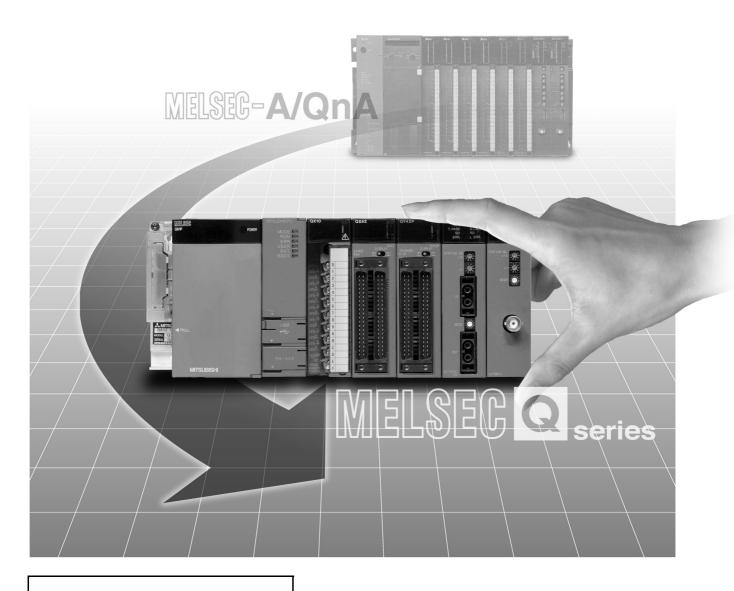


Programmable Controller

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

(Intelligent Function Modules)



Feb. 2020 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: "NARNING" and "NCAUTION".

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

<u>_____</u>CAUTION

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

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

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

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

[Design Precautions]

MARNING

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

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

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

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

(3) Outputs may remain on or off due to a failure of an output module relay or transistor. Configure an external circuit for monitoring output signals that could cause a serious accident.

[Design Precautions]

WARNING

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

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

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

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

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

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

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

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

CAUTION

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

Keep a distance of 100mm or more between them.

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

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

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

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

[Installation Precautions]

!CAUTION

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

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

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

Tighten the screws within the specified torque range.

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

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

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

Check the connection for looseness.

Poor contact may cause incorrect input or output.

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

Poor contact may cause malfunction.

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

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

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

Do not directly touch any conductive part of the module.

Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

WARNING

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

CAUTION

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

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

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

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

- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered.
 - Incomplete connections may cause short circuit, fire, or malfunction.
- Tighten the terminal screws within the specified torque range.
 - Undertightening can cause short circuit, fire, or malfunction.
 - Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Prevent foreign matter such as dust or wire chips from entering the module.
 Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring.
 - Do not remove the film during wiring.
 - Remove it for heat dissipation before system operation.
- Mitsubishi programmable controllers must be installed in control panels.
 - Connect the main power supply to the power supply module in the control panel through a relay terminal block.
 - Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock.
 - For wiring methods, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

[Startup and Maintenance Precautions]

/ WARNING

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

Failure to do so may result in electric shock.

Undertightening the terminal screws can cause short circuit or malfunction.

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

CAUTION

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

[Disposal Precautions]

!CAUTION

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

[Transportation Precautions]

<u>^</u>CAUTION

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

CONDITIONS OF USE FOR THE PRODUCT

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

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

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

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

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

REVISIONS

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Apr. 2005	L(NA)08046ENG-A	First edition
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	, ,	Section 2.1, Section 3.1, Section 4.1, Section 5.1, Section 6.1, Section 7.1,
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,	_() = 0	Appendix 4
		Change
		Chapter 9 to Appendix 1, Appendix1 to Appendix 2, Appendix2 to Appendix 3
		Partial correction
		Section3.1, Section7.1, Section7.6.1, Section7.6.2
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Dec. 2018	L(NA)08046ENG-J	
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		7.4.2, 7.4.3, 7.5.1, 7.5.2, 7.5.3, Appendix 3.1, 3.4
Feb. 2020	L(NA)08046ENG-L	Partial correction
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Japanese Handbook Version L08045-N

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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.

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this handbook uses the following generic terms and abbreviations.

Generic term/abbreviation	n Description
■Series	
A series	An abbreviation for large types of Mitsubishi Electric MELSEC-A series programmable
Aselies	controllers
And assiss	An abbreviation for compact types of Mitsubishi Electric MELSEC-A series programmable
AnS series	controllers
A/AnS series	Generic term for A series and AnS series
0 4	An abbreviation for large types of Mitsubishi Electric MELSEC-QnA series programmable
QnA series	controllers
	An abbreviation for compact types of Mitsubishi Electric MELSEC-QnA series programmable
QnAS series	controllers
QnA/QnAS series	Generic term for QnA series and QnAS series
A/AnS/QnA/QnAS series	Generic term for A series, AnS series, QnA series, and QnAS series
Q series	An abbreviation for Mitsubishi Electric MELSEC-Q series programmable controllers
■CPU module type	
CPU module	Generic term for A series, AnS series, QnA series, QnAS series, and Q series CPU modules
Process CPU	Generic term for the Q02PHCPU, Q06PHCPU, Q12PHCPU, and Q25PHCPU
Redundant CPU	Generic term for the Q12PRHCPU and Q25PRHCPU
	Generic term for the Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU,
	Q03UDVCPU, Q03UDECPU, Q04UDHCPU, Q04UDVCPU, Q04UDEHCPU, Q06UDHCPU,
Universal model QCPU	Q06UDVCPU, Q06UDEHCPU, Q10UDHCPU, Q10UDEHCPU, Q13UDHCPU, Q13UDVCPU,
	Q13UDEHCPU, Q20UDHCPU, Q20UDEHCPU, Q26UDHCPU, Q26UDVCPU, and
	Q26UDEHCPU
■CPU module model	
ACPU	Generic term for MELSEC-A series programmable controller CPUs
AnSCPU	Generic term for MELSEC-AnS series programmable controller CPUs
	Generic term for the A1NCPU, A1NCPUP21/R21, A1NCPUP21-S3, A2NCPU, A2NCPU-S1,
AnNCPU	A2NCPUP21/R21, A2NCPUP21/R21-S1, A2NCPUP21-S3(S4), A3NCPU, A3NCPUP21/R21,
	and A3NCPUP21-S3
	Generic term for the A2ACPU, A2ACPU-S1, A3ACPU, A2ACPUP21/R21, A2ACPUP21/R21-
AnACPU	S1, and A3ACPUP21/R21
	Generic term for the A2UCPU, A2UCPU-S1, A3UCPU, A4UCPU, A2USCPU, A2USCPU-S1,
AnUCPU	and A2USHCPU-S1
AnUS(H)CPU	Generic term for the A2USCPU, A2USCPU-S1, A2USHCPU-S1
A/AnSCPU	Generic term for MELSEC-A series and MELSEC-AnS series programmable controller CPUs
AnN/AnACPU	Generic term for the AnNCPU and AnACPU
AnN/AnA/AnSCPU	Generic term for the AnNCPU, AnACPU, and AnSCPU
QnACPU	Generic term for MELSEC-QnA series programmable controller CPUs
	· -
QnASCPU	Generic term for MELSEC-QnAS series programmable controller CPUs
	Generic term for MELSEC-QnAS series programmable controller CPUs Generic term for MELSEC-QnA series and MELSEC-QnAS series programmable controller
QnASCPU QnA/QnASCPU	·
QnA/QnASCPU	Generic term for MELSEC-QnA series and MELSEC-QnAS series programmable controller
	Generic term for MELSEC-QnA series and MELSEC-QnAS series programmable controller CPUs

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

With the Q series intelligent function module, you can easily set, monitor, and test the intelligent function module using GX Works2 without changing the parameter settings, auto refresh, I/O signals, and buffer memory.

- Parameter 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.

Please note that equivalent functions are available using a separately sold utility package (GX Configurator-□) in GX Developer.

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.

INTRODUCTION Memo

ANALOG INPUT MODULE REPLACEMENT

2.1 List of Analog Input Module Alternative Models for Replacement

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

Production disco	ontinuation		Transition to Q series
Product	Model	Model	Remarks (Restrictions)
		Q68ADV Q68ADI	Cable size is changed. Number of slots : Not changed Nord changed: 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:

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	
		Q68ADV		
	A68AD	Q68ADI	ERNT-AQT68AD	
Amala a import mandula	4004B 00	Q68ADV		
Analog input module	A68AD-S2	Q68ADI	1	
	A68ADN	Q68ADV	ERNT-AQT68ADN	
	AUGADIN	Q68ADI		

(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)	ENNI-AQ1010AD	

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

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

2.2 A616AD

2.2.1 Performance comparison

It	em				A616AD				
	Voltage		-10 to		Input resistance v	/alue: 1MΩ)			
Analog input	Current	-20 to 0 to +20mADC (Input resistance value: 250Ω)							
Digital output				(-48 to 40	inary (Data part: 47, -2048 to 2047 bled for each cha	')			
I/O characteristics			Input Voltage (V)	Analog input range 0 to +10 0 to +5 +1 to +5 -10 to +10	Maximum resolution 2.5mV (1/4000) 1.25mV (1/4000) 1.0mV (1/4000) 5.0mV (1/4000)	Digital output value 0 to 4000 -2000 to 2000			
maximum reso			Current (mA)	-5 to +5 0 to +20 0 to +20 +4 to +20 -20 to +20 -20 to +20	2.5mV (1/4000) 10μA (1/2000) 5μA (1/4000) 4μA (1/4000) 20μA (1/2000) 10μA (1/4000)	0 to 2000 -2000 to 0 0 to 4000 -2000 to 2000 1000 to 3000 -1000 to 1000 0 to 4000 -2000 to 2000			
Overall accura	су	When using A616AD -5V to 5V, -20 to 20m 0 to 5V, 1 to 5V 0 to 20mA, 4 to 20m/	А	}	Range: ±0.3% (Digital value ±12 Range: ±0.6% (Digital value ±24				
		When using combina is ±0.3% (Digital outp							

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

		Q68AD\	/			Q68ADI			Compatibility	Precautions for replacement
		-10 to 10V	DC		_					
	(Input ı	resistance v	alue: 1MΩ)						Δ	The voltage/current cannot be
		_			0	to 20mAD0	С			mixed for one module.
				(Input resi	stance valu	ıe: 25	50Ω)			
16-bit signed binary (Normal resolution mode: -4096 to 4095, High resolution mode: -12288 to 12287, -16384 to 16383)							Δ	A616AD can set the data format to [-2048 to 2047]. However, Q68ADV/I cannot set. When using the conversion data of Q68ADV/I in [-2048 to 2047], convert with sequence program.		
	Analog	input		olution mode		High resoluti				
	rang	=	Digital	Maximu		igital		aximum		
		0 to 10\/	output value	resolutio		ut value		solution		When using A616AD in [-5 to +
	-	0 to 10V 0 to 5V	0 to 4000	2.5mV 1.25m\		16000		625mV 416mV		5V] range, Q68ADV can obtain
	-	1 to 5V	0 10 4000	1.25IIIV	0 to	12000		333mV		equivalent resolution or more
Volta	ige –	-10 to 10V		2.5mV) to 16000		625mV		than A616AD by setting in [-10
	-	User range	-4000 to 4000	2.01117					Δ	to 10V] range/high resolution
	settings			0.375m	V -12000	-12000 to 12000		333mV		mode or user range.
		0 to 20mA	0.4.4000	5µA		0.4.40000		.66µA		When using A616AD in [-20 to
Curr		4 to 20mA	0 to 4000	4µA	0 to	12000	1.	.33µA		+20mA] range, use Q68ADI in
Cuit	CIIL	User range	-4000 to 4000	1.37µA	-1200) to 12000	1.3	.33µA		user range.
		settings								
		No	rmal resolution m	ode	Hi	gh resolution	mode	е		
		Ambien	t temperature		Ambient temperature					
Analo	g input	0	to 55°C	Ambient	0 t	0 to 55°C		Ambient		
	ige	With	Without	temperature	With	Withou	ΙTE	emperature		
	_	temperatur		25±5°C	temperature		ure	25±5°C		
		drift	drift on compensation		drift	drift on compensa	ation			
lt	0 to 10\	+ -	on compensation		-					
	-10 to	†			±0.3%	±0.4%		±0.1%		A616AD is the accuracy in
	10V				(±48 digits)	(±64 digit	is) ((±16 digits)		respect to the full scale, and
Voltage	0 to 5V	1							0	Q68ADV/I is the accuracy in
Voltage	1 to 5V									respect to maximum digital
	User									output value.
	range	±0.3%	±0.4%	±0.1%						·
	settings	(±12 digits) (±16 digits)	(±4 digits)	10.20/	±0.4%		±0.1%		
	0 to 20mA				±0.3% (±36 digits)			±0.1% (±12 digits)		
	4 to	1			(_co digito)	(= 10 digit	, [(signo)		
Current										
	User	1								
	range									
	settings	3								
									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					
Absolute maximum input	Current: ±30mA					
Analog input points	16 channels/module					
Analog Input politis	16 channels/module					
Maximum number of writes for						
E ² PROM	•					
	Between the input terminal and programmable controller: photocoupler isolation					
Isolation method	Between channels: non-isolated (1M Ω resistor isolation)					
Dielectric withstand voltage	-					
I I. R						
Insulation resistance	-					
Occupied I/O points	32 points					
Occupied I/O points	(I/O assignment: special 32 points)					
Connected terminal	38-point terminal block					
A I' It I	0.75 to 2mm ²					
Applicable wire size	(Applicable tightening torque: 39 to 59N•cm)					
Applicable solderless	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
terminal	2, 25, ,					
Internal current consumption	1A					
(5VDC)						
Weight	0.85kg					

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

 O. Compatible, A. Partial Change required, A						
Q68ADV	Q68ADI	Compatibility	Precautions for replacement			
80μs/channel (When there is temperature adding 160μs will be used regardles		0	The conversion speed of Q68ADV/I to A616AD has become quick. And then, on Q68ADV/I, the noise that did not import on A616AD can be imported as analog signal. In this case, use the averaging processing function to remove the effect of noise			
±15V	±30mA	0				
8 channel	8 channels/module					
Max. 100,	0					
Between the I/O terminal and progr photocoupl Between channe	er isolation	0				
Between the I/O terminal and progr		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.	×	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	Δ				

2.2.2 Function comparison

O: With functions, -: Without functions

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

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

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

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

	A616AD			Q68ADV/I				
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name	
No.	_	No.	Signal name	No.	Signal name	No.	Signal hame	
X0	Watchdog timer error	Y0		X0	Module READY	Y0		
X1	A/D conversion READY	Y1		X1	Temperature drift	Y1		
					compensation flag			
X2	Error flag	Y2		X2		Y2		
X3 X4		Y3 Y4		X3 X4		Y3 Y4	Not used	
X5		Y5		X5	Not used	Y5	Not used	
X6		Y6		X6		Y6		
X7		Y7		X7		Y7		
X8		Y8	Not used	X8	High resolution mode status flag	Y8		
X9		Y9		Х9	Operating condition setting completed flag	Y9	Operating condition setting request	
XA	YA	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		completed flag  A/D conversion		request	
XE		YE	A616AD is used in remote I/O station	XE	completed flag	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10		Y10						
X11		Y11						
X12 X13		Y12 Y13						
X13		Y14	Not used					
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18	Direct access request signal					
X19		Y19						
X1A		Y1A						
X1B		Y1B						
X1C		Y1C	Not used					
X1D	RFRP, RTOP instruction	Y1D						
X1E	for interlock signal when	Y1E						
X1F	A616AD is used in remote I/O station	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	E an dine of	INPUT designation	DAM	0	A/D conversion enable/disable	
1	For direct	MX. CH. designation	R/W	1	CH1 Time/count averaging setting	1
2	access	Digital output value	R	2	CH2 Time/count averaging setting	1
3	Sampling period designation			3	CH3 Time/count averaging setting	1
4	Data format selection		D 44/	4	CH4 Time/count averaging setting	D.0.4.
5	Error code storage		R/W	5	CH5 Time/count averaging setting	R/W
6	Faulty multiplexer 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	System area (N	lot used)		10	A/D conversion completed flag	
11	System area (N	ioi useu)	-	11	CH1 Digital output value	1
12			12	CH2 Digital output value	1	
13			13	CH3 Digital output value	1	
14				14	CH4 Digital output value	1
15		A616AD		15	CH5 Digital output value	R
16		INPUT 0 A60MX, A60MXR		16	CH6 Digital output value	
17		INPUT 1 A60MX, A60MXR		17	CH7 Digital output value	
18	Conversion	INPUT 2 A60MX, A60MXR		18	CH8 Digital output value	
19	enable/disable	le/disable INPUT 3 A60MX, A60MXR		19	Error code	
20	designation	INPUT 4 A60MX, A60MXR	R/W	20	Setting range (CH1 to CH4)	
21		INPUT 5 A60MX, A60MXR	-	21	Setting range (CH5 to CH8)	
22		INPUT 6 A60MX, A60MXR		22	Offset/gain setting mode Offset specification	R/W
23		INPUT 7 A60MX, A60MXR		23	Offset/gain setting mode Gain specification	1,777
24	Set data setting	request		24		
25				25		
26				26	System area (Not used)	_
27				27		
28				28		
29	_			29		
30	_			30	CH1 Maximum value	1
31				31	CH1 Minimum value	-
32				32	CH2 Maximum value	-
33	-			33	CH2 Maximum value	-
34	Cyatam (A	let weed)		34	CH3 Maximum value	-
35	System area (N	ioi useu)	-	35	CH4 Maximum value	-
36	-			36	CH4 Minimum value	-
37	-			37	CH4 Minimum value CH5 Maximum value	R
38	-			38		
39	-			39	CH5 Maximum value	-
40	-			40 41	CH6 Minimum value	-
41	-			41	CH7 Maximum value	-
42	-			42	CH7 Maximum value CH7 Minimum value	-
43	-			43	CH7 Minimum value CH8 Maximum value	-
44	-			45	CH8 Minimum value	-
45			j	45	Ci io iviiriii iurii value	

	A616AD			Q68ADV/I	
Address			Address		
(Dec.)	Name	Read/write	(Dec.)	Name	Read/write
46			46		
47	System area (Not used)	-	47		
48			48		
to	I INPUT channel digital output value	R	to		
63	in or charmer digital output value	'`	63	System area (Not used)	-
64			64		
to			to		
157			157		
158			158		<del> </del>
159			159	Mode switching setting	R/W
160			160		
to			to	System area (Not used)	
201			201	System area (Not used)	-
202			202	CH1 Industrial shipment settings offset value	
202			202	CH1 Industrial shipment settings gain value	-
203			203	CH2 Industrial shipment settings gain value	-
			204		_
205			206	CH2 Industrial shipment settings gain value	4
206			206	CH3 Industrial shipment settings offset value	_
207			207	CH3 Industrial shipment settings gain value	_
208			208	CH4 Industrial shipment settings offset value	_
209				CH4 Industrial shipment settings gain value	1
210			210 211	CH5 Industrial shipment settings offset value	
212			211	CHS Industrial shipment settings gain value	_
213			212	CH6 Industrial shipment settings offset value	_
213			213	CH6 Industrial shipment settings gain value	_
	Cyatam area (Nat yeard)		214	CH7 Industrial shipment settings offset value	_
215	System area (Not used)	-		CH7 Industrial shipment settings gain value	1
216			216 217	CH8 Industrial shipment settings offset value	
			217	CH8 Industrial shipment settings gain value	R/W
218			219	CH1 User range settings offset value	4
220			219	CH1 User range settings gain value	4
				CH2 User range settings offset value	4
221			221	CH2 User range settings gain value CH3 User range settings offset value	4
222			222		4
223			223	CH3 User range settings gain value	4
				CH4 User range settings offset value	4
225			225 226	CH4 User range settings gain value CH5 User range settings offset value	-
227			227		-
			228	CH5 User range settings gain value CH6 User range settings offset value	-
228			228		1
229			230	CH6 User range settings gain value CH7 User range settings offset value	1
230			230	CH7 User range settings offset value CH7 User range settings gain value	-
231			231	CH7 User range settings gain value CH8 User range settings offset value	-
					-
233			233	CH8 User range settings gain value	
234					
to					
255					
256	MV CII shannal digital autaut valua	_			
to	MX. CH. channel digital output value	R			
383			Ī		

# 2.3 A68AD (Upgrade to Q68ADV, Q68ADI)

## 2.3.1 Performance comparison

I	tem	A68AD						
	Voltage	-10 to 0 to +10VDC						
Analog input		(Input resistance value: Hardware version K or later: $1M\Omega$ , Hardware version J or earlier: $30k\Omega$ ) +4 to +20mADC (Input resistance value: $250\Omega$ )						
	Current	*Usable current input: -20 to 0 to +20mA						
		Coubic dufferit input. 20 to 1 to 120m/t						
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						
N 4	1.40	Voltage: 5mV (1/2000)						
Maximum reso	olution	Current: 20µA (1/1000)						
		Odnone. 20 <b>4</b> 77 (171000)						
		±1% (±20)						
Overall accura	acy (Accuracy in							
respect to max	ximum digital							
output value)								
Mandana		Mary O. Street Advanced						
Maximum con	version speed	Max. 2.5ms/channel						
Ala a ciliuti		Voltage: ±15V						
Absolute maxi	mum input	current: ±30mA						

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

		Q68AD	)V			Q68ADI	0.		tial change required, ×: Incompatible  Precautions for replacement
	-10 to 10VDC								
	(Input resistance value: $1M\Omega$ )			-				The voltage/current cannot be	
					0 to	0 to 20mADC			mixed for one module.
	-				(Input resis	tance val	ue: 250Ω)		
	(Normal resolution r			t signed bin	ary				
								0	
		High res	solution mode: -1	12288 to 12	287, -16384	to 16383)			
	Analog	g input	Normal resolution mo					As concept of gain value is	
	ran	nge	Digital output value	Maximur resolutio	esolution output		Maximum resolution		changed, refer to [Analog-
		0 to 10V	output value	2.5mV		16000	0.625mV	Δ	Digital Converter Module
		0 to 5V	0 to 4000		1.25mV		0.416mV		User's Manual] and then,
	Voltage	1 to 5V		1.0mV	0 10	12000 -	0.333mV		confirm the I/O characteristics.
	Vollago	-10 to 10V		2.5mV	-160001	to 16000	0.625mV		
		User range	-4000 to 4000	0.375m\	/ -12000 t	to 12000	0.333mV		
		settings 0 to 20mA		5µA			1.66µA		
		4 to 20mA	0 to 4000	3μA 4μA	0 to 1	12000	1.33µA	0	
	Current	User range	4000 t- 4000		40000	12000	·		
		settings	-4000 to 4000	1.37µA	-120001	to 12000	1.33µA		
		l N	ormal resolution m	ado	Llia	h rosolutio	n mode		
		-	temperature 0 to	lode	Ambient ten	h resolutio			
	Analas innu		55°C		55°C				
	Analog inpu range	With	Without	<ul> <li>Ambient temperature</li> </ul>	With	With Withou	Ambient temperature		
	19-	temperatu		25±5°C	temperature temperature		ture 25±5°C		
		drift	drift tion compensation		drift compensation	drift	ation		
	0 to 1		a on componedae.						
	-101	to			±0.3% (±48 digits)	±0.4% (±64 dig			
	10\	/			(140 digits)	(±04 dig	its) (±10 digits)		
	Voltage 0 to 5							0	
	1 to 8								
	rang	10							
	settin	±0.3%		±0.1% (±4 digits)					
	0 to	) (±12 digit	(±10 digits)	(14 digits)	±0.3%	±0.4%			
	20m				(±36 digits)	(±48 digits)	its) (±12 digits)		
	4 to								
	user								
	rang								
	settin	igs							
								1	The conversion speed of
									Q68ADV/I to A68AD has
									become quick. And then, on
			80	)µs/channel					A68AD, the noise that did not
	(When there	is temperatu				d by addi	ng 160 µs will be	. 0	import on Q68ADV/I can be
		used	d regardless of t	he number	of channels ι	used.)			imported as analog signal. In
									this case, use the averaging
									processing function to remove
									the effect of noise.
	±15V ±30mA					0			
	±30mA								

Item	A68AD				
Analog input points	8 channels/module				
Maximum number of writes for					
E ² PROM	-				
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation Between channels: non-isolated				
Dielectric withstand voltage	-				
Insulation resistance	-				
Occupied I/O points	32 points				
Оссиріси і/О роппіз	(I/O assignment: special 32 points)				
Connected terminal	38-point terminal block				
Applicable wine size	0.75 to 2mm ²				
Applicable wire size	(Applicable tightening torque: 39 to 59N•cm)				
Applicable solderless	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A				
terminal	v 1.20-3, v 1.20-133A, v2-33, v2-133A				
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				
vveignt	Hardware version J or earlier: 0.6kg				

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

Q68ADV	Q68ADI	Compatibility	Precautions for replacement	
8 channe	ls/module	0		
Max. 100,	000 times	0		
, ,	rammable controller power supply:	0		
photocoupl Between channe	er isolation els: non-isolated			
, •	rammable controller power supply: or 1 minute	0		
	rammable controller power supply: MΩ 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	.75mm ²	×	Wiring change is required.	
R1.25-3 (A solderless termina	with sleeve can not be used.)	×		
0.64A	0.64A	Δ	The recalculation of internal current consumption [5VDC] is required.	
0.19kg	0.19kg	Δ		

## 2.3.2 Function comparison

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

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

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

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

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

	A68AD				Q68ADV/I			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error	Y0		X0	Module READY	Y0		
X1	A/D conversion READY	Y1		X1	Temperature drift compensation flag	Y1		
X2		Y2		X2		Y2		
X3		Y3		Х3		Y3		
X4		Y4		X4	Not used	Y4	Not used	
X5		Y5		X5		Y5		
X6		Y6		X6		Y6		
X7 X8		Y7 Y8		X7 X8	High resolution mode	Y7 Y8		
X9		Y9		X9	Status flag Operating condition	Y9	Operating condition	
XA		YA		XA	setting completed flag Offset/gain setting mode	YA	Setting request  User range write request	
XB		YB		XB	flag Channel change completed flag	YB	Channel change request	
XC		YC		XC	Not used	YC	Not used	
7.0				7.0	Maximum value/		Maximum value/	
XD		YD		XD	minimum value reset	YD	minimum value reset	
			Not used		completed flag		request	
XE	Not used	YE		XE	A/D conversion completed flag	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10		Y10						
X11		Y11						
X12		Y12						
X13		Y13 Y14						
X14 X15		Y14 Y15						
X16		Y16						
X17		Y17						
X18		Y18						
X19		Y19						
X1A		Y1A						
X1B		Y1B						
X1C		Y1C						
X1D		Y1D						
X1E		Y1E						
X1F		Y1F						

## 2.3.4 Buffer memory address comparison

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

	A68AD			Q68ADV/I		
Address	Name	Read/write	Address	Name	Read/write	
(Dec.)	Name	Reau/write	(Dec.)	Name	Neau/Wille	
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	R/W	4	CH4 Time/count averaging setting	R/W	
5	CH4 Averaging time, count	IX/VV	5	CH5 Time/count averaging setting	TC/VV	
6	CH5 Averaging time, count		6	CH6 Time/count averaging setting		
7	CH6 Averaging time, count		7	CH7 Time/count averaging setting		
8	CH7 Averaging time, count		8	CH8 Time/count averaging setting		
9	CH8 Averaging time, count		9	Averaging processing specification	1	
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		
14	CH5 Digital output value	R	14	CH4 Digital output value		
15	CH6 Digital output value		15	CH5 Digital output value	1 _	
16	CH7 Digital output value		16	CH6 Digital output value	R	
17	CH8 Digital output value		17	CH7 Digital output value		
18			18	CH8 Digital output value		
19			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	D.044	
23			23	Offset/gain setting mode Gain specification	R/W	
24			24			
25	1		25			
26	System area (Not used)	-	26			
27			27	System area (Not used)	-	
28			28			
29			29			
30			30	CH1 Maximum value		
31			31	CH1 Minimum value		
32			32	CH2 Maximum value		
33			33	CH2 Minimum value		
34	Write data error code	R/W	34	CH3 Maximum value	1	
	•		35	CH3 Minimum value	1	
			36	CH4 Maximum value	1	
			37	CH4 Minimum value	1 _	
			38	CH5 Maximum value	R	
			39	CH5 Minimum value	1	
			40	CH6 Maximum value	1	
			41	CH6 Minimum value	1	
			42	CH7 Maximum value	1	
			43	CH7 Minimum value	1	
			44	CH8 Maximum value	1	
				•	1	

Address (Dec.)  46 to System area (Not used)  57 158 hode switching setting  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 offset value 206 CH3 Industrial shipment settings gain value 207 CH3 Industrial shipment settings offset value 208 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings offset value 210 CH5 Industrial shipment settings offset value 211 CH6 Industrial shipment settings offset value 212 CH6 Industrial shipment settings offset value 213 CH6 Industrial shipment settings offset value 214 CH7 Industrial shipment settings offset value 215 CH7 Industrial shipment settings offset value 216 CH8 Industrial shipment settings offset value 217 CH8 Industrial shipment settings offset value 218 CH1 User range settings offset value 219 CH2 User range settings offset value 220 CH2 User range settings offset value 221 CH2 User range settings offset value 222 CH3 User range settings gain value 223 CH4 User range settings gain value 224 CH4 User range settings offset value 225 CH4 User range settings offset value 226 CH5 User range settings offset value 227 CH5 User range settings gain value 228 CH6 User range settings offset value 229 CH6 User range settings offset value 220 CH7 User range settings gain value 221 CH7 User range settings offset value 222 CH8 User range settings offset value 223 CH7 User range settings offset value 224 CH7 User range settings offset value 225 CH8 User range settings offset value 226 CH6 User range settings offset value 227 CH5 User range settings offset value 228 CH6 User range settings offset value 230 CH7 User range settings offset value 231 CH7 User range settings offset value 232 CH8 User range settings offset value		Q68ADV/I	
46 to System area (Not used)	Address	Nama	Doodhuuite
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  CH2 Industrial shipment settings gain value 204  CH2 Industrial shipment settings gain value 205  CH2 Industrial shipment settings gain value 206  CH3 Industrial shipment settings gain value 207  CH3 Industrial shipment settings gain value 208  CH4 Industrial shipment settings offset value 209  CH4 Industrial shipment settings gain value 209  CH4 Industrial shipment settings gain value 210  CH5 Industrial shipment settings offset value 211  CH6 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 offset value 216  CH8 Industrial shipment settings gain value 217  CH8 Industrial shipment settings offset value 218  CH1 User range settings offset value 219  CH2 User range settings gain value 220  CH2 User range settings gain value 221  CH3 User range settings gain value 222  CH3 User range settings gain value 223  CH4 User range settings gain value 224  CH4 User range settings gain value 225  CH4 User range settings gain value 226  CH5 User range settings gain value 227  CH5 User range settings gain value 228  CH6 User range settings gain value 229  CH6 User range settings gain value 229  CH6 User range settings gain value 230  CH7 User range settings gain value 231  CH7 User range settings gain value 232  CH8 User range settings offset value 233  CH8 User range settings gain value	(Dec.)	Name 	Read/write
157 158 159 160 159 160 10 System area (Not used) 201 202 CH1 Industrial shipment settings offset value 203 CH1 Industrial shipment settings gain value 204 CH2 Industrial shipment settings gain value 205 CH2 Industrial shipment settings gain value 206 CH3 Industrial shipment settings gain value 207 CH3 Industrial shipment settings gain value 208 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings gain value 210 CH5 Industrial shipment settings gain value 211 CH6 Industrial shipment settings gain value 212 CH6 Industrial shipment settings gain value 213 CH6 Industrial shipment settings gain value 214 CH7 Industrial shipment settings 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 offset value 220 CH2 User range settings gain value 221 CH2 User range settings offset value 222 CH3 User range settings offset value 223 CH3 User range settings offset value 224 CH4 User range settings offset value 225 CH4 User range settings offset value 226 CH5 User range settings offset value 227 CH6 User range settings offset value 228 CH6 User range settings offset value 229 CH6 User range settings offset value 229 CH6 User range settings offset value 230 CH7 User range settings offset value 231 CH7 User range settings offset value 232 CH8 User range settings offset value	46		
158 159 160 160 10 System area (Not used) 201 202 CH1 Industrial shipment settings offset value 203 CH1 Industrial shipment settings gain value 204 CH2 Industrial shipment settings gain value 205 CH2 Industrial shipment settings gain value 206 CH3 Industrial shipment settings gain value 207 CH3 Industrial shipment settings gain value 208 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings gain value 210 CH5 Industrial shipment settings gain value 211 CH5 Industrial shipment settings gain value 212 CH6 Industrial shipment settings gain value 213 CH6 Industrial shipment settings gain value 214 CH7 Industrial shipment settings gain value 215 CH7 Industrial shipment settings gain value 216 CH8 Industrial shipment settings gain value 217 CH8 Industrial shipment settings gain value 218 CH1 User range settings offset value 219 CH1 User range settings gain value 220 CH2 User range settings gain value 221 CH2 User range settings gain value 222 CH3 User range settings gain value 223 CH3 User range settings gain value 224 CH4 User range settings gain value 225 CH4 User range settings gain value 226 CH5 User range settings gain value 227 CH5 User range settings gain value 228 CH6 User range settings gain value 229 CH6 User range settings gain value 229 CH6 User range settings gain value 230 CH7 User range settings gain value 231 CH7 User range settings gain value 232 CH8 User range settings gain value	to	System area (Not used)	-
System area (Not used)   CH1 Industrial shipment settings offset value	157		
160 to System area (Not used)  201 202 CH1 Industrial shipment settings offset value 203 CH1 Industrial shipment settings gain value 204 CH2 Industrial shipment settings gain value 205 CH2 Industrial shipment settings gain value 206 CH3 Industrial shipment settings gain value 207 CH3 Industrial shipment settings gain value 208 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings gain value 210 CH5 Industrial shipment settings gain value 211 CH6 Industrial shipment settings gain value 212 CH6 Industrial shipment settings gain value 213 CH6 Industrial shipment settings offset value 214 CH7 Industrial shipment settings gain value 215 CH7 Industrial shipment settings offset value 216 CH8 Industrial shipment settings gain value 217 CH8 Industrial shipment settings gain value 218 CH1 User range settings offset value 229 CH2 User range settings offset value 220 CH2 User range settings gain value 221 CH2 User range settings gain value 222 CH3 User range settings gain value 223 CH3 User range settings gain value 224 CH4 User range settings gain value 225 CH4 User range settings gain value 226 CH5 User range settings gain value 227 CH5 User range settings gain value 228 CH6 User range settings gain value 229 CH6 User range settings gain value 230 CH7 User range settings gain value 231 CH7 User range settings gain value 232 CH8 User range settings gain value	158	Mode switching setting	DAM
to System area (Not used)  201  202 CH1 Industrial shipment settings offset value 203 CH1 Industrial shipment settings gain value 204 CH2 Industrial shipment settings gain value 205 CH2 Industrial shipment settings gain value 206 CH3 Industrial shipment settings gain value 207 CH3 Industrial shipment settings gain value 208 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings offset value 210 CH5 Industrial shipment settings gain 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 offset value 220 CH2 User range settings gain 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 gain value 225 CH4 User range settings offset value 226 CH5 User range settings gain value 227 CH5 User range settings offset 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 offset value 232 CH8 User range settings offset value 233 CH9 User range settings offset value 234 CH9 User range settings offset value 235 CH9 User range settings offset value 236 CH9 User range settings offset value 237 CH9 User range settings offset value 238 CH9 User range settings offset value 239 CH9 User range settings offset value 230 CH7 User range settings offset value 231 CH9 User range settings offset value 232 CH8 User range settings offset value	159	I wode switching setting	FK/VV
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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 offset 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 offset value 226 CH5 User range settings gain value 227 CH5 User range settings offset 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 gain value	214	CH7 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 222 CH3 User range settings offset value 223 CH3 User range settings offset value 224 CH4 User range settings offset value 225 CH4 User range settings gain value 226 CH5 User range settings offset value 227 CH5 User range settings offset value 228 CH6 User range settings offset value 229 CH6 User range settings offset value 230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings offset value	215	CH7 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 offset value 222 CH3 User range settings offset value 223 CH3 User range settings offset value 224 CH4 User range settings offset value 225 CH4 User range settings gain value 226 CH5 User range settings offset value 227 CH5 User range settings offset value 228 CH6 User range settings offset value 229 CH6 User range settings offset value 230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings offset value	216	CH8 Industrial shipment settings offset value	
218 CH1 User range settings offset value 219 CH2 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 offset value 226 CH5 User range settings offset value 227 CH5 User range settings offset value 228 CH6 User range settings offset value 229 CH6 User range settings offset value 230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings gain value	217	CH8 Industrial shipment settings gain value	D/M/
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 offset value 230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings gain value	218	CH1 User range settings offset value	K/VV
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	219	CH1 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 offset value 230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings gain value	220	CH2 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 offset value 230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings gain value	221	CH2 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 gain value	222	CH3 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	223	CH3 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	224	CH4 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	225	CH4 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	226	CH5 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	227	CH5 User range settings gain 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	228	CH6 User range settings offset value	
230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings offset value	229		
231 CH7 User range settings gain value 232 CH8 User range settings offset value	230		
232 CH8 User range settings offset value	231		
	232		
	233	CH8 User range settings gain value	

# 2.4 A68AD (Upgrade to Q68AD-G)

## 2.4.1 Performance comparison

It	tem		A68	BAD					
	Voltage	(Innut resistance value: Hard		+10VDC	are version. Lor earlier: 30kO)				
Analog input	Current	+4 to	(Input resistance value: Hardware version K or later: 1MΩ, Hardware version J or earlier: 30kΩ)  +4 to +20mADC (Input resistance value: 250Ω)  *Usable current input: -20 to 0 to +20mA						
Digital output			16-bit signed binar	y (-2048 to +2047	)				
I/O characteris	otics		Analog input +10V +5V or +20mA 0V or +4mA -5V or -12mA -10V	Digital output +2000 +1000 ±0 -1000 -2000					
Maximum reso	blution		_	nV (1/2000) μΑ (1/1000)					
Overall accura respect to max output value)	icy (Accuracy in kimum digital	±1% (±20)							
Maximum conversion speed		Max. 2.5ms/channel							
Response time	9	-							
Absolute maximum input			_	e: ±15V : ±30mA					

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

					<b>O</b> .	Compatible, — . i al	dai onange requirea, moompatible
		Q	68AD-G			Compatibility	Precautions for replacement
		-10	to 10VDC				
(Input resistance value: $1M\Omega$ or more)							
		0 to	20mADC				
		(Input resista	ance value: 25	0Ω)			
		16-bit s	signed binary				
	1)	Normal resolutio	n mode: -4096	to 4095,		0	
	High resol	lution mode: -12					
	<del></del>			·			
		Normal reso	lution mode	High resolu	tion mode		
Input	Analog input range	Digital	Maximum	Digital	Maximum		
		output value	resolution	output value	resolution		
	0 to 10V		2.5mV	0 to 16000	0.625mV		
	0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV		
	1 to 5V		1.0mV	0 10 12000	0.333mV		As concept of gain value is
Voltage	1 to 5V (Expanded mode)	-1000 to 4500	1.0mV	-3000 to 13500	0.333mV	Δ	changed, refer to Q68AD-G [User's Manual] and then,
	-10 to 10V	-4000 to 4000	2.5mV	-16000 to 16000	0.625mV		confirm the I/O characteristics.
	Users range setting	-4000 to 4000	0.375mV	-12000 to 12000	0.333mV		Committe i/O characteristics.
	0 to 20mA	0 to 4000	5µA	0 to 12000	1.66µA		
	4 to 20mA		4µA	0 10 12000	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. 10/				
			±0.1%				
		Normal resol					
	•	solution mode (0		,		0	
	~	•		/e ranges): ±12di	git		
	Tempera	ature coefficient		(0.00714%/°C)			
10ms/channel							The conversion speed of
(Sampling cycle)							Q68AD-G to A68AD has
					Δ	become slow. If fast	
	20ms				_	conversion speed is required	
							for control, the Q64AD is
							recommended.
		Volta	age: ±15V			0	
		curre	ent: ±30mA				

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

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

Q68AD-G		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 $\Omega$ or more	0	
Between analog input channels: 500VDC, 10M $\Omega$ or more		
16 points		I/O occupied points has
(I/O assignment: intelligent 16 points)	Δ	changed to 16 points.
40-pin connector	×	
Within 0.3mm ²	×	Wiring change is required.
-	×	
		The recalculation of internal
0.46A	Δ	current consumption [5VDC] is
		required.
0.16kg	Δ	

### 2.4.2 Function comparison

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

Item	Description	A68AD	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.			
	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	
ŭ .	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	
3	Programming steps for the scaling can be			
	eliminated.			
	A module change is made without the			Replaceable modules during
Online module change	A module change is made without the	-	0	online are a process CPU and a
	system being stopped.			redundant CPU.

