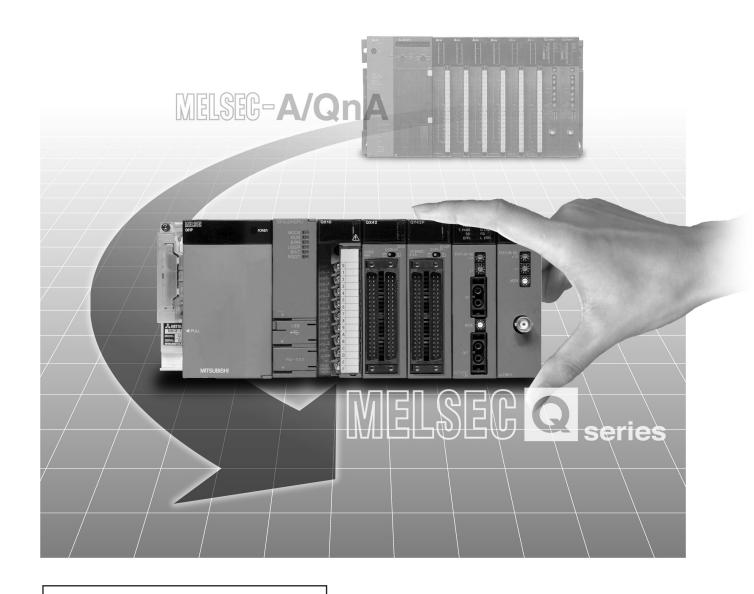
MITSUBISHI

Mitsubishi Programmable Controller

Transition from MELSEC-A/QnA (Large Type) Series to Q Series Handbook

(Intelligent Function Modules)



Sep. 2014 Edition

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

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

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

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

<u>∕</u>!\CAUTION

Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "_____CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

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

[Design Precautions]

WARNING

- Configure safety circuits external to the programmable controller to ensure that the entire system
 operates safely even when a fault occurs in the external power supply or the programmable
 controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
 - (1) Configure external safety circuits, such as an emergency stop circuit, protection circuit, and protective interlock circuit for forward/reverse operation or upper/lower limit positioning.
 - (2) When the programmable controller detects the following problems, it will stop calculation and turn off all output in the case of (a).In the case of (b), it will hold or turn off all output according to the parameter setting.Note that the AnS series module will turn off the output in either of cases (a) and (b).

	Q series module	A series module
(a) The power supply module has over current protection equipment and over voltage protection equipment.	Output OFF	Output OFF
(b) The CPU module self-diagnosis functions, such as the watchdog timer error, detect problems.	Hold or turn off all output according to the parameter setting.	Output OFF

Also, all outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller.

For a fail-safe circuit example, refer to LOADING AND INSTALLATION in the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

(3) Outputs may remain on or off due to a failure of an output module relay or transistor.

Configure an external circuit for monitoring output signals that could cause a serious accident.

[Design Precautions]

WARNING

- In an output module, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Configure a circuit so that the programmable controller is turned on first and then the external power supply.

If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.

• For the operating status of each station after a communication failure, refer to relevant manuals for each network.

Failure to do so may result in an accident due to an incorrect output or malfunction.

• When changing data of the running programmable controller from a peripheral connected to the CPU module or from a personal computer connected to an intelligent function module or special function module, configure an interlock circuit in the sequence program to ensure that the entire system will always operate safely.

For program modification and operating status change, read relevant manuals carefully and ensure the safety before operation.

Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure.

To prevent this, configure an interlock circuit in the sequence program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

CAUTION

 Do not install the control lines or communication cables together with the main circuit lines or power cables.

Keep a distance of 100mm or more between them.

Failure to do so may result in malfunction due to noise.

 When a device such as a lamp, heater, or solenoid valve is controlled through an output module, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on.

Take measures such as replacing the module with one having a sufficient current rating.

After the CPU module is powered on or is reset, the time taken to enter the RUN status varies
depending on the system configuration, parameter settings, and/or program size. Design circuits so
that the entire system will always operate safely, regardless of the time.

[Installation Precautions]

!CAUTION

- Use the programmable controller in an environment that meets the general specifications in the QCPU User's Manual (Hardware Design, Maintenance and Inspection).
 - Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it snaps into place.

Incorrect mounting may cause malfunction, failure or drop of the module.

When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.

Tighten the screws within the specified torque range.

Undertightening can cause drop of the screw, short circuit, or malfunction.

Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

 When using an extension cable, connect it to the extension cable connector of the base unit securely.

Check the connection for looseness.

Poor contact may cause incorrect input or output.

- When using a memory card, fully insert it into the memory card slot.
 - Check that it is inserted completely.

Poor contact may cause malfunction.

- Shut off the external power supply (all phases) used in the system before mounting or removing a module. Failure to do so may result in damage to the product. A module can be replaced online (while power is on) on any MELSECNET/H remote I/O station or in the system where a CPU module supporting the online module change function is used.
 - Note that there are restrictions on the modules that can be replaced online, and each module has its predetermined replacement procedure.

For details, refer to the relevant sections in the QCPU User's Manual (Hardware Design,

Maintenance and Inspection) and in the manual for the corresponding module.

Do not directly touch any conductive part of the module.
 Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before wiring.
 Failure to do so may result in electric shock or damage to the product.
- After wiring, attach the included terminal cover to the module before turning it on for operation.
 Failure to do so may result in electric shock.

CAUTION

• Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100Ω or less.

Failure to do so may result in electric shock or malfunction.

- Use applicable solderless terminals and tighten them within the specified torque range.
 If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly.

Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.

 Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered.

Incomplete connections may cause short circuit, fire, or malfunction.

- Tighten the terminal screws within the specified torque range.
 - Undertightening can cause short circuit, fire, or malfunction.

Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

Prevent foreign matter such as dust or wire chips from entering the module.

Such foreign matter can cause a fire, failure, or malfunction.

- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring.
 - Do not remove the film during wiring.

Remove it for heat dissipation before system operation.

- Mitsubishi programmable controllers must be installed in control panels.
 - Connect the main power supply to the power supply module in the control panel through a relay terminal block.
 - Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock.
 - For wiring methods, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

[Startup and Maintenance Precautions]

WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock.
- Correctly connect the battery connector.
 Do not charge, disassemble, heat, short-circuit, or solder the battery, or throw it into the fire.
 Doing so will cause the battery to produce heat, explode, or ignite, resulting in injury and fire.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws or module fixing screws.

Failure to do so may result in electric shock.

Undertightening the terminal screws can cause short circuit or malfunction.

Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

CAUTION

- Before performing online operations (especially, program modification, forced output, and operating status change) for the running CPU module from the peripheral device connected, read relevant manuals carefully and ensure the safety.
 Improper operation may damage machines or cause accidents.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller.
 Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing a module. Failure to do so may cause the module to fail or malfunction.
 - A module can be replaced online (while power is on) on any MELSECNET/H remote I/O station or in the system where a CPU module supporting the online module change function is used.
 - Note that there are restrictions on the modules that can be replaced online, and each module has its predetermined replacement procedure.
 - For details, refer to this manual and the online module change section in the manual of the module compatible with online module change.
- After the first use of the product, do not mount/remove the module to/from the base unit, and the terminal block to/from the module more than 50 times (IEC 61131-2 compliant) respectively.
 Exceeding the limit of 50 times may cause malfunction.
- Do not drop or apply shock to the battery to be installed in the module.
 Doing so may damage the battery, causing the battery fluid to leak inside the battery.
 If the battery is dropped or any shock is applied to it, dispose of it without using.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

CAUTION

When disposing of this product, treat it as industrial waste.
 When disposing of batteries, separate them from other wastes according to the local regulations.
 For details on battery regulations in EU member states, refer to the MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection).

[Transportation Precautions]

CAUTION

When transporting lithium batteries, follow the transportation regulations.
 (Refer to QCPU User's Manual (Hardware Design, Maintenance and Inspection) for details of the controlled models.)

CONDITIONS OF USE FOR THE PRODUCT

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

MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT. ("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in;

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

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

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		Section 7.2, Section 7.3, Section 7.5.5, Appendix 2.1

Japanese Handbook Version L-08045-I

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9.1

- For the products shown in handbooks for transition, catalogues, and transition examples, refer to the manuals for the relevant products and check the detailed specifications, precautions for use, and restrictions before replacement.
 - For the products manufactured by Mitsubishi Electric Engineering Co., Ltd., Mitsubishi Electric System & Service Co., Ltd., and other companies, refer to the catalogue for each product and check the detailed specifications, precautions for use, and restrictions before use.
 - The manuals and catalogues for our products, products manufactured by Mitsubishi Electric Engineering Co., Ltd., and Mitsubishi Electric System & Service Co., Ltd. are shown in Appendix of each handbook for transition.
- Products shown in this handbook are subject to change without notice.

INTRODUCTION

1.1 Advantages of Transition to Q Series

Advantage 1)Advanced performance of equipments

In addition to the processing performance improvement for Q series CPU, the processing speed for Q series intelligent function module is also increased, so that the equipment capability to improve is possible.

Advantage 2)Compact control panel and space saving

As the Q series needs only 1/4 mounting area of the A series, it is possible to create more compact control panel.

Advantage 3)Improved operating efficiency for programming and monitor

Q series intelligent function module prepares the following utility package (GX Configurator-o) sold separately.

(Example)

- GX Configurator-AD Analog input module setting/monitoring tool
- GX Configurator-DA Analog output module setting/monitoring tool
- GX Configurator-TI Temperature input module setting/monitoring tool
- GX Configurator-CT High speed counter module setting/monitoring tool
- GX Configurator-QP Positioning module setting/monitoring tool

Using the utility package is not a must. However, the utility package allows not only for the followings to do, but also reduces sequence programs.

- Initial setting is possible without a program
- The auto refresh setting allows to read/write buffer memory data of intelligent function module automatically from/to the CPU device memory.
- Checking of the setting status or operating status of intelligent function module is simplified.

1.2 Precautions for Transition from Large-sized A/QnA Series to Q Series

(1) Be sure to confirm its functions, specifications and instructions by referring the manual of the corresponding Q series module prior to use.

(2) Be sure to check the operation of whole system before the actual operation.

ANALOG INPUT MODULE REPLACEMENT

2.1 List of Analog Input Module Alternative Models for Replacement

Production discontinuation			Transition to Q series
Product	Model	Model	Remarks (Restrictions)
	A616AD	Q68ADV Q68ADI	1) External wiring : Cable size is changed. 2) Number of slots : Changed (2 modules are required.) 3) Program : Occupied I/O points, I/O signals and buffer memory address are changed. 4) Performance specifications change: 8CH/module, input signals (Either V or I input) 5) Function specifications: Not changed
		Q68ADV Q68ADI	1) External wiring : Cable size is changed. 2) Number of slots : Not changed 3) Program : Occupied I/O points, I/O signals and buffer memory address are changed. 4) Performance specifications change:
Analog input module	A68AD	Q68AD-G*1	1) External wiring : Cable size is changed. (Terminal block wiring → connector wiring) 2) Number of slots : Not changed 3) Program : Occupied I/O points, I/O signals and buffer memory address are changed. 4) Performance specifications change: Conversion speed ((the maximum of 2.5ms/channel) → sampling cycle (10ms/channel) + response speed (20ms)) and I/O characteristics 5) Function specifications: Changed (Non-insulation → insulation between channels)
	Q68ADV Q68ADI A68AD-S2	1) External wiring : Cable size is changed. 2) Number of slots : Not changed 3) Program : Occupied I/O points, I/O signals and buffer memory address are changed. 4) Performance specifications change:	
		Q68AD-G*1	 3) Program : Occupied I/O points, I/O signals and buffer memory address are changed. 4) Performance specifications change: Conversion speed ((the maximum of 2.5ms/channel) → sampling cycle (10ms/channel) + response speed (20ms)) and I/O characteristics 5) Function specifications: Changed (Non-insulation → insulation between channels)

Production discontinuation		Transition to Q series		
Product	Model	Model	Remarks (Restrictions)	
		Q68ADV Q68ADI	1) External wiring : Cable size is changed. 2) Number of slots : Not changed 3) Program : Occupied I/O points, I/O signals and buffer memory address are changed. 4) Performance specifications change:	
Analog input module	A68ADN	Q68AD-G*1	1) External wiring : Cable size is changed. (Terminal block wiring → connector wiring) 2) Number of slots : Not changed 3) Program : Occupied I/O points, I/O signals and buffer memory address are changed. 4) Performance specifications change:	

The Q68AD-G cannot be mounted on the Q series large type base unit (Q3 BL, Q6 BL, Q55BL).

⊠Point -

The existing wiring for the A/QnA series modules can be connected directly to the Q series modules using the upgrade tool (conversion adaptor) manufactured by Mitsubishi Electric Engineering Co., Ltd.

(1) One slot type (can be mounted on the Q series large type base unit)

Product	MELSEC-A/QnA	MELSEC-Q	Conversion adaptor
Product	series module	series module	
	A68AD	Q68ADV	ERNT-AQT68AD
	AUOAD	Q68ADI	
Analog input modulo	A68AD-S2	Q68ADV	
Analog input module		Q68ADI	
	A68ADN	Q68ADV	ERNT-AQT68ADN
		Q68ADI	IENNI-AQ IOOADIN

(2) Two slot type

(cannot be mounted on the Q series large type base unit)

Product	MELSEC-A/QnA series module	MELSEC-Q series module	Conversion adaptor	
	A68AD			
	A68AD-S2	Q64AD-GH (×2 modules)*1	ERNT-AQT68AD-GH	
Analog input module	A68ADN			
	A616AD (in voltage input)		ERNT-AQT616AD	
	A616AD (in current input)	Q68ADI (×2 modules)	LINIT-AQIOIDAD	

Replacement for the existing A series modules (large size) in the mixed use of voltage and current. For the single use of voltage or current, replacing with a conversion adapter of one slot type is possible.

For MELSEC-A/QnA (large type) Series to Q Series transition related products manufactured by Mitsubishi Electric Engineering Co., Ltd. or Mitsubishi Electric System & Service Co., Ltd., contact your local sales office or representative.

2.2 A616AD

2.2.1 Performance comparison

It	em				A616AD				
	Voltage		-10 to		Input resistance	value: 1MΩ)			
Analog input	Current	-20 to 0 to +20mADC (Input resistance value: 250Ω)							
Digital output		16-bit signed binary (Data part: 12 bit) (-48 to 4047, -2048 to 2047) Setting is enabled for each channel.							
I/O characteristics maximum resolution			Voltage (V) Current (mA)	Analog input range 0 to +10 0 to +5 +1 to +5 -10 to +10 -5 to +5 0 to +20 +4 to +20 -20 to +20 -20 to +20	Maximum resolution 2.5mV (1/4000) 1.25mV (1/4000) 1.0mV (1/4000) 5.0mV (1/4000) 2.5mV (1/4000) 10μA (1/2000) 5μA (1/4000) 4μA (1/4000) 20μA (1/2000)	Digital output value 0 to 4000 -2000 to 2000 0 to 2000 -2000 to 0 0 to 4000 -2000 to 2000 1000 to 3000 -1000 to 1000 0 to 4000 -2000 to 2000			
Overall accura	су	When using A616AD -5V to 5V, -20 to 20m 0 to 5V, 1 to 5V 0 to 20mA, 4 to 20m/	A tion with any c) of A60MX, A60	Range: ±0.3% (Digital value ±12 Range: ±0.6% (Digital value ±24	!)	each range of A616AD		

O: Compatible, \triangle : Partial change required, \times : Incompatible

Q68ADV Q68ADI -10 to 10VDC	Compatibility		
	Companionity	Precautions for replacement	
-10 to 10VDC - (Input resistance value: 1MΩ)		The voltage/current cannot be	
0 to 20mADC	Δ	mixed for one module.	
$^{-}$ (Input resistance value: 250Ω)			
16-bit signed binary (Normal resolution mode: -4096 to 4095, High resolution mode: -12288 to 12287, -16384 to 16383)	Δ	A616AD can set the data format to [-2048 to 2047]. However, Q68ADV/I cannot set. When using the conversion data of Q68ADV/I in [-2048 to 2047], convert with sequence program.	
Novel and English and English and English	- I		
Analog input Normal resolution mode High resolution mode	<u> </u>		
Pigital Maximum Digital Maximum range output value resolution output value resolution			
output value resolution output value resolution 0 to 10V 2.5mV 0 to 16000 0.625mV	-	When using A616AD in [-5 to +	
0 to 10V	-	5V] range, Q68ADV can obtain	
1 to 5V 1.0mV 0 to 12000 0.333mV	-	equivalent resolution or more	
Voltage -10 to 10V 2.5mV -16000 to 16000 0.625mV	-	than A616AD by setting in [-10	
User range -4000 to 4000		to 10V] range/high resolution	
settings 0.375mV -12000 to 12000 0.333mV		mode or user range.	
0 to 20mA 5μA 1.66μA	4	When using A616AD in [-20 to	
4 to 20mA 0 to 4000 4μA 0 to 12000 1.33μA	4		
Current User range 1000 1 10000 1 1000 1 1000 1 1000 1 1000 1 1000 1 1000 1 1000 1 1000 1 100		+20mA] range, use Q68ADI in	
settings -4000 to 4000 1.37µA -12000 to 12000 1.33µA		user range.	
Normal resolution mode High resolution mode	7		
Ambient temperature Ambient temperature	╡		
0 to 55°C 0 to 55°C			
Analog input With Without Ambient With Without Ambient			
range temperature temperature temperature temperature	9		
drift drift 25±5°C drift drift 25±5°C			
compensation compensation compensation			
0 to 10V ±0.3% ±0.4% ±0.1%			
-10 to (+48 digits) (+64 digits) (+16 digits)	,	A616AD is the accuracy in	
100	4	respect to the full scale, and	
Voltage 0 to 5V	0	Q68ADV/I is the accuracy in	
1 to 5V		respect to maximum digital	
User		output value.	
range ±0.3% ±0.4% ±0.1%			
settings			
0 to 20mA			
	'		
Current 20mA			
User			
range			
settings		•	

Item	A616AD	
	When using only A616AD: 1	
	When using a combination with A60MX: 1	
	When using a combination with A60MXR:	
	1 (Sampling processing time),	
Maximum conversion speed	7.0 (Direct access processing)	
	When using a combination with A60MXRN:	
	1 (Sampling processing time),	
	7.0 (Direct access processing)	
	[Unit: ms/channel]	
Absolute maximum input	Voltage: ±15V	
Absolute maximum input	Current: ±30mA	
Analog input points	16 channels/module	
Analog input points	10 Chameis/module	
Maximum number of writes for		
E ² PROM	•	
Isolation method	Between the input terminal and programmable controller: photocoupler isolation	
isolation method	Between channels: non-isolated (1M Ω resistor isolation)	
Dielectric withstand voltage	-	
Insulation resistance	_	
modication resistance		
Occupied I/O points	32 points	
оссирности о режило	(I/O assignment: special 32 points)	
Connected terminal	38-point terminal block	
Applicable wire size	0.75 to 2mm ²	
Applicable wife size	(Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
terminal	v 1.20-0, v 1.20-100A, v2-00, v2-100A	
Internal current consumption	1A	
(5VDC)	in	
Weight	0.85kg	

O : Compatible, \triangle : Partial change required, \times : Incompatible

 OCSARV	OCOADI		2. Partial change required, *. incompatible
Q68ADV	Q68ADI	Compatibility	Precautions for replacement
80μs/channel (When there is temperature adding 160μs will be used regardles	0	The conversion speed of Q68ADV/I to A616AD has become quick. And then, on Q68ADV/I, the noise that did not import on A616AD can be imported as analog signal. In this case, use the averaging processing function to remove the effect of noise.	
±15V	±30mA	0	
8 channel	ls/module	Δ	Consider replacement with multiple Q68ADV/I.
Max. 100,	0		
Between the I/O terminal and prog photocoupl Between channe	er isolation	0	
Between the I/O terminal and prog 500VAC, for		0	
Between the I/O terminal and prog 500VDC, 20		0	
16 po (I/O assignment: in		Δ	I/O occupied points has changed to 16 points.
18-point ter	minal block	×	
0.3 to 0	×	Wiring change is required.	
R1.25-3 (A solderless terminal	×		
0.64A	0.64A	0	
 0.19kg	0.19kg	0	

2.2.2 Function comparison

 \bigcirc : With functions, -: Without functions

Itom	Description	A616AD	OSSADVII	O: With functions, -: Without functions
Item	Description Specifies whether to enable or disable the A/D	A616AD	Q68ADV/I	Precautions for replacement
A/D conversion enable/ disable	conversion for each channel. By disabling the conversion for the channels that are not used, the sampling time can be shortened.	-	0	
Sampling processing	The A/D conversion for analog input values is performed successively for each channel, and the digital output value is output upon each conversion.	0	0	The sampling processing time changes depending on the number of channels used (number of channels set to A/D conversion enable) and whether, with or without the temperature drift compensation function. (a) Without temperature drift compensation function (processing time) = (number of channels used) × 80 (µs /1 channel) (b) With temperature drift compensation function (processing time) = (number of channels used) × 80 (µs /1 channel) +160µs
Direct access processing	Sequence program separately from normal sampling processing can specify channels to carry out the A/D conversion, and outputting the direct access request can perform direct A/D conversion of specified channels. When inputting channel specification with sampling processing and direct access processing simultaneously, the direct access request is prioritized.	0	-	Q68ADV/I does not have [Direct access processing] function.
Averaging processing	For each channel, A/D conversion values are averaged for the set number of times or set amount of time, and the average value is output as a digital value. The setting range is as shown below: Averaging processing by the number of times: 4 to 62500 Averaging processing by time: 2 to 5000ms The maximum and minimum values of the	-	0	
Maximum and minimum values hold function	digital output values are retained in the module.	-	0	
Temperature drift compensation function	Errors arising from changes in the ambient temperature of the module are automatically compensated to improve conversion accuracy. The temperature drift compensation function can be performed at (A/D conversion time for all channels) + 160µs.	-	0	
Resolution mode	The resolution settings of 1/4000, 1/12000 or 1/16000 can be selected according to the application. The resolution mode setting is applicable to all channels.	-	0	
Online module change	A module change is made without the system being stopped.	-	0	The CPUs corresponding to online module replacement are process CPU and redundant CPU modules.

2.2.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Analog-Digital Converter Module User's Manual.

	A61	6AD		Q68ADV/I			
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.	Signal name	No.	Signal name	No.	Signal name	No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	
X1	A/D conversion READY	Y1		X1	Temperature drift	Y1	
					compensation flag		
X2	Error flag	Y2		X2		Y2	
X3		Y3		Х3		Y3	
X4		Y4		X4	Not used	Y4	Not used
X5 X6		Y5 Y6		X5 X6		Y5 Y6	
X7		Y7		X7		Y7	
		17	Not used		High resolution mode	17	
X8		Y8		X8	status flag	Y8	
					Operating condition		Operating condition
X9		Y9		X9	setting completed flag	Y9	setting request
					Offset/gain setting mode		
XA		YA		XA	flag	YA	User range write request
VD		YB		XB	Channel change	YB	Channel shange request
XB		10		ΛD	completed flag	10	Channel change request
XC		YC		XC	Not used	YC	Not used
					Maximum value/		Maximum value/
XD		YD	RFRP, RTOP instruction	XD	minimum value reset	YD	minimum value reset
	Not used		for interlock signal when		completed flag		request
XE		YE	A616AD is used in	XE	A/D conversion	YE	Not used
VE		VE	remote I/O station	VE	completed flag	\/F	Face de la constant
XF X10		YF Y10		XF	Error flag	YF	Error clear request
X10		Y11					
X11		Y12					
X13		Y13					
X14		Y14	Not used				
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18	Direct access request signal				
X19		Y19		1			
X1A		Y1A					
X1B		Y1B					
X1C		Y1C	Not used				
X1D	RFRP, RTOP instruction	Y1D	INOL USEU				
X1E	for interlock signal when	Y1E					
X1F	A616AD is used in	Y1F					
,,,,	remote I/O station						

2.2.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory or sequence program, refer to the Analog-Digital Converter Module User's Manual.

		A616AD			Q68ADV/I	
Address (Dec.)		Name	Read/write	Address (Dec.)	Name	Read/write
0	For direct	INPUT designation	DAM	0	A/D conversion enable/disable	
1	For direct	MX. CH. designation	R/W	1	CH1 Time/count averaging setting	
2	access	Digital output value	R	2	CH2 Time/count averaging setting	
3	Sampling period designation			3	CH3 Time/count averaging setting	
4	Data format selection		DAV	4	CH4 Time/count averaging setting	D/A/
5	Error code storage		- R/W	5	CH5 Time/count averaging setting	R/W
6	Faulty multiplex	er module CNT. No. storage		6	CH6 Time/count averaging setting	
7				7	CH7 Time/count averaging setting	1
8			8	CH8 Time/count averaging setting		
9			9	Averaging processing specification		
10	System area (N	_	10	A/D conversion completed flag		
11	System area (N	_	11	CH1 Digital output value		
12			12	CH2 Digital output value		
13				13	CH3 Digital output value	
14			14	CH4 Digital output value		
15		A616AD		15	CH5 Digital output value	R
16		INPUT 0 A60MX, A60MXR		16	CH6 Digital output value	
17		INPUT 1 A60MX, A60MXR]	17	CH7 Digital output value	
18	Conversion	INPUT 2 A60MX, A60MXR		18	CH8 Digital output value	
19		disable INPUT 3 A60MX, A60MXR		19	Error code	
20	designation	INPUT 4 A60MX, A60MXR	R/W	20	Setting range (CH1 to CH4)	
21	INPUT 5 A60MX, A60MXR			21	Setting range (CH5 to CH8)	
22		INPUT 6 A60MX, A60MXR	-	22	Offset/gain setting mode Offset specification	R/W
23		INPUT 7 A60MX, A60MXR		23	Offset/gain setting mode Gain specification	
24	Set data setting	y request		24		
25	-			25		
26				26	System area (Not used)	_
27	-			27		
28				28		
29				29	CHA Mavinevine valva	
30				30 31	CH1 Maximum value CH1 Minimum value	-
31				32		-
33	-			32	CH2 Maximum value	-
34	-			34	CH2 Minimum value CH3 Maximum value	-
35	System area (N	lot used)		35	CH3 Minimum value	-
36	- Cystein area (N	iot ascaj	<u> </u>	36	CH4 Maximum value	-
37	-			37	CH4 Minimum value	-
38	-			38	CH5 Maximum value	R
39	-			39	CH5 Minimum value	-
40	-			40	CH6 Maximum value	-
41	-			41	CH6 Minimum value	-
42	1			42	CH7 Maximum value	1
43	1			43	CH7 Minimum value	-
44	-			44	CH8 Maximum value	1
45	1			45	CH8 Minimum value	-
75				70	OF TO TYME METERS AND THE TYPE OF THE TYPE	L

	A616AD			Q68ADV/I	
Address	Name	Read/write	Address	Name	Read/write
(Dec.)	Name	iteau/wiite	(Dec.)	Name	Read/Wille
46	System area (Not used)	_	46		
47	Cystem area (Not asea)		47		
48			48		
to	INPUT channel digital output value	R	to	System area (Not used)	_
63			63	,	
64			64		
to			to		
157			157		_
158			158	Mode switching setting	R/W
159			159		_
160			160		
to			to	System area (Not used)	-
201			201		_
202			202	CH1 Industrial shipment settings offset value	-
203			203	CH1 Industrial shipment settings gain value	-
204			204	CH2 Industrial shipment settings offset value	-
205			205 206	CH2 Industrial shipment settings gain value	-
207			207	CH3 Industrial shipment settings offset value	-
208			208	CH3 Industrial shipment settings gain value CH4 Industrial shipment settings offset value	-
209			209	CH4 Industrial shipment settings onset value	-
210			210	CH5 Industrial shipment settings gain value	-
211			211	CH5 Industrial shipment settings onset value	1
212			212	CH6 Industrial shipment settings gain value	1
213			213	CH6 Industrial shipment settings gain value	-
214			214	CH7 Industrial shipment settings offset value	-
215	System area (Not used)	_	215	CH7 Industrial shipment settings gain value	-
216			216	CH8 Industrial shipment settings offset value	1
217			217	CH8 Industrial shipment settings gain value	
218			218	CH1 User range settings offset value	R/W
219			219	CH1 User range settings gain value	1
220			220	CH2 User range settings offset value	
221			221	CH2 User range settings gain value	1
222			222	CH3 User range settings offset value	1
223			223	CH3 User range settings gain value	
224			224	CH4 User range settings offset value	
225			225	CH4 User range settings gain value	1
226			226	CH5 User range settings offset value	
227			227	CH5 User range settings gain value	
228			228	CH6 User range settings offset value	
229			229	CH6 User range settings gain value	
230			230	CH7 User range settings offset value	
231			231	CH7 User range settings gain value	
232			232	CH8 User range settings offset value	
233			233	CH8 User range settings gain value	
234					
to					
255					
256		_			
to	MX. CH. channel digital output value	R			
383		I			

2.3 A68AD (Upgrade to Q68ADV, Q68ADI)

2.3.1 Performance comparison

ľ	tem	A68AD					
	Voltage	-10 to 0 to +10VDC					
Analog input		(Input resistance value: Hardware version K or later: 1MΩ, Hardware version J or earlier: 30kΩ)					
	Current	+4 to +20mADC (Input resistance value: 250Ω) *Usable current input: -20 to 0 to +20mA					
Digital output		16-bit signed binary (-2048 to +2047)					
		Analog input Digital output					
I/O characteris	stics	+10V +2000 +5V or +20mA +1000					
i/O onaracient	51100	0V or +4mA ±0					
		-5V or -12mA -1000					
		-10V -2000					
		Valle and Empl (4/0000)					
Maximum reso	olution	Voltage: 5mV (1/2000)					
		Current: 20µA (1/1000)					
		±1% (±20)					
Overall accura	acy (Accuracy in						
respect to max	ximum digital						
output value)							
Maximum con	version speed	Max. 2.5ms/channel					
		Voltage: 145V					
Absolute maxi	mum input	Voltage: ±15V current: ±30mA					
		Carrent, 1900/17	I				

O : Compatible, △ : Partial change required, ×: Incompatible

					2004-21			tial change required, ×: Incompatible
	Q68AE			Q68ADI			Compatibility	Precautions for replacement
//	-10 to 10' ut resistance			-				The voltage/ourrent connet be
(Inpl	it resistance	value: TMΩ)		0 to 20mADC			Δ	The voltage/current cannot be mixed for one module.
U to 20mADC (Input resistance value: 250Ω)								mixed for othe module.
		16-hi	l t signed bin	` '	larice value	c. 230s2)		
		(Normal resolut	-	-			0	
	High res	solution mode: -1						
	g							
		Normal reso	lution mode	Н	igh resolutio	n mode		As concept of gain value is
	g input	Digital	Maximur			Maximum		changed, refer to [Analog-
Tai	nge	output value	resolutio			resolution	Δ	Digital Converter Module
	0 to 10V	0.14000	2.5mV	0 to 1	6000	0.625mV		User's Manual] and then,
	0 to 5V 1 to 5V	0 to 4000	1.25mV 1.0mV	0 to 1	2000 —	0.416mV 0.333mV		confirm the I/O characteristics.
Voltage	-10 to 10V		2.5mV	-16000 to	n 16000	0.625mV		
<u> </u>	User range	-4000 to 4000						
	settings		0.375m\	/ -12000 to	0 12000	0.333mV		
	0 to 20mA	0 to 4000	5µA	0 to 1	2000	1.66µA		
Current	4 to 20mA		4µA			1.33µA	0	
	User range settings	-4000 to 4000	1.37µA	-12000 to	o 12000	1.33µA		
	counge	<u> </u>						
							_	
		Normal resolution m		Ŭ ,		<u> </u>		
	Ambient	temperature 0 to 55°C		Ambient temperature 0 to 55°C		to		
Analog inpu	ut With	Without	Ambient	With	Without	Ambient		
range	temperati		temperature 25±5°C	temperature	temperatu	Itemperature		
	drift	drift		drift	drift			
lo to 1		tion compensation		compensation	compensat	tion	4	
0 to 1				±0.3%	±0.4%	±0.1%		
10				(±48 digits)	(±64 digit	s) (±16 digits)		
Voltage 0 to	5V							
1 to								
use								
ranç settir	±0.3%		±0.1%					
0 to	(± 1∠ (liqi	ts) (±16 digits)	(±4 digits)	±0.3%	±0.4%	±0.1%		
20m	nA			(±36 digits)	(±48 digit	s) (±12 digits)		
4 to	-							
Current 20m								
rang								
settir] [
								The conversion speed of
								Q68ADV/I to A68AD has
								become quick. And then, on
		80)µs/channel					A68AD, the noise that did not
(When there	is temperatu	ure drift compens	sation, the ti	me calculate	d by addin	g 160 µs will b	oe O	import on Q68ADV/I can be
	used	d regardless of the	he number (of channels u	sed.)			imported as analog signal. In
								this case, use the averaging
								processing function to remove
								the effect of noise.
	±15V	,			±30mA		0	

Item	A68AD	
Analog input points	8 channels/module	
Maximum number of writes for		
E ² PROM	-	
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolated	
Dielectric withstand voltage	-	
Insulation resistance	-	
Occupied I/O points	32 points (I/O assignment: special 32 points)	
Connected terminal	38-point terminal block	
Applicable wire size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Internal current consumption	Hardware version K or later: 0.39A	
(5VDC)	Hardware version J or earlier: 0.9A	
Weight	Hardware version K or later: 0.3kg	
	Hardware version J or earlier: 0.6kg	

O: Compatible, \triangle : Partial change required, \times : Incompatible

	Q68ADV	Q68ADI	Compatibility	Precautions for replacement	
	8 channels/module		0		
	Max. 100,	0			
	Between the I/O terminal and prog photocoupl Between channe	0			
	, -	rammable controller power supply: or 1 minute	0		
	Between the I/O terminal and programmable controller power supply: 500VDC, 20M Ω or more		0		
	16 points (I/O assignment: intelligent 16 points)		Δ	I/O occupied points has changed to 16 points.	
	18-point terminal block 0.3 to 0.75mm ²		×		
			×	Wiring change is required.	
	R1.25-3 (A solderless terminal	with sleeve can not be used.)	×		
	0.64A	0.64A	Δ	The recalculation of internal current consumption [5VDC] is required.	
	0.19kg	0.19kg	0		

2.3.2 Function comparison

 $\ensuremath{\mathsf{O}}$: With functions, -: Without functions

Item	Description	A68AD	Q68ADV/I	Precautions for replacement
A/D conversion enable/disable	Specifies whether to enable or disable the A/D conversion for each channel. By disabling the conversion for the channels that are not used, the sampling time can be shortened.	0	0	
Sampling processing	The A/D conversion for analog input values is performed successively for each channel, and the digital output value is output upon each conversion.	0	0	The sampling processing time changes depending on the number of channels used (number of channels set to A/D conversion enable) and whether, with or without the temperature drift compensation function. (a) Without temperature drift compensation function (processing time) = (number of channels used) × 80 (µs /1 channel) (b) With temperature drift compensation function (processing time) = (number of channels used) × 80 (µs /1 channels used) × 80 (µs /1 channel) + 160µs
Averaging processing	For each channel, A/D conversion values are averaged for the set number of times or set amount of time, and the average value is output as a digital value.	0	0	The setting range of average time and count differ. Refer to [Analog-Digital Converter Module User's Manual] and then, confirm the specifications.
Maximum and minimum values hold function	The maximum and minimum values of the digital output values are retained in the module.	-	0	
Temperature drift compensation function	Errors arising from changes in the ambient temperature of the module are automatically compensated for to improve conversion accuracy. The temperature drift compensation function can be performed at (A/D conversion time for all channels) + 160µs.	-	0	
Resolution mode	The resolution settings of 1/4000, 1/12000 or 1/16000 can be selected according to the application. The resolution mode setting is applicable to all channels.	-	0	
Online module change	A module change is made without the system being stopped.	-	0	Replaceable modules during online are a process CPU and a redundant CPU.

2.3.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Analog-Digital Converter Module User's Manual.

A68AD				Q68ADV/I			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	
X1	A/D conversion READY	Y1		X1	Temperature drift compensation flag	Y1	
X2		Y2		X2		Y2	
X3		Y3		X3		Y3	
X4		Y4		X4	Not used	Y4	Not used
X5		Y5		X5		Y5	
X6		Y6		X6		Y6	
X7 X8		Y7 Y8		X7 X8	High resolution mode	Y7 Y8	
					status flag		On anotine a condition
X9		Y9		X9	Operating condition setting completed flag	Y9	Operating condition
XA		YA		XA	Offset/gain setting mode flag	YA	Setting request User range write request
XB		YB		XB	Channel change completed flag	YB	Channel change request
XC		YC		XC	Not used	YC	Not used
					Maximum value/		Maximum value/
XD		YD		XD	minimum value reset	YD	minimum value reset
			Not used		completed flag		request
XE	Not used	YE		XE	A/D conversion completed flag	YE	Not used
XF		YF		XF	Error flag	YF	Error clear request
X10		Y10					
X11		Y11					
X12		Y12					
X13		Y13					
X14 X15		Y14 Y15					
X15 X16		Y16					
X10		Y17					
X18		Y18					
X19		Y19					
X1A		Y1A					
X1B		Y1B					
X1C		Y1C					
X1D		Y1D					
X1E		Y1E					
X1F		Y1F					

2.3.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory or sequence program, refer to the Analog-Digital Converter Module User's Manual.

	A68AD			Q68ADV/I			
Address (Dec.)	Name	Address		Name	Read/write		
0	Number of channels		0	A/D conversion enable/disable			
1	Averaging processing specification		1	CH1 Time/count averaging setting			
2	CH1 Averaging time, count		2	CH2 Time/count averaging setting			
3	CH2 Averaging time, count		3	CH3 Time/count averaging setting			
4	CH3 Averaging time, count	DAM	4	CH4 Time/count averaging setting	DAM		
5	CH4 Averaging time, count	R/W	5	CH5 Time/count averaging setting	R/W		
6	CH5 Averaging time, count		6	CH6 Time/count averaging setting			
7	CH6 Averaging time, count		7	CH7 Time/count averaging setting			
8	CH7 Averaging time, count		8	CH8 Time/count averaging setting			
9	CH8 Averaging time, count		9	Averaging processing specification			
10	CH1 Digital output value		10	A/D conversion completed flag			
11	CH2 Digital output value		11	CH1 Digital output value			
12	CH3 Digital output value		12	CH2 Digital output value	1		
13	CH4 Digital output value		13	CH3 Digital output value			
14	CH5 Digital output value	R	14	CH4 Digital output value			
15	CH6 Digital output value		15	CH5 Digital output value	_		
16	CH7 Digital output value		16	CH6 Digital output value	R		
17	CH8 Digital output value		17	CH7 Digital output value			
18			18	CH8 Digital output value			
19			19	Error code	-		
20			20	Setting range (CH1 to CH4)			
21			21	Setting range (CH5 to CH8)			
22			22	Offset/gain setting mode Offset specification	5.44		
23			23	Offset/gain setting mode Gain specification	R/W		
24			24				
25	1		25				
26	System area (Not used)	-	26		-		
27			27	System area (Not used)			
28			28				
29			29				
30			30	CH1 Maximum value			
31			31	CH1 Minimum value			
32			32	CH2 Maximum value			
33			33	CH2 Minimum value			
34	Write data error code	R/W	34	CH3 Maximum value			
			35	CH3 Minimum value			
			36	CH4 Maximum value			
			37	CH4 Minimum value			
			38	CH5 Maximum value	R		
			39	CH5 Minimum value	1		
			40	CH6 Maximum value	1		
			41	CH6 Minimum value	1		
			42	CH7 Maximum value	1		
			43	CH7 Minimum value	1		
			44	CH8 Maximum value			
				•	1		

	Q68ADV/I	
Address	Nama	Decelorite
(Dec.)	Name	Read/write
46		
to	System area (Not used)	-
157		
158	Mode quitching potting	DAM
159	Mode switching setting	R/W
160		
to	System area (Not used)	-
201		
202	CH1 Industrial shipment settings offset value	
203	CH1 Industrial shipment settings gain value	
204	CH2 Industrial shipment settings offset value	
205	CH2 Industrial shipment settings gain value	
206	CH3 Industrial shipment settings offset value	
207	CH3 Industrial shipment settings gain value	
208	CH4 Industrial shipment settings offset value	
209	CH4 Industrial shipment settings gain value	
210	CH5 Industrial shipment settings offset value	
211	CH5 Industrial shipment settings gain value	
212	CH6 Industrial shipment settings offset value	
213	CH6 Industrial shipment settings gain value	
214	CH7 Industrial shipment settings offset value	
215	CH7 Industrial shipment settings gain value	
216	CH8 Industrial shipment settings offset value	
217	CH8 Industrial shipment settings gain value	R/W
218	CH1 User range settings offset value	TX/VV
219	CH1 User range settings gain value	
220	CH2 User range settings offset value	
221	CH2 User range settings gain value	
222	CH3 User range settings offset value	
223	CH3 User range settings gain value	
224	CH4 User range settings offset value	
225	CH4 User range settings gain value	
226	CH5 User range settings offset value	
227	CH5 User range settings gain value	
228	CH6 User range settings offset value	
229	CH6 User range settings gain value	
230	CH7 User range settings offset value	
231	CH7 User range settings gain value	
232	CH8 User range settings offset value	
233	CH8 User range settings gain value	

2.4 A68AD (Upgrade to Q68AD-G)

2.4.1 Performance comparison

It	em		A68	BAD						
	Voltage	(lament resistance regional land		+10VDC	one version. Les contiens 201cO					
Analog input	Current	+4 to	(Input resistance value: Hardware version K or later: $1M\Omega$, Hardware version J or earlier: $30k\Omega$) +4 to +20mADC (Input resistance value: 250Ω) *Usable current input: -20 to 0 to +20mA							
Digital output			16-bit signed binar							
I/O characteristics			Analog input +10V +5V or +20mA 0V or +4mA -5V or -12mA -10V	Digital output +2000 +1000 ±0 -1000 -2000						
Maximum resc	blution		-	nV (1/2000) μΑ (1/1000)						
Overall accura respect to max output value)	icy (Accuracy in kimum digital		±1%	(±20)						
Maximum conv	version speed		Max. 2.5n	ns/channel						
Response time	9	-								
Absolute maxing	bsolute maximum input Voltage: ±15V current: ±30mA									

O: Compatible, △: Partial change required, ×: Incompatible

					0.		tiai change required, *. Incompatible
			68AD-G			Compatibility	Precautions for replacement
		-10					
	((Input resistance	0				
		0 to					
		(Input resista	ance value: 25	$(\Omega\Omega)$			
		16-bit s	signed binary				
	(1)	Normal resolution	n mode: -4096	to 4095,		0	
	High resol	ution mode: -12	288 to 12287,	-16384 to 16383)			
	-			·			
		Normal reso	lution mode	High resolu	tion mode		
Input	Analog input range	Digital	Maximum	Digital	Maximum		
		output value	resolution	output value	resolution		
	0 to 10V		2.5mV	0 to 16000	0.625mV		
	0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV		
	1 to 5V		1.0mV	0 10 12000	0.333mV		As concept of gain value is
Voltage	1 to 5V	-1000 to 4500	1.0mV	-3000 to 13500	0.333mV		changed, refer to Q68AD-G
	(Expanded mode)	1000 to 4000				Δ	[User's Manual] and then,
	-10 to 10V	-4000 to 4000	2.5mV	-16000 to 16000	0.625mV		confirm the I/O characteristics.
	Users range setting		0.375mV	-12000 to 12000	0.333mV		
	0 to 20mA	0 to 4000	5μA	0 to 12000	1.66µA		
	4 to 20mA		4µA		1.33µA		
Current		-1000 to 4500	4µA	-3000 to 13500	1.33µA		
	(Expanded mode) Users range setting	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		
	Users range setting	-4000 10 4000	1.37μΑ	-12000 to 12000	1.33μΑ		
		-	±0.1%				
			ution mode: ±4	ldigit			
	High res	solution mode (0		-		0	
	_	ion mode (Othe	nit				
	•	ature coefficient:					
	Tompore		s/channel	(5.501 14701 0)			The conversion speed of
			pling cycle)				Q68AD-G to A68AD has
		(Saiii	-	become slow. If fast			
	20ms						
							conversion speed is required
							for control, the Q64AD is
		, , , ,	. 45) /				recommended.
			age: ±15V			0	
		curre	ent: ±30mA				

Item	A68AD	
Analog input points	8 channels/module	
Maximum number of writes for		
E ² PROM	-	
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolated	
Dielectric withstand voltage	_	
Insulation resistance	-	
0	32 points	
Occupied I/O points	(I/O assignment: special 32 points)	
Connected terminal	38-point terminal block	
Applicable wire size	0.75 to 2mm ²	
Applicable wife size	(Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Internal current consumption	Hardware version K or later: 0.39A	
(5VDC)	Hardware version J or earlier: 0.9A	
Woight	Hardware version K or later: 0.3kg	
Weight	Hardware version J or earlier: 0.6kg	

 $O : Compatible, \triangle : Partial \ change \ required, \ \times : Incompatible$

Q68AD-G	Compatibility	Precautions for replacement
8 channels/module	0	
Up to 50,000 times	0	
Between the I/O terminal and programmable controller power supply:		
transformer isolation	0	
Between channels: transformer isolation		
Between the I/O terminal and programmable controller power supply:		
500VACrms, for 1 minute	0	
Between analog input channels: 1000VACrms, for 1 minute		
Between the I/O terminal and programmable controller power supply:		
500VDC, 10M Ω or more	0	
Between analog input channels: 500VDC, 10M Ω or more		
16 points		I/O occupied points has
(I/O assignment: intelligent 16 points)	Δ	changed to 16 points.
40-pin connector	×	
Within 0.3mm ²	×	Wiring change is required.
-	×	
		The recalculation of internal
0.46A	Δ	current consumption [5VDC] is
		required.
0.16kg	0	

2.4.2 Function comparison

 $\ensuremath{\mathsf{O}}$: With functions, -: Without functions

Item	Description	A68AD	Q68AD-G	Precautions for replacement
A/D conversion enable/disable	Specifies whether to enable or disable the A/D conversion for each channel. By disabling the conversion for the channels that are not used, the sampling time can be shortened.	0	0	
Sampling processing	The A/D conversion for analog input values is performed successively for each channel, and the digital output value is output upon each conversion.	0	0	
Averaging processing	For each channel, A/D conversion values are averaged for the set number of times or set amount of time, and the average value is output as a digital value.	0	0	The setting range of average time and count differ. Refer to Q68AD-G [User's
	Moving average takes the average of the specified number of digital output values measured per sampling time.	-	0	Manual] and then, confirm the specifications.
Primary delay filter	A digital output value is smoothed according to the preset time constant.	-	0	
Maximum and minimum values hold function	The maximum and minimum values of the digital output values are retained in the module.	-	0	
Resolution mode	The resolution can be switched according to the application. The resolution mode is batch-set for all the channels.*1	-	0	
Input signal error detection function	The voltage/current outside the setting range is detected.	-	0	
Warning output function	 (1) Process alarm A warning is output if a digital output value falls outside the setting range. (2) Rate alarm A warning is output if the varying rate of a digital output value falls outside the preset varying rate range. 	-	0	
Scaling function	Conversion of A/D conversion values to preset percentage values and loading into the buffer memory is available. Programming steps for the scaling can be eliminated.	-	0	
Online module change	A module change is made without the system being stopped.	-	0	Replaceable modules during online are a process CPU and a redundant CPU.

For the A68AD, the resolution for voltage is 1/2000 and that for current is 1/1000 (fixed). For the Q68AD-G, the resolution for voltage and current is 1/4000 in the normal resolution mode, while the resolution for the voltage from -10 to 10V is 1/16000 and the resolution for the voltage in other ranges and current is 1/12000 in the high resolution mode.

2.4.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Channel Isolated Analog-Digital Converter Module, Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual.

A68AD					Q68AD-G			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error	Y0		X0	Module READY	Y0		
X1	A/D conversion READY	Y1		X1		Y1		
X2		Y2		X2		Y2		
X3		Y3		X3	Not used	Y3		
X4		Y4		X4		Y4	Not used	
X5 X6		Y5 Y6		X5 X6		Y5 Y6		
					High resolution mode			
X7		Y7		X7	status flag	Y7		
X8		Y8		X8	Warming output signal	Y8		
X9		Y9		X9	Operating condition setting completed flag	Y9	Operating condition setting request	
XA		YA		XA	Offset/gain setting mode flag	YA	User range write request	
XB		YB		ХВ	Channel change completed flag	YB	Channel change request	
XC		YC		XC	Input signal error detection signal	YC	Not used	
					Maximum value/		Maximum value/	
XD		YD	Not used	XD	minimum value reset	YD	minimum value reset	
	Not used		Not used		completed flag		request	
XE		YE		XE	A/D conversion completed flag	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10		Y10						
X11		Y11						
X12		Y12						
X13 X14		Y13 Y14						
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18						
X19		Y19						
X1A		Y1A						
X1B		Y1B						
X1C		Y1C						
X1D		Y1D						
X1E X1F		Y1E Y1F						
A I F		TIF		J				

2.4.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory or sequence program, refer to the Channel Isolated Analog-Digital Converter Module, Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual.

	A68AD			Q68AD-G	
Address (Dec.)	Name	Read/write	Address (Dec.)	Name	Read/write
0	Number of channels		0	A/D conversion enable/disable	
1	Averaging processing specification	1	1	CH1 Average time/Average number of times/	
	Averaging processing specification		,	Moving average/Time constant settings	
2	CH1 Averaging time, count		2	CH2 Average time/Average number of times/	
	Offi Averaging line, count			Moving average/Time constant settings	
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/	
	on z / wordging time, obtain			Moving average/Time constant settings	
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/	
•	one meraging time, esam	R/W		Moving average/Time constant settings	R/W
5	CH4 Averaging time, count		5	CH5 Average time/Average number of times/	
	orry wordging time, count			Moving average/Time constant settings	
6	CH5 Averaging time, count		6	CH6 Average time/Average number of times/	
	or to 7 tronaging time, sound			Moving average/Time constant settings	
7	CH6 Averaging time, count		7	CH7 Average time/Average number of times/	
•	or to 7 weraging time, sound		,	Moving average/Time constant settings	
8	CH7 Averaging time, count		8	CH8 Average time/Average number of times/	
	orn 7 weraging time, sound			Moving average/Time constant settings	
9	CH8 Averaging time, count		9	System area (Not used)	-
10	CH1 Digital output value		10	A/D conversion completed flag	
11	CH2 Digital output value		11	CH1 Digital output value	
12	CH3 Digital output value		12	CH2 Digital output value	
13	CH4 Digital output value	R	13	CH3 Digital output value	
14	CH5 Digital output value		14	CH4 Digital output value	
15	CH6 Digital output value		15	CH5 Digital output value	R
16	CH7 Digital output value		16	CH6 Digital output value] '`
17	CH8 Digital output value		17	CH7 Digital output value	
18			18	CH8 Digital output value	
19			19	Error code	
20			20	Setting range (CH1 to CH4)	
21			21	Setting range (CH5 to CH8)	
22			22	Offset/gain setting mode Offset specification	
23			23	Offset/gain setting mode Gain specification	
24			24	Averaging process specification (CH1 to CH4)	R/W
25	System area (Not used)	-	25	Averaging process specification (CH5 to CH8)	
26			26		
27			27	System area (Not used)	
28			28	Joystem area (NOL useu)	_
29			29		
30			30	CH1 Maximum value	
31			31	CH1 Minimum value]
32			32	CH2 Maximum value]
33			33	CH2 Minimum value	R
34	Write data error code	R/W	34	CH3 Maximum value	
			to]
			44	CH8 Maximum value	
			45	CH8 Minimum value	

	Q68AD-G	
Address	Name	Read/write
(Dec.)		
46	System area (Not used)	-
47	Input signal error detection extended/input	R/W
48	signal error detection setting Warning output setting	IK/VV
49	Input signal error detection flag	
50	Warning output flag (Process alarm)	R
51	Warning output flag (Rate alarm)	, N
52	System area (Not used)	-
53	Scaling enable/disable setting	R/W
54	CH1 Scaling value	17///
to	Citt Scaling value	R
61	CH8 Scaling value	, N
62	CH1 Scaling lower limit value	
63	CH1 Scaling lower limit value	
to	CTT Scaling upper littlit value	
76	CH8 Scaling lower limit value	
77	CH8 Scaling upper limit value	
to	Cho Scaling upper littlit value	
86	CH1 Process alarm lower lower limit value	
87	CH1 Process alarm lower lower limit value	
88	CH1 Process alarm lower upper limit value	
89	CH1 Process alarm upper lower limit value	
to	CHT Process alarm upper upper limit value	
114	CH8 Process alarm lower lower limit value	
115	CH8 Process alarm lower upper limit value	
116	CH8 Process alarm upper lower limit value	
117	CH8 Process alarm upper upper limit value	R/W
118	CH1 Rate alarm warning detection period	10,00
to	Citi Nate alaim warning detection period	1
125	CH8 Rate alarm warning detection period	
126	CH1 Rate alarm upper limit value	
127	CH1 Rate alarm lower limit value	
to	Citi Nate alaini lower liinit value	
140	CH8 Rate alarm upper limit value	
141	CH8 Rate alarm lower limit value	
171	CH1 Input signal error detection setting	
142	value/CH1 Input signal error detection lower	
	limit setting value	
to	Timine colling value	
	CH1 Input signal error detection upper limit	1
150	setting value	
to	3 ·	
158		
159	Mode switching setting	R/W
to		
200	Save data classification setting	R/W
201	System area (Not used)	-
202	CH1 Factory default offset value	
203	CH1 Factory default gain value	1
to		R/W
232	CH8 Factory default offset value	
233	CH8 Factory default gain value	1
_55	1	1

2.5 A68AD-S2 (Upgrade to Q68ADV, Q68ADI)

2.5.1 Performance comparison

If	em	A68AD-S2	
		-10 to 0 to +10VDC	
	Voltage	(Input resistance value: Hardware version K or later: $1M\Omega$, Hardware version J or earlier: $30k\Omega$)	
Analog input		$+4 \text{ to } +20\text{mADC (Input resistance value: } 250\Omega)$	
	Current		
		*Usable current input: -20 to 0 to 20mA	
Digital output		16-bit signed binary (-2048 to +2047)	
I/O characteristics		Analog input Digital output +10V +2000 +5V or +20mA +1000 0V or +4mA ±0 -5V or -12mA -1000 -10V -2000	
Maximum resc	olution	Voltage: 5mV (1/2000) Current: 20μΑ (1/1000)	
Overall accura respect to max output value)	cy (Accuracy in kimum digital	Within ±1% (±20)	

O: Compatible, \triangle : Partial change required, \times : Incompatible

Q68ADV				(Q68ADI	0.0		Precautions for replacement
	-10 to 10\							
(Inpu	t resistance	/alue: 1MΩ)		- !				The voltage/current cannot be
				0 to	20mADC	;	Δ	mixed for one module.
	-			(Input resist	ance valu	e: 250Ω)		
		16-bi	t signed bina	ary				
		(Normal resolut	ion mode: -4	4096 to 4095	,		0	
	High res	olution mode: -	12288 to 122	287, -16384 t	o 16383)			
Analog	g input		olution mode		gh resolutio	on mode		As concept of gain value is
ran		Digital	Maximun			Maximum		changed, refer to [Analog-
	0 to 10\/	output value	resolution			resolution	Δ	Digital Converter Module
	0 to 10V 0 to 5V	0 to 4000	2.5mV 1.25mV	0 to 10	6000	0.625mV 0.416mV		User's Manual] and then,
	1 to 5V	0 10 4000	1.2311V 1.0mV	0 to 1	2000	0.41011V 0.333mV		confirm the I/O characteristics.
Voltage	-10 to 10V		2.5mV	-16000 to	16000	0.625mV		
	User range	-4000 to 4000	0.275m\	/ 12000 to	12000			
	settings		0.375mV	′ -12000 to	3 12000	0.333mV		
	0 to 20mA	() to 4000		5μA 0 to 12000 1.66μ.		1.66µA		
Current	4 to 20mA		4µA			1.33μΑ	0	
	User range settings	-4000 to 4000	1.37µA	-12000 to	12000	1.33μΑ		
	ocungo				<u> </u>			
	Normal resolution mode				n resolution	mode		
		Ambient temperature		Ambient ten				
Analog inn	1	0 to 55°C			0 to 55°C			
Analog inpurange	With	Without	- Ambient temperature	With	Withou	Ambient temperature		
·ango	temperatu	•	25±5°C	temperature	temperatu	ure 25±5°C		
	drift	drift ion compensation		drift compensation	drift	tion		
0 to 1		lon compensation	1	-				
-10				±0.3%	±0.4%			
10\	/			(±48 digits)	(±64 digit	ts) (±16 digits)		
Voltage 0 to	5V						0	
1 to								
Use								
rang settir	±0.3%	±0.4%	±0.1%					
0 to	- (±12 alalı	s) (±16 digits)	(±4 digits)	±0.3%	±0.4%	±0.1%		
20m				(±36 digits)	(±48 digit			
4 to	D				1			
Current 20m					1			
Use					1			
rang settir	·				1			
Settil	.9~		! _	I	l			

Item	A68AD-S2	
Maximum conversion speed	Max. 2.5ms/channel	
Absolute maximum input	Voltage: ±15V Current: ±30mA	
Analog input points	8 channels/module	
Maximum number of writes for E ² PROM	-	
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolated	
Dielectric withstand voltage	-	
Insulation resistance	-	
Occupied I/O points	32 points (I/O assignment: special 32 points)	
Connected terminal	38-point terminal block	
Applicable wire size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Internal current consumption	Hardware version K or later: 0.39A	
(5VDC)	Hardware version J or earlier: 0.9A	
Weight	Hardware version K or later: 0.3kg Hardware version J or earlier: 0.6kg	

O: Compatible, \triangle : Partial change required, \times : Incompatible

Q68ADV	Q68ADI	Compatibility	Precautions for replacement
80μs/cl (When there is temperature drift compensa will be used regardless of the	tion, the time calculated by adding 160 μs	0	The conversion speed of Q68ADV/I to A68AD-S2 has become quick. And then, on A68AD-S2, the noise that did not import on Q68ADV/I can be imported as analog signal. In this case, use the averaging processing function to remove the effect of noise.
±15V	±30mA	0	
8 channel	s/module	0	
Max. 100,	000 times	0	
Between the I/O terminal and progr photocouple Between channe	er isolation	0	
Between the I/O terminal and programmer 500VAC, for		0	
Between the I/O terminal and prog 500VDC, 20		0	
16 po (I/O assignment: in		Δ	I/O occupied points has changed to 16 points.
18-point ter	minal block	×	
0.3 to 0.	×	Wiring change is required.	
R1.25-3 (A solderless terminal	×		
 0.64A	0.64A	Δ	The recalculation of internal current consumption [5VDC] is required.
0.19kg	0.19kg	0	

2.5.2 Function comparison

 $\ensuremath{\mathsf{O}}$: With functions, -: Without functions

Item	Description	A68AD-S2	Q68ADV/I	Precautions for replacement
A/D conversion enable/disable	Specifies whether to enable or disable the A/D conversion for each channel. By disabling the conversion for the	0	0	
AD conversion enable/disable	channels that are not used, the sampling time can be shortened.		0	
Sampling processing	The A/D conversion for analog input values is performed successively for each channel, and the digital output value is output upon each conversion.	0	0	The sampling processing time changes depending on the number of channels used (number of channels set to A/D conversion enable) and whether, with or without the temperature drift compensation function. (a) Without temperature drift compensation function (processing time) = (number of channels used) × 80 (µs /1 channel) (b) With temperature drift compensation function (processing time) = (number of channels used) × 80 (µs /1 channel) + 160µs
Averaging processing	For each channel, A/D conversion values are averaged for the set number of times or set amount of time, and the average value is output as a digital value.	0	0	The setting range of average time and count differ. Refer to [Analog-Digital Converter Module User's Manual] and then, confirm the specifications.
Maximum and minimum values hold function	The maximum and minimum values of the digital output values are retained in the module.	-	0	
Temperature drift compensation function	Errors arising from changes in the ambient temperature of the module are automatically compensated for to improve conversion accuracy. The temperature drift compensation function can be performed at (A/D conversion time for all channels) + 160µs.	-	0	
Resolution mode	The resolution settings of 1/4000, 1/12000 or 1/16000 can be selected according to the application. The resolution mode setting is applicable to all channels.	-	0	
Online module change	A module change is made without the system being stopped.	-	0	Replaceable modules during online are a process CPU and a redundant CPU.

2.5.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Analog-Digital Converter Module User's Manual.

	A68 <i>A</i>	AD-S2		Q68ADV/I			
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.	Signal hame	No.	Signal hame	No.		No.	Signal Hame
X0	Watchdog timer error	Y0		X0	Module READY	Y0	
X1	A/D conversion READY	Y1		X1	Temperature drift	Y1	
	7 TB CONTOICION TREATE				compensation flag		
X2		Y2		X2		Y2	
Х3		Y3		Х3		Y3	
X4		Y4		X4	Not used	Y4	Not used
X5		Y5		X5		Y5	
X6		Y6		X6		Y6	
X7		Y7		X7	I Cala and a latter and a	Y7	
X8		Y8		X8	High resolution mode status flag	Y8	
				```	Operating condition		Operating condition
X9		Y9		X9	setting completed flag	Y9	setting request
V A		YA		XA	Offset/gain setting mode	V/A	Llaar range write request
XA		YA		XA	flag	YA	User range write request
XB		YB		XB	Channel change	YB	Channel change request
ΛD				ΛD	completed flag		Channel Change request
XC		YC		XC	Not used	YC	Not used
					Maximum value/		Maximum value
XD		YD	Not used	XD	minimum value reset	YD	/minimum value reset
					completed flag		request
XE	Not used	YE		XE	A/D conversion	YE	Not used
\ <u></u>		\/=			completed flag	\/=	
XF		YF		XF	Error flag	YF	Error clear request
X10 X11		Y10 Y11					
X11		Y12					
X12		Y13					
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19					
X1A		Y1A					
X1B		Y1B					
X1C		Y1C					
X1D		Y1D					
X1E		Y1E					
X1F		Y1F					

#### 2.5.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory or sequence program, refer to the Analog-Digital Converter Module User's Manual.

