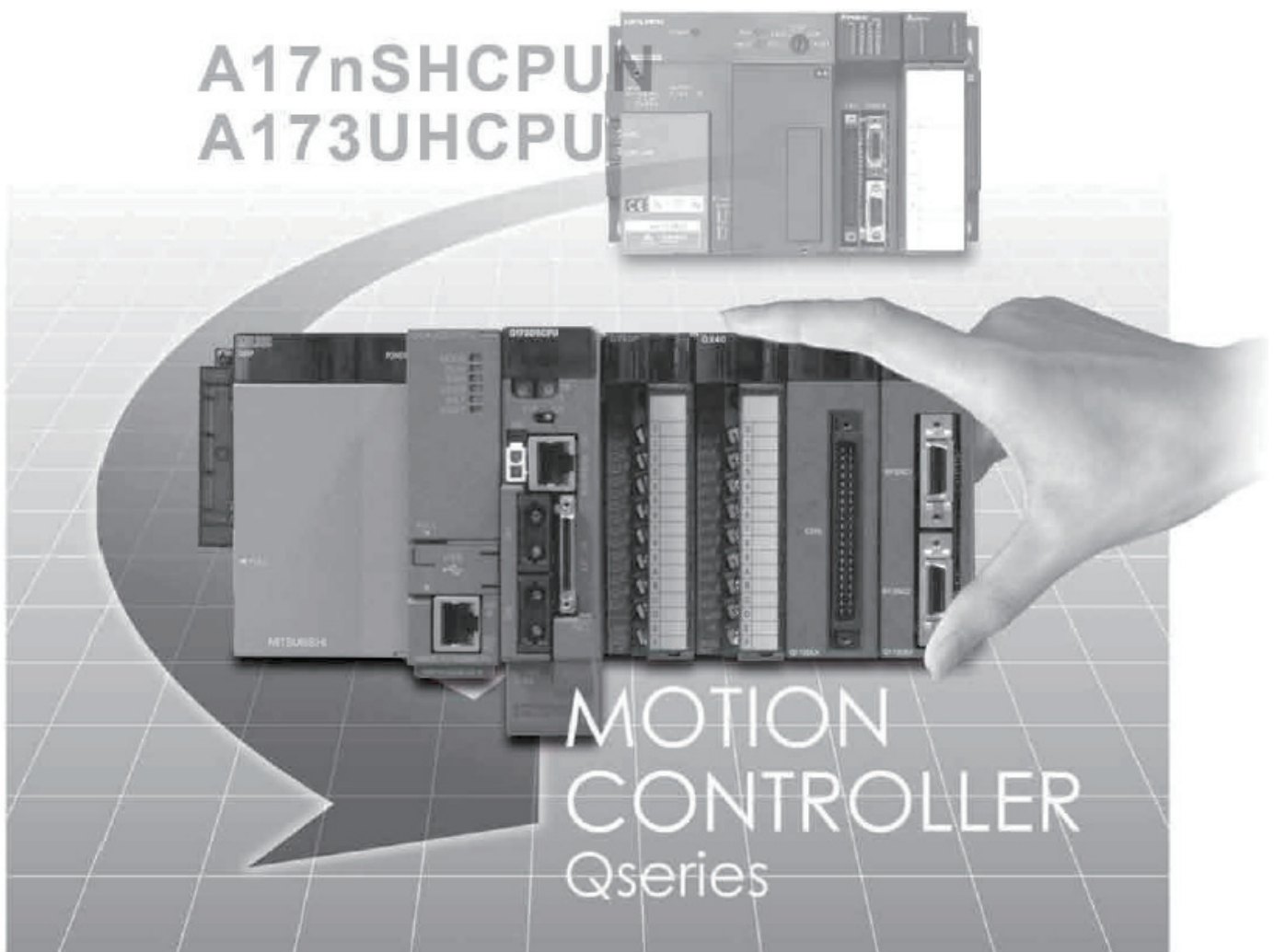

Transition from A17nSHCPUN/A173UHCPU Series to Q Series Handbook



● SAFETY PRECAUTIONS ●

(Please read these instructions before using this equipment.)

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

These precautions apply only to this product. Refer to the Users manual of the QCPU module to use for a description of the PLC system safety precautions.


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

 **DANGER**

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

 **CAUTION**

Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by  CAUTION may also be linked to serious results.

In any case, it is important to follow the directions for usage.

