

# **MELSEC System Q**

**Programmable Logic Controllers** 

**User's Manual** 

# Channel Isolated Pulse Input Module QD60P8-G GX Configurator-CT



MITSUBISHI ELECTRIC INDUSTRIAL AUTOMATION

# • SAFETY PRECAUTIONS •

(Always read these instructions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.

The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the CPU module User's Manual.

In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".



Note that the  $\triangle$ CAUTION level may lead to a serious consequence according to the circumstances. Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

## [Design Precautions]

# 

• Do not write data into the "read-only area" in the buffer memory of the intelligent function module. In addition, do not turn ON/OFF the "Reserved (N/A)" signals among the I/O signals transferred to/from the PLC CPU.

Doing so can malfunction the PLC system.

# 

• Do not bunch the control wires or pulse input wires with the main circuit or power wires, or install them close to each other.

They should be installed 150 mm(5.9 inch) or more from each other.

Not doing so could result in noise that may cause malfunction.

# [Installation Precautions]

# 

• Use the PLC in an environment that meets the general specifications contained in the CPU module User's Manual. Using this PLC in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product. • While pressing the installation lever located at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops. Then, securely mount the module with the fixing hole as a supporting point. Improper installation may result in malfunction, breakdown or the module coming loose and dropping. Securely fix the module with screws if it is subject to vibration during use. • Tighten the screws within the range of specified torque. If the screws are loose, it may cause the module to fallout, short circuits, or malfunction. If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction. • Switch all phases of the external power supply off when mounting or removing the module. Not ding so may cause electric shock or damage to the module. In the system where a CPU module supporting the online module change is used and on the MELSECNET/H remote I/O stations, modules can be replaced online (during energizing). However, there are some restrictions on replaceable modules and the replacement procedures are predetermined for each module.

For details, refer to the chapter of the online module change in this manual.

• Do not directly touch the conductive area or electronic components of the module. Doing so may cause malfunction or failure in the module.

# [Wiring Precautions]

# 

- Be careful not to let foreign matters such as sawdust or wire chips get inside the module. These may cause fires, failure or malfunction.
- The top surface of the module is covered with protective film to prevent foreign objects such as cable offcuts from entering the module when wiring.
   Do not remove this film until the wiring is complete.

Before operating the system, be sure to remove the film to provide adequate heat ventilation.

• The cables connected to the module should be placed in a duct or fixed. Not doing so can cause the module or cables to be damaged when the cables swing, more or are pulled carefully, for example or to malfunction due to poor cable connection.

# [Wiring Precautions]

# 

• When removing the cable from the module, do not pull the cable. When disconnecting a cable without a terminal block, unscrew on the part that is connected to the module.

Pulling the cable that is still connected to the module may cause malfunction or damage to the module or cable.

- Always ground the shielded cable for the PLC. There is a risk of electric shock or malfunction.
- When wiring, be sure to verify the rated voltage of the product as well as the terminal layout. Fire or failure may result if incorrect voltage is input or incorrect wiring is performed.

## [Startup/Maintenance Precautions]

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• Do not disassemble or modify the module. Doing so could cause failure, malfunction, injury or fire. • Switch all phases of the external power supply off when mounting or removing the module. Not doing so may cause failure or malfunction of the module. In the system where a CPU module supporting the online module change is used and on the MELSECNET/H remote I/O stations, modules can be replaced online (during energizing). However, there are some restrictions on replaceable modules and the replacement procedures are predetermined for each module. For details, refer to the chapter of the online module change in this manual. • Do not mount/remove the module onto/from base unit more than 50 times (IEC 61131-2compliant), after the first use of the product. Failure to do so may cause the module to malfunction due to poor contact of connector. • Do not touch the connector while the power is on. Doing so may cause malfunction. • Switch all phases of the external power supply off when cleaning or retightening the terminal screws and module installation screws. Not doing so may cause failure or malfunction of the module. If the screws are loose, it may cause the module to fallout, short circuits, or malfunction. If the screws are tightened too much, it may cause damages to the screws and/or the module, resulting in the module falling out, short circuits or malfunction. • Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.

Failure to do so may cause a failure or malfunctions of the module.

## [Disposal Precautions]

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• When disposing of the product, handle it as industrial waste.

#### REVISIONS

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

Print Date	* Manual Number	Revision
Jun., 2002	SH (NA)-080313E-A	First edition
Feb., 2003	SH (NA)-080313E-B	Correction
		SAFETY PRECAUTIONS, Section 2.1, Section 2.2, Section 6.2.2,
		Section 6.4, Section 6.5, Section 9.1.1
Jun., 2004	SH (NA)-080313E-C	Addition of program example for use on the remote I/O network.
		Correction
		SAFETY PRECAUTIONS, Section 2.2, Section 4.1, Section 6.4,
		Section 6.6, Chapter 7, Section 8.1, Section 8.3.2

Japanese Manual Version SH-080312-D

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#### INTRODUCTION

Thank you for purchasing the Mitsubishi programmable logic controller MELSEC-Q Series. Always read through this manual, and fully comprehend the functions and performance of the Q Series PLC before starting use to ensure correct usage of this product.

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#### About Manuals

#### The following manuals are also related to this product.

#### Related Manuals

Manual Name	Manual Number (Model Code)
Channel Isolated Pulse Input Module User's Manual (Hardware)	IB-0800229 (13JT94)
Describes the performance, specifications, I/O interface, part identification nomenclature, and startup	
procedure of the type QD60P8-G Channel Isolated Pulse Input Module.	
(The manual is supplied with the module.)	

#### Using This Manual

Manual Makeup

- To know the features and overview of this product (Chapter 1) Section 1.1 gives the overview and Section 1.2 the features.
- (2) To know the system configuration (Chapter 2) Chapter 2 describes the system configuration, usable PLC CPUs, etc.
- (3) To know the system performance and function list (Chapter 3) Sections 3.1 to 3.4 provides the performance specifications, list of functions, I/O signals and list of buffer memory. Section 3.5 describes the interface with external devices.
- (4) To know the module installation and setting (Chapter 4) Chapter 4 describes the wiring example of the module and the setting method necessary for start of operation.
- (5) To know the functions and their setting methods (Chapter 5) Chapter 5 provides the functions and their setting methods.
- (6) To perform initial setting, etc. from the optional utility package (Chapter 6)Chapter 6 gives the method for operating the utility package.
- To know the example of operating the QD60P8-G using a sequence program (Chapter 7)
   Chapter 7 provides a sequence program example.
- (8) To change the module without stopping the system (Chapter 8) Chapter 8 provides the method for changing the module without stopping the system (online module change).
- (9) To know the error code and corresponding remedy when an error occurs in the module (Chapter 9) Chapter 9 gives the troubleshooting and list of error codes.

#### Numeric values used in this manual

- The buffer memory addresses and error codes are represented in decimal.
- The X/Y devices are represented in hexadecimal.
- The values read/written from/to the buffer memory and the values set using the intelligent function module switches are represented in either of decimal and hexadecimal. A hexadecimal value is ended by "H".
  - (Example) 10.....10 Decimal

10H......16 Hexadecimal

#### Conformation to the EMC Directive and Low Voltage Instruction

For details on making Mitsubishi PLC conform to the EMC directive and low voltage instruction when installing it in your product, please refer to Chapter 3, "EMC Directive and Low Voltage Instruction" of the using CPU module User's Manual (Hardware).

The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction.

To make this product conform to the EMC directive and low voltage instruction, please refer to Section 4.4.1 "Wiring precautions".

#### Generic Terms and Abbreviations

Unless specially noted, the following generic terms and abbreviations are used in this manual.

Generic term/abbreviation	Details of generic term/abbreviation		
PLC CPU	Generic term for PLC CPU on which QD60P8-G can be mounted.		
QD60P8-G	Abbreviation for type QD60P8-G Channel Isolated Pulse Input Module.		
Personal computer	DOS/V-compatible personal computer of IBM PC/AT <sup>®</sup> or its compatible.		
GX Developer	Abbreviation for GX Developer (SW4D5C-GPPW-E or later).		
GX Configurator-CT Abbreviation for counter module setting/monitoring tool GX Configurator-CT (SW0D50 E).			
QCPU (Q mode) Generic term for the Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HC Q12HCPU, Q25HCPU, Q12PHCPU and Q25PHCPU.			
QnPHCPU	Generic term for the Q12PHCPU and Q25PHCPU.		

#### Component List

#### The component list of this product is given below.

Туре	Component	Quantity	
QD60P8-G	Type QD60P8-G Channel Isolated Pulse Input Module		1
SW0D5C-QCTU-E	GX Configurator-CT Version 1 (1-license product)	(CD-ROM)	1
SW0D5C-QCTU-EA	GX Configurator-CT Version 1 (Volume-license product)	(CD-ROM)	1

### **CHAPTER 1 OVERVIEW**

#### 1.1 Overview

This User's Manual describes the specifications, handling, wiring and programming methods of the Channel Isolated Pulse Input Module (QD60P8-G) used with the MELSEC-Q series PLC CPU.

The QD60P8-G counts the input pulse number (speed, rotation speed, instant flux or similar) and measures the quantity the length, accumulating flux and so forth. The input pulse value is updated every 10ms. The QD60P8-G updates the accumulating count value and the pulse number after movement averaging processing or similar (sampling pulse number) at intervals of the count cycle setting value.

#### 1.2 Features



(1) Wide range of functions

1) Pulse input voltage

A single module accepts the pulse inputs of 5VDC/12 to 24VDC.

- Pulse edge selection
   It is allowed to select the rise or fall of the input pulses to be counted.
- Pre-scale function The input pulse number is multiplied by any value to convert the pulse number.
- 4) Movement averaging function The values of the sampling pulse number are averaged by the specified number of times to calculate the average value.

#### 5) Sampling pulse number indication

The value obtained by performing pre-scale conversion on the pulse number entered in the count cycle set to the count cycle setting value is displayed. If the input pulse number is not uniform, movement averaging processing can be performed to average the input pulse number. The count range is 0 to 32767.

6) Accumulating count value indication The accumulating value of the sampling pulse number is displayed in the set count cycle. The count range is 0 to 99999999, and you can select whether to use the accumulating counter as the linear counter or ring counter.

#### 7) Input pulse value indication

The pulse number actually input is displayed every 10ms. Since the input pulse number is displayed every 10ms, the module can be used as a counter. (The input pulse value is updated every 10ms. Note this when using the module as a counter.)

The count range is 0 to 2147483647.

#### 8) Alarm output

It is allowed to set four setting values, i.e. upper/upper limit value, upper/lower limit value, lower/upper limit value and lower/lower limit value, for the sampling pulse number to output alarms.

#### 9) Accumulating counter overflow detection

If the accumulating count value overflows (exceeds 99999999) in the linear counter mode, the accumulating counter overflow detection flag turns ON to indicate that an overflow error has occurred.

#### 10) Accumulating counter comparison output If the accumulating count value reaches or exceeds the comparison output setting value, the accumulating counter comparison flag turns ON.

#### 11) Counter reset

The sampling pulse number, accumulating count value and input pulse value can be reset at any timing.

(2) Counting speed range of the input pulse can be changed By changing the input filter, the input pulse speed is available within the range 0 to 30kpps.

# (3) 8 channels of pulse inputs in one moduleOne module has 8 channels of pulse inputs to configure a system at low costs.

#### (4) Channel isolated The channels are isolated from each other. (Dielectric

The channels are isolated from each other. (Dielectric withstand voltage: 1780VAC for 1 minute)

### (5) Online module change

It is possible to change the module without stopping the system.

(6) Easy setting by utility package Utility package (GX Configurator-CT) is sold separately. The utility package enables the initial setting and auto refresh setting to be made on the screen, reducing the sequence programs as well as resulting in easy monitoring of the setting and operating status.

### **CHAPTER 2 SYSTEM CONFIGURATION**

#### 2.1 Applicable system

This section explains the applicable system.

(1) Applicable modules and numbers of QD60P8-G modules that may be mounted

The following table indicates the CPU modules and network modules (for remote I/O stations) which accept the QD60P8-G, and the number of QD60P8-G modules that can be mounted.

Applicable module		Number of modules that can be installed	Remarks	
	Q00JCPU	Maximum 16		
	Q00CPU Q01CPU	Maximum 24	(* <sup>1</sup> )	
	Q02CPU			
CDU medule	Q02HCPU		Can be installed in Q mode only (* <sup>1</sup> )	
CPU module	Q06HCPU	Maximum 64		
	Q12HCPU			
	Q25HCPU			
	Q12PHCPU	Maximum 64	(*1)	
	Q25PHCPU	IVIAXIITIUTT 04	( )	
	QJ72LP25-25		MELSECNET/H Remote I/O station ( * <sup>2</sup> )	
Notwork modulo	QJ72BR15	Movimum 64		
Network module	QJ72LP25G	IVIAXITTUTT 04		
	QJ71LP25GE			

\*1 See User's Manual (Function Explanation, Program Fundamentals) for the CPU module to use.

\*2 See Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O network).

#### (2) Base unit which the conversion can be installed

The QD60P8-G can be mounted in any I/O slot<sup>3</sup> of a base unit. However, combining it with other mounted modules may result in a power supply shortage depending on the number of modules to be mounted. Thus, always take into consideration the power supply capacity when mounting modules.

\*3: Within the I/O point ranges of the CPU modules and network modules (for remote I/O stations)

- (3) Compatibility with a multiple PLC system First read the QCPU (Q mode) User's Manual (Function Explanation, Program Fundamentals) if the QD60P8-G is used with a multiple PLC system. Perform PLC write of the intelligent function module parameters to the control PLC of the QD60P8-G only.
- (4) Compatibility with online module change The QD60P8-G supports the online module change function.

#### POINT

The QD60P8-G does not have the products of function versions A and B. The products of function version C include the functions of the products function versions A and B.

#### (5) Software packages supported

Correspondence between systems which use QD60P8-G and software packages are as shown below.

		Software Version	
		GX Developer	GX Configurator-CT
	Single PLC system	Version 7 or later	
Q00J/Q00/Q01CPU	Multiple PLC system	Version 8 or later	
Q02/Q02H/Q06H/	Single PLC system	Version 4 or later	
Q12H/Q25HCPU	Multiple PLC system	Version 6 or later	Version 1.14Q or later
Q12PH/Q25PHCPU	Single PLC system Multiple PLC system	Version 7.10L or later	
If installed in a MELSECNET/H remote I/O station		Version 6 or later	

The GX Developer is necessary when using a QD60P8-G.

2

#### 2.2 How to check the function version and the software version

This function version of the QD60P8-G and the software version of the GX Configuration-CT can be checked in the following methods.

- (1) How to check the function version of the QD60P8-G
  - (a) Method using the rated plate on the module side face Check the alphabet at the end of "SERIAL"

MITSUBISHI MODEL PASSED	
SERIAL 000000000000000000000000000000000000	—— Function version
MITSUBISHI ELECTRIC MADE IN JAPAN	Conformed standard

(b) Method using the GX Developer

Check the alphabet at the end of "Product information" displayed on "Module's Detailed Information" dialog box of GX Developer.

#### [Operation of GX Developer]

Click the [Diagnostics]  $\rightarrow$  [System monitor] menu and click the

Module's Detailed Information button in the displayed window.

<Module's Detailed Information dialog box of GX Developer>

Module's Detailed Info	mation		×	]
_ Module				
Module Name	QD60P8-G	Product information 0402	10000000000 . 💭 🛛	
I/O Address	0		~	
Implementation Position	Main Base OSlot			X
Module Information				
Module access	Possible	I/O Clear / Hold Settings		Function version
Status of External Powe	r Supply	Noise Filter Setting		
Fuse Status		Input Type		
Status of I/O Address V	erify Agree	Remote password setting		
Error Display				
No Brror	Present Error	lo Error	Display format	
NO. MITOL	T Teseric Error			
	Error History		C DEC	
H/W Information	Start monitor	(Stop monitor)	Close	

(2) How to check the software version of the GX Configurator-CT Check the "Product information" dialog box displayed on "Help" of GX Developer.

[Operation of GX Developer]

Click the [Help]  $\rightarrow$  [Production information] menu.

<product box="" dialog="" gx<="" information="" of="" th=""><th>Develo</th><th>pper&gt;</th></product>	Develo	pper>
Product information	×	1
Programming and Maintenance tool GX Developer Version 7.13P (SW7D5C-GPPW-E)		
COPYRIGHT(C) 2001 MITSUBISHI ELECTRIC CORPORATION ALL RIGHTS RESERVED		
This Product is licensed to:		
Name: MITSUBISHI		
Company: MITSUBISHI ELECTRIC CORPORATION		
List of version information on Add-in software		
GX Configurator-CT[Version1.140]SW0D5C-0CTU-E) COPYRIGHT(C) 1999 MITSUEISHI ELECTRIC CORPORATION ALL RIGHTS RESERVED	<u> </u>	
	Ŧ	Software version
Warning :		
This product is protected by copyright law and international treaties.		
Unauthorized reproduction or distribution of this program or any		
prosecuted to the maximum extension possible under the law		
OK		

### **CHAPTER 3 SPECIFICATIONS**

This chapter explains the performance specifications of the QD60P8-G, the I/O signals for the PLC CPU, and the specifications of the buffer memory.

For the general specifications of the QD60P8-G, refer to the User's Manual (Hardware) of the used CPU module.

#### 3.1 Performance specifications

The following table indicates the performance specifications of the QD60P8-G.

Item	Model name				QD60	)P8-G					
Counting spe	eed switch settings*1	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps		
Number of I/	O occupied points		32 points (I/O assignment: 32 points for intelligent function module)								
Number of c	hannels	8 channels									
Count	Phase		1-phase input								
input signal	ut signal Signal level 5VDC/12 to 24VDC										
Input deratin	g			Refer	to the deratin	g chart (Next	page)				
Counting speed (Max.) *2		30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps		
	Counting range	Sampling p Accumulati Input pulse	ulse number ng count valu value	ıe	: 16-bits binary values (0 to 32767) : 32-bits binary values (0 to 99999999) : 32-bits binary values (0 to 2147483647)						
Counter	Count type	Linear cour	iter method,	ring counter r	method						
Counter	Minimum count pulse width (Duty ratio 50%)	33.4µs	100μs 50 50 μs	1ms 0.5 0.5 ms ms	10ms	20ms	100ms 50 50 ms ms				
Dielectric wit	hstand voltage	For 1 For 1	For 1 min at 1500VAC between AC external connecting terminals and general grounding For 1 min at 500VAC between DC external connecting terminals and general grounding For 1 min at 1780VAC between channels								
Insulation res	sistance	5MΩ o	r more at 500	OVDC betwee	en AC externa	al connecting	terminals an	d general gro	ounding		
Connected te	erminal				18 points te	rminal block					
Applicable w	ire size				0.3 to 0	.75mm <sup>2</sup>					
Applicable so	olderless terminals		R1.2	5-3 (A solder	ess terminals	s with sleeves	s cannot be u	ised.)			
Internal curre (5VDC)	ent consumption				0.5	8A					
Weight					0.1	7kg					
External dim	ensions		27	7.4 (1.08) (W)	X 98 (3.86) (	H) X 90 (3.54	4) (D) [mm (ir	n.)]			

\*1: To change the counting speed, use the intelligent function module switch. (For details, refer to "Section 4.5 Switch setting for intelligent function module".)

\*2: The counting speed is affected by the rise/fall time of pulses. The countable counting speeds are indicated in the table on the next page. Note that counting the pulses of long rise/fall time may result in miscounting.

