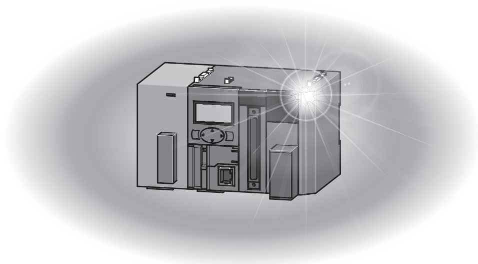
MITSUBISHI ELECTRIC

Programmable Controller

MELSEC L series

MELSEC-L High-Speed Counter Module User's Manual

-LD62
-LD62D



●SAFETY PRECAUTIONS●

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.
The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the CPU module used.

In this manual, the safety precautions are classified into two levels: "⚠WARNING" and "⚠CAUTION".

⚠WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠WARNING

- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Do not write any data to the "system area" of the buffer memory in the intelligent function module. Also, do not use any "use prohibited" signals as an input signal from the CPU module to the intelligent function module.
  Doing so may cause malfunction of the programmable controller system.
- Outputs may remain on or off due to a failure of a transistor for external output. Configure an external circuit for monitoring output signals that could cause a serious accident.

[Design Precautions]

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 150mm or more between them. Failure to do so may result in malfunction due to noise.

[Installation Precautions]

⚠WARNING
● Shut off the external power supply (all phases) used in the system before mounting or removing a module. Failure to do so may result in electric shock or cause the module to fail or malfunction.

[Installation Precautions]

⚠CAUTION
● Use the programmable controller in an environment that meets the general specifications in the Safety Guidelines provided with the CPU module or head module. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product. ● To interconnect modules, engage the respective connectors and securely lock the module joint levers until they click. Incorrect interconnection may cause malfunction, failure, or drop of the module. ● Do not directly touch any conductive parts and electronic components of the module. Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠WARNING
● Shut off the external power supply (all phases) used in the system before wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.

[Wiring Precautions]

⚠CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100Ω or less. Failure to do so may result in electric shock or malfunction.
- Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
- Connectors for external devices must be crimped with the tool specified by the manufacturer or must be correctly soldered.
  Incomplete connections may cause short circuit, fire, or malfunction.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- Tighten the connector screws within the specified torque range.
  Undertightening can cause drop of the screw, short circuit, fire, or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part.
  For the cable with connector, hold the connector part of the cable.
  Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
- Ground the shield cable on the encoder side (relay box). Always ground the FG and LG terminals to the protective ground conductor. Failure to do so may cause malfunction.
- Mitsubishi programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring methods, refer to the MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection).

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the connector screws. Failure to do so may result in electric shock.

[Startup and Maintenance Precautions]

⚠CAUTION

- Do not disassemble or modify the module. Doing so may cause failure, malfunction, injury, or a fire.
- Shut off the external power supply (all phases) used in the system before mounting or removing a module. Failure to do so may cause the module to fail or malfunction.
- After the first use of the product (module and display unit), do not connect/disconnect the product more than 50 times (in accordance with IEC 61131-2). Exceeding the limit may cause malfunction.
- Tighten the connector screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

⚠CAUTION

- When disposing of this product, treat it as industrial waste.

●CONDITIONS OF USE FOR THE PRODUCT●

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC-L series programmable controllers.
This manual describes the functions and programming of a high-speed counter module.

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC-L series programmable controller to handle the product correctly.
When applying the program examples introduced in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.

■Relevant modules: LD62, LD62D

Remark

Unless otherwise specified, this manual describes the program examples in which the I/O numbers of X/Y00 to X/Y0F are assigned for a high-speed counter module.
For I/O number assignment, refer to the following.

MELSEC-L CPU Module User's Manual (Function Explanation, Program Fundamentals)

Operating procedures are explained using GX Works2. When using GX Developer or GX Configurator-CT, refer to the following.

- When using GX Developer or GX Configurator-CT (Page 122, Appendix 5)

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

(1) Method of ensuring compliance

To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.

- MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
- MELSEC-L CC-Link IE Field Network Head Module User's Manual
- Safety Guidelines (This manual is included with the CPU module or head module.)

The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

(2) Additional measures

To ensure that this product maintains EMC and Low Voltage Directives, please refer to Page 37, Section 6.2.1 (4).

RELEVANT MANUALS

(1) CPU module user's manual

Manual name <manual number (model code)>	Description
MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) <SH-080890ENG, 13JZ36>	Specifications of the CPU modules, power supply modules, display unit, branch module, extension module, SD memory cards, and batteries, information on how to establish a system, maintenance and inspection, and troubleshooting
MELSEC-L CPU Module User's Manual (Function Explanation, Program Fundamentals) <SH-080889ENG, 13JZ35>	Functions and devices of the CPU module, and programming

(2) Head module user's manual

Manual name <manual number (model code)>	Description
MELSEC-L CC-Link IE Field Network Head Module User's Manual <SH-080919ENG, 13JZ48>	Specifications, procedures before operation, system configuration, installation, wiring, settings, and troubleshooting of the head module
MELSEC-L SSCNETIII/H Head Module User's Manual <SH-081152ENG, 13JZ78>	Specifications, procedures before operation, system configuration, installation, wiring, settings, and troubleshooting of the head module

(3) Operating manual

Manual name <manual number (model code)>	Description
GX Works2 Version 1 Operating Manual (Common) <SH-080779ENG, 13JU63>	System configuration, parameter settings, and online operations of GX Works2, which are common to Simple projects and Structured projects
GX Developer Version 8 Operating Manual <SH-080373E, 13JU41>	Operating methods of GX Developer, such as programming, printing, monitoring, and debugging

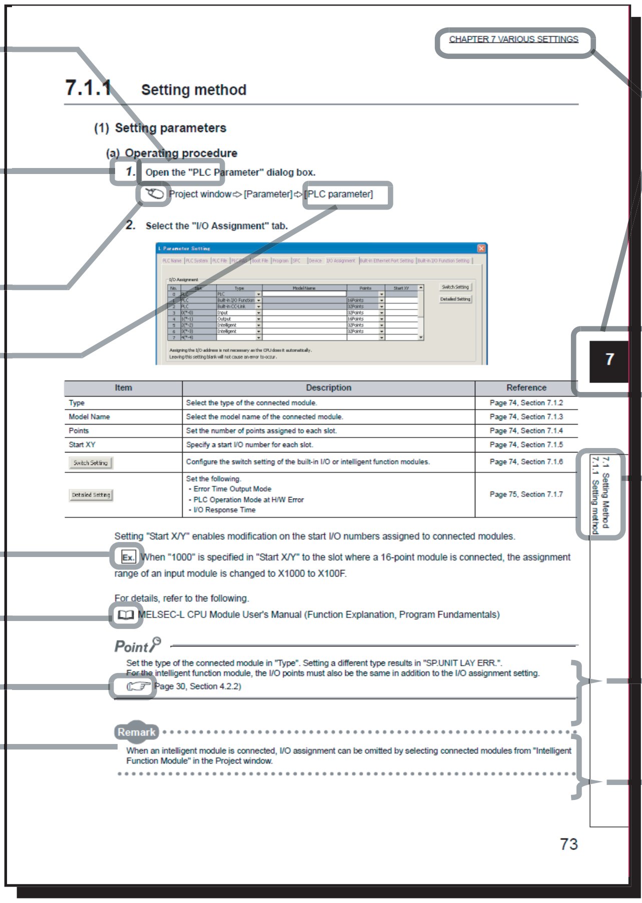
Memo

CONTENTS

MANUAL PAGE ORGANIZATION

In this manual, pages are organized and the symbols are used as shown below.

The following illustration is for explanation purpose only, and should not be referred to as an actual documentation.



"" is used for screen names and items.

1. shows operating procedures.

(mouse icon) shows mouse operations.*1

[ ] is used for items in the menu bar and the project window.

Ex. shows setting or operating examples.

(book icon) shows reference manuals.

(hand icon) shows reference pages.

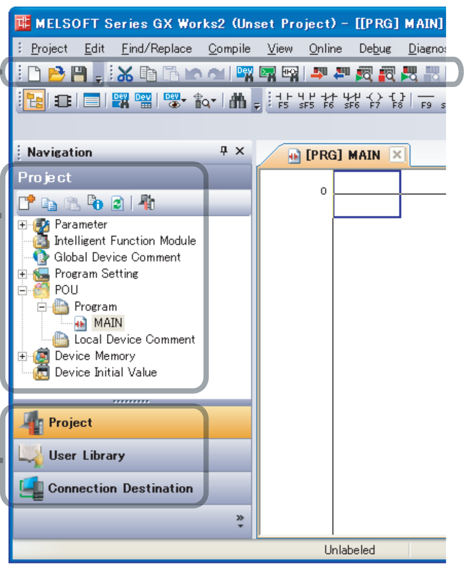
The chapter of the current page is shown.

The section of the current page is shown.

Point shows notes that requires attention.

Remark shows useful information.

*1 The mouse operation example (for GX Works2) is provided below.



Menu bar

Ex. [Online] ⇨ [Write to PLC...]

Select [Online] on the menu bar, and then select [Write to PLC...].

A window selected in the view selection area is displayed.

Ex. Project window ⇨ [Parameter] ⇨ [PLC Parameter]

Select [Project] from the view selection area to open the Project window.

In the Project window, expand [Parameter] and select [PLC Parameter].

View selection area

TERMS

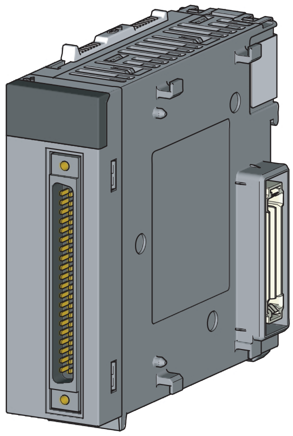
Unless otherwise specified, this manual uses the following terms.

Term	Description
High-speed counter module	Another term for the MELSEC-L series high-speed counter module
Head module	Abbreviation for the LJ72GF15-T2 CC-Link IE Field Network head module
Display unit	A liquid crystal display to be attached to the CPU module
Programming tool	Generic term for GX Works2 and GX Developer
GX Works2	The product name of the software package for the MELSEC programmable controllers
GX Developer	
GX Configurator-CT	A setting and monitoring tool added in GX Developer (for high-speed counter modules)
Buffer memory	A memory in an intelligent function module, where data (such as setting values and monitoring values) exchanged with a CPU module are stored

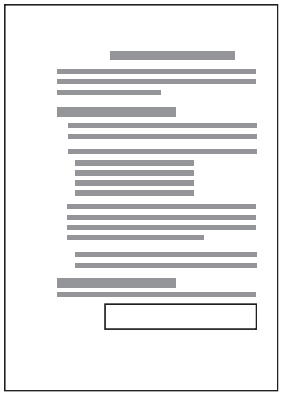
PACKING LIST

The following items are included in the package of this product. Before use, check that all the items are included.

High-speed counter module



Module



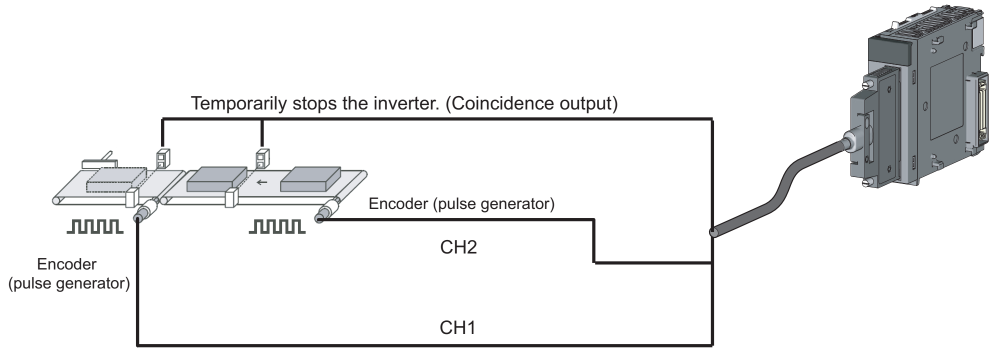
Before Using the Product

CHAPTER 1 HIGH-SPEED COUNTER MODULE

This chapter describes the application and the features of the high-speed counter module.

1.1 Application

The high-speed counter module is capable of counting the number of inputs of a high-speed pulse that cannot be measured by a sequence using general-purpose input modules.



1.2 Features

(1) Offering counting capability over the wide range from -2147483648 to 2147483647

- The module stores a count value in 32-bit signed binary.
- The number of channels is two.

(2) Switching the maximum counting speed

For the LD62D, 500k/200k/100k/10k can be switched and for the LD62, 200k/100k/10k can be switched, thereby achieving an error-free count even if a pulse has a gradual rising/falling edge.

(3) Allowing selection of pulse input

The pulse input mode can be selected from the following: 1-phase multiple of 1, 1-phase multiple of 2, 2-phase multiple of 1, 2-phase multiple of 2, 2-phase multiple of 4, and CW/CCW.

(4) Allowing selection of counter types

Either one of the following counter types can be selected.

(a) Linear counter type

This type is capable of counting pulses ranging from -2147483648 to 2147483647 and detects an overflow if this range is exceeded.

(b) Ring counter type

This type counts pulses repeatedly under the range of the ring counter upper limit value and the ring counter lower limit value.

(5) Permitting coincidence output

Outputting on/off signals or initiating an interrupt program is possible at the timing when a coincidence output point, which is set arbitrarily beforehand, matches the current value in comparison with each other.

(6) Allowing selection from the four counter functions

One of the following functions can be selected for use.

(a) Count disable function

This function makes the pulse count stop by inputting a signal while CH□ Count enable command (Y4, YC) is on.

(b) Latch counter function

This function latches the current value of a counter at the time of input of a signal.

(c) Sampling counter function

Of input signals, this function counts pulses that are input during a time specified beforehand.

(d) Periodic pulse counter function

While signals are input, this function stores the current value and previous value of a counter at each pre-specified period.

(7) Executing the preset function and the counter function selection via external control signals

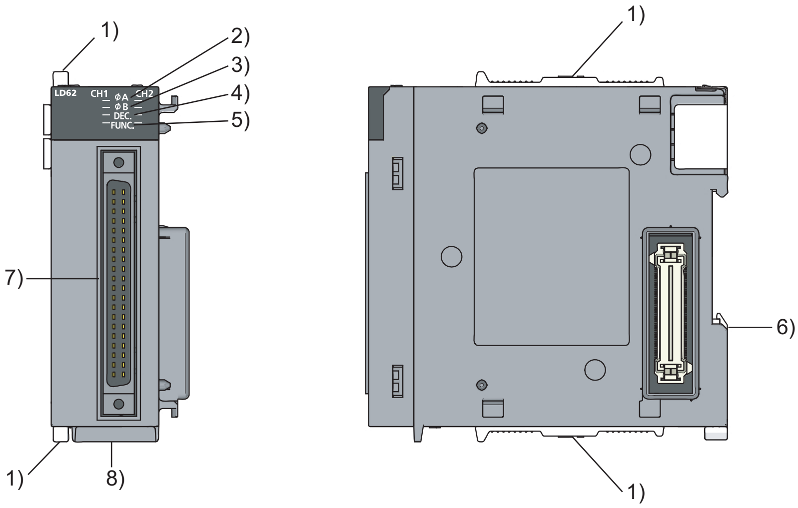
- Applying a voltage to the preset input terminal allows the preset function to be performed.
- Applying a voltage to the function start input terminal allows the counter function selection to be performed.

(8) Easy settings with GX Works2

GX Works2 allows Initial settings and auto refresh settings to be configured on the window, resulting in the reduction of programs and making it easier to check the status of module settings and operation.

CHAPTER 2 PART NAMES

The following table lists the part names of the high-speed counter module.



No.	Name	Description
1)	Module joint levers	Levers for connecting two modules
2)	ϕA LED	On: A voltage is being applied to the phase A pulse input terminal.
3)	ϕB LED	On: A voltage is being applied to the phase B pulse input terminal.
4)	DEC. LED	On: Pulses are being counted down.
5)	FUNC. LED	On: A voltage is being applied to the function start input terminal.
6)	DIN rail hook	A hook used to mount the module to a DIN rail
7)	Connector for external devices (40 pins)	A connector for I/O signal cables of external devices (Page 41, Section 6.2.3)
8)	Serial number display	Displays the serial number printed on the rating plate.

Memo

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CHAPTER 3 SPECIFICATIONS

This chapter describes general specifications, performance specifications, functions, I/O signals, and buffer memory areas.

3.1 General Specifications

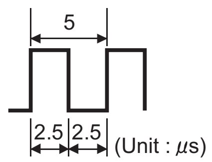
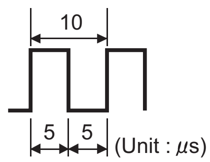
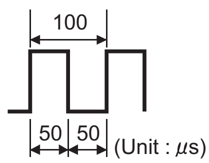
For the general specifications of the high-speed counter module, refer to the following.

📖 Safety Guidelines, provided with the CPU module or head module

3.2 Performance Specifications

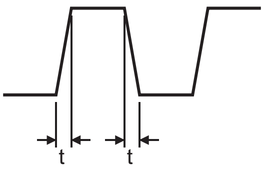
The following table describes the performance specifications of the high-speed counter module.

(1) LD62 (DC input sink output type)

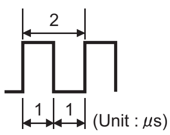
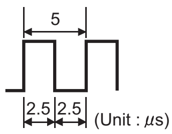
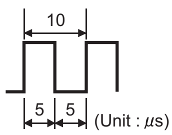
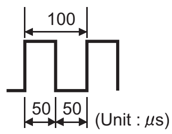
Item		Specifications		
Counting speed switch setting[*1]		200k (100k to 200kPPS)	100k (10k to 100kPPS)	10k (10kPPS or less)
Number of occupied I/O points		16 points (I/O assignment: Intelligent, 16 points)		
Number of channels		2 channels		
Count input signal	Phase	1-phase input (1 multiple/2 multiples), 2-phase input (1 multiple/2 multiples/4 multiples), CW/CCW input		
	Signal level (ϕA, ϕB)	5/12/24VDC 2 to 5mA		
Counter	Counting speed (maximum)[*2]	200kPPS	100kPPS	10kPPS
	Counting range	32-bit signed binary (-2147483648 to 2147483647)		
	Type	UP/DOWN preset counter + Ring counter functions		
	Minimum count pulse width (duty ratio 50%)	 (Minimum phase difference in 2-phase input 1.25µs)	 (Minimum phase difference in 2-phase input 2.5µs)	 (Minimum phase difference in 2-phase input 25µs)
Coincidence output	Comparison range	32-bit signed binary		
	Comparison result	Setting value < Count value Setting value = Count value Setting value > Count value		
External input	Preset	5/12/24VDC 2 to 5mA		
	Function start			
External output	Coincidence output	Transistor (sink type) output, 2 points/channel 12/24VDC 0.5A/point, 2A/common		
Internal current consumption (5VDC)		0.31A		
Weight		0.13kg		

*1 The value can be configured in intelligent function module switch setting.
*2 The counting speed is affected by the pulse rise/fall time.
The number of pulses that can be counted depending on the counting speed is as follows. Note that the count may be incorrect when pulses with long rise/fall time are counted.

Counting speed switch setting	200k	100k	10k
Rise/fall time	Both 1- and 2-phase inputs		
t = 1.25µs or less	200kPPS	100kPPS	10kPPS
t = 2.5µs or less	100kPPS	100kPPS	10kPPS
t = 25µs or less	—	10kPPS	10kPPS
t = 500µs	—	—	500PPS

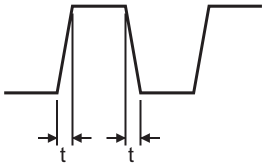


(2) LD62D (differential input sink output type)

Item		Specifications			
Counting speed switch setting*1		500k (200k to 500kPPS)	200k (100k to 200kPPS)	100k (10k to 100kPPS)	10k (10kPPS or less)
Number of occupied I/O points		16 points (I/O assignment: Intelligent, 16 points)			
Number of channels		2 channels			
Count input signal	Phase	1-phase input (1 multiple/2 multiples), 2-phase input (1 multiple/2 multiples/4 multiples), CW/CCW input			
	Signal level (ϕA, ϕB)	EIA Standard RS-422-A Differential line driver level (AM26LS31 (manufactured by Texas Instruments Incorporated) or equivalent)			
Counter	Counting speed (maximum)*2	500kPPS	200kPPS	100kPPS	10kPPS
	Counting range	32-bit signed binary (-2147483648 to 2147483647)			
	Type	UP/DOWN preset counter + Ring counter functions			
	Minimum count pulse width (duty ratio 50%)	 (Minimum phase difference in 2-phase input 0.5µs)	 (Minimum phase difference in 2-phase input 1.25µs)	 (Minimum phase difference in 2-phase input 2.5µs)	 (Minimum phase difference in 2-phase input 25µs)
Coincidence output	Comparison range	32-bit signed binary			
	Comparison result	Setting value < Count value Setting value = Count value Setting value > Count value			
External input	Preset	5/12/24VDC 2 to 5mA (EIA Standard RS-422-A differential line driver can be connected.)			
	Function start				
External output	Coincidence output	Transistor (sink type) output, 2 points/channel 12/24VDC 0.5A/point, 2A/common			
Internal current consumption (5VDC)		0.36A			
Weight		0.13kg			

*1 The value can be configured in intelligent function module switch setting.
*2 The counting speed is affected by the pulse rise/fall time.
The number of pulses that can be counted depending on the counting speed is as follows. Note that the count may be incorrect when pulses with long rise/fall time are counted.

Counting speed switch setting	500k	200k	100k	10k
Rise/fall time	Both 1- and 2-phase inputs			
t = 0.5μs or less	500kPPS	200kPPS	100kPPS	10kPPS
t = 1.25μs or less	200kPPS	200kPPS	100kPPS	10kPPS
t = 2.5μs or less	—	100kPPS	100kPPS	10kPPS
t = 25μs or less	—	—	10kPPS	10kPPS
t = 500μs	—	—	—	500PPS



3.2.1 Number of parameters that can be set

Configure the parameters of the initial setting and the auto refresh of the high-speed counter module within the number of parameters that can be set to the CPU module or head module, including the number of parameters set for other intelligent function modules. For the number of parameters that can be set to the CPU module and head module, refer to the following.

MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
MELSEC-L CC-Link IE Field Network Head Module User's Manual

(1) Number of high-speed counter module parameters

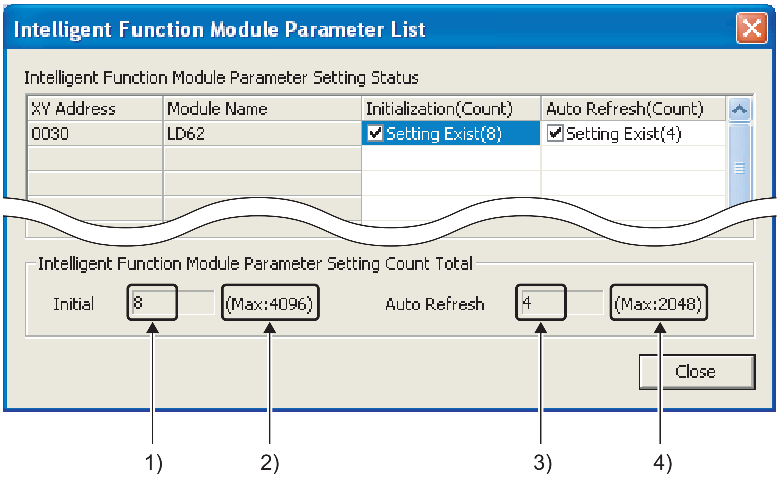
The following number of parameters can be set for one high-speed counter module.

Model	Initial setting	Auto refresh
LD62	8	14 (maximum number of parameters)
LD62D	8	14 (maximum number of parameters)

(2) Checking the number of parameters

The number of parameters set for the intelligent function module and the maximum number of parameters can be checked by the following operation.

Project window ➪ [Intelligent Function Module] ➪ Right-click ➪ [Intelligent Function Module Parameter List]



No.	Description
1)	The total number of parameters that have been selected under "Initialization (Count)"
2)	The maximum number of parameters for initial setting
3)	The total number of parameters that have been selected under "Auto Refresh (Count)"
4)	The maximum number of parameters for auto refresh setting

3.3 Function List

The following table lists the functions of the high-speed counter module.

Item		Description	Reference
Linear counter function		This function counts pulses between -2147483648 and 2147483647 and detects an overflow if the count value is outside the range.	Page 65, Section 8.2.1
Ring counter function		This function repeatedly counts pulses between the ring counter upper limit value and the ring counter lower limit value.	Page 66, Section 8.2.2
Coincidence output function	—	This function compares the present counter value with the preset coincidence output point setting value and outputs on or off signal when they match.	Page 69, Section 8.3
	Coincidence detection interrupt function	This function outputs an interrupt signal to the CPU module and starts an interrupt program when the present counter value matches with the preset coincidence output point setting value.	
Preset function		This function overwrites the present counter value with the preset value. This function is performed by a program or an external control signal (preset input).	Page 75, Section 8.4
Counter function selection	Count disable function	This function stops counting pulses while CH□ Count enable command (Y4, YC) is on.	Page 80, Section 8.6
	Latch counter function	This function stores the present counter value to the buffer memory when the counter function selection start command signal is input. This function is performed by a program or an external control signal (function input).	Page 81, Section 8.7
	Sampling counter function	This function counts pulses input during the specified sampling period after the counter function selection start command is input and stores the counter value to the buffer memory. This function is performed by a program or an external control signal (function input).	Page 82, Section 8.8
	Periodic pulse counter function	This function stores the present and previous counter values to the corresponding buffer memory areas at the preset cycle while the counter function selection start command signal is input.	Page 83, Section 8.9

Point

- These functions can be used together.
  However, select either the linear counter function or the ring counter function and any one of the counter functions from counter function selection.
- The preset function and the function selected from counter function selection can also be performed by the following external inputs.
  - To use the preset function, apply a voltage to the preset input terminal.
  - To use any function of the counter function selection, apply a voltage to the function start input terminal.

3.4 List of I/O Signals

The following table lists the I/O signals of the high-speed counter module.
For details on the I/O signals, refer to the following.

- Details of I/O signals (Page 114, Appendix 1)

Input signal		Output signal	
Device No.	**Signal name**	**Device No.**	**Signal name**
X0	Module READY	Y0	CH1 Coincidence signal No.1 reset command
X1	CH1 Counter value large (point No.1)	Y1	CH1 Preset command
X2	CH1 Counter value coincidence (point No.1)	Y2	CH1 Coincidence signal enable command
X3	CH1 Counter value small (point No.1)	Y3	CH1 Down count command
X4	CH1 External preset request detection	Y4	CH1 Count enable command
X5	CH1 Counter value large (point No.2)	Y5	CH1 External preset detection reset command
X6	CH1 Counter value coincidence (point No.2)	Y6	CH1 Counter function selection start command
X7	CH1 Counter value small (point No.2)	Y7	CH1 Coincidence signal No.2 reset command
X8	CH2 Counter value large (point No.1)	Y8	CH2 Coincidence signal No.1 reset command
X9	CH2 Counter value coincidence (point No.1)	Y9	CH2 Preset command
XA	CH2 Counter value small (point No.1)	YA	CH2 Coincidence signal enable command
XB	CH2 External preset request detection	YB	CH2 Down count command
XC	CH2 Counter value large (point No.2)	YC	CH2 Count enable command
XD	CH2 Counter value coincidence (point No.2)	YD	CH2 External preset detection reset command
XE	CH2 Counter value small (point No.2)	YE	CH2 Counter function selection start command
XF	Use prohibited	YF	CH2 Coincidence signal No.2 reset command

Point

- The I/O numbers (X/Y) above apply when the start I/O number of the high-speed counter module is set to "0".
- The use prohibited signal above is used by the system and is not available for users. If used (turned on) by a user, the performance of the high-speed counter module is not guaranteed.

3.5 List of Buffer Memory Areas

The following table lists the buffer memory areas of the high-speed counter module.
For details on the buffer memory areas, refer to the following.

- Details of Buffer Memory Areas (Page 118, Appendix 2)

Address (decimal)	Address (hexadecimal)	Name	Initial value*1	Read/write*2
0	0_H	CH1 Preset value (L)*3	0	R/W
1	1_H	CH1 Preset value (H)*3	0	R/W
2	2_H	CH1 Present value (L)*3	0	R
3	3_H	CH1 Present value (H)*3	0	R
4	4_H	CH1 Coincidence output point No.1 (L)*3	0	R/W
5	5_H	CH1 Coincidence output point No.1 (H)*3	0	R/W
6	6_H	CH1 Coincidence output point No.2 (L)*3	0	R/W
7	7_H	CH1 Coincidence output point No.2 (H)*3	0	R/W
8	8_H	CH1 Overflow detection	0	R
9	9_H	CH1 Counter function selection	0	R/W
10	A_H	CH1 Sampling/periodic time setting	0	R/W
11	B_H	CH1 Sampling/periodic counter flag	0	R
12	C_H	CH1 Latch count value (L)*3	0	R
13	D_H	CH1 Latch count value (H)*3	0	R
14	E_H	CH1 Sampling count value (L)*3	0	R
15	F_H	CH1 Sampling count value (H)*3	0	R
16	10_H	CH1 Periodic pulse count previous value (L)*3	0	R
17	11_H	CH1 Periodic pulse count previous value (H)*3	0	R
18	12_H	CH1 Periodic pulse count present value (L)*3	0	R
19	13_H	CH1 Periodic pulse count present value (H)*3	0	R
20	14_H	CH1 Ring counter lower limit (L)*3	0	R/W
21	15_H	CH1 Ring counter lower limit (H)*3	0	R/W
22	16_H	CH1 Ring counter upper limit (L)*3	0	R/W
23	17_H	CH1 Ring counter upper limit (H)*3	0	R/W
24 to 31	18_H to $1F_H$	System area	—	—
32	20_H	CH2 Preset value (L)*3	0	R/W
33	21_H	CH2 Preset value (H)*3	0	R/W
34	22_H	CH2 Present value (L)*3	0	R
35	23_H	CH2 Present value (H)*3	0	R
36	24_H	CH2 Coincidence output point No.1 (L)*3	0	R/W
37	25_H	CH2 Coincidence output point No.1 (H)*3	0	R/W
38	26_H	CH2 Coincidence output point No.2 (L)*3	0	R/W
39	27_H	CH2 Coincidence output point No.2 (H)*3	0	R/W

Address (decimal)	Address (hexadecimal)	Name	Initial value*1	Read/write*2
40	28_H	CH2 Overflow detection	0	R
41	29_H	CH2 Counter function selection	0	R/W
42	$2A_H$	CH2 Sampling/periodic time setting	0	R/W
43	$2B_H$	CH2 Sampling/periodic counter flag	0	R
44	$2C_H$	CH2 Latch count value (L)*3	0	R
45	$2D_H$	CH2 Latch count value (H)*3	0	R
46	$2E_H$	CH2 Sampling count value (L)*3	0	R
47	$2F_H$	CH2 Sampling count value (H)*3	0	R
48	30_H	CH2 Periodic pulse count previous value (L)*3	0	R
49	31_H	CH2 Periodic pulse count previous value (H)*3	0	R
50	32_H	CH2 Periodic pulse count present value (L)*3	0	R
51	33_H	CH2 Periodic pulse count present value (H)*3	0	R
52	34_H	CH2 Ring counter lower limit (L)*3	0	R/W
53	35_H	CH2 Ring counter lower limit (H)*3	0	R/W
54	36_H	CH2 Ring counter upper limit (L)*3	0	R/W
55	37_H	CH2 Ring counter upper limit (H)*3	0	R/W
56 to 63	38_H to $3F_H$	System area	—	—

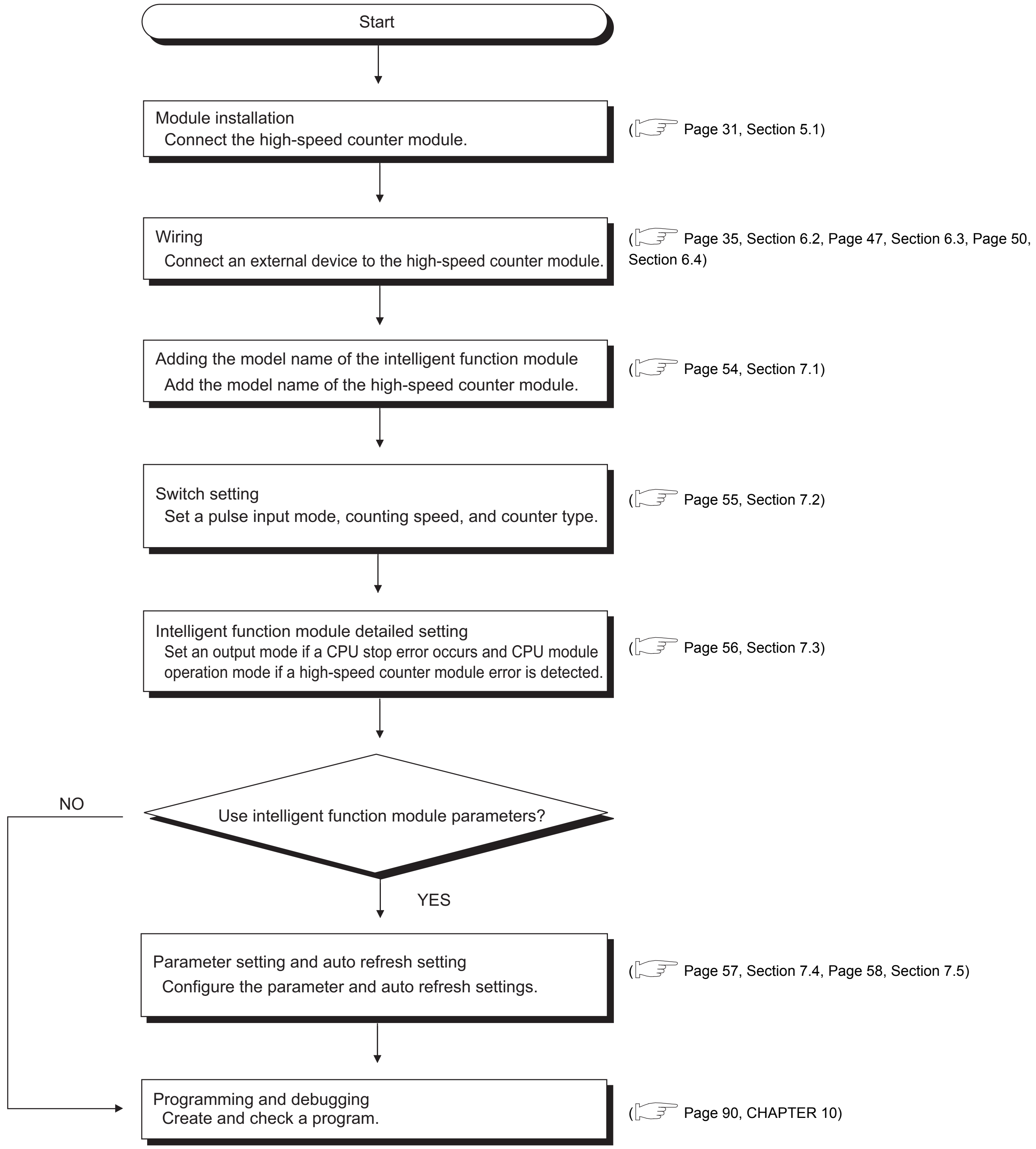
*1 This value is set when the high-speed counter module is powered on or the CPU module is reset.
*2 Whether a value can be read from/written to a program or not is indicated.
R: Readable
W: Writable
*3 Read or write values in 32-bit signed binary. (Be sure to use two words at a time.)

