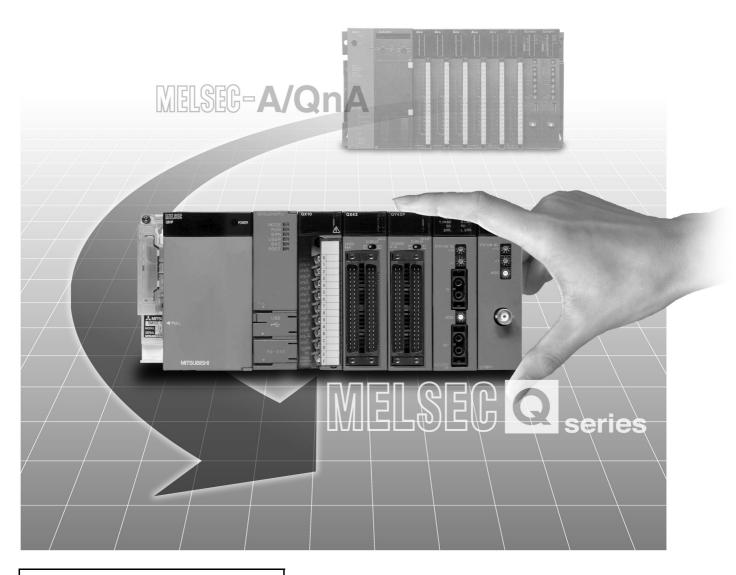




Mitsubishi Programmable Controller

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

(Intelligent Function Modules)



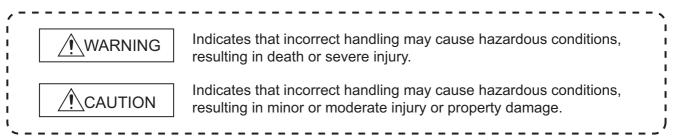
Feb. 2016 Edition

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: "_____WARNING" and "_____CAUTION".



Under some circumstances, failure to observe the precautions given under "A 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]

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]

	<u> </u> WARNING
I	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.
l	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.
I	Failure to do so may result in an accident due to an incorrect output or malfunction.
(1 :	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
1 ;	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.
i	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.
	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.
I	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]

 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]

- 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]

• 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.

 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]

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]

 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.

REVISIONS

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

Print Date	* Handbook Number	Revision
Apr. 2005	L(NA)08046ENG-A	First edition
Oct. 2005	L(NA)08046ENG-B	Addition
		Appendix 1
		Partial correction
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		 Q64DAN, Q64RD-G, Q68RD3-G, Q68TD-G-H01
		Model change
		$QD62 \rightarrow QD62$ -H01, QD62-H02, Q62DA \rightarrow Q62DAN,
		Q68DAV \rightarrow Q68DAVN, Q68DAI \rightarrow Q68DAIN
		Partial correction
		Term revision (whole), SAFETY PRECAUTIONS, Chapter 3 (whole),
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		Q68AD-G, Q68TD-G-H02
		Partial addition
		CONDITIONS OF USE FOR THE PRODUCT, Section 2.4, Section 2.6,
		Section 2.8
		Partial correction
		Term revision (whole), SAFETY PRECAUTIONS, Chapter 3 (whole),
		Chapter 4 (whole), Section 5.1.1, Section 5.2.1, Section 6.1, Section 6.2.1, Section 7.1, Section 7.4.1, Section 7.4.4, Section 7.5.1, Section 7.5.4,
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		Chapter 9 (External dimensions)
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		QD73A1
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		Partial correction
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		Section 6.1, Section 6.3.4, Section 7.1, Section 7.2, Section 7.4

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Way 2013		Appendix 4
		Change
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		Partial correction
		Section3.1, Section7.1, Section7.6.1, Section7.6.2
Feb. 2016	L(NA)08046ENG-I	·
1 05. 2010		Partial correction Cover, WARRANTY
		Japanese Handbook Version L-08045 K

Japanese Handbook Version L-08045-K

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• 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.

2 ANALOG INPUT MODULE REPLACEMENT

2.1 List of Analog Input Module Alternative Models for Replacement

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

2 ANALOG INPUT MODULE REPLACEMENT

Production disco	ontinuation		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: Input signals (Either V or I input) and increase in current consumption 5) Function specifications: Not changed				
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: Conversion speed ((20ms/channel) → sampling cycle (10ms/channel) + response speed (20ms)) 5) Function specifications: Changed (Non-insulation → insulation between channels) 				

*1 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 series module	MELSEC-Q series module	Conversion adaptor
	A68AD	Q68ADV	
	AOOAD	Q68ADI	ERNT-AQT68AD
	A68AD-S2	Q68ADV	ERNT-AQTOOAD
Analog input module		Q68ADI	
	A68ADN	Q68ADV	ERNT-AQT68ADN
	AUOADN	Q68ADI	ERNT-AQTOOADN

(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)	Q68ADV (×2 modules)	ERNT-AQT616AD
	A616AD (in current input)	Q68ADI (×2 modules)	

*1 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	tem				A616AD				
	Voltage		-10 to 0 to +10VDC (Input resistance value: $1M\Omega$)						
Analog input	Current		20.45.0	ta 100m ADO	(1			 	
	Current		-20 10 0	10 +20MADC	(Input resistance	value. 250(2)			
Digital output			16-bit signed binary (Data part: 12 bit) (-48 to 4047, -2048 to 2047) Setting is enabled for each channel.						
			Input	Analog	Maximum	Digital			
				input range 0 to +10	resolution 2.5mV (1/4000)	output value			
				0 to +5	1.25mV (1/4000)				
			Voltage	+1 to +5	1.0mV (1/4000)	0 to 4000			
			(V)	-10 to +10	5.0mV (1/4000)	-2000 to 2000			
I/O characteris				-5 to +5	2.5mV (1/4000)				
maximum reso	olution			0 to +20	10µA (1/2000)	0 to 2000 -2000 to 0			
				0 to +20	5µA (1/4000)	0 to 4000			
			Current	+4 to +20	4µA (1/4000)	-2000 to 2000			
			(mA)	-20 to +20	20µA (1/2000)	1000 to 3000 -1000 to 1000			
				-20 to +20	10µA (1/4000)	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	}	Range: ±0.3% (Digital value ±12 Range: ±0.6% (Digital value ±24				
			When using combination with any of A60MX, A60MXR, A60MXRN, the accuracy of each range of A616AD is $\pm 0.3\%$ (Digital output value ± 12).						

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

	Q68AD	V			Q68ADI	0.		Precautions for replacement
	-10 to 10\	/DC						
(Inpu	t resistance	value: 1MΩ)			-			The voltage/current cannot be
		-		0 te	o 20mADC			mixed for one module.
	-			(Input resist	tance value:	250Ω)		
		16-bi (Normal resolut olution mode: -1		4096 to 4095	,		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.
·		Γ						
Analo	g input	Normal reso	olution mode	F	ligh resolution	mode		
	ige	Digital	Maximu	-	-	Maximum		
	-	output value	resolutio		t value	resolution		When using A616AD in [-5 to +
	0 to 10V		2.5mV		16000	0.625mV		5V] range, Q68ADV can obtain
	0 to 5V	0 to 4000	1.25m\	0 to 2	12000	0.416mV		equivalent resolution or more
Voltage	1 to 5V		1.0mV			0.333mV		than A616AD by setting in [-10
	-10 to 10V	4000 1. 4000	2.5mV	-16000	to 16000	0.625mV		to 10V] range/high resolution
	User range settings	-4000 to 4000	0.375m	V -12000	to 12000	0.333mV	mV mode or user rar	mode or user range.
	0 to 20mA	0 to 4000	5μΑ	0 to 2	12000	1.66µA		When using A616AD in [-20 to
Current	4 to 20mA	4 to 20mA				1.33µA		+20mA] range, use Q68ADI in
	User range settings	-4000 to 4000	1.37µA	-12000	to 12000	1.33µA		user range.
						. 1		
		ormal resolution m	lode	-	h resolution m	ode		
		nt temperature to 55°C			emperature 55°C			
Analog inpu	t With	Without	Ambient	With	Without	Ambient		
range	temperatu		temperature	temperature	temperature	temperature		
	drift	drift	25±5°C	drift	drift	25±5°C		
	compensat	ion compensation		compensation	compensatio	n		
0 to 1	VC			10.00/	10 40/	10.49/		
-10 t	0			±0.3% (±48 digits)	±0.4% (±64 digits)	±0.1% (±16 digits)		A616AD is the accuracy in
10V	,			(140 digits)		(±10 digit3)		respect to the full scale, and
Voltage 0 to 5	V.						0	Q68ADV/I is the accuracy in
1 to 5	SV .							respect to maximum digital
Use								output value.
rang	±0.3%	±0.4%	±0.1%					•
setting	(±12 digit	s) (±16 digits)	(±4 digits)					
0 to		, , , , , , , , , , , , , , , , , , ,		±0.3%	±0.4%	±0.1%		
20m				(±36 digits)	(±48 digits)	(±12 digits)		
4 to								
Current 20m								
Use rang								
setting								
		l	1	1	1			

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	Т
Absolute maximum input	Current: ±30mA	
Analog input pointo	16 channels/module	
Analog input points		
Maximum number of writes for		
E ² PROM	- I	
	Between the input terminal and programmable controller: photocoupler isolation	
Isolation method	Between channels: non-isolated (1M Ω resistor isolation)	
Dielectric withstand voltage		1
	1	
Insulation resistance	- I	
	32 points	1
Occupied I/O points	(I/O assignment: special 32 points)	
Connected terminal	38-point terminal block	
	0.75 to 2mm ²	1
Applicable wire size	(Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
terminal		
Internal current consumption	1A	
(5VDC)		_
Weight	0.85kg	

2 ANALOG INPUT MODULE REPLACEMENT

Q68ADV	Q68ADI	Compatibility	△ : Partial change required, ×: Incompatible Precautions for replacement
80µs/channel (When there is temperature		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,	000 times	0	
Between the I/O terminal and prog photocoupl Between channe		0	
Between the I/O terminal and prog 500VAC, fo	rammable controller power supply: or 1 minute	0	
Between the I/O terminal and prog 500VDC, 20	rammable controller power supply: $M\Omega$ or more	0	
16 p (I/O assignment: in		Δ	I/O occupied points has changed to 16 points.
· · · ·	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			

2.2.2 Function comparison

Item	Description	A616AD	Q68ADV/I	O : With functions, -: Without functions 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	
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) (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	-	0	
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 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.

	A616AD 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	Error flag	Y2		X2		Y2	
X3		Y3		X3		Y3	
X4		Y4		X4	Not used	Y4	Not used
X5		Y5		X5		Y5	
X6		Y6		X6		Y6	
X7		Y7	Not used	X7		Y7	
X8		Y8		X8	High resolution mode status flag	Y8	
Х9		Y9		X9	Operating condition setting completed flag	Y9	Operating condition setting request
XA		YA		ХА	Offset/gain setting mode flag	YA	User range write request
XB		YB		XB	Channel change completed flag	YB	Channel change request
XC		YC		XC	Not used	YC	Not used
XD	Netwood		RFRP, RTOP instruction for interlock signal when	XD	Maximum value/ minimum value reset completed flag	YD	Maximum value/ minimum value reset request
XE	Not used	YE	A616AD 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		Y10					
X11		Y11					
X12		Y12					
X13		Y13	Not used				
X14		Y14					
X15		Y15					
X16		Y16					
X17 X18		Y17 Y18	Direct access request				
		Y19					
X19							
X1A		Y1A					
X1B		Y1B					
X1C		Y1C Y1D	Not used				
X1D	RFRP, RTOP instruction	Y1D Y1E					
X1E X1F	for interlock signal when A616AD is used in	Y1E 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		INPUT designation		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 perio			3	CH3 Time/count averaging setting	-	
4	Data format selection			4	CH4 Time/count averaging setting	DAM	
5	Error code storage		R/W	5	CH5 Time/count averaging setting	R/W	
6	Faulty multiplex	ker module CNT. No. storage		6	CH6 Time/count averaging setting		
7	-			7	CH7 Time/count averaging setting		
8				8	CH8 Time/count averaging setting		
9				9	Averaging processing specification		
10	Curata mana a (A	lete.d)		10	A/D conversion completed flag		
11	System area (N	lot used)	-	11	CH1 Digital output value		
12	1			12	CH2 Digital output value	1	
13	1			13	CH3 Digital output value	1	
14				14	CH4 Digital output value		
15		A616AD		15	CH5 Digital output value		
16		INPUT 0 A60MX, A60MXR		16	CH6 Digital output value	R	
17		INPUT 1 A60MX, A60MXR		17	CH7 Digital output value		
18	Conversion	INPUT 2 A60MX, A60MXR		18	CH8 Digital output value		
19	enable/disable	INPUT 3 A60MX, A60MXR	R/W	19	Error code		
20	designation	INPUT 4 A60MX, A60MXR	K/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	K/W	
24	Set data setting	request		24			
25				25			
26				26	System area (Not used)		
27				27	System alea (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	ļ			34	CH3 Maximum value		
35	System area (N	lot used)	-	35	CH3 Minimum value		
36	ļ			36	CH4 Maximum value		
37	ļ			37	CH4 Minimum value	R	
38	ļ			38	CH5 Maximum value		
39	ļ			39	CH5 Minimum value		
40	ļ			40	CH6 Maximum value		
41	ļ			41	CH6 Minimum value		
42	l			42	CH7 Maximum value		
43	ļ			43	CH7 Minimum value		
44	ļ			44	CH8 Maximum value		
45				45	CH8 Minimum value		

2 ANALOG INPUT MODULE REPLACEMENT

MELSEC

	A616AD Q68ADV/I				
Address	Name	Read/write	Address	Name	Read/write
(Dec.)		rtead/write	(Dec.)		Redd, Write
46	System area (Not used)	-	46		
47			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	CH2 Industrial shipment settings gain value	
206 207			206 207	CH3 Industrial shipment settings offset value CH3 Industrial shipment settings gain value	-
207			207	CH4 Industrial shipment settings offset value	-
208			200	CH4 Industrial shipment settings gain value	
209			209	CH5 Industrial shipment settings offset value	
210			210	CH5 Industrial shipment settings gain value	
212			212	CH6 Industrial shipment settings offset value	-
212			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	-
217			217	CH8 Industrial shipment settings gain value	5.44
218			218	CH1 User range settings offset value	R/W
219			219	CH1 User range settings gain value	
220			220	CH2 User range settings offset value	
221			221	CH2 User range settings gain value	
222			222	CH3 User range settings offset value	
223			223	CH3 User range settings gain value	
224			224	CH4 User range settings offset value	
225			225	CH4 User range settings gain value	
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	4		231	CH7 User range settings gain value	
232	4		232	CH8 User range settings offset value	-
233	4		233	CH8 User range settings gain value	
234	4				
to	1				
255 256					
to	MX. CH. channel digital output value	R			
383					
000			l		

2.3 A68AD (Upgrade to Q68ADV, Q68ADI)

2.3.1 Performance comparison

li	tem	A68AD					
	Voltage	-10 to 0 to +10VDC (Input resistance value: Hardware version K or later: 1M Ω , Hardware version J or earlier: 30k Ω)					
Analog input		+4 to +20mADC (Input resistance value: 250Ω)	+				
	Current	*Usable current input: -20 to 0 to +20mA					
			1				
Digital output		16-bit signed binary (-2048 to +2047)					
		Analog input Digital output					
		+10V +2000					
I/O characteris	stics	+5V or +20mA +1000					
		0V or +4mA ±0					
		-5V or -12mA -1000					
		-10V -2000					
Maximum reso	olution	Voltage: 5mV (1/2000)					
		Current: 20µA (1/1000)					
Overall accura	acy (Accuracy in	±1% (±20)					
respect to max							
output value)							
			+				
Maximum con	version speed	Max. 2.5ms/channel					
Absolute maxi	imum input	Voltage: ±15V					
		current: ±30mA	<u> </u>				

		Q68AD	V			Q68ADI	0.1		tial change required, ×: Incompatible Precautions for replacement
		-10 to 10				_			
	(Inpu	ut resistance	value: 1MΩ)			-		Δ	The voltage/current cannot be
		-				o 20mADC			mixed for one module.
					(Input resis	tance value	: 250 Ω)		
				t signed bin	-				
			(Normal resolut					0	
	High resolution mode: -1228				287, -16384	to 16383)			
			Namalass			:			
	Analo	g input	Digital	olution mode Maximur		igh resolutior ital	Maximum		As concept of gain value is
	rar	nge	output value	resolutio		value	resolution		changed, refer to [Analog-
		0 to 10V		2.5mV	0 to 1	6000	0.625mV		Digital Converter Module
		0 to 5V	0 to 4000	1.25mV	0 to 1	2000	0.416mV		User's Manual] and then, confirm the I/O characteristics.
	Voltage	1 to 5V		1.0mV			0.333mV	commune	commune i/O characteristics.
		-10 to 10V	4000 to 4000	2.5mV	-16000 t	o 16000	0.625mV		
		User range settings	-4000 to 4000	0.375m\	/ -12000 t	o 12000	0.333mV		
		0 to 20mA		5µA			1.66µA		
	Current	4 to 20mA	0 to 4000	4µA	0 to 1	2000	1.33µA	0	
	Current	User range	-4000 to 4000	1.37µA	-12000 t	o 12000	1.33µA		
		settings	1000 10 1000				noopri		
		N	ormal resolution m	ode	High resolution mode				
	Ambient temperature 0 to				Ambient temperature 0 to				
	Analog inpu	ıt	55°C Without	Ambient		5°C	Ambient		
	range	range With		temperature	With	Without	temperature		
	temperatu drift compensati		temperature drift tion compensation		C temperature temperature drift 25±5°C compensation compensation		e 25±5°C		
	0 to 1	0V			±0.3%	±0.4%	±0.1%		
	-10				(±48 digits)	(±64 digits			
	10 ¹								
	Voltage 1 to							0	
	use								
	rang	±0.3%	±0.4%	±0.1%					
	settir	igs (±12 digit	s) (±16 digits)	(±4 digits)	±0.3%	10 40/	10.10/		
	0 to 20m				±0.3% (±36 digits)	±0.4% (±48 digits	±0.1% (±12 digits)		
	4 te				((, (
	Current 20m	nA							
	use								
	ranç settir								
		.90	I	L	l	I			
									The conversion speed of
									Q68ADV/I to A68AD has
			00)ua/ahannal					become quick. And then, on
	(M/bon thora	ie tomocrot	וre drift compens)µs/channel		d by addisa	160 us will be		A68AD, the noise that did not import on Q68ADV/I can be
	(when there		d regardless of t				j too µs wiii be	0	•
		used	a regardless of t	ne number o	or channels t	iseu.)			imported as analog signal. In
									this case, use the averaging processing function to remove
									the effect of noise.
		±15V				±30mA		0	
									l

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	

2 ANALOG INPUT MODULE REPLACEMENT

		O: Compatible	, \triangle : Partial change required, ×: Incompatible
Q68ADV	Q68ADI	Compatibility	Precautions for replacement
8 channel	ls/module	0	
Max. 100,	000 times	0	
Between the I/O terminal and prog photocoupl Between channe	ler isolation	0	
Between the I/O terminal and progr 500VAC, fc		0	
Between the I/O terminal and progr 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.	.75mm ²	×	Wiring change is required.
R1.25-3 (A solderless terminal	l 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

Item	Description	A68AD	Q68ADV/I	O : With functions, -: Without functions 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 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.

	A68	BAD		Q68ADV/I				
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name	
No.		No.	olghai hame	No.	_	No.	oignaí name	
X0	Watchdog timer error	Y0		X0	Module READY	Y0		
X1	A/D conversion READY	Y1		X1	Temperature drift	Y1		
					compensation flag			
X2		Y2		X2		Y2		
X3 X4		Y3 Y4		X3 X4		Y3 Y4	Not used	
×4 X5		Y5		X5	Not used	Y5	Not used	
X6		Y6		X6		Y6		
X0 X7		Y7		X7		Y7		
					High resolution mode			
X8		Y8		X8	status flag	Y8		
VO		2/0		XO	Operating condition	Y9	Operating condition	
X9		Y9		X9	setting completed flag	19	setting request	
ХА		YA		ХА	Offset/gain setting mode	YA	User range write request	
		173		701	flag		ober range white request	
ХВ		YB		ХВ	Channel change	YB	Channel change request	
					completed flag			
XC		YC		XC	Not used	YC	Not used	
XD		YD		XD	Maximum value/ minimum value reset	YD	Maximum value/ minimum value reset	
λD		TD	Not used	ΧD	completed flag	TD	request	
	Not used				A/D conversion			
XE		YE		XE	completed flag	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 Y19						
X19 X1A		Y19 Y1A						
X1A X1B		Y1B						
X1D 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	Read/write	Address (Dec.)	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		4	CH4 Time/count averaging setting			
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			
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			
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)	_		
20			20	Setting range (CH5 to CH8)	_		
22			22	Offset/gain setting mode Offset specification			
23			23	Offset/gain setting mode Gain specification	R/W		
23	-		23	Chisergan setting mode Gain specification			
25			25	-			
26	System area (Not used)	-	26	-			
20			20	System area (Not used)	-		
28			28				
20							
			29	CH1 Maximum value			
30			30				
31 32			31	CH1 Minimum value CH2 Maximum value			
			32				
33	Write data arrar anda	D AA/	33	CH2 Minimum value			
34	Write data error code	R/W	34	CH3 Maximum value			
			35	CH3 Minimum value	-		
			36	CH4 Maximum value	4		
			37	CH4 Minimum value	R		
			38	CH5 Maximum value	-		
			39	CH5 Minimum value	-		
			40	CH6 Maximum value	4		
			41	CH6 Minimum value	4		
			42	CH7 Maximum value	4		
			43	CH7 Minimum value	4		
			44	CH8 Maximum value	4		
			45	CH8 Minimum value			

	Q68ADV/I	
Address		
(Dec.)	Name	Read/write
46		
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	1
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	
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	1
224	CH4 User range settings offset value	1
225	CH4 User range settings gain value	1
226	CH5 User range settings offset value	
227	CH5 User range settings gain value	1
228	CH6 User range settings offset value	1
229	CH6 User range settings gain value	
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	

2.4 A68AD (Upgrade to Q68AD-G)

2.4.1 Performance comparison

It	tem	A68AD
	Voltage	-10 to 0 to +10VDC
Analog input	Voltage	(Input resistance value: Hardware version K or later: $1M\Omega$, Hardware version J or earlier: $30k\Omega$)
/ malog input	Current	+4 to +20mADC (Input resistance value: 250Ω)
	ouncil	*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: 20µA (1/1000)
Overall accura respect to may output value)	acy (Accuracy in ximum digital	±1% (±20)
Maximum con	version speed	Max. 2.5ms/channel
Response time	e	-
Absolute maxi	imum input	Voltage: ±15V current: ±30mA

$\frac{\left(\begin{array}{c} \mbox{Expanded mode} \right)^{-1000 \ 10 \ 4300 \ 0} & 1.500 \ 10 \ 1300 \ 0} & 1.500 \ 0 \ 1300 \ 0 \ 0.5350 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \$						0:	Compatible, \triangle : Pa	tial change required, ×: Incompatible
$ \begin{array}{ c $			Q	68AD-G			Compatibility	Precautions for replacement
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			-10					
$ \begin{array}{ c $			(Input resistance	0				
$ \begin{array}{ c c c c c } \hline & & & & & & & & & & & & & & & & & & $			0 to					
Imput Imput Analog input range Normal resolution mode: -12288 to 12287, -16384 to 16383) O Imput Analog input range Digital Maximum Digital Maximum Output value resolution As concept of gain value Voltage 0 to 10V 2.5mV 0 to 12000 0.625mV As concept of gain value changed, refer to Q68AD Voltage 1 to 5V -1000 to 4500 1.0mV -3000 to 13500 0.333mV As concept of gain value -10 to 10V -1000 to 4500 1.0mV -3000 to 13500 0.333mV As concept of gain value -10 to 10V -1000 to 4500 1.0mV -3000 to 13500 0.333mV As concept of gain value -10 to 10V -1000 to 4500 1.0mV -3000 to 12000 0.333mV As concept of gain value -10 to 10V -1000 to 4500 1.0mV -3000 to 12000 0.333mV As concept of gain value Current 0 to 20mA 0 to 4000 5µA 0 to 12000 1.33µA Users range setting -4000 to 4000 1.37µA -12000 to 12000 1.3			(Input resista	ance value: 25	0Ω)			
High resolution mode: -12288 to 12287, -16384 to 16383)Image: High resolution mode: -12288 to 12287, -16384 to 16383)ImputAnalog input rangeNormal resolution modeHigh resolution modeMaximum resolution output valueMaximum resolution output valueMaximum resolution output valueAnalog input rangeNormal resolution output valueMaximum resolution output valueAnalog input rangeNormal resolution resolution output valueMaximum resolution output valueMaximum resolution resolution 0.0255mVAnalog input rangeAnalog input rangeNormal resolution resolution resolution 0.010 to 1000 0.0255mVMaximum resolution 0.0333mVAnalog input rangeAnalog input rangeNormal resolution resolution 0.010 to 1000 0.033mVMaximum resolution 0.033mVAnalog input rangeAnalog input rangeAnalog input rangeAnalog input rangeNormal resolution resolutionMaximum resolution 0.0255mVMaximum resolution 0.033mVAnalog input rangeAnalog input ra			16-bit s	signed binary				
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		1)	Normal resolutio	n mode: -4096	to 4095,		0	
$ \begin{array}{ c c c c c c } \hline \end{tabular} \begin{tabular}{ c c c c c c c } \hline \end{tabular} \\ \hline \end{tabular} \end{tabular} \\ \hline \end{tabular} \end{tabular} \end{tabular} \\ \hline \end{tabular} \en$								
$ \begin{array}{ c c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \end{tabular} \\ \hline tabula$,			-
$ \begin{array}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \end{tabular} & $			Normal reso	olution mode	High resolu	tion mode		
$ \begin{array}{ c c c c c c c } \hline & & & & & & & & & & & & & & & & & & $	Input	Analog input range	•		Digital	Maximum		
$ \begin{array}{ c c c c c c } \hline \\ \hline $		0 to 10V	output value		· · ·			
$ \begin{array}{ c c c c c c } \hline \\ \hline $		-	0 to 4000		0 10 10000			
$ \begin{array}{ c c c c c } \hline Voltage & 1 \text{ to } 5V & -1000 \text{ to } 4500 & 1.0\text{mV} & -3000 \text{ to } 13500 & 0.333\text{mV} \\ \hline (Expanded mode) & -1000 \text{ to } 4500 & 2.5\text{mV} & -16000 \text{ to } 16000 & 0.625\text{mV} \\ \hline 0.10 \text{ to } 10V & -4000 \text{ to } 4000 & 2.5\text{mV} & -12000 \text{ to } 12000 & 0.333\text{mV} \\ \hline 0 \text{ to } 20\text{mA} & 0 \text{ to } 4000 & 5\mu\text{A} & 0 \text{ to } 12000 & 1.66\mu\text{A} \\ \hline 4 \text{ to } 20\text{mA} & 0 \text{ to } 4000 & 4\mu\text{A} & -3000 \text{ to } 13500 & 1.33\mu\text{A} \\ \hline 4 \text{ to } 20\text{mA} & -1000 \text{ to } 4500 & 4\mu\text{A} & -3000 \text{ to } 13500 & 1.33\mu\text{A} \\ \hline 4 \text{ to } 20\text{mA} & -1000 \text{ to } 4500 & 4\mu\text{A} & -3000 \text{ to } 13500 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.07\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.07\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.07\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.07\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.07\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\ \hline Users range setting & -4000 \text{ to } 4000 & 1.07\nu\text{J} \text{ to } 10V\text{J} \text{ : } 16digit \\ \hline High resolution mode (0 \text{ to } 10V, -10 \text{ to } 10V\text{)} \text{ : } 16digit \\ \hline High resolution mode (Other than the above ranges) \text{ : } 12digit \\ \hline \end{array}$					0 to 12000			As concept of gain value is
$\frac{1}{10 \text{ to } 10 \text{ to } 10 \text{ V}}{10 \text{ to } 10 \text{ to } 4000 \text{ to } 4000} \frac{2.5 \text{mV}}{0.375 \text{mV}} - 16000 \text{ to } 16000 0.625 \text{mV}}{0.333 \text{mV}}$ $\frac{1}{10 \text{ to } 20 \text{mA}}{0 \text{ to } 20 \text{mA}} \frac{1}{0 \text{ to } 4000} \frac{5 \mu \text{A}}{4 \mu \text{A}} 0 \text{ to } 12000 \frac{1.66 \mu \text{A}}{1.33 \mu \text{A}}$ $\frac{1}{100 \text{ to } 20 \text{mA}}{1 \text{ to } 20 \text{mA}} - 1000 \text{ to } 4500 \frac{4 \mu \text{A}}{4 \mu \text{A}} - 3000 \text{ to } 13500 \frac{1.33 \mu \text{A}}{1.33 \mu \text{A}}$ $\frac{1}{100 \text{ to } 20 \text{ mA}}{1 \text{ to } 20 \text{ mA}} - 1000 \text{ to } 4500 \frac{4 \mu \text{A}}{1.37 \mu \text{A}} - 12000 \text{ to } 12000 \frac{1.33 \mu \text{A}}{1.33 \mu \text{A}}$ $\frac{1}{100 \text{ to } 1000 \text{ to } 4000} \frac{1.37 \mu \text{A}}{1.2000 \text{ to } 12000 \frac{1.33 \mu \text{A}}{1.33 \mu \text{A}}}$ $\frac{1}{100 \text{ to } 1000 \text{ to } 4000} \frac{1.000 \text{ to } 4000 \frac{1.37 \mu \text{A}}{1.2000 \text{ to } 12000 \frac{1.33 \mu \text{A}}{1.33 \mu \text{A}}}$ $\frac{1}{100 \text{ to } 1000 \text{ to } 4000 \frac{1.37 \mu \text{A}}{1.2000 \text{ to } 12000 \frac{1.33 \mu \text{A}}{1.33 \mu \text{A}}}$	Voltage		-1000 to 4500	1.0mV	-3000 to 13500		Δ	changed, refer to Q68AD-G
		, ,		2.5mV	-16000 to 16000	0.625mV		
$\frac{4 \text{ to } 20\text{mA}}{\text{Current}} \xrightarrow{\begin{array}{ c c c }\hline\hline 4 \text{ to } 20\text{mA}}{\hline 4 \text{ to } 20\text{mA}} & 0 \text{ to } 4000 & 4\mu\text{A} & 0 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline 4 \text{ to } 20\text{mA}}{\hline (\text{Expanded mode})} & -1000 \text{ to } 4500 & 4\mu\text{A} & -3000 \text{ to } 13500 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 1.37\mu\text{A} & -12000 \text{ to } 12000 & 1.33\mu\text{A} \\\hline\hline \text{Users range setting}} & -4000 \text{ to } 4000 & 100\text{V}, -10 \text{ to } 10\text{V}): \pm 16\text{digit} \\\hline\hline \text{High resolution mode (O ther than the above ranges): \pm 12\text{digit}} \\\hline\hline \text{Users range setting} & -4000 \text{ to } 4000 & -4000 $		Users range setting	-4000 to 4000	0.375mV	-12000 to 12000	0.333mV		confirm the I/O characteristics.
$\frac{4 \text{ to } 20\text{mA}}{\text{Current}} = \frac{4 \text{ to } 20\text{mA}}{4 \text{ to } 20\text{mA}} = \frac{4\mu\text{A}}{1.33\mu\text{A}}$ $\frac{4 \text{ to } 20\text{mA}}{(\text{Expanded mode})} = \frac{-1000 \text{ to } 4500}{4\mu\text{A}} = \frac{-3000 \text{ to } 13500}{1.33\mu\text{A}}$ $\frac{1.33\mu\text{A}}{1.33\mu\text{A}}$ $\frac{1.33\mu\text{A}}{$		0 to 20mA	0 to 1000	5μΑ	0 to 12000	1.66µA		
(Expanded mode) -1000 to 4500 4μA -3000 to 13500 1.33μA Users range setting -4000 to 4000 1.37μA -12000 to 12000 1.33μA ±0.1% ±0.1% Normal resolution mode: ±4digit O High resolution mode (0 to 10V, -10 to 10V): ±16digit O High resolution mode (Other than the above ranges): ±12digit O		4 to 20mA	0 10 4000	4µA	0 10 12000	1.33µA		
±0.1% Normal resolution mode: ±4digit High resolution mode (0 to 10V, -10 to 10V): ±16digit High resolution mode (Other than the above ranges): ±12digit	Current		-1000 to 4500	4µA	-3000 to 13500	1.33µA		
Normal resolution mode: ±4digitHigh resolution mode (0 to 10V, -10 to 10V): ±16digitHigh resolution mode (Other than the above ranges): ±12digit		Users range setting	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		
High resolution mode (0 to 10V, -10 to 10V): ±16digit O High resolution mode (Other than the above ranges): ±12digit O				±0.1%				
High resolution mode (Other than the above ranges): ±12digit			Normal resol					
		High re	solution mode (0	0				
Tomporative coefficient: 174.4 mm^{10} (0.007440/ 10 (0.0		High resolut	ion mode (Othe					
Temperature coefficient: ±71.4ppm/°C (0.00714%/°C)		Tempera	ature coefficient					
		· ·			The conversion speed of			
(Sampling cycle) Q68AD-G to A68AD has			(Sam					
become slow. If fast					become slow. If fast			
Conversion speed is requ					conversion speed is required			
20ms for control, the Q64AD is					for control, the Q64AD is			
recommended.								
Voltage: ±15V			Volt	age: ±15V				
current: ±30mA			curre	ent: ±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 (5VDC)	Hardware version K or later: 0.39A Hardware version J or earlier: 0.9A	
Weight	Hardware version K or later: 0.3kg Hardware version J or earlier: 0.6kg	

2 ANALOG INPUT MODULE REPLACEMENT

	O : Compatible, \triangle : Par	tial change required, ×: 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	Δ	I/O occupied points has
(I/O assignment: intelligent 16 points)		changed to 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	

2.4.2 Function comparison

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

*1 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.

	A68	BAD		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 X2	A/D conversion READY	Y1 Y2		X1 X2		Y1 Y2	
X3		Y3		X3		Y3	
X4		Y4		X4	Not used	Y4	
X5		Y5		X5		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		ХА	Offset/gain setting mode flag	YA	User range write request
ХВ		YB		ХВ	Channel change completed flag	YB	Channel change request
XC		YC		ХС	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				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 X12		Y11 Y12					
X12 X13		Y13					
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19					
X1A X1B		Y1A Y1B					
X1D X1C	1	Y1C					
X1D	1	Y1D					
X1E		Y1E					
X1F		Y1F					

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	CH1 Average time/Average number of times/			
I	Averaging processing specification		I	Moving average/Time constant settings			
2	CH1 Averaging time, count		2	CH2 Average time/Average number of times/			
2			2	Moving average/Time constant settings			
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/			
		-		Moving average/Time constant settings			
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/			
		R/W		Moving average/Time constant settings	R/W		
5	CH4 Averaging time, count		5	CH5 Average time/Average number of times/			
				Moving average/Time constant settings			
6	CH5 Averaging time, count		6	CH6 Average time/Average number of times/			
				Moving average/Time constant settings			
7	CH6 Averaging time, count		7	CH7 Average time/Average number of times/			
				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 16	CH6 Digital output value		15 16	CH5 Digital output value	R		
10	CH7 Digital output value		16	CH6 Digital output value	l T		
17	CH8 Digital output value		17	CH7 Digital output value CH8 Digital output value			
10	-		18	Error code	+		
20	-		20	Setting range (CH1 to CH4)			
20			20	Setting range (CH5 to CH8)			
21	-		21	Offset/gain setting mode Offset specification			
22	-		22	Offset/gain setting mode Gain specification			
23	-		23	Averaging process specification (CH1 to			
24			24	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				
29]		29				
30			30	CH1 Maximum value			
31			31	CH1 Minimum value	ļ		
32			32	CH2 Maximum value	ļ		
33			33	CH2 Minimum value	R		
34	Write data error code	R/W	34	CH3 Maximum value			
			to		ļ		
			44	CH8 Maximum value	ļ		
			45	CH8 Minimum value			

	Q68AD-G	
Address	Name	Read/write
(Dec.)	Name	Reau/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		
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		
159	Mode switching setting	R/W
to		1
200	Save data classification setting	R/W
201	System area (Not used)	-
202	CH1 Factory default offset value	1
203	CH1 Factory default gain value	1
to	, , , , , , , , , , , , , , , , , , , ,	R/W
232	CH8 Factory default offset value	1
233	CH8 Factory default gain value	
_00	setter y weiter guin value	l

2.5 A68AD-S2 (Upgrade to Q68ADV, Q68ADI)

2.5.1 Performance comparison

		A68AD-S2	1					
	em		4					
	Voltage	-10 to 0 to +10VDC (Input resistance value: Hardware version K or later: $1M\Omega$, Hardware version J or earlier: $30k\Omega$)						
Analog input		(input resistance value. Hardware version K of later. 1002, Hardware version 5 of earlier. 30022) +4 to +20mADC (Input resistance value: 250Ω)						
	Current	*Usable current input: -20 to 0 to 20mA						
			1					
Digital output		16-bit signed binary (-2048 to +2047)						
		Analog input Digital output						
		+10V +2000						
I/O characteris	tics	+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 may output value)	cy (Accuracy in timum digital	Within ±1% (±20)						

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

						268ADI			Precautions for replacement
		-10 to 10\	/DC			-			
	(Inpu	t resistance	/alue: 1MΩ)					Δ	The voltage/current cannot be
		-			0 to	20mADC			mixed for one module.
					· ·	ance valu	e: 250Ω)		
								0	
		High res	olution mode: -1	2288 to 122	287, -16384 t	o 16383)			
			N	1. 6 1.					
A	Analog	g input				-			As concept of gain value is
	ran	ge	•						changed, refer to [Analog-
		0 to 10V		2.5mV			0.625mV	\triangle	Digital Converter Module
		0 to 5V	0 to 4000	1.25mV	0 to 1	2000	0.416mV		User's Manual] and then,
Voltad	ae	1 to 5V		1.0mV			0.333mV		confirm the I/O characteristics.
	5-		1000 1. 1000	2.5mV	-16000 to	0 16000	0.625mV		
			-4000 to 4000	0.375mV	-12000 to	0 12000	0.333mV		
		0 to 20mA	0 to 1000	5µA	0 to 1	2000	1.66µA		
Curre	Current 4 to		0 10 4000	4µA	0.01.	2000	1.33µA	0	
User range settings		User range settings	-4000 to 4000	1.37µA	-12000 to	0 12000	1.33µA		
rar	0 to 1 -10 t 10 to 5 1 to 5 Use rang settin 0 to 20m Use rang	Ambie (1) (1) (2) (2) (2) (2) (2) (2) (2) (2	t temperature to 55°C Without temperature drift tion compensation	Ambient temperature 25±5°C	Ambient te 0 to With temperature drift	emperature 55°C Without temperatu drift compensa ±0.4% (±64 digit	Ambient temperature 25±5°C tion ±0.1% s) (±16 digits) ±0.1%	0	
	Voltage	Voltage Current Analog inpurrange O to 1 -10 -10 -10 -10 -10 -10 -10 -10 -10 -1	High res Analog input range 0 to 10V 0 to 5V 1 to 5V -10 to 10V User range settings 0 to 20mA 4 to 20mA 4 to 20mA User range settings 0 to 10V User range settings 0 to 10V User range settings 0 to 10V User range settings 0 to 20mA 4 to 20mA 4 to 20mA 4 to 20mA User range settings 0 to 5V 1 to 5V User range settings (±12 digit	$(Normal resolution mode: -1) \\ High resolution mode: -1 \\ \hline High resolution mode: -1 \\ \hline Normal resolution range \\ \hline 0 to 10V \\ 0 to 5V \\ 0 to 4000 \\ \hline 1 to 5V \\ -10 to 10V \\ -10 to 10V \\ -10 to 10V \\ User range \\ -4000 to 4000 \\ \hline 0 to 20mA \\ User range \\ settings \\ \hline 0 to 20mA \\ 0 to 4000 \\ \hline 0 to 4000 \\ \hline 0 to 20mA \\ \hline 0 to 5V' \\ \hline 0 to 5V' \\ \hline 0 to 5S'C \\ \hline With \\ temperature \\ 0 to 5S'C \\ \hline With \\ temperature \\ drift \\ compensation compensation \\ \hline 0 to 10V \\ -10 to \\ 10V \\ \hline 0 to 5V \\ \hline 1 to 5V \\ \hline User \\ range \\ \hline 0 to 20mA \\ \hline 1 to 5V \\ \hline 1 to $	$\begin{array}{c c} \mbox{(Normal resolution mode: -42288 to 122} \\ \hline \mbox{High resolution mode: -12288 to 122} \\ \hline \mbox{High resolution mode: -12288 to 122} \\ \hline \mbox{High resolution mode: -12288 to 122} \\ \hline \mbox{Analog input range} & \hline \mbox{Normal resolution mode: -10 to 10V} & \mbox{Output value} & \mbox{resolution resolution mode: -10 to 10V} & \mbox{Oto 5V} & \mbox{Oto 4000} & \mbox{1.25mV} \\ \hline \mbox{Voltage} & \hline \mbox{Oto 20mA} & \mbox{Oto 4000} & \mbox{5}\mu\mbox{A} \\ \hline \mbox{Ourrent} & \hline \mbox{Oto 20mA} & \mbox{Oto 4000} & \mbox{5}\mu\mbox{A} \\ \hline \mbox{Ourrent} & \mbox{Oto 20mA} & \mbox{Oto 4000} & \mbox{5}\mu\mbox{A} \\ \hline \mbox{Ourrent} & \mbox{Oto 20mA} & \mbox{Oto 4000} & \mbox{1.37}\mu\mbox{A} \\ \hline \mbox{Voltage} & \mbox{Voltage} & \mbox{Oto 55^{\circ}C} \\ \hline \mbox{With} & \mbox{Without} \\ \mbox{temperature} & \mbox{drift} \\ \mbox{compensation compensation} \\ \hline \mbox{Outgae} & \mbox{Oto 55^{\circ}C} \\ \hline \mbox{Voltage} & \mbox{find 0 to 55^{\circ}C} \\ \hline find 0 to 55^{$	$\begin{tabular}{ c c c c c c } \hline \hline & & & & & & & & & & & & & & & & & $	$\begin{tabular}{ c c c c c c } \hline Current & Vittage & Vitage & Vi$	(Normal resolution mode: -4096 to 4095, High resolution mode: -12288 to 12287, -16384 to 16383) Analog input range Normal resolution mode High resolution mode 0 to 10V 0.57 Maximum Digital Maximum 0 to 10V 2.5mV 0 to 16000 0.625mV Voltage 0 to 10V 2.5mV 16000 to 12000 0.416mV 1 to 5V 0 to 4000 1.0mV -16000 to 12000 0.333mV -10 to 10V 2.5mV -16000 to 12000 0.333mV 0 to 20mA 0 to 4000 5µA 0 to 12000 0.333mV Current 4 to 20mA 0 to 4000 1.37µA -12000 to 12000 1.33µA Analog input range Without temperature drift Ambient temperature drift Aub	Image: Control of the second secon

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	

MELSEC

MELSEC

		-	\triangle : Partial change required, ×: Incompatible		
Q68ADV	Q68ADI	Compatibility	Precautions for replacement The conversion speed of Q68ADV/I to		
(When there is temperature drift compensation	80μs/channel (When there is temperature drift compensation, the time calculated by adding 160 μs will be used regardless of the number of channels used.)				
±15V	±30mA	0			
8 channe	ls/module	0			
Max. 100,	000 times	0			
photocoup	Between the I/O terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolated				
	rammable controller power supply: or 1 minute	0			
	rammable controller power supply: $\text{M}\Omega$ or more	0			
	oints itelligent 16 points)	Δ	I/O occupied points has changed to 16 points.		
18-point ter	minal block	×			
0.3 to 0	0.3 to 0.75mm ²				
R1.25-3 (A solderless termina	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			

2.5.2 Function comparison

Item	Description	A68AD-S2	Q68ADV/I	O : With functions, -: Without functions 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 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.