### **3 SPECIFICATIONS**

<Rise/Fall time and the corresponding counting speed switch settings>

	Counting speed switch settings									
Rise/Fall Lime	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps		
t = 8.4µs or less	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps		
t = 25µs or less	10kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps		
t = 250µs or less	-	1kpps	1kpps 100pps 50pps 10pps		10pps	1pps	0.1pps			
t = 2.5ms or less	-	-	100pps	100pps	50pps	10pps	1pps	0.1pps		
t = 5ms or less	-	-	-	50pps	50pps	10pps	1pps	0.1pps		
t = 25ms or less	-	-	-	-	10pps	10pps	1pps	0.1pps		
t = 250ms or less	-			-	1pps 1pps		0.1pps			
t = 2.5s or less	-	-	-	-	-	-	0.1pps	0.1pps		
t = 5s	-	-	-	-	-	-	-	0.05pps		





\*3: "ON" indicates the status where voltage is applied to pules input terminals.

### 3.2 List of functions

	Name	Details	Reference
	Linear counter function	This function counts from 0 to 99999999 and detects an overflow when the count range is exceeded.	Section 5.2.1
	Ring counter function	This function repeats counting between 0 and 999999999.	Section 5.2.2
Accumulating counter	Comparison output function	This function turns ON the accumulating counter comparison flag when the accumulating count value reaches or exceeds the comparison output setting value. (The accumulating counter comparison flag turns OFF at a comparison signal reset request.)	Section 5.4
	Count cycle change function	This function changes the count cycle of the sampling pulse number or accumulating count value.	Section 5.1.4
Complian	Movement averaging function	This function performs movement averaging processing by the specified number of times if there are variations in the sampling pulse number.	Section 5.7
counter	Pre-scale function	This function converts the input pulse number into the unit pulse number when its weight per pulse is a fraction.	Section 5.6
	Alarm output function	This function sets the upper/upper limit value, upper/lower limit value, lower/upper limit value and lower/lower limit value for the sampling pulse number converted by the pre-scale function to output alarms.	Section 5.8
Counter reset f	unction	This function resets the sampling pulse number, accumulating count value or input pulse value. A reset can be made at any timing.	Section 5.5
Pulse edge sel	ection function	This function selects whether the rise or fall of an input pulse will be used for counting. (This setting can be made for each channel using the intelligent function module switch.)	Section 4.5
Count enable fu	unction	This function starts input pulse count operation when the count enable signal is turned ON.	Section 5.1.2
Online module	change function	This function changes the module without stopping the system. (Perform an online module change according to the messages of GX Developer.)	Chapter 8
Utility function		This function uses the utility package (GX Configurator-CT) to perform initial setting, auto refresh setting, monitor/test or similar from within the software without using sequence programs.	Chapter 6

#### The following table indicates the QD60P8-G functions.

#### POINT

The above functions can be used in combination.

However, the linear counter function and ring counter function cannot be used together.

Please select either of them.

### 3.3 I/O signals for PLC CPU

#### 3.3.1 List of I/O signals

The following table indicates the I/O signals of the QD60P8-G for the PLC CPU. The I/O numbers (X/Y) and I/O addresses indicated in this chapter and later assume that the QD60P8-G is installed on the I/O slot No. 0 of the main base unit.

Input sig	gnal (Signa	al direction: QD60P8-G $\rightarrow$ PLC CPU)	Output signal (Signal direction: PLC CPU $ ightarrow$ QD60P8-G)						
Device		Signal name	Device		Signal name				
No.		Signal name	No.		Signai name				
X0		Module READY	Y0		Reserved (N/A) *				
X1	Opera	ating condition setting complete flag	Y1	Oper	ating condition setting request flag				
X2			Y2						
to		Reserved (N/A) *	to		Reserved (N/A) *				
X7			Y7		I				
X8	CH1		Y8	CH1					
X9	CH2		Y9	CH2					
XA	CH3		YA	CH3					
XB	CH4	Error occurropco	YB	CH4	Error rooot request				
XC	CH5	Endroccurrence	YC	CH5	Enorreserrequest				
XD	CH6		YD	CH6					
XE	CH7		YE	CH7					
XF	CH8		YF	CH8					
X10	CH1		Y10	CH1					
X11	CH2		Y11	CH2					
X12	CH3		Y12	СНЗ					
X13	CH4		Y13	CH4					
X14	CH5	Accumulating counter comparison hag	Y14	CH5	Comparison signal reset request				
X15	CH6		Y15	CH6					
X16	CH7		Y16	CH7					
X17	CH8		Y17	CH8					
			Y18	CH1					
			Y19	CH2					
×4.0			Y1A	CH3					
X18			Y1B	CH4					
		Reserved (IV/A)	Y1C	CH5	Count enable				
			Y1D	CH6					
			Y1E	CH7					
			Y1F	CH8					

\*: Write is inhibited to the I/O (X/Y) reserved for the system.

### 3.3.2 Details of I/O signals

The I/O signals of the QD60P8-G are detailed below.

### (1) Details of input signals (QD60P8-G $\rightarrow$ PLC CPU) The following table indicates the ON/OFF timings and functions of the input

signals.

Device No.		Signal r	ame	Details				
X0	Module READY Module READY OFF: Not Prepared/ Watch dog timer error ON : Prepared			<ul> <li>This signal judges whether the QD60P8-G is normal or abnormal in the sequence program. This signal turns ON when the module starts normally at power-on or reset operation.</li> <li>This signal turns OFF at occurrence of a watch dog timer error.</li> </ul>	OFF			
X1	Operating condition setting complete flag		OFF: Operating condition setting ON : Operating condition setting complete	<ul> <li>This signal is used as an interlock for turning ON/OFF the operating condition setting request flag (Y1) when the function, such as the comparison output function, is selected or the setting value is changed.</li> <li>When this signal is OFF, input pulses are not counted.</li> <li>After confirming that the operating condition setting is completed (this signal has turned ON), turn ON the count enable signal (Y18 to Y1F) to start pulse counting.</li> </ul>	OFF			
X8	CH1			<ul> <li>This signal turns ON if an error exists in the overflow detection or initial setting data. (The details of the error</li> </ul>				
X9	CH2			can be confirmed from the "system monitor" screen of GX Developer.)				
ХА	СНЗ			• This signal turns OFF when the error reset request (Y8 to YF) is turned ON.				
ХВ	CH4	Frror	OFF: No error	• The "error code" is stored into the buffer memory of the corresponding channel (refer to Section 3.4.2 for details).				
XC	CH5	occurrence	ON : Error	≻ Executed by QD60P8-G ——> Executed by sequence program	OFF			
XD	CH6			ON Error occurrence OFF				
XE	CH7			(X8 to XF) Error reset request OFF				
XF	CH8			(Y8 to YF) Error code is read during this period.				

Device No.		Signal n	ame	Details					
X10	CH1		This signal turns ON if the "accumulating count value" reaches or exceeds the "comparison output setting value". The "accumulating count value" is stored into the "accumulating count value".						
X11	CH2			buffer memory for each channel. Set the "comparison output setting value" to the buffer memory for each channel. (Refer to Section 3.4.2 for details.)					
X12	СНЗ			<ul> <li>This signal remains ON until the comparison signal reset request (Y10 to Y17) turns ON.</li> <li>Once turned OFF, this signal does not turn ON until the</li> </ul>					
X13	CH4	Accumulating	count value < Comparison	count value < Comparison	count value < Comparison	count value < Comparison	accumulating count value reaches the comparison output setting value again after it has been reset. > Executed by QD60P8-G		
X14	CH5	counter comparison flag	value ON : Accumulating count value ≧	Executed by sequence program  Accumulating count value  Setting value	OFF				
X15	CH6		Comparison output setting value	Comparison output					
X16	CH7			Accumulating counter					
X17	CH8			comparison flag OFF (X10 to X17) Comparison signal OFF reset request (Y10 to Y17)					

### (2) Details of output signals (PLC CPU $\rightarrow$ QD60P8-G) The following table indicates the ON/OFF timings and functions of the output

signals.

Device No.		Signal na	me	Details				
Y1	Operating o	CFF: No opera condition setting request quest flag ON : Operating condition setting request		<ul> <li>This signal turns ON to make the "comparison output setting value" and other setting data of the buffer memory valid.</li> <li>When this signal turns ON, the setting data are reflected on the module.</li> <li>When this signal turns ON, the "sampling pulse number", "accumulating count value" or "input pulse value" assigned to the buffer memory for each channe is reset.</li> <li>When this signal is turned ON in the sequence program, it should be kept ON for longer than 10ms.</li> <li>For details on the ON/OFF timing of this signal, refer t the item of the input signal (X1).</li> </ul>				
Y8	CH1							
Y9	CH2							
YA	CH3		OFF: No error	• If the error occurrence signal (X8 to XF) has turned ON				
YB	CH4	Error reset	reset request	due to the error occurrence, turning ON this signal	OFF			
YC	CH5	request	ON : Error reset	• For details on the ON/OFE timing of this signal refer to	OFF			
YD	CH6	oquoor	request	the item of the input signal (X8 to XF)				
YE	CH7	1						
YF	CH8							
Y10	CH1	-						
Y11	CH2	-	OFF: NO	If the accumulating counter comparison flag (V40 to				
Y12	CH3	Comparison	companison	• If the accumulating counter comparison flag (X10 to				
Y13	CH4		request	accumulating counter comparison flag	OFF			
Y14	CH5	request	ON Comparison	For details on the ON/OFF timing of this signal refer to				
Y15	CH6	104000	signal reset	the item of the input signal (X10 to X17).				
Y16	CH7	ļ	request					
Y17	CH8							
Y18	CH1	1						
Y19	CH2	1	OFF: Count	• This signal turns ON when count operation is started.				
Y1A	CH3	1	operation	• when this signal turns ON, the count operation of the				
Y1B	CH4		stop	or "input pulse value" assigned to the buffer memory for	OFF			
Y1C	CH5		ON : Count	each channel is started				
Y1D	CH6	ļ	operation	• For details on the ON/OFF timing of this signal refer to				
Y1E	CH7	1	start	the item of the input signal (X1)				
Y1F	CH8							

#### 3.4 Buffer memory

#### 3.4.1 List of buffer memory assignments

The following table indicates the assignment of the QD60P8-G buffer memory. Refer to Section 3.4.2 for details of the buffer memory areas.

The initial values are set to the buffer memory at power-on or when the PLC CPU is reset. (When power is switched OFF, the setting values in the buffer memory are not retained.)

The sequence program or PLC CPU's auto refresh function, reads/writes the buffer memory contents.

The settings are reflected on the module by turning ON the operating condition setting request flag (Y1) after the data have been written to the buffer memory.

		В	uffer merr	nory addre	ess			O attitue a data la	Initial	Read/		
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	Setting details	value	Write		
0	32	64	96	128	160	192	224	Sampling pulse number		Read only		
1	33	65	97	129	161	193	225	Comparison output selection				
2	34	66	98	130	162	194	226	Comparison output setting (L)				
3	35	67	99	131	163	195	227	value (H)				
4	36	68	100	132	164	196	228	Movement averaging processing selection		Read/		
5	37	69	101	133	165	197	229	Number of movement averaging processing		White enabled		
6	38	70	102	134	166	198	230	Pre-scale function selection				
7	39	71	103	135	167	199	231	Pre-scale setting value				
8	40	72	104	136	168	200	232	(L)				
9	41	73	105	137	169	201	233	Accumulating count value (H)				
10	42	74	106	138	170	202	234	(L)		Read only		
11	43	75	107	139	171	203	235	(H)				
12	44	76	108	140	172	204	236	Overflow detection flag				
13	45	77	109	141	173	205	237	Counter reset request		Read/ Write enabled		
14	46	78	110	142	174	206	238	Carry over detection flag	0	Read only		
15	47	79	111	143	175	207	239	Carry over reset request		Read/ Write enabled		
16	48	80	112	144	176	208	240	Error code		Read only		
17	49	81	113	145	177	209	241	Alarm output selection		Read/ Write enabled		
18	50	82	114	146	178	210	242	Alarm output flag		Read only		
19	51	83	115	147	179	211	243	Alarm output setting value upper/upper limit				
20	52	84	116	148	180	212	244	Alarm output setting value upper/lower limit				
21	53	85	117	149	181	213	245	Alarm output setting value lower/upper limit		Read/		
22	54	86	118	150	182	214	246	Alarm output setting value lower/lower limit		Write enabled		
23	55	87	119	151	183	215	247	Count cycle change function selection				
24	56	88	120	152	184	216	248	Count cycle setting value	1			
25	57	89	121	153	185	217	249					
to	to	to	to	to	to	to	to	Reserved (N/A)	-	—		
31	63	95	127	159	191	223	255					

### 3.4.2 Details of buffer memory

The following table indicates the functions and setting values of the buffer memory areas.

ltere	Detaile	Initial			Buffer	mem	iory ad	ddres	5		
Item	Details		value	CH1	CH2	СНЗ	CH4	CH5	CH6	CH7	CH8
Sampling pulse number	<ul> <li>Stores the pulse number obtained by c into the unit pulse number using the previous operation starts. The count range is 0 t</li> <li>The update timing is the interval set in value" of the buffer memory. (The initial value of the count cycle is 1</li> </ul>	Stores the pulse number obtained by converting the input pulses into the unit pulse number using the pre-scale function. When the count enable signal (Y18 to Y1F) turns ON, count operation starts. The count range is 0 to 32767. The update timing is the interval set in the "count cycle setting value" of the buffer memory. (The initial value of the count cycle is 1s.)						128	160	192	224
Comparison output selection	<ul> <li>Set whether the comparison output fun</li> <li>If the setting value is other than 0 or 1, setting range outside error (error code: error, turn ON the error reset request (' corresponding channel. After this, set a turn ON the operating condition setting [Setting value]</li> <li>O: Comparison output function invalid</li> <li>1: Comparison output function valid</li> </ul>	0	1	33	65	97	129	161	193	225	
Comparison output setting value	<ul> <li>Set the value to be compared with the value" of the buffer memory.</li> <li>If the setting value is outside the range setting range outside error (error code: error, turn ON the error reset request ('corresponding channel. After this, set a turn ON the operating condition setting</li> <li>The relationships between the accumu comparison output setting value and ac comparison flag (X10 to X17) ON/OFF</li> <li>Setting value and accumulating count value</li> <li>Setting value &gt; accumulating count value</li> <li>Setting value = accumulating count value</li> <li>Setting value &lt; accumulating count value</li> <li>The accumulating counter comparison of the accumulating counter value</li> <li>The accumulating counter comparison ON the comparison signal reset reques corresponding channel.</li> <li>When the accumulating counter is ope the accumulating counter comparison for once does not turn ON until the accum reaches the comparison output setting been reset. When the accumulating counter is ope the accumulating counter comparison output setting been reset. When the accumulating counter is ope the accumulating counter comparison output setting been reset. When the accumulating counter is ope the accumulating counter comparison output setting been reset. When the accumulating counter is ope the accumulating counter comparison output setting been reset. When the accumulating counter is ope the accumulating counter comparison output setting been reset. When the accumulating counter is ope the accumulating counter comparison output setting been reset. When the accumulating counter is ope the accumulating counter comparison output setting been reset. When the accumulating counter is ope the accumulating counter is ope the accumulating counter comparison output setting been reset. When the accumulating counter is ope the accumulat</li></ul>	"accumulating count a, a comparison output 200) occurs. To clear the 78 to YF) of the a correct value and then request flag (Y1). lating count value, occumulating counter are as indicated below. Accumulating counter comparison flag (X10 to X17) OFF ON ON flag is cleared by turning at (Y10 to Y17) of the rating as a linear counter, lag that was turned OFF ulating count value value again after it has unter is operating as a e accumulating count etting value again in the	0	23	34 35	66 67	98 99	130	162	194 195	226 227

### **3 SPECIFICATIONS**

		Initial	Buffer memory address								
Item	Details		value	CH1	CH2	СНЗ	CH4	CH5	CH6	CH7	CH8
Movement averaging processing selection	<ul> <li>When "movement averaging processing averaging processing selection, movem is performed on the "sampling pulse nu memory by the number of times set in t averaging processing" of the buffer mer</li> <li>When the setting value is other than 0 of averaging setting range outside error (e To clear the error, turn ON the error ress the corresponding channel. After this, s then turn ON the operating condition set [Setting value]</li> <li>Sampling processing 1: Movement averaging processing</li> </ul>	0	4	36	68	100	132	164	196	228	
Number of movement averaging processing	<ul> <li>Set the number of times to perform movement averaging processing on the "sampling pulse number" of the buffer memory.</li> <li>When "movement averaging processing" is selected in the "movement averaging processing selection" of the buffer memory, the initial value of this buffer memory is "0". Therefore, if you run the PLC CPU without setting the value, a movement averaging setting range outside error (error code: 300) will occur.</li> <li>If the setting value is outside the range, a movement averaging setting range outside error (error code: 300) occurs. To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel. After this, set a correct value and then turn ON the operating condition setting request flag (Y1). [Setting range: 2 to 60]</li> </ul>			5	37	69	101	133	165	197	229
Pre-scale function selection	<ul> <li>The pre-scale function converts the inprycycle into the unit pulse number when the fraction, and stores the result of convert pulse number of the buffer memory. The formula is used at this time.</li> <li>Sampling pulse number =         <ul> <li>Input pulse value per count cycle × unit magnification</li> <li>The converted sampling pulse number decimal point.</li> </ul> </li> <li>Pre-scale function selection         <ul> <li>(Unit magnification)</li> <li>Pre-scale function invalid</li> <li>× 1</li> <li>× 0.1</li> <li>× 0.01</li> <li>× 0.001</li> <li>If the setting value is other than the abord setting range outside error (error code: error, turn ON the error reset request (Y corresponding channel. After this, set at turn ON the operating condition setting</li> </ul> </li></ul>	ut pulse number per count he weight per pulse is a sion into the "sampling he following operation × pre-scale setting value is rounded down to the Setting value 0 1 2 3 4 5 5 ve values, a pre-scale 400) occurs. To clear the (8 to YF) of the correct value and then request flag (X1)	0	6	38	70	102	134	166	198	230

	lr Ir			Buffer memory address						
Item	Details	value	CH1	CH2	СНЗ	CH4	CH5	CH6	CH7	CH8
Pre-scale setting value	<ul> <li>Set the pre-scale setting value.</li> <li>The pre-scale function calculates the "sampling pulse number" of the buffer memory with the following operation formula: Sampling pulse number = input pulse value per count cycle × pre-scale setting value × unit magnification Note that if the pre-scale setting value is "0", the displayed sampling pulse number becomes 0 from the above operation formula, and therefore, it seems as if pulses are not counted although they are actually counted.</li> <li>If the setting value is outside the range, a pre-scale setting range outside error (error code: 400) occurs. To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel. After this, set a correct value and then turn ON the operating condition setting request flag (Y1).</li> </ul>	0	7	39	71	103	135	167	199	231
Accumulating count value	<ul> <li>Stores the accumulating value of the "sampling pulse number" of the buffer memory.</li> <li>The accumulating count value can be used when either the linear counter or ring counter is selected.</li> <li>The accumulating count range is 0 to 99999999 for both the linear counter and ring counter.</li> <li>If the accumulating count value exceeds 99999999 when the accumulating counter is used as the linear counter, the "overflow detection flag" of the buffer memory turns ON.</li> <li>When the operating condition setting request flag (Y1) is turned ON or "1" is set in the "counter reset request" of the buffer memory, the accumulating count value is reset.</li> <li>The update timing is the same as the cycle of the sampling pulse number. (It is the interval set in the "count cycle setting value" of the buffer memory.")</li> </ul>	0	89	40 41	72 73	104 105	136 137	168 169	200 201	232 233
Input pulse value	<ul> <li>Stores the actually entered pulse number.</li> <li>This value is not converted into the unit pulse number by the prescale function, unlike the "sampling pulse number" and "accumulating count value" of the buffer memory.</li> <li>The count indication range is 0 to 2147483647.</li> <li>When the operating condition setting request flag (Y1) is turned ON or "1" is set in the "counter reset request" of the buffer memory, the input pulse value is reset.</li> <li>If an overflow error (error code: 100) occurs, this value is kept counted when the count enable (Y18 to Y1F) is ON.</li> <li>The update timing is fixed at 10ms. Therefore, take care when using the module as a counter.</li> </ul>	0	10 11	42 43	74 75	106 107	138 139	170 171	202 203	234 235
Overflow detection flag	<ul> <li>If the "accumulating count value" of the buffer memory exceeds 99999999 when the accumulating counter is used as the linear counter, the overflow detection flag turns ON. At the same time, an overflow error (error code: 100) occurs and count operation is stopped.</li> <li>When the overflow error has occurred, the accumulating count value does not change from 99999999 if pulses are input after the error occurrence. The "sampling pulse number" of the buffer memory is reset.</li> <li>The overflow error is cleared by setting "1" in the "counter reset request" of the buffer memory. Count operation is resumed after the error is cleared.</li> <li>The error is also cleared by turning ON the error reset request (Y8 to YF). To resume count operation, however, turn ON the operating condition setting request flag (Y1) or set "1" in the counter reset request.</li> <li>[Detection value]</li> <li>O: No overflow detection (OFF)</li> <li>1: Overflow detection (ON)</li> </ul>	0	12	44	76	108	140	172	204	236