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

For Safe Operations

1. Prevention of electric shocks

DANGER

- Never open the front case or terminal covers while the power is ON or the unit is running, as this may lead to electric shocks.
- Never run the unit with the front case or terminal cover removed. The high voltage terminal and charged sections will be exposed and may lead to electric shocks.
- Never open the front case or terminal cover at times other than wiring work or periodic inspections even if the power is OFF. The insides of the Motion controller and servo amplifier are charged and may lead to electric shocks.
- Completely turn off the externally supplied power used in the system before mounting or removing the module, performing wiring work, or inspections. Failing to do so may lead to electric shocks.
- When performing wiring work or inspections, turn the power OFF, wait at least ten minutes, and then check the voltage with a tester, etc.. Failing to do so may lead to electric shocks.
- Be sure to ground the Motion controller, servo amplifier and servomotor. (Ground resistance : 100 Ω or less) Do not ground commonly with other devices.
- The wiring work and inspections must be done by a qualified technician.
- Wire the units after installing the Motion controller, servo amplifier and servomotor. Failing to do so may lead to electric shocks or damage.
- Never operate the switches with wet hands, as this may lead to electric shocks.
- Do not damage, apply excessive stress, place heavy things on or sandwich the cables, as this may lead to electric shocks.
- Do not touch the Motion controller, servo amplifier or servomotor terminal blocks while the power is ON, as this may lead to electric shocks.
- Do not touch the built-in power supply, built-in grounding or signal wires of the Motion controller and servo amplifier, as this may lead to electric shocks.

2. For fire prevention

CAUTION

- Install the Motion controller, servo amplifier, servomotor and regenerative resistor on incombustible. Installing them directly or close to combustibles will lead to fire.
- If a fault occurs in the Motion controller or servo amplifier, shut the power OFF at the servo amplifier's power source. If a large current continues to flow, fire may occur.
- When using a regenerative resistor, shut the power OFF with an error signal. The regenerative resistor may abnormally overheat due to a fault in the regenerative transistor, etc., and may lead to fire.
- Always take heat measures such as flame proofing for the inside of the control panel where the servo amplifier or regenerative resistor is installed and for the wires used. Failing to do so may lead to fire.
- Do not damage, apply excessive stress, place heavy things on or sandwich the cables, as this may lead to fire.

3. For injury prevention

CAUTION

- Do not apply a voltage other than that specified in the instruction manual on any terminal. Doing so may lead to destruction or damage.
- Do not mistake the terminal connections, as this may lead to destruction or damage.
- Do not mistake the polarity (+ / -), as this may lead to destruction or damage.
- Do not touch the heat radiating fins of controller or servo amplifier, regenerative resistor and servomotor, etc., while the power is ON and for a short time after the power is turned OFF. In this timing, these parts become very hot and may lead to burns.
- Always turn the power OFF before touching the servomotor shaft or coupled machines, as these parts may lead to injuries.
- Do not go near the machine during test operations or during operations such as teaching. Doing so may lead to injuries.

4. Various precautions

Strictly observe the following precautions.

Mistaken handling of the unit may lead to faults, injuries or electric shocks.

(1) System structure

CAUTION

- Always install a leakage breaker on the Motion controller and servo amplifier power source.
- If installation of an electromagnetic contactor for power shut off during an error, etc., is specified in the instruction manual for the servo amplifier, etc., always install the electromagnetic contactor.
- Install the emergency stop circuit externally so that the operation can be stopped immediately and the power shut off.
- Use the Motion controller, servo amplifier, servomotor and regenerative resistor with the correct combinations listed in the instruction manual. Other combinations may lead to fire or faults.
- Use the Motion controller, base unit and motion module with the correct combinations listed in the instruction manual. Other combinations may lead to faults.
- If safety standards (ex., robot safety rules, etc.,) apply to the system using the Motion controller, servo amplifier and servomotor, make sure that the safety standards are satisfied.
- Construct a safety circuit externally of the Motion controller or servo amplifier if the abnormal operation of the Motion controller or servo amplifier differ from the safety directive operation in the system.
- In systems where coasting of the servomotor will be a problem during the forced stop, emergency stop, servo OFF or power supply OFF, use dynamic brakes.
- Make sure that the system considers the coasting amount even when using dynamic brakes.
- In systems where perpendicular shaft dropping may be a problem during the forced stop, emergency stop, servo OFF or power supply OFF, use both dynamic brakes and electromagnetic brakes.