Point

- The system areas listed above and the areas not listed above are used by the system and are not available for users. If data are written by a user, the performance of the high-speed counter module is not guaranteed.
- Buffer memory data in the high-speed counter module are initialized when the high-speed counter module is powered on or the CPU module is reset. To save the necessary data, read/write the data by executing the FROM/DFRO/TO/DTO instructions in the program or performing auto refresh to the device data.

CHAPTER 4 PROCEDURES BEFORE OPERATION

This chapter lists the procedures before operation.



Memo

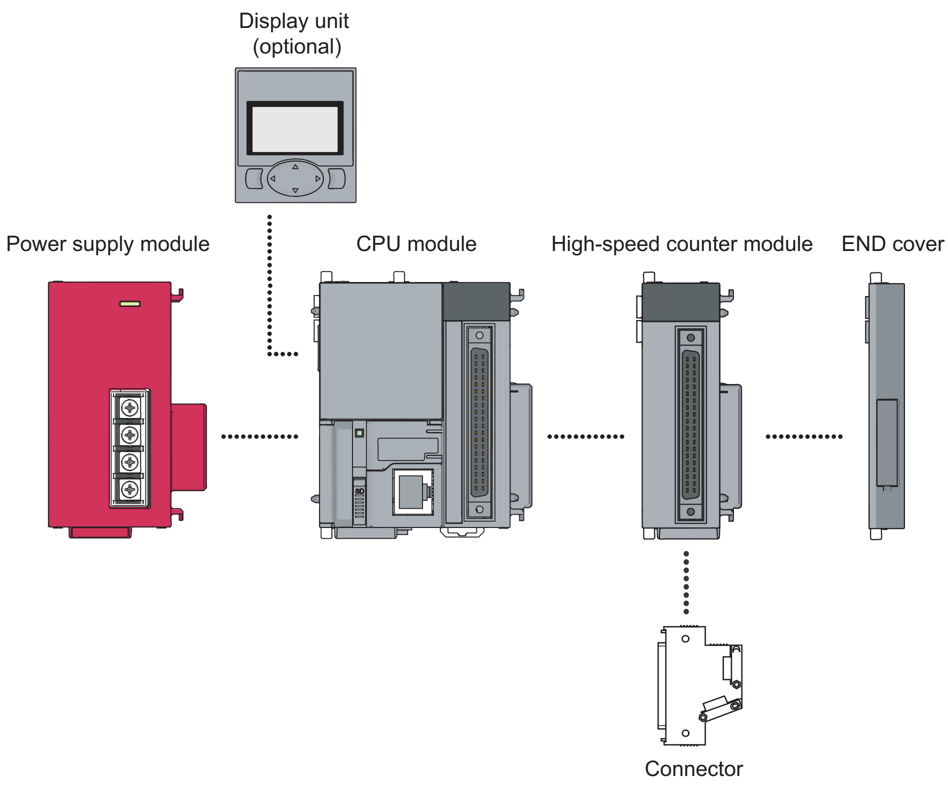
CHAPTER 5 SYSTEM CONFIGURATION

This chapter describes the overall configuration, number of connectable modules, and compatible software versions of the high-speed counter module.

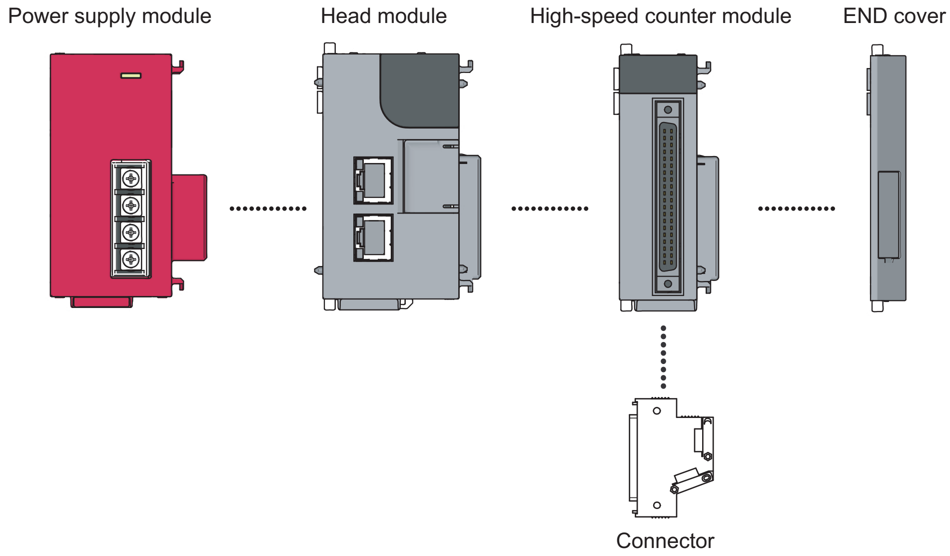
5.1 Overall Configuration

The following figures show examples of system configuration using the high-speed counter module.

(1) When connected to the CPU module



(2) When connected to the head module



5.2 Applicable System

(1) Number of connectable modules

For the number of connectable modules, refer to the following.

MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

MELSEC-L CC-Link IE Field Network Head Module User's Manual

(2) Compatible software versions

For compatible software versions, refer to the following.

MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

MELSEC-L CC-Link IE Field Network Head Module User's Manual

5.2.1 Restrictions when the high-speed counter module is connected to the head module

The restrictions are as follows:

- The coincidence detection interrupt function cannot be used.
- Due to the link scan time, a delay occurs. This delay causes variations if the processing is carried out with counter values that are input using a program. Thoroughly examine the system to make sure that it will not cause controllability problem.

CHAPTER 6 INSTALLATION AND WIRING

This chapter describes installation and wiring of the high-speed counter module.

6.1 Installation Environment and Installation Position

For precautions for installation environment and installation position, refer to the following.

MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

MELSEC-L CC-Link IE Field Network Head Module User's Manual

6.2 Wiring

This section describes wiring of encoders and controllers to the high-speed counter module.

6.2.1 Wiring precautions

To obtain the maximum performance from the functions of the high-speed counter module and improve the system reliability, an external wiring with high durability against noise is required.
Here are some precautions when wiring encoders and controllers.

(1) Wiring

- Different terminals are prepared depending on the voltage of the signal to be input. Connecting to a terminal with a different voltage may cause malfunction of the module or failure of the connected devices.
- In 1-phase input, always connect a pulse input cable on the A-phase side.
- Install a fuse for each external terminal to prevent the external devices or module from being burnt out or damaged if a load shorts in an output circuit. The following fuses have been tested by Mitsubishi.

Fuse model name	Rated current	Contact
312.750	0.75A	Littelfuse www.littelfuse.com
216.800	0.8A	

(2) Connectors for external devices

- Connectors for external devices must be soldered or crimped properly. A poor soldering or crimping may result in malfunction.
- Securely connect the connectors for external devices to the connectors of the high-speed counter module, and securely tighten the two screws.
- When removing a cable from the high-speed counter module, do not pull the cable by the cable part. Remove a cable supporting the connector part of the cable by hand. Pulling the cable being connected to the high-speed counter module can cause malfunction. In addition, a damage of the high-speed counter module or cables can result.

(3) Measures against noise

- The high-speed counter module may count pulses incorrectly if pulse-like noise is input.
- For the input of high-speed pulses, take the following measures against noise:

Measure 1

Use shielded twisted pair cables.

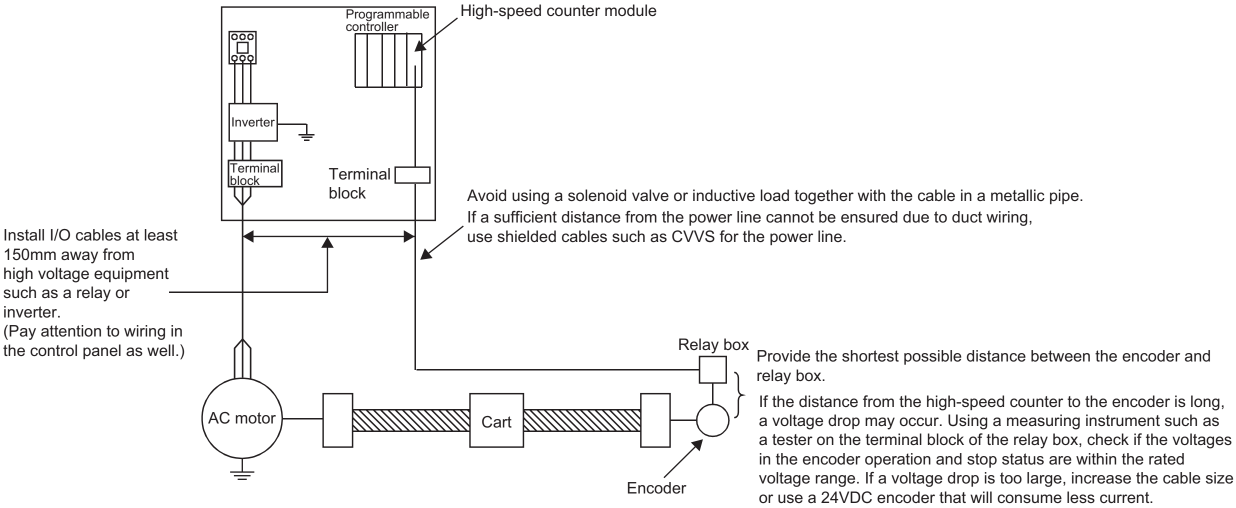
Measure 2

Use the shortest possible shielded twisted pair cables, placing them not parallel with noise-generating power cables or I/O cables and at a distance of 150mm or more.

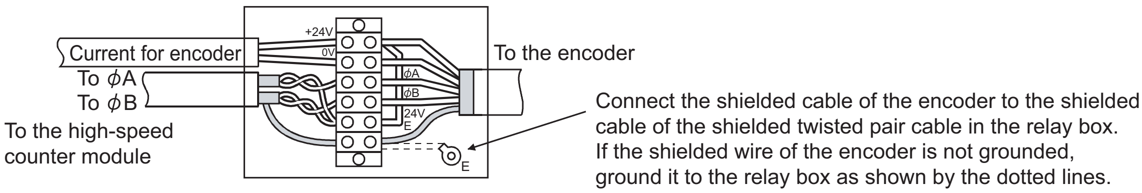
Measure3

Ground the shield cable on the encoder side (relay box). Always ground the FG and LG terminals to the protective ground conductor.

- The following figure shows a wiring example for noise reduction.



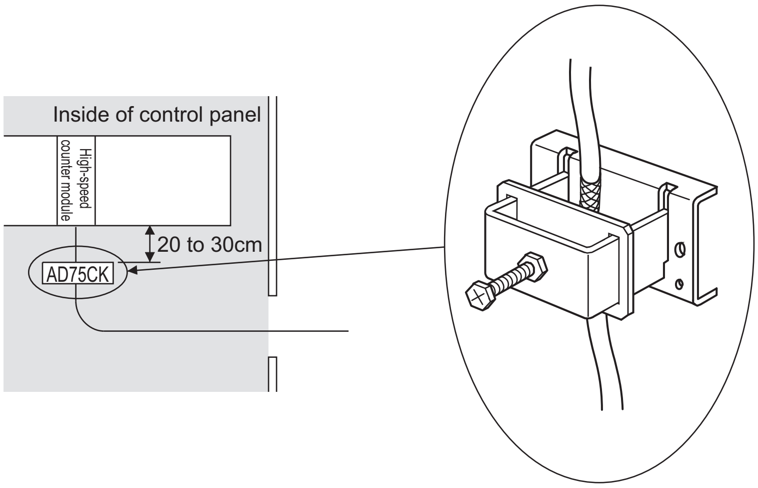
- Ground the shielded twisted pair cable on the encoder side (relay box). (Shown here is an example of wiring to an open collector output type encoder (24VDC).)



(4) Requirements for compliance with the EMC and Low Voltage Directives

Take the following measures for compliance with the EMC and Low Voltage Directives.

- Install a DC power inside the control panel.
- Use a shielded cable for the DC power when the cable is extended out of the control panel.
- Keep the length of the cables between the high-speed counter module and the external devices to 30m or less.
- Use a shielded twisted pair cable and ground the shielded part of the cable to the control panel with the AD75CK-type cable clamping (Mitsubishi).



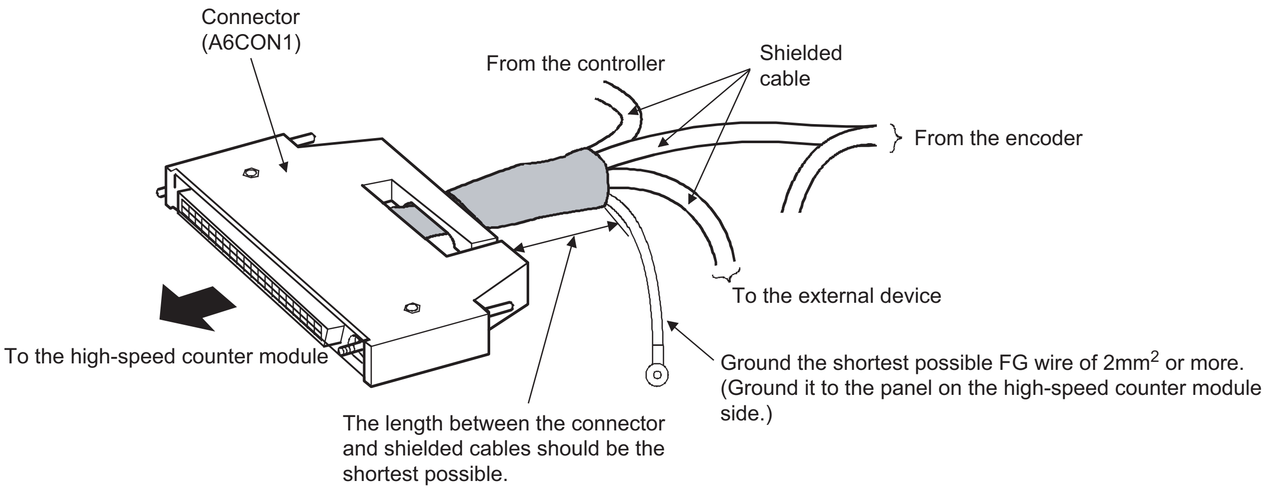
For details on the AD75CK, refer to the following.

AD75CK-type Cable Clamping Instruction Manual

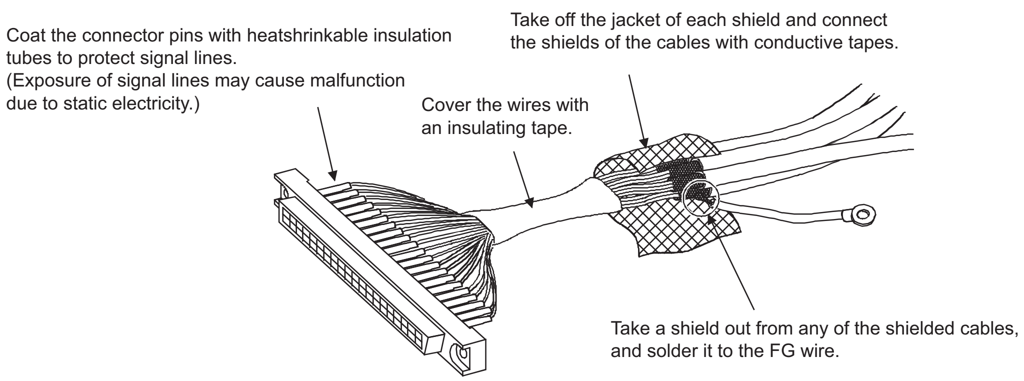
• Take the following noise reduction measures when wiring a connector for external devices.

[Example of wiring using a shielded cable]

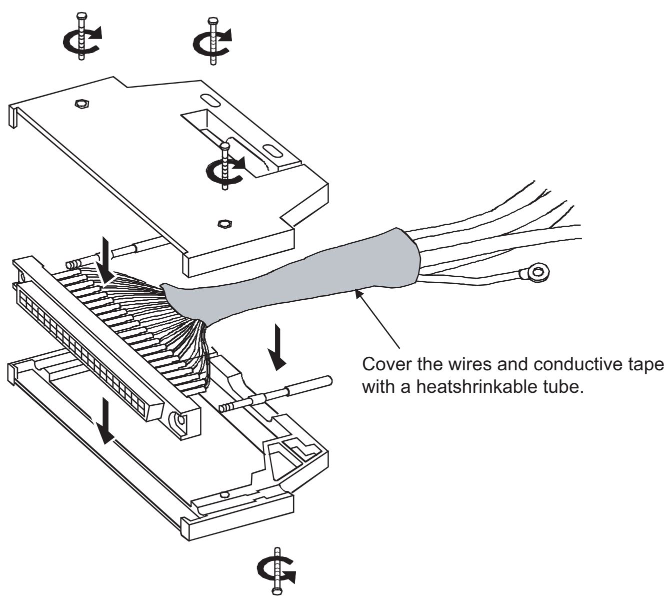
The following figure shows an example of wiring for noise reduction using the A6CON1.



[Example of noise reduction measures taken to shielded cables]



Assembling the A6CON1



6.2.2 Connectors for external devices

(1) Precautions

- Tighten the connector screws within the specified torque range.

Screw	Tightening torque range
Connector screw (M2.6)	0.20 to 0.29N·m

- Use copper wires having temperature rating of 75℃ or more for the connectors.
- Use UL listed connectors if necessary for UL compliance.

(2) Applicable connectors

Connectors for external devices that are applicable to the high-speed counter module need to be obtained by a user.
The following tables list the applicable connectors, and the reference product of a crimping tool.

(a) 40-pin connectors

Type	Model	Applicable wire size
Soldering type connector (straight out type)	A6CON1	0.3 mm² (22 AWG) (Stranded)
Crimping type connector (straight type)	A6CON2	0.088 to 0.24mm² (28 to 24 AWG) (stranded wire)
Soldering type connector (dual purpose (straight/oblique) type)	A6CON4	0.3 mm² (22 AWG) (Stranded)

Point

The A6CON3 (IDC type connector (straight type)) cannot be used.

(b) 40-pin connector crimping tool

Type	Model	Contact
Crimping tool	FCN-363T-T005/H	FUJITSU COMPONENT LIMITED www.fcl.fujitsu.com/en

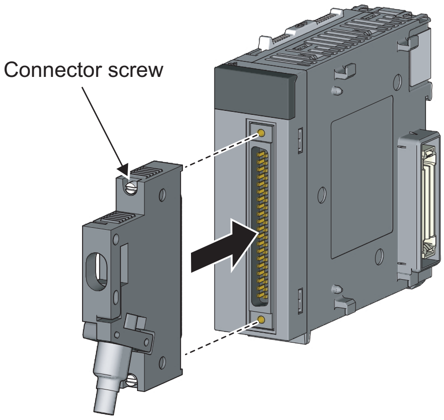
For how to wire the connector and how to use the crimping tool, contact the manufacturer.

(3) Wiring method

For wiring method, refer to the following.

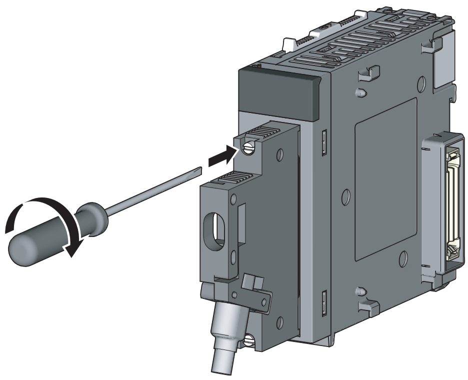
MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

(4) Connection procedure



1. **Plugging the connector**

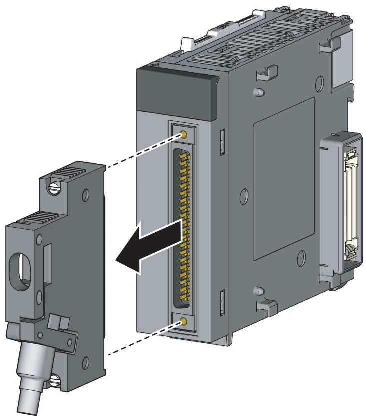
Plug the connector into the slot on the high-speed counter module.



2. **Tightening the connector screws**

Tighten the two connector screws (M2.6).

(5) Removal procedure



1. **Removing the connector**

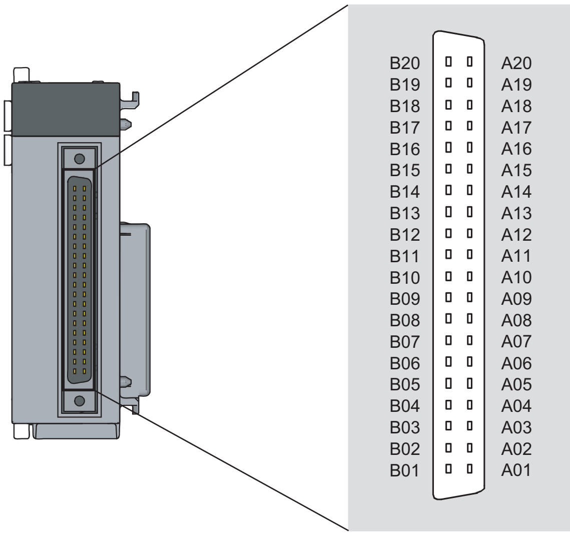
Loosen the two connector screws and pull out the connector from the module.

6.2.3 Interface with external devices

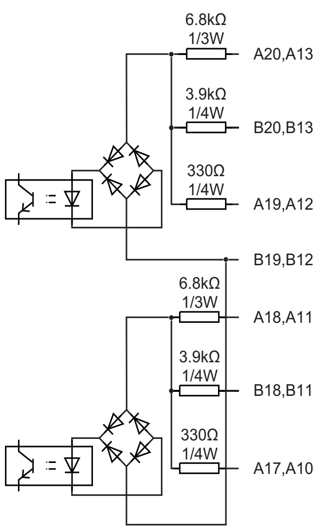
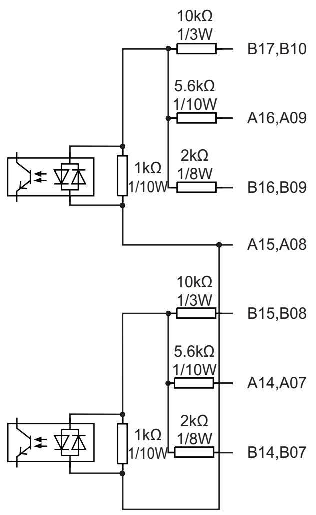
This section lists the interface of the high-speed counter module with external devices.

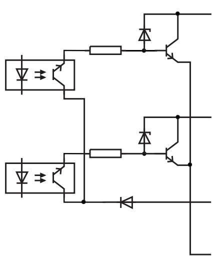
(1) Terminal layout and terminal numbers of the connector for external devices

The following figure shows the terminal layout and numbers on the connector for external devices.

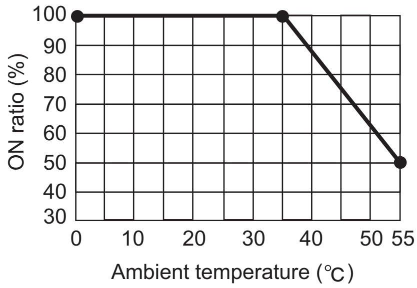


(2) LD62 (DC input sink output type)

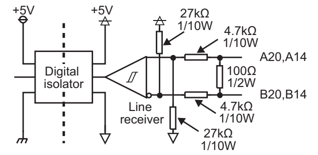
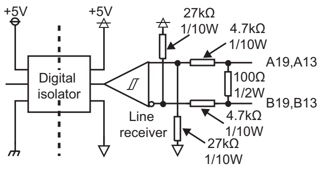
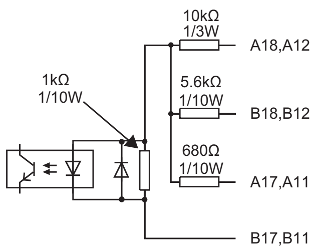
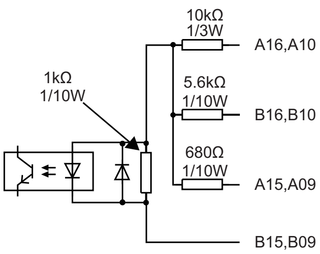
I/O classification	Internal circuit	Terminal number*1		Signal name	Operation	Input voltage (guaranteed value)	Operating current (guaranteed value)
		CH1	CH2				
Input		A20	A13	Phase A pulse input 24V	On	21.6 to 26.4V	2 to 5mA
					Off	5V or less	0.1mA or less
		B20	B13	Phase A pulse input 12V	On	10.8 to 13.2V	2 to 5mA
					Off	4V or less	0.1mA or less
		A19	A12	Phase A pulse input 5V	On	4.5 to 5.5V	2 to 5mA
					Off	2V or less	0.1mA or less
		B19	B12	ABCOM	—		
		A18	A11	Phase B pulse input 24V	On	21.6 to 26.4V	2 to 5mA
					Off	5V or less	0.1mA or less
		B18	B11	Phase B pulse input 12V	On	10.8 to 13.2V	2 to 5mA
					Off	4V or less	0.1mA or less
		A17	A10	Phase B pulse input 5V	On	4.5 to 5.5V	2 to 5mA
					Off	2V or less	0.1mA or less
		B17	B10	Preset input 24V	On	21.6 to 26.4V	2 to 5mA
					Off	5V or less	0.1mA or less
		A16	A09	Preset input 12V	On	10.8 to 13.2V	2 to 5mA
					Off	4V or less	0.1mA or less
		B16	B09	Preset input 5V	On	4.5 to 5.5V	2 to 5mA
					Off	2V or less	0.1mA or less
		A15	A08	CTRLCOM	Response time	Off to on 0.5ms or less	On to off 1ms or less
		B15	B08	Function start input 24V	On	21.6 to 26.4V	2 to 5mA
					Off	5V or less	0.1mA or less
		A14	A07	Function start input 12V	On	10.8 to 13.2V	2 to 5mA
					Off	4V or less	0.1mA or less
		B14	B07	Function start input 5V	On	4.5 to 5.5V	2 to 5mA
					Off	2V or less	0.1mA or less
		—	—	—	Response time	Off to on 0.5ms or less	On to off 1ms or less

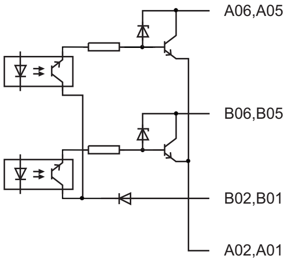
I/O classification	Internal circuit	Terminal number*1		Signal name	Operation	Input voltage (guaranteed value)	Operating current (guaranteed value)
		CH1	CH2				
Output		A06	A05	EQU1 (coincidence output point No.1)	• Operating voltage: 10.2 to 30V • Maximum load current: 0.5A/point, 2A/common*2 • Maximum voltage drop at on: 1.5V • Response time Off to on: 0.1ms or less On to off: 0.1ms or less (rated load, resistive load)		
		B06	B05	EQU2 (coincidence output point No.2)			
		B02, B01		12/24V	• Input voltage: 10.2 to 30V • Current consumption: 43mA (TYP., 24VDC and all points on/common) • Common to all channels		
		A02, A01		0V			

*1 The terminals A03, A04, B03, and B04 are not assigned.
*2 Coincidence output derating (on ratio) is as follows.

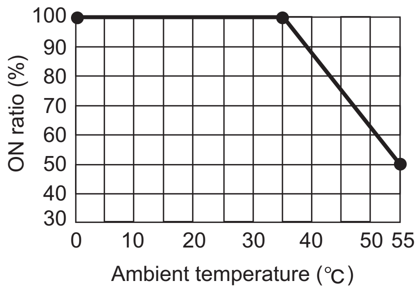


(3) LD62D (differential input sink output type)

I/O classification	Internal circuit	Terminal number*1		Signal name	Operation	Input voltage (guaranteed value)	Operating current (guaranteed value)
		CH1	CH2				
Input		A20	A14	Phase A pulse input	EIA Standard RS-422-A Line receiver (AM26C32 (manufactured by Texas Instruments Incorporated) or equivalent) The line receiver specifications are as follows: • VIT + Differential input on voltage (H level threshold voltage) 0.2V • VIT - Differential input off voltage (L level threshold voltage) - 0.2V • Vhys hysteresis voltage (VIT +- VIT -) 60mV (Current type line driver cannot be used.)		
		B20	B14	Phase $\overline{A}$ pulse input			
		A19	A13	Phase B pulse input			
		B19	B13	Phase $\overline{B}$ pulse input			
		A18	A12	Preset input 24V	On	21.6 to 26.4V	2 to 5mA
					Off	5V or less	0.1mA or less
		B18	B12	Preset input 12V	On	10.8 to 13.2V	2 to 5mA
					Off	4V or less	0.1mA or less
		A17	A11	Preset input 5V	On	2.5 to 5.5V	2 to 5mA
					Off	1V or less	0.1mA or less
		B17	B11	PRSTCOM	Response time	Off to on 0.5ms or less	On to off 1ms or less
		A16	A10	Function start input 24V	On	21.6 to 26.4V	2 to 5mA
					Off	5V or less	0.1mA or less
		B16	B10	Function start input 12V	On	10.8 to 13.2V	2 to 5mA
					Off	4V or less	0.1mA or less
		A15	A09	Function start input 5V	On	2.5 to 5.5V	2 to 5mA
					Off	1V or less	0.1mA or less
		B15	B09	FUNCCOM	Response time	Off to on 0.5ms or less	On to off 1ms or less

I/O classification	Internal circuit	Terminal number*1 CH1	Terminal number*1 CH2	Signal name	Operation	Input voltage (guaranteed value)	Operating current (guaranteed value)
Output		A06	A05	EQU1 (coincidence output point No.1)	• Operating voltage: 10.2 to 30V • Maximum load current: 0.5A/point, 2A/common*2 • Maximum voltage drop at on: 1.5V • Response time Off to on: 0.1ms or less On to off: 0.1ms or less (rated load, resistive load)		
		B06	B05	EQU2 (coincidence output point No.2)			
		B02, B01		12/24V	• Input voltage: 10.2 to 30V • Current consumption: 43mA (TYP., 24VDC and all points on/common) • Common to all channels		
		A02, A01		0V			

*1 The terminals A03, A04, A07, A08, B03, B04, B07, and B08 are not assigned.
*2 Coincidence output derating (on ratio) is as follows.



6.2.4 Connectable encoders

Encoders that can be connected to the high-speed counter module are as follows.

(1) To the LD62

- Open collector output type encoder
- Voltage output type encoder (Verify that the output voltage and output current of the encoder meet the specifications for the LD62.)

(2) To the LD62D

- Line driver output type encoder
  (Check that the encoder output voltage meets the specifications of the LD62D.)

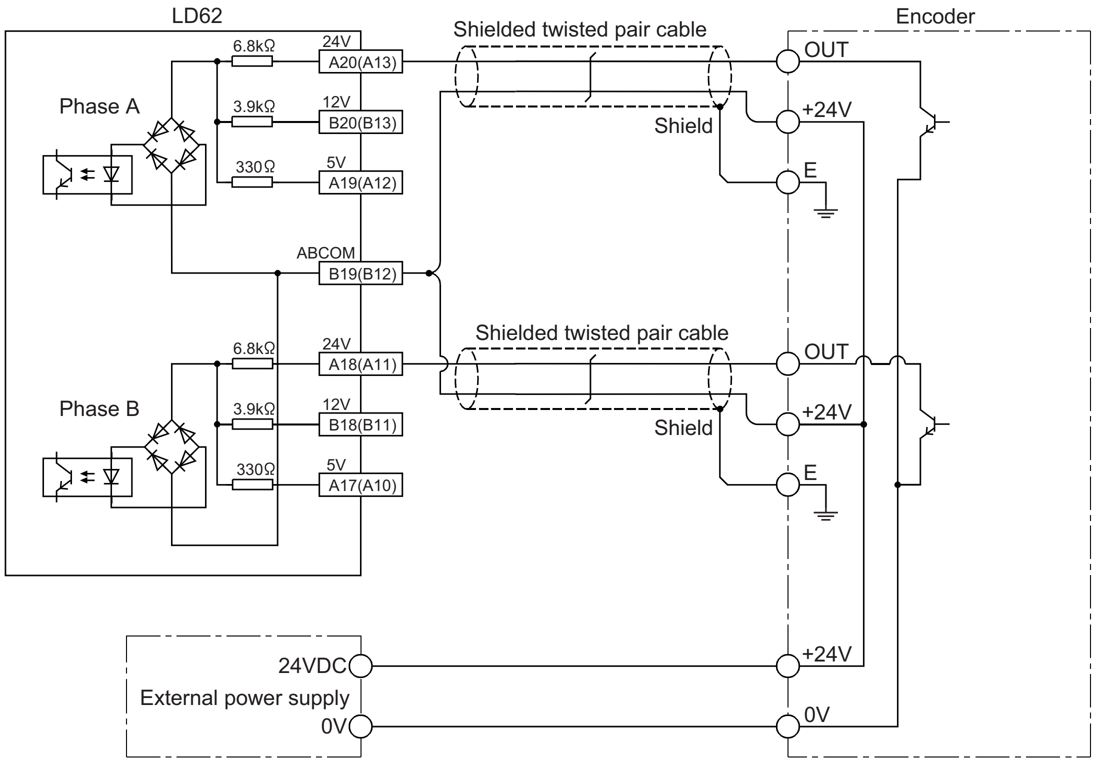
Point

The following encoder cannot be used with the high-speed counter module.