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

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

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

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

A68AD				Q68AD-G			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	
X1 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		XA	Offset/gain setting mode flag	YA	User range write request
ХВ		YB		XB	Channel change completed flag	YB	Channel change request
XC		YC		XC	Input signal error detection signal	YC	Not used
					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		Y13					
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19					
X1A X1B		Y1A Y1B					
X1C		Y1C					
X1D		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 appointing		1	CH1 Average time/Average number of times/	
1	Averaging processing specification		1	Moving average/Time constant settings	
2	CLIA Averaging time count		2	CH2 Average time/Average number of times/	
2	CH1 Averaging time, count		2	Moving average/Time constant settings	
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/	
3	CH2 Averaging time, count		3	Moving average/Time constant settings	
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/	Ī
4	Cris Averaging time, count	R/W	4	Moving average/Time constant settings	R/W
5	CH4 Averaging time, count	17/ VV	5	CH5 Average time/Average number of times/	Ī
5	CH4 Averaging time, count		5	Moving average/Time constant settings	
6	CHE Averaging time, count		6	CH6 Average time/Average number of times/	
6	CH5 Averaging time, count		6	Moving average/Time constant settings	
7	CLIC Averaging time count		7	CH7 Average time/Average number of times/	
7	CH6 Averaging time, count		7	Moving average/Time constant settings	
0	CLIZ Averaging times		0	CH8 Average time/Average number of times/	1
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	
12	CH3 Digital output value		12	CH2 Digital output value	
13	CH4 Digital output value	В	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)	Ī
21			21	Setting range (CH5 to CH8)	
22			22	Offset/gain setting mode Offset specification	
23			23	Offset/gain setting mode Gain specification	
24			24	Averaging process specification (CH1 to	R/W
24			24	CH4)	17/77
25	System area (Not used)	-	25	Averaging process specification (CH5 to CH8)	
26	1		26		
27	1		27	System area (Not used)	
28	1		28	System area (Not used)	_
29	1		29	1	
30	1		30	CH1 Maximum value	
31	]		31	CH1 Minimum value	1
32	]		32	CH2 Maximum value	1
33	1		33	CH2 Minimum value	ь
34	Write data error code	R/W	34	CH3 Maximum value	R
		•	to		1
			44	CH8 Maximum value	]
			45	CH8 Minimum value	7

	Q68AD-G	
Address (Dec.)	Name	Read/write
46	System area (Not used)	-
	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		
450	CH1 Input signal error detection upper limit	
150	setting value	
to		
158	Mada suitakina sutti	D/4/
159	Mode switching setting	R/W
to		
200	Save data classification setting	R/W
201	System area (Not used)	-
202	CH1 Factory default offset value	
203	CH1 Factory default gain value	1
to	, ,	R/W
232	CH8 Factory default offset value	1
233	CH8 Factory default gain value	1
	, , ,	1

# 2.5 A68AD-S2 (Upgrade to Q68ADV, Q68ADI)

## 2.5.1 Performance comparison

Item	A68AD-S2	1		
	-10 to 0 to +10VDC	4		
Voltage	(Input resistance value: Hardware version K or later: $1M\Omega$ , Hardware version J or earlier: $30k\Omega$ )			
Analog input	+4 to +20mADC (Input resistance value: 250Ω)			
Current	*Usable current input: -20 to 0 to 20mA			
Digital output	16-bit signed binary (-2048 to +2047)			
I/O characteristics	Analog input Digital output +10V +2000 +5V or +20mA +1000 0V or +4mA ±0 -5V or -12mA -1000 -10V -2000			
Maximum resolution	Voltage: 5mV (1/2000) Current: 20μA (1/1000)			
Overall accuracy (Accuracy in respect to maximum digital output value)	Within ±1% (±20)			

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

								0:0	•	ial change required, ×: Incompatible
		Q68AD				Q68ADI			Compatibility	Precautions for replacement
		-10 to 10V				-				<b>-</b>
(Input resistance value: 1MΩ)				0.1	00- 45			Δ	The voltage/current cannot be	
-					20mAD0		<b>50</b> 0\		mixed for one module.	
			40 h	:4 -:	(Input resist	ance vail	ue: 2	50Ω)		
			ט-סו Normal resolu	it signed bina	-					
			olution mode: -		-				0	
		riigiries	Julion mode	12200 10 122	207, -10304 (	0 10303)	1			
			Normal res	olution mode	Hi	gh resoluti	ion mo	nde		
	log in	out	Digital	Maximun				ximum		As concept of gain value is
r	ange		output value	resolution			res	solution		changed, refer to [Analog-
	(	) to 10V		2.5mV	0 to 16	6000	0.6	625mV	Δ	Digital Converter Module
		0 to 5V	0 to 4000	1.25mV	0 to 12	2000		116mV		User's Manual] and then,
Voltage		1 to 5V		1.0mV				333mV		confirm the I/O characteristics.
	_	0 to 10V	-4000 to 4000	2.5mV	-16000 to	5 16000	0.6	625mV		
	User range settings		1000 10 1000	0.375mV	-12000 to	12000	0.3	333mV		
	_	to 20mA	5µA		5μA 0 to 12000 1.66μA					
Current	4	to 20mA	0 to 4000	4µA	0 10 12	2000	1.33µA		0	
User rai		ser range	-4000 to 4000 1.37μA		μA -12000 to 12000 1.33μA		.33µA			
settings							'			
	Analog input  Analog input  Analog input		Normal resolution mode		High resolution mode					
					Ambient tempera 0 to 55°C		•			
Analog in			Without	Ambient	With	Withou	ut	Ambient		
range		temperatu		temperature	temperature	temperat	π	temperature		
		drift	drift	25±5°C	drift	drift		25±5°C		
		compensat	on compensatio	n	compensation	compens	ation			
<del> </del>	10V				±0.3%	±0.4%	6	±0.1%		
	0 to 0V				(±48 digits)	(±64 dig	jits)	(±16 digits)		
0 t	o 5V								0	
Voltage 1 t	o 5V	i.								
U	lser									
	nge	±0.3%	±0.4%	±0.1%						
	tings to	(±12 digits	s) (±16 digits)	(±4 digits)	±0.3%	±0.4%	6	±0.1%		
	)mA				(±36 digits)	(±48 dig		(±12 digits)		
4	l to									
l	)mA	,								
	lser									
	nge tings									
				1	l	1	l l			

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

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

	O. Compatible, A. Fartial change required, A. Incompatible			
Q68ADV	Q68ADI	Compatibility	Precautions for replacement	
80μs/c (When there is temperature drift compensa will be used regardless of the	ition, the time calculated by adding 160 $\mu s$	0	The conversion speed of Q68ADV/I to A68AD-S2 has become quick. And then, on A68AD-S2, the noise that did not import on Q68ADV/I can be imported as analog signal. In this case, use the averaging processing function to remove the effect of noise.	
±15V	±30mA	0		
8 channel	s/module	0		
Max. 100,000 times				
Between the I/O terminal and programmable controller power supply: photocoupler isolation				
Between channe Between the I/O terminal and progr 500VAC, fo	rammable controller power supply:	0		
	rammable controller power supply:	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	×			
 0.64A	0.64A	Δ	The recalculation of internal current consumption [5VDC] is required.	
0.19kg	0.19kg	Δ		

## 2.5.2 Function comparison

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

Item	Description	A68AD-S2	Q68ADV/I	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.			
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.

A68AD-S2				Q68ADV/I				
Device No.	Signal name		me Device Signal name		Signal name	Device No.	Signal name	
X0	Watchdog timer error	Y0		X0	Module READY	Y0		
X1	A/D conversion READY	Y1		X1	Temperature drift compensation flag	Y1		
X2		Y2		X2		Y2		
Х3		Y3		Х3		Y3		
X4		Y4		X4	Not used	Y4	Not used	
X5		Y5		X5		Y5		
X6		Y6		X6		Y6		
X7		Y7		X7	18.1 1.6 1	Y7		
X8		Y8		X8	High resolution mode status flag	Y8		
X9		Y9		X9	Operating condition setting completed flag	Y9	Operating condition setting request	
XA		YA		XA	Offset/gain setting mode flag	YA	User range write request	
ХВ		YB		ХВ	Channel change completed flag	YB	Channel change request	
XC		YC		XC	Not used	YC	Not used	
					Maximum value/		Maximum value	
XD		YD	Not used	XD	minimum value reset	YD	/minimum value reset	
			Not used		completed flag		request	
XE	Not used	YE		XE	A/D conversion completed flag	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10		Y10						
X11		Y11						
X12		Y12						
X13		Y13						
X14		Y14						
X15		Y15						
X16 X17		Y16 Y17						
X17 X18		Y18						
X10		Y19						
X1A		Y1A						
X1B		Y1B						
X1C		Y1C						
X1D		Y1D						
X1E		Y1E						
X1F		Y1F						

## 2.5.4 Buffer memory address comparison

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

	A68AD-S2			Q68ADV/I		
Address (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	1	2	CH2 Time/count averaging setting		
3	CH2 Averaging time, count		3	CH3 Time/count averaging setting		
4	CH3 Averaging time, count	T 544/	4	CH4 Time/count averaging setting	D // //	
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	1	7	CH7 Time/count averaging setting		
8	CH7 Averaging time, count	1	8	CH8 Time/count averaging setting		
9	CH8 Averaging time, count		9	Averaging processing specification	1	
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	1	15	CH5 Digital output value	-	
16	CH7 Digital output value	1	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	1		20	Setting range (CH1 to CH4)	-	
21	1		21	Setting range (CH5 to CH8)	1	
22	1		22	Offset/gain setting mode Offset specification		
23					Offset/gain setting mode Gain specification	R/W
24			23 24	Cheevigan eetting meas eam epeemeation		
25	1		25			
26	System area (Not used)	-	26		-	
27			27	System area (Not used)		
28			28			
29			29			
30			30	CH1 Maximum value		
31	-		31	CH1 Minimum value	1	
32			32	CH2 Maximum value		
33	-		33	CH2 Minimum value	1	
34	Write data error code	R/W	34	CH3 Maximum value		
35	A/D conversion completed flag	R	35	CH3 Minimum value		
33	A/D conversion completed hag	IX	36	CH4 Maximum value	1	
			37	CH4 Minimum value	1	
			38	CH5 Maximum value	R	
			39	CH5 Minimum value	-	
			40	CH6 Maximum value	-	
			_	CH6 Minimum value	-	
			41		-	
			42	CH7 Maximum value	1	
			43	CH7 Minimum value	-	
			44	CH8 Maximum value	-	
			45	CH8 Minimum value		

Address (Dec.)  46 to System area (Not used)  57 158 hode switching setting  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 offset value 206 CH3 Industrial shipment settings gain value 207 CH3 Industrial shipment settings offset value 208 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings gain value 209 CH4 Industrial shipment settings offset value 210 CH5 Industrial shipment settings offset value 211 CH6 Industrial shipment settings offset value 212 CH6 Industrial shipment settings offset value 213 CH6 Industrial shipment settings offset value 214 CH7 Industrial shipment settings offset value 215 CH7 Industrial shipment settings offset value 216 CH8 Industrial shipment settings offset value 217 CH8 Industrial shipment settings offset value 218 CH1 User range settings offset value 219 CH2 User range settings offset value 220 CH2 User range settings offset value 221 CH2 User range settings offset value 222 CH3 User range settings gain value 223 CH4 User range settings gain value 224 CH4 User range settings offset value 225 CH4 User range settings offset value 226 CH5 User range settings offset value 227 CH5 User range settings gain value 228 CH6 User range settings offset value 229 CH6 User range settings offset value 220 CH7 User range settings gain value 221 CH7 User range settings offset value 222 CH8 User range settings offset value 223 CH7 User range settings offset value 224 CH7 User range settings offset value 225 CH8 User range settings offset value 226 CH6 User range settings offset value 227 CH5 User range settings offset value 228 CH6 User range settings offset value 230 CH7 User range settings offset value 231 CH7 User range settings offset value 232 CH8 User range settings offset value		Q68ADV/I	
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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	224	CH4 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	225	CH4 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	226	CH5 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	227	CH5 User range settings gain 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	228	CH6 User range settings offset value	
230 CH7 User range settings offset value 231 CH7 User range settings gain value 232 CH8 User range settings offset value	229		
231 CH7 User range settings gain value 232 CH8 User range settings offset value	230		
232 CH8 User range settings offset value	231		
	232		
	233	CH8 User range settings gain value	

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

## 2.6.1 Performance comparison

Item		A68AD-S2						
Analog input	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	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 characteris	stics	Analog input Digital output +10V +2000 +5V or +20mA +1000 0V or +4mA ±0 -5V or -12mA -1000 -10V -2000						
Maximum reso	olution	Voltage: 5mV (1/2000) Current: 20μΑ (1/1000)						
Overall accura respect to max output value)	acy (Accuracy in ximum digital	Within ±1% (±20)						

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

					0:		tial change required, *: incompatible
		Q	68AD-G			Compatibility	Precautions for replacement
-10 to 10VDC							
(Input resistance value: $1M\Omega$ or more )							
		0 to	20mADC				
		(Input resista	ance value: 250	0Ω)			
		16-bit s	signed binary	,			
	(1)	Normal resolutio	-	to 4095		0	
	`			-16384 to 16383)	1		
	riigiricsoi	dilon mode12	200 to 12201,	-10004 to 10000,	'		
1	T						
11	<b>.</b>	Normal reso		High resolu			
Input	Analog input range	Digital	Maximum	Digital	Maximum		
	0 to 10V	output value	resolution	output value 0 to 16000	resolution 0.625mV		
		2.5mV 0 to 4000 1.25mV 1.0mV	0 10 10000	0.625IIIV 0.416mV			
	0 to 5V 1 to 5V			0 to 12000	0.4 formv 0.333mV		As assessed of main value is
Voltage		<del>                                     </del>	1.01110		0.333111		As concept of gain value is
Voltage	(Expanded mode)	-1000 to 4500	1.0mV	-3000 to 13500	0.333mV	Δ	changed, refer to Q68AD-G
	-10 to 10V	-4000 to 4000	2.5mV	-16000 to 16000	0.625mV		[User's Manual] and then,
	Users range setting		0.375mV	-12000 to 12000	0.333mV		confirm the I/O characteristics.
	0 to 20mA		5μΑ		1.66µA		
	4 to 20mA	0 to 4000		0 to 12000	1.33µA		
Current	4 to 20mA	1000 / 1500		2000/ 40500	·		
	(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					
	High res	olution mode (0	to 10V, -10 to	10V): ±16 digits		0	
	High resoluti	on mode (Other	than the above	e ranges): ±12 di	gits		
	Tempera	ature coefficient					

Item	A68AD-S2	
Maximum conversion speed	Max. 2.5ms/channel	
Response time	-	
Absolute maximum input	Voltage: ±15V Current: ±30mA	
Analog input points	8 channels/module	
Maximum number of writes for E ² PROM	-	
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation  Between channels: non-isolated	
Dielectric withstand voltage	<del>-</del>	
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	

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

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

### 2.6.2 Function comparison

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

Item	Description	A68AD-S2	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.			
- · · · · · · ·	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	A module change is made without the	-	0	online are a process CPU and a
	system being stopped.			redundant CPU.

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

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

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

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

Device No.         Signal name         No.         No.         Signal name         No.         <	al name
No.         No.         No.           X0         Watchdog timer error         Y0           X1         A/D conversion READY         Y1           X2         Y2           X3         Y3           X4         Y4           X5         Y6           X7         High resolution mode         Y7	ai iiaiiie
X1         A/D conversion READY         Y1           X2         Y2           X3         Y3           X4         Y4           X5         Y6           X7         High resolution mode         Y7	
X2     Y2       X3     X3       X4     Y4       X5     Y6       X7     High resolution mode       Y7       X2     Y2       X3     Y4       Y4     Y5       X6     Y6       X7     High resolution mode       Y7	
X3       X3       X4       X3       Not used       Y3       Y4       Y4       X5       Y5       X5       Y5       X6       Y6       X7       High resolution mode       Y7	
X4     Y4       X5     X5       X6     Y6       X7     High resolution mode       Y7     Y7	
X4       Y4       X4       Y4       Y4       Y5       X5       Y5       X6       Y6       X6       Y6       Y7       Y7       High resolution mode       Y7       Y7	
X5       Y5         X6       Y6         X7       High resolution mode         Y7       Y7	
X7 High resolution mode Y7	
X/	
X8 Warming output signal Y8	
X9 Operating condition Setting completed flag Setting requ	
XA Offset/gain setting mode flag YA User range	write request
XB Channel change completed flag YB Channel ch	ange request
XC	
Maximum value/ Maximum v	/alue/
XD   YD   Not used   XD   minimum value reset   YD   Minimum value reset	alue reset
Not used completed flag request	
XE YE XE A/D conversion completed flag	
XF	request
X10 Y10	
X11 Y11	
X12 Y12	
X13 Y13	
X14 Y14	
X15 Y15	
X16 Y16	
X17	
X18 Y18 Y19 Y19	
X19 X1A Y1A	
X1B Y1B	
X1C Y1C	
X1D Y1D	
X1E Y1E	
X1F Y1F	

#### 2.6.4 Buffer memory address comparison

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

	A68AD-S2			Q68AD-G	
Address (Dec.)	Name	Read/write	Address (Dec.)	Name	Read/write
0	Used channel specification		0	A/D conversion enable/disable	
1	Averaging processing specification		1	CH1 Average time/Average number of times/	Ī
	Averaging processing specification		'	Moving average/Time constant settings	
2	CH1 Averaging time, count		2	CH2 Average time/Average number of times/	
	Offi Averaging time, count			Moving average/Time constant settings	<u> </u>
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/	
	orizonaging amo, count			Moving average/Time constant settings	
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/	
·	or to 7 to a sure, occurs	R/W	·	Moving average/Time constant settings	R/W
5	CH4 Averaging time, count	1000	5	CH5 Average time/Average number of times/	
	Critivitiaging unio, count			Moving average/Time constant settings	<u> </u>
6	CH5 Averaging time, count		6	CH6 Average time/Average number of times/	
	or to 7 weraging time, south			Moving average/Time constant settings	<u> </u>
7	CH6 Averaging time, count		7	CH7 Average time/Average number of times/	
	or to 7 weraging time, south		,	Moving average/Time constant settings	<u> </u>
8	CH7 Averaging time, count		8	CH8 Average time/Average number of times/	
	orn riveraging lime, sound			Moving average/Time constant settings	
9	CH8 Averaging time, count		9	System area (Not used)	-
10	CH1 Digital output value		10	A/D conversion completed flag	<u> </u>
11	CH2 Digital output value		11	CH1 Digital output value	<u> </u>
12	CH3 Digital output value		12	CH2 Digital output value	
13	CH4 Digital output value	R	13	CH3 Digital output value	
14	CH5 Digital output value		14	CH4 Digital output value	
15	CH6 Digital output value		15	CH5 Digital output value	R
16	CH7 Digital output value		16	CH6 Digital output value	
17	CH8 Digital output value		17	CH7 Digital output value	
18			18	CH8 Digital output value	<u> </u>
19			19	Error code	<u> </u>
20			20	Setting range (CH1 to CH4)	<u> </u>
21			21	Setting range (CH5 to CH8)	
22			22	Offset/gain setting mode Offset specification	
23			23	Offset/gain setting mode Gain specification	
24			24	Averaging process specification (CH1 to CH4)	R/W
25	System area (Not used)	-	25	Averaging process specification (CH5 to CH8)	
26			26		
27			27	System area (Not used)	
28			28	Gystein area (INOL USEU)	_
29			29		
30			30	CH1 Maximum value	
31			31	CH1 Minimum value	
32			32	CH2 Maximum value	]
33			33	CH2 Minimum value	
34	Write data error code	R/W	34	CH3 Maximum value	R
35	A/D conversion completed flag	R	to		1
			44	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	1
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	1
88	CH1 Process alarm upper lower limit value	1
89	CH1 Process alarm upper upper limit value	1
to		
114	CH8 Process alarm lower lower limit value	1
115	CH8 Process alarm lower upper limit value	1
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	1
141	CH8 Rate alarm lower limit value	1
	CH1 Input signal error detection setting	1
142	value/CH1 Input signal error detection lower	
	limit setting value	
to		
4	CH1 Input signal error detection upper limit	1
150	setting value	
to	_	
158		
159	Mode switching setting	R/W
to		
200	Save data classification setting	R/W
201	System area (Not used)	-
202	CH1 Factory default offset value	
203	CH1 Factory default gain value	•
to	, g	R/W
232	CH8 Factory default offset value	1
233	CH8 Factory default gain value	1
	1 actory actually gain value	<u> </u>

# 2.7 A68ADN (Upgrade to Q68ADV, Q68ADI)

## 2.7.1 Performance comparison

lt	em			A68A	ON		
	Voltage		-10 to 0 to +1	10VDC (Input		ue: 1MΩ)	
Analog input	Current	-20 to 0 to +20mADC (Input resistance value: $250\Omega$ )					
				16-bit signe	d binary		
		When 1/4000 is set: -4096 to +4095					
Digital output				1/8000 is set:			
				/12000 is set:			
				Di	gital output valu	e	
			Analog input		5V/20mA, offse		
				1/4000	1/8000	1/12000	
/O characteris	tics		+10V	+4000	+8000	+12000	
O characteris	1103		+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 reso	lution		Voltage input	2.5mV	1.25mV	0.83mV	
			Current input	10µA	1.25πV 5μA	3.33µA	
			Curront input	10471	ομ, τ	0.00µ/ t	
				1/4000	1/8000	1/12000	
			±1%	±40	±80	±120	
			2170	210	100	1120	
verall accura	CV						
Accuracy in re							
	al output value)						
axiiiiuiii uigii	ai output value)						

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

السويون		Q68AE	V		C	(68ADI		Compatibility	Precautions for replacement
		-10 to 10	VDC						
	(Inp	ıt resistance	value: 1MΩ)			-		_	The voltage/current cannot be
		_			0 to	20mADC			mixed for one module.
					(Input resista	ance value	: 250Ω)		
			16-bi	signed bina	ary				
			(Normal resolut	-	-			0	
		High res	solution mode: -1	2288 to 122	287, -16384 to	16383)			
			Normal reso	lution mode	Hid	gh resolution	mode		
		g input	Digital	Maximum	`	<del>, , , , , , , , , , , , , , , , , , , </del>	Maximum		
	га	nge	output value	resolution	_		resolution		·
		0 to 10V		2.5mV			0.625mV		
		0 to 5V	0 to 4000					Δ	_
	Voltage							As concept of gain value is changed, refer to [Analog-Digital Converter Module User's Manual] and then, confirm the I/O characteristics.	
		User range	-4000 to 4000						Committe the the characteristics.
		settings		0.375mV	-12000 to	12000	0.333mV		
		0 to 20mA	0 to 4000	5µA	0 to 12	2000	1.66µA		
	Current	4 to 20mA		4µA			1.33µA		
		_	-4000 to 4000	1.37µA	-12000 to	12000	1.33µA		
		Cottingo				I		0	
			lormal resolution m	node	Hiah	resolution r	mode		
	Analog inp	ut	55°C	Ambient			Ambient		
	range	With		temperature			temperature		
		-		25±5°C			25±5°C		
	1		illori compensation	!	compensation	compensati	on		
	0 to	10V	ation compensation	ı					
	-10	to	alon compensation		±0.3% (±48 digits)	±0.4%	±0.1%		
	-10 10	to V	atori compensation		±0.3%	±0.4%	±0.1%		
	-10 10 Voltage	to V 5V	and compensation		±0.3%	±0.4%	±0.1%	0	
	-10 10	to V 5V 5V	compensation		±0.3%	±0.4%	±0.1%	0	
	Voltage -10 10 0 to 1 to Us rar	to V 5V 5V er ge +0.3%			±0.3%	±0.4%	±0.1%	0	
	Voltage 1 to Us rar sett	to V 5V 5V er ge ±0.3% ngs (±12 dig	±0.4%	±0.1% (±4 digits)	±0.3% (±48 digits)	±0.4% (±64 digits	±0.1% (±16 digits)	0	
	Voltage -10 1 to Us rar sett	to V 5V 5V er ge ±0.3% (±12 dig	±0.4%	±0.1%	±0.3% (±48 digits) ±0.3%	±0.4% (±64 digits	±0.1% (±16 digits) ±0.1%	0	
	Voltage 1 to Us rar sett	to V 5V 5V er ge ±0.3% (±12 dig	±0.4%	±0.1%	±0.3% (±48 digits)	±0.4% (±64 digits	±0.1% (±16 digits) ±0.1%	0	
	Voltage	to V 5V 5V er ge ±0.3% (±12 dig on A o	±0.4%	±0.1%	±0.3% (±48 digits) ±0.3%	±0.4% (±64 digits	±0.1% (±16 digits) ±0.1%	Ο	
	Voltage 0 to 1 to	to V 5V 5V er ge ±0.3% (±12 dig o nA o nA er	±0.4%	±0.1%	±0.3% (±48 digits) ±0.3%	±0.4% (±64 digits	±0.1% (±16 digits) ±0.1%	0	
	Voltage 0 to 1 to Us rar sett 0 200 Current 200	to V 5V 5V er ge ±0.3% (±12 dig on AA on AA er ge	10 to 10V   10 to 4000   1.25mV   0 to 16000   0.625mV   0 to 4000   1.05mV   1.20mV   1.2						

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, $5 \text{M}\Omega$ 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	

Q68ADV	Q68ADI	Compatibility	Precautions for replacement
80μs/c (When there is temperature calculated by adding 160 μs will be use use	drift compensation, the time d regardless of the number of channels	0	The conversion speed of Q68ADV/I to A68ADN has become quick. And then, on Q68ADV/I, the noise that did not import on A68ADN can be imported as analog signal. In this case, use the averaging processing function to remove the effect of noise.
±15V	±30mA	0	
8 channel	ls/module	0	
Max. 100,	000 times	0	
photocoupl	rammable controller power supply: ler isolation els: non-isolated	0	
Between the I/O terminal and prog 500VAC, for	rammable controller power supply: or 1 minute	0	
Between the I/O terminal and prog 500VDC, 5I	rammable controller power supply: MΩ or more	0	
·	oints ntelligent 16 points)	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	Δ	

### 2.7.2 Function comparison

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

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

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

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

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

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

	A68	ADN			Q68A	ADV/I	
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.	Signal name	No.	Signal name	No.	Signal name	No.	Signal hame
X0	Watchdog timer error	Y0		X0	Module READY	Y0	
X1	A/D conversion READY	Y1		X1	Temperature drift	Y1	
					compensation flag		
X2	Error flag	Y2		X2		Y2	
X3 X4		Y3 Y4		X3 X4		Y3 Y4	Not used
X5		Y5		X5	Not used	Y5	Not used
X6		Y6		X6		Y6	
X7		Y7		X7		Y7	
			Not used		High resolution mode		
X8		Y8		X8	status flag	Y8	
X9		Y9		X9	Operating condition	Y9	Operating condition
79		19		79	setting completed flag	19	setting request
XA		YA		XA	Offset/gain setting mode flag	YA	User range write request
XB		YB		ХВ	Channel change completed flag	YB	Channel change request
XC		YC		XC	Not used	YC	Not used
					Maximum value/		Maximum value/
XD		YD	RFRP, RTOP instruction	XD	minimum value reset	YD	minimum value reset
	Not used		for interlock signal when		completed flag		request
XE		YE	A68ADN is used in	XE	A/D conversion	YE	Not used
VE		VE	remote I/O station	VE	completed flag	VE	
XF X10		YF Y10		XF	Error flag	YF	Error clear request
X10		Y11	Not used				
X12		Y12	Error reset				
X13		Y13					
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19	Not used				
X1A		Y1A					
X1B		Y1B					
X1C X1D	RFRP, RTOP instruction	Y1C Y1D					
X1D X1E	for interlock signal when	Y1E					
	A68ADN is used in						
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.)		Read/write
0	A/D conversion enable/disable setting		0	A/D conversion enable/disable	
1	Averaging processing specification	1	1	CH1 Time/count averaging setting	
2	CH1 Averaging time, count	1	2	CH2 Time/count averaging setting	
3	CH2 Averaging time, count		3	CH3 Time/count averaging setting	
4	CH3 Averaging time, count	R/W	4	CH4 Time/count averaging setting	R/W
5	CH4 Averaging time, count		5	CH5 Time/count averaging setting	TX/VV
6	CH5 Averaging time, count		6	CH6 Time/count averaging setting	
7	CH6 Averaging time, count		7	CH7 Time/count averaging setting	
8	CH7 Averaging time, count		8	CH8 Time/count averaging setting	
9	CH8 Averaging time, count		9	Averaging processing specification	
10	CH1 Digital output value		10	A/D conversion completed flag	
11	CH2 Digital output value		11	CH1 Digital output value	
12	CH3 Digital output value		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	1	16	CH6 Digital output value	
17	CH8 Digital output value	1	17	CH7 Digital output value	
18	Write data error code	1	18	CH8 Digital output value	
19	A/D conversion completed flag	1	19	Error code	
20	Resolution setting	R/W	20	Setting range (CH1 to CH4)	
			21	Setting range (CH5 to CH8)	
			22	Offset/gain setting mode	
			22	Offset specification	R/W
			23	Offset/gain setting mode	IX/VV
			20	Gain specification	
			24		
			25		
			26	System area (Not used)	_
			27	System area (Not assa)	
			28		
			29		
			30	CH1 Maximum value	
			31	CH1 Minimum value	
			32	CH2 Maximum value	
			33	CH2 Minimum value	
			34	CH3 Maximum value	
			35	CH3 Minimum value	
			36	CH4 Maximum value	
			37	CH4 Minimum value	R
			38	CH5 Maximum value	
			39	CH5 Minimum value	
			40	CH6 Maximum value	
			41	CH6 Minimum value	
			42	CH7 Maximum value	_
			43	CH7 Minimum value	
			44	CH8 Maximum value	
			45	CH8 Minimum value	

	Q68ADV/I	
Address	Name	Read/write
(Dec.)	Hame	rteda/Wiite
46		
to	System area (Not used)	-
157		
158 159	Mode switching setting	R/W
160		
to	System area (Not used)	_
201	l l l l l l l l l l l l l l l l l l l	
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 gain 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	
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 onset value	
230	CH7 User range settings offset value	
231	CH7 User range settings onset value	
232	CH8 User range settings offset value	
232	CH8 User range settings onset value	
233	On to Oser range semings gain value	

## 2.8 A68ADN (Upgrade to Q68AD-G)

## 2.8.1 Performance comparison

Item			A68ADN					
Analog input	Voltage	-10 to 0 to +10VDC (	-10 to 0 to +10VDC (Input resistance value: 1M $\Omega$ )					
Analog input	Current	-20 to 0 to +20mADC (Input resistance value: $250\Omega$ )						
Digital output		16-bit signed binary  When 1/4000 is set: -4096 to +4095  When 1/8000 is set: -8192 to +8191  When 1/12000 is set: -12288 to +12287						
		1/40 +10V +40 +5V or +20mA +20 0V or 20mA 0 -5V or -20mA -200 -10V -400	00 +8000 00 +4000 0 0 -4000	(set 0V/0mA) 1/12000 +12000 +6000 0 -6000 -12000				
Maximum resc	olution	J 1	000 1/8000 mV 1.25mV μA 5μA	1/12000 0.83mV 3.33μA				
Overall accura (Accuracy in remaximum digit	•	1/4\ ±1% ±2		1/12000 ±120				

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

		06	68AD-G		0.		Precautions for replacement
		<u> </u>				Companibility	r recautions for replacement
-10 to 10VDC							
		Input resistance		r more)		- 0	
		0 to	20mADC				
		(Input resista	ance value: 250	θΩ)			
		16-bit s	signed binary				
	(1)	lormal resolution	n mode: -4096	to 4095,		0	
	High resol	ution mode: -12	288 to 12287,	-16384 to 16383)			
		Normal reso	lution mode	High resolu	tion mode		
Input	Analog input range	Digital	Maximum	Digital	Maximum		
		output value	resolution	output value	resolution		
	0 to 10V		2.5mV	0 to 16000	0.625mV		
	0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV		As concept of gain value is
	1 to 5V		1.0mV		0.333mV		
Voltage	1 to 5V (Expanded mode)	-1000 to 4500	1.0mV	-3000 to 13500	0.333mV	Δ	changed, refer to Q68AD-G [User's Manual] and then,
	-10 to 10V	4000 t- 4000	2.5mV	-16000 to 16000	0.625mV		confirm the I/O characteristics.
	Users range setting	-4000 to 4000	0.375mV	-12000 to 12000	0.333mV		
1	0 to 20mA	0.11000	5µA	0.1. 10000	1.66µA		
	4 to 20mA	0 to 4000	4µA	0 to 12000	1.33µA		
Current	4 to 20mA (Expanded mode)	-1000 to 4500	4µA	-3000 to 13500	1.33µA		
	Users range setting	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		
		•			,		
	±0.1%						
	Normal resolution mode: ±4 digits						
	High res	olution mode (0	to 10V, -10 to	10V): ±16 digits		0	
	High resolution	on mode (Other	than the above	e ranges): ±12 dig	gits		
	· ·	ature coefficient:		0 ,			

Item	A68ADN	
Maximum conversion speed	20ms/channel	
Response time	-	
Absolute maximum input	Voltage: ±15V	
A., . I	Current: ±30mA	
Analog input points	8 channels/module	
Maximum number of writes for	-	
E ² PROM		
Isolation method	Between the input terminal and programmable controller power supply: photocoupler isolation  Between channels: non-isolated	
Dielectric withstand voltage	Between the I/O terminal and programmable controller power supply: 500VAC, for 1 minute	
Insulation resistance	Between the I/O terminal and programmable controller power supply: 500VDC, 5M $\Omega$ or more	
0	32 points	
Occupied I/O points	(I/O assignment: special 32 points)	
Connected terminal	38-point terminal block	
	0.75 to 2mm ²	
Applicable wire size	(Applicable tightening torque: 39 to 59N•cm)	
Applicable solderless terminal	V1.25-3, V1.25-YS3A, V2-YS3A	
Internal current consumption (5VDC)	0.4A	
Weight	0.51kg	

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

		- · · · · · · · · · · · · · · · · · · ·	A. I artial change required, ". moonipation
	Q68AD-G	Compatibility	Precautions for replacement
	10ms/channel		
	(Sampling cycle)	0	
	20ms	7	
	Voltage: ±15V	0	
	current: ±30mA	0	
	8 channels/module	0	
	Up to 50,000 times	0	
Between	n the I/O terminal and programmable controller power supply:		
	transformer isolation	0	
	Between channels: transformer isolation		
Between	n the I/O terminal and programmable controller power supply:		
	500VACrms, for 1 minute	0	
Bet	tween analog input channels: 1000VACrms, for 1 minute		
Between	n the I/O terminal and programmable controller power supply:		
	500VDC, 10M $\Omega$ or more	0	
Be	etween analog input channels: 500VDC, 10M $\Omega$ or more		
	16 points		I/O occupied points has changed to
	(I/O assignment: intelligent 16 points)	Δ	16 points.
	40-pin connector	×	
	Within 0.3mm ²	×	Wiring change is required.
	-	×	
	0.46A	Δ	The recalculation of internal current consumption [5VDC] is required.
	0.16kg	Δ	

### 2.8.2 Function comparison

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

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.			
	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	· ·		
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	
ě .	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			
Scaling function	into the buffer memory is available.	-	0	
3	Programming steps for the scaling can be			
	eliminated.			
	A module change is made without the			Replaceable modules during
Online module change	A module change is made without the	-	0	online are a process CPU and a
	system being stopped.			redundant CPU.

