting to				
	match systems and devices connected to the temperature control module.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Operating Manual (Common).				
FB operation type	Pulsed execution (1 scan execution type)				
Application example	Refer to "Appendix 1 FB Library Application Examples".				

Item	Description						
Timing chart	[When operation completes without error]	[When an error occurs]					
	FB_EN(Execution command) FB_ENO(Execution status) Basic settings write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERRORID(Error code)	FB_EN(Execution command) FB_ENO(Execution status) Basic settings write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR_ID(Error code)					
Relevant manuals	uals •Temperature Control Module User's Manual						
	•MELSEC-Q Temperature Control Module I	Jser's Manual					
	•QCPU User's Manual(Hardware Design, Maintenance and Inspection)						
	•MELSEC-L Temperature Control Module User's Manual						
	•MELSEC-L CPU Module User's Manual (H	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)					
	•GX Works2 Version 1 Operating Manual (0	Common)					

Error codes

•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)

Name(Comment)	Label name	Data	Setting range	Description
		type		
Target CH	i_CH	Mord	1~4	Specify the channel
		vvora		number.
Input range	i_InputRange		When using the internal	Set the input range so that
			temperature sensor.	the type of the
			1~99: The unit is	thermocouple and the
			Centigrade.	measurement
		Word	100~199: The unit is	temperature range are set
			Fahrenheit.	automatically.
			When using other analog	
			module input.	
			200~299: The unit is digit.	
Set value (SV)	i_SVSetting		Set a value within the	Sets the temperature for
setting		\A/ord	temperature setting range	the set value of PID
		word	specified in the input	operation.
			range setting.	
Unused channel	i_UnusedCH		0: Used	Use to specify as unused
setting			1: Unused	channels where
		\A/ord		temperature control will
		vvord		not be performed and
				temperature sensors will
				not be connected.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	D:4		ON: Execution command is ON.
		BIT OFF		OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the basic settings
error		DIL	OFF	are completed.
Error flag	FB_ERROR	Dit		When ON, it indicates that an error has
		BIT OFF		occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetBPARAM function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

Before using any Mitsubishi products, please read all the relevant manuals.

2.2. M+TC4_SetCNTBPARAM (Control basic parameters setting)

FB Name

M+TC4_SetCNTBPARAM

Function Overview

Item	Description			
Function overview	Sets the control basic parameters setting.			
Symbol		M+TG4_SetCNTBPARAM		
	Execution command	B : FB_EN	FB_ENO : B	
	Module start XY address	W : i_StartJO_No	FB_OK : B	Completed without error
	Target CH——	w : i_он	FB_ERROR : B	Error flag
	Proportional band (P) setting	W : iPSetting	ERRORJD : W	Error code
	Integral time ① setting	W : iJSetting		
	Derivative time (D) setting	W : i_DSetting		
	Control output period setting	W : i_OutputPeriod		
	Control response parameter——	W : i,ResponseParam		
	Stop mode setting	W : i_StopMode		
Applicable hardware	Temperature control			
and software	module	Series	Γ	Model
		MELSEC-Q series	Q64TCTT(BW),	Q64TCRT(BW),
			Q64TCTT(BW)	N, Q64TCRT(BW)N
		MELSEC-L series	L60TCTT4(BW)	, L60TCRT4(BW)
	Hardware details			
		Series	l I	Vlodel
		MELSEC-Q series *1	Basic model	
			High performan	ce model
			Universal mode	I
		MELSEC-L series	LCPU	
		*1 Not applicable to QCP	U (A mode)	

Item	Description			
	Compatible software	GX Works2 *1		
		Language	Software version	
		English version	Version1.24A or later	
		Chinese version	Version1.49B or later	
		*1 For software versions	applicable to the modules used, refer to	
		"Relevant manuals".		
Programming	Ladder			
language				
Number of steps	227 steps (for MELSEC-	L series CPU)		
	*The number of steps of	the FB in a program depen	nds on the CPU model that is used and	
	input and output definiti	on.		
Function description	1) By turning ON FB_E	N (Execution command),	the control basic parameters setting is	
	written to the buffer m	nemory.		
	2) FB operation is one-s	hot only, triggered by the F	B_EN signal.	
	3) When the setting valu	e of the target channel is o	ut of range, the FB_ERROR output turns	
	ON, processing is interrupted, and the error code is stored in ERROR_ID (Error code).			
	Refer to the error cod	Refer to the error code explanation section for details.		
Compiling method	Macro type			
Restrictions and	1) The FB does not i	nclude error recovery pr	ocessing. Program the error recovery	
Precautions	processing separately	in accordance with the re-	quired system operation.	
	2) The FB cannot be use	ed in an interrupt program.		
	3) Please ensure that the	e FB_EN signal is capable	of being turned OFF by the program. Do	
	not use this FB in	programs that are only	executed once such as a subroutine,	
	FOR-NEXT loop, etc.	because it is impossible to) turn OFF.	
	4) When two or more of	these FBs are used, preca	ution must be taken to avoid repetition of	
	the target channel.			
	5) This FB uses index re	egisters Z9, Z8 and Z7. Ple	ease do not use these index registers in	
	an interrupt program.			
	6) Every input must be p	provided with a value for pro-	oper FB operation.	
	7) If the parameters are	set using the configuration	function of GX Works 2, using this FB is	
	unnecessary.			
	8) Perform the setting u	using the GX Works2 intel	ligent function module switch setting to	
	match systems and d	evices connected to the ter	mperature control module.	
	For details on how t	o use the intelligent funct	tion module switch setting, refer to GX	
	Works2 Operating Ma	anual (Common).		
FB operation type	Pulsed execution (1 sca	n execution type)		

Item	Description		
Application example	Refer to "Appendix 1 FB Library Application Examples".		
Timing chart	[When operation completes without error] [When an error occurs]		
	FB_EN(Execution command) FB_EN(Execution status) Control basic parameters setting write processing FB_ENO(Execution status) Control basic parameters setting write processing Control basic parameters setting write processing FB_ENC(Completed without error) FB_ERROR(Error flag) FB_ERROR(Error code) 0		
Relevant manuals	 Temperature Control Module User's Manual MELSEC-Q Temperature Control Module User's Manual QCPU User's Manual(Hardware Design, Maintenance and Inspection) 		
	 MELSEC-L Temperature Control Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) 		
	•GX Works2 Version 1 Operating Manual (Common)		

Error codes

Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels	
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Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the starting XY
address			point range. For details,	address (in hexadecimal)
		Word	refer to the CPU user's	where the temperature
		vvoru	manual.	control module is mounted.
				(For example, enter H10 for
				X10.)
Target CH	i_CH	Word	1~4	Specify the channel number.
Proportional band	i_PSetting	Word	0~10,000	Set the proportional band
(P) setting		vvoru		(P) setting.
Integral time (I)	i_ISetting	Word	0~3,600	Set the integral time (I)
setting		vvoru		setting.
Derivative time (D)	i_DSetting	Word	0~3,600	Set the derivative time (D)
setting		vvoru		setting.
Control output	i_OutputPeriod		Control output period	Set the ON/OFF period of
period setting			unit switch setting = 0:1s	the transistor output.
			*1	*1: For L60, the control
		Word	1~100	output period unit switch
		vvoru	Control output period	setting can be performed
			unit switch setting = 1:	by using the intelligent
			0.1s *1	function module switch.
			5~1,000	

Name(Comment)	Label name	Data	Setting range	Description
		type		
Control response	i_ResponseParam		0: Slow	Set the response to a PID
parameter		Word	1: Normal	control set value (SV)
			2: Fast	change.
Stop mode setting	i_StopMode		0: Stop	Set the mode to be entered
		Word	1: Monitor	at a PID operation stop.
			2: Alert	

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the control basic
error		DIL	OFF	parameters setting is completed.
Error flag	FB_ERROR	Bit OFF		When ON, it indicates that an error has
				occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetCNTBPARAM function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

Before using any Mitsubishi products, please read all the relevant manuals.

2.3. M+TC4_SetCNTDPARAM (Control detailed parameters setting)

FB Name

M+TC4_SetCNTDPARAM

Function Overview

Item	Description			
Function overview	Set the control detailed parameters setting.			
Symbol		M+TC4_SetCN	TDPARAM	
	Execution command		FBJENU : B	Execution status
	Module start XY address	SW : i_StartJO_No	FB <u>ok</u> : B	Completed without error
	Target CH	W:i_CH	FB_ERROR : B	——Error flag
	Forward/reverse action setting	(W : i_ActionSetting	ERRORJD : W	Error code
	Upper limit setting limiter	′─── W : i_UpSetLimiter		
	Lower limit setting limiter	′───₩ : i_LowSetLimiter		
	Setting change rate limiter	′─── W : i_ChgRateLimit		
	Setting change rate limiter (temperature fall)	W : i_ChgRateDELimit		
	Sensor compensation value setting	(
	Primary delay digital filter setting	8 — W : i_PrimaryDelay		
	Upper output limiter	′────₩ : i_UpOutLimiter		
	Lower output limiterW : i_LowOutLimiter			
	Output variation limite	rW : i_OutVariation		
	Adjustment sensitivity (dead band) setting	W : i_AdjustSetting		
Applicable hardware	Temperature control			
and software	module	Series	M	odel
		MELSEC-Q series	Q64TCTT(BW), 0	Q64TCRT(BW),
			Q64TCTT(BW)N,	Q64TCRT(BW)N
		MELSEC-L series	L60TCTT4(BW),	L60TCRT4(BW)
	Hardware details			
		Series	M	odel
		MELSEC-Q series *1	Basic model	
			High performance	e model
			Universal model	
		MELSEC-L series	LCPU	
		*1 Not applicable to QCP	U (A mode)	

Item		Description	I
	Compatible software	GX Works2 *1	
		Language	Software version
		English version	Version1.24A or later
		Chinese version	Version1.49B or later
		*1 For software versions a	applicable to the modules used, refer to
		"Relevant manuals".	
Programming	Ladder		
language			
Number of steps	254 steps (for MELSEC-L series CPU)		
	*The number of steps of the FB in a program depends on the CPU model that is used and		
	input and output definit	ion.	
Function description	1) By turning ON FB_EN (Execution command), the control detailed parameters setting is		
	written to the buffer m	nemory.	
	2) FB operation is one-s	hot only, triggered by the F	B_EN signal.
	3) When the setting val	lue of the target channel i	s out of range, the FB_ERROR output
	turns ON, processing	g is interrupted, and the er	ror code is stored in ERROR_ID (Error
	code).		
	Refer to the error cod	le explanation section for d	etails.
Compiling method	Macro type		

Item	Description			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
Precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do			
	not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop, etc. because it is impossible to turn OFF.			
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel.			
	5) This FB uses index registers Z9, Z8 and Z7. Please do not use these index registers in			
	an interrupt program.			
	6) Every input must be provided with a value for proper FB operation.			
	7) To execute this FB, the setting/operation mode command (Yn1) must be turned OFF.			
	unnecessary.			
	9) Perform the setting using the GX Works2 intelligent function module switch setting to			
	match systems and devices connected to the temperature control module.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Operating Manual (Common).			
FB operation type	Pulsed execution (1 scan execution type)			
Application example	Refer to "Appendix 1 FB Library Application Examples".			
Timing chart	[When operation completes without error] [When an error occurs]			
	FB_EN(Execution command)			
	FB_ENO(Execution status)			
	Control detailed parameters setting write processing Virite Processing Setting write processing No processing No processing			
	FB_OK			
	FB_ERROR(Error flag)			
	ERRORJD(Error code) 0 Error code 0			
Relevant manuals	Temperature Control Module User's Manual			
	MELSEC-Q Temperature Control Module User's Manual			
	•QCPU User's Manual(Hardware Design, Maintenance and Inspection)			
	•MELSEC-L Temperature Control Module User's Manual			
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)			
	•GX Works2 Version 1 Operating Manual (Common)			

Error codes

Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

●Input	labels
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Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH	Mord	1~4	Specify the channel
		word		number.
Forward/reverse	i_ActionSetting	\//ord	0: Forward action	Specify the forward or
action setting		vvord	1: Reverse action	reverse action.
Upper limit setting	i_UpSetLimiter		Set a value within the	Specify a value within the
limiter			measurement temperature	measurement
		Word	range that has been set	temperature range that
			with the input range.	has been set with the
				input range.
Lower limit setting	i_LowSetLimiter		Set a value within the	Specify a value within the
limiter			measurement temperature	measurement
		Word	range that has been set	temperature range that
			with the input range.	has been set with the
				input range.

Name(Comment)	Label name	Data	Setting range	Description
		type		
Setting change rate	i_ChgRateLimit		0: Disabled	Set the variation of the set
limiter			1~1,000 (0.1~100.0%)	value per unit time to a set
				value (SV) change.
				If the separate settings of
				the rise temperature and
		Word		fall temperature are set for
		word		the change rate limiter
				setting of the intelligent
				function module switch
				setting, the setting change
				rate limiter is the rise
				temperature setting.
Setting change rate	i_ChgRateDELimit		0: Disabled	This parameter can be set
limiter (temperature			1~1,000(0.1~100.0%)	when the separate
fall)			*1	settings of the rise
				temperature and fall
		Maral		temperature are set for
		vvora		the change rate limiter
				setting of the switch
				setting 3.
				*1: To disable this setting,
				set 0.
Sensor	i_SensorCompVal		-5,000~5,000	Sets the compensation
compensation value			(-50.00~50.00%)	value used when there is
setting		\A/ord		a difference between the
		word		measured temperature
				and the actual
				temperature.
Primary delay digital	i_PrimaryDelay	\//ord	0: Disabled	Specify the primary delay
filter setting		word	1~100	digital filter.
Upper output limiter	i_UpOutLimiter		Standard control	Specify the upper limit
		Mard	-50~1,050 (-5.0~105.0%)	value for outputting to an
		vvora	Heating/cooling control	external device.
			0~1,050 (0.0~105.0%)	

Name(Comment)	Label name	Data	Setting range	Description
		type		
Lower output limiter	i_LowOutLimiter		Standard control	Specify the lower limit
		Word	-50~1,050 (-5.0~105.0%)	value for outputting to an
		word	Heating/cooling control	external device.
			0~1,050 (0.0~105.0%)	
Output variation	i_OutVariation		0: Disabled	Specify a range to
limiter		Word	1~1,000 (0.1~100.0%/s)	suppress the variation of
				the manipulated value.
Adjustment	i_AdjustSetting		1~100 (0.1~10.0%)	Set a range to prevent
sensitivity (dead		Word		chattering of the transistor
band) setting				output.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	UFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the control
error		DIL	UFF	detailed parameters setting is completed.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL	UFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetCNTDPARAM function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

Before using any Mitsubishi products, please read all the relevant manuals.