- TTL level voltage output type encoder

6.3 Examples of Wiring Between the High-Speed Counter Module and an Encoder

(1) Example of wiring with an open collector output type encoder (24VDC)

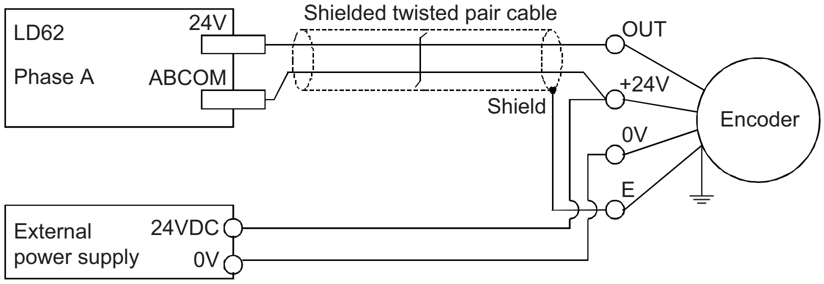


In parentheses, terminal numbers of channel 2 are shown.

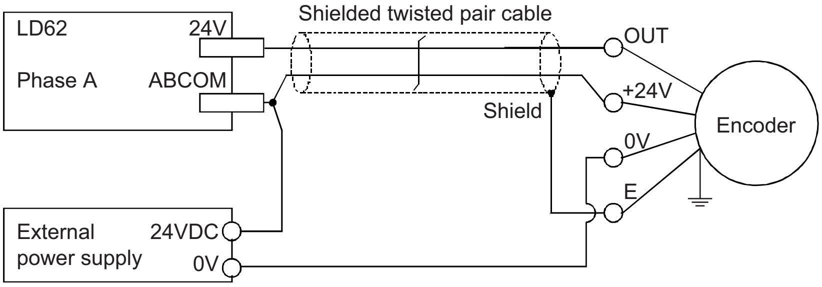
Point

For the wiring between the RD62 and an encoder, separate the power supply cables and the signal cables. The following figures show its examples:

- Example of correct wiring

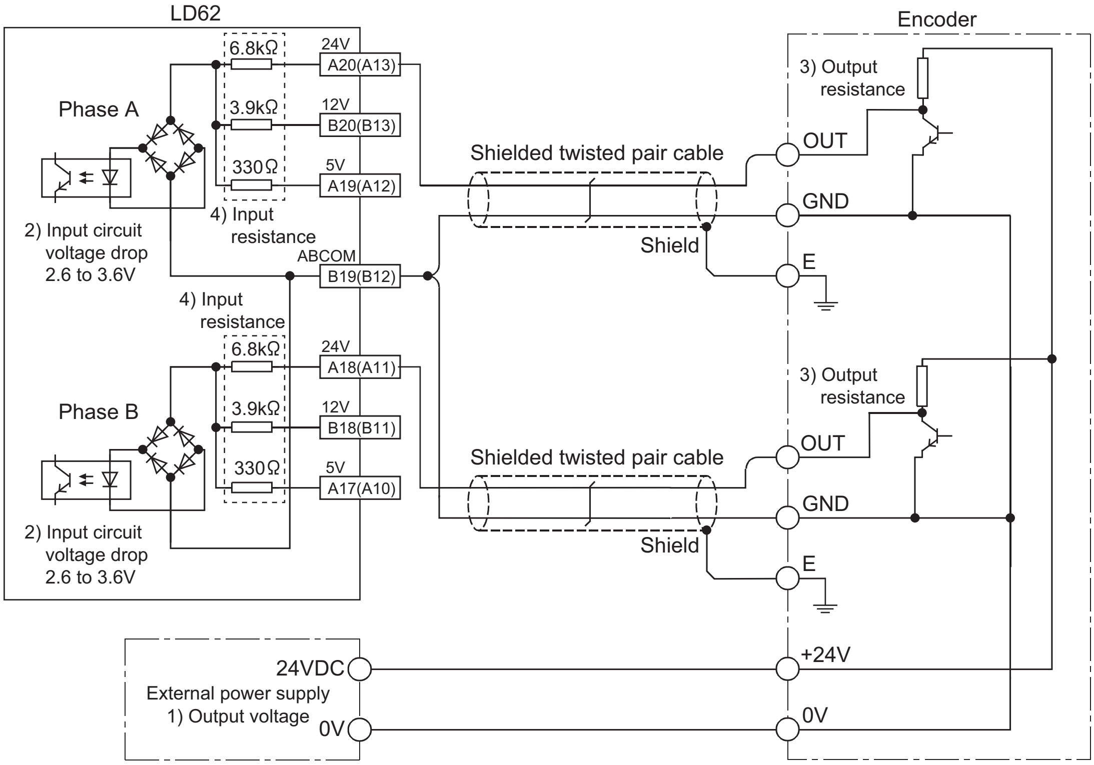


- Example of inappropriate wiring



Because currents flow in the same direction in the shielded twisted pair cable, canceling effect will be lost and electromagnetic induction may occur.

(2) Example of wiring with a voltage output type encoder (with output resistance) (24VDC)



In parentheses, terminal numbers of channel 2 are shown.

When wiring the module with a voltage output type pulse generator, input the value of 3) Output resistance in the formula below and check whether the pulse input current obtained by the formula meets the specifications of the input current. In addition, check the operations using an actual module.

$$\text{Pulse input current} = \frac{\text{1) Output voltage - 2) Input circuit voltage drop}}{\text{3) Output resistance + 4) Input resistance}}$$

Use an input terminal satisfying the specifications of input current as an input resistance.

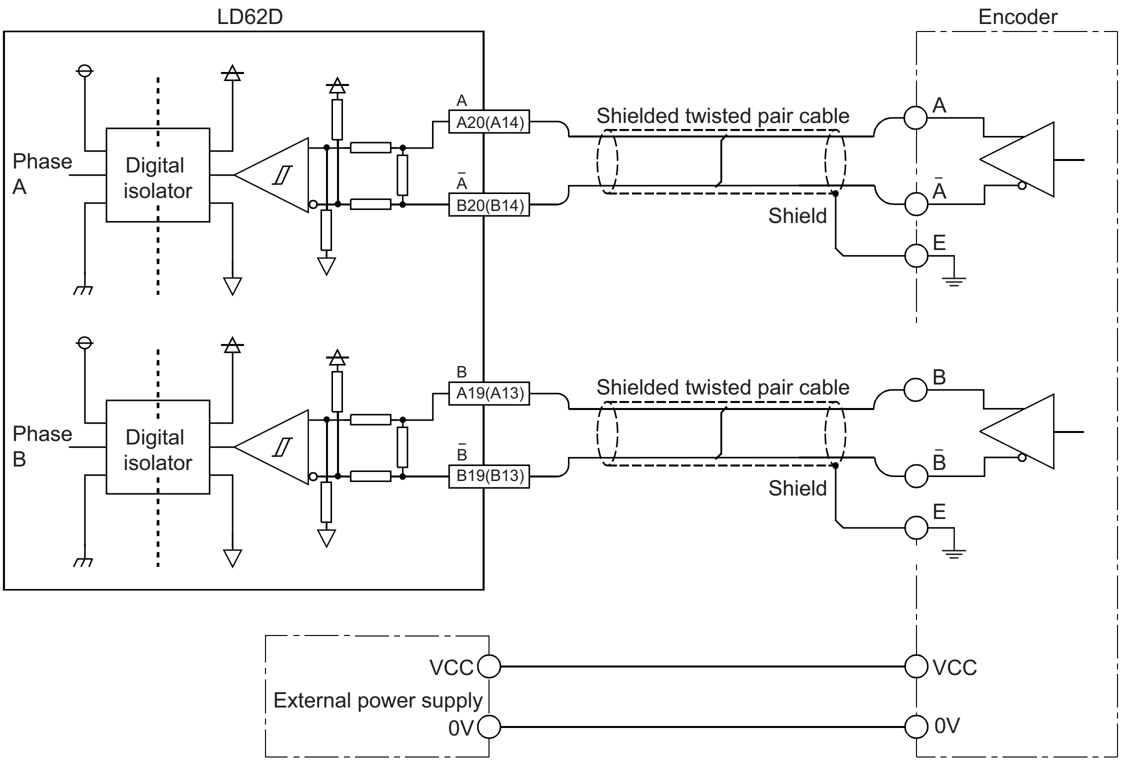
Ex. The following are the examples of pulse input current calculations when the module is wired with a 24VDC output pulse generator with an output resistance of 1kΩ. For these calculations, use a 24VDC input terminal as an input resistance.

· Pulse input current (Min) = (24V - 3.6V) ÷ (1kΩ + 6.8kΩ) = 2.62mA

· Pulse input current (Max) = (24V - 2.6V) ÷ (1kΩ + 6.8kΩ) = 2.74mA

The pulse input current obtained from the calculations above (Min: 2.62mA to Max: 2.74mA) is within the range of input specifications (input ON current: 2 to 5mA).

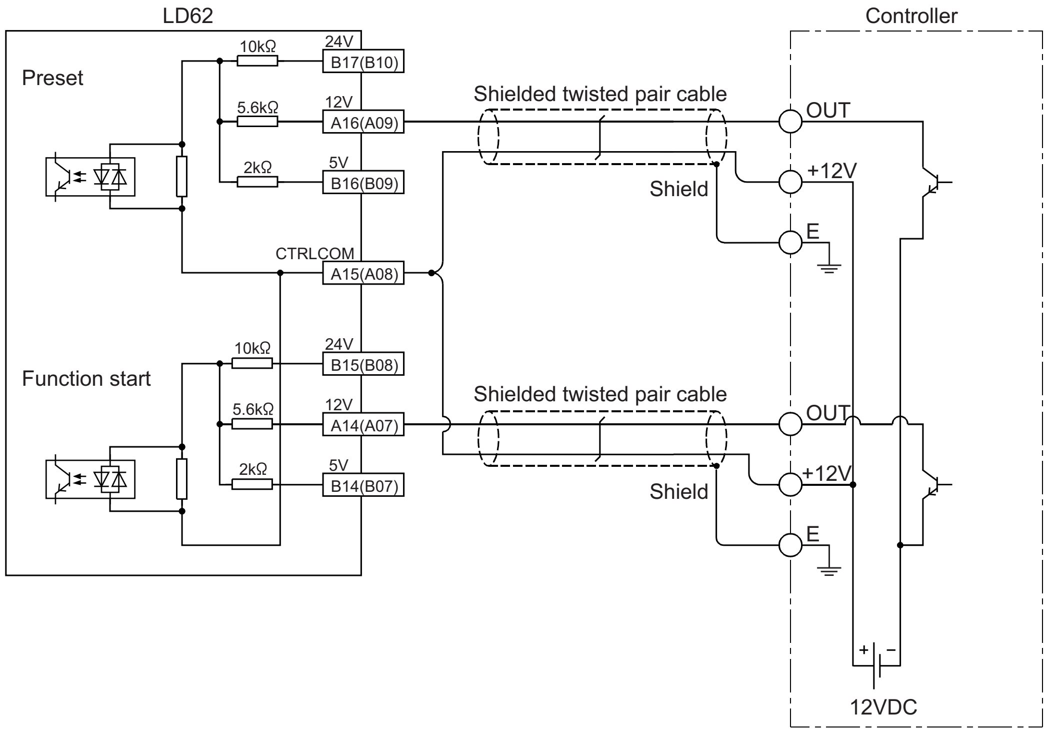
(3) Example of wiring with a line driver (equivalent to AM26LS31) encoder



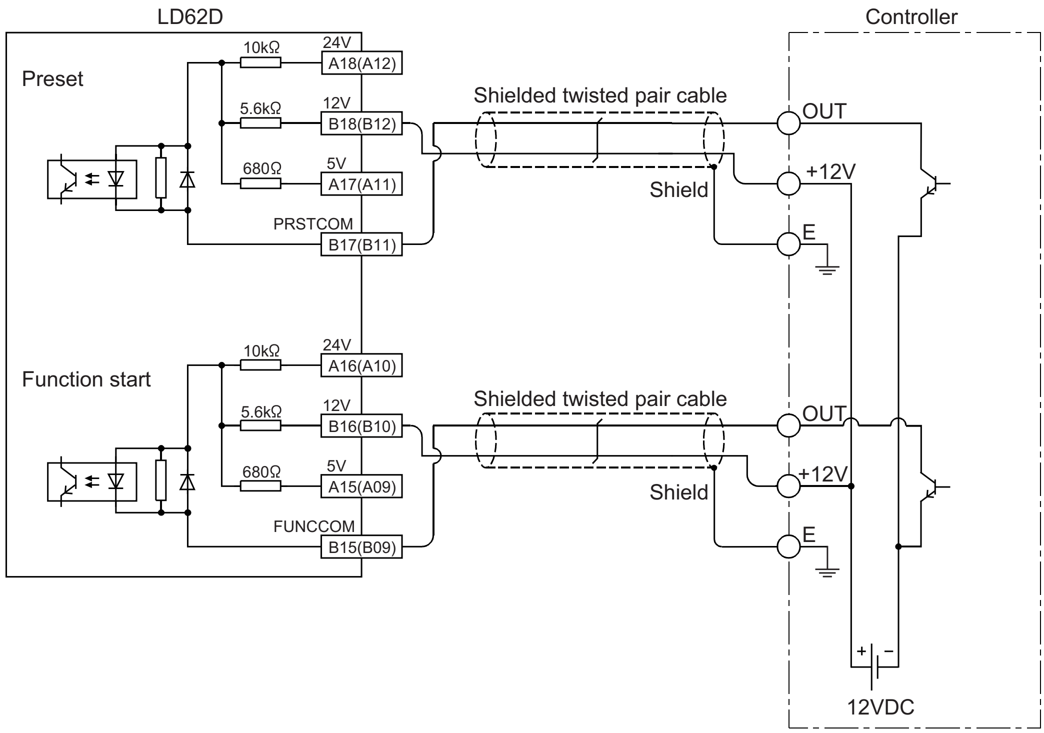
In parentheses, terminal numbers of channel 2 are shown.

6.4 Examples of Wiring Between a Controller and External Input Terminals

(1) When the controller (sink load type) has a voltage of 12VDC

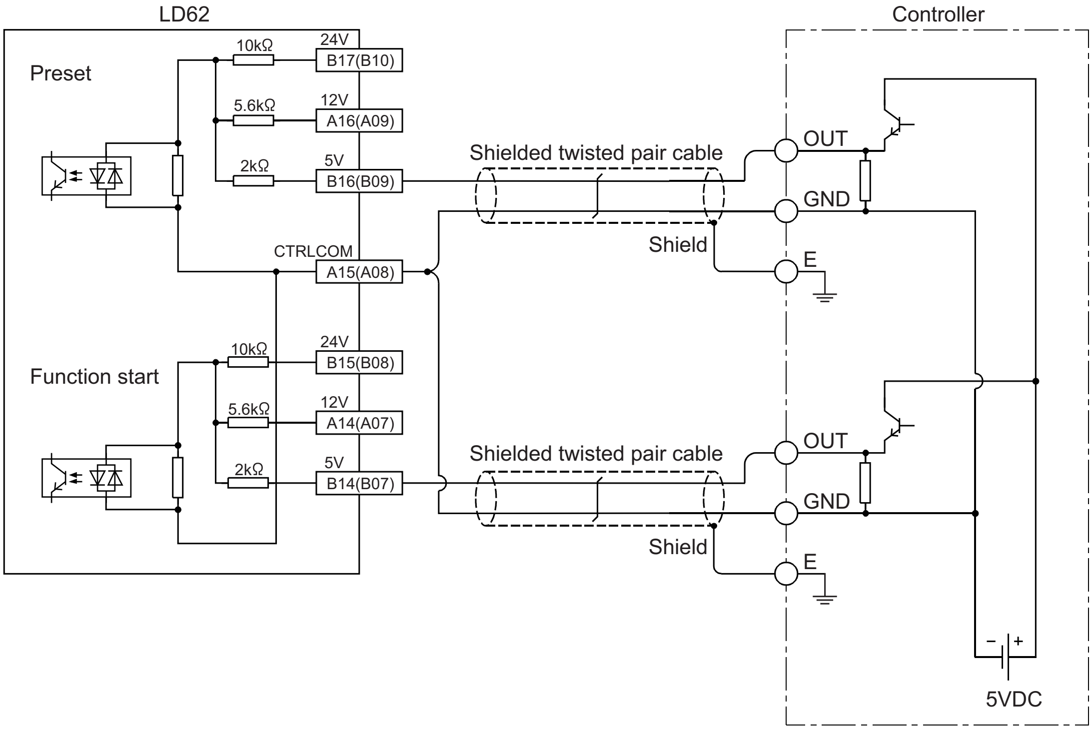


In parentheses, terminal numbers of channel 2 are shown.

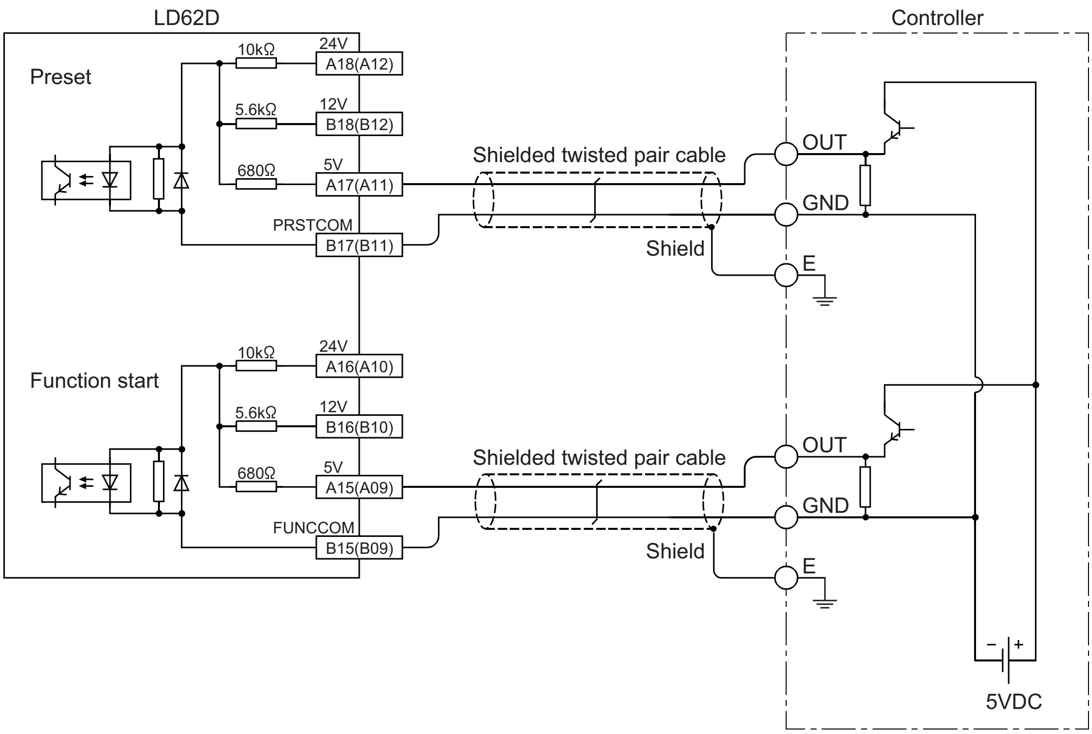


In parentheses, terminal numbers of channel 2 are shown.

(2) When the controller (source load type) has a voltage of 5VDC

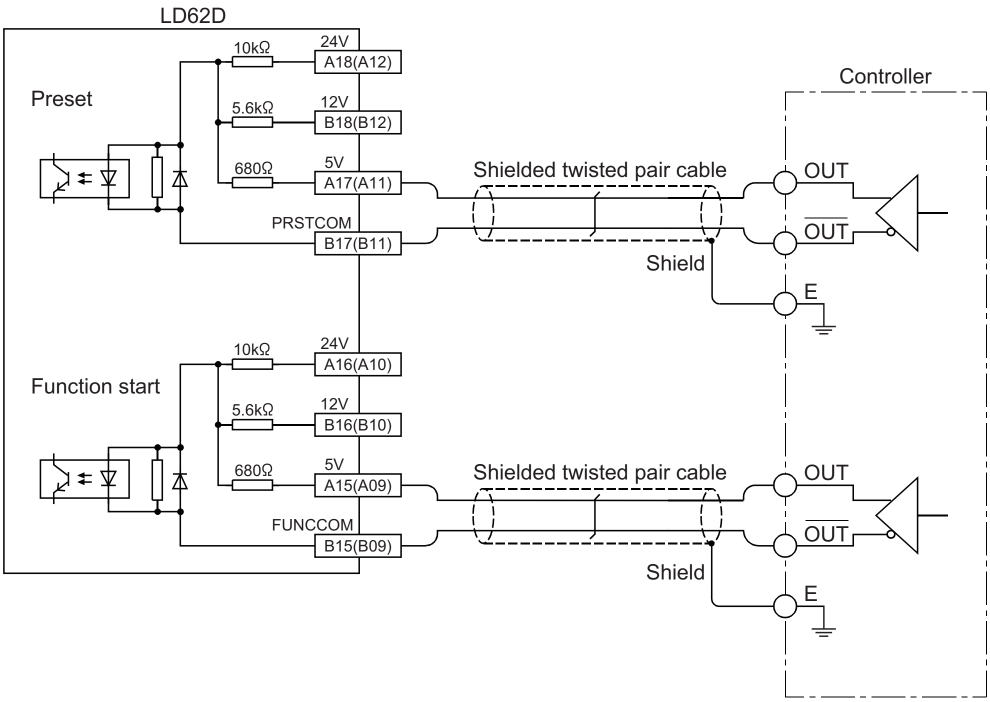


In parentheses, terminal numbers of channel 2 are shown.



In parentheses, terminal numbers of channel 2 are shown.

(3) When the controller is a line driver type

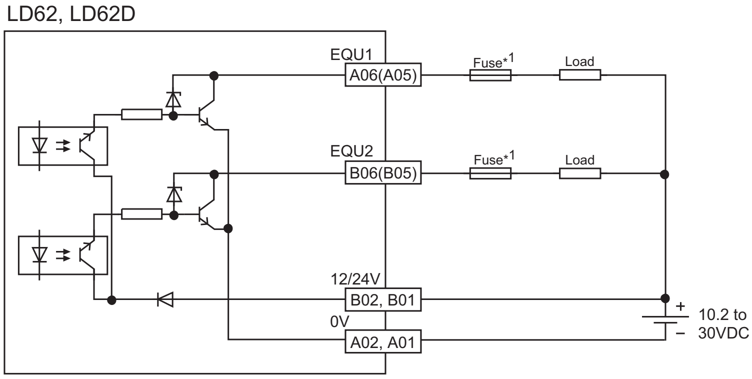


In parentheses, terminal numbers of channel 2 are shown.

6.5 Examples of Wiring with External Output Terminals

To use the coincidence output terminal (EQU), an external power supply of 10.2 to 30VDC is required to drive the internal photocoupler. The following figure shows the wiring example:

(1) For the high-speed counter module (sink output type)



In parentheses, terminal numbers of channel 2 are shown.

*1 Install a fuse for each external terminal to prevent the external devices or module from being burnt out or damaged if a load shorts in an output circuit.

CHAPTER 7 SETTINGS

This chapter describes how to configure settings of the high-speed counter module.

Point

- After writing the contents of the new module, parameter settings, and auto refresh settings into the CPU module, reset the CPU module and switch its status as STOP → RUN → STOP → RUN, or turn off and on the power supply to activate the settings.
- After writing the contents of the switch settings, reset the CPU module or turn off and on the power supply to activate the settings.

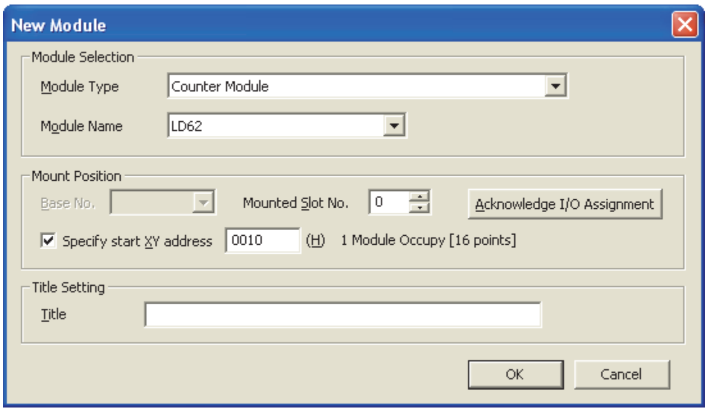
7.1 Adding a Module

Add the model name of the high-speed counter module used for the project.

(1) How to add a module

Open "New Module".

Project window ➪ [Intelligent Function Module] ➪ Right-click ➪ [New Module...]



Item		Description
Module Selection	Module Type	Select "Counter Module".
	Module Name	Select the model name of the module to be connected.
Mount Position	Mounted Slot No.	Select the number of the slot where the module is mounted.
	Specify start XY address	The start I/O number (hexadecimal) of the module mounted on the slot set to "Mounted Slot No." is displayed. This item can be set by user.
Title Setting	Title	Enter a title.

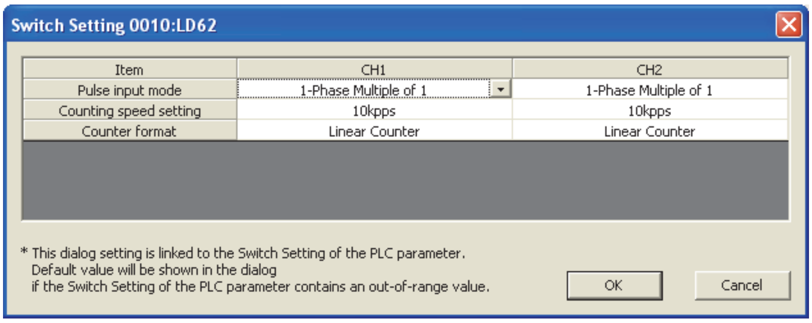
7.2 Switch Setting

Set a pulse input mode, counting speed, and counter type for each channel.

(1) Setting method

Open "Switch Setting".

Project window ⇨ [Intelligent Function Module] ⇨ Model name ⇨ [Switch Setting]



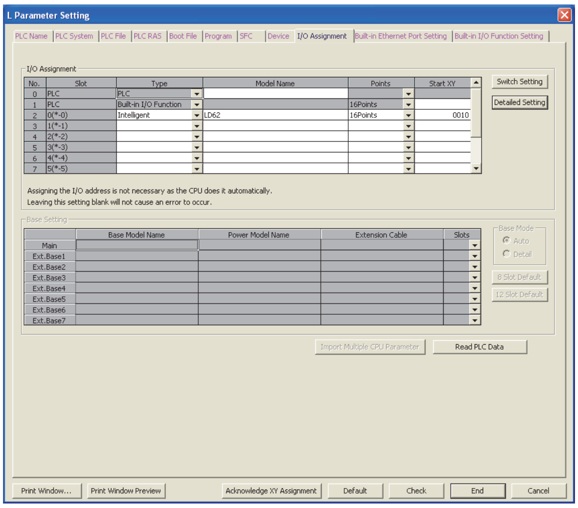
Item	Description	Setting value
Pulse input mode	Select a pulse input mode for each channel.	• 1-Phase Multiple of 1 (default) • 1-Phase Multiple of 2 • CW/CCW • 2-Phase Multiple of 1 • 2-Phase Multiple of 2 • 2-Phase Multiple of 4
Counting speed setting	Select a counting speed for each channel. 500kpps can be selected for the LD62D only.	• 10kpps (default) • 100kpps • 200kpps • 500kpps
Counter format	Select a counter type for each channel.	• Linear Counter (default) • Ring Counter

7.3 Intelligent Function Module Detailed Setting

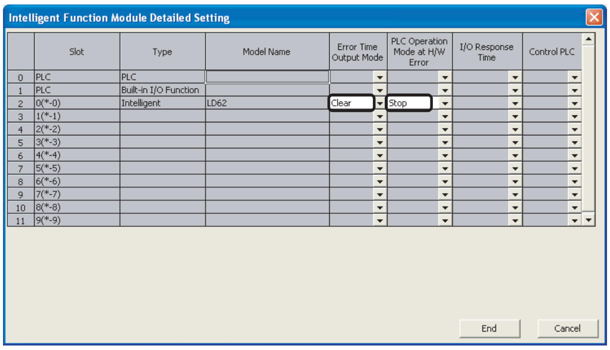
Perform an output mode setting for an error and CPU module operation mode setting for a hardware error.

(1) Setting method

Open the "I/O Assignment" tab.



↓



1. **Open "I/O Assignment" of the PLC parameter.**

Project window ➪ [Parameter] ➪ [PLC Parameter] ➪ [I/O Assignment]

2. **Click the** Detailed Setting **button.**

3. **Select "Clear" or "Hold" for "Error Time Output Mode".**

4. **Select "Stop" or "Continue" for "PLC Operation Mode at H/W Error".**

5. **Click the** End **button to complete the settings of "Error Time Output Mode" and "PLC Operation Mode at H/W Error".**

Item	Description	Setting value	Remarks
Error Time Output Mode	Select whether to clear or hold module output if a CPU stop error occurs.	• Clear (default) • Hold	• Clear: If a CPU stop error occurs, all external outputs of coincidence signals turn off. • Hold: If a CPU stop error occurs, external outputs of coincidence signals are held in the status before the CPU module stops.
PLC Operation Mode at H/W Error	• Select whether to stop or continue the CPU module operation if a high-speed counter module error (SP.UNIT DOWN) is detected. • The error (SP.UNIT DOWN) is detected if the module READY flag is not in ready due to module hardware failure.	• Stop (default) • Continue	• Stop: If a high-speed counter module error is detected, the CPU module stops. • Continue: Even if a high-speed counter module error is detected, the CPU module continues running a program for modules other than the faulty one.

7.4 Parameter Settings

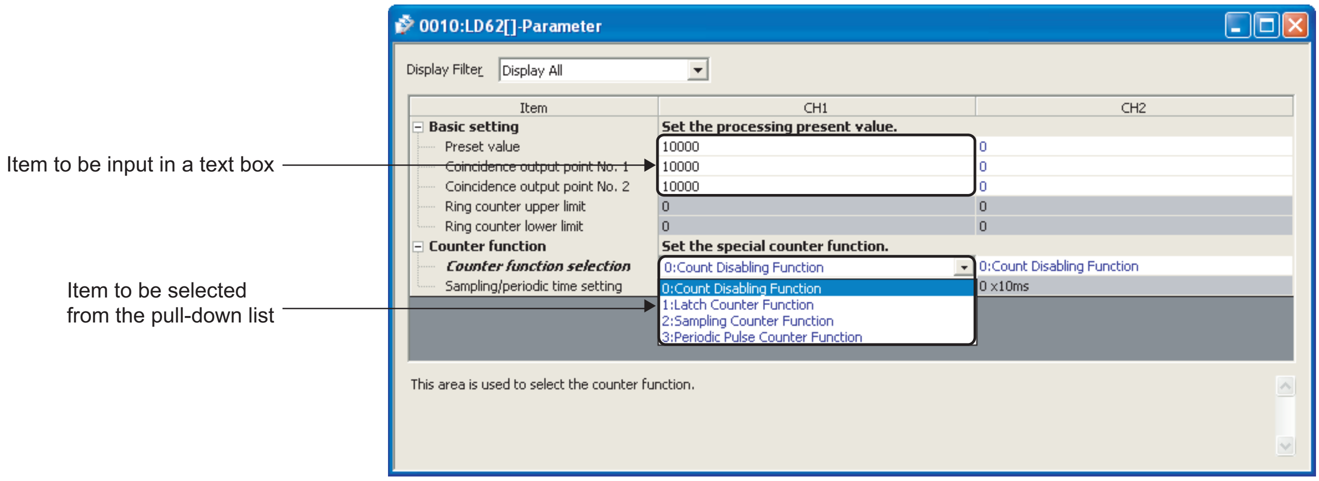
Set parameters for each channel.
Setting parameters here eliminates the need to program them.

(1) Setting method

Open the "Parameter" window.

1. Open the "Parameter" window from the project window.

Project window ⇨ [Intelligent Function Module] ⇨ Model name ⇨ [Parameter]



2. Double-click the text box of the setting-target item and select or enter a value.

- Items to be set by selecting a value from a pull-down list
  Double-click the text box and select an option from the displayed pull-down list.
- Items to be set by entering a value in a text box
  Double-click the text box and enter a value.