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

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

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

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

A68ADN					Q68A	AD-G	
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.		No.	Signal name	No.	Signal name	No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	
X1	A/D conversion READY	Y1		X1		Y1	
X2	Error flag	Y2		X2		Y2	
Х3		Y3		X3	Not used	Y3	
X4		Y4		X4		Y4	Not used
X5 X6		Y5 Y6		X5 X6		Y5 Y6	
70		10		70	High resolution mode	10	
X7		Y7		X7	status flag	Y7	
X8		Y8	Not used	X8	Warming output signal	Y8	
7.0		10			Operating condition		Operating condition
X9		Y9		X9	setting completed flag	Y9	setting request
					Offset/gain setting mode		
XA		YA		XA	flag	YA	User range write request
\/D		\/D		\/D	Channel change	\/D	
XB		YB		XB	completed flag	YB	Channel change request
XC		YC		XC	Input signal error	YC	Netwood
XC		10		XC	detection signal	Y C	Not used
					Maximum value/		Maximum value/
XD	Not used	YD	RFRP, RTOP instruction	XD	minimum value reset	YD	minimum value reset
	Not used		for interlock signal when		completed flag		request
XE		YE	A68ADN is used in	XE	A/D conversion	YE	Not used
			remote I/O station		completed flag		
XF		YF		XF	Error flag	YF	Error clear request
X10		Y10	Not used				
X11 X12		Y11 Y12	Error reset				
X12 X13		Y13	Elloi leset	ł			
X13		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19					
X1A		Y1A	Not used				
X1B		Y1B					
X1C		Y1C					
X1D	RFRP, RTOP instruction	Y1D					
X1E	for interlock signal when	Y1E					
X1F	A68ADN is used in	Y1F					
XII	remote I/O station						

#### 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	Averaging processing specification		1	CH1 Average time/Average number of times/	
	Averaging processing specification			Moving average/Time constant settings	
2	CH1 Averaging time, count		2	CH2 Average time/Average number of times/	
2	Citi Averaging time, count		2	Moving average/Time constant settings	
3	CH2 Averaging time, count		3	CH3 Average time/Average number of times/	
3	Criz Averaging time, count		3	Moving average/Time constant settings	
4	CH3 Averaging time, count		4	CH4 Average time/Average number of times/	
4	Cris Averaging time, count	R/W	4	Moving average/Time constant settings	R/W
5	CH4 Averaging time, count	1000	5	CH5 Average time/Average number of times/	
3	O'14 Averaging time, count		3	Moving average/Time constant settings	
6	CH5 Averaging time, count		6	CH6 Average time/Average number of times/	
O	one Averaging lime, count		O	Moving average/Time constant settings	
7	CH6 Averaging time, count		7	CH7 Average time/Average number of times/	
•	One Averaging lime, count		,	Moving average/Time constant settings	
8	CH7 Averaging time, count		8	CH8 Average time/Average number of times/	
O	OTT Averaging lime, count		O	Moving average/Time constant settings	
9	CH8 Averaging time, count		9	System area (Not used)	-
10	CH1 Digital output value		10	A/D conversion completed flag	
11	CH2 Digital output value		11	CH1 Digital output value	
12	CH3 Digital output value		12	CH2 Digital output value	
13	CH4 Digital output value		13	CH3 Digital output value	
14	CH5 Digital output value	R	14	CH4 Digital output value	
15	CH6 Digital output value		15	CH5 Digital output value	R
16	CH7 Digital output value		16	CH6 Digital output value	IX.
17	CH8 Digital output value		17	CH7 Digital output value	
18	Write data error code		18	CH8 Digital output value	
19	A/D conversion completed flag		19	Error code	
20	Resolution setting	R/W	20	Setting range (CH1 to CH4)	
			21	Setting range (CH5 to CH8)	
			22	Offset/gain setting mode Offset specification	
			23	Offset/gain setting mode Gain specification	
			24	Averaging process specification (CH1 to	R/W
			'	CH4)	
			25	Averaging process specification (CH5 to CH8)	
			26		
			27	System area (Not used)	
			28	System area (Not useu)	-
			29		
			30	CH1 Maximum value	
			31	CH1 Minimum value	
			32	CH2 Maximum value	
			33	CH2 Minimum value	R
			34	CH3 Maximum value	'`
			to		
			44	CH8 Maximum value	
			45	CH8 Minimum value	

	Q68AD-G	
Address	Name	Read/write
(Dec.)		
46	System area (Not used)	-
47	Input signal error detection extended/input	504
- 10	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	OUR OF IT	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	OHA lamest singed construction of the construc	
150	CH1 Input signal error detection upper limit	
	setting value	
to		
158	Mode switching setting	R/W
159		
to		D
200	Save data classification setting	R/W
201	System area (Not used)	-
202	CH1 Factory default offset value	
203	CH1 Factory default gain value	
to		R/W
232	CH8 Factory default offset value	
233	CH8 Factory default gain value	

# 3 ANALOG OUTPUT MODULE REPLACEMENT

## 3.1 List of Analog Output Module Alternative Models for Replacement

Production disco	ntinuation		Transition to Q series			
Product	Model	Model	Remarks (Restrictions)			
	A616DAI	Q68DAIN	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			
	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			
	ACCIDA	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	A62DA	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:			
	A62DA S1	Q62DAN	Cable size is changed.     Number of slots : Not changed     The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.     Performance specifications change: Not changed     Functional specifications: Not changed			
	A62DA-S1 -	Q64DAN	Cable size is changed.     Number of slots : Not changed     Nord changed     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 dis	Production discontinuation		Transition to Q series		
Product	Model	Model	Remarks (Restrictions)		
			1) External wiring : Cable size is changed. 2) Number of slots: : Not changed		
Analog output	A68DAV	Q68DAVN	3) Program : The number of occupied I/O points, I/O signals, and buffer memory addresses are changed.		
module			4) Performance specifications change:		
			Increase in current consumption		
			5) 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	
	A62DA	Q62DAN	ERNT-AQT62DA	
	A62DA-S1	QUZDAN	LINITAG 102DA	
Analog output module	A68DAV	Q68DAVN		
	A68DAI	Q68DAIN	ERNT-AQT68DA	
	A68DAI-S1	QUODAIN		

#### (2) Two slot type

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

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

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)					
Digital inpat	Setting range: 0 to 4095					
	0 to 20mADC					
Analog output	(External load resistance value: $0\Omega$ to $600\Omega$ )					
	(External load resistance value, 052 to 00052)	_				
	Digital input Analog output					
I/O characteristics	+4000 +20mA					
	+2000 +12mA					
	0 4mA					
Digital value resolution	1/4000					
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					
Campling period	·					
Conversion time	0.5ms					
	(Time required for conversion from 0 to 20mA/20mA to 0mA)					
Absolute maximum output	-					
No. of analog output channels	16 channels/module					
110. Of analog output chamiles	TO CHAIITEIS/ITIOUUIE					
Number of writes to E ² PROM	-					
Output short protection	-					

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

						O : Compatible	, △ : Partial change required, ×: Incompatit
		Q68E	AIN			Compatibility	Precautions for replacement
16-bit signed binary							
	(Normal	resolution m	0				
	High res	solution mod	e: -12288 t	o 12287)			
		0 to 20	mADC				
	(External l	oad resistan	ce value: 0	$\Omega$ to $600\Omega$ )		0	
		Normal reso	lution mode	High resolu	tion mode		
Analo	g output	Digital input	Maximum	Digital input	Maximum		
ra	inge	value	resolution	value	resolution	0	
	0 to 20mA		5µA		1.66µA		
Current	4 to 20mA	0 to 4000	4µA	0 to 12000	1.33µA		
Current	User range	-4000 to	1.5µA	-12000 to	0.83μΑ		
	settings	4000	1.5μΑ	12000	0.05μΑ	0	
A	Ambient temp	erature 25±5	°C: within ±	±0.1% (±20µ/	۹)		
Aı	mbient tempe	rature 0 to 5	5°C: within	±0.3% (±60µ	ıA)	0	
		-					
		80µs/cł	nannel			0	
21mA						0	
8 channels/module						Δ	Consider replacement with multiple
o channeis/module						Δ	Q68DAIN.
		Max. 100,0	000 times			0	
		Avail	able			0	

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

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

	O . O	, — a
Q68DAIN	Compatibility	Precautions for replacement
Between the I/O terminal and programmable controller power supply:		
photocoupler isolation		
Between output channels: non-isolation	0	
Between external power supply and analog output: transformer isolation		
Between the I/O terminal and programmable controller power supply:	0	
500VAC, for 1 minute	0	
Between the I/O terminal and programmable controller power supply:	0	
500VDC, 20M $\Omega$ or more	0	
16 points		The number of occupied I/O points
(I/O assignment: intelligent 16 points)	Δ	has changed to 16 points.
18-point terminal block	×	
0.3 to 0.75mm ²	×	Wiring change is required.
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	Δ	The recalculation of internal current
0.0071		consumption (5VDC) is required.
24VDC +20%, -15%		
Ripple, spike 500mV _{P-P} or less		As the external power supply has
0.27A	×	changed from ±15V to 24V, its change
 2.5A 230µs or less	_	is required.
0.20kg	Δ	

## 3.2.2 Functional comparison

O: With functions, -: Without functions

Item	Description	A616DAI		Precautions for replacement
	Specifies whether to enable or disable the D/A conversion			
D/A conversion enable/	for each channel.	_	_	
disable function	By disabling the D/A conversion for the channels that are	0	0	
	not used, the conversion speed can be shortened.			
	Specifies whether to output the D/A conversion value or the			On Q68DAIN, the output
D/A output enable/	offset value for each channel.			enable/disable is set with Y
disable function	The conversion speed stays constant regardless of	0	0	signal (CH□ Output enable/
	whether D/A output is enabled or disabled.			disable flag).
	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			
Synchronous output	"programmable controller CPU processing time + 120µs"			
function	has elapsed.	-	0	
	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.			
	Country   110 Office   110 Office   Country   110 Office   110 Office   Country   110 Office   110 Office			Refer to ("Analog output
				status combination list" in
				the Digital-Analog
	Retains an analog value that was output when the			Converter Module User's
Analog output HOLD/	Retains an analog value that was output when the programmable controller CPU is in the STOP status or an			Manual to check the
CLEAR function	error occurs.	0	0	execution status of output.
	citor dodars.			2) For the Q68DAIN, this
				function is set with the
				intelligent function module
				switch setting.
	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.			
Analog output test while	status.			
the programmable	Setting D/A conversion Enable Disable	_	0	
controller CPU is in the	Setting enable/disable Enable Disable			
STOP status	nation CH□ Output enable/disable flag Enable Disable Enable Disable Disable			
	Not			
	Analog output test Allowed Allowed Not allowed			
	Switches the resolution mode according to the application.			
Resolution mode	The resolution can be selected from 1/4000 or 1/12000.	_	0	
	The resolution mode is batch-set for all channels.			
Online module				Replaceable modules during
replacement	Replaces a module without stopping the system.	-	0	online are the Process CPU
теріасеттеті				and the Redundant CPU.

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

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

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

A616DAI				Q68DAIN				
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used	
X1	D/A conversion READY flag	Y1		X1		Y1	CH1 Output enable/ disable flag	
X2	Error flag	Y2		X2		Y2	CH2 Output enable/ disable flag	
Х3		Y3		Х3		Y3	CH3 Output enable/ disable flag	
X4		Y4		X4	Not used	Y4	CH4 Output enable/ disable flag	
X5		Y5		X5		Y5	CH5 Output enable/ disable flag	
X6		Y6	Not used	X6		Y6	CH6 Output enable/ disable flag	
X7		Y7		X7		Y7	CH7 Output enable/ disable flag	
X8		Y8		X8	High resolution mode status flag	Y8	CH8 Output enable/ disable flag	
X9		Y9		Х9	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		ХВ	Channel change completion flag	YB	Channel change request	
XC	Not used	YC		XC	Setting value change completion flag	YC	Setting value change request	
XD		YD	RFRP, RTOP instruction	XD	Synchronous output mode flag	YD	Synchronous output request	
XE		YE	interlock signal	XE	Not used	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10 X11		Y10 Y11						
X12 X13		Y12 Y13						
X14		Y14						
X15		Y15	Not used					
X16		Y16						
X17 X18		Y17 Y18						
X10		Y19						
X19 X1A		Y1A						
X1B		Y1B	Output enable batch flag					
X1C	1	Y1C	- Far annual Section Heigh					
X1D	DEDD DTOE:	Y1D						
X1E	RFRP, RTOP instruction	Y1E	Not used					
X1F	interlock signal	Y1F						

## 3.2.4 Buffer memory address comparison

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

	A616DAI	Q68DAIN				
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write	
0	D/A conversion enable/disable channel	R/W	0	D/A conversion enable/disable		
1	Analog output enable/disable channel	TX/VV	1	CH1 Digital value		
2			2	CH2 Digital value		
3			3	CH3 Digital value		
4			4	CH4 Digital value	R/W	
5			5	CH5 Digital value		
6			6	CH6 Digital value		
7			7	CH7 Digital value		
8	System area (Not used)		8	CH8 Digital value		
9	System area (Not used)	-	9	System area (Not used)	_	
10			10	System area (Not used)	-	
11			11	CH1 Setting value check code		
12			12	CH2 Setting value check code		
13			13	CH3 Setting value check code		
14			14	CH4 Setting value check code		
15			15	CH5 Setting value check code		
16	CH0 Digital value		16	CH6 Setting value check code	R	
17	CH1 Digital value		17	CH7 Setting value check code		
18	CH2 Digital value		18	CH8 Setting value check code		
19	CH3 Digital value		19	Error code		
20	CH4 Digital value		20	Setting range (CH1 to CH4)		
21	CH5 Digital value		21	Setting range (CH5 to CH8)		
22	CH6 Digital value		22	Offset/gain setting mode Offset specification		
	017 8: 7. 1	D 444		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		29	System area (Not used)		
30	CHE Digital value		30	System area (Not used)	-	
31	CHF Digital value		31			
32			32			
to	System area (Not used)	-	to			
47			47			

	A616DAI			Q68DAIN	
Address			Address		
(decimal)	Name	Read/write	(decimal)	Name	Read/write
48	CH0 Setting value check code		48		
49	CH1 Setting value check code		49		
50	CH2 Setting value check code		50		
51	CH3 Setting value check code		51		
52	CH4 Setting value check code		52		
53	CH5 Setting value check code		53		
54	CH6 Setting value check code		54		
55	CH7 Setting value check code	R/W	55		
56	CH8 Setting value check code	17/77	56	System area (Not used)	
57	CH9 Setting value check code		57	System area (Not used)	_
58	CHA Setting value check code		58		
59	CHB Setting value check code		59		
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	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	-
			207	CH3 Industrial shipment settings offset value CH3 Industrial shipment settings gain value	-
			208	CH4 Industrial shipment settings gain value	-
			209	CH4 Industrial shipment settings onset value	1
			210	CH5 Industrial shipment settings gain 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	1
			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	1
			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	
			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	
			222	CHR Licor rango cottings gain value	1

233

CH8 User range settings gain value

## 3.3 A616DAV

## 3.3.1 Performance comparison

Item			A616DAV					
Digital input		16-bit signed binary (Data part: 12 bits)						
Digital input		Setting range: -4096 to 4095						
	When output voltage range setting is 10V:							
	-10V to 0V to +10V							
Analog output	(1)	External lo	ad resistance valu	ue: $2k\Omega$ to 1	$M\Omega$ )			
Arialog output		When out	put voltage range	e setting is 5	5V:			
			-5V to 0V to +5	5V				
	(I	External lo	ad resistance valu	ue: 2kΩ to 1	ΜΩ)			
	D	Digital input	Analog					
	<u> </u>		5V setting	10V settir	ng			
I/O characteristics	—	+4000	+5V +2.5V	+10V +5V				
	<del>                                   </del>	0	0V	0V				
		-2000	-2.5V	-5V				
		-4000	-5V	-10V				
Digital value resolution			1/4000					
Overall accuracy	Output voltage range setting		10V		5V			
(accuracy at maximum analog	Ambient temperature (0 to 55°C)		±0.6% (±60mV)		±0.6% (±30mV)			
output value)	Ambient temperature (25°C)		±0.3% (±30mV) ±0.3% (±15					
Sampling period	1.5 + 0.5 × (D/A number of conversion enabled channels) ms							
Conversion time	0.5ms							
Conversion time	(Time re	quired for o	conversion from -	10 to +10V/-	+10 to -10V)			
Absolute maximum output			15V					
No. of analog output channels			16 channels/mod	dule				
Number of writes to E ² PROM			-					
Output short protection			-					
	Pativoon the output termin	aal and nro	grammable centr	ollor power	ounnly, photocounly, icolation			
Isolation method	between the output termin	•	grammable contro DAV channels: no	•	supply: photocoupler isolation			
		70101	z, w onamicis. No	ar isolation				
Dielectric withstand voltage			-					
Insulation resistance			-					
Number of equipped 1/O no inte			32 points					
Number of occupied I/O points			signment: specia					
Connected terminal		;	38-point terminal					
Applicable wire size			0.75 to 2mm ²	2				
Applicable solderless terminal		V1.25-3,	V1.25-YS3A, V2-	·S3, V2-YS3	3A			
Internal current consumption (5VDC)			0.38A					

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

						O : Compatible,	△ : Partial change required, ×: Incompatible
		C	Q68DAVN			Compatibility	Precautions for replacement
		16-bit	signed binary	1			
	1)	Normal resoluti	on mode: -409	0			
	High resol	ution mode: -1	2288 to 12287				
-10 to 10VDC (External load resistance value: 1k $\Omega$ to 1M $\Omega$ )							
		Normal reso	olution mode	High resolut	ion mode		
	log output	Digital input	Maximum	Digital input	Maximum		When using A616DAV in [-5 to + 5V]
	range	value	resolution	value	resolution		range, Q68DAV can obtain equivalent
	0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV	0	resolution or more than A616DAV by
	1 to 5V	0 10 1000	1.0mV		0.333mV		setting in [-10 to 10V] range/high
Voltage	-10 to 10V		2.5mV	-16000 to 16000	0.625mV		resolution mode or user range.
	User range settings	-4000 to 4000	0.75mV	-12000 to 12000	0.333mV		
						0	
	Amhien	t temperature 2	25+5°C: Withir	n ±0.1% (±10mV)			
_		•		in ±0.3% (±30mV		0	
					,		
	-						
		80	µs/channel			0	
			±12V			0	
		8 cha	innels/module			Δ	Consider replacement with multiple Q68DAVN.
		Max.	100,000 times	;		0	
		,	Available			0	
В	etween the I/C	terminal and	programmable	controller power	supply:		
		photoc	oupler isolatio	n			
	Е	Between output	channels: no	n-isolation		0	
				utput: transformer			
B	etween the I/C		-	controller power	supply:	0	
_			C, for 1 minut				
B	etween the I/C			e controller power	supply:	0	
500VDC, 20M $\Omega$ or more 16 points							The number of occupied I/O points
(I/O assignment: intelligent 16 points)						Δ	has changed to 16 points.
18-point terminal block					×	nas shanged to 10 points.	
0.3 to 0.75mm ²					×		
<del>                                     </del>	FG termin			I.25-3, V1.25-YS3	RA	1	Wiring change is required.
	i C tomilli		her than FG: F		<i></i> .	×	Jg
	(Sle	eved solderles					
	,		0.38A	,		0	

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

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

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

## 3.3.2 Functional comparison

O: With functions, -: Without functions

Item	Description	A616DAV		Precautions for replacement
D/A conversion	Specifies whether to enable or disable the D/A conversion			
enable/disable	for each channel. By disabling the D/A conversion for the	0	0	
function	channels that are not used, the conversion speed can be		0	
Turicuori	shortened.			
	Specifies whether to output the D/A conversion value or the			On Q68DAVN, the output
D/A output enable/	offset value for each channel.	0	0	enable/disable is set with Y
disable function	The conversion speed stays constant regardless of			signal (CH□ Output enable/
	whether D/A output is enabled or disabled.			disable flag).
	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			
Synchronous output	"programmable controller CPU processing time + 120μs"		_	
function	has elapsed.	-	0	
	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.			Refer to ("Analog output
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	status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output. 2) For the Q68DAVN, this function is set with the intelligent function module switch setting.
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CH□ Output enable/disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.    Setting	-	0	
	Analog output test Allowed allowed Not allowed			
Resolution mode	Switches the resolution mode according to the application. The resolution can be selected from 1/4000, 1/12000, or 1/16000.  The resolution mode is batch-set for all channels.	-	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

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

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

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

	A616DAV				Q68DAVN			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used	
X1	D/A conversion READY flag	Y1		X1		Y1	CH1 Output enable/ disable flag	
X2	Error flag	Y2		X2		Y2	CH2 Output enable/ disable flag	
Х3		Y3		Х3		Y3	CH3 Output enable/ disable flag	
X4		Y4		X4	Not used	Y4	CH4 Output enable/ disable flag	
X5		Y5		X5		Y5	CH5 Output enable/ disable flag	
X6		Y6	Not used	X6		Y6	CH6 Output enable/ disable flag	
X7		Y7		X7		Y7	CH7 Output enable/ disable flag	
X8		Y8		X8	High resolution mode status flag	Y8	CH8 Output enable/ disable flag	
X9		Y9		Х9	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	
XC	Not used	YC		XC	Setting value change completion flag	YC	Setting value change request	
XD		YD	RFRP, RTOP instruction	XD	Synchronous output mode flag	YD	Synchronous output request	
XE		YE	interlock signal	XE	Not used	YE	Not used	
XF		YF		XF	Error flag	YF	Error clear request	
X10 X11		Y10 Y11						
X12		Y12						
X13		Y13 Y14						
X14 X15		Y15	Not used					
X16		Y16	Not used					
X17		Y17						
X18		Y18						
X19		Y19						
X1A	1	Y1A						
X1B		Y1B	Output enable batch flag					
X1C		Y1C						
X1D	RFRP, RTOP instruction	Y1D	Not used					
X1E	interlock signal	Y1E	TNOT USEU					
X1F	microok orginal	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	Name	Read/write	Address	Name	Read/write	
(decimal)	D/A conversion enable/disable channel		(decimal)	D/A conversion enable/disable		
0	Analog output enable/disable channel	R/W	1	CH1 Digital value		
2	Analog output enable/disable channel		2	CH2 Digital value		
3			3	CH3 Digital value		
4			4	CH4 Digital value	H R/W	
5			5	CH5 Digital value		
6			6	CH6 Digital value		
7			7	CH7 Digital value		
8			8	CH8 Digital value		
9	System area (Not used)	-	9	Of to Digital value		
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	$\dashv$ 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)		
	-	1		Offset/gain setting mode		
22	CH6 Digital value		22	Offset specification		
	a a			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

	A616DAV			Q68DAVN	
Address			Address		
(decimal)	Name	Read/write	(decimal)	Name	Read/write
48	CH0 Setting value check code		48		
49	CH1 Setting value check code		49		
50	CH2 Setting value check code	1	50		
51	CH3 Setting value check code		51		
52	CH4 Setting value check code		52		
53	CH5 Setting value check code		53		
54	CH6 Setting value check code		54		
55	CH7 Setting value check code	R/W	55		
56	CH8 Setting value check code	17/77	56	System area (Not used)	_
57	CH9 Setting value check code		57	Cystom area (Not assa)	
58	CHA Setting value check code		58		
59	CHB Setting value check code		59		
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	Mode switching setting	R/W
			159		
			160	(A)	
			to	System area (Not used) 	-
			201	CHA Industrial chipment acttings offset value	
			202	CH1 Industrial shipment settings offset value	-
			203	CH1 Industrial shipment settings gain value CH2 Industrial shipment settings offset value	-
			204	CH2 Industrial shipment settings gain value	-
			206	CH3 Industrial shipment settings gain value	1
			207	CH3 Industrial shipment settings onset value	1
			208	CH4 Industrial shipment settings gain value	+
			209	CH4 Industrial shipment settings gain value	-
			210	CH5 Industrial shipment settings offset value	-
			211	CH5 Industrial shipment settings gain value	1
			212	CH6 Industrial shipment settings offset value	-
			213	CH6 Industrial shipment settings gain value	1
			214	CH7 Industrial shipment settings offset value	1
			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	1
			220	CH2 User range settings offset value	1
			221	CH2 User range settings gain value	1
			222	CH3 User range settings offset value	1
			223	CH3 User range settings gain value	]
			224	CH4 User range settings offset value	
			225	CH4 User range settings gain value	
			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	1
			233	CH8 User range settings gain value	<u> </u>

## 3.4 A62DA (Replacement to the Q62DAN)

## 3.4.1 Performance comparison

Item	A62DA						
Digital input	Maximum setting value  Voltage: ±2000  Current: ±1000						
Analog output	Voltage: -10 to 0 to +10VDC (External load resistance value: $500\Omega$ to $1M\Omega$ )  Current: +4 to +20mADC (External load resistance value: $0\Omega$ to $600\Omega$ )  *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, △: Partial change required, ×: Incompatible

Analog output range	Q62DAN  16-bit signed binary  Normal resolution mode: -4096 to 4095  High resolution mode: -12288 to 12287, -16384 to 16383  Voltage: -10 to 10VDC  (External load resistance value: $1 \text{k}\Omega$ to $1 \text{M}\Omega$ )  Current: 0 to $20 \text{mADC}$ (External load resistance value: $0 \Omega$ to $600 \Omega$ )							Compatibility	△: Partial change required, ×: Incompatible  Precautions for replacement  According to the I/O conversion  characteristics used, make the output range setting and offset/gain setting of the Q62DAN.  The minus current cannot be output.
(voltage: ±10mV, current: ±20μA) Ambient temperature 0 to 55°C: within ±0.3% (voltage: ±30mV, current: ±60μA)  80μs/channel  Voltage: ±12V Current: 21mA  2 channels/module  Max. 100,000 times  O  O  The minus current cannot be output.	Voltage	0 to 5V 1 to 5V -10 to 10V User range settings 0 to 20mA 4 to 20mA User range settings	Digital input value 0 to 4000 -4000 to 4000 0 to 4000 -4000 to 4000 -4000 to 4000	Maximum resolution 1.25mV 1.0mV 2.5mV 0.75mV $5 \mu A 4 \mu A$ 1.5 $\mu A$	Digital input value  0 to 12000  -16000 to 16000  -12000 to 12000  0 to 12000  -12000 to 12000	Maximum resolution 0.416mV 0.333mV 0.625mV 0.333mV 1.66 \( \mu A \)		Δ	characteristics used, make the output range setting and offset/gain setting
Voltage: ±12V Current: 21mA  2 channels/module  Max. 100,000 times  O  The minus current cannot be output.	(voltage: ±10mV, current: ±20μA) Ambient temperature 0 to 55°C: within ±0.3%							0	
Current: 21mA  2 channels/module  Max. 100,000 times	80µs/channel							0	
Max. 100,000 times O	_						Δ	The minus current cannot be output.	
								0	

Ito	em	A62DA			
Isolation metho	od	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 terr	minal	20-point terminal block			
Applicable wire	size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)			
Applicable sold	lerless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A			
Internal current (5VDC)	t consumption	0.6A			
External	Voltage	21.6 to 26.4VDC			
power supply	Current consumption	0.35A			
	Inrush current	2.4A			
Weight		0.5kg			

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

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

## 3.4.2 Functional comparison

O: Available, -: Not available

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

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

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

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

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/
Λ1	DIA CONVEISION NEAD I			Λ1			disable flag
X2		Y2		X2		Y2	CH2 Output enable/
							disable flag
X3		Y3		X3	Not used	Y3	
X4 X5		Y4 Y5		X4 X5		Y4 Y5	
X6		Y6		X6		Y6	Not used
X7		Y7		X7		Y7	Not used
					High resolution mode		
X8		Y8		X8	status flag	Y8	
					Operating condition		Operating condition
X9		Y9		X9	setting completion flag	Y9	setting request
\/A		>/^		Offset/gain setting mode	\/A		
XA		YA	Not used	XA	status flag	YA	User range write request
XB		YB	Not used	X K	Channel change	YB	Channel change request
ΛD		ТD			completion flag	TD	Channel change request
XC		YC		XC	Setting value change	YC	Setting value change
					completion flag	10	request
XD		YD		XD	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 X11		Y10 Y11					
X11		Y12					
X12		Y13					
X14		Y14					
X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18	CPU selection signal				
X19	1	Y19	Sign of CH1 digital input				
X1A		Y1A	Sign of CH2 digital input				
X1B		Y1B	Output enable				
X1C		Y1C					
X1D		Y1D	Not used				
X1E		Y1E	110. 4004				
X1F		Y1F					

## 3.4.4 Buffer memory address comparison

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

A62DA				Q62DAN			
Address	Name	Read/write	Address	Name	Read/write		
(decimal)	Name	Reau/write	(decimal)	Name	Read/Wille		
0	CH1 Digital value		0	D/A conversion enable/disable			
1	CH2 Digital value		1	CH1 Digital value	R/W		
2	CH1 Voltage setting value check code	R/W	2	CH2 Digital value			
3	CH2 Voltage setting value check code	17/77	3				
4	CH1 Current setting value check code		4				
5	CH2 Current setting value check code		5	System area (Not used)	-		
			to				
			10				
			11	CH1 Setting value check code	R		
			12	CH2 Setting value check code			
			13				
			to	System area (Not used)	-		
			18				
			19	Error code	R		
			20	Setting range (CH1 to CH2)			
			21	System area (Not used)	-		
			22	Offset/gain setting mode			
				Offset specification			
			23	Offset/gain setting mode			
				Gain specification			
			24	Offset/gain adjusted value specification			
			25				
			to	System area (Not used)	-		
			157				
			158	Mode switching setting	R/W		
			159	g county			
			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			

3 ANALOG OUTPUT MODULE REPLACEMENT

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 $ (\text{External load resistance value: } 500\Omega \text{ to } 1\text{M}\Omega) \\ \text{Current: } +4 \text{ to } +20\text{mADC} \\ \text{(External load resistance value: } 0\Omega \text{ to } 600\Omega) \\ ^*\text{Current output is usable by } -20 \text{ to } +20\text{mA}. $					
I/O characteristics	Digital input					
Maximum resolution	Voltage: 5mV (1/2000) Current: 20μA (1/1000)					
Overall accuracy (accuracy at maximum analog output value)	±1% (voltage: ±0.1V, current: ±0.2mA)					
Maximum conversion speed	Within 15ms/2 channels (same time for one channel)  Note) Time from when the digital input is written to when the specified analog voltage (current) is reached					
Absolute maximum output	Voltage: ±12V Current: ±28mA Note) Max. output voltage and current restricted by output protection circuit					
Number of analog output points	2 channels/module					
Number of writes to E ² PROM  Output short protection	<u>-</u>					

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

Q64DAN  16-bit signed binary (Normal resolution mode: -4096 to 4095, High resolution mode: -12288 to 12287, -16384 to 16383)  Voltage: -10 to 10VDC (External load resistance value: $1 \text{k}\Omega$ to $1 \text{M}\Omega$ ) Current: 0 to $20 \text{mADC}$ (External load resistance value: $0 \Omega$ to $0 \Omega$ )						Compatibility	According to the I/O conversion characteristics used, make the output range setting and offset/gain setting of the Q64DAN.  The minus current cannot be output.
Voltage	output range  0 to 5V  1 to 5V  -10 to 10V  User range settings  0 to 20mA  4 to 20mA  User range settings		esolution ode  Maximum resolution 1.25mV 1.0mV 2.5mV 0.75mV 5 \( \mu \) A 4 \( \mu \) A 1.5 \( \mu \) A	High res mod Digital input value 0 to 12000 -16000 to 16000 -12000 to 12000 -12000 to 12000	de	Δ	According to the I/O conversion characteristics used, make the output range setting and offset/gain setting of the Q64DAN.
	(volt Ambient te	age: ±10m\	V, current: : 0 to 55°C:	within ±0.3%		0	
	80μs/channel					0	
	Voltage: ±12V Current: 21mA					Δ	The minus current cannot be output.
	4 channels/module						
	Max. 100,000 times						
		Ava	ilable	0			

It	em	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 terminal		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					

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

	O . Compatible, A . I artial change required, A. Incompatible			
Q64DAN	Compatibility	Precautions for replacement		
Between the I/O terminal and programmable controller power supply:				
photocoupler isolation				
Between output channels: non-isolation	0			
Between external power supply and analog output: transformer isolation				
Between the I/O terminal and programmable controller power supply:	0			
500VAC, for 1 minute	0			
Between the I/O terminal and programmable controller power supply:				
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	Δ			

## 3.5.2 Functional comparison

O: Available, -: Not available

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

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

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

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

A62DA				Q64DAN			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error	Y0		X0	Module READY	Y0	Not used
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/
							disable flag
X2		Y2		X2		Y2	CH2 Output enable/ disable flag
							CH3 Output enable/
X3		Y3		Х3	Not used	Y3	disable flag
X4		Y4		X4		Y4	CH4 Output enable/
							disable flag
X5		Y5		X5		Y5	
X6 X7		Y6 Y7		X6 X7		Y6 Y7	Not used
		17			High resolution mode	17	Not used
X8		Y8		X8	status flag	Y8	
X9		Y9		X9	Operating condition	Y9	Operating condition
					setting completion flag Offset/gain setting mode		setting request
XA		YA	Not used	XA	status flag	YA	User range write request
XB		YB		XB	Channel change completion flag	YB	Channel change request
XC		YC		XC	Setting value change completion flag	YC	Setting value change request
	Not used				Synchronous output		Synchronous output
XD		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 Y13					
X13 X14		Y14					
X14 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	l			
X1B		Y1B	Output enable				
X1C		Y1C					
X1D		Y1D	Not used				
X1E X1F		Y1E Y1F					
ATE		TIF					

#### 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		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	_	
			13	CH3 Setting value check code	R	
			14	CH4 Setting value check code		
			15			
			to	System area (Not used)	-	
			18			
			19	Error code		
			20	Setting range (CH1 to CH4)	R	
			21	System area (Not used)	-	
			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	Mode awitching actting	R/W	
			159	Mode switching setting	IN/VV	
			160			
			to	System area (Not used)	-	
			199			
			200	Pass data classification setting	R/W	
			201	System area (Not used)	-	
			204	CH2 Industrial shipment settings offset value		
			205	CH2 Industrial shipment settings gain value		
			206	CH3 Industrial shipment settings offset value		
			207	CH3 Industrial shipment settings gain value		
			208	CH4 Industrial shipment settings offset value		
			209	CH4 Industrial shipment settings gain value		
			210	CH1 User range settings offset value	R/W	
			211	CH1 User range settings gain value		
			212	CH2 User range settings offset value		
			213	CH2 User range settings gain value		
			214	CH3 User range settings offset value		
			215	CH3 User range settings gain value		
			216	CH4 User range settings offset value		
			217	CH4 User range settings gain value	1	

3 ANALOG OUTPUT MODULE REPLACEMENT MELSEC

Memo		

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

#### 3.6.1 Performance comparison

Item			A62DA-S	<b>S1</b>				
Digital input		0 to +4000						
Analog output		Voltage: 0 to +10VDC (External load resistance value: $500\Omega$ to $1M\Omega$ )  Current: +4 to +20mADC (External load resistance value: $0\Omega$ to $600\Omega$ )  *Current output is usable by 0 to +20mA.						
I/O characteristics		Output range 0 to 10V 0 to 5V 0 to 20mA 1 to 5V 4 to 20mA	0 to 10V					
Maximum	Voltage	1 to 5V: 1mV (1/4000) 0 to 5V: 1.25mV (1/4000) 0 to 10V: 2.5mV (1/4000)						
resolution	Current	4 to 20mA: 4μA (1/4000) 0 to 20mA: 5μA (1/4000)						
Overall accura (accuracy at moutput value)	cy naximum analog	(Refer to *1.)						
Maximum conv	version speed	Within 15ms/2 channels (same time for one channel)  Note) Time from when the digital input is written to when the specified analog voltage (current) is reached						
Absolute maximum output		Note) Max. output voltage	Voltage: 0 to Current: 0 to + e and current res	+28mA	tection circuit			
Number of analog output points		,	2 channels/m	<u> </u>				
	tes to E ² PROM		-					
Output short p	rotection		-					

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

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

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

			O : Compatible,	O : Compatible, △ : Partial change required, ×: Incompatible			
		Q62	2DAN			Compatibility	Precautions for replacement
Hig	Normal h resolution i	resolution r		0			
_	-10 to 10VDC 0 to 20mADC		0				
Analog output range  0 to 5V 1 to 5V 1 to 5V Voltage -10 to 10V User range settings 0 to 20mA Current 4 to 20mA User range settings		Digital input value  0 to 4000  -4000 to 4000  0 to 4000  -4000 to 4000  -4000 to 4000	esolution ode  Maximum resolution 1.25mV 1.0mV 2.5mV 0.75mV 5 \( \mu \) A 4 \( \mu \) A 1.5 \( \mu \) A	High res mo Digital input value 0 to 12000 -16000 to 16000 -12000 to 12000 0 to 12000 -12000 to 12000	de	0	
	(volt Ambient te	age: ±10m\	/, current: ± 0 to 55°C:	within ±0.3%		0	
		80µs/	channel	0			
		Voltag Currer	0				
		2 channe	els/module	0			
		Max. 100	),000 times	i		0	
		Ava	ilable			0	

Ito	em	A62DA-S1				
Isolation metho	od	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 terr	minal	20-point terminal block				
Applicable wire	e size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)				
Applicable sold	lerless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A				
Internal current (5VDC)	t consumption	0.6A				
External	Voltage	21.6 to 26.4VDC				
power supply	Current consumption	0.35A				
	Inrush current	2.4A				
Weight		0.5kg				

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

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

## 3.6.2 Functional comparison

O: Available, -: Not available

Item	Description	A62DA-S1	Q62DAN	Precautions for replacement
Analog output HOLD/CLEAR function	Retains an analog value before Output enable signal turns off when the Output enable signal is off.	0	0	1) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.  2) For the Q62DAN, this function is set with the intelligent function module switch setting.
D/A conversion enable/disable function	Specifies whether to enable or disable the D/A conversion.	-	0	
D/A output enable/disable function	Specifies whether to output the D/A conversion value or the offset value.	0	0	The Q62DAN specifies whether to enable or disable output for each channel.
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.	-	0	
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when 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	1		CH1 Output enable/		
	Bit Conversion (CE)					Y1	disable flag		
X2		Y2		X2		Y2	CH2 Output enable/		
		\/2		V2	Nat	\/2	disable flag		
X3 X4		Y3 Y4		X3 X4	Not used	Y3 Y4			
X5		Y5		X5		Y5			
X6		Y6		X6		Y6	Not used		
X7		Y7		X7		Y7	Trot dood		
					High resolution mode				
X8		Y8		X8	status flag	Y8			
V0		\/O		V0	Operating condition	\/O	Operating condition		
X9		Y9		X9	setting completion flag	Y9	setting request		
XA		YA		XA	Offset/gain setting mode	YA	User range write request		
		IA		^^	status flag	iΛ	Osci range write request		
XB		YB		ХВ	Channel change completion flag	YB	Channel change request		
			Not used	ot used			<u> </u>		
XC		YC		XC	Setting value change	YC	Setting value change		
				completion flag		request Synchronous output			
XD	Not used	YD		XD	Synchronous output mode flag	YD	request		
XE	Not used	YE		XE	Not used	YE	Not used		
XF		YF		XF	Error flag	YF	Error clear request		
X10		Y10		7			Ziror olodi roquoot		
X11		Y11							
X12		Y12							
X13		Y13							
X14		Y14							
X15		Y15							
X16		Y16							
X17		Y17							
X18	1	Y18							
X19 X1A		Y19 Y1A							
X1A X1B		Y1B	Output enable						
X1C		Y1C	Output Ollabie						
X1D		Y1D							
X1E	1	Y1E	Not used						
X1F		Y1F							

#### 3.6.4 Buffer memory address comparison

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

	A62DA-S1		Q62DAN				
Address	Name	Read/write	Address	Name	Read/write		
(decimal)	Name	Reau/write	(decimal)	Name	Reau/write		
0	CH1 Digital value		0	D/A conversion enable/disable			
1	CH2 Digital value		1	CH1 Digital value	R/W		
2	CH1 Upper limit check code	R/W	2	CH2 Digital value			
3	CH1 Lower limit check code	TX/VV	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	10		
			13				
			to	System area (Not used)	-		
			18				
			19	Error code	R		
			20	Setting range (CH1 to CH2)			
			21	System area (Not used)	-		
			22	Offset/gain setting mode			
				Offset specification			
			23	Offset/gain setting mode	R/W		
			20	Gain specification			
			24	Offset/gain adjusted value specification			
			25				
			to	System area (Not used)	-		
			157				
			158	Mode switching setting	R/W		
			159	INOCC SWILDING SCHING	1077		
			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			
			CH2 Industrial shipment settings gain value	R/W			
		206	CH1 User range settings offset value				
			207	CH1 User range settings gain value			
				CH2 User range settings offset value			
			209	CH2 User range settings gain value			

3 ANALOG OUTPUT MODULE REPLACEMENT

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

#### 3.7.1 Performance comparison

It	em	A62DA-S1					
Digital input		0 to +4000					
Analog output		Voltage: 0 to +10VDC (External load resistance value: $500\Omega$ to $1M\Omega$ ) Current: +4 to +20mADC (External load resistance value: $0\Omega$ to $600\Omega$ ) *Current output is usable by 0 to +20mA.					
I/O characteris	tics	Output range 0 to 10V 0 to 5V 0 to 20mA 1 to 5V 4 to 20mA	Digital input + 4000 0 + 4000 0 + 4000 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 (1/4000) 0 to 20mA: 5μA (1/4000)					
Overall accura (accuracy at m output value)	cy aximum analog	(Refer to *1.)					
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: 0 to +12V  Current: 0 to +28mA  Note) Max. output voltage and current restricted by output protection circuit					
Number of ana points	log output		2 channels/m				
Number of writ	es to E ² PROM		-				
Output short pr	rotection	-					

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

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

							O : Compatible, △ : Partial change required, ×: Incompatible		
		Q64	1DAN				Compatibility	Precautions for replacement	
Higl	(Normal n resolution n	resolution			0				
-	-10 to 10VDC 0 to 20mADC	•			0				
Analog  Voltage  Current	output range  0 to 5V  1 to 5V  -10 to 10V  User range settings  0 to 20mA  4 to 20mA  User range settings	Normal r mc Digital input value 0 to 4000  -4000 to 4000  0 to 4000  -4000 to 4000	ode	High res mo Digital input value 0 to 12000 -16000 to 16000 -12000 to 12000 0 to 12000 -12000 to 12000	de		0		
	(volt Ambient te	emperature age: ±10m\ emperature age: ±30m\	/, current: ± 0 to 55°C:		0				
		80µs/	channel		0				
Voltage: ±12V Current: 21mA							0		
		4 channe	els/module		0				
		Max. 100	,000 times				0		
		Ava	ilable				0		

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

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

	o : companie, — : a ana onango roquirou, : moompanie				
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:					
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	Δ				

## 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	1) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.  2) For the Q64DAN, this function is set with the intelligent function module switch setting.
D/A conversion enable/disable function	Specifies whether to enable or disable the D/A conversion.	-	0	
D/A output enable/disable function	Specifies whether to output the D/A conversion value or the offset value.	0	0	The Q64DAN specifies whether to enable or disable output for each channel.
Synchronous output function	Obtains analog output synchronized with the programmable controller CPU.	-	0	
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when 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.