		Initial Buffer memory address					3			
Item	Details		CH1	CH2	СНЗ	CH4	CH5	CH6	CH7	CH8
Counter reset request	<ul> <li>Setting "1" in the counter reset request resets the "sampling pulse number", "accumulating count value" or "input pulse value" of the buffer memory.</li> <li>When a reset is made, the input pulses are invalid for a maximum of 20ms.</li> <li>If count operation has been stopped due to the detection of an overflow when the accumulating counter is used as the linear counter, the count operation is resumed after completion of a counter reset.</li> <li>If the setting value is other than 1, the setting is ignored.</li> <li>[Setting value] <ol> <li>Reset request</li> <li>The value automatically turns to "0" after completion of a counter reset.</li> </ol> </li> </ul>	0	13	45	77	109	141	173	205	237
Carry over detection flag	<ul> <li>If the "accumulating count value" of the buffer memory exceeds 99999999 when the accumulating counter is used as the ring counter, the carry over detection flag turns ON.</li> <li>Unlike the overflow detection flag, count operation is continued.</li> <li>The carry over detection flag is reset by setting "1" in the "carry over reset request" of the buffer memory.</li> <li>Unlike the overflow detection flag, an error does not occur if the carry over flag turns ON.</li> <li>[Detection value]</li> <li>O: No carry over detection (OFF)</li> <li>1: Carry over detection (ON)</li> </ul>	0	14	46	78	110	142	174	206	238
Carry over reset request	<ul> <li>Set the carry over reset request.</li> <li>If the setting value is other than 1, the setting is ignored.</li> <li>[Setting value] <ol> <li>Reset request</li> <li>(The value automatically turns to "0" after completion of a carry over reset.)</li> </ol> </li> </ul>		15	47	79	111	143	175	207	239
Error code	<ul> <li>Stores the error code.</li> <li>The latest error code is always stored into the error code.</li> </ul>	0	16	48	80	112	144	176	208	240
Alarm output selection	<ul> <li>The latest error code is always stored into the error code.</li> <li>Set whether an alarm will be output or not for the "sampling pulse number" of the buffer memory.</li> <li>If the setting value is other than 0 or 1, an alarm output setting range outside error (error code: 500) occurs.</li> <li>[Setting value] <ul> <li>Alarm output function invalid</li> <li>Alarm output function valid</li> </ul> </li> </ul>		17	49	81	113	145	177	209	241
Alarm output flag	When "alarm output function valid" has been set in the "alarm output selection" of the buffer memory, the alarm output flag turns ON if the sampling pulse number exceeds the upper/upper limit value or lower/lower limit value.	0	18	50	82	114	146	178	210	242

Details		Initial	nitial Buffer memory address							
Item	Details	value	CH1	CH2	СНЗ	CH4	CH5	CH6	CH7	CH8
Alarm output setting value upper/upper limit	<ul> <li>Set the alarm output setting values (upper/upper limit, upper/lower limit, lower/upper limit, lower/lower limit).</li> <li>The following setting values can also be set: upper/upper limit = upper/lower limit + lower/upper limit = lower/lower limit.</li> </ul>		19	51	83	115	147	179	211	243
Alarm output setting value upper/lower limit	an alarm output setting range outside error (error code: 500) occurs if the setting value is outside the setting range or the following relation expression is not established.	0	20	52	84	116	148	180	212	244
Alarm output setting value lower/upper limit	Upper/upper limit ≥ upper/lower limit > lower/upper limit ≥ lower/lower limit To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel.		21	53	85	117	149	181	213	245
Alarm output setting value lower/lower limit	After this, set a correct value (value that will establish the above relation expression and is within the setting range), and then turn ON the operating condition setting request flag (Y1). [Setting range: 0 to 32767]		22	54	86	118	150	182	214	246
Count cycle change function selection	<ul> <li>Set whether the count cycle change function is valid or invalid.</li> <li>Set the count cycle in the "count cycle setting value" of the buffer memory.</li> <li>By setting "count cycle change function selection valid", the update timing of the "sampling pulse number" or "accumulating count value" of the buffer memory becomes the time set in the "count cycle setting value" of the buffer memory.</li> <li>When "count cycle change function selection invalid" is set, the count cycle is fixed at 1s.</li> <li>If the setting value is other than 0 or 1, a count cycle setting range outside error (error code: 600) occurs. To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel. After this, set a correct value and then turn ON the operating condition setting request flag (Y1).</li> <li>[Setting value]</li> <li>0: Count cycle change function selection invalid</li> <li>1: Count cycle change function selection valid</li> </ul>	0	23	55	87	119	151	183	215	247
Count cycle setting value	<ul> <li>Set the count cycle of the "sampling pulse number" or "accumulating count value" of the buffer memory.</li> <li>If the setting value is other than the following values, a count cycle setting range outside error (error code: 600) occurs. To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel. After this, set a value within the setting range and then turn ON the operating condition setting request flag (Y1).</li> <li>[Setting value]</li> <li>0: 1s</li> <li>1: 100ms</li> <li>2: 200ms</li> <li>3: 500ms</li> </ul>	0	24	56	88	120	152	184	216	248

#### 3.5 Interface with external devices

The internal circuit of the QD60P8-G interface for connection of external devices is shown in a schematic diagram.

Input/ Output	Internal circuit	Terminal number	Signal name	Ope	ration	Input voltage (guaranteed value)	Operating current (guaranteed value)
		, , , , , , , , , , , , , , , , , , ,			5VDC *	3.5V to 5.5V	4mA or more
Input		11, 13, 15		ALON	12 to 24VDC *	10.2 to 30V	4mA or more
		2. 4. 6. 8. 10.	CH1 to 8 V-		5VDC *	1.0V or less	0.5mA or less
		12, 14, 16		At OFF	12 to 24VDC *	2.0V or less	0.5mA or less
-	-	17 18	FG		-	-	-

\*: Use the intelligent function module switch to change between 5VDC and 12 to 24VDC. (For details, refer to "Section 4.5 Switch setting for intelligent function module".)

	Termir	nal number	0,
	0.14	1	
	CH1	2	

#### Signal layout of each channel

Termir	nal number	Signal name
014	1	CH1 V+
CH1	2	CH1 V-
0110	3	CH2 V+
CH2	4	CH2 V-
<u>cup</u>	5	CH3 V+
CH3	6	CH3 V-
CH4	7	CH4 V+
	8	CH4 V-
0.15	9	CH5 V+
CH5	10	CH5 V-
0110	11	CH6 V+
СНь	12	CH6 V-
0.117	13	CH7 V+
CH/	14	CH7 V-
0110	15	CH8 V+
CH8	16	CH8 V-

### CHAPTER 4 SETUP AND PROCEDURE BEFORE OPERATION

The following describes the procedure prior to the QD60P8-G operation, the name and setting of each part of the QD60P8-G, and wiring method.

#### 4.1 Handling precautions

The following are the precautions for handling the QD60P8-G.

- (1) Do not drop the module casing, or do not subject it to strong impact.
- (2) Do not remove the PCB of each module from its case. Doing so may cause breakdowns.
- (3) Be careful not to let foreign matters such as sawdust or wire chips get inside the module. These may cause fires, failure and malfunction.
- (4) The top surface of the module is covered with a protective film to prevent foreign objects such as cable offcuts from entering the module when wiring. Do not remove this film until the wiring is complete.
   Before operating the system, be sure to remove the film to provide adequate heat ventilation.
- (5) Tighten the mounting and terminal screws of the module to the following specified torques.

Undertightening can cause a short circuit, failure or malfunction.

Screw location	Tightening torque range				
Module mounting screw (M3 screw)	36 to 48N•cm				
Terminal block terminal screw (M3 screw)	42 to 58N•cm				
Terminal block mounting screw (M3.5 screw)	66 to 89N•cm				

(6) To mount the module on the base unit, fully insert the module fixing latch into the fixing hole in the base unit and press the module using the hole as a fulcrum. Improper installation may result in a malfunction or breakdown of the module, or may cause the module to fall off.

#### 4.2 Procedure before operation

The figure below shows the steps that should be followed before starting the QD60P8-G operation.



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#### 4.3 Part identification nomenclature

 Part identification nomenclature The following are the part names of the QD60P8-G.



(2) LED Display

The LEDs turn ON/OFF as described below depending on the operating status of the module.

Number	Name	Details
1)	RUN LED	Indicates the operating status of the QD60P8-G. ON : Operating normally. OFF : 5V power is OFF, watch dog timer error occurred, in the module changeable status during online module change
2)	ERR. LED	Indicates the error status of the QD60P8-G. ON : Error is occurring OFF : Operating normally.
3)	CH1 to CH8 LED	Displays the voltage application status of the input terminals. ON : Voltage is being applied to the CH1 to CH8 pulse input terminal. OFF : No voltage applied to pulse input terminals of CH1 to CH8.

#### 4.4 Wiring

This section explains how to wire the pulse generator to the QD60P8-G. The following are the precautions for wiring the QD60P8-G. Read these precautions together with "Section 4.1 Handling precautions" to ensure work safety.

#### 4.4.1 Wiring precautions

In order to fully utilise the functions of the QD60P8-G and ensure system reliability, external wiring having a minimum of noise effect must be provided. The precautions regarding external wiring are described below.

- (1) Use separate cables with the AC control circuit and QD60P8-G's external input signals to avoid the influence of AC side surges and induction.
- (2) Do not run the cable close to, or bundle them with, the main circuit and high-voltage cables and the load cables from other than the PLC. Failure to do so will make the cables susceptible to noise, surges and induction.
- (3) If there may be the effect of noise when a cable to be connected to the QD60P8-G and the power line are installed close to each other, use a general shielded cable as a countermeasure against noise. The shield must be grounded on the QD60P8-G side.
- (4) No soldereless terminals with insulation sleeves can be used on the terminal block.

It is recommended to cover the electric wire connecting section of each solderless terminal with a marking tube or insulating tube.

(5) The cables connected to the QD60P8-G should be placed in a duct or fixed. Not doing so can cause the QD60P8-G or cables to be damaged when the cables swing, move or are pulled carelessly, for example, or to malfunction due to poor cable connection.
(6) To comply with the EMC Directive and Low-Voltage Directive, always ground the QD60P8-G to the control box using shielded cables and AD75CK cable clamping (Mitsubishi Electric make).



Using the AD75CK, you can tie four cables of about 7mm outside diameter together for grounding.

(For details, refer to the AD75CK-type Cable Clamping Instruction Manual<IB-68682>.)

## 4.4.2 Wiring example

This section shows an example of wiring the QD60P8-G and pulse generator. In the wiring example of this section, only CH1 is wired. Also, in this example, the voltage of the external power supply is 24VDC as the electrical specifications of the pulse generator.



(1) Wiring example with a sink logic type pulse generator(a) For transistor output



(b) For contact output





(2) Wiring example with a source logic type pulse generator(a) For transistor output





## 4.5 Switch setting for intelligent function module

Settings for QD60P8-G input voltage selection, pulse edge selection, linear counter or ring counter selection, and input filter setting can be made by the GX Developer intelligent function module switch setting.

Make the intelligent function module switch setting in the "I/O assignment setting" PLC parameter of the QCPU using GX Developer.

- The intelligent function module switch has switches 1 to 5, and is set at 16 bits data.
- If the intelligent function module switch setting is not operated, the default setting for switches 1 to 5 is 0.

The settings made with the intelligent function module switches are made valid after power-on or PLC CPU reset. You cannot change the settings during operation.



Switch No.	Setting items	Setting details/bit assignment	Default value					
Switch 3	Input filter setting (CH1 to CH4)	H CH1 Input filter CH2 Input filter CH3 Input filter CH4 Input filter	0000н					
Switch 4	Input filter setting (CH5 to CH8)	H CH5 Input filter CH6 Input filter CH7 Input filter CH8 Input	0000H					
Switch 5		Vacant	Vacant					

- (1) Input voltage selection (Switch 1: lower 8 bits) Set the level of the input signal on each channel.
- Pulse edge selection (Switch 2: lower 8 bits)
   Set the pulse edge (rise edge/fall edge) on each channel.
   For pulse edge selection, the differences between the rise edge and fall edge and the count timings are shown below.
  - 1) Rise edge



2) Fall edge



- (3) Linear counter or Ring counter selection (Switch 2: upper 8 bits) Set the count type (linear counter or ring counter) on each channel.
- (4) Input filter setting (Switch 3, Switch 4) Set the input pulse counting speed (maximum) on each channel.

#### Operating procedure

Using GX Developer, make settings with the QCPU PLC parameter "I/O assignment setting" screen.

Qn	(H)	Paramete	ſ						×		
P	PLC name PLC system PLC file PLC RAS Device Program Boot file SFC 1/D assignment										
-	- I/O Assignment(*)										
10		Slot	Type	Model name	F	Points	Start				
	0	PLC	PLC _	•		-			switch setting		
	1	0(*-0)	Intelli.	QD60P8-G	32pc	ints 💌	0000				
II.	2	1(*-1)		•		•		21	etailed setting		
II.	3	2(*-2)		·		•		-			
Iŀ	4	3(*-3)		·		-		.			
lŀ	5	4(*-4)		·		•		-			
lŀ	6	5(*-5)		·		-		- I -			
μ	7	6(*-6)		r		<u>•</u>		•			
L	lf I	the start X i	and Y are not inp	out, the PLC assigns th	nem automal	ically.					
L	lti	is not possi	ble to check cor	rectly, when there is a	slot of the u	insetting o	on the way	у.			
h	-Sta	indard settii	ng(*)								
					<b>F 1 1</b>		n	•	Base mode		
		В	ase model name	Power model name	Extension	Extension cable Points					
		Main					•		C Date:		
	Inc	rease1					-	11.			
	Inc	rease2					•		0.C. C. 1		
	Inc	rease3					•	노노	8 rixation		
	Inc	rease4					-		12 fixation		
	Inc	rease5					<b>•</b> •	- 1			
	(*)Settings should be set as same when using multiple PLC. Diversion of multiple PLC parameter Read PLC data										
A	Acknowledge XY assignment Multiple PLC settings Default Check End Cancel										

Switch setting for I/O and intelligent functional module									×		
	Input format HEX T										
	Slot	Type	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	•		
0	PLC	PLC									
1	0(*·0)	Intelli	QD60P8-G	00F0	55AA	0011	7667				
2	1(*-1)										
3	2(×-2)										
4	3(*-3)										
5	4(×-4)										
6	5(*-5)										
7	6(*-6)										
8	7(*-7)										
9	8(*-8)										
10	9(*-9)										
11	10(*-10)										
12	11(%11)										
13	12(*-12)										
14	13(*-13)										
15	[14(*·14)								-		
			End	Car	icel						

- (a) I/O assignment setting screen
   Specify the following for the slot where the QD60P8-G is mounted.
  - Type: Select "Intelli."Model name : Enter the module's model name.Points: Select 32 points.
  - Start XY : Enter the start I/O signal for the QD60P8-G.
- (b) Switch setting for I/O and intelligent function module Click on <u>Switch setting</u> on the I/O assignment setting screen to display the screen at left and set switches 1 to 4. The setting can easily be done if values are entered in hexadecimal. Change the input format to hexadecimal and enter values.

# CHAPTER 5 DETAILS AND SETTING OF FUNCTIONS

This chapter explains the details and settings of the QD60P8-G functions.

## 5.1 Count operation

## 5.1.1 Pulse input method

The pulse input method of the QD60P8-G is 1-phase input and addition count. (Subtraction count is not available.) However, it is allowed to set whether pulses will be counted on the rise or fall by using the intelligent function module switches. Refer to Section 4.5 for details of the switch settings of intelligent function module.

Pulse input method	Count timing						
	Pulse input from pulse generator (external)	Counted on rise (1) of					
	Input pulse value (QD60P8-G buffer memory) ← 1→ ← 2→ ← 3→	pulses					
1-phase	Pulse input from pulse generator (external) Input pulse value (QD60P8-G buffer memory)	Counted on fall (↓) of pulses					

## 5.1.2 Input pulse count operation



This section ex	plains the inpu	it pulse count (	operation of the	e QD60P8-G	(For CH1)
1113 3001011 07	pianis inc inpu	n puise count	speration of the		

Number	Details
	When the operating condition setting complete flag (X1) turns ON, pulse
	count operation is enabled.
1)	If any setting value or similar is in error, count operation cannot be
	performed since the operating condition setting complete flag (X1) does not
	turn ON.
2)	When the count enable (Y18) is turned ON, the count operation of CH1
۷)	starts.
3)	The count enable (Y18) turns OFF and pulse count operation stops.
4)	The count enable (Y18) turns ON and pulse count operation is restarted.
	The indications of the "sampling pulse number" and "accumulating count
	value" of the buffer memory are updated in the cycle set in the "count cycle
5)	setting value" of the buffer memory. (Refer to Section 5.1.4)
	(The update timing of the "input pulse value" of the buffer memory is fixed
	at 10ms.)

# REMARK

In the pulse count operation of the QD60P8-G, is delayed due to the control cycle (10ms). Refer to Section 5.9 for details.

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## 5.1.3 Count value reading

This section explains how to read the count values (sampling pulse number, accumulating count value, input pulse value) stored in the buffer memory.

The accumulating count value and input pulse value are stored in the buffer memory as two words (32 bits). When reading the count value from the module, always read two words together.

	Buffer memory address								
Item	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
Sampling pulse number	0	32	64	96	128	160	192	224	
	8	40	72	104	136	168	200	232	
Accumulating count value	9	41	73	105	137	169	201	233	
	10	42	74	106	138	170	202	234	
Input pulse value	11	43	75	107	139	171	203	235	

The buffer memory addresses of the counter reset requests for resetting the count values are as follows.

	Buffer memory address							
Item	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Counter reset request	13	45	77	109	141	173	205	237

The update timings of the count values are as follows.

ltem	Update timing					
Sampling pulse number	Oriente and a setting up to the Oriente Oriente of A					
Accumulating count value	Count cycle setting value (Refer to Section 5.1.4)					
Input pulse value	10ms					

POINT									
When reading the accumulating count value or input pulse value, always read two words together.									
If it is read in single word unit, a wrong count value may	If it is read in single word unit, a wrong count value may be read due to a data								
mismatch between the lower word and upper word whe	n the	count	value	is					
updated halfway during read.									
[Program example]									
	[DMOV	U0\ G8	D0	3					
[Incorrect program example]									
	MOV	U0\ G9	D1	]					
	-[MOV	U0\ G8	D0	]					

## 5.1.4 Count cycle changing

This section describes how to change the count cycles of the sampling pulse number and accumulating count value.

To change the count cycle, set "1: Count cycle change function selection valid" in the "count cycle change function selection" of the buffer memory. (Whether the function is valid or invalid can be selected on each channel.)