2.4. M+TC4_SetAlertsfunction (Alert function setting)

FB Name

M+TC4_SetAlertsfunction

Function Overview

Item		Descriptior	ו	
Function overview	Sets the alert function se	etting.		
Symbol	Γ	M+TC4_SetAlertsfun	ction	
	Execution command—— B	: FB_EN	FB_ENO : B	
	Module start XY address — w	′: i_StartJO_No	FB_OK : B	Completed without error
	Target CH	': i_OH	FB_ERROR : B	——Error flag
	Alert 1 mode setting — w	': i_Alert1 ModeSet	ERRORJD : W	——Error code
	Alert 2 mode setting — w	′: i_Alert2ModeSet		
	Alert 3 mode setting — W	′: i_Alert3ModeSet		
	Alert 4 mode setting — W	: i_Alert4ModeSet		
	Alert set value 1 — W	: i_AlertSetVall		
	Alert set value 2	: i_AlertSetVal2		
	Alert set value 3	Alert set value 3		
	Alert set value 4	: i_AlertSetVal4		
		Γ		
Applicable hardware	Temperature control			
and software	module	Series	1	Vodel
		MELSEC-Q series	Q64TCTT(BW),	, Q64TCRT(BW),
			Q64TCTT(BW)	N, Q64TCRT(BW)N
		MELSEC-L series	L60TCTT4(BW)	, L60TCRT4(BW)
	Hardware details			
		Series	1	Vodel
		MELSEC-Q series *1	Basic model	
			High performan	ce model
			Universal mode	
		MELSEC-L series	LCPU	
		*1 Not applicable to QCP	U (A mode)	

Item		Description	L	
	Compatible software	GX Works2 *1		
		Language	Software version	
		English version	Version1.24A or later	
		Chinese version	Version1.49B or later	
		*1 For software versions a	applicable to the modules used, refer to	
		"Relevant manuals".		
Programming	Ladder			
language				
Number of steps	246 steps (for MELSEC-	eps (for MELSEC-L series CPU)		
	*The number of steps of	of steps of the FB in a program depends on the CPU model that is used and		
	input and output definiti	on.		
Function description	1) By turning ON FB_EI	By turning ON FB_EN (Execution command), the alert function setting is written to the		
	buffer memory.			
	2) To enable the setting	values, turn the setting change command (YnB) OFF, ON and then		
	OFF in the setting mo	etting mode.		
	3) FB operation is one-shot only, triggered by the FB_EN signal.			
	4) When the setting val	lue of the target channel i	s out of range, the FB_ERROR output	
	turns ON, processing	; is interrupted, and the er	ror code is stored in ERROR_ID (Error	
	code).			
	Refer to the error cod	le explanation section for d	etails.	
Compiling method	Macro type			

Item	Description		
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery		
Precautions	processing separately in accordance with the required system operation.		
	2) The FB cannot be used in an interrupt program.		
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do		
	not use this FB in programs that are only executed once such as a subroutine,		
	FOR-NEXT loop, etc. because it is impossible to turn OFF.		
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of		
	the target channel.		
	5) This FB uses index registers Z9, Z8, Z7 and Z6. Please do not use these index registers		
	in an interrupt program.		
	6) Every input must be provided with a value for proper FB operation.		
	7) To execute this FB, the setting/operation mode command (Yn1) must be turned OFF.		
	8) If the parameters are set using the configuration function of GX Works 2, using this FB is		
	unnecessary.		
	9) Perform the setting using the GX Works2 intelligent function module switch setting to		
	match systems and devices connected to the temperature control module.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Operating Manual (Common).		
FB operation type	Pulsed execution (1 scan execution type)		
Application example	Refer to "Appendix 1 FB Library Application Examples".		
Timing chart	[When operation completes without error] [When an error occurs]		
	FB_EN(Execution command)		
	FB_ENQ(Execution status)		
	Alert function setting write processing Write Processing Write processing No processin		
	FB_OK (Completed without error)		
	FB_ERROR(Error flag)		
	ERROR_ID(Error code) 0 ERROR_ID(Error code) 0 Error code 0		
Relevant manuals	Temperature Control Module User's Manual		
	•MELSEC-Q Temperature Control Module User's Manual		
	•QCPU User's Manual(Hardware Design, Maintenance and Inspection)		
	•MELSEC-L Temperature Control Module User's Manual		
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)		
	•GX Works2 Version 1 Operating Manual (Common)		

Error codes

Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		vvoru		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the channel
		vvoru		number.
Alert 1 mode setting	i_Alert1ModeSet	Word	0: No alert	Set the alert 1 mode
		vvoru	1~24	setting.
Alert 2 mode setting	i_Alert2ModeSet	Word	0: No alert	Set the alert 2 mode
		vvoru	1~24	setting.
Alert 3 mode setting	i_Alert3ModeSet	Word	0: No alert	Set the alert 3 mode
		vvoru	1~24	setting.
Alert 4 mode setting	i_Alert4ModeSet	Word	0: No alert	Set the alert 4 mode
		vvoru	1~24	setting.
Alert set value 1	i_AlertSetVal1	Word	Perform the setting	Set the alert set value 1.
Alert set value 2	i_AlertSetVal2	Word	according to the alert type.	Set the alert set value 2.
Alert set value 3	i_AlertSetVal3	Word	1 and 2: The temperature	Set the alert set value 3.

Name(Comment)	Label name	Data	Setting range	Description
		type		
Alert set value 4	i_AlertSetVal4		measurement range of the	Set the alert set value 4.
			input range.	
		\A/e rel	3, 4, 15, and 16:	
		vvora	-(full-scale)~+(full-scale)	
			5, 6, 17, and 18:	
			0~+(full-scale)	

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	UFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit		When ON, it indicates that the alert function
error		ы	OFF	setting is completed.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		Bit OFF		occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetAlertsfunction function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

Before using any Mitsubishi products, please read all the relevant manuals.

2.5. M+TC4_SetOtherSettings (Other settings)

FB Name

M+TC4_SetOtherSettings

Function Overview

Item	Description				
Function overview	Sets the other settings.				
Symbol	M+TC4_SetOtherSettings				
,	Execution comm	nand — B : FB_EN	FB_ENO : B Execution status		
	Module start XY add	ress — W : i_StartJO_No	FB_OK : B Completed without error		
	Temperature rise completion range set	tting — W : i_TemOmpRange	FB_ERROR : B Error flag		
	Temperature rise comple soak time set	etionW : i_TemOmpSoakTime	ERRORJD : W Error code		
	Transistor output mo ON delay time se	nitor W : i_TraMtONDlyTime			
	Manipulated value resolution switc for other analog module ou	shingW : i_ValResolution			
	PID continuation	flag			
	Alert dead band se	tting W : i_AlertDeadBand			
	Alert delay c	ount			
	Heater disconnection/output off- current error detection delay c	timeW : i_UnusualCount ount			
	Heater disconnection compensa function selec	ationW : i,ReviseFunction			
	—	-			
Applicable hardware	Temperature control		1		
and software	module	Series	Model		
		MELSEC-Q series	Q64TCTT(BW), Q64TCRT(BW),		
			Q64TCTT(BW)N, Q64TCRT(BW)N		
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)		
	Hardware details				
		Series	Model		
		MELSEC-Q series *1	Basic model		
			High performance model		
			Universal model		
		MELSEC-L series	LCPU		
		*1 Not applicable to QCP	U (A mode)		

Item		Description					
	Compatible software	GX Works2 *1					
		Language	Software version				
		English version	Version1.24A or later				
		Chinese version	Version1.49B or later				
		*1 For software versions a	applicable to the modules used, refer to				
		"Relevant manuals".					
Programming	Ladder						
language							
Number of steps	194 steps (for MELSEC-	L series CPU)					
	*The number of steps of	the FB in a program depen	nds on the CPU model that is used and				
	input and output definiti	ion.					
Function description	1) When FB_EN (Execution command) is turned ON, the other settings are written to the						
	buffer memory.						
	2) FB operation is one-s	operation is one-shot only, triggered by the FB_EN signal.					
Compiling method	Macro type						
Restrictions and	1) The FB cannot be used in an interrupt program.						
Precautions	2) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do						
	not use this FB in programs that are only executed once such as a subroutine,						
	FOR-NEXT loop, etc.	because it is impossible to	o turn OFF.				
	3) This FB uses index re	egisters Z9 and Z8. Please	e do not use these index registers in an				
	interrupt program.						
	4) Every input must be p	provided with a value for pro-	oper FB operation.				
	5) If the parameters are	set using the configuration	function of GX Works 2, using this FB is				
	unnecessary.						
	6) Perform the setting u	using the GX Works2 intel	ligent function module switch setting to				
	match systems and d	evices connected to the ter	mperature control module.				
	For details on how t	o use the intelligent funct	ion module switch setting, refer to GX				
	Works2 Operating Ma	anual (Common).					
FB operation type	Pulsed execution (1 sca	n execution type)					
Application example	Refer to "Appendix 1 FB Library Application Examples".						

Item	Description				
Timing chart	[When operation completes without error]				
	FB_EN(Execution command) FB_ENO(Execution status) Other settings write processing FB_DK (Completed without error) FB_ERROR(Error flag) ERROR_ID(Error code)				
Relevant manuals	Temperature Control Module User's Manual				
	•MELSEC-Q Temperature Control Module User's Manual				
	 QCPU User's Manual(Hardware Design, Maintenance and Inspection) 				
	•MELSEC-L Temperature Control Module User's Manual				
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)				
	•GX Works2 Version 1 Operating Manual (Common)				

Error codes

•Error code list

Error code	Description	Countermeasure
None	None	None

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		WOIG		control module is
				mounted. (For example,
				enter H10 for X10.)
Temperature rise	i_TemCmpRange		1~10 (°C)	Set the temperature rise
completion range				value, at which a
setting		Word		temperature rise will be
				judged as completed,
				relative to the set value.
Temperature rise	i_TemCmpSoakTime		0~3600 (min)	Set a delay from when a
completion soak				temperature rise is
time setting		Word		completed until the
		Word		temperature rise
				completion judgment flag
				is turned ON.
Transistor output	i_TraMtONDlyTime		0: Disabled	Set the delay time for
monitor ON delay		Word	1~50 (10~500ms)	transistor ON delay
time setting				output.
Manipulated value	i_ValResolution		0: 0~4,000	Set the resolution for the
resolution switching		Word	1: 0~12,000	manipulated value.
for other analog		Word	2: 0~16,000	
module output			3: 0~20,000	
PID continuation flag	i_PIDFlag		0: Stop	Set the operation mode to
			1: Continue	be entered when the
		Word		setting/operation mode
				command (Yn1) turns
				OFF.

Name(Comment)	Label name	Data	Setting range	Description
Alert dead band setting	i_AlertDeadBand	Word	0~100 (0.0~10.0%)	Set the dead band for alerts.
Alert delay count	i_AlertDlyCount	Word	0~255 (times)	Set the sampling count for judging an alert.
Heater disconnection/output off-time current error detection delay count	i_UnusualCount	Word	3~255 (times)	Set how many errors will occur before alert judgment is made.
Heater disconnection compensation function selection*1	i_ReviseFunction	Word	0: Heater disconnection compensation function is not used 1: Heater disconnection compensation function is used	Set whether the heater disconnection compensation function is used or not. *1: Set 0 for modules other than below because they do not support the heater disconnection detection function. L60TCTT4BW, L60TCRT4BW, Q64TCTTBW, Q64TCRTBW, and Q64TCRTBWN

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Rit.	OFF	ON: Execution command is ON.
		ЫІ	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates the other settings are
error		ЫІ	OFF	completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetOtherSettings function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

Before using any Mitsubishi products, please read all the relevant manuals.

2.6. M+TC4_SetConversion (Conversion enable/disable setting)

FB Name

M+TC4_SetConversion

Function Overview

Item	Description				
Function overview	Sets the conversion ena	Sets the conversion enable/disable setting.			
Symbol	M+TC4 SetConversion				
	Execution command ———	B : FB_EN	FB_ENO : B Execution status		
	Module start XY address	W : i_StartJO_No	FB_OK : B	Completed without error	
	CH1 conversion setting ——	B : i_ConvertCH1	FB_ERROR : B	Error flag	
	CH2 conversion setting — R	B : i_ConvertCH2	ERRORJD : W	Error code	
	CH3 conversion setting ——	B : i_ConvertCH3			
	CH4 conversion setting	B : i_ConvertCH4			
		Γ]	
Applicable hardware	Temperature control		T		
and software	module	Series		Model	
		MELSEC-L series	L60TCTT4(BW	/), L60TCRT4(BW)	
	l landurana dataila				
	Hardware details		1		
		Series		Model	
		MELSEC-L series	LCPU		
	Compatible software				
	Compatible software	GX VVOrkS2 "1			
		Language	Softv	vare version	
		English version	Version1.24A c	or later	
		Chinese version	Version1.49B of	or later	
		*1 For software versions applicable to the modules used, refer to			
		"Relevant manuals".			
Programming	Ladder				
language					
Number of steps	221 steps (for MELSEC-L series CPU)				
	*The number of steps of the FB in a program depends on the CPU model that is used and				
	input and output definition.				

Item	Description		
Function description	1) By turning ON FB_EN (Execution command), the conversion enable/disable setting of		
	the specified channel is performed.		
	2) FB operation is one-shot only, triggered by the FB_EN signal.		
Compiling method	Macro type		
Restrictions and	1) The FB cannot be used in an interrupt program.		
Precautions	2) Please ensure that the FB_EN signal is capable of being turned OFF by the program.		
	not use this FB in programs that are only executed once such as a subroutin		
	FOR-NEXT loop, etc. because it is impossible to turn OFF.3) This FB uses index registers Z9 and Z8. Please do not use these index registers in a		
	interrupt program.		
	4) Every input must be provided with a value for proper FB operation.		
	5) If the parameters are set using the configuration function of GX Works 2, using this FB is		
	unnecessary.		
	6) Perform the setting using the GX Works2 intelligent function module switch setting to		
	match systems and devices connected to the temperature control module.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Operating Manual (Common).		
FB operation type	Pulsed execution (1 scan execution type)		
Application example	Refer to "Appendix 1 FB Library Application Examples".		
Timing chart	[When operation completes without error]		
	FB EN(Execution command)		
	FB_ENQExecution status)		
	Conversion enable/disable No processing Write No processing		
	FB_OK		
	(Completed without error)		
	ERROR_ID(Error code) 0		
D. Jacob and an and a			
Relevant manuals	•Temperature Control Module User's Manual		
	•MELSEC-Q Temperature Control Module User's Manual		
	•QCPU User's Manual(Hardware Design, Maintenance and Inspection)		
	•MELSEC-L Temperature Control Module User's Manual		
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)		
	•GX Works2 Version 1 Operating Manual (Common)		
Error codes

•Error code list

Error code	Description	Countermeasure
None	None	None

Labels

●Input labels				
Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
	vvold	word		control module is
				mounted. (For example,
				enter H10 for X10.)
CH1 conversion	i_ConvertCH1	Rit.	ON,OFF	By turning ON each
setting		DIL		parameter, conversion is
CH2 conversion	i_ConvertCH2	Dit		disabled for the
setting		DIL		corresponding channel.
CH3 conversion	i_ConvertCH3	Dit		
setting		DIL		
CH4 conversion	i_ConvertCH4	Bit		
setting		טונ		

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Bit OFF		ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates the conversion
error		DIL	UFF	enable/disable setting is completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF.
Error code	ERROR_ID	Word	0	Always 0.

Temperature Controrl Module FB Library Reference Manual FBM-M064-A

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetConversion function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.7. M+TC4_SetProcessAlarm (Process alarm setting)

FB Name

M+TC4_SetProcessAlarm

Item		Description			
Function overview	Sets the process alarm setting.				
Symbol		M+TO4_SetPr	ocessAlarm		
	Execution comman	ndB : FB_EN	FB_ENO : B ——Execution status		
	Module start XY addres	ss — W : i_StartJO_No	FB_OK : B Completed without error		
	Target C	жн——— w : i_он	FB_ERROR : B Error flag		
	Process alarm outp enable/disable settir	ut W : iProcessEnable	ERRORJD : W Error code		
	Process alarm lower lower limit valu	ue — W : i,ProLLLimit			
	Process alarm lower upper limit valu	ue — W : i,ProLULimit			
	Process alarm upper lower limit valu	ue — W : i,ProULLimit			
	Process alarm upper upper limit valu	ue W : i,ProUULimit			
Applicable hardware	Temperature control				
and software	module	Series	Model		
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)		
			·		
	Hardware details				
		Series	Model		
		MELSEC-L series	LCPU		
		.			
	Compatible software	GX Works2 *1			
		Language	Software version		
		English version	Version1.24A or later		
		Chinese version	Version1.49B or later		
		*1 For software versions a	applicable to the modules used, refer to		
		"Relevant manuals".			
Programming	Ladder				
language					
Number of steps	216 steps (for MELSEC-	L series CPU)			
	*The number of steps of	the FB in a program deper	nds on the CPU model that is used and		
	input and output definiti	ion.			