	A62DA-S1				Q64DAN				
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name		
X0	Watchdog timer error	Y0		X0	Module READY	Y0	Not used		
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/		
							disable flag		
X2		Y2		X2		Y2	CH2 Output enable/ disable flag		
							CH3 Output enable/		
Х3		Y3		Х3	Not used	Y3	disable flag		
X4		Y4		X4		Y4	CH4 Output enable/		
							disable flag		
X5		Y5		X5		Y5			
X6		Y6		X6		Y6	M. f d		
X7		Y7		X7	High resolution mode	Y7	Not used		
X8		Y8		X8	status flag	Y8			
X9		Y9		X9	Operating condition	Y9	Operating condition		
					setting completion flag Offset/gain setting mode		setting request		
XA		YA		XA	status flag	YA	User range write request		
XB		YB	Not used	XB	Channel change completion flag	YB	Channel change request		
хс		YC		XC	Setting value change completion flag	YC	Setting value change request		
	Not used				Synchronous output		Synchronous output		
XD		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 X13		Y12 Y13							
X14		Y14							
X15		Y15							
X16		Y16							
X17		Y17							
X18		Y18							
X19		Y19							
X1A		Y1A	Output anable						
X1B X1C		Y1B Y1C	Output enable						
X1D		Y1D							
X1E		Y1E	Not used						
X1F		Y1F							

#### 3.7.4 Buffer memory address comparison

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

	A62DA-S1			Q64DAN			
Address	Name	Read/write	Address	Name	Read/write		
(decimal)		Ttoda, Wilto	(decimal)		rtodd, write		
0	CH1 Digital value		0	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		4	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				
			19	Error code	R		
			20	Setting range (CH1 to CH4)			
			21	System area (Not used)	-		
			22	Offset/gain setting mode			
				Offset specification			
				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	g county			
			160				
			to	System area (Not used)	-		
			199				
			200	Pass data classification setting	R/W		
			201	System area (Not used)	-		
			202	CH1 Industrial shipment settings offset value			
			203	CH1 Industrial shipment settings gain value			
			204	CH2 Industrial shipment settings offset value			
			205	CH2 Industrial shipment settings gain value			
			206	CH3 Industrial shipment settings offset value			
			207	CH3 Industrial shipment settings gain value			
			208	CH4 Industrial shipment settings offset value			
			209	CH4 Industrial shipment settings gain value	R/W		
			210	CH1 User range settings offset value	1 1 7 7 7		
			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	1		
			216	CH4 User range settings offset value	1		
			210	Of 14 Osci Tange settings onset value			

3 ANALOG OUTPUT MODULE REPLACEMENT MELSEC

Memo		

# 3.8 A68DAI(-S1)

## 3.8.1 Performance comparison

Item A68DAI (-S1) (1)16-bit signed binary									
		(2)Setting range:	пагу						
Digital input			Set r			Setting ra	ange		
				1/4000		0 to 40	00		
				1/8000		0 to 80	00		
				1/12000		0 to 120	000		
Analog output					0 to 20mA	VDC			
Analog output				(External loa	nd resistance	value: $0\Omega$ to $600$	θΩ)		
				Diç	gital value resol	ution	*Analog		
				1/4000	1/8000	1/12000	output value		
I/O characteris	stics		Digital	4000	8000	12000	+20mA		
			input	2000	4000	6000	+12mA		
			value	0	0	0	+4mA		
		*When offset value 4mA, gain value 20mA settings							
NAi	1/4000		5.0µA						
Maximum resolution of	1/8000				2.5µA				
analog value	1/12000				1.6µA				
Overall accura (accuracy at moutput value)	naximum analog	±1.0% (±200µA)							
Conversion speed			W	ithin 40ms/8 cl	hannels (sam	e time for one c	hannel)		
Conversion sp	Note) Time	Note) Time from when the digital input is written to when the specified analog value is reached							
Absolute maxi				0 to +28n					
Absolute maximum output  Note) Max. output current restricted by output protection circuit									
Number of ana points	alog output			8 channels/m	nodule				

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

					O : Compatible,	△ : Partial change required, ×: Incompatible
	G	68DAIN			Compatibility	Precautions for replacement
	16-bit (Normal resolution High resolution r		6 to 4095,		0	
1)	0 to External load resis	20mADC tance value: 0	0			
Current	output	alue resolution $ \begin{array}{c} 5\mu A \\ 4\mu A \end{array} $ to $ \begin{array}{c} 15\mu \Delta \end{array} $		Maximum resolution 1.66μA 1.33μA	0	
	ient temperature 2 ent temperature 0				0	
80µs/channel				0		
		21mA			0	
	8 chai	nels/module			0	

It	em	A68DAI (-S1)					
Number of writ		-					
Output short pr		-					
Isolation metho	od	Between the output terminal and programmable controller power supply: photocoupler isolation (Between channels: non-isolation)					
Dielectric withs	tand voltage	-					
Insulation resis	tance	-					
Number of occ	upied I/O points	32 points (I/O assignment: special 32 points)					
Connected terr	ninal	38-point terminal block					
Applicable wire	size	0.75 to 2mm ² (Applicable tightening torque: 39 to 59N•cm)					
Applicable solo	lerless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
Internal current (5VDC)	consumption	0.15A					
Enternal	Voltage	21.6 to 26.4VDC					
External power supply	Current 0.4A						
	Inrush current	-					
Weight		0.65kg					

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

 Q68DAIN	Compatibility	Precautions for replacement
Max. 100,000 times	0	
Available	0	
Between the I/O terminal and programmable controller power supply:		
photocoupler isolation		
Between output channels: non-isolation	0	
Between external power supply and analog output: transformer isolation		
Between the I/O terminal and programmable controller power supply:	0	
500VAC, for 1 minute	0	
Between the I/O terminal and programmable controller power supply:	0	
500VDC, 20M $\Omega$ or more	O	
16 points	Δ	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
0.30A	Δ	consumption (5VDC) is required.
24VDC +20%, -15%		
Ripple, spike 500mVp-p or less		
0.27A		
2.5A, 230μs or less	-	
0.20kg	Δ	

## 3.8.2 Functional comparison

O: Available, -: Not available

		A COD AL	000	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	1) On Q68DAIN, the setting of HOLD/CLEAR is carried out for each channel. 2) For the Q68DAIN, this function is set with the intelligent function module switch setting. 3) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status of output.
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CH□ Output enable/disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.    D/A conversion	-	0	
Resolution mode	Switches the resolution mode according to the application.  The resolution can be selected from 1/4000 or 1/12000.  The resolution mode is batch-set for all channels.	0	0	
Online module replacement	Replaces a module without stopping the system.	-	0	Replaceable modules during online are the Process CPU and the Redundant CPU.

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

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

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

	A68DA	d (-S1)			Q68I	DAIN	
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/
7(1	flag			Λ1		•	disable flag
X2	Error flag	Y2		X2		Y2	CH2 Output enable/
							disable flag
Х3		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
					Operating condition		Operating condition
X9		Y9		X9	setting completion flag	Y9	setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
ХВ		YB		XB	Channel change completion flag	YB	Channel change request
XC	Not used	YC		XC	Setting value change completion flag	YC	Setting value change request
XD		YD	Interlock signal for the RFRP and RTOP	XD	Synchronous output mode flag	YD	Synchronous output request
XE		YE	instructions when the	XE	Not used	YE	Not used
XF		YF	A68DAI(-S1) is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10					
X11		Y11					
X12		Y12					
X13		Y13	D/A conversion output				
X14		Y14	enable flag				
X15		Y15					
X16		Y16					
X17		Y17	Francis de la constantina				
X18 X19		Y18 Y19	Error reset flag				
X19 X1A		Y1A					
X1B		Y1B					
X1C		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		Dandhamita	Address		Decelhorite	
(decimal)	Name	Read/write	(decimal)	Name	Read/write	
0	D/A conversion enable/disable channel		0	D/A conversion enable/disable		
1	CH1 Digital value		1	CH1 Digital value	1	
2	CH2 Digital value		2	CH2 Digital value	1	
3	CH3 Digital value		3	CH3 Digital value	1	
4	CH4 Digital value	R/W	4	CH4 Digital value	R/W	
5	CH5 Digital value	T K/VV	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)		
			22	Offset/gain setting mode		
			22	Offset specification		
			23	Offset/gain setting mode	R/W	
			23	Gain specification		
			24	Offset/gain adjusted value specification		
			25			
			to	System area (Not used)	-	
			157			
			158	Mode switching setting	R/W	
			159	wode switching setting	IX/VV	
			160			
			to	System area (Not used)	-	
			201			
			202	CH1 Industrial shipment settings offset value		
			203	CH1 Industrial shipment settings gain value		
			204	CH2 Industrial shipment settings offset value		
			205	CH2 Industrial shipment settings gain value	R/W	
			206	CH3 Industrial shipment settings offset value		
			207	CH3 Industrial shipment settings gain value		
			208	CH4 Industrial shipment settings offset value		

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

## 3.9 A68DAV

## 3.9.1 Performance comparison

It	em				A68DAV					
		(1)16-bit signed bi	nary							
		(2)Setting range:								
		, ,								
Digital input			S	etting resolution		Setting range				
				1/4000		-4000 to 4				
			1/8000			-8000 to 8				
				1/12000		-12000 to 1	12000			
Analassa			-10 to 0 to 10VDC							
Analog output			(External load resistance value: $2k\Omega$ to $1M\Omega$ )							
				•			•			
				5.	2.1.1.1.1.1		1	٦		
					ital value resolu		*Analog output value			
				1/4000 4000	1/8000 8000	1/12000 12000	+10V	_		
I/O characteris	tics		Digital	2000	4000	6000	+10V +5V	_		
" O GIAI ACIEIIS			Digital input	0	0	0	0V	1		
			value	-2000	-4000	-6000	-5V	1		
				-4000	-8000	-12000	-10V	1		
				I		l.	1	_		
	144065			*When offset \		value 10V sett	ings			
Maximum	1/4000				2.5mV					
resolution of	1/8000				1.25mV					
analog value	1/12000				0.83mV					
Overall accura										
	aximum analog				±1.0% (±100i	mV)				
output value)										
Conversion spe	eed		Within 40ms/8 channels (same time for one channel)							
		Note) Time	ote) Time from when the digital input is written to when the specified analog value is reached							
Absolute maxir	num output		-12 to +12V							
			Note) M	ax. output voltage restricted by output protection circuit						
Number of ana	log output			;	8 channels/mo	odule				
points	•									
Number of writ	es to E ² PROM				-					
Output short pr	otection									
Isolation metho	nd	Between the output terminal and programmable controller power supply: photocoupler isolation								
isolation metho	, a		(Between channels: non-isolation)							
Dielectric withs	tand voltage									
Dielectric withs	tand voltage				<u>-</u>					
Insulation resis	tance		-							
	au ioc				<u>-</u>					
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 wife	SIZE			(Applicable ti	ightening torqu	ie: 39 to 59N•c	:m)			
					·					
Applicable solo	lerless terminal			V1.25-3, V	/1.25-YS3A, V	2-S3, V2-YS3A	١			
Internal current	consumption				0.454					
(5VDC)	(115Δ									

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

	Q68DAVN							Precautions for replacement
			16-bit s ormal resolutior ution mode: -12	)	Compatibility			
		-10 to 10VD	C (External loa	2)	0			
	_	g output inge  0 to 5V  1 to 5V  -10 to 10V  User range settings	Normal reso Digital input value 0 to 4000  -4000 to 4000	lution mode Maximum resolution 1.25mV 1.0mV 2.5mV 0.75mV	High resolut Digital input value 0 to 12000 -16000 to 16000 -12000 to 12000	ion mode  Maximum resolution 0.416mV 0.333mV 0.625mV	0	
					±0.1% (±10mV) ±0.3% (±30mV)		0	
			80µ:	s/channel			0	
				±12V			0	
			8 chan	nels/module			0	
			Max. 10	00,000 times			0	
			Av	/ailable			0	
		Вє	photoco etween output o	upler isolation hannels: non-			0	
	Betv	ween the I/O		ogrammable o	controller power s	supply:	0	
	Bet	ween the I/O	terminal and pr		controller power	supply:	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 FG terminal: R1.25-3, 1.25-YS3, RAV1.25-3, V1.25-YS3A  Terminals other than FG: R1.25-3						×	·
							×	Wiring change is required.
		(Slee	ved solderless	terminal cann ).38A	ot be used.)		Δ	The recalculation of internal current consumption (5VDC) is required.

Ite	em	A68DAV	
F. 4	Voltage	21.6 to 26.4VDC	
nower supply	Current consumption	0.2A	
	Inrush current	-	
Weight		0.6kg	

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

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

## 3.9.2 Functional comparison

O: Available, -: Not available

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	1) On Q68DAVN, the setting of HOLD/CLEAR is carried out for each channel. 2) For the Q68DAVN, this function is set with the intelligent function module switch setting. 3) Refer to ("Analog output status combination list" in the Digital-Analog Converter Module User's Manual to check the execution status output.	
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		
Analog output test while the programmable controller CPU is in the STOP status	Outputs the analog value converted from a digital value when CH□ Output enable/disable flag is forcibly turned on while the programmable controller CPU is in the STOP status.    Setting	-	0		
Resolution mode	Switches the resolution mode according to the application.  The resolution can be selected from 1/4000, 1/12000, or 1/16000.  The resolution mode is batch-set for all channels.	0	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	Device Signal name		ce Signal name Device		Signal name		vice Signal name	
No.	Signal name	No.	Signal name	No.	Signal name	No.	Signal hame	
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used	
X1	D/A conversion READY	Y1		X1		Y1	CH1 Output enable/	
7(1	flag			Λ.		• •	disable flag	
X2	Error flag	Y2		X2		Y2	CH2 Output enable/	
7.=						. –	disable flag	
Х3		Y3		Х3		Y3	CH3 Output enable/	
							disable flag	
X4		Y4		X4	Not used	Y4	CH4 Output enable/	
							disable flag	
X5		Y5		X5		Y5	CH5 Output enable/	
							disable flag	
X6		Y6		X6		Y6	CH6 Output enable/	
			Not used				disable flag	
X7		Y7		X7		Y7	CH7 Output enable/	
					High resolution mode		disable flag CH8 Output enable/	
X8		Y8		X8	status flag	Y8	disable flag	
					Operating condition		Operating condition	
X9		Y9		X9	setting completion flag	Y9	setting request	
					Offset/gain setting mode		Setting request	
XA		YA		XA	status flag	YA	User range write request	
					Channel change			
XB		YB		XB	completion flag	YB	Channel change request	
					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 flog	YF	Error clear request	
<b>Λ</b> Γ		TF	remote I/O station	<b>Λ</b> Γ	Error flag	1 -	Enoi clear request	
X10		Y10					_	
X11		Y11						
X12		Y12						
X13		Y13	D/A conversion output					
X14		Y14	enable flag					
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18 Y19	Error reset flag					
X19 X1A		Y19 Y1A						
X1B		Y1B						
X1C		Y1C						
X1D	Interlock signal for the	Y1D	Not used					
X1E	RFRP and RTOP	Y1E						
, <u>_</u>	instructions when the							
X1F	A68DAV is used in	Y1F						
	remote I/O station							
	I .							

#### 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	Nama	Doodhuuita	Address				
(decimal)	Name	Read/write	(decimal)	Name	Read/write		
0	D/A conversion enable/disable channel		0	D/A conversion enable/disable			
1	CH1 Digital value	1	1	CH1 Digital value			
2	CH2 Digital value CH3 Digital value CH4 Digital value CH5 Digital value R/W		2	CH2 Digital value			
3			3	CH3 Digital value			
4			4	CH4 Digital value			
5			5	CH5 Digital value	R/W		
6	CH6 Digital value			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)			
				Setting range (CH1 to CH4)			
				Setting range (CH5 to CH8)			
				Offset/gain setting mode			
				Offset specification			
				Offset/gain setting mode	R/W		
				Gain specification			
		24	Offset/gain adjusted value specification				
		25					
			to	System area (Not used)	-		
		157					
				Mode switching setting	R/W		
		159	Wode switching setting				
		160					
				System area (Not used)	-		
			201				
			202	CH1 Industrial shipment settings offset value			
			203	CH1 Industrial shipment settings gain value			
			204	CH2 Industrial shipment settings offset value			
			205	CH2 Industrial shipment settings gain value	R/W		
			206	CH3 Industrial shipment settings offset value			
			207	CH3 Industrial shipment settings gain value			
		208	CH4 Industrial shipment settings offset value				

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

# 4

## TEMPERATURE INPUT MODULE REPLACEMENT

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

Production di	iscontinuation	Transition to Q series				
Product	Model	Model		Remarks (Restrictions)		
	A616TD ^{*1} A60MXT(N)	Q64TD	2) Number of slots : Char A60N 3) Program : The			
		Q68TD-G-H02 Q68TD-G-H01	Number of slots : Char     A60N     Program : The     addr     Performance specifications:     Functional specifications:	nector wiring and cable size are changed. nged (2 modules are required when one A616TD and one MXT(N) are used.) number of occupied I/O points, I/O signals, and buffer memory esses are changed. ns change: 8CH/module The disconnection detection function is equipped (only in the TD-G-H02). Transformer isolation is provided between channels.		
	A68RD3N	Q64RD	2) Number of slots: : Char 3) Program : The			
Temperature input module		Q64RD-G	Number of slots : Char     Program : The     addr     Performance specifications:     Functional specifications:	e size is changed.  nged (2 modules are required.)  number of occupied I/O points, I/O signals, and buffer memory esses are changed.  ns change: 4CH/module  RTD Ni100-compliant and transformer isolation is provided een channels.		
		Q68RD3-G	2) Number of slots : Not of a slots : The addr slots and slots and slots are specifications: 5) Functional specifications:	nector wiring and cable size are changed. changed number of occupied I/O points, I/O signals, and buffer memory esses are changed. ns change: Resolution and conversion speed 32-bit output is not available. RTD Ni100-compliant and eformer isolation is provided between channels.		
	A68RD4N	Q64RD	Number of slots : Char     Program : The     addr     Performance specifications     Functional specifications:	Not changed		
		Q64RD-G	Number of slots : Char     Program : The addr     Performance specifications: Functional specifications:	e size is changed.  nged (2 modules are required.)  number of occupied I/O points, I/O signals, and buffer memory  esses are changed.  ns change: 4CH/module  RTD Ni100-compliant and transformer isolation is provided  een channels.		

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

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

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

## 4.2 A616TD (Replacement to the Q64TD)

#### 4.2.1 Performance comparison

#### (1) Performance comparison list

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

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

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

^{+ (}Cold junction compensation accuracy)

An operating ambient temperature variation indicates a deviation of the operating ambient temperature from the 25±5°C range.

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

Q64TD		Compatibility	Precautions for replacement
			r recautions for replacement
-270 to 1820°C		0	
16-bit signed binary (Scaling va	ılue)	0	
16-bit signed binary (-2700 to 18200: value up to the first decin	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).	Δ	As they depend on the applicable thermocouple and measured	
*1		0	temperature range, refer to Section 4.2.1 (2) to check the specifications.
40ms/channel		0	
Isolated area  Isolation method  Between thermocouple input and earth  Between thermocouple input channels  Between cold junction  Isolation Dielectric withstar voltage  Transformer isolation  1780VrmsAC/3 cycl (altitude 2000m)	resistance 500VDC 100M Ω or more	0	
compensation input (Pt100) and ground	-		
4 channels/module		×	Consider replacement with multiple Q64TD.
16 points (I/O assignment: intelligent 16 po	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	×		
0.50A		0	
 0.25kg		Δ	

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

A616TD								
JIS	JIS ANSI		BS	Measurement range number	1	2	3	4
	Altoi	DIN	30	Allowable input voltage range [mV]	-12.5 to 12.5	0 to 25	0 to 50	0 to 100
В	В	_	PtRh30-	Measured temperature range [°C]	100 to 1500	100 to 1800	100 to 1800	100 to 1800
Ь	, B	-	PtRh6	Accuracy at 25°C [%] Temperature drift [%/°C]	-	±0.5 ±0.013	-	-
R	R		PtRh13-Pt	Measured temperature range [°C]	0 to 1000	0 to 1700	0 to 1700	0 to 1700
K	K	-	PIRITIS-PI	Accuracy at 25°C [%] Temperature drift [%/°C]	-	±0.4 ±0.011	_	-
		DiDI. Di	DIDL 40 DI	Measured temperature range [°C]	0 to 1200	0 to 1700	0 to 1700	0 to 1700
S	S	PtRh-Pt	PtRh10-Pt	Accuracy at 25°C [%] Temperature drift [%/°C]	-	±0.4 ±0.011	-	-
		NiCr-Ni	NiCr-NiAl	Measured temperature range [°C]	-200 to 250	0 to 500	0 to 1000	0 to 1300
K	К			Accuracy at 25°C [%] Temperature drift [%/°C]	±0.4 ±0.011	±0.3 ±0.01	±0.3 ±0.01	±0.5 ±0.013
	_	-	NiCr-CuNi	Measured temperature range [°C]	-200 to 150	0 to 300	0 to 600	0 to 1000
E	E			Accuracy at 25°C [%]	±0.4	±0.3	±0.3	±0.4
				Temperature drift [%/°C]	±0.011	±0.01	±0.01	±0.011
J	J	_	Fe-CuNi	Measured temperature range [°C]	-200 to 200	0 to 400	0 to 800	0 to 1200
o o		-	re-cuivi	Accuracy at 25°C [%]	±0.4	±0.3	±0.3	±0.4
				Temperature drift [%/°C]	±0.011	±0.01	±0.01	±0.011
Т	Т		Cu-CuNi	Measured temperature range [°C]	-200 to 200	0 to 400	0 to 400	0 to 400
•			Ou Ourti	Accuracy at 25°C [%]	±0.5	±0.3	_	_
				Temperature drift [%/°C]	±0.013	±0.01		
		Eo CuNi		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
		Cu CuNi		Measured temperature 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	

			Q64TD			
JIS			Specifications			
313	Magazirad tamparatura		Specifications		1700 to	
	Measured temperature	0 to 600	600 to 800	800 to 1700	1820	
	range [°C] Conversion accuracy at				1620	
В			±3.0	±2.5		
	25±0.5°C [°C]	-			-	
	Temperature characteristics		±0.4	±0.4		
	[°C]				4000 to	
	Measured temperature	-50 to 0	0 to 300	300 to 1600	1600 to	
	range [°C]				1760	
R	Conversion accuracy at		±2.5	±2.0		
	25±0.5°C [°C]	-			_	
	Temperature characteristics		±0.4	±0.3		
	[°C]					
	Measured temperature	-50 to 0	0 to 300	300 to 1600	1600 to	
	range [°C]				1760	
S	Conversion accuracy at		±2.5	±2.0		
	25±0.5°C [°C]	_			_	
	Temperature characteristics		±0.4	±0.3		
	[°C]		·			
	Measured temperature	-270 to -200	-200 to 0	0 to 1200	1200 to	
	range [°C]				1370	
K	Conversion accuracy at		Larger value of ±0.5°C, or ±0.5%	Larger value of ±0.5°C, or		
	25±0.5°C [°C]	_	of measured temperature	±0.25% of measured temperature	_	
	Temperature characteristics		Larger value of ±0.06°C, or	Larger value of ±0.06°C, or		
-	[°C]		±0.2% of measured temperature	±0.02% of measured temperature		
	Measured temperature	-270 to -200	-200 to 0	0 to 900	900 to 1000	
	range [°C]					
	Conversion accuracy at		Larger value of ±0.5°C, or ±0.5%	Larger value of ±0.5°C, or		
E	25±0.5°C [°C]		of measured temperature	±0.25% of measured temperature		
	Temperature characteristics	- Larger value of ±0.06°C, or		Larger value of ±0.06°C, or	-	
	[°C]		±0.15% of measured	±0.02% of measured temperature		
			temperature			
	Measured temperature	-210 to -40	-40 to 750	750 to 1200	_	
	range [°C]					
	Conversion accuracy at		Larger value of ±0.5°C, or			
J	25±0.5°C [°C]	-	±0.25% of measured	-	-	
	[ . ]		temperature			
	Temperature characteristics		Larger value of ±0.06°C, or			
	[°C]	-	±0.02% of measured	-	-	
			temperature			
	Measured temperature	-270 to -200	-200 to 0	0 to 350	350 to 400	
	range [°C]					
Т	Conversion accuracy at	_	Larger value of ±0.5°C, or ±0.5%	Larger value of ±0.5°C, or	_	
	25±0.5°C [°C]		of measured temperature	±0.25% of measured temperature		
	Temperature characteristics	_	Larger value of ±0.06°C, or	Larger value of ±0.06°C, or	_	
	[°C]		±0.1% of measured temperature	±0.02% of measured temperature		
	Measured temperature	-270 to -200	-200 to 0	0 to 1250	1250 to	
	range [°C]				1300	
N	Conversion accuracy at	_	Larger value of ±0.5°C, or ±0.5%	Larger value of ±0.5°C, or	-	
• •	25±0.5°C [°C]		of measured temperature	±0.25% of measured temperature	re	
	Temperature characteristics	_	Larger value of ±0.06°C, or	Larger value of ±0.06°C, or	_	
	[°C]		±0.2% of measured temperature	±0.02% of measured temperature	1	

## 4.2.2 Functional comparison

O: Available, -: Not available

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

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

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

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

	A61		Q64TD				
Device No.		Device No.	Signal name	Device No.	Signal name	Device 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 status signal	Y1	CH1 Offset setting 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 setting completion signal	Y9	Operating condition setting request
XA		YA		XA	Offset/gain setting mode status flag	YA	User range write request
XB		YB		XB	Not used	YB	
XC		YC		XC	Disconnection detection signal	YC	Not used
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used
XE		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 Y14					
X14 X15		Y15					
X16		Y16					
X17		Y17					
X18		Y18					
X19		Y19	Not used				
X1A		Y1A					
X1B X1C		Y1B Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
	instructions when the	.,_					
X1F	A616TD is used in	Y1F					
	remote I/O station						

#### 4.2.4 Buffer memory address comparison

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

	A616TD		Q64TD			
Address (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		
02	Error occurrence A60MX□CONNECT No. storage	R/W	02	CH2 Time/count averaging setting	R/W	
03	Thermocouple type setting error channel number storage		03	CH3 Time/count averaging setting		
04	Current sampling period storage	R	04	CH4 Time/count averaging setting		
05 to 0E	System area (Not used)	-	05 to 08	System area (Not used)	-	
0F	Conversion enable/ A616TD		09	Averaging processing selection	R/W	
10 to 17	disable specification Multiplexer module	R/W	0A	Conversion completion flag		
18	Setting data set request		0B	CH1 Measured temperature value		
19 to 1F	System area (Not used)	-	0C	CH2 Measured temperature value		
20 to 27	Disconnection detection enable/disable specification	R/W	0D	CH3 Measured temperature value	R	
28 to 2F	System area (Not used)	-	0E	CH4 Measured temperature value		
30 to 3F	Digital output value temperature setting		0F to 12	System area (Not used)	-	
40 to 47	Disconnection detection channel number storage	R/W	13	Error code	R	
48 to 4F	System area (Not used)	-	14	Setting range		
	Digital output value out-of-range	5	15 to 2E	System area (Not used)	-	
50 to 57	Channel number storage	R/W	2F	Warning output enable/disable setting	R/W	
58 to 5F	System area (Not used)	-	30	Warning output flag		
004-07	Detected temperature value out-of-range	DAM	31	Disconnection detection flag		
60 to 67	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		
70107F	Digital output value storage	K	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	TN/VV	3E	CH1 Scaling range lower limit value		
180 to 1FF	MX CH.channel		3F	CH1 Scaling range upper limit value		
100 to 11 1	Digital output value storage	- R	40	CH2 Scaling range lower limit value		
200 to 27F	MX CH.channel	1	41	CH2 Scaling range upper limit value	R/W	
200 to 271	Detected temperature value storage		42	CH3 Scaling range lower limit value	1000	
			43	CH3 Scaling range upper limit value		
			44	CH4 Scaling range lower limit value		
			45	CH4 Scaling range upper limit value		
			46 to 4D	System area (Not used)	-	
			4E	CH1 Scaling width lower limit value		
			4F	CH1 Scaling width upper limit value		
			50	CH2 Scaling width lower limit value	_	
			51	CH2 Scaling width upper limit value	1	
			52	CH3 Scaling width lower limit value	R/W	
			53	CH3 Scaling width upper limit value	1	
			54	CH4 Scaling width lower limit value	1	
			55	CH4 Scaling width upper limit value	1	
			56	CH1 Warning output lower/lower limit value	4	
			57	CH1 Warning output lower/upper limit value		

	Q64TD	
Address	Name	Read/write
(hex)	Hamo	rtoad/Witto
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	
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	IX/VV
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)	
В0	CH3 Factory default offset value	
B1	CH3 Factory default gain value	
	, ,	

Q64TD					
Address (hex)	Name	Read/write			
B2	CH3 User range settings offset value				
B3	CH3 User range settings gain value				
B4	CH3 User range settings thermal(L)				
B5	EMF offset value(H)				
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	17/77			
BA	CH4 User range settings offset value				
BB	CH4 User range settings gain value				
ВС	CH4 User range settings thermal(L)				
BD	EMF offset value(H)				
BE	CH4 User range settings thermal(L)				
BF	EMF gain value(H)				
C0	System area (Not used)				
to	System area (Not used)	-			

## 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	
•	i i	16-bit signed binary	
	Digital output value	(0 to 4000) (Data part: 12 bits)	
Output	Detected	16-bit signed binary	
	temperature value	(-2000 to 18000: value up to the first decimal place × 10)	
Applicab	ole thermocouple	Refer to Section 4.3.1 (2).	
Measure	ed temperature range	Refer to Section 4.3.1 (2).	
Overall a	occuracy.	Refer to the table in Section 4.3.1 (2).	
Overalla	accuracy	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)	
Disconne	ection detection	Available	
	of temperature sensor	15 points/module (A60MXT, A60MXTN)	
input poi	nts	(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)	
	connection system	38-point terminal block	
(sold sep	device connector	-	
(sold set	Jarately)	0.75 to 2mm ²	
Applicab	le wire size	(Applicable tightening torque: 39 to 59N•cm)	
Applicab	le solderless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
	current consumption		
(5VDC)	2	1.0A	
Weight		0.85kg	
J			<u> </u>

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

					O . Compatible,	△ : Partial change required, ×: Incompatible		
	Q68TD-G-H02	Q serie	es Q68TD-G-	H01 ^{*1}	Compatibility	Precautions for replacement		
		-270 to 182			0			
	16-bit s	igned binary	(Scaling value)		0			
	(-2700 to 18200: v	16-bit signed	binary e first decimal place >	· 10)	0			
	Re	fer to Section	ı 4.3.1 (2).		Δ	As they depend on the applicable thermocouple and thermocouple standard, refer to Section 4.3.1 (2) and check the specifications. Use the thermocouple that can be used on the Q68TD-G-H02/H01.		
	Re	fer to Section	1 4.3.1 (2).		Δ	As they depend on the applicable thermocouple and measured		
		*2			0	temperature range, refer to Section 4.3.1 (2) to check the specifications.		
	640ms/8 channels*3		320ms/8 cha	annels ^{*3}	0			
	Isolated area  Between thermocouple input and programmable controller power supply  Between thermocouple input channels  Between cold junction compensation input (Pt100) and programmable controller power supply	Isolation method  Transformer isolation  Transformer isolation	AC1000Vrms/1min	Insulation resistance  DC500V 10MΩ or more	0			
	Available (all the channels are independent	ndent)	Not avail	able	×	The Q68TD-G-H01 has the disconnection monitor function.		
	8 channels + c	nannels conn	ected to Pt100/modul	e	×	Consider replacement with multiple Q68TD-G-H02/H01.		
	(I/O ass	16 poin gnment: intell	ts ligent 16 points)		Δ	The number of occupied I/O points has changed to 16 points.		
		40-pin conr	nector		×			
	A6CON4				A6CON4		×	Wiring change is required.
	0.3mm ² (22 AWG) or less					g shange is roquired.		
		<u>-</u>			×			
	0.65A		0.49		0			
	0.22kg		0.18k	g	Δ			

- *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.
  - $(Accuracy) = (Conversion\ accuracy) + (Temperature\ characteristics) \times (Operating\ ambient\ temperature\ variation)$
  - + (Cold junction compensation accuracy)
  - An operating ambient temperature variation indicates a deviation of the operating ambient temperature from the 25±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	·	_	J	
313	ANOI BIN		В	Allowable input voltage range [mV]	-12.5 to 12.5	0 to 25	0 to 50	0 to 100
В	В		PtRh30-	Measured temperature range [°C]	100 to 1500	100 to 1800	100 to 1800	100 to 1800
Б	В	-	PtRh6	Accuracy at 25°C [%]		±0.5		
				Temperature drift [%/°C]	] -	±0.013	-	-
R	R		PtRh13-Pt	Measured temperature range [°C]	0 to 1000	0 to 1700	0 to 1700	0 to 1700
K	K	-	FIRITS-FI	Accuracy at 25°C [%]		±0.4		
				Temperature drift [%/°C]	-	±0.011	-	
s	S	PtRh-Pt	PtRh10-Pt	Measured temperature range [°C]	0 to 1200	0 to 1700	0 to 1700	0 to 1700
3	3	i dan-i t	T tixiiio-i t	Accuracy at 25°C [%]	_	±0.4	_	_
				Temperature drift [%/°C]	_	±0.011		
IZ.	K	NIO - NI	NIC - NIAI	Measured temperature range [°C]	-200 to 250	0 to 500	0 to 1000	0 to 1300
K	K	NiCr-Ni	NiCr-NiAl	Accuracy at 25°C [%]	±0.4	±0.3	±0.3	±0.5
				Temperature drift [%/°C]	±0.011	±0.01	±0.01	±0.013
٦	E		NiCr-CuNi	Measured temperature range [°C]	-200 to 150	0 to 300	0 to 600	0 to 1000
E	E	-		Accuracy at 25°C [%]	±0.4	±0.3	±0.3	±0.4
				Temperature drift [%/°C]	±0.011	±0.01	±0.01	±0.011
7	J		Fe-CuNi	Measured temperature range [°C]	-200 to 200	0 to 400	0 to 800	0 to 1200
J	3	_	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
Т	Т		Cu-CuNi	Measured temperature range [°C]	-200 to 200	0 to 400	0 to 400	0 to 400
'	'	-	Cu-Culvi	Accuracy at 25°C [%]	±0.5	±0.3		_
				Temperature drift [%/°C]	±0.013	±0.01	-	
		Fe-CuNi		Measured temperature range [°C]	-100 to 200	0 to 400	0 to 800	0 to 900
-	-   -		-	Accuracy at 25°C [%]		±0.3	±0.3	±0.5
				Temperature drift [%/°C]		±0.01	±0.01	±0.013
		Cu CuNi		Measured temperature range [°C]	-100 to 200	0 to 400	0 to 600	0 to 600
-	-	Cu-CuNi	-	Accuracy at 25°C [%]		±0.3	±0.4	
				Temperature drift [%/°C]	-	±0.01	±0.011	

		Q68TD-G-H02, Q68TD-	-G-H01	
Applicable thermocouple type	Measured temperature range ^{*1}	Conversion accuracy (at operating ambient temperature 25±5°C)	Temperature characteristics (per operating ambient temperature variation of 1°C)	Maximum temperature error at ambient temperature of 55°C
	0 to 600°C	*3	*3	*3
	600 to 800°C*2	±3.0°C	.0.400	±13.0°C
В	800 to 1700°C*2	±2.5°C	±0.4°C	±12.5°C
	1700 to 1820°C	*3	*3	*3
	-50 to 0°C	*3	*3	*3
Б	0 to 300°C*2	±2.5°C	±0.4°C	±12.5°C
R	300 to 1600°C*2	±2.0°C	±0.3°C	±9.5°C
	1600 to 1760°C	*3	*3	*3
	-50 to 0°C	*3	*3	*3
0	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
К	-200 to 0°C*2	Larger value of ±0.5°C or ±0.5% of measured temperature	Larger value of ±0.06°C or ±0.2% of measured temperature	±11.0°C
K.	0 to 1200°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±9.0°C
	1200 to 1370°C	*3	*3	*3
	-270 to -200°C	*3	*3	*3
E	-200 to 0°C*2	Larger value of ±0.5°C or ±0.5% of measured temperature	Larger value of ±0.06°C or ±0.15% of measured temperature	±8.5°C
_	0 to 900°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±6.75°C
	900 to 1000°C	*3	*3	*3
	-210 to -40°C	*3	*3	*3
J	-40 to 750°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±5.625°C
	750 to 1200°C	*3	*3	*3
	-270 to -200°C	*3	*3	*3
т	-200 to 0°C*2	Larger value of ±0.5°C or ±0.5% of measured temperature	Larger value of ±0.06°C or ±0.1% of measured temperature	±6.0°C
,	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
N	0 to 1250°C*2	Larger value of ±0.5°C or ±0.25% of measured temperature	Larger value of ±0.06°C or ±0.02% of measured temperature	±9.375°C
	1250 to 1300°C	*3	*3	*3

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

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

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

## 4.3.2 Functional comparison

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

		,	, ,	
Item	Description	A616TD	Q68TD-G- H02/H01	Precautions for replacement
Temperature conversion function	Imports temperature data.	0	0	
Conversion enable/disable	Sets whether to enable/disable a	_	_	
function	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.

	A61		Q68TD-G-H02, Q68TD-G-H01				
Device	Signal name	Device	Signal name	Device	Signal name	Device	Signal name
No.		No.		No.		No.	
X0 X1	Watchdog timer error  A/D conversion READY	Y0 Y1		X0 X1	Module READY	Y0 Y1	-
X2	Error flag	Y2		X1 X2		Y2	-
Х3	Disconnection error detection	Y3		Х3		Y3	
X4	Digital output value out- of-range detection	Y4		X4		Y4	Not used
X5	Detected temperature value out-of-range	Y5		X5	Not used	Y5	Not useu
X6	detection	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
XC		YC		XC	Q68TD-G-H02: Disconnection detection signal Q68TD-G-H01: Disconnection status monitor signal	YC	Not used
XD		YD	Interlock signal for the	XD	Warning output signal	YD	
XE	Not used	YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE	
XF		YF	A616TD is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10	Detected temperature value LED display request signal				
X11		Y11					
X12		Y12					
X13 X14	-	Y13 Y14					
X15	-	Y15					
X16	-	Y16					
X17	•	Y17					
X18		Y18					
X19		Y19	Not used				
X1A		Y1A					
X1B		Y1B					
X1C		Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
X1F	instructions when the A616TD is used in	Y1F					
A I F	remote I/O station	TIF					
	TELLIOIS 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.