Device No. Signal name No. Device No. Signal name No. Device Signal name Device No. Signal name No. Device Signal name Signal name Device Device Signal name Signal name Device No. Signal name Device Signal name Device No.	A68AD-S2					Q68ADV/I			
X0 Watchdog timer error Y0 X1 A/D conversion READY Y1 X2 Y2 X3 Y3 X4 Y2 X3 Y4 X5 Y6 Y6 Y6 Y7 Y8 Y8 Y8 Y9 Y8 Y8 Y8 Y8 Y8 Y8 Y8 Y8 Y8 Y8 Y8 Y8 Y8 X0 VA X8 Y8 X9 Y9 XA Y8 Y7 X8 X8 Y8 X9 Y9 X0 VA X8 Operating condition mode flag Y8 Channel change completed flag Y8 Channel change Y8 X0 V10 X11 Y11 X12 Y12 X13 Y11 <th></th> <th>Signal name</th> <th></th> <th>Signal name</th> <th></th> <th>Signal name</th> <th></th> <th>Signal name</th>		Signal name		Signal name		Signal name		Signal name	
X2 Y2 X3 Y3 X4 Y3 X4 Y4 Y5 Y3 X4 Y4 Y5 Y6 X7 Y7 X8 Y8 Y9 Y9 XA YA X8 Y8 Y9 Y9 XA YA XB YA XD Y0 Not used YE XD Y0 Not used YE XF YF X11 Y11 X12 Y12 X13 Y13 X14 Y14 X15 Y15 X16 Y16 X17 Y12 X18 Y18 X14 Y14 X15 Y15 X16 Y16 X17 Y12 X18 Y18 Y19 Y19 <td>X0</td> <td>-</td> <td>Y0</td> <td></td> <td>X0</td> <td>Temperature drift</td> <td>Y0</td> <td></td>	X0	-	Y0		X0	Temperature drift	Y0		
X4 X4 X4 X4 Not used Y4 Y5 X6 Y6 Y6 Y6 Y6 Y6 Y6 X7 X8 Y8 Y8 Y8 Y8 Y8 Y8 X9 Y9 Y9 Y8 Y9 Operating condition setting mode flag Y9 Operating condition setting request XA YA Y2 Y2 Operating condition setting mode flag Y8 Channel change completed flag Y8 XA XD Y0 Not used YC Not used YC Not used X8 Channel change completed flag Y8 Channel change completed flag YC Not used XD YC Y0 Not used YC Not used YD Maximum value Maximum value X10 Y10 Y11 Y12 Y12 Y12 Y12 Y13 Y14 Y15 Y16 Y1						compensation flag			
X5 Not used Y5 X6 Y6 Y6 X7 Y7 Y8 Y8 Y8 Y8 Y9 Y9 Y8 XA YA Y8 YB Y9 Y4 XB YB Y9 XA YA YA YB YB Operating condition setting request XC YC YC XD YD Not used YE XD YF YF Channel change completed flag YB XE YF YF Maximum value YD XD YF YF Maximum value YD XI1 Y10 Y10 Y10 YD X11 Y11 Y12 Y13 Y13 X14 Y16 Y16 Y16 Y16 X11 Y13 Y13 Y13 Y16 X11 Y16 Y16 Y16 Y16 <t< td=""><td>X3</td><td></td><td>Y3</td><td></td><td>X3</td><td></td><td>Y3</td><td></td></t<>	X3		Y3		X3		Y3		
Xb Yb Yb X8 Y6 Y7 X8 Y8 Y8 Y9 Y8 Y8 Y9 Y8 Y8 Y9 Y9 Operating condition mode status flag Y9 XA YA YA X9 Operating condition setting mode flag setting request XA YA YB YA XA User range write request flag setting mode flag setting mode flag setting mode flag setting mode flag setting completed flag YB XA XD YD Not used YC XC Not used YC XE YD Not used YE YD Maximum value reset completed flag YD Maximum value reset request X10 Y10 Y11 Y12 Y12 Y12 Y13 Y13 Y13 Y14 Y14 Y16 Y1	X4		Y4		X4	Natural	Y4	Not used	
X7 X7 Y7 X8 Y8 X9 Y9 XA Y9 XA YA XB YA XB YA XB YA YB YA YB YA YB YA YB YA YB YA YB YB YC YA YB YB YC YA YB YB YD Not used YD Not used YE YD Not used YE XF YF X10 Y10 X11 Y12 X13 Y13 X14 Y16 X17 Y17 X18 Y18 X16 Y16 X17 Y11 X18 Y18 X16 Y16 X17 Y17 X18 Y18 X16 Y16 X17 Y10 X18 Y18 X16 Y16 X17 Y16 X18 Y18 Y10 Y16 <td>X5</td> <td></td> <td>Y5</td> <td></td> <td>X5</td> <td>Not used</td> <td>Y5</td> <td></td>	X5		Y5		X5	Not used	Y5		
X8 Y8 X9 Y9 XA Y9 XA YA YB Y9 XA YA YB YB YA YB YB YB YD Not used XE YF YT0 YT0 X11 Y11 X12 Y13 X14 Y14 X15 Y16 X1A Y16 X1A Y16 Y10 Y12	X6]	Y6		X6		Y6		
X8 Y8 X9 Y9 XA Y9 XA Y4 XA Y4 Y8 Y9 Y4 Y4 Y8 Y9 Y4 Y4 Y8 Y9 Y4 Y4 Y8 Y9 Y4 Y4 Y8 Y8 Y8 Channel change request XC< Not used	X7		Y7		X7		Y7		
X8Y9XAYAXBYAYBYAYBYBXCYCYDYCYDYDNot usedYCYDYDNot usedYEYEYDYEYEYDYEYDYEYDYEYDYDNot usedYEYEYFYFYFYFYFY10Y11X11Y11X12Y12X13Y13X14Y16X16Y16X17Y17X18Y18X19Y18X10Y10X11Y11X12Y12X13Y13X14Y16X10Y10X11Y11X12Y12X13Y13X14Y16X17Y17X18Y18X19Y10X16Y10X16Y10X16Y10X16Y10X16Y10X16Y10X17Y110X18Y18X19Y10X16Y10X16Y10X16Y10X16Y10X16Y10X16Y10X16Y10X16Y10X16Y10X16Y10X16 <td>X8</td> <td></td> <td>Y8</td> <td></td> <td>X8</td> <td>-</td> <td>Y8</td> <td></td>	X8		Y8		X8	-	Y8		
XA fag YA User range write request XB YB YB XA fag YA User range write request XC YC YC XO Vot used YC Not used YC XD YD Not used YE Maximum value/ minimum value/ completed flag Maximum value/ minimum value Maximum value/ minimum value Maximum value XE YF YF YD Not used XE A/D conversion completed flag YE Not used X10 Y10 Y11 Y12 Y12 Y12 Y13 Y13 Y14 YF Error flag YF Error clear request X11 Y12 Y12 Y13 Y13 Y14 YF Error flag YF Error clear request X11 Y14 Y14 Y14 Y14 Y14 YF Error flag YF Error clear request X13 Y13 Y18 Y18 Y18 Y10 Y10 Y10 Y10 X14 Y14 Y16 Y10 Y10 Y10 Y10 Y10 X16 Y10 Y10 Y10 Y10 Y10 Y10 Y10 X16 Y10 <	X9		Y9		X9		Y9		
XBYBXBcompleted flagYBChannel change requestXCYCYCNot usedYCNot usedYCXDYDNot usedYDMaximum value/Maximum valueXEYEYEYDMaximum value/Maximum value resetXEYFYFYDNot usedYEX10Y10Y11Y11Y12X11Y12Y13Y13X14Y14Y16X16Y16Y16X18Y18X19Y19X18Y16X10Y10X11Y11Y12Y13Y13Y16Y16Y16X17Y17X18Y18X10Y10X11Y11Y12Y13Y13Y16Y16Y10X11Y11Y11Y12Y13Y13Y14Y14Y19Y14Y10Y16X11Y11Y12Y13Y16Y14Y16Y15Y16Y16Y10Y16Y16Y17Y18	ХА		YA		XA		YA	User range write request	
XC YC XD YD XD YD Not used YC XE YD XF YE X10 YF X11 Y10 X12 Y10 X11 Y11 X12 Y12 Y13 Y14 Y14 Y15 X16 Y16 X17 Y18 X18 Y18 X19 Y10 X18 Y18 X19 Y10 X18 Y18 X19 Y10 X11 Y11 X12 Y12 Y13 Y14 Y14 Y15 Y17 Y18 X18 Y10 X18 Y10 X11 Y11 X12 Y12 Y13 Y14 Y14 Y15 Y16 Y10 Y17 Y18 Y10 Y10 X11 Y10 X12 Y12	ХВ		YB		XB	-	YB	Channel change request	
XD YD Not used XD minimum value reset completed flag YD /minimum value reset request XF YE YE A/D conversion completed flag YE Not used XI0 Y10 Y11 Y12 YE YF Y11 Y12 Y13 Y13 Y14 X14 Y14 Y15 Y16 X16 Y18 Y19 Y11 X18 Y19 Y11 X18 Y19 Y11 X16 Y16 Y11 X17 Y16 Y11 X18 Y18 Y19 X10 Y11 Y14 Y11 Y12 Y12 Y13 Y14 Y15 Y16 Y16	XC		YC		XC		YC	Not used	
XE Not used YE XF YF X10 Y10 X11 Y11 X12 Y12 X13 Y13 X14 Y14 X15 Y16 X16 Y18 X19 Y18 X10 Y18 X11 Y11 X12 Y12 X13 Y13 X14 Y14 X15 Y16 X18 Y18 X19 Y18 X10 Y10 X11 Y11						Maximum value/		Maximum value	
XEVECompleted flagrequestXFYFA/D conversion completed flagYENot usedX10Y10Y10X11Y11X12Y12X13Y13X14Y14X15Y15X16Y16X17Y17X18Y18X19Y19X1AY11X11Y11X12Y12X13Y13X14Y14X15Y15X16Y16X17Y17X18Y18X10Y10X11Y11X12Y12	XD		YD	Notwood	XD	minimum value reset	YD	/minimum value reset	
XE YE XE completed flag YE Not used XF YF YF XF Error flag YF Error clear request X10 Y10 Y11 Y11 Y11 Y12 X11 Y11 Y11 Y11 X12 Y12 Y12 X13 Y13 Y13 X14 Y14 X15 Y15 X16 Y16 X17 Y17 X18 Y18 X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1D X1E Y1E				not used		completed flag		request	
X10 Y10 X11 Y11 X12 Y12 X13 Y13 X14 Y14 X15 Y15 X16 Y16 X17 Y17 X18 Y18 X19 Y19 X1A Y18 X1B Y18 X10 Y10 X11 Y11	XE	Not used	YE		XE		YE	Not used	
X11 Y11 X12 Y12 X13 Y13 X14 Y14 X15 Y15 X16 Y16 X17 Y17 X18 Y18 X19 Y19 X1A Y1B X1C Y1C X1D Y1D X1E Y1E	XF		YF		XF	Error flag	YF	Error clear request	
X12 Y12 X13 Y13 X14 Y14 X15 Y15 X16 Y16 X17 Y17 X18 Y18 X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1E	X10		Y10						
X13 Y13 X14 Y14 X15 Y15 X16 Y16 X17 Y17 X18 Y18 X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1D X1E Y1E	X11		Y11						
X14 Y14 X15 Y15 X16 Y16 X17 Y17 X18 Y18 X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1E	X12								
X15 Y15 X16 Y16 X17 Y17 X18 Y18 X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1E									
X16 Y16 X17 Y17 X18 Y18 X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1D X1E Y1E									
X17 Y17 X18 Y18 X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1D X1E Y1E									
X18 Y18 X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1D X1E Y1E									
X19 Y19 X1A Y1A X1B Y1B X1C Y1C X1D Y1D X1E Y1E									
X1A Y1A X1B Y1B X1C Y1C X1D Y1D X1E Y1E									
X1B Y1B X1C Y1C X1D Y1D X1E Y1E									
X1CY1CX1DY1DX1EY1E		4							
X1D Y1D X1E Y1E		1							
X1E Y1E									
		1							
	X1E 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 (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 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	5	4	CH4 Time/count averaging setting	5.44
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	-
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)	-
20			20	Setting range (CH5 to CH8)	
22			21	Offset/gain setting mode Offset specification	
23			22	Offset/gain setting mode Gain specification	R/W
23	-		23		
24			24		
25	System area (Not used)	-	25		
			20	System area (Not used)	-
27			-		
28			28	-	
29			29		
30			30	CH1 Maximum value	-
31			31	CH1 Minimum value	-
32			32	CH2 Maximum value	
33		DAA	33	CH2 Minimum value	
34	Write data error code	R/W	34	CH3 Maximum value	4
35	A/D conversion completed flag	R	35	CH3 Minimum value	4
			36	CH4 Maximum value	-
			37	CH4 Minimum value	R
			38	CH5 Maximum value	-
			39	CH5 Minimum value	-
			40	CH6 Maximum value	4
			41	CH6 Minimum value	4
			42	CH7 Maximum value	4
			43	CH7 Minimum value	4
			44	CH8 Maximum value	4
			45	CH8 Minimum value	

	Q68ADV/I	
Address	Name	Desilient
(Dec.)	Name	Read/write
46		
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 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	
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	
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	1
227	CH5 User range settings gain value	1
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	

2.6 A68AD-S2 (Upgrade to Q68AD-G)

2.6.1 Performance comparison

lt	em	A68AD-S2					
Analog input	Voltage	-10 to 0 to +10VDC (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)					
I/O characteristics		Analog input Digital output +10V +2000 +5V or +20mA +1000 0V or +4mA ±0 -5V or -12mA -1000 -10V -2000					
Maximum resolution		Voltage: 5mV (1/2000) Current: 20μΑ (1/1000)					
Overall accuracy (Accuracy in respect to maximum digital output value)		Within ±1% (±20)					

						0.	•	tial change required, *. Incompatible
				68AD-G			Compatibility	Precautions for replacement
	-10 to 10VDC							
		(Input resistance	0				
			0 to	20mADC			- 0	
			(Input resista	ance value: 250	ΟΩ)			
			16-bit s	signed binary				
		()	ormal resolutio	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	0 to 4000	2.5mV	0 to 16000	0.625mV		
	Voltage	0 to 5V		1.25mV	0 to 12000	0.416mV		
		1 to 5V		1.0mV	0 10 12000	0.333mV		As concept of gain value is
		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 10 4000	0.375mV	-12000 to 12000	0.333mV		commune no characteristics.
		0 to 20mA	0 to 4000	5μΑ	0 to 12000	1.66µA		
		4 to 20mA	0104000	4µA	01012000	1.33µA		
	Current	4 to 20mA (Expanded mode)	-1000 to 4500	4μΑ	-3000 to 13500	1.33µA		
		Users range setting	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		
				±0.1%				
	±0.1% Normal resolution mode: ±4 digits High resolution mode (0 to 10V, -10 to 10V): ±16 digits							
		0		-	, 0		0	
		0			e ranges): ±12 dig	lits		
		Tempera	ature coefficient:	: ±71.4ppm/°C	(0.00714%/°C)			

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	

2 ANALOG INPUT MODULE REPLACEMENT

MELSEC

	O: Compatible	, \triangle : Partial change required, ×: Incompatib
Q68AD-G	Compatibility	Precautions for replacement
10ms/channel		The conversion speed of Q68AD-G to
(Sampling cycle)		A68AD has become slow. If fast
20ms		conversion speed is required for
20115		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 Ω or more	0	
Between analog input channels: 500VDC, 10M Ω 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		The recalculation of internal current consumption [5VDC] is required.
0.16kg	0	

2.6.2 Function comparison

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

*1 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.

	A68A		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 X5		Y4 Y5		X4 X5		Y4 Y5	Not used		
X5 X6	-	Y5 Y6		X5 X6		Y5 Y6			
70		10		~0	High resolution mode	10			
X7		Y7		X7	status flag	Y7			
X8		Y8		X8	Warming output signal	Y8			
					Operating condition		Operating condition		
X9		Y9		X9	setting completed flag	Y9	setting request		
XA		YA		ХА	Offset/gain setting mode flag	YA	User range write request		
ХВ		YB		XB	Channel change completed flag	YB	Channel change request		
хс		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						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 Y13							
X13 X14		Y13 Y14							
X14 X15	-	Y15							
X15		Y16							
X10		Y17							
X18		Y18							
X19		Y19							
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.

Address (Dec.) 0	Name		Address		
0		Read/write	(Dec.)	Name	Read/write
	Used channel specification		0	A/D conversion enable/disable	
1	Averaging processing specification		1	CH1 Average time/Average number of times/	Ī
1 1	Averaging processing specification			Moving average/Time constant settings	
2	CH1 Averaging time, count		2	CH2 Average time/Average number of times/	
2			2	Moving average/Time constant settings	
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/	
Ŭ			Ŭ	Moving average/Time constant settings	
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/	
Т		R/W	-	Moving average/Time constant settings	R/W
5	CH4 Averaging time, count	1.7.4.4	5	CH5 Average time/Average number of times/	
5			5	Moving average/Time constant settings	
6	CH5 Averaging time, count		6	CH6 Average time/Average number of times/	
0	Chi Averaging time, count		0	Moving average/Time constant settings	
7			7	CH7 Average time/Average number of times/	Ī
1	CH6 Averaging time, count		1	Moving average/Time constant settings	
0	CUIZ Averaging time, sount		0	CH8 Average time/Average number of times/	Ī
8	CH7 Averaging time, count		8	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	1
12	CH3 Digital output value		12	CH2 Digital output value	1
13 (CH4 Digital output value	_	13	CH3 Digital output value	t
	CH5 Digital output value	R	14	CH4 Digital output value	ł
	CH6 Digital output value		15	CH5 Digital output value	
16	CH7 Digital output value	1	16	CH6 Digital output value	R
	CH8 Digital output value		17	CH7 Digital output value	ł
18	U		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	+
				Averaging process specification (CH1 to	-
24			24	CH4)	R/W
25	System area (Not used)	-	25	Averaging process specification (CH5 to CH8)	
26			26		
27			27		
28			28	System area (Not used)	-
29			29	1	
30			30	CH1 Maximum value	
31			31	CH1 Minimum value	1
32			32	CH2 Maximum value	ł
33			33	CH2 Minimum value	+ _
	Write data error code	R/W	34	CH3 Maximum value	R
	A/D conversion completed flag	R	to		1
		-	44	CH8 Maximum value	ł
			45	CH8 Minimum value	ł

	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		
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
150	CH1 Input signal error detection upper limit	1
150	setting value	
to		
158	Mode owitching potting	
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		R/W
232	CH8 Factory default offset value	
233	CH8 Factory default gain value	1

2.7 A68ADN (Upgrade to Q68ADV, Q68ADI)

2.7.1 Performance comparison

lt	em			A68AI	ON				
	Voltage	-	10 to 0 to +1	0VDC (Input i		ue: 1MΩ)			
Analog input	Current	-20 to 0 to +20mADC (Input resistance value: 250Ω)							
				16-bit signe	d binary				
			When	1/4000 is set:	-4096 to +40	95			
Digital output		When 1/8000 is set: -8192 to +8191							
			When 1	/12000 is set:	-12288 to +12	2287			
					gital output valu				
		Ana	llog input		5V/20mA, offse				
			+10V	1/4000 +4000	1/8000 +8000	1/12000			
O characteris	tics		or +20mA	+4000	+8000 +4000	+12000 +6000			
			or 20mA	0	0	0			
			or -20mA	-2000	-4000	-6000			
			-10V	-4000	-8000	-12000			
			(Fact	ory-set: gain	.5V, offset0\	/)			
				1/4000	1/8000	1/12000			
Maximum reso	olution	Vol	Itage input	2.5mV	1.25mV	0.83mV			
			rrent input	10µA	5µA	3.33µA			
				1/4000	1/8000	1/12000			
			±1%	±40	±80	±120			
overall accurate	су								
Accuracy in re									
-	al output value)								

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

Q68ADV				C	Q68ADI		Compatibility	Precautions for replacement
	-10 to 10	VDC		_				
(Inpu	it resistance	value: 1MΩ)			-			The voltage/current cannot be
	-				20mADC			mixed for one module.
(Input resistand						: 250 Ω)		
		16-bit	signed bina	ary				
		(Normal resoluti	on mode: -4	1096 to 4095,			0	
	High res	solution mode: -1	2288 to 122	287, -16384 te	o 16383)			
		Normal reso	lution mode	Hi	gh resolutior	n mode		
	g input 1ge	Digital	Maximun			Maximum		As a second of a sin and as is
T di	1	output value	resolutior			resolution		As concept of gain value is
	0 to 10V	0.4- 4000	2.5mV	0 to 16		0.625mV	Δ	changed, refer to [Analog- Digital Converter Module
	0 to 5V 1 to 5V	0 to 4000	1.25mV 1.0mV	0 te 120		0.416mV 0.333mV		User's Manual] and then,
Voltage	-10 to 10V		2.5mV	-16000 to		0.625mV		confirm the I/O characteristics.
	User range	-4000 to 4000	0.375mV			0.333mV		
	settings			12000 10	12000			
	0 to 20mA 4 to 20mA	0 to 4000	5μA 4μA	0 to 12	2000	1.66µА 1.33µА		
Current	User range				10000			
	settings	-4000 to 4000	1.37µA	-12000 to	12000	1.33µA	0	
							-	
		lormal resolution m	node	J	resolution			
	Ambient	Ambient temperature 0 to 55°C		Ambient temperature		0		
Analog inp	ut With	Without	Ambient	\\/ith	Without	Ambient		
range	temperat		temperature 25±5°C	temperature	temperatu	temperature		
	drift	drift		drift	drift			
0 to 1		ation compensation	1	compensation	compensat	ion		
-10				±0.3%	±0.4%	±0.1%		
10				(±48 digits)	(±64 digits	s) (±16 digits)		
Voltage 0 to							0	
1 to							Ŭ	
Us ran	a 0							
setti	±U.3%		±0.1% (±4 digits)					
0 t	0		(14 digits)	±0.3%	±0.4%	±0.1%		
20n				(±36 digits)	(±48 digits	s) (±12 digits)		
4 t Current 20n								
Us								
ran	-							
setti	ngs		ļ		<u> </u>			

MELSEC

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 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 Ω or more	
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 (5VDC)	0.4A	
Weight	0.51kg	

2 ANALOG INPUT MODULE REPLACEMENT

MELSEC

Q68ADV	Q68ADI	Compatibility	Precautions for replacement
(When there is temperature calculated by adding 160 µs will be use	channel e drift compensation, the time ed regardless of the number of channels ed.)	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 channe	els/module	0	
Max. 100	,000 times	0	
Between the I/O terminal and prog photocoup Between chann	0		
-	grammable controller power supply: for 1 minute	0	
	grammable controller power supply: $\mathrm{M}\Omega$ or more	0	
	points ntelligent 16 points)	Δ	I/O occupied points has changed to 16 points.
18-point te	rminal block	×	
0.3 to 0).75mm ²	×	Wiring change is required.
R1.25-3 (A solderless termina	al with sleeve can not be used.)	×	1
0.64A	0.64A		The recalculation of internal current consumption [5VDC] is required.
0.19kg	0.19kg	0	

2.7.2 Function comparison

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.

*1 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	Watchdog timer error	Y0		X0	Module READY	YO				
24	-	×4		×4	Temperature drift	2/4				
X1	A/D conversion READY	Y1		X1	compensation flag	Y1				
X2	Error flag	Y2		X2		Y2				
X3		Y3		X3		Y3				
X4		Y4 Y5		X4 X5	Not used	Y4 Y5	Not used			
X5 X6		Y6		X6		Y6				
X0 X7		Y7		X0 X7		Y7				
X8		Y8	Not used	X8	High resolution mode status flag	Y8				
					Operating condition		Operating condition			
X9		Y9		X9	setting completed flag	Y9	setting request			
ХА		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			
					Maximum value/		Maximum value/			
XD		YD	RFRP, RTOP instruction	XD	minimum value reset	YD	minimum value reset			
	Not used		for interlock signal when A68ADN is used in		completed flag A/D conversion		request			
XE		YE	remote I/O station	XE	completed flag	YE	Not used			
XF		YF		XF	Error flag	YF	Error clear request			
X10		Y10	Netwood				· · · ·			
X11		Y11	Not used							
X12		Y12	Error reset							
X13		Y13								
X14		Y14								
X15 X16		Y15 Y16								
X10		Y17								
X18		Y18								
X19		Y19	Natural							
X1A		Y1A	Not used							
X1B		Y1B								
X1C		Y1C								
X1D	RFRP, RTOP instruction	Y1D								
X1E	for interlock signal when A68ADN is used in	Y1E								
X1F	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	
(Dec.) 0	A/D conversion enable/disable setting		(Dec.)	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	1	3	CH3 Time/count averaging setting		
4	CH3 Averaging time, count	1	4	CH4 Time/count averaging setting		
5	CH4 Averaging time, count	R/W	5	CH5 Time/count averaging setting	R/W	
6	CH5 Averaging time, count	1	6	CH6 Time/count averaging setting		
7	CH6 Averaging time, count	1	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		14	CH4 Digital output value		
15	CH6 Digital output value	R	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	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)		
				Offset/gain setting mode		
			22	Offset specification		
				Offset/gain setting mode	R/W	
			23	Gain specification		
			24			
			25			
			26			
			27	System area (Not used)	-	
			28			
			29			
			30	CH1 Maximum value		
			31	CH1 Minimum value		
				CH2 Maximum value		
			32			
			32 33	CH2 Minimum value		
			33	CH2 Minimum value		
			33 34	CH2 Minimum value CH3 Maximum value		
			33 34 35	CH2 Minimum value CH3 Maximum value CH3 Minimum value		
			33 34 35 36	CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value		
			33 34 35 36 37	CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value	R	
			33 34 35 36 37 38	CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value CH5 Maximum value	R	
			33 34 35 36 37 38 39	CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value CH5 Maximum value CH5 Minimum value	R	
			33 34 35 36 37 38 39 40	CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value CH5 Maximum value CH5 Minimum value CH6 Maximum value	R	
			33 34 35 36 37 38 39 40 41 42	CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value CH5 Maximum value CH5 Minimum value CH6 Maximum value CH6 Minimum value CH7 Maximum value	R	
			33 34 35 36 37 38 39 40 41	CH2 Minimum value CH3 Maximum value CH3 Minimum value CH4 Maximum value CH4 Minimum value CH5 Maximum value CH5 Minimum value CH6 Maximum value CH6 Minimum value	R	

	Q68ADV/I	
Address	Name	Read/write
(Dec.)	Name	Read/write
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 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	
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	

2.8 A68AD (Upgrade to Q68AD-G)

2.8.1 Performance comparison

Ite	em			A68A	DN					
Apolog input	Voltage	-10 to 0 to +10VDC (Input resistance value: $1M\Omega$)								
Analog input	Current	-20 to 0 to +20mADC (Input resistance value: 250Ω)								
				16-bit signe	d binary					
Digital output			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				
				D	igital output valu	ie				
			Analog input	(When gain 5V/20mA, offset 0V/0mA)						
				1/4000	1/8000	1/12000				
I/O characterist	lico		+10V	+4000	+8000	+12000				
I/O characterisi	lics		+5V or +20mA	+2000	+4000	+6000				
			0V or 20mA	0	0	0				
			-5V or -20mA	-2000	-4000	-6000				
			-10V	-4000	-8000	-12000				
			(Fact	ory-set: gain	5V, offset0	/)				
				1/4000	1/8000	1/12000				
laximum resol	lution		Voltage input	2.5mV	1.25mV	0.83mV				
			Current input	10µA	5μΑ	3.33µA				
Overall accurac	,			1/4000	1/8000	1/12000				
Accuracy in re	-		±1%	±40	±80	±120				
maximum digita	al output value)									

					0:	$Compatible, \triangle : Par$	tial change required, ×: Incompatible
		Q	68AD-G			Compatibility	Precautions for replacement
		-10					
	(Input resistance					
		0 to	20mADC	,		- 0	
		(Input resista	ance value: 25	0Ω)			
				,			
			signed binary				
	•	lormal resolutio		,		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	0 to 4000	2.5mV	0 to 16000	0.625mV		
	0 to 5V		1.25mV	0 to 12000	0.416mV		
	1 to 5V		1.0mV		0.333mV		As concept of gain value is
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 characteristic
	Users range setting	-4000 10 4000	0.375mV	-12000 to 12000	0.333mV		
	0 to 20mA	0 to 4000	5μΑ	0 to 12000	1.66µA		
	4 to 20mA	0 10 4000	4μΑ	0 10 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		
			±0.1%				
		Normal resolu		diaits			
	High res	olution mode (0	0				
	•	on mode (Other					
	0	ature coefficient:		0,	jito		
	rempera	ature coemclent.	. ±/ 1.4ррш/ С	(0.00714%) C)			

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 Ω or more	
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 (5VDC)	0.4A	
Weight	0.51kg	

2 ANALOG INPUT MODULE REPLACEMENT

	O: Compatible	\triangle : Partial change required, ×: 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 Ω or more	0	
Between analog input channels: 500VDC, 10M Ω or more		
16 points	Δ	I/O occupied points has changed to
(I/O assignment: intelligent 16 points)		16 points.
40-pin connector	×	
Within 0.3mm ²	×	Wiring change is required.
-	×	1
0.46A	Δ	The recalculation of internal current consumption [5VDC] is required.
0.16kg	0	

2.8.2 Function comparison

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

*1 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				Q68AD-G			
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	Y0 Y1		
X2	Error flag	Y2		X2		Y2		
X3		Y3		X3	Not used	Y3		
X4		Y4		X4		Y4	Not used	
X5		Y5		X5		Y5		
X6		Y6		X6	1 Balance a battera seconda	Y6		
X7		Y7	Not used	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	
ХС		YC		XC	Input signal error detection signal	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		Y10	Not used		<u>.</u>		·	
X11		Y11						
X12		Y12	Error reset					
X13 X14		Y13 Y14						
X14 X15		Y15						
X15		Y16						
X17		Y17						
X18		Y18						
X19		Y19	Notwood					
X1A		Y1A	Not used					
X1B		Y1B						
X1C		Y1C						
X1D	RFRP, RTOP instruction	Y1D						
X1E	for interlock signal when A68ADN is used in	Y1E						
X1F	remote I/O station	Y1F						

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.

	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			1	CH1 Average time/Average number of times/	
1	Averaging processing specification		1	Moving average/Time constant settings	
2	CH1 Averaging time, count	2 C		CH2 Average time/Average number of times/	
2			2	Moving average/Time constant settings	
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/	
5			5	Moving average/Time constant settings	
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/	
-		R/W	-	Moving average/Time constant settings	R/W
5	CH4 Averaging time, count	1011	5	CH5 Average time/Average number of times/	
			0	Moving average/Time constant settings	
6	CH5 Averaging time, count		6	CH6 Average time/Average number of times/	
Ŭ			0	Moving average/Time constant settings	
7	CH6 Averaging time, count		7	CH7 Average time/Average number of times/	
,	ono Averaging time, count		1	Moving average/Time constant settings	
8	CH7 Averaging time, count		8	CH8 Average time/Average number of times/	
0			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	
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 CH4)	R/W
			25	Averaging process specification (CH5 to CH8)	
			26		
			27	System area (Not used)	
			28	System area (NOL USED)	-
			29		
			30	CH1 Maximum value	
			31	CH1 Minimum value	
			32	CH2 Maximum value	
			33	CH2 Minimum value	R
			34	CH3 Maximum value	
			to		
				CH8 Maximum value	
			45	CH8 Minimum value	

	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		
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
150	CH1 Input signal error detection upper limit	1
150	setting value	
to		
158	Mode owitching potting	
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		R/W
232	CH8 Factory default offset value	
233	CH8 Factory default gain value	1

3 ANALOG OUTPUT MODULE REPLACEMENT

3.1 List of Analog Output Module Alternative Models for Replacement

Production disco	ontinuation		Transition to Q series
Product	Model	Model	Remarks (Restrictions)
	A616DAI	Q68DAIN	 External wiring : Cable size is changed. Number of slots : Changed (2 modules are required.) Program : 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	1) External wiring : Cable size is changed. 2) Number of slots : Changed (2 modules are required.) 3) Program : The number of occupied I/O points, I/O signals, and buffer memory addresses are changed. 4) Performance specifications change: 8CH/module 5) 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	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: Not changed 5) Functional specifications: Not changed
		Q64DAN	 External wiring : Cable size is changed. Number of slots : Not changed Program : The number of occupied I/O points, I/O signals, and buffer memory addresses are changed. Performance specifications change: 4CH/module Functional specifications: Not changed
	A68DAI-S1	Q68DAIN	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: Increase in current consumption 5) Functional specifications: Not changed

Production discontinuation			Transition to Q series			
Product	Model	Model	Remarks (Restrictions)			
Analog output module	A68DAV	Q68DAVN	 External wiring : Cable size is changed. Number of slots: : Not changed Program : The number of occupied I/O points, I/O signals, and buffer memory addresses are changed. Performance specifications change: Increase in current consumption Functional specifications: Not changed 			

⊠Point

1. Converesion adapter

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
Analog output module	A62DA	Q62DAN	ERNT-AQT62DA
	A62DA-S1	QUZDAN	
	A68DAV	Q68DAVN	
	A68DAI	Q68DAIN	ERNT-AQT68DA
	A68DAI-S1		

(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
Analog output module	A616DAV	Q68DAVN (×2 modules)	ERNT-AQT616DA
Analog output module	A616DAI	I Q68DAIN (×2 modules)	

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

2. Inrush Current

Compared to inrush current of the external power supply of the analog output unit of A/QnA series, you might inrush current of the external power supply of the Q series analog output unit is large. If an overcurrent occurs please consider the measures below.

- The rated current of the external power supply I be increased at the time of replacement.
- The power supply line is relayed by the relay, and power-on one by one.

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
	(External load resistance value: 0Ω to 600Ω)
	Digital input Analog output
I/O characteristics	+4000 +20mA
	+2000 +12mA
	0 4mA
Digital value resolution	1/4000
Overall accuracy	
(Accuracy at maximum analog	0.6% (±120µA)
output value)	When ambient temperature is 25°C: ±0.3% (±60µA)
Sampling period	1.5 + 0.5 × (D/A number of conversion enabled channels) ms
	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
no. or analog output challnes	
Number of writes to E ² PROM	-
Output short protection	-

	O. Oompatible	△. Fatual 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: 0Ω to 600Ω)	0	
Analog output range Normal resolution mode High resolution mode 0 to 20mA 0 to 4000 5µA 0 to 12000	0	
Current 4 to 20mA Corrent 4 μA Corrent 1.33μA User range -4000 to settings -4000 to 4000 -12000 to 1.5μA -12000 to 12000 0.83μA	0	
Ambient temperature 25±5°C: within ±0.1% (±20µA) Ambient temperature 0 to 55°C: within ±0.3% (±60µA)	0	
80µs/channel	o	
21mA	0	
8 channels/module		Consider replacement with multiple Q68DAIN.
Max. 100,000 times	0	
Available	0	

3 ANALOG OUTPUT MODULE REPLACEMENT

MELSEC

Ite	em	A616DAI					
Isolation metho		Between the output terminal and programmable controller power supply: photocoupler isolation A616DAI 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		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					
Futernal	Voltage	+15VDC/-15VDC					
External power supply	Current +15VDC, 0.53A						
	consumption	-15VDC, 0.125A					
	Inrush current	-					
Weight		0.69kg					

3 ANALOG OUTPUT MODULE REPLACEMENT

	O: Compatible	$, \Delta$: Partial change required, ×: Incompatible	
Q68DAIN	Compatibility	Precautions for replacement	
Between the I/O terminal and programmable controller power supply:			
photocoupler isolation	0		
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 Ω 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	Δ	The recalculation of internal current 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 chang is required.	
2.5A 230µs or less			
 0.20kg	0		

3.2.2 Functional comparison

ltem	Des	scription		A616DAI		With functions, -: Without functions Precautions for replacement
Rom	Specifies whether to enable		D/A conversion			
D/A conversion enable/	for each channel.		2			
disable function	By disabling the D/A conve	ersion for the ch	annels that are	0	0	
	not used, the conversion s					
	Specifies whether to output					On Q68DAIN, the output
D/A output enable/	offset value for each chanr					enable/disable is set with Y
disable function	The conversion speed stay		rdloog of	0	0	signal (CHD Output enable/
	whether D/A output is enab	-				disable flag).
						disable liag).
	Obtains analog output synd		ne			
	programmable controller C					
	The analog output will be u					
	output request (YD) is set t					
Synchronous output	"programmable controller (CPU processing	time + 120µs"			
function	has elapsed.			-	0	
	However, the analog output		CH1, and other			
	channels (CH2 to CH8) ca	nnot be used.				
	When the module is mount	ed on a remote	I/O station, the			
	analog output will not be sy	nchronized bea	cause of a link			
	scan delay if the synchrone	ous output funct	ion is specified.			
					0	1) Refer to ("Analog output
						status combination list" in
						the Digital-Analog
	Detains on analog value th		han tha			Converter Module User's
Analog output HOLD/	Retains an analog value th	-		-		Manual to check the
CLEAR function	programmable controller C	PU is in the ST	OP status or an	0		execution status of output.
	error occurs.					2) For the Q68DAIN, this
						function is set with the
						intelligent function module
						switch setting.
	Outputs the analog value of	onverted from a	a digital value			<u></u>
	when CHD Output enable/		-			
	while the programmable co	-	-			
	status.					
Analog output test while						
the programmable	D/A conversion	Frable	Dischla	-	0	
controller CPU is in the	Setting enable/disable	Enable	Disable		Ū.	
STOP status	CHD Output	Enable Disable	Enable Disable			
	enable/disable flag					
	Analog output test	Allowed Not	Not allowed			
		allowed				
	Switches the resolution mo	de according to	the application.			
Resolution mode	The resolution can be sele	•		-	0	
	The resolution mode is bat					
						Replaceable modules during
Online module					_	
	Replaces a module without	t stopping the s	vstem	-	0	online are the Process 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.