		Buffer memory address							
Item	Setting value	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Count cycle change function selection	0: Count cycle change function selection invalid * 1: Count cycle change function selection valid		55	87	119	151	183	215	247
Count cycle setting value	0: 1s 1: 100ms 2: 200ms 3: 500ms	24	56	88	120	152	184	216	248

Further, set the count cycle in the "count cycle setting value" of the buffer memory.

\*: "When "count cycle change function selection invalid" is set, the count cycle is 1s (fixed).

- If the setting value is other than the above values, a count cycle setting range outside error (error code: 600) occurs. To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel. After this, set a correct value and then turn ON the operating condition setting request flag (Y1).
- The settings are reflected on the module by turning ON the operating condition setting request flag (Y1) after setting the values to the buffer memory.

#### 5.2 Count type selection

Select the linear counter or ring counter by setting with the intelligent function module switch.

Refer to Section 4.5 for details of the setting method.

#### 5.2.1 Linear counter operation

When the linear counter is selected, count operation is performed between 0 and 99999999.

If the "accumulating count value" of the buffer memory exceeds 99999999, the "overflow detection flag" of the buffer memory turns ON and an overflow error (error code: 100) occurs.

The linear counter can be used with the comparison output function (refer to Section 5.4), pre-scale function (refer to Section 5.6), movement averaging function (refer to Section 5.7) and alarm output function (refer to Section 5.8).



\*: The accumulating count value is updated in the cycle set in the "count cycle setting value" of the buffer memory. (Refer to Section 5.1.4)

## • Overflow error

An overflow error (error code: 100) occurs if the "accumulating count value" of the buffer memory exceeds 99999999 when the count type is the linear counter. If the overflow error occurs, count operation is stopped, and the "accumulating count value" of the buffer memory does not change from 999999999 if pulses are input. Also, the "sampling pulse number" of the buffer memory is reset.

The overflow error is cleared by setting "1" in the "counter reset request" of the buffer memory. Count operation is resumed after the error is cleared. The error is also cleared by turning ON the error reset request (Y8 to YF). To resume count operation, however, turn ON the operating condition setting request flag (Y1) or set "1" in the "counter reset request" of the buffer memory.

When checking for the module error at occurrence of an overflow error, click the [Diagnosis] - [System monitor] menu on GX Developer and monitor the system.

	Read value/Setting value	Buffer memory address								
Item		CH1	CH2	СНЗ	CH4	CH5	CH6	CH7	CH8	
Accumulating count value 0 to	0 to 99999999	8	40	72	104	136	168	200	232	
		9	41	73	105	137	169	201	233	
Overflow detection flag	0: No overflow detection (OFF) 1: Overflow detection (ON)	12	44	76	108	140	172	204	236	
Counter reset request	1: Reset request (The value automatically turns to "0" after completion of a counter reset.)	13	45	77	109	141	173	205	237	

#### 5.2.2 Ring counter operation

When the ring counter is selected, count operation is repeated between 0 and 99999999.

If the "accumulating count value" of the buffer memory exceeds 99999999, the accumulating count value returns to 0 and the "carry over detection flag" of the buffer memory turns ON.

The ring counter can be used with the comparison output function (refer to Section 5.4), pre-scale function (refer to Section 5.6), movement averaging function (refer to Section 5.7) and alarm output function (refer to Section 5.8).



reset request

\*: The accumulating count value is updated in the cycle set in the "count cycle setting value" of the buffer memory. (Refer to Section 5.1.4)

## 5 DETAILS AND SETTING OF FUNCTIONS

14	Read value/Setting value	Buffer memory address								
Item		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
	0.4-0000000	8	40	72	104	136	168	200	232	
	0 to 99999999	9	41	73	105	137	169	201	233	
	0: No carry over detection									
Carry over detection flag	(OFF)	14	47	79	111	143	175	207	239	
	1: Carry over detection (ON)									
	1 : Reset request									
	(The value automatically									
Carry over reset request	turns to "0" after	15	48	80	112	144	176	208	240	
	completion of a carry over									
	reset.)									

#### POINT

The carry over detection flag is not cleared until a carry over reset request is given. Once cleared, the carry over detection flag does not turn ON until the accumulating count value exceeds 99999999 again.

## 5.3 Input pulse value

The pulse number entered into the QD60P8-G is stored into the "input pulse value" of the buffer memory. This value is counted when the count enable (Y18 to Y1F) is ON.

The input pulse value is not converted into the unit pulse number by the pre-scale function (refer to Section 5.6), unlike the "sampling pulse number" and "accumulating count value" of the buffer memory. If an overflow error occurs, the value is counted when the count enable (Y18 to Y1F) is ON.

The count type of the input pulse value is a ring counter of 0 to 2147483647.



Input pulse count value of 2147483647 incremented by 1 turns to 0.

14	Item Read value	Buffer memory address										
Item		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8			
Input pulse value	0 to 2147483647	10	42	74	106	138	170	202	234			
		11	43	75	107	139	171	203	235			

The buffer memory addresses for resetting the input pulse values are as follows.

Item		Buffer memory address										
	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
Counter reset request	13	45	77	109	141	173	205	237				

- The update timing of the input pulse value is fixed at 10ms. Therefore, take care when using the module as a counter. (Refer to Section 5.9)
- When reading the input pulse value, always read two words together. If it is read in single word unit, a wrong count value may be read due to a data mismatch between the lower word and upper word when the count value is updated halfway during read.

## 5.4 Comparison output function

The comparison output function compares any count value set in the "comparison output setting value" of the buffer memory with the "accumulating count value" of the buffer memory, and if the "accumulating count value" is equal to or greater than the "comparison output setting value", turns ON the accumulating counter comparison flag (X10 to X17).

Set one point of the comparison output setting value for each channel.

		Buffer memory address									
Item	Read value/Setting value	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8		
Comparison output selection	<ul><li>0: Comparison output function invalid</li><li>1: Comparison output function valid</li></ul>	1	33	65	97	129	161	193	225		
Comparison output setting value	0 to 99999999	2 3	34 35	66 67	98 99	130 131	162 163	194 195	226 227		
Accumulating count value	0 to 99999999	8	40 41	72 73	104 105	136 137	168 169	200 201	232 233		

The buffer memory addresses related to the setting of the comparison output function are as follows.

The I/O signals (X/Y devices) related to the setting of the comparison output function are as follows.

lterre	Read value/Setting value	X/Y device								
Item		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
Accumulating counter comparison flag	OFF: Accumulating count value < Comparison output setting value ON: Accumulating count value ≧ Comparison output setting value	X10	X11	X12	X13	X14	X15	X16	X17	
Comparison signal reset request	OFF: No comparison signal reset request ON: Comparison signal reset request	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	

- If the value outside the range is set to any of the above buffer memory addresses, a comparison output setting range outside error (error code: 200) occurs. To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel. After this, set a value within the setting range and then turn ON the operating condition setting request flag (Y1).
- The settings are reflected on the module by turning ON the operating condition setting request flag (Y1) after setting the values to the buffer memory.

#### Outline of comparison output function operation

The following gives the outline of the comparison output function operation. (For CH1)



Number	Details
1)	Count operation is started when the count enable (Y18) is turned ON with the operating condition setting complete flag (X1) ON.
2)	When the "accumulating count value" is equal to or greater than the "comparison output setting value", the accumulating counter comparison flag (X10) turns ON. Since the accumulating count value is updated at intervals of the count cycle setting value (refer to Section 5.1.2), the accumulating counter comparison flag is also turned ON at the timing of the count cycle setting value.

#### POINT

The accumulating counter comparison flag (X10 to X17) is reset when the comparison signal reset request (Y10 to Y17) is turned ON. When the accumulating counter is operating as a linear counter, the accumulating counter comparison flag (X10 to X17) that was turned OFF once does not turn ON until the accumulating count value reaches the comparison output setting value again after it has been reset.

If the accumulating counter is operating as a ring counter, the flag turns ON when the accumulating count value reaches the comparison output setting value again in the ring processing.

## 5.5 Counter reset function

Setting "1" in the "counter reset request" of the buffer memory resets the "sampling pulse number", "accumulating count value" or "input pulse value" of the buffer memory.

ltem	Setting value	Buffer memory address								
		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
Counter reset request	1: Reset request (The value automatically turns to "0" after completion of a counter reset.)	13	45	77	109	141	173	205	237	

- When the counter is reset, input pulses are invalid for a maximum of 20ms.
- When the accumulating counter is the linear counter, count operation that was stopped due to the detection of an overflow is started after completion of a counter reset.
- If a value other than 1 is set, the setting is ignored.

## 5.6 Pre-scale function

The pre-scale function converts the input pulse number into the unit pulse number when its weight per pulse is a fraction.

The pre-scale function converts the input pulse value per count cycle into the unit pulse number using the following operation formula. The result of conversion is stored into the "sampling pulse number" of the buffer memory.

Sampling pulse number = input pulse value per count cycle  $\times$  pre-scale setting value  $\times$  unit magnification

(The converted sampling pulse number is rounded down to the decimal point.)

lterre	Setting value	Buffer memory address								
item		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
Pre-scale function selection (Unit magnification)	0: Pre-scale function invalid 1: $\times$ 1 2: $\times$ 0.1 3: $\times$ 0.01 4: $\times$ 0.001 5: $\times$ 0.0001	6	38	70	102	134	166	198	230	
Pre-scale setting value	0 to 32767	7	39	71	103	135	167	199	231	

(Input pulse value per count cycle)



#### (Example)

If the input pulse value per count cycle is 1000, the pre-scale setting value is 5832, and the pre-scale function selection is 4

Sampling pulse number = input pulse value per count cycle  $\times$  pre-scale setting value  $\times$  unit magnification = 1000  $\times$  5832  $\times$  0.001 = 5832

This value is added to the accumulating count value.

- Note that if the pre-scale setting value is set to 0, the sampling pulse number calculated with the above operation formula becomes 0, and it seems as if pulses are not counted although they are actually counted.
- If the setting value is other than the above values, a pre-scale setting range outside error (error code: 400) occurs. To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel. After this, set a correct value and then turn ON the operating condition setting request flag (Y1).
- The settings are reflected on the module by turning ON the operating condition setting request flag (Y1) after setting the values to the buffer memory.

times

## 5.7 Movement averaging function

The movement averaging function averages the values of the sampling pulse number, which were imported in the count cycle (refer to Section 5.1.4), by the specified number of times to calculate the average value. This function is used when variations occur in the values of the sampling pulse number.

The following shows the outline of movement averaging function operation. Movement averaging processing performed when the setting number is four

Sampling pulse Count cycle number 3) 4) 2 5) 1) 6) 8) 9) 12) 7) 10) 11) Buffer memory First storage Sampling pulse Second storage number Third storage Time Data transition in buffer memory Third storage First strage Second storage 1) +2) +3) +4) 2) +3) +4) +5) 3) +4) +5) +6) 4 4 4

\*: From a counter reset or immediately after an operating condition setting request until reaching the number of movement averaging processing, averaging processing is performed by that number.

Item	Read value/Setting value	Buffer memory address								
		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
Sampling pulse number	0 to 32767	0	32	64	96	128	160	192	224	
Movement averaging processing selection	<ol> <li>0: Sampling processing</li> <li>1: Movement averaging processing</li> </ol>	4	36	68	100	132	164	196	228	
Number of movement averaging processing	2 to 60	5	37	69	101	133	165	197	229	

- If the setting value is other than the above values, a movement averaging setting range outside error (error code: 300) occurs. To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel. After this, set a correct value and then turn ON the operating condition setting request flag (Y1).
- The settings are reflected on the module by turning ON the operating condition setting request flag (Y1) after setting the values to the buffer memory.

#### 5.8 Alarm output function

With "alarm output function valid" set in the "alarm output selection" of the buffer memory, the alarm output function outputs an alarm if the "sampling pulse number" of the buffer memory exceeds the upper/upper limit value or lower/lower limit value. The alarm is turned OFF if the sampling pulse number is below the upper/lower limit value or above the lower/upper limit value after the output of the alarm.

To set the alarm output function, set four points: upper/upper limit value, upper/lower limit value, lower/upper limit value and lower/lower limit value.

The buffer memory addresses related to the setting of the alarm output function are as follows.

ltom	Cotting value			Buff	er mem	ory add	ress		
liem	Setting value	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Alarm output selection	0: Alarm output function invalid 1: Alarm output function valid	17	49	81	113	145	177	209	241
Alarm output setting value upper/upper limit		19	51	83	115	147	179	211	243
Alarm output setting value upper/lower limit	0 to 22767	20	52	84	116	148	180	212	244
Alarm output setting value lower/upper limit	0 to 32767	21	53	85	117	149	181	213	245
Alarm output setting value lower/lower limit		22	54	86	118	150	182	214	246

If the setting value is other than in the above values or does not establish the following relation expression, an alarm output setting range outside error (error code: 500) occurs.

Upper/upper limit ≥ upper/lower limit > lower/upper limit ≥ lower/lower limit

To clear the error, turn ON the error reset request (Y8 to YF) of the corresponding channel.

After this, set a correct value (value that will establish the above relation expression and is within the setting range), and then turn ON the operating condition setting request flag (Y1).

The buffer memory addresses related to the alarm output are as follows.

ltem	Read value	Buffer memory address								
		CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
Sampling pulse number	0 to 32767	0	32	64	96	128	160	192	224	
Alarm output flag	bit0: Lower limit alarm bit8: Upper limit alarm	18	50	82	114	146	178	210	242	

[Bit pattern of alarm output]

b15	b8	b4	b0		
		tueed	J <b>≜</b>	Storage Item	Meaning
Not used	INC	i used		Lower limit alarm	0:OFF(Normal)
				Upper limit alarm	1:ON(Range over)

## Outline of alarm output function operation

The following gives the outline of the alarm output function operation.

• Example of alarm output operation



• Assuming that the upper/upper limit = upper/lower limit and lower/upper limit = lower/lower limit, operation is performed as shown below.



- Since the "sampling pulse number" of the buffer memory is updated at intervals of the count cycle setting value (refer to Section 5.1.4), the alarm output flag also turns ON/OFF at the timing of the count cycle setting value.
- The settings are reflected on the module by turning ON the operating condition setting request flag (Y1) after setting the values to the buffer memory.

## 5.9 Count response delay time

The count value of the QD60P8-G is delayed for the following reasons. Please take this into consideraton when using the module as a counter.

- A delay occurs due to the scan time of a sequence program at the time of count start processing using the count enable (Y18 to Y1F).
- A delay occurs due to the control cycle (10ms). A maximum of 20ms (one control cycle × 2) delay occurs from when the count enable (Y18 to Y1F) is turned ON/OFF until the "input pulse value" of the buffer memory is displayed. Similarly, a delay also occurs at a counter reset request.

The calculation expression of the delay time is as indicated below.

Maximum delay time [ms] = (1 scan time + 20) [ms]

# CHAPTER 6 UTILITY PACKAGE (GX Configurator-CT)

The counter module utility package (GX Configurator-CT) is software designed to make initial setting, auto refresh setting, monitor/test of the QD60P8-G using dedicated screens, without being conscious of the I/O signals and buffer memory. Use the utility package with GX Developer (SW4D5C-GPPW-E or later).

## 6.1 Utility package functions

The following table gives the lists the functions of the utility package.

Function	De	tails	Reference
	Make initial setting for operating the QD60P8-G for e	ach channel.	
	Set the values of the items which require initial settin	g.	
	[Setting items]		
	<ul> <li>CH□ Comparison output selection</li> </ul>	<ul> <li>CH □ Alarm output selection</li> </ul>	
	<ul> <li>CH□ Comparison output setting value</li> </ul>	• CH  Alarm output setting value upper/upper limit	
Initial aatting	• CH□ Movement averaging processing selection	• CH  Alarm output setting value upper/lower limit	Section 6.4
initial setting	• CH I Number of movement averaging processing	• CH  Alarm output setting value lower/upper limit	Section 6.4
	<ul> <li>CH□ Pre-scale function selection</li> </ul>	• CH  Alarm output setting value lower/lower limit	
	<ul> <li>CH□ Pre-scale setting value</li> </ul>	<ul> <li>CH          Count cycle change function selection</li> </ul>	
		<ul> <li>CH          Count cycle setting value</li> </ul>	
	(The initially set data are registered to the PLC CPU	parameters, and when the PLC CPU is set to the	
	RUN status, they are written to the QD60P8-G auton	natically.)	
	Set the buffer memory batch to be automatically refre	eshed for each channel of the QD60P8-G.	
	[Auto refresh target buffer memory values]		
	Sampling pulse number	Carry over detection flag	
	<ul> <li>Comparison output selection</li> </ul>	Carry over reset request	
	<ul> <li>Comparison output setting value</li> </ul>	Error code	
	<ul> <li>Movement averaging processing selection</li> </ul>	<ul> <li>Alarm output selection</li> </ul>	
Auto refresh	<ul> <li>Number of movement averaging processing</li> </ul>	Alarm output flag	
setting	<ul> <li>Pre-scale function selection</li> </ul>	<ul> <li>Alarm output setting value upper/upper limit</li> </ul>	Section 6.5
Setting	<ul> <li>Pre-scale setting value</li> </ul>	<ul> <li>Alarm output setting value upper/lower limit</li> </ul>	
	<ul> <li>Accumulating count value</li> </ul>	<ul> <li>Alarm output setting value lower/upper limit</li> </ul>	
	Input pulse value	<ul> <li>Alarm output setting value lower/lower limit</li> </ul>	
	Overflow detection flag	<ul> <li>Count cycle change function selection</li> </ul>	
	Counter reset request	Count cycle setting value	
	(The values stored in the automatically refreshed QD	60P8-G buffer memory are read automatically when	
	the END instruction of the PLC CPU is executed.)		
	Monitors and tests the buffer memory and I/O signals	s for the QD60P8-G.	
Monitor/Test	X/Y Monitor/Test		Section 6.6
	CH ☐ Monitor/Test		

## Utility package (GX Configurator-CT) function list

#### 6.2 Installing and uninstalling the utility package

See "Method of installing the MELSOFT Series" attached with the utility package regarding the install and uninstall operation for the utility package.

#### 6.2.1 User precautions

The following explains the precautions on using the Utility package:

#### (1) Important safety information

Since the utility is add-in software for GX Developer, make sure to read "SAFETY PRECAUTIONS" and the basic operating procedures in the GX Developer Operating Manual.

#### (2) About installation

GX Configurator-CT is an add-in software package for GX Developer Version 4 or later products. Therefore, install GX Configurator-CT in a personal computer in which GX Developer Version 4 or later product has been installed.

(3) About display screen errors while using the intelligent function module utility

There may be cases in which the screen will not properly display while the intelligent function module utility is being used, due to a lack of system resources. If this occurs, close the intelligent function module utility first, and then close GX Developer (program, comments, etc.) and other applications. Next, restart GX Developer and the intelligent function module utility.

- (4) To start the intelligent function module utility
  - (a) In GX Developer, select "QCPU (Q mode)" for the PLC series and specify the project. If anything other than "QCPU (Q mode)" is selected for the PLC series, or if no project is specified, the intelligent function module utility will not start.
  - (b) Multiple intelligent function module utilities can be started. However, the [Open file]/[Save file] parameter operations of the intelligent function module can only be performed by a single intelligent function module utility. Other intelligent function module utilities can perform the [Monitor/test] operation only.
- (5) How to switch screens when two or more intelligent function module utilities are started When two or more intelligent function module utility screens cannot be displayed side by side, use the task bar to display the desired intelligent function module utility screen on top of other screens.

🔀 Start 🕼 GX Developer C:\ME... 🜌 Intelligent function Module ... 🜌 Intelligent function Module ...

# (6) About the number of parameters that can be set in GX Configurator-CT

The number of parameters that can be set by the GX Configurator for an intelligent function module installed in the CPU module and in a remote I/O station of the MELSECNET/H network system is limited.