	A61	16TD			Q68TD-G-H02, Q68TD-G-H01	
Address			<b>5</b>	Address		<b>5</b> 1/ 1/
(hex)	Na	me	Read/write	(hex)	Name	Read/write
00	Data format selection			00	Conversion enable/disable setting	
0.4				044 00	CH1 to CH8 Time/count/moving average/	R/W
01	Error code storage			01 to 08	time constant setting	
00	Error occurrence A60I	MX□CONNECT No.	R/W	00	Out to a second (Mathematical)	
02	storage			09	System area (Not used)	-
	Thermocouple type se	etting error channel		0.4	0	
03	number storage			0A	Conversion completion flag	
04	Current sampling peri-	od storage	R	0B to 12	CH1 to CH8 Measured temperature value	
05 to 0E	System area (Not use	ed)	-	13	Error code	R
0.5	0	ACACTO		444.45	CH1 to CH8 Setting range (Thermocouple	
0F	Conversion enable/	A616TD	D///	14 to 15	type)	
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	
00.4. 07	Disconnection detection	on enable/disable	D/M/	4.0	Offset/gain setting mode (Offset	
20 to 27	specification		R/W	1A	specification)	
20.4- 25	Custom succ (Nicture	٦)		40	Offset/gain setting mode (Gain	DAV
28 to 2F	System area (Not use	a)	-	1B	specification)	R/W
30 to 3F	Digital output value te	mperature setting		1C	CH1 Offset temperature setting value	
40.4. 47	Disconnection detection	on channel number	R/W	45	OLIA O circ to construct of the construction	
40 to 47	storage			1D	CH1 Gain temperature setting value	
48 to 4F	System area (Not use	ed)	-		to	
50 to 57	Digital output value ou	ut-of-range	DAM	2B	CH8 Gain temperature setting value	R/W
50 to 57	Channel number stora	age	R/W	2C	System area (Not used)	-
					Q68TD-G-H02:Cold junction compensation	R
58 to 5F	System area (Not use	ed)	-	2D	setting state	K
					Q68TD-G-H01: System area	-
60 to 67	Detected temperature	value out-of-range	R/W	2E	Warning output enable/disable setting	R/W
00 10 07	Channel number stora	age	IT/VV	2F	Warning output flag (Process alarm)	
68 to 6F	System area (Not use	d)	-	30	Warning output flag (Rate alarm)	
					Q68TD-G-H02:Disconnection detection flag	R
70 to 7F	INPUT channel		R	31	Q68TD-G-H01:Disconnection status	
70 10 71	Digital output value st	gital output value storage			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	11/77	3B to 3D	System area (Not used)	-
180 to 1FF	MX CH.channel			3E	CH1 Scaling range lower limit value	R/W
100 to 11 F	Digital output value st	orage	- R	3F	CH1 Scaling range upper limit value	17/1/
200 to 27F	MX CH.channel		11		to	
200 10 27	Detected temperature	value storage		4D	CH8 Scaling range upper limit value	
				4E	CH1 Scaling width lower limit value	R/W
				4F	CH1 Scaling width upper limit value	
					to	
				5D	CH8 Scaling width upper limit value	]
				5E	CH1 Process alarm lower/lower limit value	R/W
				5F	CH1 Process alarm lower/upper limit value	
				60	CH1 Process alarm upper/lower limit value	

	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					
	CH1 to CH8 Rate alarm warning detection					
7E to 85	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 A3	Q68TD-G-H01:Disconnection state	R/W				
	conversion setting					
	Q68TD-G-H02:Conversion setting value for					
A6 to AD	disconnection detection					
AO IO AD	Q68TD-G-H01:Conversion setting value for					
	disconnection state					
AE to BD	System area (Not used)	-				
BE	CH1 Factory default offset value					
BF	CH1 Factory default gain value					
C0	CH1 User range settings offset value					
C1	CH1 User range settings gain value					
C2	CH1 User range settings thermal EMF offset					
	value (L)	R/W				
C3	CH1 User range settings thermal EMF offset					
	value (H)					
C4	CH1 User range settings thermal EMF gain					
	value (L)					
C5	CH1 User range settings thermal EMF gain					
	value (H)					
	to	Τ				
FC	CH8 User range settings thermal EMF gain					
	value (L)	R/W				
FD	CH8 User range settings thermal EMF gain	13,44				
	value (H)					

## 4.4 A68RD3N (Replacement to the Q64RD)

## 4.4.1 Performance comparison

Ite	em	A68RD3N					
Measuring met	nod	3-wire type					
		16-bit signed binary					
		-1800 to 6000					
Output (temper	ature	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					
		(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)					
Applicable plati	num RTD	JPt100					
		(JIS C1604-1981)					
		-180 to 600°C					
Measured	Pt100	$(27.10 \text{ to } 313.71\Omega)$					
temperature	15.100	-180 to 600°C					
range	JPt100	$(25.80 \text{ to } 317.28\Omega)$					
		,					
		±1%					
Accuracy		(accuracy at full scale)					
Resolution		0.025°C					
Conversion spe	ed	40ms/channel					
Number of anal	og input points	8 channels/module					
Output current t	for temperature	1 == 0					
detection		1mA					
Isolation metho	d	Between platinum RTD input and programmable controller power supply: photocoupler isolation					
isolation metric	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 of	detection	Detected per channel					
Number of occupied I/O points		32 points					
		(I/O assignment: special 32 points)					
External connection	_	38-point terminal block					
Applicable wire	size	0.75 to 2mm ²					
Applicable sold	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					

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

		•	△ : Partial change required, ×: Incompatible				
Q64RD		Compatibility	Precautions for replacement				
3/4-wire type		0					
16-bit signed binary							
-2000 to 8500	-2000 to 8500						
Value up to the first decimal place × 1	0	0					
32-bit signed binary							
-200000 to 850000							
Value up to the third decimal place × 10	000						
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 that can be used with the Q64RD.				
(JIS C 1604-1981)			that can be used with the Q64RD.				
-200 to 850°C							
		0					
-180 to 600°C							
Ambient temperature 0 to 55°C: ±0.25	%						
(accuracy relative to maximum value	)						
Ambient temperature 25±5°C: ±0.089	6	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 withstan voltage	d Insulation resistance						
Between platinum RTD input and programmable controller power supply  RTD input and programmable isolation 1780VrmsAC/3 cycle (altitude 2000m		0					
Between platinum RTD input and channel  Non-isolation -	resistance tester						
Detected per channel	Detected per channel						
	16 points (I/O assignment: intelligent 16 points)						
·							
18-point terminal block							
0.3 to 0.75mm ²		×	Mising a shape of the same of				
1.25-3, R1.25-3			Wiring change is required.				
(Sleeved solderless terminal cannot be u	sed.)	×					

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

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

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.)	O	Precautions for repracement
0.60A 0.17kg	Ο Δ	

## 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.

	A68F	RD3N		Q64RD					
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name		
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used		
X1	READY flag	Y1		X1	CH1 Offset/gain setting status signal	Y1	CH1 Offset setting request		
X2	Write data error flag	Y2		X2	CH2 Offset/gain setting status signal	Y2	CH1 Gain setting request		
Х3	CH1: Disconnection detection flag	Y3		Х3	CH3 Offset/gain setting status signal	Y3	CH2 Offset setting request		
X4	CH2: Disconnection detection flag	Y4		X4	CH4 Offset/gain setting status signal	Y4	CH2 Gain setting request		
X5	CH3: Disconnection detection flag	Y5		X5		Y5	CH3 Offset setting request		
X6	CH4: Disconnection detection flag	Y6	Not used	X6	Network	Y6	CH3 Gain setting request		
X7	CH5: Disconnection detection flag	Y7		X7	Not used	Y7	CH4 Offset setting request		
X8	CH6: Disconnection detection flag	Y8		X8		Y8	CH4 Gain setting request		
X9	CH7: Disconnection detection flag	Y9		X9	Operating condition setting completion signal	Y9	Operating condition setting request		
XA	CH8: Disconnection detection flag	YA		XA	Offset/gain setting mode status flag	YA	User range write request		
XB		YB		XB	Not used	YB			
XC		YC		XC	Disconnection detection signal	YC	Not used		
XD		YD	Interlock signal for the	XD	Warning output signal	YD	1140t d3Cd		
XE		YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE			
XF		YF	A68RD3N is used in remote I/O station	XF	Error flag	YF	Error clear request		
X10		Y10	Not used						
X11	N. t	Y11							
X12 X13	Not used	Y12 Y13	Error code reset flag						
X14		Y14							
X15		Y15							
X16		Y16							
X17		Y17							
X18		Y18							
X19		Y19							
X1A		Y1A	Not used						
X1B X1C		Y1B Y1C							
X1D	Interlock signal for the	Y1D							
X1E	RFRP and RTOP	Y1E							
	instructions when the								
X1F	A68RD3N is used in	Y1F							
	remote I/O station								

#### 4.4.4 Buffer memory address comparison

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

	A68RD3N			Q64RD	
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write
0	Conversion enable/disable specification		0	Conversion enable/disable specification	
1	Averaging processing selection		1	CH1 Time/count averaging setting	
2	CH1 Averaging time/count		2	CH2 Time/count averaging setting	R/W
3	CH2 Averaging time/count		3	CH3 Time/count averaging setting	
4	CH3 Averaging time/count		4	CH4 Time/count averaging setting	
5	CH4 Averaging time/count	R/W	5		
6	CH5 Averaging time/count	7	6		
7	CH6 Averaging time/count	7	7	System area (Not used)	-
8	CH7 Averaging time/count	7	8		
9	CH8 Averaging time/count	7	9	Averaging processing selection	R/W
10	CH1 Detected temperature value (16bit)		10	Conversion completion flag	
11	CH2 Detected temperature value (16bit)	_	11	CH1 Measured temperature value (16bit)	
12	CH3 Detected temperature value (16bit)	+	12	CH2 Measured temperature value (16bit)	R
13	CH4 Detected temperature value (16bit)	_	13	CH3 Measured temperature value (16bit)	+
14	CH5 Detected temperature value (16bit)	+	14	CH4 Measured temperature value (16bit)	_
15	CH6 Detected temperature value (16bit)	=	15	The measured temperature value (1001)	
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	Jetting range	
22	CH3 Detected temperature value (L)	R	22		
23	·		23		
24	(32bit) (H) CH4 Detected temperature value (L)	_	24		
25	(32bit) (H)		25		
26	CH5 Detected temperature value (L)	_	26		
27	·		27		
28	(32bit) (H) CH6 Detected temperature value (L)	_	28		
29	· ' '		29		
30	, , , , , , , , , , , , , , , , , , , ,	4	30		
31	CH7 Detected temperature value (L) (32bit) (H)		31		
32	(32bit) (H) CH8 Detected temperature value (L)	4	32		
33			33		
34	(32bit) (H)	R/W	34	System area (Not used)	-
35	Write data error code  Conversion completion flag	R	35		
	Specification of platinum RTD type	R/W			
36	Specification of platinum RTD type	R/VV	36		
			37		
			38		
			39		
			40		
			41		
			42		
			43		
			44		
			45		
			46		
			47	Warning output enable/disable setting	R/W

	Q64RD	
Address	Name	Read/write
(decimal)	Warning output flag	
48 49	Disconnection detection flag	-
50	CH1 Scaling value	-
50 	CH2 Scaling value	-
52	CH3 Scaling value	-
53	CH4 Scaling value	-
54	CH1 Measured temperature value (L)	1
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)	1
77	(H)	R/W
78	CH1 Scaling width lower limit value	- FC/VV
79	CH1 Scaling width upper limit value	
80	CH2 Scaling width lower limit value	
81	CH2 Scaling width upper limit value	
82	CH3 Scaling width lower limit value	
83	CH3 Scaling width upper limit value	
84	CH4 Scaling width lower limit value	
85	CH4 Scaling width upper limit value	
86	CH1 Warning output lower (L)	
87	lower limit value (H)	
88	CH1 Warning output lower (L)	
89	upper limit value (H)	
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 value (L)	R/W
119	(H)	[TX/ V V
120	CH1 Gain temperature setting value (L)	
121	(H)	
	to	

Q64RD						
Address	Name	Read/write				
(decimal)	Name	iteau/write				
132	CH4 Gain temperature setting value (L)	R/W				
133	(H)	IX/VV				
134 to 157	Not used	-				
158	Mode switching setting					
159	wode switching setting	R/W				
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)	17/77				

## 4.5 A68RD3N (Replacement to the Q64RD-G)

## 4.5.1 Performance comparison

Ite	em	A68RD3N					
Measuring met		3-wire type					
3		16-bit signed binary					
		-1800 to 6000					
Output (temper	rature	Value up to the first decimal place × 10					
conversion valu		32-bit signed binary					
somersion value)		-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)					
Applicable IVIL	,	JPt100					
		(JIS C1604-1981)					
		400.4. 00000					
<b>N</b> 4	Pt100	-180 to 600°C					
Measured		(27.10 to 313.71Ω)					
temperature	JPt100	-180 to 600°C					
range	Ni100	(25.80 to 317.28Ω)					
	NITOO	- ±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	od	Between platinum RTD input and programmable controller power supply: photocoupler isolation					
	_	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					
	o o						
Disconnection detection		Detected per channel					
Disconnection	detection	32 points					
Number of occupied I/O points		(I/O assignment: special 32 points)					
External conne	ction system	38-point terminal block					
Applicable wire	-	0.75 to 2mm ²					
Applicable sold	erless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A					
			-				

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

				⊕ : Gompatible, △ : Fartial orlange required, ··: meompatible			
ļ.		Q64R			Compatibility	Precautions for replacement	
		3/4-wire	e type		0		
		16-bit sign					
	-2000 to 8500  Value up to the first decimal place × 10  32-bit signed binary -200000 to 850000						
					0		
	Value u	p to the third d	ecimal place × 1000				
		Pt10	00				
	(JI	S C 1604-1997	7, IEC751 1983)			As the compliance standards for the	
		JPt1			Δ	applicable RTD differ, change the	
		(JIS C 160	04-1981)			RTD to the one that can be used with	
		Ni10	00			the Q64RD-G.	
		(DIN 4376	60 1987)				
		-200 to	850°C				
		-180 to	600°C		0		
	-60 to 180°C						
	*1				0		
	0.025°C						
		40ms/cł	0				
	4 channels/module					Consider replacement with multiple Q64RD-G.	
		1m	A		0		
		Isolation	Dielectric withstand	Insulation			
	Isolated area	method	voltage	resistance			
	Between RTD input and programmable controller power supply	Photocoupler isolation	1780VrmsAC/3 cycles (altitude 2000m)	10MΩ or more using 500VDC insulation	0		
	Between RTD input and channel	Transformer isolation	-	resistance tester			
		Detected pe	er channel		0		
	16 points					The number of occupied I/O points	
	(1/0 :	assignment: int	Δ	has changed to 16 points.			
	18-point terminal block					<u> </u>	
					×		
	0.3 to 0.75mm ² 1.25-3, R1.25-3					Wiring change is required.	
		1.25-3. F	×	0 0 1			

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

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

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

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

	,	3 1 7 1
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.)		
1) b1 SLD  Q64RD-G a1 A1 B1 b1 SLD	0	
0.62A	0	
0.20kg	Δ	

## 4.5.2 Functional comparison

O: Available, -: Not available

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

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

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

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

	A68F	RD3N			Q64	RD-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	Network	Y6	CH3 Gain setting request	
X7	CH5: Disconnection detection flag	Y7		X7	Not used	Y7	CH4 Offset setting request	
X8	CH6: Disconnection detection flag	Y8		X8		Y8	CH4 Gain setting request	
X9	CH7: Disconnection detection flag	Y9		X9	Operating condition setting completion signal	Y9	Operating condition setting request	
XA	CH8: Disconnection detection flag	YA		XA	Offset/gain setting mode status flag	YA	User range write request	
XB		YB		XB	Not used	YB		
XC		YC		XC	XC Disconnection detection signal		Not used	
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used	
XE		YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE		
XF		YF	A68RD3N is used in remote I/O station	XF	Error flag	YF	Error clear request	
X10		Y10	Not used					
X11	Nat was d	Y11	Company and a manage flow	Į.				
X12 X13	Not used	Y12 Y13	Error code reset flag					
X14		Y14						
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18						
X19		Y19						
X1A		Y1A	Not used					
X1B X1C		Y1B Y1C						
X1D	Interlock signal for the	Y1D						
X1E	RFRP and RTOP	Y1E						
	instructions when the							
X1F	A68RD3N is used in	Y1F						
	remote I/O station							

#### 4.5.4 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	17,77	5		
6	CH5 Averaging time/count		to	System area (Not used)	_
7	CH6 Averaging time/count			Cystom area (Not assa)	
8	CH7 Averaging time/count		8		
9	CH8 Averaging time/count		9	Averaging processing selection	R/W
10	CH1 Detected temperature value (16bit)		10	Conversion completion flag	
11	CH2 Detected temperature value (16bit)		11	CH1 Measured temperature value (16bit)	
12	CH3 Detected temperature value (16bit)		12	CH2 Measured temperature value (16bit)	R
13	CH4 Detected temperature value (16bit)		13	CH3 Measured temperature value (16bit)	
14	CH5 Detected temperature value (16bit)		14	CH4 Measured temperature value (16bit)	
15	CH6 Detected temperature value (16bit)		15		
16	CH7 Detected temperature value (16bit)		to	System area (Not used)	_
17	CH8 Detected temperature value (16bit)			Cystom area (Not assa)	
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)	_	21	Setting range 2	
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		
36	Specification of platinum RTD type	R/W	36		
	population of plasmann 1112 type	1011	37		
			38		
			39		
			40		
			41		
			42		
			43		
			44		
			45		
			46		
				1	1

Q64RD-G					
Address	Name	Read/write			
(decimal)	Name	rtead/write			
48	Warning output flag				
49	Disconnection detection flag				
50 to 53	CH1 to CH4 Scaling value	R			
54	CH1 Measured temperature value (L)				
55	(32bit) (H)				
	to	T			
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)	1000			
65	value (H)				
	to				
76	CH4 Scaling range upper limit (L)				
77	value (H)	R/W			
78	CH1 Scaling width lower limit value	] K/VV			
79	CH1 Scaling width upper limit value	1			
	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)	1			
91	lower limit value (H)				
92	CH1 Warning output upper (L)	1			
93	upper limit value (H)				
	to	1			
116	CH4 Warning output upper (L)				
117	upper limit value (H)				
118	CH1 Offset temperature setting (L)	1			
119	value (H)	R/W			
120	CH1 Gain temperature setting (L)	1			
121	value (H)				
to					
132	CH4 Gain temperature setting (L)				
133	value (H)	R/W			
134	Extended averaging processing selection	1			
135 to					
147	System area (Not used) -				
	Conversion setting for disconnection				
148	detection	R/W			
149	System area (Not used)	_			
. 10	[-,				

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

# 4.6 A68RD3N (Replacement to the Q68RD3-G)

#### 4.6.1 Performance comparison

Ita	em	A68RD3N				
Measuring met		3-wire type				
Weasuring met	nou	16-bit signed binary				
		-1800 to 6000				
Output (temper	rature	Value up to the first decimal place × 10				
conversion valu		32-bit signed binary				
CONVENSION VAIC		-180000 to 600000				
		Value up to the third decimal place × 1000				
		Tallo up to the time account place 1,000	+			
		Pt100				
====		(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)				
Applicable RTD	)	JPt100				
		(JIS C1604-1981)				
	Pt100	-180 to 600°C				
Measured	1 1100	$(27.10 \text{ to } 313.71\Omega)$				
temperature	JPt100	-180 to 600°C				
range		(25.80 to 317.28Ω)				
	Ni100	- 400				
Accuracy		±1%				
D b.t		(accuracy at full scale)				
Resolution		0.025°C				
Conversion spe	ed	40ms/channel				
Conversion ope	504					
Number of ana	log input points	8 channels/module				
Output current	for temperature					
detection		1mA				
Isolation metho	nd	Between platinum RTD input and programmable controller power supply: photocoupler isolation				
isolation metric	, u	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				
Dielectric withs	tand voitage	between platinum KTD input and programmable controller power supply. 500VAC, for Timinute				
Disconnection detection		Detected per channel				
Number of each	upied I/O points	32 points				
		(I/O assignment: special 32 points)				
External conne		38-point terminal block				
External device		-				
(sold separately			+			
Applicable wire		0.75 to 2mm ²				
Applicable solderless terminal		V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A				

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

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

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

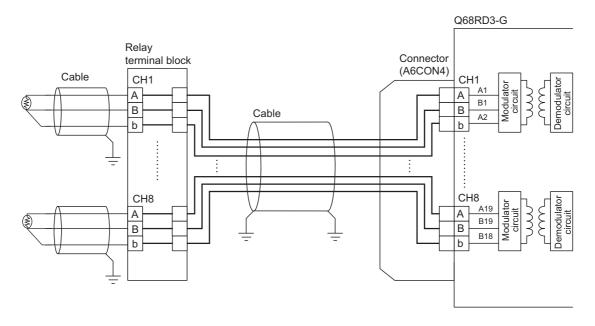
O : Compatible,  $\triangle$  : Partial change required,  $\star$  : Incompatible

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

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

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

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



## 4.6.2 Functional comparison

O: Available, -: Not available

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

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

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

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

	A68RD3N			Q68RD3-G			
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	
X1	READY flag	Y1		X1		Y1	
X2	Write data error flag	Y2		X2		Y2	
Х3	CH1: Disconnection detection flag	Y3		Х3		Y3	
X4	CH2: Disconnection detection flag	Y4		X4		Y4	
X5	CH3: Disconnection detection flag	Y5		X5	Not used	Y5	Not used
X6	CH4: Disconnection detection flag	Y6		X6		Y6	
X7	CH5: Disconnection detection flag	Y7	Not used	X7		Y7	
X8	CH6: Disconnection detection flag	Y8		X8		Y8	
X9	CH7: Disconnection detection flag	Y9		X9	Operating condition setting completion flag	Y9	Operating condition setting request
XA	CH8: Disconnection detection flag	YA		XA	Offset/gain setting mode status flag	YA	User range write request
ХВ		YB		XB	Channel change completion flag	YB	Channel change request
XC		YC		XC	Disconnection detection signal	YC	
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used
XE		YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE	
XF		YF	A68RD3N is used in remote I/O station	XF	Error flag	YF	Error clear request
X10		Y10	Not used				
X11	Not used	Y11					
X12		Y12	Error code reset flag				
X13		Y13					
X14		Y14					
X15 X16		Y15 Y16					
X10		Y17					
X17		Y18					
X19		Y19					
X1A		Y1A	Not used				
X1B		Y1B					
X1C		Y1C					
X1D	Interlock signal for the	Y1D					
X1E	RFRP and RTOP	Y1E					
	instructions when the						
X1F	A68RD3N is used in	Y1F					
	remote I/O station						

#### 4.6.4 Buffer memory address comparison

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

	A68RD3N			Q68RD3-G	
Address (decimal)	Name	Read/write	Address (decimal)	Name	Read/write
0	Conversion enable/disable specification		0	Conversion enable/disable setting	
1	Averaging processing selection		1	CH1 Time/count/moving average/time constant setting	
2	CH1 Averaging time/count		2	CH2 Time/count/moving average/time constant setting	
3	CH2 Averaging time/count		3	CH3 Time/count/moving average/time constant setting	
4	CH3 Averaging time/count	R/W	4	CH4 Time/count/moving average/time constant setting	R/W
5	CH4 Averaging time/count	- K/VV	5	CH5 Time/count/moving average/time constant setting	
6	CH5 Averaging time/count		6	CH6 Time/count/moving average/time constant setting	
7	CH6 Averaging time/count		7	CH7 Time/count/moving average/time constant setting	
8	CH7 Averaging time/count		8	CH8 Time/count/moving average/time constant setting	
9	CH8 Averaging time/count		9	System area (Not used)	-
10	CH1 Detected temperature value (16bit)		10	Conversion completion flag	
11	CH2 Detected temperature value (16bit)		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 26	(32bit) (H) CH5 Detected temperature value (L)	_	25 26	Averaging processing selection (CH5-CH8)  Offset/gain setting mode (Offset	
27	(32bit) (H)		27	specification)	_
27	CH6 Detected temperature value (L)	-	27	Offset/gain setting mode (Gain specification)	_
28	CH6 Detected temperature value (L)		28	CH1 Offset temperature setting value	_
29	(32bit) (H)		29	CH2 Offset temperature setting value	
30	CH7 Detected temperature value (L) (32bit) (H)		30	CH2 Offset temperature setting value CH2 Gain temperature setting value	R/W
32	(32bit) (H) CH8 Detected temperature value (L)	R	32	CH3 Offset temperature setting value	- FX/ V V
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	4
36	Specification of platinum RTD type	R/W	36	CH5 Offset temperature setting value	4
- 00	-F	1 .4	37	CH5 Gain temperature setting value	1
			38	CH6 Offset temperature setting value	1
					1

	Q68RD3-G			
Address (decimal)	Name	Read/write		
40	CH7 Offset temperature setting value			
41	CH7 Gain temperature setting value			
42	CH8 Offset temperature setting value	R/W		
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)	_		
49	Disconnection detection flag	R		
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			
63	CH1 Scaling range upper limit value	R/W		
	to	<u> </u>		
77	CH8 Scaling range upper limit value			
78	CH1 Scaling width lower limit value	R/W		
79	CH1 Scaling width upper limit value			
	to	I		
93	CH8 Scaling width upper limit value	I		
94	CH1 Process alarm lower/lower limit value	1		
95	CH1 Process alarm lower/upper limit value	R/W		
96	CH1 Process alarm upper/lower limit value	1000		
97	• • • • • • • • • • • • • • • • • • • •	-		
91	CH1 Process alarm upper/upper limit value to			
125		I		
125	CH4 to CH2 Pete glorm werning detection	-		
126 to 133	CH1 to CH8 Rate alarm warning detection	R/W		
124	period			
134	CH1 Rate alarm upper limit value			
135	CH1 Rate alarm lower limit value			
149	to CH8 Rate alarm lower limit value	DAM		
		R/W		
150 to 157	,	-		
	Mode switching setting	R/W		
160 to 163	System area (Not used)	-		
164	Conversion setting for disconnection			
	detection (CH1-CH4)			
165	Conversion setting for disconnection	R/W		
	detection (CH5-CH8)			
166 to173	CH1 to CH8 Conversion setting value for			
	disconnection detection			
174 to 189	System area	-		
190	CH1 Factory default offset value			
191	CH1 Factory default gain value			
192	CH1 User range settings offset value			
193	CH1 User range settings gain value	R/W		
194	CH1 User range settings offset (L)			
195	resistance value (H)			
196	CH1 User range settings gain (L)			
197	resistance value (H)			
	to			
253	CH8 User range settings gain resistance	R/W		
200	value (H)	TX/VV		

# 4.7 A68RD4N (Replacement to the Q64RD)

## 4.7.1 Performance comparison

Item		A68RD4N				
Measuring met	thod	4-wire type				
		16-bit signed binary				
Output (temperature		-1800 to 6000				
		Value up to the first decimal place × 10				
conversion val		32-bit signed binary				
	·	-180000 to 600000				
		Value up to the third decimal place × 1000				
		Pt100				
A	in DTD	(JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)				
Applicable plat	inum KID	JPt100				
		(JIS C1604-1981)				
Measured	Pt100	-180 to 600°C				
temperature	1100	(27.10 to 313.71 $\Omega$ )				
range	JPt100	-180 to 600°C				
range	371100	(25.80 to 317.28Ω)				
Accuracy		±1%				
7.000.00		(accuracy at full scale)				
Resolution		0.025°C				
Conversion sp	eed	40ms/channel				
Number of ana	alog input points	8 channels/module				
	for temperature	1mA				
detection						
Isolation metho	od	Between platinum RTD input and programmable controller power supply: photocoupler isolation				
		Between platinum RTD input and channel: non-isolation				
Dielectric withstand voltage		Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute				
Disconnection detection		Batch-detected at all channels				
		32 points				
Number of occ	cupied I/O points	(I/O assignment: special 32 points)				
External conne	ection system	38-point terminal block				
Applicable wire	-	0.75 to 2mm ²				
Applicable solo	derless terminal	V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A				

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

	C. Compatible,	△ : Partiai change required, ×: incompatible
Q64RD	Compatibility	Precautions for replacement
3/4-wire type	0	
16-bit signed binary -2000 to 8500 Value up to the first decimal place × 10		
32-bit signed binary data -200000 to 850000  Value up to the third decimal place × 1000	0	
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	0	
-180 to 600°C		
Ambient temperature 0 to 55°C: ±0.25% (accuracy relative to maximum value) Ambient temperature 25±5°C: ±0.08% (accuracy relative to maximum value)	0	
0.025°C	0	
40ms/channel	0	
4 channels/module	Δ	Consider replacement with multiple Q64RD.
1mA	0	
Isolated area Isolation method Dielectric withstand Insulation voltage resistance		
Between platinum RTD input and programmable controller power supply  Photocoupler isolation    1780VrmsAC/3 cycles (altitude 2000m)   500VDC insulation	0	
Between platinum RTD input and channel  Non-isolation - tester		
Detected per channel	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.
 1.25-3, R1.25-3	×	The stange to required.
(Sleeved solderless terminal cannot be used.)		

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

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

	O . Compatible,	4. I ditial oriange required, ". moonipatible
Q64RD	Compatibility	Precautions for replacement
The conductor resistance value must meet the condition of 1) + 2) $\leq$ 2k $\Omega$ or less.		
(In the case of 3-conductor type, the difference between 1) and 2) in the conductor		
resistance value must be $10\Omega$ or less.)		
Q64RD a1 A1 B1 b1 SLD  Conductor 2)  Q64RD a1 A1 B1 b1 SLD	0	
0.60A	Δ	The recalculation of internal current consumption (5VDC) is required.
0.17kg	Δ	

## 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			Q64RD				
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	
X0	Watchdog timer error flag	Y0		X0	Module READY	Y0	Not used	
X1	READY flag	Y1		X1	CH1 Offset/gain setting status signal	Y1	CH1 Offset setting request	
X2	Write data error flag	Y2		X2	CH2 Offset/gain setting status signal	Y2	CH1 Gain setting request	
Х3	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	Not used	
XD		YD	Interlock signal for the	XD	Warning output signal	YD	Not used	
XE	Not used	YE	RFRP and RTOP instructions when the	XE	Conversion completion flag	YE		
XF		YF	A68RD4N is used in remote I/O station	XF	Error flag	YF	Error clear request	
X10		Y10	Not used					
X11		Y11						
X12		Y12	Error code reset flag	Į.				
X13 X14		Y13 Y14						
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18						
X19		Y19						
X1A		Y1A	Not used					
X1B		Y1B						
X1C X1D	Interlock signal for the	Y1C Y1D						
X1E	RFRP and RTOP	Y1E						
, , , <u>_</u>	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			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	7	1	CH1 Time/count averaging setting	_
2	CH1 Averaging time/count	7	2	CH2 Time/count averaging setting	R/W
3	CH2 Averaging time/count	7	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		
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)	7	11	CH1 Measured temperature value (16bit)	
12	CH3 Detected temperature value (16bit)	7	12	CH2 Measured temperature value (16bit)	R
13	CH4 Detected temperature value (16bit)	7	13	CH3 Measured temperature value (16bit)	_
14	CH5 Detected temperature value (16bit)	7	14	CH4 Measured temperature value (16bit)	
15	CH6 Detected temperature value (16bit)	7	15	,	
16	CH7 Detected temperature value (16bit)	7	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	3 3	
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		
36	Specification of platinum RTD type	R/W	36		
	1 71	<u> </u>	37		
			38		
			39		
			40		
			41		
			42		
			43		
			44		
			45		
			46		
				Warning output enable/disable setting	R/W
			47	Warning output enable/disable setting	F

	Q64RD	
Address	Name	Read/write
(decimal)		rtodd, write
48	Warning output flag	_
49	Disconnection detection flag	
50 51	CH1 Scaling value CH2 Scaling value	4
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) CH3 Scaling range lower limit value (L)	
70 71		
72	(H) 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)	
88	CH1 Warning output lower/upper (L)	
89	limit value (H)	4
90	CH1 Warning output upper/lower (L)	
91 92	limit value (H) CH1 Warning output upper/upper (L)	4
93	limit value (H)	
33	to	
116	CH4 Warning output upper/upper (L)	
117	limit value (H)	
118	CH1 Offset temperature setting (L)	
119	value (H)	R/W
120	CH1 Gain temperature setting (L)	1
121	value (H)	
	to	
132	CH4 Gain temperature setting (L)	R/W
133	value (H)	17/ 4/
100	(II)	

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

# 4.8 A68RD4N (Replacement to the Q64RD-G)

#### 4.8.1 Performance comparison

Autiet type	It	em	A68RD4N			
-1800 to 6000 Value up to the first decimal place × 10 32-bit signed binary -180000 to 800000 Value up to the third decimal place × 10000  Pt100 Applicable RTD  Applicable Appl	Measuring me	thod	4-wire type			
Output (temperature conversion value)			16-bit signed binary			
Conversion value    32-bit signed binary			-1800 to 6000			
Applicable RTD	Output (tempe	rature	Value up to the first decimal place × 10			
Value up to the third decimal place × 1000  Pt100  (JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980) JPt100  (JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980) JPt100  (JIS C1604-1981)  Pt100  -180 to 600°C (27.10 to 313.71Q)  -180 to 600°C (25.80 to 317.280)  Ni100  -180 to 600°C  (25.80 to 317.280)  Accuracy  (accuracy at full scale)  Resolution  0.025°C  Conversion speed  40ms/channel  Number of analog input points  8 channels/module  Duput current for temperature detection  Between platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation  Dielectric withstand voltage  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels  32 points  (I/O assignment: special 32 points)  External connection system  38-point terminal block  Applicable wire size  0.75 to 2mm²	conversion val	ue)	32-bit signed binary			
Pt100			-180000 to 600000			
Applicable RTD  (JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)			Value up to the third decimal place × 1000			
Applicable RTD  (JIS C1604-1997, IEC 751-am2, JIS C1604-1989, DIN 43760-1980)			Diago			
Applicable RTD  JPt100 (JIS C1604-1981)  Measured temperature range  JPt100  Pt100  Pt100  Pt100  Ni100  Accuracy  Resolution  Conversion speed  Aums/channel  Number of analog input points  Output current for temperature detection  Between platinum RTD input and programmable controller power supply: photocoupler isolation  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels  Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  0.75 to 2mm²						
(JIS C1604-1981)  Measured temperature range    Description   Pi100	Applicable RTI	)				
Measured temperature range    Pt100						
Measured temperature range     (27.10 to 313.71Ω)       JPt100     -180 to 600°C       (25.80 to 317.28Ω)     (25.80 to 317.28Ω)       Ni100     -       Accuracy     ±1%       Resolution     0.025°C       Conversion speed     40ms/channel       Number of analog input points     8 channels/module       Output current for temperature detection     1mA       Isolation method     Between platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation       Dielectric withstand voltage     Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute       Disconnection detection     Batch-detected at all channels       Number of occupied I/O points     32 points       (I/O assignment: special 32 points)       External connection system     38-point terminal block       Applicable wire size     0.75 to 2mm²			(315 C 1604-1961)			
Measured temperature range  JPt100  IPt100  Accuracy  Accuracy  Accuracy  Accuracy  Resolution  Conversion speed  Number of analog input points  Output current for temperature detection  Isolation method  Between platinum RTD input and programmable controller power supply: photocoupler isolation  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels  Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  0.75 to 2mm²  Accuracy  (27.10 to 313.71Ω)  -180 to 600°C  (25.80 to 317.28Ω)  -190  Accuracy  (accuracy at full scale)  (accurac		T	-180 to 600°C			
range   JPt100   (25.80 to 317.28Ω)	Measured	Pt100	$(27.10 \text{ to } 313.71\Omega)$			
Resolution   Section   S	temperature	ID#100	-180 to 600°C			
Accuracy	range	JPt100	$(25.80 \text{ to } 317.28\Omega)$			
Resolution 0.025°C Conversion speed 40ms/channel  Number of analog input points 8 channels/module  Output current for temperature detection  Between platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation  Dielectric withstand voltage  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels 32 points  Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  0.75 to 2mm²		Ni100	-			
Resolution 0.025°C Conversion speed 40ms/channel  Number of analog input points 8 channels/module  Output current for temperature detection  Isolation method Between platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation  Dielectric withstand voltage Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection Batch-detected at all channels  Number of occupied I/O points (I/O assignment: special 32 points)  External connection system 38-point terminal block  Applicable wire size 0.75 to 2mm²	Accuracy					
Conversion speed  Number of analog input points  8 channels/module  Output current for temperature detection  Isolation method  Between platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation  Dielectric withstand voltage  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels  32 points  (I/O assignment: special 32 points)  External connection system  38-point terminal block  Applicable wire size  0.75 to 2mm²						
Number of analog input points  Output current for temperature detection  Isolation method  Between platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation  Dielectric withstand voltage  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels  Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  38-point terminal block  Applicable wire size  0.75 to 2mm²			11.11			
Output current for temperature detection    Setween platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation    Dielectric withstand voltage   Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute    Disconnection detection   Batch-detected at all channels   Number of occupied I/O points   (I/O assignment: special 32 points)   External connection system   38-point terminal block   Applicable wire size   0.75 to 2mm²	Conversion sp	eed	40ms/channel			
ImA	Number of ana	alog input points	8 channels/module			
Between platinum RTD input and programmable controller power supply: photocoupler isolation Between platinum RTD input and channel: non-isolation  Dielectric withstand voltage  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels  Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  38-point terminal block  Applicable wire size  0.75 to 2mm²		for temperature	1mA			
Between platinum RTD input and channel: non-isolation  Dielectric withstand voltage  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels  Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  0.75 to 2mm²	detection		D. t			
Dielectric withstand voltage  Between platinum RTD input and programmable controller power supply: 500VAC, for 1 minute  Disconnection detection  Batch-detected at all channels  32 points (I/O assignment: special 32 points)  External connection system  Applicable wire size  0.75 to 2mm²	Isolation metho	od				
Disconnection detection  Batch-detected at all channels  32 points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  Batch-detected at all channels  32 points  (I/O assignment: special 32 points)  38-point terminal block  0.75 to 2mm ²			Between platinum KTD input and channel. non-isolation			
Disconnection detection  Batch-detected at all channels  32 points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  Batch-detected at all channels  32 points  (I/O assignment: special 32 points)  38-point terminal block  0.75 to 2mm ²						
Disconnection detection  Batch-detected at all channels  32 points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  Batch-detected at all channels  32 points  (I/O assignment: special 32 points)  38-point terminal block  0.75 to 2mm ²	Dielestaie with		Detuces what were DTD in out and are are seened by controlling a controlling of the CONTROL for A rejector			
Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  0.75 to 2mm ²	Dielectric withs	stand voltage	Between platinum RTD input and programmable controller power supply: 500VAC, for T minute			
Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  0.75 to 2mm ²						
Number of occupied I/O points  (I/O assignment: special 32 points)  External connection system  Applicable wire size  0.75 to 2mm ²	Discourse tion detection		Datch detected at all sharpeds			
Number of occupied I/O points (I/O assignment: special 32 points)  External connection system 38-point terminal block  Applicable wire size 0.75 to 2mm ²	Disconnection	detection				
External connection system 38-point terminal block Applicable wire size 0.75 to 2mm ²	Number of occupied I/O points					
Applicable wire size 0.75 to 2mm ²	External connection system					
Applicable solderless terminal V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A						
луршавие зощенезэ terminar v 1.25-5, v 1.25-153A, v2-53, v2-153A	Applicable sole	derless terminal	V1 25.3 V1 25.VS2A V2 S2 V2 VS2A			
	Applicable 5010	deness tellillidi	v 1.20-0, v 1.20-100M, v2-00, v2-100M			

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

	Q64R	D-G		Compatibility	Precautions for replacement
	3/4-wire			0	
	16-bit sign -2000 to up to the first 32-bit signed -200000 to p to the third d	0			
(JI	Pt1 S C 1604-1997 JPt1 (JIS C 160 Ni1 (DIN 4376	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	0			
	-60 to 1				
	*1	0			
	0.02	5°C		0	
	40ms/cł	nannel		0	
	4 channels	s/module		Δ	Consider replacement with multiple Q64RD-G.
	1m	A		0	
Between RTD input and programmable controller power supply  Between RTD input and channel	Isolation method  Photocoupler isolation  Transformer isolation	Dielectric withstand voltage  1780VrmsAC/3 cycles (altitude 2000m)	Insulation resistance 10MΩ or more using 500VDC insulation resistance tester	0	
	Detected pe	0			
(I/O a	16 pc assignment: int	Δ	The number of occupied I/O points has changed to 16 points.		
	18-point terr			×	
	0.3 to 0.			×	Wiring change is required.
(Sleeved	1.25-3 R solderless terr	R1.25-3 minal cannot be used.)		×	

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

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

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

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

	O. Compatible, A. Fartial change required, A. 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.)				
Pt100  OCARD C	0			
2) A1 A1 B1 b1 SLD				
0.62A	Δ	The recalculation of internal current consumption (5VDC) is required.		
0.20kg	Δ			

## 4.8.2 Functional comparison

O: Available, -: Not available

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

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

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

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

	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	
Х3	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		Х9	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	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		Y10	Not used					
X11		Y11						
X12 X13		Y12 Y13	Error code reset flag					
X14		Y14						
X15		Y15						
X16		Y16						
X17		Y17						
X18		Y18						
X19		Y19						
X1A		Y1A	Not used					
X1B X1C		Y1B Y1C						
X1D	Interlock signal for the	Y1D						
X1E	RFRP and RTOP	Y1E						
	instructions when the	,_						
X1F	A68RD4N is used in	Y1F						
	remote I/O station							

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

Q64RD-G						
Address	Name	Read/write				
(decimal)	Name	rtoud/Write				
39						
40						
41						
42	System area (Not used)	_				
43	Dystem area (Not used)					
44						
45						
46						
47	Warning output enable/disable setting	R/W				
48	Warning output flag					
49	Disconnection detection flag					
50 to 53	CH1 to CH4 Scaling value	R				
54	CH1 Measured temperature (L)					
55	value (32bit) (H)					
	to					
60	CH4 Measured temperature (L)	Б				
61	value (32bit) (H)	R				
62	CH1 Scaling range lower limit value (L)					
63	(H)	D ^ ^ /				
64	CH1 Scaling range upper limit value (L)	R/W				
65	(H)					
	to					
76	CH4 Scaling range upper limit (L)					
77	value (H)					
78	CH1 Scaling width lower limit value	R/W				
79	CH1 Scaling width upper limit value	-				
	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				
	CH1 Warning output upper lower (L)	- IN/VV				
90	1 ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '					
91	(1.)	_				
92	CH1 Warning output upper upper (L)					
93	limit value (H)					
440	to					
116	CH4 Warning output upper upper (L)					
117	limit value (H)	4				
118	CH1 Offset temperature setting value (L)	R/W				
119	(H)	1				
120	CH1 Gain temperature setting value (L)					
121	(H)					
	to					
132	CH4 Gain temperature setting value (L)	_				
133	(H)	R/W				
134	Extended averaging processing selection					
135 to 147	System area (Not used)	-				
148	Conversion setting for disconnection	R/W				
1.15	detection					
149	System area (Not used)	-				
150	CH1 Conversion setting value for (L)	R/W				
151	disconnection detection (H)					

Q64RD-G						
Address	Nome	Doodhuite				
(decimal)	Name	Read/write				
	to					
156	CH4 Conversion setting value for (L)					
157	disconnection detection (H)					
158	Mode awitching actting					
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)	10/00				
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)	13/77				

# 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					
Analog input	Voltage	-10 to 0 to +10VDC (Input resistance value: $1M\Omega$ ) -20 to 0 to +20mADC (Input resistance value: $250\Omega$ )					
Analog input	Current						
Analog output	voltage		-10 to 0 to +10VDC	IVDC			
		Analog in	nput range				
		Voltage (V)	Current (mA)	Analog output voltage (V) ^{*1}			
		0 to +10	0 to +20				
	0 to + 5 + 1 to + 5 -10 to +10		0 to +20				
			+ 4 to +20	0 to +10			
			-20 to +20		1		
I/O characteris	tion	- 5 to + 5	-20 to +20				
i/O characteris	aucs	0 to +10	0 to +20	0 to + 5			
	0 to + 5		0 to +20	0 10 + 5			
		+ 1 to + 5	+ 4 to +20	+ 1 to + 5			
		-10 to +10	-20 to +20	-10 to +10			
		- 5 to + 5	-20 to +20	-10 to +10			
		-10 to +10	-20 to +20	- 5 to + 5			
		- 5 to + 5	-20 to +20	- 5 10 + 5			

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

Q68ADV				Q68ADI			Precautions for replacemen	
		-10 to 10\	/DC					
	(Input	resistance	value: 1MΩ)		-			The voltage/current cannot be
		_			0 to 20mAD	C	Δ	mixed for one module.
				(Ir	nput resistance va	lue: 250Ω)		
				-			-	Analog output voltage to the
								A616AD
	Analog	innut	Normal reso	lution mode	High resolu	tion mode		
	ran	•	Digital	Maximum	Digital	Maximum		When using A616AD in [-5 to
	ran	90	output value	resolution	output value	resolution		5V] range, Q68ADV can obtain equivalent resolution or more
		0 to 10V		2.5mV	0 to 16000	0.625mV		
		0 to 5V	0 to 4000	1.25mV	0 to 12000	0.416mV		than A616AD by setting in [-
Vol	ltage	1 to 5V		1.0mV	0 to 12000	0.333mV		, , ,
"	iiugo	-10 to 10V		2.5mV	-16000 to 16000	0.625mV	Δ	to 10V] range/high resolutior
		User range settings	-4000 to 4000	0.375mV	-12000 to 12000	0.333mV		mode or user range.
				5μA		1.66µA		When using A616AD in [-20
		0 to 20mA 4 to 20mA	0 to 4000	5μA 4μA	0 to 12000	1.33µA		+20mA] range, use Q68ADI in
Cui	rrent -	User range settings	-4000 to 4000	1.37µA	-12000 to 12000	1.33µA		user range.