	A610	6DAI		1	Q681	DAIN	'n
Device No.		Device No.	Signal name	Device No.		Device No.	Signal name
X0	Watchdog timer error flag	YO		X0	Module READY	YO	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
X3		Y3		X3		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
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
хс	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 X10	-	YF Y10		XF	Error flag	YF	Error clear request
X11		Y11					
X12	-	Y12					
X13	-	Y13					
X14 X15	-	Y14 Y15	Not used				
X15 X16	-	Y16	not used				
X10		Y17					
X18	-	Y18					
X19	1	Y19					
X1A	1	Y1A					
X1B	1	Y1B	Output enable batch flag				
X1C]	Y1C					
X1D	RFRP, RTOP instruction	Y1D	Not used				
X1E	interlock signal	Y1E					
X1F		Y1F		l			

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	R/W	0	D/A conversion enable/disable			
1	Analog output enable/disable channel	EV/10	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			22	Offset/gain setting mode			
22	CH6 Digital value		22	Offset specification			
23		R/W	23	Offset/gain setting mode	R/W		
23	CH7 Digital value	R/W	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

(decimal)(decimal)48CH0 Setting value check code4849CH1 Setting value check code4950CH2 Setting value check code5051CH3 Setting value check code5152CH4 Setting value check code5253CH5 Setting value check code5354CH6 Setting value check code5455CH7 Setting value check code55	lead/write
49CH1 Setting value check code4950CH2 Setting value check code5051CH3 Setting value check code5152CH4 Setting value check code5253CH5 Setting value check code5354CH6 Setting value check code5455CH7 Setting value check code55	
50CH2 Setting value check code5051CH3 Setting value check code5152CH4 Setting value check code5253CH5 Setting value check code5354CH6 Setting value check code5455CH7 Setting value check code55	
51CH3 Setting value check code5152CH4 Setting value check code5253CH5 Setting value check code5354CH6 Setting value check code5455CH7 Setting value check code55	
52CH4 Setting value check code5253CH5 Setting value check code5354CH6 Setting value check code5455CH7 Setting value check code55	
53 CH5 Setting value check code 53 54 CH6 Setting value check code 54 55 CH7 Setting value check code 55	
54 CH6 Setting value check code 54 55 CH7 Setting value check code 55	
55 CH7 Setting value check code 55	
55 CH7 Setting value check code 55	
R/W	
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 50 CHB Setting value check code 50	
59 CHB Setting value check code 59 60 CHC Setting value check code 60	
60 CHC Setting value check code 60 61 CHD Setting value check code 61	
62 CHE Setting value check code 62	
63 CHF Setting value check code 63	
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	
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	
217 CH8 Industrial shipment settings gain value 218 CH1 User range settings offset value	R/W
219 CHT User range settings onset value	
220 CH2 User range settings offset value	
220 CH2 User range settings onset 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	

3.3 A616DAV

3.3.1 Performance comparison

Item			A616DAV				
		16-hit sid	gned binary (Data	nart: 12 hit	e)		
Digital input		-	ting range: -4096		.5)		
	W	hen out	put voltage range	setting is 1	0V:		
		·	-10V to 0V to +1	-			
Analog output			ad resistance valu		,		
	V	/hen out	tput voltage range	-	5V:		
	(Ex	ternal lo	-5V to 0V to +5 ad resistance valu		IMO)		
					111122)		
			Analog	outout			
	Digit	al input	5V setting	10V setti	ng		
I/O characteristics	+-	4000	+5V	+10V	-		
	+;	2000	+2.5V	+5V			
		02000	0V -2.5V	0V -5V			
		1000	-5V	-10V			
Digital value resolution			1/4000				
Overall accuracy	Output voltage range setting						
(accuracy at maximum analog	Ambient temperature (0 to 55°C)					±0.6% (±30mV)	
output value)	Ambient temperature (25°C) ±0.3% (±30mV) ±0.3% (±15mV)					±0.3% (±15mV)	
Sampling period	1.5 + 0.5 ×	(D/A nui	mber of conversio	n enabled o	channels) ms	
Conversion time	(Timo roqu	rod for (0.5ms - conversion from	10 to ±10\//	+10 to 1	0)()	
Absolute maximum output	(Time requ		- 15V	10 10 + 10 0/	+10 10 -1	00)	
No. of analog output channels			16 channels/mod	dule			
Number of writes to E ² PROM			-				
Output short protection			-				
Isolation method	Between the output terminal	and pro	grammable contro	oller power	supply: p	photocoupler isolation	
Isolation method		A616I	DAV channels: no	n-isolation			
Dielectric withstand voltage			-				
Insulation resistance			-				
Number of occupied I/O points			32 points				
	(I/O assignment: special 32 points)						
Connected terminal Applicable wire size	38-point terminal block						
	0.75 to 2mm ²						-
Applicable solderless terminal	V	/1.25-3,	V1.25-YS3A, V2-	S3, V2-YS3	3A		
Internal current consumption (5VDC)			0.38A				

O: Compatible, \triangle : Partial change required, ×: Incompatible Q68DAVN Compatibility Precautions for replacement 16-bit signed binary (Normal resolution mode: -4096 to 4095, Ο High resolution mode: -12288 to 12287, -16384 to 16383) -10 to 10VDC (External load resistance value: $1k\Omega$ to $1M\Omega$) 0 Normal resolution mode High resolution mode Analog output When using A616DAVN in [-5 to + 5V] Digital input Digital input Maximum Maximum range range, Q68DAV can obtain equivalent value resolution value resolution 0 to 5V 1.25mV 0.416mV 0 resolution or more than A616DAV by 0 to 4000 0 to 12000 1 to 5V 1.0mV 0.333mV setting in [-10 to 10V] range/ high Voltage -10 to 10V -16000 to 16000 0.625mV 2.5mV resolution mode or user range. -4000 to 4000 User range 0.75mV -12000 to 12000 0.333mV settings Ο Ambient temperature 25±5°C: Within ±0.1% (±10mV) Ο Ambient temperature 0 to 55°C: Within ±0.3% (±30mV) Ο 80µs/channel ±12V Ο Consider replacement with multiple 8 channels/module Λ Q68DAVN. Max. 100,000 times 0 Available Ο Between the I/O terminal and programmable controller power supply: photocoupler isolation 0 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: Ο 500VDC, 20M Ω or more 16 points The number of occupied I/O points \triangle (I/O assignment: intelligent 16 points) has changed to 16 points. 18-point terminal block × × 0.3 to 0.75mm² Wiring change is required. 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 0

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

	O: Compatible,	, Δ : Partial change required, ×: 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 change is required.
2.5A, 230µs or less		
0.20kg	0	

3.3.2 Functional comparison

Item	Description	A616DAV		: With functions, -: Without functions 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 not used, the conversion speed can be shortened.	0	0	
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	 Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output. 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 combination D/A conversion enable/disable Enable Disable CHD Output enable/disable Enable Disable Analog output test Allowed Not allowed	-	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.

	A616	DAV			Q680	DAVN	
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
X3		Y3		X3		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
X9		Y9		X9	Operating condition setting completion flag	Y9	Operating condition setting request
XA		YA		ХА	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 X14		Y13 Y14					
X14 X15		Y15	Not used				
X15 X16		Y16	Not used				
X10		Y17					
X18	•	Y18					
X19	1	Y19					
X1A	1	Y1A					
X1B	1	Y1B	Output enable batch flag				
X1C	1	Y1C					
X1D	RFRP, RTOP instruction	Y1D	Not used				
X1E	interlock signal	Y1E					
X1F		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	R/W	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			22	Offset/gain setting mode		
22	CH6 Digital value		22	Offset specification		
23		R/W	23	Offset/gain setting mode	R/W	
23	CH7 Digital value	r////	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

Address (definition) Name Read/write Address (definition) Name Read/write deficiency CH3 Setting value check code </th <th></th> <th>A616DAV</th> <th></th> <th colspan="4">Q68DAVN</th>		A616DAV		Q68DAVN			
49 CH1 Setting value check code 51 50 CH2 Setting value check code 51 52 CH4 Setting value check code 51 53 CH5 Setting value check code 51 54 CH5 Setting value check code 55 55 CH7 Setting value check code 58 56 CH7 Setting value check code 59 57 CH3 Setting value check code 60 61 CH5 Setting value check code 61 62 CH5 Setting value check code 62 63 CH7 Setting value check code 63 64 CH5 Setting value check code 63 63 CH7 Setting value check code 63 64 CH5 Setting value check code 63 63 CH7 Setting value check code 63 64 CH7 Setting value check code 63 64 CH7 Setting value check code 63 65 CH7 Setting value check code 63 66 System area (Not used) - 67 CH3 Setting value check code 64 60 System area (Not used) </th <th></th> <th>Name</th> <th>Read/write</th> <th></th> <th>Name</th> <th>Read/write</th>		Name	Read/write		Name	Read/write	
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231CH7 User range settings gain value232CH8 User range settings offset value				229		1	
232 CH8 User range settings offset value				230	CH7 User range settings offset value	1	
<u> </u>				231		1	
				232	CH8 User range settings offset value]	
233 CH8 User range settings gain value				233	CH8 User range settings gain value		

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: 500Ω to 1MΩ) Current: +4 to +20mADC (External load resistance value: 0Ω to 600Ω) *Current output is usable by -20 to +20mA.					
I/O characteristics	Digital input Analog output Voltage Current +2000 +10V - +1000 +5V +20mA 0 0V +4mA -1000 -5V -12mA -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	, \triangle : Partial change required, ×: Incompatible
		Q62	2DAN			Compatibility	Precautions for replacement
Hi	Normal gh resolution i	resolution		Δ	According to the I/O conversion characteristics used, make the output range setting and offset/gain setting of the Q62DAN.		
	,	Current: 0	nce value: to 20mAD	1kΩ to 1MΩ)		0	The minus current cannot be output.
Analog output range							
		Digital input value	Maximum resolution	Digital input value	Maximum resolution		
	0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV		According to the I/O conversion
Voltage	1 to 5V -10 to 10V	-4000 to	1.0mV 2.5mV	-16000 to 16000	0.333mV 0.625mV	Δ	characteristics used, make the output range setting and offset/gain setting
	User range settings	4000	0.75mV	-12000 to 12000	0.333mV		of the Q62DAN.
	0 to 20mA 0 to		5 µ A	0 to 12000	1.66µA		
Curren	t 4 to 20mA User range settings	4000 -4000 to 4000	4⊭A 1.5⊭A	-12000 to 12000	1.33μA 0.83μA		
	volt) Ambient te	age: ±10m	/, current: : 0 to 55°C:	within ±0.3%		0	
		80µs/	channel			0	
Voltage: ±12V Current: 21mA						Δ	The minus current cannot be output.
2 channels/module						0	
		Max. 100),000 times	5		0	
		Ava	ilable			0	

analog output module replacement

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Ite	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 tern	ninal	20-point terminal block				
Applicable wire	size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)				
Applicable sold	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A				
Internal current (5VDC)	consumption	0.6A				
External	Voltage	21.6 to 26.4VDC				
power supply	Current consumption	0.35A				
	Inrush current	2.4A				
Weight		0.5kg				

3 ANALOG OUTPUT MODULE REPLACEMENT

	O: Compatible	$, \Delta$: Partial change required, ×: Incompat
Q62DAN	Compatibility	Precautions for replacement
Between the I/O terminal and programmable controller power supply:		
photocoupler isolation	0	
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 Ω 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%		
Ripple, spike 500mV _{P-P} or less	0	
0.15A	0	
2.5A, 250µs or less	0	
0.19kg	0	

3.4.2 Functional comparison

				O : Available, - : Not available
Item	Description	A62DA	Q62DAN	Precautions for replacement
Analog output HOLD/CLEAR	Retains an analog value that was output			
unction	when the programmable controller CPU is	-	0	
lunction	in the STOP status or an error occurs.			
D/A conversion enable/disable	Specifies whether to enable or disable the		0	
function	D/A conversion.	-	0	
D/A output enable/disable	Specifies whether to output the D/A			The Q62DAN specifies whether
function	conversion value or the offset value.	0	0	to enable or disable output for
Iditetion				each channel.
Synchronous output function	Obtains analog output synchronized with		0	
	the programmable controller CPU.	-	0	
	Outputs the analog value converted from a			
Analog output test while the	digital value when CHD Output enable/			
programmable controller CPU is	disable flag is forcibly turned on while the	-	0	
in the STOP status	programmable controller CPU is in the			
	STOP status.			
	Switches the resolution mode according to			
	the application.			
Desch föra meda	The resolution can be selected from 1/4000,			
Resolution mode	1/12000, or 1/16000.	-	0	
	The resolution mode is batch-set for all			
	channels.			
	Deplease a module without stepsize the			Replaceable modules during
Online module replacement	Replaces a module without stopping the	-	0	online are the Process CPU and
	system.			the Redundant CPU.

○ · Available - · Not available

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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.

	A62DA				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		
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		ХА	Offset/gain setting mode status flag	YA	User range write request	
ХВ		YB	Not used	ХВ	Channel change completion flag	YB	Channel change request	
XC	•	YC		хс	Setting value change	YC	Setting value change	
	-				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		Y11						
X12]	Y12						
X13		Y13						
X14		Y14						
X15		Y15						
X16		Y16						
X17		Y17						
X18	-	Y18	CPU selection signal					
X19 X1A	4	Y19 Y1A	Sign of CH1 digital input Sign of CH2 digital input					
X1A X1B		Y1B	Output enable					
X1C	1	Y1C						
X1D	-	Y1D						
X1E X1E	1	Y1E	Not used					
X1E X1F		Y1F						
	1							