	A68AD-S2			Q68ADV/I	
Address			Address		
(Dec.)	Name	Read/write	(Dec.)	Name	Read/write
0	Used channel specification		0	A/D conversion enable/disable	
1	Averaging processing specification		1	CH1 Time/count averaging setting	
2	CH1 Averaging time, count		2	CH2 Time/count averaging setting	
3	CH2 Averaging time, count		3	CH3 Time/count averaging setting	1
4	CH3 Averaging time, count	DAM	4	CH4 Time/count averaging setting	DAM
5	CH4 Averaging time, count	R/W	5	CH5 Time/count averaging setting	R/W
6	CH5 Averaging time, count		6	CH6 Time/count averaging setting	1
7	CH6 Averaging time, count		7	CH7 Time/count averaging setting	
8	CH7 Averaging time, count		8	CH8 Time/count averaging setting	
9	CH8 Averaging time, count		9	Averaging processing specification	
10	CH1 Digital output value		10	A/D conversion completed flag	
11	CH2 Digital output value		11	CH1 Digital output value	
12	CH3 Digital output value		12	CH2 Digital output value	
13	CH4 Digital output value		13	CH3 Digital output value	
14	CH5 Digital output value	R	14	CH4 Digital output value	
15	CH6 Digital output value		15	CH5 Digital output value	1 _
16	CH7 Digital output value		16	CH6 Digital output value	R
17	CH8 Digital output value		17	CH7 Digital output value	
18			18	CH8 Digital output value	
19	1		19	Error code	
20	1		20	Setting range (CH1 to CH4)	
21	1		21	Setting range (CH5 to CH8)	1
22	1		22	Offset/gain setting mode Offset specification	5.044
23	1		23	Offset/gain setting mode Gain specification	R/W
24	1		24		
25	1		25		
26	System area (Not used)	-	26		
27	1		27	System area (Not used)	-
28			28		
29			29		
30			30	CH1 Maximum value	
31			31	CH1 Minimum value	1
32	1		32	CH2 Maximum value	1
33	1		33	CH2 Minimum value	1
34	Write data error code	R/W	34	CH3 Maximum value	1
35	A/D conversion completed flag	R	35	CH3 Minimum value	1
	·	l l	36	CH4 Maximum value	1
			37	CH4 Minimum value	1 _
			38	CH5 Maximum value	R
			39	CH5 Minimum value	1
			40	CH6 Maximum value	1
			41	CH6 Minimum value	1
			42	CH7 Maximum value	1
			43	CH7 Minimum value	1
			44	CH8 Maximum value	1
					ī

	Q68ADV/I	
Address	Nama	Doodlywite
(Dec.)	Name	Read/write
46		
to	System area (Not used)	-
157		
158	Made autitabing actting	DAM
159	Mode switching setting	R/W
160		
to	System area (Not used)	-
201		
202	CH1 Industrial shipment settings offset value	
203	CH1 Industrial shipment settings gain value	
204	CH2 Industrial shipment settings offset value	
205	CH2 Industrial shipment settings gain value	
206	CH3 Industrial shipment settings offset value	]
207	CH3 Industrial shipment settings gain value	
208	CH4 Industrial shipment settings offset value	
209	CH4 Industrial shipment settings gain value	
210	CH5 Industrial shipment settings offset value	
211	CH5 Industrial shipment settings gain value	
212	CH6 Industrial shipment settings offset value	
213	CH6 Industrial shipment settings gain value	
214	CH7 Industrial shipment settings offset value	
215	CH7 Industrial shipment settings gain value	
216	CH8 Industrial shipment settings offset value	
217	CH8 Industrial shipment settings gain value	D / A /
218	CH1 User range settings offset value	R/W
219	CH1 User range settings gain value	
220	CH2 User range settings offset value	
221	CH2 User range settings gain value	1
222	CH3 User range settings offset value	1
223	CH3 User range settings gain value	]
224	CH4 User range settings offset value	
225	CH4 User range settings gain value	1
226	CH5 User range settings offset value	1
227	CH5 User range settings gain value	1
228	CH6 User range settings offset value	1
229	CH6 User range settings gain value	1
230	CH7 User range settings offset value	1
231	CH7 User range settings gain value	1
232	CH8 User range settings offset value	1
233	CH8 User range settings gain value	1

# 2.6 A68AD-S2 (Upgrade to Q68AD-G)

### 2.6.1 Performance comparison

ı	tem	A68AD-S2					
	Voltage	-10 to 0 to +10VDC					
Analog input	Voltage	(Input resistance value: Hardware version K or later: $1M\Omega$ , Hardware version J or earlier: $30k\Omega$ )					
Analog Input	Current	+4 to +20mADC (Input resistance value: 250Ω)					
	Ourient	*Usable current input: -20 to 0 to 20mA					
Digital output		16-bit signed binary (-2048 to +2047)					
I/O characteris	stics	Analog input Digital output +10V +2000 +5V or +20mA +1000 0V or +4mA ±0 -5V or -12mA -1000 -10V -2000					
Maximum reso	olution	Voltage: 5mV (1/2000) Current: 20μΑ (1/1000)					
Overall accura respect to ma output value)	acy (Accuracy in ximum digital	Within ±1% (±20)					

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

					Ο.	Compatible, 4.1 ai	tiai criange required, ^. incompatible
		Q	68AD-G			Compatibility	Precautions for replacement
		-10					
	(	Input resistance					
	<u> </u>	0 to	<del> </del>				
		(Input resista					
		<u> </u>	signed binary	,			
	(1)	Normal resolutio	,	to 4095		0	
	`			-16384 to 16383)			
	riigiriesoi	ation mode12	200 10 12207,	-10304 to 10303			
	T			1			
11		Normal reso		High resolu			
Input	Analog input range	Digital	Maximum	Digital	Maximum		
	0.140)./	output value	resolution	output value	resolution		
	0 to 10V	0 to 4000	2.5mV	0 to 16000	0.625mV		
	0 to 5V		1.25mV	0 to 12000	0.416mV		
Voltage	1 to 5V 1 to 5V		1.0mV		0.333mV	<del>_</del>	As concept of gain value is
voltage	(Expanded mode)	-1000 to 4500	1000 to 4500 1.0mV	-3000 to 13500	0.333mV	Δ	changed, refer to Q68AD-G
	-10 to 10V		2.5mV	-16000 to 16000	0.625mV		[User's Manual] and then,
	Users range setting	-4000 to 4000	0.375mV	-12000 to 12000	0.333mV		confirm the I/O characteristics.
	0 to 20mA		5μA		1.66µA		
	4 to 20mA	0 to 4000	4µA	0 to 12000	1.33µA		
Current	4 to 20mA (Expanded mode)	-1000 to 4500	4μA	-3000 to 13500	1.33µA		
	Users range setting	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		
	•			•	<b></b>		
	±0.1%						
		Normal resolu					
	High res	olution mode (0	to 10V, -10 to	10V): ±16 digits		0	
	High resolution	on mode (Other	than the above	e ranges): ±12 di	gits		
	Tempera	ature coefficient:					

Item	A68AD-S2	
Maximum conversion speed	Max. 2.5ms/channel	
Response time	-	
Absolute maximum input	Voltage: ±15V Current: ±30mA	
Analog input points	8 channels/module	
Maximum number of writes for E ² PROM	-	
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolated	
Dielectric withstand voltage	-	
Insulation resistance	-	
Occupied I/O points	32 points (I/O assignment: special 32 points)	
Connected terminal	38-point terminal block	
Applicable wire size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Internal current consumption	Hardware version K or later: 0.39A	
(5VDC)	Hardware version J or earlier: 0.9A	
Weight	Hardware version K or later: 0.3kg Hardware version J or earlier: 0.6kg	

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

Q68AD-G	Compatibility	Precautions for replacement
10ms/channel		The conversion speed of Q68AD-G to
(Sampling cycle)		A68AD has become slow. If fast
20		conversion speed is required for
20ms		control, the Q64AD is recommended.
Voltage: ±15V	0	
current: ±30mA	0	
8 channels/module	0	
Up to 50,000 times	0	
•		
Between the I/O terminal and programmable controller power supply:		
transformer isolation	0	
Between channels: transformer isolation		
Between the I/O terminal and programmable controller power supply:		
500VACrms, for 1 minute	0	
Between analog input channels: 1000VACrms, for 1 minute		
Between the I/O terminal and programmable controller power supply:		
500VDC, 10M $\Omega$ or more	0	
Between analog input channels: 500VDC, 10M $\Omega$ or more		
16 points		I/O occupied points has changed to
(I/O assignment: intelligent 16 points)	Δ	16 points.
40-pin connector	×	
Within 0.3mm ²	×	Wiring change is required.
-	×	
 0.46A	Δ	The recalculation of internal current
U. TUN	A	consumption [5VDC] is required.
0.16kg	0	

#### 2.6.2 Function comparison

 $\ensuremath{\mathsf{O}}$  : With functions, -: Without functions

Item	Description	A68AD-S2	Q68AD-G	Precautions for replacement
A/D conversion enable/disable	Specifies whether to enable or disable the A/D conversion for each channel. By disabling the conversion for the channels that are not used, the sampling	0	0	
Sampling processing	time can be shortened.  The A/D conversion for analog input values is performed successively for each channel, and the digital output value is output upon each conversion.	0	0	
Averaging processing	For each channel, A/D conversion values are averaged for the set number of times or set amount of time, and the average value is output as a digital value.	0	0	The setting range of average time and count differ. Refer to Q68AD-G [User's
	Moving average takes the average of the specified number of digital output values measured per sampling time.	-	0	Manual] and then, confirm the specifications.
Primary delay filter	A digital output value is smoothed according to the preset time constant.	-	0	
Maximum and minimum values hold function	The maximum and minimum values of the digital output values are retained in the module.	-	0	
Resolution mode	The resolution can be switched according to the application. The resolution mode is batch-set for all the channels.*1	-	0	
Input signal error detection function	The voltage/current outside the setting range is detected.	-	0	
Warning output function	<ul> <li>(1) Process alarm A warning is output if a digital output value falls outside the setting range.</li> <li>(2) Rate alarm A warning is output if the varying rate of a digital output value falls outside the preset varying rate range.</li> </ul>	-	0	
Scaling function	Conversion of A/D conversion values to preset percentage values and loading into the buffer memory is available.  Programming steps for the scaling can be eliminated.	-	0	
Online module change	A module change is made without the system being stopped.	-	0	Replaceable modules during online are a process CPU and a redundant CPU.

For the A68AD-S2, the resolution for voltage is 1/2000 and that for current is 1/1000 (fixed). For the Q68AD-G, the resolution for voltage and current is 1/4000 in the normal resolution mode, while the resolution for the voltage from -10 to 10V is 1/16000 and the resolution for the voltage in other ranges and current is 1/12000 in the high resolution mode.

#### 2.6.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Channel Isolated Analog-Digital Converter Module, Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual.

A68AD-S2					Q68AD-G			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error	Y0		X0	Module READY	Y0		
X1	A/D conversion READY	Y1		X1		Y1		
X2		Y2		X2		Y2		
X3		Y3		X3 X4	Not used	Y3		
X4 X5		Y4 Y5		X4 X5		Y4 Y5	Not used	
X6		Y6		X6		Y6		
X7		Y7		X7	High resolution mode status flag	Y7		
X8		Y8		X8	Warming output signal	Y8		
X9		Y9		X9	Operating condition setting completed flag	Y9	Operating condition setting request	
XA		YA		XA	Offset/gain setting mode flag	YA	User range write request	
ХВ		YB		XB	Channel change completed flag	YB	Channel change request	
XC		YC		XC	Input signal error detection signal	YC	Not used	
				XD	Maximum value/		Maximum value/	
XD		YD	Not used		minimum value reset	YD	minimum value reset	
	Not used	used			completed flag		request	
XE		YE		XE	A/D conversion completed flag	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10 X11		Y10 Y11						
X12		Y12						
X13		Y13						
X14		Y14						
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18 Y19						
X19 X1A		Y1A						
X1B		Y1B						
X1C		Y1C						
X1D		Y1D						
X1E		Y1E						
X1F		Y1F						

#### 2.6.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the I/O signals or sequence program, refer to the Channel Isolated Analog-Digital Converter Module, Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual.

	A68AD-S2			Q68AD-G	
Address (Dec.)	Name	Read/write	Address (Dec.)	Name	Read/write
0	Used channel specification		0	A/D conversion enable/disable	
1	Averaging processing specification		1	CH1 Average time/Average number of times/	
ı	Averaging processing specification			Moving average/Time constant settings	
2	CH1 Averaging time, count		2	CH2 Average time/Average number of times/	
	Offi Averaging time, count			Moving average/Time constant settings	
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/	
	one nerve and the second			Moving average/Time constant settings	
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/	
	or to reading time, accent	R/W	•	Moving average/Time constant settings	R/W
5	CH4 Averaging time, count		5	CH5 Average time/Average number of times/	
	orranding amo, count			Moving average/Time constant settings	
6	CH5 Averaging time, count		6	CH6 Average time/Average number of times/	
	or to 7 th or aging time, ocalit			Moving average/Time constant settings	
7	CH6 Averaging time, count		7	CH7 Average time/Average number of times/	
,	or to 7 trologing time, count		,	Moving average/Time constant settings	
8	CH7 Averaging time, count		8	CH8 Average time/Average number of times/	
				Moving average/Time constant settings	
9	CH8 Averaging time, count		9	System area (Not used)	-
10	CH1 Digital output value		10	A/D conversion completed flag	
11	CH2 Digital output value		11	CH1 Digital output value	
12	CH3 Digital output value		12	CH2 Digital output value	
13	CH4 Digital output value	R	13	CH3 Digital output value	
14	CH5 Digital output value		14	CH4 Digital output value	
15	CH6 Digital output value		15	CH5 Digital output value	R
16	CH7 Digital output value		16	CH6 Digital output value	
17	CH8 Digital output value		17	CH7 Digital output value	
18			18	CH8 Digital output value	
19			19	Error code	
20			20	Setting range (CH1 to CH4)	
21			21	Setting range (CH5 to CH8)	
22			22	Offset/gain setting mode Offset specification	
23			23	Offset/gain setting mode Gain specification	
24			24	Averaging process specification (CH1 to CH4)	R/W
25	System area (Not used)	-	25	Averaging process specification (CH5 to CH8)	
26			26		
27			27	System area (Not used)	
28			28	Joystem area (NOL useu)	_
29			29	<u> </u>	
30			30	CH1 Maximum value	
31			31	CH1 Minimum value	
32			32	CH2 Maximum value	]
33			33	CH2 Minimum value	R
34	Write data error code	R/W	34	CH3 Maximum value	
35	A/D conversion completed flag	R	to		1
			44	CH8 Maximum value	
			45	CH8 Minimum value	1

	Q68AD-G	
Address (Dec.)	Name	Read/write
46	System area (Not used)	-
47	Input signal error detection extended/input	
47	signal error detection setting	R/W
48	Warning output setting	
49	Input signal error detection flag	
50	Warning output flag (Process alarm)	R
51	Warning output flag (Rate alarm)	
52	System area (Not used)	-
53	Scaling enable/disable setting	R/W
54	CH1 Scaling value	
to		R
61	CH8 Scaling value	
62	CH1 Scaling lower limit value	
63	CH1 Scaling upper limit value	
to		
76	CH8 Scaling lower limit value	
77	CH8 Scaling upper limit value	
to	2 77	
86	CH1 Process alarm lower lower limit value	
87	CH1 Process alarm lower upper limit value	
88	CH1 Process alarm upper lower limit value	
89	CH1 Process alarm upper upper limit value	
to		
114	CH8 Process alarm lower lower limit value	
115	CH8 Process alarm lower upper limit value	
116	CH8 Process alarm upper lower limit value	
117	CH8 Process alarm upper upper limit value	R/W
118	CH1 Rate alarm warning detection period	
to		
125	CH8 Rate alarm warning detection period	
126	CH1 Rate alarm upper limit value	
127	CH1 Rate alarm lower limit value	
to		
140	CH8 Rate alarm upper limit value	
141	CH8 Rate alarm lower limit value	
	CH1 Input signal error detection setting	
142	value/CH1 Input signal error detection lower	
	limit setting value	
to		1
450	CH1 Input signal error detection upper limit	1
150	setting value	
to		
158	Mada wildala w	5.44
159	Mode switching setting	R/W
to		
200	Save data classification setting	R/W
201	System area (Not used)	-
202	CH1 Factory default offset value	
203	CH1 Factory default gain value	
to	, 0, 1, 1, 1	R/W
232	CH8 Factory default offset value	1
233	CH8 Factory default gain value	
	, , , , , , , , , , , , , , , , , , , ,	1

# 2.7 A68ADN (Upgrade to Q68ADV, Q68ADI)

### 2.7.1 Performance comparison

If	tem			A68AI	DN					
Analog input	Voltage		-10 to 0 to +10VDC (Input resistance value: 1MΩ)							
0 1	Current									
		16-bit signed binary								
Disital autaut			When	1/4000 is set:	: -4096 to +40	95				
Digital output			When	1/8000 is set:	: -8192 to +81	91				
			When 1	/12000 is set:	-12288 to +12	2287				
		[			gital output valu					
			Analog input		5V/20mA, offse					
				1/4000	1/8000	1/12000				
I/O characteris	stics		+10V	+4000	+8000	+12000				
			+5V or +20mA	+2000	+4000	+6000				
			0V or 20mA	0	0	0				
			-5V or -20mA	-2000	-4000	-6000				
		l	-10V	-4000	-8000	-12000				
			(Fact	ory-set: gain	.5V, offset0	V)				
				1/4000	1/8000	1/12000				
Maximum reso	Diution		Voltage input	2.5mV	1.25mV	0.83mV				
			Current input	10µA	5µA	3.33µA				
				+	+		1			
				1/4000	1/8000	1/12000				
			±1%	±40	±80	±120	l			
Overall accura	ісу									
(Accuracy in re	espect to									
maximum digit	tal output value)									
	·									

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

			Q68AD	<b>/</b>		C	Q68ADI		Compatibility	Precautions for replacement
	-10 to 10VDC									
	ıl)	nput re	sistance v	ralue: 1MΩ)			-			The voltage/current cannot be
	_					0 to 20mADC				mixed for one module.
						(Input resista	ance valu	e: 250Ω)		
				16-bi	signed bina	arv				
				Normal resolut	-	-			0	
				olution mode: -1						
				Normal roos	lution mode	1152	ab rooduitie	n mada		
	An	alog inp	out	Normal reso	Maximum	`	gh resolutio	Maximum		
		range		output value	resolution	_		resolution		As concept of gain value is
		C	) to 10V		2.5mV	0 to 16	6000	0.625mV		changed, refer to [Analog-
			0 to 5V	0 to 4000	1.25mV	0 to		0.416mV	Δ	Digital Converter Module
	Voltage		1 to 5V		1.0mV	1200		0.333mV		User's Manual] and then,
			0 to 10V	-4000 to 4000	2.5mV	-16000 to	16000	0.625mV		confirm the I/O characteristics.
			ser range settings	-4000 to 4000	0.375mV	-12000 to	12000	0.333mV		
			to 20mA	0.4.4000	5μΑ	0.1.16		1.66µA		
-	Current	4	to 20mA	0 to 4000	4µA	0 to 12	2000 —	1.33µA		
	Current	Us	ser range	-4000 to 4000	1.37uA	I -12000 to	12000	1.33uA		
	Current	Us	ser range settings	-4000 to 4000	1.37µA	-12000 to	12000	1.33μΑ	0	
	Current	Us		-4000 to 4000	1.37µA	-12000 to	12000	1.33μΑ	0	
	Current	Us		-4000 to 4000	1.37μΑ	-12000 to	12000	1.33μΑ	0	
	Current	Us		-4000 to 4000	1.37μΑ	-12000 to	12000	1.33μΑ	0	
	Curent	Us	settings N	ormal resolution n		High	n resolution	ı mode	0	
		Us	settings N	ormal resolution n		High Ambient tem	n resolution	ı mode	0	
	Analog	input	settings N Ambient	ormal resolution n emperature 0 to 55°C	node - Ambient	High Ambient tem 55	n resolution perature 0	n mode to Ambient	0	
		input	settings N	ormal resolution n emperature 0 to 55°C Without	node - Ambient temperature	High Ambient tem	n resolution	n mode to Ambient temperature	0	
	Analog	input	N Ambient With temperatu	ormal resolution n emperature 0 to 55°C  Without re temperature drift	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift	n resolution perature 0 °C Withou temperate drift	Ambient temperature 25±5°C	0	
	Analog	input ge	N Ambient With temperatu	ormal resolution nemperature 0 to 55°C  Without re temperature	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature	n resolution perature 0 °C Withou temperate drift	Ambient temperature 25±5°C	0	
	Analog rang	input de to 10V	N Ambient With temperatu	ormal resolution n emperature 0 to 55°C  Without re temperature drift	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3%	n resolution perature 0 °C Withou temperature drift compensa	Ambient temperature 25±5°C	0	
	Analog rang	input ge	N Ambient With temperatu	ormal resolution n emperature 0 to 55°C  Without re temperature drift	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation	n resolution perature 0 °C Withou temperature drift compensa	Ambient temperature 25±5°C	0	
	Analog rang	input ge	N Ambient With temperatu	ormal resolution n emperature 0 to 55°C  Without re temperature drift	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3%	n resolution perature 0 °C Withou temperature drift compensa	Ambient temperature 25±5°C ation ±0.1%		
	Analog rang	input ge  to 10V -10 to 10V	N Ambient With temperatu	ormal resolution n emperature 0 to 55°C  Without re temperature drift	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3%	n resolution perature 0 °C Withou temperature drift compensa	Ambient temperature 25±5°C ation ±0.1%	0	
	Analog rang  O  Voltage	input ge  to 10V -10 to 10V 0 to 5V I to 5V User	N Ambient With temperatu	ormal resolution n emperature 0 to 55°C  Without re temperature drift	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3%	n resolution perature 0 °C Withou temperature drift compensa	Ambient temperature 25±5°C ation ±0.1%		
	Analog rang  O  Voltage	input ge  to 10V -10 to 10V 0 to 5V I to 5V User range	N Ambient With temperatu	ormal resolution n emperature 0 to 55°C  Without re temperature drift	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3%	n resolution perature 0 °C Withou temperature drift compensa	Ambient temperature 25±5°C ation ±0.1%		
	Analog rang  O  Voltage	input je  to 10V -10 to 10V 0 to 5V User range ettings	N Ambient With temperatu drift compensa	permal resolution in remperature 0 to 55°C  Without remperature drift ion compensation	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3% (±48 digits)	resolution perature 0 °C  Withou temperatur drift compensa ±0.4% (±64 digi	Ambient temperature 25±5°C attion ±0.1% (±16 digits)		
	Analog rang  O  Voltage  1	input ge  to 10V -10 to 10V 0 to 5V I to 5V User range	N Ambient With temperatudrift compensa	permal resolution in remperature 0 to 55°C  Without remperature drift ion compensation	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3%	n resolution perature 0 °C Withou temperature drift compensa	Ambient temperature 25±5°C attion ±0.1% ±0.1%		
	Analog rang  O  Voltage  1	input to 10V -10 to 10V 1 to 5V User range ettings 0 to	N Ambient With temperatudrift compensa	permal resolution in remperature 0 to 55°C  Without remperature drift ion compensation	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3% (±48 digits)	n resolution pperature 0 °C  Withou temperatur drift compensa ±0.4% (±64 digi	Ambient temperature 25±5°C attion ±0.1% ±0.1%		
	Analog rang  O  Voltage  1	input to 10V -10 to 10V -10 to 5V I to 5V User range ettings 0 to 20mA 4 to 20mA	N Ambient With temperatudrift compensa	permal resolution in remperature 0 to 55°C  Without remperature drift ion compensation	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3% (±48 digits)	n resolution pperature 0 °C  Withou temperatur drift compensa ±0.4% (±64 digi	Ambient temperature 25±5°C attion ±0.1% ±0.1%		
	Analog rang  Voltage  Current	input je  to 10V -10 to 10V 0 to 5V I to 5V User range ettings 0 to 20mA 4 to 20mA User	N Ambient With temperatudrift compensa	permal resolution in remperature 0 to 55°C  Without remperature drift ion compensation	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3% (±48 digits)	n resolution pperature 0 °C  Withou temperatur drift compensa ±0.4% (±64 digi	Ambient temperature 25±5°C attion ±0.1% ±0.1%		
	Analog rang  O  Voltage  S  Current	input to 10V -10 to 10V -10 to 5V I to 5V User range ettings 0 to 20mA 4 to 20mA	N Ambient With temperatudrift compensa	permal resolution in remperature 0 to 55°C  Without remperature drift ion compensation	- Ambient temperature 25±5°C	High Ambient tem 55 With temperature drift compensation ±0.3% (±48 digits)	n resolution pperature 0 °C  Withou temperatur drift compensa ±0.4% (±64 digi	Ambient temperature 25±5°C attion ±0.1% ±0.1%		

Item	A68ADN	
Maximum conversion speed	20ms/channel	
Absolute maximum input	Voltage: ±15V	
	Current: ±30mA	
Analog input points	8 channel/module	
Maximum number of writes for	<u>-</u>	
E ² PROM		
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation  Between channels: non-isolated	
Dielectric withstand voltage	Between the I/O terminal and programmable controller power supply: 500VAC, for 1 minute	
Insulation resistance	Between the I/O terminal and programmable controller power supply: 500VDC, 5M $\Omega$ or more	
Occupied I/O points	32 points	
Cocapica i/O points	(I/O assignment: special 32 points)	
Connected terminal	38-point terminal block	
Applicable wire size	0.75 to 2mm ²	
Applicable wife size	(Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Internal current consumption	0.4A	
(5VDC)	U.47A	
Weight	0.51kg	

Q68ADV	Q68ADI	Compatibility	Precautions for replacement
80μs/c (When there is temperature calculated by adding 160 μs will be use use	0	The conversion speed of Q68ADV/I to A68ADN has become quick. And then, on Q68ADV/I, the noise that did not import on A68ADN can be imported as analog signal. In this case, use the averaging processing function to remove the effect of noise.	
±15V	±30mA	0	
8 channel	s/module	0	
Max. 100,	000 times	0	
Between the I/O terminal and prog photocoupl Between channe	er isolation	0	
Between the I/O terminal and progr		0	
Between the I/O terminal and progr		0	
16 po (I/O assignment: in		Δ	I/O occupied points has changed to 16 points.
18-point ter	minal block	×	
0.3 to 0.	.75mm ²	×	Wiring change is required.
R1.25-3 (A solderless terminal	with sleeve can not be used.)	×	
0.64A	0.64A	Δ	The recalculation of internal current consumption [5VDC] is required.
 0.19kg	0.19kg	0	

#### 2.7.2 Function comparison

 $\ensuremath{\bigcirc}$  : With functions, -: Without functions

Item	Description	A68ADN	Q68ADV/I	Precautions for replacement
A/D conversion enable/disable	Specifies whether to enable or disable the A/D conversion for each channel. By disabling the conversion for the channels that are not used, the sampling time can be shortened.	0	0	
Sampling processing	The A/D conversion for analog input values is performed successively for each channel, and the digital output value is output upon each conversion.	0	0	The sampling processing time changes depending on the number of channels used (number of channels set to A/D conversion enable) and whether, with or without the temperature drift compensation function.  (a) Without temperature drift compensation function (processing time) = (number of channels used) × 80 (µs /1 channel)  (b) With temperature drift compensation function (processing time) = (number of channels used) × 80 (µs /1 channel) + 160µs
Averaging processing	For each channel, A/D conversion values are averaged for the set number of times or set amount of time, and the average value is output as a digital value.	0	0	The setting range of average time and count differ. Refer to [Analog-Digital Converter Module User's Manual] and then, confirm the specifications.
Maximum and minimum values hold function	The maximum and minimum values of the digital output values are retained in the module.	-	0	
Temperature drift compensation function	Errors arising from changes in the ambient temperature of the module are automatically compensated for to improve conversion accuracy.  The temperature drift compensation function can be performed at (A/D conversion time for all channels) + 160µs.	-	0	
Resolution mode	The resolution can be switched according to the application. The resolution mode is batch-set for all the channels.*1	0	0	
Online module change	A module change is made without the system being stopped.	-	0	Replaceable modules during online are a process CPU and a redundant CPU.

For the A68ADN, the resolution for voltage and current can be set to 1/4000, 1/8000, or 1/12000. For the Q68ADV/I, the resolution for voltage and current is 1/4000 in the normal resolution mode, while the resolution for the voltage from -10 to 10V is 1/16000 and the resolution for the voltage in other ranges and current is 1/12000 in the high resolution mode.

#### 2.7.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Analog-Digital Converter Module User's Manual.

A68ADN				Q68ADV/I				
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0 X1	Watchdog timer error  A/D conversion READY	Y0 Y1		X0 X1	Module READY Temperature drift compensation flag	Y0 Y1		
X2 X3 X4	Error flag	Y2 Y3 Y4		X2 X3 X4		Y2 Y3 Y4	Not used	
X5 X6 X7		Y5 Y6 Y7		X5 X6 X7	Not used	Y5 Y6 Y7		
X8		Y8	Not used	X8	High resolution mode status flag	Y8		
X9		Y9		X9	Operating condition setting completed flag	Y9	Operating condition setting request	
XA		YA		XA	Offset/gain setting mode flag	YA	User range write request	
ХВ		YB		XB	Channel change completed flag	YB	Channel change request	
XC		YC		XC	Not used	YC	Not used	
XD	Not used	YD	RFRP, RTOP instruction for interlock signal when	XD	Maximum value/ minimum value reset completed flag	YD	Maximum value/ minimum value reset request	
XE		YE	A68ADN is used in remote I/O station	XE	A/D conversion completed flag	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10 X11		Y10 Y11	Not used					
X12		Y12	Error reset					
X13		Y13						
X14 X15		Y14 Y15						
X16		Y16						
X17		Y17						
X18		Y18						
X19		Y19	Makaaaal					
X1A		Y1A	Not used					
X1B		Y1B						
X1C		Y1C						
X1D	RFRP, RTOP instruction	Y1D						
X1E	for interlock signal when	Y1E						
X1F	A68ADN is used in remote I/O station	Y1F						

#### 2.7.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory or sequence program, refer to the Analog-Digital Converter Module User's Manual.

	A68ADN			Q68ADV/I				
Address (Dec.)	Name	Read/write	Address (Dec.)	Name	Read/write			
0	A/D conversion enable/disable setting		0	A/D conversion enable/disable				
1	Averaging processing specification		1	CH1 Time/count averaging setting				
2	CH1 Averaging time, count	1	2	CH2 Time/count averaging setting				
3	CH2 Averaging time, count	1	3	CH3 Time/count averaging setting				
4	CH3 Averaging time, count	R/W	4	CH4 Time/count averaging setting	R/W			
5	CH4 Averaging time, count	FK/VV	5	CH5 Time/count averaging setting	R/VV			
6	CH5 Averaging time, count		6	CH6 Time/count averaging setting				
7	CH6 Averaging time, count		7	CH7 Time/count averaging setting				
8	CH7 Averaging time, count		8	CH8 Time/count averaging setting				
9	CH8 Averaging time, count		9	Averaging processing specification				
10	CH1 Digital output value		10	A/D conversion completed flag				
11	CH2 Digital output value		11	CH1 Digital output value				
12	CH3 Digital output value	1	12	CH2 Digital output value				
13	CH4 Digital output value		13	CH3 Digital output value				
14	CH5 Digital output value	1 _	14	CH4 Digital output value				
15	CH6 Digital output value	R	15	CH5 Digital output value				
16	CH7 Digital output value	1	16	CH6 Digital output value	R			
17	CH8 Digital output value	1	17	CH7 Digital output value				
18	Write data error code	1	18	CH8 Digital output value				
19	A/D conversion completed flag	1	19	Error code				
20	Resolution setting	R/W	20	Setting range (CH1 to CH4)				
	Ü		21	Setting range (CH5 to CH8)				
				Offset/gain setting mode				
			22	Offset specification				
				Offset/gain setting mode	R/W			
			23	Gain specification				
			24					
			25					
			26	Custom succe (Net used)				
			27	System area (Not used)	_			
			28					
				1				
			29					
			30	CH1 Maximum value				
				CH1 Maximum value CH1 Minimum value				
			30					
			30 31	CH1 Minimum value				
			30 31 32	CH1 Minimum value CH2 Maximum value				
			30 31 32 33	CH1 Minimum value CH2 Maximum value CH2 Minimum value				
			30 31 32 33 34	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value				
			30 31 32 33 34 35	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value CH3 Minimum value				
			30 31 32 33 34 35 36	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value	R			
			30 31 32 33 34 35 36 37	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value	R			
			30 31 32 33 34 35 36 37 38	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value CH5 Maximum value	R			
			30 31 32 33 34 35 36 37 38 39	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Minimum value CH4 Minimum value CH5 Maximum value CH5 Minimum value CH5 Minimum value	R			
			30 31 32 33 34 35 36 37 38 39 40	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Minimum value CH4 Minimum value CH5 Maximum value CH5 Minimum value CH6 Maximum value CH6 Maximum value	R			
			30 31 32 33 34 35 36 37 38 39 40 41	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value CH5 Maximum value CH5 Maximum value CH6 Minimum value CH6 Minimum value CH6 Minimum value	R			
			30 31 32 33 34 35 36 37 38 39 40 41 42	CH1 Minimum value CH2 Maximum value CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value CH5 Maximum value CH5 Maximum value CH6 Minimum value CH6 Maximum value CH6 Maximum value CH7 Maximum value	R			

Address (Dec.)  46 to System area (Not used)  57 158 159 160 to System area (Not used)  70 160 To System are		Q68ADV/I	
46 to System area (Not used) 157 158 Mode switching setting R/W 159 160 to System area (Not used) 201 202 CH1 Industrial shipment settings offset value 203 CH1 Industrial shipment settings gain value 204 CH2 Industrial shipment settings gain value 205 CH2 Industrial shipment settings gain value 206 CH3 Industrial shipment settings gain value 207 CH3 Industrial shipment settings gain value 208 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings gain value 210 CH5 Industrial shipment settings offset value 211 CH5 Industrial shipment settings gain value 212 CH6 Industrial shipment settings gain value 213 CH6 Industrial shipment settings gain value 214 CH7 Industrial shipment settings gain value 215 CH7 Industrial shipment settings gain value 216 CH8 Industrial shipment settings gain value 217 CH8 Industrial shipment settings gain value 218 CH1 User range settings offset value 219 CH2 User range settings offset value 220 CH2 User range settings offset value 221 CH2 User range settings offset value 222 CH3 User range settings gain value 223 CH3 User range settings offset value 224 CH4 User range settings offset value 225 CH4 User range settings gain value 226 CH5 User range settings offset value 227 CH5 User range settings gain value 228 CH6 User range settings offset value 229 CH6 User range settings gain value 229 CH6 User range settings gain value 220 CH7 User range settings offset value 221 CH5 User range settings gain value 222 CH6 User range settings gain value 223 CH7 User range settings gain value 224 CH4 User range settings offset value 225 CH6 User range settings gain value 226 CH6 User range settings gain value 227 CH5 User range settings gain value 228 CH6 User range settings gain value	Address	Name	Read/write
to System area (Not used)  157  158  159  Mode switching setting  R/W  160  to System area (Not used)  201  202  CH1 Industrial shipment settings offset value 203  CH1 Industrial shipment settings gain value 204  CH2 Industrial shipment settings offset value 205  CH2 Industrial shipment settings gain value 206  CH3 Industrial shipment settings gain value 207  CH3 Industrial shipment settings gain value 208  CH4 Industrial shipment settings offset value 209  CH4 Industrial shipment settings offset value 210  CH5 Industrial shipment settings offset value 211  CH6 Industrial shipment settings gain value 212  CH6 Industrial shipment settings gain value 213  CH6 Industrial shipment settings gain value 214  CH7 Industrial shipment settings gain value 215  CH7 Industrial shipment settings gain value 216  CH8 Industrial shipment settings gain value 217  CH8 Industrial shipment settings gain value 218  CH1 User range settings offset value 219  CH2 User range settings gain value 220  CH2 User range settings gain value 221  CH3 User range settings gain value 222  CH4 User range settings gain value 223  CH4 User range settings gain value 224  CH4 User range settings gain value 225  CH4 User range settings gain value 226  CH5 User range settings gain value 227  CH5 User range settings gain value 228  CH6 User range settings gain value 229  CH6 User range settings gain value 230  CH7 User range settings gain value 231  CH7 User range settings gain value 232  CH8 User range settings offset value 233  CH7 User range settings gain value 234  CH8 User range settings gain value 235  CH8 User range settings gain value	(Dec.)	Name	rteau/write
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158 159 160 160 160 160 System area (Not used)  201 202 CH1 Industrial shipment settings offset value 203 CH1 Industrial shipment settings offset value 204 CH2 Industrial shipment settings offset value 205 CH2 Industrial shipment settings offset value 206 CH3 Industrial shipment settings offset value 207 CH3 Industrial shipment settings offset value 208 CH4 Industrial shipment settings offset value 209 CH4 Industrial shipment settings offset value 209 CH4 Industrial shipment settings offset value 210 CH5 Industrial shipment settings offset value 211 CH6 Industrial shipment settings offset value 212 CH6 Industrial shipment settings offset value 213 CH6 Industrial shipment settings offset value 214 CH7 Industrial shipment settings offset value 215 CH7 Industrial shipment settings offset value 216 CH8 Industrial shipment settings offset value 217 CH8 Industrial shipment settings offset value 218 CH1 User range settings offset value 219 CH2 User range settings offset value 220 CH2 User range settings offset value 221 CH3 User range settings offset value 222 CH3 User range settings offset value 223 CH3 User range settings offset value 224 CH4 User range settings offset value 225 CH4 User range settings offset value 226 CH5 User range settings offset value 227 CH5 User range settings offset value 228 CH6 User range settings offset value 229 CH6 User range settings offset value 229 CH6 User range settings offset value 230 CH7 User range settings offset value 231 CH7 User range settings offset value 232 CH8 User range settings offset value		System area (Not used)	-
System area (Not used)   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160   160			
to System area (Not used)  201  202		Mode switching setting	R/W
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230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings offset value	229	CH6 User range settings gain value	
232 CH8 User range settings offset value	230		
5 5	231	CH7 User range settings gain value	
233 CH8 User range settings gain value	232	CH8 User range settings offset value	
	233	CH8 User range settings gain value	

# 2.8 A68AD (Upgrade to Q68AD-G)

## 2.8.1 Performance comparison

3	+10VDC (Input						
Analog input	-10 to 0 to +10VDC (Input resistance value: $1M\Omega$ )						
Analog input  Current  -20 to 0 to +	+20mADC (Input	t resistance va	lue: 250Ω)				
	16-bit signe	ed binary					
Digital output Whe	en 1/4000 is set	: -4096 to +40	95				
Who	en 1/8000 is set	:: -8192 to +81	91				
When	n 1/12000 is set:	-12288 to +12	2287				
	D	igital output valu	ie				
Analog input	(When gair	n 5V/20mA, offs	et 0V/0mA)				
	1/4000	1/8000	1/12000				
/O characteristics	+4000	+8000	+12000				
+5V or +20mA	+2000	+4000	+6000				
0V or 20mA	0	0	0				
-5V or -20mA	-2000	-4000	-6000				
-10V	-4000	-8000	-12000				
(Fa	(Factory-set: gain5V, offset0V)						
Maximum resolution	1/4000	1/8000	1/12000				
Voltage input		1.25mV	0.83mV				
Current input	10μΑ	5μA	3.33µA				
Overall accuracy							
Accuracy in respect to	1/4000	1/8000	1/12000				
maximum digital output value)	±40	±80	±120				
maximum digital odiput valuo)							

 $O: Compatible, \triangle: Partial \ change \ required, \ \times: Incompatible$ 

				68AD-G		<u> </u>	•	Dragoutions for real compatible
				Compatibility	Precautions for replacement			
			-10					
		(	Input resistance	$\mathbf{e}$ value: 1M $\Omega$ o	r more)			
			0 to	20mADC			7 ~	
			(Input resista	ance value: 250	0Ω)			
			16-hit s	signed binary				
		(N	Normal resolution	,	to 4005		0	
		`			-16384 to 16383)			
		nigii resoi	ulion mode12	200 10 12201,	-10304 (0 10303)			
			Normal reso	lution mode	High resolu	tion mode		
	Input	Analog input range	Digital	Maximum	Digital	Maximum		
			output value	resolution	output value	resolution		
		0 to 10V		2.5mV	0 to 16000	0.625mV		
		0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV		As concept of gain value is
		1 to 5V		1.0mV		0.333mV		
	Voltage	1 to 5V (Expanded mode)	-1000 to 4500	1.0mV	-3000 to 13500	0.333mV	Δ	changed, refer to Q68AD-G [User's Manual] and then,
		-10 to 10V	4000 to 4000	2.5mV	-16000 to 16000	0.625mV		confirm the I/O characteristics.
		Users range setting	-4000 to 4000	0.375mV	-12000 to 12000	0.333mV		Committe i/O characteristics.
	1	0 to 20mA	0.1. 4000	5µA	0.110000	1.66µA		
		4 to 20mA	0 to 4000	4µA	0 to 12000	1.33µA		
	Current	4 to 20mA (Expanded mode)	-1000 to 4500	4µA	-3000 to 13500	1.33μΑ		
		Users range setting	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		
						<u>.</u>		
	±0.1%  Normal resolution mode: ±4 digits							
		High res	olution mode (0	to 10V, -10 to	10V): ±16 digits		0	
		High resolution	on mode (Other	than the above	e ranges): ±12 dig	jits		
		Ū	ature coefficient:		0 /	-		

Item	A68ADN	
Maximum conversion speed	20ms/channel	
Response time	-	
Absolute maximum input	Voltage: ±15V Current: ±30mA	
Analog input points	8 channels/module	
Maximum number of writes for E ² PROM	-	
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation  Between channels: non-isolated	
Dielectric withstand voltage	Between the I/O terminal and programmable controller power supply: 500VAC, for 1 minute	
Insulation resistance	Between the I/O terminal and programmable controller power supply: 500VDC, 5M $\Omega$ or more	
Occupied I/O points	32 points	
Connected terminal	(I/O assignment: special 32 points)  38-point terminal block	
Applicable wire size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Internal current consumption (5VDC)	0.4A	
Weight	0.51kg	

 $O : Compatible, \triangle : Partial \ change \ required, \ \times : Incompatible$ 

Q68AD-G	Compatibility	Precautions for replacement
10ms/channel		
(Sampling cycle)	0	
20ms		
Voltage: ±15V	0	
current: ±30mA	0	
8 channels/module	0	
Up to 50,000 times	0	
Between the I/O terminal and programmable controller power supply:		
transformer isolation	0	
Between channels: transformer isolation		
Between the I/O terminal and programmable controller power supply:		
500VACrms, for 1 minute	0	
Between analog input channels: 1000VACrms, for 1 minute		
Between the I/O terminal and programmable controller power supply:		
500VDC, 10M $\Omega$ or more	0	
Between analog input channels: 500VDC, 10M $\Omega$ or more		
16 points	Δ	I/O occupied points has changed to
(I/O assignment: intelligent 16 points)	Δ	16 points.
40-pin connector	×	
Within 0.3mm ²	×	Wiring change is required.
-	×	
0.46A	Δ	The recalculation of internal current consumption [5VDC] is required.
0.16kg	0	

#### 2.8.2 Function comparison

 $\ensuremath{\mathsf{O}}$  : With functions, -: Without functions

Item	Description	A68ADN	Q68AD-G	Precautions for replacement
A/D conversion enable/disable	Specifies whether to enable or disable the A/D conversion for each channel. By disabling the conversion for the channels that are not used, the sampling time can be shortened.	0	0	
Sampling processing	The A/D conversion for analog input values is performed successively for each channel, and the digital output value is output upon each conversion.	0	0	
Averaging processing	For each channel, A/D conversion values are averaged for the set number of times or set amount of time, and the average value is output as a digital value.	0	0	The setting range of average time and count differ. Refer to Q68AD-G [User's
	Moving average takes the average of the specified number of digital output values measured per sampling time.	-	0	Manual] and then, confirm the specifications.
Primary delay filter	A digital output value is smoothed according to the preset time constant.	-	0	
Maximum and minimum values hold function	The maximum and minimum values of the digital output values are retained in the module.	-	0	
Resolution mode	The resolution can be switched according to the application. The resolution mode is batch-set for all the channels.*1	0	0	
Input signal error detection function	The voltage/current outside the setting range is detected.	-	0	
Warning output function	<ul> <li>(1) Process alarm A warning is output if a digital output value falls outside the setting range.</li> <li>(2) Rate alarm A warning is output if the varying rate of a digital output value falls outside the preset varying rate range.</li> </ul>	-	0	
Scaling function	Conversion of A/D conversion values to preset percentage values and loading into the buffer memory is available.  Programming steps for the scaling can be eliminated.	-	0	
Online module change	A module change is made without the system being stopped.	-	0	Replaceable modules during online are a process CPU and a redundant CPU.

For the A68ADN, the resolution for voltage and current can be set to 1/4000, 1/8000, 1/12000. For the Q68AD-G, the resolution for voltage and current is 1/4000 in the normal resolution mode, while the resolution for the voltage from -10 to 10V is 1/16000 and the resolution for the voltage in other ranges and current is 1/12000 in the high resolution mode.

#### 2.8.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Channel Isolated Analog-Digital Converter Module, Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual.

A68ADN					Q68/	AD-G	
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.	Signal name	No.	Signal hame	No.	Signal name	No.	Signal Hame
X0	Watchdog timer error	Y0		X0	Module READY	Y0	
X1	A/D conversion READY	Y1		X1		Y1	
X2	Error flag	Y2		X2		Y2	
X3		Y3		X3	Not used	Y3	
X4		Y4		X4		Y4 Y5	Not used
X5 X6		Y5 Y6		X5 X6		Y6	
		10			High resolution mode	10	
X7		Y7		X7	status flag	Y7	
X8		Y8	Not used	X8	Warming output signal	Y8	
					Operating condition		Operating condition
X9		Y9		X9	setting completed flag	Y9	setting request
					Offset/gain setting mode		
XA		YA		XA	flag	YA	User range write request
VD		VD		VD	Channel change	VD	Champal shappa results
XB		YB		XB	completed flag	YB	Channel change request
XC		YC		XC	Input signal error	YC	Not used
XC		10		λC	detection signal	10	Not used
					Maximum value/		Maximum value/
XD	Not used	YD	RFRP, RTOP instruction	XD	minimum value reset	YD	minimum value reset
	Not asea		for interlock signal when		completed flag		request
XE		YE	A68ADN is used in	XE	A/D conversion	YE	Not used
			remote I/O station		completed flag		
XF		YF		XF	Error flag	YF	Error clear request
X10		Y10	Not used				
X11 X12		Y11 Y12	Error reset				
X12 X13		Y13	Ellorieset	ł			
X13		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19					
X1A	1	Y1A	Not used				
X1B	1	Y1B					
X1C	1	Y1C					
X1D	RFRP, RTOP instruction	Y1D					
X1E	for interlock signal when	Y1E					
X1F	A68ADN is used in	Y1F					
AIF.	remote I/O station	IIF					

#### 2.8.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the I/O signals or sequence program, refer to the Channel Isolated Analog-Digital Converter Module, Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual.

	Tunction) Oser's Mandai.				
	A68ADN			Q68AD-G	
Address (Dec.)	Name	Read/write	Address (Dec.)	Name	Read/write
0	A/D conversion enable/disable setting		0	A/D conversion enable/disable	
1	Averaging processing enecification	1	1	CH1 Average time/Average number of times/	
1	Averaging processing specification		'	Moving average/Time constant settings	
2	CH1 Averaging time, count	1	2	CH2 Average time/Average number of times/	
2	CH1 Averaging time, count		2	Moving average/Time constant settings	
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/	
3	CH2 Averaging time, count		3	Moving average/Time constant settings	
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/	
4	CH3 Averaging time, count	R/W	4	Moving average/Time constant settings	R/W
5	CH4 Averaging time, count	T K/VV	5	CH5 Average time/Average number of times/	
3	Cri4 Averaging time, count		3	Moving average/Time constant settings	
6	CH5 Averaging time, count		6	CH6 Average time/Average number of times/	
U	Cris Averaging time, count		0	Moving average/Time constant settings	
7	CH6 Averaging time, count		7	CH7 Average time/Average number of times/	
,	CHO Averaging time, count			Moving average/Time constant settings	
8	CH7 Averaging time, count		8	CH8 Average time/Average number of times/	
O	Crit Averaging time, count		0	Moving average/Time constant settings	
9	CH8 Averaging time, count		9	System area (Not used)	-
10	CH1 Digital output value		10	A/D conversion completed flag	
11	CH2 Digital output value		11	CH1 Digital output value	
12	CH3 Digital output value		12	CH2 Digital output value	
13	CH4 Digital output value		13	CH3 Digital output value	
14	CH5 Digital output value	R	14	CH4 Digital output value	
15	CH6 Digital output value		15	CH5 Digital output value	R
16	CH7 Digital output value		16	CH6 Digital output value	IX.
17	CH8 Digital output value		17	CH7 Digital output value	
18	Write data error code		18	CH8 Digital output value	
19	A/D conversion completed flag		19	Error code	
20	Resolution setting	R/W	20	Setting range (CH1 to CH4)	
			21	Setting range (CH5 to CH8)	
			22	Offset/gain setting mode Offset specification	
			23	Offset/gain setting mode Gain specification	
			24	Averaging process specification (CH1 to	R/W
				CH4)	
			25	Averaging process specification (CH5 to CH8)	
			26		
			27	System area (Not used)	
			28	System area (Not useu)	-
			29		
			30	CH1 Maximum value	
			31	CH1 Minimum value	
			32	CH2 Maximum value	
			33	CH2 Minimum value	R
			34	CH3 Maximum value	<b>'`</b>
			to		
			44	CH8 Maximum value	
			45	CH8 Minimum value	

	Q68AD-G	
Address	Name	Read/write
(Dec.)		
46	System area (Not used)	-
47	Input signal error detection extended/input	D.044
	signal error detection setting	R/W
48	Warning output setting	
49	Input signal error detection flag	
50	Warning output flag (Process alarm)	R
51	Warning output flag (Rate alarm)	
52	System area (Not used)	-
53	Scaling enable/disable setting	R/W
54	CH1 Scaling value	_
to		R
61	CH8 Scaling value	
62	CH1 Scaling lower limit value	
63	CH1 Scaling upper limit value	
to		
76	CH8 Scaling lower limit value	
77	CH8 Scaling upper limit value	
to		
86	CH1 Process alarm lower lower limit value	
87	CH1 Process alarm lower upper limit value	
88	CH1 Process alarm upper lower limit value	
89	CH1 Process alarm upper upper limit value	
to		
114	CH8 Process alarm lower lower limit value	
115	CH8 Process alarm lower upper limit value	
116	CH8 Process alarm upper lower limit value	
117	CH8 Process alarm upper upper limit value	R/W
118	CH1 Rate alarm warning detection period	
to		
125	CH8 Rate alarm warning detection period	
126	CH1 Rate alarm upper limit value	
127	CH1 Rate alarm lower limit value	
to	0.10 5	
140	CH8 Rate alarm upper limit value	
141	CH8 Rate alarm lower limit value	
	CH1 Input signal error detection setting	
142	value/CH1 Input signal error detection lower	
	limit setting value	
to	Olid land simple control of the Cont	4
150	CH1 Input signal error detection upper limit	
	setting value	
to		
158	Mode switching setting	R/W
159		
to		D.***
200	Save data classification setting	R/W
201	System area (Not used)	-
202	CH1 Factory default offset value	-
203	CH1 Factory default gain value	
to	0105 1 15 15 75 1	R/W
232	CH8 Factory default offset value	1
233	CH8 Factory default gain value	<u> </u>

# 3 ANALOG OUTPUT MODULE REPLACEMENT

# 3.1 List of Analog Output Module Alternative Models for Replacement

Production disco	ntinuation	Transition to Q series				
Product	Model	Model	Remarks (Restrictions)			
	A616DAI	Q68DAIN	Cable size is changed.     Number of slots : Changed (2 modules are required.)     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.  Performance specifications change: 8CH/module Functional specifications: Not changed			
	A616DAV	Q68DAVN	Cable size is changed.     Number of slots : Changed (2 modules are required.)     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.      Performance specifications change: 8CH/module     Functional specifications: Not changed			
	A62DA	Q62DAN	1) External wiring : Cable size is changed. 2) Number of slots : Not changed 3) Program : The number of occupied I/O points, I/O signals, and buffer memory addresses are changed. 4) Performance specifications change:  Output current (minus current not applicable), I/O characteristics 5) Functional specifications: Not changed			
Analog output module		Q64DAN	1) External wiring : Cable size is changed. 2) Number of slots : Not changed 3) Program : The number of occupied I/O points, I/O signals, and buffer memory addresses are changed. 4) Performance specifications change:  Output current (minus current not applicable), I/O characteristics 5) Functional specifications: Not changed			
	A62DA-S1	Q62DAN	External wiring : Cable size is changed.     Number of slots : Not changed     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.     Performance specifications change: Not changed     Functional specifications: Not changed			
		Q64DAN	Cable size is changed.     Number of slots			
	A68DAI-S1	Q68DAIN	Cable size is changed.     Number of slots			

Production disco	ontinuation	Transition to Q series				
Product	Model	Model	Remarks (Restrictions)			
Analog output module	A68DAV	Q68DAVN	1) External wiring : Cable size is changed. 2) Number of slots: : Not changed 3) Program : The number of occupied I/O points, I/O signals, and buffer memory addresses are changed. 4) Performance specifications change:			

## ⊠Point -

The existing wiring for the A/QnA series modules can be connected directly to the Q series modules using the upgrade tool (conversion adaptor) manufactured by Mitsubishi Electric Engineering Co., Ltd.

(1) One slot type (can be mounted on the Q series large type base unit)

Product	MELSEC-A/QnA series module	MELSEC-Q series module	Conversion adaptor	
	A62DA	Q62DAN	ERNT-AQT62DA	
	A62DA-S1	QUZDAN	LINIT-AQ 102DA	
Analog output module	A68DAV	Q68DAVN		
	A68DAI	Q68DAIN	ERNT-AQT68DA	
	A68DAI-S1	QUODAIN		

#### (2) Two slot type

(cannot be mounted on the Q series large type base unit)

Product	MELSEC-A/QnA	MELSEC-Q	Conversion adaptor	
Product	series module	series module		
Analog output module	A616DAV	Q68DAVN (×2 modules)	ERNT-AQT616DA	
Arialog output module	A616DAI	Q68DAIN (×2 modules)	TERNI-AQIOIODA	

For contact information for inquiries on the upgrade tool manufactured by Mitsubishi Electric Engineering Co., Ltd., refer to Section 2.1.

# 3.2 A616DAI

#### 3.2.1 Performance comparison

Item	A616DAI					
	16-bit signed binary					
Digital input	(Data part: 12 bits)					
	Setting range: 0 to 4095					
Analog output	0 to 20mADC					
Analog output	(External load resistance value: $0\Omega$ to $600\Omega$ )					
	Digital input Analog output					
I/O characteristics	+4000 +20mA					
	+2000 +12mA					
	0 4mA					
Digital value recelution	4/4000					
Digital value resolution	1/4000					
Overall accuracy	0.6% (±120μA)					
(Accuracy at maximum analog	When ambient temperature is 25°C: ±0.3% (±60μA)					
output value)	When ambient temperature is 25 C. ±0.5% (±00µA)					
Sampling period	1.5 + 0.5 × (D/A number of conversion enabled channels) ms					
0	0.5ms					
Conversion time	(Time required for conversion from 0 to 20mA/20mA to 0mA)					
Absolute maximum output	-					
No. of analog output channels	16 channels/module					
Number of writes to E ² PROM	-					
Output short protection	-					

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

							O. Compatible,	△ . Partial change required, *. Incompatible
		Q68D	AIN				Compatibility	Precautions for replacement
	•	16-bit sign resolution m solution mod	ode: -4096	*			0	
0 to 20mADC (External load resistance value: $0\Omega$ to $600\Omega$ )								
Analog output range   Normal resolution mode   High resolution mode						0		
Current	User range settings	-4000 to 4000	4μA 1.5μA	-12000 to 12000	1.33μA 0.83μA	<u>-</u>	0	
Ambient temperature 25±5°C: within ±0.1% (±20μA) Ambient temperature 0 to 55°C: within ±0.3% (±60μA)							0	
- 80µs/channel							0	
21mA							0	
8 channels/module							Δ	Consider replacement with multiple Q68DAIN.
		Max. 100,0	000 times				0	
		Avail	able				0	

Ite	em	A616DAI					
Isolation method		Between the output terminal and programmable controller power supply: photocoupler isolation  A616DAI channels: non-isolation					
Dielectric withs	tand voltage	-					
Insulation resis	tance	-					
Number of occi	upied I/O points	32 points (I/O assignment: special 32 points)					
Connected terr	ninal	38-point terminal block					
Applicable wire	size	0.75 to 2mm ²					
Applicable sold	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current (5VDC)	consumption	0.3A					
Voltage		+15VDC/-15VDC					
External	Current	+15VDC, 0.53A					
power supply	consumption	-15VDC, 0.125A					
	Inrush current	• ·					
Weight		0.69kg					

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

	O . Compatible, A . Lattial change required, A. Incompat				
Q68DAIN	Compatibility	Precautions for replacement			
Between the I/O terminal and programmable controller power supply:					
photocoupler isolation					
Between output channels: non-isolation					
Between external power supply and analog output: transformer isolation					
Between the I/O terminal and programmable controller power supply:	0				
500VAC, for 1 minute					
Between the I/O terminal and programmable controller power supply:	0				
500VDC, 20MΩ or more					
16 points		The number of occupied I/O points			
(I/O assignment: intelligent 16 points)		has changed to 16 points.			
18-point terminal block	×				
0.3 to 0.75mm ²	×				
FG terminal: R1.25-3, 1.25-YS3, RAV1.25-3, V1.25-YS3A		Wiring change is required.			
Terminals other than FG: R1.25-3	×				
(Sleeved solderless terminal cannot be used.)					
Λ 38Δ	^	The recalculation of internal current			
0.30A		consumption (5VDC) is required.			
24VDC +20%, -15%					
Ripple, spike 500mV _{P-P} or less		As the external power supply has			
0.27A	×	changed from ±15V to 24V, its change is required.			
2.5A 230µs or less		·			
0.20kg	0				
	Between the I/O terminal and programmable controller power supply:	Q68DAIN       Compatibility         Between the I/O terminal and programmable controller power supply: photocoupler isolation         Between external power supply and analog output: transformer isolation         Between the I/O terminal and programmable controller power supply: 500VAC, for 1 minute         Between the I/O terminal and programmable controller power supply: 500VDC, 20MΩ or more         16 points         (I/O assignment: intelligent 16 points)         18-point terminal block       ×         0.3 to 0.75mm²       ×         FG terminal: R1.25-3, 1.25-YS3, RAV1.25-3, V1.25-YS3A         Terminals other than FG: R1.25-3       ×         (Sleeved solderless terminal cannot be used.)         0.38A       △         24VDC +20%, -15%         Ripple, spike 500mV _{P-P} or less       ×         0.27A			

## 3.2.2 Functional comparison

 $\ensuremath{\mathsf{O}}$  : With functions, -: Without functions

Item	Description	A616DAI		Precautions for replacement
D/A conversion enable/ disable function	Specifies whether to enable or disable the D/A conversion for each channel.  By disabling the D/A conversion for the channels that are	0	0	
D/A output enable/ disable function	not used, the conversion speed can be shortened.  Specifies whether to output the D/A conversion value or the offset value for each channel.  The conversion speed stays constant regardless of whether D/A output is enabled or disabled.	0	0	On Q68DAIN, the output enable/disable is set with Y signal (CH□ Output enable/ disable flag).
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.  The analog output will be updated after Synchronous output request (YD) is set to ON and the time specified as "programmable controller CPU processing time + 120µs" has elapsed.  However, the analog output will be fixed to CH1, and other channels (CH2 to CH8) cannot be used.  When the module is mounted on a remote I/O station, the analog output will not be synchronized because of a link scan delay if the synchronous output function is specified.	-	0	
Analog output HOLD/ CLEAR function	Retains an analog value that was output when the programmable controller CPU is in the STOP status or an error occurs.	0	0	1) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.  2) For the Q68DAIN, this function is set with the intelligent function module switch setting.
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CH□ Output enable/disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.    Setting combi nation	-	0	
Resolution mode	Switches the resolution mode according to the application. The resolution can be selected from 1/4000 or 1/12000. The resolution mode is batch-set for all channels.	-	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 3.2.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A616DAI			Q68DAIN					
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name		
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used		
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/		
	flag			Λ1			disable flag		
X2	Error flag	Y2		X2		Y2	CH2 Output enable/		
							disable flag		
Х3		Y3		Х3		Y3	CH3 Output enable/ disable flag		
X4		Y4		X4	Not used	Y4	CH4 Output enable/ disable flag		
X5		Y5		X5		Y5	CH5 Output enable/ disable flag		
X6		Y6	Not used	X6		Y6	CH6 Output enable/ disable flag		
X7		Y7		X7		Y7	CH7 Output enable/ disable flag		
X8		Y8		X8	High resolution mode	Y8	CH8 Output enable/		
					status flag Operating condition		disable flag Operating condition		
X9		Y9		X9	setting completion flag	Y9	setting request		
XA		YA			YA YB	XA	Offset/gain setting mode status flag	YA	User range write request
ХВ		YB				XB	Channel change completion flag	YB	Channel change request
XC	Not used	YC		XC	Setting value change completion flag	YC	Setting value change request		
XD		YD	RFRP, RTOP instruction	XD	Synchronous output mode flag	YD	Synchronous output request		
XE		YE	interlock signal	XE	Not used	YE	Not used		
XF		YF		XF	Error flag	YF	Error clear request		
X10		Y10							
X11		Y11							
X12		Y12							
X13		Y13							
X14 X15		Y14 Y15	Not used						
X16		Y16	Not used						
X17		Y17							
X18		Y18							
X19		Y19							
X1A		Y1A							
X1B		Y1B	Output enable batch flag						
X1C		Y1C							
X1D	RFRP, RTOP instruction	Y1D	Not used						
X1E X1F	interlock signal	Y1E Y1F							

#### 3.2.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memories differs. For details of the buffer memories and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A616DAI		Q68DAIN				
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write		
0	D/A conversion enable/disable channel	DAM	0	D/A conversion enable/disable			
1	Analog output enable/disable channel	R/W	1	CH1 Digital value			
2			2	CH2 Digital value			
3			3	CH3 Digital value			
4			4	CH4 Digital value	R/W		
5			5	CH5 Digital value			
6			6	CH6 Digital value			
7			7	CH7 Digital value			
8	System area (Not used)		8	CH8 Digital value			
9	System area (Not used)	-	9	System area (Not used)			
10			10	System area (Not used)	-		
11			11	CH1 Setting value check code			
12			12	CH2 Setting value check code			
13			13	CH3 Setting value check code			
14			14	CH4 Setting value check code			
15			15	CH5 Setting value check code			
16	CH0 Digital value		16	CH6 Setting value check code	R		
17	CH1 Digital value		17	CH7 Setting value check code			
18	CH2 Digital value		18	CH8 Setting value check code			
19	CH3 Digital value		19	Error code			
20	CH4 Digital value		20	Setting range (CH1 to CH4)			
21	CH5 Digital value		21	Setting range (CH5 to CH8)			
22	CH6 Digital value		22	Offset/gain setting mode			
22	Of to Digital value		LL	Offset specification			
23	CH7 Digital value	R/W	23	Offset/gain setting mode	R/W		
20	•	1000	20	Gain specification			
24	CH8 Digital value		24	Offset/gain adjusted value specification			
25	CH9 Digital value		25				
26	CHA Digital value		26				
27	CHB Digital value		27				
28	CHC Digital value	]	28				
29	CHD Digital value		29	System area (Not used)	_		
30	CHE Digital value		30				
31	CHF Digital value		31				
32			32				
to	System area (Not used)	-	to				
47			47				

	A616DAI Q68DAIN						
Address			Address				
(decimal)	Name	Read/write	(decimal)	Name	Read/write		
48	CH0 Setting value check code		48				
49	CH1 Setting value check code		49				
50	CH2 Setting value check code		50				
51	CH3 Setting value check code		51				
52	CH4 Setting value check code		52				
53	CH5 Setting value check code		53				
54	CH6 Setting value check code		54				
55	CH7 Setting value check code	R/W	55				
56	CH8 Setting value check code		56	System area (Not used)	-		
57	CH9 Setting value check code		57	, , ,			
58	CHA Setting value check code		58				
59	CHB Setting value check code		59				
60	CHC Setting value check code		60 61				
62	CHD Setting value check code		62				
63	CHE Setting value check code CHF Setting value check code		63				
00	Of It Setting Value Check Code		to				
			157				
			158				
			159	Mode switching setting	R/W		
			160				
			to	System area (Not used)	-		
			201				
			202	CH1 Industrial shipment settings offset value			
			203	CH1 Industrial shipment settings gain value			
			204	CH2 Industrial shipment settings offset value			
			205	CH2 Industrial shipment settings gain value			
			206	CH3 Industrial shipment settings offset value			
			207	CH3 Industrial shipment settings gain value	1		
			208	CH4 Industrial shipment settings offset value			
			209	CH4 Industrial shipment settings gain value			
			210	CH5 Industrial shipment settings offset value			
			211	CH5 Industrial shipment settings gain value	_		
			212	CH6 Industrial shipment settings offset value	_		
			213	CH6 Industrial shipment settings gain value	1		
			214 215	CH7 Industrial shipment settings offset value			
			216	CH7 Industrial shipment settings gain value CH8 Industrial shipment settings offset value	-		
			217	CH8 Industrial shipment settings onset value			
			218	CH1 User range settings offset value	R/W		
			219	CH1 User range settings gain value	-		
			220	CH2 User range settings offset value	†		
			221	CH2 User range settings gain value			
			222	CH3 User range settings offset value	†		
			223	CH3 User range settings gain value	1		
			224	CH4 User range settings offset value	1		
			225	CH4 User range settings gain value			
			226	CH5 User range settings offset value			
		227 CH5 User range settings gain value		CH5 User range settings gain value	]		
		CH6 User range settings offset value					
			229	CH6 User range settings gain value			
			230	CH7 User range settings offset value	]		
			231	CH7 User range settings gain value	_		
			232	CH8 User range settings offset value	_		
			233	CH8 User range settings gain value			