3. When using CH2, perform the procedure 2.

Item		Setting value	Reference
Basic setting	Preset value	-2147483648 to 2147483647 (default: 0)	Page 75, Section 8.4
	Coincidence output point No.1	-2147483648 to 2147483647 (default: 0)	Page 69, Section 8.3
	Coincidence output point No.2	-2147483648 to 2147483647 (default: 0)	
	Ring counter upper limit	-2147483648 to 2147483647 (default: 0)	Page 66, Section 8.2.2
	Ring counter lower limit	-2147483648 to 2147483647 (default: 0)	
Counter function	Counter function selection	0: Count Disable Function (default) 1: Latch Counter Function 2: Sampling Counter Function 3: Periodic Pulse Counter Function	Page 77, Section 8.5
	Sampling/periodic time setting	1 to 65535 (unit: 10ms) (default: 0)	

7.5 Auto Refresh

The function of auto refresh is to transfer buffer memory data to a specified device.
This setting eliminates the need to read data with a program.

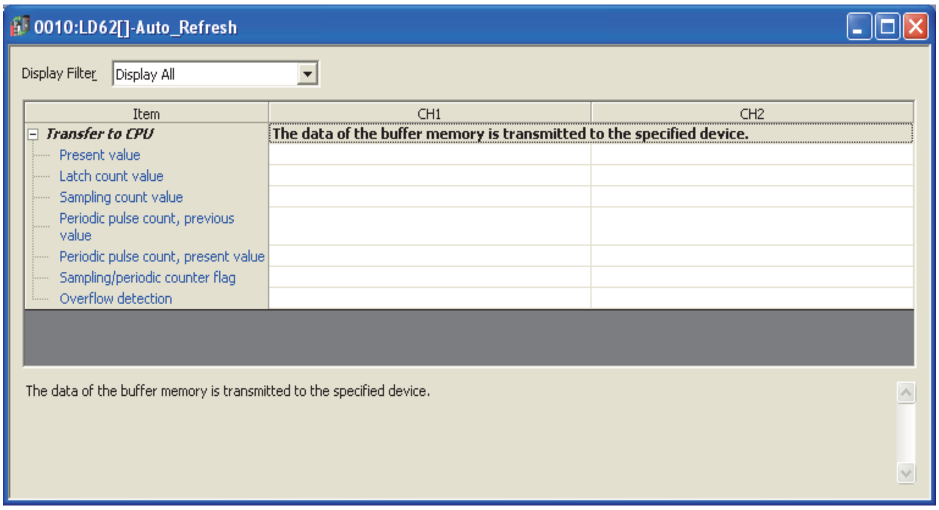
(1) Setting method

Open the "Auto_Refresh" window.

1. Open the "Auto_Refresh" window from the project window.

Project window ➪ [Intelligent Function Module] ➪ Model name ➪ [Auto_Refresh]

2. Click the text box of the setting-target item and enter the auto refresh target device.



CHAPTER 8 FUNCTIONS

This chapter describes the details of the functions that can be achieved through the high-speed counter module and their setting methods.
For details on I/O signals and buffer memory, refer to the following.

- Details of I/O signals (☞ Page 114, Appendix 1)
- Details of Buffer Memory Areas (☞ Page 118, Appendix 2)

8

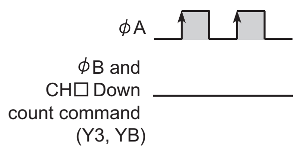
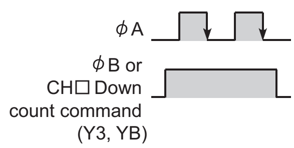
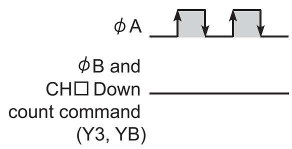
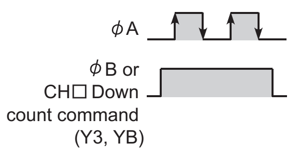
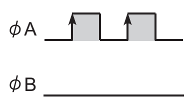
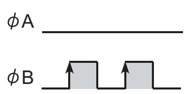
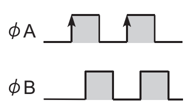
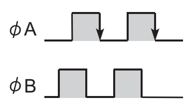
8.1 Pulse Input Modes and Counting Methods

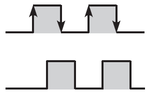
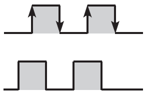
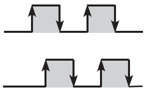
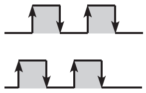
This section describes the pulse input modes and the counting methods.

8.1.1 Types of pulse input modes

The following six pulse input modes are prepared: 1-phase pulse input (1 multiple/2 multiples), CW/CCW pulse input, and 2-phase pulse input (1 multiple/2 multiples/4 multiples).

(1) Pulse input modes and count timing

Pulse input mode	Count timing		
1-phase multiple of 1	At up count		Counts on the rising edge (↑) of ϕA. ϕB and CH□ Down count command (Y3, YB) are off.
	At down count		Counts on the falling edge (↓) of ϕA. ϕB or CH□ Down count command (Y3, YB) is on.
1-phase multiple of 2	At up count		Counts on the rising edge (↑) and the falling edge (↓) of ϕA. ϕB and CH□ Down count command (Y3, YB) are off.
	At down count		Counts on the rising edge (↑) and the falling edge (↓) of ϕA. ϕB or CH□ Down count command (Y3, YB) is on.
CW/CCW	At up count		Counts on the rising edge (↑) of ϕA. ϕB is off.
	At down count		ϕA is off. Counts on the rising edge (↑) of ϕB.
2-phase multiple of 1	At up count		Counts on the rising edge (↑) of ϕA while ϕB is off.
	At down count		Counts on the falling edge (↓) of ϕA while ϕB is off.

Pulse input mode	Count timing		
2-phase multiple of 2	At up count		Counts on the rising edge (↑) of ϕA while ϕB is off. Counts on the falling edge (↓) of ϕA while ϕB is on.
	At down count		Counts on the rising edge (↑) of ϕA while ϕB is on. Counts on the falling edge (↓) of ϕA while ϕB is off.
2-phase multiple of 4	At up count		Counts on the rising edge (↑) of ϕA while ϕB is off. Counts on the falling edge (↓) of ϕA while ϕB is on. Counts on the rising edge (↑) of ϕB while ϕA is on. Counts on the falling edge (↓) of ϕB while ϕA is off.
	At down count		Counts on the rising edge (↑) of ϕA while ϕB is on. Counts on the falling edge (↓) of ϕA while ϕB is off. Counts on the rising edge (↑) of ϕB while ϕA is off. Counts on the falling edge (↓) of ϕB while ϕA is on.

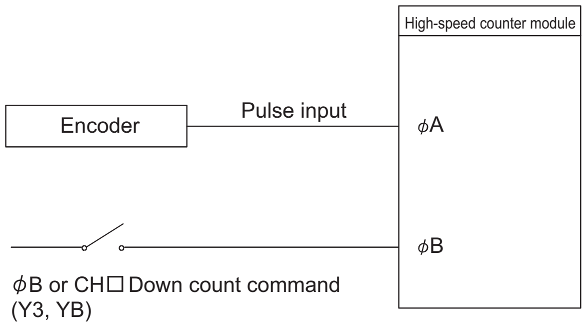
Point

For the 1-phase pulse input, check that for up count, the phase B pulse input and CH☐ Down count command (Y3, YB) are off before performing the phase A pulse input.
If at least one of the B phase pulse input and CH☐ Down count command (Y3, YB) is on, pulses are counted down in the A phase pulse input.

(a) 1-phase pulse input

The count method can be selected from 1 multiple and 2 multiples.

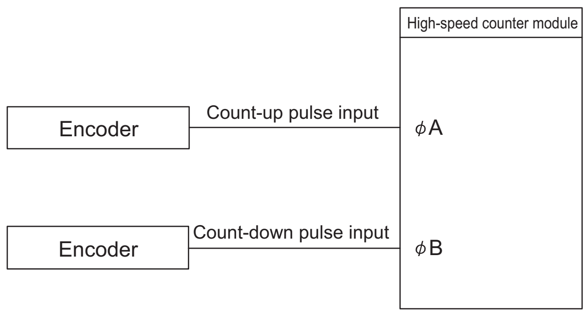
The following figure shows the relationship between phase A pulse input and phase B pulse input or CH☐ Down count command (Y3, YB).



(b) CW/CCW pulse input

Pulses can be counted up with the A phase pulse input and counted down with the B phase pulse input.

The following figure shows the relationship between A phase pulse input and B phase pulse input.

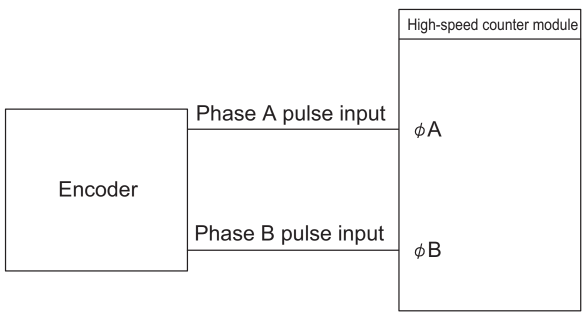


(c) 2-phase pulse input

The count method can be selected from 1 multiple, 2 multiples, and 4 multiples.

The phase difference between the A phase pulse and B phase pulse determines whether the pulses are counted up or down.

The following figure shows the relationship between A phase pulse input and B phase pulse input.



8.1.2 Setting a counting method

Set a counting method by switch setting.
For details on the setting method, refer to the following.

- Switch Setting (Page 55, Section 7.2)

8.1.3 Reading the present value

This section describes the details on the present value stored in the buffer memory and the count values selected from the counter function selection, and their reading method.

(1) Storage location of the count value

The present value is always stored in CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) regardless of the counter function used.
When the latch counter, sampling counter, or periodic pulse counter function is performed, the count value is stored in the corresponding buffer memory areas listed in the table below.

Description		Present value	Counter function selection count value			
			Latch count value	Sampling count value	Periodic pulse count previous value	Periodic pulse count current value
Buffer memory address	CH1	Un\G2, Un\G3	Un\G12, Un\G13	Un\G14, Un\G15	Un\G16, Un\G17	Un\G18, Un\G19
	CH2	Un\G34, Un\G35	Un\G44, Un\G45	Un\G46, Un\G47	Un\G48, Un\G49	Un\G50, Un\G51

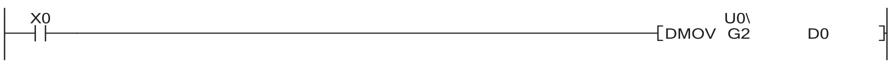
(2) Stored data

The present value and the counter function selection count values are stored in the buffer memory areas in 32-bit signed binary.
The buffer memory data is automatically updated by counting operation. The latest count value can be read from the buffer memory.

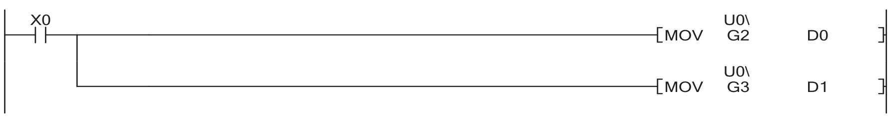
Point

Read the present value and counter function selection count values by two words at a time.
If the values are read by one word at a time, the lower word data and the higher word data will be inconsistent when the count value is updated during reading, and an incorrect count value may be read.

- Program example



- Inappropriate program example
  The present value may change while CH1 Present value (L) (Un\G2) and CH1 Present value (H) (Un\G3) are read.



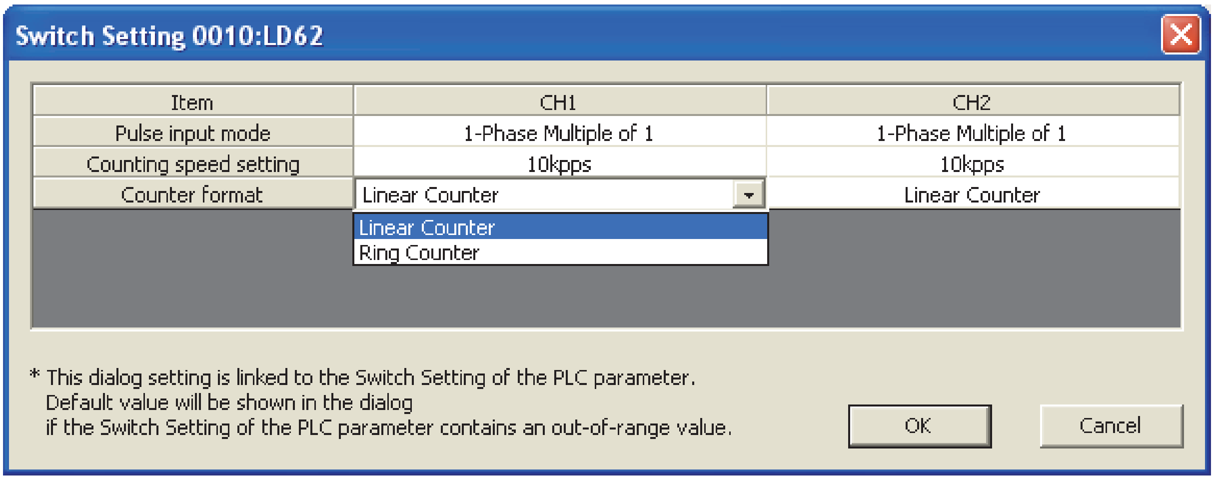
8.2 Selecting Counter Type

Select a counting method in the switch setting.

(1) Setting method

1. Set "Counter format" to "Linear Counter" or "Ring Counter".

Project window ➪ [Intelligent Function Module] ➪ Model name ➪ [Switch Setting]

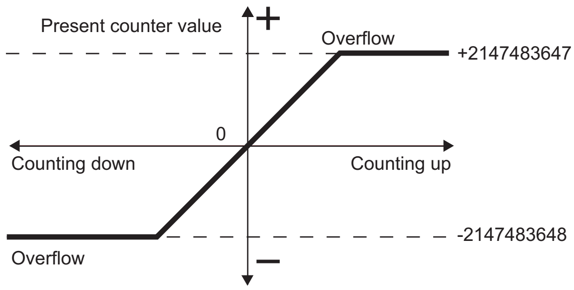


Item	Description	Reference
Linear counter	Pulses are counted between -2147483648 (lower limit value) and 2147483647 (upper limit value).	Page 65, Section 8.2.1
Ring Counter	Pulses are repeatedly counted between the values stored in CH□ Ring counter lower limit (Un\G20, Un\G21, Un\G52, Un\G53) and CH□ Ring counter upper limit (Un\G22, Un\G23, Un\G54, Un\G55).	Page 66, Section 8.2.2

8.2.1 Linear counter function

(1) Operation of the linear counter

- This function counts pulses between -2147483648 (lower limit value) and 2147483647 (upper limit value).
- The preset function and the coincidence output function can be used together.



(2) Overflow error

- In linear counter, an overflow error occurs if the present counter value falls below -2147483648 (lower limit value) in counting down or exceeds 2147483647 (upper limit value) in counting up.
- If an overflow error occurs, "1" is stored in CH□ Overflow detection (Un\G8, Un\G40), the counting operation stops, and the present value does not change from -2147483648 or 2147483647 even if pulses are input.
- An overflow error can be cleared by performing the preset function.
- When the preset function is performed, "0" is stored in CH□ Overflow detection (Un\G8, Un\G40) and the counting operation can be restarted.
- Overflow error status can be checked in the system monitor window. (☞ Page 110, Section 11.1 (1))

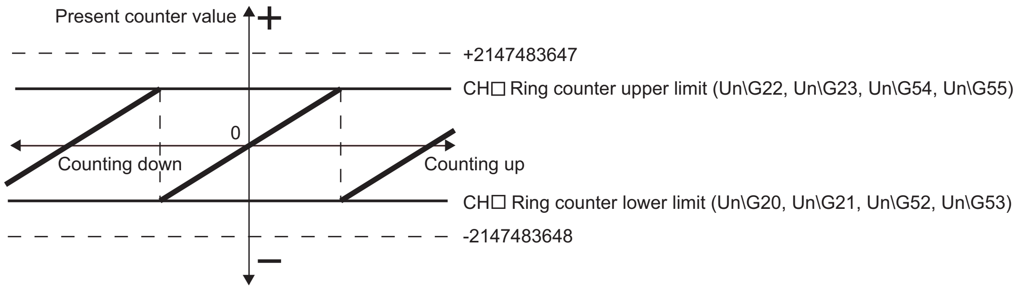
8.2.2 Ring counter function

(1) Operation of the ring counter

This function repeatedly counts pulses between the values stored in CH☐ Ring counter lower limit (Un\G20, Un\G21, Un\G52, Un\G53) and CH☐ Ring counter upper limit (Un\G22, Un\G23, Un\G54, Un\G55).

In ring counter, an overflow error does not occur.

The preset function and the coincidence output function can be used together.



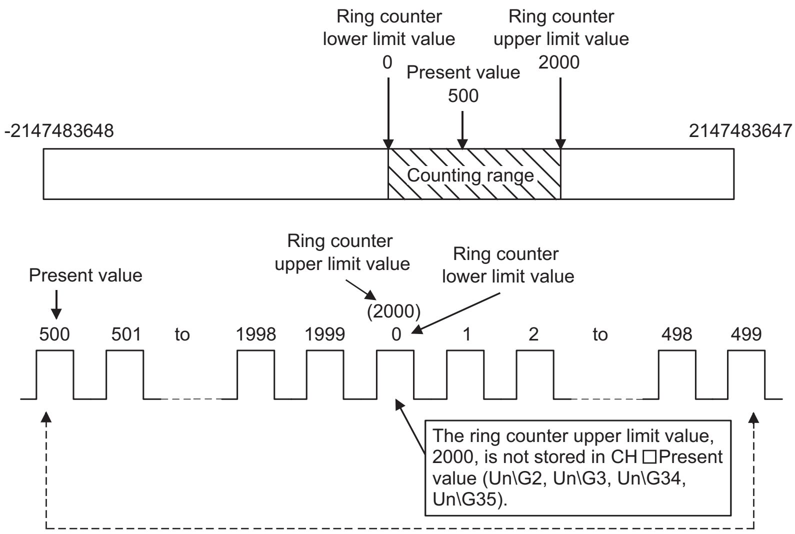
(2) Count range of the ring counter

The count range is determined by the relationship between CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) and the ring counter lower limit/upper limit values when CH□ Count enable command (Y4, YC) is turned on or when the preset function is performed.
Normally, the count range is "Ring counter lower limit value ≤ Present value ≤ Ring counter upper limit value".

(a) When the count range is Ring counter lower limit value ≤ Present value ≤ Ring counter upper limit value (normally used)

- For up count
  When the present value reaches the ring counter upper limit value, the ring counter lower limit value is automatically stored in CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35).
- For down count
  Even when the present value reaches the ring counter lower limit value, the ring counter lower limit value is held as the lower limit, and "Ring counter upper limit value - 1" is stored in CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) at the next count-down pulse input.

Both in up count and in down count, the ring counter upper limit value is not stored in CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35).
For example, when the count enable command is valid while the ring counter lower limit value is 0, the ring counter upper limit value is 2000, and the present value is 500, the count range and the present value will change as follows.



8

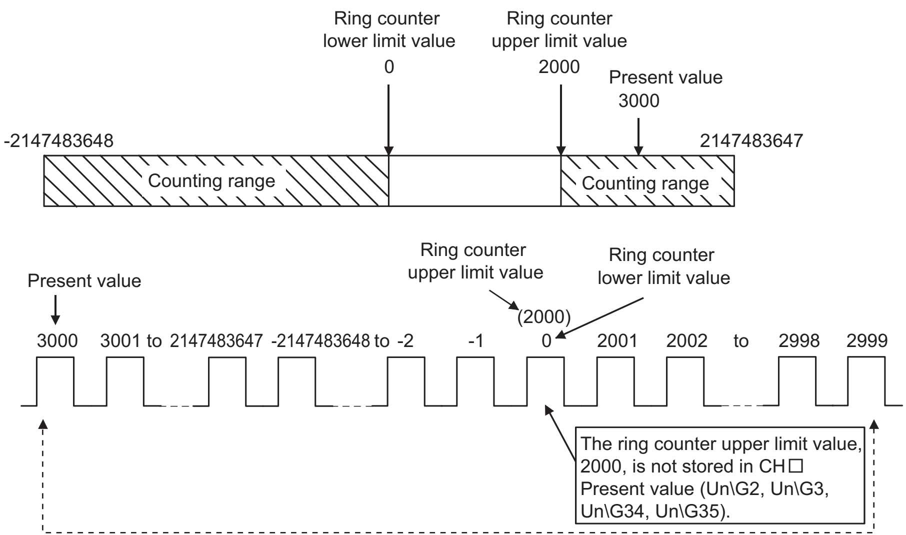
8.2 Selecting Counter Type
8.2.2 Ring counter function

(b) When the count range is "Present value < Ring counter lower limit value or ring counter upper limit value < Present value"

- For up count
  Even when the present value reaches the ring counter lower limit value, the ring counter lower limit value is held as the lower limit, and "Ring counter upper limit value + 1" is stored in CH☐ Present value (Un\G2, Un\G3, Un\G34, Un\G35) at the next count-up pulse input.
- For down count
  When the present value reaches the ring counter upper limit value, the ring counter lower limit value is automatically stored in CH☐ Present value (Un\G2, Un\G3, Un\G34, Un\G35).

Both in up count and in down count, the ring counter upper limit value is not stored in CH☐ Present value (Un\G2, Un\G3, Un\G34, Un\G35).

For example, when the count enable command is valid while the ring counter lower limit value is 0, the ring counter upper limit value is 2000, and the present value is 3000, the count range and the present value will change as follows.



(c) When the count range is "Ring counter lower limit value = Ring counter upper limit value"

When this condition is established, the count range will be the full range (-2147483648 to 2147483647) which can be expressed in 32-bit signed binary regardless of the present value.

Point

- While CH☐ Count enable command (Y4, YC) is on, even if a value is written to CH☐ Ring counter lower limit (Un\G20, Un\G21, Un\G52, Un\G53) or CH☐ Ring counter upper limit (Un\G22, Un\G23, Un\G54, Un\G55), the stored value does not change.
  Turn off CH☐ Count enable command (Y4, YC) before changing the ring counter upper/lower limit value.
- Turn off CH☐ Count enable command (Y4, YC) before changing the count range by the preset function.

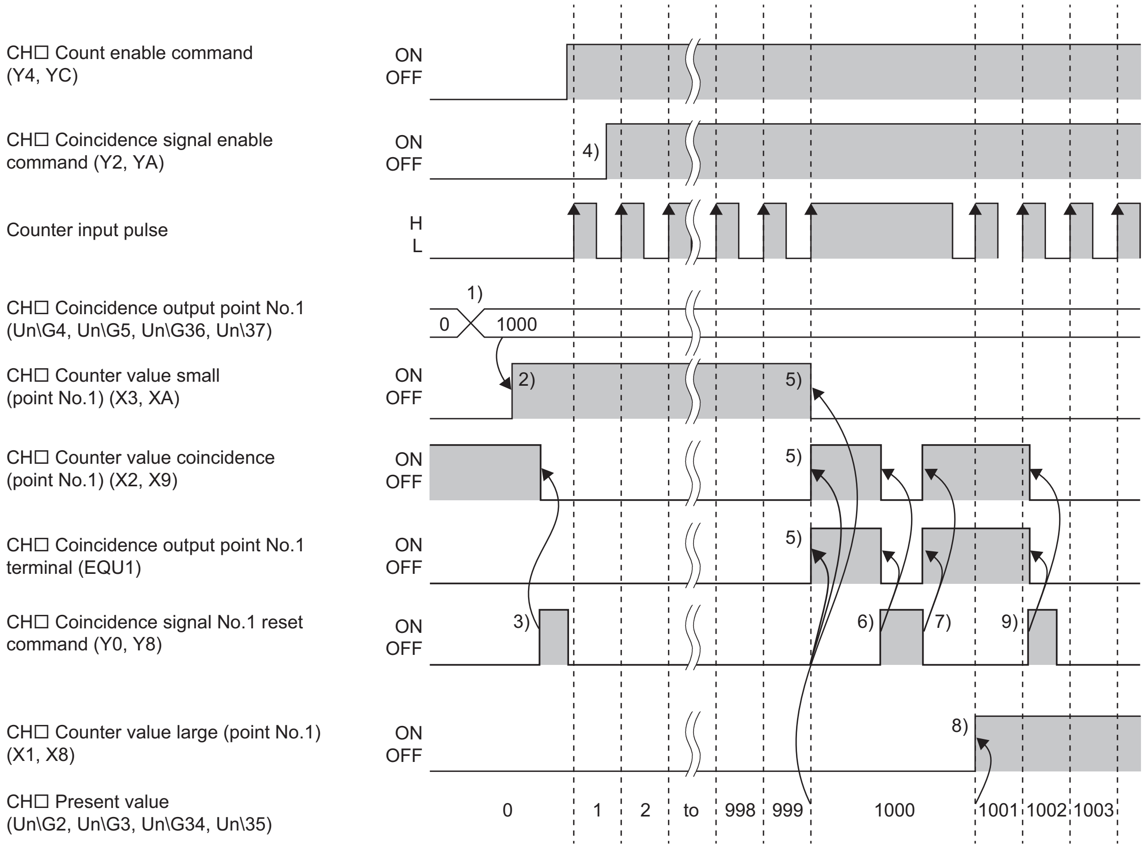
8.3 Coincidence Output Function

This function compares the present counter value with the preset coincidence output point setting value and outputs a signal when they match.
Up to two coincidence outputs can be set for each channel.
When using external output of the coincidence signal, turn on CH☐ Coincidence signal enable command (Y2, YA) beforehand.

(1) Operation of the coincidence output

The I/O numbers (X/Y) and the buffer memory addresses in (1) are for coincidence output point No.1.
For those of coincidence output point No.2, refer to the following.

- List of I/O Signals (Page 26, Section 3.4)
- List of Buffer Memory Areas (Page 27, Section 3.5)



No.	Description
1)	Start the comparison by using the value set in CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37).
2)	When the following condition is met, CH□ Counter value small (point No.1) (X3, XA) turns on. • CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) < CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37)
3)	Turning on CH□ Coincidence signal No.1 reset command (Y0, Y8) turns off CH□ Counter value coincidence (point No.1) (X2, X9) and CH□ Coincidence output point No.1 terminal (EQU1).
4)	To output the coincidence signal from CH□ Coincidence output point No.1 terminal (EQU1), turn on CH□ Coincidence signal enable command (Y2, YA).
5)	When the following condition is met, CH□ Counter value coincidence (point No.1) (X2, X9) and CH□ Coincidence output point No.1 terminal (EQU1) turn on. In addition, CH□ Counter value small (point No.1) (X3, XA) turns off. • CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) = CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37)
6)	Turning on CH□ Coincidence signal No.1 reset command (Y0, Y8) while the values are matched turns off CH□ Counter value coincidence (point No.1) (X2, X9) and CH□ Coincidence output point No.1 terminal (EQU1).
7)	Turning off CH□ Coincidence signal No.1 reset command (Y0, Y8) while the values are matched turns on CH□ Counter value coincidence (point No.1) (X2, X9) and CH□ Coincidence output point No.1 terminal (EQU1) again.
8)	When the following condition is met, CH□ Counter value large (point No.1) (X1, X8) turns on. • CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) > CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37)
9)	Turn on CH□ Coincidence signal No.1 reset command (Y0, Y8) to reset CH□ Counter value coincidence (point No.1) (X2, X9) and CH□ Coincidence output point No.1 terminal (EQU1). If CH□ Counter value coincidence (point No.1) (X2, X9) remains on, the next coincidence output cannot be detected.

Point

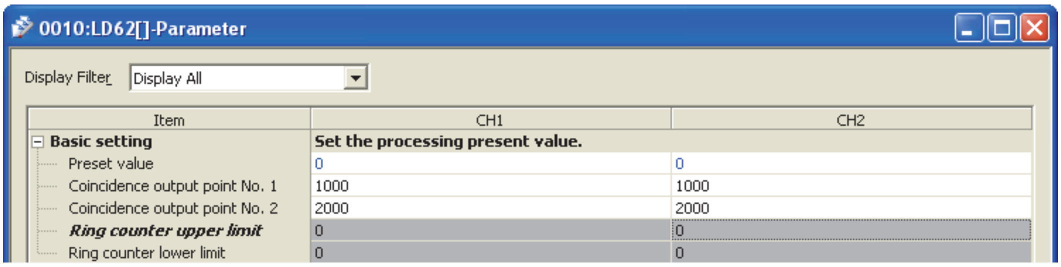
Perform the following before turning on CH□ Coincidence signal enable command (Y2, YA).

- Set different values between CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37) and CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) by any of the following ways:
  - Changing the coincidence output point setting
  - Changing the present value using the preset function
  - Changing the present value by inputting a pulse
- Turn off, on, and then off CH□ Coincidence signal No.1 reset command (Y0, Y8).
  When CH□ Coincidence signal enable command (Y2, YA) is turned on before counting operation or while the coincidence output point setting value matches with the present value, coincidence output is performed.
- CH□ Counter value coincidence (point No.1) (X2, X9) is on immediately after the CPU module is powered on or is reset because both CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) and CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37) are set to "0".

(2) Setting method

Set values for "Coincidence output point No.1" and "Coincidence output point No.2".

Project window ➪ [Intelligent Function Module] ➪ Model name ➪ [Parameter]



Item	Setting range
Coincidence output point No.1	-2147483648 to 2147483647
Coincidence output point No.2	

(3) Output status setting at a CPU stop error

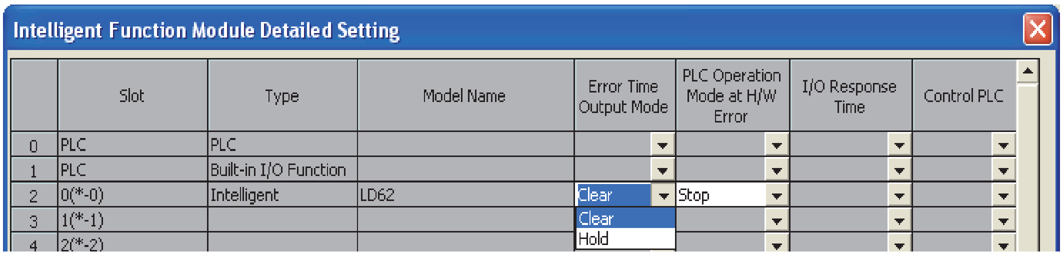
If a CPU stop error occurs, the output status (clear/hold) of external output signals can be set.
The output status setting can be set in the intelligent function module detailed setting.

(a) Setting method

Set "Clear" or "Hold" for "Error Time Output Mode".

Project window ➪ [Parameter] ➪ [PLC Parameter] ➪ [I/O Assignment]

➪ Detailed Setting button



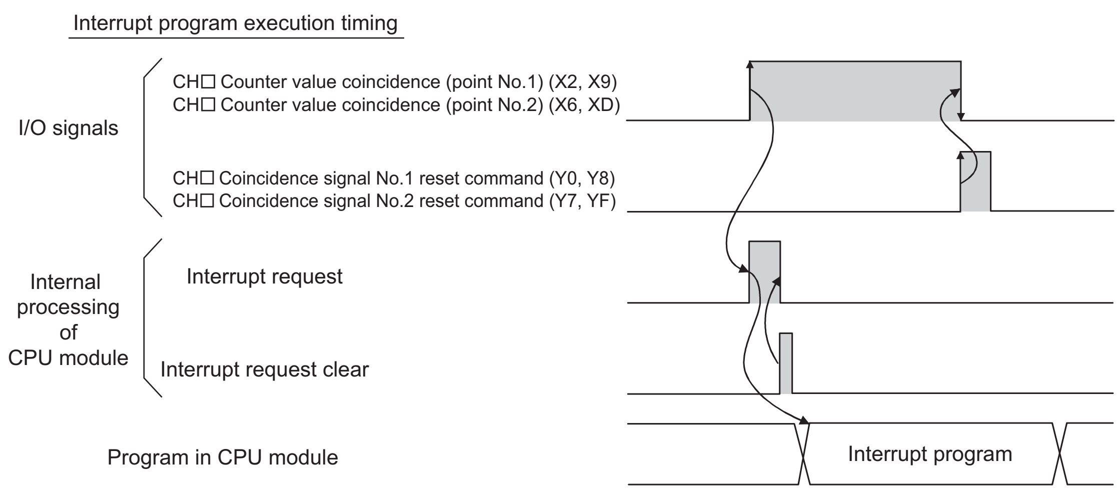
(4) Coincidence detection interrupt function

This function outputs an interrupt request to the CPU module and starts an interrupt program when the present counter value matches with the preset coincidence output point setting value.

(a) Interrupt factors (SI)

One intelligent function module can have interrupt factors (SI) up to 16 points.
The high-speed counter module has interrupt factors of 4 points for each coincidence output point as shown below.