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 (decimal)	Name	Read/write	Address (decimal)	Name	Read/write	
	CH1 Digital value			D/A conversion enable/disable		
1	CH2 Digital value	-	1	CH1 Digital value	R/W	
2	CH1 Voltage setting value check code		2	CH2 Digital value		
3	CH2 Voltage setting value check code	R/W	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	Р	
			12	CH2 Setting value check code	R	
			13			
			to	System area (Not used)	-	
			18			
			19	Error code	R	
			20	Setting range (CH1 to CH2)	n.	
			21	System area (Not used)	-	
			22	Offset/gain setting mode	R/W	
			~~~	Offset specification		
			23	Offset/gain setting mode		
			20	Gain specification		
			24	Offset/gain adjusted value specification		
			25			
			to	System area (Not used)	-	
			157			
			158	Mode switching setting	R/W	
			159			
			160			
			to	System area (Not used)	-	
			199		5.44	
			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		
			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		

## Memo


## 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: 500Ω to 1MΩ) Current: +4 to +20mADC (External load resistance value: 0Ω to 600Ω) *Current output is usable by -20 to +20mA.					
I/O characteristics	$\begin{tabular}{ c c c c c } \hline Digital input \\ \hline Digital input \\ \hline Voltage & Current \\ \hline +2000 & +10V & - \\ \hline +1000 & +5V & +20mA \\ \hline 0 & 0V & +4mA \\ \hline 0 & 0V & +4mA \\ \hline -1000 & -5V & -12mA \\ \hline -2000 & -10V & - \\ \hline \end{tabular}$					
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	-					

							$\Delta$ : Partial change required, ×: Incompatible
Q64DAN 16-bit signed binary (Normal resolution mode: -4096 to 4095, High resolution mode: -12288 to 12287, -16384 to 16383)					Compatibility	Precautions for replacement According to the I/O conversion characteristics used, make the output range setting and offset/gain setting of the Q64DAN.	
Voltage: -10 to 10VDC (External load resistance value: 1kΩ to 1MΩ) Current: 0 to 20mADC (External load resistance value: 0Ω to 600Ω)						0	The minus current cannot be output.
Analog Voltage Current	User range settings 0 to 20mA		Maximum resolution 1.25mV 1.0mV 2.5mV 0.75mV 5 µ A 4 µ A 1.5 µ A	High res mo Digital input value 0 to 12000 -16000 to 12000 to 12000 0 to 12000 0 to 12000 0 to 12000 to 12000 to	de	Δ	According to the I/O conversion characteristics used, make the output range setting and offset/gain setting of the Q64DAN.
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)						0	
	80µs/channel					0	
Voltage: ±12V Current: 21mA					Δ	The minus current cannot be output.	
4 channels/module					0		
Max. 100,000 times					0		
Available						0	

# 3 ANALOG OUTPUT MODULE REPLACEMENT

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Item		A62DA				
Isolation method		Between the output terminal and programmable controller power supply: photocoupler isolation (Between channels: non-isolation)				
Dielectric withstand voltage		-				
Insulation resistance		-				
Number of occupied I/O points		32 points (I/O assignment: special 32 points)				
Connected tern	ninal	20-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)		0.6A				
External	Voltage	21.6 to 26.4VDC				
power supply	Current consumption	0.35A				
	Inrush current	2.4A				
Weight		0.5kg				

## $\mathbf 3$ analog output module replacement

	O : Compatible, $\triangle$	: Partial change required, ×: Incompatible
Q64DAN	Compatibility	Precautions for replacement
Between the I/O terminal and programmable controller power supply:		
photocoupler isolation	0	
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	

## 3.5.2 Functional comparison

			O∶Available, - : Not a			
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.		

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#### 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		
							CH4 Output enable/		
X4		Y4		X4		Y4	disable flag		
X5		Y5		X5		Y5	Ŭ		
X6		Y6		X6		Y6			
X7		Y7		X7		Y7	Not used		
X8		Y8		X8	High resolution mode status flag	Y8			
X9		Y9		X9	Operating condition	Y9	Operating condition		
				7.0	setting completion flag		setting request		
XA		YA	Not used	XA	Offset/gain setting mode status flag	YA	User range write request		
XB		YB		XB	Channel change completion flag	YB	Channel change request		
хс		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		Y18	CPU selection signal						
X19		Y19	Sign of CH1 digital input						
X1A		Y1A	Sign of CH2 digital input						
X1B	4	Y1B	Output enable						
X1C	-	Y1C Y1D							
X1D X1E	1	Y1E	Not used						
X1E X1F	1	Y1F							

#### 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 (decimal)	Name	Read/write	Address (decimal)	Name	Read/write	
0	CH1 Digital value		0	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		
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			
			11	CH1 Setting value check code		
			12	CH2 Setting value check code	R	
			13	CH3 Setting value check code		
			14	CH4 Setting value check code		
			15			
			to	System area (Not used)	-	
			18			
			19	Error code	R	
			20	Setting range (CH1 to CH4)		
			21	System area (Not used)	-	
			22	Offset/gain setting mode		
				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			
			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		

## Memo


## 3.6 A62DA-S1 (Replacement to the Q62DAN)

#### 3.6.1 Performance comparison

I	tem		A62DA-S	51				
Digital input 0 to +4000								
Analog output		Current: +4 to +20mAE	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 characteris	stics	Output range 0 to 10V 0 to 5V 0 to 20mA 1 to 5V 4 to 20mA	Digital input + 4000 0 + 4000 0 + 4000 0 0	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	· · ·				
Overall accura (accuracy at n output value)	acy naximum analog		(Refer to *	+ 10V         0V         + 5V or + 20mA         0V or 0mA         + 5V or + 20mA         + 1V or + 4mA         (1/4000)         / (1/4000)         / (1/4000)         / (1/4000)         / (1/4000)         / (1/4000)         / (1/4000)         / (1/4000)         / (1/4000)         / (1/4000)         / (1/4000)         *1.)         ne time for one channel)         n the specified analog voltage (current) is reached to +12V         +28mA         estricted by output protection circuit				
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						
output value) Maximum conversion speed Absolute maximum output		Note) Max. output voltage	Voltage: 0 to Current: 0 to + e and current res	-28mA	tection circuit			
Number of ana points	alog output		2 channels/m	<u> </u>				
Number of wri Output short p	tes to E ² PROM		-					

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

Output range	1 to 5V	0 to 5V	0 to 10V	4 to 20mA	0 to 20mA
$25^{\circ}C(\text{within}\pm0.5\%)$	±25mV	±25mV	±50mV	±0.1mA	±0.1mA
0 to $55^{\circ}C$ (within ±1%)	±50mV	±50mV	±100mV	±0.2mA	±0.2mA

								O : Compatible, $\Delta$ : Partial change required, ×: Incompatible			
		Q62	2DAN				Compatibility	Precautions for replacement			
		-	ned binary								
	Normal	resolution r	mode: -409		0						
Hig	h resolution r	mode: -122	88 to 1228								
Voltage:	-10 to 10VDC	C(External)	load resista	ance value: 1	$k\Omega$ to $1M\Omega$ )						
-				ance value: 0			0				
		(			,						
		Normal r	esolution	High res							
			de	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 A	0 to	1.66µA						
 Current	4 to 20mA	4000	<b>4</b> μ <b>A</b>	12000	1.33µA						
	User range settings	-4000 to 4000	1.5 <i>µ</i> A	-12000 to 12000	0.83µA						
	Ambiont t	omporature	25+5°C: W	vithin ±0.1%							
		age: ±10m									
		-		within ±0.3%			0				
		age: ±30m\									
	(1011	-		2000///)							
		80µs/	channel				0				
		Voltao	je: ±12V								
Current: 21mA							0				
2 channels/module							0				
		Max. 100	),000 times				0				
		Ava	ailable				0				

# 3 ANALOG OUTPUT MODULE REPLACEMENT

MELSEC
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Ite	em	A62DA-S1					
Isolation metho		Between the output terminal and programmable controller power supply: photocoupler isolation (Between channels: non-isolation)					
Dielectric withs	tand voltage	-					
Insulation resist	tance	-					
Number of occu	upied I/O points	32 points (I/O assignment: special 32 points)					
Connected tern	ninal	20-point terminal block					
Applicable wire	size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)					
Applicable sold	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current (5VDC)	consumption	0.6A					
External	Voltage	21.6 to 26.4VDC					
power supply	Current consumption	0.35A					
	Inrush current	t 2.4A					
Weight		0.5kg					

# 3 ANALOG OUTPUT MODULE REPLACEMENT

	O: Compatible	, $\triangle$ : Partial change required, ×: Incompati
Q62DAN	Compatibility	Precautions for replacement
Between the I/O terminal and programmable controller power supply:		
photocoupler isolation	0	
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:	â	
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		1
(Sleeved solderless terminal cannot be used.)	×	
0.33A	0	
24VDC +20%, -15%	<u> </u>	
Ripple, spike 500mV _{P-P} or less	0	
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	<ol> <li>Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.</li> <li>For the Q62DAN, this function is set with the intelligent function module switch setting.</li> </ol>
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 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.

#### 3.6.3 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/		
				×0	N a f a sa a d	>/0	disable flag		
X3 X4		Y3 Y4		X3 X4	Not used	Y3 Y4			
X4 X5		Y5		X4 X5		Y5			
X6		Y6		X6		Y6	Not used		
X0 X7		Y7		X0 X7		Y7			
					High resolution mode	.,			
X8		Y8		X8	status flag	Y8			
					Operating condition		Operating condition		
X9		Y9		X9	setting completion flag	Y9	setting request		
× 4		2/4		X/A	Offset/gain setting mode	2/4	11		
XA		YA		XA	status flag	YA	User range write request		
XB		YB		XD XD	Channel change	YB	Channel change request		
XD		1D	Not used		completion flag	TD			
хс		YC			Setting value change	YC	Setting value change		
					completion flag		request		
XD		YD			Synchronous output	YD	Synchronous output		
	Not used				mode flag		request		
XE		YE		XE	Not used	YE	Not used		
XF		YF		XF	Error flag	YF	Error clear request		
X10		Y10 Y11							
X11 X12		Y12							
X12 X13		Y13							
X10		Y14							
X15		Y15							
X16		Y16							
X17		Y17							
X18		Y18							
X19		Y19							
X1A		Y1A							
X1B		Y1B	Output enable						
X1C		Y1C							
X1D		Y1D	Not used						
X1E		Y1E							
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 (decimal)	Name	Read/write	Address (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 Upper limit check code	R/W	2	CH2 Digital value		
3	CH1 Lower limit check code	K/W	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		
			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			
			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		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		

## Memo


## 3.7 A62DA-S1 (Replacement to the Q64DAN)

#### 3.7.1 Performance comparison

It	tem		A62DA-S	51				
Digital input		0 to +4000						
		Voltage: 0 to +10VDC						
Analog output		Current: +4 to +20mAI	•		Ω to 600Ω)			
		^Curren	t output is usable	e by 0 to +20mA.				
		Output range	Digital input	Analog output				
			+ 4000	+ 10V				
		0 to 10V	0	0V				
I/O characteris	stics	0 to 5V	+ 4000	+ 5V or + 20mA				
		0 to 20mA	0	0V or 0mA				
		1 to 5V	+ 4000	+ 5V or + 20mA				
		4 to 20mA	0	+ 1V or + 4mA				
		1 to 5V: 1mV (1/4000)						
	Voltage		0 to 5V: 1.25mV	(1/4000)				
Maximum		0 to 10V: 2.5mV (1/4000)						
resolution		4 to 20mA: 4µA (1/4000)						
	Current		0 to 20mA: 5µA (1/4000)					
Overall accura	асу							
(accuracy at m	naximum analog	(Refer to *1.)						
output value)								
Marian and		Within 15ms/2 channels (same time for one channel)						
Maximum con	version speed	Note) Time from when the digital input is	Note) Time from when the digital input is written to when the specified analog voltage (current) is reached					
			Voltage: 0 to +12V					
Absolute maxi	mum output		Current: 0 to +					
		Note) Max. output voltag	e and current res	stricted by output pro	tection circuit			
Number of ana points	alog output		2 channels/m	odule				
P	tes to E ² PROM		-					
Output short p			-					
o aipar onorr p			_			l		

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

Output 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 $55^{\circ}C$ (within ±1%)	±50mV	±50mV	±100mV	±0.2mA	±0.2mA

							$\triangle$ : Partial change required, ×: incompatible	
		Q64	4DAN	Compatibility	Precautions for replacement			
			gned binary					
	•	resolution		0				
Hig	h resolution r	node: -1228	88 to 1228 <i>i</i>	7, -16384 to 1	6383)			
				ance value: 1 ance value: 0		0		
ourient.	0 10 2011/100				32 10 00032)			
		Normal r	esolution	High res	solution			
Analog			ode	mo				
Analog	output range	Digital input value	Maximum resolution	Digital input value	Maximum 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	0	
	User range settings	4000	0.75mV	-12000 to 12000	0.333mV			
	0 to 20mA	0 to	5 µ A	0 to	1.66µA			
Current		4000	<b>4</b> # <b>A</b>	12000	1.33 ^µ A			
	User range settings	-4000 to 4000	1.5 <i>µ</i> A	-12000 to 12000	0.83µA			
	Ambient	temperature	≥ 25+5°C ⁻ v	vithin ±0.1%				
		age: ±10m						
	Ambient te	emperature	0 to 55°C:	within ±0.3%		0		
	(volt	age: ±30m	V, current: :	±60µA)				
		80µs/	channel	0				
		Voltac	ge: ±12V					
		-	nt: 21mA	0				
		4 chann	els/module	0				
			0,000 times			0		
		Ava	ailable			0		

# analog output module replacement

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

# 3 ANALOG OUTPUT MODULE REPLACEMENT

	O: Compatible	, $\triangle$ : Partial change required, ×: Incompati
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:	â	
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		1
(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	0	<ol> <li>Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.</li> <li>For the Q64DAN, this function is set with the intelligent function module switch setting.</li> </ol>
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.

#### 3.7.3 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.

Device No.         Signal name No.         Device No.         Signal name Not used         Module READY         YO         Not used         Chance interport disable flag         Chance interport disable flag         Chance interport disable flag         Chance interport disable flag         YE         YE		A620	DA-S1		Q64DAN				
X1         D/A conversion READY         Y1           X2         Y2           X3         Y2           X3         Y3           X4         Y4           X5         Y5           X6         Y7           Y8         Y6           Y7         Y8           Y9         Y9           XA         Y4           X6         Y7           Y8         Y9           XA         Y4           Y2         Y8           Y9         Y9           XA         Y4           Y6         Y7           Y8         Y9           XA         YA           XB         YA           XC         YC           XD         Y0           XE         Y1           X10         Y1           X11         Y17           X12         Y12           X13         Y13           X14         Y14           X15         Y16           X17         Y17           X18         Y19           X19         Y10           X11			Device	Signal name			Device	Signal name	
X1       D/A conversion KEAUY       Y1         X2       Y2         X3       Y2         X3       Y3         X4       Y4         X5       Y5         X6       Y5         X7       Y7         X8       Y6         X9       Y9         XA       Y4         Y8       Y6         X7       Y7         X8       Y8         Y9       Y2         X4       Y4         Y4       Y4         X4       Y4         X6       Y5         X6       Y6         X7       Y7         X8       Y8         Y9       Y4         X8       Y8         Y9       Y4         X8       Y8         Y4       Y8         Y4       V4         Y8       Operating condition mode status flag         X8       Offset/gan status flag       Y8         X9       Synchronous output mode flag       Y8         X0       V10       Y10         X11       Y11         X12       Y12 <td>X0</td> <td>Watchdog timer error</td> <td>Y0</td> <td></td> <td>X0</td> <td>Module READY</td> <td>Y0</td> <td>Not used</td>	X0	Watchdog timer error	Y0		X0	Module READY	Y0	Not used	
X2         Y2           X3         Y3           X4         Y4           X5         Y5           X6         Y6           Y7         Y6           Y6         Y6           Y7         Y6           Y6         Y6           Y7         Y7           X8         Y8           Y9         Y9           XA         Y4           Y8         Y8           Y9         Y9           XA         Y4           Y8         Y8           Y9         Y9           XA         Y4           Y2         X8           Y8         Y9           XA         Y4           Y2         X8           Y8         Y9           XA         Y4           Y2         Y9           XA         Y4           Y2         Y4           Y4         Y4           Y4         Y4           Y8         Channel change         Y8           Y9         Setting value change         Y9           X6         Setting value change         Y9	X1	D/A conversion READY	¥1		X1		Y1		
X2     Y2     X2     disable flag       X3     Y3     Y3       X4     Y4       X4     Y4       X5     Y5       X6     Y6       Y7     X6       Y8     Y8       Y9     Y9       XA     YA       Y8     Y8       Y9     Y9       XA     YA       YA     YA       Y8     Y8       Y9     Y9       XA     YA       YA     Operating condition mode status flag       YB     YA       YA     YA       YB     YA       YB     YA       YB     YA       YB     YB       YA     YB       YA     YB       YB     YB       YA			••					-	
X3     Y3       X4     Y4       X5     Y5       X6     Y6       X7     Y7       X8     Y8       X9     Y9       XA     YA       X8     Y8       Y9     Y3       X4     Y4       X5     Y5       X6     Y6       Y7     Y7       X8     Y8       Y9     Y9       XA     YA       Y8     Y8       Y9     Y9       XA     YA       YA     Operating condition setting completion flag setting request status flag       X0     V7       X0     V7       X0     Used       X10     Y0       X11     Y11       X12     Y12       X13     Y13       X14     Y14       X16     Y16       X17     Y17       X18     Y18       X10     Y14       X11     Y14       X12     Y12       X13     Y13       X14     Y14       X15     Y15       X16     Y16       X17     Y16       Y17     Y16 <t< td=""><td>X2</td><td></td><td>Y2</td><td>X2 Y2</td><td>Y2</td><td></td></t<>	X2		Y2	X2 Y2	Y2				
X3     Y3     X3     Not used     Y3     disable flag       X4     Y4     X4     Y4     X4       X5     Y5     Y5       X6     Y7     Y7       X8     Y8     Y8       Y9     Y9       Y4     Y8       Y8     Y8       Y9     Y9       YA     Y8       Y8     Y8       Y9     Y9       XA     YA       Y8     Y8       Y9     Y9       XA     YA       XB     YA       XB     YB       Not used     YB       XD     YC       XF     YE       XF     Y10       X111     Y11       X12     Y12       X13     Y13       X14     Y16       X16     Y16       X17     Y16       X18     Y18       Y10     Y10       Y11     Y12 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td></td<>								_	
X4     X4     X4     X4       X5     Y5     Y5       X6     Y5     Y5       Y7     Y7     Y7       X8     Y8     Y8       X9     Y9     Y9       XA     YA     CH4 Output enable/ disable flag       X8     Y8     Y6       X9     Y9     Y7       X8     Y8       X9     Y9       YA     Channel change       YB     Y0       YC     Y2       YD     Y0       XE     YF       X10     Y11       X11     Y11       X12     Y12       X13     Y13       X14     Y18       X10     Y18       Y12     Y18       Y12        Y13 <td>Х3</td> <td></td> <td>Y3</td> <td></td> <td>X3</td> <td>Notused</td> <td>Y3</td> <td></td>	Х3		Y3		X3	Notused	Y3		
X4     Y4     X4     Y4     disable flag       X5     Y5     Y6     Y6       X7     Y7     Not used     Y6       X8     Y8     Y8     Y7       X8     Y8     Y8     Y8       X9     Y9     Y9       XA     YA     YA       XB     YB     Not used       XC     YC     YC       XD     YD     Not used       YE     YF       X10     Y10       X11     Y11       X12     Y12       X13     Y18       Y19     Y10       X11     Y11       Y11     Y12       X16     Y16       X17     Y18       V10     Y11       X11     Y11       X11     Y11       X11     Y11       X11     Y11       X11     Y11       X14     Y14       Y15     Y16       X16     Y18       X17     Y18       Y18     Y18       Y19     Y10       Y16     Y10       Y17     Y18       Y18     Y18       Y19     Y10       Y11								-	
X5     X6     Y6       X7     Y8       X8     Y8       X9     Y8       XA     Y8       Y9     Y4       Y8     Y8       Y9     Y8       Y0     Operating condition mode status flag       Y8     Y8       Y9     YA       XA     YA       XB     YA       YB     Not used       YC     YC       YC     YC       YC     YC       YC     YC       YE     YF       XD     YD       X11     Y11       X12     Y13       X14     Y18       X17     Y18       Y18     Y18       Y10     Y11       X11     Y13       X11     Y18       X11     Y18       X11     Y18       X11     Y18       Y18     Y18       Y19     Not used	X4		Y4		X4		Y4		
X7     X7     Y7     Not used       X8     Y8     Y8     Y8       X9     Y8     Y8       Y9     Y8     Y8       Y8     Y9     Operating condition setting request       XA     YA     YA       XB     YA     YA       YB     Not used     YB       YC     YB     Channel change completion flag       YB     YC     YB       YC     YB     Channel change request       XC     YE     YE       YF     Y10     YD       X11     Y11     Y12       X13     Y13     Y13       X14     Y14     Y13       X16     Y16     Y19       X16     Y16     Y19       X16     Y16     Y19       X17     Y18     Y19       X18     Y18     Y19       X10     Y16     Y10       X11     Y11     Y12       X12     Y13     Y14       X16     Y16	X5		Y5		X5		Y5		
X8     Y8       X9     Y9       XA     Y9       XA     YA       YB     YA       YA     YA       YB     YB       YA     YB       YB     YB       YA     YB       YB     YB       YC     YB       YC     YB       YB     Channel change       YC     Setting value change       YC     Setting value change       YC     Setting value change       YB     YB       YB     YB <t< td=""><td>X6</td><td></td><td>Y6</td><td></td><td>X6</td><td></td><td>Y6</td><td></td></t<>	X6		Y6		X6		Y6		
X8     Y8     status flag     Y8       X9     Y9     Y9       XA     YA       YA     YA       YA     YA       YA     YA       YA     YA       YB     Not used       YB     Not used       YC     YB       YC     YB       YD     Not used       YD     YC       YD     YC       YE     YC       YE     YC       YD     YD       YE     YE       Y10     Y10       X11     Y11       X12     Y12       X13     Y13       X14     Y14       X15     Y16       X16     Y16       X17     Y18       Y18     Output enable       Y10     Y11       X11     Y12       X18     Y18       X19     Y10       X11     Y11       X12     Y12       X13     Y18       Y10     Y10       X11     Y11       X11     Y12       X18     Y18       Y10     Y10       X11     Y11       Y10     Y10	X7		Y7		X7		Y7	Not used	
X9Y9X9XAYAXBYAXBYBYAYBYBNot usedYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYCYC <t< td=""><td>X8</td><td></td><td>Y8</td><td></td><td>X8</td><td></td><td>Y8</td><td></td></t<>	X8		Y8		X8		Y8		
XA     YA     Setting completion flag     setting request       XB     YB     VA     User range write request       XC     YB     VC     XB       XC     YC     YB     Channel change completion flag     YB       XD     YD     YC     Setting value change completion flag     YB       XD     YD     YD     XC     Setting value change completion flag     YC       XE     YE     YE     XD     Synchronous output request       XE     YF     YF     XD     Synchronous output request       X10     Y11     Y11     Y12     XZ     Setting value change request       X11     Y11     Y11     YD     Synchronous output request       X11     Y11     Y12     YE     Not used     YE       X11     Y13     Y13     YE     Fror flag     YF       X11     Y13     Y13     Y14     Y14       X18     Y18     Output enable     Y1C       X10     Y11     Y11     Y11       X11     Y18     Output enable     Y1C       X11     Y11     Y11     Y11       X18     Y10     Y10     Y11       X11     Y11     Y11	VO		VO		VO	Operating condition	VO	Operating condition	
XA     YA     Va       XB     YB     Not used     XA     status flag     YA     User range write request       XC     YC     YB     Not used     XB     Channel change completion flag     YB     Channel change request       XD     YD     YC     Setting value change completion flag     YC     Setting value change request       XE     YE     YE     YE     XF     Synchronous output mode flag     YD     Synchronous output request       X10     Y10     Y11     Y11     Y11     XF     Error flag     YF     Error clear request       X11     Y11     Y11     Y11     Y11     YF     Error clear request       X11     Y11     Y11     Y12     YF     Error flag     YF     Error clear request       X11     Y11     Y13     Y13     Y13     Y14     Y14     Y15     Y16       X11     Y18     Y18     Y18     Y18     Y18     Y16     Y16     Y16       X10     Y10     Y11     Y11     Y11     Y11     Y16     Y16     Y16       X11     Y11     Y11     Y11     Y11     Y16     Y16     Y16     Y16	79		19		~9		19	setting request	
XB     YB     YB     Channel change request       XC     YC     Setting value change completion flag     YC     Setting value change request       XD     YD     YD     Synchronous output mode flag     YD     Synchronous output request       XI0     YF     YF     YF     XE     Not used     YE     Not used     YE     Synchronous output mode flag     YD     Synchronous output request       X10     Y10     Y10     Y10     Y10     XF     Error flag     YF     Error clear request       X11     Y11     Y11     Y11     Y11     YF     Error clear request       X11     Y13     Y13     Y13     YF     Error clear request       X11     Y13     Y13     Y13     YF     Error clear request       X11     Y13     Y13     Y13     YF     Error clear request       X11     Y13     Y13     Y14     Y14     YF     Error clear request       X11     Y13     Y18     Y19     YA     YF     Error clear request       X11     Y11     Y11     Y10     YF     YF     Error clear request       X11     Y13     Y14     Y14     YF     YF     YF       X12     Y12	ХА		YA		XA		YA	User range write request	
XC     YC       XD     YD       XD     YD       XE     YE       XF     YF       X10     Y10       X11     Y11       X12     Y12       X13     Y13       X14     Y14       X15     Y15       X16     Y16       X17     Y17       X18     Y18       X19     Y14       X11     Y12       X13     Y16       X11     Y11       X12     Y12       X13     Y14       X14     Y16       X17     Y17       X18     Y18       X19     Y10       X11     Y12       X12     Y12       X13     Y16       X17     Y17       X18     Y18       X19     Y10       X11     Y11       X12     Y12       X13     Y16       X16     Y16       X17     Y17       X18     Y18       X10     Y10       X11     Y11       X12     Y12       X13     Y18       X16     Y10       X17     Y10 </td <td>ХВ</td> <td></td> <td>YB</td> <td>Not used</td> <td>XB</td> <td>-</td> <td>YB</td> <td>Channel change request</td>	ХВ		YB	Not used	XB	-	YB	Channel change request	
XC     YC       XD     Not used       YD     YD       YD     YD       YD     Synchronous output mode flag       YE     YF       XF     YF       X10     Y10       X11     Y11       X12     Y12       X13     Y14       X14     Y15       X16     Y16       X17     Y18       Y19     Y1A       Y18     Y11       Y11     Y12       Y13     Y14       Y15     Y16       Y11     Y11       Y12     Y13       Y14     Y15       Y16     Y16       Y17     Y18       Y19     Y1A       Y110     Y11       Y12     Y13								Setting value change	
XDYDXDmode flagYDrequestXEYEYEYENot usedXENot usedX10Y10Y10Y11Y11XFError flagYFError clear requestX11Y11Y11Y12Y12Y13Y13Y14X12Y13Y14Y14Y14Y14X15Y15Y16Y16Y17X18Y18Y19Y19Y14X10Y10Y10Not usedX11Y11Y11Not used	XC		YC		хс		YC		
XF         YF           X10         Y10           X11         Y10           X11         Y11           X12         Y12           X13         Y13           X14         Y14           X15         Y15           X16         Y16           X17         Y17           X18         Y18           X19         Y18           X11         Y11           X12         Y13           X14         Y14           X15         Y15           X16         Y16           X17         Y17           X18         Y18           X19         Y14           X11         Y11           X16         Y12           X17         Y13           X18         Y18           X19         Y11           X10         Y10           X11         Y11           X12         Y12           X12         Y12           X12         Y12	XD	Not used	YD		XD		YD		
X10     Y10       X11     Y11       X12     Y12       X13     Y13       X14     Y14       X15     Y15       X16     Y16       X17     Y17       X18     Y18       X19     Y19       X1A     Y1B       X1B     Y1B       X1C     Y1C       X1D     Y1D       X1E     Y1E	XE		YE		XE	Not used	YE	Not used	
X11     Y11       X12     Y12       X13     Y13       X14     Y14       X15     Y15       X16     Y16       X17     Y17       X18     Y18       X19     Y18       X18     Y18       X18     Y18       X19     Y11       X18     Y18       X10     Y10       X11     Y11       Not used     Y11					XF	Error flag	YF	Error clear request	
X12     Y12       X13     Y13       X14     Y14       X15     Y15       X16     Y16       X17     Y17       X18     Y18       X19     Y19       X1A     Y1B       X1B     Y1C       X1D     Y1E       X1E     Y1E									
X13     Y13       X14     Y14       X15     Y15       X16     Y16       X17     Y17       X18     Y18       X19     Y19       X1A     Y1B       X1B     Y1B       X1C     Y1C       X1D     Y1E									
X14     Y14       X15     Y15       X16     Y16       X17     Y17       X18     Y18       X19     Y19       X1A     Y1A       X1B     Y1B       X1C     Y1C       X1D     Y1E       X1E     Y1E									
X15     Y15       X16     Y16       X17     Y17       X18     Y18       X19     Y19       X1A     Y1A       X1B     Y1B       X1C     Y1C       X1D     Y1E       X1E     Y1E									
X16     Y16       X17     Y17       X18     Y18       X19     Y19       X1A     Y1A       X1B     Y1B       X1C     Y1C       X1D     Y1E       X1E     Y1E									
X18     Y18       X19     Y19       X1A     Y1A       X1B     Y1B       X1C     Y1C       X1D     Y1D       X1E     Y1E									
X19     Y19       X1A     Y1A       X1B     Y1B       X1B     Y1B       X1C     Y1C       X1D     Y1D       X1E     Y1E	X17		Y17						
X1A     Y1A       X1B     Y1B     Output enable       X1C     Y1C       X1D     Y1D       X1E     Y1E	X18								
X1B     Y1B     Output enable       X1C     Y1C       X1D     Y1D       X1E     Y1E									
X1C     Y1C       X1D     Y1D       X1E     Y1E   Not used									
X1D     Y1D       X1E     Y1E   Not used				Output enable					
X1E V1E Not used									
				Not used					
	X1E 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)		rtoud, mito	(decimal) 0		rtoud, mito	
0	CH1 Digital value			D/A conversion enable/disable		
1	CH2 Digital value		1	CH1 Digital value		
2	CH1 Voltage upper limit check code	R/W	2	CH2 Digital value	R/W	
3	CH2 Voltage lower limit check code		3	CH3 Digital value		
4	CH1 Current upper limit check code			CH4 Digital value		
5	CH2 Current lower limit check code		5			
			to	System area (Not used)	-	
			10			
			11	CH1 Setting value check code		
			12	CH2 Setting value check code	R	
			13	CH3 Setting value check code		
			14	CH4 Setting value check code		
			15			
			to	System area (Not used)	-	
			18	Energy and a	ļ	
			19	Error code	R	
			20	Setting range (CH1 to CH4)		
			21	System area (Not used)	-	
			22	Offset/gain setting mode		
				Offset specification	5.44	
			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			
			160			
			to	System area (Not used)	-	
			199	Deep data alagai(ingtion - atting	DAM	
			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	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		

## Memo


# 3.8 A68DAI(-S1)

#### 3.8.1 Performance comparison

lte	em				A68DAI (-	S1)					
		(1)16-bit signed bir (2)Setting range:	(1)16-bit signed binary								
		(2)Setting range.									
Digital input				Set resolution		Setting ra	inge				
				1/4000		0 to 400					
				1/8000		0 to 800					
				1/12000		0 to 120	000	j			
Analog output					0 to 20mA	DC					
Analog output				(External loa	d resistance v	value: $0\Omega$ to 600	)Ω)				
				Dic	jital value resolu	ution	*Analog	1			
				1/4000	1/8000	1/12000	output value				
I/O characteris	tics		Digital	4000	8000	12000	+20mA	]			
			input	2000	4000	6000	+12mA				
			value	0	0	0	+4mA				
	1	*When offset value 4mA, gain value 20mA settings									
Maximum	1/4000				5.0µA						
resolution of	1/8000				2.5µA						
analog value	1/12000		1.6µA								
Overall accurat	Cy										
	aximum analog	±1.0% (±200µA)									
output value)											
Conversion			N	/ithin 40ms/8 cł	nannels (same	e time for one cl	hannel)				
Conversion spe	eeu	Note) Time	from when	the digital inpu	t is written to	when the specif	fied analog valu	le is reached			
Absolute maxir					0 to +28m	۱A					
			Note) I	Max. output cur	rent restricted	d by output prote	ection circuit				
Number of ana	log output				8 channels/m	nodule					
points											

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

068041N										
		Q68D	AIN				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			
	og output ange 0 to 20mA 4 to 20mA User range settings	Normal re mo Digital input value 0 to 4000 -4000 to 4000	de Maximum	High resolu Digital input value 0 to 12000 -12000 to 12000	tion mode Maximum resolution 1.66µA 1.33µA 0.83µA		0			
Ambient temperature $25\pm5^{\circ}$ C: within $\pm 0.1\%$ ( $\pm 20\mu$ A) Ambient temperature 0 to $55^{\circ}$ C: within $\pm 0.3\%$ ( $\pm 60\mu$ A)							0			
80µs/channel							0			
		21n	ηA				0			
		8 channels	s/module				0			

lte	em	A68DAI (-S1)					
Number of writes to E ² PROM		-					
Output short pr							
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 occu	upied I/O points	32 points (I/O assignment: special 32 points)					
Connected term	ninal	38-point terminal block					
Applicable wire	size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)					
Applicable sold	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current (5VDC)	consumption	0.15A					
	Voltage	21.6 to 26.4VDC					
External power supply	Current consumption	0.4A					
	Inrush current	-					
Weight		0.65kg					

# analog output module replacement

 		: Partial change required, ×: 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	0		
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, 20M $\Omega$ or more	0		
16 points	Δ	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.)			
0.38A		The recalculation of internal current	
0.00A		consumption (5VDC) is required.	
24VDC +20%, -15%			
Ripple, spike 500mVp-p or less			
0.27A			
2.5A, 230µs or less	-		
0.20kg	0		

### 3.8.2 Functional comparison

				O : Available, - : Not available
Item	Description	A68DAI (-S1)	Q68 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	<ol> <li>On Q68DAIN, the setting of HOLD/CLEAR is carried out for each channel.</li> <li>For the Q68DAIN, this function is set with the intelligent function module switch setting.</li> <li>Refer to ("Analog output status combination list" in the Digital- Analog Converter Module User's Manual to check the execution status of output.</li> </ol>
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.         Strop status.         D/A conversion enable/disable       Enable         D/A conversion enable/disable       Disable         Combin ation       CHD Output enable/disable         Final       Disable         ChD Output enable/disable       Enable         Disable       Disable         ChD Output enable/disable       Enable         Disable       flag         Analog output test       Allowed         Not allowed	-	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	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.		No.		No.		No.	
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used CH1 Output enable/
X1	D/A conversion READY flag	Y1		X1		Y1	disable flag
	-						CH2 Output enable/
X2	Error flag	Y2		X2		Y2	disable flag
N O		Y3		V2		Y3	CH3 Output enable/
X3		13		X3		13	disable flag
X4		Y4		X4	Not used	Y4	CH4 Output enable/
							disable flag
X5		Y5		X5		Y5	CH5 Output enable/
							disable flag CH6 Output enable/
X6		Y6	Not used	X6		Y6	disable flag
			Notused				CH7 Output enable/
X7		Y7		X7		Y7	disable flag
					High resolution mode	2/0	CH8 Output enable/
X8		Y8		X8	status flag	Y8	disable flag
X9		Y9		X9	Operating condition	Y9	Operating condition
7.5		10		7.5	setting completion flag	10	setting request
ХА		YA		ХА	Offset/gain setting mode	YA	User range write request
	-				status flag		
XB		YB		XB	Channel change completion flag	YB	Channel change request
					Setting value change		Setting value change
XC	Not used	YC		XC	completion flag	YC	request
VD		VD	Interlock signal for the	VD	Synchronous output	VD	Synchronous output
XD		YD	RFRP and RTOP	XD	mode flag	YD	request
XE		YE	instructions when the	XE	Not used	YE	Not used
XF		YF	A68DAI(-S1) is used in	XF	Error flag	YF	Error clear request
×40	-	>(4.0	remote I/O station		Ũ		•
X10 X11	-	Y10 Y11					
X11 X12		Y12					
X12			D/A conversion output				
X14		Y14	enable flag				
X15		Y15					
X16		Y16					
X17		Y17					
X18	-	Y18	Error reset flag				
X19		Y19					
X1A X1B		Y1A Y1B					
X1D X1C	1	Y1C					
X1D	Interlock signal for the	Y1D	Not used				
X1E	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A68DAI(-S1) is used in	Y1F					
	remote I/O station						

#### 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	Name	Read/write	Address	Name	Read/write
(decimal)	Name	Redu/write	(decimal)	Name	Reau/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	R/W	4	CH4 Digital value	R/W
5	CH5 Digital value	N/W	5	CH5 Digital value	
6	CH6 Digital value		6	CH6 Digital value	
7	CH7 Digital value		7	CH7 Digital value	
8	CH8 Digital value		8	CH8 Digital value	
9	Resolution of digital value		9	System area (Not used)	
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		14	CH4 Setting value check code	
15	CH6 Setting value check code	-	15	CH5 Setting value check code	
16	CH7 Setting value check code		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)	
			20	Offset/gain setting mode	
			22	Offset specification	
			00	Offset/gain setting mode	R/W
			23	Gain specification	
			24	Offset/gain adjusted value specification	-
			25		
			to	System area (Not used)	-
			157		
			158		5
			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	R/W
			206	CH3 Industrial shipment settings offset value	1
			207	CH3 Industrial shipment settings gain value	1

Q68DAIN							
Address	Name	Read/write					
(decimal)							
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				
	<u>-</u>	(1)16-bit signed bi	nary						
		(2)Setting range:	-						
Digital input				Setting resolution		Setting ra			
				1/4000		-4000 to 4			
				1/8000		-8000 to 8			
							12000		
Analog output					-10 to 0 to 10				
				(External load	d resistance va	lue: $2k\Omega$ to $1N$	ΛΩ)		
				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 value	0 -2000	0 -4000	0 -6000	0V -5V	-	
			value	-2000	-4000	-12000	-3V -10V	-	
			L	1				]	
				*When offset v		value 10V sett	lings		
Maximum	1/4000				2.5mV				
resolution of	1/8000				1.25mV				
analog value	1/12000				0.83mV				
Overall accura	•				1 00/ /1 100-	-)()			
	aximum analog				±1.0% (±100n	nv)			
output value)			١٨	/ithin 40ms/8 ch	annola (aama	time for one o	hannal)		
Conversion speed		Note) Time		the digital inpu				le is reached	
		Note) fille	nom wher		-12 to +12\			le is reached	
Absolute maxir	num output	Note) Max. output voltage restricted by output protection circuit							
Number of ana	log output								
points	3	8 channels/module							
Number of writ	es to F ² PROM				-				
Output short pr		-							
		Between the output terminal and programmable controller power supply: photocoupler isolation							
Isolation metho	bd	(Between channels: non-isolation)							
<b>B</b> : 1 (1) (1)									
Dielectric withs	tand voltage	-							
Inculation racio	tanaa								
Insulation resis	aance	-							
Number of occ	upied I/O points				32 points				
Number of occ		(I/O assignment: special 32 points)							
Connected terr	Connected terminal 38-point terminal block								
Applicable wire					0.75 to 2mm	1 ²			
	5120			(Applicable ti	ghtening torqu	e: 39 to 59N•c	cm)		
Applicable solo	lerless terminal			V1.25-3, V	1.25-YS3A, V2	2-S3, V2-YS3/	Ą		
Internal curren	t consumption				0.15A				
(5VDC)									

Q68DAVN					$O: Compatible, \Delta: Partial change required, \times: Incompatible$		
		Qe	<b>SADAVN</b>		Compatibility	Precautions for replacement	
		16-bit s ormal resolution ition mode: -12	0				
	-10 to 10VD	C (External loa	0				
	0 to 5V 1 to 5V -10 to 10V User range settings	Normal resc Digital input value 0 to 4000 -4000 to 4000	lution mode Maximum resolution 1.25mV 1.0mV 2.5mV 0.75mV	High resolution modeDigital input valueMaximum resolution0 to 120000.416mV0 to 120000.333mV-16000 to 160000.625mV-12000 to 120000.333mV	0		
		temperature 25 emperature 0 te	0				
		80µ:	0				
			±12V		0		
		8 chan	nels/module		0		
		Max. 10	00,000 times		0		
		A	vailable		0		
	Be	photoco etween output o	upler isolation channels: non		0		
		500VAC	, for 1 minute		0		
Bet	ween the I/O		rogrammable 20M $\Omega$ or mor	controller power supply: e	0		
	(1	16 O assignment/	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.	
		l: R1.25-3, 1.25 Terminals othe ved solderless	er than FG: R		×		
			0.38A		Δ	The recalculation of internal current consumption (5VDC) is required.	

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

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

### 3.9.2 Functional comparison

Item	Description	A68DAV	Q68DAVN	O : Available, - : Not available 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 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	<ol> <li>On Q68DAVN, the setting of HOLD/CLEAR is carried out for each channel.</li> <li>For the Q68DAVN, this function is set with the intelligent function module switch setting.</li> <li>Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.</li> </ol>
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.         Store       D/A conversion enable/disable       Enable       Disable         Combi       CH Output enable/disable       Enable       Disable         Combi       CH Output enable/disable       Enable       Disable         Imation       CH Output enable/disable       Enable       Disable         Imation       Grading output test       Allowed       Not allowed	-	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	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.

A68DAV			Q68DAVN				
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	Y0	Not used
X1	D/A conversion READY flag	Y1		X1		Y1	CH1 Output enable/ disable flag
	llag						CH2 Output enable/
X2	Error flag	Y2		X2		Y2	disable flag
							CH3 Output enable/
X3		Y3		X3		Y3	disable flag
X4		Y4		X4	Not used	Y4	CH4 Output enable/
		17		7.4			disable flag
X5		Y5		X5		Y5	CH5 Output enable/
							disable flag
X6		Y6	Netword	X6		Y6	CH6 Output enable/
			Not used				disable flag CH7 Output enable/
X7		Y7		X7		Y7	disable flag
					High resolution mode		CH8 Output enable/
X8		Y8		X8	status flag	Y8	disable flag
XO		VO		VO	Operating condition	VO	Operating condition
X9		Y9		X9	setting completion flag	Y9	setting request
ХА		YA		ХА	Offset/gain setting mode	YA	User range write request
,,,,				,,,,	status flag		ober range mite requeet
ХВ		YB		XB	Channel change	YB	Channel change request
					completion flag Setting value change		Setting value change
XC	Not used	YC		XC	completion flag	YC	request
			Interlock signal for the		Setting value change		Synchronous output
XD		YD	RFRP and RTOP	XD	completion flag	YD	request
XE		YE	instructions when the	XE	Not used	YE	Not used
XF		YF	A68DAV is used in	XF	Error flag	YF	Error clear request
			remote I/O station				
X10		Y10					
X11		Y11					
X12 X13		Y12 Y13	D/A conversion output				
X13		Y14	enable flag				
X15		Y15	onable hag				
X16		Y16					
X17		Y17					
X18		Y18	Error reset flag				
X19		Y19					
X1A		Y1A					
X1B X1C		Y1B Y1C					
X1C X1D	Interlock signal for the		Not used				
XIE	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	Name	Read/write	Address	Name	Read/write		
(decimal)	Name	Reau/write	(decimal)	Name	Reau/write		
0	/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	R/W	4	CH4 Digital value			
5	CH5 Digital value	N/W	5	CH5 Digital value	R/W		
6	CH6 Digital value		6	CH6 Digital value			
7	CH7 Digital value		7	CH7 Digital value			
8	CH8 Digital value		8	CH8 Digital value			
9	Resolution of digital value		9	System area (Nat used)			
10	CH1 Setting value check code		10	System area (Not used)			
11	CH2 Setting value check code	-		CH1 Setting value check code			
12	CH3 Setting value check code	1	12	CH2 Setting value check code	1		
13	CH4 Setting value check code		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		15	CH5 Setting value check code			
16	CH7 Setting value check code		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)			
			00	Offset/gain setting mode			
			22	Offset specification			
			00	Offset/gain setting mode	R/W		
			23	Gain specification			
			24	Offset/gain adjusted value specification	-		
			25				
			to	System area (Not used)	-		
			157				
			158		<b>5</b>		
			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	R/W		
			206	CH3 Industrial shipment settings offset value	1		
			207	CH3 Industrial shipment settings gain value	1		

Q68DAVN					
Address	Name	Read/write			
(decimal)					
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				

# TEMPERATURE INPUT MODULE REPLACEMENT

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

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

*1 Depending on the connected sensor and the analog input range, use each module in combination (A616TD, A60MX, A60MXR, A60MXR, A60MXT, and 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 compination	Thermocouple	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

Temperature sensor input	lt	tem	A616TD (When using the A60MXT and A60MXTN together)	
value         (0 to 4000) (Data part: 12 bits)           Dutput         Detected temperature value         16-bit signed binary (-2000 to 18000: value up to the first decimal place × 10)           Applicable thermocouple         Refer to Section 4.2.1 (2).           Measured temperature range accuracy         Refer to Section 4.2.1 (2).           Overall accuracy         Refer to the table in Section 4.2.1 (2).           Overall accuracy         Refer to the table in Section 4.2.1 (2).           Measured temperature range accuracy         Section 4.2.1 (2).           Overall accuracy         Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1MG2 resistor isolation)           Isolation method         Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1MG2 resistor isolation)           Number of temperature sensor input points         (The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)           Number of occupied I/O points         32 points (1/O assignment: special 32 points)           External connection system         32-points (1/O assignment: special 32 points)           External connection system         0.75 to 2mm ² (Applicable soldenles sterminal block           (SVDC)         (Applicable tightening torque: 39 to 59N-cm)           Applicable soldenles sterminal         V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	Temperature s	sensor input	-200 to 1800°C	
Image:	value			
Measured temperature range accuracy         Refer to Section 4.2.1 (2).           Overall accuracy         Refer to the table in Section 4.2.1 (2).           Maximum conversion speed         50ms/channel           Maximum conversion speed         50ms/channel           Isolation method         Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1MΩ resistor isolation)           Number of temperature sensor input points         15 points/module (A60MXT, A60MXTN) (The 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         33-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	Output	temperature		