# 3.3 A616DAV

#### 3.3.1 Performance comparison

Item			A616DAV					
B. W. 1.		16-bit sig	ned binary (Data	part: 12 bit	s)			
Digital input		-			,			
		When out	put voltage range	setting is 1	OV:			
	-10V to 0V to +10V							
Analog output	(1	External lo	ad resistance valu	ue: $2k\Omega$ to 1	ΜΩ)			
Analog output		When out	tput voltage range	e setting is 5	SV:			
	()	External lo	ad resistance valu	ue: $2k\Omega$ to 1	ΜΩ)			
		igital input	Analog	output				
					ng			
I/O characteristics	_							
	<u> </u> -							
	<u> </u>	-						
		-4000	-5V	-10V				
D: ". I			1/1000					
Digital value resolution	0 1 1 11 11					5)/		
Overall accuracy				Λ.	. 0. 0	-		
(accuracy at maximum analog								
output value)			· · · · · · · · · · · · · · · · · · ·	,	l	% (±15mV)		
Sampling period	1.5 + 0.5	1.5 + 0.5 × (D/A number of conversion enabled channels) ms						
Conversion time	(Timo ro	0.5ms (Time required for conversion from 10 to ±10V/±10 to 10V)						
Absolute maximum output	(Tillie Te	quired for c		10 10 + 10 0/	+10 (0 -10 v)			
Absolute maximum output			150					
No. of analog output channels		(Time required for conversion from -10 to +10V/+10 to -10V)  15V  16 channels/module						
Number of writes to E ² PROM		t temperature (0 to 55°C) ±0.6% (±60mV) ±0.6% (±30mV)  ent temperature (25°C) ±0.3% (±30mV) ±0.3% (±15mV)  1.5 + 0.5 × (D/A number of conversion enabled channels) ms  0.5ms  (Time required for conversion from -10 to +10V/+10 to -10V)  15V  16 channels/module  -  -  etween the output terminal and programmable controller power supply: photocoupler isolation						
Output short protection			-					
Isolation method	Between the output terminal and programmable controller power supply: photocoupler isolation							
		A616I	DAV channels: no	n-isolation				
Dielectric withstand voltage								
Diolocatio Watiotalia Voltage								
Insulation resistance		(External load resistance value: 2kΩ to 1MΩ)  When output voltage range setting is 5V:  -5V to 0V to +5V  (External load resistance value: 2kΩ to 1MΩ)    Digital input						
Number of occupied I/O points		(1)0	•	1.00!				
Connected terminal								
Applicable wire size		•						
Applicable wife Size			0.75 to 2mm					
Applicable solderless terminal		16-bit signed binary (Data part: 12 bits)						
Internal current consumption			0.38A					
(5VDC)								

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

			200D AVAI				△ : Partial change required, ×: Incompatible
			Q68DAVN			Compatibility	Precautions for replacement
1			signed binary				
	•	Normal resoluti	0				
	High resol	ution mode: -1	2288 to 12287	7, -16384 to 1638	3)		
-10 to 10VDC (External load resistance value: $1k\Omega$ to $1M\Omega$ )							
Ana	og output	Normal reso	olution mode	High resolut	tion mode		
	og output range	Digital input	Maximum	Digital input	Maximum		When using A616DAVN in [-5 to + 5V]
	,	value	resolution	value	resolution		range, Q68DAV can obtain equivalent
	0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV	0	resolution or more than A616DAV by
	1 to 5V		1.0mV		0.333mV		setting in [-10 to 10V] range/ high
Voltage	-10 to 10V		2.5mV	-16000 to 16000	0.625mV		resolution mode or user range.
	User range settings	-4000 to 4000	0.75mV	-12000 to 12000	0.333mV		
						0	
	Ambion	t tomporaturo	D5±5°C+ \Mithir	n ±0.1% (±10mV)			
				in ±0.1% (±10mV)		0	
	Ambient	temperature o	to 55 C. With	III 10.5 % (150IIIV	,		
			-				
		80	µs/channel			0	
			±12V			0	
		8 cha	innels/module			Δ	Consider replacement with multiple Q68DAVN.
		Max.	100,000 times	3		0	
			Available			0	
D,	otwoon the I/C			e controller power	eupply:		
	E	photoc Between output	oupler isolation channels: no	on		0	
		terminal and		e controller power		0	
В	etween the I/C	terminal and	programmable	e controller powe	supply:	0	
500VDC, 20MΩ or more  16 points						Δ	The number of occupied I/O points has changed to 16 points.
(I/O assignment: intelligent 16 points)  18-point terminal block						×	nas shanged to 10 points.
			to 0.75mm ²	×			
1	FC tormin			1.25-3, V1.25-YS	2Λ		Wiring change is required.
		Terminals oth	her than FG: F	R1.25-3	<i>.</i>	×	Thing ordings to required.
<del>                                     </del>	(Sle	eved solderles	s terminal can	inot be used.)			
			0.38A			0	

Item		A616DAV	
Estemal	Voltage	+15VDC / -15VDC	
External	Current	+15VDC, 0.2A	
power supply	consumption	-15VDC, 0.17A	
	Inrush current	-	
Weight		0.65kg	

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

Q68DAVN	Compatibility	Precautions for replacement
24VDC +20%, -15%		
Ripple, spike 500mV _{P-P} or less		As the external power supply has
0.20A	×	changed from ±15V to 24V, its chang is required.
2.5A, 230µs or less		
0.20kg	0	

#### 3.3.2 Functional comparison

O: With functions, -: Without functions

Item	Description	A616DAV		Precautions for replacement
D/A conversion enable/disable	Specifies whether to enable or disable the D/A conversion for each channel. By disabling the D/A conversion for the	0	0	
function	channels that are not used, the conversion speed can be shortened.			On OCODAVAL the cutout
D/A output enable/ disable function	Specifies whether to output the D/A conversion value or the offset value for each channel.  The conversion speed stays constant regardless of whether D/A output is enabled or disabled.	0	0	On Q68DAVN, the output enable/disable is set with Y signal (CH□ Output enable/ disable flag).
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU. The analog output will be updated after Synchronous output request (YD) is set to ON and the time specified as "programmable controller CPU processing time + 120µs" has elapsed. However, the analog output will be fixed to CH1, and other channels (CH2 to CH8) cannot be used. When the module is mounted on a remote I/O station, the analog output will not be synchronized because of a link scan delay if the synchronous output function is specified.	-	0	
Analog output HOLD/ CLEAR function	Retains an analog value that was output when the programmable controller CPU is in the STOP status or an error occurs.	0	0	1) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.  2) For the Q68DAVN, this function is set with the intelligent function module switch setting.
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CH□ Output enable/disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.    Setting	-	0	
Resolution mode	Switches the resolution mode according to the application. The resolution can be selected from 1/4000, 1/12000, or 1/16000.  The resolution mode is batch-set for all channels.	-	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 3.3.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A616DAV			Q68DAVN				
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used	
X1	D/A conversion READY flag	Y1		X1		Y1	CH1 Output enable/ disable flag	
X2	Error flag	Y2		X2		Y2	CH2 Output enable/ disable flag	
Х3		Y3		Х3		Y3	CH3 Output enable/ disable flag	
X4		Y4		X4	Not used	Y4	CH4 Output enable/ disable flag	
X5		Y5		X5		Y5	CH5 Output enable/ disable flag	
X6		Y6	Not used	X6		Y6	CH6 Output enable/ disable flag	
X7		Y7		X7		Y7	CH7 Output enable/ disable flag	
X8	Y8	Y8		X8	High resolution mode status flag	Y8	CH8 Output enable/ disable flag	
X9		Y9		X9	Operating condition setting completion flag	Y9	Operating condition setting request	
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request	
XB		YB		XB	Channel change completion flag	YB	Channel change request	
XC	Not used	YC		XC	Setting value change completion flag	YC	Setting value change request	
XD		YD	RFRP, RTOP instruction	XD	Synchronous output mode flag	YD	Synchronous output request	
XE		YE	interlock signal	XE	Not used	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10 X11 X12		Y10 Y11 Y12						
X13		Y13						
X14		Y14	Natural					
X15 X16		Y15 Y16	Not used					
X10 X17		Y17						
X17 X18		Y18						
X19		Y19						
X1A		Y1A						
X1B	<del>1</del>	Y1B	Output enable batch flag					
X1C		Y1C	<u> </u>					
X1D	DEDD DTOD instruction	Y1D	Not used					
X1E	RFRP, RTOP instruction	Y1E	Not used					
X1F	interlock signal	Y1F						

#### 3.3.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memories differs. For details of the buffer memories and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A616DAV	Q68DAVN				
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write	
0	D/A conversion enable/disable channel		0	D/A conversion enable/disable		
1	Analog output enable/disable channel	R/W	1	CH1 Digital value		
2	<u> </u>		2	CH2 Digital value		
3			3	CH3 Digital value		
4			4	CH4 Digital value	R/W	
5			5	CH5 Digital value		
6			6	CH6 Digital value		
7			7	CH7 Digital value		
8			8	CH8 Digital value		
9	System area (Not used)	-	9	0 1 (1) 1		
10			10	System area (Not used)	-	
11			11	CH1 Setting value check code		
12			12	CH2 Setting value check code		
13			13	CH3 Setting value check code		
14			14	CH4 Setting value check code		
15			15	CH5 Setting value check code		
16	CH0 Digital value		16	CH6 Setting value check code	R	
17	CH1 Digital value		17	CH7 Setting value check code		
18	CH2 Digital value		18	CH8 Setting value check code		
19	CH3 Digital value		19	Error code		
20	CH4 Digital value		20	Setting range (CH1 to CH4)		
21	CH5 Digital value		21	Setting range (CH5 to CH8)		
20	CHC Digital value		20	Offset/gain setting mode		
22	CH6 Digital value		22	Offset specification		
23	CUT Digital value	R/W	23	Offset/gain setting mode	R/W	
23	CH7 Digital value	F/VV	23	Gain specification		
24	CH8 Digital value		24	Offset/gain adjusted value specification		
25	CH9 Digital value		25			
26	CHA Digital value		26			
27	CHB Digital value		27			
28	CHC Digital value		28			
29	CHD Digital value	1	29	System area (Not used)		
30	CHE Digital value	1	30	System area (Not used)	_	
31	CHF Digital value	1	31			
32			32			
to	System area (Not used)	-	to			
47			47			

# 3 ANALOG OUTPUT MODULE REPLACEMENT

	A616DAV				
Address			Address	Q68DAVN	
(decimal)	Name	Read/write	(decimal)	Name	Read/write
48	CH0 Setting value check code		48		
49	CH1 Setting value check code		49		
50	CH2 Setting value check code		50		
51	CH3 Setting value check code		51		
52	CH4 Setting value check code		52		
53	CH5 Setting value check code		53		
54	CH6 Setting value check code		54		
55	CH7 Setting value check code	R/W	55		
56	CH8 Setting value check code		56	System area (Not used)	-
57	CH9 Setting value check code		57		
58	CHA Setting value check code		58		
59	CHB Setting value check code		59		
60	CHC Setting value check code		60		
61 62	CHD Setting value check code		61		
63	CHE Setting value check code		62		
03	CHF Setting value check code		to		
			157		
			158		
			159	Mode switching setting	R/W
			160		
			to	System area (Not used)	-
			201		
			202	CH1 Industrial shipment settings offset value	
			203	CH1 Industrial shipment settings gain value	
			204	CH2 Industrial shipment settings offset value	1
			205	CH2 Industrial shipment settings gain value	]
			206	CH3 Industrial shipment settings offset value	
			207	CH3 Industrial shipment settings gain value	
			208	CH4 Industrial shipment settings offset value	
			209	CH4 Industrial shipment settings gain value	
			210	CH5 Industrial shipment settings offset value	
			211	CH5 Industrial shipment settings gain value	
			212	CH6 Industrial shipment settings offset value	
			213	CH6 Industrial shipment settings gain value	
			214	CH7 Industrial shipment settings offset value	
			215 216	CH7 Industrial shipment settings gain value CH8 Industrial shipment settings offset value	
			217	CH8 Industrial shipment settings gain value	
			218	CH1 User range settings offset value	R/W
			219	CH1 User range settings direct value	
			220	CH2 User range settings offset value	-
			221	CH2 User range settings gain value	-
			222	CH3 User range settings offset value	1
			223	CH3 User range settings gain value	1
			224	CH4 User range settings offset value	
			225	CH4 User range settings gain value	
			226	CH5 User range settings offset value	1
			227	CH5 User range settings gain value	1
			228	CH6 User range settings offset value	1
			229	CH6 User range settings gain value	1
			230	CH7 User range settings offset value	1
			231	CH7 User range settings gain value	
			232	CH8 User range settings offset value	
			233	CH8 User range settings gain value	1

# 3.4 A62DA (Replacement to the Q62DAN)

#### 3.4.1 Performance comparison

Item	A62DA							
Digital input	Maximum setting value  Voltage: ±2000  Current: ±1000							
Analog output	Voltage: -10 to 0 to +10VDC (External load resistance value: $500\Omega$ to $1M\Omega$ )							
I/O characteristics	Digital input							
Maximum resolution	Voltage: 5mV (1/2000) Current: 20μA (1/1000)							
Overall accuracy (accuracy at maximum analog output value)	±1% (voltage: ±0.1V, current: ±0.2mA)							
Maximum conversion speed	Within 15ms/2 channels (same time for one channel)  Note) Time from when the digital input is written to when the specified analog voltage (current) is reached							
Absolute maximum output	Voltage: ±12V Current: ±28mA  Note) Max. output voltage and current restricted by output protection circuit							
Number of analog output points	2 channels/module							
Number of writes to E ² PROM	-							
Output short protection	-							

O: Compatible, △: Partial change required, ×: Incompatible

		Os	2DAN				O: Compatible, Compatibility	△ : Partial change required, ×: Incompatible  Precautions for replacement
Hiç	Normal gh resolution r	16-bit sig	ned binary mode: -409			According to the I/O conversion characteristics used, make the output range setting and offset/gain setting of the Q62DAN.		
	•	Voltage: -1 oad resista Current: 0 oad resista	nce value: to 20mAD	0	The minus current cannot be output.			
Voltage	0 to 5V 1 to 5V -10 to 10V User range settings 0 to 20mA 4 to 20mA User range settings	Normal r mc Digital input value 0 to 4000  -4000 to 4000  0 to 4000  -4000 to 4000		High res mod Digital input value 0 to 12000 -16000 to 16000 -12000 to 12000 -12000 to 12000 -12000 to 12000	de		Δ	According to the I/O conversion characteristics used, make the output range setting and offset/gain setting of the Q62DAN.
Ambient temperature 25±5°C: within ±0.1% (voltage: ±10mV, current: ±20μA) Ambient temperature 0 to 55°C: within ±0.3% (voltage: ±30mV, current: ±60μA)								
80µs/channel							0	
		-	e: ±12V nt: 21mA		Δ	The minus current cannot be output.		
			els/module				0	
			),000 times iilable				0	
		AVa	iiiabie	U				

Ito	em	A62DA					
Isolation metho	od	Between the output terminal and programmable controller power supply: photocoupler isolation (Between channels: non-isolation)					
Dielectric withs	stand voltage	-					
Insulation resis	stance	-					
Number of occupied I/O points		32 points (I/O assignment: special 32 points)					
Connected terminal		20-point terminal block					
Applicable wire	e size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)					
Applicable solo	derless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current (5VDC)	t consumption	0.6A					
External	Voltage	21.6 to 26.4VDC					
power supply	Current consumption	0.35A					
	Inrush current	2.4A					
Weight		0.5kg					

O : Compatible, △ : Partial change required, ×: Incompatible

○. Compatible,△. Fartial change required, *. Incompatible				
Compatibility	Precautions for replacement			
O O O T h				
0				
0				
0				
	The number of occupied I/O points			
Δ	has changed to 16 points.			
×				
×	Wiring change is required.			
*				
0				
0				
0				
0				
0				
	Compatibility  O  A  x  x  O  O  O			

#### 3.4.2 Functional comparison

O: Available, -: Not available

Item	Description	A62DA	Q62DAN	Precautions for replacement
Analog output HOLD/CLEAR function	Retains an analog value that was output when the programmable controller CPU is in the STOP status or an error occurs.	-	0	
D/A conversion enable/disable function	Specifies whether to enable or disable the D/A conversion.	ı	0	
D/A output enable/disable function	Specifies whether to output the D/A conversion value or the offset value.	0	0	The Q62DAN specifies whether to enable or disable output for each channel.
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.	-	0	
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CH□ Output enable/ disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.	-	0	
Resolution mode	Switches the resolution mode according to the application. The resolution can be selected from 1/4000, 1/12000, or 1/16000. The resolution mode is batch-set for all channels.	-	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 3.4.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A6:	2DA			Q62	DAN		
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error	Y0		X0	Module READY	Y0	Not used	
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/ disable flag	
X2		Y2		X2		Y2	CH2 Output enable/ disable flag	
X3	-	Y3		X3	Not used	Y3	uisable liag	
X4	-	Y4		X4	1101 4004	Y4		
X5		Y5		X5		Y5		
X6	•	Y6		X6		Y6	Not used	
X7		Y7		X7		Y7		
X8		Y8		X8	High resolution mode status flag	Y8		
X9		Y9		X9	Operating condition setting completion flag	Y9	Operating condition setting request	
XA		YA	Not used	XA	Offset/gain setting mode status flag	YA	User range write request	
XB		YB		ХВ	Channel change completion flag	YB	Channel change request	
XC		YC			XC	Setting value change completion flag	YC	Setting value change request
XD	Not used	YD			XD	Synchronous output mode flag	YD	Synchronous output request
XE	1	YE		XE	Not used	YE	Not used	
XF	•	YF		XF	Error flag	YF	Error clear request	
X10		Y10				•		
X11		Y11						
X12		Y12						
X13		Y13						
X14		Y14						
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18	CPU selection signal					
X19		Y19	Sign of CH1 digital input					
X1A		Y1A	Sign of CH2 digital input					
X1B		Y1B Y1C	Output enable					
X1C								
X1D	-	Y1D Y1E	Not used					
X1E X1F	-	Y1E Y1F						
A I F		TIF						

#### 3.4.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memories and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A62DA		Q62DAN				
Address	Name	Read/write	Address	Name	Read/write		
(decimal)	Name	Read/write	(decimal)	Name	Read/write		
0	CH1 Digital value		0	D/A conversion enable/disable			
1	CH2 Digital value		1	CH1 Digital value	R/W		
2	CH1 Voltage setting value check code	R/W	2	CH2 Digital value			
3	CH2 Voltage setting value check code	IN/VV	3				
4	CH1 Current setting value check code		4				
5	CH2 Current setting value check code		5	System area (Not used)	-		
			to				
			10				
			11	CH1 Setting value check code	R		
			12	CH2 Setting value check code	1,		
			13				
			to	System area (Not used)	-		
			18				
			19	Error code	R		
			20	Setting range (CH1 to CH2)			
			21	System area (Not used)	-		
			22	Offset/gain setting mode			
				Offset specification			
			23	Offset/gain setting mode	R/W		
				Gain specification			
			24	Offset/gain adjusted value specification			
			25				
			to	System area (Not used)	-		
			157				
			158	Mode switching setting	R/W		
			159	3 3			
			160				
			to	System area (Not used)	-		
			199		D."		
			200	Pass data classification setting	R/W		
			201	System area (Not used)	-		
			202	CH1 Industrial shipment settings offset value			
			203	CH1 Industrial shipment settings gain value			
			204	CH2 Industrial shipment settings offset value			
			205	CH2 Industrial shipment settings gain value	R/W		
			206	CH1 User range settings offset value			
			207	CH1 User range settings gain value			
			208	CH2 User range settings offset value			
			209	CH2 User range settings gain value			

3 ANALOG OUTPUT MODULE REPLACEMENT

Memo	

**MELSEC** 

# 3.5 A62DA (Replacement to the Q64DAN)

#### 3.5.1 Performance comparison

Item	A62DA							
Digital input	Maximum setting value  Voltage: ±2000  Current: ±1000							
Analog output	Voltage: -10 to 0 to +10VDC (External load resistance value: $500\Omega$ to $1M\Omega$ )							
I/O characteristics	Digital input         Analog output Voltage Current           +2000         +10V           +1000         +5V           0         0V           -1000         -5V           -2000         -10V							
Maximum resolution	Voltage: 5mV (1/2000) Current: 20μA (1/1000)							
Overall accuracy (accuracy at maximum analog output value)	±1% (voltage: ±0.1V, current: ±0.2mA)							
Maximum conversion speed	Within 15ms/2 channels (same time for one channel)  Note) Time from when the digital input is written to when the specified analog voltage (current) is reached							
Absolute maximum output	Voltage: ±12V  Current: ±28mA  Note) Max. output voltage and current restricted by output protection circuit							
Number of analog output points	2 channels/module							
Number of writes to E ² PROM	-							
Output short protection	-							

O : Compatible, △ : Partial change required, ×: Incompatible

Hig	(Normal th resolution n	16-bit sig		96 to 4095,	6383)	O: Compa	atible, △: Partial change required, ×: Incompatible  Iity  Precautions for replacement  According to the I/O conversion  characteristics used, make the output range setting and offset/gain setting of the Q64DAN.
	•	oad resista	to 20mAD	0	The minus current cannot be output.		
Analog Voltage Current	User range settings 0 to 20mA		esolution ode  Maximum resolution 1.25mV 1.0mV 2.5mV 0.75mV $5 \mu A$ $4 \mu A$ $1.5 \mu A$	High res mod Digital input value 0 to 12000 -16000 to 16000 -12000 to 12000 -12000 to 12000	de	Δ	According to the I/O conversion characteristics used, make the output range setting and offset/gain setting of the Q64DAN.
	(volt Ambient te	emperature age: ±10m\ emperature age: ±30m\	0				
		80µs/	channel	0			
		-	je: ±12V nt: 21mA	Δ	The minus current cannot be output.		
			els/module	0			
			),000 times nilable	i		0	
						J	

Ito	em	A62DA					
Isolation method		Between the output terminal and programmable controller power supply: photocoupler isolation (Between channels: non-isolation)					
Dielectric withs	tand voltage	-					
Insulation resis	tance	-					
Number of occupied I/O points		32 points (I/O assignment: special 32 points)					
Connected terminal		20-point terminal block					
Applicable wire	e size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)					
Applicable sold	lerless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current (5VDC)	t consumption	0.6A					
External	Voltage	21.6 to 26.4VDC					
power supply	Current consumption	0.35A					
	Inrush current	2.4A					
Weight		0.5kg					

O : Compatible, △ : Partial change required, ×: Incompatible

	. Partial change required, *. incompatible	
Q64DAN	Compatibility	Precautions for replacement
Between the I/O terminal and programmable controller power supply:		
photocoupler isolation		
Between output channels: non-isolation	0	
Between external power supply and analog output: transformer isolation		
Between the I/O terminal and programmable controller power supply:	0	
500VAC, for 1 minute		
Between the I/O terminal and programmable controller power supply:	0	
500VDC, 20MΩ or more		
16 points		The number of occupied I/O points
(I/O assignment: intelligent 16 points)	Δ	has changed to 16 points.
18-point terminal block	×	
0.3 to 0.75mm ²	×	Wiring change is required.
R1.25-3		
(Sleeved solderless terminal cannot be used.)	×	
0.34A	0	
24VDC +20%, -15%	0	
Ripple, spike 500mV _{P-P} or less		
0.24A	0	
2.5A, 260µs or less	0	
0.20kg	0	
	Between the I/O terminal and programmable controller power supply:	Q64DAN       Compatibility         Between the I/O terminal and programmable controller power supply: photocoupler isolation         Between external power supply and analog output: transformer isolation         Between the I/O terminal and programmable controller power supply: 500VAC, for 1 minute         Between the I/O terminal and programmable controller power supply: 500VDC, 20MΩ or more         16 points         (I/O assignment: intelligent 16 points)         A supplied terminal block         X         R1.25-3         (Sleeved solderless terminal cannot be used.)         0.34A         0.34A         24VDC +20%, -15%         Ripple, spike 500mV _{P-P} or less       0         0.24A         2.5A, 260µs or less       0

#### 3.5.2 Functional comparison

O: Available, -: Not available

Item	Description	A62DA	Q64DAN	Precautions for replacement
Analog output HOLD/CLEAR function	Retains an analog value that was output when the programmable controller CPU is in the STOP status or an error occurs.	-	0	
D/A conversion enable/disable function	Specifies whether to enable or disable the D/A conversion.	-	0	
D/A output enable/disable function	Specifies whether to output the D/A conversion value or the offset value.	0	0	The Q64DAN specifies whether to enable or disable output for each channel.
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.	-	0	
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CH Output enable/ disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.	-	0	
Resolution mode	Switches the resolution mode according to the application.  The resolution can be selected from 1/4000, 1/12000, or 1/16000.  The resolution mode is batch-set for all channels.	-	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 3.5.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Digital-Analog Converter Module User's Manual.

A62DA				Q64DAN			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	Not used
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/
							disable flag
X2		Y2		X2		Y2	CH2 Output enable/ disable flag
							CH3 Output enable/
X3		Y3		X3	Not used	Y3	disable flag
X4		Y4		X4		Y4	CH4 Output enable/
							disable flag
X5		Y5		X5		Y5	
X6 X7		Y6 Y7		X6 X7		Y6 Y7	Not used
		17			High resolution mode	17	Not used
X8		Y8		X8	status flag	Y8	
X9		Y9		X9	Operating condition	Y9	Operating condition
- 1.0					setting completion flag		setting request
XA		YA	Not used	XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		ХВ	Channel change completion flag	YB	Channel change request
XC		YC		XC	Setting value change completion flag	YC	Setting value change request
XD	Not used	YD		XD	Synchronous output mode flag	YD	Synchronous output request
XE		YE		XE	Not used	YE	Not used
XF		YF		XF	Error flag	YF	Error clear request
X10		Y10					
X11		Y11					
X12 X13		Y12 Y13					
X13		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18			CPU selection signal	]			
X19		Y19	Sign of CH1 digital input				
X1A		Y1A	Sign of CH2 digital input				
X1B		Y1B	Output enable				
X1C		Y1C					
X1D X1E		Y1D Y1E	Not used				
X1F	-	Y1F					
/\ II	l			ı			

#### 3.5.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memories and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A62DA			Q64DAN		
Address	Name	Read/write	Address	Name	Read/write	
(decimal)	CH1 Digital value		(decimal)	D/A conversion enable/disable		
1	CH2 Digital value		1	CH1 Digital value		
2	CH1 Voltage setting value check code	=	2	CH2 Digital value	R/W	
3	CH2 Voltage setting value check code	R/W	3	CH3 Digital value	1000	
4	CH1 Current setting value check code		4	CH4 Digital value		
5	CH2 Current setting value check code		5			
			to	System area (Not used)	_	
			10	, 5,555 (. 155 255 2,5		
			11	CH1 Setting value check code		
			12	CH2 Setting value check code	_	
			13	CH3 Setting value check code	R	
			14	CH4 Setting value check code		
			15			
			to	System area (Not used)	-	
			18			
			19	Error code	Б	
			20	Setting range (CH1 to CH4)	R	
			21	System area (Not used)	-	
			22	Offset/gain setting mode		
			22	Offset specification	R/W	
			22	Offset/gain setting mode		
			23	Gain specification		
			24	Offset/gain adjusted value specification		
			25			
			to	System area (Not used)		
			157			
			158	Mode switching setting	R/W	
			159	Iwode switching setting	1000	
			160			
			to	System area (Not used)	-	
			199			
			200	Pass data classification setting	R/W	
			201	System area (Not used)	-	
			204	CH2 Industrial shipment settings offset value		
			205	CH2 Industrial shipment settings gain value		
			206	CH3 Industrial shipment settings offset value		
			207	CH3 Industrial shipment settings gain value		
			208	CH4 Industrial shipment settings offset value		
			209	CH4 Industrial shipment settings gain value		
			210	CH1 User range settings offset value	R/W	
			211	CH1 User range settings gain value		
			212	CH2 User range settings offset value		
			213	CH2 User range settings gain value		
			214	CH3 User range settings offset value		
			215	CH3 User range settings gain value		
			216	CH4 User range settings offset value		
			217	CH4 User range settings gain value	1	

3 ANALOG OUTPUT MODULE REPLACEMENT

Memo		

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# 3.6 A62DA-S1 (Replacement to the Q62DAN)

#### 3.6.1 Performance comparison

ľ	tem	A62DA-S1					
Digital input		0 to +4000					
Analog output		Voltage: 0 to +10VDC (External load resistance value: $500\Omega$ to $1M\Omega$ )  Current: +4 to +20mADC (External load resistance value: $0\Omega$ to $600\Omega$ )  *Current output is usable by 0 to +20mA.					
I/O characteristics		Output range         Digital input         Analog output           0 to 10V         + 4000         + 10V           0 v         0 V           0 to 5V         + 4000         + 5V or + 20mA           0 to 20mA         0 vo r 0mA           1 to 5V         + 4000         + 5V or + 20mA           4 to 20mA         0 vo r + 1V or + 4mA					
Maximum	Voltage	1 to 5V: 1mV (1/4000) 0 to 5V: 1.25mV (1/4000) 0 to 10V: 2.5mV (1/4000)					
resolution	Current	4 to 20mA: 4μA (1/4000) 0 to 20mA: 5μA (1/4000)					
Overall accura (accuracy at noutput value)	acy naximum analog	(Refer to *1.)					
Maximum con	version speed	Within 15ms/2 channels (same time for one channel)  Note) Time from when the digital input is written to when the specified analog voltage (current) is reached					
Absolute maximum output		Voltage: 0 to +12V  Current: 0 to +28mA  Note) Max. output voltage and current restricted by output protection circuit					
Number of ana	alog output	2 channels/module					
	ites to E ² PROM	-					
Output short p	notection	-					

^{*1} Indicates accuracy at the maximum analog output value of the A62DA-S1.

Output range Temperature range	1 to 5V	0 to 5V	0 to 10V	4 to 20mA	0 to 20mA
25°C(within ± 0.5%)	±25mV	±25mV	±50mV	±0.1mA	±0.1mA
0 to 55°C (within ±1%)	±50mV	±50mV	±100mV	±0.2mA	±0.2mA

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

								△ : Partial change required, ×: Incompatible
			Q62	2DAN			Compatibility	Precautions for replacement
		NII	_	ned binary				
	Hig	Normal h resolution r	resolution r		0			
	-		,		ance value: 11 ance value: 0	•	0	
	Angles	autnut vanga		esolution ode	High res			
	Analog	output range	Digital input value	Maximum resolution	Digital input value	resolution		
		0 to 5V	0 to	1.25mV	0 to	0.416mV		
		1 to 5V	4000	1.0mV	12000	0.333mV		
	Voltage	-10 to 10V	-4000 to	2.5mV	-16000 to 16000	0.625mV	0	
		User range settings	4000	0.75mV	-12000 to 12000	0.333mV		
		0 to 20mA	0 to	5 μ <b>A</b>	0 to	1.66 <i>µ</i> A		
			4000	<b>4 / A</b>	12000	1.33 ^µ A		
		User range settings	-4000 to 4000	1.5 <i>µ</i> A	-12000 to 12000	<b>0.83</b> μ <b>A</b>		
		Ambient t	emperature	25±5°C: v	vithin ±0.1%			
		•	age: ±10m\		. ,		0	
			emperature age: ±30m\		within ±0.3% ±60µA)			
	80µs/channel						0	
			Voltag	e: ±12V				
			Currer	nt: 21mA	0			
			2 channe	els/module	0			
			Max. 100	,000 times	;		0	
			Ava	ilable			0	

It	em	A62DA-S1			
Isolation metho	od	Between the output terminal and programmable controller power supply: photocoupler isolation (Between channels: non-isolation)			
Dielectric withs	stand voltage	-			
Insulation resis	stance	-			
Number of occupied I/O points		32 points (I/O assignment: special 32 points)			
Connected terr	minal	20-point terminal block			
Applicable wire	e size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)			
Applicable solo	derless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A			
Internal current (5VDC)	t consumption	0.6A			
External	Voltage	21.6 to 26.4VDC			
power supply	Current consumption	0.35A			
	Inrush current	2.4A			
Weight		0.5kg			

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

	O. Compatible, 2.1 artial change required, 5. incompatible				
Q62DAN	Compatibility	Precautions for replacement			
Between the I/O terminal and programmable controller power supply:					
photocoupler isolation					
Between output channels: non-isolation	0				
Between external power supply and analog output: transformer isolation					
Between the I/O terminal and programmable controller power supply:	0				
500VAC, for 1 minute	0				
Between the I/O terminal and programmable controller power supply:	0				
500VDC, 20M $\Omega$ or more	0				
16 points	_	The number of occupied I/O points			
(I/O assignment: intelligent 16 points)	Δ	has changed to 16 points.			
18-point terminal block	×				
0.3 to 0.75mm ²	×	Wiring change is required.			
R1.25-3	×				
(Sleeved solderless terminal cannot be used.)	^				
0.33A	0				
24VDC +20%, -15%	0				
Ripple, spike 500mV _{P-P} or less	U				
0.15A	0				
2.5A, 250µs or less	0				
0.19kg	0				

#### 3.6.2 Functional comparison

O: Available, -: Not available

Item	Description	A62DA-S1	Q62DAN	Precautions for replacement
Analog output HOLD/CLEAR function	Retains an analog value before Output enable signal turns off when the Output enable signal is off.	0	0	1) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.  2) For the Q62DAN, this function is set with the intelligent function module switch setting.
D/A conversion enable/disable function	Specifies whether to enable or disable the D/A conversion.	-	0	
D/A output enable/disable function	Specifies whether to output the D/A conversion value or the offset value.	0	0	The Q62DAN specifies whether to enable or disable output for each channel.
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.	-	0	
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CHD Output enable/ disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.	-	0	
Resolution mode	Switches the resolution mode according to the application. The resolution can be selected from 1/4000, 1/12000, or 1/16000. The resolution mode is batch-set for all channels.	-	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 3.6.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Digital-Analog Converter Module User's Manual.

A62DA-S1				Q62DAN			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	Not used
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/ disable flag
X2		Y2		X2		Y2	CH2 Output enable/ disable flag
X3		Y3		X3	Not used	Y3	disable hag
X4		Y4		X4		Y4	
X5		Y5		X5		Y5	
X6		Y6		X6		Y6	Not used
X7		Y7		X7		Y7	
X8		Y8		X8	High resolution mode status flag	Y8	
X9		Y9		X9	Operating condition setting completion flag	Y9	Operating condition setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB	Not used	ХВ	Channel change completion flag	YB	Channel change request
XC		YC		XC	Setting value change completion flag	YC	Setting value change request
XD	Not used	YD		XD	Synchronous output mode flag	YD	Synchronous output request
XE		YE		XE	Not used	YE	Not used
XF		YF		XF	Error flag	YF	Error clear request
X10 X11 X12 X13		Y10 Y11 Y12 Y13					
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19	İ	Y19					
X1A		Y1A					
X1B		Y1B	Output enable				
X1C		Y1C					
X1D		Y1D	Not used				
X1E		Y1E	1101 0300				
X1F		Y1F					

#### 3.6.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memories and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A62DA-S1		Q62DAN				
Address	Name	Read/write	Address	Name	Read/write		
(decimal)	Name	Reau/write	(decimal)	Name	Reau/write		
0	CH1 Digital value		0	D/A conversion enable/disable			
1	CH2 Digital value		1	CH1 Digital value	R/W		
2	CH1 Upper limit check code	R/W	2	CH2 Digital value			
3	CH1 Lower limit check code	1000	3				
4	CH2 Upper limit check code		4				
5	CH2 Lower limit check code		5	System area (Not used)	-		
			to				
			10				
			11	CH1 Setting value check code	R		
			12	CH2 Setting value check code			
			13				
			to	System area (Not used)	-		
			18				
			19	Error code	R		
			20	Setting range (CH1 to CH2)			
			21	System area (Not used)	-		
			22	Offset/gain setting mode			
				Offset specification			
			23	Offset/gain setting mode	R/W		
				Gain specification			
			24	Offset/gain adjusted value specification			
			25				
			to	System area (Not used)	-		
			157				
			158	Mode switching setting	R/W		
			159	<u> </u>			
			160				
			to	System area (Not used)	-		
			199	Daniel de la companya	D/A4		
			200	Pass data classification setting	R/W		
			201	System area (Not used)	-		
			202	CH1 Industrial shipment settings offset value			
			203	CH1 Industrial shipment settings gain value			
	205 C			CH2 Industrial shipment settings offset value			
			CH2 Industrial shipment settings gain value	R/W			
			206	CH1 User range settings offset value			
				CH1 User range settings gain value			
			208	CH2 User range settings offset value	-		
			209	CH2 User range settings gain value			

3 ANALOG OUTPUT MODULE REPLACEMENT

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# 3.7 A62DA-S1 (Replacement to the Q64DAN)

#### 3.7.1 Performance comparison

It	em		A62DA-S	51		
Digital input			0 to +400	00		
Analog output		Voltage: 0 to +10VDC Current: +4 to +20mAD *Current	C (External load			
I/O characteris	tics	Output range  0 to 10V  0 to 5V  0 to 20mA  1 to 5V  4 to 20mA	Digital input + 4000 0 + 4000 0 + 4000	Analog output + 10V 0V + 5V or + 20mA 0V or 0mA + 5V or + 20mA + 1V or + 4mA		
Maximum	Voltage	1 to 5V: 1mV (1/4000) 0 to 5V: 1.25mV (1/4000) 0 to 10V: 2.5mV (1/4000)				
resolution	Current		4 to 20mA: 4μA 0 to 20mA: 5μA	0V or 0mA + 5V or + 20mA + 1V or + 4mA /4000) (1/4000) (1/4000) 1/4000)		
Overall accuracy (accuracy at moutput value)	cy aximum analog		(Refer to *1.)			
Maximum conv	version speed	Within 15ms/2 Note) Time from when the digital input is	written to when		,	
Absolute maxir	mum output	Note) Max. output voltage	Voltage: 0 to Current: 0 to + e and current res	⊦28mA	tection circuit	
Number of ana points	log output	,	2 channels/m			
Number of writ			-			
Output short pr	OLECTION		-			

Indicates accuracy at the maximum analog output value of the A62DA-S1.

Output range Temperature range	1 to 5V	0 to 5V	0 to 10V	4 to 20mA	0 to 20mA
25°C(within ± 0.5%)	±25mV	±25mV	±50mV	±0.1mA	±0.1mA
0 to 55°C (within ±1%)	±50mV	±50mV	±100mV	±0.2mA	±0.2mA

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

							△ : Partial change required, ×: Incompatible
		Q64	4DAN			Compatibility	Precautions for replacement
		16-bit sig	ned binary				
	•	resolution		0			
Hig	h resolution r	node: -1228	38 to 12287				
Voltage:	-10 to 10VD0	(External I	load resista	ance value: 11	kΩ to 1MΩ)		
_		•		ance value: 0	•	0	
		Normal r	esolution	High res	solution		
			ode	mo			
Analog	output range	Digital input	Maximum	Digital input	Maximum		
		value	resolution	value	resolution		
	0 to 5V	0 to	1.25mV	0 to	0.416mV		
	1 to 5V	4000	1.0mV	12000	0.333mV		
Voltage	-10 to 10V	-4000 to	2.5mV	-16000 to 16000	0.625mV	0	
	User range settings	4000	0.75mV	-12000 to 12000	0.333mV		
	0 to 20mA	0 to	5 μ <b>A</b>	0 to	1.66 <i>µ</i> A		
Current	4 to 20mA	4000	<b>4 / / A</b>	12000	1.33 <i>µ</i> A		
	User range settings	-4000 to 4000	1.5 μ <b>A</b>	-12000 to 12000	<b>0.83</b> μ <b>A</b>		
	Ambiant t	omporatura	25±5°C: v	vithin ±0.1%			
		age: ±10m\					
	,	-		within ±0.3%		0	
		age: ±30m\					
	(1011)	-		M' '/			
		80µs/	channel	0			
Voltage: ±12V							
Current: 21mA						0	
Guirent, 2111/A							
	4 channels/module						
		Max. 100	0,000 times	3		0	
		Ava	ailable			0	

It	em	A62DA-S1			
Isolation method		Between the output terminal and programmable controller power supply: photocoupler isolation (Between channels: non-isolation)			
Dielectric withs	stand voltage	-			
Insulation resis	stance	-			
Number of occ	upied I/O points	32 points (I/O assignment: special 32 points)			
Connected terr	minal	20-point terminal block			
Applicable wire	e size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)			
Applicable solo	derless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A			
Internal current (5VDC)	t consumption	0.6A			
External	Voltage	21.6 to 26.4VDC			
power supply	Current consumption	0.35A			
	Inrush current	2.4A			
Weight	•	0.5kg			

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

	0 . 00pa	= : a.t.a. c.a.gc :cqaca, :copaa.c.c
Q64DAN	Compatibility	Precautions for replacement
Between the I/O terminal and programmable controller power supply:		
photocoupler isolation		
Between output channels: non-isolation	0	
Between external power supply and analog output: transformer Isolation		
Between the I/O terminal and programmable controller power supply:	0	
500VAC, for 1 minute	0	
Between the I/O terminal and programmable controller power supply:	0	
500VDC, 20M $\Omega$ or more	0	
16 points		The number of occupied I/O points
(I/O assignment: intelligent 16 points)	Δ	has changed to 16 points.
18-point terminal block	×	
0.3 to 0.75mm ²	×	Wiring change is required.
R1.25-3 (Sleeved solderless terminal cannot be used.)	×	
0.34A	0	
24VDC +20%, -15% Ripple, spike 500mV _{P-P} or less	0	
0.24A	0	
2.5A, 260µs or less	0	
0.20kg	0	

#### 3.7.2 Functional comparison

O: Available, -: Not available

Item	Description	A62DA-S1	Q64DAN	Precautions for replacement
Analog output HOLD/CLEAR function	Retains an analog value before Output enable signal turns off when the Output enable signal is off.	0	O	1) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.  2) For the Q64DAN, this function is set with the intelligent function module switch setting.
D/A conversion enable/disable function	Specifies whether to enable or disable the D/A conversion.	-	0	
D/A output enable/disable function	Specifies whether to output the D/A conversion value or the offset value.	0	0	The Q64DAN specifies whether to enable or disable output for each channel.
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.	-	0	
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CHD Output enable/ disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.	-	0	
Resolution mode	Switches the resolution mode according to the application. The resolution can be selected from 1/4000, 1/12000, or 1/16000. The resolution mode is batch-set for all channels.	-	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 3.7.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Digital-Analog Converter Module User's Manual.

A62DA-S1					Q64DAN			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error	Y0		X0	Module READY	Y0	Not used	
X1	D/A conversion READY	Y1	Y1			Y1	CH1 Output enable/	
				X1			disable flag	
X2	Y2	Y2		X2		Y2	CH2 Output enable/ disable flag	
							CH3 Output enable/	
Х3		Y3		Х3	Not used	Y3	disable flag	
X4		Y4		X4		Y4	CH4 Output enable/	
							disable flag	
X5		Y5		X5		Y5		
X6		Y6 Y7		X6 X7		Y6 Y7	Netword	
X7		Y /		X/	High resolution mode	Y /	Not used	
X8		Y8		X8	status flag	Y8		
X9		Y9		X9	Operating condition	Y9	Operating condition	
					setting completion flag		setting request	
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request	
XB		YB	Not used	XB	Channel change	YB	Channel change request	
		10		AD.	completion flag	טו		
XC		YC		XC	Setting value change	YC	Setting value change	
	Not used				completion flag Synchronous output		request Synchronous output	
XD	Not used	YD		XD	mode flag	YD	request	
XE		YE		XE	Not used	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10		Y10						
X11 X12		Y11 Y12						
X12		Y13						
X14		Y14						
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18						
X19 X1A		Y19 Y1A						
X1A X1B		Y1B	Output enable					
X1C		Y1C	- Carpar Oriabio					
X1D		Y1D	Nat was d					
X1E		Y1E	Not used					
X1F		Y1F						

#### 3.7.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memories and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A62DA-S1			Q64DAN		
Address	Name	Read/write	Address	Name	Read/write	
(decimal)	CH1 Digital value		(decimal)	D/A conversion enable/disable		
1	CH2 Digital value	-	1	CH1 Digital value		
2	CH1 Voltage upper limit check code		2	CH2 Digital value	R/W	
3	CH2 Voltage lower limit check code	R/W	3	CH3 Digital value	10,00	
4	CH1 Current upper limit check code	_	4	CH4 Digital value		
5	CH2 Current lower limit check code	5				
U	OTTE GUITGIN TOWER INTIN GITGON GGGG		to	System area (Not used)	_	
			10	Joyatam area (i tet aeea)		
			11	CH1 Setting value check code		
			12	CH2 Setting value check code		
			13	CH3 Setting value check code	R	
			14	CH4 Setting value check code		
			15			
			to	System area (Not used)	-	
			18	<u> </u>		
			19	Error code		
			20	Setting range (CH1 to CH4)	R	
			21	System area (Not used)	-	
			00	Offset/gain setting mode		
			22	Offset specification		
			Offset/gain setting mode		R/W	
			23	Gain specification		
			24	Offset/gain adjusted value specification		
			25			
			to	System area (Not used)	-	
			157			
			158	Mode switching setting	R/W	
			159	Wiede Switching Setting	1000	
			160			
			to	System area (Not used)	-	
			199			
			200	Pass data classification setting	R/W	
			201	System area (Not used)	-	
			202	CH1 Industrial shipment settings offset value		
			203	CH1 Industrial shipment settings gain value		
			204	CH2 Industrial shipment settings offset value		
			205	CH2 Industrial shipment settings gain value		
			206	CH3 Industrial shipment settings offset value		
			207	CH3 Industrial shipment settings gain value		
			208	CH4 Industrial shipment settings offset value		
			209	CH4 Industrial shipment settings gain value	R/W	
			210	CH1 User range settings offset value		
			211	CH3 User range settings gain value		
			212	CH2 User range settings offset value		
			213	CH2 User range settings gain value		
			214	CH3 User range settings offset value		
			215	CH3 User range settings gain value		
			216	CH4 User range settings offset value		
			217	CH4 User range settings gain value		

3 ANALOG OUTPUT MODULE REPLACEMENT

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Memo		

# 3.8 A68DAI(-S1)

#### 3.8.1 Performance comparison

It	em	(1)16-bit signed bir	narv		A68DAI	(-S1)			
		(2)Setting range:	iai y						
				Set resolution		Setting ra	ange		
z igitai ii ipat				1/4000		0 to 40	00		
			1/8000 0 to 8000						
			1/12000 0 to 12000						
Analog autaut					0 to 20m	nADC			
Analog output				(External loa	nd resistance	e value: $0\Omega$ to $60$	0Ω)		
				Diç	gital value res	olution	*Analog		
				1/4000	1/8000	1/12000	output value		
I/O characteris	stics		Digital	4000	8000	12000	+20mA		
			input	2000	4000	6000	+12mA		
			value	0	0	0	+4mA		
			*When offset value 4mA, gain value 20mA settings						
Maximum	1/4000		5.0µA						
resolution of	1/8000				2.5µ	A			
analog value	1/12000				1.6µ	A			
Overall accura (accuracy at moutput value)	naximum analog		±1.0% (±200µA)						
Conversion anded			W	ithin 40ms/8 cl	hannels (sai	me time for one c	hannel)		
Conversion speed Note) Time from when the		the digital inpu			fied analog valu	e is reached			
Absolute maxi	mum output				0 to +28				
			Note) N	/lax. output cui	rrent restrict	ted by output prot	ection circuit		
Number of and points	alog output				8 channels	/module			

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

	O : Compatible, △ : Partial change required, ×: Incompatible			
Q68DAIN	Compatibility	Precautions for replacement		
16-bit signed binary (Normal resolution mode: -4096 to 4095, High resolution mode: -12288 to 12287)	0			
0 to 20mADC (External load resistance value: $0\Omega$ to $600\Omega$ )	0			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	0			
Ambient temperature 25±5°C: within ±0.1% (±20 $\mu$ A) Ambient temperature 0 to 55°C: within ±0.3% (±60 $\mu$ A)	0			
80μs/channel	0			
21mA	0			
8 channels/module	0			

I+a	em	A68DAI (-S1)					
Number of write		A00DAI (-51)					
		<u> </u>					
Output short pr	otection	•					
Isolation method		Between the output terminal and programmable controller power supply: photocoupler isolation (Between channels: non-isolation)					
Dielectric withs	tand voltage	•					
Insulation resistance		-					
Number of occi	upied I/O points	32 points					
Number of occ	upied i/O points	(I/O assignment: special 32 points)					
Connected terr	ninal	38-point terminal block					
Applicable wire	size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)					
Applicable sold	lerless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current (5VDC)	consumption	0.15A					
Cytomal	Voltage	21.6 to 26.4VDC					
External power supply	Current consumption	0.4A					
	Inrush current	-					
Weight		0.65kg					

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

Q68DAIN	Compatibility	Precautions for replacement
Max. 100,000 times	0	
Available	0	
Between the I/O terminal and programmable controller power supply:		
photocoupler isolation		
Between output channels: non-isolation	0	
Between external power supply and analog output: transformer isolation		
Between the I/O terminal and programmable controller power supply:	0	
500VAC, for 1 minute	0	
Between the I/O terminal and programmable controller power supply:	0	
500VDC, 20M $\Omega$ or more	0	
16 points	^	The number of occupied I/O points
(I/O assignment: intelligent 16 points)	Δ	has changed to 16 points.
18-point terminal block	×	
0.3 to 0.75mm ²	×	
FG terminal: R1.25-3, 1.25-YS3, RAV1.25-3, V1.25-YS3A		Wiring change is required.
Terminals other than FG: R1.25-3	×	
(Sleeved solderless terminal cannot be used.)		
0.38A	^	The recalculation of internal current
0.30A	Δ	consumption (5VDC) is required.
24VDC +20%, -15%		
Ripple, spike 500mVp-p or less	_ 0	
0.27A		
2.5A, 230µs or less	-	
0.20kg	0	

#### 3.8.2 Functional comparison

O: Available, -: Not available

		A68DAI	Q68	O : Available, - : Not available
Item	Description	(-S1)	DAIN	Precautions for replacement
D/A conversion enable/ disable function	Specifies whether to enable or disable the D/A conversion for each channel.	0	0	On Q68DAIN, by disabling the D/A conversion for the channels that are not used, the conversion speed can be shortened.
D/A output enable/disable function	Specifies whether to output the D/A conversion value or the offset value for each channel.  The conversion speed stays constant regardless of whether D/A output is enabled or disabled.	0	0	On Q68DAIN, the output enable/ disable is set with Y signal (CH□ Output enable/disable flag).
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.  The analog output will be updated after Synchronous output request (YD) is set to ON and the time specified as "programmable controller CPU processing time + 120µs" has elapsed.  However, the analog output will be fixed to CH1, and other channels (CH2 to CH8) cannot be used.  When the module is mounted on a remote I/O station, the analog output will not be synchronized because of a link scan delay if the synchronous output function is specified.	-	0	
Analog output HOLD/ CLEAR function	Retains an analog value that was output when the programmable controller CPU is in the STOP status or an error occurs.	0	0	1) On Q68DAIN, the setting of HOLD/CLEAR is carried out for each channel. 2) For the Q68DAIN, this function is set with the intelligent function module switch setting. 3) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CH□ Output enable/disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.    D/A conversion	-	0	
Resolution mode	Switches the resolution mode according to the application.  The resolution can be selected from 1/4000 or 1/12000.  The resolution mode is batch-set for all channels.	0	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 3.8.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A68DA		Q68DAIN				
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/
	flag						disable flag
X2	Error flag	Y2		X2		Y2	CH2 Output enable/
	Ů						disable flag
Х3		Y3		Х3		Y3	CH3 Output enable/ disable flag
X4		Y4		X4	Not used	Y4	CH4 Output enable/ disable flag
X5		Y5		X5		Y5	CH5 Output enable/ disable flag
X6		Y6	Not used	X6		Y6	CH6 Output enable/ disable flag
X7		Y7		X7		Y7	CH7 Output enable/ disable flag
X8		Y8		X8	High resolution mode	Y8	CH8 Output enable/
					status flag Operating condition		disable flag Operating condition
X9		Y9		X9	setting completion flag	Y9	setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Channel change completion flag	YB	Channel change request
XC	Not used	YC		XC	Setting value change completion flag	YC	Setting value change request
XD		YD	Interlock signal for the RFRP and RTOP	XD	Synchronous output mode flag	YD	Synchronous output request
XE		YE	instructions when the	XE	Not used	YE	Not used
XF		YF	A68DAI(-S1) is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10			ı		
X11		Y11					
X12		Y12					
X13			D/A conversion output				
X14		Y14	enable flag				
X15 X16		Y15 Y16					
X10		Y17					
X17		Y18	Error reset flag				
X19		Y19					
X1A		Y1A					
X1B	1	Y1B					
X1C		Y1C					
X1D	Interlock signal for the	Y1D	Not used				
X1E	RFRP and RTOP	Y1E					
V45	instructions when the	V45					
X1F	A68DAI(-S1) is used in	Y1F					
	remote I/O station			I			

#### 3.8.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memories and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A68DAI(-S1)		Q68DAIN				
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write		
0	D/A conversion enable/disable channel		0	D/A conversion enable/disable			
1	CH1 Digital value	1	1	CH1 Digital value			
2	CH2 Digital value	1	2	CH2 Digital value			
3	CH3 Digital value		3	CH3 Digital value	1		
4	CH4 Digital value	D/4/	4	CH4 Digital value	R/W		
5	CH5 Digital value	R/W	5	CH5 Digital value	1		
6	CH6 Digital value		6	CH6 Digital value			
7	CH7 Digital value		7	CH7 Digital value			
8	CH8 Digital value		8	CH8 Digital value	1		
9	Resolution of digital value		9	Customs area (Nistured)			
10	CH1 Setting value check code		10	System area (Not used)	-		
11	CH2 Setting value check code		11	CH1 Setting value check code			
12	CH3 Setting value check code		12	CH2 Setting value check code			
13	CH4 Setting value check code	R	13	CH3 Setting value check code			
14	CH5 Setting value check code	7 ~	14	CH4 Setting value check code			
15	CH6 Setting value check code	1	15	CH5 Setting value check code			
16	CH7 Setting value check code	1	16	CH6 Setting value check code	R		
17	CH8 Setting value check code		17	CH7 Setting value check code			
			18	CH8 Setting value check code			
			19	Error code			
			20	Setting range (CH1 to CH4)			
			21	Setting range (CH5 to CH8)			
			22	Offset/gain setting mode			
			22	Offset specification			
			23	Offset/gain setting mode	R/W		
			20	Gain specification			
			24	Offset/gain adjusted value specification			
			25				
			to	System area (Not used)	-		
			157				
			158	Mode switching setting	R/W		
			159	Twode switching setting	1000		
			160				
			to	System area (Not used)	-		
			201				
			202	CH1 Industrial shipment settings offset value			
			203	CH1 Industrial shipment settings gain value			
			204	CH2 Industrial shipment settings offset value			
			205	CH2 Industrial shipment settings gain value	R/W		
			206	CH3 Industrial shipment settings offset value			
			207	CH3 Industrial shipment settings gain value			
			208	CH4 Industrial shipment settings offset value	ĺ		

	Q68DAIN	
Address	Name	Read/write
(decimal)	Name	iteau/wille
209	CH4 Industrial shipment settings gain value	
210	CH5 Industrial shipment settings offset value	
211	CH5 Industrial shipment settings gain value	
212	CH6 Industrial shipment settings offset value	
213	CH6 Industrial shipment settings gain value	
214	CH7 Industrial shipment settings offset value	
215	CH7 Industrial shipment settings gain value	
216	CH8 Industrial shipment settings offset value	
217	CH8 Industrial shipment settings gain value	
218	CH1 User range settings offset value	
219	CH1 User range settings gain value	
220	CH2 User range settings offset value	
221	CH2 User range settings gain value	R/W
222	CH3 User range settings offset value	
223	CH3 User range settings gain value	
224	CH4 User range settings offset value	
225	CH4 User range settings gain value	
226	CH5 User range settings offset value	
227	CH5 User range settings gain value	
228	CH6 User range settings offset value	
229	CH6 User range settings gain value	
230	CH7 User range settings offset value	
231	CH7 User range settings gain value	
232	CH8 User range settings offset value	
233	CH8 User range settings gain value	

## 3.9 A68DAV

#### 3.9.1 Performance comparison

It	em				A68DAV				
		(1)16-bit signed bi	nary						
		(2)Setting range:							
Digital input		Setting resolution Setting					ange		
Digital Input				1/4000		-4000 to 4	_		
				1/8000		-8000 to 8			
				1/12000		-12000 to	12000		
A 1					-10 to 0 to 10\	/DC			
Analog output				(External load	d resistance va	lue: $2k\Omega$ to $1N$	<b>Λ</b> Ω)		
				Dig	ital value resolut	ion	*Analog		
				1/4000	1/8000	1/12000	output value		
				4000	8000	12000	+10V		
I/O characteris	tics		Digital	2000	4000	6000	+5V		
			input	0	0	0	0V		
			value	-2000 -4000	-4000 -8000	-6000 -12000	-5V -10V		
				l		I		ı	
Mandania	14/4000			*When offset v	value 0V, gain	value 10V sett	ings		
Maximum of	1/4000				2.5mV				
resolution of	1/12000				1.25mV 0.83mV				
analog value Overall accura					0.031110				
	aximum analog		±1.0% (±100mV)						
output value)	aximum analog		2 (2.1001117)						
			Within 40ms/8 channels (same time for one channel)						
Conversion sp	eed	Note) Time	Note) Time from when the digital input is written to when the specified analog value is reached						
Abaduta mavi	mum autaut	·	-12 to +12V						
Absolute maxii	mum output		Note) Max. output voltage restricted by output protection circuit						
Number of ana	alog output		8 channels/module						
points			o channeis/module						
Number of writ	es to E ² PROM	-							
Output short p	rotection		-						
Isolation metho	od	Between the	e output tern				upply: photocou	pler isolation	
				(Betwee	en channels: no	on-isolation)			
Dielectric withs	stand voltage				-				
Insulation resis	stance				-				
Number of occ	upied I/O points				32 points				
	<u> </u>			•	ignment: speci				
Connected terr	minal			38	3-point termina				
Applicable wire	e size				0.75 to 2mm				
				(Applicable ti	ghtening torqu	e: 39 to 59N•c	cm)		
Applicable sale	dorloss terminal			\/1 25 2 \/	11 25 VC2A \/	) 63 \/J V63/	<b>\</b>		
Applicable sol	derless terminal			v 1.∠5-3, V	′1.25-YS3A, V2	∠-33, VZ-Y3 <i>3F</i>	1		
Internal curren	t consumption								
torriar ourieri	. Jonean plion				0.15A				

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

						•	: Partial change required, ×: Incompatible	
			Q6	8DAVN			Compatibility	Precautions for replacement
	16-bit signed binary (Normal resolution mode: -4096 to 4095, High resolution mode: -12288 to 12287, -16384 to 16383)							
	-1	0 to 10VD0	C (External load	0				
V	_	-	Normal reso Digital input value 0 to 4000 -4000 to 4000	lution mode  Maximum resolution  1.25mV  1.0mV  2.5mV  0.75mV	High resolut Digital input value  0 to 12000  -16000 to 16000  -12000 to 12000	Maximum resolution 0.416mV 0.333mV 0.625mV 0.333mV	0	
			•		±0.1% (±10mV) ±0.3% (±30mV)		0	
			80µs	s/channel			0	
			:	±12V			0	
			8 chan	nels/module			0	
			Max. 10	00,000 times			0	
			A۱	/ailable			0	
		Ве	photocou tween output o	upler isolation hannels: non-	controller power s isolation put: transformer i		0	
	Betwee	en the I/O t		ogrammable o	controller power s	supply:	0	
	Betwe	en the I/O t	erminal and pr		controller power s	supply:	0	
		(1/	16 O assignment	points intelligent 16	points)		Δ	The number of occupied I/O points has changed to 16 points.
			18-point	terminal block			×	
				0.75mm ²			×	Wiring change is required.
	F		: R1.25-3, 1.25 Terminals other red solderless	er than FG: R1		<b>A</b>	×	
			(	0.38A			Δ	The recalculation of internal current consumption (5VDC) is required.

Item		A68DAV	
	Voltage	21.6 to 26.4VDC	
External power supply	Current consumption	0.2A	
	Inrush current	-	
Weight		0.6kg	

 $O : Compatible, \triangle : Partial \ change \ required, \ \times : Incompatible$ 

Q68DAVN	Compatibility	Precautions for replacement
24VDC +20%, -15%		
Ripple, spike 500mVp-p or less		
0.20A	0	
2.5A, 230µs or less		
0.20kg	0	

#### 3.9.2 Functional comparison

				O : Available, - : Not available
Item	Description	A68DAV	Q68DAVN	Precautions for replacement
D/A conversion enable/ disable function	Specifies whether to enable or disable the D/A conversion for each channel.	0	0	On Q68DAVN, by disabling the D/A conversion for the channels that are not used, the conversion speed can be shortened.
D/A output enable/ disable function	Specifies whether to output the D/A conversion value o the offset value for each channel.  The conversion speed stays constant regardless of whether D/A output is enabled or disabled.	0	0	On Q68DAVN, the output enable/ disable is set with Y signal (CH□ Output enable/disable flag).
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.  The analog output will be updated after Synchronous output request (YD) is set to ON and the time specified as "programmable controller CPU processing time + 120µs" has elapsed.  However, the analog output will be fixed to CH1, and other channels (CH2 to CH8) cannot be used.  When the module is mounted on a remote I/O station, the analog output will not be synchronized because of a link scan delay if the synchronous output function is specified.	-	0	
Analog output HOLD/ CLEAR function	Retains an analog value that was output when the programmable controller CPU is in the STOP status or an error occurs.	0	0	1) On Q68DAVN, the setting of HOLD/CLEAR is carried out for each channel. 2) For the Q68DAVN, this function is set with the intelligent function module switch setting. 3) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.
Analog output test while the programmable controller CPU is in the STOP status	mable  PU is in the  Setting enable/disable Enable Disable		0	
Resolution mode	Switches the resolution mode according to the application. The resolution can be selected from 1/4000, 1/12000, 0 1/16000. The resolution mode is batch-set for all channels.	0	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 3.9.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A68		Q68DAVN				
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/
	flag						disable flag
X2	Error flag	Y2		X2		Y2	CH2 Output enable/
	Ů						disable flag
Х3		Y3		Х3		Y3	CH3 Output enable/ disable flag
X4		Y4		X4	Not used	Y4	CH4 Output enable/ disable flag
X5		Y5		X5		Y5	CH5 Output enable/ disable flag
X6		Y6	Not used	X6		Y6	CH6 Output enable/ disable flag
X7		Y7		X7		Y7	CH7 Output enable/ disable flag
X8		Y8		X8	High resolution mode status flag	Y8	CH8 Output enable/ disable flag
	-				Operating condition		Operating condition
X9		Y9		X9	setting completion flag	Y9	setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
ХВ		YB		XB	Channel change completion flag	YB	Channel change request
XC	Not used	YC		XC	Setting value change completion flag	YC	Setting value change request
XD		YD	Interlock signal for the RFRP and RTOP	XD	Setting value change completion flag	YD	Synchronous output request
XE	-	YE	instructions when the	XE	Not used	YE	Not used
XF		YF	A68DAV is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10					
X11	1	Y11					
X12		Y12					
X13		Y13	D/A conversion output				
X14		Y14	enable flag				
X15		Y15					
X16	_	Y16					
X17		Y17					
X18 X19	-	Y18 Y19	Error reset flag				
X1A	-	Y1A					
X1B		Y1B					
X1C	1	Y1C					
X1D	Interlock signal for the	Y1D	Not used				
X1E	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A68DAV is used in	Y1F					
	remote I/O station						

#### 3.9.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memories and sequence program, refer to the Digital-Analog Converter Module User's Manual.