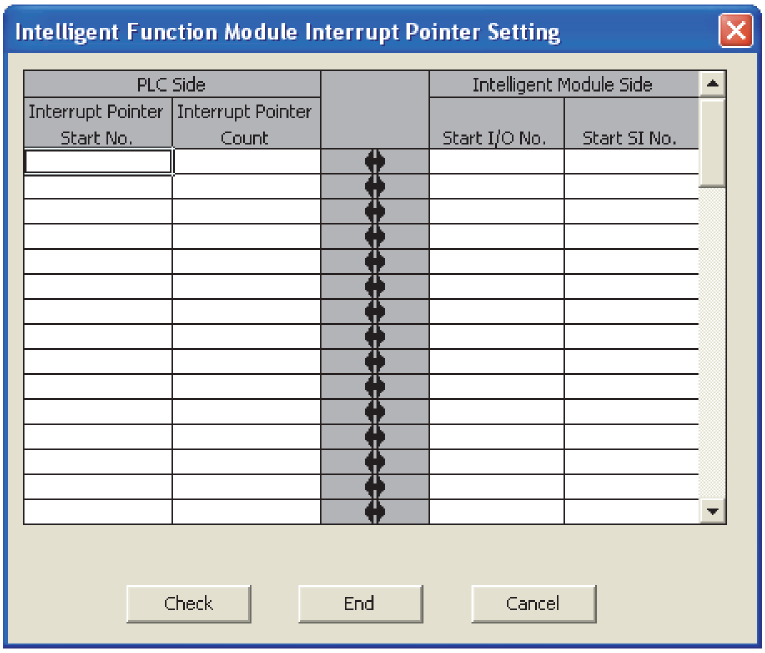
SI No.	Interrupt factor
0	Channel 1: Coincidence detection of coincidence output point No.1
1	Channel 1: Coincidence detection of coincidence output point No.2
2	Channel 2: Coincidence detection of coincidence output point No.1
3	Channel 2: Coincidence detection of coincidence output point No.2
4 to 15	Reserved



(b) Setting interrupt pointers

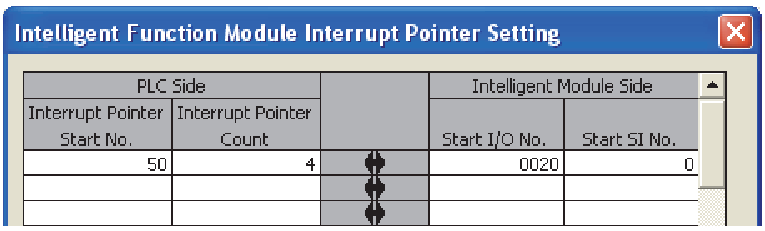
Assign interrupt factors (SI) and the interrupt pointers of the CPU module in "Intelligent Function Module Interrupt Pointer Setting" of "PLC Parameter".

Project window ⇨ [Parameter] ⇨ [PLC Parameter] ⇨ [PLC System]
⇨ [Intelligent Function Module Setting] ⇨ Interrupt Pointer Setting button



Item		Description	Setting range
PLC Side	Interrupt Pointer Start No.	Enter the start number of the interrupt pointer of the CPU module.	50 to 255
	Interrupt Pointer Count	Enter the number of interrupt factors (SI).	1 to 4
Intelligent Module Side	Start I/O No.	Enter the start I/O number of the high-speed counter module.	0000_H to $0FF0_H$
	Start SI No.	Enter the start number of the interrupt factor (SI) of the high-speed counter module.	0 to 3

Ex. Assigning SI0 to SI3 of the high-speed counter module, whose start I/O number has been set to 20, to the interrupt pointers I50 to I53



(c) Using only a specific SI No.

- Setting in the intelligent function module interrupt pointer setting in the parameters
  Interrupt factors are used starting from the start SI No. by the number of interrupt pointers set in the "Intelligent Function Module Interrupt Pointer Setting" dialog box.
  For example, when "1" is set for "Start SI No." and "2" is set for "Interrupt Pointer Count", only SI1 and SI2 are used.
  When these settings are not configured, the interrupt function will not be used.
- Using the IMASK instruction
  Using the IMASK instruction allows enabling or disabling interrupt program execution (interrupt mask) for each interrupt pointer.
  For details on the IMASK instruction, refer to the following.

MELSEC-Q/L Programming Manual (Common Instruction)

Point

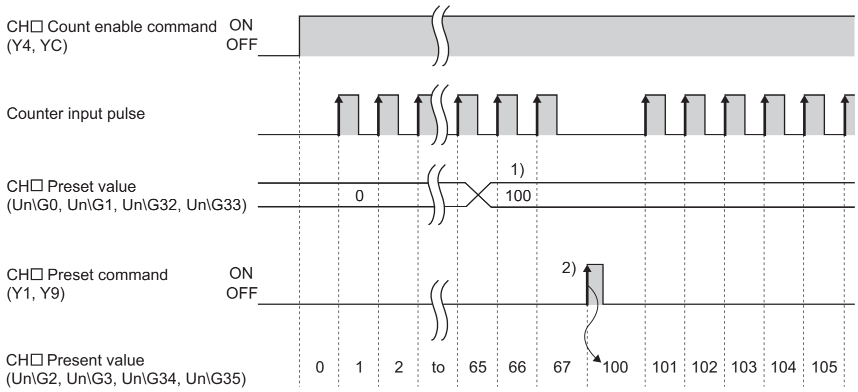
A coincidence detection interrupt occurs on the rising edge of the counter value coincidence signal (off to on).
Therefore, the next interrupt will not be requested unless the coincidence signal is reset and the counter value coincidence signal is turned off.

8.4 Preset Function

This function overwrites the present counter value with the set value.
The set value is referred to as a preset value.
This function can be used to start counting pulses from the preset value.
The function can be performed using a program or an external control signal.

(1) Performing the preset function using a program

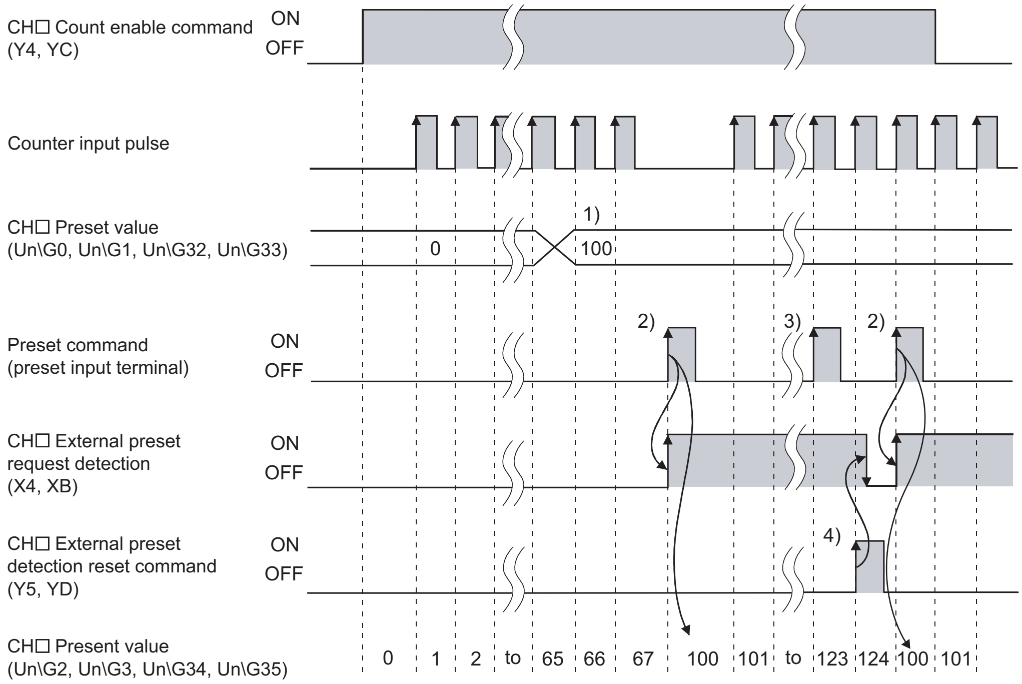
Perform the preset function by turning on CH□ Preset command (Y1, Y9).



No.	Description
1)	Write a value to CH□ Preset value (Un\G0, Un\G1, Un\G32, Un\G33) in 32-bit signed binary.
2)	On the rising edge (off to on) of CH□ Preset command (Y1, Y9), the value stored in CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is replaced with the value stored in CH□ Preset value (Un\G0, Un\G1, Un\G32, Un\G33). The preset function is performed regardless of the on/off status of CH□ Count enable command (Y4, YC).

(2) Performing the preset function using an external control signal

Perform the preset function by applying an ON voltage to the preset input terminal for external input.



No.	Description
1)	Write a value to CH☐ Preset value (Un\G0, Un\G1, Un\G32, Un\G33) in 32-bit signed binary.
2)	On the rising edge (off to on) of the preset command (A voltage is applied to the preset input terminal.), the value stored in CH☐ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is replaced with the value stored in CH☐ Preset value (Un\G0, Un\G1, Un\G32, Un\G33). The preset function is performed regardless of the on/off status of CH☐ Count enable command (Y4, YC).

Point

While CH☐ External preset request detection (X4, XB) is on (3)), the preset function cannot be performed even if a voltage is applied to the preset input terminal or CH☐ Preset command (Y1, Y9) is turned on.
The preset function can be performed when CH☐ External preset request detection (X4, XB) is turned off by turning on CH☐ External preset detection reset command (Y5, YD) (4)).

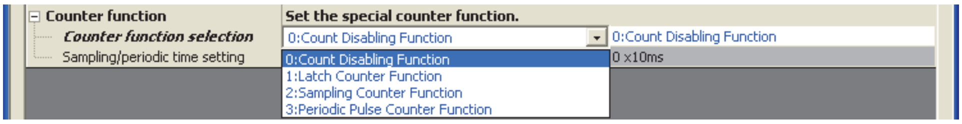
8.5 Counter Function Selection

The count disable function, the latch counter function, the sampling counter function, or the periodic pulse counter function can be used by selecting each item in "Counter function selection". The selected counter function is performed by the counter function selection start command (A voltage is applied to the function start input terminal or CH□ Counter function selection start command (Y6, YE) is turned on by a program).
The counter function selection permits using only one function of the four counter functions.

(1) Setting method

Select a counter function in "Counter function selection".

Project window ⇨ [Intelligent Function Module] ⇨ Model name ⇨ [Parameter]



Item	Description	Reference
Count Disabling Function	Stops counting while CH□ Count enable command (Y4, YC) is on.	Page 80, Section 8.6
Latch Counter Function	Latches the present counter value when a signal is input.	Page 81, Section 8.7
Sampling Counter Function	Counts pulses input during the specified sampling period (T).	Page 82, Section 8.8
Periodic Pulse Counter Function	Stores the present and previous counter values to CH□ Periodic pulse count present value (Un\G18, Un\G19, Un\G50, Un\G51) and CH□ Periodic pulse count previous value (Un\G16, Un\G17, Un\G48, Un\G49), respectively, at the preset cycle (T).	Page 83, Section 8.9

Point

- When changing the counter function, change the function with the off state of CH□ Counter function selection start command (Y6, YE).
- The selected counter function can be performed by turning on CH□ Counter function selection start command (Y6, YE) or applying a voltage to the function start input terminal. A signal that is input first takes priority.
- Time for the sampling counter function or the periodic pulse counter function can be set by writing a value of 1 to 65535 to CH□ Sampling/periodic time setting (Un\G10, Un\G42). The unit of time is 10ms.
  Example: Setting "420" for CH□ Sampling/periodic time setting (Un\G10, Un\G42)

  $$420 \times 10 = 4200(\text{ms})$$

8.5.1 Reading the counter function selection count value

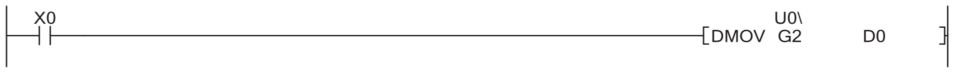
The counter function selection count value refers to the count value that is stored when the counter function selection is performed.
When the latch counter, sampling counter, or periodic pulse counter function is performed, the count value is stored in the corresponding buffer memory areas listed in the table below.

Description		Present value	Counter function selection count value			
			Latch count value	Sampling count value	Periodic pulse count previous value	Periodic pulse count current value
Buffer memory address	CH1	Un\G2, Un\G3	Un\G12, Un\G13	Un\G14, Un\G15	Un\G16, Un\G17	Un\G18, Un\G19
	CH2	Un\G34, Un\G35	Un\G44, Un\G45	Un\G46, Un\G47	Un\G48, Un\G49	Un\G50, Un\G51

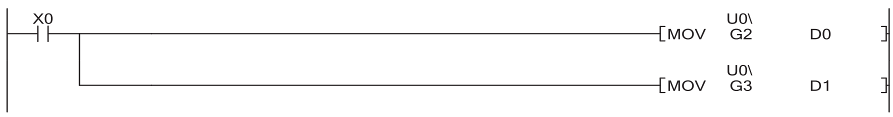
The present value and the counter function selection count values are stored in the buffer memory areas in 32-bit signed binary.
The buffer memory data is automatically updated by counting operation. The latest count value can be read from the buffer memory.

Point

- Read the present value and counter function selection count values by two words at a time. If the values are read by one word at a time, the lower word data and the higher word data will be inconsistent when the count value is updated during reading, and an incorrect count value may be read.
  - Program example



  - Inappropriate program example
    The present value may change while CH1 Present value (L) (Un\G2) and CH1 Present value (H) (Un\G3) are read.



- Although the storage addresses differ between the latch count value and periodic pulse count current value, the stored values are always the same (updated simultaneously). Therefore, when the latch counter function or periodic pulse counter function is executed, the latch count value and periodic pulse count current value do not hold their previous values.

8.5.2 Count error

A count error may occur when the selected counter function is performed by external input (A voltage is applied to the function start input terminal.) or by a program (CH□ Counter function selection start command (Y6, YE) is turned on). The following describes how to calculate the count error.

(1) Count error (maximum) due to a delay of response to an external input

$$\left(\frac{1\ [\text{ms}]}{1000}\right)[\text{s}] \times \text{Pulse input speed [PPS]} \times \text{Multiplication [count]}$$

(2) Count error (maximum) when the selected counter function is performed by a program

$$\left(\frac{1\ \text{scan time [ms]}}{1000}\right)[\text{s}] \times \text{Pulse input speed [PPS]} \times \text{Multiplication [count]}$$

(3) Count error (maximum) due to an internal clock delay when the sampling counter function or the periodic pulse counter function is performed

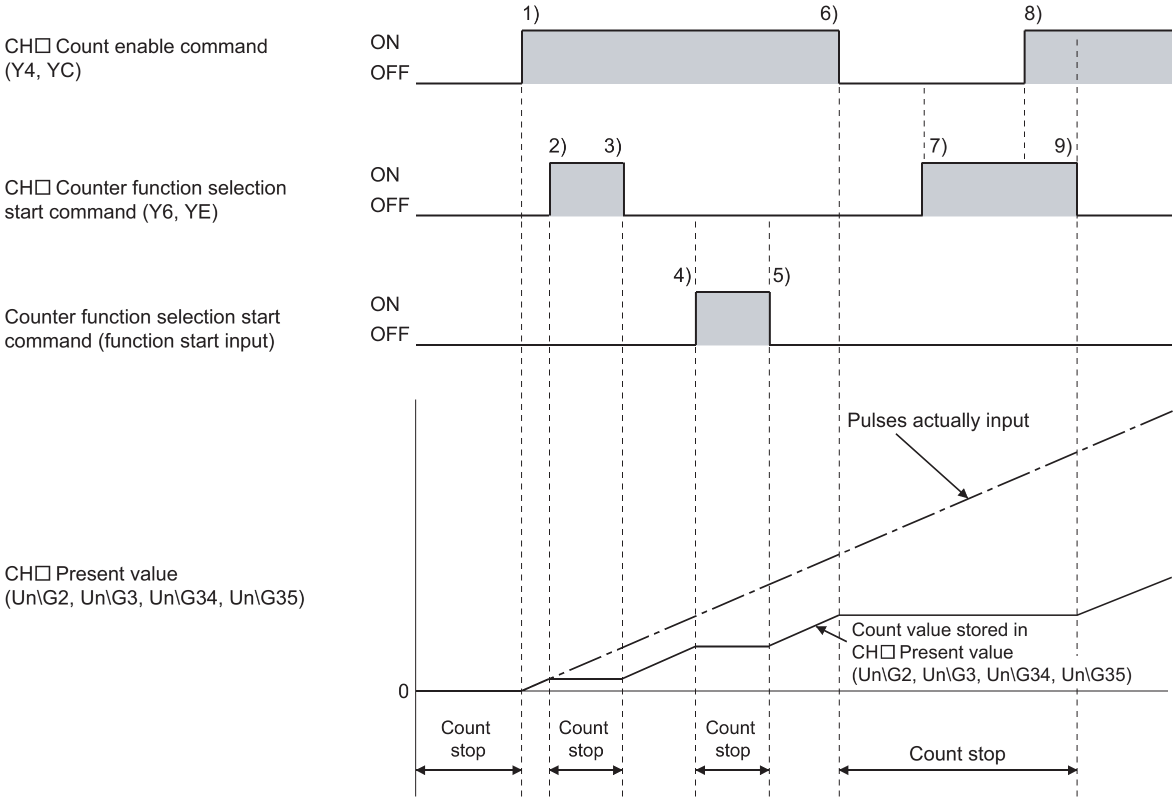
$$\left(\frac{\text{Sampling/periodic time setting value} \times 10\ [\text{ms}]}{1000}\right)[\text{s}] \times \frac{\text{Error in design, 100 [ppm]}}{1000000}$$

$$\times \text{Pulse input speed [PPS]} \times \text{Multiplication [count]}$$

$$= \frac{\begin{array}{c}\text{(Sampling/periodic time setting value}\\ \text{(unit: 10ms))}\end{array} \times \text{Pulse input speed [PPS]} \times \text{Multiplication [count]}}{1000000}$$

8.6 Count Disable Function

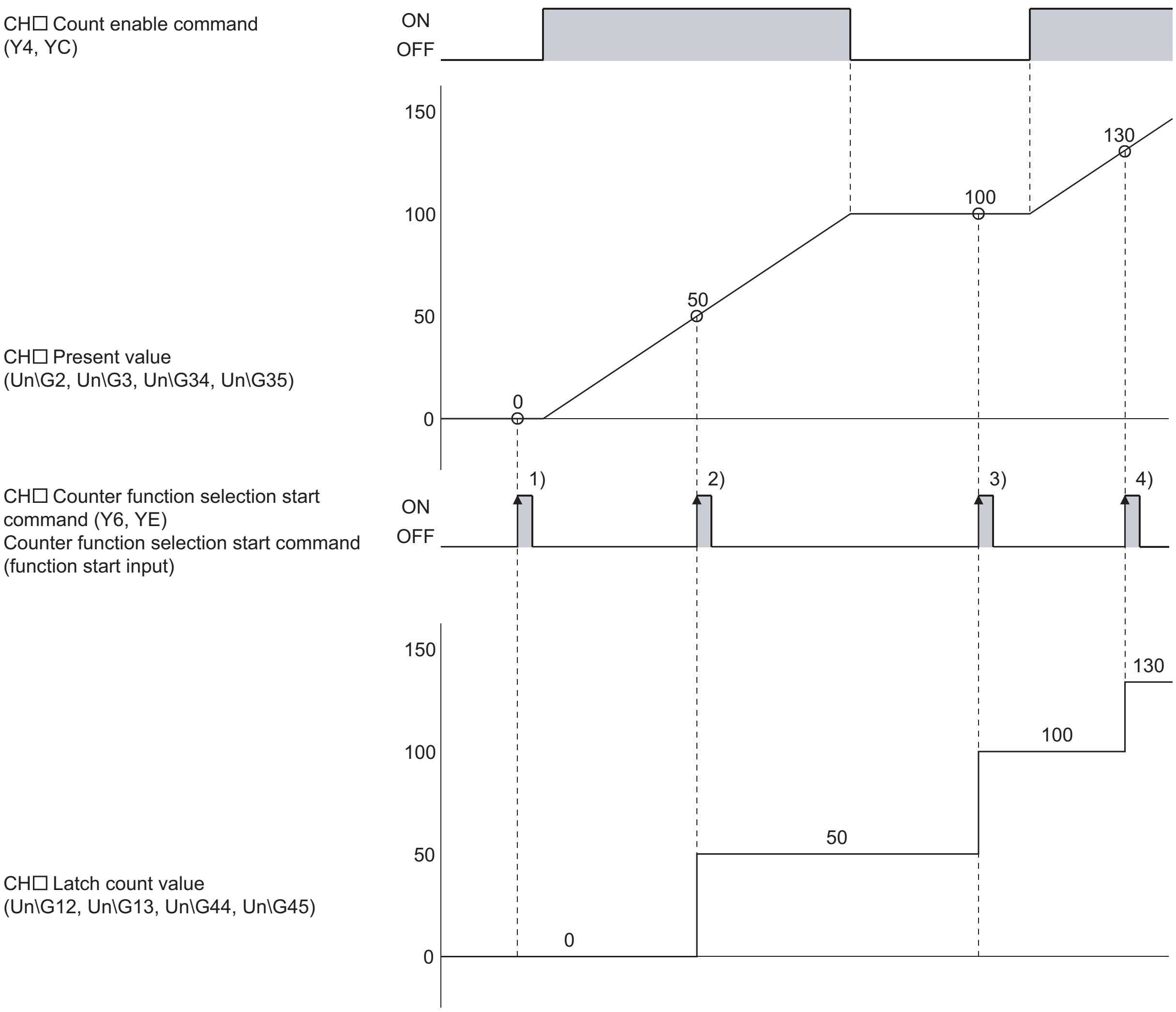
This function stops counting pulses while CH☐ Count enable command (Y4, YC) is on.
The following figure shows the relationship among CH☐ Count enable command (Y4, YC), the counter function selection start command, and the present counter value.



No.	Description
1)	Counting starts when CH☐ Count enable command (Y4, YC) is turned on.
2)	Counting stops when CH☐ Counter function selection start command (Y6, YE) is turned on.
3)	Counting restarts when CH☐ Counter function selection start command (Y6, YE) is turned off.
4)	Counting stops when the counter function selection start command (function start input) is turned on.
5)	Counting restarts when the counter function selection start command (function start input) is turned off.
6)	Counting stops when CH☐ Count enable command (Y4, YC) is turned off.
7)	Counting stops regardless of the on/off status of CH☐ Counter function selection start command (Y6, YE) because CH☐ Count enable command (Y4, YC) is off.
8)	Even though CH☐ Count enable command (Y4, YC) is turned on, counting remains stopped because CH☐ Counter function selection start command (Y6, YE) is on.
9)	Counting restarts when CH☐ Counter function selection start command (Y6, YE) is turned off.

8.7 Latch Counter Function

The function latches the present counter value when a signal is input.
The following figure shows the relationship among the present counter value, the counter function selection start command, and CH☐ Latch count value (Un\G12, Un\G13, Un\G44, Un\G45).



On the rising edge of CH☐ Counter function selection start command (Y6, YE) or the counter function selection start command (function start input) of 1) to 4), the present counter value is stored in CH☐ Latch count value (Un\G12, Un\G13, Un\G44, Un\G45).
The latch counter function is performed regardless the on/off status of CH☐ Count enable command (Y4, YC).

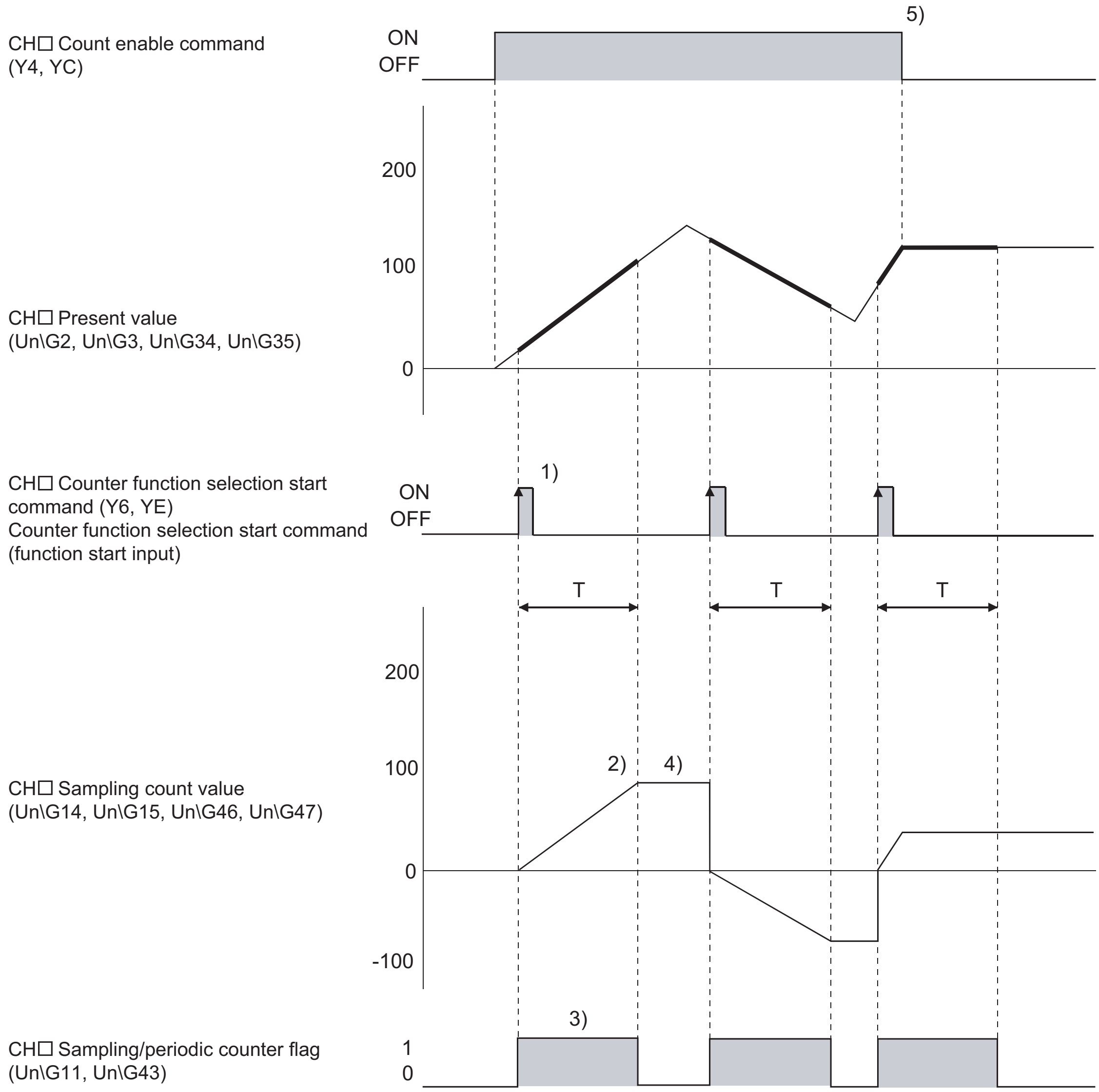
8

8.7 Latch Counter Function

8.8 Sampling Counter Function

This function counts pulses input during the specified sampling period (T).

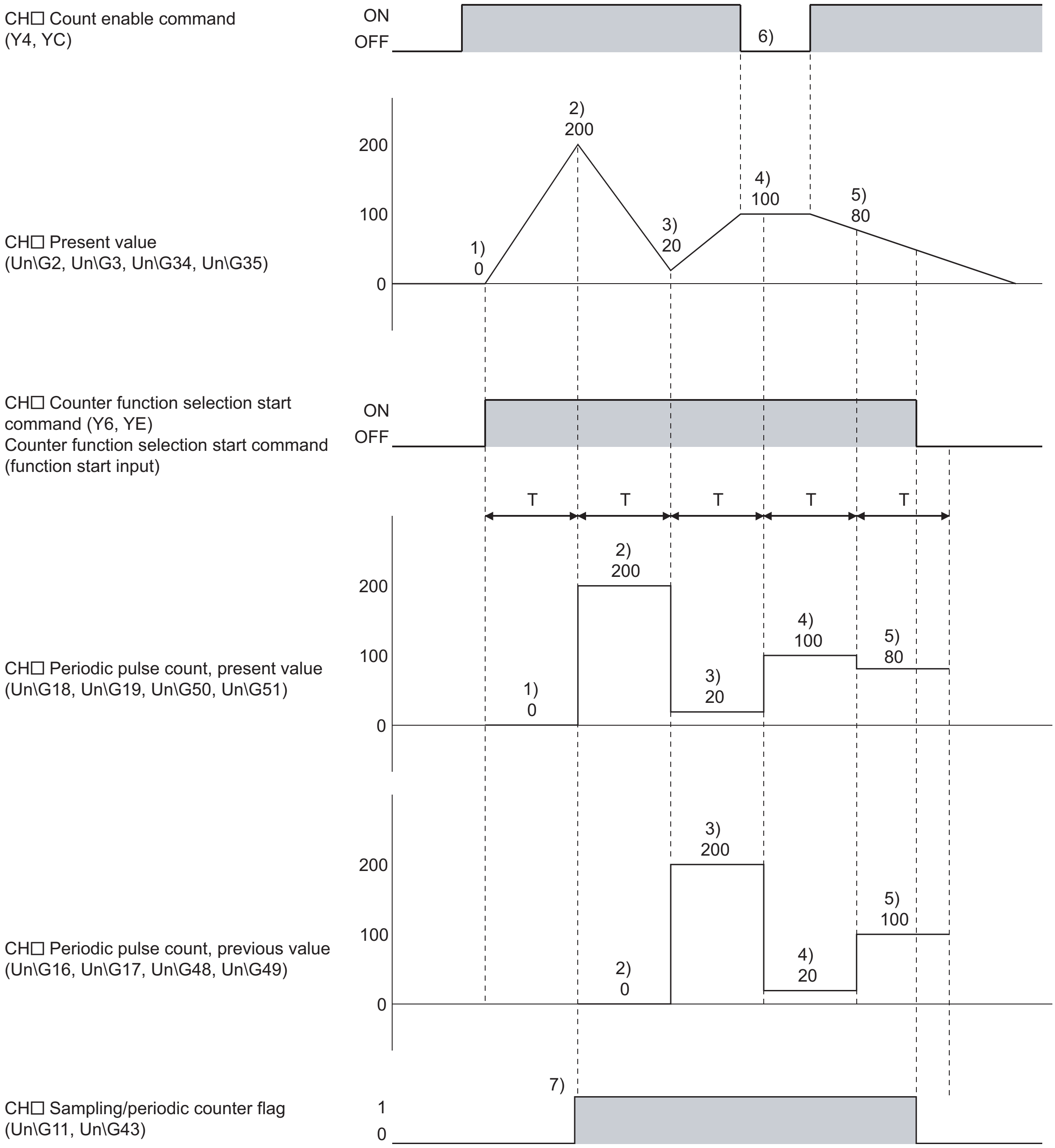
The following figure shows the relationship between the signals and the buffer memory areas.



No.	Description
1)	Input pulses are counted from 0 on the rising edge of CH☐ Counter function selection start command (Y6, YE) or the counter function selection start command (function start input).
2)	Counting stops when the specified sampling period has elapsed.
3)	While the sampling counter function is performed, "1" is stored in CH☐ Sampling/periodic counter flag (Un\G11, Un\G43).
4)	Even after the sampling counter function is performed, the value stored in CH☐ Sampling count value (Un\G14, Un\G15, Un\G46, Un\G47) is held.
5)	The sampling counter function is performed regardless the on/off status of CH☐ Count enable command (Y4, YC).

8.9 Periodic Pulse Counter Function

This function stores the present and previous counter values to CH□ Periodic pulse count present value (Un\G18, Un\G19, Un\G50, Un\G51) and CH□ Periodic pulse count previous value (Un\G16, Un\G17, Un\G48, Un\G49), respectively, at the preset cycle (T).
The following figure shows the relationship between the signals and the buffer memory areas.

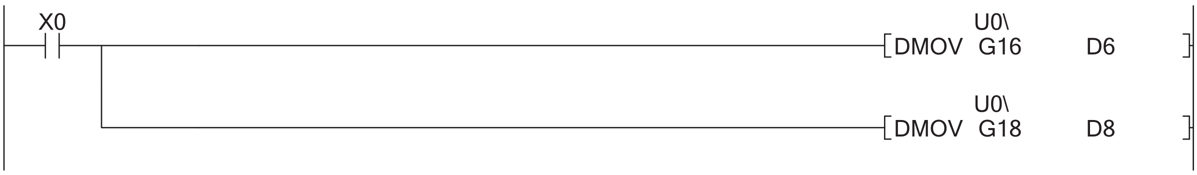


No.	Description
1)	The present counter value, 0, is stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51).
2)	The present counter value, 200, is stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51). The value 0, which has been stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51), is then stored in CH□ Periodic pulse count, previous value (Un\G16, Un\G17, Un\G48, Un\G49).
3)	The present counter value, 20, is stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51). The value 200, which has been stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51), is then stored in CH□ Periodic pulse count, previous value (Un\G16, Un\G17, Un\G48, Un\G49).
4)	The present counter value, 100, is stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51). The value 20, which has been stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51), is then stored in CH□ Periodic pulse count, previous value (Un\G16, Un\G17, Un\G48, Un\G49).
5)	The present counter value, 80, is stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51). The value 100, which has been stored in CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51), is then stored in CH□ Periodic pulse count, previous value (Un\G16, Un\G17, Un\G48, Un\G49).
6)	The periodic pulse counter function is performed regardless the on/off status of CH□ Count enable command (Y4, YC).
7)	While the periodic pulse counter function is performed, "1" is stored in CH□ Sampling/periodic counter flag (Un\G11, Un\G43).

Point

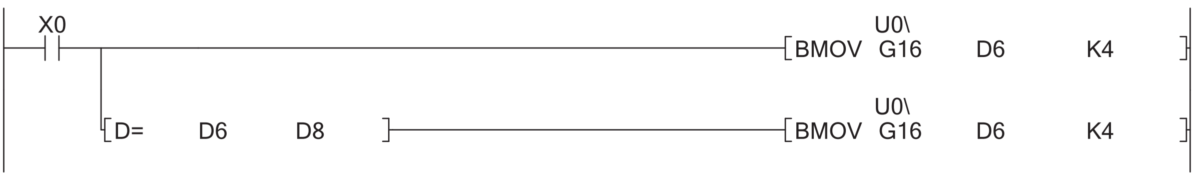
Note the following when reading CH□ Periodic pulse count, previous value (Un\G16, Un\G17, Un\G48, Un\G49) and CH□ Periodic pulse count, present value (Un\G18, Un\G19, Un\G50, Un\G51).

- When reading values using a program, read values in two-word units.



Depending on the relation between the update timings of the previous and present values inside the module and the read timing in the program, the previous value and the present value may be the same.
In that case, read values again. (Page 96, Section 10.1 (7))

- When reading values using the auto refresh setting, only the value in the device to which the present value is written may change depending on the relation between the update timings of the previous and present values inside the module and the auto refresh timing. In that case, read values using a program.



CHAPTER 9 DISPLAY UNIT

This chapter describes display unit functions that can be used for the high-speed counter module.
For details on operations, functions, and menu structure of the display unit, refer to the following.