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					

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

	Q68ADV			Q68ADI			Compatibility	Precautions for replacement
Analog input range	With Without temper		- Ambient temperature 25±5°C	ature With Without te		Ambient temperature 25±5°C		
0 to 10V -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	±0.3% (±12 digits)	±0.4% (±16 digits)	±0.1% (±4 digits)	±0.3% (±36 digits)	±0.4% (±48 digits)	±0.1% (±12 digits)	0	respect to the full scale, and Q68ADV/I is the accuracy in respect to maximum digital output value.
	±15V			- ±30mA			0	
	-	8 cha	nnels/modu		ESUITA		Δ	Consider replacement with multiple Q68ADV/I.
			-				-	
Betw	veen the I/O t		oupler isola	tion	power supply	y:	0	
16 points (I/O assignment: intelligent 16 points)								Q68ADV/I cannot set to 0 point with I/O assignment.
18-point terminal block								
0.3 to 0.75mm ²							×	Wiring change is required.
R1.25-3 (A solderless terminal with sleeve can not be used.)							×	
	0.64A				0.64A		0	
	0.19kg			(	0.19kg		Δ	

^{*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 to +20	10.14 (1/2000)	0 to 2000
	0 10 +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 (IIIA)	-20 to +20	20.14 (1/2000)	1000 to 3000
	-20 to +20	20μA (1/2000)	-1000 to 1000
	-20 to +20	10µA (1/4000)	0 to 4000
	-20 to +20	10μΑ (1/4000)	-2000 to 2000

# **5.2 A60MXRN**

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

#### 5.2.1 Performance comparison

Analog output voltage	Ito	em	A60MXRN							
Current   -20 to 0 to +20mADC (input resistance value: 250t3)		Voltage	-10 to 0 t	o +10VDC (Input resistance valu	e: 1MΩ)					
Analog input range	Analog input	Current	· · · · · · · · · · · · · · · · · · ·							
Voltage (V)   Current (mA)   Analog output voltage (V)	Analog output	voltage		-10 to 0 to +10VDC						
Voltage (V)   Current (mA)   Analog output voltage (V)			Analog inp	out range	****					
0 to +10					Analog output voltage (V)					
1										
1-0 to +10   -20 to +20   -5 to +5   -20 to +20   -10 to +10   -20 to +20   -5 to +5   -20 to +20   -20 to			0 to + 5	0 to +20						
1-0 to +10   -20 to +20   -5 to +5   -20 to +20   -10 to +10   -20 to +20   -5 to +5   -20 to +20   -20 to			+ 1 to + 5	+ 4 to +20	0 to +10					
			-10 to +10	-20 to +20						
O to +10			- 5 to + 5	-20 to +20						
O to + 5	I/O characteris	tics	0 to +10	0 to +20						
+1 to +5			0 to + 5		0 to + 5					
-10 to +10					+ 1 to + 5					
-5 to +5										
-10 to +10			- 5 to + 5	-20 to +20	-10 to +10					
Overall accuracy  ### 20.3% (Digital output value ±12)  ### 20.3% (Dig										
Overall accuracy ±0.3% (Digital output value ±12)  Absolute maximum input Current ±30mA  Analog input points 16 channels/module  Multiplexer element Photo MOS relay  Isolation method Between the input terminal and programmable controller: photocoupler isolation Between channels: photo MOS relay isolation  Between channels dielectric withstand voltage 400VDC (accuracy guarantee 400VDC)  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 2mm² (Applicable tightening torque: 39 to 59N-cm)  Applicable solderless terminal 1.25A, V1.25-YS3A, V2-YS3A  Internal current consumption (6VDC)					- 5 to + 5					
Multiplexer element  Between the input terminal and programmable controller: photocoupler isolation Between channels: photo MOS relay isolation  Between channels dielectric withstand voltage  400VDC (accuracy guarantee 400VDC)  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 2mm² (Applicable tightening torque: 39 to 59N•cm)  Applicable solderless terminal  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC)										
Multiplexer element  Between the input terminal and programmable controller: photocoupler isolation Between channels: photo MOS relay isolation  Between channels dielectric withstand voltage  400VDC (accuracy guarantee 400VDC)  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 2mm² (Applicable tightening torque: 39 to 59N•cm)  Applicable solderless terminal  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC)										
Multiplexer element  Between the input terminal and programmable controller: photocoupler isolation Between channels: photo MOS relay isolation  Between channels dielectric withstand voltage  400VDC (accuracy guarantee 400VDC)  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 2mm² (Applicable tightening torque: 39 to 59N•cm)  Applicable solderless terminal  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC)	Analog input po	pints	16 channels/module							
Between the input terminal and programmable controller: photocoupler isolation Between channels: photo MOS relay isolation  Between channels dielectric withstand voltage  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 2mm² (Applicable tightening torque: 39 to 59N•cm)  Applicable solderless terminal  Internal current consumption (5VDC)  Description  Between the input terminal and programmable controller: photocoupler isolation Between channels: photo MOS relay isolation  400VDC (accuracy guarantee 400VDC)  16 points (treated as empty slots) (0 point setting is possible by I/O assignment.)  70 point setting is possible by I/O assignment.)  71 points (Treated as empty slots) (10 point setting is possible by I/O assignment.)  72 point setting is possible by I/O assignment.)  73 point terminal block  74 points (Treated as empty slots) (10 point setting is possible by I/O assignment.)  75 to 2mm² (Applicable tightening torque: 39 to 59N•cm)  76 points (Treated as empty slots) (10 point setting is possible by I/O assignment.)  77 points (Treated as empty slots) (10 point setting is possible by I/O assignment.)  78 point terminal block  79 points (Treated as empty slots) (10 points etting is possible by I/O assignment.) (10 point setting is possible by I/O assignment.) (11 points (Treated as empty slots) (12 points etting is possible by I/O assignment.)										
Between channels: photo MOS relay isolation  Between channels dielectric withstand voltage  400VDC (accuracy guarantee 400VDC)  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 2mm² (Applicable tightening torque: 39 to 59N•cm)  Applicable solderless terminal  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC)	Multiplexer elei	ment	-							
Between channels dielectric withstand voltage  400VDC (accuracy guarantee 400VDC)  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 2mm² (Applicable tightening torque: 39 to 59N•cm)  Applicable solderless terminal  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC)	Isolation metho	od								
Connected terminal  38-point terminal block  Applicable wire size  0.75 to 2mm² (Applicable tightening torque: 39 to 59N•cm)  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC)  (0 point setting is possible by I/O assignment.)  38-point terminal block  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A		Between channels dielectric 400VDC (accuracy quarantee 400VDC)								
Connected terminal  38-point terminal block  Applicable wire size  0.75 to 2mm² (Applicable tightening torque: 39 to 59N•cm)  Applicable solderless terminal  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC)  0.35A	Occupied I/O p	oints								
Applicable wire size 0.75 to 2mm² (Applicable tightening torque: 39 to 59N•cm)  Applicable solderless terminal V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC) 0.35A	Connected terr	minal	(U point		ment.)					
Applicable solderless terminal  V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A  Internal current consumption (5VDC)  0.35A			· · · · · · · · · · · · · · · · · · ·							
Internal current consumption (5VDC) 0.35A										
Weight 0.56kg	Internal current									
	Weight			0.56kg						

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

			Compatibility	Precautions for replacement			
	-10 to 0 t	to +10VD	0				
	0 to 20	0mADC (I	Δ	The minus current cannot be input.			
			-	Analog output voltage to the A616AD			
Input	Analog input range	Maximu 32 bit	m resolution	Digital output value (32 bit)	Digital output value (16 bit)		When using a range of -5 up to +5 (with A60MX), With Q64AD-GH,
	0 to 10V	156.3µV	312.6µV				equivalent or more resolution value
	0 to 5V	78.2µV	156.4µV				can be obtained by setting at a
	1 to 5V	62.5µV	125.0µV	0 to 64000	0 to 32000		range of -10 up to 10V/high
Voltage	User range settings (Uni-polar)	47.4µV	94.8µV			Δ	resolution mode, or user range.
	-10 to 10V	156.3µV	312.6µV	-64000 to 64000	-32000 to 32000		When using a range of -20 up to +20mA (with A60MX), negative
	User range settings (Bi-polar)	47.4µV	94.8µV	-04000 to 04000	-32000 to 32000		current can not be converted with
	0 to 20mA	312.5nA		1			Q64AD-GH.
Current	4 to 20mA User range settings	250.0nA	500.0nA	0 to 64000	0 to 32000		Use conversion devices to convert
	(Uni-polar)	151.6nA	303.2nA				into a input range.
#0.05%  Reference accuracy  Digital output value (32  Digital output value (16  Temperature coefficient  #71.4ppm/°C (0.00					6 digits	0	A60MXRN is the accuracy in respect to the full scale, and Q64AD-GH is the accuracy in respect to maximum digital output value.
			±15V			0	
			±30mA			0	
		4 c	channels/mod	dule		Δ	Consider replacement with multiple Q64AD-GH.
			-			-	
	Specific isolated area		Isolation	Dielectric withstar			
	ween the I/O terminal		method Photocoupler	voltage	resistance		
	mable controller power		isolation	1780VrmsAC/3 cyc	sles 500V DC,	0	
Between analog channels		els	Transformer isolation	(Altitude 2000m	) 10M $\Omega$ or more		
			Δ	Q64AD-GH cannot set to 0 point			
	(1/0		ment: intellige		with I/O assignment.		
			oint terminal	×			
			).3 to 0.75mn	×	Wiring change is required.		
 	R1.25-3 (A so	iderless te	erminal with s	sleeve can not be	used.)	×	
1					The recalculation of internal		
			0.89A			Δ	current consumption [5VDC] is required.

*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)		

Memo

# 5.3 A60MXR

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

#### 5.3.1 Performance comparison

Item		A60MXR						
	Voltage	-10 to 0	to +10VDC (Input resistance valu	ue: 1MΩ)				
Analog input	0	-20 to 0 to +20mADC						
	Current		(Input resistance value: $250\Omega$ )					
Analog output voltage			-10 to 0 to +10VDC					
Analog output voltage		Analog ir	nput range					
		Voltage (V)	Current (mA)	Analog output voltage (V) ^{*1}				
		0 to +10	0 to +20					
		0 to + 5	0 to +20					
		+ 1 to + 5	+ 4 to +20	0 to +10				
		-10 to +10	-20 to +20					
		- 5 to + 5	-20 to +20					
I/O characteris	stics	0 to +10	0 to +20	0 to + 5				
		0 to + 5	0 to +20	0 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 to +10				
		-10 to +10	-20 to +20					
		- 5 to + 5	-20 to +20	- 5 to + 5				
Absolute	1/2/42							
Absolute	Voltage		±15V ±30mA					
maximum inpu	it Current	16 channels/module  Mercury plunger relay						
Analog input p	oints							
Multiplexer ele	ment							
Isolation metho	od	Between the input terminal and programmable controller: photocoupler isolation						
		Between channels: mercury plunger relay isolation						
Between channels dielectric withstand voltage		500VDC (accuracy guarantee 500VDC)						
Occupied I/O p	points		16 points (treated as empty slots	,				
		(0 poi	nt setting is possible by I/O assign 38-point terminal block	nment.)				
Connected terminal Applicable wire size		0.75 / 0		0.4. 50N				
			n ² (Applicable tightening torque: 3					
Applicable solo	derless terminal	V1	.25-3, V1.25-YS3A, V2-S3, V2-Y	DJA				
Internal curren (5VDC)	t consumption		0.5A					
				U U				

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

			Compatibility Precautions for replacement				
	-10 to 0 t	to +10VD	0				
	0 to 20	OmADC (I	Δ	The minus current cannot be input.			
			-			-	Analog output voltage to the A616AD
		Maximui	m resolution	Digital	Digital		With A60MXR, equivalent or more resolution value can be obtained
Input	Analog input range	32 bits	16 bits	output value (32 bits)	output value (16 bits)		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
1	User range settings (Bi-polar)	47.4µV	94.8µV	-64000 to 64000	-32000 to 32000		+20mA (with A60MXR), negative
	0 to 20mA	312.5nA	625.0nA				current can not be converted with
┨╸.	4 to 20mA	250.0nA	500.0nA	0.4.000	0.4.00000		Q64AD-GH.
Current	User range settings (Uni-polar)	151.6nA	303.2nA	0 to 64000	0 to 32000		Use conversion devices to convert into a input range.
Digital ou				±0.05%  out value (32 bit) ±32  out value (16 bit) ±16  opm/°C (0.00714%/°C	digits	0	to the full scale, and Q64AD-GH is the accuracy in respect to maximum digital output value.
			±15V ±30mA			0	
		4 c	hannels/mod	lule		Δ	Consider replacement with multiple Q64AD-GH.
			-			-	
	Specific isolated area		Isolation	Dielectric withstar			
l <u> </u>			method	voltage	resistance		
	ween the I/O terminal nmable controller powe		Photocoupler isolation	1780VrmsAC/3 cyc		0	
В	etween analog channo	els	Transformer isolation	(Altitude 2000m)	) 10MΩ or more		
16 points (I/O assignment: intelligent 16 points)							Q64AD-GH cannot set to 0 point with I/O assignment.
		18-p	×				
	D4 05 0 /A	0	×	Wiring change is required.			
ļ	R1.25-3 (A so	iaeriess te	erminal with s	sleeve can not be u	used.)	×	
			0.89A			Δ	The recalculation of internal current consumption [5VDC] is required.
			0.2kg			Δ	<u> </u>
			Δ				

*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)	0.4- 4000	
Voltage (V)	+1 to +5	1.0mV (1/4000)	0 to 4000 -2000 to 2000	
	-10 to +10	5.0mV (1/4000)	-2000 18 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 discontinuation		Transition to Q series				
Product	Model	Model	Remarks (Restrictions)			
High-speed counter	AD61	QD62-H01 ^{*1}	1) External wiring : Terminal block wiring → Connector wiring Cable size is changed.  2) Number of slots : Not changed  3) Counting speed : Not changed  4) Counting range : 24-bit unsigned binary (0 to 16777215) → 32-bit signed binary (−2147483648 to 2147483647) Review the program.  5) Program : Occupied I/O points, I/O signals and buffer memory address are changed.  6) Performance specifications change: Not changed  7) Function specifications: Not changed			
module	AD61S1	QD62-H02 ^{*1}	1) External wiring : Terminal block wiring → Connector wiring Cable size is changed.  2) Number of slots : Not changed  3) Counting speed : Not changed  4) Counting range : 24-bit unsigned binary (0 to 16777215) → 32-bit signed binary (−2147483648 to 2147483647) Review the program.  5) Program : Occupied I/O points, I/O signals and buffer memory address are changed.  6) Performance specifications change: Not changed  7) Function specifications: Not changed			

The QD62-H01 is a module dedicated for replacing the AD61 with the Q series module. The QD62-H02 is a module dedicated for replacing the AD61S1 with the Q series module. Both of them have same input filter system with the AD61 and AD61S1.

#### ⊠Point -

1) Action to the replaced 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 counter

Counting range of the AD61 and AD61S1 differs from that of the QD62-H01 and QD62-H02. To make the counting range same as that of the module before replacement, review the program. AD61, AD61S1: 0 to 16, 777, 215 (24-bit unsigned binary)

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

3) Wiring to the module

External wiring method of the AD61 and AD61S1 differs from that of the QD62-H01 and QD62-H02.

AD61, AD61S1: Wiring using a terminal block QD62-H01, QD62-H02: Wiring using a connector

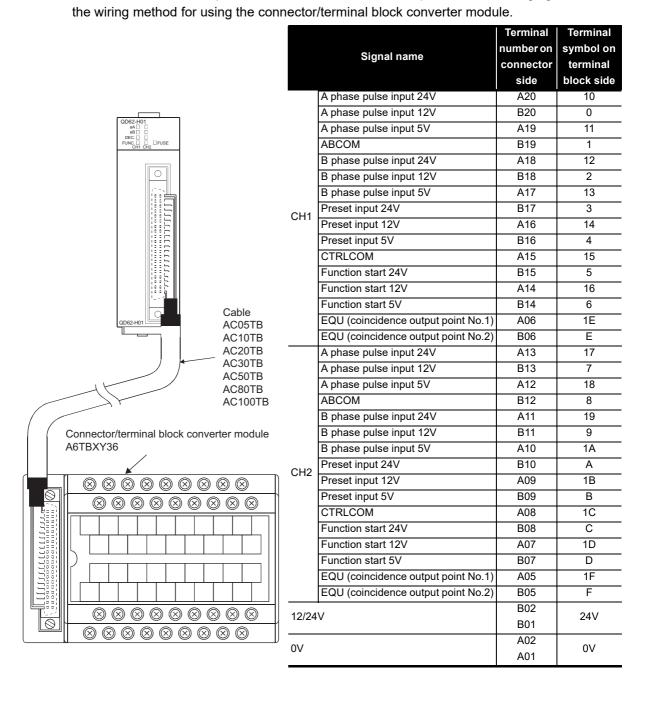
- 4) In module replacement, continuous use of the I/O signal wire with solderless terminal that has been used for the AD61 or AD61S1 requires the change of the external wiring method as in (a) (b).
  - (a) Using the upgrade tool (a conversion adaptor) The existing wiring for AD61 and AD61S1 can be connected directly to the Q series modules using the upgrade tool, a conversion adaptor, manufactured by Mitsubishi Electric Engineering Co., Ltd.

Product	MELSEC-A/QnA series module	MELSEC-Q series module	Conversion adaptor	
High-speed counter module	AD61	QD62-H01	-ERNT-AQTD61	
riigii-speed counter module	AD61S1	QD62-H02		

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

(c) Using the connector/terminal block converter module Used for replacement when the Q series large type base unit and conversion adapters manufactured by Mitsubishi Electric Engineering Co., Ltd. cannot be used due to the restrictions such as a system configuration and an installation location. I/O cables with solderless terminal of the existing module can be continuously used without being aware of the existing wire size by rewiring the I/O cables with solderless terminal to the connector/terminal block converter module and connecting them by dedicated cables. This

method, therefore, is helpful when there is not a sufficient space. The following figure shows



## 6.2 AD61

## 6.2.1 Performance comparison

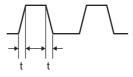
O : Compatible, △ : Partial change required, ×: Incompatible

						•	Compat-	tial change required, ×: Incompatible
	Item		AD	61	QD62-	H01	ibility	Precautions for replacement
Occupied I/O points			32 po (I/O assignme poir	nt: special 32	16 po (I/O assignment point	: intelligent 16	Δ	*1
Number o	of channe	els	·	2 cha	nnels	,	0	
Counting speed switch settings		witch settings	-		50KP	PS	0	Set "2 (counting speed 200KPPS)" in the intelligent function module switch setting. Counting is performed using 50KPPS by setting "2 (counting speed 200KPPS)."
		Phase		1-phase input,	, 2-phase input		0	,
Coun signa	nt input	Signal level (φΑ, φΒ)		5VDC 12VDC 24VDC	}2 to 5mA		0	
		Counting speed (Max.)	1-phase input 2-phase input	50KPPS 50KPPS	1-phase input 2-phase input	50KPPS 50KPPS	0	*2
		Counting range	24-bit unsig (0 to 16,7	•	32-bit signe (-2147483648 to	-	Δ	On QD62-H01, as the value is used with 32-bit signed binary values, change of sequence program is required.
	-	Туре	UP/DOV	/N preset counte	0			
Performance specifications of 1 channels On Day da Berry Channels On Day d		Minimum count pulse width (set input rise time to 5µs or less. Duty ratio: 50%)		10 $\mu$ s (1,2 phase	0			
Magn comp	parison	Comparison range	24-bit unsig	ned binary	32-bit signe	ed binary	0	
Detwee CPU AD61 -H01	and 1/QD62	Comparison result		Set value = Set value >	count value count value count value	0		
		Preset	12/24VD0 5VDC	, 5mA	5/12/24VDC	, 2 to 5mA		On QD62-H01, as the external
Exter input	t	Count disable	12/24VD0 5VDC		-		Δ	input specifications differ, confirm the external devices
		Function start	-		5/12/24VDC			specifications.
	External output Coincidence output Coincidence output Transistor (open collector) output points/channel 12/24VDC, 0.5A Transistor (sink type) output 2 points/channel 12/24VDC, 0.5A/point, 2A/common					nannel 0.5A/point,	0	
Internal cu (5VDC)	current co	nsumption	0.0	ЗА	0.3	Ą	0	
Weight			0.5	kg	0.11	kg	Δ	

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

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

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



## 6.2.2 Function comparison

O: With functions, -: Without functions

Item	Description	AD61	QD62-H01	Precautions for replacement
Preset function  Changes the counter present value to a specified value.		0	0	
Disable function	Terminates counting.	0	0	
Ring counter function	Repeatedly executes counting between user's setting values.		0	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	· Iprogrammable controller CPU when I		0	
Latch counter function	Latches the present value at the time a signal is input.	-	0	
Sampling counter function	Counts the pulse that was input during the sampling time set.	-	0	
Periodic pulse counter function	The function allows storing the present value in the periodic pulse count present value and the previous value in the periodic pulse count previous value for each period time set.	-	0	

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

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

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

	AD	61			QD62	2-H01	
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	CH1 Counter value greater	Y0		X0	Module READY	Y0	CH1 Coincidence signal No.1 reset command
X1	CH1 Counter value coincidence	Y1		X1	CH1 Counter value large (Point No.1)	Y1	CH1 Preset command
X2	CH1 Counter value less	Y2		X2	CH1 Counter value coincidence (Point No.1)	Y2	CH1 Coincidence signal enable command
Х3	CH1 External preset request detection	Y3		Х3	CH1 Counter value small (Point No.1)	Y3	CH1 Down count command
X4	CH2 Counter value greater	Y4		X4	CH1 External preset request detection	Y4	CH1 Count enable command
X5	CH2 Counter value coincidence	Y5		X5	CH1 Counter value large (Point No.2)	Y5	CH1 External preset detection reset command
X6	CH2 Counter value less	Y6		X6	CH1 Counter value coincidence (Point No.2)	Y6	CH1 Counter function selection start command
X7	CH2 External preset request detection	Y7		X7	CH1 Counter value small (Point No.2)	Y7	CH1 Coincidence signal No.2 reset command
X8		Y8	Not used	X8	CH2 Counter value large (Point No.1)	Y8	CH2 Coincidence signal No.1 reset command
X9		Y9		X9	CH2 Counter value coincidence (Point No.1)	Y9	CH2 Preset command
XA		YA	YA		CH2 Counter value small (Point No.1)	YA	CH2 Coincidence signal enable command
ХВ		YB		ХВ	CH2 External preset request detection	YB	CH2 Down count command
XC		YC		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				
X11		Y11	CH1 Preset command				
X12	Not used	Y12	CH1 Coincidence signal output enable command				
X13		Y13	CH1 Down count command				
X14		Y14	CH1 Count enable				
X15		Y15	CH1 Present value read request				
X16		Y16	CH1 External preset detection reset command				
X17		Y17	CH2 Coincidence signal reset command				
X18		Y18	CH2 Preset command				
X19		Y19	CH2 Coincidence signal output enable command				
X1A		Y1A	CH2 Down count command				
X1B		Y1B	CH2 Count enable				
X1C		Y1C	CH2 Present value read request				
X1D		Y1D	CH2 External preset detection reset command				
X1E X1F		Y1E Y1F	Not used				

#### 6.2.4 Buffer memory address comparison

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

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

AD61				QD62-H01				
Add	ress			Add	ress			
(De	ec.)	Name	Read/write	(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	Treset value setting	(H)	TC/VV
3	35	Mode register	R/W	2	34	Present value	(L)	R
4	36	Present value read (Lower and middle)	R	3	35	Tresent value	(H)	
(5)	(37)	Present value read (Upper)	11	4	36	Coincidence output point set No.1	(L)	
6	38	Set value read/write (Lower and middle)	R/W	5	37	Contolectice output point set ivo.	(H)	R/W
(7)	(39)	Set value read/write (Upper)	17/77	6	38	Coincidence output point set No.2	(L)	FK/VV
Addre	ss in pa	arentheses in the above table indicates the	upper 8 bits	7	39	Comordence datput point set 146.2	(H)	
of 24-l	bit data	i.		8	40	Overflow detection flag		R
				9	41	Counter function selection setting		R/W
				10	42	Sampling/periodic setting		10,00
				11	43	Sampling/periodic counter flag		
				12	44	Latch count value	(L)	
				13	45		(H)	
				14	46	Sampling count value	(L)	
				15	47	Jamping Journ Value	(H)	R
				16	48	Periodic pulse count previous value	(L)	
				17	49		(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	J	(H)	
				24	56			
				to	to	System area (Not used)	-	-
				31	63			

# 6.3 AD61S1

## 6.3.1 Performance comparison

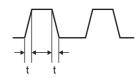
O : Compatible, △ : Partial change required, ×: Incompatible

Occupied I/O points    32 points   16 points	2 (counting speed
Occupied I/O points  (I/O assignment: special 32 points)  (I/O assignment: intelligent 16 points)  A *1  Number of channels  Counting speed switch settings  (I/O assignment: intelligent 16 points)  Classing points  Classing poi	PPS)" in the intelligent
Counting speed switch - 10KPPS O Set "2 (200KPF function Counting Settings	PPS)" in the intelligent
Counting speed switch settings - 10KPPS - 200KPF function Counting	PPS)" in the intelligent
(counting)	on module switch setting. ting is performed using PS by setting "2 ting speed 200KPPS)."
Phase 1-phase input, 2-phase input	
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 unsigned binary (0 to 16,777,215) 32-bit signed binary (-2147483648 to 2147483647) $\triangle$ used with values,	D62-H02, as the value is with 32-bit signed binary s, change of sequence am is required.
Type UP/DOWN preset counter + ring counter function	
Counter  Minimum count pulse width (set input rise time to 5µs or less. Duty ratio: 50%)  Magnitude comparison between CPU and  Comparison CPU and  Comparison COunter  Minimum count pulse width (set input rise time to 5µs or less. (1-phase input)  24-bit unsigned binary  Set value < count value  Comparison  Set value < count value	
Magnitude comparison range 24-bit unsigned binary 32-bit signed binary	
AD61/QD62 result Set value = count value  Set value = count value  Set value > count value	
	D62-H02, as the external
	specifications differ,
input disable 5VDC, 5mA confirm	m the external devices
Function start - 5/12/24VDC, 2 to 5mA	fications.
Start	
External output Coincidence output Coincidence output 12/24VDC, 0.5A  Transistor (open collector) output 2 points/channel 12/24VDC, 0.5A/point, 2A/common	
External Coincidence output Coincidence output 12/24VDC, 0.5A  Transistor (open collector) points/channel 12/24VDC, 0.5A/point,	



- *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	
Disable function	Terminates counting.	0	0	
Ring 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	Iprogrammable controller CPU when		0	
Latch counter function	Latches the present value at the time a signal is input.	1	0	
Sampling counter function	Counts the pulses that are input during the sampling time set.	1	0	
Periodic pulse counter function	The function allows storing the present value in the periodic pulse count present value and the previous value in the periodic pulse count previous value for each period time set.	-	0	



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

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

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

	AD6	i1S1			QD62	2-H02	
Device No.	Signal name	Device No.	Signal name	Device No.	Signal name	Device No.	Signal name
X0	CH1 Counter value greater	Y0		X0	Module READY	Y0	CH1 Coincidence signal No.1 reset command
X1	CH1 Counter value coincidence	Y1		X1	CH1 Counter value large (Point No.1)	Y1	CH1 Preset command
X2	CH1 Counter value less	Y2		X2	CH1 Counter value coincidence (Point No.1)	Y2	CH1 Coincidence signal enable command
Х3	CH1 External preset request detection	Y3		Х3	CH1 Counter value small (Point No.1)	Y3	CH1 Down count command
X4	CH2 Counter value greater	Y4		X4	CH1 External preset request detection	Y4	CH1 Count enable command
X5	CH2 Counter value coincidence	Y5		X5	CH1 Counter value large (Point No.2)	Y5	CH1 External preset detection reset command
X6	CH2 Counter value less	Y6		X6	CH1 Counter value coincidence (Point No.2)	Y6	CH1 Counter function selection start command
X7	CH2 External preset request detection	Y7	Not used	X7	CH1 Counter value small (Point No.2)	Y7	CH1 Coincidence signal No.2 reset command
X8		Y8	Not used	X8	CH2 Counter value large (Point No.1)	Y8	CH2 Coincidence signal No.1 reset command
X9		Y9		X9	CH2 Counter value coincidence (Point No.1)	Y9	CH2 Preset command
XA		YA		XA	CH2 Counter value small (Point No.1)	YA	CH2 Coincidence signal enable command
XB		YB		ХВ	CH2 External preset request detection	YB	CH2 Down count command
XC		YC		XC	CH2 Counter value large (Point No.2)	YC	CH2 Count enable command
XD		YD		XD	CH2 Counter value coincidence (Point No.2)	YD	CH2 External preset detection reset command
XE		YE		XE	CH2 Counter value small (Point No.2)	YE	CH2 Counter function selection start command
XF		YF		XF	Fuse broken detection flag	YF	CH2 Coincidence signal No.2 reset command
X10		Y10	CH1 Coincidence signal reset command				
X11		Y11	CH1 Preset command				
X12	Not used	Y12	CH1 Coincidence signal				
7(12	Not used		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	1	Y1A	CH2 Down count command	1			
X1B	1	Y1B	CH2 Count enable	1			
X1C		Y1C	CH2 Present value read request				
X1D		Y1D	CH2 External preset detection reset command				
X1E		Y1E	Not used	1			

X1F

Y1F

#### 6.3.4 Buffer memory address comparison

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

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

		AD61S1				QD62-H02		ı
Add	ress			Add	ress			
(D	ec.)	Name	Read/write (Dec.)		ec.)	Name		Read/write
CH1	CH2			CH1	CH2			
1	33	Preset value write (Lower and middle)	w	0	32	Preset value setting	(L)	R/W
(2)	(34)	Preset value write (Upper)	VV	1	33	Treset value setting	(H)	1000
3	35	Mode register	R/W	2	34	Present value	(L)	R
4	36	Present value read (Lower and middle)	R	3	35	Tresent value	(H)	
(5)	(37)	Present value read (Upper)	11	4	36	Coincidence output point set No.1	(L)	
6	38	Set value read/write (Lower and middle)	R/W	5	37	Compacine output point set ivo.	(H)	R/W
(7)	(39)	Set value read/write (Upper)	17/77	6	38	Coincidence output point set No.2	(L)	TC/VV
Addre	ss in p	arentheses in the above table indicates the	upper 8 bits	7	39	Compacine output point set 140.2	(H)	
of 24-l	bit data	l.		8	40	Overflow detection flag		R
				9	41	Counter function selection setting		R/W
				10	42	Sampling/periodic setting		1000
				11	43	Sampling/periodic counter flag		
				12	44	Latch count value	(L)	
				13	45	Eaton sount value	(H)	
				14	46	Sampling count value	(L)	
				15	47	Camping Count Value	(H)	R
				16	48	Periodic pulse count previous	(L)	
				17	49	value	(H)	
				18	50	Periodic pulse count present value	(L)	
				19	51	T chould pulse doubt present value	(H)	
				20	52	Ring counter minimum value	(L)	
				21	53	Trang counter minimum value	(H)	R/W
				22	54	Ring counter maximum value	(L)	1,444
				23	55	Tang seamer maximum value	(H)	
				24	56			
				to	to	System area (Not used)		-
				31	63			

# POSITIONING MODULE REPLACEMENT

# 7.1 List of Positioning Module Alternative Models for Replacement

	uction		Transition to Q series
Product	Model	Model	Remarks (Restrictions)
	AD70	QD73A1	Not changed *2 (An external power supply (±15VDC) is not required.  2) Number of slots : Changed (1 slot → 2 slots)  3) Program : Buffer memory assignment and change of the setting method  4) Performance specifications change: Upward-compatibility  5) Function specifications:  Partly changed (LED indication and function setting method)
	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	Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.  4) Performance specifications change: Upward-compatibility     Function specifications: Partly changed
Positioning module	AD75M2	QD75M2	Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.  4) Performance specifications change: Upward-compatibility  5) Function specifications: Partly changed
	AD75M3	QD75M4	External wiring : Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.     Performance specifications change: Upward-compatibility     Function specifications: Partly changed
	AD75P1-S3	QD75P1N ^{*1} (when an open collector is connected)  QD75D1N ^{*1} (when a differential driver is connected)	External wiring : Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.     4) Performance specifications change: Not changed.     5) Function specifications: Partly changed
	AD75P2-S3	QD75P2N*1 (when an open collector is connected)  QD75D2N*1 (when a differential driver is connected)	Connector and manual pulsar wiring are changed.     Number of slots : Not changed     : Not changed     : I/O signals, XY assignment, buffer memory assignment and different functions are changed.     Performance specifications change: Not changed.     Function specifications: Partly changed

Production discontinuation			Transi	ition to Q series	
Positioning		QD75P4N ^{*1} (when an open collector is connected)	2) Number of slots	: Connector and manual pulsar wiring are changed. : Not changed	
module	diffe	QD75D4N ^{*1} (when a	3) Program	: I/O signals, XY assignment, buffer memory assignment and different functions are changed.	
		differential driver is connected)	,	ecifications change: Not changed. ations: Partly changed	

^{*1} The QD75P□N and QD75D□N are the upward-compatibility for the QD75P□ and QD75D□ 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 QA6 B extension base unit, replacing with two QD73A1 modules, or shifting to the QD75 system.