⚠ CAUTION

- The dynamic brakes must be used only on errors that cause the forced stop, emergency stop, or servo OFF. These brakes must not be used for normal braking.
- The brakes (electromagnetic brakes) assembled into the servomotor are for holding applications, and must not be used for normal braking.
- The system must have a mechanical allowance so that the machine itself can stop even if the stroke limits switch is passed through at the max. speed.
- Use wires and cables that have a wire diameter, heat resistance and bending resistance compatible with the system.
- Use wires and cables within the length of the range described in the instruction manual.
- The ratings and characteristics of the parts (other than Motion controller, servo amplifier and servomotor) used in a system must be compatible with the Motion controller, servo amplifier and servomotor.
- Install a cover on the shaft so that the rotary parts of the servomotor are not touched during operation.
- There may be some cases where holding by the electromagnetic brakes is not possible due to the life or mechanical structure (when the ball screw and servomotor are connected with a timing belt, etc.). Install a stopping device to ensure safety on the machine side.

(2) Parameter settings and programming**⚠ CAUTION**

- Set the parameter values to those that are compatible with the Motion controller, servo amplifier, servomotor and regenerative resistor model and the system application. The protective functions may not function if the settings are incorrect.
- The regenerative resistor model and capacity parameters must be set to values that conform to the operation mode, servo amplifier and servo power supply module. The protective functions may not function if the settings are incorrect.
- Set the mechanical brake output and dynamic brake output validity parameters to values that are compatible with the system application. The protective functions may not function if the settings are incorrect.
- Set the stroke limit input validity parameter to a value that is compatible with the system application. The protective functions may not function if the setting is incorrect.
- Set the servomotor encoder type (increment, absolute position type, etc.) parameter to a value that is compatible with the system application. The protective functions may not function if the setting is incorrect.
- Set the servomotor capacity and type (standard, low-inertia, flat, etc.) parameter to values that are compatible with the system application. The protective functions may not function if the settings are incorrect.
- Set the servo amplifier capacity and type parameters to values that are compatible with the system application. The protective functions may not function if the settings are incorrect.
- Use the program commands for the program with the conditions specified in the instruction manual.

⚠ CAUTION

- Set the sequence function program capacity setting, device capacity, latch validity range, I/O assignment setting, and validity of continuous operation during error detection to values that are compatible with the system application. The protective functions may not function if the settings are incorrect.
- Some devices used in the program have fixed applications, so use these with the conditions specified in the instruction manual.
- The input devices and data registers assigned to the link will hold the data previous to when communication is terminated by an error, etc. Thus, an error correspondence interlock program specified in the instruction manual must be used.
- Use the interlock program specified in the intelligent function module's instruction manual for the program corresponding to the intelligent function module.

(3) Transportation and installation**⚠ CAUTION**

- Transport the product with the correct method according to the mass.
- Use the servomotor suspension bolts only for the transportation of the servomotor. Do not transport the servomotor with machine installed on it.
- Do not stack products past the limit.
- When transporting the Motion controller or servo amplifier, never hold the connected wires or cables.
- When transporting the servomotor, never hold the cables, shaft or detector.
- When transporting the Motion controller or servo amplifier, never hold the front case as it may fall off.
- When transporting, installing or removing the Motion controller or servo amplifier, never hold the edges.
- Install the unit according to the instruction manual in a place where the mass can be withstood.
- Do not get on or place heavy objects on the product.
- Always observe the installation direction.
- Keep the designated clearance between the Motion controller or servo amplifier and control panel inner surface or the Motion controller and servo amplifier, Motion controller or servo amplifier and other devices.
- Do not install or operate Motion controller, servo amplifiers or servomotors that are damaged or that have missing parts.
- Do not block the intake/outtake ports of the Motion controller, servo amplifier and servomotor with cooling fan.
- Do not allow conductive matter such as screw or cutting chips or combustible matter such as oil enter the Motion controller, servo amplifier or servomotor.
- The Motion controller, servo amplifier and servomotor are precision machines, so do not drop or apply strong impacts on them.
- Securely fix the Motion controller, servo amplifier and servomotor to the machine according to the instruction manual. If the fixing is insufficient, these may come off during operation.

⚠ CAUTION

- Always install the servomotor with reduction gears in the designated direction. Failing to do so may lead to oil leaks.
- Store and use the unit in the following environmental conditions.