Intelligent function module installation	Maximum number c	of parameter settings
object	Initial setting	Auto refresh setting
Q00J/Q00/Q01CPU	512	256
Q02/Q02H/Q06H/Q12H/Q25HCPU	512	256
Q12PH/Q25PHCPU	512	256
MELSECNET/H remote I/O station	512	256

For example, if multiple intelligent function modules are installed in a remote I/O station, set the GX Configurator so that the number of parameter settings of all the intelligent function modules does not exceed the maximum number of parameter settings. The total number of parameter settings is calculated separately for the initial setting and for the auto refresh setting. The number of parameter settings that can be set for one module in the GX Configurator-CT is as shown below.

Object Module	Initial setting	Auto refresh setting
QD60P8-G	24 (Fixed)	8 (Maximum number of settings)

Example) Counting the number of parameter settings in the auto refresh setting

A	uto refresh setting					_	□ ×	
	Module information Module model name: QD60P8-G Module type: Counter Module		Start I/O No.:	: 0000				
	Setting item	Module side Buffer size	Module side Transfer word count		Transfer direction	PLC side Device	1	
	CH1 Auto refresh setting(Address 0-24)	25	25		->			
$\left \right $	CH2 Auto refresh setting(Address 32-56)	25	25		->	D10	ווּ	The number of settings in the one line is
	CH3 Auto refresh setting(Address 64-88)	25	25		->	D30		counted as one setting.
	CH4 Auto refresh setting(Address 96-120)	25	25		->			The number of settings is not counted by columns
	CH5 Auto refresh setting(Address 128-152)	25	25		->			Add up all the setting items in this setting screen,
	CH6 Auto refresh setting(Address 160-184)	25	25		->			then add them to the total for the other intelligent
	CH7 Auto refresh setting(Address 192-216)	25	25		->			function modules to get a grand total.
	CH8 Auto refresh setting(Address 224-248)	25	25		->	B200	÷	
	Make text file		·	End setu	ip	Cancel		

## 6.2.2 Operating environment

The operating environment of the personal computer where the GX Configurator-CT is used is explained.

	ltem	Peripheral devices
Installation (	Add-in) destination * <sup>1</sup>	Add-in to GX Developer Version 4 (English version) or later * <sup>2</sup>
Computer m	nain unit	Personal computer on which Windows <sup>®</sup> operates.
	CPU	Refer to the following table "Used operating system and performance required for
	Required memory	personal computer".
Hard disk	For installation	65 MB or more
free space	For operation	10 MB or more
Display		800 $ imes$ 600 dot or more resolution * <sup>3</sup>
		Microsoft <sup>®</sup> Windows <sup>®</sup> 95 Operating System (English version)
		Microsoft <sup>®</sup> Windows <sup>®</sup> 98 Operating System (English version)
		Microsoft <sup>®</sup> Windows <sup>®</sup> Millennium Edition Operating System (English version)
Operating s	ystem	Microsoft <sup>®</sup> Windows NT <sup>®</sup> Workstation Operating System Version 4.0 (English version)
		Microsoft <sup>®</sup> Windows <sup>®</sup> 2000 Professional Operating System (English version)
		Microsoft <sup>®</sup> Windows <sup>®</sup> XP Professional Operating System (English version)
		Microsoft <sup>®</sup> Windows <sup>®</sup> XP Home Edition Operating System (English version)

\*1: Install the GX Configurator-CT in GX Developer Version 4 or higher in the same language. GX Developer (English version) and GX Configurator-CT (Japanese version) cannot be used in combination, and GX Developer (Japanese version) and GX Configurator-CT (English version) cannot be used in configuration.

\*2: GX Configurator-CT cannot be used as an add-in with GX Developer Version 3 or earlier versions.

\*3: Setting fonts Size of Windows<sup>®</sup> for "Large Fonts" may cause the text to extend off screen. Therefore, choose "Small Fonts".

0	1:	Performance Required	for Personal Computer
Opera	ting system	CPU	Required memory
Windows <sup>®</sup> 95		Pentium <sup>®</sup> 133MHz or more	32MB or more
Windows <sup>®</sup> 98		Pentium <sup>®</sup> 133MHz or more	32MB or more
Windows <sup>®</sup> Me		Pentium <sup>®</sup> 150MHz or more	32MB or more
Windows NT <sup>®</sup> Workst	ation 4.0	Pentium <sup>®</sup> 133MHz or more	32MB or more
Windows <sup>®</sup> 2000 Profe	essional	Pentium <sup>®</sup> 133MHz or more	64MB or more
Windows <sup>®</sup> XP	"XP compatibility		
Professional	mode" and "Fast User	Pentium 300MHZ or more	128MB of more
Windows <sup>®</sup> XP	Switching" are not	Dentium <sup>®</sup> 200MUz er mere	120MD or more
Home Edition	supported.	Penuum SOUMHZ of more	

Used operating system and performance required for personal computer

## 6.3 Explanation of utility package operations

#### 6.3.1 How to perform common utility package operations

## (1) Available control keys

Special keys that can be used during operations of the utility package and their applications are shown in the table below.

Name of key	Application
Esc	Cancels a newly entered value when entering data in a cell. Closes the window.
Tab	Moves between controls in the window.
Ctrl	Uses together with the mouse when multiple cells are selected in the Test selected.
Delete	Deletes the character where the cursor is positioned. When a cell is selected, clears all of the setting contents.
Back space	Deletes the character where the cursor is positioned.
	Moves the cursor.
Page Up	Moves the cursor one page up.
Page Down	Moves the cursor one page down.
Enter	Confirms the value entered in the cell.

#### (2) Data to be created with the utility package

The data and files shown below that are created with the utility package are also used by GX Developer operations. Figure 6.1 shows which operation uses which data or file.

#### <Intelligent function module parameters>

(a) This data is created with the auto refresh setting, and stored in the intelligent function module parameter file of the project to be created using GX Developer.



- (b) Steps 1) to 3) shown in Figure 6.1 are performed using the following operations.
  - Operating using GX Developer.
     [Project] → [Open project] / [Save] / [Save as]
  - 2) Operating on the intelligent function module parameter setting module selection screen of the utility.

 $[File] \rightarrow [Open file] / [Save file]$ 

3) Operating using GX Developer.
[Online] → [Read from PLC] / [Write to PLC] → "Intelligent function module parameter"
Or, operate on the intelligent function module parameter setting module selection screen of the utility.
[Online] → [Read from PLC] / [Write to PLC]

## <Text file>

- (a) A text file can be created by performing the initial setting or auto refresh setting, or selecting <u>Make text file</u> on the Monitor/Test screen. Text files can be utilized to create user documents.
- (b) Text files can be saved to any directory.



Figure 6.1 Correlation diagram for data created using the utility package

## 6.3.2 Operation overview

GX Develope mple01 • [LD[Edit mod/ Lools Window Heb - Check parameter Gheck parameter Transter ROM Delete unused cogme Class all parameter L Cmemory card Start Jadder logic test	PET SCREEN MAIN 352 Step] MAIN 352 Step]			
Sej TEL data Intelligent function utili Customize (seys Change gisplay color Options Create start-up setting	Utility list      Start      Ifie      [Tools] - [Intelligent fit	unction utility	y] - [Start]	
Intelligent function setting module	inty C:My Documents.			
Initial setting Auto refresh Refer to Section 6.3.3	Delete Exit	Enter "Sta and "Mod	art I/O No.", then select " ule model name".	Package name"
	Initial setting			Auto refres
Initial setting	etting screen		Auto re	fresh setting screen
Module information			Module information	
Module model name: QD60P8-G Module type: Counter Module	Start I/O No.: 0000		Module model name: QD60P8-G Module type: Counter Module	Start I/O No.: 0000
Setting item	Setting value	<u> </u>		Module side Module side
CH2 Initial Setting	CH1		Setting item	Buffer size Transfer
CH3 Initial Setting	CH2		CH1 Auto refresh setting(åddress 0.24)	25 25
CH4 Initial Setting	CH3		CH2 Auto refresh setting(Address 0:24)	25 25
CH5 Initial Setting	CUE		CH2 Auto refresh setting(Address C4 00)	25 25
CH6 Initial Setting	010		CH 4 Auto refresh setting(Address 00-100)	23 23
CH7 Initial Setting	CH0 CH7		CH5 Auto refresh setting(Address 36-120)	20 20
	on		I LICHU Auto rerresh settingiAddress 128-152	1 401 401

Start I/O No.: 0000 Module side Transfer word count PLC side Device Transfer direction 25 25 CH4 Auto refresh setting(Address 96-120) 25 25 CH5 Auto refresh setting(Address 128-152) CH6 Auto refresh setting(Address 160-184) 25 25 25 -CH7 Auto refresh setting(Address 192-216) 25 25 H8 Auto refresh setting(Address 224-248) Move to sub window

End setup Refer to Section 6.4

Deta

CH7 CH8

Cancel

Make text file

Refer to Section 6 5

End setup Cancel

Auto refresh

\_ 🗆 X

CH8 Initial Setting

Make text file

→ Next page 1)

		[Online	] - [Monitor/te	st]	
Selec	t monitor/	test module	screen		
Select monitor/te	st module		×		
	st module				
Start I/O No					
	r	ickage name			
10000		Lounter Module	<u> </u>		
	Mo	odule model name			
	[	QD60P8-G	•		
Module implemen	itation status				
Start I/O No.	h	Aodule model name			
0000	QD60P8-G				
			•		
Monitor/test			Exit		
Monito	r/test	Enter "Sta and "Modu	rt I/O No. ", th ile model nan	ien sele ne".	ct" Packag
Ν	/Ionitor/Te	est screen			
0				_ 🗆 X	
ormation					
odel name: QD60P8-G	Start I/O No.:	0000			
e: Counter Module					
Setting item		Current value	Setting value	<u> </u>	
pr/Test			CH1 Monitor/Test		
or/Test			CH2 Monitor/Test		
r/Test			CH3 Monitor/Test		
r/Test			CH5 Monitor/Test		
n/Test			CH6 Monitor/Test		
n/iest w/Test			CH7 Monitor/Test		
r/Test			X/Y Monitor/Test		
				•	
JM setting		- Details			
to File save Current va	alue	Monitoring			
ule display			Move to sub	window	
File read Make text	file				
anitor Stop monitor	Execute	test	0	lose	

Before page 1)

Refer to Section 6.6

## 6.3.3 Starting the intelligent function module utility

## [Purpose of operation]

Start the utility from GX Developer, and display the intelligent function module parameter setting module select screen. The initial setting, auto refresh setting and select monitor/test module (selecting the module for which monitoring/testing is to be performed) screens can be started from this screen.

## [Startup procedure]

 $[\mathsf{Tools}] \rightarrow [\mathsf{Intelligent\ function\ utility}] \rightarrow [\mathsf{Start}]$ 

## [Setting screen]

⊘ Intelligent <u>File</u> <u>Online</u> <u>I</u>	function Module utility ools <u>H</u> elp	C:\My Docur	nents 💶 🗖
☐ Intelligent fui Start I/ 00000	nction module parameter s /0 No. Pack Co Co Modi	etting module se age name uunter Module ule model name D60P8-G	ect
Intelligent fu	nction module parameter s	etting module	
Start I/O No.	Module model name	Initial setting	Auto refresh
0000	QD60P8-G	Available	Available
			-
Initial setting	Auto refresh	Delete	Exit

## [Explanation of items]

- (1) How to start each screen
  - (a) Starting the initial setting
     "Start I/O No. \* " → "Package name" → "Module model name" →
     Initial setting
  - (b) Starting the auto refresh setting "Start I/O No. \* "  $\rightarrow$  "Package name" $\rightarrow$  "Module model name" $\rightarrow$  Auto refresh
  - (c) Select monitor/test module screen [Online]  $\rightarrow$  [Monitor/test]
  - \* Enter the start I/O No. in hexadecimal.
- (2) Explanation of the screen command buttons
  - Delete Deletes the initial settings and auto refresh setting for the selected module.
  - Exit Ends the intelligent function module parameter setting module select screen.

(3) Menu bar

(a) File items

2 Intelligent function mod							
<u>Fi</u> le <u>O</u> nline	<u>T</u> ools	<u>H</u> e	lp				
<u>O</u> pen file <u>C</u> lose file	Ctrl+O		lule				
<u>5</u> ave file <u>D</u> elete file	Util+5		ſ				
E <u>x</u> it							

Intelligent function mode <u>Online</u> <u>T</u>ools <u>H</u>elp <u>M</u>onitor/test

> <u>Read from PLC</u> Write to PLC

h

File operations a	re performed for the intelligent function module parameters
for the project op	ened by GX Developer.
[Onen file]	· Opens the parameter file

	[Open me]	
	[Close file]	: Closes the parameter file. If changes have been made,
		the dialog box asking whether to save the me appears.
	[Save file]	: Saves the parameter file.
	[Delete file]	: Deletes the parameter file.
	[Exit]	: Ends the intelligent function module parameter setting
		module selection screen.
(b)	Online items	
	[Monitor/test]	: Starts the select monitor/test module screen.
	[Read from PLC]	: Reads the intelligent function module parameters from the CPU module.
	[Write to PLC]	: Writes the intelligent function module parameters to the CPU module.

# POINT

- (1) Saving the intelligent function module parameter files Since these files cannot be saved using the GX Developer's project save operation, save the files using the intelligent function module parameter setting module selection screen mentioned above.
- (2) Reading and writing the intelligent function module parameters to and from a PLC using GX Developer.
  - (a) Once the intelligent function module parameters are saved in a file, they can be read from and written to the PLC.
  - (b) Set the target PLC CPU using [Online]  $\rightarrow$  [Transfer setup] of GX Developer.
  - (c) When mounting the QD60P8-G on a remote I/O station, use Read from PLC and Write to PLC of GX Developer.
- (3) Checking for the required utility

Start I/O No. is displayed in the Intelligent function module utility setting screen, but a "\*" may be displayed for the model name.

This means that either the required utility is not installed or that the utility cannot be started from the GX Developer.

Check for the required utility in [Tools] - [Intelligent function utility] - [Utility list ...] in GX Developer, and set it.

## 6.4 Initial setting

## [Purpose of operation]

Make initial setting for operating the QD60P8-G for each channel. There are the following setting items as the initial setting data (buffer memory).

- Comparison output selection
- Comparison output setting value
- Movement averaging processing selection
- Number of movement averaging processing
  Pre-scale function selection
- Count cycle change function selection
  - Count cycle setting value

• Alarm output setting value

Alarm output setting value

• Alarm output setting value

• Alarm output setting value

upper/upper limit

upper/lower limit

lower/upper limit

lower/lower limit

Pre-scale setting value Alarm output selection

This initial setting makes sequence program setting unnecessary. For more information on the setting details, refer to Section 3.4.2

## [Startup procedure]

"Start I/O No.\*"  $\rightarrow$  "Package name"  $\rightarrow$  "Module model name"  $\rightarrow$  Initial setting

\* Enter the start I/O No. in hexadecimal.

## [Setting screen]

nitial setting				_ □
Module information				
Module model name: QD60P8-G	S	tart I/O No.: 0000		
Module type: Counter Module				
Setting item			Setting value	
CH1 Initial Setting			CH1	
CH2 Initial Setting			CH2	
CH3 Initial Setting			CH3	
CH4 Initial Setting			CH4	
CH5 Initial Setting			CH5	
CH6 Initial Setting			CH6	
CH7 Initial Setting			CH7	
CH8 Initial Setting			CH8	-
		Details	Move	to sub window
Make text file	End set	up		Lancel
	ļ			
H1 Initial Setting				-
Module information				
Module model name: QD60P8-G Module type: Counter Module		Start I/O I	No.: 0000	
Setting item			Setting value	
Comparison output selection	0	Compare o/p funct	on invalid	-
Comparison output setting value				0
Movement averaging processing selection	9	ampling processin	g	•
Number of movement averaging processing				2
Pre-scale function selection	F	re-scale function i	nvalid	• `
Pre-scale setting value				0
Alarm output selection	4	larm output function	on invalid	•
Alarm output setting value upper/upper limit				0
	Details Select input Setting ra Compare Compare	ange o/p function invalid o/p function valid	d	
Make text file	Endeal	hun I		Cancel

## [Explanation of items]

(1) Explanation of the command buttons

Make	e text file	Outputs the screen display in a text file format.
End s	setup	Confirms the entry of set data and ends the operation

setup	Confirms the entry of set	t data and ends the operation

Cancel Cancels the set data and ends the operation.

## POINT

Initial settings are stored in the intelligent function module parameters. After being written to the CPU module, the initial setting is made effective by either (1) or (2).

- (1) Cycle the RUN/STOP switch of the CPU module: STOP  $\rightarrow$  RUN  $\rightarrow$  STOP  $\rightarrow$ RUN.
- (2) With the RUN/STOP switch set to RUN, turn off and then on the power or reset the CPU module.

If the initialization settings have been written by a sequence program, the initialization settings will be executed during the STOP  $\rightarrow$  RUN of the CPU module. Arrange so that the initial settings written by the sequence program are re-executed during the STOP  $\rightarrow$  RUN of the CPU module.

## 6.5 Auto refresh setting

## [Purpose of operation]

Set the QD60P8-G buffer memory to be automatically refreshed, for each channel.

There are the following buffer memory items to be automatically refreshed for each channel.

- Sampling pulse number
- Comparison output selection
- Comparison output setting value
- Movement averaging processing selection
- Number of movement averaging processing
- Pre-scale function selection
- Pre-scale setting value
- Accumulating count value
- Input pulse value
- Overflow detection flag
- Counter reset request

- Carry over detection flag
- Carry over reset request
- Error code
- Alarm output selection
- Alarm output flag
- Alarm output setting value upper/upper limit
- Alarm output setting value upper/lower limit
- Alarm output setting value lower/upper limit
- Alarm output setting value lower/lower limit
- Count cycle change function selection
- Count cycle setting value

These auto refresh settings eliminate the need for reading by a sequence program.

#### [Startup procedure]

- "Start I/O No.\*"  $\rightarrow$  "Package name"  $\rightarrow$  "Module model name"  $\rightarrow$  Auto refresh
- \* Enter the start I/O No. in hexadecimal.

#### [Setting screen]

Module information						
Module model name: QD60P8-G		Start I/O No.	: 0000			
Module type: Counter Module						
Setting item	Module side Buffer size	Module side Transfer word count		Transfer direction	PLC side Device	1
CH1 Auto refresh setting(Address 0-24)	25	25		->	DO	11
H2 Auto refresh setting(Address 32-56)	25	25		->	D25	1
H3 Auto refresh setting(Address 64-88)	25	25		->	D50	
H4 Auto refresh setting(Address 96-120)	25	25		->		
H5 Auto refresh setting(Address 128-152)	25	25		->		
H6 Auto refresh setting(Address 160-184)	25	25		->		
CH7 Auto refresh setting(Address 192-216)	25	25		->		
"H8 Auto refresh setting(Address 224-248)	25	25		->		-
### [Explanation of items]

(1)	Contents of the sc	een display					
	Module side buffer size	: Displays the size of the setting item buffer memory.					
	Module side transfer word count	: Displays the number of words to transfer.					
	Transfer direction	: "←" indicates that data at the PLC CPU side is written to the buffer memory.					
		" $\rightarrow$ " indicates that data is read from the buffer memory to the PLC CPU side.					
	PLC side device	: Enter the device at the CPU module to be automatically refreshed.					
		The devices that can be used include X, Y, M, L, B, T, C, ST, D, W, R, and ZR. When using bit devices, X, Y, M, L or B, set a number that can be divided by 16 points (examples: X10, Y120, M16).					
		Also, buffer memory data is stored in 16-point portions starting with the device number that has been set. For example, if X10 is set, data will be stored to X10 through X1F.					

### (2) Explanation of the command buttons

Make text file	Creates a file containing the displayed screen data in a text file format.
End setup	Confirms the entry of set data and ends the operation.
Cancel	Cancels the set data and ends the operation.