Item	Description
Function description	1) By turning ON FB_EN (Execution command), the setting values of the process alarm are
	written to the buffer memory.
	2) To enable the setting values, turn the setting change command (YnB) OFF, ON and then
	OFF in the setting mode.
	3) FB operation is one-shot only, triggered by the FB_EN signal.
	4) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error
	code).
	Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
Precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do
	not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop, etc. because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of
	the target channel.
	5) To execute this FB, the setting/operation mode command (Yn1) must be turned OFF.
	6) This FB uses index registers Z9, Z8 and Z7. Please do not use these index registers in
	an interrupt program.
	7) Every input must be provided with a value for proper FB operation.
	8) Do not use this FB in modules other than applicable modules. If used in modules other
	than applicable modules, an error will occur in the module.
	9) To use this FB, set the temperature input mode.
	10) Perform the setting using the GX Works2 intelligent function module switch setting to
	match systems and devices connected to the temperature control module.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Operating Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1 FB Library Application Examples".

Item	Des	cription			
Timing chart	[When operation completes without error]	[When an error occurs]			
	FB_EN(Execution command) FB_ENO(Execution status) Process alarm setting write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR_ID(Error code)	FB_EN(Execution command) FB_ENO(Execution status) Process alarm setting write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR ID(Error code)			
Relevant manuals	•Temperature Control Module User's Manua	l			
	 MELSEC-Q Temperature Control Module User's Manual 				
	 QCPU User's Manual (Hardware Design, Maintenance and Inspection) 				
	•MELSEC-L Temperature Control Module User's Manual				
	•MELSEC-L CPU Module User's Manual (Ha	ardware Design, Maintenance and Inspection)			
	•GX Works2 Version 1 Operating Manual (C	common)			

Error codes

•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
				control module is
				mounted. (For example,
				enter H10 for X10.)

Name(Comment)	Label name	Data type	Setting range	Description
Target CH	i_CH) (or al	1~4	Specify the channel
		vvora		number.
Process alarm	i_ProcessEnable		0: Enabled	Set whether to enable or
output		Word	1: Disabled	disable the output of the
enable/disable		word		process alarm.
setting				
Process alarm lower	i_ProLLLimit		Set values within the	Set the lower/lower limit
lower limit value		Word	temperature setting range	value of the process
			specified in the input	alarm
Process alarm lower	i_ProLULimit		range setting.	Set the lower/upper limit
upper limit value		Word		value of the process
				alarm.
Process alarm upper	i_ProULLimit			Set the upper/lower limit
lower limit value		Word		value of the process
				alarm.
Process alarm upper	i_ProUULimit			Set the upper/upper limit
upper limit value		Word		value of the process
				alarm.

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Bit OFF		ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the process
error				alarm setting is completed.
Error flag	FB_ERROR			When ON, it indicates that an error has
		DIL	UFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Temperature Controrl Module FB Library Reference Manual FBM-M064-A

Note

This chapter includes information related to the M+TC4_SetProcessAlarm function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.8. M+TC4_SetRateAlarm (Rate alarm setting)

FB Name

M+TC4_SetRateAlarm

Item	Description			
Function overview	Sets the rate alarm.			
Symbol	Execution command — Module start XY address— Target CH — Rate alarm output enable/disable setting Rate alarm detection period –	M+TC4_SetRate# B : FB_EN W : i_StartJO_No W : i_OH W : i_RateEnable W : i_RateOut	FB_ENO : B Execution status FB_OK : B Completed without error FB_ERROR : B Error flag ERRORJD : W Error code	
	Rate alarm upper limit value — Rate alarm lower limit value —	W : i,RateUpLim W : i,RateLowLim		
Applicable hardware and software	Temperature control module	Series MELSEC-L series	Model L60TCTT4(BW), L60TCRT4(BW)	
	Hardware details	Series MELSEC-L series	Model LCPU	
	Compatible software	GX Works2 *1 Language Software version English version Version1.24A or later Chinese version Version1.49B or later *1 For software versions applicable to the modules used, r "Relevant manuals".		
Programming language	Ladder			
Number of steps	207 steps (for MELSEC-L series CPU) *The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.			

Item	Description		
Function description	1) By turning ON FB_EN (Execution command), the setting values of the rate alarm are		
	written to the buffer memory.		
	2) To enable the setting values, turn the setting change command (YnB) OFF, ON and then		
	OFF in the setting mode.		
	3) FB operation is one-shot only, triggered by the FB_EN signal.		
	4) When the setting value of the target channel is out of range, the FB_ERROR output		
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error		
	code).		
	Refer to the error code explanation section for details.		
Compiling method	Macro type		
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery		
Precautions	processing separately in accordance with the required system operation.		
	2) The FB cannot be used in an interrupt program.		
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do		
	not use this FB in programs that are only executed once such as a subroutine,		
	FOR-NEXT loop, etc. because it is impossible to turn OFF.		
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of		
	the target channel.		
	5) To execute this FB, the setting/operation mode command (Yn1) must be turned OFF.		
	6) This FB uses index registers Z9, Z8 and Z7. Please do not use these index registers in		
	an interrupt program.		
	7) Every input must be provided with a value for proper FB operation.		
	8) Do not use this FB in modules other than applicable modules. If used in modules other		
	than applicable modules, an error will occur in the module.		
	9) To use this FB, set the temperature input mode.		
	10) Perform the setting using the GX Works2 intelligent function module switch setting to		
	match systems and devices connected to the temperature control module.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Operating Manual (Common).		
FB operation type	Pulsed execution (1 scan execution type)		
Application example	Refer to "Appendix 1 FB Library Application Examples".		

Item	Description		
Timing chart	[When operation completes without error]	[When an error occurs]	
	FB_EN(Execution command) FB_ENO(Execution status) Rate alarm setting write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR_ID(Error code) 0	FB_EN(Execution command) FB_ENO(Execution status) Rate alarm setting write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR_ID(Error code)	
Relevant manuals	 Temperature Control Module User's Manual MELSEC-Q Temperature Control Module User's Manual QCPU User's Manual(Hardware Design, Maintenance and Inspection) MELSEC-L Temperature Control Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) 		

Error codes

•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)

Name(Comment)	Label name	Data	Setting range	Description
		type		
Target CH	i_CH	Word	1~4	Specify the channel
		word		number.
Rate alarm output	i_RateEnable		0: Enabled	Set the rate alarm.
enable/disable		Word	1: Disabled	
setting				
Rate alarm detection	i_RateOut		1~6000 (times)	Set the number of periods
period		Word		to check the changes of
		word		the measured
				temperature value.
Rate alarm upper	i_RateUpLim	Word	-32,768~32,767	Set the upper limit value
limit value		word		of the rate alarm.
Rate alarm lower	i_RateLowLim	Mord	-32,768~32,767	Set the lower limit value of
limit value		word		the rate alarm.

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the rate alarm
error		DIL	UFF	setting is completed.
Error flag	FB_ERROR	D:+	OFF	When ON, it indicates that an error has
			occurred.	
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetRateAlarm function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.9. M+TC4_SetPVScaling (Process value (PV) scaling function setting)

FB Name

M+TC4_SetPVScaling

Item	Description			
Function overview	Sets the process value (PV) scaling function.			
Symbol	Execution comm Module start XY addr Target Process value (PV) scaling funct enable/disable set Process value (PV) sca upper limit va Process value (PV) sca lower limit va	M+TC4_SetP\ B : FB_EN ess W : i_StartJO_No CH W : i_CH tion W : i_ScalingEnable ling W : i_ScalingUpLim ling W : i_ScalingLowLim	/Scaling FB_ENO : B — Execution status FB_OK : B — Completed without error FB_ERROR : B — Error flag ERRORJD : W — Error code	
Applicable hardware	Temperature control			
and software	module	Series	Model	
		MELSEC-Q series	Q64TCTT(BW)N, Q64TCRT(BW)N	
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)	
	Hardware details			
		Series	Model	
		MELSEC-Q series *1	Basic model	
			High performance model	
			Universal model	
		MELSEC-L series	LCPU	
		*1 Not applicable to QCP	U (A mode)	
	Compatible software	GX Works2 *1		
		Language	Software version	
		English version	Version1.24A or later	
		Chinese version	Version1.49B or later	
		*1 For software versions a	applicable to the modules used, refer to	
		"Relevant manuals".		
Programming	Ladder			
language				

Item	Description		
Number of steps	232 steps (for MELSEC-L series CPU)		
	*The number of steps of the FB in a program depends on the CPU model that is used and		
	input and output definition.		
Function description	1) By turning ON FB_EN (Execution command), the set parameters are written to the buffer		
	memory.		
	2) To enable the setting values, turn the setting change command (YnB) OFF, ON and then		
	OFF in the setting mode.		
	3) FB operation is one-shot only, triggered by the FB_EN signal.		
	4) When the setting value of the target channel is out of range, the FB_ERROR output		
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error		
	code).		
	Refer to the error code explanation section for details.		
Compiling method	Macro type		
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery		
Precautions	processing separately in accordance with the required system operation.		
	2) The FB cannot be used in an interrupt program.		
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do		
	not use this FB in programs that are only executed once such as a subroutine,		
	FOR-NEXT loop, etc. because it is impossible to turn OFF.		
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of		
	the target channel.		
	5) To execute this FB, the setting/operation mode command (Yn1) must be turned OFF.		
	6) This FB uses index registers Z9, Z8 and Z7. Please do not use these index registers in		
	an interrupt program.		
	7) Every input must be provided with a value for proper FB operation.		
	8) Perform the setting using the GX Works2 intelligent function module switch setting to		
	match systems and devices connected to the temperature control module.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Operating Manual (Common).		
FB operation type	Pulsed execution (1 scan execution type)		
Application example	Refer to "Appendix 1 FB Library Application Examples".		

Item	Description		
Timing chart	[When operation completes without error]	[When an error occurs]	
	FB_EN(Execution command) FB_ENO(Execution status) Process value scaling function setting value write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR_ID(Error code)	 FB_EN(Execution command) FB_ENO(Execution status) Process value scaling function setting value write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR ID(Error code) 0 	
Relevant manuals	 Temperature Control Module User's Manual MELSEC-Q Temperature Control Module User's Manual QCPU User's Manual(Hardware Design, Maintenance and Inspection) MELSEC-L Temperature Control Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version 1 Operating Manual (Common) 		

Error codes

•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
				control module is
				mounted. (For example,
				enter H10 for X10.)

Name(Comment)	Label name	Data	Setting range	Description
		type		
Target CH	i_CH	Word	1~4	Specify the channel
		word		number.
Process value (PV)	i_ScalingEnable		0: Disabled	Set whether to enable or
scaling function		Word	1: Enabled	disable the process value
enable/disable		word		(PV) scaling function.
setting				
Process value (PV)	i_ScalingUpLim		-32,000~32,000	Set the process value
scaling upper limit		Word		(PV) scaling upper limit
value				value.
Process value (PV)	i_ScalingLowLim		-32,000~32,000	Set the process value
scaling lower limit		Word		(PV) scaling lower limit
value				value.

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the process value
error		ЫІ	UFF	(PV) scaling setting is completed.
Error flag	FB_ERROR		When ON, it indicates that an error has	
				occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetPVScaling function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.10. M+TC4_MoniCJTemperature (Cold junction temperature process value monitoring function)

FB Name

M+TC4_MoniCJTemperature

Item	Description				
Function overview	Sets the cold junction temperature compensation and reads the cold junction temperature				
	process value.				
Symbol		M+TC4_MoniCJTemperature			
	Execution command ——	B : FB_EN	FB_ENO : B Execution status		
	Module start XY address —	W : i_StartjO_No	FB_OK : B Completed without error		
	Cold junction temperature compensation selection	W : i_TempCompSelect o_1	FempProcessVal : W Cold junction temperature process value		
			FB_ERROR : B Error flag		
			ERRORJD : W Error code		
Applicable bardware					
Applicable hardware		Quring	N/a dal		
and software	module	Series			
		MELSEC-Q series	Q64TCTT(BW), Q64TCTT(BW)N		
		MELSEC-L series	L60TCTT4(BW)		
	Hardware details				
		Series	Model		
		MELSEC-Q series *1 Basic model			
		High performance model			
		Universal model			
		MELSEC-L series	LCPU		
		*1 Not applicable to QCP	U (A mode)		
	Compatible software	GX Works2 *1			
		Language	Software version		
		English version	Version1.24A or later		
		Chinese version	Version1.49B or later		
		*1 For software versions	applicable to the modules used, refer to		
		"Relevant manuals".			
Programming	Ladder				
language					

Item	Description			
Number of steps	203 steps (for MELSEC-L series CPU)			
	*The number of steps of the FB in a program depends on the CPU model that is used and			
	input and output definition.			
Function description	1) By turning ON FB_EN (Execution command), the value of i_TempCompSelect (Cold			
	junction temperature compensation selection) is written to the buffer memory and the			
	cold junction temperature process value is read from the buffer memory.			
Compiling method	Macro type			
Restrictions and	1) The FB cannot be used in an interrupt program.			
Precautions	2) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do			
	not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop, etc. because it is impossible to turn OFF.			
	3) This FB uses index registers Z9 and Z8. Please do not use these index registers in an			
	interrupt program.			
	4) Every input must be provided with a value for proper FB operation.			
	5) Do not use this FB in modules that are not listed in applicable hardware section. If used			
	n modules other than applicable modules, an error will occur in the module.			
	6) Perform the setting using the GX Works2 intelligent function module switch setting to			
	match systems and devices connected to the temperature control module.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Operating Manual (Common).			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1 FB Library Application Examples".			
Timing chart	[When operation completes without error]			
	FB EN(Execution command)			
	FB_ENO(Execution status)			
	Cold junction temperature compensation selection Write Write Processing			
	o TempProcessVal (Cold junction temperature process value)			
	FB_OK (Completed without error)			
	FB_ERROR(Error flag)			
	ERROR_ID(Error code) 0			

Item	Description		
Relevant manuals	Temperature Control Module User's Manual		
	•MELSEC-Q Temperature Control Module User's Manual		
	 QCPU User's Manual(Hardware Design, Maintenance and Inspection) 		
	•MELSEC-L Temperature Control Module User's Manual		
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)		
	•GX Works2 Version 1 Operating Manual (Common)		

Error codes		
Error code list		
Error code	Description	Countermeasure
None	None	None

Labels

I

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		vvora		control module is
				mounted. (For example,
				enter H10 for X10.)
Cold junction	i_TempCompSelect		0: Standard terminal block	Set the cold junction
temperature			is used.	temperature
compensation			1: Temperature control	compensation.
selection			terminal block	*1: For Q64TCTT(BW), do
		Word	conversion module	not set "2" because this
			2: Cold junction	model does not support
			temperature	the setting.
			compensation is not	
			used. *1	

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the cold junction
error				temperature process value is being read.
Cold junction	o_TempProcessVal			Store the cold junction temperature process
temperature process		Word	0	value.
value				
Error flag	FB_ERROR	Bit	OFF	Always OFF.
Error code	ERROR_ID	Word	0	Always 0.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_MoniCJTemperature function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.11. M+TC4_Autotuning (Auto tuning)

FB Name

M+TC4_Autotuning

Item	Description			
Function overview	Sets and executes auto tuning.			
Symbol	Execution command — Module start XY address — Target CH — Auto tuning execution — Upper output limiter — Lower output limiter — Cooling upper output limiter — Output variation limiter — Sensor compensation value setting — Control output period setting — Primary delay digital filter setting — Forward/reverse action setting — Forward/reverse action setting — Automatic backup setting after _ auto tuning of PID constants	M+TD4_Autotuning B : FB_EN W : i_Start_JD_No W : i_OH B : i_AT W : i_UpsetLimiter W : i_LowSetLimiter W : i_CoolUpLimit W : i_CoolUpLimit W : i_SensorCompVal W : i_SensorCompVal W : i_SensorCompVal W : i_SensorCompVal W : i_AutoBackup	FB_END : B Execution status FB_OK : B Completed without error o.ReadP : W Proportional band (P)/ o.ReadPc : W Cooling proportional band (Pc) o.ReadP : W Cooling proportional band (Pc) o.Read : W Integral time (D) setting o.ReadD : W Derivative time (D) setting o.JudgmentTime : W Loop disconnection detection FB_ERROR : B Error flag ERRORJD : W Error code	
	Auto tuning mode selection —	W : i_ATModeSelect		
Applicable hardware	Temperature control			
and software	module	Series	Model	
		MELSEC-Q series	Q64TCTT(BW), Q64TCRT(BW), Q64TCTT(BW)N, Q64TCRT(BW)N	
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)	
	Hardware details			
		Series	Model	
		MELSEC-Q series *1	Basic model	
			High performance model	
			Universal model	
		MELSEC-L series	LCPU	
		*1 Not applicable to QCP	U (A mode)	