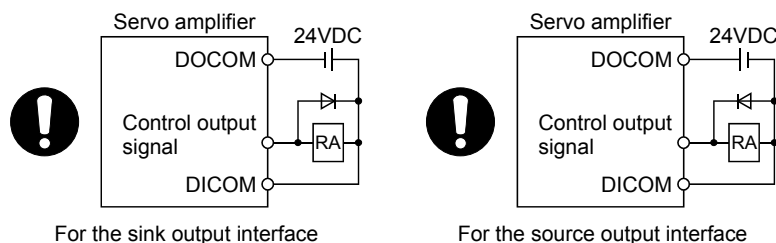
Environment	Conditions	
	Motion controller/Servo amplifier	Servomotor
Ambient temperature	According to each instruction manual.	0°C to +40°C (With no freezing) (32°F to +104°F)
Ambient humidity	According to each instruction manual.	80% RH or less (With no dew condensation)
Storage temperature	According to each instruction manual.	-20°C to +65°C (-4°F to +149°F)
Atmosphere	Indoors (where not subject to direct sunlight). No corrosive gases, flammable gases, oil mist or dust must exist	
Altitude	1000m (3280.84ft.) or less above sea level	
Vibration	According to each instruction manual	

- When coupling with the synchronous encoder or servomotor shaft end, do not apply impact such as by hitting with a hammer. Doing so may lead to detector damage.
- Do not apply a load larger than the tolerable load onto the synchronous encoder and servomotor shaft. Doing so may lead to shaft breakage.
- When not using the module for a long time, disconnect the power line from the Motion controller or servo amplifier.
- Place the Motion controller and servo amplifier in static electricity preventing vinyl bags and store.
- When storing for a long time, please contact with our sales representative.
Also, execute a trial operation.

(4) Wiring

⚠ CAUTION

- Correctly and securely wire the wires. Reconfirm the connections for mistakes and the terminal screws for tightness after wiring. Failing to do so may lead to run away of the servomotor.
- After wiring, install the protective covers such as the terminal covers to the original positions.
- Do not install a phase advancing capacitor, surge absorber or radio noise filter (option FR-BIF) on the output side of the servo amplifier.
- Correctly connect the output side (terminal U, V, W) and ground. Incorrect connections will lead the servomotor to operate abnormally.
- Do not connect a commercial power supply to the servomotor, as this may lead to trouble.
- Do not mistake the direction of the surge absorbing diode installed on the DC relay for the control signal output of brake signals, etc. Incorrect installation may lead to signals not being output when trouble occurs or the protective functions not functioning.



- Do not connect or disconnect the connection cables between each unit, the encoder cable or PLC expansion cable while the power is ON.
- Securely tighten the cable connector fixing screws and fixing mechanisms. Insufficient fixing may lead to the cables coming off during operation.
- Do not bundle the power line or cables.

(5) Trial operation and adjustment

⚠ CAUTION

- Confirm and adjust the program and each parameter before operation. Unpredictable movements may occur depending on the machine.
- Extreme adjustments and changes may lead to unstable operation, so never make them.
- When using the absolute position system function, on starting up, and when the Motion controller or absolute value motor has been replaced, always perform a home position return.
- Before starting test operation, set the parameter speed limit value to the slowest value, and make sure that operation can be stopped immediately by the forced stop, etc. if a hazardous state occurs.

(6) Usage methods

⚠ CAUTION

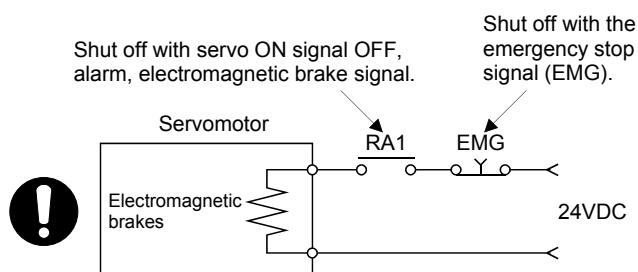
- Immediately turn OFF the power if smoke, abnormal sounds or odors are emitted from the Motion controller, servo amplifier or servomotor.
- Always execute a test operation before starting actual operations after the program or parameters have been changed or after maintenance and inspection.
- Do not attempt to disassemble and repair the units excluding a qualified technician whom our company recognized.
- Do not make any modifications to the unit.
- Keep the effect or electromagnetic obstacles to a minimum by installing a noise filter or by using wire shields, etc. Electromagnetic obstacles may affect the electronic devices used near the Motion controller or servo amplifier.
- When using the CE Mark-compliant equipment, refer to this manual for the Motion controllers and refer to the corresponding EMC guideline information for the servo amplifiers, inverters and other equipment.
- Use the units with the following conditions.

Item	Conditions
Input power	According to each instruction manual.
Input frequency	According to each instruction manual.
Tolerable momentary power failure	According to each instruction manual.