	A68DAV		Q68DAVN		
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write
0	D/A conversion enable/disable channel		0	D/A conversion enable/disable	
1	CH1 Digital value		1	CH1 Digital value	
2	CH2 Digital value		2	CH2 Digital value	
3	CH3 Digital value		3	CH3 Digital value	
4	CH4 Digital value	D.A./	4	CH4 Digital value	
5	CH5 Digital value	R/W	5	CH5 Digital value	R/W
6	CH6 Digital value	1	6	CH6 Digital value	
7	CH7 Digital value	1	7	CH7 Digital value	
8	CH8 Digital value	1	8	CH8 Digital value	
9	Resolution of digital value	1	9	0 1 (1) 1	
10	CH1 Setting value check code		10	System area (Not used)	
11	CH2 Setting value check code	1	11	CH1 Setting value check code	
12	CH3 Setting value check code	1	12	CH2 Setting value check code	
13	CH4 Setting value check code	1 _	13	CH3 Setting value check code	
14	CH5 Setting value check code	R	14	CH4 Setting value check code	
15	CH6 Setting value check code	1	15	CH5 Setting value check code	
16	CH7 Setting value check code	1	16	CH6 Setting value check code	R
17	CH8 Setting value check code	1	17	CH7 Setting value check code	
		•	18	CH8 Setting value check code	
			19	Error code	
			20	Setting range (CH1 to CH4)	
			21	Setting range (CH5 to CH8)	
				Offset/gain setting mode	
			22	Offset specification	
				Offset/gain setting mode	R/W
			23	Gain specification	
			24	Offset/gain adjusted value specification	
			25		
			to	System area (Not used)	-
			157		
			158		5.04/
			159	Mode switching setting	R/W
			160		
			to	System area (Not used)	-
			201	, ,	
			202	CH1 Industrial shipment settings offset value	
			203	CH1 Industrial shipment settings gain value	
			204	CH2 Industrial shipment settings offset value	
			205	CH2 Industrial shipment settings gain value	R/W
			206	CH3 Industrial shipment settings offset value	
			207	CH3 Industrial shipment settings gain value	
			208	CH4 Industrial shipment settings offset value	

Q68DAVN						
Address	Name	Read/write				
(decimal)	Name	ixeau/wiite				
209	CH4 Industrial shipment settings gain value					
210	CH5 Industrial shipment settings offset value					
211	CH5 Industrial shipment settings gain value					
212	CH6 Industrial shipment settings offset value					
213	CH6 Industrial shipment settings gain value					
214	CH7 Industrial shipment settings offset value					
215	CH7 Industrial shipment settings gain value					
216	CH8 Industrial shipment settings offset value					
217	CH8 Industrial shipment settings gain value					
218	CH1 User range settings offset value					
219	CH1 User range settings gain value					
220	CH2 User range settings offset value					
221	CH2 User range settings gain value	R/W				
222	CH3 User range settings offset value					
223	CH3 User range settings gain value					
224	CH4 User range settings offset value					
225	CH4 User range settings gain value					
226	CH5 User range settings offset value					
227	CH5 User range settings gain value					
228	CH6 User range settings offset value					
229	CH6 User range settings gain value					
230	CH7 User range settings offset value					
231	CH7 User range settings gain value					
232	CH8 User range settings offset value					
233	CH8 User range settings gain value					

# 4

# TEMPERATURE INPUT MODULE REPLACEMENT

### 4.1 List of Temperature Input Module Alternative Models for Replacement

<b>Production discontinuation</b>		Transition to Q series			
Product	Model	Model		Remarks (Restrictions)	
Temperature input module	A616TD*1 A60MXT(N)	Q64TD	<ol> <li>External wiring</li> <li>Number of slots</li> <li>Program</li> <li>Performance spec</li> <li>Functional specific</li> </ol>	: Cable size is changed. : Changed (4 modules are required when one A616TD and one A60MXT(N) are used.) : The number of occupied I/O points, I/O signals, and buffer memory addresses are changed. cifications change: 4CH/module cations: Not changed	
		Q68TD-G-H02 Q68TD-G-H01	External wiring     Number of slots     Program     Performance specifications	Connector wiring and cable size are changed.     Changed (2 modules are required when one A616TD and one A60MXT(N) are used.)     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.     ifications change: 8CH/module cations: The disconnection detection function is equipped (only in the Q68TD-G-H02). Transformer isolation is provided between channels.	
	A68RD3N	Q64RD	3) Program	Cable size is changed.     Changed (2 modules are required.)     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.     Sifications change: 4CH/module cations: Not changed	
		Q64RD-G		Cable size is changed.     Changed (2 modules are required.)     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.     Sifications change: 4CH/module cations: RTD Ni100-compliant and transformer isolation is provided between channels.	
		Q68RD3-G		Connector wiring and cable size are changed.     Not changed     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.     ifications change: Resolution and conversion speed cations: 32-bit output is not available. RTD Ni100-compliant and transformer isolation is provided between channels.	
	A68RD4N	Q64RD	5) Functional specific	Cable size is changed.     Changed (2 modules are required.)     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.     ifications change: 4CH/module cations: Not changed	
		Q64RD-G		Cable size is changed.     Changed (2 modules are required.)     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.     cifications change: 4CH/module cations: RTD Ni100-compliant and transformer isolation is provided between channels.	

*1 Depending on the connected sensor and the analog input range, use each module in combination (A616TD, A60MX, A60MXR, A60MXRN, A60MXTN) as shown below.

The description in this chapter is based on the condition with "Thermocouple" connected, which is a general use.

Module combination	Thermocouple	Sensor other than thermocouple			
Module Combination	Thermocoupie	0 to 10V	-10 to 10V, -20 to 20mA		
A616TD + A60MXT(N)	0	0	-		
A616TD + A60MXT(N) + A60MX(R/RN)	0	0	0		
A616TD + A60MX(R/RN)	-	0	0		
A616TD	-	0	-		

## 4.2 A616TD (Replacement to the Q64TD)

#### 4.2.1 Performance comparison

#### (1) Performance comparison list

Item		A616TD (When using the A60MXT and A60MXTN together)					
Temperature ser	nsor input	-200 to 1800°C					
	Digital output	16-bit signed binary					
<u> </u>	value	(0 to 4000) (Data part: 12 bits)					
•	Detected	16-bit signed binary					
	temperature value	(-2000 to 18000: value up to the first decimal place × 10)					
Applicable therm	nocouple	Refer to Section 4.2.1 (2).					
Measured temperaccuracy	erature range	Refer to Section 4.2.1 (2).					
Overall accuracy	V	Refer to the table in Section 4.2.1 (2).					
Overall accuracy	y	Measured temperature range accuracy ±0.5°C					
Maximum conve	ersion speed	50ms/channel					
Isolation method		Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1M $\Omega$ resistor isolation)					
Number of temper	erature sensor	15 points/module (A60MXT, A60MXTN) (The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)					
Number of occup	pied I/O points	32 points (I/O assignment: special 32 points)					
External connec	tion system	38-point terminal block					
Applicable wire s	size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)					
Applicable solde	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current of (5VDC)	consumption	1.0A					
Weight		0.85kg					

^{*1} Calculate the accuracy in the following method.

 $(Accuracy) = (Conversion\ accuracy) + (Temperature\ characteristics) \times (Operating\ ambient\ temperature\ variation)$ 

^{+ (}Cold junction compensation accuracy)

An operating ambient temperature variation indicates a deviation of the operating ambient temperature from the  $25\pm5^{\circ}$ C range.

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

	Q64TD		Compatibility	Precautions for replacement
	Q041D		Compatibility	Precautions for replacement
-2	70 to 1820°C	0		
16-bit signed	l binary (Scaling valu	0		
16-b (-2700 to 18200: value	it signed binary up to the first decima	ıl place × 10)	0	
Refer to	Δ	As the applicable thermocouples and thermocouple compliance standards differ, refer to Section 4.2.1 (2) to check the specifications, and use the thermocouple that can be used with the Q64TD.		
Refer to	Section 4.2.1 (2).		Δ	As they depend on the applicable thermocouple and measured
	*1		0	temperature range, refer to Section 4.2.1 (2) to check the specifications.
40	Oms/channel		0	
Isolated area Isolatio metho		Insulation resistance		
thermocouple input and earth	1780VrmsAC/3 cycles	500VDC 100M Ω or more		
Between thermocouple input channels		500VDC 10MΩ or more	0	
Between cold junction compensation input (Pt100) and ground	ion -	-		
4 ch	annels/module		×	Consider replacement with multiple Q64TD.
(I/O assignme	Δ	The number of occupied I/O points has changed to 16 points.		
18-ро	×			
0.3	×	Wiring change is required.		
1.2 (Sleeved solderle	×			
	0.50A		0	
·	0.25kg		0	



### (2) Applicable thermocouple and measured temperature range accuracy

	A616TD							
JIS	ANSI	DIN	BS	Measurement range number	1	2	3	4
010	Altoi	Bill	В	Allowable input voltage range [mV]	-12.5 to 12.5	0 to 25	0 to 50	0 to 100
В	В	_	PtRh30-	Measured temperature range [°C]	100 to 1500	100 to 1800	100 to 1800	100 to 1800
Б	, B	-	PtRh6	Accuracy at 25°C [%] Temperature drift [%/°C]	-	±0.5 ±0.013	-	-
R	R		PtRh13-Pt	Measured temperature range [°C]	0 to 1000	0 to 1700	0 to 1700	0 to 1700
K	K	-	Funitio-Fu	Accuracy at 25°C [%] Temperature drift [%/°C]	_	±0.4 ±0.011	-	-
-		DiDi- Di	DiDi-40 Di	Measured temperature range [°C]	0 to 1200	0 to 1700	0 to 1700	0 to 1700
S	S	PtRh-Pt	PtRh10-Pt	Accuracy at 25°C [%] Temperature drift [%/°C]	-	±0.4 ±0.011	-	-
	17	NiCr-Ni	AUG AUA	Measured temperature range [°C]	-200 to 250	0 to 500	0 to 1000	0 to 1300
K	K		NiCr-NiAl	Accuracy at 25°C [%] Temperature drift [%/°C]	±0.4 ±0.011	±0.3 ±0.01	±0.3 ±0.01	±0.5 ±0.013
	_		- NiCr-CuNi	Measured temperature range [°C]	-200 to 150	0 to 300	0 to 600	0 to 1000
E	E	-		Accuracy at 25°C [%] Temperature drift [%/°C]	±0.4 ±0.011	±0.3 ±0.01	±0.3 ±0.01	±0.4 ±0.011
			- Fe-CuNi	Measured temperature range [°C]	-200 to 200	0 to 400	0 to 800	0 to 1200
J	J	-		Accuracy at 25°C [%]	±0.4	±0.3	±0.3	±0.4
				Temperature drift [%/°C] Measured temperature range [°C]	±0.011 -200 to 200	±0.01 0 to 400	±0.01 0 to 400	±0.011 0 to 400
Т	Т	-	Cu-CuNi	Accuracy at 25°C [%]	±0.5	±0.3		
				Temperature drift [%/°C]	±0.013	±0.01	-	
_	_	Fe-CuNi	_	Measured temperature range [°C]	-100 to 200	0 to 400	0 to 800	0 to 900
-		I C-Ouivi	_	Accuracy at 25°C [%]	_	±0.3	±0.3	±0.5
				Temperature drift [%/°C]		±0.01	±0.01	±0.013
_	_	Cu-CuNi	_	Measured temperature range [°C]	-100 to 200	0 to 400	0 to 600	0 to 600
		Cu-Cuivi	_	Accuracy at 25°C [%]	_	±0.3	±0.4	_
				Temperature drift [%/°C]		±0.01	±0.011	

**MELSEC** 

			Q64TD			
JIS			Specifications			
313	Measured temperature		Specifications		1700 to	
	· ·	0 to 600	600 to 800	800 to 1700	1820	
	range [°C]				1820	
В	Conversion accuracy at		±3.0	±2.5		
	25±0.5°C [°C]	-			-	
	Temperature characteristics		±0.4	±0.4		
	[°C]					
	Measured temperature	-50 to 0	0 to 300	300 to 1600	1600 to	
	range [°C]				1760	
R	Conversion accuracy at		±2.5	±2.0		
	25±0.5°C [°C]	_	-	-	_	
	Temperature characteristics		±0.4	±0.3		
	[°C]		10.4	10.0		
	Measured temperature	-50 to 0	0 to 300	300 to 1600	1600 to	
	range [°C]	-30 to 0	0 10 300	300 10 1000	1760	
S	Conversion accuracy at		±2.5	±2.0		
3	25±0.5°C [°C]		±2.5	±2.0		
	Temperature characteristics	-	10.4	10.3	-	
	[°C]		±0.4	±0.3		
	Measured temperature	0701 000	000.1.0	0.11000	1200 to	
	range [°C]	-270 to -200	-200 to 0	0 to 1200	1370	
	Conversion accuracy at		Larger value of ±0.5°C, or ±0.5%	Larger value of ±0.5°C, or		
K	25±0.5°C [°C]		of measured temperature	±0.25% of measured temperature		
	Temperature characteristics	-	Larger value of ±0.06°C, or	Larger value of ±0.06°C, or	7 -	
	[°C]		~	±0.02% of measured temperature		
	Measured temperature			·		
	range [°C]	-270 to -200	-200 to 0	0 to 900	900 to 1000	
	Conversion accuracy at		Larger value of ±0.5°C, or ±0.5%	Larger value of ±0.5°C, or		
Е	25±0.5°C [°C]		of measured temperature	±0.25% of measured temperature		
_	2010.0 0 [ 0]	_	Larger value of ±0.06°C, or	10.20% of measured temperature	_	
	Temperature characteristics		+0.15% of measured Larger value of			
	[°C]		temperature	±0.02% of measured temperature		
	Measured temperature		temperature			
	range [°C]	-210 to -40	-40 to 750	750 to 1200	-	
	range [ C]		Larger value of ±0.5°C, or			
	Conversion accuracy at		±0.25% of measured			
J	25±0.5°C [°C]	-		-	-	
			temperature			
	Temperature characteristics		Larger value of ±0.06°C, or			
	[°C]	-	±0.02% of measured	-	-	
	Management		temperature			
	Measured temperature	-270 to -200	-200 to 0	0 to 350	350 to 400	
	range [°C]					
Т	Conversion accuracy at	-	Larger value of ±0.5°C, or ±0.5%	Larger value of ±0.5°C, or	-	
	25±0.5°C [°C]		of measured temperature	±0.25% of measured temperature		
	Temperature characteristics	-	Larger value of ±0.06°C, or	Larger value of ±0.06°C, or	-	
	[°C]		±0.1% of measured temperature	±0.02% of measured temperature		
	Measured temperature	-270 to -200	-200 to 0	0 to 1250	1250 to	
	range [°C]				1300	
N	Conversion accuracy at	_	Larger value of ±0.5°C, or ±0.5%	Larger value of ±0.5°C, or	_	
14	25±0.5°C [°C]		of measured temperature	±0.25% of measured temperature		
	Temperature characteristics		Larger value of ±0.06°C, or	Larger value of ±0.06°C, or		
	[°C]	_	±0.2% of measured temperature	±0.02% of measured temperature	_	

## 4.2.2 Functional comparison

O: Available, -: Not available

Item	Description	A616TD	Q64TD	Precautions for replacement
Temperature conversion function	Imports temperature data.	0	0	
Conversion enable/disable function	Sets whether to enable/disable a conversion per channel.	0	0	
Disconnection detection function	Detects a disconnection of the connected thermocouple of each channel.	0	0	On Q64TD, the channel set conversion enable automatically performs the disconnection detection.
Temperature conversion value storage	Stores imported temperature data in the buffer memory.	0	0	
Input type selection function	Sets an input type for each channel.	0	0	For the Q64TD, this function is set with the intelligent function module switch setting.
Warning output function	Outputs a warning when the temperature exceeds the set temperature range.	-	0	
Temperature conversion system	Processes the detected temperature by specified method.	-	0	
Scaling function	Converts a measured temperature value into a percent value (%) in set width.	-	0	
Pt100 cold junction compensation enable/disable setting function	Sets whether the cold junction compensation using the Pt100 attached to the terminal is performed or not.	-	0	
Offset/gain setting function	Performs linear correction by individually compensating any given 2 points (offset value/gain value) within the effective range.	-	0	
Error correction function	For all input ranges, the function allows compensating the temperature measurement value by part of the compensation value the errors compensation value.	0	-	Perform the error correction by the offset/gain setting of the Q64TD.
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 4.2.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Thermocouple Input Module/Channel Isolated Thermocouple/Micro Voltage Input Module User's Manual.

	A61		Q64TD				
Device		Device	Cinnal name	Device		Device	Cinnal name
No.	Signal name	No.	Signal name	No.	Signal name	No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	Not used
X1	A/D conversion READY	Y1		X1	CH1 Offset/gain setting	Y1	CH1 Offset setting
	7 0 CONTOICHT (L. A.D.)				status signal		request
X2	Error flag	Y2		X2	CH2 Offset/gain setting status signal	Y2	CH1 Gain setting request
X3	Disconnection error	Y3		X3	CH3 Offset/gain setting	Y3	CH2 Offset setting
	detection	13		Α3	status signal	13	request
X4	Digital output value out- of-range detection	Y4		X4	CH4 Offset/gain setting status signal	Y4	CH2 Gain setting request
	Detected temperature						CH3 Offset setting
X5	value out-of-range	Y5		X5		Y5	request
	detection		Not used				·
X6		Y6		X6	Not used	Y6	CH3 Gain setting request
X7		Y7		X7		Y7	CH4 Offset setting
		>/0				>/0	request
X8		Y8		X8	On a nation of a soundition	Y8	CH4 Gain setting request
X9		Y9		X9	Operating condition setting completion signal	Y9	Operating condition setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Not used	YB	
XC		YC		XC	Disconnection detection signal	YC	
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used
XE		YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE	
XF	Not used	YF	A616TD is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10	Detected temperature value LED display request signal				
X11		Y11		1			
X12		Y12					
X13		Y13					
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18 X19		Y18 Y19	Not used				
X1A		Y1A	Not used				
X1B		Y1B					
X1C	1	Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A616TD is used in	Y1F					
	remote I/O station						

#### 4.2.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of buffer memories and sequence programs, refer to the Thermocouple Input Module/ Channel Isolated Thermocouple/Micro Voltage Input Module User's Manual.

	A616TD		Q64TD				
Address	Name	Read/write	Address	Name	Read/write		
(hex)		Troda Willo	(hex)		rtodd, write		
00	Data format selection		00	Conversion enable/disable setting			
01	Error code storage		01	CH1 Time/count averaging setting			
02	Error occurrence A60MX□CONNECT No. storage	R/W	02	CH2 Time/count averaging setting	R/W		
03	Thermocouple type setting error channel number storage		03	CH3 Time/count averaging setting			
04	Current sampling period storage	R	04	CH4 Time/count averaging setting			
05 to 0E	System area (Not used)	-	05 to 08	System area (Not used)	-		
0F	Conversion enable/ A616TD		09	Averaging processing selection	R/W		
10 to 17	disable specification Multiplexer module	R/W	0A	Conversion completion flag			
18	Setting data set request	0B CH1 Measured temperature value					
19 to 1F	System area (Not used)	-	0C	CH2 Measured temperature value	1 5		
20 to 27	Disconnection detection enable/disable specification	R/W	0D	CH3 Measured temperature value	R		
28 to 2F	System area (Not used)	_	0E	CH4 Measured temperature value			
30 to 3F	Digital output value temperature setting		0F to 12	System area (Not used)	_		
40 to 47	Disconnection detection channel number storage	R/W	13	Error code	R		
48 to 4F	System area (Not used)	-	14	Setting range	1		
	Digital output value out-of-range	5.11	15 to 2E	System area (Not used)	-		
50 to 57	Channel number storage	R/W	2F	Warning output enable/disable setting	R/W		
58 to 5F	System area (Not used)	-	30	Warning output flag			
00.4- 07	Detected temperature value out-of-range	DAM	31	Disconnection detection flag			
60 to 67	Channel number storage	R/W	32	CH1 Scaling value	1		
68 to 6F	System area (Not used)	-	33	CH2 Scaling value	R		
70 to 75	INPUT channel	0	34	CH3 Scaling value			
70 to 7F	Digital output value storage	R	35	CH4 Scaling value			
80 to FF	Error correction value setting	R/W	36 to 3D	System area (Not used)			
100 to 17F	Thermocouple type setting	- R/VV	3E	CH1 Scaling range lower limit value			
180 to 1FF	MX CH.channel		3F	CH1 Scaling range upper limit value	1		
100 10 177	Digital output value storage	R	40	CH2 Scaling range lower limit value			
200 to 27F	MX CH.channel		41	CH2 Scaling range upper limit value	R/W		
200 10 271	Detected temperature value storage		42	CH3 Scaling range lower limit value	- IN/VV		
			43	CH3 Scaling range upper limit value			
			44	CH4 Scaling range lower limit value			
			45	CH4 Scaling range upper limit value			
			46 to 4D	System area (Not used)	-		
			4E	CH1 Scaling width lower limit value			
			4F	CH1 Scaling width upper limit value			
			50	CH2 Scaling width lower limit value			
			51	CH2 Scaling width upper limit value	]		
			52	CH3 Scaling width lower limit value	R/W		
			53	CH3 Scaling width upper limit value	17/4/		
			54	CH4 Scaling width lower limit value			
			55	CH4 Scaling width upper limit value	]		
			56	CH1 Warning output lower/lower limit value			
			57	CH1 Warning output lower/upper limit value			

	Q64TD	
Address	Name	Read/write
(hex)	Name	rtead/write
	CH1 Warning output upper/lower limit value	
	CH1 Warning output upper/upper limit value	
	CH2 Warning output lower/lower limit value	
	CH2 Warning output lower/upper limit value	
	CH2 Warning output upper/lower limit value	
-	CH2 Warning output upper/upper limit value	
	CH3 Warning output lower/lower limit value	R/W
	CH3 Warning output lower/upper limit value	
	CH3 Warning output upper/lower limit value	
	CH3 Warning output upper/upper limit value	
	CH4 Warning output lower/lower limit value	
	CH4 Warning output lower/upper limit value	
	CH4 Warning output upper/lower limit value	
	CH4 Warning output upper/upper limit value	
	System area (Not used)	-
	CH1 Offset temperature setting value	
	CH1 Gain temperature setting value	
	CH2 Offset temperature setting value	
	CH2 Gain temperature setting value	R/W
	CH3 Offset temperature setting value	
7B	CH3 Gain temperature setting value	
7C	CH4 Offset temperature setting value	
	CH4 Gain temperature setting value	
7E to 9D	System area (Not used)	-
	Mode switching setting	
A0	CH1 Factory default offset value	
A1	CH1 Factory default gain value	
A2	CH1 User range settings offset value	
A3	CH1 User range settings gain value	
A4	CH1 User range settings thermal (L)	
	EMF offset value (H)	
A6	CH1 User range settings thermal (L)	
	EMF gain value (H)	
A8	CH2 Factory default offset value	R/W
A9	CH2 Factory default gain value	
AA	CH2 User range settings offset value	
AB	CH2 User range settings gain value	
AC	CH2 User range settings thermal (L)	
AD	EMF offset value (H)	
AE	CH2 User range settings thermal (L)	
AF	EMF gain value (H)	
В0	CH3 Factory default offset value	
B1	CH3 Factory default gain value	

Q64TD						
Address (hex)	Name	Read/write				
B2	CH3 User range settings offset value					
B3	CH3 User range settings gain value					
B4	CH3 User range settings thermal(L)					
B5	EMF offset value(H)					
В6	CH3 User range settings thermal(L)					
B7	EMF gain value(H)					
B8	CH4 Factory default offset value	R/W				
B9	CH4 Factory default gain value	FX/VV				
BA	CH4 User range settings offset value					
BB	CH4 User range settings gain value					
ВС	CH4 User range settings thermal(L)					
BD	EMF offset value(H)					
BE	CH4 User range settings thermal(L)					
BF	EMF gain value(H)					
C0	System area (Not used)					
to	System area (NOL useu)	-				

## 4.3 A616TD (Replacement to the Q68TD-G-H02, Q68TD-G-H01)

#### 4.3.1 Performance comparison

#### (1) Performance comparison list

	Item	A616TD (When using the A60MXT and A60MXTN together)	
Tempera	ature sensor input	-200 to 1800°C	
	Digital output value	16-bit signed binary	
O44	Digital output value	(0 to 4000) (Data part: 12 bits)	
Output	Detected	16-bit signed binary	
	temperature value	(-2000 to 18000: value up to the first decimal place × 10)	
Applicab	ole thermocouple	Refer to Section 4.3.1 (2).	
Measure	ed temperature range	Refer to Section 4.3.1 (2).	
Overell	accuracy.	Refer to the table in Section 4.3.1 (2).	
Overall	accuracy	Measured temperature range accuracy ±0.5°C	
Maximur	m conversion speed	50ms/channel	
Isolation	n method	Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1M $\Omega$ resistor isolation)	
Disconn	ection detection	Available	
Number	of temperature sensor	15 points/module (A60MXT, A60MXTN)	
input poi	ints	(The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)	
Number	of occupied I/O points	32 points (I/O assignment: special 32 points)	
External	connection system	38-point terminal block	
External	device connector		
(sold se	parately)	<u> </u>	
Applicab	ole wire size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)	
Applicab	ole solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Internal (5VDC)	current consumption	1.0A	
Weight		0.85kg	

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

				O. Compatible,	△ : Partiai change required, ×: incompatible
Q68TD-G-H02	Q serie	es Q68TD-G-	H01 ^{*1}	Compatibility	Precautions for replacement
	-270 to 182	20°C		0	
16-bit signed binary (Scaling value)					
16-bit signed binary (-2700 to 18200: value up to the first decimal place × 10)					
 Refer to Section 4.3.1 (2).				Δ	As they depend on the applicable thermocouple and thermocouple standard, refer to Section 4.3.1 (2) and check the specifications. Use the thermocouple that can be used on the Q68TD-G-H02/H01.
Re	fer to Section	4.3.1 (2).		Δ	As they depend on the applicable thermocouple and measured
	*2			0	temperature range, refer to Section 4.3.1 (2) to check the specifications.
640ms/8 channels*3		320ms/8 cha	annels*3	0	
Isolated area  Between thermocouple input and programmable controller power supply  Between thermocouple input channels  Between cold junction compensation input (Pt100) and programmable controller power supply	Isolation method  Transformer isolation  Transformer isolation  Non-isolation	AC1000Vrms/1min	Insulation resistance  DC500V 10MΩ or more	0	
Available (all the channels are indepen	ndent)	Not available		×	The Q68TD-G-H01 has the disconnection monitor function.
8 channels + ch	nannels conn	×	Consider replacement with multiple Q68TD-G-H02/H01.		
(I/O assi	16 poing gnment: intell	Δ	The number of occupied I/O points has changed to 16 points.		
	40-pin conn	×			
A6CON4					Wiring change is required.
0.3mm ² (22 AWG) or less				×	vviinig change is required.
 	-			×	
0.65A		0.49		0	
0.22kg		0.18k	g	0	

- *1 Restrictions on mountable slot position apply to the Q68TD-G-H01. For details, refer to the user's manual for the Q68TD-G-H01/H02.
- *2 Calculate the accuracy in the following method.
  - (Accuracy) = (Conversion accuracy) + (Temperature characteristics) × (Operating ambient temperature variation)
  - + (Cold junction compensation accuracy)
  - An operating ambient temperature variation indicates a deviation of the operating ambient temperature from the 25±5°C range.
- *3 A measured temperature value is stored in the buffer memory at every 320ms/640ms, regardless of the number of conversion enable channels.

### (2) Applicable thermocouple and measured temperature range accuracy

A616TD								
				Measurement range	1	2	3	4
JIS	ANSI	DIN	BS	number			,	
313	ANOI	DIN	В	Allowable input voltage	-12.5 to 12.5	0 to 25	0 to 50	0 to 100
				range [mV]	-12.0 to 12.0	0 10 23	0 10 00	0 10 100
				Measured temperature	100 to 1500	100 to 1800	100 to 1800	100 to 1800
В	В	_	PtRh30-	range [°C]	100 to 1000	100 to 1000	100 to 1000	100 10 1000
D			PtRh6	Accuracy at 25°C [%]	_	±0.5	_	_
				Temperature drift [%/°C]		±0.013		
				Measured temperature	0 to 1000	0 to 1700	0 to 1700	0 to 1700
R	R	_	PtRh13-Pt	range [°C]	0 10 1000	0 10 17 00	0 10 17 00	0 10 11 00
			1 4411011	Accuracy at 25°C [%]	_	±0.4	_	_
				Temperature drift [%/°C]		±0.011		
				Measured temperature	0 to 1200	0 to 1700	0 to 1700	0 to 1700
S	S	PtRh-Pt	PtRh10-Pt	range [°C]	- 10 1-00			0 10 1700
	_			Accuracy at 25°C [%]	_	±0.4	-	_
				Temperature drift [%/°C]		±0.011		
	К	NiCr-Ni	NiCr-NiAl	Measured temperature	-200 to 250	0 to 500	0 to 1000	0 to 1300
K				range [°C]				
				Accuracy at 25°C [%]	±0.4	±0.3	±0.3	±0.5
				Temperature drift [%/°C]	±0.011	±0.01	±0.01	±0.013
	E	-		Measured temperature	-200 to 150	0 to 300	0 to 600	0 to 1000
E			NiCr-CuNi	range [°C]				
				Accuracy at 25°C [%]	±0.4	±0.3	±0.3	±0.4
				Temperature drift [%/°C]	±0.011	±0.01	±0.01	±0.011
	J			Measured temperature	-200 to 200	0 to 400		0 to 1200
J		-	Fe-CuNi	range [°C]		1		
				Accuracy at 25°C [%]	±0.4	±0.3	±0.3	±0.4
				Temperature drift [%/°C]	±0.011	±0.01	±0.01	±0.011
				Measured temperature	-200 to 200	0 to 400	0 to 400	0 to 400
Т	Т	-	Cu-CuNi	range [°C]				
				Accuracy at 25°C [%]	±0.5	±0.3	-	-
_				Temperature drift [%/°C]	±0.013	±0.01		
_				Measured temperature	-100 to 200	0 to 400	0 to 800	0 to 900
	-	Fe-CuNi	-	range [°C]		.00	.00	.0.5
				Accuracy at 25°C [%]	-	±0.3	±0.3	±0.5
				Temperature drift [%/°C]		±0.01	±0.01	±0.013
				Measured temperature	-100 to 200	0 to 400	0 to 600	0 to 600
-	-	Cu-CuNi	_	range [°C]		.0.0	10.4	_
				Accuracy at 25°C [%]	-	±0.3	±0.4	-
				Temperature drift [%/°C]		±0.01	±0.011	

Q68TD-G-H02, Q68TD-G-H01							
Applicable thermocouple type	Measured temperature range ^{*1}	Conversion accuracy (at operating ambient temperature 25±5°C)	Temperature characteristics (per operating ambient temperature variation of 1°C)	Maximum temperature error at ambient temperature of 55°C			
	0 to 600°C	*3	*3	*3			
	600 to 800°C*2	±3.0°C	.0.490	±13.0°C			
В	800 to 1700°C*2	±2.5°C	±0.4°C	±12.5°C			
	1700 to 1820°C	*3	*3	*3			
	-50 to 0°C	*3	*3	*3			
	0 to 300°C*2	±2.5°C	±0.4°C	±12.5°C			
R	300 to 1600°C*2	±2.0°C	±0.3°C	±9.5°C			
	1600 to 1760°C	*3	*3	*3			
	-50 to 0°C	*3	*3	*3			
	0 to 300°C*2	±2.5°C	±0.4°C	±12.5°C			
S	300 to 1600°C*2	±2.0°C	±0.3°C	±9.5°C			
	1600 to 1760°C	*3	*3	*3			
	-270 to -200°C	*3	*3	*3			
K	-200 to 0°C*2	Larger value of ±0.5°C or ±0.5% of measured temperature	Larger value of ±0.06°C or ±0.2% of measured temperature	±11.0°C			
K	0 to 1200°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±9.0°C			
	1200 to 1370°C	*3	*3	*3			
	-270 to -200°C	*3	*3	*3			
E	-200 to 0°C*2	Larger value of ±0.5°C or ±0.5% of measured temperature	Larger value of ±0.06°C or ±0.15% of measured temperature	±8.5°C			
	0 to 900°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±6.75°C			
	900 to 1000°C	*3	*3	*3			
	-210 to -40°C	*3	*3	*3			
J	-40 to 750°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±5.625°C			
	750 to 1200°C	*3	*3	*3			
	-270 to -200°C	*3	*3	*3			
Т	-200 to 0°C*2	Larger value of ±0.5°C or ±0.5% of measured temperature	Larger value of ±0.06°C or ±0.1% of measured temperature	±6.0°C			
ľ	0 to 350°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±2.625°C			
	350 to 400°C	*3	*3	*3			
	-270 to -200°C	*3	*3	*3			
NI	-200 to 0°C*2	Larger value of ±0.5°C or ±0.5% of measured temperature	Larger value of ±0.06°C or ±0.2% of measured temperature	±11.0°C			
N	0 to 1250°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±9.375°C			
	1250 to 1300°C	*3	*3	*3			

^{*1} If a value entered from the thermocouple is outside the measured temperature range given in the table, it is handled as the maximum/minimum value of the measured temperature range.

^{*2} The accuracy only in the temperature ranges of Class 1 to 3 (shaded areas) in JIS C1602-1995 apply. Also, a warm-up (power distribution) period of 30 minutes is required to satisfy with the accuracy.

^{*3} A temperature can be measured; however, the accuracy is not guaranteed.

## 4.3.2 Functional comparison

O : Available,  $\triangle$  : Partial change required, - : Not available

Item	Description	A616TD	Q68TD-G- H02/H01	Precautions for replacement
Temperature conversion function	Imports temperature data.	0	0	
Conversion enable/disable	Sets whether to enable/disable a	0	0	
function	conversion per channel.			The Q68TD-G-H01 does not
Disconnection detection function	Detects a disconnection of the connected thermocouple of each channel.	0	Δ	have the disconnection detection function. Use the disconnection monitor function instead.
Temperature conversion value storage	Stores imported temperature data in the buffer memory.	0	0	
Input type selection function	Sets an input type for each channel.	0	0	For the Q68TD-G-H02/H01, this function is set with the intelligent function module switch setting.
Warning output function	Outputs a warning when the temperature exceeds the set temperature range.	-	0	
Temperature conversion system	Processes the detected temperature by specified method.	-	0	
Scaling function	Converts a measured temperature value into a percent value (%) in set width.	-	0	
Pt100 cold junction compensation enable/disable setting function	Sets whether the cold junction compensation using the Pt100 attached to the terminal is performed or not.	-	0	
Offset/gain setting function	Performs linear correction by individually compensating any given 2 points (offset value/gain value) within the effective range.	-	0	
Error correction function	For all input ranges, the function allows compensating the temperature measurement value by part of the compensation value the errors compensation value.	0	-	Perform the error correction by the offset/gain setting of the Q68TD-G-H02/H01.
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 4.3.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the Thermocouple Input Module/Channel Isolated Thermocouple/Micro Voltage Input Module User's Manual.

	A61		Q68TD-G-H02, Q68TD-G-H01				
Device	Ciamal name	Device	Cinnal name	Device	Cinnal name	Device	Cinnal name
No.	Signal name	No.	Signal name	No.	Signal name	No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	
X1	A/D conversion READY	Y1		X1		Y1	
X2	Error flag	Y2		X2		Y2	
Х3	Disconnection error detection	Y3		Х3		Y3	
X4	Digital output value out- of-range detection	Y4		X4	Not used	Y4	Not used
X5	Detected temperature value out-of-range detection	Y5		X5		Y5	
X6		Y6		X6		Y6	
X7		Y7		X7		Y7	
X8		Y8	Not used	X8		Y8	
X9		Y9		X9	Operating condition setting completion flag	Y9	Operating condition setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Channel change completion flag	YB	Channel change request
XC		YC		XC	Q68TD-G-H02: Disconnection detection signal Q68TD-G-H01: Disconnection status monitor signal	YC	Not used
XD		YD	Interlock signal for the	XD	Warning output signal	YD	
XE	Not used	YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE	
XF		YF	A616TD is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10	Detected temperature value LED display request signal				_
X11		Y11					
X12		Y12					
X13	_	Y13					
X14	-	Y14					
X15	-	Y15					
X16		Y16					
X17	-	Y17					
X18	-	Y18	Nat ad				
X19	-	Y19	Not used				
X1A	-	Y1A					
X1B	-	Y1B					
X1C	Interior I C U	Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A616TD is used in	Y1F					
	remote I/O station						

#### 4.3.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of buffer memories and sequence programs, refer to the Thermocouple Input Module/ Channel Isolated Thermocouple/Micro Voltage Input Module User's Manual.

A616TD				Q68TD-G-H02, Q68TD-G-H01			
Address (hex)	Na	me	Read/write	Address (hex)	Name	Read/write	
00	Data format selection			00	Conversion enable/disable setting		
01	Error code storage			01 to 08	CH1 to CH8 Time/count/moving average/ time constant setting	R/W	
02	Error occurrence A60	Error occurrence A60MX□CONNECT No. storage		09	System area (Not used)	-	
03	Thermocouple type se number storage	etting error channel		0A	Conversion completion flag		
04	Current sampling peri-	od storage	R	0B to 12	CH1 to CH8 Measured temperature value		
05 to 0E	System area (Not use	d)	-	13	Error code	R	
0F	Conversion enable/	A616TD	R/W	14 to 15	CH1 to CH8 Setting range (Thermocouple type)		
10 to 17	disable specification	Multiplexer module	IK/VV	16	Setting range (Offset/gain setting )		
18	Setting data set reque	est		17	System area (Not used)	-	
19 to 1F	System area (Not use	d)	-	18 to 19	CH1 to CH8 Averaging processing selection		
20 to 27	Disconnection detection specification	on enable/disable	R/W	1A	Offset/gain setting mode (Offset specification)		
28 to 2F	System area (Not use	d)	-	1B	Offset/gain setting mode (Gain specification)	R/W	
30 to 3F	Digital output value te	mperature setting		1C	CH1 Offset temperature setting value	=	
40 to 47	Disconnection detection storage	R/W	1D	CH1 Gain temperature setting value			
48 to 4F	System area (Not used)		-		to	l	
50 to 57	Digital output value ou	ut-of-range	DAM	2B	CH8 Gain temperature setting value	R/W	
50 to 57	Channel number stora	age	R/W	2C	System area (Not used)	-	
58 to 5F	System area (Not used)		-	2D	Q68TD-G-H02:Cold junction compensation setting state	R	
				Q68TD-G-H01: System area	_		
	Detected temperature	value out-of-range		2E	Warning output enable/disable setting	R/W	
60 to 67	Channel number stora	_	R/W	2F	Warning output flag (Process alarm)		
68 to 6F	System area (Not use	<u> </u>	-	30	Warning output flag (Rate alarm)		
	`	,			Q68TD-G-H02:Disconnection detection flag	_	
	INPUT channel	INPUT channel		31	Q68TD-G-H01:Disconnection status	R	
70 to 7F	Digital output value st	orage	R		monitor flag		
				32 to 39	CH1 to CH8 Scaling value		
80 to FF	Error correction value	setting	DAM	3A	Scaling valid/invalid setting	R/W	
100 to 17F	Thermocouple type se	etting	R/W	3B to 3D	System area (Not used)	-	
180 to 1FF	MX CH.channel			3E	CH1 Scaling range lower limit value	R/W	
100 to 1FF	Digital output value st	orage	R	3F	CH1 Scaling range upper limit value	FVVV	
200 to 27F	MX CH.channel		, rx		to		
200 10 27 F	Detected temperature	value storage		4D	CH8 Scaling range upper limit value		
				4E	CH1 Scaling width lower limit value	R/W	
				4F	CH1 Scaling width upper limit value		
					to		
				5D	CH8 Scaling width upper limit value		
				5E	CH1 Process alarm lower/lower limit value	R/W	
				5F	CH1 Process alarm lower/upper limit value		
				60	CH1 Process alarm upper/lower limit value		

Address (hex) 61 CH1 Process alarm upper/upper limit value TO TD CH8 Process alarm upper/upper limit value CH1 to CH8 Rate alarm warning detection period R/W  86 CH1 Rate alarm upper limit value 87 CH1 Rate alarm lower limit value 87 CH8 Rate alarm lower limit value 87 CH8 Rate alarm lower limit value 87 CH8 Rate alarm lower limit value 88 CH8 Rate alarm lower limit value 89 System area 99 Eto 9F Mode switching setting A0 to A3 System area (Not used) C68TD-G-H02:Conversion setting for disconnection detection C68TD-G-H01:Disconnection state conversion setting A6 to AD A6 to AD A6 to AD A7 CH1 Factory default offset value BF CH1 Factory default offset value BF CH1 Factory default offset value CO CH1 User range settings offset value C1 CH1 User range settings thermal EMF offset value (L) C3 CH1 User range settings thermal EMF offset value (H) C4 CH1 User range settings thermal EMF gain value (L) C5 CH8 User range settings thermal EMF gain value (L) C6 CH8 User range settings thermal EMF gain value (L) C7 CH8 User range settings thermal EMF gain value (L) C8 CH8 User range settings thermal EMF gain value (L) CC9 CH8 User range settings thermal EMF gain value (L) CC9 CH8 User range settings thermal EMF gain value (L) CC9 CH8 User range settings thermal EMF gain value (L) CC9 CH8 User range settings thermal EMF gain value (L) CC9 CH8 User range settings thermal EMF gain value (L) CC9 CH8 User range settings thermal EMF gain value (L)	Q68TD-G-H02, Q68TD-G-H01								
TO CH8 Process alarm upper/upper limit value  CH1 to CH8 Rate alarm warning detection period  R/W  86 CH1 Rate alarm upper limit value  87 CH1 Rate alarm lower limit value  88 CH8 Rate alarm lower limit value  89 CH8 Rate alarm lower limit value  89 CH8 Rate alarm lower limit value  80 CH8 Rate alarm lower limit value  81 CH8 System area  82 CH8 Rate alarm lower limit value  83 CH8 Rate alarm lower limit value  84 CH9 System area  85 CH8 Rate alarm lower limit value  86 CH9 CH9 System area  86 CH1 CH9		Name	Read/write						
TD CH8 Process alarm upper/upper limit value  CH1 to CH8 Rate alarm warning detection period  R/W  86 CH1 Rate alarm upper limit value  87 CH1 Rate alarm lower limit value  88 CH3 Rate alarm lower limit value  89 CH8 Rate alarm lower limit value  80 System area  90 System area  90 System area  90 CH8 Rate alarm lower limit value  91 R/W  92 System area  93 CH8 Rate alarm lower limit value  84 R/W  95 CH8 Rate alarm lower limit value  85 R/W  96 to 9D System area  96 to 9F Mode switching setting  86 R/W  A0 to A3 System area (Not used)  C68TD-G-H02:Conversion setting for disconnection detection  Q68TD-G-H01:Disconnection state  conversion setting  Q68TD-G-H01:Conversion setting value for disconnection detection  Q68TD-G-H01:Conversion setting value for disconnection state  C01 CH1 Factory default offset value  BF CH1 Factory default offset value  CH1 User range settings offset value  CH1 User range settings offset value  CH1 User range settings thermal EMF offset value (L)  CH1 User range settings thermal EMF offset value (L)  CH1 User range settings thermal EMF gain value (L)  CH1 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)	61	R/W							
TE to 85 CH1 to CH8 Rate alarm warning detection period  86 CH1 Rate alarm upper limit value 87 CH1 Rate alarm lower limit value  87 CH8 Rate alarm lower limit value  88 CH8 Rate alarm lower limit value  89 System area - 98 System area - 98 System area (Not used) C68TD-G-H02:Conversion setting for disconnection detection  Q68TD-G-H01:Disconnection state conversion setting  Q68TD-G-H01:Conversion setting value for disconnection detection  Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value  BF CH1 Factory default offset value  C0 CH1 User range settings offset value  C1 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  C6 CH1 User range settings thermal EMF gain value (L)  C7 CH1 User range settings thermal EMF gain value (L)  C8 C9 CH1 User range settings thermal EMF gain value (L)  C9 CH1 User range settings thermal EMF gain value (L)  C1 C4 CH1 User range settings thermal EMF gain value (L)  C5 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)		to							
R/W  86 CH1 Rate alarm upper limit value  87 CH1 Rate alarm lower limit value  88 CH1 Rate alarm lower limit value  89 CH8 Rate alarm lower limit value  89 CH8 Rate alarm lower limit value  80 R/W  90 to 9D System area  9E to 9F Mode switching setting  A0 to A3 System area (Not used)  A6 to A5 CH8 Rate alarm lower limit value  86 R/W  A6 to A5 CH8 Rate alarm lower limit value  87 R/W  A6 to A6 CH8 Rate alarm lower limit value  88 R/W  A6 to A7 CH8 Rate alarm lower limit value  95 CH8 Rate alarm lower limit value  96 to 9D System area  98 R/W  A6 to A9 CH8 Rate alarm lower limit value  99 CH8 Rate alarm lower limit value  90 CH8 CH9 CH9 CH9 CH9  90 CH9 CH9 CH9 CH9 CH9  80 CH9 CH9 CH9  80 CH9  80 CH9 CH9  80 CH9  8	7D	CH8 Process alarm upper/upper limit value							
86 CH1 Rate alarm upper limit value 87 CH1 Rate alarm lower limit value  88 CH1 Rate alarm lower limit value  89 CH8 Rate alarm lower limit value  89 CH8 Rate alarm lower limit value  80 Eto 9D System area  90 Eto 9F Mode switching setting  A0 to A3 System area (Not used)  A4 to A5 CH8 Rate alarm lower limit value  A6 to AD CH1 Conversion setting for disconnection detection  A6 Eto AD CH1 Conversion setting value for disconnection detection  A6 to AD CH1 Factory default offset value  BE CH1 Factory default offset value  BF CH1 User range settings offset value  C1 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF gain value (L)  C4 CH1 User range settings thermal EMF gain value (H)  C5 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)	7F to 85	CH1 to CH8 Rate alarm warning detection							
The state alarm lower limit value  to  95 CH8 Rate alarm lower limit value  96 to 9D System area  9E to 9F Mode switching setting  A0 to A3 System area (Not used)  Q68TD-G-H02:Conversion setting for disconnection detection  Q68TD-G-H01:Disconnection state conversion setting  Q68TD-G-H01:Conversion setting value for disconnection detection  Q68TD-G-H01:Conversion setting value for disconnection state  System area (Not used)  BE CH1 Factory default offset value  C1 CH1 User range settings offset value  C1 CH1 User range settings fleet value  C1 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C1 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)	7 = 10 00	period	R/W						
To  95 CH8 Rate alarm lower limit value  96 to 9D System area  9E to 9F Mode switching setting  A0 to A3 System area (Not used)  A4 to A5 CH8 Rate alarm lower limit value  PA4 to A5 System area (Not used)  A6 to AD CH8	86	* *							
95 CH8 Rate alarm lower limit value R/W 96 to 9D System area - 9E to 9F Mode switching setting R/W A0 to A3 System area (Not used) -  A4 to A5 Gestidate alarm lower limit value R/W A0 to A3 System area (Not used) -  A6 to AD Gestidate alarm lower limit value for disconnection detection Gestidate conversion setting for disconnection detection Gestidate alarm lower limit value for disconnection detection Gestidate alarm lower limit value for disconnection state  AE to BD System area (Not used) -  BE CH1 Factory default offset value BF CH1 Factory default gain value C0 CH1 User range settings offset value C1 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (L)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  C6 CH3 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)	87	CH1 Rate alarm lower limit value							
96 to 9D System area		to							
PE to 9F Mode switching setting  A0 to A3 System area (Not used)  Q68TD-G-H02:Conversion setting for disconnection detection Q68TD-G-H01:Disconnection state conversion setting  Q68TD-G-H02:Conversion setting value for disconnection detection Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value  CO CH1 User range settings offset value  C1 CH1 User range settings gain value  C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF gain value (L)  C4 CH1 User range settings thermal EMF gain value (H)  C5 CH8 User range settings thermal EMF gain value (L)  CCB CH8 User range settings thermal EMF gain value (L)  CCB CH8 User range settings thermal EMF gain value (L)  CCB CH8 User range settings thermal EMF gain value (L)  CCB CH8 User range settings thermal EMF gain value (L)  CCB CH8 User range settings thermal EMF gain value (L)	95	CH8 Rate alarm lower limit value	R/W						
A4 to A3  A4 to A5  A6 to AD  A6 to AD  A6 to AD  A6 to BD  BE  CH1 Factory default offset value  C1  CH1 User range settings thermal EMF offset value (L)  C3  CH1 User range settings thermal EMF gain value (L)  C4  CH1 User range settings thermal EMF gain value (H)  C4  C5  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)		System area	-						
A4 to A5  Q68TD-G-H02:Conversion setting for disconnection detection Q68TD-G-H01:Disconnection state conversion setting Q68TD-G-H02:Conversion setting value for disconnection detection Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value  BF CH1 User range settings offset value  C1 CH1 User range settings gain value  C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF gain value (L)  C4 CH1 User range settings thermal EMF gain value (H)  C5 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)	9E to 9F	Mode switching setting	R/W						
disconnection detection  Q68TD-G-H01:Disconnection state conversion setting  Q68TD-G-H02:Conversion setting value for disconnection detection  Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value  BF CH1 Factory default gain value  C0 CH1 User range settings offset value  C1 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (H)  C5 CH3 User range settings thermal EMF gain value (H)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)	A0 to A3	System area (Not used)	-						
A4 to A5  Q68TD-G-H01:Disconnection state conversion setting Q68TD-G-H02:Conversion setting value for disconnection detection Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value BF CH1 Factory default gain value C0 CH1 User range settings offset value C1 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH3 User range settings thermal EMF gain value (H)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)		Q68TD-G-H02:Conversion setting for							
A6 to AD  Q68TD-G-H01:Disconnection state conversion setting  Q68TD-G-H02:Conversion setting value for disconnection detection  Q68TD-G-H01:Conversion setting value for disconnection detection  Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value  BF CH1 Factory default gain value  C0 CH1 User range settings offset value  C1 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  T0 CH1 User range settings thermal EMF gain value (L)  C5 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)	Λ4 to ΛΕ	disconnection detection							
A6 to AD  Q68TD-G-H02:Conversion setting value for disconnection detection Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value  BF CH1 Factory default gain value  C0 CH1 User range settings offset value  C1 CH1 User range settings gain value  C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  C6 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)	A4 10 A3	Q68TD-G-H01:Disconnection state	1						
Q68TD-G-H02:Conversion setting value for disconnection detection Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value  BF CH1 Factory default gain value  C0 CH1 User range settings offset value  C1 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)		conversion setting	R/W						
A6 to AD  Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used)  BE CH1 Factory default offset value  BF CH1 Factory default gain value  C0 CH1 User range settings offset value  C1 CH1 User range settings gain value  C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  C6 CH3 User range settings thermal EMF gain value (H)  T0 CH3 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)		Q68TD-G-H02:Conversion setting value for							
Q68TD-G-H01:Conversion setting value for disconnection state  AE to BD System area (Not used) -  BE CH1 Factory default offset value  BF CH1 Factory default gain value  C0 CH1 User range settings offset value  C1 CH1 User range settings gain value  C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  T0 CH3 User range settings thermal EMF gain value (H)  T0 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)	Λ6 to ΛΠ	disconnection detection	-						
AE to BD System area (Not used)  BE CH1 Factory default offset value  BF CH1 Factory default gain value  C0 CH1 User range settings offset value  C1 CH1 User range settings gain value  C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  C6 CH1 User range settings thermal EMF gain value (H)  C7 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)	A6 t0 AD	Q68TD-G-H01:Conversion setting value for							
BE CH1 Factory default offset value BF CH1 Factory default gain value C0 CH1 User range settings offset value C1 CH1 User range settings gain value C2 CH1 User range settings thermal EMF offset value (L) C3 CH1 User range settings thermal EMF offset value (H) C4 CH1 User range settings thermal EMF gain value (L) C5 CH1 User range settings thermal EMF gain value (H)  T0 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)  C9 CH8 User range settings thermal EMF gain value (L)		disconnection state							
BF CH1 Factory default gain value  C0 CH1 User range settings offset value  C1 CH1 User range settings gain value  C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  R/W	AE to BD	System area (Not used)	-						
C0 CH1 User range settings offset value C1 CH1 User range settings gain value C2 CH1 User range settings thermal EMF offset value (L) C3 CH1 User range settings thermal EMF offset value (H) C4 CH1 User range settings thermal EMF gain value (L) C5 CH1 User range settings thermal EMF gain value (H)  T0 CH3 User range settings thermal EMF gain value (H)  T0 CH8 User range settings thermal EMF gain value (L)  C6 CH8 User range settings thermal EMF gain value (L)  C7 CH8 User range settings thermal EMF gain value (L)  C8 CH8 User range settings thermal EMF gain value (L)	BE	CH1 Factory default offset value							
C1 CH1 User range settings gain value  C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  R/W	BF	CH1 Factory default gain value							
C2 CH1 User range settings thermal EMF offset value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  R/W	C0	CH1 User range settings offset value							
value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  FD CH8 User range settings thermal EMF gain value (L)  R/W	C1	CH1 User range settings gain value							
value (L)  C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  R/W	Ca	CH1 User range settings thermal EMF offset							
C3 CH1 User range settings thermal EMF offset value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain	02	value (L)	D/M/						
value (H)  C4 CH1 User range settings thermal EMF gain value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  R/W	C3	CH1 User range settings thermal EMF offset	IX/VV						
value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  R/W	03	value (H)							
value (L)  C5 CH1 User range settings thermal EMF gain value (H)  to  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain value (L)  R/W	C4	CH1 User range settings thermal EMF gain							
value (H)  to  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain  R/W	04	value (L)							
ralue (H)  to  CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain  R/W	C5	CH1 User range settings thermal EMF gain							
FC CH8 User range settings thermal EMF gain value (L)  CH8 User range settings thermal EMF gain  R/W	0.5	value (H)							
value (L)  CH8 User range settings thermal EMF gain  R/W		to							
value (L)  CH8 User range settings thermal EMF gain  R/W	EC	CH8 User range settings thermal EMF gain							
CH8 User range settings thermal EMF gain	10	value (L)	D/M/						
value (H)	ED	CH8 User range settings thermal EMF gain	IV/VV						
	יו	value (H)							

# 4.4 A68RD3N (Replacement to the Q64RD)

#### 4.4.1 Performance comparison

Item		A68RD3N				
Measuring meth		3-wire type				
oaoagoa		16-bit signed binary				
		-1800 to 6000				
Output (temper	ature	Value up to the first decimal place × 10				
conversion valu		32-bit signed binary				
CONTOROIS VAIC	.0)	-180000 to 600000				
		Value up to the third decimal place × 1000				
		Pt100				
		(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)				
Applicable plati	num RTD	JPt100				
		(JIS C1604-1981)				
	DI 100	-180 to 600°C				
Measured	Pt100	$(27.10 \text{ to } 313.71\Omega)$				
temperature	ID4400	-180 to 600°C				
range	JPt100	(25.80 to 317.28Ω)				
Accuracy		±1%				
Accuracy		(accuracy at full scale)				
Resolution		0.025°C				
Conversion spe	eed	40ms/channel				
Number of anal	og input points	8 channels/module				
Output current t	for temperature	1mA				
detection						
Isolation metho	d	Between platinum RTD input and programmable controller power supply: photocoupler isolation				
	<u> </u>	Between platinum RTD input and channel: non-isolation				
Dielectric withstand voltage		Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute				
Disconnection detection		Detected per channel				
Number of occupied I/O points		32 points				
		(I/O assignment: special 32 points)				
External connection system		38-point terminal block				
Applicable wire	size	0.75 to 2mm ²				
Applicable sold	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A				

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

	O: Compatible, △: Partial change required, ×: Incompa			
Q64RD	Compatibility	Precautions for replacement		
3/4-wire type	0			
16-bit signed binary -2000 to 8500  Value up to the first decimal place × 10  32-bit signed binary -200000 to 850000	0			
Value up to the third decimal place × 1000  Pt100  (JIS C 1604-1997, IEC751 1983)  JPt100  (JIS C 1604-1981)	Δ	As the compliance standards for the applicable platinum RTD differ, change the platinum RTD to the one that can be used with the Q64RD.		
-200 to 850°C  -180 to 600°C	0	and our se used war the gorne.		
Ambient temperature 0 to 55°C: ±0.25%  (accuracy relative to maximum value)  Ambient temperature 25±5°C: ±0.08%  (accuracy relative to maximum value)	0			
0.025°C	0			
40ms/channel	0			
4 channels/module	Δ	Consider replacement with multiple Q64RD.		
1mA	0			
Isolated area   Isolation method   Dielectric withstand voltage   Insulation resistance	0			
Between platinum RTD input and channel  RTD input and channel  resistance tester				
Detected per channel	0			
16 points (I/O assignment: intelligent 16 points)	Δ	The number of occupied I/O points has changed to 16 points.		
18-point terminal block	×			
0.3 to 0.75mm ²	×	Wiring change is required.		
1.25-3, R1.25-3 (Sleeved solderless terminal cannot be used.)	×	3 3 <del>1</del>		

Item	A68RD3N	
Cables between module and platinum RTD	Make sure that the conductor resistance value between the Pt100 and A68RD3N is $10\Omega$ or less per conductor. All channels become the same specifications.	
Internal current consumption (5VDC)	0.94A	
Weight	0.43kg	

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

00477		Duran diama famina diamanda		
Q64RD	Compatibility	Precautions for replacement		
The conductor resistance value must meet the condition of 1) + 2) $\leq$ 2k $\Omega$ or less. (In the case of 3-conductor type, the difference between 1) and 2) in the conductor resistance value must be 10 $\Omega$ or less.)	0			
0.60A	0			
0.17kg	0			

## 4.4.2 Functional comparison

O: Available, -: Not available

Item	Description	A68RD3N	Q64RD	Precautions for replacement
Conversion enable/disable specification of each channel	Enables/disables a detection of temperature.	0	0	
Sampling/averaging processing selection	Processes the detected temperature by specified method.	0	0	The setting ranges of time and count averages differ. Refer to the RTD Input Module/ Channel Isolated RTD Input Module User's Manual to check the specifications.
Detected temperature value storage	Stores temperature data in the buffer memory.	0	0	
Disconnection detection	Detects a disconnection of connected platinum RTD or a cable.	0	0	
Specification of platinum RTD type	Specifies a platinum RTD type used.	0	0	
Range switching function	Switches the measured temperature range.	-	0	
Warning output function	Outputs a warning when the temperature exceeds the set temperature range.	-	0	
Scaling function	Converts a measured temperature value into a percent value (%) in set width.	-	0	
Error correction function	Corrects an error in temperature conversion value.	0	0	Perform the error correction by the offset/gain setting of the Q64RD.
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 4.4.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

	A68RD3N				Q64RD				
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name		
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used		
X1	READY flag	Y1		X1	CH1 Offset/gain setting status signal	Y1	CH1 Offset setting request		
X2	Write data error flag	Y2		X2	CH2 Offset/gain setting status signal	Y2	CH1 Gain setting request		
Х3	CH1: Disconnection detection flag	Y3		Х3	CH3 Offset/gain setting status signal	Y3	CH2 Offset setting request		
X4	CH2: Disconnection detection flag	Y4		X4	CH4 Offset/gain setting status signal	Y4	CH2 Gain setting request		
X5	CH3: Disconnection detection flag	Y5		X5		Y5	CH3 Offset setting request		
X6	CH4: Disconnection detection flag	Y6	Not used	X6	Noticed	Y6	CH3 Gain setting request		
X7	CH5: Disconnection detection flag	Y7		X7	Not used	Y7	CH4 Offset setting request		
X8	CH6: Disconnection detection flag	Y8		X8		Y8	CH4 Gain setting request		
X9	CH7: Disconnection detection flag	Y9		X9	Operating condition setting completion signal	Y9	Operating condition setting request		
XA	CH8: Disconnection detection flag	YA		XA	Offset/gain setting mode status flag	YA	User range write request		
XB		YB		XB	Not used	YB			
XC		YC		XC	Disconnection detection signal	YC	Not used		
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used		
XE		YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE			
XF		YF	A68RD3N is used in remote I/O station	XF	Error flag	YF	Error clear request		
X10		Y10	Not used						
X11	Natural	Y11	Canan and a spect flow						
X12 X13	Not used	Y12 Y13	Error code reset flag						
X14		Y14							
X15		Y15							
X16		Y16							
X17		Y17							
X18		Y18							
X19		Y19							
X1A X1B		Y1A Y1B	Not used						
X1C		Y1C							
X1D	Interlock signal for the	Y1D							
X1E	RFRP and RTOP	Y1E							
	instructions when the								
X1F	A68RD3N is used in	Y1F							
	remote I/O station								

#### 4.4.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memories and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

	A68RD3N			Q64RD		
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write	
0	Conversion enable/disable specification		0	Conversion enable/disable specification		
1	Averaging processing selection		1	CH1 Time/count averaging setting		
2	CH1 Averaging time/count		2	CH2 Time/count averaging setting	R/W	
3	CH2 Averaging time/count		3	CH3 Time/count averaging setting		
4	CH3 Averaging time/count	5	4	CH4 Time/count averaging setting		
5	CH4 Averaging time/count	R/W	5			
6	CH5 Averaging time/count	7	6			
7	CH6 Averaging time/count	7	7	System area (Not used)	-	
8	CH7 Averaging time/count		8			
9	CH8 Averaging time/count	7	9	Averaging processing selection	R/W	
10	CH1 Detected temperature value (16bit)		10	Conversion completion flag		
11	CH2 Detected temperature value (16bit)	_	11	CH1 Measured temperature value (16bit)		
12	CH3 Detected temperature value (16bit)	+	12	CH2 Measured temperature value (16bit)	R	
13	CH4 Detected temperature value (16bit)	_	13	CH3 Measured temperature value (16bit)	+	
14	CH5 Detected temperature value (16bit)	+	14	CH4 Measured temperature value (16bit)		
15	CH6 Detected temperature value (16bit)	=	15		-	
16	CH7 Detected temperature value (16bit)	+	16			
17	CH8 Detected temperature value (16bit)	+	17	System area (Not used)		
18	CH1 Detected temperature value (L)	+	18			
19	(32bit) (H)		19	Error code		
20	CH2 Detected temperature value (L)	$\dashv$	20	Setting range	R	
21	(32bit) (H)		21	Setting range		
22	CH3 Detected temperature value (L)	R	22			
23	·		23			
24	(32bit) (H) CH4 Detected temperature value (L)	+	24			
25	(32bit) (H)		25			
26	CH5 Detected temperature value (L)	+	26			
27	(32bit) (H)		27			
28	CH6 Detected temperature value (L)	+	28			
29	(32bit) (H)		29			
30	CH7 Detected temperature value (L)	_	30			
31	·		31			
32	(32bit) (H) CH8 Detected temperature value (L)	_	32			
33	· ` '		33			
34	(32bit) (H) Write data error code	R/W	34	System area (Not used)	-	
35	Conversion completion flag	R	35			
36	Specification of platinum RTD type	R/W	36			
30	Specification of platinum KTD type	F/VV	37			
			38			
			39			
			40			
			41			
			42			
			43			
			44			
			45			
			46			
			47	Warning output enable/disable setting	R/W	

	Q64RD	
Address	Name	Read/write
(decimal)		
48	Warning output flag	-
49	Disconnection detection flag	-
50 51	CH1 Scaling value CH2 Scaling value	-
52	CH3 Scaling value	+
53	CH4 Scaling value	-
54	CH1 Measured temperature value (L)	-
55	(32bit) (H)	R
56	CH2 Measured temperature value (L)	1
57	(32bit) (H)	
58	CH3 Measured temperature value (L)	-
59	(32bit) (H)	
60	CH4 Measured temperature value (L)	-
61	(32bit) (H)	
62	CH1 Scaling range lower limit value (L)	
63	(H)	
64	CH1 Scaling range upper limit value (L)	1
65	(H)	
66	CH2 Scaling range lower limit value (L)	1
67	(H)	
68	CH2 Scaling range upper limit value (L)	-
69	(H)	
70	CH3 Scaling range lower limit value (L)	
71	(H)	
72	CH3 Scaling range upper limit value (L)	
73	(H)	
74	CH4 Scaling range lower limit value (L)	
75	(H)	
76	CH4 Scaling range upper limit value (L)	
77	(H)	R/W
78	CH1 Scaling width lower limit value	
79	CH1 Scaling width upper limit value	
80	CH2 Scaling width lower limit value	
81	CH2 Scaling width upper limit value	
82	CH3 Scaling width lower limit value	-
83	CH3 Scaling width upper limit value	
84	CH4 Scaling width lower limit value	-
85	CH4 Scaling width upper limit value	-
86	CH1 Warning output lower (L)	
87	lower limit value (H) CH1 Warning output lower (L)	-
88 89	i	
90	upper limit value (H) CH1 Warning output upper (L)	-
91	lower limit value (H)	
92	CH1 Warning output upper (L)	-
93	upper limit value (H)	
- 55	to	
116	CH4 Warning output upper (L)	
117	upper limit value (H)	
118	CH1 Offset temperature setting value (L)	1
119	(H)	R/W
120	CH1 Gain temperature setting value (L)	-
	(H)	
121	(11)	

Q64RD					
Address Name		Read/write			
(decimal)	Name	recad, write			
132	CH4 Gain temperature setting value (L)	R/W			
133	(H)	R/VV			
134 to 157	Not used	-			
158	Mode switching setting	R/W			
159	wode switching setting				
160	3-conductor type CH1 Factory default				
100	offset value				
to					
254	4-conductor type CH4 User range (L)	R/W			
255	settings gain resistance value (H)				

# 4.5 A68RD3N (Replacement to the Q64RD-G)

#### 4.5.1 Performance comparison

Item		A68RD3N				
Measuring method		3-wire type				
		16-bit signed binary				
		-1800 to 6000				
Output (tempe	rature	Value up to the first decimal place × 10				
conversion val	ue)	32-bit signed binary				
		-180000 to 600000				
		Value up to the third decimal place × 1000				
		Diago				
		Pt100 (IIS C1604 1007 IEC 751 cm2 IIS C1604 1090 DIN 42760 1090)				
Applicable RTI	)	(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)				
		JPt100 (JIS C1604-1981)				
		(313 0 1004-1981)				
	Pt100	-180 to 600°C				
Measured	P1100	(27.10 to 313.71Ω)				
temperature	JPt100	-180 to 600°C				
range	31 1100	$(25.80 \text{ to } 317.28\Omega)$				
	Ni100	<u>-</u>				
Accuracy		±1%				
		(accuracy at full scale)				
Resolution		0.025°C				
Conversion spe	eed	40ms/channel				
Number of ana	log input points	8 channels/module				
Output current	for temperature	1mA				
detection						
Isolation metho	od	Between platinum RTD input and programmable controller power supply: photocoupler isolation				
		Between platinum RTD input and channel: non-isolation				
Dielectric withs	stand voltage	Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute				
Disconnection detection		Detected per channel				
Number of see	unied I/O points	32 points				
Number of occupied I/O points		(I/O assignment: special 32 points)				
External connection system		38-point terminal block				
Applicable wire size		0.75 to 2mm ²				
Applicable solderless terminal		V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A				

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

				O: Compatible, \(\Delta\): Partial change required, \(\circ\): Incompatible		
		Q64R	D-G		Compatibility	Precautions for replacement
	3/4-wire type			0		
	16-bit signed binary -2000 to 8500  Value up to the first decimal place × 10  32-bit signed binary -200000 to 850000  Value up to the third decimal place × 1000			0		
	Pt100 (JIS C 1604-1997, IEC751 1983)  JPt100 (JIS C 1604-1981)  Ni100 (DIN 43760 1987)			Δ	As the compliance standards for the applicable RTD differ, change the RTD to the one that can be used with the Q64RD-G.	
	-200 to 850°C -180 to 600°C -60 to 180°C				0	
	*1				0	
		0.025	5°C		0	
	40ms/channel			0		
	4 channels/module			Δ	Consider replacement with multiple Q64RD-G.	
		1m	A		0	
co	Isolated area  Between RTD input and programmable ontroller power supply  Between RTD input and channel	Isolation method  Photocoupler isolation  Transformer isolation	Dielectric withstand voltage 1780VrmsAC/3 cycles (altitude 2000m)	Insulation resistance 10MΩ or more using 500VDC insulation resistance tester	0	
	Detected per channel				0	
	16 points (I/O assignment: intelligent 16 points)			Δ	The number of occupied I/O points has changed to 16 points.	
	18-point terminal block			×		
	0.3 to 0.75mm ²				×	Wiring change is required.
	1.25-3, R1.25-3 (Sleeved solderless terminal cannot be used.)			×		

^{*1} Indicates accuracy of the Q64RD-G (accuracy at the maximum value in the selection range).