Item	Description		
	Compatible software	GX Works2 *1	
		Language	Software version
		English version	Version1.24A or later
		Chinese version	Version1.49B or later
		*1 For software versions a	applicable to the modules used, refer to
		"Relevant manuals".	
Programming	Ladder		
language			
Number of steps	352 steps (for MELSEC-L series CPU)		
	*The number of steps of the FB in a program depends on the CPU model that is used and		
	input and output definit	ion.	
Function description	1) By turning ON FB_EN (Execution command), the parameters are set, and by turning ON		
	i_AT (Auto tuning exe	ecution), auto tuning is exec	cuted.
	2) When the setting val	lue of the target channel i	s out of range, the FB_ERROR output
	turns ON, processing	j is interrupted, and the er	ror code is stored in ERROR_ID (Error
	code).		
	Refer to the error cod	le explanation section for d	etails.
Compiling method	Macro type		

Item	Desc	ription		
Restrictions and	1) The FB does not include error recove	ry processing. Program the error recovery		
Precautions	processing separately in accordance with	the required system operation.		
	2) The FB cannot be used in an interrupt proc	gram.		
	3) Please ensure that the FB_EN signal is cap	pable of being turned OFF by the program. Do		
	not use this FB in programs that are	only executed once such as a subroutine,		
	FOR-NEXT loop, etc. because it is imposs	sible to turn OFF.		
	4) When two or more of these FBs are used, I	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of		
	the target channel.			
	5) To execute this FB, the setting/operation m	node command (Yn1) must be turned ON.		
	6) This FB uses index registers Z9, Z8, Z7, Z	Z6, Z5 and Z4. Please do not use these index		
	registers in an interrupt program.			
	7) Every input must be provided with a value	for proper FB operation.		
	8) When this FB is used in two or more place	es, a duplicated coil warning will occur during		
	compile operation due to the Y signal be	ing operated by index modification. However		
	this is not a problem and the FB will opera	te without error.		
	9) Perform the setting using the GX Works2 intelligent function module switch setting to			
	match systems and devices connected to the temperature control module.			
	For details on how to use the intelligent	function module switch setting, refer to GX		
	Works2 Operating Manual (Common).			
FB operation type	Pulsed execution (multiple scan execution typ	pe)		
Application example	Refer to "Appendix 1 FB Library Application E	Examples".		
Timing chart	[When operation completes without error]	[When an error occurs] (CH1)		
	(CH1)	FB_EN(Execution command)		
	FB_EN(Execution command)	FB_ENO(Execution status)		
	FB_ENQ(Execution status)	Auto tuning setting value No processing		
	Auto tuning setting value No processing Write No processing	i_AT (Auto tuning execution)		
	iAT (Auto tuning execution)	Auto tuning command(Yn4)		
	Auto tuning command(Yn4)	Auto tuning status(Xn4)		
	Auto tuning status(Xn4)	Auto tuning read processing No refreshing		
	Auto tuning read processing No refreshing No refreshing No refreshing	FB_OK (Completed without error)		
	FB_OK (Completed without error)	FB_ERROR(Error flag)		
	FB_ERROR(Error flag)	ERRORID(Error code) 0 Error code 0		
	ERROR_ID(Error code) 0			

Item	Description	
Relevant manuals	•Temperature Control Module User's Manual	
	•MELSEC-Q Temperature Control Module User's Manual	
	•QCPU User's Manual(Hardware Design, Maintenance and Inspection)	
	•MELSEC-L Temperature Control Module User's Manual	
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)	
	•GX Works2 Version 1 Operating Manual (Common)	

Error codes

•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the channel
		word		number.
Auto tuning	i_AT	Dit	ON,OFF	To execute auto tuning,
execution		ы		turn ON this parameter.
Upper output limiter	i_UpSetLimiter		Standard control	Specify the upper limit
			-50~1,050 (-5.0~105.0%)	value for outputting to an
		vvoru	Heating/cooling control	external devise.
			0~1,050 (0.0~105.0%)	

Name(Comment)	Label name	Data	Setting range	Description
		type		
Lower output limiter	i_LowSetLimiter		Standard control	Specify the lower limit
			-50~1,050 (-5.0~105.0%)	value for outputting to an
		Word	Heating/cooling control *1	external devise.
			This parameter is disabled	*1: Set 0 for
			even if it is set.	heating/cooling control.
Cooling upper output	i_CoolUpLimit		Standard control	Set the cooling upper
limiter			This parameter is disabled	limiter.
		\//ord	even if it is set.	*1: Set 0 for Q64TCTT
		vvord	Heating/cooling control *1	(BW) and Q64TCRT
			0~1,050 (0.0~105.0%)	(BW) because they are
				not supported.
Output variation	i_OutVariation		0: Disabled	Specify a range to prevent
limiter		Word	1~1,000(0.1~100.0%/s)	a sudden manipulated
				value change.
Sensor	i_SensorCompVal		-5,000~5,000	Set the compensation
compensation value			(-50.00~50.00%)	value for when there is a
setting		Word		difference between the
				measured temperature
				and actual temperature.
Control output	i_OutputPeriod		Control output period unit	Set the ON/OFF period of
period setting			switch setting = 0: 1s	the transistor output.
		\A/o rd	1~100	
		vvord	Control output period unit	
			switch setting = 1: 0.1s	
			5~1,000	
Primary delay digital	i_PrimaryDelay	\//ord	0: Disabled	Set the primary delay
filter setting		word	1~100 s	digital filter.
AT bias setting	i_ATbias	Word	Input range	Set the AT bias setting.
Forward/reverse	i_ActionSetting		0: Forward action *1	Set the forward/reverse
action setting		Mord	1: Reverse action	action setting.
		vvora		*Set 0 for heating/cooling
				control.

Name(Comment)	Label name	Data	Setting range	Description
		type		
Automatic backup	i_AutoBackup		0: Disable	Set whether to
setting after auto		\A/ord	1: Enable	automatically back up the
tuning of PID		word		PID constants.
constants				
Auto tuning mode	i_ATModeSelect	Mord	0: Standard mode	Set the auto tuning mode.
selection		vvoid	1: Fast response mode	

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the auto tuning is
error		ЫІ	OFF	completed.
Proportional band	o_ReadP			Store the proportional band (P)/heating
(P)/heating		Word	0	proportional band (Ph) setting.
proportional band		Word	0	
(Ph) setting				
Cooling proportional	o_ReadPc			Store the cooling proportional band (Pc).
band (Pc)		Word	0	*Do not set any output label circuits for
		Word	0	Q64TCTT(BW) and Q64TCRT(BW)
				because they do not have read targets.
Integral time (I)	o_Readl	Word	0	Store the integral time (I) setting.
setting		Word	Ŭ	
Derivative time (D)	o_ReadD	Word	0	Store the derivative time (D) setting.
setting		Word	Ŭ	
Loop disconnection	o_JudgmentTime			Store the loop disconnection detection
detection judgment		Word	0	judgment time setting.
time setting				
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has
				occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_Autotuning function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.12. M+TC4_Selftuning (Self tuning)

FB Name

M+TC4_Selftuning

Function Overview

Item	Description		
Function overview	Sets the self tuning settin	ig and monitors the self tu	ning flag.
Symbol	Execution command — Module start XY address — Target CH — Self tuning setting —	M+TC4_Selftuning B : FB_EN W : i_StartJO_No W : i_CH W : i_STSetting	FB_ENO : B Execution status FB_OK : B Completed without error o_STFlag : W Self tuning flag FB_ERROR : B Error flag ERRORJD : W Error code
Applicable hardware	Temperature control		
and software	module	Series	Model
		MELSEC-Q series	Q64TCTT(BW)N, Q64TCRT(BW)N
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)
	Llardwara dataila		
		Corios	Medel
		Series	
		MELSEC-Q Selles 1	High porformance model
		MELSEC-L series	
		*1 Not applicable to OCP	
	Compatible software	GX Works2 *1	
		Language	Software version
		English version	Version1.24A or later
		Chinese version	Version1.49B or later
		*1 For software versions a	applicable to the modules used, refer to
		"Relevant manuals".	
Programming	Ladder		
language			
Number of steps	189 steps (for MELSEC-I	₋ series CPU)	
	*The number of steps of t	the FB in a program deper	nds on the CPU model that is used and
	input and output definition	on	

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Item	Description			
Function description	1) By turning ON FB_EN (Execution command), i_STSetting (Self tuning setting) is set and			
	o_STFlag (Self tuning flag) is monitored.			
	2) When the setting value of the target channel is out of range, the FB_ERROR output			
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error			
	code).			
	Refer to the error code explanation section for details.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
Precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do			
	not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop, etc. because it is impossible to turn OFF.			
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of			
	the target channel.			
	5) This FB uses index registers Z9, Z8 and Z7. Please do not use these index registers in			
	an interrupt program.			
	6) Every input must be provided with a value for proper FB operation.			
	7) This FB sets the self tuning and monitors its flag. For details on the self tuning, refer to			
	MELSEC-L Temperature Control Module User's Manual.			
	8) Perform the setting using the GX Works2 intelligent function module switch setting to			
	match systems and devices connected to the temperature control module.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Operating Manual (Common).			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1 FB Library Application Examples".			
Timing chart	[When operation completes without error] [When an error occurs]			
	FB_EN(Execution command)			
	FB_ENO(Execution status)			
	Self tuning setting write No processing Write No Self tuning setting write No processing			
	o_STFlag(Self tuning flag) No refreshing Refreshing O_STFlag(Self tuning flag) No refreshing No refr			
	FB_OK (Completed without error)			
	FB_ERROR(Error flag)			
	ERROR JD(Error code) 0 ERROR JD(Error code) 0 Error code			

Item	Description
Relevant manuals	Temperature Control Module User's Manual
	•MELSEC-Q Temperature Control Module User's Manual
	 QCPU User's Manual(Hardware Design, Maintenance and Inspection)
	•MELSEC-L Temperature Control Module User's Manual
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	•GX Works2 Version 1 Operating Manual (Common)

Error codes Error code list Error code Description 10 (Decimal) The specified target channel is not valid. The target channel is not within the range of 1 to 4. Please try again after confirming the setting.

Labels

Input labels

Name(Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the temperature control module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the channel number.
Self tuning setting	i_STSetting	Word	 0: Self tuning is not performed 1: Start-up ST (Calculates PID constants only) 2: Start-up ST (Calculates simultaneous temperature rise parameter only) 3: Start-up ST (Calculates PID constants and simultaneous temperature rise parameter) 4: Start-up ST + Vibration ST (Both calculates PID constants only) 	Set the self tuning operation setting.

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Bit OFF	ON: Execution command is ON.	
			OFF: Execution command is OFF.	
Completed without	FB_OK	Bit OFF		When ON, it indicates that the self tuning is
error				being monitored.
Self tuning flag	o_STFlag	Word	0	Store the status of the self tuning.
Error flag	FB_ERROR			When ON, it indicates that an error has
		UFF	occurred.	
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_Selftuning function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.13. M+TC4_PIDControl (PID control)

FB Name

M+TC4_PIDControl

Item	Description		
Function overview	Reads the PID constants and executes a forced PID control stop.		
Symbol	M+TC4 PIDControl		
	Execution command —— B	: FB_EN	FB_ENO : B Execution status
	Module start XY address — w	: i_StartJO_No	FB_OK : B Completed without error
	Target CH — W	: i_OH	о PIDReadOK : В ——PID constant read completion
	PID constant B memory read command	: i_PIDReadCommand	o_PIDResdNG : B PID constant read failure
	PID control B forced stop command	: i,PIDStop	o_PIDStop : B PID control stop
			o,ReadPSetting : W Proportional band (P)
			o_ReadPcSetting : W Cooling proportional band (Pc)
			o,ReadlSetting : W Integral time O
			o,ReadDSetting : W Derivative time (D)
		0_	ReadLoopJudg : w Loop disconnection detection judgment time
			FB_ERROR : B Fror flag
			ERRORJD : W Error code
Applicable hardware	Temperature control		
and software	module	Series	Model
		MELSEC-Q series	Q64TCTT(BW)N, Q64TCRT(BW)N
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)
	Hardware details		1
		Series	Model
		MELSEC-Q series *1	Basic model
			High performance model
			Universal model
		MELSEC-L series	LCPU
		*1 Not applicable to QCP	PU (A mode)

Item	Description		
	Compatible software	GX Works2 *1	
		Language	Software version
		English version	Version1.24A or later
		Chinese version	Version1.49B or later
		*1 For software versions	applicable to the modules used, refer to
		"Relevant manuals".	
Programming	Ladder		
language			
Number of steps	313 steps (for MELSEC-L series CPU)		
	*The number of steps of the FB in a program depends on the CPU model that is used and		
	input and output definit	ion.	
Function description	1) After FB_EN (Execution command) is turned ON, the PID constants are read by turning		
	ON i_PIDReadCommand (PID constant memory read command) and a forced PID		
	control stop is executed by turning ON i_PIDStop (PID control forced stop command).		
	2) When the setting val	lue of the target channel i	s out of range, the FB_ERROR output
	turns ON, processing	g is interrupted, and the er	ror code is stored in ERROR_ID (Error
	code).		
	Refer to the error cod	le explanation section for d	etails.
Compiling method	Macro type		

Item	Description					
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery					
Precautions	processing separately in accordance with the required system operation.					
	2) The FB cannot be used in an interrupt program.					
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do					
	not use this FB in programs that are only executed once such as a subroutine					
	FOR-NEXT loop, etc. because it is impossible to turn OFF.					
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of					
the target channel.						
	5) This FB uses index registers Z9, Z8, Z7, Z6, and Z5. Please do not use these index					
	registers in an interrupt program.					
	6) Every input must be provided with a value for proper FB operation.					
	7) The action to be taken at a PID operation stop depends on the setting of the stop mode					
	setting. For details, refer to MELSEC-L Temperature Control Module User's Manual and					
MELSEC-Q Temperature Control Module User's Manual.						
	8) When this FB is used in two or more places, a duplicated coil warning will occur during					
	compile operation due to the Y signal being operated by index modification. However					
	this is not a problem and the FB will operate without error.					
	9) Perform the setting using the GX Works2 intelligent function module switch setting to					
	match systems and devices connected to the temperature control module.					
	For details on how to use the intelligent function module switch setting, refer to GX					
	Works2 Operating Manual (Common).					
FB operation type	Real-time execution					
Application example	Refer to "Appendix 1 FB Library Application Examples".					
Item	Description					
------------------	--	---------------------------------	---	----	--	--
Timing chart	[When operation of	completes without error]	[When an error occurs]			
	(CH1)		FB_EN(Execution command)	_		
	FB_EN(Execution command)	- <u>_</u>	FB_ENO(Execution status)	_		
	FB_ENO(Execution status)		i PIDReadCommand (PID constant memory read command)	-		
	i PIDReadCommand (PID constant memory read 0 command)		o_PIDReadOK(PID constant read completion)	_		
	o_PIDReadOK(PID constant read completion)		PID setting value read No refreshing	-		
	PID setting value read	No efreshing Read refreshing	i PIDStop(PID control forced stop command)	_		
	i_PIDStop(PID control forced stop command)		PID control forced stop instruction(YnC)	_		
	PID control forced stop instruction(YnC)		Manipulated value No refreshing	-		
	Manipulated value	No refreshing	o_PIDStop (PID control stop)	-		
	o_PIDStop (PID control stop)		FB_OK (Completed without error)	_		
	FB_OK (Completed without error)		FB_ERROR(Error flag)	-		
	FB_ERROR(Error flag)		ERROR_JD(Error code) 0 Error code 0	-		
	ERROR_ID(Error code)	0				
Relevant manuals	Temperature Control Module User's Manual					
	•MELSEC-Q Temperature Control Module User's Manual					
	 QCPU User's Manual (Hardware Design, Maintenance and Inspection) 					
	•MELSEC-L Tempe	erature Control Module Use	er's Manual			
	•MELSEC-L CPU N	Module User's Manual (Ha	ardware Design, Maintenance and Inspection	n)		
	•GX Works2 Versio	on 1 Operating Manual (Co	ommon)			