### POINTS

- At the time of auto refresh, the buffer memory contents are batch-read (25 words) for each channel. The order of storing the data into the CPU module side devices is the same as that of buffer memory assignment (refer to Section 3.4.1).
- The auto refresh settings are stored in the intelligent function module parameters. Once the intelligent function module parameters are written to the CPU module, they can be enabled by turning the power OFF and then ON, or resetting the CPU module.
- Auto refresh settings cannot be changed from the sequence program. However, it is possible to add a process similar to auto refresh by the sequence program.

### 6.6 Monitor/test

### [Purpose of operation]

Start the buffer memory monitoring/testing, and I/O signals monitoring/testing from this screen.

#### [Startup procedure]

Select monitor/test module screen  $\rightarrow$  "Start I/O No.\*"  $\rightarrow$  "Package name"  $\rightarrow$  "Module model name"  $\rightarrow$  Monitor/test

\* Enter the start I/O No. in hexadecimal.

The screen can also be started from the GX Developer Version 6 or later system monitor.

Refer to GX Developer Operating Manual for details.

### [Setting screen]

	Monitor/Test		_ <b>_ _ X</b>	1		
	M 11 1 6 1 8					
	Module Information					
	Module model name: QD60P8-G	Start I/O No.: 0000				
	Module type: Counter Module					
In the second set of the second set		-				
Different Trie       Different Trie         Different Trie       Different	Setting item	Current value	Setting value			
Childheader Fina       Childheader Fina         Childheader Fina	CH1 Monitor/Test		CH1 Monitor/Test			
Control of the contr	CH2 Monitor/Test		CH2 Monitor/Test			
Difference / fail       Difference / fail	CH4 Monitor/Test		CI14 Manitor/Test			
Diff Mode/Test       Diff Mode/Test         Off Mode/Test       Diff Mode/Test         Victor/Test       Diff Mode/Test         Off Mode/Test       Diff Mode/Test         Victor/Test       Diff Mode/Test         Mode Information       Diff Mode	CH5 Monitor/Test		CH4 Monitor/Test			
Diff Media/Tell       Diff Media/Tell         Diff Media/Tell       Diff Media/Tell         Diff Media/Tell       Diff Media/Tell         Diff Media/Tell       Diff Media/Tell         Virt Bide Hold       Diff Media/Tell         Virt Bide Hold       More to able webdow         Virt Bide Hold       More to able webdow         Virt Bide Hold       More to able webdow         Virt Monitor/Tell       More to sub window         Virt Monitor/Tell       Tell Monitor/Tell         Virt Monitor/Tell       Tell Monitor/Tell         Moke to sub window       Virt Monitor/Tell         Virt Monitor/Tell       Tell Monitor/Tell         Moke molt mole:       Start/D hs: 0000         Moke molt mole:       Start/D hs: 0000         Moke to scourses       Start to max         Moke molt mole:       Start/D hs: 0000         Moke to scourses       New to scourses         Start Tell       Moke to scourses         Start Tell       Start Tell         Start Tell       Moke to scourses         Start Tell       Start Tell Tell         Start Tell       Start Tell Tell         Start Tell       Start Tell Tell         Moke most conseres       New to scourses <tr< td=""><td>CH6 Monitor/Test</td><td></td><td>CH6 Monitor/Test</td><td></td><td></td><td></td></tr<>	CH6 Monitor/Test		CH6 Monitor/Test			
Bit Mondar/Test       OrBit Mondar/Test         V/ Mondar/Test       V/ Mondar/Test         Sind ROM series       Monde to sub window         Mondar/Test       Monde to sub window         Sind ROM series       Monde to sub window         V/ Tr Monitor/Test       CH1 Monitor/Test         Mode model manual       Monde to sub window         V/ Tr Monitor/Test       CH1 Monitor/Test         Mode model manual       Start 10 No:         Mode mode manual       Start 10 No:      <	CH7 Monitor/Test		CH7 Monitor/Test			
D// Merke/Part       X// Medel//Test         Image: Participation of the control barrier of th	CH8 Monitor/Test		CH8 Monitor/Test			
Image: Control within the contrel within the contre within the control within the control within	X/Y Monitor/Test		X/Y Monitor/Test			
Fash RDM setting       Detain         Mark model memory       Mark model memory         Mark model memory       Mark model memory         Mark model memory       Moneton name         Models reference       No ten name         Model model memory       Moneton name         Models reference       No ten name         Models reference       No ten name         Model model memory       No ten name         Model model memory       Moneton name         Model model memory       No ten name         Model model memo						
Figh RDM etting       Details         Wordshift       Te neal         Bast motion       Septemonian         Monetor Sub window       CH1 Monitor/Test         VMonder FERM       CM1 Monitor/Test         Model reformation       Septemonian         Model reformation       Septemonian <td></td> <td></td> <td>•</td> <td></td> <td></td> <td></td>			•			
Fight Reading       Control value       Mode to take window         Start motion       Stage motion       Execute pert       Does         Mode to take window       X/T Monitor/Test       CH1 Monitor/Test         Y Mode/r fat       Image for provide for the fat of the fa						
Worder       Fire are       Carry value       Modeling         Part monto       Bear monto       Bear monto       Bear monto         Spen monto       Bear monto       Bear monto       Bear monto         Spen monto       Bear monto       Bear monto       Bear monto         VM control relativity       Move to sub window       CH1 Monitor/Test         VM control relativity       V/T Monitor/Test       CH1 Monitor/Test         VM control relativity       Start 100 No: 0000       Node information         Modelar fictoreadion       No exercitoreadion       Start 100 No: 0000         Modelar fictoreadion       No exercitoreadion       Start 100 No: 0000         Modelar fictoreadion       No exercitoreadion       Sta	Flash ROM setting	Details				
Image in graphing in the set of the	Write to File save Current value	Monitoring				
Bear monder       Bear monder         Bear monder       Bear monder         Bear monder       Bear monder         Move to sub window          V.Monitor/Test       CH1 Monitor/Test         VMade model moner       CORPRE         Made model mone       Stati //D No. 000         Modeler formation       Modeler formation         Modeler formation       Modeler formation         Modeler formation       Stati //D No. 000         Modeler formation       Modeler formation         Modeler formation       Stati //D No. 000         Modeler formation       Modeler formation         Modeler formation       Stati //D No. 000         Modeler formation       Modeler formation         Modeler formation       Stati //D No. 000         Modeler formation       Modeler formation         Modeler formation       Stati //D No. 000         Modeler formation       No. 000         Modeler formation       No. 000 <td>module display</td> <td></td> <td>Move to sub window</td> <td></td> <td></td> <td></td>	module display		Move to sub window			
But notifie       But notifie       Execute (set)         Move to sub window          VM notifie          VM notifie <td>Read from File read Make text file</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Read from File read Make text file					
But monte     Buquente     Executeret       More to sub window       X/T Monitor/Test       X/T Monitor/Test       Chade modi nam:     CDPFBG       Satu/0 No: 000       Made modi nam:     CDPFBG       Satu/0 No: 000       Statu/0 No:	module					
Step monder     Execute test       Move to sub window       V/r Monitor/Test       Variant       Modae information						
Statundar       Catal statut       Catal         More to sub window       X/T Monitor/Test         V More to resub window       CH1 Monitor/Test         Mode information       Mode information         Mode information complete information complete information complete information complete information complete information complete information       Mode information         Mode information contrance       No entry contrance       Stating them Contrant Mode         Mode information contrance       No entry contrance       Stating them Contrant Mode         Mode information contrance       No entry contrance       Rest request         Mode information contrance       No entry contrance       Rest request         Mode information information contrance       No entry contrance       Rest request         Mode information contrance       No entry contrance       Rest request       Image information information         Mode information contrance       No entry contrance       No entry contrance       Rest request       <	Charl marries	European des bands	Claus			
Move to sub window         X/T Monitor/Test         ** Mode frame: QDSD*B G       Start / D No: 000         Mode node name: QDSD*B G       Start / D No: 000         Mode type: Courter Mode       Mode information:         Mode type: Courter Mode       Mode type: Courter Value         Setting team       Descripted fig         Setting team       Descripted fig         QBC HE fors occurrence       No error occurrence         Note of the rest occurrence       No error occurrence         QBC HE fors occurrence       No error occurrence         No contranse       No error occurrence         No for for occurrence       No error occurrence         No error occurrence       No err	Start Interitor	Execute fest	Close			
Move to sub window         VI Monitor/Test         VMode Information         Mode Information entry completed Itag         Mode Information entry completed Itag <tr< td=""><td></td><td></td><td></td><td>1</td><td></td><td></td></tr<>				1		
Worker KU Sub Window         V/ Monitor/Test         Mode information         Mode informatin		Move to su	ub window			
X/T Monitor/Test         Mode indeminie         Mode		NOVE to St				
VMonitor/Test         VMonitor/Test         Mode information         Mode informatin						
V Mankaur/Lest       CH1 Monitor/Test         Madde information       Image: Control of Co						
X/T Monitor/Test         Marker/Test         Marker/Test      <						
V Horthour rest         Montion/Test         Module information         Module informating counteree		V/T Mon	tor/Toot			anitor/Teat
Y Monder Index       Image: Start //2 Na:: 0000         Mode inder Index: QD60P8.6       Start //2 Na:: 0000         Mode inder Index: QD60P8.6       Start //2 Na:: 0000         Mode by::::::::::::::::::::::::::::::::::::			IIII/Test			
Y Monitar/Test       Image: Comparison of the second						
A Mondal rate:       Chill Module information         Module Index:       QD60P8-G       Start I/O No:: 0000         Module Index:       QD60P8-G       Start I/O No:: 0000         Module type:       Counter Module         Setting tem       Current value       Module information         Module type:       Counter Module         Module type:       Counter mode         Module type:       Counter mode         Module type:       Counter mode         Module type:       No reast request				CUL M - 1 IT -	15.1111.00000 110.1 11	
Modele indormation         Modele indeale name:       Dp60P96 G       Start //D No::       0000         Modele indeale name:       Dp60P96 G       Start //D No::       0000         Modele indeale regulation       Modele indeale name:       Dp60P96 G       Start //D No::       0000         Modele indeale regulation       Setting item       Current value       Setting value       0         Sold Modele EADY       Prepared       0       0       0         Visit Diperating completed flag       Dise cond. setting complete       0       0       0         Visit Diperating completed flag       Dise cond. setting complete       0       0       0       0         Visit Diperating completed flag       Dise cond. setting complete       0 <td< td=""><td>K/Y Monitor/Test</td><td></td><td>×</td><td>CHT Monitor/Test</td><td></td><td><u>-</u></td></td<>	K/Y Monitor/Test		×	CHT Monitor/Test		<u>-</u>
Module model name:       D060P8G       Statt //D No:       0000         Module type:       Counter Module       Module model name:       D060P8G       Statt //D No:       0000         Module type:       Counter Module       Image: Setting value       Image: Module type:       Module type:       0         Module type:       Counter Module       Image: Setting value       Image: Setting value       0       Image: Setting value       Image: Setting value <td< td=""><td>Module information</td><td></td><td></td><td>Module information</td><td></td><td></td></td<>	Module information			Module information		
Module type:       Counter Module         Module type:       No overflow detection Ing         Module type:	Module model name: OD60P8-6 St	art 170 No : 0000		Module model name: QD60P8-G	Start IZD No 1 0000	
Module type:       Current Value       Module type:       Current Value       Image: Courter Module         X000.Module FEADY       Prepared       Image: Courter Module       Image: Courter Module         X000.Module FEADY       Prepared       Image: Courter Module       Image: Courter Module         X000.Module FEADY       Prepared       Image: Courter Module       Image: Courter Module         X000.Module FEADY       Prepared       Image: Courter Module       Image: Courter Module         X000.CHE End courternce       No error occurrence       Image: Courter Module       Image: Courter Module         X000.CHE End courternce       No error occurrence       Image: Courter Module       Image: Courter Module         X000.CHE End courternce       No error occurrence       Image: Courter Module       Image: Courter Module         X000.CHE End courternce       No error occurrence       Image: Courter Module       Image: Courter Module         X000.CHE End courternce       No error occurrence       Image: Courter Module       Image: Courter Module         X000.CHE End courternce       No error occurrence       Image: Courter Module       Image: Courter Module         X000.CHE End courternce       No error occurrence       Image: Courter Module       Image: Courter Module       Image: Courter Module         X00.CHE End courternco       N		artivo No.: 0000		indexic index name. Queen e d	0.0.1.0.100000	
Setting ken       Durrent value       Setting value       A         X000 Module READY*       Prepared       A         X000 Module READY*       Prepared       0         X000 Module READY*       0       0         X000 Module READY*       No verificities       No verificities         X000 Module Ready       No error occurrence       No error occurrence       No error occurrence         X000 Module Ready       Normal	Module type: Counter Module			Module type: Counter Module		
Setting item       Current value       Setting value         2000 Mode READY       Prepared       0         2000 Mode READY       No error accurrence       No error accurrence       No error accurrence         2000 Mode READY       No error accurrence       Adam output flag lower finit alam       Normal       Error code       Core of p function valid       Impairs attract and						
Setting Item     Current value     Setting value       OSI Obdade FLAPY     Pepaeid       Vitil: Dark DAY     Pepaeid       Vitil: Dark DAY     Operation setting completed flag     Oper. cond. setting complete       Vitil: Dark DAY     No error occurrence     0       Vitil: Dark DAY     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No error occurrence       No error occurrence     No error occurrence     No erroro					-	
3000 Model READY       Prepared       0         3000 Model READY       Prepared       0         3000 Model READY       Reprint on control in setting completed flag       0         3000 Model READY       No error accurrence       0         3000 Model READY       No error accurrence       0         3000 HD2 Error accurrence       No error accurrence       0         3000 HD2 Error accurrence       No error accurrence       0         3000 HD2 Error accurrence       No error accurrence       No error accurrence         3000 HD3 Error accurrence       No error accurrence       No reset request       No reset request         3000 HD3 Error accurrence       No error accurrence       No reset request       No reset request       No reset request         3000 HD3 Error accurrence       No error accurren	Setting item	Current value	Setting value	Setting item	Current value	Setting value
VDU: Uper lang condition setting completed itag       Oper. cond. setting completed itag       No overflow detection       Oper. cond. setting completed itag       No comple	X00:Module READY	Prepared		Sampling pulse number		
Value Lift and occurrence       No entra occurrence       0         Value Lift and occurrence       No entra occurrence       0         Value Lift and occurrence       No entra occurrence       0         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       No entra occurrence         Value Lift and occurrence       No entra occurrence       Normal         Value Lift and occurrence       No entra occurrence       Comparison otlput talge lower time later         Value Lift and occurrence       No entra occurence       Comparison otlput talge lower tim al	X01:Operating condition setting completed flag	Oper. cond. setting complete		Accumulating count value		
Add Lind Statu docuterice       Indextor declaring       Indextor declaring       Indextor declaring       Indextor declaring         Add Lind Statu docuterice       No entra occurrence	XU8:UH1 Error occurrence	No error occurrence		Input pulse value	No quarflow datastia:	
Name Construction     Protein deglet     Protein deglet     Protein deglet       No construction     No endra occurrence     No endra occurrence     No endra occurrence       NOC CH5 End occurrence     No endra occurrence     No endra occurrence     No endra occurrence       NOC CH5 End occurrence     No endra occurrence     No endra occurrence     No endra occurrence       NOC CH5 End occurrence     No endra occurrence     No endra occurrence     No endra occurrence       NOC CH5 End occurrence     No endra occurrence     No endra occurrence     No endra occurrence       NOC CH5 End occurrence     No endra occurrence     O       No occurrence     No endra occurrence     O       No endra occurrence     No endra occurrence     O       No occurrence     No endra occurrence     O <t< td=""><td>V0AUCH2 Error occurrence</td><td>No error occurrence</td><td></td><td>Counter reset request</td><td>No reset request</td><td>Bacatraquet</td></t<>	V0AUCH2 Error occurrence	No error occurrence		Counter reset request	No reset request	Bacatraquet
Concentration     Interest of accounting       Concentration     No end of accounting       No contract     No end of accounting       No end of accounting     No end of accounting       No contract     No end of accounting       No end of accounting     Compare of p function invalid       No doll for accounting     Compare of p function invalid       No doll for accounting     Normal       No doll for accounting     Compare of p function invalid       No doll for accounting     Normal       No doll for accounting     Compare of p function invalid       No doll for accounting     Normal	V0P:CH4 Error occurrence	No error occurrence		Counterreset request	No caru over detection	nesectequest •
Noncold     Normal       Alarm output figs/borer limit alarm     Normal       Monitoring     Compare o/p function revalue       Write to     File save     Current value       Monodule     File read     Marke test file       Stat monitor     Stat monitor     Stat monitor     Stat monitor	XID: CH5 Error occurrence	No error occurrence		Carry over reset request	No reset request	Beset request
XXIE: CH7 E tror occurrence       No error occurrence       No error occurrence       No error occurrence       O         XXIE: CH3 E tror occurrence       No error occurrence       No error occurrence       O       O         XXIE: CH3 E tror occurrence       No error occurrence       O       O       O         XXIE: CH3 E tror occurrence       No error occurrence       O       O       O         XXIE: CH3 E tror occurrence       O       Comparison of type tror occurrence       O         Flash RDM setting       O       Comparison of type tror occurrence       O         Wide to module       Flash RDM setting       O       Corrent value       O         Make text file       Monitoring       Carnot execute test       Monitoring       Carnot execute test         Read from module       Flas monitor       Execute test       Close       Stat monitor       Stap monitor       Execute test	X0D:CH6 Error occurrence	No error occurrence		Alarm output flag lower limit alarm	Normal	
X0FEH8 Enor occurrence       No entor occurrence       0         X10EF14 Accumulating counter comparison flag       Accum. counter < Setting value	X0E:CH7 Error occurrence	No error occurrence		Alarm output flag upper limit alarm	Normal	1
XID:CH1 Accumulating counter comparison flag       Accum. counter < Setting value	X0F:CH8 Error occurrence	No error occurrence		Error code		0
Flash RDM setting     Details       Wile to module     File save     Current value display     Details       Read from module     File read     Make text file       Start monitor     Stop monitor     Execute jest	X10:CH1 Accumulating counter comparison flag	Accum. counter < Setting value	•	Comparison output selection	Compare o/p function valid	Compare o/p function invalid 💌 👻
Flash ROM setting     Details       Write to     File save     Current value       module     File save     Current value       Read from module     File save     Current value       Make text file     Make text file       Stat monitor     Stop monitor						
Wile b     File save     Current value     Monitoring       Module     File save     Current value     Monitoring       Read from module     File read     Make text file     Monitoring       Start monitor     Stop monitor     Execute jest     Close	Flash ROM setting	Details		Flash ROM setting	Details	
module     File read     display     Cannot execute test       Read from Guide     File read     Make text file     Make text file       Start monitor     Stop monitor     Execute jest     Close	Write to File save Current value	Monitoring		Write to File save Current value	Monitoring	
Bead from module     File read     Make text file       Stat monitor     Stop monitor     Execute jest	module rile save display			module display		Cannot execute test
module     rest text     module     rest text       Stat monitor     Stop monitor     Execute jest     Close	Read from Claused Higher and			Read from Electored Metro sus Co.		
Start monitor Stop monitor Execute text Close Start monitor Stop monitor Execute text Close	module File read Make text hie			module rie reau Wake text file		
Stat monitor         Stop monitor         Execute test         Close         Stat monitor         Stop monitor         Execute test         Close						
Start monitor Stop monitor Execute test Close Start monitor Stop monitor Execute test Close					1	
	Start monitor Stop monitor	Execute test	Close	Start monitor Stop monitor	Execute test	Close

### [Explanation of items]

- (1) Contents of the screen display Setting item : Displays the I/O signal or buffer memory name. Current value : Displays the I/O signal status or present buffer memory value for monitoring.
  - Setting value : Select or enter a value to be written to the buffer memory with a test operation.
- (2) Explanation of the command buttons

Current value display	Displays the current value of the selected item. (This command button is used to check text that cannot be displayed in the current value field. However, in this utility package, all items can be displayed in the display fields).
Make text file	Makes a file consisting of the displayed screen contents in a text file format.
Start monitor / Stop monitor	Selects whether or not to monitor the current values.
Execute test	Tests the selected item. To select more than one item, select each additional item while holding
	down the Ctrl key.