	Accuracy	Specifications		
Reference accuracy		Within 0.04%		
	Pt100/JPt100 (-20 to 120°C)	±70ppm/°C (±0.0070%/°C)		
Temperature coefficient	Pt100/JPt100 (0 to 200°C)	±65ppm/°C (±0.0065%/°C)		
remperature coemicient	Pt100/JPt100 (-200 to 850°C)	±50ppm/°C (±0.0050%/°C)		
	Ni100Ω (-60 to 180°C)	±70ppm/°C (±0.0070%/°C)		

Item	A68RD3N	
Cable between module and RTD	Make sure that the conductor resistance value between the Pt100 and A68RD3N is $10\Omega$ or less per conductor. All channels become the same specifications. $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
Internal current consumption (5VDC)	0.94A	
Weight	0.43kg	

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

Q64RD-G		Precautions for replacement
The conductor resistance value must meet the condition of 1) + 2) $\leq$ 2k $\Omega$ or less. (In the case of 3-conductor type, the difference between 1) and 2) in the conductor resistance value must be $10\Omega$ or less.)	Compatibility	Precautions for replacement
2) A1 B1 b1 SLD		
0.62A	0	
0.20kg	0	

## 4.5.2 Functional comparison

O: Available, -: Not available

Item	Description	A68RD3N	Q64RD-G	Precautions for replacement
Conversion enable/disable	Enables/disables a detection of	0	0	
specification of each channel	temperature.	O	)	
Sampling/averaging processing selection	Processes the detected temperature by specified method.	0	0	The setting ranges of time and count averages differ. Refer to the RTD Input Module/ Channel Isolated RTD Input Module User's Manual to check the specifications.
Detected temperature value storage	Stores temperature data in the buffer memory.	0	0	
Disconnection detection	Detects a disconnection of the connected RTD or cable.	0	0	
Specification of RTD type	Specifies a RTD type used.	0	0	
Range switching function	Switches the measured temperature range.	-	0	
Warning output function	Outputs a warning when the temperature exceeds the set temperature range.	-	0	
Scaling function	Converts a measured temperature value into a percent value (%) in set width.	-	0	
Error correction function	Corrects an error in temperature conversion value.	0	0	Perform the error correction by the offset/gain setting of the Q64RD-G.
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 4.5.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

	A68RD3N				Q64	RD-G	
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.	-	No.		No.		No.	
X0	Watchdog timer error flag	Y0		X0	Module READY CH1 Offset/gain setting	Y0	Not used CH1 Offset setting
X1	READY flag	Y1		X1	status signal	Y1	request
X2	Write data error flag	Y2		X2	CH2 Offset/gain setting status signal	Y2	CH1 Gain setting request
Х3	CH1: Disconnection detection flag	Y3		Х3	CH3 Offset/gain setting status signal	Y3	CH2 Offset setting request
X4	CH2: Disconnection detection flag	Y4		X4	CH4 Offset/gain setting status signal	Y4	CH2 Gain setting request
X5	CH3: Disconnection detection flag	Y5		X5		Y5	CH3 Offset setting request
X6	CH4: Disconnection detection flag	Y6	Not used	X6	Not used	Y6	CH3 Gain setting request
X7	CH5: Disconnection detection flag	Y7		X7	Not useu	Y7	CH4 Offset setting request
X8	CH6: Disconnection detection flag	Y8		X8		Y8	CH4 Gain setting request
X9	CH7: Disconnection detection flag	Y9		X9	Operating condition setting completion signal	Y9	Operating condition setting request
XA	CH8: Disconnection detection flag	YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Not used	YB	
XC		YC		XC	Disconnection detection signal	YC	Not used
XD		YD	Interlock signal for the	XD	Warning output signal	YD	
XE		YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE	
XF		YF	A68RD3N is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10	Not used				
X11 X12	Not used	Y11 Y12	Error code reset flag	ł			
X12	140t useu	Y13	Life code reset liag	1			
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19					
X1A		Y1A	Not used				
X1B X1C		Y1B Y1C					
X1C X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A68RD3N is used in	Y1F					
	remote I/O station						

#### 4.5.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

1 2 0 3 0 4 0 5 0 6 0 7 0 8 0	Name  Conversion enable/disable specification  Averaging processing selection  CH1 Averaging time/count  CH2 Averaging time/count	Read/write	Address (decimal)	Name	Read/write
0 0 1 1 2 3 4 6 5 6 6 7 8 6 9 0	Averaging processing selection CH1 Averaging time/count	_			
1 2 0 3 0 4 0 5 0 6 0 7 0 8 0	Averaging processing selection CH1 Averaging time/count	4		Conversion analyte (disable softing)	
2 3 4 5 6 7 8 9	CH1 Averaging time/count		1	Conversion enable/disable setting	-
3 (4 (5 (5 (6 (6 (6 (6 (6 (6 (6 (6 (6 (6 (6 (6 (6		+	2	CH1 Time/count/moving averaging setting	R/W
4 0 5 0 6 0 7 0 8 0 9 0		-	3	CH2 Time/count/moving averaging setting CH3 Time/count/moving averaging setting	- 17/11
5 (6 7 (7 (8 (9 (9 (9 (9 (9 (9 (9 (9 (9 (9 (9 (9 (9	CH3 Averaging time/count	-	4	CH4 Time/count/moving averaging setting	-
6 ( 7 ( 8 ( 9 (	CH4 Averaging time/count	R/W	5	Time/countrilloving averaging setting	
7 8 9	CH5 Averaging time/count	+			
8 (	CH6 Averaging time/count	-	to	System area (Not used)	-
9 (	CH7 Averaging time/count	-	8		
	CH8 Averaging time/count	1	9	Averaging processing selection	R/W
	CH1 Detected temperature value (16bit)		10	Conversion completion flag	
	CH2 Detected temperature value (16bit)	-	11	CH1 Measured temperature value (16bit)	1
	CH3 Detected temperature value (16bit)	1	12	CH2 Measured temperature value (16bit)	R
	CH4 Detected temperature value (16bit)	1	13	CH3 Measured temperature value (16bit)	1
	CH5 Detected temperature value (16bit)	1	14	CH4 Measured temperature value (16bit)	1
	CH6 Detected temperature value (16bit)	1	15	principle (11.7)	
	CH7 Detected temperature value (16bit)	_			
	CH8 Detected temperature value (16bit)		to	System area (Not used)	-
	CH1 Detected temperature value(L)		18		
	(32bit)(H)		19	Error code	
	CH2 Detected temperature value (L)	-	20	Setting range 1	R
	(32bit) (H)		21	Setting range 2	
	CH3 Detected temperature value (L)	R	22		
	(32bit) (H)		23		
	CH4 Detected temperature value (L)	-	24		
	(32bit) (H)		25		
	, , , , ,	-	26		
	CH5 Detected temperature value (L) (32bit) (H)		27		
	· ,	+	28		
	CH6 Detected temperature value (L)		29		
	(32bit) (H)	_	30		
	CH7 Detected temperature value (L)		31		
	(32bit) (H)	_	32		
	CH8 Detected temperature value (L)				
	(32bit) (H)	DAM	33	System area (Not used)	_
	Write data error code	R/W	34	( ver assa)	
	Conversion completion flag	R	35		
36	Specification of platinum RTD type	R/W	36		
			37		
			38 39		
			40		
			41 42		
			43		
			44		
			45 46		
			46	Warning output enable/disable setting	R/W

	Q64RD-G		
Address (decimal)	Name	Read/write	
48	Warning output flag		
49	Disconnection detection flag		
50 to 53	CH1 to CH4 Scaling value	R	
54	CH1 Measured temperature value (L)		
55	(32bit) (H)		
	to	_	
60	CH4 Measured temperature value (L)	R	
61	(32bit) (H)	11	
62	CH1 Scaling range lower limit value (L)		
63	(H)	R/W	
64	CH1 Scaling range upper limit (L)	1000	
65	value (H)		
	to		
76	CH4 Scaling range upper limit (L)		
77	value (H)	R/W	
78	CH1 Scaling width lower limit value	17/77	
79	CH1 Scaling width upper limit value		
	to		
85	CH4 Scaling width upper limit value		
86	CH1 Warning output lower (L)		
87	lower limit value (H)		
88	CH1 Warning output lower (L)	1	
89	upper limit value (H)	R/W	
90	CH1 Warning output upper (L)		
91	lower limit value (H)		
92	CH1 Warning output upper (L)		
93	upper limit value (H)		
	to		
116	CH4 Warning output upper (L)		
117	upper limit value (H)		
118	CH1 Offset temperature setting (L)	R/W	
119	value (H)	IK/VV	
120	CH1 Gain temperature setting (L)	1	
121	value (H)		
	to		
132	CH4 Gain temperature setting (L)		
133	value (H)	R/W	
134	Extended averaging processing selection		
135 to 147	System area (Not used)	-	
148	Conversion setting for disconnection detection	R/W	
149	System area (Not used)	-	
	1 - 7	1	

	Q64RD-G								
Address (decimal)	Name	Read/write							
150	CH1 Conversion setting value for (L)	R/W							
151	disconnection detection (H)	TV/ V V							
	to								
156	CH4 Conversion setting value for (L)								
157	disconnection detection (H)								
158	Mode switching setting								
159	Mode switching setting								
160	3-conductor type CH1 Factory (L)								
161	default offset value (H)								
162	3-conductor type CH1 Factory (L)								
163	default gain value (H)								
164	3-conductor type CH1 User range (L)								
165	settings offset value (H)								
166	3-conductor type CH1 User range (L)								
167	settings gain value (H)								
168	3-conductor type CH1 User range (L)								
169	settings offset resistance value (H)	R/W							
170	3-conductor type CH1 User range (L)	FK/VV							
171	settings gain resistance value (H)								
172	4-conductor type CH1 Factory (L)								
173	default offset value (H)								
174	4-conductor type CH1 Factory (L)								
175	default gain value (H)								
176	4-conductor type CH1 User range (L)								
177	settings offset value (H)								
178	4-conductor type CH1 User range (L)								
179	settings gain value (H)								
180	4-conductor type CH1 User range (L)								
181	settings offset resistance value (H)								
182	4-conductor type CH1 User range (L)								
183	settings gain resistance value (H)								
	to								
254	4-conductor type CH4 User range (L)	R/W							
255	settings gain resistance value (H)	FV/VV							



# 4.6 A68RD3N (Replacement to the Q68RD3-G)

## 4.6.1 Performance comparison

It	em	A68RD3N					
Measuring met	thod	3-wire type					
		16-bit signed binary					
		-1800 to 6000					
Output (temper	Applicable RTD  Measured emperature range  Measured emperature range  Accuracy  Resolution  Conversion speed  Number of analog input points  Dutput current for temperature detection  solation method  Dielectric withstand voltage  Disconnection detection  Number of occupied I/O points  External connection system  External device connector	Value up to the first decimal place × 10					
		32-bit signed binary					
	-1800 to 6000  Value up to the first decimal place × 10  32-bit signed binary -18000 to 60000  Value up to the first decimal place × 1000  Pt100  (JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)						
		3-wire type  16-bit signed binary -1800 to 6000  Value up to the first decimal place × 10 32-bit signed binary -180000 to 600000  Value up to the third decimal place × 1000  P100  (JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980) JPt100  (JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980) JPt100  (JIS C1604-1981)  -180 to 600°C (27.10 to 313.71Ω) -180 to 600°C (25.80 to 317.28Ω) -190 to 600°C (25.80 to 317.28Ω) -190 to 600°C (25.80 to 317.28Ω) -100 to 600°C (25.80 to 600°C (25.8					
Applicable RTI		3-wire type  16-bit signed binary -1800 to 6000  Value up to the first decimal place × 10 32-bit signed binary -180000 to 600000  Value up to the third decimal place × 1000  Pt100  (JIS C1604-1997, IEC 751-anz, JIS C1604-1989, DIN 43760-1980) JPt100 (JIS C1604-1997, IEC 751-anz, JIS C1604-1989, DIN 43760-1980) JPt100 (JIS C1604-1981)  -180 to 600°C (27.10 to 313.710) -180 to 600°C (28.80 to 317.28Ω)  -11% (accuracy at full scale) 0.025°C  40ms/channel  Between platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Detected per channel 32 points					
Output (temperature conversion value)  Applicable RTD  Measured temperature range Pt100 JPt100 Ni100  Accuracy Resolution Conversion speed Number of analog input points Output current for temperature detection Isolation method  Dielectric withstand voltage  Disconnection detection Number of occupied I/O points External connection system External device connector (sold separately)							
		(JIS C1604-1981)					
	D+400	-180 to 600°C					
Measured	Pt100	(27.10 to 313.71Ω)					
temperature	16-bit signed binary						
range	16-bit signed binary   16-bit signed binary   1-bit signed binar						
	Dutput (temperature onversion value)  Output out						
Accuracy							
Resolution		0.025°C					
Conversion spe	eed	40ms/channel					
Number of ana	log input points	8 channels/module					
Output current	for temperature	1m1					
detection							
Isolation metho	od						
		Between platinum RTD input and channel: non-isolation	_				
Dielectric withs	stand voltage	Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute					
Disconnection detection		·					
Number of occ	upied I/O points						
		38-point terminal block					
		-					
Applicable solo	ieriess terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

 		, △ : Partial change required, ×: Incompatible
Q68RD3-G	Compatibility	Precautions for replacement
 3-wire type	0	
16-bit signed binary -2000 to 8500 Value up to the first decimal place × 10	Δ	32-bit output is not available.
Pt100 (JIS C 1604-1997, IEC751 1983) JPt100 (JIS C 1604-1981) Ni100 (DIN 43760 1987)	Δ	As the compliance standards for the applicable RTD differ, change the RTD to the one that can be used with the Q68RD3-G.
-200 to 850°C		
-180 to 600°C	0	
-60 to 180°C		
*1	0	
0.1°C	Δ	The resolution reduces.
320ms/8 channels	Δ	The conversion speed is fixed at 320ms, regardless of the number of enable channels.
8 channels/module	0	
1mA	0	
Isolated area   Isolation method   Dielectric withstand voltage   Insulation resistance	0	
Between RTD input and channel resistance isolation /minute resistance tester		
Detected per channel	0	
16 points (I/O assignment: intelligent 16 points)	Δ	The number of occupied I/O points has changed to 16 points.
 40-pin connector	×	Wiring change is required.
A6CON4	×	Prepare the A6CON4 separately.
0.3 mm ²	×	
 -	×	

Item	A68RD3N	
Cables between module and RTD	Make sure that the conductor resistance value between the Pt100 and A68RD3N is $10\Omega$ or less per conductor. All channels become the same specifications. $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
Internal current consumption (5VDC)	0.94A	
Weight	0.43kg	

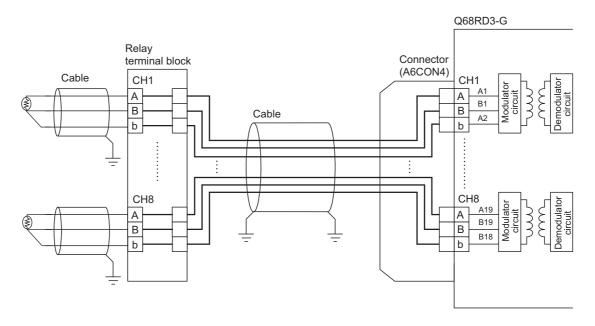
 $O: Compatible, \triangle: Partial \ change \ required, \ \times: Incompatible$ 

Q68RD3-G	Compatibility	Precautions for replacement
*2	Δ	Install a relay terminal block outside.
 0.54A	0	
0.20kg	0	

^{*1} Accuracy of the Q68RD3-G for each RTD type is as follows.

Co	nversion accuracy	Specifications				
	-200 to 850°C*1	±0.8°C (Ambient temperature: 25±5°C), ±2.4°C (Ambient temperature: 0 to 55°C)				
Pt100	-20 to 120°C*1	±0.3°C (Ambient temperature: 25±5°C), ±1.1°C (Ambient temperature: 0 to 55°C)				
	0 to 200°C*1	±0.4°C (Ambient temperature: 25±5°C), ±1.2°C (Ambient temperature: 0 to 55°C)				
	-180 to 600°C*1	±0.8°C (Ambient temperature: 25±5°C), ±2.4°C (Ambient temperature: 0 to 55°C)				
JPt100	-20 to 120°C*1	±0.3°C (Ambient temperature: 25±5°C), ±1.1°C (Ambient temperature: 0 to 55°C)				
	0 to 200°C*1	±0.4°C (Ambient temperature: 25±5°C), ±1.2°C (Ambient temperature: 0 to 55°C)				
Ni100	-60 to 180°C*1	±0.4°C (Ambient temperature: 25±5°C), ±1.2°C (Ambient temperature: 0 to 55°C)				

*2 Connect cables between the Q68RD3-G and RTD using a relay terminal block as shown below.



## 4.6.2 Functional comparison

O: Available, -: Not available

Item	Description	A68RD3N	Q68RD3-G	Precautions for replacement
Conversion enable/disable	Enables/disables a detection of	0	0	
specification of each channel	temperature.		O	
Sampling/averaging processing selection	Processes the detected temperature by specified method.	0	0	The setting ranges of time and count averages differ. Refer to the RTD Input Module/ Channel Isolated RTD Input Module User's Manual to check the specifications.
Detected temperature value storage	Stores temperature data in the buffer memory.	0	0	
Disconnection detection	Detects a disconnection of the connected RTD or cable.	0	0	
Specification of RTD type	Specifies a RTD type used.	0	0	
Range switching function	Switches the measured temperature range.	-	0	
Warning output function	Outputs a warning when the temperature exceeds the set temperature range.	-	0	
Scaling function	Converts a measured temperature value into a percent value (%) in set width.	-	0	
Error correction function	Corrects an error in temperature conversion value.	0	0	Perform the error correction by the offset/gain setting of the Q68RD3-G.
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 4.6.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

	A68RD3N			Q68RD3-G			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	
X1	READY flag	Y1		X1		Y1	
X2	Write data error flag	Y2		X2		Y2	
Х3	CH1: Disconnection detection flag	Y3		Х3		Y3	
X4	CH2: Disconnection detection flag	Y4		X4		Y4	
X5	CH3: Disconnection detection flag	Y5		X5	Not used	Y5	Not used
X6	CH4: Disconnection detection flag	Y6		X6		Y6	
X7	CH5: Disconnection detection flag	Y7	Not used	X7		Y7	
X8	CH6: Disconnection detection flag	Y8		X8		Y8	
X9	CH7: Disconnection detection flag	Y9		Х9	Operating condition setting completion flag	Y9	Operating condition setting request
XA	CH8: Disconnection detection flag	YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Channel change completion flag	YB	Channel change request
XC		YC		XC	Disconnection detection signal	YC	
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used
XE		YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE	
XF		YF	A68RD3N is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10	Not used				
X11	Not used	Y11					
X12		Y12	Error code reset flag				
X13		Y13					
X14 X15		Y14 Y15					
X16		Y16					
X10		Y17					
X18		Y18					
X19		Y19					
X1A		Y1A	Not used				
X1B		Y1B					
X1C		Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A68RD3N is used in	Y1F					
	remote I/O station						

#### 4.6.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

	A68RD3N			Q68RD3-G	
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write
0	Conversion enable/disable specification		0	Conversion enable/disable setting	
1	Averaging processing selection		1	CH1 Time/count/moving average/time constant setting	
2	CH1 Averaging time/count		2	CH2 Time/count/moving average/time constant setting	
3	CH2 Averaging time/count		3	CH3 Time/count/moving average/time constant setting	
4	CH3 Averaging time/count	R/W	4	CH4 Time/count/moving average/time constant setting	R/W
5	CH4 Averaging time/count	- K/VV	5	CH5 Time/count/moving average/time constant setting	
6	CH5 Averaging time/count		6	CH6 Time/count/moving average/time constant setting	
7	CH6 Averaging time/count		7	CH7 Time/count/moving average/time constant setting	
8	CH7 Averaging time/count		8	CH8 Time/count/moving average/time constant setting	
9	CH8 Averaging time/count		9	System area (Not used)	-
10	CH1 Detected temperature value (16bit)		10	Conversion completion flag	
11	CH2 Detected temperature value (16bit)	1	11	CH1 Measured temperature value	
12	CH3 Detected temperature value (16bit)	1	12	CH2 Measured temperature value	
13	CH4 Detected temperature value (16bit)	1	13	CH3 Measured temperature value	
14	CH5 Detected temperature value (16bit)		14	CH4 Measured temperature value	
15	CH6 Detected temperature value (16bit)		15	CH5 Measured temperature value	
16	CH7 Detected temperature value (16bit)		16	CH6 Measured temperature value	R
17	CH8 Detected temperature value (16bit)		17	CH7 Measured temperature value	
18	CH1 Detected temperature value (L)		18	CH8 Measured temperature value	
19	(32bit) (H)		19	Error code	
20	CH2 Detected temperature value (L)	R	20	Setting range 1 (Input type CH1-4)	
21	(32bit) (H)		21	Setting range 2 (Input type CH5-8)	
22	CH3 Detected temperature value (L)		22	Setting range 3 (Offset/gain setting)	
23	(32bit) (H)		23	System area (Not used)	-
24	CH4 Detected temperature value (L)		24	Averaging processing selection (CH1-CH4)	
25	(32bit) (H)		25	Averaging processing selection (CH5-CH8)	
26	CH5 Detected temperature value (L) (32bit) (H)		26	Offset/gain setting mode (Offset specification)	
27	` '	4	27	Offset/gain setting mode (Gain specification)	1
28	CH6 Detected temperature value (L)		28	CH1 Offset temperature setting value	-
29	(32bit) (H)		29	CH1 Gain temperature setting value	
30	CH7 Detected temperature value (L)		30	CH2 Offset temperature setting value	
31	(32bit) (H)	R	31	CH2 Gain temperature setting value	R/W
32	CH8 Detected temperature value (L)		32	CH3 Offset temperature setting value	
33	(32bit) (H)	DAM	33	CH3 Gain temperature setting value	-
34	Write data error code	R/W	34	CH4 Offset temperature setting value	
35	Conversion completion flag	R	35	CH4 Gain temperature setting value	
36	Specification of platinum RTD type	R/W	36	CH5 Offset temperature setting value	-
			37	CH5 Gain temperature setting value	-
			38	CH6 Offset temperature setting value	-
			39	CH6 Gain temperature setting value	

Address (decimal)   Address (decimal)   Address (decimal)   Address (decimal)   Address (Address Address Add		Q68RD3-G			
41 CH7 Offset temperature setting value 41 CH7 Cain temperature setting value 42 CH8 Offset temperature setting value 43 CH8 Cain temperature setting value 44 to 45 System area (Not used)		Name	Read/write		
41 CH7 Gain temperature setting value 42 CH8 Offset temperature setting value 43 CH8 Gain temperature setting value 44 to 45 System area (Not used) 46 Warning output enable/disable setting 47 Warning output flag (Process alarm) 48 Warning output flag (Rate alarm) 49 Disconnection detection flag 50 to 57 CH1 to CH8 Scaling value 58 Scaling valid/invalid setting 59 to 61 System area (Not used) 62 CH1 Scaling range lower limit value 63 CH1 Scaling range upper limit value 63 CH1 Scaling range upper limit value 79 CH8 Scaling width lower limit value 79 CH1 Scaling width upper limit value 79 CH1 Scaling width upper limit value 91 CH1 Process alarm lower/lower limit value 92 CH1 Process alarm lower/lower limit value 93 CH8 Process alarm upper/lower limit value 94 CH1 Process alarm upper/lupper limit value 95 CH1 Process alarm upper/lupper limit value 96 CH1 Process alarm upper/lupper limit value 97 CH1 Rate alarm upper limit value 98 CH1 Rate alarm upper limit value 99 CH1 Rate alarm upper limit value 126 to 133 CH8 Rate alarm warning detection period 134 CH1 Rate alarm lower limit value 149 CH8 Rate alarm lower limit value 150 to 157 System area (Not used) 160 to 163 System area (Not used) 160 to 163 System area (Not used) 164 Conversion setting for disconnection detection (CH1-CH4) 165 COnversion setting for disconnection detection (CH5-CH8) 166 to 173 CH1 to CH8 Conversion setting value for disconnection detection (CH5-CH8) 164 CH1 to CH8 Conversion setting value 195 CH1 User range settings offset value 196 CH1 User range settings offset value 197 CH1 User range settings offset value 198 CH1 User range settings offset value 199 CH1 User range settings offset (L) 199 resistance value (H) 190 CH1 User range settings gain value 191 CH1 User range settings gain value 192 CH1 User range settings gain value 194 CH1 User range settings gain resistance 196 CH1 User range settings gain resistance		CH7 Offset temperature setting value			
42 CH8 Offset temperature setting value  43 CH8 Gain temperature setting value  44 to 45 System area (Not used)  46 Warning output flag (Process alarm)  48 Warning output flag (Process alarm)  49 Disconnection detection flag  50 to 57 CH1 to CH8 Scaling value  58 Scaling valid/invalid setting  79 to 61 System area (Not used)  62 CH1 Scaling range lower limit value  63 CH1 Scaling range upper limit value  78 CH3 Scaling width lower limit value  79 CH3 Scaling width upper limit value  79 CH1 Scaling width upper limit value  79 CH1 Scaling width upper limit value  91 CH1 Process alarm lower/lower limit value  92 CH1 Process alarm upper/upper limit value  93 CH8 Rate alarm upper/upper limit value  94 CH1 Process alarm upper/upper limit value  95 CH1 Process alarm upper/upper limit value  126 to 133 period  134 CH1 Rate alarm upper limit value  135 CH1 Rate alarm lower limit value  149 CH8 Rate alarm lower limit value  150 to 157 System area (Not used)  160 to 163 System area (Not used)  164 Conversion setting for disconnection detection (CH1-CH4)  165 Conversion setting for disconnection detection (CH5-CH8)  166 to 173 CH1 Exctory default offset value  191 CH1 Factory default offset value  192 CH1 User range settings offset value  193 CH1 User range settings offset value  194 CH1 User range settings offset value  195 CH1 User range settings offset value  196 CH1 User range settings offset (L)  197 resistance value (H)  196 CH1 User range settings of nesistance  100 CH3 CH1 User range settings of nesistance  101 CH1 User range settings offset value  102 CH1 User range settings offset value  103 CH3 User range settings offset value  104 CH1 User range settings offset value  105 CH1 User range settings offset value  107 CH3 CH3 User range settings offset value  108 CH1 User range settings offset value  109 CH1 Factory default offset value  109 CH1 User range settings offset value  109 CH1 User range settings offset value		·	-		
43 CH8 Gain temperature setting value 44 to 45 System area (Not used) 46 Warning output enable/disable setting 47 Warning output flag (Process alarm) 48 Warning output flag (Rate alarm) 49 Disconnection detection flag 50 to 57 CH1 to CH8 Scaling value 58 Scaling valid/invalld setting 59 to 61 System area (Not used) 62 CH1 Scaling range lower limit value 63 CH1 Scaling range upper limit value 63 CH3 Scaling range upper limit value 77 CH8 Scaling range upper limit value 78 CH1 Scaling width lower limit value 79 CH1 Scaling width upper limit value 91 CH1 Process alarm lower/lower limit value 92 CH1 Process alarm lower/lower limit value 93 CH8 Process alarm upper/lower limit value 94 CH1 Process alarm upper/lower limit value 95 CH1 Process alarm upper/lower limit value 96 CH1 Process alarm upper/lower limit value 97 CH1 Process alarm upper/lower limit value 98 CH1 Process alarm upper/lower limit value 99 CH1 Process alarm upper/lower limit value 125 CH8 Process alarm upper/lower limit value 126 to 133 period 134 CH1 Rate alarm lower limit value 135 CH1 Rate alarm lower limit value 136 CH3 Rate alarm lower limit value 137 CH8 Rate alarm lower limit value 138 CH1 Rate alarm lower limit value 149 CH8 Rate alarm lower limit value 150 to 157 System area (Not used) 160 to 163 System area (Not used) 164 Conversion setting for disconnection detection (CH1-CH4) 165 CONVERSION Setting Setting RW 160 to 163 System area (Not used) 164 Conversion setting for disconnection detection (CH1-CH4) 165 CH1 Factory default offset value 190 CH1 Factory default offset value 191 CH1 User range settings offset (L) 192 resistance value (H) 193 CH1 User range settings gain value 194 CH1 User range settings offset (L) 195 resistance value (H) 196 CH1 User range settings gain resistance 197 CH8 User range settings gain resistance 198 CH8 User range settings gain resistance		·	R/W		
44 to 45 System area (Not used) 46 Warning output enable/disable setting 47 Warning output flag (Process alarm) 48 Warning output flag (Process alarm) 49 Disconnection detection flag 50 to 57 CH1 to CH8 Scaling value 58 Scaling valid/invalid setting 59 to 61 System area (Not used) 62 CH1 Scaling range lower limit value 63 CH1 Scaling range upper limit value 77 CH8 Scaling width lower limit value 78 CH1 Scaling width lower limit value 79 CH1 Scaling width upper limit value 79 CH1 Scaling width upper limit value 91 CH1 Process alarm lower/lower limit value 92 CH1 Process alarm lower/lower limit value 93 CH8 Scaling width upper limit value 94 CH1 Process alarm upper/lower limit value 95 CH1 Process alarm upper/lower limit value 96 CH1 Process alarm upper/lower limit value 125 CH8 Process alarm upper/lower limit value 126 to 133 CH8 Rate alarm warning detection period 134 CH1 Rate alarm lower limit value 135 CH1 Rate alarm lower limit value 149 CH8 Rate alarm lower limit value 150 to 157 System area (Not used) 160 to 163 System area (Not used) 164 Conversion setting for disconnection detection (CH1-CH4) 165 Conversion setting for disconnection detection (CH5-CH8) 166 to 173 CH1 to CH8 Conversion setting value for disconnection detection (CH5-CH8) 166 to 173 CH1 to CH8 Conversion setting value 190 CH1 per range settings offset value 191 CH1 per range settings offset value 192 CH1 User range settings offset value 193 CH1 User range settings offset value 194 CH1 User range settings offset value 195 CH1 User range settings offset value 196 CH1 User range settings offset value 197 CH1 User range settings offset value 198 CH1 User range settings offset value 199 CH1 User range settings offset value		, ,			
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So to 57    CH1 to CH8 Scaling value	48	Warning output flag (Rate alarm)	_		
58 Scaling valid/invalid setting R/W  59 to 61 System area (Not used)  62 CH1 Scaling range lower limit value  63 CH1 Scaling range upper limit value  77 CH8 Scaling range upper limit value  78 CH1 Scaling width lower limit value  79 CH1 Scaling width upper limit value  79 CH3 Scaling width upper limit value  79 CH4 Scaling width upper limit value  79 CH5 Scaling width upper limit value  91 CH2 Process alarm lower/lower limit value  92 CH3 Process alarm lower/lower limit value  93 CH4 Process alarm upper/lower limit value  94 CH5 Process alarm upper/lower limit value  95 CH6 Process alarm upper/lower limit value  96 CH7 Process alarm upper/lower limit value  97 CH8 Process alarm upper/lower limit value  98 CH1 Rate alarm upper limit value  10 CH1 Rate alarm upper limit value  1125 CH8 Rate alarm lower limit value  126 to 133 CH1 Rate alarm lower limit value  135 CH1 Rate alarm lower limit value  149 CH8 Rate alarm lower limit value  150 to 157 System area (Not used)  158 to 159 Mode switching setting  160 to 163 System area (Not used)  164 Conversion setting for disconnection detection (CH5-CH8)  165 CH1 to CH8 Conversion setting value for disconnection detection (CH5-CH8)  166 to 173 CH1 to CH8 Conversion setting value for disconnection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default offset value  192 CH1 User range settings offset value  193 CH1 User range settings offset (L)  195 resistance value (H)  196 CH3 User range settings gain value  197 CH3 User range settings gain value  198 CH4 User range settings gain value  199 CH4 User range settings gain value  199 CH4 User range settings gain value  190 CH4 User range settings gain value  191 CH4 User range settings gain value  191 CH4 User range settings gain value  192 CH4 User range settings gain value  193 CH4 User range settings gain value  194 CH4 User range settings gain value	49	, , ,	R		
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62 CH1 Scaling range lower limit value 63 CH1 Scaling range upper limit value 10 to 177 CH8 Scaling range upper limit value 78 CH1 Scaling width lower limit value 79 CH1 Scaling width upper limit value 19 CH1 Scaling width upper limit value 19 CH1 Process alarm lower/lower limit value 95 CH1 Process alarm lower/lower limit value 96 CH1 Process alarm upper/lower limit value 97 CH1 Process alarm upper/lower limit value 98 CH1 Process alarm upper/lower limit value 99 CH1 Process alarm upper/lower limit value 125 CH8 Process alarm upper/upper limit value 126 to 133 CH1 to CH8 Rate alarm warning detection period 134 CH1 Rate alarm lower limit value 135 CH1 Rate alarm lower limit value 136 CH3 Rate alarm lower limit value 149 CH8 Rate alarm lower limit value 150 to 157 System area (Not used) 158 to 159 Mode switching setting 160 to 163 System area (Not used) 164 Conversion setting for disconnection detection (CH1-CH4) 165 Conversion setting for disconnection detection (CH5-CH8) 166 to 173 CH1 to CH8 Conversion setting value for disconnection detection detection 174 to 189 System area 190 CH1 Factory default offset value 191 CH1 Factory default gain value 192 CH1 User range settings gain value 193 CH1 User range settings offset value 194 CH1 User range settings offset (L) 195 resistance value (H) 196 CH1 User range settings gain resistance R/W 253 CH8 User range settings gain resistance	58	Scaling valid/invalid setting	R/W		
to  77 CH8 Scaling range upper limit value  78 CH1 Scaling width lower limit value  79 CH3 Scaling width lower limit value  79 CH3 Scaling width upper limit value  80 CH3 Scaling width upper limit value  91 CH1 Process alarm lower/lower limit value  92 CH1 Process alarm lower/lower limit value  93 CH8 Scaling width upper limit value  94 CH1 Process alarm lower/lower limit value  95 CH1 Process alarm upper/lower limit value  96 CH1 Process alarm upper/lower limit value  97 CH3 Process alarm upper/lower limit value  125 CH8 Process alarm upper/lupper limit value  126 to 133 CH1 to CH8 Rate alarm warning detection period  134 CH1 Rate alarm lower limit value  135 CH1 Rate alarm lower limit value  149 CH8 Rate alarm lower limit value  150 to 157 System area (Not used)  160 to 163 System area (Not used)  164 Conversion setting for disconnection detection (CH1-CH4)  165 Conversion setting for disconnection detection (CH5-CH8)  166 to 173 CH1 to CH8 Conversion setting value for disconnection detection detection (CH5-CH8)  161 CH1 Factory default offset value  190 CH1 Factory default gain value  191 CH1 User range settings gain value  192 CH1 User range settings offset (L)  193 CH3 User range settings gain value  194 CH1 User range settings gain value  195 CH3 User range settings gain value  196 CH1 User range settings gain value  197 resistance value (H)  198 CH8 User range settings gain resistance  109 CH8 User range settings gain resistance	59 to 61	System area (Not used)	-		
CH3 Scaling range upper limit value  to  77 CH8 Scaling range upper limit value  78 CH1 Scaling width lower limit value  79 CH3 Scaling width upper limit value  to  93 CH8 Scaling width upper limit value  94 CH1 Process alarm lower/lower limit value  95 CH1 Process alarm lower/lower limit value  96 CH1 Process alarm upper/lower limit value  97 CH1 Process alarm upper/lower limit value  98 CH1 Process alarm upper/lower limit value  99 CH1 Process alarm upper/upper limit value  125 CH8 Process alarm upper/upper limit value  126 to 133 CH1 to CH8 Rate alarm warning detection period  134 CH1 Rate alarm lower limit value  135 CH1 Rate alarm lower limit value  149 CH8 Rate alarm lower limit value  150 to 157 System area (Not used)  158 to 159 Mode switching setting  160 to 163 System area (Not used)  164 Conversion setting for disconnection detection (CH1-CH4)  165 Conversion setting for disconnection detection (CH5-CH8)  166 to173  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default offset value  192 CH1 User range settings offset value  193 CH1 User range settings offset value  194 CH1 User range settings gain value  195 CH1 User range settings offset (L)  196 CH1 User range settings gain (L)  197 resistance value (H)  100  CH8 User range settings gain resistance  101  CH8 User range settings gain resistance  102  CH8 User range settings gain resistance	62	CH1 Scaling range lower limit value	D 44/		
77 CH8 Scaling range upper limit value 78 CH1 Scaling width lower limit value 79 CH1 Scaling width upper limit value 10 93 CH8 Scaling width upper limit value 94 CH1 Process alarm lower/lower limit value 95 CH1 Process alarm lower/upper limit value 96 CH1 Process alarm upper/upper limit value 97 CH1 Process alarm upper/upper limit value 98 CH1 Process alarm upper/upper limit value 99 CH1 Process alarm upper/upper limit value 125 CH8 Process alarm upper/upper limit value 126 to 133 CH1 to CH8 Rate alarm warning detection period 134 CH1 Rate alarm lower limit value 135 CH1 Rate alarm lower limit value 136 to 157 System area (Not used) 158 to 159 Mode switching setting 160 to 163 System area (Not used) 164 Conversion setting for disconnection detection (CH1-CH4) 165 COnversion setting for disconnection detection (CH5-CH8) 166 to173 CH1 to CH8 Conversion setting value for disconnection detection (CH5-CH8) 174 to 189 System area 190 CH1 Factory default offset value 191 CH1 Factory default offset value 192 CH1 User range settings offset value 193 CH1 User range settings offset value 194 CH1 User range settings gain value 195 CH1 User range settings gain value 196 CH1 User range settings gain value 197 resistance value (H) 198 CH1 User range settings gain (L) 199 resistance value (H) 190 CH1 User range settings gain resistance 190 CH1 User range settings gain resistance	63	CH1 Scaling range upper limit value	R/W		
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79 CH1 Scaling width upper limit value  10	77	CH8 Scaling range upper limit value			
to  93 CH8 Scaling width upper limit value  94 CH1 Process alarm lower/lower limit value  95 CH1 Process alarm lower/upper limit value  96 CH1 Process alarm upper/lower limit value  97 CH1 Process alarm upper/upper limit value  125 CH8 Process alarm upper/upper limit value  126 to 133 CH1 to CH8 Rate alarm warning detection period  134 CH1 Rate alarm upper limit value  135 CH1 Rate alarm lower limit value  149 CH8 Rate alarm lower limit value  150 to 157 System area (Not used)  158 to 159 Mode switching setting  160 to 163 System area (Not used)  164 Conversion setting for disconnection detection (CH1-CH4)  165 Conversion setting for disconnection detection (CH5-CH8)  166 to 173 CH1 to CH8 Conversion setting value for disconnection detection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings gain value  193 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  197 resistance value (H)  10 CH8 User range settings gain resistance  10 CH8 User range settings gain resistance	78	CH1 Scaling width lower limit value	R/W		
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94 CH1 Process alarm lower/lower limit value 95 CH1 Process alarm lower/upper limit value 96 CH1 Process alarm upper/lower limit value 97 CH1 Process alarm upper/lower limit value 125 CH8 Process alarm upper/upper limit value 126 to 133 CH1 to CH8 Rate alarm warning detection period 134 CH1 Rate alarm lower limit value 135 CH1 Rate alarm lower limit value 136 to 157 System area (Not used) 158 to 159 Mode switching setting 160 to 163 System area (Not used) 164 Conversion setting for disconnection detection (CH1-CH4) 165 Conversion setting for disconnection detection (CH5-CH8) 166 to 173 CH1 to CH8 Conversion setting value for disconnection detection detection 174 to 189 System area 190 CH1 Factory default offset value 191 CH1 Factory default gain value 192 CH1 User range settings gain value 194 CH1 User range settings offset (L) 195 resistance value (H) 196 CH1 User range settings gain (L) 197 resistance value (H) 198 CH8 User range settings gain resistance 199 CH8 User range settings gain resistance 190 CH8 User range settings gain resistance 190 CH8 User range settings gain resistance 190 CH8 User range settings gain resistance		to			
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96 CH1 Process alarm upper/lower limit value 97 CH1 Process alarm upper/upper limit value  125 CH8 Process alarm upper/upper limit value  126 to 133 CH1 to CH8 Rate alarm warning detection period  134 CH1 Rate alarm upper limit value  135 CH1 Rate alarm lower limit value  149 CH8 Rate alarm lower limit value  150 to 157 System area (Not used)  158 to 159 Mode switching setting  160 to 163 System area (Not used)  164 Conversion setting for disconnection detection (CH1-CH4)  165 Conversion setting for disconnection detection (CH5-CH8)  166 to 173 CH1 to CH8 Conversion setting value for disconnection detection detection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings offset value  193 CH1 User range settings gain value  194 CH1 User range settings gain value  195 resistance value (H)  196 CH1 User range settings gain (L)  197 resistance value (H)  100 CH8 User range settings gain resistance  100 CH8 User range settings gain resistance	94	CH1 Process alarm lower/lower limit value			
125 CH8 Process alarm upper/upper limit value  126 to 133 CH1 to CH8 Rate alarm warning detection period Pe	95	CH1 Process alarm lower/upper limit value	R/W		
to  125	96	CH1 Process alarm upper/lower limit value			
125 CH8 Process alarm upper/upper limit value  CH1 to CH8 Rate alarm warning detection period  134 CH1 Rate alarm upper limit value  135 CH1 Rate alarm lower limit value  149 CH8 Rate alarm lower limit value  R/W  150 to 157 System area (Not used)  158 to 159 Mode switching setting  R/W  160 to 163 System area (Not used)  Conversion setting for disconnection detection (CH1-CH4)  Conversion setting for disconnection detection (CH5-CH8)  CH1 to CH8 Conversion setting value for disconnection detection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings gain value  194 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  197 resistance value (H)  CH8 User range settings gain resistance  R/W	97	CH1 Process alarm upper/upper limit value			
CH1 to CH8 Rate alarm warning detection period  134		to	•		
134 CH1 Rate alarm upper limit value  135 CH1 Rate alarm lower limit value  to  149 CH8 Rate alarm lower limit value  150 to 157 System area (Not used)  158 to 159 Mode switching setting  160 to 163 System area (Not used)  164 Conversion setting for disconnection detection (CH1-CH4)  165 COnversion setting for disconnection detection (CH5-CH8)  166 to 173 CH1 to CH8 Conversion setting value for disconnection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings offset value  193 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  197 resistance value (H)  108 CH8 User range settings gain resistance  190 CH8 User range settings gain resistance	125	CH8 Process alarm upper/upper limit value			
134 CH1 Rate alarm upper limit value  135 CH1 Rate alarm lower limit value  to  149 CH8 Rate alarm lower limit value  R/W  150 to 157 System area (Not used)  158 to 159 Mode switching setting  R/W  160 to 163 System area (Not used)  Conversion setting for disconnection detection (CH1-CH4)  Conversion setting for disconnection detection (CH5-CH8)  CH1 to CH8 Conversion setting value for disconnection detection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 User range settings offset value  192 CH1 User range settings gain value  194 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  197 resistance value (H)  108 CH8 User range settings gain resistance  R/W	126 to 133	CH1 to CH8 Rate alarm warning detection			
135 CH1 Rate alarm lower limit value  149 CH8 Rate alarm lower limit value R/W 150 to 157 System area (Not used) - 158 to 159 Mode switching setting R/W 160 to 163 System area (Not used) - 164 Conversion setting for disconnection detection (CH1-CH4) Conversion setting for disconnection detection (CH5-CH8)  CH1 to CH8 Conversion setting value for disconnection detection detection 174 to 189 System area - 190 CH1 Factory default offset value 191 CH1 Factory default gain value 192 CH1 User range settings offset value 193 CH1 User range settings gain value 194 CH1 User range settings offset (L) 195 resistance value (H) 196 CH1 User range settings gain (L) 197 resistance value (H) 198 CH8 User range settings gain resistance  CH8 User range settings gain resistance	120 10 100	period	R/W		
to  149 CH8 Rate alarm lower limit value R/W  150 to 157 System area (Not used) -  158 to 159 Mode switching setting R/W  160 to 163 System area (Not used) -  Conversion setting for disconnection detection (CH1-CH4)  Conversion setting for disconnection detection (CH5-CH8)  CH1 to CH8 Conversion setting value for disconnection detection detection  174 to 189 System area -  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings offset value  193 CH1 User range settings gain value  194 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  resistance value (H)  197 resistance value (H)  CH8 User range settings gain resistance  R/W	134	CH1 Rate alarm upper limit value			
149 CH8 Rate alarm lower limit value R/W 150 to 157 System area (Not used) - 158 to 159 Mode switching setting R/W 160 to 163 System area (Not used) - 164 Conversion setting for disconnection detection (CH1-CH4)  165 Conversion setting for disconnection detection (CH5-CH8)  166 to 173 CH1 to CH8 Conversion setting value for disconnection detection detection 174 to 189 System area - 190 CH1 Factory default offset value 191 CH1 User range settings offset value 192 CH1 User range settings gain value 193 CH1 User range settings gain value 194 CH1 User range settings offset (L) 195 resistance value (H) 196 CH1 User range settings gain (L) 197 resistance value (H) 198 CH8 User range settings gain resistance 199 CH8 User range settings gain resistance	135	CH1 Rate alarm lower limit value			
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160 to 163 System area (Not used)  164 Conversion setting for disconnection detection (CH1-CH4)  165 Conversion setting for disconnection detection (CH5-CH8)  166 to 173 CH1 to CH8 Conversion setting value for disconnection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings offset value  193 CH1 User range settings gain value  194 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  197 resistance value (H)  108 CH8 User range settings gain resistance  109 CH8 User range settings gain resistance			-		
Conversion setting for disconnection detection (CH1-CH4)  Conversion setting for disconnection detection (CH5-CH8)  CH1 to CH8 Conversion setting value for disconnection detection  CH1 to CH8 Conversion setting value for disconnection detection  CH1 Factory default offset value  190 CH1 Factory default gain value  191 CH1 User range settings offset value  192 CH1 User range settings gain value  193 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  resistance value (H)  CH8 User range settings gain resistance  CH8 User range settings gain resistance			R/W		
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detection (CH1-CH4)  Conversion setting for disconnection detection (CH5-CH8)  166 to173  CH1 to CH8 Conversion setting value for disconnection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings offset value  193 CH1 User range settings gain value  194 CH1 User range settings offset (L)  195 resistance value  (H)  196 CH1 User range settings gain (L)  resistance value  (H)  197 resistance value  (H)  CH8 User range settings gain resistance  R/W	164	_			
detection (CH5-CH8)  166 to173  CH1 to CH8 Conversion setting value for disconnection detection  174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings offset value  193 CH1 User range settings gain value  194 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L) resistance value (H)  197 CH8 User range settings gain resistance  R/W		,			
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174 to 189 System area  190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings offset value  193 CH1 User range settings gain value  194 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  197 resistance value (H)  198 CH8 User range settings gain resistance  108 CH8 User range settings gain resistance	166 to173	=			
190 CH1 Factory default offset value  191 CH1 Factory default gain value  192 CH1 User range settings offset value  193 CH1 User range settings gain value  194 CH1 User range settings offset (L)  195 resistance value (H)  196 CH1 User range settings gain (L)  197 resistance value (H)  253 CH8 User range settings gain resistance  R/W					
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192 CH1 User range settings offset value 193 CH1 User range settings gain value 194 CH1 User range settings offset (L) 195 resistance value (H) 196 CH1 User range settings gain (L) 197 resistance value (H)  to  CH8 User range settings gain resistance  R/W					
193 CH1 User range settings gain value 194 CH1 User range settings offset (L) 195 resistance value (H) 196 CH1 User range settings gain (L) 197 resistance value (H)  to  CH8 User range settings gain resistance  R/W			-		
194 CH1 User range settings offset (L) 195 resistance value (H) 196 CH1 User range settings gain (L) 197 resistance value (H)  to  CH8 User range settings gain resistance  R/W		· · · · · · · · · · · · · · · · · · ·	-		
195 resistance value (H) 196 CH1 User range settings gain (L) 197 resistance value (H)  to  CH8 User range settings gain resistance  R/W			R/W		
196 CH1 User range settings gain (L) 197 resistance value (H)  to  CH8 User range settings gain resistance  R/W					
197 resistance value (H)  to  CH8 User range settings gain resistance  R/W		` ,			
to  CH8 User range settings gain resistance  R/W					
CH8 User range settings gain resistance	19/	, ,			
■ 253 I I R/W			1		
value (n)	253		R/W		
		value (H)			

# 4.7 A68RD4N (Replacement to the Q64RD)

## 4.7.1 Performance comparison

It	em	A68RD4N	
Measuring met	thod	4-wire type	
		16-bit signed binary	
		-1800 to 6000	
Output (tempe	rature	Value up to the first decimal place × 10	
conversion val	ue)	32-bit signed binary	
		-180000 to 600000	
		Value up to the third decimal place × 1000	
		Pt100	
Applicable plat	inum PTD	(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)	
Applicable plat	IIIUIII KTD	JPt100	
		(JIS C1604-1981)	
Measured	Pt100	-180 to 600°C	
temperature		(27.10 to 313.71Ω)	
range	JPt100	-180 to 600°C	
		(25.80 to 317.28Ω)	
Accuracy		±1%	
		(accuracy at full scale)	
Resolution		0.025°C	
Conversion spe	eed	40ms/channel	
Number of ana	log input points	8 channels/module	
Output current detection	for temperature	1mA	
Isolation metho	od	Between platinum RTD input and programmable controller power supply: photocoupler isolation	
isolation metric	od	Between platinum RTD input and channel: non-isolation	
Dielectric withstand voltage		Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute	
Disconnection detection		Batch-detected at all channels	
Number of occupied I/O points		32 points	
		(I/O assignment: special 32 points)	
External connection system		38-point terminal block	
Applicable wire size		0.75 to 2mm ²	
Applicable solderless terminal		V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

		△ : Partial change required, ×: incompatible
Q64RD	Compatibility	Precautions for replacement
3/4-wire type	0	
16-bit signed binary -2000 to 8500  Value up to the first decimal place × 10  32-bit signed binary data -200000 to 850000	0	
Value up to the third decimal place × 1000 Pt100 (JIS C 1604-1997, IEC751 1983) JPt100 (JIS C 1604-1981)	Δ	As the compliance standards for the applicable platinum RTD differ, change the platinum RTD to the one that can be used with the Q64RD.
-200 to 850°C -180 to 600°C	0	
Ambient temperature 0 to 55°C: ±0.25% (accuracy relative to maximum value) Ambient temperature 25±5°C: ±0.08% (accuracy relative to maximum value)	0	
0.025°C	0	
40ms/channel	0	
4 channels/module	Δ	Consider replacement with multiple Q64RD.
1mA	0	
Isolated area   Isolation method   Dielectric withstand voltage   Insulation resistance	0	
Detected per channel	0	The purpher of accurated 1/O resists
16 points (I/O assignment: intelligent 16 points)	Δ	The number of occupied I/O points has changed to 16 points.
18-point terminal block	×	nao shangou to 10 politis.
0.3 to 0.75mm ²	×	Marine alegan a in as suite d
1.25-3, R1.25-3 (Sleeved solderless terminal cannot be used.)	×	Wiring change is required.

Item	A68RD4N	
Cable between module and platinum RTD	Set the total resistance value of a conductor where the current runs to $70\Omega$ or less. Example: When connecting Pt100 to CH1 and CH2  Conductor  a1 A68RD4N  CH.1  Pt100  2)  b1/a2  SLD  A2  Pt100  4)  b2/a3  Lay wiring so that the following condition is met. 1) + 2) + 3) + 4) $\leq 70$ ( $\Omega$ )  - indicates the direction of current.	
Internal current consumption (5VDC)	0.41A	
Weight	0.43kg	

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

		· · · · · · · · · · · · · · · · · ·	3
	Q64RD	Compatibility	Precautions for replacement
	The conductor resistance value must meet the condition of 1) + 2) $\leq$ 2k $\Omega$ or less. (In the case of 3-conductor type, the difference between 1) and 2) in the conductor resistance value must be 10 $\Omega$ or less.)		
	Q64RD a1 A1 B1 b1 SLD	0	
	O64RD  2)  A1  A1  B1  b1  SLD		
	0.60A	Δ	The recalculation of internal current consumption (5VDC) is required.
·	0.17kg	0	

## 4.7.2 Functional comparison

O: Available, -: Not available

Item	Description	A68RD4N	Q64RD	Precautions for replacement
Conversion enable/disable specification of each channel	Enables/disables a detection of temperature.	0	0	
Sampling/averaging processing selection	Processes the detected temperature by specified method.	0	0	The setting ranges of time and count averages differ. Refer to the RTD Input Module/ Channel Isolated RTD Input Module User's Manual to check the specifications.
Detected temperature value storage	Stores temperature data in the buffer memory.	0	0	
Disconnection detection	This function detects connected platinum RTD or cable breakage.	0	0	For the Q64RD, a disconnection is detected per channel.
Specification of platinum RTD type	Specifies a platinum RTD type used.	0	0	
Range switching function	Switches the measured temperature range.	-	0	
Warning output function	Outputs a warning when the temperature exceeds the set temperature range.	-	0	
Scaling function	Converts a measured temperature value into a percent value (%) in set width.	-	0	
Error correction function	Corrects an error in temperature conversion value.	0	0	Perform the error correction by the offset/gain setting of the Q64RD.
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 4.7.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

A68RD4N					Q64	4RD	
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.	-	No.	<b>.</b>	No.	, and the second se	No.	
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used CH1 Offset setting
X1	READY flag	Y1		X1	CH1 Offset/gain setting status signal	Y1	request
X2	Write data error flag	Y2		X2	CH2 Offset/gain setting status signal	Y2	CH1 Gain setting request
Х3	Σ disconnection detection flag (CH1 to CH8)	Y3		Х3	CH3 Offset/gain setting status signal	Y3	CH2 Offset setting request
X4		Y4		X4	CH4 Offset/gain setting status signal	Y4	CH2 Gain setting request
X5		Y5	Not used	X5		Y5	CH3 Offset setting request
X6		Y6		X6	Not used	Y6	CH3 Gain setting request
X7		Y7		X7	Not used	Y7	CH4 Offset setting request
X8		Y8		X8		Y8	CH4 Gain setting request
X9		Y9		X9	Operating condition setting completion signal	Y9	Operating condition setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Not used	YB	
XC		YC		XC	Disconnection detection signal	YC	Netword
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used
XE	Not used	YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE	
XF		YF	A68RD4N is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10	Not used				
X11		Y11					
X12		Y12	Error code reset flag				
X13 X14		Y13 Y14					
X14 X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19					
X1A		Y1A	Not used				
X1B		Y1B					
X1C		Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
X1F	instructions when the A68RD4N is used in	Y1F					
A I F	remote I/O station	115					
	Torriote #O station			J			

#### 4.7.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

	A68RD4N			Q64RD	
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write
0	Conversion enable/disable specification		0	Conversion enable/disable specification	
1	Averaging processing selection		1	CH1 Time/count averaging setting	
2	CH1 Averaging time/count		2	CH2 Time/count averaging setting	R/W
3	CH2 Averaging time/count		3	CH3 Time/count averaging setting	
4	CH3 Averaging time/count	5	4	CH4 Time/count averaging setting	
5	CH4 Averaging time/count	R/W	5		
6	CH5 Averaging time/count	7	6		
7	CH6 Averaging time/count	7	7	System area (Not used)	-
8	CH7 Averaging time/count		8		
9	CH8 Averaging time/count	7	9	Averaging processing selection	R/W
10	CH1 Detected temperature value (16bit)		10	Conversion completion flag	
11	CH2 Detected temperature value (16bit)	_	11	CH1 Measured temperature value (16bit)	
12	CH3 Detected temperature value (16bit)	+	12	CH2 Measured temperature value (16bit)	R
13	CH4 Detected temperature value (16bit)	_	13	CH3 Measured temperature value (16bit)	+
14	CH5 Detected temperature value (16bit)	+	14	CH4 Measured temperature value (16bit)	
15	CH6 Detected temperature value (16bit)	=	15		
16	CH7 Detected temperature value (16bit)	+	16		
17	CH8 Detected temperature value (16bit)	+	17	System area (Not used)	-
18	CH1 Detected temperature value (L)	+	18		
19	(32bit) (H)		19	Error code	
20	CH2 Detected temperature value (L)	$\dashv$	20	Setting range	R
21	(32bit) (H)		21		
22	CH3 Detected temperature value (L)	R	22		
23	·		23		
24	(32bit) (H) CH4 Detected temperature value (L)	+	24		
25	(32bit) (H)		25		
26	CH5 Detected temperature value (L)	+	26		
27	(32bit) (H)		27		
28	CH6 Detected temperature value (L)	+	28		
29	(32bit) (H)		29		
30	CH7 Detected temperature value (L)	_	30		
31	·		31		
32	(32bit) (H) CH8 Detected temperature value (L)	_	32		
33	· ` '		33		
34	(32bit) (H) Write data error code	R/W	34	System area (Not used)	-
35	Conversion completion flag	R	35		
36	Specification of platinum RTD type	R/W	36		
30	Specification of platinum KTD type	F/VV	37		
			38		
			39		
			40		
			41		
			42		
			43		
			44		
			45		
			46	NA/	Dati
			47	Warning output enable/disable setting	R/W

	Q64RD	
Address	Name	Read/write
(decimal)		Reau/wille
48	Warning output flag	
49	Disconnection detection flag	
50	CH1 Scaling value	
51	CH2 Scaling value CH3 Scaling value	_
52 53	CH4 Scaling value	-
54	CH1 Measured temperature value (L)	
55	(32bit) (H)	R
56	CH2 Measured temperature value (L)	
57	(32bit) (H)	
58	CH3 Measured temperature value (L)	
59	(32bit) (H)	
60	CH4 Measured temperature value (L)	
61	(32bit) (H)	
62	CH1 Scaling range lower limit value (L)	
63	(H)	
64	CH1 Scaling range upper limit value (L)	
65	(H)	
66	CH2 Scaling range lower limit value (L)	
67	(H)	
68	CH2 Scaling range upper limit value (L)	
69	(H)	_
70	CH3 Scaling range lower limit value (L)	
71	(H) CH3 Scaling range upper limit value (L)	
72 73		
74	(H) CH4 Scaling range lower limit value (L)	-
75	(H)	
76	CH4 Scaling range upper limit value (L)	-
77	(H)	
78	CH1 Scaling width lower limit value	R/W
79	CH1 Scaling width upper limit value	
80	CH2 Scaling width lower limit value	
81	CH2 Scaling width upper limit value	
82	CH3 Scaling width lower limit value	
83	CH3 Scaling width upper limit value	
84	CH4 Scaling width lower limit value	
85	CH4 Scaling width upper limit value	
86	CH1 Warning output lower/lower (L)	
87	limit value (H)	
88	CH1 Warning output lower/upper (L)	
89	limit value (H)	
90	CH1 Warning output upper/lower (L)	
91	limit value (H)	_
92	CH1 Warning output upper/upper (L)	
93	limit value (H)	
116	CH4 Warning output upper/upper (L)	1
117	limit value (H)	
118	CH1 Offset temperature setting (L)	-
119	value (H)	R/W
120	CH1 Gain temperature setting (L)	-
121	value (H)	
	to	1
132	CH4 Gain temperature setting (L)	
133	value (H)	R/W
	, ,	

Q64RD				
Address	Name	Read/write		
(decimal)	Hamo	rtodd, mito		
134 to 157	Not used	ı		
158	Mode switching setting	R/W		
159	wode switching setting			
160	3-conductor type	FX/VV		
100	CH1 Factory default offset value			
to				
254 4-conductor type CH4 User range (L)		R/W		
255	settings gain resistance value (H)	FK/VV		

# 4.8 A68RD4N (Replacement to the Q64RD-G)

#### 4.8.1 Performance comparison

li li	tem	A68RD4N	
Measuring me	thod	4-wire type	
		16-bit signed binary	
		-1800 to 6000	
Output (tempe	erature	Value up to the first decimal place × 10	
conversion val	lue)	32-bit signed binary	
		-180000 to 600000	
		Value up to the third decimal place × 1000	
		Pt100	
		(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)	
Applicable RT	D	JPt100	
		(JIS C1604-1981)	
		-180 to 600°C	
Measured	Pt100	$(27.10 \text{ to } 313.71\Omega)$	
temperature	IDIAGO	-180 to 600°C	
range	JPt100	(25.80 to 317.28Ω)	
	Ni100	-	
Accuracy		±1%	
Accuracy		(accuracy at full scale)	
Resolution		0.025°C	
Conversion sp	eed	40ms/channel	
Number of ana	alog input points	8 channels/module	
	for temperature	1mA	
detection		Between platinum RTD input and programmable controller power supply: photocoupler isolation	
Isolation meth	od	Between platinum RTD input and channel: non-isolation	
Dielectric withstand voltage		Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute	
Disconnection	detection	Batch-detected at all channels	
Number of occupied I/O points		32 points	
		(I/O assignment: special 32 points)	
External connection system		38-point terminal block	
Applicable wire size		0.75 to 2mm ²	
Applicable sol	derless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

18-bit signed binary	Q64RD-G	Compatibility	Precautions for replacement
Value up to the first decimal place × 10   32-bit signed binary data	3/4-wire type	0	
As the compliance standards for the applicable RTD differ, change the RTD to the one that can be used with the Q64RD-G.    Consider replacement with multiple Q64RD-G.	-2000 to 8500  Value up to the first decimal place × 10  32-bit signed binary data  -200000 to 850000	0	
-180 to 600°C  -60 to 180°C  -	(JIS C 1604-1997, IEC751 1983)  JPt100  (JIS C 1604-1981)  Ni100	Δ	applicable RTD differ, change the RTD to the one that can be used with
-180 to 600°C  -60 to 180°C  11 O  0.025°C O  40ms/channel O  Consider replacement with multiple Q64RD-G.  1mA O  Isolated area   Isolation method   Dielectric withstand voltage   1780VrmsAC/3 cycles (altitude 2000m)   1780VrmsAC/3 cycles (altitude 20		0	
1 0.025°C 0 Consider replacement with multiple Q64RD-G.  ImA 0 Consider replacement with multiple Q64RD-G.  Insulation resistance look of the power supply solved isolation resistance rester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance tester look of the power supply solved isolation resistance to the power supply solved isolation resistance look of the power supply solved isolation look of the power supply solved isolation resistance look of the power supply solved isolation look of the power supply solved isol			
0.025°C			
4 channels/module   Δ   Consider replacement with multiple Q64RD-G.	*1	0	
A channels/module	0.025°C	0	
A channels/module	40ms/channel	0	
Isolated area   Isolation method   Dielectric withstand voltage   Isolation method   Photocoupler sisolation   1780VrmsAC/3 cycles (altitude 2000m)   1780VrmsAC/3 cycles sisolation   Isolation	4 channels/module	Δ	·
Between RTD input and programmable controller power supply   Photocoupler isolation   1780VrmsAC/3 cycles (altitude 2000m)   1780VrmsAC/3 cycles (altitude 2000m)   500VDC insulation resistance tester   O	1mA	0	
Detected per channel  16 points (I/O assignment: intelligent 16 points)  18-point terminal block  0.3 to 0.75mm²  1.25-3 R1.25-3  Detected per channel  The number of occupied I/O points has changed to 16 points.  ** Wiring change is required.	Between RTD input and programmable controller power supply   Between RTD	0	
16 points (I/O assignment: intelligent 16 points)  18-point terminal block  0.3 to 0.75mm²  1.25-3 R1.25-3   The number of occupied I/O points has changed to 16 points.  ** Wiring change is required.	10000	_	
(I/O assignment: intelligent 16 points)  18-point terminal block  0.3 to 0.75mm²  1.25-3 R1.25-3   has changed to 16 points.   Wiring change is required.		0	The growth of a consist I/O as into
0.3 to 0.75mm ² × 1.25-3 R1.25-3 × Wiring change is required.	 (I/O assignment: intelligent 16 points)	Δ	
1.25-3 R1.25-3 × viring change is required.		×	
1.25-3 R1.25-3		×	Wiring change is required.
		×	J J 17

^{*1} Indicates accuracy of the Q64RD-G (accuracy at the maximum value in the selection range).