•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH	\//ord	1~4	Specify the channel
		vvord		number.
PID constant	i_PIDReadComman		ON,OFF	ON: Read the PID
memory read	d	Dit		commands.
command		ы		OFF: Do not read the PID
				commands.
PID control forced	i_PIDStop		ON,OFF	ON: Execute a forced PID
stop command		Dit		control stop.
		DIL		OFF: Do not execute a
				forced PID control stop.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON.
		DIL		OFF: Execution command is OFF.
Completed without	FB_OK	Bit	OFF	When ON, the PID setting can be read and
error		DIL		a forced PID control stop can be executed.
PID constant read	o_PIDReadOK	Dit	OFF	ON: Read is completed.
completion		DIL	OFF	OFF: Read is not executed.
PID constant read	o_PIDReadNG	Dit	OFF	ON: Read failed.
failure		ы	OFF	OFF: Read is not executed.
PID control stop	o_PIDStop	Dit		ON: PID control is stopped.
		BIT	OFF	OFF: PID control is being performed.
Proportional band	o_ReadPSetting	\\/ord	0	Store the proportional band (P) that was
(P)		vvora	0	read.
Cooling proportional	o_ReadPcSetting			Store the cooling proportional band (Pc) that
band (Pc)				was read.
		Word	0	*Do not set any output label circuits for
				Q64TCTT(BW) or Q64TCRT(BW) because
				they do not have read targets.
Integral time (I)	o_ReadISetting	Word	0	Store the integral time (I) that was read.
Derivative time (D)	o_ReadDSetting	Word	0	Store the derivative time (D) that was read.
Loop disconnection	o_ReadLoopJudg			Store the loop disconnection detection
detection judgment		Word	0	judgment time that was read.
time				
Error flag	FB_ERROR	Dit	055	When ON, it indicates that an error has
		BIT		occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_PIDControl function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.14. M+TC4_HeaterDisconnection (Heater disconnection detection function)

FB Name

M+TC4_HeaterDisconnection

Item	Description			
Function overview	Sets the heater disconnection detection and monitors the heater disconnection.			
Symbol	Execution command —— Module start XY address —— Target CH —— Heater disconnection aiert setting	M+TC 4_HeaterDisconner B : FB_EN - W : i_StartJO_No - W : i_CH - W : i_HeaterSetting	Ction FB_ENO : B Execution status FB_OK : B Completed without error o_Disconnect : B Disconnection detection flag FB_ERROR : B Error flag ERRORJD : W Error code	
Applicable hardware	Temperature control			
and software	module	Series	Model	
		MELSEC-Q series	Q64TCTTBW, Q64TCRTBW,	
			Q64TCTTBWN, Q64TCRTBWN	
		MELSEC-L series	L60TCTT4BW, L60TCRT4BW	
	Hardware details			
		Series	Model	
		MELSEC-Q series *1	Basic model	
			High performance model	
			Universal model	
		MELSEC-L series	LCPU	
		*1 Not applicable to QCP	PU (A mode)	
	Compatible software	GX Works2 *1		
		Language	Software version	
		English version	Version1.24A or later	
		Chinese version	Version1.49B or later	
		*1 For software versions	applicable to the modules used, refer to	
		"Relevant manuals".		
Programming	Ladder			
language				

Item	Description			
Number of steps	252 steps (for MELSEC-L series CPU)			
	*The number of steps of the FB in a program depends on the CPU model that is used and			
	input and output definition.			
Function description	1) By turning ON FB_EN (Execution command), the set parameters are written to the buffer			
	memory and the heater disconnection is monitored.			
	2) When the setting value of the target channel is out of range, the FB_ERROR output			
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error			
	code).			
	Refer to the error code explanation section for details.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
Precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do			
	not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop, etc. because it is impossible to turn OFF.			
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition o			
	the target channel.			
	5) This FB uses index registers Z9, Z8, Z7 and Z6. Please do not use these index registers			
	in an interrupt program.			
	6) Every input must be provided with a value for proper FB operation.			
	7) Do not use this FB in modules other than applicable modules. If used in modules other			
	than applicable modules, an error will occur in the module.			
	8) If the parameters are set using the configuration function of GX Works 2, using this FB is			
	unnecessary.			
	9) Perform the setting using the GX Works2 intelligent function module switch setting to			
	match systems and devices connected to the temperature control module.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Operating Manual (Common).			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1 FB Library Application Examples".			

Item	Description					
Timing chart	[When operation completes without error] [When an error occurs]					
	FB_EN(Execution command) FB_EN(Execution status) Heater disconnection detected disconnection detected No o_Disconnect(Disconnect(Disconnection detected detection flag) FB_OK FB_ENC FB_OK (Completed without error) FB_EROR(Error flag) FB_EROR(Error flag) FB_EROR(Error code) 0 0 ERROR_ID(Error code) 0					
Relevant manuals	•Temperature Control Module User's Manual •MELSEC-Q Temperature Control Module User's Manual					
	•OCPLUIser's Manual/Hardware Design, Maintenance and Inspection)					
	•MELSEC-L Temperature Control Module User's Manual					
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)					
	•GX Works2 Version 1 Operating Manual (Common)					

Error code list

Error codes	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the channel
		word		number.
Heater	i_HeaterSetting		0: Disabled	Set the heater
disconnection alert		Word	1~100(%)	disconnection alert
setting				setting.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		Ы	OFF	OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that the heater
error		Bit	OFF	disconnection detection function setting is
				completed.
Disconnection	o_Disconnect	Dit	OFF	ON: Heater disconnection occurring.
detection flag		ы	UFF	OFF: Heater disconnection not occurring.
Error flag	FB_ERROR			When ON, it indicates that an error has
		ЫІ	OFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_HeaterDisconnection function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.15. M+TC4_LoopDisconnection (Loop disconnection detection function)

FB Name

M+TC4_LoopDisconnection

Item	Description			
Function overview	Sets the loop disconnection detection and monitors the loop disconnection.			
Symbol	M+TC4_LoopDisconnection			
	Execution command—— B : FB_EN		FB_ENO : B Execution status	
	Module start XY address — w	: i_StartJO_No	FB_OK : B Completed without error	
	Target CH—— W	: i_CH	o_Disconnect : B Disconnection detection flag	
	Loop disconnectionw detection judgment timew	: i_LoopJudgTime	FB_ERROR : B Error flag	
	Loop disconnectionw detection dead bandw	: i,DeadBand	ERRORJD : W Error code	
Applicable hardware	Temperature control			
and software	module	Series	Model	
		MELSEC-Q series	Q64TCTT(BW), Q64TCRT(BW),	
			Q64TCTT(BW)N, Q64TCRT(BW)N	
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)	
	Hardware details			
		Series	Model	
		MELSEC-Q series *1	Basic model	
			High performance model	
			Universal model	
		MELSEC-L series LCPU		
		*1 Not applicable to QCF	PU (A mode)	
	Compatible software	Compatible software GX Works2 *1		
		Language	Software version	
		English version	Version1.24A or later	
		Chinese version	Version1.49B or later	
		*1 For software versions	applicable to the modules used, refer to	
		"Relevant manuals".		
Programming	Ladder			
language				

Item	Description	
Number of steps	248 steps (for MELSEC-L series CPU)	
	*The number of steps of the FB in a program depends on the CPU model that is used and	
	input and output definition.	
Function description	1) By turning ON FB_EN (Execution command), the set parameters are written to the buffer	
	memory and the loop disconnection is monitored.	
	2) When the setting value of the target channel is out of range, the FB_ERROR output	
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error	
	code).	
	Refer to the error code explanation section for details.	
Compiling method	Macro type	
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery	
Precautions	processing separately in accordance with the required system operation.	
	2) The FB cannot be used in an interrupt program.	
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do	
	not use this FB in programs that are only executed once such as a subroutine,	
	FOR-NEXT loop, etc. because it is impossible to turn OFF.	
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of	
	the target channel.	
	5) This FB uses index registers Z9, Z8, Z7, and Z6. Please do not use these index registers	
	in an interrupt program.	
	6) Every input must be provided with a value for proper FB operation.	
	7) If the parameters are set using the configuration function of GX Works 2, using this FB is	
	8) Perform the setting using the GX Works? intelligent function module switch setting to	
	match systems and devices connected to the temperature control module	
	For details on how to use the intelligent function module switch setting, refer to GX	
	Works2 Operating Manual (Common)	
FB operation type	Real-time execution	
Application example	Refer to "Appendix 1 FB Library Application Examples".	

Item	Description		
Timing chart	[When operation completes without error] [When an error occurs]		
	FB_EN(Execution command)		
	FB_ENO(Execution status)		
	Loop disconnection detection function write processing Write Vercessing detection function write processing detection function write proce		
	Alert occurrence b13: Loop disconnection detection		
	o_Disconnect(Disconnection detection flag)		
	FB_OK (Completed without error)		
	FB_ERROR(Error flag) FB_ERROR(Error flag)		
	ERROR JD(Error code) 0 ERROR JD(Error code) 0 Error code 0		
Relevant manuals	Temperature Control Module User's Manual		
	•MELSEC-Q Temperature Control Module User's Manual		
	 QCPU User's Manual(Hardware Design, Maintenance and Inspection) 		
	•MELSEC-L Temperature Control Module User's Manual		
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)		
	•GX Works2 Version 1 Operating Manual (Common)		

•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
	Word		the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the channel
		word		number.
Loop disconnection	i_LoopJudgTime		0~7,200(s)	Set the loop disconnection
detection judgment		Word		detection judgment time.
time				
Loop disconnection	i_DeadBand	Word	Input range	Set the loop disconnection
detection dead band		vvoru		detection dead band.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Rit.	OFF	ON: Execution command is ON.
		DIL	011	OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that the loop
error		Bit	OFF	disconnection detection function setting is
				completed.
Disconnection	o_Disconnect	Dit	OFF	ON: Loop disconnection occurring.
detection flag		DIL	OFF	OFF: Loop disconnection not occurring.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL	UFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_LoopDisconnection function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.16. M+TC4_SimultaneousTemperature (Simultaneous temperature rise function)

FB Name

M+TC4_SimultaneousTemperature

Function Overview

Item	Description			
Function overview	Sets simultaneous temperature rise function setting and monitors the status of the			
	simultaneous temperatur	e rise.		
Symbol		M+TC4 SimultaneousTe	mperature	
	Execution command —	B : FB_EN	FB_ENO : B Execution status	
	Module start XY address—	W : i_StartJO_No	FB_OK : B Completed without error	
	Target CH—	— w : i_СН	о,RiseState : вSimultaneous temperature rise status	
	Simultaneous temperature rise group setting	W : i_GroupSetting	FB_ERROR : BError flag	
	Simultaneous temperature rise gradient data	W : i_GradientData	ERRORJD : W Error code	
	Simultaneous temperature rise idle time	— W : iJdleTime		
	Simultaneous temperature rise AT mode selection	W : i_ATModeSelect		
	-			
Applicable hardware	Iemperature control		· · · · · · · · · · · · · · · · · · ·	
and software	module	Series	Model	
		MELSEC-Q series	Q64TCTT(BW)N, Q64TCRT(BW)N	
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)	
	Hardware details			
		Series	Model	
		MELSEC-O series *1	Basic model	
			High porformance model	
		*1 Not applicable to OCD		
	Compatible software	GX VVOrks2 ^1		
			Software version	
		English version	Version1.24A or later	
		Chinese version	Version1.49B or later	
		*1 For software versions applicable to the modules used, refer to		
		"Relevant manuals".		

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Item	Description		
Programming	Ladder		
language			
Number of steps	253 steps (for MELSEC-L series CPU)		
	*The number of steps of the FB in a program depends on the CPU model that is used and		
	input and output definition.		
Function description	1) By turning ON FB_EN (Execution command), the setting values of the simultaneous		
	temperature rise function are written to the buffer memory.		
	2) After FB_OK (Completed without error) is turned ON, the simultaneous temperature rise		
	status is monitored.		
	3) To enable the setting values, turn the setting change command (YnB) OFF, ON and then		
	OFF in the setting mode.		
	4) When the setting value of the target channel is out of range, the FB_ERROR output		
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error		
	code).		
	Refer to the error code explanation section for details.		
Compiling method	Macro type		
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery		
Precautions	processing separately in accordance with the required system operation.		
	2) The FB cannot be used in an interrupt program.		
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do		
	not use this FB in programs that are only executed once such as a subroutine,		
	FOR-NEXT loop, etc. because it is impossible to turn OFF.		
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of		
	the target channel.		
	5) To execute this FB, the setting/operation mode command (Yn1) must be turned OFF.		
	6) This FB uses index registers Z9, Z8 and Z7. Please do not use these index registers in		
	an interrupt program.		
	7) Every input must be provided with a value for proper FB operation.		
	8) If the parameters are set using the configuration function of GX Works 2, using this FB is		
	unnecessary.		
	9) Perform the setting using the GX Works2 intelligent function module switch setting to		
	match systems and devices connected to the temperature control module.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Operating Manual (Common).		
FB operation type	Real-time execution		
Application example	Refer to "Appendix 1 FB Library Application Examples".		