accuracy       Refer to Section 4.2.1 (2).         Overall accuracy       Refer to the table in Section 4.2.1 (2).         Maximum conversion speed       50ms/channel         Isolation method       Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1MΩ resistor isolation)         Number of temperature sensor input points       (The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)         Number of occupied I/O points       (The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)         External connection system       38-point terminal block         Applicable wire size       0.75 to 2mm²         (Applicable solderless terminal       V1.25-3, V1.25-YS3A, V2-YS3A         Internal current consumption (SVDC)       1.0A	Applicable the	rmocouple	Refer to Section 4.2.1 (2).	
Overall accuracy         Measured temperature range accuracy ±0.5°C           Maximum conversion speed         50ms/channel           Isolation method         Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1MΩ resistor isolation)         Isolation           Number of temperature sensor input points         (The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)         Isolation           Number of cocupied I/O points         (I/O assignment: special 32 points)         Isolation           External connection system         38-point terminal block         Image: CAPPIcaPice Sensor           Applicable wire size         (Applicable tightening torque: 39 to 59N-cm)         Internal Current consumption (5VDC)		perature range	Refer to Section 4.2.1 (2).	
Measured temperature range accuracy ±0.5°C           Maximum conversion speed         50ms/channel           Isolation method         Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1MΩ resistor isolation)           Number of temperature sensor input points         15 points/module (A60MXT, A60MXTN) (The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)           Number of occupied I/O points         (I/O assignment: special 32 points) (I/O assignment: special 32 points)           External connection system         38-point terminal block           Applicable wire size         (Applicable tightening torque: 39 to 59N•cm)           Applicable solderless terminal         V1.25-3, V1.25-YS3A, V2-YS3A	Overall accura			
Isolation method         Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation (1MΩ resistor isolation)           Number of temperature sensor input points         15 points/module (A60MXT, A60MXTN) (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           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-YS3A           Internal current consumption (5VDC)         1.0A		-		 
Isolation methodBetween channels: non-isolation (1MΩ resistor isolation)Number of temperature sensor input points15 points/module (A60MXT, A60MXTN) (The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)Number of occupied I/O points32 points (I/O assignment: special 32 points)External connection system38-point terminal blockApplicable wire size0.75 to 2mm² (Applicable tightening torque: 39 to 59N•cm)Applicable solderless terminalV1.25-3, V1.25-YS3A, V2-S3, V2-YS3AInternal current consumption (5VDC)1.0A	Maximum conv	version speed	50ms/channel	
input points(The A60MXT and A60MXTN can be mounted up to seven in total to one A616TD.)Number of occupied I/O points32 points (I/O assignment: special 32 points)External connection system38-point terminal blockApplicable wire size0.75 to 2mm² (Applicable tightening torque: 39 to 59N•cm)Applicable solderless terminalV1.25-3, V1.25-YS3A, V2-S3, V2-YS3AInternal current consumption (5VDC)1.0A			Between channels: non-isolation (1M $\Omega$ resistor isolation)	
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 tightening torque: 39 to 59N•cm)         Applicable solderless terminal       V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A         Internal current consumption (5VDC)       1.0A		perature sensor		
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)       1.0A		cupied I/O points	32 points	
Applicable wire size       (Applicable tightening torque: 39 to 59N•cm)         Applicable solderless terminal       V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A         Internal current consumption (5VDC)       1.0A	External conne	ection system	38-point terminal block	
Internal current consumption (5VDC) 1.0A	Applicable wire	e size		
(5VDC)	Applicable solo	derless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Weight 0.85kg		nt consumption		
	Weight		0.85kg	

*1 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.

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

	-	$\triangle$ : Partial change required, ×: Incompatible
Q64TD	Compatibility	Precautions for replacement
-270 to 1820°C	0	
16-bit signed binary (Scaling value)	0	
16-bit signed binary (-2700 to 18200: value up to the first decimal place × 10)	0	
Refer to Section 4.2.1 (2).	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).		As they depend on the applicable thermocouple and measured
*1	0	temperature range, refer to Section 4.2.1 (2) to check the specifications.
40ms/channel	0	
Isolated areaIsolation methodDielectric withstand voltageInsulation resistance		
Between thermocouple input and earthTransformer isolation500VDC 100M Ω or more1780VrmsAC/3 cycles0		
Between thermocouple input channelsTransformer isolation(altitude 2000m) 500VDC 10M Ω or more	0	
Between cold junction compensation input (Pt100) and ground		
4 channels/module	×	Consider replacement with multiple Q64TD.
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.)	×	
0.50A	0	
0.25kg	0	

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

A616TD								
				Measurement range	1	2	3	4
JIS	ANSI	DIN	BS	number		2	3	4
515	ANSI	DIN	63	Allowable input voltage	-12.5 to 12.5	0 to 25	0 to 50	0 to 100
				range [mV]	-12.5 (0 12.5	01020	01000	
				Measured temperature	100 to 1500	100 to 1800	100 to 1800	100 to 1800
В	В	_	PtRh30-	range [°C]	100 10 1000	100 10 1000	100 10 1000	100 10 1000
D	в В		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]	0.0.1000		0.0 1100	0.001100
i c			1 44110 1 1	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]	0101200		0101100	0.001100
U	U		1 4 4 1 0 1 0	Accuracy at 25°C [%]	_	±0.4	_	_
				Temperature drift [%/°C]		±0.011		
		NiCr-Ni	r-Ni NiCr-NiAl	Measured temperature	-200 to 250	0 to 500	0 to 1000	0 to 1300
К	к			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
		_		Measured temperature	-200 to 150	0 to 300	0 to 600	0 to 1000
Е	E 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
				Measured temperature	-200 to 200	0 to 400	0 to 800	0 to 1200
J	J	-	Fe-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
				Measured temperature	-200 to 200	0 to 400	0 to 400	0 to 400
Т	т	-	Cu-CuNi	range [°C]	10.5	.0.0		
				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]		+0.2	+0.2	+0 F
				Accuracy at 25°C [%] Temperature drift [%/°C]		±0.3	±0.3	±0.5
				Measured temperature		±0.01	±0.01	±0.013
					-100 to 200	0 to 400	0 to 600	0 to 600
-	-	Cu-CuNi	-	range [°C] Accuracy at 25°C [%]		±0.3	±0.4	
				Temperature drift [%/°C]		±0.3 ±0.01	±0.4 ±0.011	-
						±0.01	IU.UII	

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			Q64TD		
JIS			Specifications		
	Measured temperature range [°C]	0 to 600	600 to 800	800 to 1700	1700 to 1820
-	Conversion accuracy at		.0.0	.0.5	1620
В	25±0.5°C [°C]	-	±3.0	±2.5	-
	Temperature characteristics [°C]		±0.4	±0.4	
	Measured temperature range [°C]	-50 to 0	0 to 300	300 to 1600	1600 to 1760
R	Conversion accuracy at 25±0.5°C [°C]	-	±2.5	±2.0	-
	Temperature characteristics [°C]		±0.4	±0.3	
	Measured temperature range [°C]	-50 to 0	0 to 300	300 to 1600	1600 to 1760
S	Conversion accuracy at 25±0.5°C [°C]	-	±2.5	±2.0	-
	Temperature characteristics [°C]		±0.4	±0.3	
	Measured temperature range [°C]	-270 to -200	-200 to 0	0 to 1200	1200 to 1370
к	Conversion accuracy at 25±0.5°C [°C]	_	Larger value of $\pm 0.5^{\circ}$ C, or $\pm 0.5\%$ of measured temperature	Larger value of ±0.5°C, or ±0.25% of measured temperature	_
	Temperature characteristics [°C]		Larger value of ±0.06°C, or ±0.2% of measured temperature	Larger value of ±0.06°C, or ±0.02% of measured temperature	
	Measured temperature range [°C]	-270 to -200	-200 to 0	0 to 900	900 to 100
Е	Conversion accuracy at 25±0.5°C [°C]		Larger value of ±0.5°C, or ±0.5% of measured temperature	Larger value of ±0.5°C, or ±0.25% of measured temperature	
	Temperature characteristics [°C]	-	Larger value of ±0.06°C, or ±0.15% of measured temperature	Larger value of ±0.06°C, or ±0.02% of measured temperature	-
	Measured temperature range [°C]	-210 to -40	-40 to 750	750 to 1200	-
J	Conversion accuracy at 25±0.5°C [°C]	-	Larger value of ±0.5°C, or ±0.25% of measured temperature	-	-
	Temperature characteristics [°C]	-	Larger value of ±0.06°C, or ±0.02% of measured temperature	-	-
	Measured temperature range [°C]	-270 to -200	-200 to 0	0 to 350	350 to 40
т	Conversion accuracy at 25±0.5°C [°C]	-	Larger value of $\pm 0.5^{\circ}$ C, or $\pm 0.5^{\circ}$ of measured temperature	Larger value of ±0.5°C, or ±0.25% of measured temperature	-
	Temperature characteristics [°C]	-	Larger value of ±0.06°C, or ±0.1% of measured temperature	Larger value of ±0.06°C, or ±0.02% of measured temperature	-
	Measured temperature range [°C]	-270 to -200	-200 to 0	0 to 1250	1250 to 1300
N	Conversion accuracy at 25±0.5°C [°C]	-	Larger value of $\pm 0.5^{\circ}$ C, or $\pm 0.5^{\circ}$ of measured temperature	Larger value of ±0.5°C, or ±0.25% of measured temperature	-
	Temperature characteristics		Larger value of ±0.06°C, or	Larger value of ±0.06°C, or ±0.02% of measured temperature	

# 4.2.2 Functional comparison

140 mg	Description	ACACTO	OCATD	O : Available, - : Not available
Item	Description	A616TD	Q64TD	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.	Ŭ	Ŭ	
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	Stores imported temperature data in the	6	0	
storage	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.

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## 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	6TD			Q64	4TD	
Device		Device	<u>Cinnel neme</u>	Device		Device	
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
	A D CONVEISION NEAD I				status signal		request
X2	Error flag	Y2		X2	CH2 Offset/gain setting status signal	Y2	CH1 Gain setting request
Х3	Disconnection error detection	Y3		Х3	CH3 Offset/gain setting status signal	Y3	CH2 Offset setting request
X4	Digital output value out- of-range detection	Y4		X4	CH4 Offset/gain setting status signal	Y4	CH2 Gain setting request
X5	Detected temperature value out-of-range detection	Y5	Not used	X5		Y5	CH3 Offset setting request
X6		Y6		X6	Not used	Y6	CH3 Gain setting request
X7		Y7		X7		Y7	CH4 Offset setting
							request
X8		Y8		X8		Y8	CH4 Gain setting request
X9		Y9		X9	Operating condition 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	
хс		YC		хс	Disconnection detection signal	YC	Notwood
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					
X12		Y12					
X13		Y13					
X14		Y14					
X15 X16		Y15 Y16					
X10 X17		Y17					
X17 X18		Y18					
X19		Y19	Not used				
X1A		Y1A					
X1B		Y1B					
X1C		Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
N/1E	instructions when the	VIE					
X1F	A616TD is used in	Y1F					
	remote I/O station			J			

#### 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 (hex)	Name	Read/write	Address (hex)	Name	Read/write	
00	Data format selection		00	Conversion enable/disable setting		
01	Error code storage	-	01	CH1 Time/count averaging setting	-	
01	Error occurrence A60MXIICONNECT No.	-	01		-	
02	storage	R/W	02	CH2 Time/count averaging setting	R/W	
	Thermocouple type setting error channel	-				
03	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	_	
	Disconnection detection enable/disable				R	
20 to 27	specification	R/W	0D	CH3 Measured temperature value		
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)	-	
10 10 17	Disconnection detection channel number	R/W	40	Francisco		
40 to 47	storage		13	Error code	R	
48 to 4F	System area (Not used)	-	14	Setting range		
50 to 57	Digital output value out-of-range	R/W	15 to 2E	System area (Not used)	-	
50 10 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		
60 to 67	Detected temperature value out-of-range	R/W	31	Disconnection detection flag		
001007	Channel number storage	r/w	32	CH1 Scaling value		
68 to 6F	System area (Not used)	-	33	CH2 Scaling value	R	
70 to 7F	INPUT channel	R	34	CH3 Scaling value		
101011	Digital output value storage	IX IX	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	1.7,4,4	3E	CH1 Scaling range lower limit value		
180 to 1FF	MX CH.channel		3F	CH1 Scaling range upper limit value		
	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 10 211	Detected temperature value storage		42	CH3 Scaling range lower limit value		
			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	4	
			51	CH2 Scaling width upper limit value	4	
			52	CH3 Scaling width lower limit value	R/W	
			53	CH3 Scaling width upper limit value	4	
			54	CH4 Scaling width lower limit value	4	
			55	CH4 Scaling width upper limit value	4	
			56	CH1 Warning output lower/lower limit value	-	
			57	CH1 Warning output lower/upper limit value		

	Q64TD					
Address (hex)	Name	Read/write				
58	CH1 Warning output upper/lower limit value					
59	CH1 Warning output upper/upper limit value					
5A	CH2 Warning output lower/lower limit value					
5B	CH2 Warning output lower/upper limit value					
5C	CH2 Warning output upper/lower limit value					
5D	CH2 Warning output upper/upper limit value					
5E	CH3 Warning output lower/lower limit value	R/W				
5F	CH3 Warning output lower/upper limit value	10.00				
60	CH3 Warning output upper/lower limit value					
61	CH3 Warning output upper/upper limit value					
62	CH4 Warning output lower/lower limit value					
63	CH4 Warning output lower/upper limit value					
64	CH4 Warning output upper/lower limit value					
65	CH4 Warning output upper/upper limit value					
66 to 75	System area (Not used)	-				
76	CH1 Offset temperature setting value					
77	CH1 Gain temperature setting value					
78	CH2 Offset temperature setting value					
79	CH2 Gain temperature setting value	R/W				
7A	CH3 Offset temperature setting value					
7B	CH3 Gain temperature setting value					
7C	CH4 Offset temperature setting value					
7D	CH4 Gain temperature setting value					
7E to 9D	System area (Not used)	-				
9E to 9F	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)					
A5	EMF offset value (H)					
A6	CH1 User range settings thermal (L)					
A7	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)					
B0 B1	CH3 Factory default offset value					
DI	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)				
B6	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	r./ vv			
BA	CH4 User range settings offset value				
BB	CH4 User range settings gain value				
BC	CH4 User range settings thermal(L)				
BD	EMF offset value(H)				
BE	CH4 User range settings thermal(L)	1			
BF	EMF gain value(H)				
C0	System area (Net used)				
to	System area (Not used)	-			

# Memo

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# 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	
	Disitel extput volue	16-bit signed binary	1
Output	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	ble thermocouple	Refer to Section 4.3.1 (2).	
Measure	ed temperature range	Refer to Section 4.3.1 (2).	
accuracy	¥		
Overall a	accuracy	Refer to the table in Section 4.3.1 (2).	
Overand	locuracy	Measured temperature range accuracy ±0.5°C	
Maximur	m conversion speed	50ms/channel	
Isolation	method	Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolation ( $1M\Omega$ resistor isolation)	
	ection detection	Available	
	of temperature sensor	15 points/module (A60MXT, A60MXTN)	
input poir	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	
	device connector		
(sold sep	parately)		
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 of (5VDC)	current consumption	1.0A	
Weight		0.85kg	
		~	<u> </u>

O : Compatible,  $\bigtriangleup$  : Partial change required, <code>x</code>: Incompatible

Q series						
Q68TD-G-H02		Q68TD-G-	H01 ^{*1}	Compatibility	Precautions for replacement	
	-270 to 182	20°C		0		
16-bit si	gned binary (	Scaling value)		0		
	16-bit signed alue up to the	binary first decimal place >	< 10)	0		
Rei	fer 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.	
Ret	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	Isolation method	Dielectric withstand voltage	Insulation resistance			
Between thermocouple input and programmable controller power supply	Transformer isolation	AC500Vms/1min	DC500V 10MΩ or more	0		
Between thermocouple input channels	Transformer isolation	AC1000Vrms/1min	TOWSFOLMOLE			
Between cold junction compensation input (Pt100) and programmable controller power supply	Non-isolation	-	-			
Available (all the channels are indepen	dent)	Not avail	able	×	The Q68TD-G-H01 has the disconnection monitor function.	
8 channels + ch	annels conne	ected to Pt100/modul	e	×	Consider replacement with multiple Q68TD-G-H02/H01.	
(I/O assig	16 point gnment: intelli	Δ	The number of occupied I/O points has changed to 16 points.			
	40-pin conn	×				
A6CON4					Wiring change is required.	
0.3	mm ² (22 AW)	×				
	-	×				
0.65A		0.49/	A	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		2	2	-
010	ANSI	Diri	БЭ	Allowable input voltage	-12.5 to 12.5	0 to 25	0 to 50	0 to 100
				range [mV]				
				Measured temperature	100 to 1500	100 to 1800	100 to 1800	100 to 1800
В	В	_	PtRh30-	range [°C]				
			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]				
				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]				
				Accuracy at 25°C [%]		±0.4	-	-
				Temperature drift [%/°C]		±0.011		
				Measured temperature	-200 to 250	0 to 500	0 to 1000	0 to 1300
к	к к	NiCr-Ni	NiCr-NiAl	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
		_		Measured temperature	-200 to 150	0 to 300	0 to 600	0 to 1000
E	Е		NiCr-CuNi	range [°C] Accuracy at 25°C [%]	±0.4	10.2	10.2	±0.4
				Temperature drift [%/°C]	±0.4 ±0.011	±0.3 ±0.01	±0.3	±0.4 ±0.011
		-		Measured temperature	±0.011	±0.01	±0.01	±0.011
				range [°C]	-200 to 200	200 0 to 400	0 to 800	0 to 1200
J	J	-	Fe-CuNi	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	10.011	10.01	10.01	10.011
				range [°C]	-200 to 200	0 to 400	0 to 400	0 to 400
Т	Т	-	Cu-CuNi	Accuracy at 25°C [%]	±0.5	±0.3		
				Temperature drift [%/°C]	±0.013	±0.01	-	-
				Measured temperature				
				range [°C]	-100 to 200	0 to 400	0 to 800	0 to 900
-	-	Fe-CuNi	-	Accuracy at 25°C [%]		±0.3	±0.3	±0.5
				Temperature drift [%/°C]	-	±0.01	±0.01	±0.013
				Measured temperature	100 / 00-			
				range [°C]	-100 to 200	0 to 400	0 to 600	0 to 600
-	-	Cu-CuNi	-	Accuracy at 25°C [%]		±0.3	±0.4	
				Temperature drift [%/°C]	-	±0.01	±0.011	-

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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			
В	600 to 800°C ^{*2}	±3.0°C	±0.4°C	±13.0°C			
	800 to 1700°C ^{*2}	±2.5°C	10.4 0	±12.5°C			
	1700 to 1820°C	*3	*3	*3			
	-50 to 0°C	*3	*3	*3			
R	0 to 300°C ^{*2}	±2.5°C	±0.4°C	±12.5°C			
ĸ	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	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			
V	-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			
К	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			
Е	-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			
E	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			
Т	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			
N	-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			
Ν	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

		0:	$O$ : Available, $\Delta$ : 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 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	Δ	The Q68TD-G-H01 does not 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.

	A616TD				Q68TD-G-H02, Q68TD-G-H01				
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name		
<b>No.</b> X0		<b>No.</b> Y0		<b>No.</b> X0	Module READY	<b>No.</b> Y0			
X1	Watchdog timer error A/D conversion READY	Y1		X1		Y1			
X2	Error flag	Y2		X1 X2		Y2			
Х3	Disconnection error detection	Y3		X3		Y3			
X4	Digital output value out- of-range detection	Y4		X4		Y4	Not used		
X5	Detected temperature value out-of-range detection	Y5		X5	Not used	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		
ХВ		YB		XB	Channel change completion flag	YB	Channel change request		
хс		YC		ХС	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 X16	4	Y15 Y16							
X10	1	Y17							
X17	1	Y18							
X19	•	Y19	Not used						
X1A	1	Y1A							
X1B	1	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			J					

#### 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.

	A6	16TD			Q68TD-G-H02, Q68TD-G-H01		
Address (hex)	Na	ime	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 A60MXIICONNECT No. storage		R/W	09	System area (Not used)	-	
03	Thermocouple type setting error channel number storage			0A	Conversion completion flag		
04	Current sampling period storage		R	0B to 12	CH1 to CH8 Measured temperature value		
05 to 0E	System area (Not used) Conversion enable/ A616TD		-	13	Error code	R	
0F				14 to 15	CH1 to CH8 Setting range (Thermocouple type)	Γ.	
10 to 17	disable specification	Multiplexer module	R/W	16	Setting range (Offset/gain setting )		
18	Setting data set reque	est		17	System area (Not used)	-	
19 to 1F	System area (Not use	ed)	-	18 to 19	CH1 to CH8 Averaging processing selection		
20 to 27	Disconnection detecti specification	on enable/disable	R/W	1A	Offset/gain setting mode (Offset specification)		
28 to 2F	System area (Not used) Digital output value temperature setting Disconnection detection channel number storage		-	1B	Offset/gain setting mode (Gain specification)	R/W	
30 to 3F				1C	CH1 Offset temperature setting value		
40 to 47			R/W	1D	CH1 Gain temperature setting value		
48 to 4F	System area (Not use	ed)	-		to		
50 to 57	Digital output value of	ut-of-range	DAA	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 use	ed)	-	2D	Q68TD-G-H02:Cold junction compensation setting state	R	
					Q68TD-G-H01: System area	-	
60 to 67	Detected temperature	e value out-of-range	R/W	2E	Warning output enable/disable setting	R/W	
00 10 07	Channel number stora	age	1000	2F	Warning output flag (Process alarm)		
68 to 6F	System area (Not use	ed)	-	30	Warning output flag (Rate alarm)		
					Q68TD-G-H02:Disconnection detection flag	R	
70 to 7F	INPUT channel	NPUT channel		31	Q68TD-G-H01:Disconnection status		
10 10 11	Digital output value st	orage			monitor flag		
				32 to 39	CH1 to CH8 Scaling value		
80 to FF	Error correction value	setting	R/W	3A	Scaling valid/invalid setting	R/W	
100 to 17F	Thermocouple type se	etting	1000	3B to 3D	System area (Not used)	-	
180 to 1FF	MX CH.channel			3E	CH1 Scaling range lower limit value	R/W	
	Digital output value st	orage	R	3F	CH1 Scaling range upper limit value	F\/VV	
200 to 27F	MX CH.channel				to	-	
200 10 211	Detected temperature	e 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		

	Q68TD-G-H02, Q68TD-G-H01							
Address (hex)	Name	Read/write						
61	CH1 Process alarm upper/upper limit value	R/W						
	to							
7D	CH8 Process alarm upper/upper limit value							
7E to 85	CH1 to CH8 Rate alarm warning detection							
12 10 00	period	R/W						
86	CH1 Rate alarm upper limit value							
87	CH1 Rate alarm lower limit value							
	to							
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)	-						
	Q68TD-G-H02:Conversion setting for							
A4 to A5	disconnection detection							
A4 10 A5	Q68TD-G-H01:Disconnection state							
	conversion setting	R/W						
	Q68TD-G-H02:Conversion setting value for							
A6 to AD	disconnection detection Q68TD-G-H01:Conversion setting value for							
AU IU AD								
	isconnection 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							
02	value (L)	R/W						
C3	CH1 User range settings thermal EMF offset	10,00						
05	value (H)							
C4	CH1 User range settings thermal EMF gain							
04	value (L)							
C5	CH1 User range settings thermal EMF gain							
value (H)								
	to							
FC	CH8 User range settings thermal EMF gain							
10	value (L)	R/W						
FD	CH8 User range settings thermal EMF gain	N						
	value (H)							

# Memo

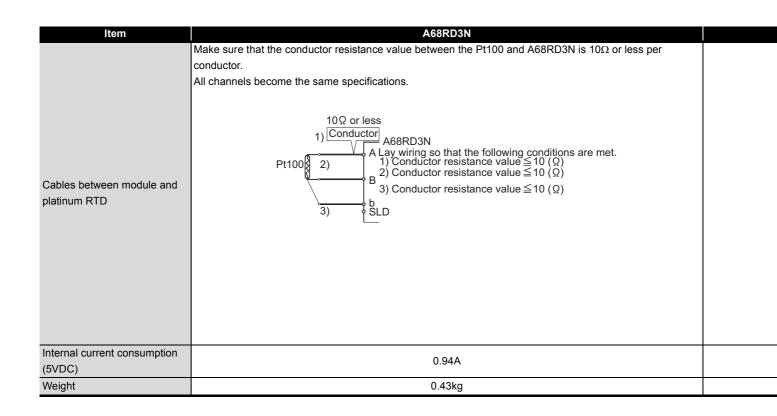

# 4.4 A68RD3N (Replacement to the Q64RD)

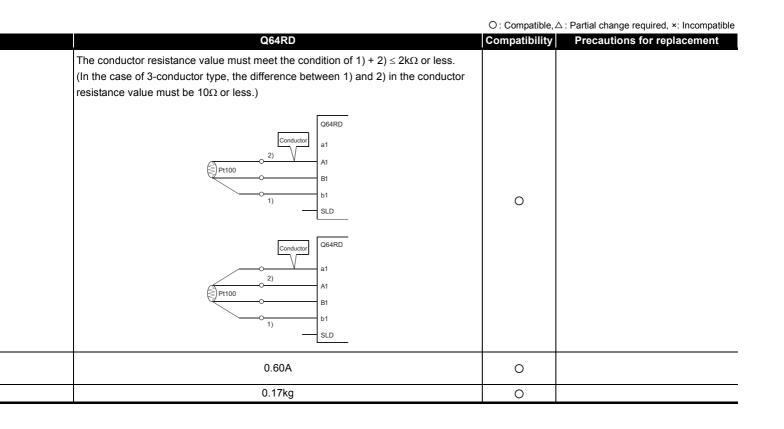
## 4.4.1 Performance comparison

Ite	em	A68RD3N			
Measuring meth		3-wire type			
nicacian.g.m.	iou	16-bit signed binary	++		
		-1800 to 6000			
Output (tempera	ature	Value up to the first decimal place × 10			
conversion value		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 platir	num RTD	JPt100			
		(JIS C1604-1981)			
•• •••		-180 to 600°C	1 1		
Measured	Pt100	(27.10 to 313.71Ω)			
temperature	151400	-180 to 600°C	1 1		
range	JPt100	(25.80 to 317.28Ω)			
			1 1		
1.00000		±1%			
Accuracy		(accuracy at full scale)			
Resolution		0.025°C			
Conversion spe	ed	40ms/channel			
Number of analo	og input points	8 channels/module			
Output current fe	or temperature	1mA			
detection					
Isolation method	d	Between platinum RTD input and programmable controller power supply: photocoupler isolation			
	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 d	letection	Detected per channel			
Number of occu	iniad I/O points	32 points			
Number of occu	ipieu i/O pointo	(I/O assignment: special 32 points)			
External connect	ction system	38-point terminal block			
Applicable wire	size	0.75 to 2mm ²			
Applicable solde	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A			

		$\Delta$ : 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	0	
32-bit signed binary	0	
-200000 to 850000		
Value up to the third decimal place × 1000		
Pt100		As the compliance standards for the
(JIS C 1604-1997, IEC751 1983)	Δ	applicable platinum RTD differ,
JPt100		change the platinum RTD to the one
(JIS C 1604-1981)		that can be used with the Q64RD.
-200 to 850°C		
200 10 000 0	- 0	
-180 to 600°C	U	
Ambient temperature 0 to 55°C: ±0.25%		
(accuracy relative to maximum value)	0	
Ambient temperature 25±5°C: ±0.08%	Ũ	
(accuracy relative to maximum value)		
0.025°C	0	
40ms/channel	0	
4 channels/module	Δ	Consider replacement with multiple Q64RD.
	_	
1mA	0	
Isolated area Isolation method Dielectric withstand Insulation resistance		
Between platinum		
RTD input and programmable Photocoupler 1780VrmsAC/3 cycles 10MΩ or		
controller Isolation (altitude 2000m) more using	0	
power supply 500VDC insulation		
Between platinum resistance		
RTD input and Non-isolation - tester		
Detected per channel	0	
16 points		The number of occupied I/O points
(I/O assignment: intelligent 16 points)	$\Delta$	has changed to 16 points.
18-point terminal block	×	
0.3 to 0.75mm ²	×	
1.25-3, R1.25-3		Wiring change is required.
(Sleeved solderless terminal cannot be used.)	×	

O : Compatible,  $\bigtriangleup$  : Partial change required, ×: Incompatible





# 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	YO		X0	Module READY	YO	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	Not used	Y6	CH3 Gain setting request		
X7	CH5: Disconnection detection flag	Y7		X7		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 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			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	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						
X12 X13		Y13							
X14		Y14							
X15		Y15							
X16		Y16							
X17		Y17							
X18		Y18							
X19 X1A	-	Y19 Y1A	Not used						
X1B		Y1B							
X1C	1	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			I					

#### 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	DAA	4	CH4 Time/count averaging setting	
5	CH4 Averaging time/count	R/W	5		
6	CH5 Averaging time/count		6		
7	CH6 Averaging time/count		7	System area (Not used)	-
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)	1	13	CH3 Measured temperature value (16bit)	1
14	CH5 Detected temperature value (16bit)	1	14	CH4 Measured temperature value (16bit)	1
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)	-	20	Setting range	R
21	(32bit) (H)		21		
22	CH3 Detected temperature value (L)	R	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		
31	(32bit) (H)		31		
32	CH8 Detected temperature value (L)	-	32		
33	(32bit) (H)		33		
34	Write data error code	R/W	34	System area (Not used)	-
35	Conversion completion flag	R	35	1	
36	Specification of platinum RTD type	R/W	36	1	
		1	37	1	
			38		
			39		
			40		
			41	1	
			42	1	
			43	1	
			44	1	
			45	1	
			46	1	
			47	Warning output enable/disable setting	R/W
			11	Training output chapie/disable setting	1.7.4.4

	Q64RD	
Address (decimal)	Name	Read/write
(decimal) 48	Warning output flag	
49	Disconnection detection flag	-
50	CH1 Scaling value	1
51	CH2 Scaling value	1
52	CH3 Scaling value	
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)	1
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)	
70	(H)	
72	CH3 Scaling range upper limit value (L)	1
72	(H)	
74	CH4 Scaling range lower limit value (L)	-
74	(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	1
84	CH4 Scaling width lower limit value	1
85	CH4 Scaling width upper limit value	
86	CH1 Warning output lower (L)	
87	lower limit value (H)	
88	CH1 Warning output lower (L)	
89		
90	upper limit value (H) CH1 Warning output upper (L)	1
90 91	lower limit value (H)	
91	CH1 Warning output upper (L)	-
92	upper limit value (H)	
35	to	L
116	CH4 Warning output upper (L)	Γ
117		4
118	CH1 Offset temperature setting value (L)	R/W
119	(H)	-
120	CH1 Gain temperature setting value (L)	
121	(H)	
	to	

Q64RD					
Address	Name	Read/write			
(decimal)	Name	iteau/write			
132	132 CH4 Gain temperature setting value (L)				
133	133 (H)				
134 to 157 Not used		-			
158	Mode switching setting	R/W			
159	mode 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)	EV VV			

# Memo


# 4.5 A68RD3N (Replacement to the Q64RD-G)

## 4.5.1 Performance comparison

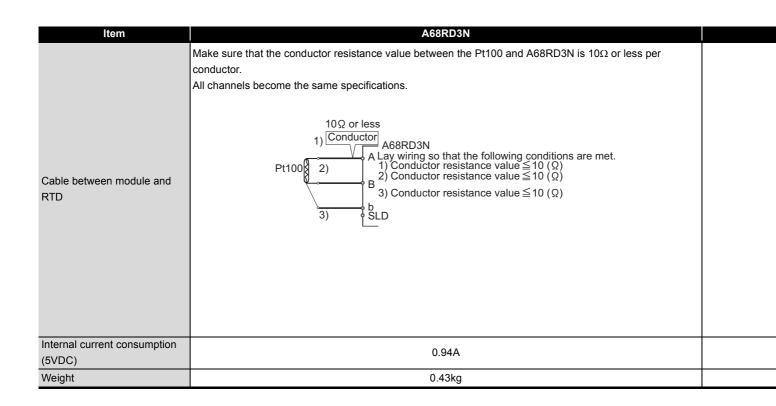
It	em	A68RD3N	
Measuring met		3-wire type	
measurig	inou	16-bit signed binary	
		-1800 to 6000	
Output (temper	rature	Value up to the first decimal place × 10	
conversion valu		32-bit signed binary	
•••••	,	-180000 to 600000	
		Value up to the third decimal place × 1000	
		•	
		Pt100	
Applicable RTE		(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)	
Applicable ITT	,	JPt100	
		(JIS C1604-1981)	
		-180 to 600°C	
Measured	Pt100	(27.10 to 313.71Ω)	
temperature		-180 to 600°C	
range	JPt100	(25.80 to 317.28Ω)	
J	Ni100	-	
Accuracy		±1%	
Accuracy		(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	bd	Between platinum RTD input and programmable controller power supply: photocoupler isolation	
100.000		Between platinum RTD input and channel: non-isolation	_
<b>B</b> (1) (1) (1) (1)			
Dielectric withs	tand voltage	Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute	
Disconnection	detection	Detected per channel	
Number of occ	upied I/O points	32 points	
		(I/O assignment: special 32 points)	
External conne	-	38-point terminal block	
Applicable wire	e size	0.75 to 2mm ²	
Applicable sold	lerless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

						$\triangle$ : Partial change required, ×: Incompatible	
		Q64R	D-G		Compatibility	Precautions for replacement	
		3/4-wire	e type		0		
		16-bit signe	ed binary				
		-2000 to	8500				
	Value up	p to the first o	lecimal place × 10		0		
		32-bit signe	-		Ŭ		
		-200000 to					
	Value up		ecimal place × 1000				
		Pt10	-				
	(JIS C 1604-1997, IEC751 1983) JPt100					As the compliance standards for the	
						applicable RTD differ, change the	
		(JIS C 160			Δ	RTD to the one that can be used with	
		Ni10				the Q64RD-G.	
		(DIN 4376	0 1987)				
		-200 to 8	350°C				
		-180 to 6	500°C		0		
		-60 to 1	80°C		-		
		*1			0		
		0.025	5°C		0		
		40ms/ch	annel		0		
		4 channels	/module		Δ	Consider replacement with multiple Q64RD-G.	
		1m/	Ą		0		
	Isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance			
	Between RTD input and programmable controller power supply	hotocoupler isolation	1780VrmsAC/3 cycles (altitude 2000m)	10MΩ or more using 500VDC insulation	0		
	Between RTD T input and channel	ransformer isolation	-	resistance tester			
		Detected pe	er channel		0		
		16 po	ints			The number of occupied I/O points	
		signment: inte	Δ	has changed to 16 points.			
		18-point term	×				
		0.3 to 0.7	×	Wiring change is required.			
		1.25-3, R			×		
	(Sleeved so	olderless tern					

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

*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 coemcient	Pt100/JPt100 (-200 to 850°C)	±50ppm/°C (±0.0050%/°C)		
	Ni100Ω (-60 to 180°C)	±70ppm/°C (±0.0070%/°C)		



	O: Compatible, Z	: Partial change required, ×: 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.)		
Conductor 2) Pt100 Conductor 2) A1 B1 b1 SLD Conductor Q64RD-G a1 A1 B1 b1 SLD Q64RD-G a1 b1 SLD Conductor 1) SLD 1) SLD	Ο	
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 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	
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.

	A68F		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 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	Not used	Y6	CH3 Gain setting request
X7	CH5: Disconnection detection flag	Y7		X7		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 RFRP and RTOP	XD	Warning output signal	YD	
XE		YE	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 X11		Y10 Y11	Not used				
X11 X12	Not used	Y12	Error code reset flag				
X13		Y13					
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19 X1A	Y19	Y1A	Not used				
X1A X1B	-	Y1B					
X1C	1	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			J			

### 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.

	A68RD3N		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 averaging setting	
2	CH1 Averaging time/count		2	CH2 Time/count/moving averaging setting	R/W
3	CH2 Averaging time/count		3	CH3 Time/count/moving averaging setting	
4	CH3 Averaging time/count	R/W	4	CH4 Time/count/moving averaging setting	
5	CH4 Averaging time/count		5		
6	CH5 Averaging time/count		to	System area (Not used)	_
7	CH6 Averaging time/count				
8	CH7 Averaging time/count		8		<b></b>
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)	4 _
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)		10		
18	CH1 Detected temperature value(L)		18	Energy and a	
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		
31	(32bit) (H)		31		
32	CH8 Detected temperature value (L)		32		
33	(32bit) (H)		33		
34	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		
			37		
			38		
			39		
			40		
			41		
			42		
			43		
			44		
			45		
			46		D 44/
			47	Warning output enable/disable setting	R/W

	Q64RD-G							
Address	Name	Read/write						
(decimal)		itouu, iiito						
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)							
62	CH1 Scaling range lower limit value (L)							
63	(H)	R/W						
64	CH1 Scaling range upper limit (L)	10.00						
65	value (H)							
	to							
76	CH4 Scaling range upper limit (L)							
77	value (H)	R/W						
78	J J J							
79								
	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)	-						
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)	_						
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						
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						

	Q64RD-G	
Address	Name	Read/write
(decimal)		noula, mnico
150	CH1 Conversion setting value for (L)	R/W
151	disconnection detection (H)	1000
	to	
156	CH4 Conversion setting value for (L)	
157	disconnection detection (H)	_
158	Mode switching setting	
159	wode 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)	D 444
170	3-conductor type CH1 User range (L)	R/W
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)	1
181	settings offset resistance value (H)	
182	4-conductor type CH1 User range (L)	1
183	settings gain resistance value (H)	
	to	•
254	4-conductor type CH4 User range (L)	DAV
255	settings gain resistance value (H)	R/W

# Memo

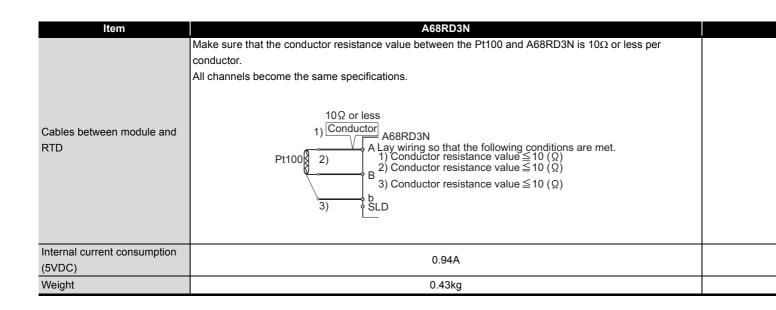

# 4.6 A68RD3N (Replacement to the Q68RD3-G)

### 4.6.1 Performance comparison

Ite	em	A68RD3N					
Measuring met		3-wire type					
		16-bit signed binary					
		-1800 to 6000					
Output (temperature conversion value)		Value up to the first decimal place × 10					
		32-bit signed binary					
		-180000 to 600000					
		Value up to the third decimal place × 1000					
		Pt100					
Applicable RTD		(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)					
		JPt100					
		(JIS C1604-1981)					
	Pt100	-180 to 600°C					
Measured	1 1100	(27.10 to 313.71Ω)					
temperature	JPt100	-180 to 600°C					
range		(25.80 to 317.28Ω)					
	Ni100	-					
Accuracy		±1%					
		(accuracy at full scale)	-				
Resolution		0.025°C	_				
Conversion on	and	40ms/channel					
Conversion spe	eeu	Torray Charmen					
Number of ana	log input points	8 channels/module					
Output current							
detection		1mA					
laciation mathe	.d	Between platinum RTD input and programmable controller power supply: photocoupler isolation					
Isolation metho	a	Between platinum RTD input and channel: non-isolation					
Dielectric withs	tand voltage	Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute					
Disconnection detection		Detected per channel					
		32 points					
Number of occupied I/O points		(I/O assignment: special 32 points)					
External connection system		38-point terminal block					
External device	-		1				
(sold separately	y)	-					
Applicable wire	size	0.75 to 2mm ²					
Applicable sold	lerless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					

O : Compatible,  $\bigtriangleup$  : Partial change required, ×: Incompatible

	Q68RI	D3-G		Compatibility	Precautions for replacement
	3-wire	type		0	
Value	16-bit sign -2000 to up to the first o			Δ	32-bit output is not available.
IL)	Pt10 S C 1604-1997 JPt1 (JIS C 160 Ni10 (DIN 4376	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 1	80°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	s/module		0	
	1m	A		0	
Isolated area Between RTD input and programmable controller power supply Between RTD	Isolation method Transformer isolation Transformer	Dielectric withstand voltage 500VACrms /minute 1000VACrms	Insulation resistance 10MΩ or more using 500VDC insulation resistance	0	
input and channel	isolation	/minute	tester		
Detected per channel					
16 points (I/O assignment: intelligent 16 points)				Δ	The number of occupied I/O points has changed to 16 points.
	40-pin co	nnector		×	Wiring change is required.
	A6CC	DN4		×	Prepare the A6CON4 separately.
	0.3 m	1m ²		×	
	-			×	

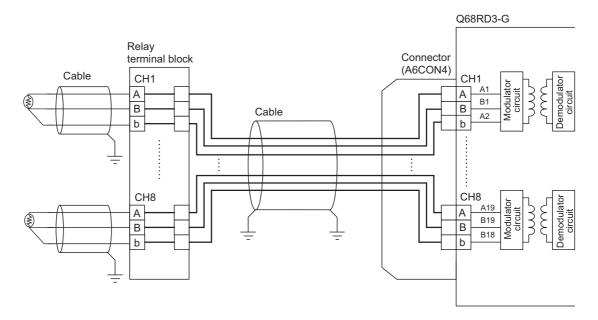


		$\Delta$ : Partial change required, ×: Incompatible
Q68RD3-G	Compatibility	Precautions for replacement
*2	Δ	Install a relay terminal block outside.
0.54A	0	
0.20kg	0	

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

Con	version 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

Item	Description	A68RD3N	Q68RD3-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	
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.

Davidson         Signal name         Davidson         Signal name         Davidson         Signal name         Davidson         Signal name         No.         No.         No.         No.         Signal name         No.         No.         Signal name         No.         No.         Signal name         No.         No.         Signal name         No.         No.         No.         Signal name         No.         No.         Signal name         No.         No.         Signal name         No.         No.         Signal name         No.		A68F			Q68R	D3-G		
X0         Watchdog timer error flag         Y0           X1         READY flag         Y1           X2         Write date error flag         Y2           X3         CH1: Disconnection         Y3           detection flag         Y3           detection flag         Y3           detection flag         Y6           CH2: Disconnection         Y6           detection flag         Y7           detection flag         Y7           detection flag         Y6           detection flag         Y7           detection flag         Y8           CH6: Disconnection         Y8           detection flag         Y8           detection flag         Y8           GH6: Disconnection         Y8           detection flag         Y8           CH8: Disconnection         YA           detection flag         Y8           CH8: Disconnection         YA           detection flag         YB           Attal         S8           YC         Interlock signal for the           ArX         GB         Chranel charage         YB           Not used         YE           ArX         G		Signal name		Signal name		Signal name		Signal name
X2     Write data error flag     Y2       X3     CH1: Disconnection detection flag     Y3       X4     CH2: Disconnection detection flag     Y4       X5     CH3: Disconnection detection flag     Y5       X6     CH3: Disconnection detection flag     Y7       X7     CH4: Disconnection detection flag     Y7       X8     CH4: Disconnection detection flag     Y7       X8     CH4: Disconnection detection flag     Y7       X8     CH4: Disconnection detection flag     Y9       X8     CH4: Disconnection detection flag     Y9       X8     CH4: Disconnection detection flag     Y9       X8     CH4: Disconnection detection flag     Y8       X0     CH4: Disconnection detection flag     Y8       X0     CH4: Disconnection detection flag     Y8       X10     CH4: Disconnection detection flag     Y8       X10     Y10     Interlock signal for the remote I/O station     XD       X11     Y10     Not used     XE       X11     Y11     Y11       X12     Y10       X13     Y14       X14     Y16       X15     Not used       X16     Herlock signal for the renote I/O station       X11     Y11       Y11     Y	X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	
X3     CHT: Disconnection detection flag     Y3       X4     CH2: Disconnection detection flag     Y4       X5     CH3: Disconnection detection flag     Y5       X6     CH4: Disconnection detection flag     Y6       X7     CH5: Disconnection detection flag     Y7       X8     CH5: Disconnection detection flag     Y8       X8     CH5: Disconnection detection flag     Y9       CH7: Disconnection detection flag     Y9       X4     CH7: Disconnection detection flag     Y9       X0     CH7: Disconnection detection flag     Y8       X10     RFNP and RTOP instructions when the ABRD3N is used in Y10     X0       X11     Y10       X12     Y10       X14     Y16       X15     Y10       X16     Interlock signal for the Y18       X17     Y10       X18     Ch39       X19     Y11       Y11<	X1		Y1		X1		Y1	]
X3     detection flag     Y3       X4     CH2: Disconnection detection flag     Y4       X6     CH4: Disconnection detection flag     Y6       X7     CH3: Disconnection detection flag     Y7       X8     CH4: Disconnection detection flag     Y7       CH4: Disconnection detection flag     Y7       CH4: Disconnection detection flag     Y7       CH4: Disconnection detection flag     Y8       CH4: Disconnection detection flag     Y8       X8     CH7: Disconnection detection flag     Y8       XA     CH8: Disconnection detection flag     Y8       XA     CH8: Disconnection detection flag     Y8       XA     CH7: Disconnection detection flag     Y8       XA     CH8: Disconnection detection flag     Y8       XA     CH8: Disconnection detection flag     Y8       XA     CH8: Disconnection detection flag     Y8       XA     Channel change completion flag     Y8       XB     VF     Interlock signal for the remotel I/O station     XD       X12     Y14     Not used       X14     Y14       X15     Y14       X14     Y14       X15     Y14       X16     Not used       X17     Not used       X18     Y14<	X2		Y2		X2		Y2	
X4         detection flag         Y4           X5         CH3: Disconnection         Y5           detection flag         Y6           X6         CH4: Disconnection         Y6           CH3: Disconnection         Y6           detection flag         Y7           detection flag         Y7           detection flag         Y7           detection flag         Y7           detection flag         Y8           detection flag         Y9           detection flag         Y9           detection flag         Y9           detection flag         Y4           X8         CH7: Disconnection         Y8           detection flag         YA           detection flag         YA           XA         CH5: Disconnection         Y4           X6         CH7: Disconnection         Y4           X8         Ch7         Operating condition         Y9           detection flag         YA         User range write request           XA         Ch7         Ch7         Not used           X8         Ch7         Operating condition flag         YB           X9         Interlock signal for the remote I/O station	X3		Y3		X3		Y3	
X5     detection flag     Y5       X8     CH4: Disconnection detection flag     Y6       X7     CH5: Disconnection detection flag     Y7       K8     CH5: Disconnection detection flag     Y7       K8     CH7: Disconnection detection flag     Y8       X4     CH7: Disconnection detection flag     Y9       X8     CH7: Disconnection detection flag     Y9       XA     CH8: Disconnection detection flag     Y8       XB     YB     YB       XB     YC     YA       YD     Interlock signal for the remote I/O station     XD       XI0     YF     RFRP and RT0P       X11     YF     A68RD3N is used in remote I/O station       X10     Y11     Not used       X11     Y11     Not used       X13     Y14       Y15     Y16       Y16     Y16       Y17     Y18       Y18     Y18       Y19     Not used       Y11     Not used       Y11     Not used       Y13     Y18       Y14	X4		Y4		X4		Y4	
X6         detection flag         Y6           X7         detection flag         Y7           Value (CH5: Disconnection detection flag         Y8           X8         CH6: Disconnection detection flag         Y8           X8         CH7: Disconnection detection flag         Y8           detection flag         Y8           X8         CH7: Disconnection detection flag         Y8           X8         CH7: Disconnection detection flag         YA           X8         CH8: Disconnection detection flag         YA           X8         CH8: Disconnection detection flag         YA           X8         YB         YB           X8         YB         YB           X8         YB         Channel change completion flag         YA           X8         YC         XB         Channel change request           XC         YB         Interlock signal for the instructors when th	X5		Y5		X5	Not used	Y5	Not used
X7     detection flag     Y7       X8     CH6: Disconnection detection flag     Y8       X9     CH7: Disconnection detection flag     Y9       XA     CH8: Disconnection detection flag     YA       XB     CH8: Disconnection detection flag     YA       XB     CH8: Disconnection detection flag     YA       XB     YB     Channel change completion flag     YB       XC     YC     YC       YD     Interlock signal for the remote I/O station     XD       XF     YF     A68RD3N is used in remote I/O station     XF       Y10     Not used     Y1       Y11     Y12     Error code reset flag       Y13     Y13       X14     Y14       X15     Y16       X16     Y16       X17     Y10       X18     Y13       Y13     Y14       Y14     Y16       Y17     Not used       Y18     Y16       X11     Y16       X14     Y16       X15     Y16       X16     Y16       X17     Y16       Y18     Y18       X19     Interlock signal for the Y16       Y17     Y16       X18     Y16 </td <td>X6</td> <td></td> <td>Y6</td> <td></td> <td>X6</td> <td></td> <td>Y6</td> <td></td>	X6		Y6		X6		Y6	