	Accuracy	Specifications
Reference accuracy		Within 0.04%
	Pt100/JPt100 (-20 to 120°C)	±70ppm/°C (±0.0070%/°C)
Tomporature coefficient	Pt100/JPt100 (0 to 200°C)	±65ppm/°C (±0.0065%/°C)
Temperature coefficient	Pt100/JPt100 (-200 to 850°C)	±50ppm/°C (±0.0050%/°C)
	Ni100Ω (-60 to 180°C)	±70ppm/°C (±0.0070%/°C)

Item	A68RD4N	
Cable across module - platinum resistance thermometer	Set the total resistance value of a conductor where the current runs to $70\Omega$ or less. Example: When connecting Pt100 to CH1 and CH2  Conductor  a1 A68RD4N  CH.1  Pt100  2)  B1  b1/a2  SLD  A2  Pt100  4)  B2  b2/a3  Lay wiring so that the following condition is met. 1) + 2) + 3) + 4) $\leq 70$ ( $\Omega$ )  indicates the direction of current.	
Internal current consumption (5VDC)	0.41A	
Weight	0.43kg	

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

	Q64RD-G	Compatibility	Precautions for replacement
	The conductor resistance value must meet the condition of 1) + 2) $\leq$ 2k $\Omega$ or less. (In the case of 3-conductor type, the difference between 1) and 2) in the conductor resistance value must be $10\Omega$ or less.)		
	O64RD-G a1 A1 B1 b1 SLD	0	
	2) A1 B1 b1 SLD		
	0.62A	Δ	The recalculation of internal current consumption (5VDC) is required.
·	0.20kg	0	

## 4.8.2 Functional comparison

O : Available, - : Not available

Item	Description	A68RD4N	Q64RD-G	Precautions for replacement
Conversion enable/disable specification of each channel	Enables/disables a detection of temperature.	0	0	
Sampling/averaging processing selection	Processes the detected temperature by specified method.	0	0	The setting ranges of time and count averages differ. Refer to the RTD Input Module/ Channel Isolated RTD Input Module User's Manual to check the specifications.
Detected temperature value storage	Stores temperature data in the buffer memory.	0	0	
Disconnection detection	Detects a disconnection of the connected RTD or cable.	0	0	For the Q64RD-G, a disconnection is detected per channel.
Type specification of RTD	Specifies a RTD type used.	0	0	
Range switching function	Switches the measured temperature range.	-	0	
Warning output function	Outputs a warning when the temperature exceeds the set temperature range.	-	0	
Scaling function	Converts a measured temperature value into a percent value (%) in set width.	-	0	
Error correction function	Corrects an error in temperature conversion value.	0	0	Perform the error correction by the offset/gain setting of the Q64RD-G.
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

#### 4.8.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

	A68F	RD4N		Q64RD-G			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used
X1	READY flag	Y1		X1	CH1 Offset/gain setting	Y1	CH1 Offset setting
					status signal		request
X2	Write data error flag	Y2		X2	CH2 Offset/gain setting status signal	Y2	CH1 Gain setting request
	Σ disconnection				CH3 Offset/gain setting		CH2 Offset setting
X3	detection flag (CH1 to CH8)	Y3		Х3	status signal	Y3	request
X4	(CITI to CITO)	Y4		X4	CH4 Offset/gain setting status signal	Y4	CH2 Gain setting request
X5		Y5	Not used	X5	-	Y5	CH3 Offset setting request
X6		Y6		X6	Not used	Y6	CH3 Gain setting request
X7		Y7		X7	Not used	Y7	CH4 Offset setting request
X8		Y8		X8		Y8	CH4 Gain setting request
X9		Y9		X9	Operating condition setting completion signal	Y9	Operating condition setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Not used	YB	
XC		YC		XC	Disconnection detection signal	YC	Not used
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used
XE	Not used	YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE	
XF		YF	A68RD4N is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10	Not used				
X11		Y11					
X12 X13		Y12 Y13	Error code reset flag				
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19 X1A		Y19 Y1A	Not used				
X1B		Y1B	Not used				
X1C		Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A68RD4N is used in	Y1F					
	remote I/O station			I			

#### 4.8.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory and sequence program, refer to the RTD Input Module/Channel Isolated RTD Input Module User's Manual.

	A68RD4N		Q64RD-G			
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write	
0	Conversion enable/disable specification		0	Conversion enable/disable setting		
1	Averaging processing selection		1	CH1 Time/count/moving average/time constant setting		
2	CH1 Averaging time/count		2	CH2 Time/count/moving average/time constant setting	R/W	
3	CH2 Averaging time/count	R/W	3	CH3 Time/count/moving average/time constant setting		
4	CH3 Averaging time/count		4	CH4 Time/count/moving average/time constant setting		
5	CH4 Averaging time/count		5			
6	CH5 Averaging time/count		to	System area		
7	CH6 Averaging time/count		ιο	System area	_	
8	CH7 Averaging time/count		8			
9	CH8 Averaging time/count		9	Averaging processing selection	R/W	
10	CH1 Detected temperature value (16bit)		10	Conversion completion flag		
11	CH2 Detected temperature value (16bit)		11	CH1 Measured temperature value (16bit)		
12	CH3 Detected temperature value (16bit)		12	CH2 Measured temperature value (16bit)	R	
13	CH4 Detected temperature value (16bit)		13	CH3 Measured temperature value (16bit)		
14	CH5 Detected temperature value (16bit)		14	CH4 Measured temperature value (16bit)		
15	CH6 Detected temperature value (16bit)		15			
16	CH7 Detected temperature value (16bit)		to	System area (Not used)		
17	CH8 Detected temperature value (16bit)		ιο	System area (Not used)		
18	CH1 Detected temperature value (L)		18			
19	(32bit) (H)		19	Error code		
20	CH2 Detected temperature value (L)		20	Setting range 1	R	
21	(32bit) (H)	R	21	Setting range 2		
22	CH3 Detected temperature value (L)		22			
23	(32bit) (H)		23			
24	CH4 Detected temperature value (L)		24			
25	(32bit) (H)		25			
26	CH5 Detected temperature value (L)		26			
27	(32bit) (H)		27			
28	CH6 Detected temperature value (L)		28			
29	(32bit) (H)		29			
30	CH7 Detected temperature value (L)		30	System area (Not used)	-	
31	(32bit) (H)		31			
32	CH8 Detected temperature value (L)		32			
33	(32bit) (H)		33			
34	Write data error code	R/W	34			
35	Conversion completion flag	R	35			
36	Specification of platinum RTD type	R/W	36			
			37			
			38	1		

	Q64RD-G	
Address	Name	Read/write
(decimal)	Numo	rtodd/Witto
39		
40		
41		
42	System area (Not used)	_
43	(Not dood)	
44		
45		
46		
47	Warning output enable/disable setting	R/W
48	Warning output flag	
49	Disconnection detection flag	
50 to 53	CH1 to CH4 Scaling value	R
54	CH1 Measured temperature (L)	
55	value (32bit) (H)	
	to	
60	CH4 Measured temperature (L)	R
61	value (32bit) (H)	, r
62	CH1 Scaling range lower limit value (L)	
63	(H)	DAA
64	CH1 Scaling range upper limit value (L)	R/W
65	(H)	
	to	
76	CH4 Scaling range upper limit (L)	
77	value (H)	
78	CH1 Scaling width lower limit value	R/W
79	CH1 Scaling width upper limit value	1
	to	1
85	CH4 Scaling width upper limit value	
86	CH1 Warning output lower lower (L)	1
87	limit value (H)	
88	CH1 Warning output lower upper (L)	1
89	limit value (H)	R/W
90	CH1 Warning output upper lower (L)	1
91	limit value (H)	
92	CH1 Warning output upper upper (L)	†
93	limit value (H)	
- 55	to	1
116	CH4 Warning output upper upper (L)	
117	limit value (H)	
118	CH1 Offset temperature setting value (L)	1
119	(H)	R/W
120	CH1 Gain temperature setting value (L)	-
120		
121	(H)	1
132	CH4 Gain temperature setting value (L)	1
133		R/W
133	(H) Extended averaging processing selection	- FX/ V V
134 135 to	Exterior averaging processing selection	
135 to	System area (Not used)	-
148	Conversion setting for disconnection detection	R/W
149	System area (Not used)	-
150	CH1 Conversion setting value for (L)	
151	disconnection detection (H)	R/W
	(1)	1

Q64RD-G						
Address (decimal)	Name	Read/write				
	to					
156	CH4 Conversion setting value for (L)					
157	disconnection detection (H)					
158	Mode switching setting					
159	Iwode switching setting					
160	3-conductor type CH1 Factory default (L)					
161	offset value (H)					
162	3-conductor type CH1 Factory default (L)					
163	gain value (H)					
164	3-conductor type CH1 User range (L)					
165	settings offset value (H)					
166	3-conductor type CH1 User range (L)					
167	settings gain value (H)					
168	3-conductor type CH1 User range (L)					
169	settings offset resistance value (H)	R/W				
170	3-conductor type CH1 User range (L)	N/W				
171	settings gain resistance value (H)					
172	4-conductor type CH1 Factory default (L)					
173	offset value (H)					
174	4-conductor type CH1 Factory default (L)					
175	gain value (H)					
176	4-conductor type CH1 User range (L)	1				
177	settings offset value (H)					
178	4-conductor type CH1 User range (L)					
179	settings gain value (H)					
180	4-conductor type CH1 User range (L)					
181	settings offset resistance value (H)					
182	4-conductor type CH1 User range (L)					
183	settings gain resistance value (H)					
	to					
254	4-conductor type CH4 User range (L)	R/W				
255	settings gain resistance value (H)	17/77				

# 5 MULTIF

# **MULTIPLEXER REPLACEMENT**

The multiplexer module is designed especially for channel extension of the analog-digital converter module A616AD.

Analog input signals (voltage/current) taken by the multiplexer module are output as analog output signals (voltage) to the A616AD.

For this reason, the I/O characteristics and the maximum resolution of the multiplexer module are adjusted to be the same as the voltage input specifications of the A616AD.

Check the set range in each channel of the existing multiplexer module to estimate the I/O characteristics and the maximum resolution.

#### 5.1 A60MX

As regarding A60MX non-isolated multiplexer module, consider replacement using multiple Q68ADV/I.

#### 5.1.1 Performance comparison

Item		A60MX						
Analog input	Voltage	-10 to 0 to +10VDC (Input resistance value: 1MΩ)						
Analog Input	Current	-20 to 0 to +20mADC (Input resistance value: 250Ω)						
Analog output	Analog output voltage -10 to 0 to +10VDC							
		Analog ir	nput range					
		Voltage (V)	Current (mA)	Analog output voltage (V)*1				
		0 to +10	0 to +20					
	0 to + 5		0 to +20					
		+ 1 to + 5	+ 4 to +20	0 to +10				
		-10 to +10	-20 to +20					
I/O abarastaria	tion	- 5 to + 5	-20 to +20					
I/O characteris	tics	0 to +10	0 to +20	0 to + 5				
		0 to + 5	0 to +20	0 10 + 5				
		+ 1 to + 5	+ 4 to +20	+ 1 to + 5				
		-10 to +10	-10 to +10 -20 to +20					
		- 5 to + 5	-20 to +20	-10 to +10				
		-10 to +10	-20 to +20	- 5 to + 5				
		- 5 to + 5	-20 to +20	- 5 10 + 5				

 $\bigcirc : Compatible, \triangle : Partial \ change \ required, \ \times : Incompatible$ 

Q68ADV				Q68ADI		Compatibility	Precautions for replacement
	-10 to 10\	/DC					
(Inpu	t resistance	value: 1MΩ)		-			The voltage/current cannot be
	-		(In	0 to 20mAD			mixed for one module.
			-	iput resistance va	lue. 250(2)	-	Analog output voltage to the A616AD
Analas		Normal reso	lution mode	High resolu	tion mode		
`	g input ige	Digital	Maximum	Digital	Maximum		When using A616AD in [-5 to
Tui	ige .	output value	resolution	output value	resolution		5V] range, Q68ADV can obtain
	0 to 10V		2.5mV	0 to 16000	0.625mV		equivalent resolution or more
	0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV		
Voltage	1 to 5V		1.0mV	0 10 12000	0.333mV		than A616AD by setting in [-1
Voltage	-10 to 10V		2.5mV	-16000 to 16000	0.625mV	Δ	to 10V] range/high resolution
	User range settings	-4000 to 4000	0.375mV	-12000 to 12000	0.333mV		mode or user range. When using A616AD in [-20 to +20mA] range, use Q68ADI in user range.
	0 to 20mA	0 to 4000	5μΑ	0 to 12000	1.66µA		
Current	4 to 20mA	0 10 4000	4µA	0 10 12000	1.33µA		
Current	User range settings	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		-

Item	A60MX					
Overall accuracy	±0.3% (Digital output value ±12)					
Absolute Voltage	±15V					
maximum input   Current	±30mA					
Analog input points	16 channels/module					
Multiplexer element	IC relay					
Isolation method	Between the input terminal and programmable controller: photocoupler isolation  Between channels: non-isolated (1MΩ resistor isolation)					
Occupied I/O points	16 points (treated as empty slots) (0 point setting is possible by I/O assignment.)					
Connected terminal	38-point terminal block					
Applicable wire size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)					
Applicable solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current consumption (5VDC)	0.65A					
Weight	0.55kg					

O: Compatible, △: Partial change required, ×: Incompatible

Q68ADV				Q68ADI			Compatibility	Precautions for replacement
Analog inp range	Ambient to 0 to With temperature drift	nal resolution memperature 55°C Without temperature drift compensation	- Ambient temperature 25±5°C	Ambient to 0 to With temperature drift	n resolution mo emperature 55°C Without temperature drift compensation	Ambient temperature 25±5°C		
Voltage 0 to -10 10 Usi ran setti 0 20r 4 Current Usi	to V 55V 55V ers ge ±0.3% (±12 digits) on nA on nA ers	±0.4% (±16 digits)	±0.1% (±4 digits)	±0.3% (±48 digits) ±0.3% (±36 digits)	±0.4% (±64 digits) ±0.4% (±48 digits)	±0.1% (±16 digits) ±0.1% (±12 digits)	0	A60MX is the accuracy in respect to the full scale, and Q68ADV/I is the accuracy in respect to maximum digital output value.
setti	-	8 cha	nnels/modu		- ±30mA		Ο Δ	Consider replacement with
								multiple Q68ADV/I.
Between the I/O terminal and programmable controller power supply:  photocoupler isolation  Between channels: non-isolated							0	
16 points (I/O assignment: intelligent 16 points)							Δ	Q68ADV/I cannot set to 0 point with I/O assignment.
18-point terminal block							×	-
0.3 to 0.75mm ²							×	Wiring change is required.
 R1.25-3 (A solderless terminal with sleeve can not be used.)						×		
0.64A				0.64A			0	
	0.19kg			(	0.19kg		0	

Analog output (voltage) to the A616AD, processing analog input values of the A60MX.

The I/O characteristics and the maximum resolution are to be the same as in the specifications of the A616AD as below.

Input	Analog input range	Maximum resolution	Digital output value
	0 to +10	2.5mV (1/4000)	
	0 to +5	1.25mV (1/4000)	0 to 4000
Voltage (V)	+1 to +5	1.0mV (1/4000)	-2000 to 2000
	-10 to +10	5.0mV (1/4000)	-2000 to 2000
	-5 to +5	2.5mV (1/4000)	
	0 to +20	10µA (1/2000)	0 to 2000
	0 to +20	10μΑ (1/2000)	-2000 to 0
	0 to +20	5μA (1/4000)	0 to 4000
Current (mA)	+4 to +20	4μA (1/4000)	-2000 to 2000
Current (IIIA)	-20 to +20	20µA (1/2000)	1000 to 3000
	-20 to +20	20μΑ (1/2000)	-1000 to 1000
	-20 to +20	10µA (1/4000)	0 to 4000
	-20 (0 +20	10μΑ (1/4000)	-2000 to 2000

# **5.2 A60MXRN**

As regarding A60MXRN non-isolated multiplexer module, consider replacement using multiple Q64AD-GH.

#### 5.2.1 Performance comparison

Ite	em		A60MXRN						
Analog input Voltage Current		-10 to 0 to +10VDC (Input resistance value: $1M\Omega$ ) -20 to 0 to +20mADC (Input resistance value: $250\Omega$ )							
		Analog inp							
		Voltage (V)	Analog output voltage (V)*1						
		0 to +10							
		0 to + 5	0 to +20						
		+ 1 to + 5	+ 4 to +20	0 to +10					
		-10 to +10	-20 to +20						
		- 5 to + 5	-20 to +20						
I/O characterist	tics	0 to +10	0 to +20	0.1 5					
		0 to + 5	0 to +20	0 to + 5					
		+ 1 to + 5	+ 4 to +20	+ 1 to + 5					
		-10 to +10	-20 to +20	404 : 42					
		- 5 to + 5	-20 to +20	-10 to +10					
		-10 to +10	-20 to +20						
		- 5 to + 5	-20 to +20	- 5 to + 5					
Absolute	Voltage		±15V						
maximum input	Current	±30mA							
Analog input po	oints	16 channels/module							
Multiplexer eler	ment	Photo MOS relay							
		Between the input terminal and programmable controller: photocoupler isolation							
Isolation metho	od	-	en channels: photo MOS relay isc						
Between chann withstand volta		400'	VDC (accuracy guarantee 400VD	OC)					
Occupied I/O p	oints		6 points (treated as empty slots) setting is possible by I/O assign						
Connected terr	ninal	(o point	38-point terminal block	,					
Applicable wire		0.75 to 2mm ²	(Applicable tightening torque: 39	) to 59N•cm)					
Applicable wife size  Applicable solderless terminal			25-3, V1.25-YS3A, V2-S3, V2-YS	,					
Internal current consumption (5VDC)		0.35A							
Weight			0.56kg						
Weight 0.56kg									

 $\bigcirc$  : Compatible,  $_{\triangle}$  : Partial change required,  $\times$  : Incompatible

			Compatibility	Precautions for replacement			
	-10 to 0 t	o +10VD	0				
	0 to 20	)mADC (I	nput resistar	nce value: 250Ω)		Δ	The minus current cannot be input.
			-	Analog output voltage to the A616AD			
Input	Analog input range	Maximu 32 bit	m resolution 16 bit		When using a range of -5 up to +5 (with A60MX), With Q64AD-GH,		
	0 to 10V 0 to 5V	156.3μV 78.2μV	312.6μV 156.4μV				equivalent or more resolution value can be obtained by setting at a
) /alta aa	1 to 5V User range settings	62.5µV	125.0µV	0 to 64000	0 to 32000		range of -10 up to 10V/high
Voltage	(Uni-polar) -10 to 10V	47.4μV 156.3μV	94.8μV 312.6μV			Δ	resolution mode, or user range. When using a range of -20 up to
	User range settings (Bi-polar)	47.4µV	94.8µV	-64000 to 64000	-32000 to 32000		+20mA (with A60MX), negative current can not be converted with
Current	0 to 20mA 4 to 20mA	312.5nA 250.0nA		0 to 64000	0 to 22000		Q64AD-GH. Use conversion devices to convert
Current	User range settings (Uni-polar)	151.6nA	303.2nA	0 10 04000	0 to 32000		into a input range.
	erence accuracy		Digital out	±0.05%  put value (32 bit) ±32  put value (16 bit) ±16  ppm/°C (0.00714%/°	6 digits	0	A60MXRN is the accuracy in respect to the full scale, and Q64AD-GH is the accuracy in respect to maximum digital output
			±15V	,			value.
			±30mA			0	
		4 0	channels/mod	dule		Δ	Consider replacement with multiple Q64AD-GH.
			-			-	
	Specific isolated area		Isolation method	Dielectric withstar			
	ween the I/O terminal mable controller power		Photocoupler isolation	voltage  1780VrmsAC/3 cyc		0	
Вє	etween analog channe	els	Transformer (Altitude 2000m) 10M $\Omega$ or more isolation				
	16 points (I/O assignment: intelligent 16 points)		Δ	Q64AD-GH cannot set to 0 point with I/O assignment.			
		18-р	oint terminal block			×	
			0.3 to 0.75mn			×	Wiring change is required.
R1.25-3 (A solderless terminal with sleeve can not be used.)						×	
			0.89A			Δ	The recalculation of internal current consumption [5VDC] is required.
			0.2kg			0	<u> </u>

*1 Analog output (voltage) to the A616AD, processing analog input values of the A60MX.

The I/O characteristics and the maximum resolution are to be the same as in the specifications of the A616AD as below.

Input	Analog input range	Maximum resolution	Digital output value	
	0 to +10	2.5mV (1/4000)	0.4- 4000	
	0 to +5	1.25mV (1/4000)		
Voltage (V)	+1 to +5	1.0mV (1/4000)	0 to 4000 -2000 to 2000	
	-10 to +10	5.0mV (1/4000)	-2000 to 2000	
	-5 to +5	2.5mV (1/4000)		

Memo

# 5.3 A60MXR

As regarding A60MXR non-isolated multiplexer module, consider replacement using multiple Q64AD-GH.

#### 5.3.1 Performance comparison

It	em	A60MXR						
Voltage Analog input		-10 to 0 to +10VDC (Input resistance value: $1M\Omega$ )						
Analog input	Commont							
Current			(Input resistance value: $250\Omega$ )					
Analog output voltage		-10 to 0 to +10VDC						
, inding output voltage		Analog ir	nput range					
		Voltage (V)	Current (mA)	Analog output voltage (V)*1				
		0 to +10	0 to +20					
		0 to + 5	0 to +20					
		+ 1 to + 5	+ 4 to +20	0 to +10				
		-10 to +10	-20 to +20					
		- 5 to + 5	-20 to +20					
I/O characteris	stics	0 to +10	0 to +20	0 to + 5				
		0 to + 5	0 to +20	0 10 + 3				
		+ 1 to + 5	+ 4 to +20	+ 1 to + 5				
		-10 to +10	-20 to +20	-10 to +10				
		- 5 to + 5	-20 to +20	-10 to 110				
		-10 to +10	-20 to +20					
		- 5 to + 5	-20 to +20	- 5 to + 5				
Overall accura		±0.3% (Digital output value ±12)						
Absolute	Voltage	±15V ±30mA 16 channels/module						
maximum inpu	it Current							
Analog input p	oints							
Multiplexer ele	ment		Mercury plunger relay					
Isolation metho	od	•	inal and programmable controller	•				
		Betweer	n channels: mercury plunger relay	isolation				
Between chandielectric withs		500VDC (accuracy guarantee 500VDC)						
Occupied I/O p	points		16 points (treated as empty slots)					
Connected terr		(0 poir	nt setting is possible by I/O assign 38-point terminal block	iment.)				
Applicable wire		0.754.0		0.45 50N(-50)				
			² (Applicable tightening torque: 39	·				
Applicable solderless terminal		V1.	.25-3, V1.25-YS3A, V2-S3, V2-YS	DOM .				
Internal current consumption (5VDC)			0.5A	0.5A				
Weight			0.6kg					
			·					

O : Compatible, △ : Partial change required, ×: Incompatible

Input   Analog input range   Maximum resolution   Digital   Output value   (16 bits)				Compatibility	Precautions for replacement			
Input Analog input range Maximum resolution output value (16 bits)  Input Analog input range Maximum resolution output value (16 bits)  0 to 10V 150.3µV 1312.6µV (16 bits)  1 to 5V 78.2µV 156.4µV 156.4µV 10 to 64000 0 to 32000  Votlage User range settings 47.4µV 94.8µV (10.000 to 64000 10.0000 to 32000 (10.0000 to 32000 to 3		-10 to 0 t	:o +10VD0	0				
Input		0 to 20	mADC (I	Δ	The minus current cannot be input.			
Input				-			-	
Input			Maximur	n resolution	Digital	Digital		With A60MXR, equivalent or more
0 to 10V   156.3µV   312.6µV   156.4µV   1 to 5V   78.2µV   1 to 5V   78.2µV   1 to 5V   78.2µV   1 to 10 to 10V   156.3µV   312.6µV   47.4µV   94.6µV   94.6µ	Input	Analog input range			output value	output value		resolution value can be obtained by setting at the analog inputs,
1 to 5V   62.5µV   125.0µV   0 to 64000   0 to 32000		0 to 10V	156.3µV	312.6µV	, ,	, ,		range of -10 up to 10V/high
User range settings		0 to 5V	78.2µV	156.4µV				resolution mode, and User range
Voltage   User range settings   47.4μV   94.8μV   -64000 to 64000   -32000 to 32000		1 to 5V	62.5µV	125.0µV	0 to 64000	0 to 32000		while the analog inputs are used at
User range settings (Bi-polar)   47.4µV 94.8µV -64000 to 64000 -32000 to 32000    User range settings (Bi-polar)   41.50 DMA    250 DMA    260	Voltage		47.4µV	94.8µV			Δ	the range of -5 up to 5V on
User range settings   47.4μV   94.8μV   -84000 to 64000   -32000 to 32000     +20mA   (with A60MXR), negation current can not be converted work Q84AD-GH.   Use conversion devices to cominto a input range.   +20mA   (Uni-polar)   151.6nA   303.2nA   0 to 64000   0 to 32000     +20mA   (with A60MXR), negation current can not be converted work Q84AD-GH.   Use conversion devices to cominto a input range.   +20mA   (Vini-polar)   +20mA   (with A60MXR), negation current can not be converted work Q84AD-GH.   Use conversion devices to cominto a input range.   +20mA   (Vini-polar)   +20mA   (Vini		-10 to 10V	156.3µV	312.6µV				
Current			47.4µV	94.8µV	-64000 to 64000	-32000 to 32000		+20mA (with A60MXR), negative
Current   User range settings   Uni-polar)   151.6nA   303.2nA   0 to 64000   0 to 32000   Use conversion devices to convinto a input range.		0 to 20mA	312.5nA	625.0nA				
User range settings (Uni-polar)   151.6nA   303.2nA   Ist lead to convict sit of conviction devices to convict sit of a input range.	Current	4 to 20mA	250.0nA	500.0nA	0 to 64000	0 to 32000		Q64AD-GH.
Reference accuracy   Digital output value (32 bit) ±32 digits   Digital output value (16 bit) ±16 digits   Temperature coefficient   ±71.4ppm/°C (0.00714%/°C)   Temperature coefficient   Temperature coefficient   ±71.4ppm/°C (0.00714%/°C)   Temperature coefficient   Temperature coeffici	Current		151.6nA	303.2nA	0 10 04000	0 10 32000		Use conversion devices to convert into a input range.
### Specific isolated area   Isolation method voltage   Specific isolated area   Isolation method voltage   Transformer isolation   Transformer isolation   (I/O assignment: intelligent 16 points   18-point terminal block   18-point terminal block   18-point terminal with sleeve can not be used.)   The recalculation of internal current consumption [5VDC] is    ###################################	·			Digital output value (32 bit) ±32 digits Digital output value (16 bit) ±16 digits			0	
A channels/module  A multiple Q64AD-GH.				-			- 0	
Specific isolated area Isolation method voltage resistance  Between the I/O terminal and programmable controller power supply isolation Between analog channels Transformer isolation  16 points (I/O assignment: intelligent 16 points)  18-point terminal block  0.3 to 0.75mm²  X Wiring change is required.  R1.25-3 (A solderless terminal with sleeve can not be used.)  Specific isolated area Isolation woltage resistance  (Altitude 2000m) 10MΩ or more  (Altitude 2000m) 10MΩ or more  A Q64AD-GH cannot set to 0 point with I/O assignment.  Wiring change is required.  The recalculation of internal current consumption [5VDC] is			4 cl	hannels/mod	ule		Δ	
Specific isolated area   method   voltage   resistance				-			-	
Programmable controller power supply   isolation   1780VrmsAC/3 cycles   500VDC,   10MΩ or more				method				
Between analog channels isolation  16 points (I/O assignment: intelligent 16 points)  18-point terminal block  0.3 to 0.75mm²  R1.25-3 (A solderless terminal with sleeve can not be used.)  The recalculation of internal current consumption [5VDC] is				•	1780VrmsAC/3 cycl	es 500VDC,	0	
(I/O assignment: intelligent 16 points)  18-point terminal block  0.3 to 0.75mm²  × Wiring change is required.  R1.25-3 (A solderless terminal with sleeve can not be used.)  The recalculation of internal current consumption [5VDC] is	В	etween analog channe	els	Transformer (Altitude 2000m) 10MΩ or m		10M $\Omega$ or more		
0.3 to 0.75mm² × Wiring change is required.  R1.25-3 (A solderless terminal with sleeve can not be used.) ×  The recalculation of internal current consumption [5VDC] is	·							Q64AD-GH cannot set to 0 point with I/O assignment.
R1.25-3 (A solderless terminal with sleeve can not be used.)  The recalculation of internal current consumption [5VDC] is				×				
The recalculation of internal current consumption [5VDC] is								Wiring change is required.
0.89A △ current consumption [5VDC] is		R1.25-3 (A so	lderless te	×				
required.				0.89A			Δ	
0.2kg				0.2kg			0	

*1 Analog output (voltage) to the A616AD, processing analog input values of the A60MX.

The I/O characteristics and the maximum resolution are to be the same as in the specifications of the A616AD as below.

Input	Analog input range	Maximum resolution	Digital output value	
	0 to +10	2.5mV (1/4000)		
	0 to +5	1.25mV (1/4000)	0.45.4000	
Voltage (V)	+1 to +5	1.0mV (1/4000)	0 to 4000 -2000 to 2000	
	-10 to +10	5.0mV (1/4000)	-2000 to 2000	
	-5 to +5	2.5mV (1/4000)		

# 6 HIGH-SPEED COUNTER MODULE REPLACEMENT

# 6.1 List of High-Speed Counter Module Alternative Models for Replacement

Production disco	ntinuation	Transition to Q series			
Product	Model	Model	Remarks (Restrictions)		
High-speed counter	AD61	QD62-H01* ¹	1) External wiring : Terminal block wiring → Connector wiring Cable size is changed.  2) Number of slots : Not changed  3) Counting speed : Not changed  4) Counting range : 24-bit unsigned binary (0 to 16777215) → 32-bit signed binary (−2147483648 to 2147483647) Review the program.  5) Program : Occupied I/O points, I/O signals and buffer memory address are changed.  6) Performance specifications change: Not changed  7) Function specifications: Not changed		
module	AD61-S1	QD62-H02*1	1) External wiring : Terminal block wiring → Connector wiring Cable size is changed.  2) Number of slots : Not changed  3) Counting speed : Not changed  4) Counting range : 24-bit unsigned binary (0 to 16777215) → 32-bit signed binary (−2147483648 to 2147483647) Review the program.  5) Program : Occupied I/O points, I/O signals and buffer memory address are changed.  6) Performance specifications change: Not changed  7) Function specifications: Not changed		

The QD62-H01 is a module dedicated for replacing the AD61 with the Q series module. The QD62-H02 is a module dedicated for replacing the AD61-S1 with the Q series module. Both of them have same input filter system with the AD61 and AD61-S1.

#### ⊠Point -

1) Action to the replaced module

Input filter system of the AD61 and AD61-S1 is the same as that of the QD62-H01 and QD62-H02. Therefore, utilizing pulse generator such as existing encoder is possible.

2) Counting range of the counter

Counting range of the AD61 and AD61-S1 differs from that of the QD62-H01 and QD62-H02. To make the counting range same as that of the module before replacement, review the program. AD61, AD61-S1: 0 to 16, 777, 215 (24-bit unsigned binary)

QD62-H01, QD62-H02: - 2,147, 483, 648 to 2, 147, 483, 647 (32-bit signed binary)

3) Wiring to the module

External wiring method of the AD61 and AD61-S1 differs from that of the QD62-H01 and QD62-H02.

AD61, AD61-S1: Wiring using a terminal block QD62-H01, QD62-H02: Wiring using a connector

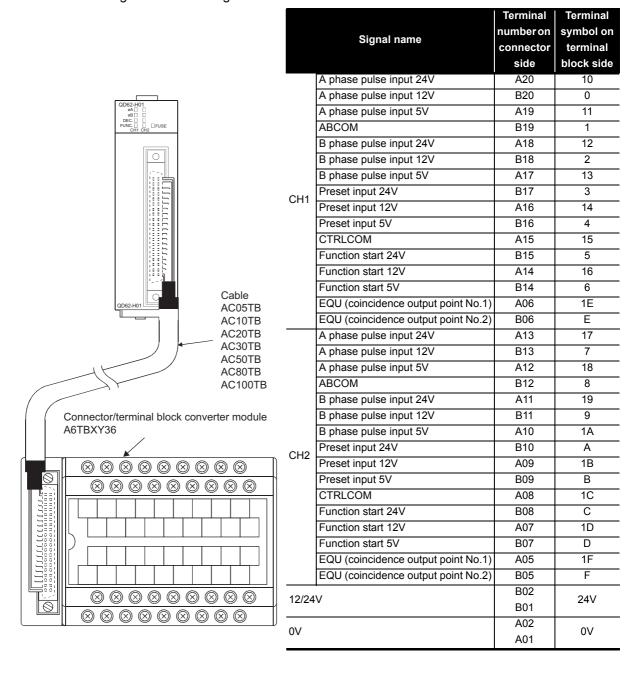
- 4) In module replacement, continuous use of the I/O signal wire with solderless terminal that has been used for the AD61 or AD61-S1 requires the change of the external wiring method as in (a) (b).
  - (a) Using the upgrade tool (a conversion adaptor) The existing wiring for AD61 and AD61-S1 can be connected directly to the Q series modules using the upgrade tool, a conversion adaptor, manufactured by Mitsubishi Electric Engineering Co., Ltd.

Product	MELSEC-A/QnA series module	MELSEC-Q series module	Conversion adaptor	
	AD61	QD62	ERNT-AQTD61	
High-speed counter module	ADOT	QD62-H01		
	AD61-S1	QD62-H02		

(b) For contact information for inquiries on the upgrade tool manufactured by Mitsubishi Electric Engineering Co., Ltd., refer to Section 2.1.

(c) Using the connector/terminal block converter module Used for replacement when the Q series large type base unit and conversion adapters manufactured by Mitsubishi Electric Engineering Co., Ltd. cannot be used due to the restrictions such as a system configuration and an installation location.

I/O cables with solderless terminal of the existing module can be continuously used without being aware of the existing wire size by rewiring the I/O cables with solderless terminal to the connector/terminal block converter module and connecting them by dedicated cables. This method, therefore, is helpful when there is not a sufficient space. The following figure shows the wiring method for using the connector/terminal block converter module.



# 6.2 AD61

# 6.2.1 Performance comparison

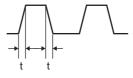
O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

				-	tial change required, ×: Incompatible	
Item		AD61		QD62-H01	Compat- ibility	Precautions for replacement
Occupied I/O	points	32 poir (I/O assignment points	: special 32	16 points (I/O assignment: intelligent 16 points)	Δ	*1
Number of ch	annels		2 cha	annels	0	
Counting spe	ed switch settings	-		50KPPS	0	Set "2" at the intelligent function module switch setting.
	Phase	,	1-phase input	, 2-phase input	0	
Count inp	Signal level (\phiA, \phiB)		5VDC 12VDC 24VDC	2 to 5mA	0	
	Counting speed (Max.)	1-phase input 2-phase input	50KPPS 50KPPS	1-phase input 50KPPS 2-phase input 50KPPS	- 0	*2
	Counting range	24-bit unsigne (0 to 16,77	-	32-bit signed binary (-2147483648 to 2147483647)	Δ	On QD62-H01, as the value is used with 32-bit signed binary values, change of sequence program is required.
	Туре	UP/DOWN	I preset count	er + ring counter function	0	
Counter  Magnitud  comparis  between  CPU and  CPU and	count pulse width (set input rise time to 5µs or less. Duty ratio: 50%)		10.4s (1,2 phas	101/2	0	
Magnitud comparis	· · · · · ·	24-bit unsigne	ed binary	32-bit signed binary	0	
between CPU and AD61/QE -H01	Comparison		Set value =	count value count value count value	0	
	Preset	12/24VDC, 5VDC, 5		5/12/24VDC, 2 to 5mA		On QD62-H01, as the external
External input	Count disable	12/24VDC, 5VDC, 5		-	Δ	input specifications differ, confirm the external devices
	Function start	-		5/12/24VDC, 2 to 5mA		specifications.
External output	Coincidence output	Transis (open collecto 12/24VDC	or) output	Transistor (sink type) output 2 points/channel 12/24VDC, 0.5A/point, 2A/common	0	
Internal curre (5VDC)	nt consumption	0.3A	1	0.3A	0	
Weight		0.5kg	9	0.11kg	0	

- *1 I/O numbers of the modules mounted to the right of the QD62-H01 change, because the number of I/O occupied points for the AD61 are different from the QD62-H01. Set the start I/O number for the module mounted to the right of the QD62-H01 to the same number for the module before the replacement in the I/O assignment tab of the Q parameter setting window. The program for the module before the replacement can be used.
- *2 The rise/fall time of a pulse affects the counting speed. Countable counting speeds are as follows. Counting a pulse greater than t = 50μs may result in a miscount.
  - For the AD61 and QD62-H01 (common for 1-phase input and 2-phase input)

Rise/fall time	Common to 1-phase input and 2-phase input
t = 5µs	50KPPS
t = 50µs	5KPPS

 $t=5\mu s: 50KPPS$  $t=50\mu s: 5KPPS$ 



# 6.2.2 Function comparison

O: With functions, -: Without functions

Item	Description	AD61	QD62-H01	Precautions for replacement
Preset function	Changes the counter present value to a specified value.	0	0	
Disable function	Terminates counting.	0	0	
Ring counter function	Repeatedly executes counting between user's setting values.	0	0	On QD62-H01, the setting is carried out using intelligent function module switch setting.
Linear counter function	If the count exceeds the range, this function detects an overflow.	-	0	
Coincidence output function	Outputs signals when user's setting and the present values are matched.	0	0	No.1 and No.2 coincidence output points can be set for each channel.
Coincidence detection interrupt function	Generates an interrupt signal to the programmable controller CPU when coincidence is detected.	-	0	
Latch counter function	Latches the present value at the time a signal is input.	-	0	
Sampling counter function	Counts the pulse that was input during the sampling time set.	-	0	
Periodic pulse counter function	The function allows storing the present value in the periodic pulse count present value and the previous value in the periodic pulse count previous value for each period time set.	-	0	

#### 6.2.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the High-Speed Counter Module User's Manual.

	AD		QD62-H01					
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	CH1 Counter value greater	Y0		X0	Module READY	Y0	CH1 Coincidence signal No.1 reset command	
X1	CH1 Counter value coincidence	Y1		X1	CH1 Counter value large (Point No.1)	Y1	CH1 Preset command	
X2	CH1 Counter value less	Y2		X2	CH1 Counter value coincidence (Point No.1)	Y2	CH1 Coincidence signal enable command	
Х3	CH1 External preset request detection	Y3		Х3	CH1 Counter value small (Point No.1)	Y3	CH1 Down count command	
X4	CH2 Counter value greater	Y4		X4	CH1 External preset request detection	Y4	CH1 Count enable command	
X5	CH2 Counter value coincidence	Y5		X5	CH1 Counter value large (Point No.2)	Y5	CH1 External preset detection reset command	
X6	CH2 Counter value less	Y6		X6	CH1 Counter value coincidence (Point No.2)	Y6	CH1 Counter function selection start command	
X7	CH2 External preset request detection	Y7	Not used	X7	CH1 Counter value small (Point No.2)	Y7	CH1 Coincidence signal No.2 reset command	
X8		Y8	Not used	X8	CH2 Counter value large (Point No.1)	Y8	CH2 Coincidence signal No.1 reset command	
X9		Y9		X9	CH2 Counter value coincidence (Point No.1)	Y9	CH2 Preset command	
XA		YA		XA	CH2 Counter value small (Point No.1)	YA	CH2 Coincidence signal enable command	
ХВ		YB		ХВ	CH2 External preset request detection	YB	CH2 Down count command	
XC		YC		XC	CH2 Counter value large (Point No.2)	YC	CH2 Count enable command	
XD		YD		XD	CH2 Counter value coincidence (Point No.2)	YD	CH2 External preset detection reset command	
XE		YE		XE	CH2 Counter value small (Point No.2)	YE	CH2 Counter function selection start command	
XF		YF		XF	Fuse broken detection flag	YF	CH2 Coincidence signal No.2 reset command	
X10		Y10	CH1 Coincidence signal reset command					
X11		Y11	CH1 Preset command					
X12	Not used	Y12	CH1 Coincidence signal output enable command					
X13		Y13	CH1 Down count command					
X14		Y14	CH1 Count enable					
X15		Y15	CH1 Present value read request					
X16		Y16	CH1 External preset detection reset command					
X17		Y17	CH2 Coincidence signal reset command					
X18		Y18	CH2 Preset command					
X19		Y19	CH2 Coincidence signal output enable command					
X1A		Y1A	CH2 Down count command					
X1B	1	Y1B	CH2 Count enable					
X1C		Y1C	CH2 Present value read request					
X1D		Y1D	CH2 External preset detection reset command					
X1E X1F		Y1E Y1F	Not used					

#### 6.2.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs.

For details of the buffer memory or sequence program, refer to the High-Speed Counter Module User's Manual.

		AD61			QD62-H01					
Add	ress			Add	ress					
(De	ec.)	Name	Read/write	(D	ec.)	Name		Read/write		
CH1	CH2			CH1	CH2					
1	33	Preset value write (Lower and middle)	W	0	32	Preset value setting	(L)	R/W		
(2)	(34)	Preset value write (Upper)	VV	1	33	Treset value setting	(H)	10,44		
3	35	Mode register	R/W	2	34	Present value	(L)	R		
4	36	Present value read (Lower and middle)	R	3	35	Tresent value	(H)	1		
(5)	(37)	Present value read (Upper)		4	36	Coincidence output point set No.1	(L)			
6	38	Set value read/write (Lower and middle)	R/W	5	37	Compacine Surpar point Set 140.1	(H)	R/W		
(7)	•	Set value read/write (Upper)		6	38	Coincidence output point set No.2	(L)			
		arentheses in the above table indicates the	upper 8 bits	7	39		(H)			
of 24-l	bit data			8	40	Overflow detection flag		R		
				9	41	Counter function selection setting		R/W		
				10	42	Sampling/periodic setting				
				11	43	Sampling/periodic counter flag				
				12	44	Latch count value	(L)			
				13	45		(H)			
				14	46	Sampling count value	(L)	_		
				15	47	1 0	(H)	R		
				16	48	Periodic pulse count previous value	(L)	<u> </u>		
				17	49		(H)	1		
				18	50	Periodic pulse count present value	(L)	1		
				19	51		(H)			
				20	52	Ring counter minimum value	(L)	-		
				21	53		(H)	R/W		
				22	54	Ring counter maximum value	(L)	-		
				23	55		(H)			
				24	56	System area (Not used)				
				to	to	System area (Not used)	-	_		
				31	63		1	1		

# 6.3 AD61S1

# 6.3.1 Performance comparison

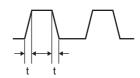
O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

ltem			AD6	1S1	QD62	-H02	Compat- ibility	Precautions for replacement
Occ	cupied I/O poir	nts	32 points 16 points (I/O assignment: special 32 points) 16 points (I/O assignment: intelligent 16 points)				Δ	*1
Nur	nber of chann	els		2 cha	0			
	inting speed s ings	witch	-		10KF	PPS	0	Set "2" at the intelligent function module switch setting.
		Phase		1-phase input	, 2-phase input		0	
	Count input signal	Signal level (φA, φB)		5VDC 12VDC 24VDC	2 to 5mA		0	
		Counting	1-phase input	10KPPS	1-phase input	10KPPS		
		speed (Max.)	2-phase input	7KPPS	2-phase input	7KPPS	0	*2
		Counting range	24-bit unsig (0 to 16,7	-	32-bit sign (-2147483648 to	-	Δ	On QD62-H02, as the value is used with 32-bit signed binary values, change of sequence program is required.
S	Counter	Туре	UP/DOW	/N preset count	er + ring counter	0		
Performance specifications of 1 channels		Minimum count pulse width (set input rise time to 5µs or less. Duty ratio: 50%)	17	100 µs 50 µs phase input)	142 Us  71 Us  71 Us  (2-phase input)		0	
mance	Magnitude comparison	Comparison range	24-bit unsig	ned binary	32-bit sign	ed binary	0	
Perfor	between CPU and AD61/QD62 -H02	Comparison result		Set value =	count value count value count value		0	
		Preset	12/24VD0 5VDC,		5/12/24VDC	C, 2 to 5mA		On QD62-H02, as the external
	External input	Count disable	12/24VD0 5VDC,	,	-		Δ	input specifications differ, confirm the external devices
		Function start	-		5/12/24VDC	C, 2 to 5mA		specifications.
	External output Coincidence output Transistor (open collector) output 12/24VDC, 0.5A  Transistor (sink type) out points/channel 12/24VDC, 0.5A/poin 2A/common				hannel 0.5A/point,	0		
	rnal current co	onsumption	0.3	BA	0.3	BA	0	
We	ght		0.5	kg	0.11	1kg	0	



- *1 I/O numbers of the modules mounted to the right of the QD62-H02 change, because the number of I/O occupied points for the AD61S1 are different from the QD62-H02. Set the start I/O number for the module mounted to the right of the QD62-H02 to the same number for the module before the replacement in the I/O assignment tab of the Q parameter setting window. The program for the module before the replacement can be used.
- *2 The rise/fall time of a pulse affects the counting speed. Countable counting speeds are as follows. Counting a pulse whose rise/fall time is long may result in a miscount.
  - For the AD61S1 and QD62-H02

Rise/fall time	1-phase input	2-phase input
t = 5µs	10KPPS	7KPPS
t = 500µs	500PPS	250PPS



# 6.3.2 Function comparison

O: With functions, -: Without functions

Item	Description	AD61S1	QD62-H02	Precautions for replacement
Preset function	Changes the counter present value to a specified value.	0	0	
Disable function	Terminates counting.	0	0	
Ring counter function	Repeatedly executes counting between user's setting values.	0	0	On QD62-H02, the setting is carried out using intelligent function module switch setting.
Linear counter function	If the count exceeds the range, this function detects an overflow.	-	0	
Coincidence output function	Outputs signals when user and the present values are matched.	0	0	No.1 and No.2 coincidence output points can be set for each channel.
Coincidence detection interrupt function	Generates an interrupt signal to the programmable controller CPU when coincidence is detected.	-	0	
Latch counter function	Latches the present value at the time a signal is input.	-	0	
Sampling counter function	Counts the pulses that are input during the sampling time set.	ı	0	
Periodic pulse counter function	The function allows storing the present value in the periodic pulse count present value and the previous value in the periodic pulse count previous value for each period time set.	-	0	



#### 6.3.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the High-Speed Counter Module User's Manual.

				,			
	AD6				QD62	2-H02	
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	CH1 Counter value greater	Y0		X0	Module READY	Y0	CH1 Coincidence signal No.1 reset command
X1	CH1 Counter value coincidence	Y1		X1	CH1 Counter value large (Point No.1)	Y1	CH1 Preset command
X2	CH1 Counter value less	Y2		X2	CH1 Counter value coincidence (Point No.1)	Y2	CH1 Coincidence signal enable command
Х3	CH1 External preset request detection	Y3		Х3	CH1 Counter value small (Point No.1)	Y3	CH1 Down count command
X4	CH2 Counter value greater	Y4		X4	CH1 External preset request detection	Y4	CH1 Count enable command
X5	CH2 Counter value coincidence	Y5		X5	CH1 Counter value large (Point No.2)	Y5	CH1 External preset detection reset command
X6	CH2 Counter value less	Y6		X6	CH1 Counter value coincidence (Point No.2)	Y6	CH1 Counter function selection start command
X7	CH2 External preset request detection	Y7		X7	CH1 Counter value small (Point No.2)	Y7	CH1 Coincidence signal No.2 reset command
X8	40.000.00.1	Y8	Not used	X8	CH2 Counter value large (Point No.1)	Y8	CH2 Coincidence signal No.1 reset command
X9		Y9		X9	CH2 Counter value coincidence (Point No.1)	Y9	CH2 Preset command
XA		YA		XA	CH2 Counter value small (Point No.1)	YA	CH2 Coincidence signal enable command
ХВ		YB		ХВ	CH2 External preset request detection	YB	CH2 Down count command
XC		YC		XC	CH2 Counter value large (Point No.2)	YC	CH2 Count enable command
XD		YD		XD	CH2 Counter value coincidence (Point No.2)	YD	CH2 External preset detection reset command
XE		YE		XE	CH2 Counter value small (Point No.2)	YE	CH2 Counter function selection start command
XF		YF		XF	Fuse broken detection flag	YF	CH2 Coincidence signal No.2 reset command
X10		Y10	CH1 Coincidence signal reset command				
X11		Y11	CH1 Preset command				
X12	Not used	Y12	CH1 Coincidence signal output enable command				
X13		Y13	CH1 Down count command	1			
X14		Y14	CH1 Count enable				
X15		Y15	CH1 Present value read request				
X16		Y16	CH1 External preset detection reset command				
X17		Y17	CH2 Coincidence signal reset command				
X18		Y18	CH2 Preset command	1			
X19		Y19	CH2 Coincidence signal output enable command				
X1A		Y1A	CH2 Down count command				
X1B	1	Y1B	CH2 Count enable	1			
X1C		Y1C	CH2 Present value read request				
X1D		Y1D	CH2 External preset	1			
			detection reset command				
X1E	-	Y1E	Not used				
X1F	1	Y1F					

#### 6.3.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory or sequence program, refer to the High-Speed Counter Module User's Manual.

		AD61S1		QD62-H02					
Add	ress			Add	ress				
(De	ec.)	Name	Read/write	(De	ec.)	Name		Read/write	
CH1	CH2			CH1	CH2				
1	33	Preset value write (Lower and middle)	w	0	32	Preset value setting	(L)	R/W	
(2)	(34)	Preset value write (Upper)	VV	1	33	Treset value setting	(H)	17/1/	
3	35	Mode register	R/W	2	34	Present value	(L)	R	
4	36	Present value read (Lower and middle)	R	3	35	Tresent value	(H)	1	
(5)	(37)	Present value read (Upper)	11	4	36	Coincidence output point set No.1	(L)		
6	38	Set value read/write (Lower and middle)	R/W	5	37	Compactive output point set 140.1	(H)	R/W	
(7)	(39)	Set value read/write (Upper)	1000	6	38	Coincidence output point set No.2	(L)	1000	
Addre	ss in pa	arentheses in the above table indicates the	upper 8 bits	7	39	Compacine output point set 140.2	(H)		
of 24-l	oit data			8	40	Overflow detection flag		R	
				9	41	Counter function selection setting		R/W	
				10	42	Sampling/periodic setting			
				11	43	Sampling/periodic counter flag			
				12	44	Latch count value	(L)		
				13	45	24.6.1. 354.11. 14.45	(H)		
				14	46	Sampling count value	(L)		
				15	47	, ,	(H)	R	
				16	48	Periodic pulse count previous	(L)		
				17	49	value	(H)		
				18	50	Periodic pulse count present value	(L)		
				19	51		(H)		
				20	52	Ring counter minimum value	(L)		
				21	53	3	(H)	R/W	
				22	54	Ring counter maximum value	(L)		
				23	55		(H)		
				24	56				
				to	to	System area (Not used)		-	
				31	63				

# **POSITIONING MODULE REPLACEMENT**

# 7.1 List of Positioning Module Alternative Models for Replacement

	uction		Transition to Q series
Product	Model	Model	Remarks (Restrictions)
	AD70	QD73A1	Not changed *3 (An external power supply (±15VDC) is not required. The connector installation direction is reverse.)     Number of slots : Changed (1 slot → 2 slots)     Buffer memory assignment and change of the setting method     Performance specifications change: Upward-compatibility     Function specifications:  Partly changed (LED indication and function setting method)
	AD70D	None	Mount AD70D to the QA6□B-type extension base unit.
	7.0700		Otherwise, replacing with the QD75M system is recommended.
	AD72	None	Replacing with two QD73A1 modules or QD75 system is recommended.
	AD75M1	QD75M1	Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.  4) Performance specifications change: Upward-compatibility  5) Function specifications: Partly changed
Positioning module*2	AD75M2	QD75M2	External wiring : Connector and manual pulsar wiring are changed.     Number of slots : Not changed
	AD75M3	QD75M4	Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.  4) Performance specifications change: Upward-compatibility     Function specifications: Partly changed
	AD75P1-S3	QD75P1N*1 (when an open collector is connected)  QD75D1N*1 (when a differential driver is connected)	External wiring : Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.  4) Performance specifications change: Not changed.  5) Function specifications: Partly changed
	AD75P2-S3	QD75P2N*1 (when an open collector is connected)  QD75D2N*1 (when a differential driver is connected)	External wiring : Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.  4) Performance specifications change: Not changed.  5) Function specifications: Partly changed

	uction inuation		Transition to Q series
Positioning		QD75P4N*1 (when an open collector is connected)	2) Number of slots : Not changed
module*2	AD75P3-S3	5P3-53 QD75D4N ⁻¹ (when a	<ul> <li>3) Program : I/O signals, XY assignment, buffer memory assignment and different functions are changed.</li> <li>4) Performance specifications change: Not changed.</li> </ul>
		connected)	5) Function specifications: Partly changed

- The QD75P\(\text{DN}\) and QD75D\(\text{DN}\) are the upward-compatibility for the QD75P\(\text{D}\) and QD75D\(\text{D}\) and their programs are the same when they are replaced.
  - Change the sequence program as necessary with checking the processing timing, because performances such as the starting time and data update cycle are improved.
- *2 Production of AD71 (S1/S2/S7) has been discontinued since the end of October 2004.
  - For details, refer to Technical Bulletin No.T12-0015.
  - When replacing the existing AD71 (S1/S2/S7) with "QD75P/QD75D", refer to Technical Bulletin "FA-A-0060-A: Procedures for Replacing Positioning Module AD71 with QD75".
- *3 When the AD70 being used in the setting that the negative voltage is output when the positioning address increases is replaced with the QD73A1, the wiring change between the AD70 and an encoder is required. For details, refer to Section 7.6.6.

#### 7.2 AD70D

No Q series alternative model is available. Consider mounting the existing module on the QA6□B extension base unit or shifting to the QD75M system.

#### 7.3 AD72

No Q series alternative model is available.

Consider mounting the existing module on the QA6 B extension base unit, replacing with two QD73A1 modules, or shifting to the QD75 system.

Note that with two QD73A1 modules after the replacement, the interpolation function cannot be performed.