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Timing chart	[When operation completes without error] [When an error occurs] FB_EN(Execution command) FB_ENO(Execution status) Simultaneous temperature rise function setting value No processing No	p processing
	write processing write processing Simultaneous temperature rise status (buffer memory) Simultaneous temperature rise status (buffer memory) o_RiseState(Simultaneous temperature rise status) o_RiseState(Simultaneous temperature rise status) FB_OK FB_OK (Completed without error) FB_ERROR(Error flag) ERRORJD(Error code) 0	Error code 0
Relevant manuals	 Temperature Control Module User's Manual MELSEC-Q Temperature Control Module User's Manual QCPU User's Manual(Hardware Design, Maintenance and Inspection) MELSEC-L Temperature Control Module User's Manual MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) 	e and Inspection)

•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		\A/o rd	the CPU user's manual.	where the temperature
		vvora		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH		1~4	Specify the channel
		vvora		number.
Simultaneous	i_GroupSetting		<standard control=""></standard>	Set the simultaneous
temperature rise			0: Simultaneous	temperature rise group
group setting			temperature rise is not	setting.
			performed	
			1: Group 1 selection	
			2: Group 2 selection	
		Word	<mixed control=""></mixed>	
			0: Simultaneous	
			temperature rise is not	
			performed	
			1: Simultaneous	
			temperature rise is	
			performed	
Simultaneous	i_GradientData		0~Upper limit value of the	Set the simultaneous
temperature rise		Word	input range	temperature rise gradient
gradient data				data.
Simultaneous	i_IdleTime		0~3,600(s)	Set the simultaneous
temperature rise idle		Word		temperature rise idle time.
time				

Name(Comment)	Label name	Data	Setting range	Description
		type		
Simultaneous	i_ATModeSelect		0: Standard auto tuning	Set the auto tuning mode
temperature rise AT			selection	setting.
mode selection		Word	1: Simultaneous	
			temperature rise auto	
			tuning selection	

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		Ы	OFF	OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that the simultaneous
error		Bit	OFF	temperature rise function setting is
				completed.
Simultaneous	o_RiseState			ON: Simultaneous temperature rise is being
temperature rise		Dit	OFF	performed.
status		ы	UFF	OFF: Simultaneous temperature rise is not
				performed.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		ы	OFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SimultaneousTemperature function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.17. M+TC4_SetPeakCurrentSuppress (Peak current limit control setting)

FB Name

M+TC4_SetPeakCurrentSuppress

Item	Description				
Function overview	Sets the peak current limit control setting.				
Symbol	M+TC4_SetPeakCurrentSuppress				
	Execution command——	B : FB_EN	FB_ENO : B Execution status		
	Module start XY address ———	W : i_StartJO_No	FB_OK : B Completed without error		
	Group setting CH 1	W : i_SetGroupCH1	FB_ERROR : B Error flag		
	Group setting CH 2 ——	W : i_SetGroupCH2	ERRORJD : W Error code		
	Group setting CH 3 ———	W : i_SetGroupCH3			
	Group setting CH 4	W : i_SetGroupCH4			
	L	1			
Applicable hardware	Temperature control				
and software	module	Series	Model		
		MELSEC-Q series	Q64TCTT(BW)N, Q64TCRT(BW)N		
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)		
	Hardware details				
		Sorios	Modol		
		MELSEC O porioo *1	Resis model		
		MELSEC-Q series 1	High performance model		
		MELSEC-L series			
		*1 Not applicable to QCP	U (A mode)		
	Compatible software	GX Works2 *1			
		Language	Software version		
		English version	Version1.24A or later		
		Chinese version	Version1.49B or later		
		*1 For software versions a	applicable to the modules used, refer to		
		"Relevant manuals".			
Programming	Ladder				
language					

Item	Description			
Number of steps	236 steps (for MELSEC-L series CPU)			
	*The number of steps of the FB in a program depends on the CPU model that is used and			
	input and output definition.			
Function description	1) By turning ON FB_EN (Execution command), the divided groups of each channel is			
	written to the peak current limit control setting divided group setting.			
	2) To enable the setting values, turn the setting change command (YnB) OFF, ON and then			
	OFF in the setting mode.			
	3) FB operation is one-shot only, triggered by the FB_EN signal.			
	4) When the setting value of the target channel is out of range, the FB_ERROR output			
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error			
	code).			
	Refer to the error code explanation section for details.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
Precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do			
	not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop, etc. because it is impossible to turn OFF.			
	4) To execute this FB, the setting/operation mode command (Yn1) must be turned OFF.			
	5) This FB uses index registers Z9 and Z8. Please do not use these index registers in an			
	interrupt program.			
	6) Every input must be provided with a value for proper FB operation.			
	7) Do not use this FB in modules that are not listed in applicable hardware section. If used			
	in modules other than applicable modules, an error will occur in the module.			
	8) If the parameters are set using the configuration function of GX Works 2, using this FB is			
	9) Perform the setting using the GX Works? intelligent function module switch setting to			
	match systems and devices connected to the temperature control module			
	For details on how to use the intelligent function module switch setting refer to GX			
	Works2 Operating Manual (Common).			
FB operation type	Pulsed execution (1 scan execution type)			
Application example	Refer to "Appendix 1 FB Library Application Examples".			

Item	D	escription		
Timing chart	[When operation completes without error]	[When an error occurs]		
	FB_EN(Execution command) FB_ENO(Execution status) Peak current limit control setting write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR_ID(Error code) 0	FB_EN(Execution command) FB_ENO(Execution status) Peak current limit control setting write processing FB_OK (Completed without error) FB_ERROR(Error flag) ERROR JD(Error code)		
Relevant manuals	•Temperature Control Module User's Manual •MELSEC-Q Temperature Control Module User's Manual •QCPU User's Manual(Hardware Design, Maintenance and Inspection) •MELSEC-L Temperature Control Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspectior OXUM to 0.2000			

•Error code list

Error code	Description	Countermeasure
11 (Decimal)	Group settings CH1 to CH4 are not valid.	Please try again after confirming the setting.
	Group settings CH1 to CH 4 are not	
	within the range of 0 to 4.	

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Group setting CH 1	i_SetGroupCH1	Word	0: Not divided	Set the peak current limit
Group setting CH 2	i_SetGroupCH2	Word	1: Group 1	control divided group
Group setting CH 3	i_SetGroupCH3	Word	2: Group 2	settings for CH1 to CH4.
Group setting CH 4	i_SetGroupCH4	Word	3: Group 3	
		word	4: Group 4	

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the peak current
error		DIL	OFF	limit control setting is completed.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL	OFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_SetPeakCurrentSuppress function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.18. M+TC4_AlertStatus (Alert status check)

FB Name

M+TC4_AlertStatus

Item		Description	
Function overview	Monitors an alert that ha	as occurred.	
Symbol	Execution command — B Module start XY address — W Target CH — W	M+TC4_AlertStatus M+TC4_AlertStatus FB_EN FB_EN FB_EN FB_O FB_C FB_ERRO FB_ERRO FB_ERRO	D:: B Execution status K:: B Completed without error 0:: B PV has exceeded the temperature measurement range of the set input range 1:: B PV has fallen below the temperature measurement range of the set input range 2:: B Process alarm upper limit alert occurrence 3:: B Process alarm lower limit alert occurrence 4:: B Rate alarm lower limit alert occurrence 5:: B Alert 1 occurrence 9:: B Alert 2 occurrence 0:: B Alert 3 occurrence 1:: B Alert 4 occurrence 2:: B Heater disconnection detection 3:: B Loop disconnection detection 3:: B Loop disconnection detection 3:: B Loop disconnection detection 4:: B Cotput off-time current error detection 3:: B Loop disconnection detection 4:: B Error flag
Applicable bardware]
and software	module	Sorias	Model
and software	module	Series	
			Q64TCTT(BW)N, Q64TCRT(BW)N
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)

Item	Description			
	Hardware details			
		Series	Model	
		MELSEC-Q series *1	Basic model	
			High performance model	
			Universal model	
		MELSEC-L series	LCPU	
		*1 Not applicable to QCP	U (A mode)	
	Compatible software	GX Works2 *1		
		Language	Software version	
		English version	Version1.24A or later	
		Chinese version	Version1.49B or later	
		*1 For software versions	applicable to the modules used, refer to	
		"Relevant manuals".		
Programming	Ladder			
language				
Number of steps	262 steps (for MELSEC-L series CPU)			
	*The number of steps of the FB in a program depends on the CPU model that is used and			
	input and output definition.			
Function description	1) By turning ON FB_EN (Execution command), an alert is monitored.			
	2) When the setting value of the target channel is out of range, the FB_ERROR output			
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error			
	code).			
	Refer to the error code explanation section for details.			
Compiling method	Macro type			

Item	Description			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
Precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do			
	not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop, etc. because it is impossible to turn OFF.			
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel.			
	5) This FB uses index registers Z9, Z8 and Z7. Please do not use these index registers in			
	an interrupt program.			
	6) Every input must be provided with a value for proper FB operation.			
	7) If the parameters are set using the configuration function of GX Works 2, using this FB is			
	unnecessary.			
	8) Perform the setting using the GX Works2 intelligent function module switch setting to			
	match systems and devices connected to the temperature control module.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Operating Manual (Common).			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1 FB Library Application Examples".			
Timing chart	[When operation completes without error] [When an error occurs]			
	(When alert occurrence b0 is monitored) (When alert occurrence b0 is monitored)			
	FB_EN(Execution command)			
	FB_ENO(Execution status)			
	Alert occurrence b0: PV has exceeded the temperature measurement			
	range o Bit0(PV has exceeded the temperature the temperature			
	measurement range of the set input range) set input range FB_OK Completed without error			
	FB_ERROR(Error flag) FB_ERROR(Error flag)			
	ERROR_ID(Error code) 0 ERROR_ID(Error code) 0 Error code			
Relevant manuals	Temperature Control Module User's Manual			
	•MELSEC-Q Temperature Control Module User's Manual			
	•QCPU User's Manual(Hardware Design, Maintenance and Inspection)			
	•MELSEC-L Temperature Control Module User's Manual			
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)			
	•GX Works2 Version 1 Operating Manual (Common)			

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•Error code list

Error code	Description	Countermeasure
10 (Decimal)	The specified target channel is not valid.	Please try again after confirming the setting.
	The target channel is not within the range	
	of 1 to 4.	

Labels

|--|

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the channel
		word		number.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
			OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that an alert is being
error		ЫІ	OFF	monitored.
PV has exceeded	o_Bit0			ON: PV has exceeded the temperature
the temperature				measurement range of the set input range.
measurement range		Bit	OFF	OFF: Alert not occurring.
of the set input				
range				

Name(Comment)	Label name	Data	Initial	Description
		type	value	
PV has fallen below	o_Bit1			ON: PV has fallen below the temperature
the temperature				measurement range of the set input range.
measurement range		Bit	OFF	OFF: Alert not occurring.
of the set input				
range				
Process alarm upper	o_Bit2		OFF	ON: Process alarm upper limit alert
limit alert occurrence		Bit		occurring.
				OFF: Alert not occurring.
Process alarm lower	o_Bit3		OFF	ON: Process alarm lower limit alert
limit alert occurrence		Bit		occurring.
				OFF: Alert not occurring.
Rate alarm upper	o_Bit4	Dit	OFF	ON: Rate alarm upper limit alert occurring.
limit alert occurrence		BIT		OFF: Alert not occurring.
Rate alarm lower	o_Bit5	D.1	OFF	ON: Rate alarm lower limit alert occurring.
limit alert occurrence		Bit		OFF: Alert not occurring.
Alert 1 occurrence	o_Bit8	Dit	OFF	ON: Alert 1 occurring.
		BIT		OFF: Alert not occurring.
Alert 2 occurrence	o_Bit9	Dit	OFF	ON: Alert 2 occurring.
		BIT		OFF: Alert not occurring.
Alert 3 occurrence	o_Bit10	D.1	OFF	ON: Alert 3 occurring.
		Bit		OFF: Alert not occurring.
Alert 4 occurrence	o_Bit11	D.1	OFF	ON: Alert 4 occurring.
		Bit		OFF: Alert not occurring.
Heater	o_Bit12		OFF	ON: Heater disconnection was detected.
disconnection		Bit		OFF: Alert not occurring.
detection				
Loop disconnection	o_Bit13	D	OFF	ON: Loop disconnection was detected.
detection		Bit		OFF: Alert not occurring.
Output off-time	o_Bit14		OFF	ON: A current error when the output is OFF
current error		Bit		was detected.
detection				OFF: Alert not occurring.
Error flag	FB_ERROR	Dit	055	When ON, it indicates that an error has
		Bit		occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC-4_AlertStatus function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.19. M+TC4_ErrorOperation (Error operation)

FB Name

M+TC4_ErrorOperation

Item	Description			
Function overview	Monitors an error code and perform an error reset.			
Symbol		M+TC4_ErrorOperation		
	Execution command ——	B : FB_EN	FB_ENO : B Execution status	
	Module start XY address ——	W : i_StartJO_No	FB_OK : B Completed without error	
	Error reset request	B : i_ErrorReset	o_UnitError : B Module error detection	
			o_ErrorCode : W Module error code	
			p_ErrorAddress : W Error occurrence address	
			FB_ERROR : B Error flag	
			ERRORJD : W Error code	
Applicable hardware	Temperature control			
and software	module	Series	Model	
		MELSEC-Q series	Q64TCTT(BW), Q64TCRT(BW),	
			Q64TCTT(BW)N, Q64TCRT(BW)N	
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)	
	Hardware details			
		Series	Model	
		MELSEC-Q series *1	Basic model	
			High performance model	
			Universal model	
		MELSEC-L series	LCPU	
		*1 Not applicable to QCP	PU (A mode)	
	Compatible software	GX Works2 *1		
		Language	Software version	
		English version	Version1.24A or later	
		Chinese version	Version1.49B or later	
		*1 For software versions	applicable to the modules used, refer to	
		"Relevant manuals".		
Programming	Ladder			
language				

Item	Description			
Number of steps	219 steps (for MELSEC-L series CPU)			
	*The number of steps of the FB in a program depends on the CPU model that is used and			
	input and output definition.			
Function description	1) By turning ON FB_EN (Execution command), whether an error occurred is monitored.			
	2) When a module error occurs, o_UnitError (Module error detection) is turned ON and the			
	module error information is stored in o_ErrorCode (Module error code) and			
	o_ErrorAddress (Error occurrence address).			
	3) After FB_EN (Execution command) is turned ON, an error reset is performed by turning			
	ON i_ErrorReset (Error reset request) during error occurrence.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
Precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do			
	not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop, etc. because it is impossible to turn OFF.			
	4) This FB uses index registers Z9 and Z8. Please do not use these index registers in an			
	interrupt program.			
	5) Every input must be provided with a value for proper FB operation.			
	6) Perform the setting using the GX Works2 intelligent function module switch setting to			
	match systems and devices connected to the temperature control module.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Operating Manual (Common).			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1 FB Library Application Examples".			

Item	Description		
Timing chart	[When operation completes without error]		
	FB_EN(Execution command) FB_ENXExecution status) i_ErrorReset (Error reset request) Error reset command(Yn2) Write error flag(Xn2) o_UnitError (Module error code) o_ErrorAddress (Error recourrence address) FB_DK (Completed without error) FB_ERROR(Error flag) ERRORJD(Error code) 0		
Relevant manuals	Temperature Control Module User's Manual		
	•MELSEC-Q Temperature Control Module User's Manual		
	 QCPU User's Manual(Hardware Design, Maintenance and Inspection) 		
	•MELSEC-L Temperature Control Module User's Manual		
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)		
	•GX Works2 Version 1 Operating Manual (Common)		

•Error code list

Error code	Description	Countermeasure
None	None	None

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.

Name(Comment)	Label name	Data	Setting range	Description
		type		
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
				control module is
				mounted. (For example,
				enter H10 for X10.)
Error reset request	i_ErrorReset		ON,OFF	Turn ON this parameter to
				perform an error reset.
		Dit		Turn OFF the request
	Bit	DIL		when FB_OK (Completed
		without error) is turned		
				ON.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	Execution status FB_ENO	OFF	ON: Execution command is ON.	
			011	OFF: Execution command is OFF.
Completed without	FB_OK		When ON, it indicates that an error reset is	
error		Ы		completed.
Module error	o_UnitError		OFF	When ON, it indicates that an error has
detection				occurred.
Module error code	o_ErrorCode	Ward 0	Store an error code for an error that	
		word	0	occurred in the module.
Error occurrence	o_ErrorAddress	Word (0	Store an address in which an error has
address				occurred.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_ErrorOperation function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

2.20. M+TC4_ReadVal (Value read)

FB Name

M+TC4_ReadVal

Item	Description						
Function overview	Reads the values to the specified devices.						
Symbol	M+TC4,ReadVal Execution command — B : FB,EN		FB_ENO : B Execution status				
	Module start XY address — V	V : i_StartJO_No	FB_OK : B Completed without error				
	Target CH — W : i_OH		o.ReadData : W Read data				
			FB_ERROR : B Error flag				
			ERRORJD : W Error code				
Applicable hardware	Temperature control						
and software	module	Series	Model				
		MELSEC-Q series	Q64TCTT(BW), Q64TCRT(BW),				
			Q64TCTT(BW)N, Q64TCRT(BW)N				
		MELSEC-L series	L60TCTT4(BW), L60TCRT4(BW)				
	Hardware details						
		Series	Model				
		MELSEC-Q series *1	Basic model				
			High performance model				
			Universal model				
		MELSEC-L series	LCPU				
		*1 Not applicable to QCPU (A mode) GX Works2 *1					
	Compatible software						
		Language	Software version				
		English version	Version1.24A or later				
		Chinese version	Version1.49B or later				
		*1 For software versions	applicable to the modules used, refer to				
		"Relevant manuals".					
Programming	Ladder						
language							
Item	Description						
----------------------	---	--	--	--	--	--	--
Number of steps	267 steps (for MELSEC-L series CPU)						
	*The number of steps of the FB in a program depends on the CPU model that is used and						
	input and output definition.						
Function description	1) By turning ON FB_EN (Execution command), the specified values are read to						
	o_ReadData (Read data).						
	2) When the setting value of the target channel is out of range, the FB_ERROR output						
	turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error						
	code).						
	Refer to the error code explanation section for details.						
Compiling method	Macro type						
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery						
Precautions	processing separately in accordance with the required system operation.						
	2) The FB cannot be used in an interrupt program.						
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do						
	not use this FB in programs that are only executed once such as a subroutine,						
	FOR-NEXT loop, etc. because it is impossible to turn OFF.						
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of						
	the target channel.						
	5) This FB uses index registers Z9, Z8, Z7, Z6 and Z5. Please do not use these index						
	registers in an interrupt program.						
	6) Every input must be provided with a value for proper FB operation.						
	7) If the parameters are set using the configuration function of GX Works 2, using this FB is						
	unnecessary.						
FB operation type	Real-time execution						
Application example	Refer to "Appendix 1 FB Library Application Examples".						
Timing chart	[When operation completes without error] [When an error occurs]						
	FB_EN(Execution command)						
	FB_ENQ(Execution status) FB_ENQ(Execution status)						
	Setting value read						
	FB_OK FB_OK						
	(Completed without error)						
	FB_ERROR(Error flag) ERRORJD(Error code) 0 ERDOR D(Error code) 0 ERDOR D(Error code) 0						
	ERROR D/Error code)						

Item	Description				
Relevant manuals	Temperature Control Module User's Manual				
	•MELSEC-Q Temperature Control Module User's Manual				
	•QCPU User's Manual(Hardware Design, Maintenance and Inspection)				
	•MELSEC-L Temperature Control Module User's Manual				
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)				
	•GX Works2 Version 1 Operating Manual (Common)				

Error codes Error code list Error code Description 10 (Decimal) The specified target channel is not valid. The target channel is not within the range of 1 to 4. Please try again after confirming the setting.