### (Example)

Click this button after selecting "Error reset request" in the setting (value) field of "Error reset request" on the X/Y Monitor/Test screen.



Perform similar operation also for the "Operating condition setting request flag".



### POINT

- To reflect the new settings (values) on the module, you have to choose "Operating condition setting request" for the "Operating condition setting request flag" and click Execute test.
- "Error reset request"/"Comparison signal reset request" turns to "No request" automatically if the error occurrence (X8 to XF)/accumulating counter comparison flag (X10 to X17) turns "OFF" at the time of test execution.

## CHAPTER 7 PROGRAMMING

This chapter describes a sequence program for use of the QD60P8-G. Using the utility package (GX Configurator-CT), the QD60P8-G can operate the system without using a sequence program. Refer to Chapter 6 for details of how to operate the utility package (GX Configurator-CT).

When diverting the program example introduced in this chapter to the actual system, fully check that there are no problems in the controllability of the system.

### 7.1 Programming procedure

This section explains the programming procedure for the QD60P8-G. In the following procedure, create the program that performs the initial setting of the QD60P8-G, then turns ON the operating condition setting request flag (Y1), and turns ON the count enable (Y18 to Y1F) to start count operation.



### 7.2 For use in normal system configuration

### System configuration used in the program explanation

(1) System configuration



### (2) Program conditions

The program performs the initial setting of the CH1 of the QD60P8-G, then turns ON the operating condition setting request flag (Y1), and turns ON the count enable (Y18) to start count operation.

Set the input voltage selection, pulse edge selection, linear counter/ring counter selection and input filter setting using the intelligent function module switch of GX Developer. (Refer to Section 4.5 for details of setting the intelligent function module switch.)

- Input voltage selection
- Pulse edge selection
- Linear counter or Ring counter selection
- Input filter setting (CH1)

- : 12 to 24VDC
- : Rise edge
- : Linear counter
- : 30kpps

### (3) List of devices used

In Section 7.2.1 program example, the used devices are assigned as indicated in the following table.

The I/O numbers for QD60P8-G indicate those when QD60P8-G is mounted in the 0-slot of the main base unit.

If it is mounted in the slot other than the 0-slot of the main base unit, change the I/O number to that for the position where QD60P8-G was installed. In addition, change the external inputs, internal relays and data resisters,

according to the system used.

### Inputs/outputs, external inputs, and internal relays of QD60P8-G

Deview		Device	Application		
Device	ename	CH1	Application		
		X0	Module READY		
	lasuta	X1	Operating condition setting complete flag		
	inputs	X8	Error occurrence		
Input/output of		X10	Accumulating counter comparison flag		
QD60P8-G		Y1	Operating condition setting request flag		
	Outpute	Y8	Error reset request		
	Oulpuis	Y10	Comparison signal reset request		
		Y18	Count enable		
		X20	Data setting command		
		X21	Count enable ON command		
		X22	Count enable OFF command		
		X23	Comparison signal reset command		
External input (com	imand)	X24	Error reset command		
		X25	Counter reset request command		
		X26	Sampling pulse number read command		
		X27	Accumulating count value read command		
		X28	Input pulse value read command		
		M10	Data setting enable		
		M11	Overflow detection flag		
		M30	Counter resetting		
Internal relay		M40	Carry over detection flag		
		M60	Carry over resetting		
		M80	Alarm output flag		
		M100	Error reset flag		

### Data registers

Device name	Device	Buffer memory address	Data stored		
	D30	0	Sampling pulse number		
	D31	8			
	D32	9	Accumulating count value	(H)	
Data registers	D33	10		(L)	
	D34	11	input puise value	(H)	
	D35	16	Error code		

### 7.2.1 Program example



### 7 PROGRAMMING

## MELSEC-Q



### 7.3 For use on remote I/O network

#### System configuration used in the program explanation

### (1) System configuration

Remote master station (Network No.1)					)	Remote I/O station (Station No.1)							
Power supply module	Qrurd	Q J 7 1 L P 2 1	QX 1 0	Q > 1 0			Power supply module	Q J 7 1 L P 2 5	Q X 1 0	Q Y 1 0	Q D 6 0 P 8 – G		
									X/Y100 to X/Y10F	X/Y110 to X/Y11F	X/Y120 to X/Y13F	) =	

#### (2) Program conditions

The program performs the initial setting of the CH1 of the QD60P8-G, then turns ON the operating condition setting request flag (Y121), and turns ON the count enable (Y138) to start count operation.

Set the input voltage selection, pulse edge selection, linear counter/ring counter selection and input filter setting using the intelligent function module switch of GX Developer. (Refer to Section 4.5 for details of setting the intelligent function module switch.)

<ul> <li>Input voltage selection</li> </ul>	: 12 to 24VDC
Pulse edge selection	: Rise edge

T uise euge selection	. Mise euge
<ul> <li>Linear counter or Ring counter selection</li> </ul>	: Linear counter

- Linear counter or Ring counter selectionInput filter setting (CH1)
- : 30kpps

### (3) Operation of GX Developer (Network parameter setting)

Network type	: MNET/H (remote master)
• Head I/O No.	: 0000н
Network No.	: 1
Total number of (slave) stations	: 1
• Mode	: Online

Network range assignment

	M station -> R station							M station <- R station					
StationNo.	Y			Y			×			×			
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	1
. 1	256	0100	01FF	256	0000	OOFF	256	0100	01FF	256	0000	OOFF	-

:

:

#### Refresh parameters

				Link side			PLC side			
	Dev.	name	Points	Start End			Dev. name	Points	Start	End
Transfer SB	SB		512	0000	01FF	ŧ	SB	512	0000	01FF
Transfer SW	S₩		512	0000	01FF	₩.	S₩	512	0000	01FF
Random cyclic	andom cyclic LB					↔	•			
Random cyclic	LW					₩.	•			
Transfer1	LB	•	8192	0000	1FFF	↔	B 💌	8192	0000	1FFF
Transfer2	LW	•	8192	0000	1FFF	↔	w 🔹	8192	0000	1FFF
Transfer3	LX	-	512	0000	01FF	↔	× 🔹	512	0000	01FF
Transfer4	LY	-	512	0000	01FF	+	Y 🔹	512	0000	01FF
Transfer5		-				+	•			
Transfer6		•				+	•			-

### (4) List of devices used

In Section 7.3.1 program example, the used devices are assigned as indicated in the following table.

The I/O numbers for QD60P8-G indicate those when QD60P8-G is mounted on Slot 2 of the remote I/O station.

If it is mounted on the slot other than Slot 2 of the remote I/O station, change the I/O numbers to those for the position where QD60P8-G was installed. In addition, change the external inputs, internal relays and data resisters, according to the system used.

### Inputs/outputs, external inputs, and internal relays of QD60P8-G

Davia		Device	Anglianting
Device	e name	CH1	Application
		X120	Module READY
	lanuta	X121	Operating condition setting complete flag
	inputs	X128	Error occurrence
Input/output of		X130	Accumulating counter comparison flag
QD60P8-G		Y121	Operating condition setting request flag
	Outpute	Y128	Error reset request
	Outputs	Y130	Comparison signal reset request
		Y138	Count enable
		X20	Data setting command
		X21	Count enable ON command
		X22	Count enable OFF command
		X23	Comparison signal reset command
External input (com	nmand)	X24	Error reset command
		X25	Counter reset request command
		X26	Sampling pulse number read command
		X27	Accumulating count value read command
		X28	Input pulse value read command
		M10	Data setting enable
		M11	Overflow detection flag
		M30	Counter resetting
Internal relay		M40	Carry over detection flag
		M60	Carry over resetting
		M80	Alarm output flag
		M100	Error reset flag

### Data registers

Device name	Device	Buffer memory address	Data stored	
	D30	0	Sampling pulse number	
	D31	8		(L)
	D32	9	Accumulating count value	(H)
Data registers	D33	10		(L)
	D34	11	input puise value	(H)
	D35	16	Error code	

### 7.3.1 Program example



### 7 PROGRAMMING



### 7 PROGRAMMING

# MELSEC-Q



# MEMO


### **CHAPTER 8 ONLINE MODULE CHANGE**

When changing a module online, carefully read the QCPU User's Manual (Hardware Design, Maintenance and Inspection),section 12.4.1 "Online module change". This chapter describes the functions of an online module change. Perform an online module change by operating GX Developer.

#### POINT

- (1) Perform an online module change after making sure that the system outside the PLC will not malfunction.
- (2) To prevent an electric shock and malfunction of operating modules, provide means such as switches for powering off each of the external power supply and external devices connected to the module to be replaced online.
- (3) To prevent an electric shock, always turn OFF the input pulse signal from the pulse generator connected to the module to be changed online.
- (4) After the module has become faulty, the buffer memory contents cannot be confirmed. Therefore, prerecord the settings (The whole buffer memory contents that can be written refer to Section 3.4.1).
- (5) It is recommended to perform an online module change in the actual system in advance to ensure that it would not affect the other modules by checking the following:
  - Means of cutting off the connection to external devices and its configuration are correct.
  - Switching ON/OFF does not bring any undesirable effect.
- (6) Do not mount/remove the module onto/from base unit more than 50 times (IEC61131-2-compliant), after the first use of the product. Failure to do so may cause the module to malfunction due to poor contact of

connector.

### 8.1 Online module change conditions

The PLC CPU, MELSECNET/H remote I/O module, GX Developer and base unit given below are needed to perform an online module change.

#### (1) PLC CPU

The Q12PHCPU or Q25PHCPU is needed.

For precautions for multiple PLC system configuration, refer to the Process CPU User's Manual (Function Explanation/Program Fundamentals).

#### (2) MELSECNET/H remote I/O module

The module of function version D or later is necessary.

#### (3) GX Developer

GX Developer of Version 7.10L or later is necessary. GX Developer of Version 8.18U or later is required to perform an online module change on the remote I/O station.

### (4) Base unit

- 1) When the slim type main base unit (Q3 SB) is used, an online module change cannot be performed.
- When the power supply module unnecessary type extension base unit (Q5\_B) is used, online module change cannot be performed for the modules on all the base units connected.

### 8.2 Online module change operations

	PLC	CPU operation	n O:Exec	$\times$ : Not e	executed		
No.	VA	FROM/TO	Device	GX Config	jurator-CT		(Intelligent function module
* 3	X/Y	instruction	Device	Initial setting	Monitor/	(User operation) * 3	operation)
	refresh	* 1	test	parameter	test		
(1)	0	0	0	×	0	<ul> <li>(1) Operation stop         Turn OFF all Y signals that             were turned ON by a             sequence program.         </li> <li>(2) Dismounting of module</li> </ul>	Module is operating.
(2)	×	×	×	×	×	Operate GX Developer to start an online module change. Click the [Execution] button of GX Developer to make the module dismountable. Dismount the corresponding module (QD60P8-G).	Module stops operating. • RUN LED turns OFF.
(3)	0	×	×	0	×	Mount a new module (QD60P8-G).	X/Y refresh resumes and the module starts. • RUN LED turns ON. • Default operation (X0 remains OFF) When there are initial setting parameters, operation is performed according to the initial setting parameters at this point.
(4)	0	×	0	×	0	Click the [Cancel] button of GX Developer to leave the online mode. Conduct an operation test on the new module using "Device test" of GX Developer or "Monitor/test" of GX Configurator-CT.	Module operates according to test operation *2
(5)	0	0	0	×	0	Operate GX Developer to resume the online module change mode, and click the [Execution] button to resume control.	Start is made when X0 turns from OFF to ON. Operation is performed according to the initial setting sequence.*2

The following gives the operations performed for an online module change.

\* 1: Access to the intelligent function module device (U $\Box$ \G $\Box$ ) is included.

\*2: In the absence of the operation marked \*2, the operation of the intelligent function module is the operation performed prior to that.

\* 3: The item numbers (1) to (5) correspond to the operation step numbers of "Section 8.3 Online module change procedure".

#### 8.3 Online module change procedure

The online module change procedure is explained separately for the case where GX Configurator-CT was used for initial setting and for the case where a sequence program was used for initial setting.

#### 8.3.1 GX Configurator-CT was used for initial setting

(1) Operation stop

Turn OFF all output signals (Y devices) from the sequence program or the device test of GX Developer to stop the module operation.

Device test		X
⊢ Bit device		
Device		Close
YC	-	
	F Toggle force	Hide history
Word device/buffer memory-		
Device		•
C Buffer memory Module start	1/0 🗐 (Hex)	
Address	THEX	-
Setting value	: 💌 16 bit integer	▼ Set
Program Label reference program	IAIN	<b>T</b>
Execution history		
Device	Setting condition 🔺	Find
	Force OFF	Find next
YOA	Force OFF	- ind flow
Y9	Force OFF	He-setting
¥8 •		Clear

#### (2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.

System Monito	r														×
- Installed status-														n - Ba	ase
	0	1	2	з	4									Bas	e Module
MasterPLC->	-	-	-	-	-									۱L	Main base
Q25PHCPU	QD60 98-G 32pt	Unmo unti ng	Unno unti ng	Unno unti ng	Unno unti ng										C         Expansion base 1           C         Expansion base 2           C         Expansion base 3           C         Expansion base 3           C         Expansion base 4           C         Expansion base 4           C         Expansion base 5           C         Expansion Expansion base 6
															] 🗋 o Expansion base 7
- Parameter statu:	s —	0.0	0.0	40	50	1	1	1	1	1	1	-		[[ <sup>™</sup>	Sustan manitar
1/U Address	0	20	30	40	50						╞	+	_	6	Opline module change
	0	1	Z	3	4						+	_		L.	online medale enange
Q25PHCPU	Inte 11ig ent 32pt	None 16pt	None 16pt	None 16pt	None 16pt										Diagnostics Module's Detailed Information
															Base Information
- Status	em erro	or <b>m</b>	/odule	error	M	odule v	warning	I M	odule o	hange	, ] .	Sta	rt mon	itor	Product Inf. List
												Sto	p mon	itor	Close

#### (b) Click the "Execution" button to enable a module change.

Online module change	×
Operation	Target module
Module change execution Installation confirmation Module control restart	I/O address 000H Module name QD60P8-G Status Change module selection completed
- Status/Guidance Please turn off Y signal of the ch intelligent function module.	nanged module when you change the
Execution	Cancel

If the following error screen appears, click the "OK" button and perform the operation in (2)(c) and later.

MELSOF	T series GX Developer 🛛 🔀
٩	The target module didn't respond. The task is advanced to the installation confirmation.
	(OK)

(c) After confirming that the "RUN" LED of the module has turned OFF, disconnect the external wiring and dismount the module.

#### POINT

Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

### (3) Mounting of new module

- (a) Mount a new module to the same slot and connect the external wiring.
- (b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module Ready (X0) remains OFF.

Online module change	×
Operation	Target module
Module change execution Thistallation confirmation Module control restart Status/Guidance	I/D address 000H Module name QD60P8-G Status Changing module
The module can be exchanged. Please execute after installing a	new module.
[Execution]	Cancel

### (4) Operation check

(a) When making an operation check, click the [Cancel] button to cancel control resumption.

Online module change	×
Coperation-	Target module
Module change execution Installation confirmation Module control restart	I/O address 000H Module name QD60P8-G Status Change module installation completion
Status/Guidance The controls such as I/O, FROM and automatic refresh for the ins Please confirm the parameter se	1/TO instruction executions, talled module are restarted. tting and wiring, etc. and execute.
Execution	Cancel

(b) Click the [OK] button to leave the "Online module change" mode.

MELSOF	T series GX Developer 🛛 🛛 🗙
•	The online module change mode is stopped. Even if the stop is executed, the online module change mode on the PLC side is not cancelled. Please execute the online module change and restart the control of the module again.
	OK )

	0	1	2	3	4				ם    ר	ase	Mod	ule	
asterPLC->	-	-	-	-	-						<u> </u>	Maint	base
Q25PHCPU	32pt	Unmo unti ng	Unmo unti ng	Unmo unti ng	Unmo unti ng							Expan base 1 Expan base 2 Expan base 2 Expan base 4 Expan base 5	ision    sion 2  sion  sion 1  sion 5
												Expan base 6 Expan base 7	isioi 6 isioi 7
laramatar atab												Expan base ( Expan base (	ision 3 ision 7
'arameter statu	s	20	30	40	50							Expan base 6 Expan base 7	ision 6 ision 7
'arameter statu /0 Addres:	s	20	30	40	50							Expan base ( Expan base i monitor	ision Sision 7
<sup>)</sup> arameter statu /O Addres: Q25PHCPU	S 0 Inte 11ig ent 32pt	20 1 None 16pt	30 2 None 16pt	40 3 None 16pt	50 4 None 16pt					Moo • (	de Divstem Diline I Mod	monitor module agnostic	ision 3 ision 7 cha cs
arameter statu /0_Addres: Q25PHCPU	0 Inte 1lig ent 32pt	20 1 None 16pt	30 2 None 16pt	40 3 None 16pt	50 4 None 16pt						de bystem Dnline I Mod In Base	Expan base 6 Expan base 7 monitor nodule agnostic defs De formatio	ision Sision 7 cha cs etaile

(c) Click the [Close] button to close the System monitor screen.

#### (5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to redisplay the "Online module change" screen, click the [Execution] button to resume control. The FROM/TO instruction for the module resumes.

Online module change	×
_ Operation	Target module
Module change execution	1/O address 000H Module name QD60P8-G
Module control restart	Status Change module installation completion
Status/Guidance	
The controls such as I/O, FRDN and automatic refresh for the ins Please confirm the parameter se	1/TO instruction executions, talled module are restarted. tting and wiring, etc. and execute.
[ Execution ]	Cancel

(b) The "Online module change completed" screen appears.

MELSOF	T series GX Developer 🛛 🔀
٩	Online module change completed.
	(OK)

### 8.3.2 Sequence program was used for initial setting

- (1) Operation stop
  - (a) Turn OFF all output signals (Y devices) from the sequence program or the device test of GX Developer to stop the module operation.

Device test	X
⊢ Bit device	1
Device	Close
MC 🔽	
FORCE ON FORCE OFF Toggle force	Hide history
© Device	•
C Buffer memory Module start I/0 (Hex)	
Address HEX	<b>-</b>
Setting value	
DEC 🔽 16 bit integer	▼ Set
Program Label reference program MAIN	<b>T</b>
Execution history	
Device Setting condition	Find
YUL Force UFF	Find next
Y0A Force OFF	
Y9 Force OFF	He-setting
	Clear

(b) Prerecord the writable buffer memory contents that have been set initially in the sequence program.

Choose [Online] - [Monitor] - [Buffer memory batch] on GX Developer, monitor the buffer memory, and record the values.

### POINT

If a CPU continuation error (e.g. SP. UNIT DOWN, UNIT VERIFY ERR.) has occurred due to the fault of the module to be changed, the buffer memory contents cannot be confirmed.