# 7.4 AD75P1-S3/P2-S3/P3-S3

#### 7.4.1 Performance comparison

O : Compatible, △ : Partial change required, ×: Incompatible

Item	Model		AD75P2-S3	AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement
No. of contro	l axes	1	2	3	1	2	4	0	
No. of positio items	ning data		600/axis ^{*1}			600/axis		0	
Position control interpolation	2-axis linear interpolation	×	0	0	×	0	(3-/4-axis linear interpolation : available)	0	
functions	2-axis circular interpolation	×	0	0	×	0	0		
	Position control		0			0			
Positioning	Speed control		0			0			
system	Speed- position switching control		0		0			0	

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

Model	AD75P1-S3 AD75P2-S3 AD75P3-S3	QD75P1N	QD75P2N	QD75P4N	Compat-	Precautions for
Item		QD75D1N	QD75D2N	QD75D4N	ibility	replacement
		<absolute sy<="" td=""><td>stem&gt;</td><td></td><td></td><td></td></absolute>	stem>			
		-214748364.8	to 214748364.7	7 (µm)		
	<absolute system=""> -214748364.8 to 214748364.7 (μm)</absolute>	-21474.8364	8 to 21474.83	647 (inch)		
	/-13421772.8 to 13421772.7 (μm) -21474.83648 to 21474.83647 (inch)	0 to 359.999	99 (degree)			
	/-1342.17728 to 1342.17727 (inch) 0 to 359.99999 (degree)	-2147483648	to 21474836	47 (pulse)		
	/0 to 359.99999 (degree) -2147483648 to 2147483647 (pulse) /-134217728 to 134217727 (pulse)	<incremental< p=""> -214748364.8</incremental<>	system> to 214748364.7	⁷ (µm)		
Positioning range*2	<ul><li><li><li><li><li>-214748364.8 to 214748364.7 (μm)</li></li></li></li></li></ul>	-21474.8364	8 to 21474.83	647 (inch)		
	/-13421772.8 to 13421772.7 (μm) -21474.83648 to 21474.83647 (inch)	-21474.8364	8 to 21474.83	647 (degree)		
	/-1342.17728 to 1342.17727 (inch) -21474.83648 to 21474.83647 (degree)	-2147483648	s to 21474836	0		
	/-1342.17728 to 1342.17727 (degree) -2147483648 to 2147483647 (pulse)) /-134217728 to 134217727 (pulse)		osition switchir	•		
	<pre><in control="" speed-position="" switching=""> 0 to 214748364.7 (µm)</in></pre>	0 to 21474836	4.7 (µm)			
	/0 to 13421772.7 (µm) 0 to 21474.83647 (inch)	0 to 21474.83	3647 (inch)			
	/0 to 1342.17727 (inch) 0 to 21474.83647 (degree)	0 to 21474.83	3647 (degree)			
	/0 to 1342.17727 (degree) 0 to 2147483647 (pulse)	0 to 2147483	647 (pulse)			
	/0 to 134217727 (pulse)	<in speed-po<="" td=""><td>sition switchir</td><td>ng control</td><td></td><td></td></in>	sition switchir	ng control		
		0 to 359.999				
	0.01 to 6000000.00 (mm/min)	0.01 to 20000	0000.00 (mm/	min)		
	/0.01 to 375000.00 (mm/min)					
	0.001 to 600000.000 (inch/min)	0.001 to 2000	0000.000 (incl	n/min)		
Speed command range *2	/0.001 to 37500.000 (inch/min)	0 004 1- 000	2000 000 (-1	(i)	0	
-	0.001 to 600000.000 (degree/min) /0.001 to 37500.000 (degree/min)	0.001 to 2000	0000.000 (deg	jree/min)		
	1 to 1000000 (pulse/s)	1 to 1000000	(pulse/s)			
	/1 to 62500 (pulse/s)	1 to 1000000 (pulse/s)				
Machine OPR function (OPR method)	O(6 OPR methods)	0(	6 OPR metho	ds)	0	
JOG operation	0		0		0	

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

Item	Model	AD75P1-S3 AD75P2-S3 AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat-	Precautions for replacement
Manual pulse generator function		1 generator/axis	1 generator/module		Δ	On QD75P□N/QD75D□N, the manual pulse generator cannot be used by each axis independent. When connecting the manual pulse generator for each axis is required, use one axis module.     The manual pulse generator itself can use the same one.     The operation for inputting one pulse differs. Set the parameter so that movement amount may be same.	
Starting time		20ms	1.5 to 2.0ms (when other axes are starting: 1.5 to 2.0ms + 0.1ms to 0.5ms)		0	The starting time becomes fast. Check the processing timing.	
/deceleration	Automatic trapezoidal acceleration/ deceleration	0		0		0	
processing	S-pattern acceleration/ deceleration	0	0				
Acceleration /deceleration time	No. of patterns Setting range	Acceleration time and deceleration time can be set independently.  (4 patterns each)  Changeover between 1 to 65535ms/1 to 8388608ms possible	can be	time and dece e set independ patterns eac to 8388608m	dently. h)	0	
	Sudden stop deceleration	Changeover between 1 to 65535ms/1 to 8388608ms possible	1	to 8388608m	s	0	
Compensation		Electronic gears, backlash compensation, near pass*3		onic gears, ba nsation, near		Δ	Refer to *3.
Error display		17-segment LED		Error LED		×	For details of diagnostic, use GX Developer.
History data s error, warning	storage (Start, g)	Provided (4 types, 16 items/module)	(3 type	Provided es, 16 items/m	odule)	0	The start history during error is integrated into the start history.
Data storage	destination	Flash ROM (battery-less backup)	(bat	Flash ROM tery-less back	cup)	0	

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

		i e	O . 00m	patible, $\triangle$ . I are	iai change it	equired, ×: Incompatible
Model	AD75P1-S3 AD75P2-S3 AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement
item	10136-3000VE (Soldering type, supplied)	A6CON1 (Soldering type, straight-out type, sold separately) A6CON2 (Crimping type, straight-out type, sold separately) A6CON4 (Soldering type, straight-out/diagonal-out type, sold separately)			-	As the connectors
Connection connector	10136-6000EL (Crimping type, sold separately)				10136-6000EL sold separately)  mping type, sold separately)  Sold separately)  A6CON4  (Soldering type, straight-out/diagonal-	
Applicable wire size	10136-3000VE: 24 to 30 AWG (approx. 0.05 to 0.2 mm ² ) 10136-6000EL:	A6CON1, A6CON4: 0.3mm ² A6CON2: 24 AWG			0	QD75D⊡N are sold separately.
Command pulse output system	28 AWG (approx. 0.08 mm ² )  Differential driver/Open collector	QD75P□N: Open collector QD75D□N: Differential driver			Δ	The differential driver and the open collector are separate module. In initial condition, AD75P□-S3 outputs with positive logic, and QD75P□N/QD75D□N outputs with negative logic.
Max. output pulse	When connected to open collector: 200kpps When connected to differential driver: 400kpps	When connected to open collector: 200kpps When connected to differential driver: 4Mpps			0	
Max. connection distance between servos	When connected to open collector: 2m When connected to differential driver: 10m	When connected to open collector: 2m When connected to differential driver: 10m			0	
Internal current consumption (A) (5VDC)	0.7A or less	QD75P1N:         QD75P2N:         QD75P4N:           0.29A         0.30A         0.36A           QD75D1N:         QD75D2N:         QD75D4N:           0.43A         0.45A         0.66A		- 0		
Flash ROM write count	Max. 100,000 times	Max. 100,000 times			0	When QD75P□N/ QD75D□N carries out the flash write 26 times from the sequence program, an error occurs. The error reset enables to perform the flash write.
Occupied I/O points	32 points (I/O assignment: special 32 points)	32 points (I/O assignment: intelligent 32 points)			0	
No. of module occupied slots	1		1		0	
Weight	0.35kg	QD75P1N: QD75P2N: QD75P4N: 0.14kg			0	

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

	Model			O . Compatible,△ . Farti						
Item	Moder	AD75P1-S3 AD75P2-S3 AD75	5P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement		
I/O signal for external	STRT signal	O(External start signal)		× (integrated into CHG)			Δ	When using both the speed-position switching control and the external start, input the external start signal to the interrupt module, and start using the direct output.		
devices	CHG signal	Speed-position switching signal Speed-position switching signal start or speed-position switching selectable with parameters)				start or speed-position switching				
	in-Position (INP)	O(for monitor)		×			Δ	No INP signal. When it is required for monitor, monitor using the input module.		
	Signal logic switching	Command pulse output signal	l only	0		0	The default logic of pulse output differs.			
Peripheral	Connection with peripheral devices	Direct connection		Connection via programmable controller CPU, Q corresponding seri communication module, Q corresponding MELSECNET/H remo		onding serial dule, Q	0	The connecting shape differs.		
devices (data setting, etc.)	AD75TU	0			×		×		×	AD75TU cannot be used. Use GX Configurator-QP.
	GX Configurator	GX Configurator-AP		GX Configurator-QP		Δ	Available GX Configurator differs.			

^{*1} With AD75P□-S3, Nos.1 to 100 data items/axis of positioning data can be set using the buffer memory and Nos.1 to 600 data/axis can be set with QD75P□N/QD75D□N.

The positioning data in the buffer memory is not backed up.

^{*2} Indicates the standard mode/stepping motor mode about AD75P□-S3.

^{*3} The near pass function is valid only during the continuous path control. (AD75P□-S3: Selected with parameters, QD75P□N/QD75D□N: Standard function)

QD75P\(\text{D}N\)/QD75D\(\text{D}N\) does not have address pass mode. When being asked for passing the positioning address, continue with continuous running. (However, it will stop once.)

#### 7.4.2 Function comparison

#### (1) Deleted function from AD75P1-S3/P2-S3/P3-S3

When using the following function on AD75P□-S3, change the program.

Deleted functions	Precautions for replacement			
Stepping motor mode	The setting is not required when using stepping motor due to it's performance gain.			
Fast machine OPR	With the QD75P\(\text{DN/QD75D}\(\text{DN}\), there is no possible function for replacement.			
Special start (stop)	Execute it separately for the start two times.			
	In the QD75P\(\text{DN/QD75D}\(\text{DN}\), the start block area on the buffer memory is expanded to five blocks (0			
Indirect designation	to 4).			
	Each start block can be directly designated with positioning start No. (7000 to 7004).			
Block transfer	With the AD75P□-S3, this interface is used to set positioning data Nos. 101 to 600 that do not exist			
	on the buffer memory.			
Positioning data I/F	Since all positioning data can be set in the buffer memory with the QD75P□N/QD75D□N, this			
	function is deleted.			
Ctart history during arrors	The contents are the same as the start history.			
Start history during errors	Therefore, the QD75P□N/QD75D□N stores only the start history.			
Cystom monitor data	These data were deleted because they can be displayed in system monitor "Module's detailed			
System monitor data  (Madula name, OS type, OS yarajan)	information" of GX Developer.			
(Module name, OS type, OS version)	(Refer to GX Developer Operating Manual.)			

#### (2) Changed function from AD75P1-S3/P2-S3/P3-S3

In case of using the following functions with AD75P $\square$ -S3, make sure that there is no operation problems when converted to QD75P $\square$ N/QD75D $\square$ N.

Changed functions		Change description					
	The limit check of arc address is carried out only when a sub point is designated.						
	It is not carried out when a center	•	<b>3</b>				
	The software stroke limit check during speed control is carried out in the following cases:						
		pplied to the current feed value with					
	updated with Pr.21						
	When the software stroke limit is a	pplied to the machine feed value					
Software stroke limit	3. If an attempt is made to change t	he current value but the designated a ered as an error and the current value					
function	4. Error code change	ered as an error and the current value	e is not changed.				
	AD75P□-S3:						
	There are 3 types of errors for ea	ich unner and lower stroke limit					
	(error code 509 to 512)	on apper and lower stroke limit.					
	QD75P\(\text{DN/QD75D\(\text{DN}\)}\)						
		per limit are integrated in to error cod	e 507				
	Errors for the lower limit are integ						
	Error codes 509 to 512 are delete						
Current value changing M	An error occurs when the designation		oftware stroke limit range.				
code function	2. The M code setting value is valid						
	An error occurs when the command frequency value calculated from the speed limit value exceeds the						
Acceleration/deceleration	maximum command frequency of the positioning module being used.						
speed control	2. Only two-word type (1 to 838860	8ms) can be used as the setting valu	e for the acceleration/deceleration				
	time.						
	1. "Peripheral side (emergency) sto	p" is deleted from the stop causes of	Stop group 2 "sudden stop				
	selection".						
Stop process and restart	"Test mode fault" in the stop caus	ses of Stop group 3 "sudden stop sele	ection" is changed to be in the stop				
after stop positioning	causes of Stop group 2 "sudden s	stop selection".					
operation stop	2. "Stop (QD75 peripheral)" is adde		"sudden stop selection".				
operation otop	3. Error code 100 (Peripheral device						
	=	rror occurrence" is added to the stop	causes of Stop group 2 Sudden stop				
	selection.						
		AD75P□-S3	QD75P□N/QD75D□N				
READY signal (X0)	OFF	Normal (READY)	Not READY/WDT error				
Manual nules generates	ON	Not READY/WDT error	Normal (READY)				
Manual pulse generator operation	The No. of connectable manual pulse	e generator is changed from 1genera	ator/1axis to 1generator/1 module.				
Axis operation status	"Step stopped" is changed to "Stoppe	ed" and "Step error occurring" is char	nged to "Error occurring".				
	• AD75P□-S3:						
	If the reference axis operates in re	verse direction, the control is interna	lly changed into the continuous				
	positioning control. (restart after deceleration stop)						
Continuous path control	• QD75P□N/QD75D□N:						
	Even if the reference axis operates in reverse direction with interpolation, the control remains as the						
	continuous path control.						
		ation is the same as that of the AD75	P∐-S3.)				
Near pass	For the continuous path control, only Positioning address pass is not cond						
2-axis interpolation	5 11 111 p 111 10 111 10 111						
2-axis linear interpolation							
2-axis fixed-feed	The interpolation target axis can be r	andomly set with a positioning identi	tier.				
<ul> <li>Circular interpolation</li> </ul>							
	•						

Changed functions	Change description						
	1. "Step stopped" is changed to "Stopped" and "Step error occurring" is changed to "Error occurring" in the						
Stan function	axis operations status parameter	S.					
Step function	2. The restart command for step sta	art information (02H) is deleted.					
	3. The step operation is restarted w	rith the restart command.					
Command in-position  The command in-position width is expanded.							
function	• AD75P□-S3: 1 to 32767000						
TUTICUOTI	• QD75P□N/QD75D□N: 1 to 2147483647						
Positioning start No.	7004 to 7010 (block start designation) and 8000 to 8049 (indirect designation) are deleted.						
block start data	With QD75P□N/QD75D□N, number of blocks has been change to 5 (7000 to 7004).						
DIOCK Start data	(With the AD75P□-S3, this data is called "Positioning start information".)						
Start history	The configuration of "start informatio	n" and "start No." is changed so that t	the start No. can be directly checked.				
Basic parameter1	When the programmable controller is	s turned ON or the programmable co	ntroller CPU module is reset, the				
"Pr.5 Pulse output mode"	valid value is only the first value afte	r the programmable controller READ	Y signal (Y0) turns from OFF to ON.				
		AD75P□-S3	QD75P□N/QD75D□N				
Detailed parameters	0	Software stroke limits invalid for	Software stroke limits valid for				
"Pr.15 Software stroke limit	(Factory setting)	manual operation	manual operation				
valid/invalid setting"	1	Software stroke limits valid for	Software stroke limits invalid for				
	I	manual operation	manual operation				

#### 7.4.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Type QD75P/QD75D Positioning Module User's Manual.

In	out (X)		Output (Y)				
Signal name	AD75P□-S3	QD75P□N/ QD75D□N	Signal name	AD75P□-S3	QD75P□N/ QD75D□N		
(QD75/AD75) READY	X00*	X00*	Axis 1 Positioning start	Y10	Y10		
Axis 1 Start complete	X01	X10	Axis 2 Positioning start	Y11	Y11		
Axis 2 Start complete	X02	X11	Axis 3 Positioning start	Y12	Y12		
Axis 3 Start complete	X03	X12	Axis 4 Positioning start	-	Y13		
Axis 4 Start complete	-	X13	Axis 1 Stop	Y13	Y04		
Axis 1 BUSY	X04	X0C	Axis 2 Stop	Y14	Y05		
Axis 2 BUSY	X05	X0D	Axis 3 Stop	Y1C	Y06		
Axis 3 BUSY	X06	X0E	Axis 4 Stop	-	Y07		
Axis 4 BUSY	-	X0F	Axis 1 Forward run JOG start	Y16	Y08		
Axis 1 Positioning complete	X07	X14	Axis 1 Reverse run JOG start	Y17	Y09		
Axis 2 Positioning complete	X08	X15	Axis 2 Forward run JOG start	Y18	Y0A		
Axis 3 Positioning complete	X09	X16	Axis 2 Reverse run JOG start	Y19	Y0B		
Axis 4 Positioning complete	-	X17	Axis 3 Forward run JOG start	Y1A	Y0C		
Axis 1 Error detection	X0A	X08	Axis 3 Reverse run JOG start	Y1B	Y0D		
Axis 2 Error detection	X0B	X09	Axis 4 Forward run JOG start	-	Y0E		
Axis 3 Error detection	X0C	X0A	Axis 4 Reverse run JOG start	-	Y0F		
Axis 4 Error detection	-	X0B	Programmable controller READY	Y1D	Y00		
Axis 1 M code ON	X0D	X04	Axis 1 Execution prohibition flag	-	Y14		
Axis 2 M code ON	X0E	X05	Axis 2 Execution prohibition flag	-	Y15		
Axis 3 M code ON	X0F	X06	Axis 3 Execution prohibition flag	-	Y16		
Axis 4 M code ON	-	X07	Axis 4 Execution prohibition flag	-	Y17		
Synchronization flag	-	X01		Y00 to Y0F	Y01 to Y03		
Not used	X10 to X1F	X02, X03 X18 to X1F	Not used	Y1E to Y1F	Y18 to Y1F		

^{*} The ON/OFF statuses for READY are different between the QD75P□N/QD75D□N and AD75P□-S3.

	Not READY/WDT error	READY
QD75P□N/	OFF	ON
QD75D□N	OFF	ON
AD75P□-S3	ON	OFF

#### 7.4.4 Buffer memory address comparison

For details of the buffer memory or sequence program, refer to the Type QD75P/QD75D Positioning Module User's Manual.

area shows the differences between AD75P□-S3 and QD75P□N/QD75D□N.

Pr.1 Unit setting         0         150         300         0         150         300           Pr.2 1 No. of pulses per rotation (Ap)         1         151         301         1         151         301           Pr.3 1 Movement amount per rotation (Al)         2         152         302         2         152         302           Pr.4 Unit magnification (Am)         3         153         303         3         153         303           Pr.5 Pulse output mode         4         154         304         4         154         304           Pr.6 Rotation direction setting         5         155         305         5         155         305           Pr.7 Speed limit value         6         156         306         10         160         310           Pr.8 Acceleration time 0         8         158         308         12         162         312           Pr.9 Deceleration time 0         10         160         310         14         164         314           Pr.9 Deceleration time 0         11         161         311         15         165         315           Pr.10 Bias speed at start         12         162         312         6         156         306		Buffer memory address							
Pr.1 Unit setting         0         150         300         0         150         300           Pr.2 1 No. of pulses per rotation (Ap)         1         151         301         1         151         301           Pr.3 1 Movement amount per rotation (Al)         2         152         302         2         152         302           Pr.4 Unit magnification (Am)         3         153         303         3         153         303           Pr.5 Pulse output mode         4         154         304         4         154         304           Pr.6 Rotation direction setting         5         155         305         5         155         305           Pr.7 Speed limit value         6         156         306         10         160         310           Pr.8 Acceleration time 0         8         158         308         12         162         312           Pr.9 Deceleration time 0         10         160         310         14         164         314           Pr.9 Deceleration time 0         11         161         311         15         165         315           Pr.10 Bias speed at start         12         162         312         6         156         306	Item of AD75P□-S3								
Pr.2         1 No. of pulses per rotation (Ap)         1         151         301         1         151         301           Pr.3         1 Movement amount per rotation (Al)         2         152         302         2         152         302           Pr.4         Unit magnification (Am)         3         153         303         3         153         303           Pr.5         Pulse output mode         4         154         304         4         154         304           Pr.6         Rotation direction setting         5         155         305         5         155         305           Pr.7         Speed limit value         7         157         307         11         161         311           Pr.8         Acceleration time 0         9         159         309         13         163         313           Pr.9         Deceleration time 0         10         160         310         14         164         314           Pr.9         Deceleration time 0         11         161         311         15         165         315           Pr.10         Bias speed at start         12         162         312         6         156         306			Ĭ				Axis 3		
Pr.3   1 Movement amount per rotation (AI)   2   152   302   2   152   302	Pr.1 Unit setting	0	150	300	0	150	300		
Pr.4         Unit magnification (Am)         3         153         303         3         153         303           Pr.5         Pulse output mode         4         154         304         4         154         304           Pr.6         Rotation direction setting         5         155         305         5         155         305           Pr.7         Speed limit value         6         156         306         10         160         310           Pr.8         Acceleration time 0         8         158         308         12         162         312           Pr.8         Acceleration time 0         9         159         309         13         163         313           Pr.9         Deceleration time 0         10         160         310         14         164         314           Pr.9         Deceleration time 0         11         161         311         15         165         315           Pr.10         Bias speed at start         12         162         312         6         156         306           Pr.11         Stepping motor mode selection amount         14         164         314         -         -         -	Pr.2 1 No. of pulses per rotation (Ap)	1	151	301	1	151	301		
Pr.5   Pulse output mode	Pr.3 1 Movement amount per rotation (AI)	2	152	302	2	152	302		
Pr.6         Rotation direction setting         5         155         305         5         155         305           Pr.7         Speed limit value         6         156         306         10         160         310           Pr.8         Acceleration time 0         8         158         308         12         162         312           Pr.8         Acceleration time 0         9         159         309         13         163         313           Pr.9         Deceleration time 0         10         160         310         14         164         314           Pr.9         Deceleration time 0         11         161         311         15         165         315           Pr.10         Bias speed at start         12         162         312         6         156         306           Pr.11         Stepping motor mode selection amount         14         164         314         -         -         -           Pr.12         Backlash compensation amount         15         165         315         17         167         317           Pr.13         Software stroke limit upper limit value         16         166         316         18         168 <td< td=""><td>Pr.4 Unit magnification (Am)</td><td>3</td><td>153</td><td>303</td><td>3</td><td>153</td><td>303</td></td<>	Pr.4 Unit magnification (Am)	3	153	303	3	153	303		
Pr.7   Speed limit value	Pr.5 Pulse output mode	4	154	304	4	154	304		
Pr.7         Speed limit value         7         157         307         11         161         311           Pr.8         Acceleration time 0         8         158         308         12         162         312           9         159         309         13         163         313           Pr.9         Deceleration time 0         10         160         310         14         164         314           Pr.9         Deceleration time 0         11         161         311         15         165         315           Pr.10         Bias speed at start         12         162         312         6         156         306           Pr.11         Stepping motor mode selection amount         14         164         314         -         -         -           Pr.12         Backlash compensation amount         15         165         315         17         167         317           Pr.13         Software stroke limit upper limit value         16         166         316         18         168         318           Pr.14         Software stroke limit lower limit value         19         169         319         21         171         321           Pr	Pr.6 Rotation direction setting	5	155	305	5	155	305		
Pr.8   Acceleration time 0   8   158   308   12   162   312     Pr.9   Deceleration time 0   10   160   310   14   164   314     Pr.9   Deceleration time 0   11   161   311   15   165   315     Pr.10   Bias speed at start   12   162   312   6   156   306     Pr.10   Bias speed at start   13   163   313   7   157   307     Pr.11   Stepping motor mode selection amount   14   164   314   -   -     Pr.12   Backlash compensation amount   15   165   315   17   167   317     Pr.13   Software stroke limit upper limit value   16   166   316   18   168   318     Pr.14   Software stroke limit lower limit value   18   168   318   20   170   320     Pr.15   Software stroke limit selection   20   170   320   22   172   322     Pr.15   Software stroke limit selection   20   170   320   22   172   322     Pr.15   Software stroke limit selection   20   170   320   22   172   322     Pr.15   Software stroke limit selection   20   170   320   22   172   322     Pr.15   Software stroke limit selection   20   170   320   22   172   322     Pr.15   Software stroke limit selection   20   170   320   22   172   322     Pr.15   Software stroke limit selection   20   170   320   22   172   322     Pr.16   Software stroke limit selection   20   170   320   22   172   322     Pr.17   Pr.18   Pr.18	Pr 7 Speed limit value						310		
Pr.8       Acceleration time 0       9       159       309       13       163       313         Pr.9       Deceleration time 0       10       160       310       14       164       314         Pr.9       Deceleration time 0       11       161       311       15       165       315         Pr.10       Bias speed at start       12       162       312       6       156       306         Pr.11       Stepping motor mode selection amount       14       164       314       -       -       -       -         Pr.12       Backlash compensation amount       15       165       315       17       167       317         Pr.13       Software stroke limit upper limit value       16       166       316       18       168       318         Pr.14       Software stroke limit lower limit value       19       169       319       21       171       321         Pr.15       Software stroke limit selection       20       170       320       22       172       322	- Opeca mini value								
Pr.9 Deceleration time 0       10       160       310       14       164       314         Pr.10 Bias speed at start       12       162       312       6       156       306         Pr.11 Stepping motor mode selection amount       14       164       314       -       -       -         Pr.12 Backlash compensation amount       15       165       315       17       167       317         Pr.13 Software stroke limit upper limit value       16       166       316       18       168       318         Pr.14 Software stroke limit lower limit value       18       168       318       20       170       320         Pr.15 Software stroke limit selection       20       170       320       22       172       322	Pr.8 Acceleration time 0					-			
Pr.9       Deceleration time 0       11       161       311       15       165       315         Pr.10       Bias speed at start       12       162       312       6       156       306         Pr.10       Bias speed at start       13       163       313       7       157       307         Pr.11       Stepping motor mode selection amount       14       164       314       -       -       -         Pr.12       Backlash compensation amount       15       165       315       17       167       317         Pr.13       Software stroke limit upper limit value       16       166       316       18       168       318         Pr.14       Software stroke limit lower limit value       17       167       317       19       169       319         Pr.15       Software stroke limit selection       20       170       320       22       172       322									
Pr.10 Bias speed at start       12 162 163 312 6 156 306         13 163 313 7 157 307         Pr.11 Stepping motor mode selection amount       14 164 314         Pr.12 Backlash compensation amount       15 165 315 17 167 317         Pr.13 Software stroke limit upper limit value       16 166 316 18 168 318         17 167 317 19 169 319         Pr.14 Software stroke limit lower limit value       18 168 318 20 170 320         Pr.15 Software stroke limit selection       20 170 320 22 172 322	Pr.9 Deceleration time 0	-				-	-		
Pr.11 Stepping motor mode selection amount         14         164         314         -         -         -           Pr.12 Backlash compensation amount         15         165         315         17         167         317           Pr.13 Software stroke limit upper limit value         16         166         316         18         168         318           Pr.14 Software stroke limit lower limit value         18         168         318         20         170         320           Pr.15 Software stroke limit selection         20         170         320         22         172         322									
Pr.12         Backlash compensation amount         15         165         315         17         167         317           Pr.13         Software stroke limit upper limit value         16         166         316         18         168         318           Pr.13         Software stroke limit upper limit value         17         167         317         19         169         319           Pr.14         Software stroke limit lower limit value         18         168         318         20         170         320           Pr.15         Software stroke limit selection         20         170         320         22         172         322	Pr.10 Bias speed at start	13	163	313	7	157	307		
Pr.13         Software stroke limit upper limit value         16         166         316         18         168         318           Pr.14         Software stroke limit lower limit value         18         168         318         20         170         320           Pr.14         Software stroke limit lower limit value         19         169         319         21         171         321           Pr.15         Software stroke limit selection         20         170         320         22         172         322	Pr.11 Stepping motor mode selection amount	14	164	314	-	-	-		
Pr.13         Software stroke limit upper limit value         17         167         317         19         169         319           Pr.14         Software stroke limit lower limit value         18         168         318         20         170         320           19         169         319         21         171         321           Pr.15         Software stroke limit selection         20         170         320         22         172         322	Pr.12 Backlash compensation amount	15	165	315	17	167	317		
Pr.14       Software stroke limit lower limit value       18       168       318       20       170       320         19       169       319       21       171       321         15       Software stroke limit selection       20       170       320       22       172       322	Pr 13 Software stroke limit upper limit value						318		
Pr.14         Software stroke limit lower limit value         19         169         319         21         171         321           Pr.15         Software stroke limit selection         20         170         320         22         172         322	- Ookware stroke mint apper mint value								
Pr.15         Software stroke limit selection         20         170         320         22         172         322	Pr.14 Software stroke limit lower limit value								
	Pr 15 Software stroke limit selection						322		
Pr. 16   Software Stroke limit valid/invalid setting   21   1/1   321   23   1/3   323	Pr.16 Software stroke limit valid/invalid setting	21	171	321	23	173	323		
		22	172	322	24	174	324		
Pr.17 Command in-position width         23         173         323         25         175         325	Pr.17 Command in-position width								
Pr.18 Torque limit setting value         24         174         324         26         176         326	Pr.18 Torque limit setting value	24	174	324	26	176	326		
Pr.19 M code ON signal output timing         25         175         325         27         177         327	Pr.19 M code ON signal output timing	25	175	325	27	177	327		
Pr.20 Speed switching mode         26         176         326         28         178         328	Pr.20 Speed switching mode	26	176	326	28	178	328		
Pr.21 Interpolation speed designation method 27 177 327 29 179 329	Pr.21 Interpolation speed designation method	27	177	327	29	179	329		
Pr.22 Current feed value during speed control         28         178         328         30         180         330	Pr.22 Current feed value during speed control	28	178	328	30	180	330		
Pr.23 Manual pulse generator selection 29 179 329	Pr.23 Manual pulse generator selection	29	179	329	-	-	-		
Pr.24 Logic selection for pulse output to the drive unit 30 180 330	Pr.24 Logic selection for pulse output to the drive unit	30	180	330	-	-	-		
Pr.25 Size selection for acceleration/deceleration time 31 181 331	Pr.25 Size selection for acceleration/deceleration time	31	181	331	-	-	-		
36 186 336 36 186 336	Dr. 26 Appolaration time 4	36	186	336	36	186	336		
	PI.20 Acceleration time 1						337		
Pr 27 Acceleration time 2	Pr 27 Acceleration time 2						338		
39 189 339 39 189 339	11.21 Addictation time 2						339		
Pr 28 Acceleration time 3	Pr.28 Acceleration time 3						340		
41 191 341 41 191 341							341		
Pr 20 Deceleration time 1	Pr.29 Deceleration time 1						343		

	Buffer memory address						
Item of AD75P□-S3		AD75P□-S3		QD7	5P□N/QD75	D□N	
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3	
Pr.30 Deceleration time 2	44	194	344	44	194	344	
F1.30 Deceleration time 2	45	195	345	45	195	345	
Pr.31 Deceleration time 3	46	196	346	46	196	346	
	47 48	197 198	347 348	47 48	197 198	347 348	
Pr.32 JOG Speed limit value	49	199	349	49	199	349	
Pr.33 JOG operation acceleration time selection	50	200	350	50	200	350	
Pr.34 JOG operation deceleration time selection	51	201	351	51	201	351	
Pr.35 Acceleration/deceleration process selection	52	202	352	52	202	352	
Pr.36 S-pattern proportion	53	203	353	53	203	353	
Pr.37 Sudden stop deceleration time	54	204	354	54	204	354	
Sudden stop deceleration time	55	205	355	55	205	355	
Pr.38 Stop group 1 sudden stop selection	56	206	356	56	206	356	
Pr.38 Stop group 2 sudden stop selection	57	207	357	57	207	357	
Pr.40 Stop group 3 sudden stop selection	58	208	358	58	208	358	
Pr.41 Positioning complete signal output time	59	209	359	59	209	359	
Pr.42 Allowable circular interpolation error width	60 61	210 211	360 361	60 61	210 211	360 361	
Pr.43 External start function selection	01	211	301	01	211	301	
	62	212	362	62	212	362	
(QD75P□N/QD75D□N: Pr.42 External command function				-			
selection)		0.10					
Pr.44 Near pass mode selection for path control	66	216	366	-	-	-	
Pr.45 OPR method	70	220	370	70	220	370	
Pr.46 OPR direction	71	221	371	71	221	371	
Pr.37 OP address	72 72	222	372	72	222	372	
	73 74	223 224	373 374	73 74	223 224	373 374	
Pr.48 OPR speed	74 75	225	375	75	225	375	
	76	226	376	76	226	376	
Pr.49 Creep speed	77	227	377	77	227	377	
Pr.50 OPR retry	78	228	378	78	228	378	
Pr.51 OPR dwell time	79	229	379	79	229	379	
Pr.52 Setting for the movement amount after near-point dog	80	230	380	80	230	380	
ON	81	231	381	81	231	381	
Pr.53 OPR acceleration time selection	82	232	382	82	232	382	
Pr.54 OPR deceleration time selection	83	233	383	83	233	383	
Pr.55 OP shift amount	84	234	384	84	234	384	
	85 86	235 236	385 386	85 86	235 236	385 386	
Pr.56 OPR torque limit value	88	238	388	88	238	388	
Pr.57 Speed designation during OP shift							
Pr.58 Dwell time during OPR retry	89	239	389	89	239	389	

		Buffer memory address					
Item of AD75P□-S3		AD75P□-S3	QD75P□N/QD75D□N				
		Common for axis 1, 2, 3	Common for axis 1, 2, 3, 4				
Md.1 In test mode flag		450	1200				
Md.2 Module name		451	-				
Md.3 OS type		452 453 454 455	-				
Md.4 OS version		456 457	-				
Md.5 Clock data (hour: minute)		460	-				
Md.6 Clock data (second: 100 ms)		461	-				
(Pointer number)		(0)	to (15)				
Md.7 Start axis		400 to 507	4040 1- 4007				
(QD75P□N/QD75D□N: Md.3 Start information)		462 to 537	1212 to 1287				
Md.8 Operation type		402 to 520	4040 to 4000				
(QD75P□N/QD75D□N: Md.4 Start No.)	) C	463 to 538	1213 to 1288				
Md.9 Start Hour: minute	Start history	404 to 520	4044 to 4000				
(QD75P□N/QD75D□N: Md.5 Start Hour)	Start	464 to 539	1214 to 1289				
Md.10 Start Second: 100 ms		465 to 540	1215 to 1290				
(QD75P□N/QD75D□N: Md.6 Start Minute: second)		403 to 340	1215 (0 1290				
Md.11 Error judgment		466 to 541	1216 to 1291				
Md.12 Start history pointer		542	1292				
(Pointer number)		(0) to (15)	-				
Md.13 Start axis	errors	543 to 618	-				
Md.14 Operation type	ng e	544 to 619	-				
Md.15 Start Hour: minute	Start history during	545 to 620	-				
Md.16 Start Second: 100 ms	istor	546 to 621	-				
Md.17 Error judgment	tart h	547 to 622	-				
Md.18 Start history storage during error	Ś	623	-				
(Pointer number)		(0)	to (15)				
Md.19 Axis in which the error occurred		624 to 684	1293 to 1353				
Md.20 Axis error No.		625 to 685	1294 to 1354				
Md.21 Axis error occurrence Hour: minute							
(QD75P□N/QD75D□N: Md.11 Axis error occurrence (Hour))	Error history	626 to 686	1295 to 1355				
Md.22 Axis error occurrence Second: 100 ms	Err						
(QD75PDN/QD75DDN: Md.12 Axis error occurrence		627 to 687	1296 to 1356				
(Minutes: second))							
Md.23 Error history pointer		688	1357				

Item of AD75P□-S3		Buffer memory address		
		AD75P□-S3	QD75P□N/QD75D□N	
		Common for axis 1, 2, 3	Common for axis 1, 2, 3, 4	
(Pointer number)		(0) to (15)		
Md.24 Axis in which the warning occurred	Warning history	689 to 749	1358 to 1418	
Md.25 Axis warning No.		690 to 750	1359 to 1419	
Md.26 Axis warning occurrence Hour: minutes		691 to 751	1360 to 1420	
(QD75PDN/QD75DDN: Md.16 Axis warning				
occurrence (Hour))				
Md.27 Axis warning occurrence Second: 100 ms		3692 to 752	1361 to 1421	
(QD75PDN/QD75DDN: Md.17 Axis warning				
occurrence (Minutes: second))				
Md.28 Warning history pointer		753	1422	

			Buffer mem	ory address		
Item of AD75P□-S3		AD75P□-S3			5P□N/QD75	D□N
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3
Md.29 Current feed value	800	900	1000	800	900	1000
wo.25 current loca value	801	901	1001	801	901	1001
Md.30 Machine feed value	802 803	902 903	1002 1003	802 803	902 903	1002 1003
	804	904	1003	804	904	1003
Md.31 Feedrate	805	905	1005	805	905	1005
Md.32 Valid M code	806	906	1006	808	908	1008
Md.33 Axis error No.	807	907	1007	806	906	1006
Md.34 Axis warning No.	808	908	1008	807	907	1007
Md.35 Axis operation status	809	909	1009	809	909	1009
Md.36 Current speed	810	910	1010	810	910	1010
- Industrial Speed	811	911	1010	811	911	1011
Md.37 Axis feedrate	812 813	912 913	1012 1013	812 813	912 913	1012 1013
	814	914	1013	814	914	1013
Md.38 Speed-position switching control positioning amount	815	915	1015	815	915	1015
Md.39 External input/output signal	816	916	1016	816	916	1016
Md.40 Status	817	917	1017	817	917	1017
MALAA Tarrah valua	818	918	1018	818	918	1018
Md.41 Target value	819	919	1019	819	919	1019
Md.42 Target speed	820	920	1020	820	920	1020
	821 822	921 922	1021 1022	821	921	1021
Md.43 OP absolute position	823	923	1022	-	-	-
	824	924	1024	824	924	1024
Md.44 Movement amount after near-point dog ON	825	925	1025	825	925	1025
Md.45 Torque limit stored value	826	926	1026	826	926	1026
Md.46 Special start data instruction code setting value	827	927	1027	827	927	1027
Md.47 Special start data instruction parameter setting value	828	928	1028	828	928	1028
Md.48 Start positioning data No. setting value	829	929	1029	829	929	1029
Md.49 In speed control flag	830	930	1030	830	930	1030
Md.50 In speed change processing flag	831	931	1031	831	931	1031
Md.51 Start data pointer being executed	832	932	1032	834	934	1034
Md.52 Last executed positioning data No.	833	933	1033	837	937	1037
Md.53 Repetition counter						
(QD75PDN/QD75DDN: Md.41 Special start repetition	834	934	1034	832	932	1032
counter)						
Md.54 Positioning data No. being executed	835	935	1035	835	935	1035
Md.55 Block No. being executed	836	936	1036	836	936	1036
Md.56 Positioning data being executed	838 to 847	938 to 947	1038 to 1047	838 to 847	938 to 947	1038 to 1047
Deceleration starting flag	-	-	-	899	999	1099

			Buffer mem	nory address			
Item of AD75P□-S3		AD75P□-S3			5P□N/QD75		
Obel Obel date at the office (house)	Axis 1	<b>Axis 2</b> 1100	Axis 3	Axis 1	Axis 2	Axis 3	
Cd.1 Clock data setting (hour)		1101					
Cd.2 Clock data setting (minute, second)		1102		-			
Cd.3 Clock data writing					-		
Cd.4 Target axis		1103			-		
Cd.5 Positioning data No.		1104			-		
Cd.6 Write pattern		1105			-		
Cd.7 Read/write request		1106			-		
Cd.8 Read/write positioning data I/F		1108 to 1137			-		
Cd.9 Flash ROM write request		1138			1900		
Cd.10 Parameter initialization request		1139			1901		
Cd.11 Positioning start No.	1150	1200	1250	1500	1600	1700	
Cd.12 Axis error reset	1151	1201	1251	1502	1602	1702	
Cd.13 Restart command	1152	1202	1252	1503	1603	1703	
Cd.14 M code OFF request	1153	1203	1253	1504	1604	1704	
	1154	1204	1254	1506	1606	1706	
Cd.15 New current value	1155	1205	1255	1507	1607	1707	
Cd.16 New speed value	1156 1157	1206 1207	1256 1257	1514 1515	1614 1615	1714 1715	
Cd.17 Speed change request	1158	1208	1258	1516	1616	1716	
Cd.18 Positioning operation speed override	1159	1209	1259	1513	1613	1713	
	1160	1210	1260	1518	1618	1718	
Cd.19 JOG speed	1161	1211	1261	1519	1619	1719	
Cd.20 Speed-position switching enable flag	1163	1213	1263	1528	1628	1728	
Cd.21 Speed-position switching control movement amount	1164	1214	1264	1526	1626	1726	
change register	1165	1215	1265	1527	1627	1727	
Cd.22 Manual pulse generator enable flag	1167	1217	1267	1524	1624	1724	
Cd.23 Manual pulse generator 1 pulse input magnification	1168 1169	1218 1219	1268 1269	1522 1523	1622 1623	1722 1723	
Cd.24 OPR return request flag OFF request	1170	1220	1270	1521	1621	1721	
Cd.25 External start valid							
(QD75P□N/QD75D□N: Cd.8 External command valid)	1171	1221	1271	1505	1605	1705	
Cd.26 Step valid flag	1172	1222	1272	1545	1645	1745	
Cd.27 Step mode	1173	1223	1273	1544	1644	1744	
Cd.28 Step start information	1174	1224	1274	1546	1646	1746	
	1175	1225	1275	1547	1647	1747	
Cd.29 Skip command	1176	1225	1275	1525	1625	1747	
Cd.30 New torque value							
Cd.31 Positioning starting point No.	1178	1228	1278	1501	1601	1701	
Cd.32 Interrupt request during continuous operation	1181	1231	1281	1520	1620	1720	
Cd.33 New acceleration time value	1184 1185	1234 1235	1284 1285	1508 1509	1608 1609	1708 1709	
Cd.34 New deceleration time value	1186	1236	1286	1510	1610	1710	
	1187	1237	1287	1511	1611	1711	
Cd.35 Acceleration/deceleration time change during speed change, enable /disable selection	1188	1238	1288	1512	1612	1712	

								Buff	er mem	ory add	ress				
		Item of AD75P□-S3					P□-S3					75P□N			
				Ax	is 1	Ax	is 2	Ax	is 3	Ax	s 1	Ax	is 2	Axi	is 3
	Da	.1 Operation pattern .2 Control system .3 Acceleration time No.		13	300	23	00	33	300	20	00	80	000	140	000
	Da	.4 Deceleration time No.													
	Da No.	.5 M code/condition data		13	301	23	01	33	801	20	01	80	01	140	001
		.8 Dwell time/JUMP	No.1	13	802	23	02	33	802	20	02	80	02	140	002
_	_	tination positioning data No.		40				0.0		0.0		0.0	.00	1.1	000
g da	Emp	oty			803 804		03		803 806	20	03 04		03 04		003 004
Positioning data*1	Da	.7 Command speed			305		05		307		05		05		005
ositi	Da	.5 Positioning address/		13	306	23	06	33	806	20	06	80	06	140	006
ш	movement amount				807		07	33	807	20		80	07	140	007
	Da	.6 Arc address			808 809		08 09		808 809	20 20	08 00		108 109		008 009
			<u> </u>												10 to
	No.2			1310 to 1319		2310 to 2319		3310 t	o 3319	2010 to 2019		8010 to 8019		14019	
	No.3			1320 t	o 1329	2320 t	o 2329	3320 t	o 3329	2020 t	0 2029	8020 t	o 8029	14020 to 14029	
	to			1	to	1	:0	1	to	1	0	1	to	1	to
		No.100		2290 t	o 2299	3290 t	o 3299	4290 t	o 4299	2990 t	o 2999	8990 t	o 8999		90 to
		Da.10 Shape			1				1					149	999
	z*£	Da.11 Start data No.	1st	4300	4350	4550	4600	4800	4850	26000	26050	27000	27050	28000	28050
	Start block data*2	Da.12 Special start instruction	point	1000	1000	1000	1000	1000	1000	20000	20000	27000	2,000	20000	20000
	lock	Da.13 Parameter													
	art b	2nd point		4301	4351	4551	4601	4801	4851	26001	26051	27001	27051	28001	28051
	ş	3rd point		4302	4352	4552	4602	4802	4852	26002		27002	27052	28002	28052
3		to			to		:0		to		0		to		to
natio		50th point	1	4349	4399	4599	4649	4849	4899	26049	26099	27049	27099	28049	28099
nforn		Da.14 Condition target		44	100	46	50	49	000	26 ⁻	100	27	100	28	100
arti		Da.15 Condition operator													
Positioning start information*3		Da.16 Address	No.1	44	102 103	46	52 53	49	002 003		103	27	102 103	28	102 103
ositio	Da.17 Parameter 1				04 05		54 55		)04 )05	26 ⁻	104 105		104 105		104 105
₫.	Posi Condition data	Danaga dan O			06		56		06		106		106	28105 28106	
		Da.18 Parameter 2		44	107	46	57	49	07	26107		27107		28107	
	S	No.2		4410 t	o 4419	4660 t	o 4669	4910 t	o 4919	261			10 to		10 to
										26119 26120 to		27119 27120 to		28119 28120 to	
		No.3		4420 t	o 4429	4670 t	o 4679	4920 t	o 4929		129		129		129
		to		1	to	1	:0	1	to		0		to	to	
		No.10		4490 t	o 4499	4740 t	o 4749	4990 t	o 4999		90 to 199		90 to 199		90 to 199

With the QD75P\(\text{DN/QD75D}\(\text{DN}\), the positioning data buffer memory addresses are Nos. 1 to 600.

^{*2} With the QD75P\(\text{DN/QD75D\(\text{DN}\), it is called [block start data].

With the QD75P\(\text{DN/QD75D}\(\text{DN}\), the [block start data] and [condition data] in \(\begin{array}{c}\text{the area are called [start block 0].}\) There are five start blocks: 0 to 4

	_				Buffer mem	ory address			
Iten	n of A	.D75P□-S3		AD75P□-S3		QD75P□N/QD75D□N			
			Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3	
	5	Start No.8001	4500	4750	5000	-	-	-	
Positioning start	Indirect designation	st natic	Start No.8002	4501	4751	5001	-	-	-
information		to	to	to	to	to	to	to	
		Ctart No. 00E0	4549	4799	5049	-	-	-	
Programmable controller	· CDU	Condition judgment target data		5050			30000		
J	CFU	Condition judgment target data of the condition data	to			to			
memory area		or the condition data		5099		30099			
Target axis			5100 -						
Head positioning block N	10.			5101		-			
No. of read/write data items			5102			-			
Read/write request				5103		-			
Read/write block				5110 to 6109	)	-			

### 7.4.5 Interface specifications comparison with external devices

For the external interface specifications, the following shows the differences between AD75P□-S3 and QD75P□N/QD75D□N.

O: Compatible, △: Partial change required

	Item ^{*1}	Differences as Interface specifications*2	Compat- ibility	Precautions for replacement
	Drive unit READY	-	0	
	Upper/lower limit signal	-	0	
	Stop signal	-	0	
Input	Near-point dog signal	Input resistance: $4.7k\Omega\rightarrow4.3k\Omega$ Response time: $4ms\rightarrow1ms$	Δ	<when for="" is="" machine="" method="" near-point="" opr="" signal="" the="" used="" watchdog=""> The input response time for the QD75P□N/QD75D□N is shorter than the A1SD75P□-S3. If a sensor, which the chattering time when the near-point watchdog signal is turned on is long, is used, an error may occurs due to the false detection of the ON/OFF status.*4 Check specifications for the sensor.</when>
	Speed-position switching signal	Input resistance: $4.7k\Omega \rightarrow 7.7k\Omega$ Response time: $4ms \rightarrow 1ms$	Δ	
	Zero signal	Input resistance: $3.5k\Omega\rightarrow4.7k\Omega$ (at input of 24V) $0.5k\Omega\rightarrow0.62k\Omega$ (at input of 5V) Response time: $0.8ms\rightarrow1ms^{*3}$ ON voltage: $2.5V\rightarrow2.0V$ (at input of 5V)	Δ	Including the response time differences, reconfirming is required.
	Manual pulse generator	ON current: 3.5mA→2mA	0	
Output	Pulse	-	0	
Juiput	Deviation counter clear	-	0	

- *1 For the external start and in-position signal of which QD75PDN/QD75DDN does not have, they are not described.
- *2 The column of interface specifications differences is described as the form, [Specifications of AD75P□-S3] → [Specifications of QD75P□N/QD75D□N].
- *3 The response time difference (0.2 ms) of AD75P□-S3 and QD75P□N/QD75D□N is the time difference of 1pls part for creep speed of 5000pps.
  - When the accuracy is required, it is required for the creep speed to be low enough value.
- *4 If the chattering time is long when the near-point watchdog signal is turned on, the OFF status may be detected shortly after the ON status of the signal is detected (under changing into the creep speed). In this case, the QD75P\(\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\

# 7.5 AD75M1/M2/M3

# 7.5.1 Performance comparison

O : Compatible, △ : Partial change required, ×: Incompatible

ΔD75M1							U . Cor	npatible,△. Pa	rtiai change	required, ×: Incompatible
No. of positioning data items	em	Model		AD75M2	AD75M3	QD75M1	QD75M2	QD75M4		Precautions for replacement
Position control interpolation   2-axis linear interpolation   x	lo. of control a	axes	1	2	3	1	2	4	0	
Interpolation   Interpolatio	lo. of positioni	ing data items		600/axis*1			600/axis		0	
Position   Position   Control   Position   Speed control   Speed   Switching   Control   Position   Speed   Switching   Swit			×	0	0	×	0	0	0	
Control   Speed control   Speed control   Speed control   Speed control   Speed control   Speed   Speed control   Speed   Switching control   Position-speed   Switching control   Speed   Switching control   Switching contro	•		×	0	0	×	0	0	U	
Positioning system   Speed-position   System   Position-speed   x   Speed   x   System   S				0			0			
Positioning system    Position   Speed   Switching   System   Syst		<u> </u>		0			0			
Speed switching control   Simple	Positioning system position switching control  Position-speed switching			0			0		0	
-214748364.8 to 214748364.7 (μm) -21474.83648 to 21474.83647 (inch) 0 to 359.99999 (degree) -2147483648 to 2147483647 (PLS) -2147483648 to 2147483647 (μm) -2147483648 to 2147483647 (μm) -21474.83648 to 21474.83647 (inch) -21474.83648 to 21474.83647 (degree) -2147483648 to 2147483647 (PLS) -2147483647 (inch) 0 to 2147483647 (inch) 0 to 2147483647 (inch) 0 to 21474.83647 (degree) 0 to 21474.83647 (degree) 0 to 2147483647 (PLS)  0.01 to 600000.00 (mm/min) 0.001 to 600000.000 (inch/min) Speed command range				×			0			
Speed command range 0.001 to 600000.000 (inch/min) 0.001 to 2000000.000 (inch/min)	Positioning range		-214748364.8 -21474.83648 0 to 359.99999 -214748364.8 -21474.83648 -21474.83648 -21474.83648 -21474.83648 0 to 21474.836 0 to 21474.836 0 to 21474.836	to 214748364 to 21474.8364 g (degree) to 2147483647 system> to 214748364 to 21474.8364 to 21474.83647 ition switching of 4.7 (µm) 647 (inch) 647 (degree) i47 (PLS)	7 (inch) (PLS) 7 (μm) 7 (inch) 7 (degree) (PLS) control>	-214748364.8 -21474.83648 0 to 359.99999 -214748364.8 -21474.83648 -21474.83648 -21474.83648 -21474.83648 0 to 21474.836 0 to 21474.836 0 to 21474.836	to 214748364. to 21474.8364. d (degree) o 2147483647 system> to 214748364. to 21474.8364. to 21474.8364. o 2147483647 ition switching of 4.7 (µm) 647 (inch) 647 (degree) 447 (PLS)	7 (inch) (PLS) 7 (μm) 7 (inch) 7 (degree) (PLS) control>	0	
1 to 1000000 (PLS/s) 1 to 10000000 (PLS/s)	Speed command range 0.001 to 600000.000 (inch/min) 0.001 to 600000.000 (degree/min)		0.001 to 2000000.000 (inch/min) 0.001 to 2000000.000 (degree/min)			0				
Machine OPR function (OPR methods)  O(4 OPR methods)  OP unpassed of required. Return the moth than one rotation at the error and			e(6 OPR method	ds)	O(4 OPR methods)		O(4 OPR methods)		Δ	Corresponding to the OP unpassed error is required. Return the motor more than one rotation once at the error and perform the OPR start again.
JOG operation O O	OG operation			0			0		0	

O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

_			0 : 00pa,= : : a	tiai onango	required, ×: incompatible
Item	Model	AD75M1 AD75M2 AD75M3	QD75M1 QD75M2 QD75M4	Compati- bility	Precautions for replacement
Manual pulse generator function		1 generator/axis	1 generator/module	Δ	On QD75M□, the manual pulse generator cannot be used by each axis independent.     When connecting the manual pulse generator for each axis is required, use one axis module.     The manual pulse generator itself can use the same one.     The operation for inputting one pulse differs.     Set the parameter so that movement amount may be same.
Acceleration/ deceleration	Automatic trapezoidal acceleration/ deceleration	0	0	0	
processing S-pattern acceleration/ deceleration		0	0		
Acceleration/ deceleration action time No. of patterns setting range		Acceleration time and deceleration time can be set independently.  (4 patterns each)	Acceleration time and deceleration time can be set independently.  (4 patterns each)	0	
		1 to 65535ms/1 to 8388608ms switching is enabled	1 to 8388608ms		
Compensation		Electronic gears, backlash compensation, near pass*2	Electronic gears, backlash compensation, near pass*2	Δ	Refer to *2.
Error display		17-segment LED	Error LED	×	For details of diagnostic, use GX Developer.
History data steerror, warning)	• .	Provided (4 types, 16 items/module)	Provided (3 types, 16 items/module)	0	The start history during error is integrated into the start history.
Data storage d	estination	Flash ROM (battery-less backup)	Flash ROM (battery-less backup)	0	
		10136-3000VE (Soldering type, supplied)	A6CON1, A6CON4 (Soldering type, sold separately)		
Connection con	nnector	10136-6000EL (Crimping type, sold separately)	A6CON2 (Crimping type, sold separately) A6CON3 (IDC type, sold separately)	×	As the connectors differ, wiring change is
		10136-3000VE: 24 to 30 AWG (approx. 0.05 to 0.2mm²)	A6CON1, A6CON4: 0.3mm ²		required. The connectors of QD75M□ is sold
Applicable wire	e size	10136-6000EL: 28 AWG (approx. 0.08mm ² )	A6CON2: 24 to 28 AWG	0	separately.
	A6CON3: 28 AWG (twisted wire),  - 30 AWG (single wire)		1		
SSCNET connection type		Refer to Sec	tion 7.5.5 (3).		The connector
Maximum exte of SSCNET		3	0m	Δ	configuration of bass differs.
Internal current consumption(A		0.7A or less	QD75M1 QD75M2 QD75M4 : 0.40A : 0.40A : 0.40A	0	
consumption(A) (5VDC)  Flash ROM write count		Max. 100,000 times	Max. 100,000 times	0	When QD75M□ carries out the flash write 26 times from the sequence program, an error occurs.  The error reset enables to perform the flash write.

O: Compatible,  $\triangle$ : Partial change required,  $\times$ : Incompatible

Item	Model	AD75M1	AD75M2	AD75M3	QD75M1	QD75M2	QD75M4	Compati- bility	Precautions for replacement
I/O points		32 points (I/O assignment: special 32 points)			(I/O assign	32 points ment: intelligen	t 32 points)	0	
No. of module	occupied slots		1			1		0	
Weight			0.35kg		0.15kg	0.15kg	0.16kg	0	
I/O signal for external devices	START signal	0		× (integrated into CHG)			Δ	When using both the speed-position switching control and the external start, input the external start signal to the interrupt module and start using the direct output.	
	CHG signal	Speed-p	Speed-position switching signal			External command signal (External start or speed-position switching selectable with parameters)			
novinhoval	Connection with peripheral devices	С	Direct connection	n	CPU, ( communication	Connection via programmable controller CPU, Q corresponding serial communication module, Q corresponding MELSECNET/H remote I/O module		0	The connecting shape differs.
peripheral devices (data setting, etc.)	AD75TU	Available			Unavailable			AD75TU cannot be used. Use GX Configurator-QP.	
	GX Configurator	G)	Configurator-	AP	GX	Configurator-C	P*3	0	Available GX Configurator differs.

^{*1} Nos.1 to 100 data items/axis of positioning data can be set using the buffer memory and Nos.1 to 600 data/axis can be set with QD75MD.

The positioning data in the buffer memory is not backed up.

^{*2} The near pass function is valid only during the continuous path control. (AD75M□: Selected with parameters, QD75M□: Standard function)

QD75M does not have address pass mode. If passing the positioning address, continue with continuous operation. (However, it will stop once.)

^{*3} GX Configurator-QP is available with SW2D5C-QD75P or later version.

## 7.5.2 Function comparison

## (1) Deleted function from AD75M1/AD75M2/AD75M3

When using the following function on AD75M $\square$  -S3, change the program.

Deleted functions	Precautions for replacement						
Creep speed out of range error (error code: 208)	Vith QD75M□, there is no the error code of the left column.						
Fast machine OPR	ith the Q75M□, there is no possible function for replacement.						
Special start (stop)	Execute it separately for the start two times.						
Indirect designation	In the QD75M $\square$ , the start block area on the buffer memory is expanded to five blocks (0 to 4). Each start block can be directly designated with positioning start No. (7000 to 7004).						
Block transfer	/ith the AD75M□, this interface is used to set positioning data Nos. 101 to 600 that do not exist on						
Positioning data I/F	he buffer memory. Since all positioning data can be set in the buffer memory with the QD75M□, this function is deleted.						
Start history during errors	The contents are the same as the start history.  Therefore, the QD75M□ stores only the start history.						
System monitor data (Module name, OS type, OS version)	These data were deleted because they can be displayed in system monitor "Module's detailed information" of GX Developer.  (Refer to GX Developer Operating Manual.)						



## (2) Changed function from AD75M1/AD75M2/AD75M3

In case of using the following functions with AD75M $\square$ , make sure that there is no operation problems when converted to QD75M $\square$ .

Changed functions		Change description						
Ghanged functions	The software stroke limit chec	<u> </u>	when a sub point is designated					
	It is not carried out when a cer	-	when a sub-point is designated.					
	2. The software stroke limit chec		out in the following cases:					
		s applied to the current feed value						
	value is updated with Pr.21							
	When the software stroke limit is applied to the machine feed value  If an attempt is made to change the current value but the designated address is out of the							
Coffware strake limit function	3. If an attempt is made to change the current value but the designated address is out of the software stroke limit range, the attempt is considered as an error and the current value is not							
Software stroke limit function	changed.	e attempt is considered as an end	i and the current value is not					
	4. Error code change							
	AD75MD:							
		each upper and lower stroke limit	(error code 509 to 512)					
	QD75MD:	edon apper and lower stroke in its	(61161 6646 665 16 612)					
		upper limit are integrated in to erro	or code 507					
	Errors for the lower limit are in	•	3. 0000 007.					
	Error codes 509 to 512 are de	•						
Current value changing M code	An error occurs when the designated new current value is out of the software stroke limit range.							
function	2. The M code setting value is valid during the positioning data current value changing instruction.							
Acceleration/deceleration speed	Only two-word type (1 to 8388608	<u> </u>						
control	deceleration time.							
	1. "Peripheral side (emergency) stop" is deleted from the stop causes of Stop group 2 "sudden stop							
	selection".	·						
	"Test mode fault" in the stop causes of Stop group 3 "sudden stop selection" is changed to be in							
Stop process and restart after stop	the stop causes of Stop group	. • .						
positioning operation stop		Ided to the stop causes of Stop gro	oup 3 "sudden stop selection".					
	3. Error code 100 (Peripheral de							
		J error occurrence" is added to the						
	"Sudden stop selection".							
		AD75M□	QD75M□					
READY signal (X0)	OFF	Normal (READY)	Not READY/WDT error					
	ON	Not READY/WDT error	Normal (READY)					
Manual pulse generator eneration	The No. of connectable manual p	ulse generator is changed from 1g	enerator/1axis to 1generator/1					
Manual pulse generator operation	module.							
Axis operation status	"Step stopped" is changed to "Sto	pped" and "Step error occurring" i	s changed to "Error occurring".					
	• AD75M□:							
	If the reference axis operates in	reverse direction, the control is in	nternally changed into the					
	continuous positioning control.	(restart after deceleration stop)						
Continuous path control	• QD75M□:							
	Even if the reference axis opera	ates in reverse direction with interp	polation, the control remains as					
	the continuous path control.							
	(In single-axis operation, the op	peration is the same as that of the	AD75M□.)					
Near pass	For the continuous path control, o	nly the near pass function is availa	able.					
	Positioning address pass is not co	onducted.						
2-axis interpolation								
<ul> <li>2-axis linear interpolation</li> </ul>	The interpolation target axis can be	pe randomly set with a positioning	identifier.					
<ul> <li>2-axis fixed-feed</li> </ul>	The interpolation target axis out is	tandonny oot wan a poolaoning						
Circular interpolation								
	1. "Step stopped" is changed to "		g" is changed to "Error occurring"					
Step function	in the axis operations status p							
• • • • • • • • • • • • • • • • • • • •		start information (02H) is deleted.						
	3. The step operation is restarted	d with the restart command.						

Changed functions	Change description							
	The command in-position width i	s expanded.						
Command in-position function	• AD75M□: 1 to 32767000							
	• QD75M□: 1 to 2147483647							
Positioning start No.	7004 to 7010 (block start designation	7004 to 7010 (block start designation) and 8000 to 8049 (indirect designation) are deleted.						
Display about date	With QD75M□, number of blocks has been change to 5 (7000 to 7004).							
Block start data	(With the AD75M□, this data is called "Positioning start information".)							
Chart history	The configuration of start information and start No. is changed so that the start No. can be directly							
Start history	checked.							
		AD75M□	QD75M□					
Detailed parameters	0	Software stroke limits invalid for	Software stroke limits valid for					
"Pr.15 Software stroke limit valid/	(Factory setting)	manual operation	manual operation					
invalid setting"	1	Software stroke limits valid for	Software stroke limits invalid for					
	I	manual operation	manual operation					

## 7.5.3 I/O signal comparison to programmable controller CPU

Sequence program change is required as the I/O signals differ.

For details of the I/O signals or sequence program, refer to the Type QD75M Positioning Module User's Manual.

In	put (X)		Output (Y)				
Signal name	AD75M□	QD75M□	Signal name	AD75M□	QD75M□		
(QD75/AD75) READY	X00*	X00 [*]	Axis 1 Positioning start	Y10	Y10		
Axis 1 Start complete	X01	X10	Axis 2 Positioning start	Y11	Y11		
Axis 2 Start complete	X02	X11	Axis 3 Positioning start	Y12	Y12		
Axis 3 Start complete	X03	X12	Axis 4 Positioning start	-	Y13		
Axis 4 Start complete	-	X13	Axis 1 Stop	Y13	Y04		
Axis 1 BUSY	X04	X0C	Axis 2 Stop	Y14	Y05		
Axis 2 BUSY	X05 X0D Axis 3 Stop		Y1C	Y06			
Axis 3 BUSY	X06	X0E	Axis 4 Stop	-	Y07		
Axis 4 BUSY	-	X0F	All axes servo ON	Y15	Y01		
Axis 1 Positioning complete	X07	X14	Axis 1 Forward run JOG start	Y16	Y08		
Axis 2 Positioning complete	X08	X15	Axis 1 Reverse run JOG start	Y17	Y09		
Axis 3 Positioning complete	X09	X16	Axis 2 Forward run JOG start	Y18	Y0A		
Axis 4 Positioning complete	-	X17	Axis 2 Reverse run JOG start	Y19	Y0B		
Axis 1 Error detection	X0A	X08	Axis 3 Forward run JOG start	Y1A	Y0C		
Axis 2 Error detection	X0B	X09	Axis 3 Reverse run JOG start	Y1B	Y0D		
Axis 3 Error detection	X0C	X0A	Axis 4 Forward run JOG start	-	Y0E		
Axis 4 Error detection	-	X0B	Axis 4 Reverse run JOG start	-	Y0F		
Axis 1 M code ON	X0D	X04	Programmable controller READY	Y1D	Y00		
Axis 2 M code ON	X0E	X05	Axis 1 Execution prohibition flag	-	Y14		
Axis 3 M code ON	X0F	X06	Axis 2 Execution prohibition flag	-	Y15		
Axis 4 M code ON	-	X07	Axis 3 Execution prohibition flag	-	Y16		
Synchronization flag	-	X01	Axis 4 Execution prohibition flag	-	Y17		
Not used	X10 to X1F	X02, X03	Netuced	Y00 to Y0F	Y02, Y03		
Not used	X 10 to X 1F	X18 to X1F	Not used	Y1E to Y1F	Y18 to Y1F		

The ON/OFF statuses for READY are different between the QD75M□/ and AD75M□.

	Not READY/WDT error	READY
QD75M□	OFF	ON
AD75M□	ON	OFF

## 7.5.4 Buffer memory address comparison

Sequence program change is required as the assignment of buffer memory differs. For details of the buffer memory or sequence program, refer to the Type QD75M Positioning Module User's Manual.

area shows the differences between AD75M□ and QD75M□.