MELSEC-L CPU Module User's Manual (Function Explanation, Program Fundamentals)

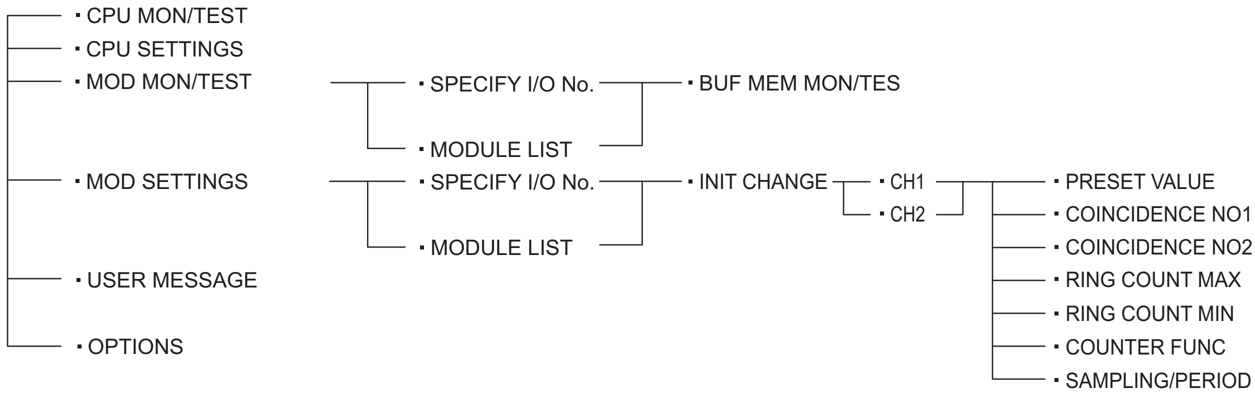
9.1 Features

The display unit is a liquid crystal display that can be connected to the CPU module. Connecting it to the CPU module allows checking the system status and changing the system setting value even without using software packages.

9.2 Menu Transition

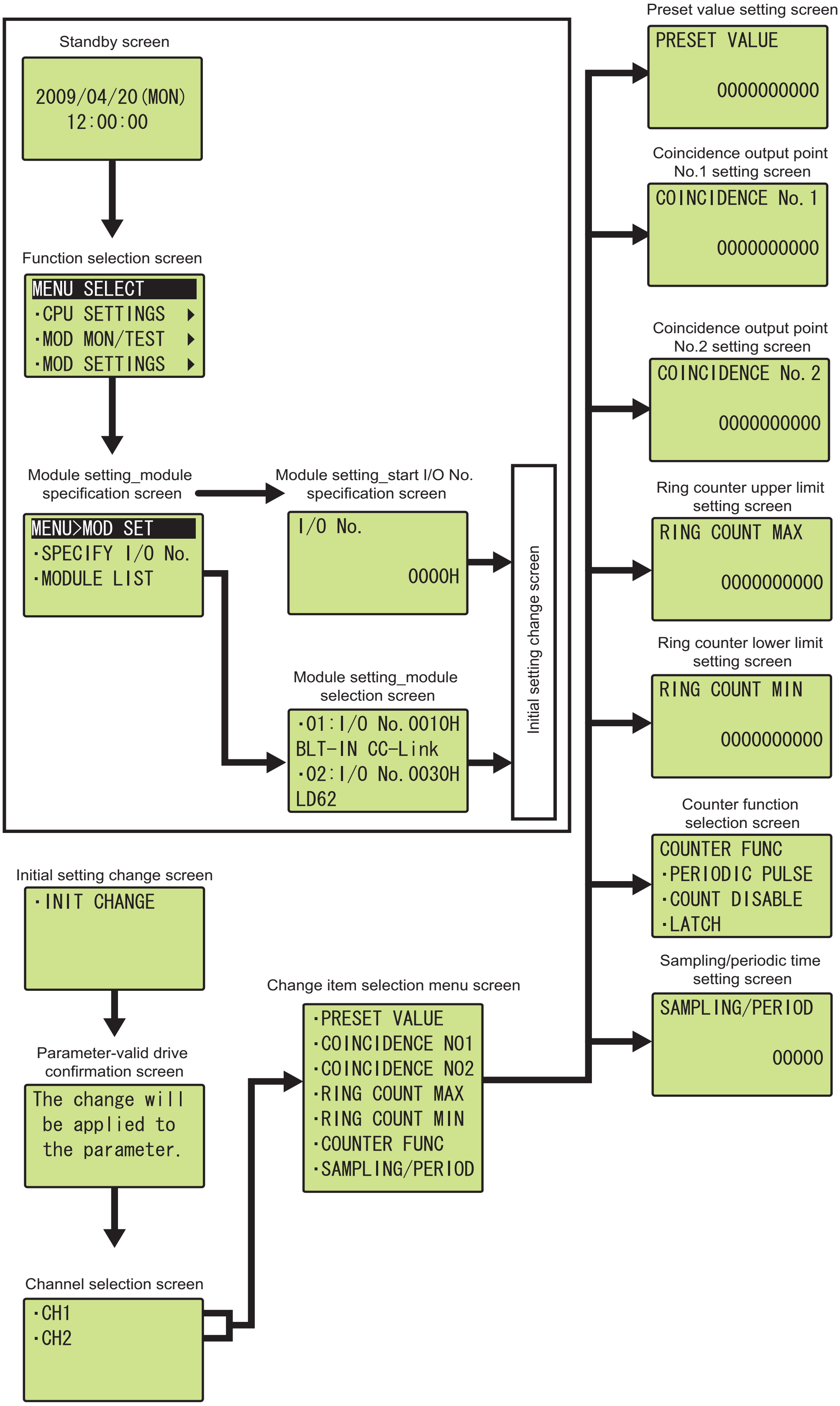
(1) Menu structure

The following diagram shows the "MOD MON/TEST" menu and the "MOD SETTINGS" menu structures.



(2) Screen transition to the initial setting change screen

The following figure shows screen transition to the initial setting change screen.



9.3 List of Setting Value Change Screens

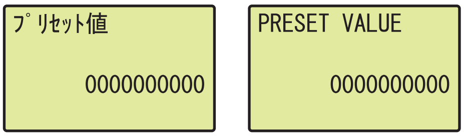
The following table lists setting value change screens.

(1) User interface language is English

Name		Format	Setting range	
Setting item	Screen display		Upper limit value	Lower limit value
Preset value	PRESET VALUE	Numeric value	2147483647	-2147483648
Coincidence output point No.1	COINCIDENCE NO1	Numeric value	2147483647	-2147483648
Coincidence output point No.2	COINCIDENCE NO2	Numeric value	2147483647	-2147483648
Ring counter upper limit	RING COUNT MAX	Numeric value	2147483647	-2147483648
Ring counter lower limit	RING COUNT MIN	Numeric value	2147483647	-2147483648
Counter function selection	COUNTER FUNC	Set by user	—	—
Sampling/periodic time setting	SAMPLING/PERIOD	Numeric value	65535	1

(2) Preset value

"PRESET VALUE" screen



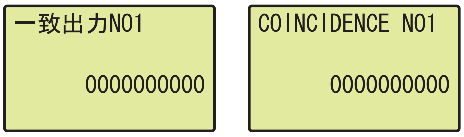
1. **Move the cursor using the ◀ and ▶ buttons, increase or decrease the cursor position value using the ▲ and ▼ buttons, and press the OK button.**

Input item

Input item	Setting range	
	Upper limit value	**Lower limit value**
PRESET VALUE	2147483647	-2147483648

(3) Coincidence output point No.1

"COINCIDENCE NO1" screen



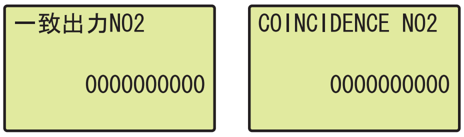
1. **Move the cursor using the ◀ and ▶ buttons, increase or decrease the cursor position value using the ▲ and ▼ buttons, and press the OK button.**

Input item

Input item	Setting range	
	Upper limit value	**Lower limit value**
COINCIDENCE NO1	2147483647	-2147483648

(4) Coincidence output point No.2

"COINCIDENCE NO2" screen



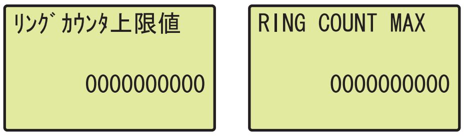
1. **Move the cursor using the ◀ and ▶ buttons, increase or decrease the cursor position value using the ▲ and ▼ buttons, and press the OK button.**

Input item

Input item	Setting range	
	Upper limit value	**Lower limit value**
COINCIDENCE NO2	2147483647	-2147483648

(5) Ring counter upper limit value

"RING COUNT MAX" screen



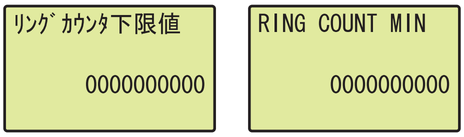
1. **Move the cursor using the ◀ and ▶ buttons, increase or decrease the cursor position value using the ▲ and ▼ buttons, and press the OK button.**

Input item

Input item	Setting range	
	Upper limit value	Lower limit value
Ring counter upper limit value	2147483647	-2147483648

(6) Ring counter lower limit value

"RING COUNT MIN" screen



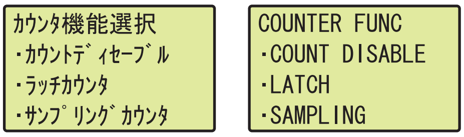
1. **Move the cursor using the ◀ and ▶ buttons, increase or decrease the cursor position value using the ▲ and ▼ buttons, and press the OK button.**

Input item

Input item	Setting range	
	Upper limit value	Lower limit value
RING COUNT MIN	2147483647	-2147483648

(7) Counter function selection

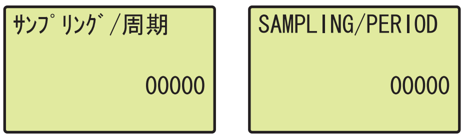
"COUNTER FUNC" screen



1. **Use the ▲ and ▼ buttons to select "COUNT DISABLE", "LATCH", "SAMPLING", or "PERIODIC PULSE" and press the OK button.**

(8) Sampling/periodic time setting

"SAMPLING/PERIOD" screen



1. **Move the cursor using the ◀ and ▶ buttons, increase or decrease the cursor position value using the ▲ and ▼ buttons, and press the OK button.**

Input item

Input item	Setting range	
	Upper limit value	Lower limit value
SAMPLING/PERIOD	65535	1

CHAPTER 10 PROGRAMMING

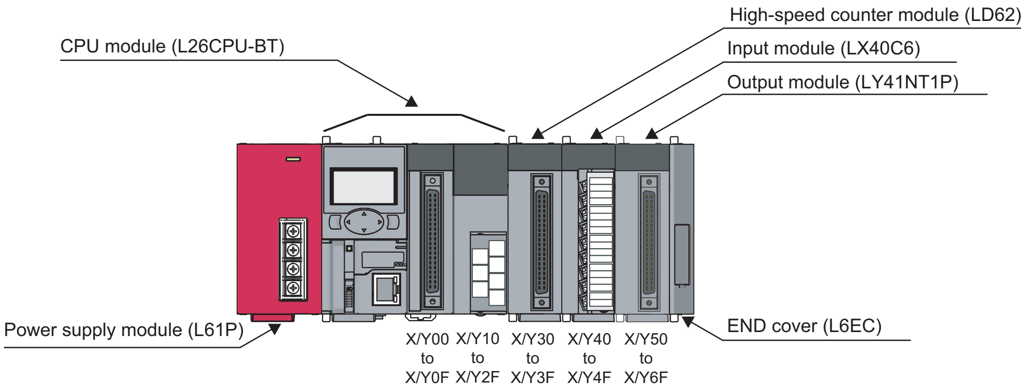
This chapter describes basic programs of the high-speed counter module.

10.1 Using the Module in Standard System Configuration

This section describes the system configuration and program examples based on conditions.

(1) System configuration

The following figure shows an example using the high-speed counter module in standard system configuration.



Point

When using the L02CPU, assign X/Y30 to X/Y3F for the high-speed counter module to set the same assignment as the system above. For the LX40C6, assign X/Y40 to X/Y4F and for the LY41NT1P, assign X/Y50 to X/Y6F.

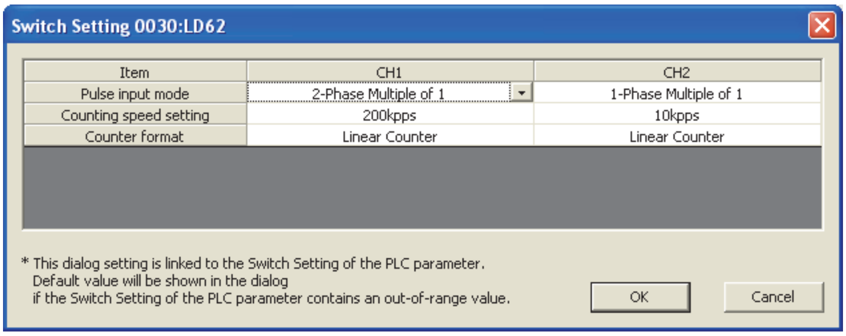
(2) Programming condition

The program counts pulses input to CH1 of the high-speed counter module.

(3) Switch setting

Set a pulse input mode, counting speed, and counter type as follows:

Project window ➪ [Intelligent Function Module] ➪ [LD62] ➪ [Switch Setting]



Item	Description	
	CH1	CH2*1
Pulse input mode	2-Phase Multiple of 1	1-Phase Multiple of 1
Counting speed setting	200kpps	10kpps
Counter format	User defined	Linear Counter

*1 Leave unused channels with the default values.

(4) Initial setting

Item	Contents	
	CH1	CH2*1
Preset value	2500	0
Coincidence output point No.1	1000	0
Coincidence output point No.2	0	0
Ring counter upper limit*2	5000	0
Ring counter lower limit*2	-5000	0
Counter function selection	User defined	Count Disabling Function
Sampling time setting*3	10000ms	0
Periodic time setting*4	5000ms	0

*1 Leave unused channels with the default values.
*2 Set these items when using the ring counter function.
*3 Set this item when using the sampling counter function.
*4 Set this item when using the periodic pulse counter function.

(5) User devices

Device	Description	
D0 and D1	Present value	
D2 and D3	Latch count value	
D4 and D5	Sampling count value	
D6 and D7	Periodic pulse count previous value	
D8 and D9	Periodic pulse count present value	
D10	Overflow status storage	
M10	Initial setting completion signal	
X40	Count start signal	LX40C6 (X40 to X4F)
X41	Present value read signal	
X42	Coincidence output data setting signal	
X43	Preset command signal	
X44	Count stop signal	
X45	Coincidence LED clear signal	
X46	Counter function start signal	
X47	Counter function stop signal	
X48	Latch count data read signal	
X49	Latch execution signal	
X4A	Sampling count data read signal	
X4B	Sampling count start signal	
X4C	Periodic pulse count data read signal	
X4D	Periodic pulse count start signal	
Y50	Coincidence confirmation LED signal	LY41NT1P (Y50 to Y6F)
Y51	Overflow occurrence confirmation LED signal	
X30	Module READY	LD62 (X/Y30 to X/Y3F)
X31	CH1 Counter value large (point No.1)	
X32	CH1 Counter value coincidence (point No.1)	
X33	CH1 Counter value small (point No.1)	
X34	CH1 External preset request detection	
X35	CH1 Counter value large (point No.2)	
X36	CH1 Counter value coincidence (point No.2)	
X37	CH1 Counter value small (point No.2)	
Y30	CH1 Coincidence signal No.1 reset command	
Y31	CH1 Preset command	
Y32	CH1 Coincidence signal enable command	
Y33	CH1 Down count command	
Y34	CH1 Count enable command	
Y35	CH1 External preset detection reset command	
Y36	CH1 Counter function selection start command	
Y37	CH1 Coincidence signal No.2 reset command	

Point

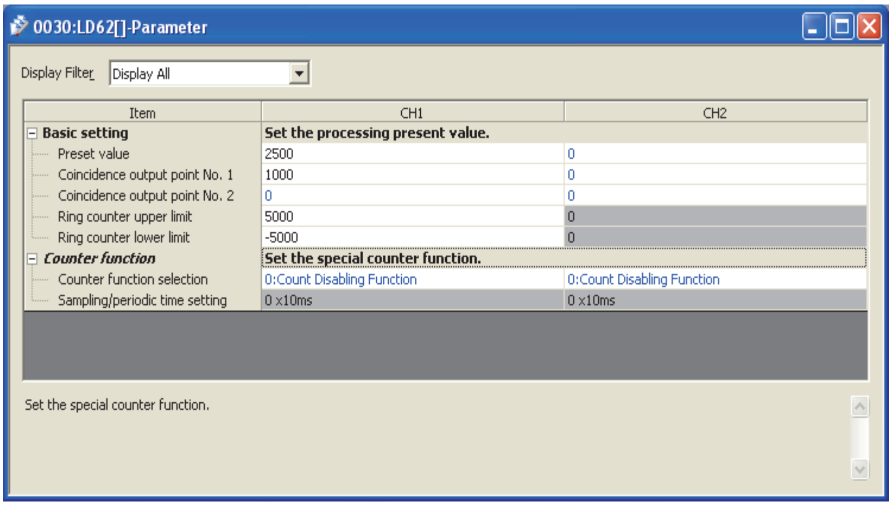
The input signal X3F is used by the system and is not available for users. If a user uses this signal (turning off and on), the performance of the high-speed counter module is not guaranteed.

(6) Program example when intelligent function module parameters are used

(a) Setting parameters

Configure initial settings on the parameters.

Project window ➪ [Intelligent Function Module] ➪ [LD62] ➪ [Parameter]

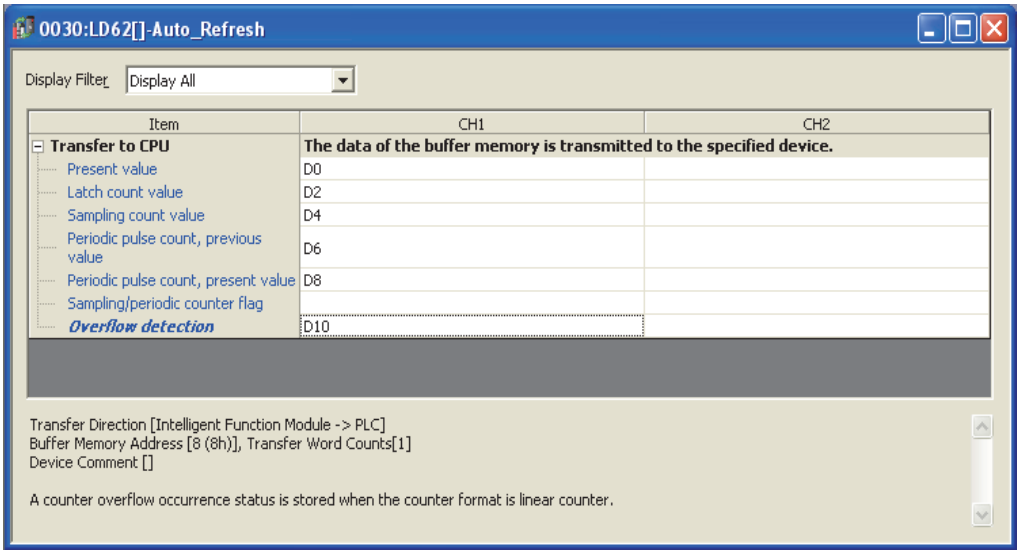


Item	Description	Setting value
Preset value	Enter a preset value.	2500
Coincidence output point No.1	Enter a value for the coincidence output point No.1.	1000
Coincidence output point No.2	Not used	—
Ring counter upper limit	Enter these values when using the ring counter function.	5000
Ring counter lower limit		-5000
Counter function selection	Select the counter function to be used. Select any function when a counter function is not used.	Depends on the function used.
Sampling/periodic time setting (unit: 10ms)	Enter a value when using the sampling counter function.	1000
	Enter a value when using the periodic pulse counter function.	500

(b) Auto refresh

Set auto refresh destination devices.

Project window ➪ [Intelligent Function Module] ➪ [LD62] ➪ [Auto_Refresh]

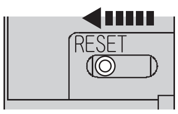


Item	Description	Setting value
Present value	Enter the device where the present value is stored.	D0
Latch count value	Enter the device where the latch count value is stored.	D2
Sampling count value	Enter the device where the sampling count value is stored when using the sampling counter function.	D4
Periodic pulse count previous value	Enter the device where the previous periodic pulse count value is stored when using the periodic pulse counter function.	D6
Periodic pulse count present value	Enter the device where the present periodic pulse count value is stored when using the periodic pulse counter function.	D8
Sampling/periodic counter flag	Not used	—
Overflow detection	Enter the device where the overflow detection result is stored when using the linear counter function.	D10

(c) Writing intelligent function module parameters

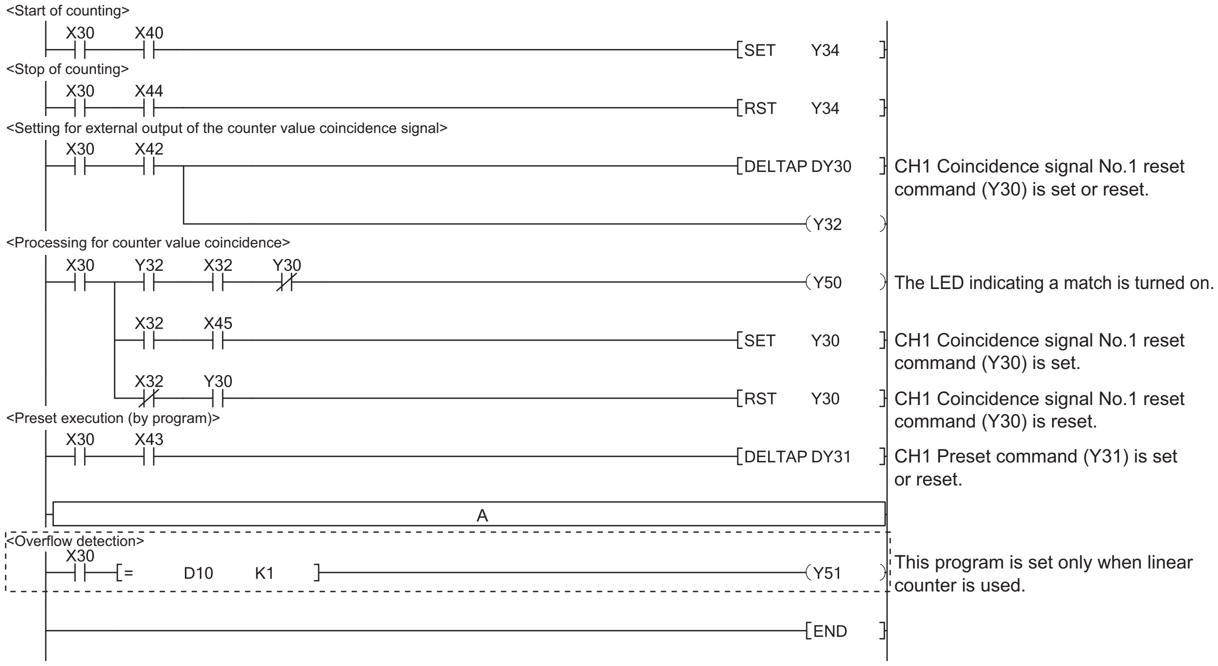
Write the set parameters to the CPU module, and reset the CPU module or power off and then on the programmable controller.

[Online] ➪ [Write to PLC...]



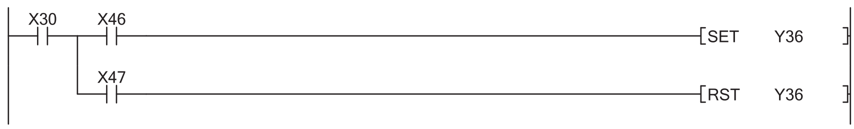
Or powering off → on the programmble controller

(d) Program example



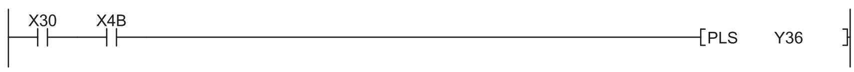
To use each function, insert the following program into the position "A" in the program above.

- Using the count disable function

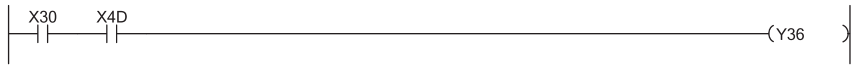


- Using the latch counter function

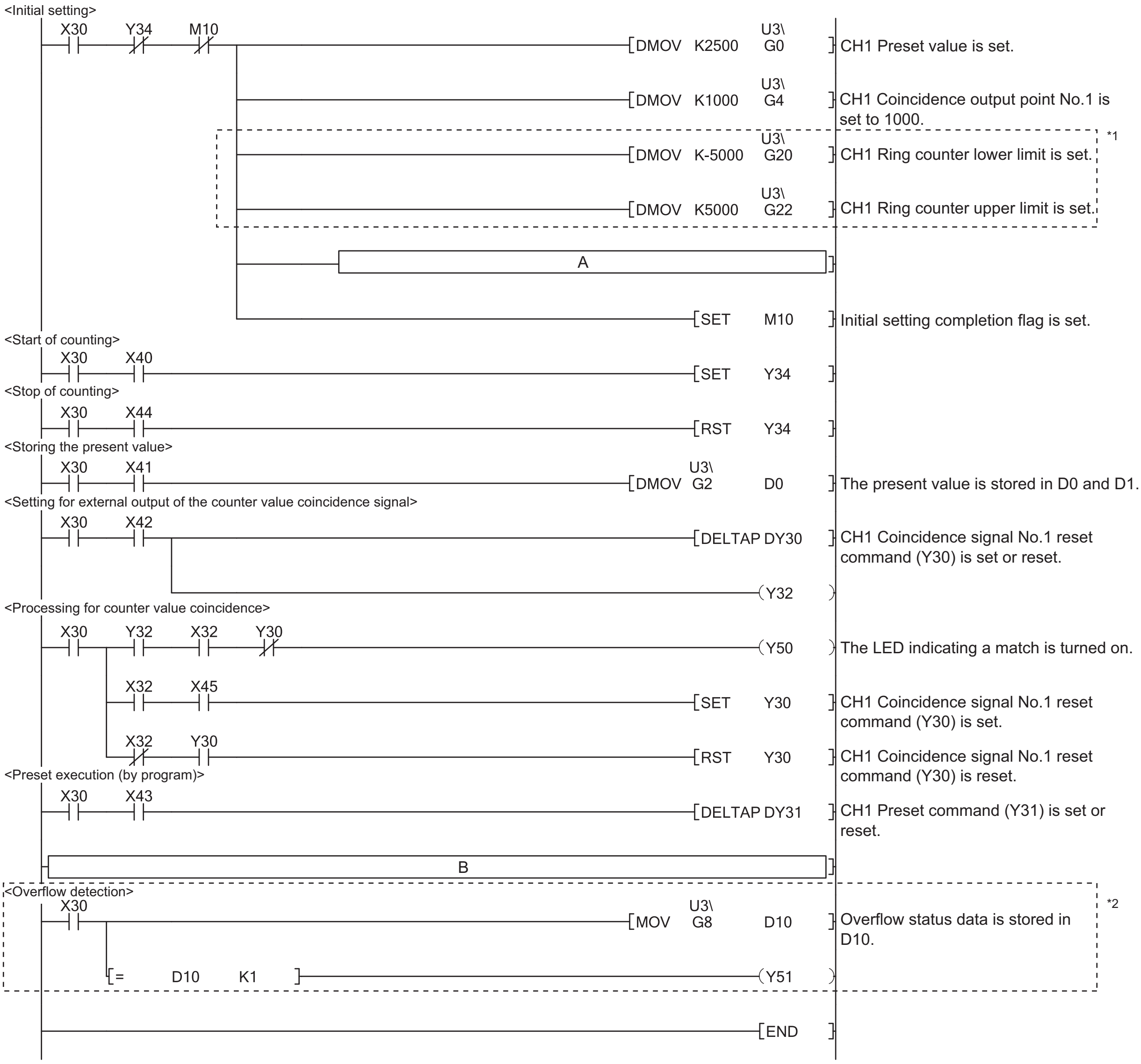
- Using the sampling counter function



- Using the periodic pulse counter function



(7) Program example when intelligent function module parameters are not used

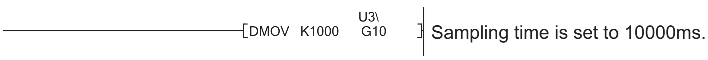


*1 Set these values when using the ring counter.
*2 Set this value when using the linear counter.

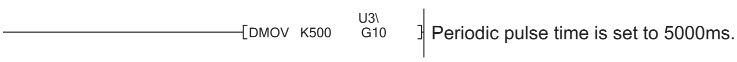
(a) Using the sampling counter function or the periodic pulse counter function

To use the sampling counter function or the periodic pulse counter function, insert the following program into the position "A" in the program above.

- Using the sampling counter function



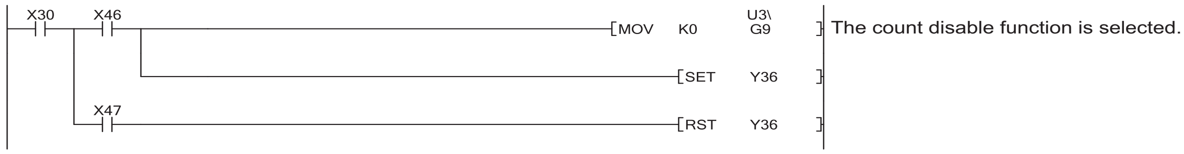
- Using the periodic pulse counter function



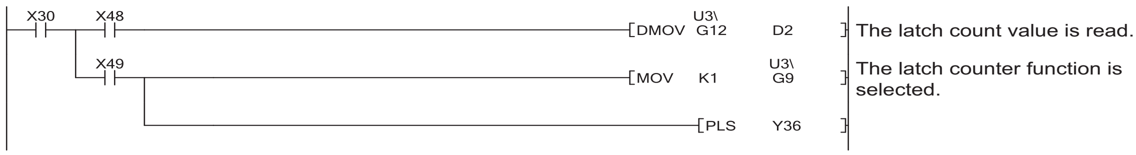
(b) Using each function

To use each function, insert the following program into the position "B" in the program above.

- Using the count disable function

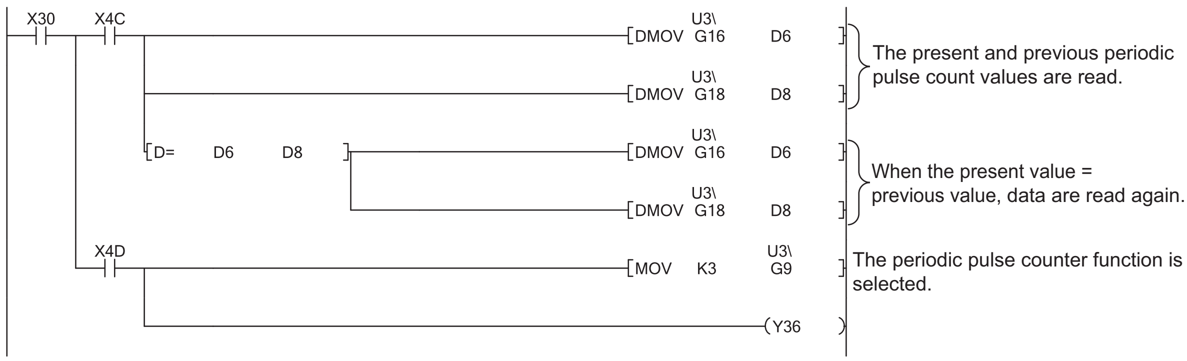


- Using the latch counter function



- Using the sampling counter function

- Using the periodic pulse counter function

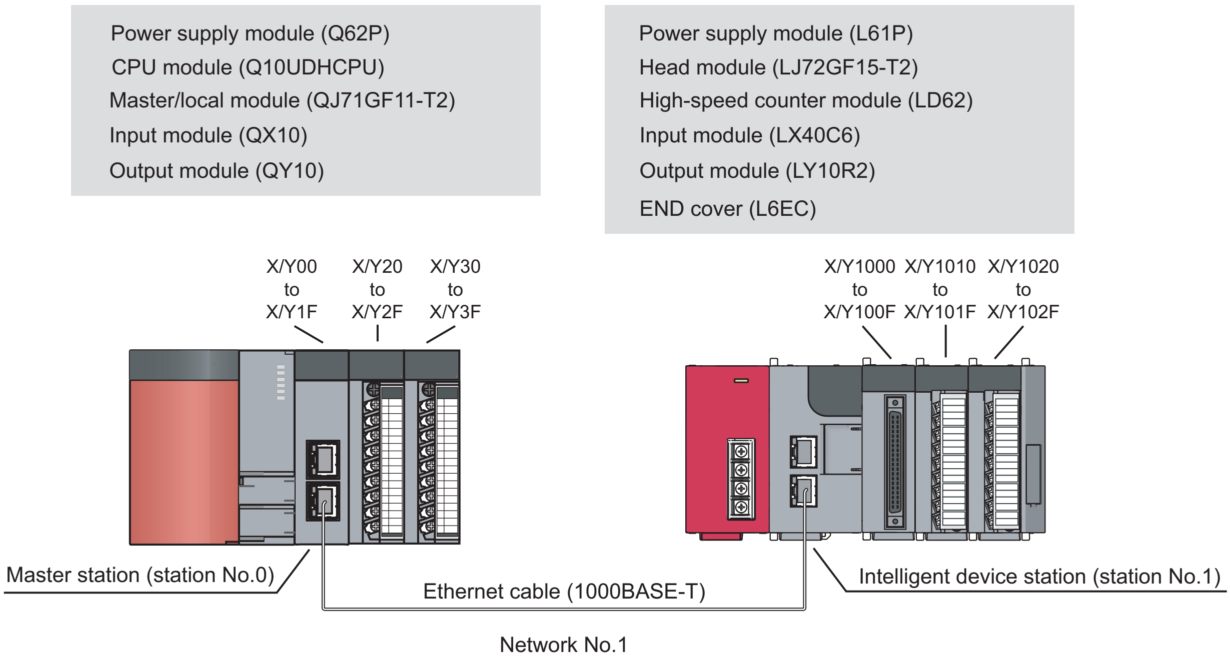


10.2 Connecting the Module to the Head Module

This section describes the system configuration and program examples based on conditions.