X8     detection flag     Y8       X9     CH7: Disconnection detection flag     Y9       XA     CHE: Disconnection detection flag     YA       XB     XA     Cherating condition setting completion flag     YA       XB     YB     YA       XB     YB     YA       YB     YA     User range write request status flag     YA       XB     YC     YA     User range write request status flag     YB       XC     Disconnection detection signal     YB     Channel change completion flag     YB       XD     YD     Interlock signal for the remote I/O station     XD     Warning output signal     YD       XF     YF     A68RD3N is used in remote I/O station     XF     Error flag     YF     Error clear request       X10     Y11     Not used     Y12     Error code reset flag     XF     Interlock signal for the remote I/O station     XF     Error flag     YF     Error clear request       X10     Y11     Not used     Y13     Not used     YF     Error clear request       X11     Y14     Y14     Y14     Y14     Y14     Y14       X15     Y16     Y16     Y16     Y16     Y16       X18     Y18     Y18     Y16     Y16 <td>X7</td> <td></td> <td>Y7</td> <td>Not used</td> <td>X7</td> <td></td> <td>Y7</td> <td></td>	X7		Y7	Not used	X7		Y7	
X9     detection flag     Y9     setting request       XA     CH8: Disconnection detection flag     YA     XA     Offset/gain setting mode status flag     YA     User range write request       XB     YB     YB     XA     Offset/gain setting mode status flag     YB     Channel change completion flag     YB     Channel change request       XD     YC     YC     XC     Disconnection detection signal     YC     Not used       XE     YC     YC     XD     XC     Disconnection detection signal     YD     Not used       XF     YF     A68RD3N is used in remote I/O station     XF     Error flag     YF     Error clear request       X10     Y11     Not used     Y12     Error code reset flag     XF     YF     Error clear request       X11     Y13     Y14     Y15     Y16	X8		Y8		X8		Y8	
XA     detection flag     YA     XA     status flag     YA     User range Write request       XB     YB     YB     XA     status flag     YA     User range Write request       XC     YB     YB     YB     XB     Channel change completion flag     YB     Channel change request       XD     YD     Interlock signal for the remote I/O station     XD     XD     YD     Not used       XF     YF     A68RD3N is used in remote I/O station     YE     Error flag     YF     Error clear request       X10     Y11     Not used     Y12     Error code reset flag     XF     Error flag     YF     Error clear request       X11     Y14     Y1	X9		Y9		X9		Y9	
XB     XB     completion flag     YB     Channel change request       XC     YC     XC     Disconnection detection signal     YC       XD     YD     Interlock signal for the instructions when the A68RD3N is used in remote I/O station     XE     XD     Warning output signal     YD     Not used       X10     Y1     A68RD3N is used in remote I/O station     XF     Error flag     YF     Error clear request       X12     Y11     Not used     Y12     Error code reset flag     XF     Error flag     YF     Error clear request       X13     Y14     Y15     Y16     Not used     YF     Error clear request     YF     Error clear request       X11     Y14     Y16     Y16     Y16     YF     Error clear request     YF     YF       X13     Y14     Y13     Y14     YF     Error clear request     YF     Error clear request       X16     Y16     Y16     Y16     Y16     YF     Error clear request     YF     YF       X14     Y14     Y16     Y16     YF     Error clear request     YF     YF       X16     Y16     Y16     YF     YF     YF     YF     YF       X16     Y16     YF     YF     YF <td>XA</td> <td></td> <td>YA</td> <td></td> <td>ХА</td> <td></td> <td>YA</td> <td>User range write request</td>	XA		YA		ХА		YA	User range write request
XC     Signal     YC       XD     YD     Interlock signal for the RFRP and RTOP instructions when the A68RD3N is used in remote I/O station     XD     Warning output signal     YD     Not used       X10     YF     RFRP and RTOP instructions when the A68RD3N is used in remote I/O station     XE     Conversion completion flag     YF     Error clear request       X10     Y11     Not used     XF     Error flag     YF     Error clear request       X11     Y11     Not used     Y11     Not used     XF     Error flag     YF     Error clear request       X11     Y11     Not used     Y11     Not used     XF     Error flag     YF     Error clear request       X11     Y11     Y11     Not used     Y13     Y14     Y14     Y15     Y16     Y16     Y16       X14     Y13     Y14     Y17     Y18     Y16     Not used     Y16     Y16       X18     Y19     Y14     Y16     Y16     Y16     Y16     Y16     Y16       X16     A68RD3N is used in     Y16     Y16     Y16     Y16     Y16     Y16       X16     A68RD3N is used in     Y16     Y16     Y16     Y16     Y16       X16     A68RD3N is used in     Y16<	XB		YB		XB	-	YB	Channel change request
XE     YE     RFRP and RTOP instructions when the A68RD3N is used in remote I/O station     XE     Conversion completion flag     YE       X10     YF     A68RD3N is used in remote I/O station     XF     Error flag     YF     Error clear request       X10     Y11     Not used     Y12     Error code reset flag     XF     Image: Conversion completion     YF     Error clear request       X11     Y12     Error code reset flag     Y13     Y14     Y14     Y15       X13     Y14     Y16     Y16     Y17     Y18       X14     Y18     Y18     Y18     Y14       X18     Y18     Y16     Y10       X10     Interlock signal for the X11     Y10     Y16       X11     RFRP and RTOP     Y1E       X11     A68RD3N is used in     Y1F	XC		YC		XC		YC	
XE     YE     instructions when the A68RD3N is used in remote I/O station     XE     flag     YE       X10     YF     A68RD3N is used in remote I/O station     XF     Error flag     YF     Error clear request       X10     Y11     Not used     Y12     Error code reset flag     Y13     Instructions when the Y13     Instructions when the Y14     Y13     Instructions when the Y16     Instructions when the Y17     Instructions when the X16     Y16     Instructions when the Y19     Interlock signal for the Y16     Y10       X10     Interlock signal for the X16     Y10     Y10     Interlock signal for the X16     Y10       X110     Interlock signal for the X16     Y10     Y10       X17     A68RD3N is used in     Y16       X18     A68RD3N is used in     Y16	XD		YD		XD	Warning output signal	YD	Not used
XF     YF     remote I/O station     XF     Error flag     YF     Error clear request       X10     Y11     Not used     Y11     Not used     Y11     Y11     Y11       X12     Y12     Error code reset flag     Y13     Y14     Y14     Y15       X16     Y16     Y16     Y16     Y16     Y16       X17     Y18     Y19     Y14     Y16     Y16       X18     Y19     Y14     Y16     Y16     Y16       X10     Interlock signal for the     Y10     Y16     Y16       X11     Y16     Y16     Y16     Y16       X11     Y18     Y16     Y16     Y16       X11     Y18     Y16     Y16     Y16       X11     Y16     Y16     Y16     Y16       X11     Y16     Y16     Y16     Y16       X11     A68RD3N is used in     Y1F     Y16     Y16	XE		YE		XE		YE	
X11 X12Not usedX12 X13Y11Error code reset flagX13 X14Y13X14 X15Y14X16 X17Y15X16 X17Y17X18 X19Y18X14 X11Y14X18 X19Y11X10 X11Y11X11 X11Y11X12 X11Y11X13 X14Y11X14 X15Y11X15 X16Y11X16 X19Y11X17 X18 X11Y11X18 X11Y11X11 X11Interlock signal for the Y11X11 X11 X11Interlock signal for the Y11X11 X11 X11Interlock signal for the Y11X11 X11 X11 X11 X11Y11 Y11 Y11X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 X11 <br< td=""><td>XF</td><td></td><td>YF</td><td></td><td>XF</td><td>Error flag</td><td>YF</td><td>Error clear request</td></br<>	XF		YF		XF	Error flag	YF	Error clear request
X11Not usedY11X12Y12Error code reset flagX13Y13X14Y13X14Y14X15Y15X16Y16X17Y17X18Y18X19Y14X1AY1AX1BY1CX1DInterlock signal for theX1ERFRP and RTOPX1FA68RD3N is used inX1FA68RD3N is used in				Not used				
X13Y13X14Y14X15Y15X16Y16X17Y17X18Y18X19Y19X1AY1AX1BY1BX1CY1CX1DInterlock signal for the Y1DX1ERFRP and RTOPX1FA68RD3N is used inX1FA68RD3N is used in		Not used						
X14Y14X15Y15X16Y16X17Y17X18Y18X19Y19X1AY1AX1BY1BX1CY1CX1DInterlock signal for theX1DInterlock signal for theX1DY1Einstructions when theX1FA68RD3N is used inY1F				Error code reset flag				
X15Y15X16Y16X17Y17X18Y18X19Y19X1AY1AX1BY1BX1CY1CX1DInterlock signal for theX1ERFRP and RTOPX1ERFRP and RTOPX1FA68RD3N is used inX1FA68RD3N is used in								
X16Y16X17Y17X18Y18X19Y19X1AY1AX1BY1BX1CY1CX1DInterlock signal for theX1EY1DX1ERFRP and RTOPX1EA68RD3N is used inX1FA68RD3N is used in								
X17X18X18Y18X19Y19X1AY1AX1BY1AX1CY1CX1DInterlock signal for theY1DX1ERFRP and RTOPY1Einstructions when the A68RD3N is used inY1F								
X18Y18X19Y19X1AY1AX1AY1AX1BY1BX1CY1CX1DInterlock signal for theX1DInterlock signal for theX1ERFRP and RTOPX1EA68RD3N is used inX1FA68RD3N is used in								
X19Y19X1AY1AX1BY1BX1CY1CX1DInterlock signal for theY1DX1ERFRP and RTOPY1Einstructions when theY1FA68RD3N is used inY1F		-						
X1AY1ANot usedX1BY1BY1BX1CY1CX1DInterlock signal for theY1DX1ERFRP and RTOPY1Einstructions when theY1FX1FA68RD3N is used inY1F		-						
X1BY1BX1CY1CX1DInterlock signal for theY1DX1ERFRP and RTOPY1Einstructions when theY1FA68RD3N is used inY1F		•		Not used				
X1CY1CX1DInterlock signal for theY1DX1ERFRP and RTOPY1Einstructions when theY1FA68RD3N is used inY1F		1						
X1DInterlock signal for theY1DX1ERFRP and RTOPY1Einstructions when theinstructions when theA68RD3N is used inY1F		1						
X1ERFRP and RTOPY1Einstructions when theX1FA68RD3N is used inY1F		Interlock signal for the						
X1F A68RD3N is used in Y1F		-						
X1F A68RD3N is used in Y1F								
	X1F		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		4	CH4 Time/count/moving average/time constant setting	R/W	
5	CH4 Averaging time/count	R/W	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)		11	CH1 Measured temperature value		
12	CH3 Detected temperature value (16bit)		12	CH2 Measured temperature value		
13	CH4 Detected temperature value (16bit)		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	(32bit) (H)		27	Offset/gain setting mode (Gain specification)		
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)		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		

	Q68RD3-G		
Address	Name	Read/write	
(decimal)		iteau/wille	
40	CH7 Offset temperature setting value		
41	CH7 Gain temperature setting value	R/W	
42	CH8 Offset temperature setting value	1010	
43	CH8 Gain temperature setting value		
44 to 45	System area (Not used)	-	
46	Warning output enable/disable setting	R/W	
47	Warning output flag (Process alarm)		
48	Warning output flag (Rate alarm)	R	
49	Disconnection detection flag		
50 to 57	CH1 to CH8 Scaling value		
58	Scaling valid/invalid setting	R/W	
59 to 61	System area (Not used)	-	
62	CH1 Scaling range lower limit value	R/W	
63	CH1 Scaling range upper limit value	1011	
	to		
77	CH8 Scaling range upper limit value		
78	CH1 Scaling width lower limit value	R/W	
79	CH1 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/upper limit value	R/W	
96	CH1 Process alarm upper/lower limit value		
97	CH1 Process alarm upper/upper limit value		
	to		
125	CH8 Process alarm upper/upper limit value		
100 1- 100	CH1 to CH8 Rate alarm warning detection		
126 to 133	period	R/W	
134	CH1 Rate alarm upper limit value		
135	CH1 Rate alarm lower limit value		
	to	I	
149	CH8 Rate alarm lower limit value	R/W	
150 to 157		-	
	Mode switching setting	R/W	
160 to 163		-	
	Conversion setting for disconnection		
164	detection (CH1-CH4)		
	Conversion setting for disconnection		
165	detection (CH5-CH8)	R/W	
	CH1 to CH8 Conversion setting value for		
166 to173	disconnection detection		
174 to 189	System area	-	
190	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	R/W	
194	CH1 User range settings offset (L)		
195	resistance value (H)		
196	CH1 User range settings gain (L)		
197	resistance value (H)	L	
	to		
253	CH8 User range settings gain resistance	R/W	
	value (H)		

# 4.7 A68RD4N (Replacement to the Q64RD)

### 4.7.1 Performance comparison

lte	em	A68RD4N	
Measuring met		4-wire type	
		16-bit signed binary	+
		-1800 to 6000	
Output (temper	rature	Value up to the first decimal place × 10	
conversion value)		32-bit signed binary	
•••••	,	-180000 to 600000	
		Value up to the third decimal place × 1000	
		Pt100	1
		(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)	
Applicable plati	inum RTD	JPt100	
		(JIS C1604-1981)	
••••••	5/100	-180 to 600°C	1
Measured	Pt100	(27.10 to 313.71Ω)	
temperature	15400	-180 to 600°C	
range	JPt100	(25.80 to 317.28Ω)	
			1
Accuracy		±1%	
Accuracy		(accuracy at full scale)	
Resolution		0.025°C	
Conversion spe	eed	40ms/channel	
Number of ana	log input points	8 channels/module	
	for temperature	1mA	1 1
detection		Determined and an	
Isolation metho	bd	Between platinum RTD input and programmable controller power supply: photocoupler isolation	
		Between platinum RTD input and channel: non-isolation	
Dielectric withs		Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute	
Disconnection detection		Batch-detected at all channels	
Number of occ	unied I/O points	32 points	
Number of occupied I/O points		(I/O assignment: special 32 points)	
External conne	ction system	38-point terminal block	
Applicable wire	size	0.75 to 2mm ²	
Applicable sold	derless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

		$\Delta$ : 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	0	
-200000 to 850000 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%	0	
(accuracy relative to maximum value)		
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		
RTD input and programmable controller power supply       Photocoupler isolation       1780VrmsAC/3 cycles (altitude 2000m)       10MΩ or more using 500VDC insulation	0	
Between platinum RTD input and channel Non-isolation - 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	×	g onango io roquirou.
(Sleeved solderless terminal cannot be used.)		

O: Compatible, △: Partial change required, ×: Incompatible Compatibility Precautions for replacement

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	
Internal current consumption (5VDC)	0.41A	
Weight	0.43kg	

	O: Compatible,	$\triangle$ : Partial change required, ×: Incompatible
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.)		
Conductor 2) Pt100 Conductor B1 b1 SLD Conductor Q64RD a1 A1 B1 b1 SLD Conductor Q64RD a1 A1 B1 b1 SLD	0	
Pr100 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 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
ХЗ	Σ disconnection detection flag (CH1 to CH8)	Y3		X3	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 signal	Y9	Operating condition setting request
XA		YA		ХА	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Not used	YB	
XC		YC		XC	Disconnection detection signal	YC	Netwood
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 X11		Y10 Y11	Not used				
X12		Y12	Error code reset flag				
X13		Y13					
X14 X15		Y14					
X15 X16		Y15 Y16					
X17		Y17					
X18		Y18					
X19		Y19					
X1A			Not used				
X1B	4	Y1B					
X1C X1D	Interlock signal for the	Y1C Y1D					
XIE	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A68RD4N is used in	Y1F					
	remote I/O station						

#### 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			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	R/W	4	CH4 Time/count averaging setting			
5	CH4 Averaging time/count		5				
6	CH5 Averaging time/count		6	System area (Not used)	-		
7	CH6 Averaging time/count		7				
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	1		
11	CH2 Detected temperature value (16bit)		11	CH1 Measured temperature value (16bit)	1		
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)	ļ		
15	CH6 Detected temperature value (16bit)		15				
16	CH7 Detected temperature value (16bit)		16	System area (Not used)	-		
17	CH8 Detected temperature value (16bit)		17				
18	CH1 Detected temperature value (L)		18				
19	(32bit) (H)		19	Error code	R		
20	CH2 Detected temperature value (L)		20	Setting range	ļ		
21	(32bit) (H)	R	21	-			
22	CH3 Detected temperature value (L)		22	-			
23	(32bit) (H)		23				
24	CH4 Detected temperature value (L)		24				
25 26	(32bit) (H)		25 26				
20	CH5 Detected temperature value (L)		20				
27	(32bit) (H) CH6 Detected temperature value (L)		27				
20	• • • • •		20				
29 30	(32bit) (H) CH7 Detected temperature value (L)		29 30				
30	(32bit) (H)		30				
31	CH8 Detected temperature value (L)		31				
32	(32bit) (H)		32	4			
33	Write data error code	R/W	33	System area (Not used)	-		
34	Conversion completion flag	R	35	1			
36	Specification of platinum RTD type	R/W	36	1			
00	eposition of platitum (TD type	11/14	30	1			
			38				
			39				
			40				
			41	1			
			42	1			
			43	1			
			44	1			
			45	1			
			46	1			
			47	Warning output enable/disable setting	R/W		
				1	1011		

# MELSEC

	Q64RD	
Address (decimal)	Name	Read/write
48	Warning output flag	
49	Disconnection detection flag	
50	CH1 Scaling value	
51	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)	_
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)	
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)	
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)	4
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) to	
116	CH4 Warning output upper/upper (L)	
117	limit value (H)	
118	CH1 Offset temperature setting (L)	5
119	value (H)	R/W
120	CH1 Gain temperature setting (L)	-
121	value (H)	
· - ·	to	1
132	CH4 Gain temperature setting (L)	
1.37		R/W

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

# Memo


# 4.8 A68RD4N (Replacement to the Q64RD-G)

### 4.8.1 Performance comparison

It	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 RTI	D	(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980) JPt100	
		(JIS C1604-1981)	
	Pt100	-180 to 600°C	
Measured	PTIOU	(27.10 to 313.71Ω)	
temperature	JPt100	-180 to 600°C	
range		(25.80 to 317.28Ω)	
	Ni100		
Accuracy		±1%	
-		(accuracy at full scale)	
Resolution		0.025°C	
Conversion sp	beed	40ms/channel	
Number of ana	alog input points	8 channels/module	
Output current detection	t for temperature	1mA	
		Between platinum RTD input and programmable controller power supply: photocoupler isolation	
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	Batch-detected at all channels	
Number of occ	subject I/O points	32 points	
Number of occupied I/O points		(I/O assignment: special 32 points)	
External conne	ection system	38-point terminal block	
Applicable wire	e size	0.75 to 2mm ²	
Applicable solo	derless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	

Q64RD-G

Q0+		companionity	Frecautions for replacement	
3/4-wi	re type		0	
16-bit sig -2000 Value up to the firs 32-bit signe -200000 Value up to the third	0			
Pt (JIS C 1604-199 JP (JIS C 10 Ni (DIN 433	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 -180 to -60 to	0			
		0		
0.0		0		
40ms/		0		
4 channe	Δ	Consider replacement with multiple Q64RD-G.		
11		0		
 Isolated areaIsolation methodBetween RTD input and programmable controller power supplyPhotocouple isolationBetween RTD input and channelTransformer isolation	r 1780VrmsAC/3 cycles (altitude 2000m) - r res	sulation sistance DMΩ or re using D0VDC sulation sistance	0	
		tester		
Detected   16 p (I/O assignment: ii		<u>О</u>	The number of occupied I/O points has changed to 16 points.	
	rminal block		×	<b>U U U U U U U U U U</b>
	).75mm ²		×	Wiring change is required.
	R1.25-3 rminal cannot be used.)		×	
•				

O: Compatible, △: Partial change required, ×: Incompatible Compatibility Precautions for replacement

*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)			
Temperature coemcient	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	
Internal current consumption (5VDC)	0.41A	
Weight	0.43kg	

	O: Compatible,	$\triangle$ : Partial change required, ×: 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.)		
PH100 Conductor 1) Conductor	0	
0.62A	Δ	The recalculation of internal current consumption (5VDC) is required.
0.20kg	0	

### 4.8.2 Functional comparison

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.

A68RD4N					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 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		
X3	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	Nint wood		
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 X11		Y10 Y11	Not used						
X12		Y12	Error code reset flag						
X13		Y13							
X14		Y14							
X15 X16		Y15 Y16							
X10		Y17							
X18		Y18							
X19		Y19							
X1A		Y1A	Not used						
X1B		Y1B							
X1C	Intorlook signal for the	Y1C							
X1D X1E	Interlock signal for the RFRP and RTOP	Y1D Y1E							
ATE	instructions when the								
X1F	A68RD4N is used in	Y1F							
	remote I/O station								

### 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		10	oystem 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 (Net used)			
17	CH8 Detected temperature value (16bit)		to	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)	1	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				

Address (decimal)NameRead/w3939-4041424344454647Warning output enable/disable settingR/W48Warning output flag-49Disconnection detection flagR50 to 53CH1 to CH4 Scaling valueR54CH1 Measured temperature (L)-55value (32bit)(H)to	
(decimal)         39         40         41         42         43         44         45         46         47         Warning output enable/disable setting         48         Warning output flag         49         50 to 53         CH1 to CH4 Scaling value         54         CH1 Measured temperature (L)         55         value (32bit)	
4041424344454647Warning output enable/disable setting48Warning output flag49Disconnection detection flag50 to 53CH1 to CH4 Scaling value54CH1 Measured temperature (L)55value (32bit)	1
41         42         43         44         45         46         47         Warning output enable/disable setting         48         Warning output flag         49         Disconnection detection flag         50 to 53         CH1 to CH4 Scaling value         54         CH1 Measured temperature (L)         55         value (32bit)	1
42A43A44454647Warning output enable/disable setting48Warning output flag49Disconnection detection flag50 to 53CH1 to CH4 Scaling value54CH1 Measured temperature (L)55value (32bit)	1
43System area (Not used)-434444454647Warning output enable/disable settingR/W48Warning output flag49Disconnection detection flag50 to 53CH1 to CH4 Scaling valueR54CH1 Measured temperature (L)R55value (32bit)(H)	1
43         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         54       CH1 Measured temperature (L)         55       value (32bit)	1
454647Warning output enable/disable settingR/W48Warning output flag49Disconnection detection flag50 to 53CH1 to CH4 Scaling valueR54CH1 Measured temperature (L)K55value (32bit)(H)	1
46Kim47Warning output enable/disable settingR/W48Warning output flag49Disconnection detection flag50 to 53CH1 to CH4 Scaling valueR54CH1 Measured temperature (L)55value (32bit)(H)	1
47Warning output enable/disable settingR/W48Warning output flag49Disconnection detection flag50 to 53CH1 to CH4 Scaling value54CH1 Measured temperature (L)55value (32bit)(H)	1
48Warning output flag49Disconnection detection flag50 to 53CH1 to CH4 Scaling value54CH1 Measured temperature (L)55value (32bit)(H)	1
49Disconnection detection flag50 to 53CH1 to CH4 Scaling value54CH1 Measured temperature (L)55value (32bit)	
50 to 53CH1 to CH4 Scaling valueR54CH1 Measured temperature (L)55value (32bit)(H)	
54     CH1 Measured temperature (L)       55     value (32bit)	
55 value (32bit) (H)	
to	
60 CH4 Measured temperature (L)	
61 value (32bit) (H) R	
62 CH1 Scaling range lower limit value (L)	
63 (H)	,
64 CH1 Scaling range upper limit value (L)	
65 (H)	
to	
76 CH4 Scaling range upper limit (L)	
77 value (H)	,
78 CH1 Scaling width lower limit value	
79 CH1 Scaling width upper limit value	
to	
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) R/W	1
90 CH1 Warning output upper lower (L)	
91 limit value (H)	
92 CH1 Warning output upper upper (L)	
93 limit value (H)	
to	
116 CH4 Warning output upper upper (L)	
117 limit value (H)	
118 CH1 Offset temperature setting value (L)	,
119 (H) R/W	
120 CH1 Gain temperature setting value (L)	
121 (H)	
to	
132 CH4 Gain temperature setting value (L)	
133 (H) R/W	1
134 Extended averaging processing selection	
135 to	
System area (Not used)	
147 System area (Not used) -	
147 System area (Not used) - Conversion setting for disconnection	,
147 System area (Not used) -	1
147         System area (Not used)         -           148         Conversion setting for disconnection         R/W	1
147     System area (Not used)     -       148     Conversion setting for disconnection detection     R/W	

Q64RD-G							
Address (decimal)	Name	Read/write					
	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 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)						
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)						
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)	1011					

# Memo


# 5

# 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							
Voltage		-10 to 0 to +10VDC (Input resistance value: $1M\Omega$ )							
Analog input	Current	-20 to 0 to	-20 to 0 to +20mADC (Input resistance value: $250\Omega$ )						
Analog output voltage			-10 to 0 to +10VDC						
		Analog in	iput range	• • • • • • • • • • • • • • • • • • • •					
		Voltage (V)	Current (mA)	Analog output voltage (V) ^{*1}					
		0 to +10	0 to +20						
		0 to + 5	0 to + 5 0 to +20						
		+ 1 to + 5	+ 4 to +20	0 to +10					
		-10 to +10	-20 to +20						
	4:	- 5 to + 5	-20 to +20						
I/O characteris	tics	0 to +10	0 to +20	0.45.4.5					
		0 to + 5	0 to +20	0 to + 5					
		+ 1 to + 5	+ 4 to +20	+ 1 to + 5					
		-10 to +10	-20 to +20	-10 to +10					
		- 5 to + 5	-20 to +20	-10 (0 +10					
		-10 to +10	-20 to +20	E to L E					
		- 5 to + 5	-20 to +20	- 5 to + 5					

		Q68AD	V		Q68ADI		Compatibility	Precautions for replacement
	(Inpu	-10 to 10 ut resistance -		(In	- 0 to 20mADC (Input resistance value: 250Ω)			The voltage/current cannot be mixed for one module.
	-			-	· · · · · · · · · · · · · · · · · · ·			Analog output voltage to the A616AD
			Normal reso	lution mode	High resolu	ution mode		
		g input nge	Digital output value	Maximum resolution	Digital output value	Maximum resolution	t ∧ t	When using A616AD in [-5 to + 5V] range, Q68ADV can obtain equivalent resolution or more than A616AD by setting in [-10
		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		1.0mV	01012000	0.333mV		, .
	voltage	-10 to 10V		2.5mV	-16000 to 16000	0.625mV		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
		0 to 20mA	0 to 4000	5µA	0 to 12000	1.66µA		+20mA] range, use Q68ADI in
	Current	4 to 20mA	0 10 4000	4µA	0 10 12000	1.33µA		user range.
	Guilent	User range settings	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		

 $O: Compatible, \bigtriangleup:$  Partial change required, ×: Incompatible

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 (1M $\Omega$ 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	

	Q68ADV			C	Q68ADI		Compatibility	Precautions for replacement	
		nal resolution m	node	•	n resolution mo	ode			
Analog input	0 to	emperature 55°C	Ambient		emperature 55°C	Ambient			
range	With temperature drift compensation	Without temperature drift compensation	temperature 25±5°C	temperature drift	Without temperature drift compensation	temperature 25±5°C			
0 to 10 -10 to 10V	>			±0.3% (±48 digits)	±0.4% (±64 digits)	±0.1% (±16 digits)		A60MX is the accuracy in respect to the full scale, and	
Voltage 0 to 5 1 to 5 User rang setting 0 to	V 3 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5	±0.4% (±16 digits)	±0.1% (±4 digits)	±0.3%		±0.1%	0	Q68ADV/I is the accuracy in respect to maximum digital output value.	
20m/ 4 to Current 20m/ User rang setting	A 6 9			(±36 digits)		s) (±12 digits)			
	±15V				-		- 0		
	-	8 cha	annels/modu		±30mA		Δ	Consider replacement with multiple Q68ADV/I.	
			-				-		
Be	Between the I/O terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolated								
	16 points (I/O assignment: intelligent 16 points)						Δ	Q68ADV/I cannot set to 0 poin 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		

*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 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)	
	0.45.1.20	101 (1/2000)	0 to 2000
	0 to +20	10µA (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 (mA)	-20 to +20	20.14 (1/2000)	1000 to 3000
	-20 to +20	20µA (1/2000)	-1000 to 1000
	-20 to +20	104 (1/4000)	0 to 4000
	-20 (0 +20	10µA (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	m		A60MXRN				
	Voltage	-10 to 0	to +10VDC (Input resistance valu	ie [.] 1MΩ)			
Analog input	Current		o +20mADC (Input resistance valu				
Analog output v	oltage		-10 to 0 to +10VDC				
Analog input 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 characteristi	ICS	0 to +10	0 to +20	0.15			
		0 to + 5	0 to +20	0 to + 5			
		+ 1 to + 5	+ 4 to +20	+ 1 to + 5			
		-10 to +10	-20 to +20	10 10 10			
		- 5 to + 5	-20 to +20	-10 to +10			
		-10 to +10	-20 to +20	54.5			
		- 5 to + 5	-20 to +20	- 5 to + 5			
Absolute maximum input	Voltage		±15V +30mA				
maximum input	Current		±30mA				
Analog input po	vints		16 channels/module				
Multiplexer elen	nent	Photo MOS relay					
Isolation metho	d	Between the input terminal and programmable controller: photocoupler isolation					
		Betwe	een channels: photo MOS relay is	olation			
Between chann withstand voltag		40	400VDC (accuracy guarantee 400VDC)				
Occupied I/O po	ointe	16 points (treated as empty slots)					
		(0 point setting is possible by I/O assignment.)					
Connected term			38-point terminal block				
Applicable wire 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-YS	53A			
Internal current consumption (5VDC)		0.35A					

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

Image         Compatibility         Precations for replacement           -10 to 0 to +1000C (Input resistance value: 2500)         △         The minus current cannot be input.           0 to 20mADC (Input resistance value: 2500)         △         The minus current cannot be input.           10 to 20mADC (Input resistance value: 2500)         △         The minus current cannot be input.           10 to 20mADC (Input resistance value: 2500)         △         The minus current cannot be input.           10 to 20mADC (Input resistance value: 2500)         △         The minus current cannot be input.           10 to 20mA 200 the 150 to 10 to 2000         10 to 2000 to 2000         ○         When using a range of 5 up to 45 (with A60MX), With G64AD-GH, equivalent or more resolution value can be obtained by setting at a range of -20 up to 10 vhigh resolution mode, or user range.           10 to 20mA 212 5 hA 25 0hA 210 thA 200 thA 200 th 64000         0 to 53000         0 to 53000         O         Consider respect to the full scale, and C64AD-GH.           10 to 20mA 212 5 hA 25 0hA 200 thA 200 t	1							Partial change required, ×: Incompatible
0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         A         The minus current cannot be input.         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A         A								Precautions for replacement
Imput         Analog output voltage to the AstGAD           Imput         Analog output voltage to the AstGAD           Imput         Analog input range           Imput         Imput           Imput         Analog input range           Imput         Analog input range           Imput         Imput range           Imput         Analog input range           Imput range         Imput range		-10 to 0 t	o +10VDC	C (Input resis	stance value: 1MΩ	2)	0	
Imput     Anatog input range     Maximum resolution     Digital output value     Digital output value     When using a range of .5 up to +5 (with A60MX) With C64AD-CH, with C62 bit 125 div       0 to 10V     155 bV     0.5 bV     12.5 div     0 to 64000     0 to 32000       Voltage     Uber range settings     47.4 µV     44.8 µV     64000 to 64000     32000 to 32000       Uber range settings     47.4 µV     44.8 µV     64000 to 64000     32000 to 32000       Uber range settings     47.4 µV     44.8 µV     64000 to 64000     32000 to 32000       Uber range settings     47.4 µV     44.8 µV     64000 to 64000     32000 to 32000       Uber range settings     47.4 µV     44.8 µV     64000 to 64000     32000 to 32000       Uber range settings     151.6 hA     303.2 hA     0 to 64000     0 to 32000       User range settings     151.6 hA     303.2 hA     0 to 64000     0 to 32000       User range settings     151.6 hA     303.2 hA     0 to 64000     0 to 32000       User range settings     151.6 hA     303.2 hA     0 to 64000     0 to 32000       User range settings     151.6 hA     303.2 hA     0 to 64000     0 to 32000       User range settings     151.6 hA     303.2 hA     0 to 64000     0 to 32000       User range settings		0 to 20	)mADC (Ir	$\bigtriangleup$	The minus current cannot be input.			
Input         Analog input angle         32 bit         10 bit         32 bit         10 bit         32 bit         10 bit         32 bit         10 bit         (16 bit)         (16				-			-	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Input Analog input range					• ·		
Voltage       User range settings -10 to 100       155 3µV       312.6µV       -64000 to 64000       -32000 to 32000       A       When using a range of -20 up to +20mA (with A60MX), negative current in 200mA       -64000 to 64000       -32000 to 32000       -20mA (with A60MX), negative current in a not be converted with Q64AD-GH.         Current       4 to 20mA       200 0mA       0 to 64000       0 to 32000       0 to 64000       -32000 to 72000       -20mA (with A60MX), negative current can not be converted with Q64AD-GH.         User range settings       151.6nA       303.2nA       0 to 64000       0 to 32000       0 to 32000         Reference accuracy       Digital output value (32 bit) ±32 digits (Uni-polar)       0 to 64000       0 to 32000       Q64AD-GH.       use conversion devices to convert into a input range.         Image settings       151.6nA       303.2nA       0 to 64000       0 to 32000       Q64AD-GH.       use conversion devices to convert into a input range.         Image settings       151.6nA       303.2nA       0 to 64000       0 to 32000       0 to 64000       0 to 32000         Image settings       151.6nA       303.2nA       0 to 64000       0 to 32000       0 to 64000       0 to 32000         Image settings       151.6nA       303.2nA       0 to 64000       0 to 32000       0 to 64000       0 to 32000       0 to 6		0 to 5V	78.2µV	156.4µV	0 to 64000	0 to 32000		can be obtained by setting at a
User range settings     47.4µV     94.8µV     -64000 to 64000     -32000 to 32000     -20mA (with A60MX), negative current can not be converted with G64AD-GH.       0 to 20mA     312.5nA     625.5nA     0 to 64000     0 to 32000     0 to 32000     G64AD-GH.       User range settings     151.6nA     303.2nA     0 to 64000     0 to 32000     0 to 32000     G64AD-GH.       Use conversion devices to convert     151.6nA     303.2nA     0 to 64000     0 to 32000     G64AD-GH.       We conversion devices to convert     151.6nA     303.2nA     0 to 64000     0 to 32000     G64AD-GH.       We conversion devices to convert     151.6nA     303.2nA     0 to 64000     0 to 32000     G64AD-GH.       We conversion devices to convert     151.6nA     303.2nA     0 to 64000     0 to 32000     G64AD-GH.       We conversion devices to convert     151.6nA     303.2nA     0     G64AD-GH.     G64AD-GH.       We conversion devices to convert     151.6nA     151.6nA     G64AD-GH.     G64AD-GH.       We conversion devices to convert     151.6nA     151.6nA     G64AD-GH.     G64AD-GH.       Consider replacement with multiple G64AD-GH.     -     -     Consider replacement with multiple G64AD-GH.       Get conversion devices to convert isolation     100.8010m     10.8020m     G60V DC, 10.00	Voltage	(Uni-polar)	47.4µV	94.8µV			Δ	resolution mode, or user range.
$ \begin{array}{ c c c c c } \hline \hline 0 & to 20mA & 312 5nA & 625.0nA \\ \hline \hline Current & 322.0nA & 500.0nA & 500.0nA \\ \hline \hline \hline Variable & Vari$		User range settings			-64000 to 64000	-32000 to 32000		+20mA (with A60MX), negative
Image: Index angle:       Importance       Importance       Importance         Image:	Current	0 to 20mA 4 to 20mA		-	0 to 64000	0 to 32000		Q64AD-GH.
±0.05%       respect to the full scale, and Q64AD-GH is the accuracy in respect to maximum digital output value (32 bit) ±32 digits       respect to maximum digital output value (32 bit) ±32 digits         Temperature coefficient       ±17.4ppm/°C (0.00714%/°C)       O         1       ±15V       O         ±30mA       O       O         4 channels/module       Δ       Consider replacement with multiple Q64AD-GH.         1       -       -       -         1       Specific isolated area       Isolation method value (a coupler isolation)       Insulation resistance       O         1       Specific isolated area       Isolation method value (2000m)       1780VmsAC/3 cycles       500V DC, 10MΩ or more       O         1       6 points       (Altitude 2000m)       10MΩ or more       O       O       O         1       18-point terminal block       ×       Wiring change is required.       ×       Viring change is required.         0.89A       Δ       0.89A       Δ       The recalculation of internal current consumption [5VDC] is required.		• •	151.6nA	303.2nA				into a input range.
L       1       1       Varie.         1       ±15V       O         1       ±30mA       O         4       channels/module       Δ       Consider replacement with multiple Q64AD-GH.         1       -       -       -         2       Specific isolated area       Isolation method       Dielectric withstand voltage       Insulation resistance         Between the I/O terminal and protocoupler isolation       1780VmsAC/3 cycles       500V DC, 10MΩ or more       O         Between analog channels       Transformer isolation       1780VmsAC/3 cycles       500V DC, 10MΩ or more       O         16 points       Δ       Q64AD-GH cannot set to 0 point with I/O assignment. intelligent 16 points)       Δ       Q64AD-GH cannot set to 0 point with I/O assignment.         18-point terminal block       ×       ×       Wiring change is required.         R1.25-3 (A solderless terminal with sleeve can not be used.)       ×       The recalculation of internal current consumption [5VDC] is required.         0.89A       Δ       The recalculation of internal current consumption [5VDC] is required.		-		0	respect to the full scale, and Q64AD-GH is the accuracy in respect to maximum digital output			
$ \begin{array}{ c c c c c } \hline & & & & & & & & & & & & & & & & & & $								
4 channels/module       Δ       Consider replacement with multiple Q64AD-GH.         -       -       -       -         Specific isolated area       Isolation method       Dielectric withstand voltage       Insulation resistance       O         Between the I/O terminal and programmable controller power supply       Photocoupler isolation       1780VrmsAC/3 cycles       500V DC, 10MΩ or more       O         Between analog channels       Transformer isolation       1780VrmsAC/3 cycles       500V DC, 10MΩ or more       O       Q64AD-GH cannot set to 0 point with I/O assignment.         Image: the information of the programmable controller power supply       16 points       Δ       Q64AD-GH cannot set to 0 point with I/O assignment.         Image: the information of the programmable controller power supply       0.3 to 0.75mm²       ×       Wiring change is required.         Image: the information of the programmable controller power supply       0.89A       Δ       The recalculation of internal current consumption [5VDC] is required.								
4 channels/module     Δ     multiple Q64AD-GH.       Image: Constraint of the second				±30mA			0	
Specific isolated area       Isolation method       Dielectric withstand voltage       Insulation resistance         Between the I/O terminal and protocoupler programmable controller power supply       Photocoupler isolation       1780VrmsAC/3 cycles       500V DC, 10MΩ or more       O         Between analog channels       Transformer isolation       1780VrmsAC/3 cycles       500V DC, 10MΩ or more       Q64AD-GH cannot set to 0 point with I/O assignment: intelligent 16 points)         Image: Controller power supply       Transformer isolation       C       Q64AD-GH cannot set to 0 point with I/O assignment.         Image: Controller power supply       Transformer isolation       C       A       Q64AD-GH cannot set to 0 point with I/O assignment.         Image: Controller power supply       Transformer isolation       C       A       Q64AD-GH cannot set to 0 point with I/O assignment.         Image: Controller power supply       Transformer isolation       C       A       Wring change is required.         Image: Controller power supply       Transformer isolation       Second controller power supply       Yeing change is required.         Image: Controller power supply       Transformer isolation       Second controller power supply       Yeing change is required.         Image: Controller power supply       The recalculation of internal current consumption [5VDC] is required.       A       The recalculation of internal current consumption [5			4 cł	nannels/moo	lule			
Specific isolated area       method       voltage       resistance         Between the I/O terminal and programmable controller power supply       Photocoupler isolation       1780VrmsAC/3 cycles       500V DC, 10MΩ or more       O         Between analog channels       Transformer isolation       (Altitude 2000m)       10MΩ or more       O         Image: the im				-			-	
Image: Constraint of the integration of the integrate of the integrate of the integrate of the integrate of the in	Specific isolated area         method           Between the I/O terminal and programmable controller power supply         Photocoupler isolation           Between analog channels         Transformer			voltage 1780VrmsAC/3 cyc	resistance	0		
O.3 to 0.75mm ² ×     Wiring change is required.       R1.25-3 (A solderless terminal with sleeve can not be used.)     ×     The recalculation of internal current consumption [5VDC] is required.								-
R1.25-3 (A solderless terminal with sleeve can not be used.)       ×         0.89A       △         The recalculation of internal current consumption [5VDC] is required.	18-point terminal block							
R1.25-3 (A solderless terminal with sleeve can not be used.)       ×         0.89A       △         The recalculation of internal current consumption [5VDC] is required.	0.3 to 0.75mm ²							Wiring change is required.
0.89A          \[Delta]           The recalculation of internal             current consumption [5VDC] is             required.								
0.2kg O							Δ	current consumption [5VDC] is
				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 to 4000		
Voltage (V)	+1 to +5	1.0mV (1/4000)			
	-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	-10 to 0	to +10VDC (Input resistance valu	e: 1MΩ)		
Analog input			-20 to 0 to +20mADC	,		
	Current		(Input resistance value: $250\Omega$ )			
Analog output voltage			-10 to 0 to +10VDC			
		Analog i	nput range	$\begin{array}{c c c c c c c c c c c c c c c c c c c $		
		Voltage (V)	Current (mA)	Analog output voltage (V) '		
		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	tics	0 to +10	0 to +20	0 to + 5		
		0 to + 5	0 to +20	01013		
		+ 1 to + 5	+ 4 to +20	+ 1 to + 5		
		-10 to +10	-20 to +20	-10 to +10		
		- 5 to + 5	-20 to +20	1010 10		
-	-10 to +10	-20 to +20				
		- 5 to + 5	-20 to +20	- 5 to + 5		
Abaoluto	Voltage		+15)/			
Absolute maximum inpu	Voltage		±15V ±30mA			
maximum inpu	Current		IJUIIA			
Analog input p	oints		16 channels/module			
Multiplexer ele	ment		Mercury plunger relay			
Isolation metho	bd	-	ninal and programmable controller			
		Betweer	n channels: mercury plunger relay	ISOIATION		
Between channels dielectric withstand voltage		500VDC (accuracy guarantee 500VDC)				
Occupied I/O p	ooints	(0	16 points (treated as empty slots)			
Connected terr	minal	(U poi	nt setting is possible by I/O assign 38-point terminal block	ment.)		
Applicable wire		0.75 to 2mm	² (Applicable tightening torque: 3	9 to 59N•cm)		
	lerless terminal		.25-3, V1.25-YS3A, V2-S3, V2-YS			
Internal curren (5VDC)			0.5A			
Weight			0.6kg			
-			5			

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

							O: Compatible, △	Partial change required, ×: Incompatible	
				Q64AD-GH			Compatibility	Precautions for replacement	
		-10 to 0 t	o +10VD0	C (Input resis	tance value: 1MΩ	)	0		
		0 to 20	)mADC (I	Δ	The minus current cannot be input.				
				-			-	Analog output voltage to the A616AD	
_								With A60MXR, equivalent or more	
	Input	Analog input range	Maximur 32 bits	m resolution 16 bits	Digital output value (32 bits)	Digital output value (16 bits)		resolution value can be obtained by setting at the analog inputs,	
		0 to 10V	156.3µV	312.6µV				range of -10 up to 10V/high	
		0 to 5V	78.2µV	156.4µV				resolution mode, and User range	
		1 to 5V	62.5µV	125.0µV	0 to 64000	0 to 32000		while the analog inputs are used at	
	Voltage	User range settings (Uni-polar)	47.4µV	94.8µV			Δ	the range of -5 up to 5V on Q64AD-GH.	
		-10 to 10V	156.3µV	312.6µV				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 A60MXR), negative current can not be converted with	
		0 to 20mA	312.5nA	625.0nA				Q64AD-GH.	
	Current	4 to 20mA	250.0nA	500.0nA	0 to 64000	0 to 32000		Use conversion devices to convert	
		User range settings (Uni-polar)	151.6nA	303.2nA				into a input range.	
[		rence accuracy erature coefficient		Digital outp	±0.05% but value (32 bit) ±32 but value (16 bit) ±16 ppm/°C (0.00714%/°(	digits	0	A60MXR is the accuracy in respect to the full scale, and Q64AD-GH is the accuracy in respect to maximum digital output value.	
				±15V ±30mA			0		
			4 c	hannels/mod	ule			Consider replacement with multiple Q64AD-GH.	
				-			-		
		Specific isolated area		Isolation method	Dielectric withstar	nd Insulation resistance	1		
		veen the I/O terminal mable controller powe		Photocoupler isolation	voltage 1780VrmsAC/3 cyc		0		
	Between analog channels			Transformer isolation	(Altitude 2000m				
	16 points (I/O assignment: intelligent 16 points)						Δ	Q64AD-GH cannot set to 0 point with I/O assignment.	
Ī	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.)								
	0.89A						Δ	The recalculation of internal current consumption [5VDC] is required.	
					<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 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 10 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	ontinuation		Transition to Q series
Product	Model	Model	Remarks (Restrictions)
High-speed counter	AD61	QD62-H01 ^{*1}	<ol> <li>External wiring : Terminal block wiring → Connector wiring Cable size is changed.</li> <li>Number of slots : Not changed</li> <li>Counting speed : Not changed</li> <li>Counting range : 24-bit unsigned binary (0 to 16777215) → 32-bit signed binary (-2147483648 to 2147483647) Review the program.</li> <li>Program : Occupied I/O points, I/O signals and buffer memory address are changed.</li> <li>Performance specifications change: Not changed</li> <li>Function specifications: Not changed</li> </ol>
module	AD61S1	QD62-H02 ^{*1}	<ul> <li>1) External wiring : Terminal block wiring → Connector wiring Cable size is changed.</li> <li>2) Number of slots : Not changed</li> <li>3) Counting speed : Not changed</li> <li>4) Counting range : 24-bit unsigned binary (0 to 16777215) → 32-bit signed binary (-2147483648 to 2147483647) Review the program.</li> <li>5) Program : Occupied I/O points, I/O signals and buffer memory address are changed.</li> <li>6) Performance specifications change: Not changed</li> <li>7) Function specifications: Not changed</li> </ul>

*1 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 AD61S1 with the Q series module. Both of them have same input filter system with the AD61 and AD61S1.

### ⊠Point —

• وتستق	onne									
1)	Action to the replace	ed module								
	Input filter system of the AD61 and AD61S1 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	ne counter								
		ne AD61 and AD61S1 diffe								
				ment, review the program.						
		o 16, 777, 215 (24-bit unsig								
		102: - 2,147, 483, 648 to 2	, 147, 483, 647 (32-bit sig	ned binary)						
3)	Wiring to the module		<b>.</b>							
	-	nod of the AD61 and AD61	IS1 differs from that of the	QD62-H01 and						
	QD62-H02.									
		ing using a terminal block								
		102: Wiring using a connec								