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Target CH	i_CH	Word	1~4	Specify the channel
		word		number.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit		ON: Execution command is ON.
		BI	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit		When ON, it indicates that the data are
error		BIT	OFF	being read.

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Name(Comment) Read data	Label name o_ReadData	Data type	Initial value	DescriptionThe following values are stored in the specified devices.(Example: If D0 is set, the temperature process value (PV) is stored in D2.)+0: Error code+1: Alert occurrence data+2: Temperature process value (PV)+3: Manipulated value (MV)+4: Temperature rise judgment flag+5: Transistor output flag+6: Set value (SV) setting+7: Proportional band (P) setting+8: Integral time (I) setting+9: Derivative time (D) setting+11: Alert setting value 1+11: Alert setting value 2+12: Alert setting value 3+13: Alert setting value 4+14: Heater disconnection alert setting+15: Loop disconnection detection judgmenttime setting+16: Manipulated value for other analogmodule output (MV)+17: CT1 Heater current measurementvalue+18: CT2 Heater current measurementvalue+19: CT3 Heater current measurementvalue+20: CT4 Heater current measurementvalue
				value +21: CT5 Heater current measurement value
				+22: CT6 Heater current measurement value
				+23: CT7 Heater current measurement
		7 112/	emperature 160	Qahteorl Module FB Library Reference Manual FBM-M064-A +24: CT8 Heater current measurement
				value
				+25: Cooling proportional band setting (PC)
				+26: Cooling manipulated value (MVc)

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_ReadVal function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

Before using any Mitsubishi products, please read all the relevant manuals.

2.21. M+TC4_ParamBackup (Setting value backup)

FB Name

M+TC4_ParamBackup

Function Overview

Item	Description					
Function overview	Backs up the setting value or executes the default setting registration command.					
Symbol	Execution command B : FB_EN FB_ENC : B Execution status Module start XY address W : i_StartJO_No FB_OK : B Completed without error Setting value B : i_Backup o_BackupComp : B Setting value backup backup command B : i_Backup o_Default setting Default setting registration command B : i_DefaultSetting o_DefaultComp : B Default value write completion flag o_BackupFailure : B FB_ERROR : B Error flag Error flag ERRORJD : W Error code Error code					
Applicable hardware	Temperature control					
and software	module	Series	Model			
		MELSEC-Q series	Q64TCTT(BW), Q64TCRT(BW),			
			Q64TCTT(BW)N, Q64TCRT(BW)N			
		MELSEC-L series L60TCTT4(BW), L60TCRT4(BW)				
	Hardware details					
	Series Model					
		MELSEC-Q series *1 Basic model				
			High performance model			
			Universal model			
		MELSEC-L series	LCPU			
		*1 Not applicable to QCP	U (A mode)			
	Compatible software	GX Works2 *1				
		Language	Software version			
		English version	Version1.24A or later			
		Chinese version	Version1.49B or later			
		*1 For software versions	applicable to the modules used, refer to			
Dragramming		"Relevant manuals".				
Programming	Ladder					
language						

Item	Description
Number of steps	174 steps (for MELSEC-L series CPU)
	*The number of steps of the FB in a program depends on the CPU model that is used and
	input and output definition.
Function description	1) After FB_EN (Execution command) is turned ON, the control mode selection of the
	switch setting and the parameter settings in the buffer memory are backed up by turning
	ON i_Backup (Setting value backup command) and the buffer memory contents are
	returned to the default values by turning ON i_DefaultSetting (Default setting registration
	command).
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
Precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do
	not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop, etc. because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of
	the target channel.
	5) This FB uses index register Z9. Please do not use this index register in an interrupt
	6) Every input must be provided with a value for proper FB operation.
	7) If the parameters are set using the configuration function of GX Works 2, using this FB is
	unnecessary.
	8) When this FB is used in two or more places, a duplicated coil warning will occur during
	compile operation due to the Y signal being operated by index modification. However
	this is not a problem and the FB will operate without error.
	9) Perform the setting using the GX Works2 intelligent function module switch setting to
	match systems and devices connected to the temperature control module.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 FB Library Application Examples".

Item	Description			
Timing chart	[When operation completes without error]			
	FB_EN(Execution command)			
	i.Backup(Setting value backup command)			
	Setting value backup command(Yn8)			
	Setting value backup completion flag(Xn8)			
	o_BackupComp(Setting value backup completion flag)			
	i DefaultSetting (Default setting registration command)			
	Default value registration command(Yn9)			
	Default value write completion flag(Xn9)			
	o_DefaultComp(Default value write completion flag)			
	FB_OK (Completed without error)			
	FB_ERROR(Error flag)			
	ERROR JD(Error code) 0			
Relevant manuals	•Temperature Control Module User's Manual			
	•MELSEC-Q Temperature Control Module User's Manual			
	•QCPU User's Manual(Hardware Design, Maintenance and Inspection)			
	•MELSEC-L Temperature Control Module User's Manual			
	•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)			
	•GX Works2 Version 1 Operating Manual (Common)			

Error codes

•Error code list

Error code	Description	Countermeasure
None	None	None

Labels

Input labels

Name(Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN		ON,OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
		Word	the CPU user's manual.	where the temperature
		word		control module is
				mounted. (For example,
				enter H10 for X10.)
Setting value backup	i_Backup		ON,OFF	When ON, the parameter
command		Dit		setting in the buffer
		ы		memory is written to the
				non-volatile memory.
Default setting	i_DefaultSetting		ON,OFF	When ON, the buffer
registration		Dit		memory contents are
command		DIL		returned to the default
				values.

Output labels

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that it is possible to
error		Bit	OFF	back up the setting values and return to the
				default values.
Setting value backup	o_BackupComp	Dit	OFF	When ON, it indicates that backing up the
completion flag		סוו	OFF	setting values is completed.
Default value write	o_DefaultComp	Dit	OFF	When ON, it indicates that writing the default
completion flag		DIL		values is completed.

Name(Comment)	Label name	Data	Initial	Description
		type	value	
Setting value backup	o_BackupFailure			When ON, it indicates backing up the setting
failure flag				values failed.
				*When the setting value backup failure flag
		Bit	OFF	is turned ON, it can be turned OFF by
				re-executing the setting value backup
				command (i_Backup) and after the write
				operation is completed normally.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2011/09/16	First edition

Note

This chapter includes information related to the M+TC4_ParamBackup function block.

It does not include information on restrictions of use such as combination with temperature modules or programmable controller CPUs.

Before using any Mitsubishi products, please read all the relevant manuals.

Appendix 1 FB Library Application Examples

TC4 FB application examples are as follows.

(1) System Configuration

a) Q series system configuration Example



b) L series system configuration Example



Reminder

- •Every input must be provided with a value for proper FB operation.
- If not set, the values will be unspecified.
- •Abbreviations may be used in the label comments due to the limitation on the number of the characters to display in GX Works2.

(2) Device list

a) Input (commands)

Device	FB function name	Application (ON details)
MO	Basic settings	Basic settings request
M10	Control basic parameters setting	Cnt BParam setting request
M20	Control detailed parameters setting	Cnt DParam setting request
M30	Alert function setting	Alert function setting request
M40	Other settings	Other settings request
M50	Conversion enable/disable setting	Conv enable/disable set request
M51		CH1 conversion command
M52		CH2 conversion command
M53		CH3 conversion command
M54		CH4 conversion command
M60	Process alarm setting	Process alarm setting request
M70	Rate alarm setting	Rate alarm setting request
M80	Process value (PV) scaling function setting	scaling function setting request
M90	Cold junction temperature process value	CJ temp PV monitor request
	monitoring function	
M100	Auto tuning	Auto tuning request
M101		Auto tuning ready
M110	Self tuning	Self tuning request
M120	PID control	PID control command
M121		PID control FB
M122		PID control forced stop command
M130	Heater disconnection detection function	Heater disc detection request
M140	Loop disconnection detection function	Loop disc detection command
M150	Simultaneous temperature rise function	Simultaneous temp rise request
M160	Peak current limit control setting	Peak current limit cnt request
M170	Alert status check	Alert status check command
M190	Error operation	Error operation FB start
M191		Error reset request
M200	Value read	Value read command
M210	Setting value backup	Setting value backup FB start
M211		Setting value backup command
M212		Default set registration command

b) Output (checks)

Device	FB function name	Application (ON details)
M1	Basic settings	Basic settings FB ready
M2		Basic settings complete
F0		Basic settings FB error
M11	Control basic parameters setting	Cnt BParam setting FB ready
M12		Cnt BParam setting complete
F5		Cnt BPraam setting FB error
M21	Control detailed parameters setting	Cnt DParam setting FB ready
M22		Cnt DParam setting complete
F10		Cnt DParam setting FB error
M31	Alert function setting	Alert function setting FB ready
M32		Alert function setting complete
F15		Alert function setting error
M41	Other settings	Other settings FB ready
M42		Other settings complete
M55	Conversion enable/disable setting	Conv enable/disable set ready
M56		Conv enable/disable set complete
M61	Process alarm setting	Process alarm setting FB ready
M62		Process alarm setting complete
F20		Process alarm setting FB error
M71	Rate alarm setting	Rate alarm setting FB ready
M72		Rate alarm setting complete
F25		Rate alarm setting FB error
M81	Process value (PV) scaling function setting	scaling function setting ready
M82		scaling function set complete
F30		scaling function setting error
M91	Cold junction temperature process value	CJ temp PV monitor ready
M92	monitoring function	CJ temp PV monitor complete
M102	Auto tuning	Auto tuning FB ready
M103		Auto tuning complete
F35		Auto tuning FB error
M111	Self tuning	Self tuning FB ready
M112		Self tuning complete
F40		Self tuning FB error
M123	PID control	PID control FB ready

Device	FB function name	Application (ON details)
M124		PID control complete
M125		PID constant read completion
M126		PID constant read failure
M127		PID control stop flag
F45		PID control FB error
M131	Heater disconnection detection function	Heater disc detection ready
M132		Heater disc detection complete
M133		Heater disc detection flag
F50		Heater disc detection error
M141	Loop disconnection detection function	Loop disc detection FB ready
M142		Loop disc detection complete
M143		Loop disc detection flag
F55		Loop disc detection FB error
M151	Simultaneous temperature rise function	Simultaneous temp rise ready
M152		Simultaneous temp rise complete
M153		Simultaneous temperature rise st
F60		Simultaneous temp rise error
M161	Peak current limit control setting	Peak current limit cnt ready
M162		Peak current limit cnt complete
F65		Peak current limit cnt error
M171	Alert status check	Alert status check FB ready
M172		Alert status checking
M173		PV exceeded the temp range
M174		PV fallen below the temp range
M175		Process alarm upper limit alert
M176		Process alarm lower limit alert
M177		Rate alarm upper limit alert
M178		Rate alarm lower limit alert
M179		Alert 1 occurrence
M180		Alert 2 occurrence
M181		Alert 3 occurrence
M182		Alert 4 occurrence
M183		Heater disconnection detection
M184		Loop disconnection detection
M185		Output off-time current error
F70		Alert status check FB error

Device	FB function name	Application (ON details)
M192	Error operation	Error operation FB ready
M193		Error reset request complete
M194		Module error detection
M201	Value read	Value read FB ready
M202		Value read complete
F75		Value read FB error
M213	Setting value backup	Setting value backup FB ready
M214		Setting value backup complete
M215		Backup complete flag
M216		Default value write comp flag
M217		Backup failure flag

c) Data register

Device	FB function name	Application (ON details)
D0	Basic settings	Basic settings FB error code
D10	Control basic parameters setting	Cnt BParam setting FB error code
D20	Control detailed parameters setting	Cnt DParam setting FB error code
D30	Alert function setting	Alert function setting err code
D60	Process alarm setting	Process alarm setting error code
D70	Rate alarm setting	Rate alarm setting FB error code
D80	Process value (PV) scaling function setting	scaling function set error code
D90	Cold junction temperature process value monitoring function	Cold junction temp PV
D100	Auto tuning	Proportional / heat proportional
D101		Cooling proportional band
D102		Integral time value
D103		Derivative time value
D104		Loop disc detection time value
D105		Auto tuning FB error code
D110	Self tuning	Self tuning flag
D111		Self tuning FB error code
D120	PID control	Proportional band
D121		Cooling proportional band
D122		Integral time
D123		Derivative time
D124		Loop disconnection detection jud
D125		PID control FB error code
D130	Heater disconnection detection function	Heater disc detection error code
D140	Loop disconnection detection function	Loop disc detection FB error cod
D150	Simultaneous temperature rise function	Simultaneous temp rise err code
D160	Peak current limit control setting	Peak current limit cnt err code
D170	Alert status check	Alert status check FB error code
D190	Error operation	Module error code
D191		error occurrence address
D201	Value read	Read data
D200		Value read FB error code

(3) Program

M+TC4_SetBPARAM (Basic settings)

Label Name	setting values	Description	
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where	
		the temperature control module is mounted.	
i_CH	K1	Set the target channel to channel 1.	
i_InputRange	К2	Set the measurement temperature range to 0 to	
		1300 °C.	
i_SVSetting	K500	Sets the temperature for the set value to 500°C.	
i_UnusedCH	К0	Set the channel 1 as the channel where temperature	
		control will be performed and temperature sensors	
		will be connected.	

By turning ON M0, the values of the basic settings for channel 1 are written to the buffer memory.



M+TC4	_SetCNTBPARAM	(Control basic	parameters	setting)
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Label Name	setting values	Description	
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where	
		the temperature control module is mounted.	
i_CH	K1	Set the target channel to channel 1.	
i_PSetting	K100	Set the proportional band (P) setting for PID	
		operation to 10.0%.	
i_ISetting	K200	Set the integral time (I) setting for PID operation to	
		200s.	
i_DSetting	K300	Set the derivative time (D) setting for PID operation	
		to 300s.	
i_OutputPeriod	K5	Set the control output period setting to 5 s. (When	
		"Control output period unit switch setting" which is bit	
		2 of switch 3 is 0.)	
i_ResponseParam	К1	Set the response to a PID control set value (SV)	
		change to "Normal".	
i_StopMode	К1	Set the mode to be entered at a PID operation stop	
		to "monitor".	