(1) System configuration

The following figure shows a system configuration where the high-speed counter module is connected to the head module.



(2) Programming condition

The program counts pulses input to CH1 of the high-speed counter module connected to a head module.

(3) Initial setting

Item	Contents	
	CH1	CH2*1
Preset value	2500	0
Coincidence output point No.1	1000	0
Coincidence output point No.2	0	0
Ring counter upper limit*2	5000	0
Ring counter lower limit*2	-5000	0
Counter function selection	User defined	Count Disabling Function
Sampling time setting*3	10000ms	0
Periodic time setting*4	5000ms	0

*1 Leave unused channels with the default values.
*2 Set these items when using the ring counter function.
*3 Set this item when using the sampling counter function.
*4 Set this item when using the periodic pulse counter function.

(4) User devices

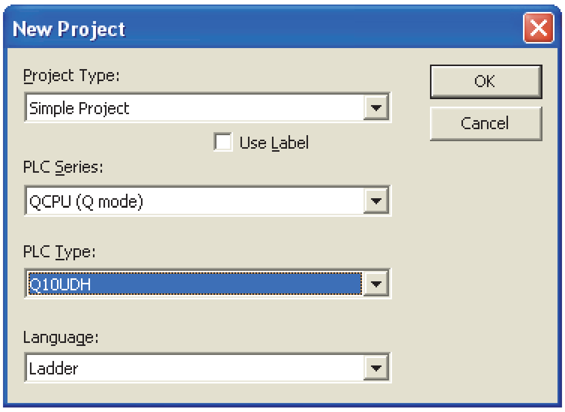
Device	Description	
W1000 and W1001	Device to which the present value is to be written at auto refresh	
W1002 and W1003	Device to which the latch count value is to be written at auto refresh	
W1004 to W1005	Device to which the sampling count value is to be written at auto refresh	
W1006 and W1007	Device to which the periodic pulse count previous value is to be written at auto refresh	
W1008 and W1009	Device to which the periodic pulse count present value is to be written at auto refresh	
W1010	Device to which the overflow status storage is to be written at auto refresh	
X20	Count start signal	QX10 (X20 to X2F)
X22	Coincidence output data setting signal	QX10 (X20 to X2F)
X23	Preset command signal	QX10 (X20 to X2F)
X24	Count stop signal	QX10 (X20 to X2F)
X25	Coincidence LED clear signal	QX10 (X20 to X2F)
X26	Counter function start signal	QX10 (X20 to X2F)
X27	Counter function stop signal	QX10 (X20 to X2F)
X29	Latch execution signal	QX10 (X20 to X2F)
X2B	Sampling count start signal	QX10 (X20 to X2F)
X2D	Periodic pulse count start signal	QX10 (X20 to X2F)
Y30	Coincidence confirmation LED signal	QY10 (Y30 to Y3F)
Y31	Overflow occurrence confirmation LED signal	QY10 (Y30 to Y3F)
X1000	Module READY	LD62 (X/Y1000 to X/Y100F)
X1002	CH1 Counter value coincidence (point No.1)	LD62 (X/Y1000 to X/Y100F)
Y1000	CH1 Coincidence signal No.1 reset command	LD62 (X/Y1000 to X/Y100F)
Y1001	CH1 Preset command	LD62 (X/Y1000 to X/Y100F)
Y1002	CH1 Coincidence signal enable command	LD62 (X/Y1000 to X/Y100F)
Y1004	CH1 Count enable command	LD62 (X/Y1000 to X/Y100F)
Y1006	CH1 Counter function selection start command	LD62 (X/Y1000 to X/Y100F)
SB49	Data link status of the own station	
SWB0.0	Data link status of each station (station No.1)	
N0	Nesting (station No.1)	
M0	Communication ready flag (station No.1)	
T1 to T5	Interlock between the own and other stations	

(5) Setting parameters for the master station

1. **Create a project on GX Works2.**

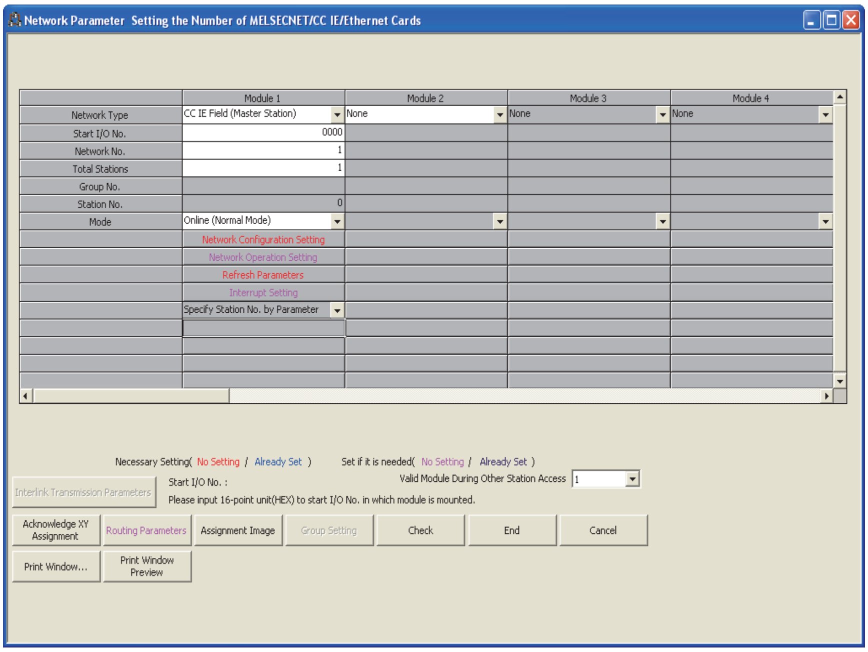
Select "QCPU(Q mode)" for "PLC Series" and "Q10UDH" for "PLC Type".

[Project] ➪ [New...]



2. **Open the network parameter setting window and set parameters as shown below.**

Project window ➪ [Parameter] ➪ [Network Parameter] ➪ [Ethernet/CC IE/MELSECNET]



3. **Open the Network Configuration Setting window and set parameters as shown below.**

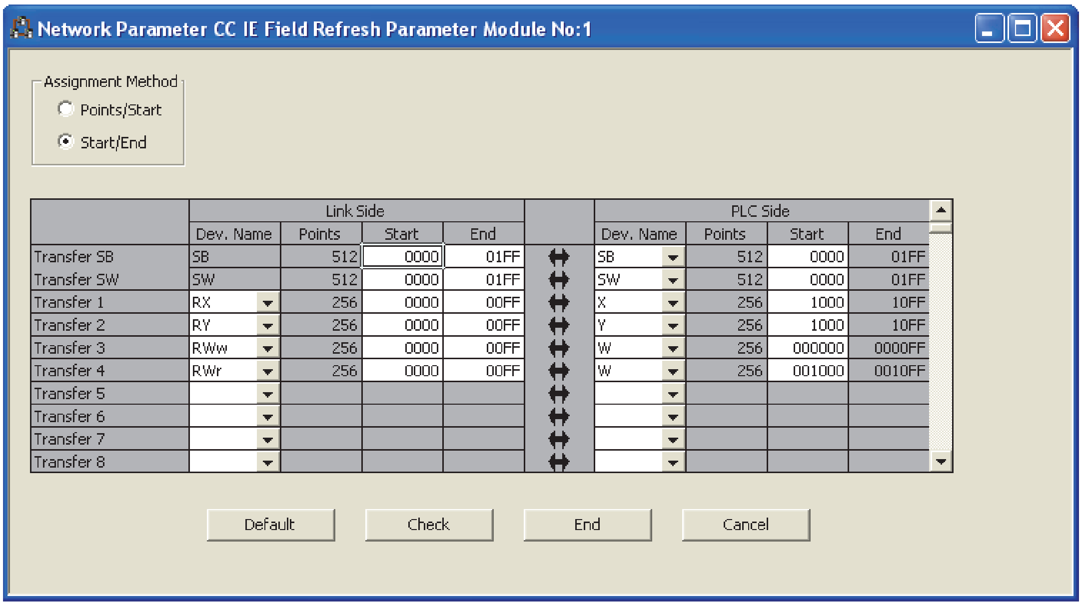
Project window ➪ [Parameter] ➪ [Network Parameter] ➪

[Ethernet/CC IE/MELSECNET] ➪ Network Configuration Setting button

Number of PLCs	Station No.	Station Type	RX/RY Setting			RWw/RWr Setting		
			Points	Start	End	Points	Start	End
1	1	Intelligent Device Station	256	0000	00FF	256	0000	00FF

4. **Open the Refresh Parameter window and set parameters as shown below.**

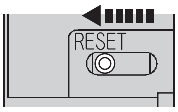
Project window ➪ [Parameter] ➪ [Network Parameter] ➪ [Ethernet/CC IE/MELSECNET] ➪ Refresh Parameters button



	Link Side Dev. Name	Link Side Points	Link Side Start	Link Side End		PLC Side Dev. Name	PLC Side Points	PLC Side Start	PLC Side End
Transfer SB	SB	512	0000	01FF	⇔	SB	512	0000	01FF
Transfer SW	SW	512	0000	01FF	⇔	SW	512	0000	01FF
Transfer 1	RX	256	0000	00FF	⇔	X	256	1000	10FF
Transfer 2	RY	256	0000	00FF	⇔	Y	256	1000	10FF
Transfer 3	RWw	256	0000	00FF	⇔	W	256	000000	0000FF
Transfer 4	RWr	256	0000	00FF	⇔	W	256	001000	0010FF
Transfer 5					⇔				
Transfer 6					⇔				
Transfer 7					⇔				
Transfer 8					⇔				

5. **Write the set parameters to the CPU module on the master station, and reset the CPU module or power off and then on the programmable controller.**

[Online] ➪ [Write to PLC...]



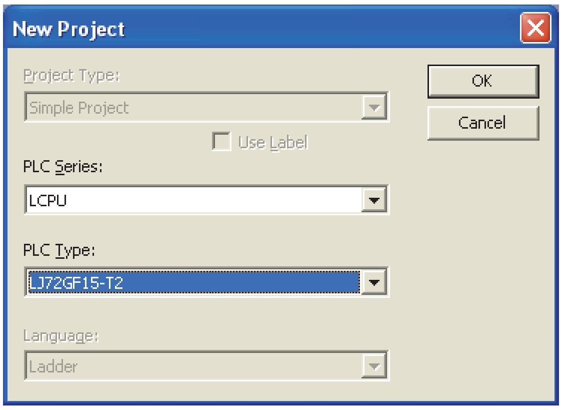
Or powering off → on the programmble controller

(6) Setting parameters for the intelligent device station

1. Create a project on GX Works2.

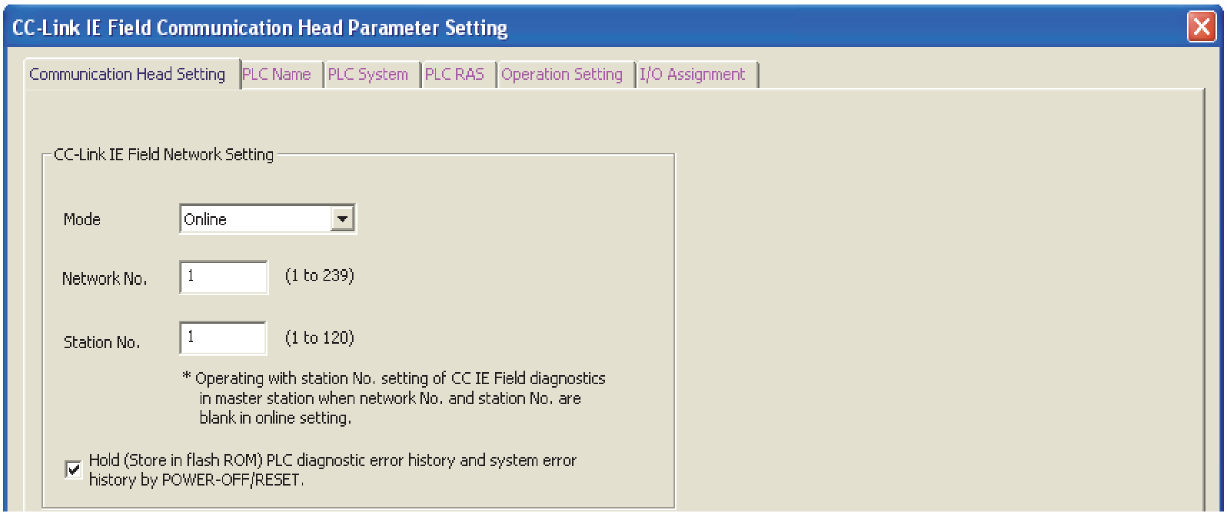
Select "LCPU" for "PLC Series" and "LJ72GF15-T2" for "PLC Type".

[Project] ➪ [New...]



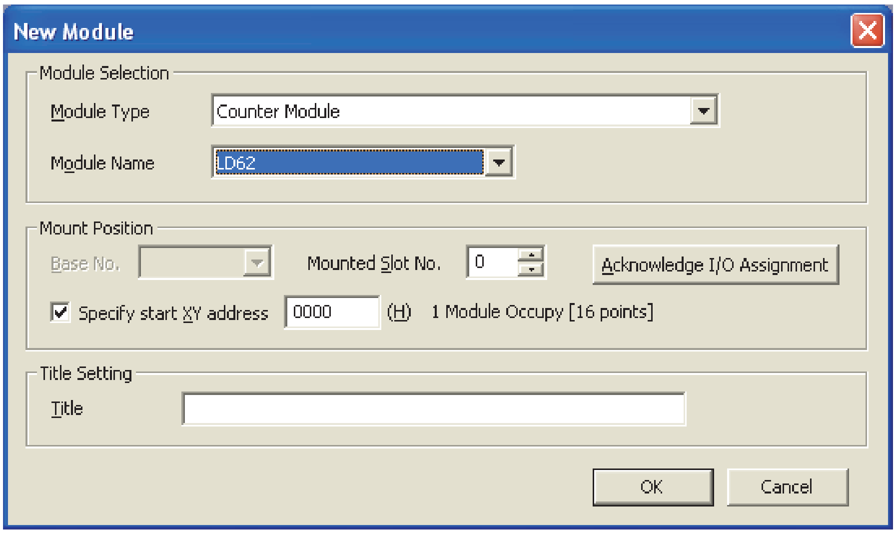
2. Open the PLC parameter setting window and set parameters as shown below.

Project window ➪ [Parameter] ➪ [PLC Parameter] ➪ "Communication Head Setting"



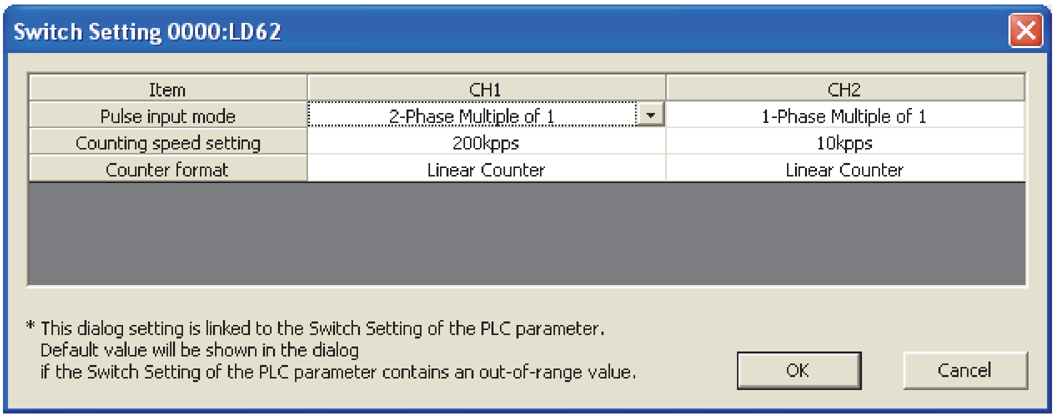
3. **Add the high-speed counter module (LD62) to the GX Works2 project.**

Project window ➪ [Intelligent Function Module] ➪ Right-click ➪ [New Module...]



4. **Open the switch setting window for the high-speed counter module and set parameters as shown below.**

Project window ➪ [Intelligent Function Module] ➪ [LD62] ➪ [Switch Setting]

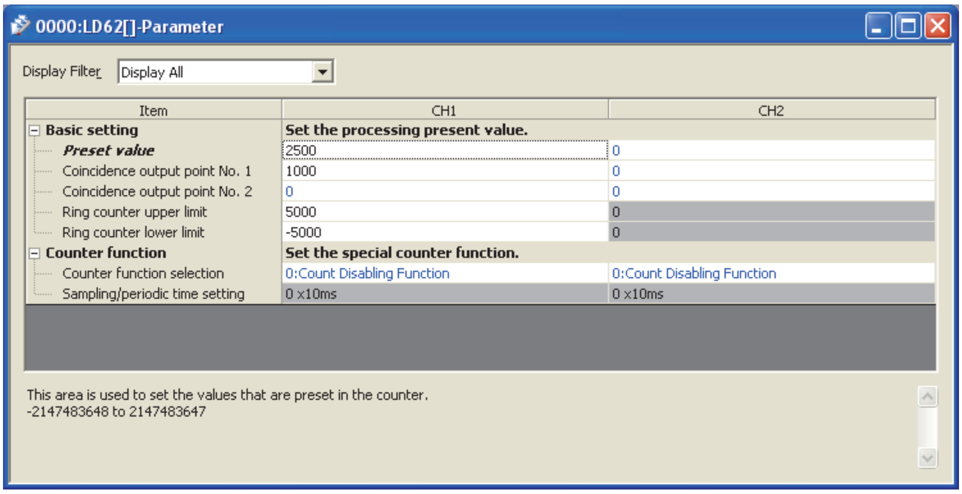


Item	Contents	
	CH1	CH2[*1]
Pulse input mode	2-Phase Multiple of 1	1-Phase Multiple of 1
Counting speed setting	200kpps	10kpps
Counter format	User defined	Linear Counter

*1 Leave unused channels with the default values.

5. **Open the initial setting window for the high-speed counter module and set parameters as shown below.**

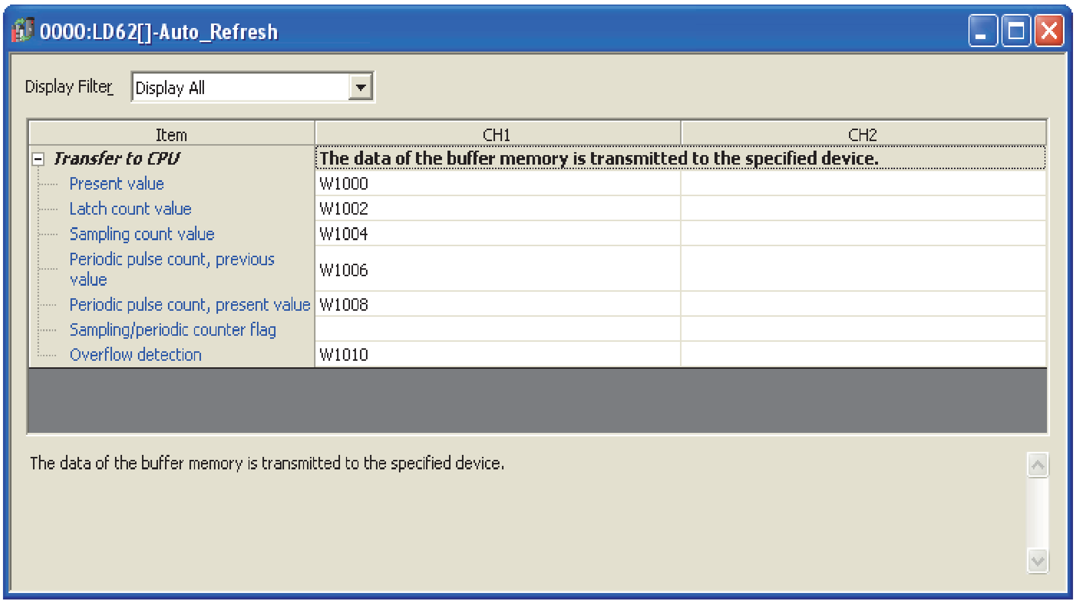
Project window ➪ [Intelligent Function Module] ➪ [LD62] ➪ [Parameter]



Item	Description	Setting value
Preset value	Enter a preset value.	2500
Coincidence output point No.1	Enter a value for the coincidence output point No.1.	1000
Coincidence output point No.2	Not used	—
Ring counter upper limit	Enter these values when using the ring counter function.	5000
Ring counter lower limit		-5000
Counter function selection	Select the counter function to be used. Select any function when a counter function is not used.	Depends on the function used.
Sampling/periodic time setting (unit: 10ms)	Enter a value when using the sampling counter function.	1000
	Enter a value when using the periodic pulse counter function.	500

6. **Open the "Auto_Refresh" window for the high-speed counter module and set parameters as shown below.**

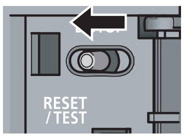
Project window ➪ [Intelligent Function Module] ➪ [LD62] ➪ [Auto_Refresh]



Item	Description	Setting value
Present value	Enter the device where the present value is stored.	W1000
Latch count value	Enter the device where the latch count value is stored.	W1002
Sampling count value	Enter the device where the sampling count value is stored when using the sampling counter function.	W1004
Periodic pulse count previous value	Enter the device where the previous periodic pulse count value is stored when using the periodic pulse counter function.	W1006
Periodic pulse count present value	Enter the device where the present periodic pulse count value is stored when using the periodic pulse counter function.	W1008
Sampling/periodic counter flag	Not used	—
Overflow detection	Enter the device where the overflow detection result is stored when using the linear counter function.	W1010

7. **Write the set parameters to the head module, and reset the head module or power off and then on the programmable controller.**

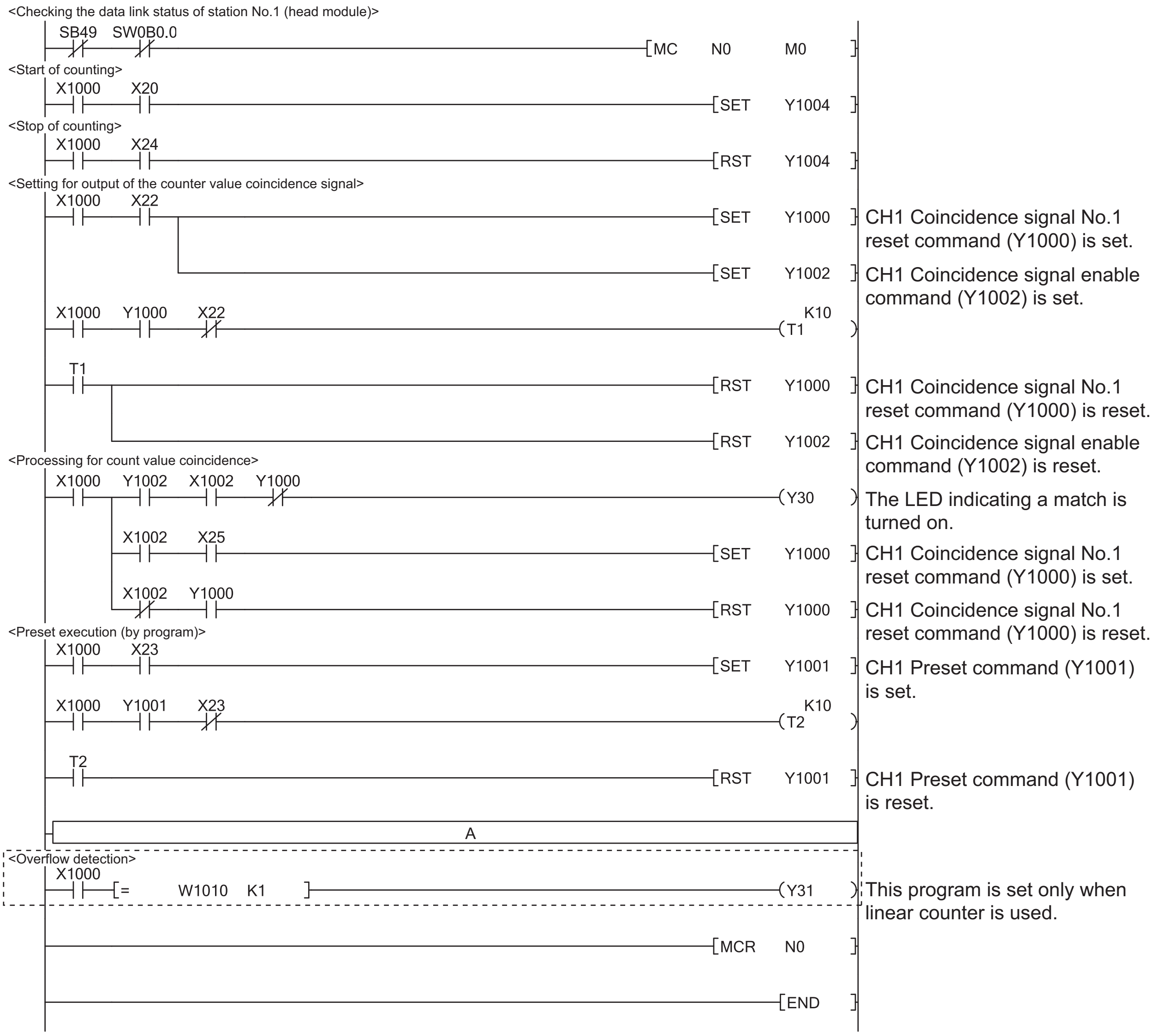
[Online] ➪ [Write to PLC...]



Or powering off → on the programmble controller

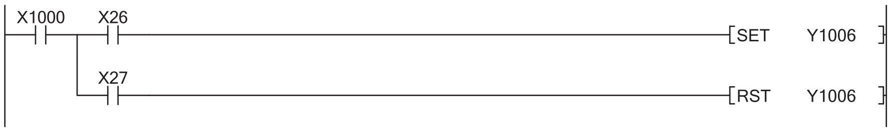
(7) Program example

The following figure shows a program example. Write the program to the CPU module on the master station. Timers for interlock between the own and other stations (T1 to T5) are set to 100ms.



To use each function, insert the following program into the position "A" in the program above.

- Using the count disable function



- Using the latch counter function

- Using the sampling counter function

- Using the periodic pulse counter function

10.3 Program Example with the Coincidence Detection Interrupt Function

This section describes a program example to start an interrupt program at coincidence detection in CH1 Coincidence detection point No.1.

(1) System configuration

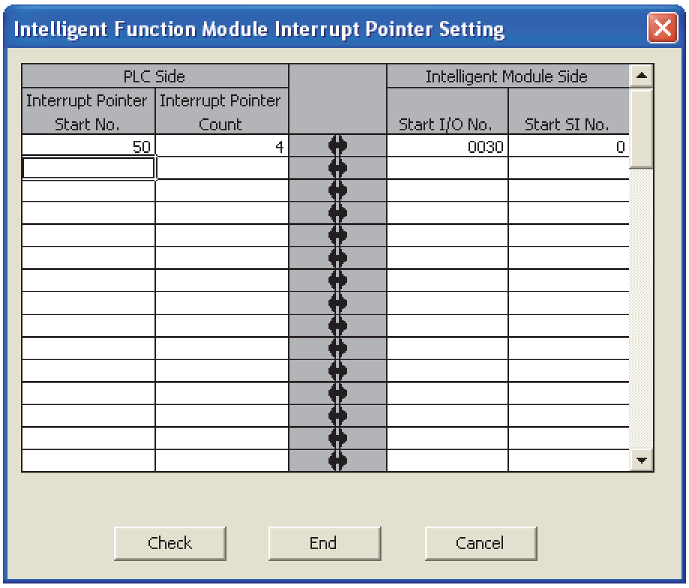
The system configuration is the same as the following.

- System configuration (Page 90, Section 10.1 (1))

(2) Programming condition

(a) Interrupt pointer setting

Project window ⇨ [Parameter] ⇨ [PLC Parameter] ⇨ [PLC System] ⇨ "Intelligent Function Module Setting" ⇨ Interrupt Pointer Setting button

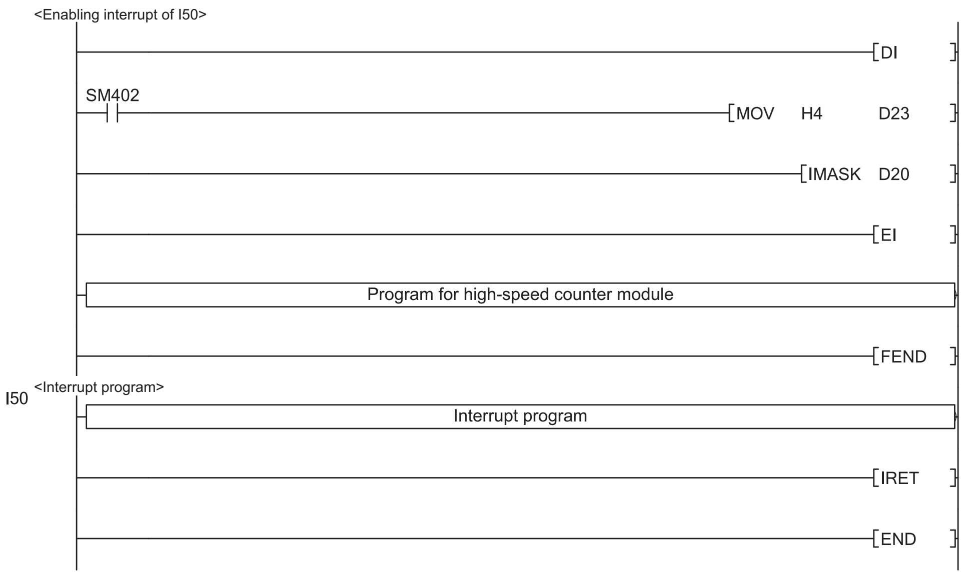


(b) User devices

Device	Description
D20 to D35	Interrupt enable flag storage for IMASK instruction

(3) Program example

Before using an interrupt pointer, enable an interrupt with the IMASK instruction.



Point

- When the program above is executed, the I50 interrupt program is enabled, and all other interrupt programs are disabled. To execute any interrupt program other than the I50 interrupt program, set the bit that corresponds to the target interrupt pointer to "1: enabled".
- For details on the IMASK instruction, refer to the following.
  MELSEC-Q/L Programming Manual (Common Instruction)

CHAPTER 11 TROUBLESHOOTING

This chapter describes errors that may occur while using the high-speed counter module, and those troubleshooting.

Point

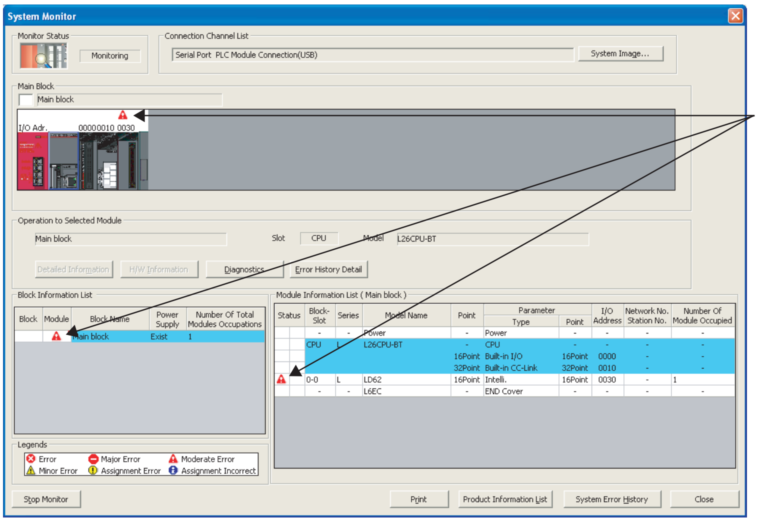
The high-speed counter module does not support the following functions performed in the system monitor.

- Display of the "H/W Information" window
- Display of errors and the corresponding actions in the "Module's Detailed Information" window
- Module error collection function

11.1 Error Information

(1) Checking errors in the system monitor

[Diagnostics] ⇨ [System Monitor]



An icon showing a moderate error is displayed if an overflow error is detected.

(2) Error information that the high-speed counter module detects

Description and cause	Where to check the error information	Action
Overflow error • In linear counter, an up pulse has been counted from the present value 2147483647. • In linear counter, a down pulse has been counted from the present value -2147483648.	Module status display in the system monitor window • No display: No overflow detected (no error) • Module error: Overflow detected	Execute a preset to clear the overflow error.
	Overflow detection flag The following value is stored in CH☐ Overflow detection (Un\G8, Un\G40). • 0: No overflow detected • 1: Overflow detected	
	Module error status bit of the module information read by the UNIRD instruction • 00: No overflow detected (no error) • 10: Overflow detected (moderate error)	

11.2 The Module Does Not Start Counting Operation

Check item	Action
Is any LED of the CPU module indicating an error?	If the LED indicates an error, refer to the troubleshooting in the manual for the CPU module used and take corrective actions to restore normal operation of the CPU module.
Do the ϕA LED and ϕB LED turn on when a voltage is directly applied to the pulse input terminals for ϕA and ϕB?	If the ϕA LED and ϕB LED turn on, check the external wiring and the encoder, and make necessary corrections. If they do not turn on, the cause is a hardware failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.
Is the external wiring for ϕA and ϕB correct?	Check the external wiring and make necessary corrections.
Is CH□ Count enable command (Y4, YC) on?	Turn on CH□ Count enable command (Y4, YC) using a program.
Is the pulse input method same as the pulse input mode setting specified in the intelligent function module switch setting?	Set the pulse input method same as the pulse input mode specified in the intelligent function module switch setting.
Is CH□ Counter function selection start command (Y6, YE) off or is a voltage not applied to the function start input terminal?	If the count disable function has been selected, turn off CH□ Counter function selection start command (Y6, YE) or the function start input terminal.
Is there an overflow error?	Execute a preset to clear the overflow error.