4)		ent, continuous use of the								
		D61 or AD61S1 requires t	he change of the external	wiring method as in (a)						
	(b).		- 1							
		de tool (a conversion ada	, ,							
		ing for AD61 and AD61S1								
	using the upgrade tool, a conversion adaptor, manufactured by Mitsubishi Electric									
	Engineering Co									
	Product	MELSEC-A/QnA	MELSEC-Q	Conversion adaptor						
		series module	series module							
High-	speed counter module	AD61 AD61S1	QD62-H01 QD62-H02	ERNT-AQTD61						

(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.

		Signal name	Terminal number on connector side	Terminal symbol on terminal block side
		A phase pulse input 24V	A20	10
		A phase pulse input 12V	B20	0
QD62-H01		A phase pulse input 5V	A19	11
DEC. U FUNC. U GHT CH2		ABCOM	B19	1
		B phase pulse input 24V	A18	12
0		B phase pulse input 12V	B18	2
		B phase pulse input 5V	A17	13
	CH1	Preset input 24V	B17	3
	om	Preset input 12V	A16	14
		Preset input 5V	B16	4
		CTRLCOM	A15	15
		Function start 24V	B15	5
		Function start 12V	A14	16
Cable		Function start 5V	B14	6
		EQU (coincidence output point No.1)	A06	1E
AC10TB		EQU (coincidence output point No.2)	B06	E
AC20TB AC30TB		A phase pulse input 24V	A13	17
AC301B AC50TB		A phase pulse input 12V	B13	7
AC80TB		A phase pulse input 5V	A12	18
AC100TB		ABCOM	B12	8
		B phase pulse input 24V	A11	19
Connector/terminal block converter module		B phase pulse input 12V	B11	9
A6TBXY36		B phase pulse input 5V	A10	1A
	CH2	Preset input 24V	B10	A
		Preset input 12V	A09	1B
		Preset input 5V	B09	В
		CTRLCOM	A08	1C
		Function start 24V	B08	С
		Function start 12V	A07	1D
		Function start 5V	B07	D
		EQU (coincidence output point No.1)	A05	1F
		EQU (coincidence output point No.2)	B05	F
	12/24	V	B02	24V
			B01	
	0V		A02	0V
			A01	

# 6.2 AD61

### 6.2.1 Performance comparison

						O: Compa	ible,∆: Par	tial change required, ×: Incompatible
	Iten	ı	AD	61	QD62	-H01	Compat- ibility	Precautions for replacement
Occupied I/O points		(I/O assignme	2 points     16 points       ment: special 32     (I/O assignment: intelligent 16 points)       points)     points)		Δ	*1		
Nur	Number of channels		2 channels				0	
Counting speed switch settings		-		50KI	PPS	0	Set "2" at the intelligent function module switch setting.	
	Phase			1-phase input,	, 2-phase input		0	
	Count input signal	Signal level (∳A, ∳B)		5VDC 12VDC 24VDC	2 to 5mA		0	
		Counting	1-phase input	50KPPS	1-phase input	50KPPS	0	*2
		speed (Max.)	2-phase input	50KPPS	2-phase input	50KPPS	Ŭ	
		Counting range	24-bit unsig (0 to 16,7	-	32-bit sign (-2147483648 tr	•	Δ	On QD62-H01, as the value is used with 32-bit signed binary values, change of sequence program is required.
		Туре	UP/DOV	VN preset count	0			
Performance specifications of 1 channels	Counter	Minimum count pulse width (set input rise time to 5µs or less. Duty ratio: 50%)		10//s (1,2 phase	10 <i>µ</i> s		0	
ance s	Magnitude comparison	Comparison range	24-bit unsigned binary 32-bit signed bin				0	
Perform	between CPU and AD61/QD62 -H01	Veen J and Comparison Set value < count value 1/QD62 result Set value > count value			count value		0	
		Preset	12/24VD0 5VDC		5/12/24VD0	C, 2 to 5mA		On QD62-H01, as the external
	External input	Count disable	12/24VD0 5VDC		-		Δ	input specifications differ, confirm the external devices
		Function start	-		5/12/24VD0	C, 2 to 5mA		specifications.
	External output	Coincidence output	Trans (open collec 12/24VD	ctor) output	Transistor (sink points/c 12/24VDC, 2A/co	hannel 0.5A/point,	0	
Inte (5V	rnal current c DC)	onsumption	0.3	3A	0.3	3A	0	
Wei	ght		0.5	kg	0.11	lkg	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.
- 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= 5μs: 50KPPS t=50μs: 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.

Device No.         Signal name         Device No.         Signal name         Device No.         Signal name         Device No.         Signal name           X0         CH1 Counter value greater         Y0         Signal name         X0         Module READY         Y0         Ch1 Counter value large         Y1           X1         Ch11 Counter value less         Y2         Ch11 Counter value large         Y1         Ch11 Co		AD	61			QD62	2-H01	
XI         CH1 Conter value greater         Y0         No. 1 reset command           XI         CH1 Conter value loss         Y1           XI         CH1 Conter value loss         Y2           XI         CH2 conter value greater         Y4           XI         CH2 conter value loss         Y6           XI         CH2 conter value greater         Y4           XI         CH2 conter value loss         Y6           CH2 conter value loss         Y6           XI         CH2 conter value loss         Y6           XI         CH2 conter value loss         Y6           Y1         CH2 conter value loss         Y6           Y1         Y6         Y7           K8         Y8         Y7           X8         Y8         Y7           Y2         Y7         Y7           X8         Y8         Y7           X9         Y2         Y7           X4         Y8         Y8           Y1         Y1         Y1		Signal name		Signal name		Signal name		Signal name
XI         Open No.1,         VI         CH1 Preset command           X2         CH1 Counter value less         Y2         X4         CH2 counter value less         Y2         CH1 Deam count command         Y4         CH1 Counter value less         Y3         CH1 Deam count command         Y4         CH1 Counter value less         Y4	X0	CH1 Counter value greater	Y0		X0	Module READY	Y0	-
X2     CHI Counter value less     Y2     enable command       X3     detection     Y3     CHI Counter value small     Y3     CHI Count command       X4     CH2 Counter value greater     Y4     Y4     CHI Counter value small     Y3     CHI Count command       X6     CH2 Counter value greater     Y4     Y4     CHI Counter value small     Y3     CHI Count command       X6     CH2 Counter value greater     Y4     Y4     CHI Counter value small     Y4     CHI Count command       X7     CH2 Counter value greater     Y4     CHI Counter value small     Y4     CHI Counter value small     Y4     CHI Counter value command       X8     CH2 Counter value small     Y4     CHI Counter value small     Y4     CHI Counter value small     Y6     CHI Counter value small     Y7     No.1 reset command       X8     Y8     Y8     Y8     Y8     Y7     No.1 reset command     Y7     No.1 reset command       X8     Y6     Y6     Y6     CH2 Counter value command     Y8     CH2 Counter value command       X8     Y6     Y6     Y6     Y7     No.2 reset command       X8     Y6     Y6     Y6     CH2 Counter value command       X9     CH2 Counter value small     Y6     CH2 Counter malue comm	X1		Y1		X1	0	Y1	CH1 Preset command
X3     election     Y3     CH1 Down count command       X4     CH2 Counter value greater     Y4     CH1 Count environment       X6     CH2 Counter value less     Y6       X6     CH2 Counter value less     Y6       X7     CH2 External preset request     Y4       X8     Y8       X8     Y9       XA     Y9       X6     Y9       X8     Y9       XA     Y9       X8     Y9       XA     Y9       XA     Y8       Y1     Y1       Y1     Y1       Y1     Y1       Y1     CH2 Counter value areal (Point No.1)       Y9     V1       X8     Y8       Y1     Y1       Y2     Y2       Y2     Y2       Y2     Y2       Y2     Y2       Y2     Y2       Y2   <	X2	CH1 Counter value less	Y2		X2		Y2	•
X4     CH2 Counter value greater     Y4       X5     Ch1 Counter value greater     Y5       X6     CH2 Counter value less     Y6       X7     CH2 Counter value less     Y6       X7     CH2 Counter value less     Y6       X8     CH2 Counter value less     Y7       K8     Y8     Y8       Y9     Y8     Y8       Y9     Y8     Y8       Y9     Y9     Y8       Y1     Y1     Y1       Y1     Y1     Y1       Y1     Y1     Y1       Y1     CH2 Counter value large     Y7       X11     Y1     Y1       X12     Y1     CH1 Counter value large     Y8       Y1     Y1     CH2 Counter value large     Y1       Y1     Y1     CH2 Counter value large     Y1       Y2     Y1     CH1 Condence signal     Y2       Y2     Y1     CH1 Condence signal     Y2       Y2     Y1     CH1 Condence signal     Y2       Y1 <td< td=""><td>X3</td><td></td><td>Y3</td><td></td><td>X3</td><td></td><td>Y3</td><td>CH1 Down count command</td></td<>	X3		Y3		X3		Y3	CH1 Down count command
X5         coincidence         Y5           X6         CH2 Counter value less         Y6           X7         CH2 External preset request v7         Y7           CH2 External preset request v7         Y7           X8         Y8           Y9         Y8           Y9         CH2 Counter value small v7         Y7           X8         Y8           Y9         Y8           Y9         Y8           Y9         Y8           Y9         Y9           XA         YA           YA         Y8           Y9         Y9           XA         YA           YA         Y8           Y9         Y9           XA         YA           YA         Y4           Y1         Y1           Y1         Y1           Y1         CH2 Counter value small (Point No.1)         Y9           Y4         Y4           Y1         Y1           Y1         Y1           Y1         CH2 Counter value small (Point No.2)         Y0           Y1         Y1         CH1 Counter value small (Point No.2)         Y0	X4	CH2 Counter value greater	Y4		X4		Y4	CH1 Count enable command
X6     CH2 Counter value less     Y6       X7     CH2 External preset request y7     Y7       X8     Y8       X9     Y4       XA     Y8       Y9     Y4       XA     Y4       YA     Y4       Y4     Y4       Y4     Y4       Y4     Y4 <td>X5</td> <td></td> <td>Y5</td> <td></td> <td>X5</td> <td>•</td> <td>Y5</td> <td></td>	X5		Y5		X5	•	Y5	
X7     detection     Y7     No1 used       X8     Y8       X9     Y8       Y9     Y9       XA     YA       YA     YA       YB     YA       YA     YA       YB     YA       YB     YA       YA     YA       YA     YA       YA	X6	CH2 Counter value less	Y6		X6		Y6	
X8     Y8     Y8       X9     Y9       XA     YA       XB     YA       XA     YA       XB     YB       YA     YB       YA     YB       YB     YA       YB     YA       YB     YA       YB     YB       YC     YA       YB     YB       XC     YC       YD     YD       YD     CH2 Counter value arge (Point No.2)       YD     YD       YE     YE       YE     YE       YD     CH2 Counter value arge (Point No.2)       YD     CH2 Coincidence signal reset command       Y10     CH1 Coincidence signal reset command       Y11     CH1 Poset rommand <td>X7</td> <td></td> <td>Y7</td> <td>Netwood</td> <td>X7</td> <td></td> <td>Y7</td> <td>•</td>	X7		Y7	Netwood	X7		Y7	•
X9     Y9       XA     YA       XA     YA       XB     YA       XB     YB       YC     CH2 Counter value small (Point No.1)     YA       XB     YB       YC     YB       YD     YD       XD     YD       YD     YD       XE     YE       YE     YE       YF     YE       YF     YE       YF     YF       Y10     CH1 Coincidence signal reset command       Y11     CH1 Coincidence signal reset command       Y12     CH1 Coincidence signal reset command       Y13     CH1 Coincidence signal reset command       Y14     CH1 Present value readle command       Y15     CH1 Coincidence signal request       Y16     CH1 Coincidence signal request       Y11     CH1 Present value readle request       Y12     CH1 Coincidence signal request       Y13     CH1 Coincidence signal request       Y14     CH1 Coincidence signal request       Y16     CH2 Present value readle command       Y17	X8		Y8	Notuseu	X8		Y8	Ŭ
XA     YA     YA       XB     YB       XC     YB       YC     YB       YD     YB       YD     YB       YD     YB       YE     YC       YE     YE       YF     YB       YF     YE       YF     YF       Y10     CH1 Coincidence signal reset command       Y11     Y11       X11     Y12       X11     Y12       Y11     CH1 Preset command       Y12     CH1 Coincidence signal reset command       Y13     CH1 Down count command       Y14     CH1 Down count command       Y15     CH1 Coincidence signal reset command       Y16     CH1 Coincidence signal reset command       Y17     CH1 Coincidence signal reset command       Y18     CH2 Counter value read request       Y19     CH2 Counter nalue       Y10     CH2 Counter set value read request       Y14     CH2 Counten realue	X9		Y9		X9		Y9	CH2 Preset command
XB     YB     YB     CH2 Down count command detection     YB     CH2 Counter value large (Point No.2)     YC     CH2 Counter value detection     YC     CH2 Counter value coincidence (Point No.2)     YD       XE     YE     YE     YE     XE     CH2 Counter value small (Point No.2)     YD     CH2 Counter function selection start command       XI0     YF     YF     XF     Fuse broken detection flag     YF     CH2 Coincidence signal request       X11     Y10     CH1 Coincidence signal reset command     XF     Fuse broken detection flag     YF     CH2 Coincidence signal No.2 reset command       X11     Y11     CH1 Coincidence signal request     CH1 Coincidence signal request     YF     CH2 Coincidence signal request       X16     Y16     CH1 Coincidence signal request     CH1 Coincidence signal request     YF     CH2 Coincidence signal request       X18     Y18     CH2 Counter nable     CH1 Coincidence signal request     YF     CH2 Coincidence signal request       X18     Y18     CH2 Command CH2 Counter mall     CH2 Counter mall     YF       X16     Y16     CH2 Counter mall CH2 Counter mall     YF       X17     Y16     CH2 Counter command request     YF       X18     Y18     CH2 Count command request     YF       Y10     CH2 External preset detection	ХА		YA		ХА		YA	•
XC     YC     YC     CH2 Count make command       XD     YD     YD     XD     CH2 Counter value CH2 Counter value (Point No.2)     YD     CH2 External preset detection reset command       XF     YE     YF     CH2 Counter value counter value (Point No.2)     YE     CH2 Counter value selection set command (Point No.2)     CH2 Counter value selection reset command No.2 reset command       X10     YF     CH1 Coincidence signal reset command     YF     CH2 Counter value selection set command       X11     Y10     CH1 Preset command     YF     CH2 Counter value selection set command       X11     Y11     CH1 Preset command     YF     CH2 Counter value selection set command       X11     Y11     CH1 Preset command     YF     CH2 Counter value reset command       X11     Y11     CH1 Preset value read request     YF     CH2 Counter value CH2 Counter value read       X16     Y16     CH1 External preset detection reset command     YF     CH2 Preset rommand       X17     Y16     CH2 Preset rommand     YF     CH2 Counter value read       X18     Y1A     CH2 Preset rommand     YF     CH2 Preset rommand       X12     Y12     CH2 Present value read request     YF     CH2 Preset rommand       X18     Y1A     CH2 Present value read request     YF     CH2 External pres	ХВ		ΥB		ХВ		ΥB	CH2 Down count command
XD     YD       XE     YE       XF     YF       YF     CH2 Counter value small (Point No.2)     YE       XF     YF       YF     CH2 Counter function selection start command       X10     XF     Fuse broken detection flag     YF       X11     Y10     CH1 Coincidence signal reset command       Y11     CH1 Preset command       Y12     CH1 Coincidence signal output enable command       Y13     CH1 Count command       Y14     CH1 Count command       Y15     CH1 Count enable       Y16     CH2 Counter signal request       Y17     CH2 Counter signal request       Y18     CH2 Counter signal request       Y19     CH2 Coincidence signal request       Y11     CH1 Cunter nable       Y12     CH1 Coincidence signal request       Y14     CH1 Cunter nable       Y15     CH2 Coincidence signal reset command       Y17     CH2 Coincidence signal request       Y18     CH2 Preset command       Y19     CH2 Counter nable       Y11     CH2 Counter nable       Y110     CH2 Counter nable       Y110     CH2 Counter nable       Y111     CH2 Counter nable       Y110     CH2 Counter nable       Y110	ХС		YC		ХС		YC	CH2 Count enable command
XE     YE     XE     (Point No.2)     YE     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     YF     CH2 Coincidence signal No.2 reset command       X11     Y11     CH1 Preset command     Y12     CH1 Coincidence signal output enable command       X13     Y13     CH1 Down count command     Y14     CH1 Count enable       X14     Y15     CH1 External preset detection reset command     Y16     CH1 External preset detection reset command       X16     Y16     CH2 Preset command     Y17     CH2 Coincidence signal output enable command       X17     Y16     CH2 Preset command     Y17     CH2 Coincidence signal output enable command       X17     Y16     CH2 Preset command     Y17     CH2 Coincidence signal output enable command       X18     Y18     CH2 Preset command     Y16     CH1 External preset detection reset command       X18     Y18     CH2 Preset command     Y16     CH2 Preset command       X18     Y16     CH2 Preset value read request     Y16     CH2 Preset value read request       X10     Y10     CH2 External preset detection reset command     Y16     CH2 Preset value read request       X10<	XD		YD		XD		YD	
XF     YF     XF     Fuse broken detection flag     YF     No.2 reset command       X10     Y10     CH1 Coincidence signal reset command     YF     No.2 reset command       X11     Y11     CH1 Preset command     Y11     CH1 Preset command       X13     Y11     CH1 Preset command     Y13     CH1 Coincidence signal output enable command       X13     Y13     CH1 Coincidence signal output enable     Y14     CH1 Coincidence signal       X14     Y14     CH1 Preset value read request     Y16     CH1 Preset command       X16     Y16     CH1 External preset detection reset command     Y17       X17     Y18     CH2 Coincidence signal output enable command       X18     Y18     CH2 Down count command       X19     Y14     CH2 Down count command       X11     Y18     CH2 Down count command       Y11     CH2 Down count command     Y16       Y18     CH2 Down count command     Y16       Y10     CH2 External preset request     Y16       X10     Y16     CH2 External preset request       X10     Y10     CH2 External preset request       X110     Y11     CH2 External preset request	XE		YE		XE		YE	
X10     Y10     reset command       X11     Y11     CH1 Preset command       X12     VH1     CH1 Preset command       Y13     CH1 Own count command       Y14     CH1 Down count command       Y15     CH1 Preset value read       Y16     CH1 Preset value read       request     Y16       Y17     CH2 Coincidence signal       detection reset command       Y16     CH1 External preset       detection reset command       Y17     CH2 Coincidence signal       reset command     Y17       CH2 Preset command       Y18     CH2 Preset command       Y19     CH2 Count conto command       Y18     CH2 Down count command       Y10     CH2 Present value read       request     Y10       X10     Y10       X11     Y10       X12     Y10       X14     Y10       X16     Y10       X17     Y10       X18     Y10       X10     Y10       X110     Y10       X12     Not used	XF		YF		XF	Fuse broken detection flag	YF	•
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     Y1A     CH2 Coincidence signal output enable command       X18     Y1A     CH2 Coincidence signal reset command       X18     Y18     CH2 Preset command       X19     Y1A     CH2 Down count command       X1A     Y1A     CH2 Coincidence signal output enable       X110     Y1A     CH2 Preset value read request       X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used	X10		Y10	°				
X12     Not used     Y12     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     Y1B     CH2 Coincidence signal request       X1C     Y12     CH2 Present value read request       X1D     Y10     CH2 External preset detection reset command       X1E     Y1E     Not used	X11		Y11	CH1 Preset 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     Y1B     CH2 Down count command       X1C     Y1C     CH2 Present value read request       X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used	X12	Notused	Y12	, i i i i i i i i i i i i i i i i i i i				
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       Y18       CH2 Down count command         X1A       Y1A       CH2 Count enable         X1C       Y18       CH2 Preset value read request         X10       Y10       CH2 External preset detection reset command         X11       Y11       CH2 Down count command         X11       Y11       CH2 Preset value read request         X10       Y10       CH2 External preset detection reset command         X11E       Y11E       Not used	>//10		>//10					
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     Y1B     CH2 Count enable       X1C     Y1C     CH2 Present value read request       X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used								
X16       Y16       CH1 External preset detection reset command         X17       Y17       CH2 Coincidence signal reset command         X18       Y18       CH2 Preset command         X19       Y18       CH2 Chicidence signal output enable command         X1A       Y1A       CH2 Down count command         X1B       Y1B       CH2 Count enable         X1C       Y1C       CH2 Present value read request         X1D       Y1D       CH2 External preset detection reset command         X1E       Y1E       Not used				CH1 Present value read				
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     Y1B     CH2 Count enable       X1C     Y1C     CH2 Present value read request       X1D     Y1D     CH2 External preset detection reset command	X16		Y16	CH1 External preset				
X18     Y18     CH2 Preset command       X19     Y19     CH2 Coincidence signal output enable command       X1A     Y1A     CH2 Down count command       X1B     Y1B     CH2 Count enable       X1C     Y1C     CH2 Present value read request       X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used	X17		Y17	CH2 Coincidence signal				
X19     Y19     CH2 Coincidence signal output enable command       X1A     Y1A     CH2 Down count command       X1B     Y1B     CH2 Count enable       X1C     Y1C     CH2 Present value read request       X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used	X18		Y18					
X1A     Y1A     CH2 Down count command       X1B     Y1B     CH2 Count enable       X1C     Y1C     CH2 Present value read request       X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used				CH2 Coincidence signal				
X1B     Y1B     CH2 Count enable       X1C     Y1C     CH2 Present value read request       X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used	X1A		Y1A					
X1C     Y1C     request       X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used		1						
X1D     Y1D     CH2 External preset detection reset command       X1E     Y1E     Not used	X1C		Y1C					
X1E Y1E Not used	X1D		Y1D	CH2 External preset				

#### 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			Address					
(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	Freset value setting	(H)		
3	35	Mode register	R/W	2	34	Present value	(L)	R	
4	36	Present value read (Lower and middle)	R	3	35		(H)	ĸ	
(5)	(37)	Present value read (Upper)	ĸ	4	36	Coincidence output point set No.1			
6	38	Set value read/write (Lower and middle)		5	37	Concidence output point set No. 1	(H)	R/W	
(7)	(39)	Set value read/write (Upper)	R/W		38	Coincidence output point set No.2	(L)	FX/ V V	
Address in parentheses in the above table indicates the upper 8 bits				7	39	Concidence output point set No.2	(H)	1	
of 24-b	oit data			8	40	Overflow detection flag		R	
				9	41	Counter function selection setting		R/W	
				10	42	Sampling/periodic setting		FX/ V V	
				11	43	Sampling/periodic counter flag			
				12	44	Latch count value	(L)		
				13	45		(H)		
				14	46	Sampling count value	(L)		
				15	47		(H)	R	
				16	48	Periodic pulse count previous value	(L)		
				17	49	r enouic puise count previous value	(H)		
				18	50	Periodic pulse count present value	(L)		
				19	51	r enouic puise count present value	(H)		
				20	52	Ring counter minimum value	(L)		
				21	53	Thing counter minimum value	(H)	R/W	
				22	54	Ring counter maximum value	(L)	17/44	
				23	55		(H)		
				24	56				
				to	to	System area (Not used)	-	-	
				31	63				

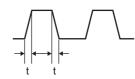
# 6.3 AD61S1

### 6.3.1 Performance comparison

						O: Compa		tial change required, ×: Incompatible
Item			AD61S1 QD62-H02				Compat- ibility	Precautions for replacement
Ос	Occupied I/O points		32 points (I/O assignment: special 32 points)		(I/O assignmen	16 points (I/O assignment: intelligent 16 points)		*1
Nu	mber of chann	els		2 cha	annels		0	
	Counting speed switch settings Phase		-		10KF	PPS	0	Set "2" at the intelligent function module switch setting.
				1-phase input	, 2-phase input		0	
	Count input signal	Signal level (¢A, ¢B)		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.
	Counter	Туре	UP/DOV	VN preset count	0			
Performance specifications of 1 channels		Minimum count pulse width (set input rise time to 5µs or less. Duty ratio: 50%)		100 µs	142 µs 71 µs 71 µs 71 µs (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 (op out 12/24VD	put	Transistor (sink points/c 12/24VDC, 2A/coi	hannel 0.5A/point,	0	
	ernal current c DC)	onsumption	0.3	3A	0.3	A	0	
We	ight		0.5	ikg	0.11	kg	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	g counter function Repeatedly executes counting between user's setting values.		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.	-	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.

X1 CF X2 CF X3 CF X4 CF X5 CF X6 CF X7 CF	Signal name         H1 Counter value greater         H1 Counter value opincidence         H1 Counter value less         H1 Counter value less         H1 External preset request etection         H2 Counter value greater         H2 Counter value less         H2 Counter value less         H2 Counter value less         H2 External preset request etection	Device           No.           Y0           Y1           Y2           Y3           Y4           Y5           Y6           Y7           Y8	Signal name	Device No.           X0           X1           X2           X3           X4           X5           X6	Signal name Module READY CH1 Counter value large (Point No.1) CH1 Counter value coincidence (Point No.1) CH1 Counter value small (Point No.1) CH1 External preset request detection CH1 Counter value large (Point No.2) CH1 Counter value coincidence (Point No.2)	Device No.           Y0           Y1           Y2           Y3           Y4           Y5           Y6	Signal name CH1 Coincidence signal No.1 reset command CH1 Preset command CH1 Coincidence signal enable command CH1 Down count command CH1 Count enable command CH1 External preset detection reset command CH1 Counter function
X0 Cr X1 Cr X2 Cr X3 Cr X3 Cr de X4 Cr X5 Cr Cc X6 Cr X7 Cr de X8	H1 Counter value greater H1 Counter value bincidence H1 Counter value less H1 External preset request etection H2 Counter value greater H2 Counter value bincidence H2 Counter value less H2 External preset request	Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7		X0 X1 X2 X3 X4 X5	Module READY CH1 Counter value large (Point No.1) CH1 Counter value coincidence (Point No.1) CH1 Counter value small (Point No.1) CH1 External preset request detection CH1 Counter value large (Point No.2) CH1 Counter value	Y0 Y1 Y2 Y3 Y4 Y5	CH1 Coincidence signal No.1 reset command CH1 Preset command CH1 Coincidence signal enable command CH1 Down count command CH1 Count enable command CH1 External preset detection reset command
X1     CH       X2     CH       X3     CH       X4     CH       X5     CH       X6     CH       X7     CH       X8     CH	H1 Counter value bincidence H1 Counter value less H1 External preset request etection H2 Counter value greater H2 Counter value bincidence H2 Counter value less H2 External preset request	Y1 Y2 Y3 Y4 Y5 Y6 Y7		X1 X2 X3 X4 X5	CH1 Counter value large (Point No.1) CH1 Counter value coincidence (Point No.1) CH1 Counter value small (Point No.1) CH1 External preset request detection CH1 Counter value large (Point No.2) CH1 Counter value	Y1 Y2 Y3 Y4 Y5	CH1 Preset command CH1 Coincidence signal enable command CH1 Down count command CH1 Count enable command CH1 External preset detection reset command
X1 contract of the second seco	bincidence H1 Counter value less H1 External preset request etection H2 Counter value greater H2 Counter value bincidence H2 Counter value less H2 External preset request	Y2 Y3 Y4 Y5 Y6 Y7		X2 X3 X4 X5	(Point No.1) CH1 Counter value coincidence (Point No.1) CH1 Counter value small (Point No.1) CH1 External preset request detection CH1 Counter value large (Point No.2) CH1 Counter value	Y2 Y3 Y4 Y5	CH1 Coincidence signal enable command CH1 Down count command CH1 Count enable command CH1 External preset detection reset command
X3 CH def X4 CH X5 CH X5 CH X6 CH X7 CH def X8	H1 External preset request etection H2 Counter value greater H2 Counter value pincidence H2 Counter value less H2 External preset request	Y3 Y4 Y5 Y6 Y7		X3 X4 X5	coincidence (Point No.1) CH1 Counter value small (Point No.1) CH1 External preset request detection CH1 Counter value large (Point No.2) CH1 Counter value	Y3 Y4 Y5	enable command CH1 Down count command CH1 Count enable command CH1 External preset detection reset command
X3 de X4 Cl X5 Cl X6 Cl X6 Cl X7 Cl de X8	etection H2 Counter value greater H2 Counter value pincidence H2 Counter value less H2 External preset request	Y4 Y5 Y6 Y7		X4 X5	CH1 Counter value small (Point No.1) CH1 External preset request detection CH1 Counter value large (Point No.2) CH1 Counter value	Y4 Y5	CH1 Count enable command CH1 External preset detection reset command
X5 CH CC X6 CH X7 CH X8 X8	H2 Counter value bincidence H2 Counter value less H2 External preset request	Y5 Y6 Y7		X5	detection CH1 Counter value large (Point No.2) CH1 Counter value	Y5	CH1 External preset detection reset command
X5 co X6 CH X7 CH X7 de X8	Dincidence H2 Counter value less H2 External preset request	Y6 Y7			(Point No.2) CH1 Counter value		detection reset command
X7 CH de X8	H2 External preset request	Y7		X6		Y6	CH1 Counter function
X7 de X8							selection start command
	-	Y8		X7	CH1 Counter value small (Point No.2)	Y7	CH1 Coincidence signal No.2 reset command
X9		10	Not used	X8	CH2 Counter value large (Point No.1)	Y8	CH2 Coincidence signal No.1 reset command
		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
хс		YC		хс	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			L	
X11		Y11	CH1 Preset command				
X12 No	ot used	Y12	CH1 Coincidence signal				
X13		Y13	output enable command CH1 Down count command				
X13 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				
V1A	-	V1 A	output enable command				
X1A X1B	ŀ	Y1A Y1B	CH2 Down count command CH2 Count enable				
X1D X1C	-	Y1C	CH2 Count enable CH2 Present value read request				
X1D	-	Y1D	CH2 External preset detection reset command				
X1E	ŀ	Y1E		1			
X1E X1F	ł	Y1F	Not used				

#### 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	(Dec.)		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	Fleset value setting	(H)		
3	35	Mode register	R/W	2	34	Present value	(L)	R	
4	36	Present value read (Lower and middle)	R	3	35		(H)	IX IX	
(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	Concidence output point set NO.1		R/W	
(7)	(39)	Set value read/write (Upper)	11/11	6	38	Coincidence output point set No.2	(L)	10,00	
Addre	ss in pa	arentheses in the above table indicates the	upper 8 bits	7	39	Concidence output point set No.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		1011	
				11	43	Sampling/periodic counter flag		_	
				12	44	Latch count value	(L)		
				13	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		(H)	R/W	
				22	54	Ring counter maximum value	(L)		
				23	55		(H)		
				24	56				
				to	to	System area (Not used)		-	
				31	63				

# 7.1 List of Positioning Module Alternative Models for Replacement

	uction tinuation		Transition to Q series
Product	Model	Model	Remarks (Restrictions)
	AD70	QD73A1	<ol> <li>External wiring : Not changed^{*2} (An external power supply (±15VDC) is not required.</li> <li>Number of slots : Changed (1 slot → 2 slots)</li> <li>Program : Buffer memory assignment and change of the setting method</li> <li>Performance specifications change: Upward-compatibility</li> <li>Function specifications: Partly changed (LED indication and function setting method)</li> </ol>
	AD71(S1/S2/ S7)	None	Replacing QD75 system is recommended. When replacing the existing AD71 (S1/S2/S7) with "QD75P/QD75D", refer to Technical Bulletin "FA-A-0060: Procedures for Replacing Positioning Module AD71 with QD75".
	AD70D	None	Mount AD70D to the QA6 B-type extension base unit. Otherwise, replacing with the QD75M system is recommended.
	AD72	None	Replacing with two QD73A1 modules or QD75 system is recommended.
Desitioning	AD75M1	QD75M1	1) External wiring       : Connector and manual pulsar wiring are changed.         2) Number of slots       : Not changed         3) Program       : 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	AD75M2	QD75M2	<ol> <li>External wiring : Connector and manual pulsar wiring are changed.</li> <li>Number of slots : Not changed</li> <li>Program : I/O signals, XY assignment, buffer memory assignment and different functions are changed.</li> <li>Performance specifications change: Upward-compatibility</li> <li>Function specifications: Partly changed</li> </ol>
	AD75M3	QD75M4	1) External wiring       : Connector and manual pulsar wiring are changed.         2) Number of slots       : Not changed         3) Program       : I/O signals, XY assignment, buffer memory assignment and different functions are changed.         4) Performance specifications change: Upward-compatibility         5) Function specifications: Partly changed
	AD75P1-S3	QD75P1N ^{*1} (when an open collector is connected) QD75D1N ^{*1} (when a differential driver is connected)	<ol> <li>1) External wiring : Connector and manual pulsar wiring are changed.</li> <li>2) Number of slots : Not changed</li> <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> <li>5) Function specifications: Partly changed</li> </ol>
	AD75P2-S3	QD75P2N ^{*1} (when an open collector is connected) QD75D2N ^{*1} (when a differential driver is connected)	1) External wiring       : Connector and manual pulsar wiring are changed.         2) Number of slots       : Not changed         3) Program       : I/O signals, XY assignment, buffer memory assignment and different functions are changed.         4) Performance specifications change: Not changed.         5) Function specifications: Partly changed

Production discontinuation			Transition to Q series
Positioning module		QD75P4N ^{*1} (when an open collector is connected) QD75D4N ^{*1} (when a differential driver is connected)	<ol> <li>External wiring : Connector and manual pulsar wiring are changed.</li> <li>Number of slots : Not changed</li> <li>Program : I/O signals, XY assignment, buffer memory assignment and different functions are changed.</li> <li>Performance specifications change: Not changed.</li> <li>Function specifications: Partly changed</li> </ol>

*1 The QD75PDN and QD75DDN are the upward-compatibility for the QD75PD and QD75DD 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 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 QA6DB 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, △ : Parti							al change re	quired, ×: Incompatible	
Item	Model		AD75P2-S3	AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement
No. of contro	laxes	1	2	3	1	2	4	0	
No. of position items	ning data		600/axis ^{*1}			600/axis		0	
Position control interpolation	2-axis linear interpolation	×	0	0	×	0	O (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	

# 7 POSITIONING MODULE REPLACEMENT

O : Compatible,  $\bigtriangleup$  : Partial change required, ×: Incompatible

~			0.000	al change le	quired, ×. Incompatible		
Model	AD75P1-S3 AD75P2-S3 AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement	
		<absolute sy<="" td=""><td>stem&gt;</td><td></td><td></td><td></td></absolute>	stem>				
			to 214748364.	7 (um)			
	<absolute system=""> -214748364.8 to 214748364.7 (μm) /-13421772.8 to 13421772.7 (μm) -21474.83648 to 21474.83647 (inch)</absolute>	-21474.8364	8 to 21474.83 99 (degree)				
	/-1342.17728 to 1342.17727 (inch)	-2147483648	to 21474836	47 (pulse)			
	0 to 359.99999 (degree) /0 to 359.99999 (degree) -2147483648 to 2147483647 (pulse) /-134217728 to 134217727 (pulse)	<incremental< td=""><td></td><td></td><td></td></incremental<>					
	<incremental system=""> -214748364.8 to 214748364.7 (µm)</incremental>	-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)			
Positioning range ^{*2}	/-1342.17728 to 1342.17727 (inch) -21474.83648 to 21474.83647 (degree)	-2147483648 to 2147483647 (pulse)			0		
	/-1342.17728 to 1342.17727 (degree) -2147483648 to 2147483647 (pulse)) /-134217728 to 134217727 (pulse)	<ul> <li>2147483647 (pulse))</li> <li>134217727 (pulse)</li> <li>Control</li> <li>Control</li> <li>Control</li> </ul>					
	0 to 214748364.7 (μm)	In speed-position switching control>					
	/0 to 13421772.7 (μm) 0 to 21474.83647 (inch)	10 to 21474 83647 (inch)					
	/0 to 1342.17727 (inch) 0 to 21474.83647 (degree)	0 to 21474.8	3647 (degree)				
	/0 to 1342.17727 (degree) 0 to 2147483647 (pulse)	0 to 2147483	647 (pulse)	7 (pulse)			
	/0 to 134217727 (pulse)	<in (abs="" control="" mode)="" speed-position="" switching=""></in>					
		0 to 359.999	<b>、</b> δ ,				
	0.01 to 600000.00 (mm/min) /0.01 to 375000.00 (mm/min) 0.001 to 600000.000 (inch/min)		0000.00 (mm/ 0000.000 (inc	,			
Speed command range *2	/0.001 to 37500.000 (inch/min) 0.001 to 600000.000 (degree/min) /0.001 to 37500.000 (degree/min)	0.001 to 2000	000.000 (deç	gree/min)	0		
	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		
					-		

_			1		O : Comp	patible, $\triangle$ : Partia	al change re	quired, ×: Incompatible
Item	Model	AD75P1-S3 AD75P2-S3 /	AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement
Item Manual pulse generator function		1 generator/axis		1 generator/module		Δ	<ul> <li>On QD75P□N/ QD75D□N, the manual pulse generator cannot be used by each axis independent.</li> <li>When connecting the manual pulse generator for each axis is required, use one axis module.</li> <li>The manual pulse generator itself can use the same one.</li> <li>The operation for inputting one pulse differs. Set the parameter so that movement amount may be same.</li> </ul>	
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		0		0			0	
processing	S-pattern acceleration/ deceleration	0	o o					
Acceleration /deceleration time	No. of patterns Setting range			(4	time and dece e set independ patterns eac to 8388608m	dently. h)	0	
une	Sudden stop deceleration	to 8388608ms poss Changeover between 1 to 6 to 8388608ms poss	35535ms/1	1	to 8388608m	IS	0	
Compensation		Electronic gears, bac compensation, near p			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		Provided (4 types, 16 item	s/module)	Provided (3 types, 16 items/module)		0	The start history during error is integrated into the start history.	
Data storage	destination	Flash ROM (battery-less backu	ıp)	(bat	Flash ROM tery-less back	kup)	0	

# 7 POSITIONING MODULE REPLACEMENT

O : Compatible,  $\bigtriangleup$  : Partial change required, ×: Incompatible

			O. Com		lai change re	equired, ×: Incompatible
Model	AD75P1-S3 AD75P2-S3 AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement
	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)			-	
Connection connector	10136-6000EL (Crimping type, sold separately)				×	As the connectors differ, wiring change is required. The connectors of QD75P□N/
Applicable wire size	10136-3000VE: 24 to 30 AWG (approx. 0.05 to 0.2 mm ² ) 10136-6000EL:		11, A6CON4: CON2: 24 AV		0	QD75D⊡N are sold separately.
Command pulse output system	28 AWG (approx. 0.08 mm ² ) Differential driver/Open collector	QD75P디N: Open collector QD75D디N: 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		ected to open ected to differ 10m		0	
Internal current consumption (A) (5VDC)	0.7A or less	QD75P1N: 0.29A QD75D1N: 0.43A	QD75P2N: 0.30A QD75D2N: 0.45A	QD75P4N: 0.36A QD75D4N: 0.66A	0	
Flash ROM write count	Max. 100,000 times	Max. 100,000 times		0	When QD75PDN/ QD75DDN 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	cupied I/O points 32 points (I/O assignment: special 32 points)		32 points nent: intellige	nt 32 points)	0	
No. of module occupied slots	1		1		0	
Weight	0.35kg	QD75P1N: 0.14kg QD75D1N: 0.15kg	QD75P2N: 0.14kg QD75D2N: 0.15kg	QD75P4N: 0.16kg QD75D4N: 0.16kg	0	

# 7 POSITIONING MODULE REPLACEMENT

				·		0.000	al change required, ×: Incompatin		
Item	Model	AD75P1-S3	AD75P2-S3	AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement
I/O signal for external devices	STRT signal	O(Ex	xternal start s	ignal)	× (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	nal Speed-position switching signal			start or sp	ommand signa beed-position ble with parar	0		
	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 only			0			0	The default logic of pulse output differs.
Peripheral	Connection with peripheral devices	Direct connection		Connection via programmable controller CPU, Q corresponding serial communication module, Q corresponding MELSECNET/H remote I/O module		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 AD75PD-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 QD75PDN/QD75DDN.

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

*2 Indicates the standard mode/stepping motor mode about AD75PD-S3.

*3 The near pass function is valid only during the continuous path control. (AD75PD-S3: Selected with parameters, QD75PDN/QD75DDN: Standard function)

QD75PDN/QD75DDN 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 AD75PD-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 QD75PDN/QD75DDN, there is no possible function for replacement.				
Special start (stop)	Execute it separately for the start two times.				
	In the QD75PDN/QD75DDN, 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 AD75PD-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 QD75PDN/QD75DDN, this				
	function is deleted.				
Chart biston , during among	The contents are the same as the start history.				
Start history during errors	Therefore, the QD75PDN/QD75DDN stores only the start history.				
Custom monitor data	These data were deleted because they can be displayed in system monitor "Module's detailed				
System monitor data	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 AD75PD-S3, make sure that there is no operation problems when converted to QD75PDN/QD75DDN.

Changed functions		Change description						
Changed functions	1 The limit sheek of are address is		topignotod					
	1. The limit check of arc address is carried out only when a sub point is designated.							
	It is not carried out when a center point is designated. 2. The software stroke limit check during speed control is carried out in the following cases:							
		0 1	C C					
	• When the software stroke limit is applied to the current feed value with Pr.14 and the current feed value is							
	updated with Pr.21							
	When the software stroke limit is a							
Software stroke limit	3. If an attempt is made to change the							
function		ered as an error and the current value	e is not changed.					
	4. Error code change							
	AD75P□-S3:							
	There are 3 types of errors for ea	ch upper and lower stroke limit.						
	(error code 509 to 512)							
		er limit are integrated in to error code	e 507.					
	Errors for the lower limit are integ							
	Error codes 509 to 512 are delete		<u> </u>					
Current value changing M	1. An error occurs when the designation		-					
code function	2. The M code setting value is valid	8 I 8	8 8					
A secleration (decaleration	1. An error occurs when the command frequency value calculated from the speed limit value exceeds the							
Acceleration/deceleration	<ul><li>maximum command frequency of the positioning module being used.</li><li>2. Only two-word type (1 to 8388608ms) can be used as the setting value for the acceleration/deceleration</li></ul>							
speed control	time.							
	<ol> <li>"Peripheral side (emergency) stop" is deleted from the stop causes of Stop group 2 "sudden stop</li> </ol>							
	selection".							
	"Test mode fault" in the stop causes of Stop group 3 "sudden stop selection" is changed to be in the stop							
Stop process and restart	causes of Stop group 2 "sudden stop selection".							
after stop positioning	<ol> <li>"Stop (QD75 peripheral)" is added to the stop causes of Stop group 3 "sudden stop selection".</li> </ol>							
operation stop	<ol> <li>Stop (QD75 perpheral) is added to the stop causes of stop group 5 studien stop selection .</li> <li>Error code 100 (Peripheral device stop during operation) is deleted.</li> </ol>							
	<ol> <li>Programmable controller CPU error occurrence" is added to the stop causes of Stop group 2 Sudden stop</li> </ol>							
	selection.							
		AD75PD-S3	QD75PDN/QD75DDN					
READY signal (X0)	OFF	Normal (READY)	Not READY/WDT error					
	ON	Not READY/WDT error	Normal (READY)					
Manual pulse generator	The No. of connectable manual pulse	e generator is changed from 1genera	tor/1axis to 1generator/1 module.					
operation Axis operation status	"Step stopped" is changed to "Stoppe	ad" and "Step error occurring" is char	and to "Error occurring"					
	• AD75PD-S3:							
	If the reference axis operates in reverse direction, the control is internally changed into the continuous							
Continuous path control	positioning control. (restart after deceleration stop)							
	• QD75PDN/QD75DDN:							
	Even if the reference axis operates in reverse direction with interpolation, the control remains as the continuous path control.							
		tion is the same as that of the AD75	P□-S3.)					
	(In single-axis operation, the operation is the same as that of the AD75P□-S3.) For the continuous path control, only the near pass function is available.							
		the near pass function is available.						
Near pass								
Near pass 2-axis interpolation	For the continuous path control, only							
· · · · · · · · · · · · · · · · · · ·	For the continuous path control, only Positioning address pass is not cond	ucted.	fice					
2-axis interpolation	For the continuous path control, only	ucted.	fier.					

Changed functions		Change description					
	1. "Step stopped" is changed to "St	opped" and "Step error occurring" is o	changed to "Error occurring" in the				
Stop 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	ith the restart command.					
Command in-position	The command in-position width is ex	panded.					
function	• AD75P□-S3: 1 to 32767000						
	• 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 QD75PDN/QD75DDN, number of blocks has been change to 5 (7000 to 7004).						
DIOCK Start Gata	(With the AD75PD-S3, this data is called "Positioning start information".)						
Start history	The configuration of "start informatio	n" and "start No." is changed so that t	he 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.				
		AD75PD-S3	QD75PDN/QD75DDN				
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				
		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.

Inpu	ut (X)		Output (Y)			
Signal name	AD75Pロ-S3	QD75P□N/ QD75D□N	Signal name	AD75PD-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	YOU to YOF Y1E to Y1F	Y18 to Y1F	

* The ON/OFF statuses for READY are different between the QD75PDN/QD75DDN and AD75PD-S3.

	Not READY/WDT error	READY		
QD75P□N/	OFF	ON		
QD75D□N	OFF	ON		
AD75PD-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 AD75PD-S3 and QD75PDN/QD75DDN.

	Buffer memory address							
Item of AD75P□-S3		AD75Pロ-S3				75P□N/QD75D□N		
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3		
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 (AI)	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		
	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 11	160 161	310 311	14 15	164 165	314 315		
	11	162	312	6	156	306		
Pr.10 Bias speed at start	13	163	312	7	150	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 19	168 169	318 319	20 21	170 171	320 321		
Pr.15 Software stroke limit selection	20	170	320	22	172	322		
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.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	-	-	-		