By turning ON M10, the control basic parameters setting values for channel 1 are written to the buffer memory.



(Continues on next page.)



M+TC4_SetCNTDPARAM	(Control o	detailed parameters	setting)
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Label Name	setting values	Description	
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where	
		the temperature control module is mounted.	
i_CH	K1	Set the target channel to channel 1.	
i_ActionSetting	К0	Set the action for channel 1 to "Forward action".	
i_UpSetLimiter	K1300	Set the upper limit value of the set value (SV) to	
		1300.	
i_LowSetLimiter	К0	Set the lower limit value of the set value (SV) to 0.	
i_ChgRateLimit	К0	Set the change rate limiter of the set value per unit	
		time to a set value (SV) change to "Disabled".	
i_ChgRateDELimit	K0	Set the change rate limiter of the set value per unit	
		time to a set value (SV) change to "Disabled".	
i_SensorCompVal	K100	Sets the compensation value used when there is a	
		difference between the measured temperature and	
		the actual temperature to 10.0%.	
i_PrimaryDelay	К0	Set the primary delay digital filter for channel 1 to	
		"Disabled".	
i_UpOutLimiter	K500	Set the upper limit value for outputting to an external	
		device to 50.0%.	
i_LowOutLimiter	К0	Set the lower limit value for outputting to an external	
		device to 0.0%.	
i_OutVariation	К0	Set the output variation limiter for channel 1 to	
		"Disabled".	
i_AdjustSetting	K10	Set the adjustment sensitivity for the set value to	
		1.0%.	

By turning ON M20, the control detailed parameters setting values for channel 1 are written to the buffer memory.



-[ко	W:iPrimaryDelay Primary delaydi gitalfi Iterset
-{к500	} W:i_UpOutLimiter Upper ou tput lim iter
-{ко	} W:i_LowOutLimiter Lower ou tput lim iter
-[ко	} W:i_OutVariation Output v ariation limiter
-[K10	} W:i_AdjustSetting Adjustme nt sensi tivity (dead ban

Label Name	setting values	Description	
i_Start_IO_No	H0	Specify the starting XY address to channel 1 where	
		the temperature control module is mounted.	
i_CH	K1	Set the target channel to channel 1.	
i_Alert1ModeSet	K1	Set the alert 1 mode setting to "Upper limit input	
		alert".	
i_Alert2ModeSet	К0	Set the alert 2 mode setting to "No alert".	
i_Alert3ModeSet	K15	Set the alert 3 mode setting to "Upper limit deviation	
		alert".	
i_Alert4ModeSet	K17	Set the alert 4 mode setting to "Upper/lower limit	
		deviation alert".	
i_AlertSetVal1	K1000	Set the alert set value 1 to 1000.	
i_AlertSetVal2	K0	Set the alert set value 2 to "No alert".	
i_AlertSetVal3	K1000	Set the alert set value 3 to 1000.	
i_AlertSetVal4	K500	Set the alert set value 4 to 500.	

M+TC4_SetAlertsfunction (Alert function setting)

By turning ON M30, the alert function setting values for channel 1 are written to the buffer memory.





M+TC4_SetOtherSettings	(Other	settings)
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Label Name	setting values	Description	
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where	
		the temperature control module is mounted.	
i_TemCmpRange	K2	Set the temperature rise completion range to $\pm 2^{\circ}C$.	
i_TemCmpSoakTime	K500	Set a delay from when a temperature rise is	
		completed until the temperature rise completion	
		judgment flag is turned ON to 500 min.	
i_TraMtONDlyTime	К0	Set the transistor output monitor ON delay time to	
		"Disabled".	
i_ValResolution	K1	Set the manipulated value resolution to "0 to	
		12,000".	
i_PIDFlag	K1	Set the PID continuation flag to "Continue".	
i_AlertDeadBand	K10	Set the alert dead band to 1.0%.	
i_AlertDlyCount	K50	Set the alert delay count to 50 times.	
i_UnusualCount	K100	Set the heater disconnection/output off-time current	
		error detection delay count to 100 times.	
i_ReviseFunction	K1	Set the heater disconnection compensation to	
		"Heater disconnection compensation function is	
		used".	

By turning ON M40, the values of the other settings for channel 1 are written to the buffer memory.



[К10	} W:i_AlertDeadBand Alert de ad band setting
[K50	} W:i_AlertDlyCount Alert de lay coun t
[К100	} W:i_UnusualCount Heater d isconnec tion∕out put off-
[К1	} W:i_ReviseFunction Heater d isconnec tion com pensatio

M+TC4_SetConversion	(Conversion	enable/disable	setting)
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Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_ConvertCH1	ON/OFF	Turn ON this parameter to disable the conversion
		setting for the specified channel 1.
i_ConvertCH2	ON/OFF	Turn ON this parameter to disable the conversion
		setting for the specified channel 2.
i_ConvertCH3	ON/OFF	Turn ON this parameter to disable the conversion
		setting for the specified channel 3.
i_ConvertCH4	ON/OFF	Turn ON this parameter to disable the conversion
		setting for the specified channel 4.

After turning ON M51 to M54, the conversion settings for the specified channels are disabled by turning ON M50.



M+TC4_SetProcessAlarm (Pr	'rocess alarm	setting)
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Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.
i_ProcessEnable	КО	Set the process alarm to "Enabled".
i_ProLLLimit	K100	Set the process alarm lower lower limit value to 100.
i_ProLULimit	K200	Set the process alarm lower upper limit value to 200.
i_ProULLimit	K1000	Set the process alarm upper lower limit value to
		1000.
i_ProUULimit	K1100	Set the process alarm upper upper limit value to
		1100.

By turning ON M60, the process alarm setting values for channel 1 are written to the buffer memory.



[к100] W:i_ProLLLimit Process alarm lo wer lowe r limit
[К200] W:i_ProLULimit Process alarm lo wer uppe r limit
[к1000] W:i_ProULLimit Process alarm up per lowe r limit
[К1100] W:i_ProUULimit Process alarm up per uppe r limit

M+TC4	SetRateAlarm	(Rate	alarm	setting)
		(

Label Name	setting values	Description	
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where	
		the temperature control module is mounted.	
i_CH	K1	Set the target channel to channel 1.	
i_RateEnable	КО	Set the rate alarm output to "Enabled".	
i_RateOut	K1000	Set the number of periods to check the changes of	
		the measured temperature value using the rate	
		alarm function to 1000 times.	
i_RateUpLim	K5000	Set the rate alarm upper limit value to 5000.	
i_RateLowLim	K-5000	Set the rate alarm lower limit value to -5000.	

By turning ON M70, the rate process alarm setting values for channel 1 are written to the buffer memory.he setting values of the rate alarm are written to the buffer memory.



(к1000	} W:i_RateOut Rate ala rm detec tion per iod
[κ5000	} W:i_RateUpLim Rate ala rm upper limit v alue
{K-5000	}W:i_RateLowLim Rate ala rm lower limit v alue

M+TC4_SetPVScaling (Process value (PV) scaling function setting)

Label Name	setting values	Description	
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where	
		the temperature control module is mounted.	
i_CH	K1	Set the target channel to channel 1.	
i_ScalingEnable	K1	Set the process value (PV) scaling function to	
		"Enabled".	
i_ScalingUpLim	K32000	Set the process value (PV) scaling upper limit value	
		to 32000.	
i_ScalingLowLim	K-32000	Set the process value (PV) scaling lower limit value	
		to -32000.	

By turning ON M80, the process value (PV) scaling function setting values for channel 1 are written to the buffer memory.



M+TC4	MoniCJTemperature	(Cold junction	temperature r	process value	monitoring function)
			tomporataro p		inormorning ranouorij

Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_TempCompSelect	К1	Set the cold junction temperature compensation to
		"Temperature control terminal block conversion
		module".

By turning ON M90, the cold junction temperature compensation selection value is written to the buffer and the cold junction temperature process value is monitored.

M90 CJtemp PV monit or reque st	MoniCJ B:FB_EN Executio n comman d	FB_ENO:B Executio n status		— (M91) CJtemp PV monit or ready
[но]	W:iStart_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		— (M92) CJtemp PVmonit orcompl ete
[K1]	W:i_TempCompSelect o_ Coldjun ctionte mperatur ecompen	TempProcessVal:W Coldjun ctionte mperatur eproces	[D90] Cold jun ction te mp PV	
		FB_ERROR:B Error fl ag		
		ERROR_ID:W Error co de		

M+TC4_Autotuning (Auto tuning)

Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.
i_AT	ON/OFF	To execute auto tuning, turn ON this parameter.
i_UpSetLimiter	K1050	Specify the upper limit value for outputting to an
		external devise to 105.0%.
i_LowSetLimiter	К0	Specify the lower limit value for outputting to an
		external devise to 0.0%.
i_CoolUpLimit	К0	Set the cooling upper limit value for outputting to an
		external devise to 0.0%.
i_OutVariation	K1	Set a range to prevent a sudden manipulated value
		change to 0.1%/s.
i_SensorCompVal	K1000	Set the compensation value for when there is a
		difference between the measured temperature and
		actual temperature to 10.00%.
i_OutputPeriod	K1	Set the ON/OFF period of the transistor output to 1 s.
		(When "Control output period unit switch setting"
		which is bit 2 of switch 3 is 0.)
i_PrimaryDelay	K100	Set the primary delay digital filter setting to 100s.
i_ATbias	K500	Set the AT bias setting to 500.
i_ActionSetting	К0	Set the forward action for channel 1.
i_AutoBackup	К1	Set the automatic backup setting after auto tuning of
		PID constants to enabled.
i_ATModeSelect	K1	Set the auto tuning mode to "Fast response mode".

The auto tuning parameters are set by turning ON M100, and the auto tuning is executed by turning ON M101.


——[К1	} W∶i_OutVariation Output ∨ ariation limiter	FB_ERROR:B Error fl ag		F35 Autotun ing FBe rror
——[К1000	} W:i_SensorCompVal Sensor c ompensat ion valu e settin	ERROR_ID:W Error co de	[D105] Autotun ing FBe rrorcod e	
——[К1	} W:i_OutputPeriod Control output p eriod se tting			
——[К100] W:i_PrimaryDelay Primary delay di gital fi Iter set			
——[К500	} W:i_ATbias AT bias setting			
——[КО	} W:i_ActionSetting Forward/ reverse action s etting			
——[К1	} W:i_AutoBackup Automati c backup setting after a			
——[К1	W:i_ATModeSelect Autotun ing mode selecti on			

M+TC4_Selftuning (Self tuning)

Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.
i_STSetting	K1	Set the self tuning setting to "Start-up ST (Calculates
		PID constants only)".

By turning ON M110, the self tuning setting values are written to the buffer memory and the self tuning flag is monitored.



M+TC4_PIDControl (PID control)

Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.
i_PIDReadCommand	ON/OFF	Turn ON to execute the PID constant memory read
		command for channel 1.
i_PIDStop	ON/OFF	Turn ON to execute the PID control forced stop
		command for channel 1.

After 120 is turned ON, the PID constant memory read command is executed by turning ON M122 and the PID control forced stop command is executed by turning ON M122.





Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.
i_HeaterSetting	K50	Set the reference heater current value to 50%.

M+TC4_HeaterDisconnection (Heater disconnection detection function)

By turning ON M130, the heater disconnection alert setting values are written to the buffer memory and a heater disconnection is monitored.



M+TC4_LoopDisconnection (Loop disconnection detection function)

Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.
i_LoopJudgTime	K1000	Set the judgment time of a loop disconnection to
		1000s.
i_DeadBand	K100	Set the temperature width where loop disconnection
		is not detected to 100.

By turning ON M140, the values for the loop disconnection detection are written to the buffer memory and a loop disconnection is monitored.



M+TC4_SimultaneousTemperature (Simultaneous temperature rise function)

Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.
i_GroupSetting	K1	Set channel 1 to group 1 selection.
i_GradientData	K500	Set the simultaneous temperature rise gradient data
		to 500.
i_ldleTime	K1000	Set the time from when the output is turned ON until
		the temperature starts rising to 1000s.
i_ATModeSelect	К0	Set the simultaneous temperature rise AT mode to
		"Standard auto tuning selection".

By turning ON M150, the simultaneous temperature rise function setting values are written to the buffer memory and the simultaneous temperature rise status is monitored.



[K500]	W:i_GradientData Simultan eous tem perature rise gr	ERROR_ID:W Error co de	-[D150 Simultan eoustem prisee rrcode]
[K1000]	W:i_IdleTime Simultan eous tem perature rise id			
[ко] 	W:i_ATModeSelect Simultan eoustem perature rise AT			

Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_SetGroupCH1	K1	Set channel 1 to group 1.
i_SetGroupCH2	K2	Set channel 2 to group 2.
i_SetGroupCH3	К3	Set channel 3 to group 3.
i_SetGroupCH4	К4	Set channel 4 to group 4.

M+TC4_SetPeakCurrentSuppress (Peak current limit control setting)

By turning ON M160, the divided groups of each channel is written to the peak current limit control setting divided group setting.

SetPeakOurrent]	
B:FB_EN Executio n comman d	FB_ENO:B Executio n status		(M161) Peakcur rentlim itcntr eady
W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		(M162) Peak cur rent lim it cnt c omplete
W:i_SetGroupCH1 Group se tting CH 1	FB_ERROR:B Error fl ag		(F65)- Peak cur rent lim it cnt e rror
W:i_SetGroupCH2 Group se tting CH 2	ERROR_ID:W Error co de	{D160 } Peakcur rentlim itcn te rrcode	
W:i_SetGroupCH3 Group se tting CH 3			
W:i_SetGroupCH4 Group se tting CH 4			
	SetPeakCurrent B:FB_EN Executio n comman d W:i_Start_IO_No Module s tart XY address W:i_SetGroupCH1 Group se tting CH 1 W:i_SetGroupCH2 Group se tting CH 2 W:i_SetGroupCH3 Group se tting CH 3 W:i_SetGroupCH4 Group se tting CH 4	SetPeakCurrent FB_ENO:B B:FB_EN Executio n comman n status d W:i Start_IO_No Module s Complete tart XY d withou address t error W:i_SetGroupCH1 FB_ERROR:B Group se Error fl tting CH ag W:i_SetGroupCH2 ERROR:ID:W Group se Error co tting CH de 2 W:i_SetGroupCH3 Group se tting CH 3 W:i_SetGroupCH4 Group se tting CH 4 4	SetPeakCurrent FB_ENO:B Executio Executio n comman n status d n status g WijStart JO_No FB_OK:B Complete dduile s Complete tart XY d withou address t error WijSetGroupCH1 FB_ERROR:B Group se Error fl 1 ag WijSetGroupCH2 ERROR JD:W Group se Error co tting CH ag WijSetGroupCH3 Error co Group se time CH 3 WijSetGroupCH3 Group se time CH 3 WijSetGroupCH4 Group se time CH 4 4

M+TC4_AlertStatus (Alert status check)

Label Name	setting values	Description
i_Start_IO_No	H0	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.

By turning ON M170, an alert that has occurred is monitored.





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M+TC4_ErrorOperation (Error operation)

Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_ErrorReset	ON/OFF	Turn ON this parameter to perform an error reset.

By turning ON M190, an error code and an address in which an error has occurred are output when an error has occurred.



M+TC4_ReadVal (Value read)

Label Name	setting values	Description
i_Start_IO_No	H0	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_CH	K1	Set the target channel to channel 1.

By turning ON M200, the specified values are output to the read data.



Label Name	setting values	Description
i_Start_IO_No	HO	Specify the starting XY address to channel 1 where
		the temperature control module is mounted.
i_Backup	ON/OFF	Turn ON this parameter to write the parameter
		setting in the buffer memory to the non-volatile
		memory.
i_DefaultSetting	ON/OFF	Turn ON this parameter to return the buffer memory
		contents to the default values.

After M230 is turned ON, the setting value backup command is performed by turning ON M231 and the buffer memory contents are returned to the default values by turning ON M232.