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

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

#### 7.4.1 Performance comparison

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

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

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

O : Compatible, \(\triangle : \triangle :								
Model	AD75P1-S3 AD75P2-S3 AD75P3-	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement		
Item				Q5.05		торішовіноні		
		<absolute sy<="" td=""><td></td><td></td><td></td><td></td></absolute>						
		-214748364.8	to 214748364.	7 (µm)				
	<absolute system=""> -214748364.8 to 214748364.7 (μm)</absolute>	-21474.8364	8 to 21474.83	3647 (inch)				
	/-13421772.8 to 13421772.7 (μm) -21474.83648 to 21474.83647 (inch)	0 to 359.999	99 (degree)					
	/-1342.17728 to 1342.17727 (inch) 0 to 359.99999 (degree)	-2147483648	3 to 21474836	647 (pulse)				
	/0 to 359.99999 (degree) -2147483648 to 2147483647 (pulse) /-134217728 to 134217727 (pulse)	<incrementa< p=""> -214748364.8</incrementa<>	I system> to 214748364.	7 (µm)				
	<pre><incremental system=""> -214748364.8 to 214748364.7 (µm)</incremental></pre>	-21474.8364	8 to 21474.83	8647 (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 (degre	-2147483648	3 to 21474836	0				
	/-1342.17728 to 1342.17727 (degree -2147483648 to 2147483647 (pulse) /-134217728 to 134217727 (pulse)	(INC mode)/p	osition switchi					
	<pre><in control="" speed-position="" switching=""> 0 to 214748364.7 (µm)</in></pre>	0 to 21474836	64.7 (µm)					
	/0 to 13421772.7 (μm) 0 to 21474.83647 (inch)	0 to 21474.8	3647 (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	3647 (pulse)					
	/0 to 134217727 (pulse)	<in speed-po<="" td=""><td>sition switchi</td><td></td><td></td></in>	sition switchi					
		(ABS mode):	>					
		0 to 359.999	99 (degree)					
	0.01 to 6000000.00 (mm/min)	0.01 to 2000	0000.00 (mm/	/min)				
	/0.01 to 375000.00 (mm/min)							
	0.001 to 600000.000 (inch/min)	0.001 to 200	0000.000 (inc	:h/min)				
Speed command range *2	/0.001 to 37500.000 (inch/min)				0			
apada dammana rango	0.001 to 600000.000 (degree/min)	0.001 to 200	0000.000 (de	gree/min)				
	/0.001 to 37500.000 (degree/min)							
	1 to 1000000 (pulse/s) /1 to 62500 (pulse/s)	1 to 1000000	1 to 1000000 (pulse/s)					
Machine OPR function	/ 1 to 02000 (pulse/s)	+						
(OPR method)	O(6 OPR methods)	0(	6 OPR metho	ods)	0			
JOG operation	0		0	-	0			

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

_				O: Comp	alible, △ : Partia	ai change re	quired, ×: Incompatible	
Item	Model	AD75P1-S3 AD75P2-S3 AD75P3-S3		D75P2N D75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement	
Manual pulse generator function		1 generator/axis	1 gene	erator/mod	ule	Δ	On QD75P□N/QD75D□N, the manual pulse generator cannot be used by each axis independent. When connecting the manual pulse generator for each axis is required, use one axis module.     The manual pulse generator itself can use the same one.     The operation for inputting one pulse differs. Set the parameter so that movement amount may be same.	
Starting time		20ms	1.5 to 2.0ms (when other axes are starting: 1.5 to 2.0ms + 0.1ms to 0.5ms)			0	The starting time becomes fast. Check the processing timing.	
/deceleration	Automatic trapezoidal acceleration/ deceleration	0		0		0		
processing	S-pattern acceleration/ deceleration	0	0					
Acceleration /deceleration time	No. of patterns Setting range	Acceleration time and deceleration time can be set independently.  (4 patterns each)  Changeover between 1 to 65535ms/1 to 8388608ms possible	(4 pa	e and dece et independ tterns eacl 8388608m	dently. n)	0		
	Sudden stop deceleration	Changeover between 1 to 65535ms/1 to 8388608ms possible		8388608m		0		
Compensatio	n	Electronic gears, backlash compensation, near pass*3	Electronic compensa	gears, ba ition, near		Δ	Refer to *3.	
Error display		17-segment LED	E	rror LED		×	For details of diagnostic, use GX Works2/GX Developer.	
History data s error, warning	storage (Start, g)	Provided (4 types, 16 items/module)	(3 types, ²	Provided 16 items/m	odule)	0	The start history during error is integrated into the start history.	
Data storage	destination	Flash ROM (battery-less backup)		ash ROM /-less back	kup)	0		

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

	al 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 g type, straigh old separately A6CON2			
Connection connector	10136-6000EL (Crimping type, sold separately)	(Soldering ty	i type, straigh old separatel A6CON4 ype, straight-c pe, sold sepa	y) out/diagonal-	×	As the connectors differ, wiring change is required. The connectors of QD75P□N/QD75D□N are
Applicable wire size	10136-3000VE: 24 to 30 AWG (approx. 0.05 to 0.2 mm ² ) 10136-6000EL:		I1, A6CON4: SCON2: 24 AV		0	sold separately.
Command pulse output system	28 AWG (approx. 0.08 mm ² )  Differential driver/Open collector	QD75P⊡N: Open collector QD75D⊡N: Differential driver			Δ	The differential driver and the open collector are separate module. In initial condition, AD75P□-S3 outputs with positive logic, and QD75P□N/QD75D□N outputs with negative logic.
Max. output pulse	When connected to open collector: 200kpps When connected to differential driver: 400kpps	When connected to open collector: 200kpps When connected to differential driver: 4Mpps			0	
Max. connection distance between servos	When connected to open collector: 2m When connected to differential driver: 10m		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 QD75P□N/ QD75D□N carries out the flash write 26 times from the sequence program, an error occurs. The error reset enables to perform the flash write.
Occupied I/O points	32 points (I/O assignment: special 32 points)	32 points (I/O assignment: intelligent 32 points)		0		
No. of module occupied slots	1	1			0	
Weight	0.35kg	QD75P1N: 0.14kg QD75D1N: 0.15kg	QD75P2N: 0.14kg QD75D2N: 0.15kg	QD75P4N: 0.16kg QD75D4N: 0.16kg	Δ	

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

	O: Compatible, A: Pari							ai criariye re	quireu, ^. incompatible		
Item	Model		AD75P2-S3	AD75P3-S3	QD75P1N QD75D1N	QD75P2N QD75D2N	QD75P4N QD75D4N	Compat- ibility	Precautions for replacement		
I/O signal for external	STRT signal	O(E)	xternal start s	ignal)	× (int	egrated into (	CHG)	Δ	When using both the speed-position switching control and the external start, input the external start signal to the interrupt module, and start using the direct output.		
devices	CHG signal	Speed-position switching signal		start or sp	ommand signa beed-position ble with para	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	Di	irect connection		controller CP	ion via progra PU, Q corresp unication mod ng MELSECN I/O module	onding serial dule, Q	0	The connecting shape differs.		
devices (data setting, etc.)	Teaching module		AD75TU Not a		Not available		U Not available			×	The teaching module cannot be used.
	Software package	GX Configurator-AP		GX	GX Works2 Configurator-	Δ	The software package that can be used differs.				

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

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

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

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

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

#### 7.4.2 Function comparison

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

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

Deleted functions	Precautions for replacement
Stepping motor mode	The setting is not required when using stepping motor due to it's performance gain.
Fast machine OPR	With the QD75P□N/QD75D□N, 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 AD75P□-S3, this interface is used to set positioning data Nos. 101 to 600 that do not exist
	on the buffer memory.
Positioning data I/F	Since all positioning data can be set in the buffer memory with the QD75PDN/QD75DDN, this
	function is deleted.
Ctart history during arrays	The contents are the same as the start history.
Start history during errors	Therefore, the QD75P□N/QD75D□N stores only the start history.
System monitor data	These data were deleted because they can be displayed in system monitor "Module's detailed
(Module name, OS type, OS version	on) information" of GX Works2/GX Developer.



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

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

Changed functions		Change description						
<b>J</b>	1. The limit check of arc address is		designated.					
	It is not carried out when a center point is designated.							
	The software stroke limit check during speed control is carried out in the following cases:							
	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 t							
function	limit range, the attempt is considered as an error and the current value is not changed.							
	4. Error code change							
	AD75P□-S3:							
	There are 3 types of errors for ea	ich upper and lower stroke limit.						
	(error code 509 to 512) QD75P□N/QD75D□N:							
		per limit are integrated in to error and	0.507					
	Errors for the lower limit are integ	per limit are integrated in to error cod	e 507.					
	Error codes 509 to 512 are delete							
Current value changing M	An error occurs when the designation		oftware stroke limit range					
code function	2. The M code setting value is valid							
Acceleration/deceleration	<ol> <li>An error occurs when the command frequency value calculated from the speed limit value exceeds the maximum command frequency of the positioning module being used.</li> </ol>							
speed control	Only two-word type (1 to 8388608ms) can be used as the setting value for the acceleration/deceleration							
·	time.							
-	1. "Peripheral side (emergency) stop" is deleted from the stop causes of Stop group 2 "sudden stop							
	selection".							
Stop process and restart	"Test mode fault" in the stop causes of Stop group 3 "sudden stop selection" is changed to be in the stop							
after stop positioning	causes of Stop group 2 "sudden stop selection".							
operation stop	2. "Stop (QD75 peripheral)" is added to the stop causes of Stop group 3 "sudden stop selection".							
oporation otop	3. Error code 100 (Peripheral device stop during operation) is deleted.							
	4. "Programmable controller CPU error occurrence" is added to the stop causes of Stop group 2 Sudden stop							
	selection.							
		AD75P□-S3	QD75P□N/QD75D□N					
READY signal (X0)	OFF	Normal (READY)	Not READY/WDT error					
Manual nulsa nananatan	ON	Not READY/WDT error	Normal (READY)					
Manual pulse generator operation	The No. of connectable manual pulse							
Axis operation status		ed" and "Step error occurring" is cha	nged to "Error occurring".					
	• AD75P□-S3:							
	· ·	verse direction, the control is internal	lly changed into the continuous					
	positioning control. (restart after de	eceleration stop)						
Continuous path control	• QD75P□N/QD75D□N:							
	Even if the reference axis operates in reverse direction with interpolation, the control remains as the							
	continuous path control.  (In single-axis operation, the operation is the same as that of the AD75P□-S3.)							
			РЦ-53.)					
Near pass	For the continuous path control, only Positioning address pass is not cond							
2-axis interpolation								
• 2-axis linear interpolation	The interpolation target axis can be r	andomly set with a positioning identi-	fier					
<ul> <li>2-axis fixed-feed</li> </ul>	The interpolation target axis call be i	andomy set with a positioning identi	iidi.					
<ul> <li>Circular interpolation</li> </ul>								

Changed functions	Change description							
	1. "Step stopped" is changed to "Stopped" and "Step error occurring" is changed to "Error occurring" in the							
Stan function	axis operations status parameters.							
Step function	2. The restart command for step sta	art information (02H) is deleted.						
	3. The step operation is restarted w	rith the restart command.						
Command in-position	The command in-position width is ex	rpanded.						
function	• AD75P□-S3: 1 to 32767000							
	• QD75P□N/QD75D□N: 1 to 21474	D75P□N/QD75D□N: 1 to 2147483647						
Positioning start No.	7004 to 7010 (block start designation	n) and 8000 to 8049 (indirect designa	ition) are deleted.					
block start data	With QD75P□N/QD75D□N, number of blocks has been change to 5 (7000 to 7004).							
DIOCK Start data	(With the AD75P□-S3, this data is called "Positioning start information".)							
Start history	The configuration of "start informatio	n" and "start No." is changed so that t	the start No. can be directly checked.					
Basic parameter1	When the programmable controller is	s turned ON or the programmable co	ntroller CPU module is reset, the					
"Pr.5 Pulse output mode"	valid value is only the first value afte	r the programmable controller READ	Y signal (Y0) turns from OFF to ON.					
		AD75P□-S3	QD75P□N/QD75D□N					
Detailed parameters	0	Software stroke limits invalid for	Software stroke limits valid for					
"Pr.15 Software stroke limit	(Factory setting)	manual operation	manual operation					
valid/invalid setting"	1	Software stroke limits valid for	Software stroke limits invalid for					
	l	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.

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

^{*1} The ON/OFF statuses for READY are different between the QD75P N/QD75D N and AD75P -S3.

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

^{*2} When using a program example of No.10 Reset program described in "A1SD75P1-S3/P2-S3/P3-S3, AD75P1-S3/P2-S3/P3-S3 Positioning Module User's Manual" for the QD75P□N/QD75D□N, replace "X4 (BUSY signal for Axis 1)" with "DXC (Direct access input of BUSY signal for Axis 1)". Do the same thing for programs for Axis 2 and Axis 3.

#### 7.4.4 Buffer memory address comparison

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

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

	Buffer memory address									
Item of AD75P□-S3		AD75P□-S3			QD75P□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	159 160	309 310	13 14	163 164	313 314				
Pr.9 Deceleration time 0	11	161	311	15	165	314				
	12	162	312	6	156	306				
Pr.10 Bias speed at start	13	163	313	7	157	307				
Pr.11 Stepping motor mode selection amount	14	164	314	-	-	-				
Pr.12 Backlash compensation amount	15	165	315	17	167	317				
Pr.13 Software stroke limit upper limit value	16	166	316	18	168	318				
	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 37	186 187	336 337	36 37	186 187	336 337				
Pr.27 Acceleration time 2	38	188	338	38	188	338				
11.21 Acceleration time 2	39	189	339	39	189	339				
Pr.28 Acceleration time 3	40 41	190 191	340 341	40 41	190 191	340 341				
D. 00 December 4 in the control of t	41	192	342	42	192	342				
Pr.29 Deceleration time 1	43	193	343	43	193	343				

Item of AD75P□-S3	Buffer memory address					
	AD75P□-S3 QD75P□N/QD75D□N					
	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	199	349	49	199	349
Pr.33 JOG operation acceleration time selection	50	200	350	50	200	350
Pr.34 JOG operation deceleration time selection	51	201	351	51	201	351
Pr.35 Acceleration/deceleration process selection	52	202	352	52	202	352
Pr.36 S-pattern proportion	53	203	353	53	203	353
Pr.37 Sudden stop deceleration time	54	204	354	54	204	354
	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	360	60 61	210	360 361
Pr.43 External start function selection	01	211	361	01	211	361
	62	212	362	62	212	362
(QD75PDN/QD75DDN: Pr.42 External command function				-		
selection)	00	040	000			
Pr.44 Near pass mode selection for path control	66	216	366	-	-	-
Pr.45 OPR method	70	220	370	70	220	370
Pr.46 OPR direction	71	221	371	71	221	371
Pr.37 OP address	72	222	372	72	222	372
	73 74	223 224	373 374	73 74	223 224	373 374
Pr.48 OPR speed	74 75	224	374 375	74 75	224	374 375
Pr.49 Creep speed	76	226	376	76	226	376
	77	227	377	77	227	377
Pr.50 OPR retry	78	228	378	78	228	378
Pr.51 OPR dwell time	79	229	379	79	229	379
Pr.52 Setting for the movement amount after near-point dog	80	230	380	80	230	380
ON	81	231	381	81	231	381
Pr.53 OPR acceleration time selection	82	232	382	82	232	382
Pr.54 OPR deceleration time selection	83	233	383	83	233	383
Pr.55 OP shift amount	84	234	384	84	234	384
	85 86	235 236	385 386	85 86	235 236	385 386
Pr.56 OPR torque limit value	88	238	388	88	238	388
Pr.57 Speed designation during OP shift						
Pr.58 Dwell time during OPR retry	89	239	389	89	239	389

		Buffer men	nory address		
Item of AD75P□-S3		AD75P□-S3	QD75P□N/QD75D□N		
		Common for axis 1, 2, 3	Common for axis 1, 2, 3, 4		
Md.1 In test mode flag		450	1200		
Md.2 Module name		451	-		
Md.3 OS type		452 453 454 455	-		
Md.4 OS version		456 457	-		
Md.5 Clock data (hour: minute)		460	-		
Md.6 Clock data (second: 100 ms)		461	-		
(Pointer number)		(0) t	o (15)		
Md.7 Start axis		400 4 507	40404 4007		
(QD75P□N/QD75D□N: Md.3 Start information)		462 to 537	1212 to 1287		
Md.8 Operation type		462 to 520	1010 to 1000		
(QD75P□N/QD75D□N: Md.4 Start No.)	ory	463 to 538	1213 to 1288		
Md.9 Start Hour: minute	Start history	464 to 539	1214 to 1289		
(QD75P□N/QD75D□N: Md.5 Start Hour)	Start	404 to 559	1214 to 1209		
Md.10 Start Second: 100 ms		465 to 540	1215 to 1290		
(QD75PDN/QD75DDN: Md.6 Start Minute: second)		400 to 040	1213 to 1290		
Md.11 Error judgment		466 to 541	1216 to 1291		
Md.12 Start history pointer		542	1292		
(Pointer number)		(0) to (15)	г		
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) 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	Error history				
QD75P□N/QD75D□N: Md.11 Axis error occurrence (Hour))		626 to 686	1295 to 1355		
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		

		Buffer mem	ory address
Item of AD75P□-S3		AD75P□-S3	QD75P□N/QD75D□N
		Common for axis 1, 2, 3	Common for axis 1, 2, 3, 4
(Pointer number)		(0) to	(15)
Md.24 Axis in which the warning occurred		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		
(QD75P□N/QD75D□N: Md.16 Axis warning		1360 to 1420	
occurrence (Hour))	Warning		
Md.27 Axis warning occurrence Second: 100 ms	War		
(QD75PDN/QD75DDN: Md.17 Axis warning		3692 to 752	1361 to 1421
occurrence (Minutes: second))			
Md.28 Warning history pointer		753	1422

			Buffer memory address					
Item of AD75P□-S3		AD75P□-S3			5P□N/QD75	D□N		
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3		
Md.29 Current feed value	800	900	1000	800	900	1000		
Sanoni 1664 Valdo	801	901	1001	801	901	1001		
Md.30 Machine feed value	802 803	902 903	1002 1003	802 803	902 903	1002 1003		
	804	904	1003	804	904	1003		
Md.31 Feedrate	805	905	1005	805	905	1005		
Md.32 Valid M code	806	906	1006	808	908	1008		
Md.33 Axis error No.	807	907	1007	806	906	1006		
Md.34 Axis warning No.	808	908	1008	807	907	1007		
Md.35 Axis operation status	809	909	1009	809	909	1009		
Md.36 Current speed	810	910	1010	810	910	1010		
Mid.30 Current speed	811	911	1010	811	911	1011		
Md.37 Axis feedrate	812 813	912	1012	812	912	1012		
	814	913 914	1013 1014	813 814	913 914	1013 1014		
Md.38 Speed-position switching control positioning amount	815	915	1015	815	915	1015		
Md.39 External input/output signal	816	916	1016	816	916	1016		
Md.40 Status	817	917	1017	817	917	1017		
Table Transport	818	918	1018	818	918	1018		
Md.41 Target value	819	919	1019	819	919	1019		
Md.42 Target speed	820	920	1020	820	920	1020		
	821 822	921 922	1021 1022	821	921	1021		
Md.43 OP absolute position	823	922	1022	-	-	-		
	824	924	1024	824	924	1024		
Md.44 Movement amount after near-point dog ON	825	925	1025	825	925	1025		
Md.45 Torque limit stored value	826	926	1026	826	926	1026		
Md.46 Special start data instruction code setting value	827	927	1027	827	927	1027		
Md.47 Special start data instruction parameter setting value	828	928	1028	828	928	1028		
Md.48 Start positioning data No. setting value	829	929	1029	829	929	1029		
Md.49 In speed control flag	830	930	1030	830	930	1030		
Md.50 In speed change processing flag	831	931	1031	831	931	1031		
Md.51 Start data pointer being executed	832	932	1032	834	934	1034		
Md.52 Last executed positioning data No.	833	933	1033	837	937	1037		
Md.53 Repetition counter								
(QD75PDN/QD75DDN: Md.41 Special start repetition counter)	834	934	1034	832	932	1032		
Md.54 Positioning data No. being executed	835	935	1035	835	935	1035		
Md.55 Block No. being executed	836	936	1036	836	936	1036		
Md.56 Positioning data being executed	838 to 847	938 to 947	1038 to 1047	838 to 847	938 to 947	1038 to 1047		
Deceleration starting flag	-	-	-	899	999	1099		

	Buffer memory address								
Item of AD75P□-S3		AD75P□-S3			5P□N/QD75				
	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			
Cd.15 New current value	1154	1204	1254	1506	1606	1706			
Ca. 15 New Current value	1155	1205	1255	1507	1607	1707			
Cd.16 New speed value	1156 1157	1206 1207	1256 1257	1514 1515	1614 1615	1714 1715			
Cd.17 Speed change request	1158	1208	1258	1516	1616	1716			
Cd.18 Positioning operation speed override	1159	1209	1259	1513	1613	1713			
	1160	1210	1260	1518	1618	1718			
Cd.19 JOG speed	1161	1211	1261	1519	1619	1719			
Cd.20 Speed-position switching enable flag	1163	1213	1263	1528	1628	1728			
Cd.21 Speed-position switching control movement amount	1164 1165	1214 1215	1264	1526	1626 1627	1726			
change register			1265	1527		1727			
Cd.22 Manual pulse generator enable flag	1167 1168	1217 1218	1267 1268	1524 1522	1624 1622	1724 1722			
Cd.23 Manual pulse generator 1 pulse 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									
(QD75P□N/QD75D□N: Cd.8 External command valid)	1171	1221	1271	1505	1605	1705			
Cd.26 Step valid flag	1172	1222	1272	1545	1645	1745			
Cd.27 Step mode	1173	1223	1273	1544	1644	1744			
Cd.28 Step start information	1174	1224	1274	1546	1646	1746			
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			
	1184	1234	1284	1508	1608	1708			
Cd.33 New acceleration time value	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	1188	1237	1288	1511	1612	1711			
change, enable /disable selection	1100	1200	.200	1012	7012	71.12			

								Buff	er mem	ory add	ress				
		Item of AD75P□-S3					P□-S3					75P□N			
	Da	1.1 Operation pattern		Ax	is 1	Ax	is 2	Ax	is 3	Axi	s 1	Ax	is 2	Ax	is 3
	Da	.2 Control system		40	.00	00	00	20	100	200	00	0.0	.00	4.44	200
	Da	.3 Acceleration time No.		13	00	23	00	3300		2000		00	000	140	000
	Da	.4 Deceleration time No.													
	Da No.	.5 M code/condition data		13	01	2301		33	801	20	01	80	01	140	001
	Da	.8 Dwell time/JUMP	No.1	13	02	23	02	33	302	20	02	80	02	140	002
, E	-	tination positioning data No.													
y dat	Emp	oty			603 604		03		803 806	20	03 04		03 04		003
Positioning data*1	Da	.7 Command speed			05		05		807		05		05		005
ositic	Da	.5 Positioning address/		13	06	23	06	33	806	20	06	80	06	140	006
<b>□</b>		rement amount		13	07	23	07	33	807	20	07	80	07	140	007
	Da	a.6 Arc address			808		80		808		08		80		800
		<u> </u>		13	609	23	09		809	20	09	80	109		009 10 to
		No.2		1310 to 1319		2310 to 2319		3310 t	10 to 3319 2010 to 20		o 2019	8010 to 8019		14019	
	No.3			1320 t	o 1329	2320 t	o 2329	3320 to 3329 2020 to 2029		8020 to 8029		14020 to			
	to			1	to	1	:O	1	to	t	0	to		14029 to	
															90 to
		No.100	ı	2290 to 2299		3290 to 3299		4290 t	o 4299	2990 t	o 2999	8990 t	o 8999 I	149	999
		Da.10 Shape													
	*2	Da.11 Start data No.	1st		4300 4350										
	*ata	Da.12 Special start	point	4300		4550	50 4600	4800 4850	4850	26000 26050	27000	27050	28000	28050	
	ock o	instruction													
	Start block data	Da.13 Parameter													
	Sta	2nd point 3rd point		4301 4302	4351 4352	4551 4552	4601 4602	4801 4802	4851 4852	26001 26002	26051 26052	27001 27002	27051 27052	28001 28002	28051 28052
ზ		to			4332 to		1002		to		0		10002	1	20032 to
ation		50th point		4349	4399	4599	4649	4849	4899		26099	27049	27099		
orm		Da.14 Condition target		11	.00	46	50	40	000	26.	100	27	100	20	100
rt in		Da.15 Condition operator		44	.00	40	30	48	,00	20	100	21	100	20	100
g sta		Da.16 Address			02	46	52	49	002	26	102		102		102
oning		Da. 10 Address	No.1		03		53		003		103		103		103
Positioning start information*3	data	Da.17 Parameter 1			.04 .05		54 55		)04 )05	26° 26°	104		104 105		104 105
ш.	on d	Da.18 Parameter 2		4406			56		006		106		106		106
	Condition	Da. 10 I didifficio 2		440		46	57	49	07		107		107	28107 28110 to	
	ပိ	No.2		4410 t	o 4419	4660 t	o 4669	4910 t	o 4919	261 ²	119		10 to 119		119
		No 2		4420 +	o 4420	4670+	o 4670	4020 +	o 4020		20 to		20 to		20 to
		No.3			o 4429		o 4679		o 4929		129		129		129
		to		1	to	1	:0	1	to		o 90 to	to 27190 to		1	to 90 to
		No.10		4490 t	o 4499	4740 t	o 4749	4990 t	o 4999		199		199		199

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

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

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

					Buffer mem	ory address									
Iter	n of A	D75P□-S3		AD75P□-S3	}	QD75P□N/QD75D□N									
			Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3							
	2	Start No.8001	4500	4750	5000	-	-	-							
Positioning start	Indirect designatio	lirect signation	irect signation	irect	iatic	t natic	st patic	ع ج	Start No.8002	4501	4751	5001	-	-	-
information					to	to	to	to	to	to	to				
		Ctart Na OOFO	4549	4799	5049	-	-	-							
Dragrammable controller	· CDLI	Condition indement toward data	5050				30000								
Programmable controller	CPU	, , ,		to		to									
memory area		of the condition data		5099		30049									
Target axis				5100		-									
Head positioning block N	Ю.			5101		-									
No. of read/write data ite	ms			5102		-									
Read/write request				5103		-									
Read/write block				5110 to 6109	)		-								

#### 7.4.5 Interface specifications comparison with external devices

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

O: Compatible,  $\triangle$ : 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: $4.7 k\Omega \rightarrow 4.3 k\Omega$ Response time: $4 ms \rightarrow 1 ms$	Δ	<when for="" is="" machine="" method="" near-point="" opr="" signal="" the="" used="" watchdog=""> The input response time for the QD75P□N/QD75D□N is shorter than the A1SD75P□-S3. If a sensor, which the chattering time when the near-point watchdog signal is turned on is long, is used, an error may occurs due to the false detection of the ON/OFF status.*4 Check specifications for the sensor.</when>
	Speed-position switching signal	Input resistance: $4.7k\Omega \rightarrow 7.7k\Omega$ Response time: $4ms \rightarrow 1ms$	Δ	
	Zero signal	Input resistance: $3.5 \text{k}\Omega \rightarrow 4.7 \text{k}\Omega$ (at input of 24V) $0.5 \text{k}\Omega \rightarrow 0.62 \text{k}\Omega$ (at input of 5V) Response time: $0.8 \text{ms} \rightarrow 1 \text{ms}^{*3}$ ON voltage: $2.5 \text{V} \rightarrow 2.0 \text{V}$ (at input of 5V)	Δ	Including the response time differences, reconfirming is required.
	Manual pulse generator	ON current: 3.5mA→2mA	0	
Output	Pulse	-	0	_
Juiput	Deviation counter clear	-	0	

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

## 7.5 AD75M1/M2/M3

# 7.5.1 Performance comparison

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

	Model	AD75M1	AD75M2	AD75M3	QD75M1	QD75M2	QD75M4	Compati-	Precautions for replacement
Item									replacement
No. of control a	axes	1	2	3	1	2	4	0	
No. of position	-		600/axis ^{*1}	T		600/axis	1	0	
Position control	2-axis linear interpolation	×	× 0		×	0	0	0	
interpolation functions	2-axis circular interpolation	×	0	0	×	0	0		
	Position control		0			0			
	Speed control		0			0			
Positioning system Speed-position switching control			0			0		0	
	Position- speed switching control		×			0			
Positioning range		-21474.83648 0 to 359.99999 -2147483648   <a href="Incrementals">Incrementals</a> -214748364.8 -21474.83648 -21474.83648	to 214748364 to 21474.8364 d (degree) to 2147483647 system> to 2147483647 to 21474.83647 to 21474.83647 ition switching of 4.7 (µm) 647 (degree)	7 (inch) (PLS) 7 (µm) 7 (inch) 7 (degree) (PLS)	-21474.83648 0 to 359.99999 -2147483648 <incremental s<br="">-2147483648 -21474.83648 -21474.83648</incremental>	to 214748364: to 21474.8364' d (degree) o 2147483647 system> to 214748364; to 21474.8364' to 21474.8364' o 2147483647 ition switching d 4.7 (µm) 647 (inch)	0		
Speed comma	nd range	0.01 to 6000000.00 (mm/min) 0.001 to 600000.000 (inch/min) 0.001 to 600000.000 (degree/min) 1 to 1000000 (PLS/s)			0.01 to 20000000.00 (mm/min) 0.001 to 2000000.000 (inch/min) 0.001 to 2000000.000 (degree/min) 1 to 10000000 (PLS/s)			0	
Machine OPR function (OPR method)		○(6 OPR methods)			O(4 OPR methods)			Δ	Corresponding to the OP unpassed error is required. Return the motor more than one rotation once at the error and perform the OPR start again.
JOG operation			0			0		0	

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

						O. Con	ilpatible, $\triangle$ . I a	riiai criange	required, ×: Incompatible	
Item	Model	AD75M1	AD75M2	AD75M3	QD75M1	QD75M2	QD75M4	Compati- bility	Precautions for replacement	
Manual pulse g function	generator		generator/axis		1 generator/module			Δ	On QD75M□, the manual pulse generator cannot be used by each axis independent.     When connecting the manual pulse generator for each axis is required, use one axis module.     The manual pulse generator itself can use the same one.     The operation for inputting one pulse differs.     Set the parameter so that movement amount may be same.	
Acceleration/ deceleration	Automatic trapezoidal acceleration/ deceleration		0			0		0		
processing	S-pattern acceleration/ deceleration		0			0				
		Acceleration til	ne and deceler	ation time can	Acceleration ti	me and deceler	ation time can			
Acceleration/	No. of patterns		set independen	-		set independer	-			
deceleration action time	setting range		4 patterns each /1 to 8388608m enabled			4 patterns each 1 to 8388608ms		0		
Compensation		Electronic gea	ars, backlash co near pass ^{*2}	ompensation,	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 Works2/GX Developer.	
History data sto error, warning)	orage (Start,	Provided (4	1 types, 16 item	ıs/module)	Provided (3 types, 16 items/module)			0	The start history during error is integrated into the start history.	
Data storage d	estination		Flash ROM			Flash ROM		0		
			ttery-less backı 10136-3000VE	th)	·	attery-less back 6CON1, A6CON		-		
			ering type, sup	olied)		ng type, sold se				
Connection cor	nector		10136-6000EL	•	·	A6CON2	. ,,	×		
		(Crimpin	g type, sold sep	parately)		ig type, sold se			As the connectors differ,	
		10100	-		A6CON3 (	IDC type, sold s	separately)		wiring change is required.	
			3000VE: 24 to 3 ox. 0.05 to 0.2r		A6CO	N1, A6CON4: 0	.3mm ²		The connectors of	
A 11			6-6000EL: 28 A						QD75M□ is sold	
Applicable wire	size	(a	pprox. 0.08mm	² )	A6C	ON2: 24 to 28 A	AWG	0	separately.	
			-			3: 28 AWG (twis AWG (single w	,,			
SSCNET conne				Refer to Sec	tion 7.5.5 (3).	· · · · · · · · · · · · · · · · · · ·			The connector	
Maximum exter of SSCNET				30	)m			Δ	configuration of bass differs.	
Internal current consumption(A) (5VDC)		0.7A or less			QD75M1 : 0.40A	QD75M2 : 0.40A	0			

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

	Model							<u> </u>	· ·
Item	Model	AD75M1	AD75M2	AD75M3	QD75M1	QD75M2	QD75M4	Compati- bility	Precautions for replacement
Flash ROM write count		Max. 100,000 times			М	ax. 100,000 tim	es	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.
I/O points	9 points 32 points 32 points (I/O assignment: special 32 points) (I/O assignment: intelligent 32 points)					t 32 points)	0		
No. of module	occupied slots		1			1		0	
Weight	Weight 0.35kg				0.15kg	0.15kg	0.16kg	Δ	
I/O signal for external devices	START signal	0			× (ir	ntegrated into C	HG)	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-r	oosition switchir	ng signal		mand signal (Ex on switching se parameters)	0		
peripheral	Connection with peripheral devices		Direct connectio	n	CPU, o	via programmal Q corresponding on module, Q c NET/H remote I	0	The connecting shape differs.	
devices (data setting, etc.)	Teaching module	AD75TU				Not available	×	The teaching module cannot be used.	
	Software package	G	X Configurator-	AP	GX Works2 GX Configurator-QP*3			0	The software package that can be used differs.

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

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

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

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

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

## 7.5.2 Function comparison

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

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

Deleted functions	Precautions for replacement						
Creep speed out of range error (error code: 208)	With QD75M□, there is no the error code of the left column.						
Fast machine OPR	With the Q75M□, there is no possible function for replacement.						
Special start (stop) Execute it separately for the start two times.							
Indirect designation	n the QD75M□, the start block area on the buffer memory is expanded to five blocks (0 to 4). Each start block can be directly designated with positioning start No. (7000 to 7004).						
Block transfer	With the AD75M□, 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 QD75M□, this function is deleted.						
Start history during errors	The contents are the same as the start history.  Therefore, the QD75M□ stores only the start history.						
System monitor data	These data were deleted because they can be displayed in system monitor "Module's detailed						
(Module name, OS type, OS versio	n) information" of GX Works2/GX Developer.						

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

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

Changed functions		Change description							
3.0	The software stroke limit check	k of arc address is carried out only	when a sub point is designated.						
	It is not carried out when a ce	· · · · · · · · · · · · · · · · · · ·	, ,						
		k during speed control is carried o	ut in the following cases:						
		is applied to the current feed value							
	value is updated with Pr.21								
		is applied to the machine feed valu	I A						
	If an attempt is made to change the current value but the designated address is out of the								
Software stroke limit function	3. If an attempt is made to change the current value but the designated address is out of the software stroke limit range, the attempt is considered as an error and the current value is not								
Software stroke littlic function	changed.								
	4. Error code change								
	AD75MD:								
	There are 3 types of errors for	each upper and lower stroke limit	:. (error code 509 to 512)						
	QD75M□:								
		upper limit are integrated in to erro	or code 507.						
	Errors for the lower limit are in								
	Error codes 509 to 512 are deleted.								
Current value changing M code		1. An error occurs when the designated new current value is out of the software stroke limit range.							
function	-	alid during the positioning data cur							
Acceleration/deceleration speed		Bms) can be used as the setting va	alue for the acceleration/						
control	deceleration time.								
	1. "Peripheral side (emergency) stop" is deleted from the stop causes of Stop group 2 "sudden stop selection".								
		average of Otana analysis 2 Havedday at							
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	"Stop (QD75 peripheral)" is added to the stop causes of Stop group 3 "sudden stop selection".								
positioning operation stop									
		vice stop during operation) is dele U error occurrence" is added to the							
	"Sudden stop selection".	o endi occurrence is added to the	e stop causes of Stop group 2						
	Oudden stop selection :	AD75M□	QD75M□						
READY signal (X0)	OFF	Normal (READY)	Not READY/WDT error						
(12 12 1 olg.la. (710)	ON	Not READY/WDT error	Normal (READY)						
		ulse generator is changed from 1g	. ,						
Manual pulse generator operation	module.	3 3	3						
Axis operation status	"Step stopped" is changed to "Sto	opped" and "Step error occurring" i	s changed to "Error occurring".						
· · · ·	• AD75M□:	•							
	If the reference axis operates in	n reverse direction, the control is in	iternally changed into the						
	continuous positioning control.	(restart after deceleration stop)							
Continuous path control	• QD75M□:								
	Even if the reference axis operates in reverse direction with interpolation, the control remains as								
	the continuous path control.								
	(In single-axis operation, the operation is the same as that of the AD75M□.)								
Near page	For the continuous path control, c	only the near pass function is availa	able.						
Near pass	Positioning address pass is not co	onducted.							
2-axis interpolation									
<ul> <li>2-axis linear interpolation</li> </ul>	The interpolation target axis can be	pe randomly set with a positioning	identifier						
<ul> <li>2-axis fixed-feed</li> </ul>	The interpolation target axis can be randomly set with a positioning identifier.								
Circular interpolation									
		'Stopped" and "Step error occurring	g" is changed to "Error occurring"						
Step function	in the axis operations status p								
•		start information (02H) is deleted.							
	3. The step operation is restarted with the restart command.								

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 designa	ation) and 8000 to 8049 (indirect de	esignation) are deleted.				
Block start data	With QD75M□, number of blocks has been change to 5 (7000 to 7004).						
BIOCK Start data	(With the AD75M□, this data is c	the AD75M□, this data is called "Positioning start information".)					
Ctart biotom	The configuration of start informa	information and start No. is changed so that the start No. can be directly					
Start history	checked.						
		AD75M□	QD75M□				
Detailed parameters	0	Software stroke limits invalid for	Software stroke limits valid for				
"Pr.15 Software stroke limit valid/	(Factory setting)	manual operation	manual operation				
invalid setting"	Software stroke limits valid for Software stroke limits in						
	!	manual operation	manual operation				

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

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

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

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

^{*1} The ON/OFF statuses for READY are different between the QD75M□ and AD75M□.

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

^{*2} When using a program example of No.11 Reset program described in A1SD75M1/M2/M3, AD75M1/M2/M3 Positioning Module User's Manual for the QD75M□, replace "X4 (BUSY signal for Axis 1)" with "DXC (Direct access input of BUSY signal for Axis 1)". Do the same thing for programs for Axis 2 and Axis 3.

#### 7.5.4 Buffer memory address comparison

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

area shows the differences between AD75M□ and QD75M□.