11.3 The Module Does Not Correctly Count Pulses

Check item	Action
Is the external wiring for ϕA and ϕB correct?	Check the external wiring and make necessary corrections.
	Even in 1-phase input, connecting an ABCOM terminal to a pulse signal can result in an incorrect count. Reconnect the ABCOM terminal to the external power supply (5V/12V/24V) or the GND terminal. (☞ Page 47, Section 6.3, Page 50, Section 6.4)
Is the maximum speed of the input pulses within the counting speed range specified in the intelligent function module switch setting?	Correct the counting speed configured in the intelligent function module switch setting according to the maximum speed of the input pulses.
Does the input pulse waveform meet the performance specifications?	Observe and check the pulse waveform with a synchroscope. If the input pulse does not meet the performance specifications, input pulses which meet the performance specifications.
Are the count value data handled in 32-bit signed binary in the program?	Correct the program so that the count value data are handled in 32-bit signed binary.
Are shielded twisted pair cables used for the pulse input lines?	Use shielded twisted pair cables for the pulse input lines.
Is the high-speed counter module affected by noise through the grounding area?	• Separate the grounding cable of the high-speed counter module from the grounded part. • If the high-speed counter module touches the grounded part, separate it.
Are noise reduction measures taken in the control panel or for noise emitting devices?	Take noise reduction measures such as attaching a CR surge suppressor to the magnet switch.
Is there a sufficient distance between the high voltage equipment and the pulse input cables?	Wire the pulse input cables alone when placing them in a duct and keep a distance of 150mm or more from the power cables in the control panel.
Are the count values of CH1 and CH2 same when the same number of pulses are input?	If the count values differ, the cause is a hardware failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.
Was the preset function performed within the count range of the ring counter? (for the ring counter function only)	Reset the preset value within the count range and perform the preset function again.

11.4 Coincidence Output Function Does Not Correctly Operate

Check item	Action
Are CH□ Coincidence signal No.1 reset command (Y0, Y8) and CH□ Coincidence signal No.2 reset command (Y7, YF) off?	Turn off CH□ Coincidence signal No.1 reset command (Y0, Y8) and/or CH□ Coincidence signal No.2 reset command (Y7, YF).
Are the values in CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37) and CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39) set within the count range of the ring counter? (for the ring counter function only)	Set the value(s) in CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37) and/or CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39) within the count range of the ring counter.
Is CH□ Coincidence signal enable command (Y2, YA) on?	Turn on CH□ Coincidence signal enable command (Y2, YA).
Is a voltage applied to the power supply terminal for external coincidence output?	Apply a voltage to the power supply terminal for external coincidence output.
Is the external wiring for the coincidence output point No.1 terminal (EQU1) and the coincidence output point No.2 terminal (EQU2) correct?	Check the external wiring and make necessary corrections.

11.5 Coincidence Detection Interrupt Does Not Occur

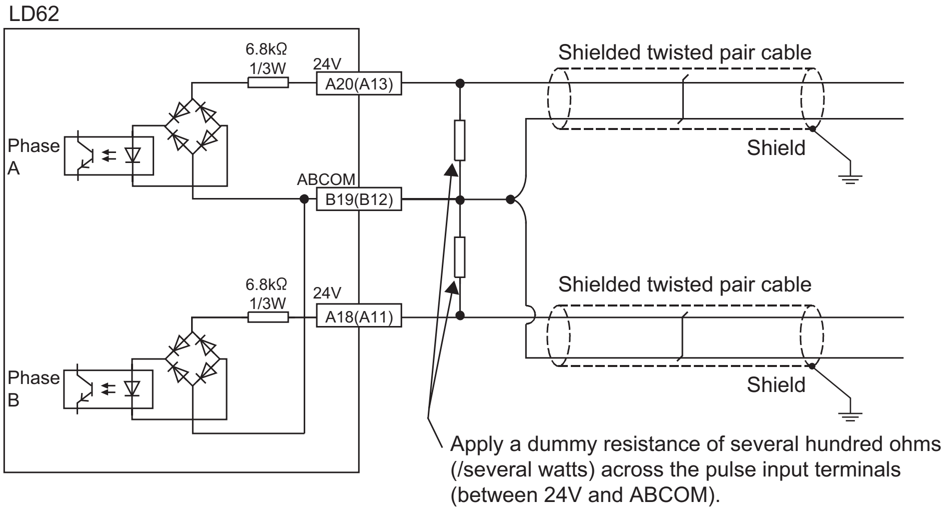
Check item	Action
Is the intelligent function module interrupt pointer setting in the PLC parameter correct?	Review the intelligent function module interrupt pointer setting.
Are program execution control instructions, such as the IMASK instruction, correctly used?	Review the program.
Are CH□ Counter value coincidence (point No.1) (X2, X9) and CH□ Counter value coincidence (point No.2) (X6, XD) off?	Reset (turn off) CH□ Counter value coincidence (point No.1) (X2, X9) and/or CH□ Counter value coincidence (point No.2) (X6, XD) using CH□ Coincidence signal No.1 reset command (Y0, Y8) and/or CH□ Coincidence signal No.2 reset command (Y7, YF).

11.6 Present Value Cannot be Replaced with the Preset Value

Check item	Action
Is CH□ External preset request detection (X4, XB) off?	Reset (turn off) CH□ External preset request detection (X4, XB) using CH□ External preset detection reset command (Y5, YD).
Is the external wiring for the preset input terminal correct?	Check the external wiring and make necessary corrections.

11.7 Pulse Waveform Shaping Method

An effective method for pulse shaping is to apply a dummy resistance of several hundreds ohms (/several watts) across pulse input terminals connected to a pulse generator to increase a load current through the cables. This method becomes more effective as the load current value increases.
The following figure shows an example of dummy resistance connection when the signal level is at 24VDC.
[Dummy resistance connection example at 24VDC]



Pulse shaping is effective as counter measures against the following situations.

(1) Wiring distance between the pulse generator and the LD62 is long

Pulse shaping removes waveform rounding and stabilizes pulse waveforms.

(2) Waveform is unstable due to a noise

The pulse waveform becomes stable by shaping the waveform, which has an effect on external noise reduction.

Point

The following example describes how to evaluate the resistance constant and rated-power of a dummy resister.
For example, when approx. 30mA load current is set, the corresponding dummy resistance rating is calculated in the following formula.
R = V ÷ I = 24V ÷ 30mA = 800Ω
The power applied to the dummy resistance is calculated in the following formula.
P = V × I = 24V × 30mA = 0.72W
Considering the design margin, select a dummy resistor with the rated power of 2W.

APPENDICES

Appendix 1 Details of I/O Signals

This section describes the details on the I/O signals from the high-speed counter module to the CPU module.

Point

The I/O numbers (X/Y) in this section are shown on the assumption that the start I/O number of the high-speed counter module is set to 0.

Appendix 1.1 Input signals

(1) Module READY (X0)

- This signal turns on when the high-speed counter module is ready for counting operation after the CPU module is powered on or is reset.
- Pulses are not counted while this signal is off.

(2) CH□ Counter value large (point No.1) (X1, X8)

- This signal turns on when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is larger than CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37).
- This signal turns off when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is equal to or smaller than CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37).

(3) CH□ Counter value coincidence (point No.1) (X2, X9)

- This signal turns on when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is equal to CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37). And then, the on status will be latched.
- This signal is turned off by CH□ Coincidence signal No.1 reset command (Y0, Y8).
- This signal is on immediately after the CPU module is powered on or is reset because both CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) and CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37) are set to "0".

(4) CH□ Counter value small (point No.1) (X3, XA)

- This signal turns on when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is smaller than CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37).
- This signal turns off when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is equal to or larger than CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37).

(5) CH□ External preset request detection (X4, XB)

- This signal is turned on by a preset command from an external input terminal. And then, the on status will be latched.
- This signal is turned off by CH□ External preset detection reset command (Y5, YD).

(6) CH□ Counter value large (point No.2) (X5, XC)

- This signal turns on when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is larger than CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39).
- This signal turns off when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is equal to or smaller than CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39).

(7) CH□ Counter value coincidence (point No.2) (X6, XD)

- This signal turns on when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is equal to CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39). And then, the on status will be latched.
- This signal is turned off by CH□ Coincidence signal No.2 reset command (Y07, YF).
- This signal is on immediately after the CPU module is powered on or is reset because both CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) and CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39) are set to "0".

(8) CH□ Counter value small (point No.2) (X7, XE)

- This signal turns on when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is smaller than CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39).
- This signal turns off when CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35) is equal to or larger than CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39).

Appendix 1.2 Output signals

(1) CH□ Coincidence signal No.1 reset command (Y0, Y8)

This signal is turned on to reset CH□ Counter value coincidence (point No.1) (X2, X9).

(a) Operating timing

The command is valid as long as the signal is on.

(2) CH□ Preset command (Y1, Y9)

This signal is turned on to perform the preset function.

(a) Operating timing

The command is valid on the rising edge (from off to on) of the signal.

(3) CH□ Coincidence signal enable command (Y2, YA)

This signal is turned on to output the status of CH□ Counter value coincidence (point No.1) (X2, X9) and CH□ Counter value coincidence (point No.2) (X6, XD) to the external terminal.

(a) Operating timing

The command is valid as long as the signal is on.

(4) CH□ Down count command (Y3, YB)

- This signal is turned on to count down pulses in 1-phase pulse input mode.
- The module counts down pulses when the phase B pulse input or this signal is turned on.
- For counting up, check that the phase B pulse input and this signal are off.

(a) Operating timing

The command is valid as long as the signal is on.

(5) CH□ Count enable command (Y4, YC)

This signal is turned on to count pulses.

(a) Operating timing

The command is valid as long as the signal is on.

(6) CH□ External preset detection reset command (Y5, YD)

This signal is turned on to reset CH□ External preset request detection (X4, XB).

(a) Operating timing

The command is valid as long as the signal is on.

(7) CH□ Counter function selection start command (Y6, YE)

This signal is turned on to perform the selected counter function.

(a) Operating timing

- The command is valid on the rising edge (from off to on) of the signal. (latch counter function and sampling counter function)
- The command is valid as long as the signal is on. (count disable function and periodic pulse counter function)

(8) CH□ Coincidence signal No.2 reset command (Y7, YF)

This signal is turned on to reset CH□ Counter value coincidence (point No.2) (X6, XD).

(a) Operating timing

The command is valid as long as the signal is on.

Appendix 2 Details of Buffer Memory Areas

(1) CH□ Preset value (Un\G0, Un\G1, Un\G32, Un\G33)

- A preset value is stored in this area.
- The setting range is from -2147483648 to 2147483647 (32-bit signed binary).

(2) CH□ Present value (Un\G2, Un\G3, Un\G34, Un\G35)

- The present counter value is stored in this area.
- The stored value is between -2147483648 and 2147483647 (32-bit signed binary).

(3) CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37), CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39)

- The coincidence output point setting value for comparison with the present counter value is stored in this area.
- Two coincidence detection output points, CH□ Coincidence output point No.1 (Un\G4, Un\G5, Un\G36, Un\G37) and CH□ Coincidence output point No.2 (Un\G6, Un\G7, Un\G38, Un\G39), can be set for each channel.
- The setting range is from -2147483648 to 2147483647 (32-bit signed binary).

(4) CH□ Overflow detection (Un\G8, Un\G40)

- When the counter type is set to linear counter, overflow status is stored in this area.
- Either of the following values is stored based on overflow status.

Status	Stored value
No overflow detected	0
Overflow detected	1

(5) CH□ Counter function selection (Un\G9, Un\G41)

- A value to select the counter function is stored in this area.
- The following table shows the setting value for each function.

Counter function	Setting value
Count disable function	0
Latch counter function	1
Sampling counter function	2
Periodic pulse counter function	3

(6) CH□ Sampling/periodic time setting (Un\G10, Un\G42)

- A time value for the sampling counter function or the periodic pulse counter function is stored in this area.
- The setting range is from 1 to 65535 (16-bit signed binary)*1. The unit of time is 10 (ms).

*1 To set a value between 32768 and 65535, store the value in hexadecimal.
For example, store "$F424_H$" to set "62500".

Ex. Storing "420" in this area

$420 \times 10 = 4200$(ms)

A

(7) CH□ Sampling/periodic counter flag (Un\G11, Un\G43)

- When the sampling counter function or the periodic pulse counter function is selected, the operating status of the selected function is stored in this area.
- Either of the following values is stored based on the operating status.

Operating status	Stored value
Function stopped	0
Function being performed	1

(8) CH□ Latch count value (Un\G12, Un\G13, Un\G44, Un\G45)

- The latch count value is stored in this area during execution of the latch counter function.
- The stored value ranges from -2147483648 to 2147483647 (32-bit signed binary).

(9) CH□ Sampling count value (Un\G14, Un\G15, Un\G46, Un\G47)

- The sampling count value is stored in this area during execution of the sampling counter function.
- The stored value ranges from -2147483648 to 2147483647 (32-bit signed binary).

(10)CH□ Periodic pulse count previous value (Un\G16, Un\G17, Un\G48, Un\G49), CH□ Periodic pulse count present value (Un\G18, Un\G19, Un\G50, Un\G51)

- The previous and present periodic pulse count values are stored in this area during execution of the periodic pulse counter function.
- The stored value ranges from -2147483648 to 2147483647 (32-bit signed binary).

(11)CH□ Ring counter lower limit (Un\G20, Un\G21, Un\52, Un\G53), CH□ Ring counter upper limit (Un\G22, Un\G23, Un\G54, Un\G55)

- When the counter type is set to ring counter, the count range is stored in this area.
- The setting range is from -2147483648 to 2147483647 (32-bit signed binary).

Appendix 3 Checking Serial Number and Function Version

For how to check the serial number and the function version, refer to the following.

MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

MELSEC-L CC-Link IE Field Network Head Module User's Manual

A

Appendix 4 Differences Between L Series and Q Series Modules

The following table describes the differences between the L series modules and the Q series modules in specifications.

Item	LD62	LD62D	QD62	QD62D
Coincidence output derating (on ratio)	Limited[*1]		No limitations	
Coincidence output external auxiliary power supply and current consumption	43mA (TYP., 24VDC and all points on/common)		8mA (TYP., 24VDC/point)	
Blown fuse detection	Not supported[*2] No FUSE LED is equipped. XF: Use prohibited		Supported The FUSE LED is equipped. XF: Blown fuse detection flag	

*1 Coincidence output derating (on ratio) has been set to the high-speed counter module. (Page 41, Section 6.2.3)

*2 The high-speed counter module does not have a built-in fuse for blown fuse detection. Install a fuse for each external terminal to prevent the external devices or module from being burnt out or damaged if a load shorts. (Page 35, Section 6.2.1)

Appendix 5 When Using GX Developer and GX Configurator-CT

This chapter describes how to operate GX Developer and GX Configurator-CT.

(1) Applicable software versions

For the applicable software versions, refer to the following.

MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

Appendix 5.1 GX Developer operation

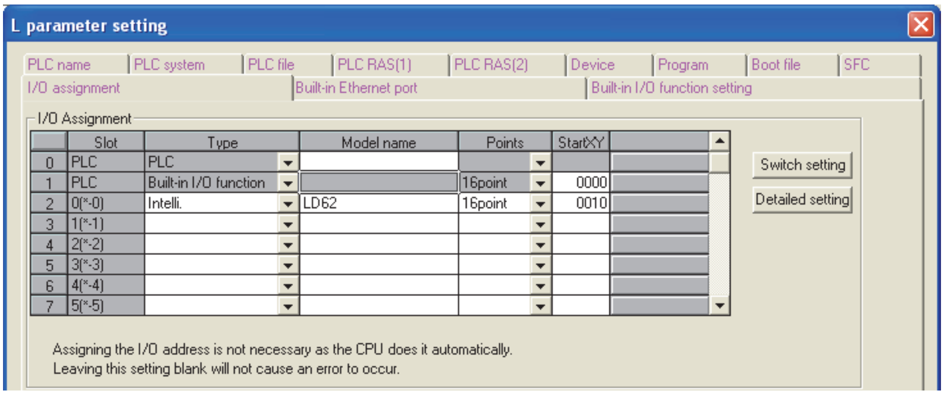
When using GX Developer, configure settings in the following screens.

Screen	Application	Reference
I/O assignment	Set the type and the I/O signal range of the module to be connected.	Page 122, Appendix 5.1 (1)
Intelligent function module detailed setting	Set an output mode if a CPU stop error occurs and CPU module operation mode if a high-speed counter module error is detected.	Page 123, Appendix 5.1 (2)
Switch setting for I/O and intelligent function module	Set a pulse input mode, counting speed, and counter type.	Page 124, Appendix 5.1 (3)

(1) I/O assignment

Open the "I/O assignment" tab.

Parameter ⇨ [PLC parameter] ⇨ [I/O assignment]

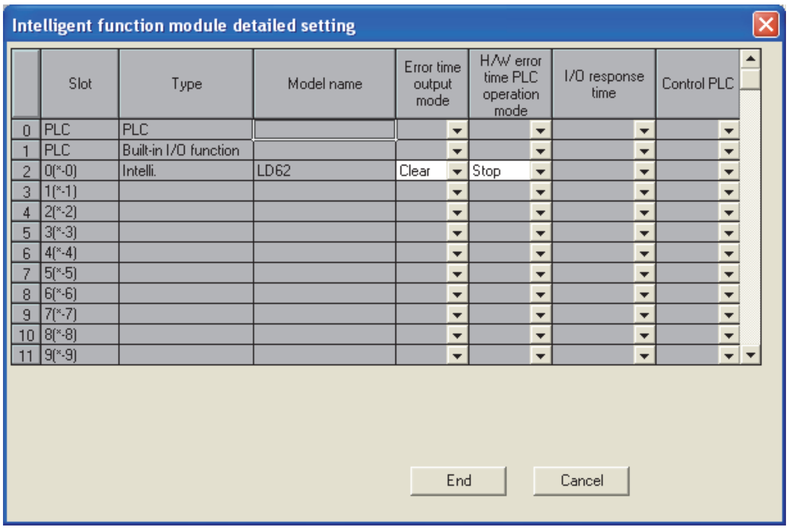


Item	Description
Type	Select "Intelli.".
Model name	Enter the model name of the module.
Points	Select "16point".
Start XY	Enter the start I/O number of the high-speed counter module if required.

(2) Intelligent function module detailed setting

Open the "I/O assignment" tab.

Parameter ⇨ [PLC parameter] ⇨ [I/O assignment] ⇨ Detailed Setting button

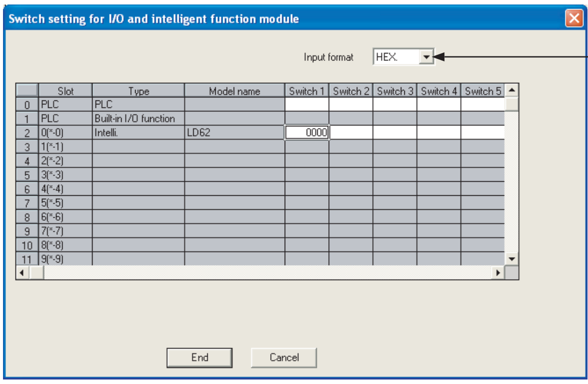


Item	Description	Setting value	Remarks
Error time output mode	Select whether to clear or hold module output if a CPU stop error occurs.	• Clear (default) • Hold	• Clear: If a CPU stop error occurs, all external outputs of coincidence signals turn off. • Hold: If a CPU stop error occurs, external outputs of coincidence signals are held in the status before the CPU module stops.
H/W error time PLC operation mode	• Select whether to stop or continue the CPU module operation if a high-speed counter module error (SP.UNIT DOWN) is detected. • The error (SP.UNIT DOWN) is detected if the module READY flag is not in ready due to module hardware failure.	• Stop (default) • Continue	• Stop: If a high-speed counter module error is detected, the CPU module stops. • Continue: Even if a high-speed counter module error is detected, the CPU module continues running a program for modules other than the faulty one.

(3) Switch setting

Open the "I/O assignment" tab.

Parameter ⇨ [PLC parameter] ⇨ [I/O assignment] ⇨ Switch setting button



Select "HEX.".

Item	Setting item		Description
Switch 1 (for CH1)	0□□□H — Pulse input mode	Pulse input mode 0: 1-phase multiple of 1 1: 1-phase multiple of 2 2: CW/CCW 3: 2-phase multiple of 1 4: 2-phase multiple of 2 5: 2-phase multiple of 4	Select a pulse input mode.
	Counting speed setting	Counting speed setting 0: 10kPPS 1: 100kPPS 2: 200kPPS 3: 500kPPS (LD62D only)	Select a counting speed.
	Counter type	Counter type 0: Linear counter 1: Ring counter	Select a counter type.
Switch 2 (for CH2)	The setting items are the same as those for Switch 1 (for CH1).		
Switch 3	Blank Leave the fields blank if values have been set.		
Switch 4			
Switch 5			

Point

- In counting speed setting, "500kPPS" can be selected for the LD62 only. Do not set "500kPPS" for the LD62. Doing so will result in incorrect count.
- Switches 3 to 5 fields in "Switch setting for I/O and intelligent function module" are used by the system and are not available for users. Always leave these fields blank. If a value is set, the performance of the high-speed counter module is not guaranteed.

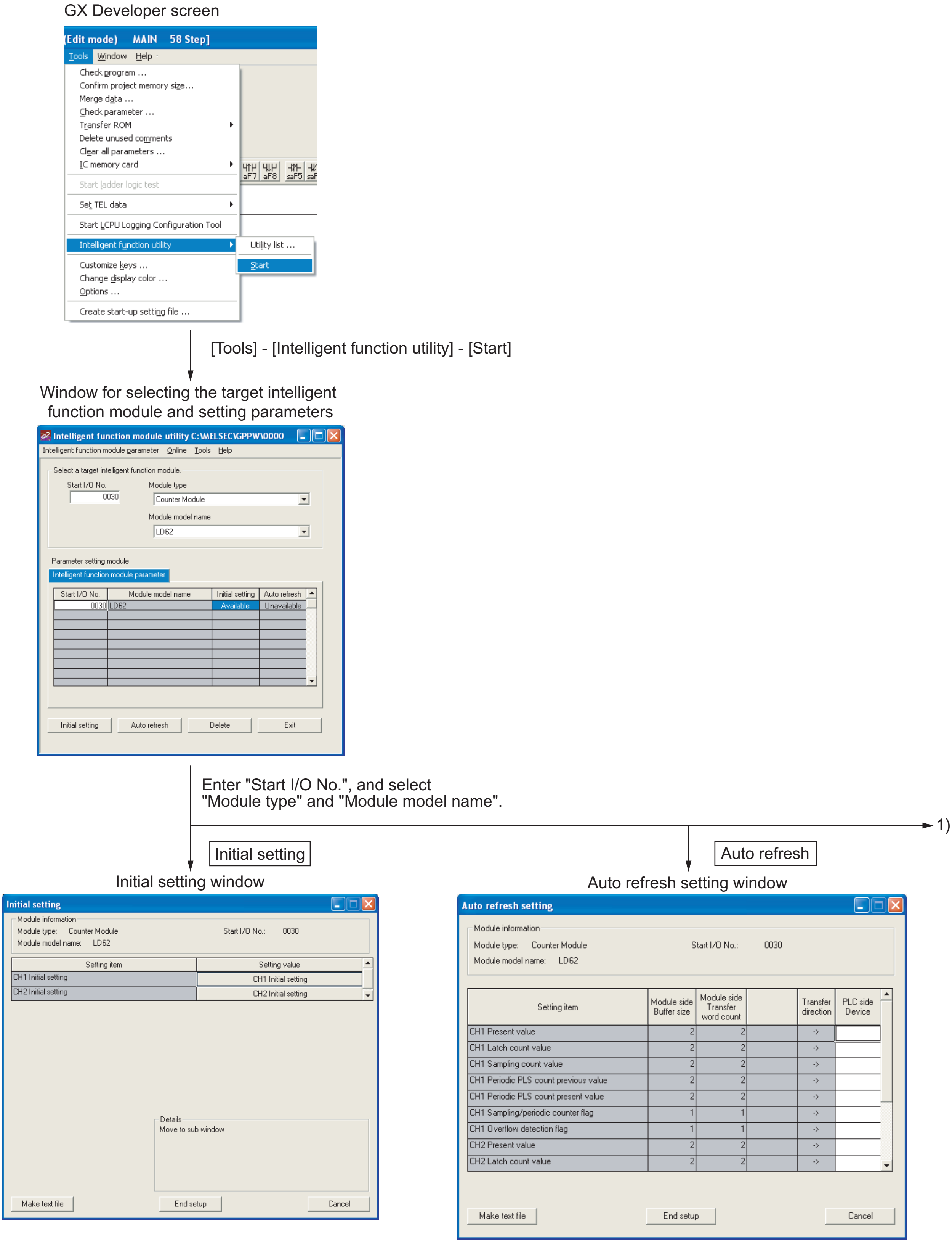
Appendix 5.2 GX Configurator-CT operation

When using GX Developer, procedures for displaying parameter setting screens of GX Configurator-CT differ from those of GX Works2.

The following figures show how to display GX Configurator-CT screens using GX Developer.

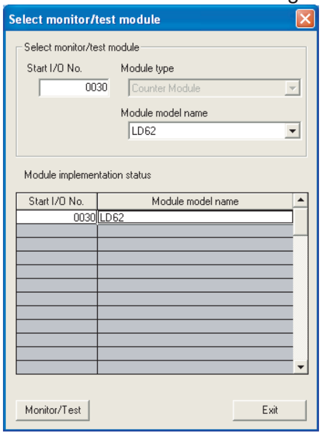
Note that the setting contents are the same as those of GX Works2. (☞ Page 54, CHAPTER 7)

Screen	Application
Initial setting	Set values including a preset value.
Auto refresh setting	Transfer buffer memory data to the specified device.
Monitor/Test	Test/monitor the buffer memory and I/O signals.


GX Developer screen
[Edit mode) MAIN 58 Step]
Tools Window Help
Check program ...
Confirm project memory size...
Merge data ...
Check parameter ...
Transfer ROM
Delete unused comments
Clear all parameters ...
IC memory card
Start ladder logic test
Set TEL data
Start LCPU Logging Configuration Tool
Intelligent function utility
Utility list ...
Start
Customize keys ...
Change display color ...
Options ...
Create start-up setting file ...
[Tools] - [Intelligent function utility] - [Start]
Window for selecting the target intelligent function module and setting parameters
Intelligent function module utility C:\MELSEC\GPPW\0000
Select a target intelligent function module.
Start I/O No. 0030
Module type Counter Module
Module model name LD62
Parameter setting module
Intelligent function module parameter
Start I/O No. Module model name Initial setting Auto refresh
0030 LD62 Available Unavailable
Initial setting Auto refresh Delete Exit
Enter "Start I/O No.", and select "Module type" and "Module model name".
1)
Initial setting
Auto refresh
Initial setting window
Auto refresh setting window
Initial setting
Module information
Module type: Counter Module Start I/O No.: 0030
Module model name: LD62
Setting item Setting value
CH1 Initial setting CH1 Initial setting
CH2 Initial setting CH2 Initial setting
Details
Move to sub window
Make text file End setup Cancel
Auto refresh setting
Module information
Module type: Counter Module Start I/O No.: 0030
Module model name: LD62
Setting item Module side Buffer size Module side Transfer word count Transfer direction PLC side Device
CH1 Present value 2 2 ->
CH1 Latch count value 2 2 ->
CH1 Sampling count value 2 2 ->
CH1 Periodic PLS count previous value 2 2 ->
CH1 Periodic PLS count present value 2 2 ->
CH1 Sampling/periodic counter flag 1 1 ->
CH1 Overflow detection flag 1 1 ->
CH2 Present value 2 2 ->
CH2 Latch count value 2 2 ->
Make text file End setup Cancel

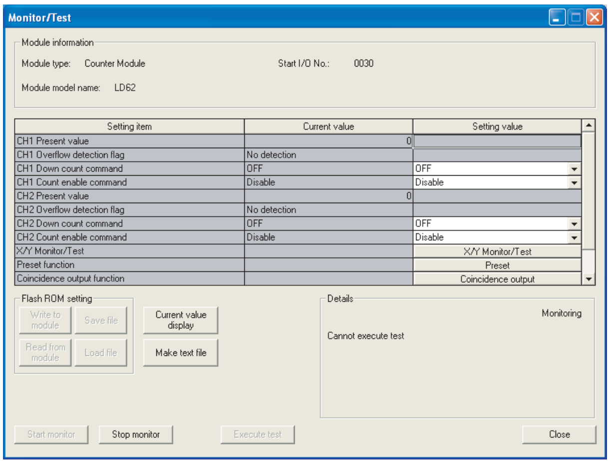
1) [Online] - [Monitor/Test]

Select monitor/test module dialog box



Monitor/Test | Select a module to be monitored/tested.

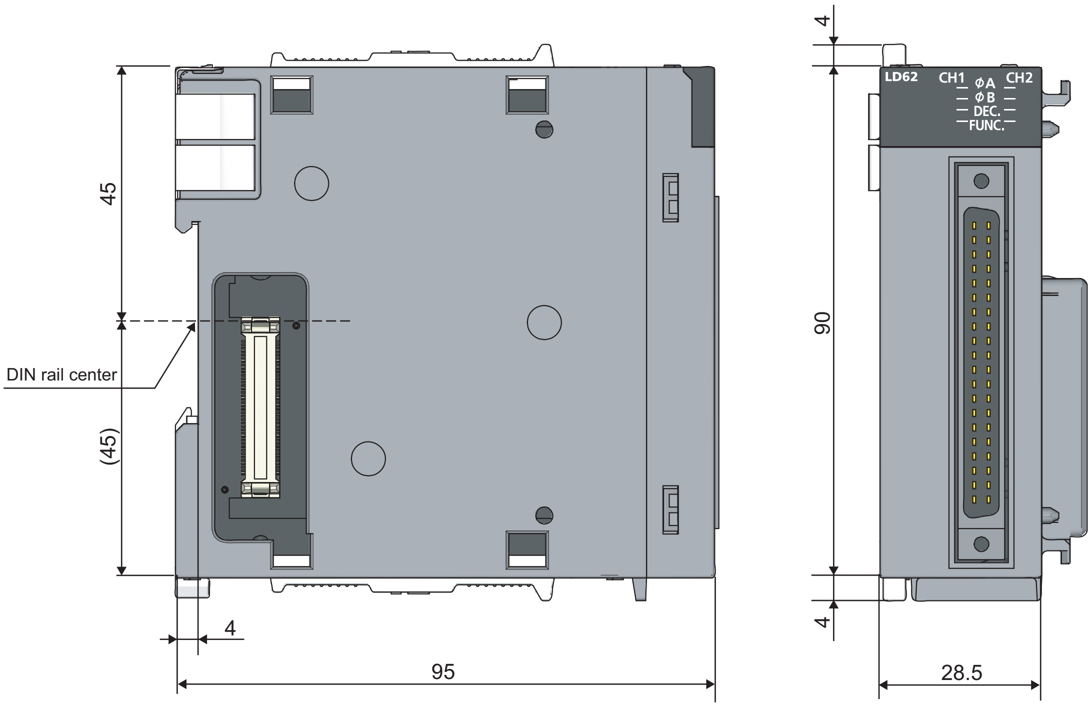
Monitor/Test window



Appendix 6 External Dimensions

The following figures show the external dimensions of the high-speed counter module.

(1) LD62, LD62D



(Unit: mm)

Memo

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R

S

I

REVISIONS

*The manual number is given on the bottom left of the back cover.

Print date	*Manual number	Revision
April 2010	SH(NA)-080920ENG-A	First edition
December 2010	SH(NA)-080920ENG-B	Partial correction SAFETY PRECAUTIONS, Section 1.1, 1.2, CHAPTER 2, CHAPTER 3, Section 3.2, 3.2.1, 3.3, 3.4, 3.5, CHAPTER 4, CHAPTER 5, Section 5.1, 5.2, 5.2.1, CHAPTER 6, Section 6.1, 6.2, 6.2.1, 6.2.2, 6.2.3, 6.2.4, 6.3, 6.4, 6.5, CHAPTER 7, Section 7.1, 7.2, 7.3, 7.4, 7.5, CHAPTER 8, Section 8.1, 8.1.1, 8.1.2, 8.1.3, 8.2, 8.2.1, 8.2.2, 8.3, 8.4, 8.5, 8.5.1, 8.5.2, 8.6, 8.7, 8.8, 8.9, CHAPTER 9, Section 9.1, 9.2, 9.3, CHAPTER 10, Section 10.1, 10.2, 10.3, CHAPTER 11, Section 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, Appendix 1, 1.1, 1.2, 2, 3, 4, 5, 5.1, 5.2
February 2012	SH(NA)-080920ENG-C	Partial correction COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES, RELEVANT MANUALS, Section 7.2, 8.2, 10.1, 10.2
October 2014	SH(NA)-080920ENG-D	Partial correction SAFETY PRECAUTIONS, Section 5.1, 6.2.1, 6.2.2, Chapter 7
June 2017	SH(NA)-080920ENG-E	Partial correction INTRODUCTION, RELEVANT MANUALS, Section 5.1, 6.2.1, 6.2.4, 6.3, 6.4, 8.3, 8.9, 10.1, 11.7, Appendix 5.1

Japanese manual version SH-080912-E

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]
The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

TRADEMARKS

SH(NA)-080920ENG-E

SH(NA)-080920ENG-E(1706)MEE
MODEL: LD62(D)-U-E
MODEL CODE: 13JZ49

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