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.26 Acceleration time 1	36	186	336	36	186	336		
	37	187	337	37	187	337		
Pr.27 Acceleration time 2	38 39	188 189	338 339	38 39	188 189	338 339		
	40	190	340	40	190	340		
Pr.28 Acceleration time 3	41	191	341	41	191	341		
Pr.29 Deceleration time 1	42	192	342	42	192	342		
	43	193	343	43	193	343		

Item of AD75Pロ-S3	Buffer memory address					
	AD75PI-S3 QD75PIN/QD75DIN					
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3
Pr.30 Deceleration time 2	44	194	344	44	194	344
	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	190	349	40 49	190	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
D- 27 Sudden sten 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.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
(QD75PDN/QD75DDN: Pr.42 External command function selection)						
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.37 OP address	73	223	373	73	223	373
Pr.48 OPR speed	74	224	374	74	224	374
	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
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	235	385	85	235	385
Pr.56 OPR torque limit value	86	236	386	86	236	386
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

Item of AD75P□-S3		Buffer memory address					
		AD75Pロ-S3					
		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		460 to 507					
(QD75PDN/QD75DDN: Md.3 Start information)		462 to 537	1212 to 1287				
Md.8 Operation type		400 to 500	1010 to 1000				
(QD75PDN/QD75DDN: Md.4 Start No.)	٥Ŋ	463 to 538	1213 to 1288				
Md.9 Start Hour: minute	Start history	464 to 539	10111 1000				
(QD75PDN/QD75DDN: Md.5 Start Hour)	Start		1214 to 1289				
Md.10 Start Second: 100 ms	1 1	465 to 540	1015 to 1000				
(QD75PDN/QD75DDN: Md.6 Start Minute: second)			1215 to 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	istor	546 to 621	-				
Md.17 Error judgment	Start history during errors	547 to 622	-				
Md.18 Start history storage during error	S	623	-				
(Pointer number)		(0) 1	(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	Σ.	626 to 686					
(QD75PDN/QD75DDN: Md.11 Axis error occurrence	Error history		1295 to 1355				
(Hour))	irror						
Md.22 Axis error occurrence Second: 100 ms							
(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			
		AD75PD-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		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				
(QD75PDN/QD75DDN: Md.16 Axis warning	g his	691 to 751	1360 to 1420		
occurrence (Hour))	ning				
Md.27 Axis warning occurrence Second: 100 ms	Warning				
(QD75PDN/QD75DDN: Md.17 Axis warning		3692 to 752	1361 to 1421		
occurrence (Minutes: second))					
Md.28 Warning history pointer		753	1422		

			Buffer mem	ory address		
Item of AD75Pロ-S3		AD75PD-S3			5PDN/QD75	DI
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3
Md.29 Current feed value	800	900	1000	800	900	1000
	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
Md.31 Feedrate	804 805	904 905	1004	804 805	904 905	1004
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
	810	910	1010	810	910	1010
Md.36 Current speed	811	911	1010	811	911	1011
Md.37 Axis feedrate	812	912	1012	812	912	1012
MU.57 Axis leculate	813	913	1013	813	913	1013
Md.38 Speed-position switching control positioning amount	814	914	1014	814	914	1014
	815 816	915 916	1015 1016	815 816	915 916	1015 1016
Md.39 External input/output signal	817	910	1010	817	910	1010
Md.40 Status						
Md.41 Target value	818 819	918 919	1018 1019	818 819	918 919	1018 1019
	819	920	1019	820	919	1019
Md.42 Target speed	821	921	1021	821	921	1021
	822	922	1022			
Md.43 OP absolute position	823	923	1023	-	-	-
Md.44 Movement amount after near-point dog ON	824	924	1024	824	924	1024
	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

			ory address			
Item of AD75P□-S3		AD75PD-S3		QD7	5PDN/QD75	D□N
	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			-	
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	1200	1250	1506	1604	1704
Cd.15 New current value	1155	1205	1255	1507	1607	1707
Cd.16 New speed value	1156	1206	1256	1514	1614	1714
	1157 1158	1207 1208	1257 1258	1515 1516	1615 1616	1715 1716
Cd.17 Speed change request						
Cd.18 Positioning operation speed override	1159 1160	1209 1210	1259 1260	1513 1518	1613 1618	1713 1718
Cd.19 JOG speed	1161	1210	1261	1518	1619	1718
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	1218	1268	1522	1622	1722
	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	1171	1221	1271	1505	1605	1705
(QD75PDN/QD75DDN: Cd.8 External command valid)						
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.32 Interrupt request during continuous operation	1181	1231	1281	1520	1620	1720
Cd.33 New acceleration time value	1184	1234	1284	1508	1608	1708
	1185	1235	1285	1509	1609	1709
Cd.34 New deceleration time value	1186 1187	1236 1237	1286 1287	1510 1511	1610 1611	1710 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ロ-S3				AD75					QD	75P□N			
				Ax	is 1	Axi	s 2	Axi	s 3	Ax	is 1	Ax	is 2	Ax	is 3
	Da	<ul> <li>.1 Operation pattern</li> <li>.2 Control system</li> <li>.3 Acceleration time No.</li> </ul>		13	00	2300		33	3300 2000		80	00	140	000	
		.4 Deceleration time No.													
	Da No.	.5 M code/condition data		13	01	23	01	33	01	20	01	8001		140	001
*		Da.8 Dwell time/JUMP destination positioning data No.		13	02	23	02	33	02	20	02	8002		140	002
data	Emp	oty			03	23		33			03		03		003
Positioning data ^{*1}	Da	.7 Command speed			604 605	23 23		33 33			04 05		04 05		004 005
Positi		.5 Positioning address/			06 07	23 23		33 33			06 07		06 07		006 007
	movement amount			13	808	23 23	08	33	08	20	08	80	08	140	008
	No.2			1309 1310 to 1319 2		2310 t		3310 te		2009 2010 to 2019		8009 8010 to 8019		14009 14010 to 14019	
	No.3			1320 t	o 1329	2320 to 2329		3320 te	o 3329	2020 to 2029		8020 to 8029		14020 to 14029	
	to			1	to	t	0	t	0	to		1	to		to
		No.100		2290 t	o 2299	3290 t	o 3299	4290 te	o 4299	2990 t	o 2999	8990 t	o 8999	14990 to 14999	
		Da.10 Shape													
		Da.11 Start data No.	4.4												
	Start block data ^{*2}	Da.12 Special start instruction	1st point	4300	4350	4550	4600	4800	4850	26000	26050	27000	27050	28000	28050
	bloc	Da.13 Parameter													
	Start	2nd point	L	4301	4351	4551	4601	4801	4851	26001	26051	27001	27051	28001	28051
	0,	3rd point		4302	4352	4552	4602	4802	4852		26052			28002	
on ^{*3}		to 50th point		1 4349	to 4399	t 4599	o 4649	t 4849	o 4899		o 26099		o 27099		to 28099
ormati		Da.14 Condition target											1		
art info		Da.15 Condition operator		44	00	46	50	49	00	26	100	27	100		100
ning st		Da.16 Address	No.1		·02 ·03	46 46		49 49			102 103		102 103		102 103
Positioning start information ^{*3}	ata	Da.17 Parameter 1			·04 ·05	46 46		49 49			104 105		104 105		104 105
ш	Condition data	Da.18 Parameter 2			·06 ·07	46 46		49 49			106 107		106 107	28106 28107	
	No.2 No.3	L		o 4419	4660 t		4910 te		261	10 to 119	271 ⁻	10 to 119	281	10 to 119	
			4420 t	o 4429	4670 t	o 4679	4920 to 4929		26120 to 26129		27120 to 27129		28120 to 28129		
		to		1	to	t	0	t	0		:0		120		to
		No.10		4490 t	o 4499	4740 te	o 4749	4990 te	o 4999		90 to 199		90 to 199		90 to 199
_	l							1		20		-1		20	

*1 With the QD75PDN/QD75DDN, the positioning data buffer memory addresses are Nos. 1 to 600.

*2 With the QD75P $\Box$ N/QD75D $\Box$ N, it is called [block start data].

*3 With the QD75PDN/QD75DDN, 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	i		
Iter	n of A	D75P□-S3		AD75PD-S3		QD75PDN/QD75DDN			
			Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3	
	L	Start No.8001	4500	4750	5000	-	-	-	
Positioning start	t lation	Start No.8002	4501	4751	5001	-	-	-	
information	Indirect desiane	to	to	to	to	to	to	to	
	lnd des	Start No.8050	4549	4799	5049	-	-	-	
Dragrommable controller		Condition indoment torget date		5050			30000		
Programmable controller	CPU	, , , ,	to			to			
memory area		of the condition data		5099		30049			
Target axis				5100		-			
Head positioning block N	۱o.			5101		-			
No. of read/write data items				5102		-			
Read/write request	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 AD75PD-S3 and QD75PDN/QD75DDN.

				O : Compatible, $\Delta$ : 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: 4.7kΩ→4.3kΩ Response time: 4ms → 1ms	Δ	<when for="" machine="" opr="" the="" the<br="">near-point watchdog signal method is used&gt; The input response time for the QD75PDN/QD75DDN is shorter than the A1SD75PD-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: $3.5k\Omega \rightarrow 4.7k\Omega$ (at input of 24V) $0.5k\Omega \rightarrow 0.62k\Omega$ (at input of 5V) Response time: $0.8ms \rightarrow 1ms^{*3}$ ON voltage : $2.5V \rightarrow 2.0V$ (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	
Sulpul	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 $\Box$ -S3]  $\rightarrow$  [Specifications of QD75P $\Box$ N/QD75D $\Box$ N].

*3 The response time difference (0.2 ms) of AD75PD-S3 and QD75PDN/QD75DDN 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 QD75PDN/QD75DDN outputs an error and stops the OPR control.

### 7.5 AD75M1/M2/M3

### 7.5.1 Performance comparison

								artial change	required, ×: Incompatible
Item	Model	AD75M1	AD75M2	AD75M3	QD75M1	QD75M2	QD75M4	Compati- bility	Precautions for replacement
No. of control	axes	1	2	3	1	2	4	0	
No. of position	ing data items		600/axis ^{*1}			600/axis		0	
Position control	2-axis linear interpolation	×	0	0	×	0	0	0	
interpolation functions	2-axis circular interpolation	×	0	0	×	0	0		
	Position control		0			0		-	
Positioning system control			0			0			
			0			0	0		
	Position- speed switching control		×			0			
Positioning range		-21474.83648 0 to 359.99999 -2147483648 ti <incremental s<br="">-21474.83648 -21474.83648 -21474.83648 -21474.83648 <in speed-pos<br="">0 to 21474.836 0 to 21474.836 0 to 21474.836 0 to 21474.836</in></incremental>	to 214748364. to 21474.8364 d (degree) to 2147483647 system> to 2147483647 to 21474.83647 to 21474.83647 to 21474.83647 tition switching of 4.7 (µm) 547 (inch) 547 (degree) 47 (PLS)	7 (inch) (PLS) 7 (μm) 7 (inch) 7 (degree) (PLS) control>	-21474.83648 0 to 359.99999 -2147483648 <incremental s<br="">-2147483648 -21474.83648 -21474.83648 -21474.83648 <in speed-pos<br="">0 to 21474.836 0 to 21474.836 0 to 21474.836 0 to 21474.836</in></incremental>	to 214748364. to 21474.8364 e (degree) to 2147483647 system> to 2147483647 to 21474.83647 to 21474.83647 to 21474.83647 ition switching of 4.7 (µm) 647 (inch) 647 (degree) 47 (PLS)	(PLS) 7 (μm) 7 (μm) 7 (inch) 7 (degree) (PLS) control>	0	
Speed command range         0.01 to 600000.00           0.001 to 600000.00         0.001 to 600000.00           0.001 to 600000.00         1 to 100000 (PLS/		00.000 (inch/mi 00.000 (degree/	n)	0.01 to 2000000.00 (mm/min) 0.001 to 200000.000 (inch/min) 0.001 to 2000000.000 (degree/min) 1 to 10000000 (PLS/s)			0		
Machine OPR function (OPR method)		0	O(6 OPR methods) 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 operatior	ı		0			0		0	

### MELSEC

O : Compatible,  $\bigtriangleup$  : Partial change required, ×: Incompatible

						0.00		rtial change	required, ×: Incompatible
Item	Model	AD75M1	AD75M2	AD75M3	QD75M1	QD75M2	QD75M4	Compati- bility	Precautions for replacement
Manual pulse generator function			1 generator/axis	5	1 generator/module		Δ	<ul> <li>On QD75M□, the manual pulse generator cannot be used by each axis independent.</li> <li>When connecting the manual pulse generator for each axis is required, use one axis module.</li> <li>The manual pulse generator itself can use the same one.</li> <li>The operation for inputting one pulse differs. Set the parameter so that movement amount may be same.</li> </ul>	
Acceleration/ deceleration	Automatic trapezoidal acceleration/ deceleration	0		0 0		0			
processing	S-pattern acceleration/ deceleration	eration/ O O							
Acceleration/ deceleration			Acceleration time and deceleration time can be set independently. (4 patterns each) 1 to 65535ms/1 to 8388608ms switching is			me and deceler set independer 4 patterns each	ntly.	0	
action time	setting range		enabled			1 to 8388608m	S		
Compensation		Electronic gears, backlash compensation, near pass ^{*2}			Electronic ge	ars, backlash c near pass ^{*2}	ompensation,	Δ	Refer to *2.
Error display		17-segment LED				Error LED		×	For details of diagnostic, use GX Developer.
History data sto error, warning)	orage (Start,	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	(ba	Flash ROM	up)	Flash ROM (battery-less backup)			0	
Connection cor	nnector	(Sold	10136-3000VE ering type, sup 10136-6000EL g type, sold se	plied)	A6CON1, A6CON4 (Soldering type, sold separately) A6CON2 (Crimping type, sold separately)			×	As the connectors differ,
Applicable wire size		(appi) 1013	- 3000VE: 24 to 3 rox. 0.05 to 0.2 66-6000EL: 28 / pprox. 0.08mm	mm ² ) AWG	A6CON3 (IDC type, sold separately) A6CON1, A6CON4: 0.3mm ² A6CON2: 24 to 28 AWG A6CON3: 28 AWG (twisted wire),		A6CON4: 0.3mm ²		wiring change is required. The connectors of QD75M□ is sold separately.
SSCNET conn				Refer to Sec	tion 7.5.5 (3).		•		The connector
Maximum exter of SSCNET	nsion distance			30	)m				configuration of bass differs.
Internal current consumption(A			0.7A or less		QD75M1 : 0.40A	QD75M2 : 0.40A	QD75M4 : 0.40A	0	
consumption(A) (5VDC) Flash ROM write count		Ma	ax. 100,000 tim	es			ies	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: intelliger	nt 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		0.30kg		× (ir	ntegrated into C	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-position switching signal			External command signal (External start or speed-position switching selectable with parameters)			0			
	Connection with peripheral Direct connection devices			n	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	X Configurator-	AP	GX	Configurator-C	2P ^{*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. (AD75MD: Selected with parameters, QD75MD: 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 AD75MD -S3, change the program.

Deleted functions	Precautions for replacement				
Creep speed out of range error	With QD75MD, there is no the error code of the left column.				
(error code: 208)					
Fast machine OPR	With the Q75MD, there is no possible function for replacement.				
Special start (stop)	Execute it separately for the start two times.				
Indirect designation	In the QD75MD, the start block area on the buffer memory is expanded to five blocks (0 to 4). Each				
	tart block can be directly designated with positioning start No. (7000 to 7004).				
Block transfer	With the AD75MD, this interface is used to set positioning data Nos. 101 to 600 that do not exist on				
Positioning data I/F	the buffer memory. Since all positioning data can be set in the buffer memory with the QD75MD, this				
Fositioning data I/F	function is deleted.				
Start history during array	The contents are the same as the start history.				
Start history during errors	Therefore, the QD75M□ stores only the start history.				
System monitor data	These data were deleted because they can be displayed in system monitor "Module's detailed				
System monitor data	information" of GX Developer.				
(Module name, OS type, OS version)	(Refer to GX Developer Operating Manual.)				

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

In case of using the following functions with AD75MD, make sure that there is no operation problems when converted to QD75MD.

Changed functions		Change description							
	1. The software stroke limit chec	k of arc address is carried out only	when a sub point is designated.						
	It is not carried out when a cer	nter point is designated.							
	2. The software stroke limit chec	k during speed control is carried o	ut in the following cases:						
	When the software stroke limit i	s applied to the current feed value	with Pr.14 and the current feed						
	value is updated with Pr.21								
	When the software stroke limit is applied to the machine feed value								
	3. If an attempt is made to change the current value but the designated address is out of the								
Software stroke limit function	software stroke limit range, the attempt is considered as an error and the current value is not								
	changed.								
	4. Error code change								
	AD75MD:								
	•••	each upper and lower stroke limit	. (error code 509 to 512)						
	QD75MD:								
		upper limit are integrated in to erro	or code 507.						
	Errors for the lower limit are in	•							
Ourse studies also sizes Manada	Error codes 509 to 512 are de	<ol> <li>An error occurs when the designated new current value is out of the software stroke limit range.</li> </ol>							
Current value changing M code		<ol> <li>An error occurs when the designated new current value is out of the software stroke limit range.</li> <li>The M code setting value is valid during the positioning data current value changing instruction.</li> </ol>							
function	÷								
Acceleration/deceleration speed		Bms) can be used as the setting va	live for the acceleration/						
control	deceleration time.								
	<ol> <li>"Peripheral side (emergency) stop" is deleted from the stop causes of Stop group 2 "sudden stop selection".</li> </ol>								
		average of Chara arrays 2 llaveleters at	a coloritorilio chevrodito ha in						
Stan process and restart after stan	"Test mode fault" in the stop causes of Stop group 3 "sudden stop selection" is changed to be in the stop causes of Stop group 2 "sudden stop selection".								
Stop process and restart after stop	<ol> <li>"Stop (QD75 peripheral)" is added to the stop causes of Stop group 3 "sudden stop selection".</li> </ol>								
positioning operation stop	<ol> <li>Stop (QD75 peripheral) is added to the stop causes of Stop group 5 studien stop selection .</li> <li>Error code 100 (Peripheral device stop during operation) is deleted.</li> </ol>								
	<ol> <li>Error code rob (Penpheral device stop during operation) is deleted.</li> <li>"Programmable controller CPU error occurrence" is added to the stop causes of Stop group 2</li> </ol>								
	"Sudden stop selection".								
	Sudden stop selection .	AD75MD	QD75M□						
READY signal (X0)	OFF	Normal (READY)	Not READY/WDT error						
	ON	Not READY/WDT error	Normal (READY)						
		ulse generator is changed from 1g	· /						
Manual pulse generator operation	module.	alse generator is changed norming							
Axis operation status		pped" and "Step error occurring" is	s changed to "Error occurring"						
	• AD75MD:								
		reverse direction, the control is ir	ternally changed into the						
	continuous positioning control.								
Continuous path control	• QD75M□:	(							
·	Even if the reference axis operation	ates in reverse direction with interp	oolation, the control remains as						
	the continuous path control.								
		eration is the same as that of the	AD75MD.)						
		nly the near pass function is availa							
Near pass	Positioning address pass is not co								
2-axis interpolation									
<ul> <li>2-axis linear interpolation</li> </ul>									
2-axis fixed-feed	The interpolation target axis can b	be randomly set with a positioning	identifier.						
<ul> <li>Circular interpolation</li> </ul>									
	1. "Step stopped" is changed to "	Stopped" and "Step error occurring	g" is changed to "Error occurring"						
Stop function	in the axis operations status p	arameters.	-						
Step function	2. The restart command for step	start information (02H) is deleted.							
	E. The restart command for stop								

Changed functions	Change description								
	The command in-position width is	s expanded.							
Command in-position function	• AD75M□: 1 to 32767000								
	• QD75M□: 1 to 2147483647								
Positioning start No.	7004 to 7010 (block start designation) and 8000 to 8049 (indirect designation) are deleted.								
Dis els eterts dete	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".)								
Ctart history	The configuration of start information and start No. is changed so that the start No. can be directly								
Start history	checked.								
		AD75MD	QD75MD						
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						
č		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.

Inj	out (X)		Output (Y)					
Signal name	AD75M	QD75M□	Signal name	AD75MD	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			
Netword		X02, X03	Netword	Y00 to Y0F	Y02, Y03			
ot used	X10 to X1F	X18 to X1F	Not used	Y1E to Y1F	Y18 to Y1F			

* The ON/OFF statuses for READY are different between the QD75MD/ and AD75MD.

	Not READY/WDT error	READY
QD75M□	OFF	ON
AD75MD	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 AD75MD and QD75MD.

	Buffer memory address								
Item of AD75Mロ		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			
·····				3	153 154	303 304			
Pr.3 Movement amount per rotation (AL)	2	152	302	4 5	154	304 305			
Pr.4 Unit magnification (AM)	3	153	303	1	151	301			
Pr.7 Speed limit value	6	156	306	10	160	310			
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	311			
Pr.9 Deceleration time 0	10	160	310	14	164	314			
	11	161	311	15 6	165	315			
Pr.10 Bias speed at start	12 13	162 163	312 313	6 7	156 157	306 307			
	-			1					
Pr.12 Backlash compensation amount	15	165	315	17	167	317			
Pr.13 Software stroke limit upper limit	16	166	316	18	168	318			
value	17	167	317	19	169	319			
Pr.14 Software stroke limit lower limit	18	168	318	20	170	320			
value	19	169	319	21	171	321			
Pr.15 Software stroke limit selection	20	170	320	22	172	322			
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.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			
Dr 26 Accoloration time 1	36	186	336	36	186	336			
Pr.26 Acceleration time 1	37	187	337	37	187	337			
Pr.27 Acceleration time 2	38	188	338	38	188	338			
	39	189	339	39	189	339			
Pr.28 Acceleration time 3	40	190	340	40	190	340			
	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	192	342	42	192	342		
	43	193	343	43	193	343		
Pr.30 Deceleration time 2	44	194	344	44	194	344		
	45	195	345	45	195	345		
Pr.31 Deceleration time 3	46 47	196 197	346 347	46 47	196 197	346 347		
	47	197	348	47	197	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		
	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		
	60	210	360	60	210	360		
Pr.42 Allowable circular interpolation	61	210	361	61	210	361		
error width	•							
Pr.43 External start function selection								
(QD75MD: 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	372	73	223	373		
	74	224	374	74	224	374		
Pr.48 OPR speed	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		
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		
	84	234	384	84	234	384		
Pr.55 OP shift amount	85	235	385	85	235	385		
Pr.56 OPR torque limit value	86	236	386	86	236	386		

	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	91	241	391	-	-	-		
selection Pr.100 Servo series	100	250	400	30100	30200	30300		
	100	250	400	30101	30201	30301		
Pr.101 Amplifier setting								
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		
	132	283	433	30133	30233	30333		
Pr.133 Optional function 6 Pr.134 PI-PID control switch-over position	100	200		00100	00200	00000		
droop	134	284	434	30134	30234	30334		

	Buffer memory address									
Item of AD75Mロ		AD75M□			QD75M□					
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3				
Maker setting	-	-	-	30135	30235	30335				
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	149	299	449	-	-	-				
setting										
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	_	_	_	30155	30255	30355				
ratio										
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□		AD75MD	QD75MD					
		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) t	o (15)					
Md.7 Start axis								
(QD75MD: Md.3 Start information)		462 to 537	1212 to 1287					
Md.8 Operation type		162 to 529	1010 to 1000					
(QD75MD: Md.4 Start No.)	ory	463 to 538	1213 to 1288					
Md.9 Start Hour: minute	Start history	464 to 539	1214 to 1289					
(QD75MD: Md.5 Start Hour)	Star		1214 (0 1203					
Md.10 Start Second: 100 ms		465 to 540	1215 to 1290					
(QD75MD: Md.6 Start Minute: second)		403 10 340	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	Start history during errors	545 to 620	-					
Md.16 Start Second: 100 ms	listor	546 to 621	-					
Md.17 Error judgment	tart h	547 to 622	-					
Md.18 Start history pointer at error	S	623	-					
(Pointer number)		(0) t	o (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		1295 (0 1555					
Md.22 Axis error occurrence Second: 100 ms	Errc							
(QD75MD: Md.12 Axis error occurrence		627 to 687	1296 to 1356					
(Minutes: second))								
Md.23 Error history pointer		688	1357					

		Buffer memory address						
Item of AD75M□		AD75MD	QD75M□					
		Common for axis 1,2,3	Common for axis 1,2,3,4					
(Pointer number)		(0) to	p (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))	ing h	03110701	1300 10 1420					
Md.27 Axis warning occurrence Second: 100 ms	Warning							
(QD75MD: Md.17 Axis warning occurrence	_	692 to 752	1361 to 1421					
(Minutes: second))								
Md.28 Warning history pointer		753	1422					

	Buffer memory address							
ltem of AD75Mロ		AD75MD		QD75M□				
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3		
Md.29 Current feed value	800 801	900 901	1000 1001	800 801	900 901	1000 1001		
	802	901	1001	801	901	1001		
Md.30 Machine feed value	803	903	1003	803	903	1003		
Pr.31 Feedrate	804	904	1004	804	904	1004		
PI.31 Feedrale	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		
	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		
Md.41 Target value	819	919	1019	819	919	1019		
Md.42 Target speed	820 821	920 921	1020 1021	820 821	920 921	1020 1021		
	822	921	1021	021	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	829	929	1029	829	929	1029		
value								
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								
(QD75MD: 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		
	848	948	1048	848	948	1048		
Md.100 OPR re-travel value	849	949	1049	849	949	1049		
Md.101 Real current value	850	950	1050	850	950	1050		
	851	951	1051	851	951	1051		

	Buffer memory address									
Item of AD75M□		AD75M□			QD75M□	Axis 2         Axis 3           952         1052           953         1053           954         1054           955         1055           956         1056           957         1057           958         1059           960         1060           961         1061           962         1062           963         1063           964 - 969         1064 - 1069           970         1070           971         1071           972         1072           973         1073           974         1074           975         1075           976         1076           977         1077				
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3				
Md.102 Deviation counter value	852	952	1052	852	952	1052				
	853	953	1053	853						
Md.103 Motor rotation	854	954	1054	854						
	855	955	1055	855	955	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	-	1074				
Maker setting		-		875						
		I	1	876	976	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									
Item of AD75Mロ		AD75MD			QD75MD					
	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			-					
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	1207	1257	1515	1615	1715				
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	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										
(QD75MD: 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	1520	1020	1720			
	1184	1234	1284	1508	1608	1708			
Cd.33 New acceleration time value	1185	1235	1285	1509	1509 1609				
Cd 24 Now deceleration time value	1186	1236	1286	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				1907					
stop selection		-			1907				
Servo amplifier data read		-		1553	1653	1753			

								Buff	er mem	ory add	Iress					
		Item of AD75M□				AD7	5M□					QD7	5M□			
				Axis 1		Ax	is 2	Axi	is 3	Ax	is 1	Ax	is 2	Ax	is 3	
	Da Da	<ol> <li>Control system</li> <li>Acceleration time No.</li> </ol>		13	800	23	00	33	00	20	00	80	00	140	000	
	Da.			- 10	0.4		0.4		04							
	Da.			13	801	23	01	33	01	20	01	80	01	140	001	
*_		8 Dwell time/JUMP nation positioning data	No.1	13	802	2302		33	02	20	02	80	02	140	002	
date	Emp	ty		13	803	23	03	33	03	20	03	80	03	14(	003	
Positioning data ^{*1}	Da.	7 Command speed			804 805		04 05		04 05		04 05		04 05		)04 )05	
osit	Da.	5 Positioning address/			806		06		06		06		06		006	
	move	ement amount			807		07		07		07		07		007	
	Da.	6 Arc address			808 809		08 09		08 09		108 109		08 09	140	008 009	
	No.2			1310 t	o 1319	2310 t	o 2319	3310 t	o 3319	2010 t	o 2019	8010 t	o 8019	14010 to 14019		
		No.3			o 1329		o 2329		o 3329		o 2029		8020 to 8029		14020 to 14029	
		to		1	to	1	to	t	0	1	to	1	to		0	
	No.100			2290 t	o 2299	3290 t	o 3299	4290 t	o 4299	2990 t	o 2999	8990 t	o 8999	14990 to 14999		
		Da.10 Shape														
		Da.11 Start data No.	1st													
	Start block data ^{*2}	Da.12 Special start instruction	point	4300	4350	4550	4600	4800	4850	26000	26050	27000	27050	28000	28050	
	bloc	Da.13 Parameter														
	tart	2nd point		4301	4351	4551	4601	4801	4851	26001	26051	27001	27051	28001	28051	
	Ś	3rd point		4302	4352	4552	4602	4802	4852	26002	26052	27002	27052	28002	28052	
÷		to			to		to		0		to		to		0	
ation		50th point		4349	4399	4599	4649	4849	4899	26049	26099	27049	27099	28049	28099	
form		Da.14 Condition target		44	00	46	50	49	00	26	100	27	100	28	100	
art in		Da.15 Condition														
Positioning start information* ³		Da.16 Address	No.1		02 03		52 53		02 03		102 103		102 103		102 103	
Positio	data	Da.17 Parameter 1		44	04	46	54 55	49	04 05	26	104 105	27	106 107	28	106 107	
	Condition data	Da.18 Parameter 2		44	06 07	46	56 57	49	06 07	26	106 107	27	106 107	28	106 107	
	Cor	No.2	I		o 4419		o 4669		o 4919	261	10 to 119	271	10 to 119	281	10 to 119	
		No.3		4420 t	o 4429	4670 t	o 4679	4920 t	o 4929	261	20 to	271	20 to	2812	20 to 129	
1		to		1	to	1	to	t	0	26129 to		27129 to			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 QD75MD, the positioning data buffer memory addresses are Nos. 1 to 600.

*2 With the QD75MD, it is called "block start data".

*3 With the QD75MD, 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	nory address				
	Item of AD75M□			AD75M		QD75M□				
		Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3			
Positioning		Start No.8001	4500	4750	5000	-	-	-		
U	Indirect	Start No.8002	4501	4751	5001	-	-	-		
start information	designation	to	to	to	to	to	to	to		
mornation		Start No.8050	4549	4799	5049	-	-	-		
Drogrammal	ala controllar	Condition judgmont torget		5050		30000				
Programmal CPU memor		Condition judgment target data of the condition data		to		to				
CFU IIIeIII0I	y alea		5099			30049				
Target axis			5100 -							
Head positioning block No.		5101			-					
No. of read/write data items		5102			-					
Read/write request		5103			-					
Read/write b	olock			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

O : Compatible,  $\Delta$  : Partial change required

	ltem	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	
	oppentower infint signal	Input resistance: $4.7k\Omega \rightarrow 6.8k\Omega$	Δ	satisfied values	
	Stop signal	OFF current: 1.5mA→1.0mA		Check whether the OFF current value met	
	Stop signal	Input resistance: $4.7k\Omega \rightarrow 6.8k\Omega$	Δ	satisfied values	
		OFF current: 1.5mA→1.0mA		Check whether the OFF current value met	
lagut	Near-point dog signal	signal Input resistance: $4.7k\Omega \rightarrow 6.8k\Omega$		satisfied values	
Input		Response time: 4ms→1ms		sausned values	
		OFF current: 1.5mA→1.0mA		Check whether the OFF current value met	
	Speed-position switching signal	Input resistance: $4.7k\Omega \rightarrow 6.8k\Omega$	$\triangle$	satisfied values	
		Response time: 4ms→1ms		sausned values	
	Manual nulsa ganaratar	ON current: 3.5mA→1.0mA	0		
	Manual pulse generator	Input resistance: 1.5k $\rightarrow$ 1.2k $\Omega$	0		

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

#### (2) Comparison of connector signal sequence

*

When using with QD75MD, change the connector and wiring.

	AD7	′5M□	QD75M□		
Name	Logic	Logic switching by	Logic	Logic switching by	
	(Initial setting)	parameter	(Initial setting)	parameter	
Manual pulse generator A phase	Negative logic	Not allowed	Negative logic	Allowed	
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	Negative logic	Allowed	

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

	AD75MD	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 QD75MD, 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-J2D-B	Available	
MR-J2SD-B	Available	Needs to change the SSCNET cables (refer to (b) in the next page.)
WR-JZSLI-B	Available	Model to be discontinued at the end of September 2015

#### ⊠Point –

 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: QD77MSD + servo amplifier: MR-J3D-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-J2SD-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-J2HBUSDM-A		×		×
MR-HBUSDM		×	×	×
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-J2HBUSDM		×	×	×
MR-J2HBUSDM-A		0	×	×
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

<hr/>	Model			. Fattai Ch	ange required, ×: Incompatible
Item	Model	AD70	QD73A1	Compat- ibility	Precautions for replacement
Number of co	ontrol axes	1 axis	1 axis	0	
Positioning	Capacity	1 data	1 data	0	
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	
Desitioning	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 operatio	n	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)
				1	

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

O : Compatible,  $\bigtriangleup$  : Partial change required, ×: Incompatible

Model	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.
Applicable connector	Refer to Section 7.6.5	Refer to Section 7.6.5	0	The existing external wiring can be used without change.
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	

*1 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

				0.0		
	Function		Description	AD70	QD73A1	Precautions for replacement
		Positioning	Positioning is executed from the current position to a specified		0	Refer to Section
		control	position at a specified speed.	0	0	7.6.6.
	Position	Ture alegae	Positioning is executed to the address specified in			
	control mode	Two-phase trapezoidal	"Da.2 Positioning address P1" at "Da.3 Positioning speed V1",	0	0	
	mode	positioning control	then to the address specified in " $Da.4$ Positioning address P2" at	0	0	
Major		Control	"Da.5 Positioning speed V2" by one positioning start signal.			
positioning			Operation starts according to the positioning speed set beforehand			
control			by one start signal, then the operation switches to position control			
			by Speed-position switching command signal. If the operation			
	Speed-po	sition	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.
			position mode restart signal. In addition, the positioning address			
			(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 opera	tion			0 0		
			signal starts operation at a specified speed and speed control			
			operation is continued until Stop signal is input.			
			A workpiece is returned to an original point following an OPR start			
OPR contro	DI		command from a CPU module, and the current value is corrected	0	0	
			to an OP address after the completion of OPR.			
Multiplicatio	on settina		This function multiplies the feedback pulse frequency from the	0	0	
			pulse generator by 4, 2, 1, or 1/2.	0	Ŭ	
Electronic	near functio	n	This function controls moving distance and speed by multiplying	0	0	
	goal lanoit		command pulse output.	0	0	
			This function clears the accumulated pulses in the deviation			
			counter. When the servomotor power is turned off due to an			
Deviation of	counter clea	ar function	emergency stop during positioning, clearing the accumulated	0	0	
			pulses in the deviation counter prevents servomotor rotation at			
			power recovery.			
Speed abo	ngo functio	2	This function forces to change speed from a program during			Refer to Section
Speed change function		11	positioning control or JOG operation.	0	0	7.6.6.
Current value change function		function	This function changes the current feed value to a specified value	~	-	Refer to Section
		TUNCTION	from a sequence program on the condition other than while BUSY.	0	0	7.6.6.
			This function turns on In-position signal while the accumulated			
	<b>c</b>		pulse amount in the deviation counter is within the specified in-	_	_	
In-position	function		position range. In-position signal can be used as the signal right	0	0	
			before positioning completion.			
			This function adjusts analog voltage contained in accumulated			Refer to Section
Zero/gain a	adjustment		pulses.	0	0	7.6.6.

. . . . . . . . . . . . . . . . .

Remarks

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

. . . . . . . . . . . .

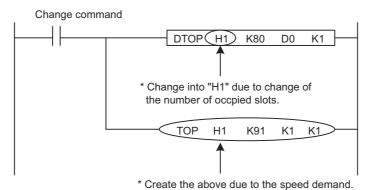
Though the functions of the AD70 and the QD73A1 are same, the setting methods and buffer memory addresses for the functions are partly changed.

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
Major 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.
	• 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> <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> </ol></li></ul>
LED	Refer to *2.

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



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

LED name	AD70	QD73A1	Remarks ^{*3}
RUN		RUN	
Minor error	ERR.1	ERR.	Lload for both minor arrors and major arrors
Major error	ERR.2		Used for both minor errors and major errors.
Encoder phase A	φA	φA	
Encoder phase B	φB	φB	
Encoder phase Z	φZ	φZ	
BUSY	BUSY	BUSY	
Zero adjustment status		ZERO	The contents indicated with "ZERO" of the QD73A1 differ from the ones
		ZERU	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
End counter value			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.
			Can be checked with an input signal "X12".
Zero-return request	ZERO		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	   QD73A1   				

### 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
		X0F			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 Y0F	to Y19
Forward start complete			-	-	Y1D
(for the incremental positioning and the		X22		Y1B	to
speed-position control switching)		, ALL	Use prohibited ^{*2}	Y1E, Y1F	Y1F
Reverse start complete (for the incremental positioning and the speed-position control switching)		X23			Y2E, Y2F
Synchronization flag		X24			•
Zero/gain adjustment data writing complete flag		X2A			
Zero/gain adjustment change complete flag		X2B	1		
Set value change complete flag		X2C	1		
Operating status of the speed-position control switch mode		X2D	1		
	X10	X25 to X29	]		
Use prohibited ^{*2}	to 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.

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.

*2

#### 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.

Item			Buffer memory address		
			AD70	QD73A1	
	Stroke limit upper limit		0	0	
Fixed parameter	Stroke innit upper inn	iit	1	1	
	Stroke limit lower lim	it	2	2	
			3	3	
		Numerator of command	4	4	
		pulse multiplication			
	Electronic gear	Denominator of			
		command pulse	5	5	
		multiplication			
	Speed limit value		20	20	
			21	21	
Variable parameter	Acceleration time		22	22	
	Deceleration time In-position range		23	23 24	
	Positioning mode		24	24 25	
	Positioning mode		40	40	
	OP address		40	40	
			42	41	
	OPR speed	OPR speed		43	
OPR data				44	
	Creep speed		44 45	45	
	Setting for the mover	nent amount after near-point	46	46	
	dog ON		47	47	
	Positioning pattern		60	301	
		2	61	302	
	Positioning address I	71	62	303	
	Positioning speed V ₁		63	304	
Positioning data			64	305	
	Positioning address I	D_	65	306	
		2	66	307	
	Positioning speed V ₂		67	308	
	5 5 5 5 5 F F F Z		68	309	
	New current value		80	80	
			81	81	
	New speed value		82 83	82	
Control change area				83	
	JOG speed (area)	JOG speed (area)		84	
	Deviation counter cle	or command	85	85	
	Analog output adjust		86 87	86 87	
			88	88	
	New speed-position	movement amount	89	89	
	Current value change	e request		90	
	Speed change reque	-		91	
				92	
	Analog output adjustment area 2			93	

140.00		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		06	
	restoration request		96	
	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}	
	Meuerrent erreunt effer noor neist des 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	
			115	
	(Record 0) Error code		120	
	(Record 0) Error occurrence (Year : Month)		121	
Error history	(Record 0) Error occurrence (Day : Hour)		122	
LITOL 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.

					atible, $\triangle$ : Partial change required	
It	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.	
		-	ternal wiring (pin type)			
	CONT.		anufactured by DDK Ltd.)	0		
External		Included	Not included		The existing external wiring can	
wiring	SERVO	-	kternal wiring (pin type) anufactured by DDK Ltd.)		be used without change.	
connectors	SERVU	Included	Not included	0		
	Applicable	Included	Not included		-	
	wire size	0.3m ² or less		0		
	Servo					
	READY	0	0	0		
	Stop signal	0	0	0		
	Near-point	0	0	0		
	dog signal	<u> </u>	<u> </u>	Ŭ		
External	Upper limit signal	0	0	0		
input signal	Lower limit					
	signal	0	0	0		
	Speed- position switching command	0	0	0		
		(Pulse frequency)	(Pulse frequency)			
Positioning feedback pulse input		Open collector: 100kpulse/s or less TTL: 100kpulse/s or less Differential: 100kpulse/s or less	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)	hand (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	Addresses are partly changed.     New items are added due to the specification change.		*3
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	ween the AD70 and the QD73A1.	*5
External wiring	The existing connectors can be used.     *6		*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.

1) 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)	Rotation direction	Wiring between the AD70 a	nd encoder	Wiring when the AD70 is re	placed to the QD73A1
1	OFF	Same direction	Phase Phase B AD70	Phase A Phase B B Encoder	Phase A Phase B QD73A1	Phase A- Phase B Encoder
2		Reverse direction	A A Phase B AD70	Phase A 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	nent Q series	Evicting A	Existing A series positioning m	
ABSOCODER sensor	Positioning module	Position detection module	Existing A series positioning r		ing mouule
	VS-Q62	VS-Q62B	A62LS	A62LS-S5	A1S62LS
MRE-32SP062SAC			0	0	0
MRE-G SP062FAC	VS-Q62-M2PG	VS-Q62B-M2PG	0	0	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			0	0	-
VLS-2048PY	1		0	0	-

VS-Q62: Positioning type with scaling, positioning, and switch output functions VS-Q62B: Converter type with position detection function

	Replaceme	Existing A series positioning module		
ABSOCODER sensor	Positioning module Position detection module		Existing A series positioning module	
	VS-Q262	VS-Q262B	A63LS	
MRE-32SP062SAC			0	
MRE-G□SP062FAC (□: 64/128/160/256/320)	VS-Q262-M2PG	VS-Q262B-M2PG	0	

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

## **APPENDICES**

## Appendix 1 External Dimensions

For external dimensions of modules shown in this handbook, refer to the user's manual for each module.

## Appendix 2 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
Device events module	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 3 Related Manuals

## **Appendix 3.1 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	Model Code
1	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L-08043ENG	
	Handbook (Fundamentals)	L-00043LING	_
2	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L-08046ENG	
2	Handbook (Intelligent Function Modules)	L-00040LING	_
3	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L-08048ENG	
5	Handbook (Network Modules)	E-00040ENG	_
4	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L-08050ENG	
-	Handbook (Communications)	L-00030EING	_
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	-
1	Transition from MELSEC-I/OLINK to AnyWire DB A20 Handbook	L08263ENG	_
8	Transition of CPUs in MELSEC Redundant System Handbook	L-08117ENG	
0	(Transition from Q4ARCPU to QnPRHCPU)	E-00117 ENG	

## (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

No.	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	
	model QCPU	FA-A-0000	-

## Appendix 3.2 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	10-00275	
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	311-3008	
18	Positioning Module Type A1SD75M1/M2/M3	ID 66715	13JH85
18	AD75M1/M2/M3 User's Manual	IB-66715	
19	GX Configurator-AP Version 1 Operating Manual	IB-80031	13JN44

## Appendix 3.3 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
	Signal Conditioning Function) User's Manual	51-000277	
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	311-000141	
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 3.4 Programming tool

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

## Appendix 4 How to Change Resolution After Analog I/O Module is Replaced

This section describes how to change the resolution of an analog I/O module after the module is replaced from A series to Q series.

### (1) Resolution of A series and Q series analog I/O modules

Each A series analog I/O module have different resolutions. Please check the resolution of the module in this handbook or user's manual.

If the resolution differs between A series and Q series modules, it needs to be matched by a user (by creating a sequence program or changing user range settings).

 $\mathsf{O}$  : Measure required by user,  $\bigtriangleup$  : Measure not required by user

Resolution of Q series analog I/O				dule
<b>Resolution of A series</b>	Normal resolution	High resolution mode		lleor rango
analog I/O module	mode	Current	Voltage	User range (Voltage: 1/12000)
	1/4000	1/12000	1/16000	(voltage. 1/12000)
1/4000	0	-	-	-
1/8000	∆ ^{*1}	^{*1}	∆ ^{*1}	-
1/12000	-	0	-	ے * <b>2</b>

*1 Change the resolution in a sequence program. (Refer to Appendix 4 (2).)

*2 Set a user range in high resolution mode.

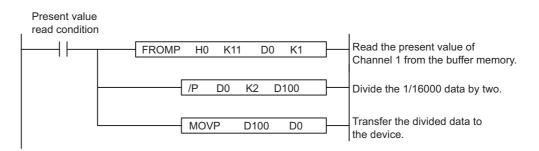
#### (2) Example of sequence program to change a resolution

(Condition)

- (a) Resolution of an A series analog I/O module: 1/8000
- (b) Device that stores a present value read from the analog I/O module: D0

#### (c) Device that is used for resolution change operation: D100, D101

* Two-/four-word data is used in the four arithmetic operations instruction. Use unused device areas so that existing device data are not affected by this operation.



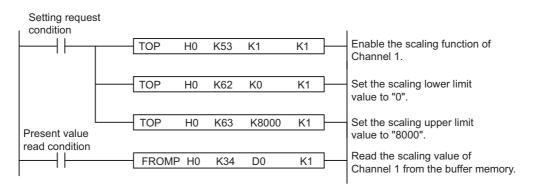
## (3) Using the scaling function (for example in the Q68AD-G) to change a resolution

If the module after replacement (for example, the Q68AD-G) supports the scaling function^{*1}, a resolution can be changed using this function. (Condition)

(a) Resolution of an A series analog I/O module: 1/8000 (Only one channel is used.)

(b) Q series analog I/O module: Q68AD-G

(Example of sequence program to set the function and read the scaling value)



#### (Buffer memory areas of the Q68AD-G)

Address		Description	Default	Read/Write
Hexadecimal	Decimal	Description		iteau/wille
35 _H	53	Scaling enable/disable setting	00FF _H	R/W
36 _H	54	CH1 Scaling value	0	
37 _H	55	CH2 Scaling value	0	
38 _H	56	CH3 Scaling value	0	
39 _H	57	CH4 Scaling value	0	R
3A _H	58	CH5 Scaling value	0	
3B _H	59	CH6 Scaling value	0	
3C _H	60	CH7 Scaling value	0	
3D _H	61	CH8 Scaling value	0	
3E _H	62	CH1 Scaling lower limit value	0	
3F _H	63	CH1 Scaling upper limit value	0	R/W
40 _H	64	CH2 Scaling lower limit value	0	EV/ V V
41 _H	65	CH2 Scaling upper limit value	0	

*1 For details of the scaling function, refer to the user's manual for the module used.

## WARRANTY

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

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

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

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

#### [Gratis Warranty Term]

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

[Gratis Warranty Range]

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

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

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

#### 3. Overseas service

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

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

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

#### 5. Changes in product specifications

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

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