### (2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.

System Monito	٢														x
- Installed status -											-	_		$\begin{bmatrix} B \\ B \end{bmatrix}$	ase Module
	0	1	2	3	4							_			Main base
MasterPLC->	-	-	-	-	-										
Q25PHCPU	QD 60 P8-G 32pt	Unno unti ng	Unno unti ng	Unno unti ng	Unno unti ng										C Expansion     Base 1     Expansion     Base 2     Expansion     Base 3     C Expansion     Base 4     C Expansion     Base 5     C Expansion     Base 5     C Expansion     C Expansion     Base 6     C Expansion     Sase 7
-Parameter statu:	s													n - M	lode
I/O Address	0	20	30	40	50									c	System monitor
	0	1	2	3	4						Τ			0	Online module change
Q25PHCPU	Inte 11ig ent 32pt	None 16pt	None 16pt	None 16pt	None 16pt										Diagnostics Module's Detailed Information
															Base Information
- Status-			4								7	Sta	art mor	hitor	Product Inf. List
Module system	em erro	n Eine v	rodule	enor	Шм	oquie (	varning	M	oquie (	nange	<u> </u>	Sto	op mor	nitor	Close

#### (b) Click the "Execution" button to enable a module change.

Online module change	×
_ Operation	Target module
Module change execution     Installation confirmation     Module control restart	I/D address 000H Module name QD60P8-G Status Change module selection completed
Status/Lauidance	nanged module when you change the
Execution	Cancel

If the following error screen appears, click the [OK] button and perform the operation in (2) (c) and later.



(c) After confirming that the "RUN" LED of the module has turned OFF, disconnect the external wiring and dismount the module.

#### POINT

Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

(3) Mounting of new module

- (a) Mount a new module to the same slot and connect the external wiring.
- (b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module Ready (X0) remains OFF.

Online module change	×
Operation	Target module
Module change execution  for Installation confirmation  Module control restart	I/O address 000H Module name QD60P8-G Status Changing module
Status/Guidance The module can be exchanged. Please execute after installing a	new module.
Execution	Cancel

#### (4) Operation check

(a) To make an operation check, click the [Cancel] button to cancel control resumption.

Online module change	x							
Operation	Target module							
Module change execution	I/O address 000H							
Installation confirmation	Module name QD60P8-G							
<ul> <li>Module control restart</li> </ul>	Status Change module installation completion							
Status/Guidance								
The controls such as I/O, FROM and automatic refresh for the ins	1/TO instruction executions, talled module are restarted.							
Please confirm the parameter setting and wiring, etc. and execute.								
[ Execution ]	Cancel							

(b) Click the [OK] button to leave the "Online module change" mode.

MELSOF	T series GX Developer
¢	The online module change mode is stopped. Even if the stop is executed, the online module change mode on the PLC side is not cancelled. Please execute the online module change and restart the control of the module again.
	ОК

(c) Click the [Close] button to close the System monitor screen.

System Monito												×
-Installed status-								 	 	 	Ba	se
	0	1	2	3	4						Base	e Module
MasterPLC->	-	-	-	-	-							Main base
Q2 5PHC PU	32pt	Unno unti ng	Unno unti ng	Unno unti ng	Unno unti ng							C Expansion base 1 C Expansion base 2 C Expansion base 3 C Expansion base 4 C Expansion base 5 C Expansion base 6
												C Expansion
												Dase /
- Parameter statu:	s									 	Mo	de
I/O Address	0	20	30	40	50						ုင္း	System monitor
	0	1	2	3	4						•	Online module change
Q25PHCPU	Inte 11ig ent 32pt	None 16pt	None 16pt	None 16pt	None 16pt							Diagnostics Module's Detailed Information
												Base Information
Status- Status Module system error Module error Module warning Module change Stop monitor Close												

- (d) Choose [Online] [Debug] [Device test] on GX Developer, and set the buffer memory contents recorded in step (1)(b) to the buffer memory.
- (e) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.
   Before performing initialization, check whether the contents of the initialization program are correct or not.
  - 1) Normal system configuration
    - The sequence program should perform initialization on the leading edge of Module Ready (X9) of the QD60P8-G. When control resumption is executed, Module Ready (X0) turns ON and initialization is performed. (If the sequence program performs initialization only one scan after RUN, initialization is not performed.)
  - 2) When used on remote I/O network Insert a user device that will execute initialization at any timing (initialization request signal) into the sequence program. After control resumption, turn ON the initialization request signal to perform initialization. (If the sequence program performs initialization only one scan after a data link start of the remote I/O network, initialization is not performed.)

### (5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to redisplay the "Online module change" screen, click the [Execution] button to resume control. The FROM/TO instruction for the module resumes.

Online module change	×						
Operation-	Target module						
Module change execution Installation confirmation Module control restart	I/O address 000H Module name QD60P8-G						
Status/Guidance The controls such as I/O, FROM/TO instruction executions, and automatic refresh for the installed module are restarted.							
Please confirm the parameter set	ting and wiring, etc. and execute.						

(b) The "Online module change completed" screen appears.



### 8.4 Precautions for online module change

The following are the precautions for online module change.

- (1) Always perform an online module change in the correct procedure. A failure to do so can cause a malfunction or failure.
- (2) When an online module change is made, the following buffer memory values are cleared to "0".
  - Sampling pulse number
  - Accumulating count value
  - Input pulse value

# CHAPTER 9 TROUBLESHOOTING

### 9.1 Troubleshooting

This section explains the troubleshooting for the cases where the count of input pulses cannot be started and the input pulse count value is incorrect during use of the QD60P8-G.

Check item	Corrective action
Is the power being supplied?	Confirm that the supply voltage for the power supply module is within the rated range.
Is the capacity of the power supply module adequate?	Calculate the current consumption of the CPU module, I/O module and intelligent function module mounted on the base unit to see if the power supply capacity is adequate.
Has a watch dog timer error occurred?	Reset the PLC CPU and verify that it is lit. If the RUN LED does not light even after doing this, the module may be malfunctioning. Contact the nearest branch office or agency with a details of the occurring problem.
Is the module correctly mounted on the base unit?	Check the mounting condition of the module.
Is a module change enabled during an online module change?	Refer to Chapter 8 and take corrective action.

### (1) When the RUN LED is turned OFF

# (2) When the "ERR." LED is turned ON

Check item	Corrective action
le en error being generated?	Confirm the error code and take corrective action described
is an error being generated?	in Section 9.3.

(3) When count cannot be started o	r normal count cannot be made
------------------------------------	-------------------------------

Check item		Corrective action		
Is the termina	al block external wiring normal?	Refer to Section 3.5, and check and correct the external wiring.		
	Does the pulse input wiring use a twisted pair shielded cable?	Use a twisted pair shielded cable for the pulse input wiring.		
Noise preventive measure	Is noise entering from the module grounding section?	Separate the module's ground cable. If the module's case is contacting the grounding section, detach it.		
	Have noise preventive measures been taken inside the panel and for adjacent equipment?	Take noise preventative measures such as attaching a CR surge suppressor to a magnet switch.		
	Is there sufficient clearance between high voltage equipment and pulse input lines?	Wire the pulse input line independently inside the panel, separate the pulse input line from the power line by at least 150 mm (5.9 in) as a guideline.		
Is the "CH□' input termina	LED lit when a voltage is applied to the pulse I by a stabilized power supply or similar?	If the LED lights up, check the external wiring and the pulse generator side and make necessary corrections. If the LED is not lit, the possible cause of a module fault. Contact the nearest branch office or agency with a details of the occurring problem.		
Does the "input voltage selection" in setting with the intelligent function module switch match the actual input pulse voltage.		Correct the "input voltage selection" in setting with the intelligent function module.		
Is the edge (rise/fall) of the counted pulses correct?		Check whether pulses are counted on the rise or fall, and correct the "pulse edge selection" in setting with the intelligent function module.		
Is the maximum speed of input pulses within the range of the counting speed set to the "input filter setting" in setting with the intelligent function module?		Correct the "input filter setting" in setting with the intelligent function module to match the maximum speed of input pulses.		
Does the input pulse waveform satisfy the performance specifications?		Observe and check the pulse waveform with a synchroscope or similar, and if the input pulses do not satisfy the performance specifications, enter the input pulses that satisfy the performance specifications.		
If the "accum the buffer me is read in the	ulating count value" or "input pulse value" of emory read on a two-word (32-bit) unit when it sequence program?	Read two words together.		
Are the count values on multiple channels the same when the same pulse is input to the multiple channels?		If the count values are different, the possible cause is a module fault. Contact the nearest branch office or agency with a details of the occurring problem.		
Is the count enable (Y18 to Y1F) ON?		Turn the count enable (Y18 to Y1F) ON using a sequence program.		
Is the "overflow detection flag" of the buffer memory* "1"?		Set "1" in the "counter reset request" of the buffer memory* to reset the counter.		
Is the "pre-scale setting value" of the buffer memory* "0"?		Set a value other than "0" in the "pre-scale setting value" of the buffer memory*.		

\*: Refer to Section 3.4 for details of the buffer memory.

### 9.1.1 Confirming the error definitions using system monitor of GX Developer

Choosing Module's detailed information in the system monitor of GX Developer allows you to confirm the error code.

- (1) Operation of GX Developer Choose [Diagnostics]  $\rightarrow$  [System monitor]  $\rightarrow$  "QD60P8-G module" and choose Module's Detailed Information].
- (2) Confirmation of error code

The error code appears in the latest error code field.

(By pressing the Error History button, the definition shown as the latest error

code appears at No. 1.)

Module's Detailed Info	mation		>	×	
Module				1	
Module Name	QD60P8-G	Product information 04	10210000000000 · C		
I/O Address	0				
Implementation Position	Main Base OSlot				
Module Information				1	
Module access	Possible	1/O Clear / Hold Setting	gs		
Status of External Powe	r Supply	Noise Filter Setting			
Fuse Status		Input Type			
Status of I/O Address V	erify Agree	Remote password setti	ng		
Ho. Error 1 1500 2 2600 H/W Information	Present Error	quence of the error history st error is displayed in the lin	Usplay format C HEX C DEC is from the oldest ne as under. Close		<ul> <li>[Display format]</li> <li>Select "Decimal".</li> <li>(The error codes indicated in "Section 9.3 List of errors" are in decimal.)</li> </ul>
[Error display details] [Present Error] Means error code 300 "Movement averaging setting range outside error". CHn $(1 \le n \le 8)$					

### (3) Confirmation of Module's detailed information

Check the module information, the LED statuses, and the statuses of setting with the intelligent function module from "H/W Information" of Module's detailed information that can be displayed on the system monitor of GX Developer (Version 7.17T or later).

### [Setting procedure]

Chose [Diagnostics]  $\rightarrow$  [System monitor]  $\rightarrow$  "QD60P8-G module" and choose "Module's Detailed Information"  $\rightarrow$  [H/W Information].

H/W Informati	ion							>
_ Module							Display forn	nat
Module Name	QD60P8-G	Pro	duct informat	ion (	070110000000	1000 - C	• HEX	O DEC
H/W LED Info	ormation			ГН	/W SW Inform	nation		
Item	Value	Item	Value		Item	Value	Item	Value
RUN	0001						INPUT V	00F0
ERR	0000						PLS EDGE	00AA
							RNG LIN	0055
				IΓ			FIL 4-1	0011
							FIL 8-5	7667
							NOP	0000
				-	Start monitor	Stop mor	nitor	Close

### [H/W LED Information]

H/W LED information displays the following information.

ltem	Signal name	Value
RUN	"RUN" LED of QD60P8-G	0: LED OFF
ERR	"ERR." LED of QD60P8-G	1: LED ON

### [H/W SW Information]

The setting status of the intelligent function module switches are displayed.

Item	Signal name	Corresponding switch		Value
INPUT V	Input voltage selection	Switch 1		
PLS EDGE	Pulse edge selection		Lower 8 bits	
RNG LIN	Linear counter or Ring counter selection	Switch 2	Upper 8 bits	For details, refer to "Section 4.5 Switch setting for intelligent function
FIL 4-1	Input filter setting (CH1 to CH4)	Switch 3		module".
FIL 8-5	Input filter setting (CH5 to CH8)	Switch 4		
NOP	_	Switch 5		

### 9.2 Error details

#### (1) Types of errors

The following errors are detected by the QD60P8-G.

#### (a) Overflow error

This error occurs if the accumulating count value overflows (exceeds 99999999) when the count type of the accumulating counter is the linear counter.

To clear this error, turn ON the error reset request (Y8 to YF). Further, to start count operation properly, set "1" in the "counter reset request" of the buffer memory.

#### (b) Buffer memory setting range outside error

This error occurs if any setting error is found by a check made on the values set to the buffer memory when the operating condition setting request flag (Y1) turns ON. It occurs if any setting value in the "comparison output setting value" or similar of the buffer memory is outside the range.

To clear this error, set a correct value and turn ON the operating condition setting request flag (Y1) again.

#### (c) Intelligent function module switch setting error

This error occurs if any setting error is found by a check made on the setting values of the switch settings for intelligent function module set in the PLC parameters when power is switched from OFF to ON or the PLC CPU is reset.

To clear this error, set a correct value on GX Developer, perform write to PLC, and then switch power from OFF to ON or reset the PLC CPU.

#### (d) Module error

This error occurs if a fault occurs in the module for some reason.

Change the module if the error occurs again after power is switched from OFF to ON or the PLC CPU is reset.

### (2) Error storage

If any of the settings made in the buffer memory or the setting with the intelligent function module is outside the setting range, the error occurrence (X8 to XF) turns ON and the error code corresponding to the error definition is stored into the buffer memory.

By checking the "error code" of the buffer memory, you can identify the error cause.

	X/Y d	Buffer memory address	
СН	Error occurrence	Error reset request	of Error code
1	X8	Y8	16
2	Х9	Y9	48
3	ХА	YA	80
4	ХВ	YB	112
5	XC	YC	144
6	XD	YD	176
7	XE	YE	208
8	XF	YF	240

### (3) Confirmation of error definitions

GX Developer or GX Configurator-CT is required to check the error definition. For details of how to check the error definition, refer to "Section 9.1.1 Confirming the error definitions using system monitor of GX Developer" or "Chapter 6 Utility Package (GX Configurator-CT)". (Refer to Section 9.3 for details of the error codes.)

# MEMO

### 9.3 List of errors

The following table shows the error details and remedies to be taken when an error occurs.

Error code	Error name Error		Operation status at error occurrence	
000	Normal status	_	_	
100	Overflow error	When the linear counter was selected, the accumulating count value exceeded 999999999.	Count operation is stopped.	
200	Comparison output setting range outside error	The value set in the "comparison output selection" or "comparison output setting value" of the buffer memory is outside the setting range.		
300	Movement averaging setting range outside error	The value set in the "movement averaging processing selection" or "number of movement averaging processing" of the buffer memory is outside the setting range.		
400	Pre-scale setting range outside error	The value set in the "pre-scale function selection" or "pre-scale setting value" of the buffer memory is outside the setting range.		
500	Alarm output setting range outside error	<ul> <li>The value set in the "alarm output selection", "alarm output setting value upper/upper limit", "alarm output setting value upper/lower limit", "alarm output setting value lower/upper limit" or "alarm output setting value lower/lower limit" of the buffer memory is outside the setting range.</li> <li>The upper and lower relationships between the "alarm output setting values" of the buffer memory are illegal.</li> </ul>	Count operation cannot be started.	
600	Count cycle setting range outside error	The value set in the "count cycle change function selection" or "count cycle setting value" of the buffer memory is outside the setting range.		

Related buffer memory address				Sotting rongo	Demedu				
CH1	CH2	СНЗ	CH4	CH5	CH6	CH7	CH8	Setting range	Remedy
_	_	_	-	_	l	—	_	_	_
Accumulating count value									Set "1" in the "counter reset
8 9	40 41	72 73	104 105	136 137	168 169	200 201	232 233	_	reset the accumulating count value. (This error is cleared when
		Coun	ter re	set red	quest			1: Reset request	the error reset request (Y8 to YF) turns ON but requires the counter
13	45	77	109	141	173	205	237	(The value automatically turns to "0" after completion of a counter reset.)	to be reset to perform count
	Со	mpari	son o	utput s	selecti	ion	1	0: Comparison output function invalid	
1	33	65	97	129	161	193	225	1: Comparison output function valid	
	Com	pariso	on out	put se	tting v	alue			
2	34 35	66 67	98 99	130 131	162 163	194 195	226 227	0 to 99999999	
Mov	/emer	nt aver	raging	proce	essing	selec	tion	0: Sampling processing	
4	36	68	100	132	164	196	228	1: Movement averaging processing	
Num	ber of	per of movement averaging processing							
5	37	69	101	133	165	197	229	12 10 60	
	Pr	Pre-scale function selection				on		0: Pre-scale function invalid 1: $ imes$ 1	
6	38	70	102	134	166	198	230	$2: \times 0.1$ $3: \times 0.01$ $4: \times 0.001$ $5: \times 0.0001$	
		Pre-s	cale s	etting	value			0 to 22767	Turn ON the error reset request
7	39	71	103	135	167	199	231	0 10 32787	(Y8 to YF) of the corresponding channel. After this, set a correct
		Alarm	n outp	ut sele	ection			0: Alarm output function invalid	value and then turn ON the
17	49	81	113	145	177	209	241	1: Alarm output function valid	operating condition setting
Alar	m out	out se	tting v	alue u	pper/	upper	limit		request flag (Y1).
19	51	83	115	147	179	211	243		
Alar	m out	put se	tting v	alue ι	/upper	lower	limit		
20	52	84	116	148	180	212	244	0 to 32767 and upper/upper limit $\geq$	
Alar	m out	put se	tting v	alue l	ower/u	upper	limit	lower/lower limit	
21	53	85	117	149	181	213	245		
Alar	m out	put se	etting \	/alue l	ower/	lower	limit		
22	54	86	118	150	182	214	246		
С	ount o	cycle c	chang	e func	tion se	electic	n	0: Count cycle change function selection	
23	55	87	119	151	183	215	247	1: Count cycle change function selection valid	
	C	Count	cycle	setting	g valu	е	n	0: 1s 1: 100ms	
24	56	88	120	152	184	216	248	2: 200ms 3: 500ms	

### 9 TROUBLESHOOTING

Error code	Error name	Error	Operation status at error occurrence
810	Switch setting error	Any of the setting values of setting with the intelligent function module set on GX Developer is in error.	<ul> <li>Count operation cannot be performed.</li> <li>If an error occurs in any of the channels, all channels result in an error.</li> </ul>
820	PLC CPU error	An error occurred in the PLC CPU.	
830	PLC CPU watch dog timer error	The watch dog timer error of the PLC CPU occurred.	Module READY (X0) turns OFF.
840	Module error	A module power off error occurred.	
850	Hardware error	Hardware fault.	

### 9 TROUBLESHOOTING

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Related buffer memory address									
CH1	CH2	СНЗ	CH4	CH5	CH6	CH7	CH8	Setting range	Remedy
Refer to "Section 4.5 Switch setting for intelligent function module".						Set the correct setting value on GX Developer, perform write to PLC, and then switch power from OFF to ON or reset the PLC CPU.			
_	_	_	_		_	_	_	_	
_			Ι	Ι	Ι	Ι	_	_	Switch power from OFF to ON or reset the PLC CPU.
_	_	_	_	_	_	_	_	_	
_	_	_	_	_	_	_	_	_	Change the module.

# **APPENDIX**

Appendix 1 External dimension diagram



Unit: mm (in.)

Арр

# MEMO


Арр

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# MEMO

### WARRANTY

Please confirm the following product warranty details before starting use.

### 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 dealer or Mitsubishi Service Company. Note that if repairs are required at a site overseas, on a detached island or remote place, expenses to dispatch an engineer shall be charged for.

### [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 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 possible 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 chance loss and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to damages caused by any cause found not to be the responsibility of Mitsubishi, chance losses, lost profits incurred to the user by Failures of Mitsubishi products, damages and secondary damages caused from special reasons regardless of Mitsubishi's expectations, compensation for accidents, and compensation for damages to products other than Mitsubishi products and other duties.

#### 5. Changes in product specifications

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

#### 6. Product application

- (1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi general-purpose programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or National Defense purposes shall be excluded from the programmable logic controller applications.

Note that even with these applications, if the user approves that the application is to be limited and a special quality is not required, application shall be possible.

When considering use in aircraft, medical applications, railways, incineration and fuel devices, manned transport devices, equipment for recreation and amusement, and safety devices, in which human life or assets could be greatly affected and for which a particularly high reliability is required in terms of safety and control system, please consult with Mitsubishi and discuss the required specifications.

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