	Buffer memory address								
Item of AD75M□		AD75M□		QD75M□					
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3			
Pr.1 Unit setting	0	150	300	0	150	300			
Pr.2 No. of pulses per rotation (AP)	1	151	301	2	152	302			
Pr.2 No. of pulses per rotation (AP)		101	301	3	153	303			
Pr.3 Movement amount per rotation (AL)	2	152	302	4 5	154 155	304 305			
Pr.4 Unit magnification (AM)	3	153	303	1	151	301			
Pr.7 Speed limit value	6	156	306	10	160	310			
11.7 Opeca mint value	7	157	307	11	161	311			
Pr.8 Acceleration time 0	8	158	308	12	162	312			
-	9	159	309	13	163	311			
Pr.9 Deceleration time 0	10	160	310	14	164	314			
	11 12	161 162	311 312	15 6	165 156	315			
Pr.10 Bias speed at start	13	163	312	7	157	306 307			
Pr.12 Backlash compensation amount	15	165	315	17	167	317			
	16	166	316	18	168	318			
Pr.13 Software stroke limit upper limit value	17	167	317	19	169	319			
Pr.14 Software stroke limit lower limit	18	168	318	20	170	320			
	19	169	319	21	171	321			
value	20	170	320	22	172	322			
Pr.15 Software stroke limit selection	20	170	320	22	112	322			
Pr.16 Software stroke limit valid/invalid	21 171 321	23	173	323					
setting	22	172	322	24	174	324			
Pr.17 Command in-position width	23	173	323	25	175	325			
Pr.18 Torque limit setting value	24	174	324	26	176	326			
Pr.19 M code ON signal output timing	25	175	325	27	177	327			
Pr.20 Speed switching mode	26	176	326	28	178	328			
Pr.21 Interpolation speed designation method	27	177	327	29	179	329			
Pr.22 Current feed value during speed control	28	178	328	30	180	330			
Pr.23 Manual pulse generator selection	29	179	329	33	-	-			
Pr.25 Size selection for acceleration/ deceleration time	31	181	331	-	-	-			
Function selection for speed-positioning	_	-	-	34	184	334			
	36	186	336	36	186	336			
Pr.26 Acceleration time 1	37	187	337	37	187	337			
D.O. A sealantian time C	38	188	338	38	188	338			
Pr.27 Acceleration time 2	39	189	339	39	189	339			
Pr.28 Acceleration time 3	40	190	340	40	190	340			
T1.20 Accordation time 0	41	191	341	41	191	341			

		Buffer memory address							
Item of AD75M□		AD75M□			QD75M□				
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3			
Pr.29 Deceleration time 1	42 43	192 193	342 343	42 43	192 193	342 343			
	44	194	344	44	194	344			
Pr.30 Deceleration time 2	45	195	345	45	195	345			
Dr. 24 Deceleration time 2	46	196	346	46	196	346			
Pr.31 Deceleration time 3	47	197	347	47	197	347			
Pr.32 JOG Speed limit value	48 49	198 199	348 349	48 49	198 199	348 349			
Pr.33 JOG operation acceleration time selection	50	200	350	50	200	350			
Pr.34 JOG operation deceleration time selection	51	201	351	51	201	351			
Pr.35 Acceleration/deceleration process selection	52	202	352	52	202	352			
Pr.36 S-pattern proportion	53	203	353	53	203	353			
Dr 27 Sudden step deceleration time	54	204	354	54	204	354			
Pr.37 Sudden stop deceleration time	55	205	355	55	205	355			
Pr.38 Stop group 1 sudden stop selection	56	206	356	56	206	356			
Pr.39 Stop group 2 sudden stop selection	57	207	357	57	207	357			
Pr.40 Stop group 3 sudden stop selection	58	208	358	58	208	358			
Pr.41 Positioning complete signal output time	59	209	359	59	209	359			
Pr.42 Allowable circular interpolation	60	210	360	60	210	360			
error width	61	211	361	61	211	361			
Pr.43 External start function selection									
(QD75M□: Pr.42 External command	62	212	362	62	212	362			
function selection)									
Pr.150 Restart allowable range when	64	214	364	64	214	364			
servo OFF to ON	65	215	365	65	215	365			
Pr.44 Near pass mode selection for path control	66	216	366	-	-	-			
Pr.45 OPR method	70	220	370	70	220	370			
Pr.46 OPR direction	71	221	371	71	221	371			
	72	222	372	72	222	372			
Pr.47 OP address	73	223	373	73	223	373			
Pr.48 OPR speed	74	224	374	74	224	374			
11.40 01 100000	75	225	375	75	225	375			
Pr.49 Creep speed	76 77	226 227	376 377	76 77	226 227	376 377			
Pr.50 OPR retry	78	228	378	78	228	378			
OPR dwell time	-	-	-	79	229	379			
Pr.52 Setting for the movement amount	80	230	380	80	230	380			
after near-point dog ON	81	231	381	81	231	381			
Pr.53 OPR acceleration time selection	82	232	382	82	232	382			
Pr.54 OPR deceleration time selection	83	233	383	83	233	383			
Pr.55 OP shift amount	84	234	384	84	234	384			
Pr.56 OPR torque limit value	85 86	235 236	385 386	85 86	235 236	385 386			
1 1.30 Of 13 torque illilit value			000		200				

	Buffer memory address								
Item of AD75M□		AD75M□		QD75M□					
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3			
Pr.57 Speed designation during OP shift	88	238	388	88	238	388			
Pr.58 Dwell time during OPR retry	89	239	389	89	239	389			
Pr.59 Absolute position restoration selection	91	241	391	-	-	-			
Pr.100 Servo series	100	250	400	30100	30200	30300			
Pr.101 Amplifier setting	101	251	401	30101	30201	30301			
Pr.102 Regenerative brake resistor	102	252	402	30102	30202	30302			
Pr.103 Motor type	103	253	403	30103	30203	30303			
Pr.104 Motor capacity	104	254	404	30104	30204	30304			
Pr.105 Servo motor speed	105	255	405	30105	30205	30305			
Pr.106 Feed back pulse	106	256	406	30106	30206	30306			
Pr.107 Rotation direction selection	107	257	407	30107	30207	30307			
Pr.108 Auto tuning	108	258	408	30108	30208	30308			
Pr.109 Servo response	109	259	409	30109	30209	30309			
Maker setting	-	-	-	30110	30210	30310			
Maker setting	-	-	-	30111	30211	30311			
Pr.112 Load inertia ratio	112	262	412	30112	30212	30312			
Pr.113 Position loop gain 1	113	263	413	30113	30213	30313			
Pr.114 Speed loop gain 1	114	264	414	30114	30214	30314			
Pr.115 Position loop gain 2	115	265	415	30115	30215	30315			
Pr.116 Speed loop gain 2	116	266	416	30116	30216	30316			
Pr.117 Speed integral compensation	117	267	417	30117	30217	30317			
Pr.118 Notch filter selection	118	268	418	30118	30218	30318			
Pr.119 Feed forward gain	119	269	419	30119	30219	30319			
Pr.120 In-position range	120	270	420	30120	30220	30320			
Pr.121 Electromagnetic brake sequence output	121	271	421	30121	30221	30321			
Pr.122 Analog monitor output	122	272	422	30122	30222	30322			
Pr.123 Optional function 1	123	273	423	30123	30223	30323			
Pr.124 Optional function 2	124	274	424	30124	30224	30324			
Pr.125 Adaptive vibration suppression control/ low pass filter	125	275	425	30125	30225	30325			
Pr.126 Maker setting	-	-	-	30126	30226	30326			
Pr.127 Monitor output 1 offset	127	277	427	30127	30227	30327			
Pr.128 Monitor output 2 offset	128	278	428	30128	30228	30328			
Pr.129 Pre-alarm data selection	129	279	429	30129	30229	30329			
Pr.130 Zero speed	130	280	430	30130	30230	30330			
Pr.131 Error excessive alarm level	131	281	431	30131	30231	30331			
Pr.132 Optional function 5	132	282	432	30132	30232	30332			
Pr.133 Optional function 6	133	283	433	30133	30233	30333			
Pr.134 PI-PID control switch-over position droop	134	284	434	30134	30234	30334			

	Buffer memory address								
Item of AD75M□		AD75M□			QD75M□	Axis 3 30335 30336 30337 30338  - 30339 30340 30341 30343 30344 30345 30346 30347 30348 30349 30350 30351 30352 30353 30354 30355 30356 30357			
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3			
Maker setting	-	-	-	30135	30235				
Pr.136 Speed differential compensation	136	286	436	30136	30236	30336			
Pr.137 Maker setting	-	-	-	30137	30237	30337			
Pr.138 Encoder output pulses	138	288	438	30138	30238	30338			
Pr.149 Servo parameter transmission setting	149	299	449	-	-	-			
Maker setting	-	-	-	30139	30239	30339			
Maker setting	-	-	-	30140	30240	30340			
Maker setting	-	-	-	30141	30241	30341			
Slight vibration suppression control selection 1	-	-	-	30143	30243	30343			
Slight vibration suppression control selection 2	-	-	-	30144	30244	30344			
Induction voltage compensation	-	-	-	30145	30245	30345			
Maker setting	-	-	-	30146	30246	30346			
Maker setting	-	-	-	30147	30247	30347			
Maker setting	-	-	-	30148	30248	30348			
Gain changing selection	-	-	-	30149	30249	30349			
Gain changing condition	-	-	-	30150	30250	30350			
Gain changing time constant	-	-	-	30151	30251	30351			
Ratio of load inertia moment to servomotor inertia moment 2	-	-	-	30152	30252	30352			
Position loop gain 2 changing ratio	-	-	-	30153	30253	30353			
Speed loop gain 2 changing ratio	-	-	-	30154	30254	30354			
Speed integral compensation changing ratio	-	-	-	30155	30255	30355			
Maker setting	_	-	-	30156	30256	30356			
Maker setting	-	-	-	30157	30257	30357			
Maker setting	-	-	_	30158	30258	30358			
Maker setting	-	-	-	30159	30259	30359			
Optional function C	-	-	-	30160	30260	30360			
Machine resonance suppression filter	-	-	-	30161	30261	30361			
Maker setting	-	-	-	30162	30262	30362			
Maker setting	-	-	-	30163	30263	30363			
Maker setting	-	-	-	30164	30264	30364			
Maker setting	-	-	-	30165	30265	30365			
Maker setting	-	-	-	30166	30266	30366			

		Buffer memory address					
Item of AD75M□		AD75M□	QD75M□				
		Common for axis 1,2,3	Common for axis 1,2,3,4				
Md.1 In test mode flag		450	1200				
Md.2 Module name		451	-				
Md.3 OS type		452 453 454 455	-				
Md.4 OS version		456 457	-				
Md.5 Clock data (hour: minute)		460	-				
Md.6 Clock data (second: 100 ms)		461	-				
(Pointer number)		(0)	to (15)				
Md.7 Start axis		462 to 537	1212 to 1287				
(QD75M□: Md.3 Start information)		402 to 001	1212 (0 120)				
Md.8 Operation type		463 to 538	1213 to 1288				
(QD75M□: Md.4 Start No.)	ory	403 to 330	12 13 to 1200				
Md.9 Start Hour: minute	Start history	464 to 539	1214 to 1289				
(QD75M□: Md.5 Start Hour)	Star	404 to 300	1214 10 1200				
Md.10 Start Second: 100 ms		465 to 540	1215 to 1290				
(QD75M□: Md.6 Start Minute: second)		403 (0 340	1213 (0 1290				
Md.11 Error judgment		466 to 541	1216 to 1291				
Md.12 Start history pointer		542	1292				
(Pointer number)		(0) to (15)	-				
Md.13 Start axis	rrors	543 to 618	-				
Md.14 Operation type	ing e	544 to 619	-				
Md.15 Start Hour: minute	y dur	545 to 620	-				
Md.16 Start Second: 100 ms	Start history during errors	546 to 621	-				
Md.17 Error judgment	tart h	547 to 622	-				
Md.18 Start history pointer at error	S	623	-				
(Pointer number)		(0)	to (15)				
Md.19 Axis in which the error occurred		624 to 684	1293 to 1353				
Md.20 Axis error No.		625 to 685	1294 to 1354				
Md.21 Axis error occurrence Hour: minute	tory	626 to 686	1295 to 1355				
(QD75MD: Md.11 Axis error occurrence (Hour))	Error history	020 to 000	1200 to 1000				
Md.22 Axis error occurrence Second: 100 ms							
(QD75M□: Md.12 Axis error occurrence		627 to 687	1296 to 1356				
(Minutes: second))	1						
Md.23 Error history pointer		688	1357				

		Buffer memory address						
Item of AD75M□		AD75M□	QD75M□					
		Common for axis 1,2,3	Common for axis 1,2,3,4					
(Pointer number)		(0) to	(15)					
Md.24 Axis in which the warning occurred		689 to 749	1358 to 1418					
Md.25 Axis warning No.		690 to 750	1359 to 1419					
Md.26 Axis warning occurrence Hour: minutes	history	691 to 751	1360 to 1420					
(QD75D: Md.16 Axis warning occurrence (Hour))		09110731	1300 to 1420					
Md.27 Axis warning occurrence Second: 100 ms	Warning							
(QD75M□: Md.17 Axis warning occurrence		692 to 752	1361 to 1421					
(Minutes: second))								
Md.28 Warning history pointer		753	1422					

	Buffer memory address							
Item of AD75M□		AD75M□	Daner mem	ory address	QD75M□			
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3		
Md.29 Current feed value	800	900	1000	800	900	1000		
Md.29 Culterit leed value	801	901	1001	801	901	1001		
Md.30 Machine feed value	802	902	1002	802	902	1002		
	803 804	903 904	1003 1004	803 804	903 904	1003 1004		
Pr.31 Feedrate	805	905	1005	805	905	1005		
Md.32 Valid M code	806	906	1006	808	908	1008		
Md.33 Axis error No.	807	907	1007	806	906	1006		
Md.34 Axis warning No.	808	908	1008	807	907	1007		
Md.35 Axis operation status	809	909	1009	809	909	1009		
Md.36 Current speed	810	910	1010	810 811	910 911	1010 1011		
MJ 27 Avia foodrata	812	912	1012	812	912	1012		
Md.37 Axis feedrate	813	913	1013	813	913	1013		
Md.38 Speed-position switching control	814	914	1014	814	914	1014		
positioning amount	815	915	1015	815	915	1015		
Md.39 External input/output signal	816	916	1016	816	916	1016		
Md.40 Status	817	917	1017	817	917	1017		
Md.41 Target value	818	918	1018	818	918	1018		
Target value	819	919	1019	819	919	1019		
Md.42 Target speed	820	920	1020	820	920	1020		
	821 822	921 922	1021 1022	821	921	1021		
Md.43 OP absolute position	823	923	1023	-	-	-		
Md.44 Movement amount after near-point	824	924	1024	824	924	1024		
dog ON	825	925	1025	825	925	1025		
Md.45 Torque limit stored value	826	926	1026	826	926	1026		
Md.46 Special start data instruction code setting value	827	927	1027	827	927	1027		
Md.47 Special start data instruction parameter setting value	828	928	1028	828	928	1028		
Md.48 Start positioning data No. setting value	829	929	1029	829	929	1029		
Md.49 In speed control flag	830	930	1030	830	930	1030		
Md.50 In speed change processing flag	831	931	1031	831	931	1031		
Md.51 Start data pointer being executed	832	932	1032	834	934	1034		
Md.52 Last executed positioning data No.	833	933	1033	837	937	1037		
Md.53 Repetition counter								
(QD75M□: Md.41 Special start repetition	834	934	1034	832	932	1032		
counter)								
Md.54 Positioning data No. being executed	835	935	1035	835	935	1035		
Md.55 Block No. being executed	836	936	1036	836	936	1036		
Md.56 Positioning data being executed	838 to 847	938 to 947	1038 to 1047	838 to 847	938 to 947	1038 to 1047		
Md.100 OPR re-travel value	848	948	1048	848	948	1048		
	849	949	1049	849	949	1049		
Md.101 Real current value	850 851	950 951	1050 1051	850 851	950 951	1050 1051		

	Buffer memory address								
Item of AD75M□		AD75M□			QD75M□				
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3			
Md.102 Deviation counter value	852	952	1052	852	952	1052			
Mid. 102 Beviation doubler value	853	953	1053	853	953	1053			
Md.103 Motor rotation	854 855	954 955	1054 1055	854 855	954 955	1054 1055			
Md.104 Motor current value	856	956	1056	856	956	1056			
Md.105 Auto tuning	857	957	1057	857	957	1057			
Md.106 Load inertia ratio	858	958	1058	858	958	1058			
Md.107 Position loop gain 1	859	959	1059	859	959	1059			
Md.108 Speed loop gain 1	860	960	1060	860	960	1060			
Md.109 Position loop gain 2	861	961	1061	861	961	1061			
Md.110 Speed loop gain 2	862	962	1062	862	962	1062			
Pr.111 Speed integral compensation	863	963	1063	863	963	1063			
Md.112 Servo amplifier software No.	864 - 869	964 - 969	1064 - 1069	864 - 869	964 - 969	1064 - 1069			
Md.113 Parameter error (No.0 to 15)	870	970	1070	870	970	1070			
Md.114 Parameter error (No.16 to 31)	871	971	1071	871	971	1071			
Md.115 Parameter error (No.32 to 47)	872	972	1072	872	972	1072			
Parameter error (No.48 to 63)		-		873	973	1073			
Parameter error (No.64 to 75)		-		874	974	1074			
Maker setting		-		875 876	975 976	1075 1076			
Md.116 Servo status	873	973	1077	877	977	1077			
Md.117 Regenerative load ratio	876	976	1078	878	978	1078			
Md.118 Effective load torque	877	977	1079	879	979	1079			
Md.119 Peak torque ratio	878	978	1080	880	980	1080			
Md.121 Absolute position restoration mode	879	979	1079						
Md.120 FeRAM access count	880 - 883	980 - 983	1080 - 1083						
Deceleration start flag		-		899	999	1099			

		Buffer memory address						
ltem of AD75M□		AD75M□			QD75M□			
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3		
Cd.1 Clock data setting (hour)		1100			-			
Cd.2 Clock data setting (minute, second)		1101			-			
Cd.3 Clock data writing		1102			_			
Cd.4 Target axis		1103			_			
Cd.5 Positioning data No.		1104						
Cd.6 Write pattern		1105						
		1106						
		1108 to 1137						
Cd.8 Read/write positioning data I/F		1138			1000			
Cd.9 Flash ROM write request					1900			
Cd.10 Parameter initialization request		1139			1901			
Cd.11 Positioning start No.	1150	1200	1250	1500	1600	1700		
Cd.12 Axis error reset	1151	1201	1251	1502	1602	1702		
Cd.13 Restart command	1152	1202	1252	1503	1603	1703		
Cd.14 M code OFF request	1153	1203	1253	1504	1604	1704		
Cd.15 New current value	1154	1204	1254	1506	1606	1706		
	1155 1156	1205 1206	1255 1256	1507 1514	1607 1614	1707 1714		
Cd.16 New speed value	1157	1207	1257	1515	1615	1715		
Cd.17 Speed change request	1158	1208	1258	1516	1616	1716		
Cd.18 Positioning operation speed override	1159	1209	1259	1513	1613	1713		
Cd.19 JOG speed	1160	1210	1260	1518	1618	1718		
	1161	1211	1261	1519	1619	1719		
Cd.20 Speed-position switching enable flag	1163	1213	1263	1528	1628	1728		
Cd.21 Speed-position switching control	1164	1214	1264	1526	1626	1726		
movement amount change register	1165	1215	1265	1527	1627	1727		
Cd.22 Manual pulse generator enable flag	1167	1217	1267	1524	1624	1724		
Cd.23 Manual pulse generator 1 pulse	1168	1218	1268	1522	1622	1722		
input magnification	1169	1219	1269	1523	1623	1723		
Cd.24 OPR return request flag OFF request	1170	1220	1270	1521	1621	1721		
Cd.25 External start valid								
(QD75M□: Cd.8 External command valid)	1171	1221	1271	1505	1605	1705		
Cd.26 Step valid flag	1172	1222	1272	1545	1645	1745		
Cd.27 Step mode	1173	1223	1273	1544	1644	1744		
Cd.28 Step start information	1174	1224	1274	1546	1646	1746		
Cd.29 Skip command	1175	1225	1275	1547	1647	1747		
Cd.30 New torque value	1176	1226	1276	1525	1625	1725		
Cd.31 Positioning starting point No.	1178	1228	1278	1501	1601	1701		
Cd.100 Servo OFF command	1179	1229	1279	1551	1651	1751		
Cd.101 Torque output setting value	1180	1230	1280	1552	1652	1752		

	Buffer memory address								
Item of AD75M□		AD75M□		QD75M□					
	Axis 1 Axis 2 Axis 3		Axis 1	Axis 2	Axis 3				
Cd.32 Interrupt request during	1181	1231	1281	1520	1620	1720			
continuous operation	1101	1231	1201	1320	1020	1720			
	1184	1234	1284	1508	1608	1708			
Cd.33 New acceleration time value	1185	1235	1285	1509	1609	1709			
	1186	1186 1236 1286 1510		1510	1610	1710			
Cd.34 New deceleration time value	1187	1237	1287	1511	1611	1711			
Cd.35 Acceleration/deceleration time									
change during speed change, enable/	1188	1238	1288	1512	1612	1712			
disable selection									
Deceleration start flag valid		-		1905					
Stop command processing for deceleration					4007				
stop selection		-			1907				
Servo amplifier data read		-		1553	1653	1753			

				Buffer memory address												
		Item of AD75M□				AD7	5M□					QD7	5M□			
				Ax	is 1	Ax	is 2	Ax	is 3	Ax	is 1	Ax	is 2	Axi	is 3	
	Da Da Da	.3 Acceleration time No.		13	1300 2300 3300		20	000	80	000	140	000				
	E			12	:01	23	:01	33	n1	20	101	90	001	140	201	
<del>-</del>		.9 M code/condition data .8 Dwell time/JUMP ination positioning data	No.1		1301 2301 1302 2302			3301		2001		8001			002	
ata	Emp	oty		13	03	23	03	33	03	20	03	80	003	140	003	
Positioning data*1	Da				04 05		04 05		04 05		Axis 2   Axis 2			004		
ositio	Da	.5 Positioning address/		13	06	23	06	33	06	20	06	80	006	140	006	
l g		ement amount		13	07	23	07	33	07	20	07	80	07	140	007	
	Da	.6 Arc address			08 09		08 09		08 09						008	
		No.2			o 1319	2310 t	o 2319	3310 t	o 3319	2010 t	o 2019	8010 t	8009 8010 to 8019		14010 to 14019	
		No.3			o 1329		o 2329		o 3329				8020 to 8029		14020 to 14029	
		to		1	to	t	to	1	:0	1	to	1	to	to 14990 to		
		No.100		2290 t	o 2299	3290 t	o 3299	4290 to 4299		2990 to 2999		8990 to 8999		14990 to		
	Start block data*2	Da.10 Shape Da.11 Start data No. Da.12 Special start instruction Da.13 Parameter	1st point	4300	4300 4350 45		4600	4800	4850					28000		
	Sta	2nd point		4301	4351	4551	4601	4801	4851				27051	28001	28051	
		3rd point to		4302	4352 to	4552	4602 to	4802	4852 o			1		1	28052	
n*3		50th point		4349	4399	4599	4649	4849	4899					28049		
Positioning start information*3		Da.14 Condition target  Da.15 Condition operator		44	-00	46	550	49	00	26	100	27	100	281	100	
ioning		Da.16 Address	No.1	44	.02 .03	46	52 53	49	02 03	26	103	27	103	28	102 103	
Posit	ı data	Da.17 Parameter 1		44	.04 .05	46	54 55	49	04 05	26	105	27	107	28	106 107	
	Condition data	Da.18 Parameter 2			·06 ·07		56 57		06 07						106 107	
	ပိ	No.2		4410 t	o 4419	4660 t	o 4669	4910 t	o 4919						10 to 119	
		No.3		4420 t	o 4429	4670 t	o 4679	4920 t	o 4929	2612	20 to	271	20 to	2812	20 to 129	
		to		1	to	t	to	1	:0						0	
		No.10		4490 t	o 4499	4740 t	o 4749	4990 t	o 4999		90 to 199		90 to 199		90 to 199	

^{*1} With the QD75M $\square$ , the positioning data buffer memory addresses are Nos. 1 to 600.

^{*2} With the QD75M□, it is called "block start data".

With the QD75M□, the [block start data] and [condition data] in _____ the area are called [start block 0]. There are five start blocks: 0 to 4

					Buffer mem	ory address				
	Item of AD75M□			AD75M□						
		Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3			
Positioning		Start No.8001	4500	4750	5000	-	-	-		
start	Indirect	Start No.8002	4501	4751	5001	-	-	-		
information	designation	to	to	to	to	to	to	to		
IIIIOIIIIalioii		Start No.8050	4549	4799	5049	-	-	-		
Programmat	ale controller	Condition judgment target	5050			30000				
CPU memor		data of the condition data	to I				to	to		
CPU Memor	у агеа	data of the condition data	5099			30099				
Target axis			5100 -			-				
Head positioning block No.			5101			-				
No. of read/write data items			5102			-				
Read/write request		5103			-					
Read/write b	lock			5110 to 6109			-			

### 7.5.5 Interface specifications comparison with external devices

For the external interface specifications, the following shows the differences between AD75M□ and QD75M□.

### (1) Comparison of electrical specifications

 $\bigcirc$  : Compatible,  $\triangle$  : Partial change required

Item		Differences as Interface specifications*	compati- bility	Precautions for replacement	
	Upper/lower limit signal	OFF current: 1.5mA→1.0mA		Check whether the OFF current value met	
	Opper/lower littlit signal	Input resistance: $4.7k\Omega\rightarrow6.8k\Omega$	Δ	satisfied values	
	Stop signal	OFF current: 1.5mA→1.0mA		Check whether the OFF current value met	
	Stop signal	Input resistance: $4.7k\Omega\rightarrow6.8k\Omega$	Δ	satisfied values	
		OFF current: 1.5mA→1.0mA		Check whether the OFF current value met	
Input	Near-point dog signal	Input resistance: $4.7k\Omega\rightarrow6.8k\Omega$	Δ	satisfied values	
input		Response time: 4ms→1ms		satisfied values	
		OFF current: 1.5mA→1.0mA		Check whether the OFF current value met	
	Speed-position switching signal	Input resistance: $4.7k\Omega\rightarrow6.8k\Omega$	Δ	satisfied values	
		Response time: 4ms→1ms		satisfied values	
	Manual pulse generator	ON current: 3.5mA→1.0mA			
	Manual pulse generator	Input resistance: 1.5k→1.2kΩ	0		

The column of interface specifications differences is described as the form, [Specifications of AD75M $\square$ ]  $\rightarrow$  [Specifications of QD75M $\square$ ].

### (2) Comparison of connector signal sequence

When using with QD75M□, change the connector and wiring.

	AD7	75М□	QD75M□		
Name	Logic (Initial setting)	Logic switching by parameter	Logic (Initial setting)	Logic switching by parameter	
Manual pulse generator A phase	Negative logic	Not allowed	Negative logic	Allerrad	
Manual pulse generator B phase*1	(multiple of 4)	Not allowed	(multiple of 4)	Allowed	
Near-Point signal	Negative logic	Not allowed	Negative logic	Allowed	
Stop signal	Negative logic	Not allowed	Negative logic	Allowed	
Upper limit	Negative logic	Not allowed	Negative logic	Allowed	
Lower limit	Negative logic	Not allowed	Negative logic	Allowed	
External start*2	Negative logic	Not allowed	Negative logic	Allowed	
Speed-position switching signal*2	Negative logic	Not allowed	rvegative logic	Allowed	

¹ The following shows comparisons about manual pulse generator A phase/B phase.

	AD75M□	QD75M□
No. of connection	1 generator/axis	1 generator/module
		Allowed
Mode change (Parameter)	Not allowed	1 x mode, 2 x mode,
		4 x mode, PLS/SIGN mode

^{*2} With the QD75M□, the "external start signal" and "speed-position switching signal" are combined into the "external command signal/switching signal".

#### (3) Supported servo amplifier

#### (a) For continuous use of a servo amplifier connected with the existing AD75M

The following table shows whether or not the existing servo amplifier can be continuously used with positioning modules replaced.

AD75M□ Supported amplifier model	QD75M□ Availability	Remarks
MR-J□-B	Available	Needs to change the SSCNET cables (refer to (b) in the next page.)
MR-H□-B	Available	Discontinued model
MR-J2□-B	Available	- Discontinued model
MR-J2S□-B	Available	Needs to change the SSCNET cables (refer to (b) in the next page.)
WIN-323LI-B	Available	Model to be discontinued at the end of September 2015

## ☑Point -

(1) Selecting suitable products to replace the existing servo amplifier

When replacing the existing servo amplifier, select a positioning module in the following combinations.

Additionally, the servo motor needs to be replaced.

• Positioning module: QD77MS□ + servo amplifier: MR-J3□-B

• Positioning module: QD77MS□ + servo amplifier: MR-J4□-B

(2) Selecting suitable products to replace the existing servo amplifier without servo motor replacement

When replacing the existing servo amplifier alone without servo motor replacement, select a module in the following combination.

Positioning module: QD75M

+ Servo amplifier: MR-J4-B-RJ020

(Conversion Unit for SSCNET of MR-J2S-B Compatible Servo Amplifier)

+ Converter MR-J4-T20

module: (Conversion Unit for SSCNET of MR-J2S-B)

For replacing servo amplifiers and servo motors, data such as positioning parameters and positioning data need to be changed.

When replacing them, contact the department in charge of Mitsubishi electric servo products. For replacing the MR-J2S□-B, refer to "Transition from MELSERVO-J2-Super/J2M Series to J4 Series Handbook" (L(NA)03093).

### (b) For SSCNET cables applicable to the servo amplifiers

The following tables show applicable SSCNET cables when the existing servo amplifier is continuously used.

Replacing positioning modules from the AD75M to the QD75M requires the change of SSCNET cables.

Table 1. With the servo amplifier MR-J, J2, or J2S

SSCNET cable		Between QD75 and MR-J/J2/ J2S amplifier	Between AD75 and MR-J/J2/ J2S amplifier	Between MR-J/J2/J2S amplifier and MR-J/J2/J2S amplifier	
MR-J2HBUS□M		0	×	0	
MR-J2HBUS□M-A		×	0	×	
MR-HBUS□M		×	×	×	
MR-J2CN1		0	×	0	
MR-J2CN1-A	*1	×	0	×	
MR-HBCNS		×	×	×	

^{*1} Connector set for making the cable by user

Table 2. With the servo amplifier MR-H

SSCNET cable		Between QD75M and MR-H amplifier	Between AD75M and MR-H amplifier	Between MR-H amplifier and MR-H amplifier	
MR-J2HBUS□M		×	×	×	
MR-J2HBUS□M-A		O ×		×	
MR-HBUS□M		×	0	0	
MR-J2CN1		×	×	×	
MR-J2CN1-A	*1	0	×	×	
MR-HBCNS		×	0	0	

^{*1} Connector set for making the cable by user

# 7.6 AD70

# 7.6.1 Performance specifications comparison

O : Compatible,  $\triangle$  : Partial change required, x : Incompatible

	Maria		○: Compatible, △	: Partial cr	ange required, ×: Incompatible
Item	Model	AD70	QD73A1	Compat- ibility	Precautions for replacement
Number of co	ontrol axes	1 axis	1 axis	0	
D	Capacity	1 data	1 data	0	
Positioning data	Setting method	Sequence program	Sequence program	0	
	Mode	Position control mode (Positioning, two-phase trapezoidal positioning) Speed-position control switch mode	Position control mode (Positioning, two-phase trapezoidal positioning) Speed-position control switch mode	0	
	System	Position control mode: Absolute system/incremental system Speed-position control switch mode: Incremental system	Position control mode: Absolute system/incremental system Speed-position control switch mode: Incremental system	0	
	Position command	-2147483648 to 2147483647 (pulse) (32-bit signed binary)	-2147483648 to 2147483647 (pulse) (32-bit signed binary)	0	
Docitioning	Speed command	1 to 400,000 (pulse/s)	1 to 4,000,000 (pulse/s)	0	The specification has improved. (Upward-compatibility)
Positioning	Acceleration/ deceleration	Automatic trapezoidal acceleration/ deceleration	Automatic trapezoidal acceleration/ deceleration	0	
	Automatic acceleration/ deceleration	Acceleration time: 2 to 9999 (ms) Deceleration time: 2 to 9999 (ms)	Acceleration time: 2 to 9999 (ms) Deceleration time: 2 to 9999 (ms)	0	
	In-position range	1 to 2047 pulse	1 to 20479 pulse	0	The specification has improved. (Upward-compatibility)
	Backlash compensation	×	×	0	
	Error correction function	×	×	0	
Speed comm	and output	0 to ±10VDC (Adjustable to set in the range of ±5 to ±10VDC)	0 to ±10VDC  (Adjustable to set in the range of ±5 to ±10VDC)	0	
Positioning	Pulse frequency	Open collector : 100kpulse/s TTL: 100kpulse/s Differential output: 100kpulse/s	Open collector: 200kpulse/s TTL: 200kpulse/s Differential output: 1Mpulse/s	0	The specification has improved. (Upward-compatibility)
feedback pulse input	Connectable encoder type	Open collector, TTL, or differential output	Open collector, TTL, or differential output	0	
	Multiplica-tion setting	The number of input feedback pulses can be multiplied by 4, 2, 1, or 1/2.	The number of input feedback pulses can be multiplied by 4, 2, 1, or 1/2.	0	
OPR control		Available (2 method)	Available (2 method)	0	The setting method is changed from a hardware switch to PLC parameter of a CPU module. The function is the same though the setting method is changed.
JOG operation		0	0	0	
Starting time		Absolute system: 4.4ms*1 Incremental system: 4.5ms*1 JOG operation: 4.3ms OPR (near-point dog method): 4.4ms OPR (count method): 5.1ms	Absolute system: 1.2ms*1 Incremental system: 1.2ms*1 JOG operation: 1.2ms OPR (near-point dog method): 1.2ms OPR (count method): 1.2ms	0	The specification has improved. (Upward-compatibility)
M function		× ×	× ×	0	
M function			1	J	

O : Compatible,  $\triangle$  : Partial change required,  $\times$  : Incompatible

Model Item	AD70	QD73A1	Compat- ibility	Precautions for replacement
Internal current consumption (5VDC)	5VDC 0.3A	5VDC 0.52A	Δ	The recalculation of internal current consumption (5VDC) is required.
External supply voltage/ current terminal block	+15VDC, 0.2A -15VDC, 0.02A		0	An external power supply is not required.
Number of occupied I/O points	32 points (Number of I/O slots: 1 slot occupied) (I/O assignment: 32 points, special function module)	48 points (Number of I/O slots: 2 slots occupied) (I/O assignment: First half 16 points, empty slot, Second half 32 points, intelligent function module)	Δ	The number of occupied slots and I/O points are changed.*2
Weight	0.4kg	0.2kg	0	

For the AD70, 0.2ms is added to the starting time in two-phase trapezoidal positioning mode. For the QD73A1, an extra time is not added even in two-phase trapezoidal positioning mode.

^{*2} For the QD73A1, the number of occupied slots is 2 and the number of occupied I/O points is 48.

The program can be utilized easily by setting Empty 0 point to the first half slot of the QD73A1, or by setting the XY address of the AD70 to the second half slot of the QD73A1 at Start XY in I/O assignment of PLC parameter.

# 7.6.2 Function comparison

# (1) Function comparison between the AD70 and the QD73A1

○: Compatible, --: Not available

	Function		Description	AD70	QD73A1	Precautions for replacement
	Position	Positioning control	Positioning is executed from the current position to a specified position at a specified speed.	0	0	Refer to Section 7.6.6.
		Two-phase	Positioning is executed to the address specified in			
	mode	trapezoidal positioning		0	0	
Major		control	The tree dad one opening in the tree dad one opening address to the			
Major positioning			"Da.5 Positioning speed V2" by one positioning start signal.  Operation starts according to the positioning speed set beforehand			
control			by one start signal, then the operation switches to position control			
CONTROL			by Speed-position switching command signal. If the operation			
	Speed-po	eition	stopped by Stop signal after the input of Speed-position switching			Refer to Section
		vitch mode	command signal, the positioning can be continued by Speed-	0	0	7.6.6.
	COITHOLSY	vitcii iiiode	position mode restart signal. In addition, the positioning address			7.0.0.
			(movement amount) can be changed if it is before the input of			
			Speed-position switching command signal.			
			Positioning is executed in the specified direction at specified			
			speed while a JOG operation command is on. Turning on the			
JOG operat	tion		signal starts operation at a specified speed and speed control	0	0	
			operation is continued until Stop signal is input.			
			A workpiece is returned to an original point following an OPR start			
OPR control			command from a CPU module, and the current value is corrected	0	0	
OT IT COINE	Of IX control		to an OP address after the completion of OPR.			
Multiplication	n cotting		This function multiplies the feedback pulse frequency from the			
Multiplication	in setting		pulse generator by 4, 2, 1, or 1/2.	0	0	
Electronic g	ear function	on	This function controls moving distance and speed by multiplying	0	0	
	, , , , , , , , , , , , , , , , , , , ,		command pulse output.		O	
			This function clears the accumulated pulses in the deviation			
			counter. When the servomotor power is turned off due to an			
Deviation c	ounter clea	ar function	emergency stop during positioning, clearing the accumulated	0	0	
			pulses in the deviation counter prevents servomotor rotation at			
			power recovery.			
Speed char	nae functio	n	This function forces to change speed from a program during	0	0	Refer to Section
opeca change function			positioning control or JOG operation.		O	7.6.6.
Current value change function		function	This function changes the current feed value to a specified value	0	0	Refer to Section
			from a sequence program on the condition other than while BUSY.			7.6.6.
			This function turns on In-position signal while the accumulated			
In-position	function		pulse amount in the deviation counter is within the specified in-	0	0	
			position range. In-position signal can be used as the signal right			
			before positioning completion.			
Zero/gain a	djustment		This function adjusts analog voltage contained in accumulated	0	0	Refer to Section
	-		pulses.		_	7.6.6.



Positioning execution time (BUSY signal (X14) ON to Positioning complete signal (X15) ON) of the QD73A1 and AD70 may differ because their internal processing methods are different. As a result, the timing when In-position signal (X16) turns on may also vary.

Adjust positioning execution time using the following methods if the difference of the positioning execution time (or the timing when In-position signal (X16) turns on) affects the system.

- Adjusting the QD73A1's positioning parameter, "Pr.6 Acceleration time" or "Pr.7 Deceleration time".
- Increasing gain by changing the accumulated pulse amount setting through the QD73A1's zero/ gain adjustment

#### (2) Changed function from the AD70

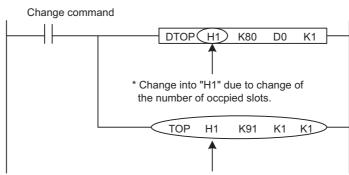
Though the functions of the AD70 and the QD73A1 are same, the setting methods and buffer memory addresses for the functions are partly changed.

To use following functions, changes or corrections of the programs or setting methods are required. For details, refer to the user's manual for the QD73A1.

Changed function	Change description
Maior positioning control	Program corrections of the QD73A1 are required because buffer memory addresses for the positioning
Major positioning control	address, positioning speed, and positioning pattern differ from those of the AD70.
	• AD70
	For Velocity/position axis travel distance change area, the value is reflected during speed control.
Speed-position control switch	Setting value: 0 to 2147483647 (valid within the stroke range)
mode (speed control	• QD73A1
operation)	For New speed-position movement amount, the value is cleared to 0 when the next operation starts and
	reflected when Speed-position switching command signal is turned on.
	Setting value: 1 to 2147483647 (valid within the stroke range)
	• AD70
	The speed change is requested by writing a new speed value in Velocity change area of the buffer
	memory.
Speed change function	• QD73A1
	The speed change is requested by writing a new speed value in the buffer memory and writing "1" to
	Speed change request (buffer memory address: 91).
	* To use the speed change function, an additional program is required.*1
	• AD70
	The current value is changed by writing a new address in Present value change area of the buffer
Current value change function	memory.
carrent value change faileten	• QD73A1
	The current value is changed by writing a new address in New current value of the buffer memory and
	writing "1" to Current value change request (buffer memory address: 90).
	• AD70
	The adjustment is performed using the volumes for zero/gain adjustment.
	• QD73A1
	The adjustment is performed by either of following methods.
Zero/gain adjustment	1) Using the UP/DOWN switch for zero/gain adjustment
	The function is the same as the AD70 though the QD73A1 uses the UP/DOWN switch instead of the
	volumes.
	2) Using the buffer memory
	To use the buffer memory for the adjustment, create a program.

Changed function	Change description
Mode switch	<ul> <li>AD70 The setting is configured with slide switches or encoder interface setting pin (hardware setting) <ol> <li>Slide switches</li> <li>Rotation direction, accumulated pulse, multiplication setting, zero-return direction, zero-return mode, and zero/gain adjustment mode setting/clear</li> <li>Encoder interface setting pin</li> <li>Encoder output types</li> <li>QD73A1</li> <li>The setting is configured with Switch setting in I/O assignment of PLC parameter (GX Developer).</li> <li>When using GX Works2, set it with the intelligent function module switch setting.)</li> </ol> </li> <li>* Though the setting method is changed from a hardware switch to parameters of software, the same level of settings are available because the function is upward compatible.</li> </ul>
LED	Refer to *2.

*1 Example of an additional program (using a buffer memory address for the speed change function)



* Create the above due to the speed demand.

*2 Details of LEDs are shown in the table below.

LED name	AD70	QD73A1	Remarks ^{*3}
RUN		RUN	
Minor error	ERR.1	ERR.	Used for both minor errors and major errors.
Major error	ERR.2	LKK.	Osed for both million errors and major errors.
Encoder phase A	φА	φА	
Encoder phase B	φВ	φВ	
Encoder phase Z	φZ	φZ	
BUSY	BUSY	BUSY	
Zero adjustment status		ZERO	The contents indicated with "ZERO" of the QD73A1 differ from the ones indicated with "ZERO" of the AD70.
Gain adjustment status	-	GAIN	
Servo READY	SV RDY		Can be checked with an input signal "X1B".
Near-zero point dog	DOG		Can be checked with an input signal "X1C".
Stop	STOP		Can be checked with an input signal "X1D".
Upper limit LS	FLS		Can be checked with an input signal "X1E".
Lower limit LS	RLS		Can be checked with an input signal "X1F".
In-Position	IN-POS		Can be checked with an input signal "X16".
Error counter polarity	POLE		Can be checked with buffer memory addresses "106, 107".
Error counter value	2 ⁿ		The LED "POLE" of the AD70 indicates ON when the deviation counter value is "-", and indicates OFF when the deviation counter value is "+".
PC READY	PC RDY		Check the on/off status of an output signal "Y2D" with a device monitor.
Zero-return request	ZERO		Can be checked with an input signal "X12".  The contents indicated with "ZERO" of the AD70 differ from the ones indicated with "ZERO" of the QD73A1.
Excessive error	EEX		Can be checked with an input signal "X17".
WDT error	WDT ERR		Can be checked with an input signal "X10".
During velocity operation	V-MODE		Can be checked with an input signal "X2D".

*3 The I/O signals shown in the table are the ones when the QD73A1 is mounted on the slots "0, 1" of a main base unit. Note that XY addresses of the QD73A1 are different from the ones of the AD70 because the number of occupied slots differs between the modules as shown below.

AD70						
Power supply module	CPU module	AD70				

	QD73A1					
Power supply module	CPU module	QD7	      3A1   			

### 7.6.3 I/O signals comparison to CPU module

An addition or change of a sequence program is required because the I/O signals partly differ between the modules.

For details of the I/O signals or sequence program, refer to the MELSEC-Q QD73A1 Positioning Module User's Manual.

Input (X)			Output (Y)			
Signal name	AD70	QD73A1	Signal name	AD70	QD73A1	
Unused		X00	Unused		Y00	
(The first half slot is Empty 16 points.)*1		to	(The first half slot is Empty 16 points.)*1		to	
(The first hair slot is Empty 16 points.)		X0F	(The first hair slot is Empty 16 points.)		Y0F	
WDT error, H/W error	X00	X10	Zero/gain adjustment data writing request		Y1A	
Module READY	X01	X11	Zero/gain adjustment change request		Y1B	
OPR request	X02	X12	Set value change request		Y1C	
OPR complete	X03	X13	OPR start	Y10	Y20	
BUSY	X04	X14	Absolute positioning start	Y11	Y21	
Positioning complete	X05	X15	Forward start	Y12	Y22	
In-position	X06	X16	Reverse start	Y13	Y23	
Excessive error	X07	X17	Forward JOG start	Y14	Y24	
Error detection	X08	X18	Reverse JOG start	Y15	Y25	
Overflow	X09	X19	Speed-position mode restart	Y16	Y26	
Underflow	X0A	X1A	Stop	Y17	Y27	
Servo READY	X0B	X1B	Error reset	Y18	Y28	
Near-point dog	X0C	X1C	Overflow reset	Y19	Y29	
External stop	X0D	X1D	Underflow reset	Y1A	Y2A	
Upper limit signal	X0E	X1E	Speed-position switching enable	Y1C	Y2C	
Lower limit signal	X0F	X1F	PLC READY	Y1D	Y2D	
OPR start complete		X20		Y00	Y10	
Absolute positioning start complete		X21		to	to	
Absolute positioning start complete		٨٢١		Y0F	Y19	
Forward start complete				Y1B	Y1D	
(for the incremental positioning and the		X22	*2		to	
speed-position control switching)			Use prohibited*2	Y1E, Y1F	Y1F	
Reverse start complete						
(for the incremental positioning and the		X23			Y2E, Y2F	
speed-position control switching)		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			125, 125	
speed-position control switching)						
Synchronization flag		X24				
Zero/gain adjustment data writing complete		\/a.	1			
flag		X2A				
Zero/gain adjustment change complete flag		X2B	1			
Set value change complete flag		X2C	1			
Operating status of the speed-position			1			
control switch mode		X2D				
Control switch mode						
	X10	X25 to X29				
Use prohibited*2	to	VOE VOE	1			
	X1F	X2E, X2F				

^{*1} The XY number same as the AD70 can be used for the QD73A1 by setting "Empty 0 point" to the "Unused" area of the QD73A1 (first half slot: Empty 16 points) in I/O assignment of PLC parameter.

^{*2} A "Use prohibited" area is reserved for the system use and cannot be used by a user.

If it is turned on/off through a sequence program, the normal operation of the module cannot be guaranteed.

## 7.6.4 Buffer memory address comparison

Sequence program change is required because the assignment of buffer memory differs between the modules.

For details of the buffer memory or sequence program, refer to the MELSEC-Q QD73A1 Positioning Module User's Manual.

area shows the differences between the AD70 and the QD73A1.

Itom			Buffer memory address		
	Item		AD70	QD73A1	
	Charles limit was an limit		0	0	
Fixed parameter	Stroke littil upper littil	Stroke limit upper limit		1	
	Stroke limit lower limit	Chrolica limeth leaves a limeth		2	
	Stroke littlit lower littlit		3	3	
		Numerator of command	4	4	
	Electronic gear	pulse multiplication	4	7	
		Denominator of			
		command pulse	5	5	
		multiplication			
	Speed limit value		20	20	
	Opeca iiiiii vaide		21	21	
Variable parameter	Acceleration time		22	22	
variable parameter	Deceleration time		23	23	
	In-position range		24	24	
	Positioning mode		25	25	
	OP address		40	40	
	Or address		41	41	
	OPR speed	ODB speed		42	
OPR data	Of it speed		43 44	43	
Of It data	Creep speed	Croop appead		44	
			45	45	
	-	ent amount after near-point	46	46	
	dog ON		47	47	
	Positioning pattern		60	301	
	Positioning address P	4	61	302	
	. comormig addition	I	62	303	
	Positioning speed V ₁		63	304	
Positioning data	. comerming operation		64	305	
	Positioning address P	2	65	306	
		2	66	307	
	Positioning speed V ₂		67	308	
	J 17 1 2		68	309	
	New current value		80	80	
			81	81	
	New speed value		82 83	82	
	,	New speed value		83	
	JOG speed (area)		84	84	
	, , , ,		85	85	
Control change area	Deviation counter clea		86	86	
	Analog output adjustn	nent area 1	87	87	
	New speed-position m	novement amount	88	88	
			89	89	
	Current value change	-		90	
	Speed change reques	t		91	
	Analog output adjustn	nent area 2		92	
				93	

ll a ve		Buffer memory address		
	Item	AD70	QD73A1	
	Zero/gain adjustment specification		94	
Zero/gain adjustment area	Zero/gain adjustment value specification		95	
	Factory default zero/gain adjustment value		96	
	restoration request		90	
	Current feed value	100	100	
	Current leed value	101	101	
	Actual current value	102	102	
	Actual current value	103	103	
	Error code (ERR.1)	104	104	
	Error code (ERR.2)	105	105	
		106	116 ^{*1}	
	Deviation counter value	107	117 ^{*1}	
Monitor area			106 ^{*2}	
Monitor area	Deviation counter value (address)		107 ^{*2}	
	Mayamant amount after near point dog ON	108	108	
	Movement amount after near-point dog ON	109	109	
	Speed-position switching command	110	110	
	Control mode	111	111	
	Zero/gain execution status		112	
	Zero/gain adjustment status		113	
	Feedrate		114	
	reediate		115	
	(Record 0) Error code		120	
	(Record 0) Error occurrence (Year : Month)		121	
Error history	(Record 0) Error occurrence (Day : Hour)		122	
LITOI HISTOLY	(Record 0) Error occurrence (Minute : Second)		123	
	(Record 1 to 15)		124 to 183	
	Error history pointer		184	

^{*1} A value of the same specification as AD70 is stored. The buffer memory address name of the QD73A1 changes Deviation counter value (pulse). Deviation counter value (pulse) supports the QD73A1 whose serial number (first five digits) is "15042" or later.

^{*2} When electronic gear setting is 1/1, the value will be the same as Deviation counter value (pulse).

## 7.6.5 Interface specifications comparison with external devices

For the external interface specifications, the following shows the differences between the AD70 and the QD73A1.

O: Compatible, △: Partial change required

					alibie, \(\triangle\). Partial change required
Ito	em	AD70	QD73A1	Compati- bility	Precautions for replacement
External power supply		+15VDC, 0.2A -15VDC, 0.02A		0	An external power supply terminal block is not available because an external power supply is not required.
	Servo READY	0	0	0	
	Stop signal	0	0	0	
	Near-point dog signal	0	0	0	
External input signal	Upper limit signal	0	0	0	
	Lower limit signal	0	0	0	
	Speed- position switching command	0	0	0	
Positioning feedback pulse input		(Pulse frequency)    Open collector:    100kpulse/s or less    TTL: 100kpulse/s or less Differential: 100kpulse/s or less	(Pulse frequency) Open collector: 200kpulse/s or less TTL: 200kpulse/s or less Differential: 1Mpulse/s or less	0	The specification has improved. (Upward-compatibility)
Servo ON		0	0	0	
Speed comm signal)	and (analog	0	0	0	

#### 7.6.6 Precautions for the replacement of the AD70 by the QD73A1

The following shows precautions for the replacement of the AD70 by the QD73A1.

Item	AD70	QD73A1	Precautions
Number of occupied slots	1 slot	2 slots	*1
Number of occupied I/O points  32 points  (I/O assignment: Special function module, 32 points)		48 points (I/O assignment: First half slot: Empty 16 points Second half slot: Intelli., 32 points)	*2
Buffer memory address	Buffer memory address		
Mode setting	Hardware switch setting	Parameter setting of a CPU module ("I/O assignment" → "Switch setting")	*4
LED	Items indicated with the LEDs differ betw	veen the AD70 and the QD73A1.	*5
External wiring	rnal wiring • The existing connectors can be used.		*6*7
Operation of when Servo READY signal is off	The AD70 counts the feedback pulse, and outputs the voltage proportional to the deviation counter.	The QD73A1 clears the deviation counter to 0, and outputs 0V.	*8

- *1 Note the following because the number of occupied slots increases for the QD73A1.
  - Check that the base unit has empty slots of 1 slot (or more).
     If the base unit does not have an empty slot, an additional extension base unit is required.
  - 2) The module occupying 2 slots cannot be mounted on the Q series large type base unit.
    Because the same base unit of the existing module is used for the QD73A1, when mounting the QD73A1 on the Q series large type base unit, use 2 base units by adding an extension base unit.
- *2 Configure the I/O assignment setting of parameters in either of following ways so that addresses of the QD73A1 remain the same as the AD70 even after the replacement.
  - 1) Set Empty 0 point to the first half slot.
  - 2) Set the same address of the AD70 to the second half slot of the QD73A1 in the start XY setting.
- *3 Changes or corrections of the programs are required.
  - For details, refer to the MELSEC-Q QD73A1 Positioning Module User's Manual.
- *4 The method of mode setting, which is required for the positioning, is changed from a hardware switch to the switch setting in I/O assignment of PLC parameter.
  - Configure the same setting as the AD70 by referring to the MELSEC-Q QD73A1 Positioning Module User's Manual.
- *5 Items indicated with the LEDs can be checked with I/O signals of the QD73A1.

  If necessary, install lamps corresponding to the LED indications externally and indicate the on/off status of the I/O signals using a program.
- *6 The position where a module is mounted is changed because the dimensions of a base unit of the QD73A1 differ.

  Check whether the wiring is enough even after the replacement because the connector position is changed though the existing connectors can be used without the wiring change.

*7 When the AD70 being used in the setting that the positive voltage is output when the positioning address increases (slide switch 1 (rotation direction setting): on) is replaced with the QD73A1, the cables between the AD70 and an encoder can be used

When the AD70 being used in the setting that the negative voltage is output when the positioning address increases (slide switch 1 (rotation direction setting): off) is replaced with the QD73A1, the wiring change between the AD70 and an encoder is required.

When the AD70 is replaced with the QD73A1 whose serial number (first five digits) is "15042" or later, the cables between the AD70 and the encoder can be used by changing the intelligent function module switch setting.

- <Replacement with the QD73A1 whose serial number (first five digits) is "15041" or earlier>
  - Change the wiring between the AD70 and the encoder so that each phase A and B is reversed.

No.	Slide switch 1 of the AD70 (rotation direction setting)	of the motor and	Wiring between the AD70 and	encoder	Wiring when the AD70 is replaced	to the QD73A1
1	OFF	Same direction	Phase Phase B	Phase   Phase   B   Encoder	Phase A Phase B QD73A1	Phase A Phase B Encoder
2		Reverse direction	Phase A Phase B AD70	Phase   Phase   B   Encoder	Phase A Phase B QD73A1	Phase A Phase B Encoder

- <Replacement with the QD73A1 whose serial number (first five digits) is "15042" or later>
  - Set b0 (switch 3) of the intelligent function module switch to 1.
- *8 The operation for the QD73A1 while the signal is off was changed from the operation for the AD70 due to the safety consideration of when Servo READY signal is turned on.

The QD73A1 whose serial number (first five digits) is "15042" or later operates the same as the AD70 by setting b4 (switch 3) of the intelligent function module switch to 1.

# 8 UPGRADE OF THE POSITION

## 8.1 A61LS

A61LS, the Mitsubishi position detection modules, is able to upgrade to VARILIMIT. VS-Q62B-V1PG manufactured by our partner "NSD Corporation".

VS-Q62B-V1PG is a built-in converter for Mitsubishi programmable controller Q series.

#### (1) ABSOCODER sensor cable

The existing cables can be reused. A new wiring is not necessary. I/O cables should be replaced because connectors are different.

The specifications are different between A61LS and VS-Q62B-V1PG, and the extensive modification is necessary in the sequence program and so on. Therefore, please contact your local Mitsubishi representative.

# 8.2 A62LS-S5 and A63LS

A62LS-S5 and A63LS, the Mitsubishi position detection modules, are able to upgrade to VARILIMIT "VS-Q62" or "VS-Q62B Series" manufactured by our partner "NSD Corporation".

VS-Q62/VS-Q62B Series are a built-in converter for Mitsubishi programmable controller Q series.

# (1) Model list of the existing positioning modules, ABSOCODER sensors, and replacement modules

The replacement module "VS-Q62" is selected based on the existing position detection modules and ABSOCODER sensor models with using the below list.

	Replacen	Existing A series positioning module			
ABSOCODER sensor	Positioning module Position detection module				
	VS-Q62	VS-Q62B	A62LS	A62LS-B5	A1S62LS
MRE-32SP062SAC			0	0	0
MRE-G□SP062FAC	VS-Q62-M2PG	VS-Q62B-M2PG			0
(□: 64/128/160/256/320)			0	0	0
VLS-256PWB			0	0	-
VLS-512PWB	1		0	0	-
VLS-1024PW	VS-Q62-L		0	0	-
VLS-512PYB	VS-Q02-L	-	0	0	-
VLS-1024PYB	1		0	0	-
VLS-2048PY	]		0	0	-

VS-Q62: Positioning type with scaling, positioning, and switch output functions

VS-Q62B: Converter type with position detection function

Replacem	Eviating A series positioning modul		
Positioning module	Position detection module	Existing A series positioning module  A63LS	
VS-Q262	VS-Q262B		
		0	
VS-Q262-M2PG	VS-Q262B-M2PG	0	
	Positioning module VS-Q262	VS-Q262 VS-Q262B	

VS-Q262: Positioning type with scaling, positioning, and switch output functions

VS-Q262B: Converter type with position detection function

#### (2) ABSOCODER sensor cable

The existing cables can be reused. A new wiring is not necessary. I/O cables should be replaced because connectors are different.

#### (3) Parameter setting software

Please select VS-Q62/Q262-EDW, the parameter setting software for VS-Q62 series.

	VS-Q62	VS-Q62B	A62LS	A62LS-S5	A63LS	A1S62LS
VS-T62	VS-Q62/Q262-EDW		-	-	0	0
Accessory	(Parameter setting software)		0	0	-	-

Please contact SG Corporation, Overseas division of NSD Group if you need the details of upgrading or VS-Q62 series.

Contact: SG Corporation, Overseas division

Tel: +81 (0) 52 261 2352 Fax: +81 (0) 52 252 0522 E-mail: foreign@nsdcorp.co.jp

# **9** EXTERNAL DIMENSIONS

# 9.1 External Dimensions

For external dimensions of modules shown in this handbook, refer to the Use's Manual for each module. For external dimensions of base units shown in this handbook, refer to the following.

Handbook	Manual number
Transition from MELSEC-A/QnA (Large Type) Series to Q Series Handbook	L-08043ENG
(Fundamentals)	L-00043ENG

## **APPENDICES**

## **Appendix 1 Spare parts storage**

(1) The general specifications of programmable controllers are as follows. Please do not store spare parts under a high temperature or high humidity condition, even within the range guaranteed by the specifications.

Storage ambient temperature	-20 to 75°C
Storage ambient humidity	10 to 90%, no condensation

- (2) Store in a place avoiding direct sunlight.
- (3) Store under condition with less dust or no corrosive gas.
- (4) The battery capacity of a A6BAT battery or a lithium-coin battery (commercially available) for memory card will be decreased by its self-discharging even when not used. Replace it with new one in 5 years as a guideline.
- (5) For a power supply module, CPU module with built-in power supply, or analog module that use any aluminum electrolytic capacitor, which is indicated in the table below, take the following measures since the characteristics will be deteriorated when the aluminum electrolytic capacitor is left un-energized for a long time.

Product	Model
CPU module	A1NCPU, A1NCPUP21, A1NCPUR21, A1NCPUP21-S3, A2CCPU,
	A2CCPUP21, A2CCPUR21, A2CCPUC24, A2CCPUC24-PRF,
(Power supply built-in type)	A2CJCPU-S3
Davier averalis madula	A61P, A61PEU, A61P-UL, A62P, A62PEU, A63P, A68P, A61RP,
Power supply module	A67RP, A2CJ66P
Analog module	A62DA, A62DA-S1

[Countermeasures for preventing aluminum electrolytic capacitor characteristics deterioration]
Apply the rated voltage to the aluminum electrolytic capacitor for several hours once a year to activate it. Or, rotate products at the periodic inspection (in every 1 year or two).

[Reference]

The life of an aluminum electrolytic capacitor, even if not used, under a normal temperature decreases approximately at 1/4 speed of the case when it is energized.

# **Appendix 2 Related Manuals**

## **Appendix 2.1 Replacement Handbooks**

### (1) Transition Guide

No.	Manual Name	Manual Number	Model Code
1	MELSEC-A/QnA Series Transition Guide	L(NA)08077E	_

### (2) Transition from MELSEC-A/QnA (large type) to Q series handbook

No.	Manual Name	Manual Number	<b>Model Code</b>
1	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L-08043ENG	
	Handbook (Fundamentals)	L-00043LNG	
2	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L-08046ENG	
	Handbook (Intelligent Function Modules)	L-00040ENG	_
3	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L-08048ENG	
3	Handbook (Network Modules)	L-00040ENG	_
4	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L-08050ENG	
4	Handbook (Communications)	L-00030ENG	_
5	Transition from MELSEC-A0J2H Series to Q Series Handbook	L-08060ENG	_
6	Transition from MELSECNET/MINI-S3, A2C(I/O) to CC-Link Handbook	L-08061ENG	_
7	Transition from MELSEC-I/OLINK to CC-Link/LT Handbook	L-08062ENG	_
,	Transition from MELSEC-I/OLINK to AnyWire DB A20 Handbook	L08263ENG	_
8	Transition from MELSEC-A/QnA Large Type Series to AnS/Q2AS Small	L-08064ENG	_
0	Type Series Handbook	L-00004LNG	
9	Transition of CPUs in MELSEC Redundant System Handbook	L-08117ENG	_
9	(Transition from Q4ARCPU to QnPRHCPU)	L-00117 LING	_

#### (3) Transition Examples

No.	Manual Name	Manual Number	Model Code
1	MELSEC-A/QnA (Large), AnS/QnAS (Small) Transition Examples	L(NA)08121E	-

#### (4) Others

Ν	0.	Manual Name (TECHNICAL BULLETIN)	Manual Number	Model Code
	1	Procedures for Replacing Positioning Module AD71 with QD75	FA-A-0060	
	2	Precautions for replacing A/QnA (large type) series CPU with Universal	FA-A-0068	-
4		model QCPU	FA-A-0000	

# Appendix 2.2 A/QnA series

No.	Manual name	Manual number	Model code
1	MELSEC-QnA/A Catalog	L-174-0-C5177	_
2	MELSEC-QnAS/AnS Catalog	L-174-0-C5266	_
3	Analog-Digital Converter Module Type A68AD User's Manual	IB-64572	13J305
4	Analog-Digital Converter Module Type A68AD-S2 User's Manual	IB-68102	13J349
5	Analog-Digital Converter Module Type A68ADN User's Manual	IB-68219	13JA33
6	Analog-Digital Converter Module Type A616AD User's Manual	IB-68078	13J361
7	Digital-Analog Converter Module Type A62DA User's Manual	IB-64573	13J306
8	Digital-Analog Converter Module Type A62DA-S1 User's Manual	IB-68074	13J350
9	Digital-Analog Converter Module Type A68DAV/A68DAI(S1) User's	IB-68273	13JA35
9	Manual	ID-002/3	
10	Digital-Analog Converter Module Type A616DAV User's Manual	IB-68079	13J362
11	Digital-Analog Converter Module Type A616DAI User's Manual	IB-68080	13J363
12	Pt100 Input Module Type A68RD3N/4N, A1S62RD3N/4N User's Manual	SH-080190	13JT69
13	Temperature-Digital Converter Module Type A616TD User's Manual	IB-68104	13J368
14	High-Speed Counter Module Type AD61(AD61S1) User's Manual	IB-64576	13J307
15	Positioning Module Type AD70 User's Manual	IB-68106	13J356
16	Positioning Module Type AD72 User's Manual	IB-68008	13J333
17	Positioning Module Type A1SD75P1-S3/P2-S3/P3-S3	SH-3608	13JH86
17	AD75P1-S3/P2-S3/P3-S3 User's Manual	SH-3000	
18	Positioning Module Type A1SD75M1/M2/M3	ID 00745	13JH85
18	AD75M1/M2/M3 User's Manual	IB-66715	
19	GX Configurator-AP Version 1 Operating Manual	IB-80031	13JN44

## Appendix 2.3 Q series

No.	Manual name	Manual number	Model code
1	MELSEC-Q Catalog	L-08033E	_
2	MELSEC-Q Data Book	L-08029E	_
3	Analog-Digital Converter Module User's Manual	SH-080055	13JR03
4	Channel Isolated High Resolution Analog-Digital Converter Module (With	SH-080277	13JR51
4	Signal Conditioning Function) User's Manual	3H-000211	
5	Digital-Analog Converter Module User's Manual	SH-080054	13JR02
6	Channel Isolated Digital-Analog Converter Module User's Manual	SH-080281	13JR52
7	Channel Isolated Analog-Digital Converter Module (With Signal	SH-080647ENG	13JR96
,	Conditioning Function) User's Manual	3H-000047 ENG	
8	Channel Isolated Thermocouple Input Module User's Manual	SH-080795ENG	13JZ26
9	Thermocouple Input Module Channel Isolated Thermocouple/Micro	SH-080141	13JR30
9	Voltage Input Module User's Manual	311-060141	
10	RTD Input Module Channel Isolated RTD Input Module User's Manual	SH-080142	13JR31
11	High-Speed Counter Module User's Manual	SH-080036	13JL95
12	High-Speed Counter Module QD62-H01, QD62-H02 User's Manual	IB-0800421	13JY78
13	Type QD75P/QD75D Positioning Module User's Manual	SH-080058	13JR09
14	Type QD75M Positioning Module User's Manual	IB-0300062	1CT752
15	GX Configurator-QP Version 2 Operating Manual	SH-080172	13JU19
16	QD73A1 Positioning Module User's Manual	SH-081075ENG	13JZ69

# Appendix 2.4 Programming tool

No.	Manual name	Manual number	Model code
1	GX Developer Version 8 Operating Manual	SH-080373E	13JU41

Memo	

## **WARRANTY**

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

#### 1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

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

#### 2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.
  - Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

#### 3. Overseas service

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

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

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

#### 5. Changes in product specifications

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



# Mitsubishi Programmable Controller



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