	Buffer memory address							
Item of AD75M□		AD75M□			QD75M□			
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3		
Pr.1 Unit setting	0	150	300	0	150	300		
Pr.2 No. of pulses per rotation (AP)	1	151	301	2	152	302		
				3	153 154	303 304		
Pr.3 Movement amount per rotation (AL)	2	152	302	5	154	304		
Pr.4 Unit magnification (AM)	3	153	303	1	151	301		
	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		
F1.8 Acceleration time 0	9	159	309	13	163	311		
Pr.9 Deceleration time 0	10	160	310	14	164	314		
	11 12	161 162	311 312	15 6	165 156	315 306		
Pr.10 Bias speed at start	13	163	312	7	157	307		
D- 42 Backlash companyation amount	15	165	315	17	167	317		
Pr.12 Backlash compensation amount								
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		
Pr.26 Acceleration time 1	36	186	336	36	186	336		
[F1.20] 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 41	190	340 341	40 41	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 44	193 194	343 344	43	193 194	343 344	
Pr.30 Deceleration time 2	45	195	345	45	195	345	
	46	196	346	46	196	346	
Pr.31 Deceleration time 3	47	197	347	47	197	347	
Pr.32 JOG Speed limit value	48	198	348	48	198	348	
- T1.32 300 Speed littlit 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	
- 1.00 O-pattern proportion	54	204	354	54	204	354	
Pr.37 Sudden stop deceleration time	55	205	355	55	205	355	
Pr.38 Stop group 1 sudden stop selection	56	206	356	56	206	356	
Pr.39 Stop group 2 sudden stop selection	57	207	357	57	207	357	
Pr.40 Stop group 3 sudden stop selection	58	208	358	58	208	358	
Pr.41 Positioning complete signal output time	59	209	359	59	209	359	
Pr.42 Allowable circular interpolation	60	210	360	60	210	360	
error width	61	211	361	61	211	361	
Pr.43 External start function selection							
	62	212	362	62	212	362	
(QD75M□: Pr.42 External command	<b>~</b> =			<u> </u>		552	
function selection)							
Pr.150 Restart allowable range when	64 65	214	364	64	214	364	
servo OFF to ON	65	215	365	65	215	365	
Pr.44 Near pass mode selection for path	66	216	366	-	_	-	
control							
Pr.45 OPR method	70	220	370	70	220	370	
Pr.46 OPR direction	71	221	371	71	221	371	
	72	222	372	72	222	372	
Pr.47 OP address	73	223	373	73	223	373	
Pr.48 OPR speed	74	224	374	74	224	374	
11.40 Of Kapeed	75	225	375	75	225	375	
Pr.49 Creep speed	76 77	226 227	376 377	76 77	226 227	376 377	
				78	228		
Pr.50 OPR retry	78	228	378			378	
OPR dwell time	-	-	-	79	229	379	
Pr.52 Setting for the movement amount	80 81	230 231	380 381	80 81	230 231	380 381	
after near-point dog ON							
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	

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

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

		Buffer memory address					
Item of AD75M□		AD75M□	QD75M□				
		Common for axis 1,2,3	Common for axis 1,2,3,4				
Md.1 In test mode flag		450	1200				
Md.2 Module name		451	-				
Md.3 OS type		452 453 454 455	-				
Md.4 OS version		456 457	-				
Md.5 Clock data (hour: minute)		460	-				
Md.6 Clock data (second: 100 ms)		461	-				
(Pointer number)		(0) to	o (15)				
Md.7 Start axis		400 to 507	4040 to 4007				
(QD75M□: Md.3 Start information)		462 to 537	1212 to 1287				
Md.8 Operation type		400 to 500	4040 to 4000				
(QD75M□: Md.4 Start No.)	ory	463 to 538	1213 to 1288				
Md.9 Start Hour: minute	Start history	40.4 % 500	40444, 4000				
(QD75M□: Md.5 Start Hour)	Start	464 to 539	1214 to 1289				
Md.10 Start Second: 100 ms		465 to 540					
(QD75M□: 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	errors	543 to 618	-				
Md.14 Operation type	ing e	544 to 619	-				
Md.15 Start Hour: minute	y dur	545 to 620	-				
Md.16 Start Second: 100 ms	Start history during	546 to 621	-				
Md.17 Error judgment	tart h	547 to 622	-				
Md.18 Start history pointer at error	Ó	623	-				
(Pointer number)		(0) to	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	tony	626 to 686	1295 to 1355				
(QD75M□: Md.11 Axis error occurrence (Hour))	Error history	020 to 000	1290 to 1000				
Md.22 Axis error occurrence Second: 100 ms							
(QD75M□: 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□		AD75M□	QD75M□				
		Common for axis 1,2,3	Common for axis 1,2,3,4				
(Pointer number)		(0) to	(15)				
Md.24 Axis in which the warning occurred		689 to 749	1358 to 1418				
Md.25 Axis warning No.	,	690 to 750	1359 to 1419				
Md.26 Axis warning occurrence Hour: minutes	history	691 to 751	1360 to 1420				
(QD75□: Md.16 Axis warning occurrence (Hour))		09110731	1300 to 1420				
Md.27 Axis warning occurrence Second: 100 ms	Warning						
(QD75M□: Md.17 Axis warning occurrence		692 to 752	1361 to 1421				
(Minutes: second))							
Md.28 Warning history pointer		753	1422				

	Buffer memory address							
Item of AD75M□		AD75M□	Duller Illetti	ory address	QD75M□	QD75M□		
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3		
Md.29 Current feed value	800	900	1000	800	900	1000		
Md.29 Current leed value	801	901	1001	801	901	1001		
Md.30 Machine feed value	802	902	1002	802	902	1002		
	803 804	903 904	1003 1004	803 804	903 904	1003 1004		
Pr.31 Feedrate	805	904	1004	805	904	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		
Mu.33 Axis operation status				810	910	1010		
Md.36 Current speed	810	910	1010	811	911	1011		
Md.37 Axis feedrate	812	912	1012	812	912	1012		
Mu.57 Axis leedlate	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	920	1020	820	920	1020		
g. 1g. 1	821 822	921 922	1021 1022	821	921	1021		
Md.43 OP absolute position	823	922	1022	-	-	-		
Md.44 Movement amount after near-point	824	924	1024	824	924	1024		
dog ON	825	925	1025	825	925	1025		
Md.45 Torque limit stored value	826	926	1026	826	926	1026		
Md.46 Special start data instruction code setting value	827	927	1027	827	927	1027		
Md.47 Special start data instruction parameter setting value	828	928	1028	828	928	1028		
Md.48 Start positioning data No. setting value	829	929	1029	829	929	1029		
Md.49 In speed control flag	830	930	1030	830	930	1030		
Md.50 In speed change processing flag	831	931	1031	831	931	1031		
Md.51 Start data pointer being executed	832	932	1032	834	934	1034		
Md.52 Last executed positioning data No.	833	933	1033	837	937	1037		
Md.53 Repetition counter								
(QD75M□: Md.41 Special start repetition	834	934	1034	832	932	1032		
counter)								
Md.54 Positioning data No. being executed	835	935	1035	835	935	1035		
Md.55 Block No. being executed	836	936	1036	836	936	1036		
Md.56 Positioning data being executed	838 to 847	938 to 947	1038 to 1047	838 to 847	938 to 947	1038 to 1047		
Md.100 OPR re-travel value	848	948	1048	848	948	1048		
Wid. 100 Of 10 18-travel value	849	949	1049	849	949	1049		
Md.101 Real current value	850 851	950 951	1050 1051	850 851	950 951	1050 1051		

	Buffer memory address							
Item of AD75M□	AD75M□			QD75M□				
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3		
Md.102 Deviation counter value	852	952	1052	852	952	1052		
ivid. 102 Deviation Counter value	853	953	1053	853	953	1053		
Md.103 Motor rotation	854	954	1054	854	954	1054		
	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	974	1074		
Maker setting		-		875	975	1075		
		I	T	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						
ltem of AD75M□		AD75M□			QD75M□		
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3	
Cd.1 Clock data setting (hour)		1100			-		
Cd.2 Clock data setting (minute, second)		1101			-		
Cd.3 Clock data writing		1102			-		
Cd.4 Target axis		1103			-		
Cd.5 Positioning data No.		1104			-		
Cd.6 Write pattern		1105			-		
Cd.7 Read/write request		1106			-		
Cd.8 Read/write positioning data I/F		1108 to 1137			-		
Cd.9 Flash ROM write request		1138			1900		
Cd.10 Parameter initialization request		1139			1901		
Cd.11 Positioning start No.	1150	1200	1250	1500	1600	1700	
Cd.12 Axis error reset	1151	1201	1251	1502	1602	1702	
Cd.13 Restart command	1152	1202	1252	1503	1603	1703	
Cd.14 M code OFF request	1153	1203	1253	1504	1604	1704	
	1154	1204	1254	1506	1606	1706	
Cd.15 New current value	1155	1205	1255	1507	1607	1707	
Cd.16 New speed value	1156 1157	1206 1207	1256 1257	1514 1515	1614 1615	1714 1715	
Cd.17 Speed change request	1158	1208	1258	1516	1616	1716	
Cd.18 Positioning operation speed override	1159	1209	1259	1513	1613	1713	
	1160	1210	1260	1518	1618	1718	
Cd.19 JOG speed	1161	1211	1261	1519	1619	1719	
Cd.20 Speed-position switching enable flag	1163	1213	1263	1528	1628	1728	
Cd.21 Speed-position switching control	1164	1214	1264	1526	1626	1726	
movement amount change register	1165	1215	1265	1527	1627	1727	
Cd.22 Manual pulse generator enable flag	1167	1217	1267	1524	1624	1724	
Cd.23 Manual pulse generator 1 pulse	1168	1218	1268	1522	1622	1722	
input magnification	1169	1219	1269	1523	1623	1723	
Cd.24 OPR return request flag OFF request	1170	1220	1270	1521	1621	1721	
Cd.25 External start valid							
(QD75M□: Cd.8 External command valid)	1171	1221	1271	1505	1605	1705	
Cd.26 Step valid flag	1172	1222	1272	1545	1645	1745	
Cd.27 Step mode	1173	1223	1273	1544	1644	1744	
Cd.28 Step start information	1174	1224	1274	1546	1646	1746	
Cd.29 Skip command	1175	1225	1275	1547	1647	1747	
Cd.30 New torque value	1176	1226	1276	1525	1625	1725	
Cd.31 Positioning starting point No.	1178	1228	1278	1501	1601	1701	
Cd.100 Servo OFF command	1179	1229	1279	1551	1651	1751	
Cd.101 Torque output setting value	1180	1230	1280	1552	1652	1752	

	Buffer memory address								
Item of AD75M□		AD75M□		QD75M□					
	Axis 1	Axis 2	Axis 3	Axis 1	Axis 2	Axis 3			
Cd.32 Interrupt request during	1181	1231	1281	1520	1620	1720			
continuous operation	1101	1231	1201	1520	1020	1720			
	1184	1234	1284	1508	1608	1708			
Cd.33 New acceleration time value	1185	1235	1285	1509	1609	1709			
O LOCA Name de la la confirma francisco	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		-	1	1905					
Stop command processing for deceleration	-			1907					
stop selection									
Servo amplifier data read		-		1553	1653	1753			

		Buffer memory address												
Item of AD75M□					AD7	5M□	Dan	01 1110111	ory aut		QD7	5M□		
			Ax	is 1			Axi	is 3	Ax	is 1			Ax	is 3
Da.	Da.1 Operation pattern Da.2 Control system Da.3 Acceleration time No.													000
			4.0	104	22	04	22	04	200	104	00	04	4.44	204
Da.	9 M code/condition data		13	301	23	01	33	01	20	101	80	01	140	J01
		No.1	13	302	23	02	33	02	20	002	80	02	140	002
Empt	ty		13	803	23	03	33	03	20	03	80	03	140	003
Da.	7 Command speed								_					004 005
Da.	5 Positioning address/		13	306	23	06	33	06	20	06	80	06	140	006
	-		13	807	23	07	33	07	20	07	80	07	140	007
Da.	6 Arc address													008 009
	No.2		1310 t	o 1319	2310 to	o 2319	3310 t	o 3319	2010 t	o 2019	8010 t	o 8019		10 to 019
No.3			1320 t	1320 to 1329		o 2329	3320 to 3329		2020 to 2029		8020 to 8029		14020 to 14029	
	to		1	to	t	0	to t		to	1	0.0	to		
	No.100		2290 to 2299		3290 to 3299		4290 to 4299		2990 to 2999		8990 to 8999		14990 to 14999	
	D. 40 Chana									l			148	999
ata*2	Da.11 Start data No.  Da.12 Special start	1st point	4300	4350	4550	4600	4800	4850	26000	26050	27000	27050	28000	28050
block d	instruction  Da.13 Parameter	·												
tart			4301	4351	4551	4601	4801	4851	26001	26051	27001	27051	28001	28051
Ś	3rd point		4302	4352	4552	4602	4802							
	to		1	to	t	0	t	0	1	to	1	.0	t	.0
	50th point	1	4349	4399	4599	4649	4849	4899	26049	26099	27049	27099	28049	28099
	Da.14 Condition target  Da.15 Condition		44	100	46	50	49	00	26	100	27	100	28 ⁻	100
	•	No.4	44	02	46	52	49	02	26	102	27	102	28	102
		No.1												103
													28106 28107	
dition	Da.18 Parameter 2													106 107
Con	No 2								261	10 to	271 ⁻	10 to	281	10 to
INU.Z					.550 (		.5.00	010	26119					119
	No.3		4420 t	o 4429	4670 t	o 4679	4920 t	o 4929			27120 to			
	to		1	to	1	0	t	0					28129 to	
	No.10								261	90 to	2719	90 to	2819	90 to
l	Da.  Da.  Da.  Da.  desti No.  Empi  Da.  move	Da.1 Operation pattern Da.2 Control system Da.3 Acceleration time No. Da.4 Deceleration time No. Da.9 M code/condition data Da.8 Dwell time/JUMP destination positioning data No. Empty  Da.7 Command speed  Da.5 Positioning address/ movement amount  Da.6 Arc address  No.2  No.3  to  No.100  Pa.10 Shape Da.11 Start data No. Da.12 Special start instruction Da.13 Parameter instruction Da.13 Parameter  2nd point 3rd point to  50th point  Da.15 Condition target  Da.16 Address  Papp Da.17 Parameter 1  Da.18 Parameter 2  No.2  No.3  To  No.2  Papp Da.17 Parameter 1  Da.18 Parameter 2  No.2  No.3  To  No.3  To  No.3  To	Da.1 Operation pattern Da.2 Control system Da.3 Acceleration time No. Da.4 Deceleration time No. Da.9 M code/condition data Da.8 Dwell time/JUMP destination positioning data No. Empty Da.7 Command speed  Da.5 Positioning address/ movement amount  Da.6 Arc address  No.2  No.3  To  No.100  Pa.10 Shape Da.11 Start data No. Da.12 Special start instruction Da.13 Parameter  2nd point 3rd point to  50th point  Da.14 Condition target Da.15 Condition operator  Da.16 Address  No.1  Parameter 1  Da.17 Parameter 1  Da.18 Parameter 2  No.2  No.3  To  No.1	Da.1   Operation pattern   Da.2   Control system   Da.3   Acceleration time No.   Da.4   Deceleration time No.   Da.9   M code/condition data   No.   Da.8   Dwell time/JUMP   destination positioning data   No.   Da.7   Command speed   Da.5   Positioning address/   movement amount   Da.6   Arc address   No.2   1310 to   No.3   1320 to   No.3   1320 to   No.100   Da.10   Shape   Da.11   Start data No.   Da.12   Special start   instruction   Da.13   Parameter   Point   Instruction   Da.13   Parameter   Point   Da.15   Condition   Conjugation   Conjugation   Da.16   Address   No.1   Da.16   Address   No.1   Da.17   Parameter 1   Da.18   Parameter 2   Address   No.2   Address   No.1   Da.18   Parameter 2   Address   No.1   Da.18   Parameter 2   Address   No.2   Address   Address   No.2   Address   Address   No.1   Da.18   Parameter 2   Address   Address   Address   Address   Address   Da.17   Parameter 1   Da.18   Parameter 2   Address   Address	Da.1   Operation pattern     Da.2   Control system     Da.3   Acceleration time No.     Da.9   M code/condition data     No.     Empty   1303     Da.7   Command speed     Da.5   Positioning address/ movement amount     Da.6   Arc address     No.2   1310 to 1319     No.100   2290 to 2299     No.100   1st point instruction     Da.11   Start data No.     Da.12   Special start instruction     Da.13   Parameter     Da.14   Condition target     Da.15   Condition operator     Da.16   Address     Da.17   Parameter 1     Da.18   Parameter 2     No.2   4410 to 4419     No.3   4420 to 4429     To.   To.     To.   To.	Da.1   Operation pattern   Da.2   Control system   Da.3   Acceleration time No.   Da.9   M code/condition data   No.   Da.7   Command speed   Da.5   Positioning address/ movement amount   Da.6   Arc address   No.1   No.100   Command Speed   No.1   No.100   Command Speed   No.1   Command Speed   No.2   Command Speed   No.3   Command Speed   No.2   Command Speed   No.3   Command Speed   Command Speed   No.3   Command Speed   Command Speed   Command Speed   No.3   Command Speed   Comm	Da.1   Operation pattern	Da.1   Operation pattern	Da.1   Operation pattern	Da.1   Operation pattern   Da.2   Control system   Da.3   Acceleration time No. Da.4   Deceleration time No. Da.9   M code/condition data   Da.8   Dwell time/JUMP   destination positioning data   No.   Ist   Da.6   Arc address   Da.6   Arc address   Da.1   Sharpe   Da.1   Start data No.   Da.1   Da.1   Start data No.   Da.1   Da.	No.2   Septiment   Septiment	Da.1   Operation pattern   Da.2   Control system   Da.3   Acceleration time No.   Da.4   Deceleration time No.   Da.4   Deceleration time No.   Da.5   Positioning data   No.1   Da.5   Positioning address/ movement amount   Da.5   Positioning address/ movement amount   Da.5   Arc address   Da.5   Arc address   Da.1   Start data No.   Da.1	Da.1   Operation pattern   Da.2   Control system   Da.3   Axis 2   Axis 3   Axis 1   Axis 3   Axis 1   Axis 2   Axis 3   Axis 1   Axis 1   Axis 2   Axis 3   Axis 1   Axis 1   Axis 2   Axis 3   Axis 1   Axis 1   Axis 1   Axis 3   Axis 1   Axis	Dail   Operation pattern   Dail   Operation   Dail   Operation pattern   Dail   Operation   Operation   Dail   Operation   Operation   Dail   Operation   Operation   Dail   Operation   Operation   Dail   Operation   Operati

^{*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".

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

				Buffer memory 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			
mormation		Start No.8050	4549	4799	5049	-	-	-			
Dragrammal	olo controllor	Condition judgment torget	5050			30000					
Programmal		Condition judgment target data of the condition data		to	to		to				
CPU memor	y area	data of the condition data		5099			30049				
Target axis			5100			-					
Head positioning block No.			5101			-					
No. of read/\	No. of read/write data items			5102			-				
Read/write r	Read/write request		5103			-					
Read/write b	Read/write block			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,  $\triangle$  : Partial change required

	ltem	Differences as Interface specifications*	compati- bility	Precautions for replacement	
	Upper/lower limit signal	OFF current: 1.5mA→1.0mA	Δ	Check whether the OFF current value met	
	Opper/lower littlit signal	Input resistance: $4.7k\Omega\rightarrow6.8k\Omega$	Δ	satisfied values	
	Stop signal	OFF current: 1.5mA→1.0mA	Δ	Check whether the OFF current value met	
	Stop signal	Input resistance: 4.7kΩ→6.8kΩ		satisfied values	
		OFF current: 1.5mA→1.0mA		Check whether the OFF current value me	
Input	Near-point dog signal	Input resistance: 4.7kΩ→6.8kΩ	Δ	satisfied values	
iliput		Response time: 4ms→1ms		Salislieu values	
		OFF current: 1.5mA→1.0mA		Check whether the OFF current value met	
	Speed-position switching signal	Input resistance: 4.7kΩ→6.8kΩ	Δ	satisfied values	
		Response time: 4ms→1ms		Salislieu values	
	Manual pulse generator	ON current: 3.5mA→1.0mA	0		
	Iwanuai puise generator	Input resistance: 1.5k→1.2kΩ	O		

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

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

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

	AD7	75M□	QD75M□			
Name	Logic (Initial setting)	Logic switching by parameter	Logic (Initial setting)	Logic switching by parameter		
Manual pulse generator A phase	Negative logic	Not allowed	Negative logic	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.

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

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

#### (3) Supported servo amplifier

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

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

AD75M□ Supported amplifier model	QD75M□ Availability	Remarks
MR-J□-B	Available	
MR-H□-B	Available	Needs to change the SSCNET cables (refer to (b) in the next page.)
MR-J2□-B	Available	Discontinued model
MR-J2S□-B	Available	

### ⊠Point -

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

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

Additionally, the servo motor needs to be replaced.

- Positioning module: QD77MS□ + servo amplifier: MR-J3□-B
- Positioning module: QD77MS□ + servo amplifier: MR-J4□-B
- (2) Selecting suitable products to replace the existing servo amplifier without servo motor replacement

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

Positioning module: QD75M

+ Servo amplifier: MR-J4-B-RJ020

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

+ Converter MR-J4-T20

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

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

When replacing them, contact the department in charge of Mitsubishi electric servo products.

For replacing the MR-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-J2HBUS□M-A		×	0	×
MR-HBUS□M		×	×	×
MR-J2CN1		0	×	0
MR-J2CN1-A	*1	×	0	×
MR-HBCNS		×	×	×

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

Table 2. With the servo amplifier MR-H

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

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

# 7.6 AD70

## 7.6.1 Performance specifications comparison

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

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

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

Model Item	AD70	QD73A1	Compat- ibility	Precautions for replacement
Internal current consumption (5VDC)	5VDC 0.3A	5VDC 0.52A	Δ	The recalculation of internal current consumption (5VDC) is required.
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	Δ	

^{*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

O: Compatible, --: Not available

Positioning		Function		Description	AD70	QD73A1	Precautions for replacement
Control   Dosition   Two-phase   Positioning is executed to the address specified in   Da.3   Positioning speed V1",   Da.3   Positioning speed V1",   The number of the address specified in   Da.3   Positioning speed V1",   Da.3   Positioning speed value speed set beforehand by one start signal, then the operation switching speed set beforehand by one start signal, the positioning speed set beforehand by one start signal, the positioning speed set beforehand by one start signal, the positioning speed set beforehand speed position switching command signal, the positioning can be continued by Speed-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 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 command from a CPU module, and the current value is corrected to an OP address after the completion of OPR.   This function multiplies the feedback pulse frequency from the pulse generator by 4, 2, 1, or 1/2.   Description   Deviation counter clear function   This function controls moving distance and speed by multiplying command pulse output.   This function clears the accumulated pulses in the deviation counter revents servomotor rotation at power recovery.   This function forces to change speed from a program during positioning control or			Positioning	Positioning is executed from the current position to a specified	0	0	
Two-phase trapeziola "[0.a.2] Positioning address P1" at "[0.a.3] Positioning speed V1", then to the address specified in "[0.a.4] Positioning address P2" at positioning control positioning control positioning control positioning speed V2" by one positioning speed set beforehand by one start signal, then the operation switches to position control by Speed-position switching command signal. If the operation switches to position control by Speed-position switching command signal. If the operation switching command signal, the positioning address (movement amount) can be changed if it is before the input of Speed-position mode restart signal. In addition, the positioning address (movement amount) can be changed if it is before the input of Speed-position mode restart signal. In addition, the positioning address (movement amount) can be changed if it is before the input of Speed-position mode restart signal. In addition, the positioning address (movement amount) can be changed if it is before the input of Speed-position mode restart signal. In addition, the positioning address (movement amount) can be changed if it is before the input of Speed-position mode restart signal. In addition, the positioning address (movement amount) can be changed if it is before the input of Speed-position of Speed-position of Speed-position of Speed-position at specified direction at specified speed and speed ontrol operation is continued until Stop signal is input.  A workpiece is returned to an original point following an OPR start command from a CPU module, and the current value is corrected to an OP address after the completion of OPR.  This function multiplies the feedback pulse frequency from the pulse generator by 4, 2, 1, or 1/2.  This function centres moving distance and speed by multiplying command pulse output.  This function centres the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter is			control	position at a specified speed.	U		7.6.6.
Control mode   Irapezoidal positioning dorters P1" at "Da.3] Positioning speed V1", positioning control   To.3] Positioning address P2" at   To.3] Positioning address P2" at   To.3] Positioning address P2" at   To.3] Positioning speed V2" by one positioning start signal. Positioning speed v2" by one positioning start signal. The through the positioning speed set beforehand by one start signal, then the operation switches to position control by Speed-position switching command signal. If the operation stopped by Stop signal after the input of Speed-position switching command signal, the positioning can be continued by Speed-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 signal starts operation at a specified speed and speed control operation is confinued until Stop signal is input.  A workpiece is returned to an original point following an OPR start command from a CPU module, and the current value is corrected to an OP address after the completion of OPR. This function multiplies the feedback pulse frequency from the pulse generator by 4, 2, 1, or 1/2.  Electronic gear function  Deviation counter clear function  Deviation counter clear function  This function controls moving distance and speed by multiplying command pulse output.  This function clears the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter revents servomotor rotation at power recovery.  Speed change function  This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY.  This function turns on In-position signal can be used as the signal right before positioning completion.  This function turns on In-posi		Position	Two-nhase	Positioning is executed to the address specified in			
Dositioning control   Dositioning control   Dositioning address P2" at   Dositioning address P2" at   Dositioning speed V2" by one positioning start signal.   Dositioning speed v2" by one positioning start signal.   Dositioning speed set beforehand by one start signal, then the operation switches to position control by Speed-position switching command signal. If the operation stopped by Stop signal after the input of Speed-position switching command signal, the positioning can be continued by Speed-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 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 command from a CPU module, and the current value is corrected to an OP address after the completion of OPR.   This function multiplies the feedback pulse frequency from the pulse generator by 4, 2, 1, or 1/2.   This function clears the secumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter revents servomotor rotation at power recovery.   This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY.   This function turns on In-position signal can be used as the signal right before positioning completion.   This function turns on In-position signal can be used as the sign				"Da.2 Positioning address P1" at "Da.3 Positioning speed V1",			
Major positioning control  Operation starts according to the positioning speed set beforehand by one start signal, then the operation switches to position control by Speed-position switching command signal. If the operation switches to position switching command signal. If the operation switching command signal is the positioning can be conflicted by Speed-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 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 command from a CPU module, and the current value is corrected to an OP address after the completion of OPR.  Multiplication setting  This function multiplies the feedback pulse frequency from the pulse generator by 4, 2, 1, or 1/2.  This function controls moving distance and speed by multiplying command pulse output.  This function clears the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter. When the servomotor rotation at power recovery.  This function forces to change speed from a program during positioning control or JOG operation.  This function forces to change speed from a program during positioning control or JOG operation.  This function forces to change speed from a program during positioning control or JOG operation.  This function forces to change speed from a program during positioning control or position signal while the accumulated		mode	_	then to the address specified in Sar-1 contorning address 12 at	0	0	
by one start signal, then the operation switches to position control by Speed-position stopped by Stop signal after the input of Speed-position switching command signal. If the operation stopped by Stop signal after the input of Speed-position switching command signal. The positioning can be continued by Speed-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 JOC operation command is on. Turning on the 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 command from a CPU module, and the current value is corrected to an OP address after the completion of OPR.  Multiplication setting  This function multiplies the feedback pulse frequency from the pulse generator by 4, 2, 1, or 1/2.  Electronic gear function  Deviation counter clear function  Deviation counter clear function  Deviation counter clear function  This function clears the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter prevents servomotor rotation at power recovery.  Speed change function  This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.  This function adjusts analog voltage contained in accumulated	Major		control	"Da.5 Positioning speed V2" by one positioning start signal.			
by Speed-position switching command signal. If the operation stopped by Stop signal after the input of Speed-position switching command signal, the positioning can be continued by Speed-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.  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 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 command from a CPU module, and the current value is corrected to an OP address after the completion of OPR.  Multiplication setting  This function multiplies the feedback pulse frequency from the pulse generator by 4, 2, 1, or 1/2.  pulse generator by 4, 2, 1, or 1/2.  This function controls moving distance and speed by multiplying command pulse output.  This function clears the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter prevents servomotor rotation at power recovery.  Speed change function  This function forces to change speed from a program during positioning control or JOG operation.  This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY.  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.	positioning			Operation starts according to the positioning speed set beforehand			
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A workpiece is returned to an original point following an OPR start command from a CPU module, and the current value is corrected to an OP address after the completion of OPR.  Multiplication setting  This function multiplies the feedback pulse frequency from the pulse generator by 4, 2, 1, or 1/2.  Electronic gear function  This function controls moving distance and speed by multiplying command pulse output.  This function clears the accumulated pulses in the deviation counter. When the servomotor power is turned off due to an emergency stop during positioning, clearing the accumulated pulses in the deviation counter prevents servomotor rotation at power recovery.  Speed change function  This function forces to change speed from a program during positioning control or JOG operation.  Current value change function  This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY.  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.  Tetro/gain adjustment  A workpiece is returned to an original point following an OPR start to an OPR start t							
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Current value change function  Deviation function  Current value change function  In-position function  Current value change function  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position ing completion.  Current value change function  This function dailusts analog voltage contained in accumulated pulse amount in the function adjusts analog voltage contained in accumulated  Current value change function  Current value change function  This function dailusts analog voltage contained in accumulated  Current value change function  Current value change function  This function dailusts analog voltage contained in accumulated  Current value change function  Refer to Section  7.6.6.  Refer to Section  Refer to Section  Refer to Section	Multiplication	on setting			0	0	
Current value change function  In-position function  Carrent value change function  In-position function  Carrent value change function  Carrent value to a specified value on	Electronic o	near function	n .	This function controls moving distance and speed by multiplying		0	
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Deviation counter clear function  emergency stop during positioning, clearing the accumulated pulses in the deviation counter prevents servomotor rotation at power recovery.  Speed change function  This function forces to change speed from a program during positioning control or JOG operation.  This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY.  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.  This function adjusts analog voltage contained in accumulated  Refer to Section  Refer to Section  Refer to Section  Refer to Section				This function clears the accumulated pulses in the deviation			
pulses in the deviation counter prevents servomotor rotation at power recovery.  Speed change function  This function forces to change speed from a program during positioning control or JOG operation.  Current value change function  This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY.  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.  This function adjusts analog voltage contained in accumulated  Refer to Section  Refer to Section  Refer to Section  Refer to Section				counter. When the servomotor power is turned off due to an			
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Current value change function  This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY.  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.  This function adjusts analog voltage contained in accumulated  Refer to Section  7.6.6.  Refer to Section  7.6.6.  Refer to Section  Refer to Section				power recovery.			
Current value change function  This function changes the current feed value to a specified value from a sequence program on the condition other than while BUSY.  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.  This function adjusts analog voltage contained in accumulated  Refer to Section  Refer to Section  Refer to Section  Refer to Section	Spood char	ago functio	n	This function forces to change speed from a program during		_	Refer to Section
from a sequence program on the condition other than while BUSY.  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.  This function adjusts analog voltage contained in accumulated  Refer to Section	Speed change function		11	positioning control or JOG operation.	0		7.6.6.
In-position function  This function turns on In-position signal while the accumulated pulse amount in the deviation counter is within the specified in-position range. In-position signal can be used as the signal right before positioning completion.  This function adjusts analog voltage contained in accumulated  Refer to Section	Current value change function		function	This function changes the current feed value to a specified value		_	Refer to Section
pulse amount in the deviation counter is within the specified inposition range. In-position signal can be used as the signal right before positioning completion.  Zero/gain adjustment  Refer to Section			TUTICLIOTT	from a sequence program on the condition other than while BUSY.	0		7.6.6.
In-position function position range. In-position signal can be used as the signal right before positioning completion.  Zero/gain adjustment Refer to Section	In-position function			This function turns on In-position signal while the accumulated			
position range. In-position signal can be used as the signal right before positioning completion.  This function adjusts analog voltage contained in accumulated  Refer to Section				pulse amount in the deviation counter is within the specified in-			
Zero/gain adjustment  This function adjusts analog voltage contained in accumulated  Refer to Section				position range. In-position signal can be used as the signal right			
Zero/gain adjustment				before positioning completion.			
pulses.   7.6.6.	Zoro/zoir -	dinatasst		This function adjusts analog voltage contained in accumulated	_		Refer to Section
	Zero/gain a	ajusiment		pulses.	0	0	7.6.6.



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

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

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

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

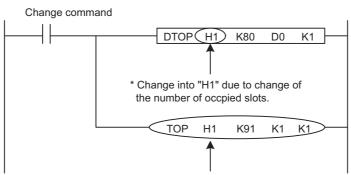
Though the functions of the AD70 and the QD73A1 are same, the setting methods and buffer memory addresses for the functions are partly changed.

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

Changed function	Change description				
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.				
ŭ	• 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.				
Zero/gain adjustment	• QD73A1  The adjustment is performed by either of fallowing methods				
	The adjustment is performed by either of following methods.				
	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.				
	to use the bullet memory for the adjustment, create a program.				

Changed function	Change description
Mode switch	AD70 The setting is configured with slide switches or encoder interface setting pin (hardware setting)  1) Slide switches Rotation direction, accumulated pulse, multiplication setting, zero-return direction, zero-return mode, and zero/gain adjustment mode setting/clear  2) Encoder interface setting pin Encoder output types  • QD73A1 The setting is configured with the intelligent function module switch setting (GX Works2) or the switch setting in I/O assignment of PLC parameter (GX Developer).  * 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.
LED	Refer to *2.

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



* Create the above due to the speed demand.

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

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

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

AD70					
Power supply module	CPU module	AD70			

	QD73A1				
Power supply module	CPU module	QD7	      3A1   		

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

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

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

Input (X)	Output (Y)				
Signal name	AD70	QD73A1	Signal name	AD70	QD73A1
Unused		X00	Unused		Y00
		to			to
(The first half slot is Empty 16 points.)*1		X0F	(The first half slot is Empty 16 points.)*1		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
Alexander of the second		V04		to	to
Absolute positioning start complete		X21		Y0F	Y19
Forward start complete				Y1B	Y1D
(for the incremental positioning and the		X22	*0		to
speed-position control switching)			Use prohibited*2	Y1E, Y1F	Y1F
Reverse start complete					
(for the incremental positioning and the		X23			Y2E, Y2F
speed-position control switching)		723			126, 126
speed-position control switching)					
Synchronization flag		X24			
Zero/gain adjustment data writing complete			1		
flag		X2A			
Zero/gain adjustment change complete flag		X2B	1		
Set value change complete flag		X2C	1		
Operating status of the speed-position			1		
control switch mode		X2D			
Control switch mode					
	X10	X25 to X29			
Use prohibited*2	to	VOE VOE	1		
	X1F	X2E, X2F			

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

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

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

### 7.6.4 Buffer memory address comparison

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

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

area shows the differences between the AD70 and the QD73A1.

Item		Buffer memory address		
	item		AD70	QD73A1
	Stroke limit upper limit		0	0
	Choke mine apper mine		1	1
	Stroke limit lower limit		2	2
	Otroke militiower milit		3	3
Fixed parameter		Numerator of command	4	4
		pulse multiplication	7	· · · · · · · · · · · · · · · · · · ·
	Electronic gear	Denominator of		
		command pulse	5	5
		multiplication		
	Speed limit value		20	20
			21	21
Variable parameter	Acceleration time		22	22
, <b>,</b>	Deceleration time		23	23
	In-position range		24	24
	Positioning mode		25	25
	OP address		40	40
	0. 444.000		41	41
	OPR speed		42	42
OPR data			43	43
	Creep speed		44	44
	Catting for the mayament amount ofter near point		45	45
	Setting for the movement amount after near-point		46	46
	dog ON		47	47
	Positioning pattern		60 61	301 302
	Positioning address P ₁		62	303
	Positioning speed V ₁		63	304
Positioning data			64	305
1 Ositioning data			65	306
	Positioning address P ₂		66	307
			67	308
	Positioning speed V ₂		68	309
			80	80
	New current value		81	81
			82	82
	New speed value		83	83
	100		84	84
	JOG speed (area)		85	85
Combinal about the	Deviation counter clear of	command	86	86
Control change area	Analog output adjustmer	nt area 1	87	87
	Now anod position	roment amount	88	88
	New speed-position mov	ement amount	89	89
	Current value change re	quest		90
	Speed change request			91
	Analog output adjustmer	nt area 2	_	92
	Analog output adjustmer	il aiga Z		93

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

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

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

### 7.6.5 Interface specifications comparison with external devices

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

O: Compatible, △: Partial change required

					atible, Δ: Partial change required
Ite	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.
External	CONT.	9-pin connector for external wiring (pin type)  17JE-23090-02(D8A) (manufactured by DDK Ltd.)  Included Not included		0	The existing external wiring can
wiring connectors	SERVO		xternal wiring (pin type) anufactured by DDK Ltd.) Not included	0	be used without change.
	Applicable wire size	0.3m ²	or less	0	
	Servo READY	0	0	0	
	Stop signal	0	0	0	
	Near-point dog signal	0	0	0	
External input signal	Upper limit signal	0	0	0	
input oignai	Lower limit signal	0	0	0	
	Speed- position switching command	0	0	0	
Positioning feedback pulse input		(Pulse frequency) Open collector: 100kpulse/s or less TTL: 100kpulse/s or less Differential: 100kpulse/s or less	(Pulse frequency) Open collector: 200kpulse/s or less TTL: 200kpulse/s or less Differential: 1Mpulse/s or less	0	The specification has improved. (Upward-compatibility)
Servo ON		0	0	0	
Speed comm signal)	and (analog	0	0	0	

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

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

Item	AD70	QD73A1	Precautions
Number of occupied slots	1 slot	2 slots	*1
Number of occupied I/O points	32 points (I/O assignment: Special function module, 32 points)	48 points (I/O assignment: First half slot: Empty 16 points Second half slot: Intelli., 32 points)	*2
Buffer memory address	Addresses are partly changed.     New items are added due to the specific	*3	
Mode setting	Hardware switch setting  Parameter setting of a CPU module  ("I/O assignment" → "Switch setting")  *∠		*4
LED	<ul> <li>Items indicated with the LEDs differ betw</li> </ul>	veen the AD70 and the QD73A1.	*5
External wiring	The existing connectors can be used.		*6*7
Operation of when Servo READY signal is off	the AD70 counts the feedback pulse, and utputs the voltage proportional to the eviation 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 and en	coder	Wiring when the AD70 is replaced t	o the QD73A1
1	OFF	Same direction	, B	Phase A Phase B	Phase Phase B	Phase A Phase B Encoder
2	1011	Reverse direction	Phase B	Phase A Phase B B	Phase 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.

	Replacement Q series		Existing A series positioning module				
ABSOCODER sensor	Positioning module	Positioning module Position detection module VS-Q62 VS-Q62B		Existing A series positioning module			
	VS-Q62			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		
VLS-256PWB			0	0	-		
VLS-512PWB			0	0	-		
VLS-1024PW	VS-Q62-L	_	0	0	-		
VLS-512PYB	V3-Q02-L		0	0	-		
VLS-1024PYB			0	0	-		
VLS-2048PY			0	0	-		

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

VS-Q62B: Converter type with position detection function

	Replaceme	Existing A series positioning module	
ABSOCODER sensor	Positioning module Position detection 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
Davier averaly madella	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	<b>Model Code</b>
1	MELSEC-A/QnA Series Transition Guide	L08077E	_

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

No.	Manual Name	Manual Number	<b>Model Code</b>
1	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L08043ENG	
'	Handbook (Fundamentals)	L00043ENG	_
2	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L08046ENG	
	Handbook (Intelligent Function Modules)	L00040EING	_
3	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L08048ENG	
3	Handbook (Network Modules)	L00046ENG	_
4	Transition from MELSEC-A/QnA (Large Type) Series to Q Series	L08050ENG	
4	Handbook (Communications)	LUGUSUEING	_
5	Transition from MELSEC-A0J2H Series to Q Series Handbook	L08060ENG	_
6	Transition from MELSECNET/MINI-S3, A2C(I/O) to CC-Link Handbook	L08061ENG	_
7	Transition from MELSEC-I/OLINK to CC-Link/LT Handbook	L08062ENG	_
,	Transition from MELSEC-I/OLINK to AnyWire DB A20 Handbook	L08263ENG	_
8	Transition of CPUs in MELSEC Redundant System Handbook	L08117ENG	_
0	(Transition from Q4ARCPU to QnPRHCPU)	LOUTTILING	

### (3) Transition Examples

No.	Manual Name	Manual Number	Model Code
1	MELSEC-A/QnA (Large), AnS/QnAS (Small) Transition Examples	L08121E	_

### (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 model QCPU	FA-A-0068	-
3	Transition from MELSERVO-J2-Super/J2M Series to J4 Series Handbook	L03093	_

### 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
	Manual	18 00270	100/100
10	Digital-Analog Converter Module Type A616DAV User's Manual	IB-68079	13J362
11	Digital-Analog Converter Module Type A616DAI User's Manual	IB-68080	13J363
12	Pt100 Input Module Type A68RD3N/4N, A1S62RD3N/4N User's Manual	SH-080190	13JT69
13	Temperature-Digital Converter Module Type A616TD User's Manual	IB-68104	13J368
14	High-Speed Counter Module Type AD61(AD61S1) User's Manual	IB-64576	13J307
15	Positioning Module Type AD70 User's Manual	IB-68106	13J356
16	Positioning Module Type AD72 User's Manual	IB-68008	13J333
17	Positioning Module Type A1SD75P1-S3/P2-S3/P3-S3	SH-3608	13JH86
17	AD75P1-S3/P2-S3/P3-S3 User's Manual	SH-3006	133000
18	Positioning Module Type A1SD75M1/M2/M3	IB-66715	13JH85
10	AD75M1/M2/M3 User's Manual	ID-007 13	133003
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	L08033E	_
2	MELSEC-Q Data Book	L08029E	-
3	Analog-Digital Converter Module User's Manual	SH-080055	13JR03
4	Channel Isolated High Resolution Analog-Digital Converter Module (With SH-080277		13JR51
4	Signal Conditioning Function) User's Manual	311-000277	ISJKST
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	SH-000047 ENG	1551(50
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	133130
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	QD73A1 Positioning Module User's Manual	SH-081075ENG	13JZ69

### Appendix 3.4 Programming tool

No.	Manual name	Manual number	Model code
1	GX Works2 Version 1 Operating Manual (Common)	SH-080779ENG	13JU63
2	GX Works2 Version 1 Operating Manual (Intelligent Function Module)	SH-080921ENG	13JU69
3	GX Developer Version 8 Operating Manual	SH-080373E	13JU41
4	GX Configurator-QP Version 2 Operating Manual	SH-080172	13JU19

## 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).

	l	Resolution of Q seri	es analog I/O module	<b>;</b>
Resolution of A series	Normal resolution	High resolution mode		User range
analog I/O module	mode	Current	Voltage	(Voltage: 1/12000)
	1/4000	1/12000	1/16000	(voitage: 1/12000)
1/4000	0	-	-	_
1/8000	*1	*1	*1	_

0

 $\ensuremath{\mathsf{O}}$  : Measure required by user,  $\ensuremath{^\cdot\!\Delta}\text{-:}$  Measure not required by user

1/12000

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

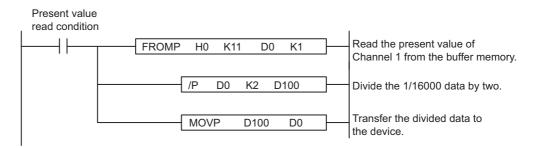
(Condition)

(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.



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

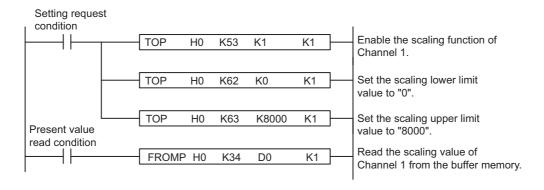
^{*2} Set a user range in high resolution mode.

### (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 Hexadecimal Decimal		Description	Default	Read/Write	
		<del>Desc</del> iption	Derault		
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	K	
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	IT/VV	
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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### Programmable Controller

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