(7) Corrective actions for errors

⚠ CAUTION

- If an error occurs in the self diagnosis of the Motion controller or servo amplifier, confirm the check details according to the instruction manual, and restore the operation.
- If a dangerous state is predicted in case of a power failure or product failure, use a servomotor with electromagnetic brakes or install a brake mechanism externally.
- Use a double circuit construction so that the electromagnetic brake operation circuit can be operated by emergency stop signals set externally.



- If an error occurs, remove the cause, secure the safety and then resume operation after alarm release.
- The unit may suddenly resume operation after a power failure is restored, so do not go near the machine. (Design the machine so that personal safety can be ensured even if the machine restarts suddenly.)

(8) Maintenance, inspection and part replacement

 CAUTION

- Perform the daily and periodic inspections according to the instruction manual.
- Perform maintenance and inspection after backing up the program and parameters for the Motion controller and servo amplifier.
- Do not place fingers or hands in the clearance when opening or closing any opening.
- Periodically replace consumable parts such as batteries according to the instruction manual.
- Do not touch the lead sections such as ICs or the connector contacts.
- Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body. Failure to do so may cause the module to fail or malfunction.
- Do not directly touch the module's conductive parts and electronic components. Touching them could cause an operation failure or give damage to the module.
- Do not place the Motion controller or servo amplifier on metal that may cause a power leakage or wood, plastic or vinyl that may cause static electricity buildup.
- Do not perform a megger test (insulation resistance measurement) during inspection.
- When replacing the Motion controller or servo amplifier, always set the new module settings correctly.
- When the Motion controller or absolute value motor has been replaced, carry out a home position return operation using one of the following methods, otherwise position displacement could occur.
 - 1) After writing the servo data to the Motion controller using programming software, switch on the power again, then perform a home position return operation.
 - 2) Using the backup function of the programming software, load the data backed up before replacement.
- After maintenance and inspections are completed, confirm that the position detection of the absolute position detector function is correct.
- Do not drop or impact the battery installed to the module. Doing so may damage the battery, causing battery liquid to leak in the battery. Do not use the dropped or impacted battery, but dispose of it.
- Do not short circuit, charge, overheat, incinerate or disassemble the batteries.
- The electrolytic capacitor will generate gas during a fault, so do not place your face near the Motion controller or servo amplifier.
- The electrolytic capacitor and fan will deteriorate. Periodically replace these to prevent secondary damage from faults. Replacements can be made by our sales representative.
- Lock the control panel and prevent access to those who are not certified to handle or install electric equipment.
- Do not burn or break a module and servo amplifier. Doing so may cause a toxic gas.

(9) About processing of waste

When you discard Motion controller, servo amplifier, a battery (primary battery) and other option articles, please follow the law of each country (area).

⚠ CAUTION

- This product is not designed or manufactured to be used in equipment or systems in situations that can affect or endanger human life.
- When considering this product for operation in special applications such as machinery or systems used in passenger transportation, medical, aerospace, atomic power, electric power, or submarine repeating applications, please contact your nearest Mitsubishi sales representative.
- Although this product was manufactured under conditions of strict quality control, you are strongly advised to install safety devices to forestall serious accidents when it is used in facilities where a breakdown in the product is likely to cause a serious accident.

(10) General cautions

- All drawings provided in the instruction manual show the state with the covers and safety partitions removed to explain detailed sections. When operating the product, always return the covers and partitions to the designated positions, and operate according to the instruction manual.

REVISIONS

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

Print Date	* Manual Number	Revision
Oct.,2014	L(NA)03104ENG-C	First edition Based on L(NA)03079-C(Japanese)

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< GUIDEBOOK CONFIGURATION >

The guidebook is consist of the documents as follows.

Contents

Safety Precautions

Guidebook Configuration (Contents)

1. OVERVIEW OF A-MOTION REPLACEMENT

This overview is beginning with the case study about the system replacement used A-Motion. And it will discuss the most suitable method according to the user's system and conditions. After replacement policy have been decided, it is recommended to replace refer to the corresponding parts after section 2 and the relevant catalogs, relevant manuals.

2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION

This part describes the replacement from A173UHCPU/A172SHCPUN/A171SHCPUN to Q173DSCPU/Q172DSCPU (operating system software is SV13/SV22).

3. REPLACEMENT PROPOSAL FROM A-MOTION TO STAND-ALONE MOTION

This part describes the replacement from A173UHCPU/A172SHCPUN/A171SHCPUN to Q170MCPUS1 (operating system software is SV13/SV22).

4. REPLACEMENT FROM A-MOTION TO QN-MOTION

This part describes the replacement from A173UHCPU/A172SHCPUN/A171SHCPUN to Q173CPUN/Q172CPUN (QN-Motion) (operating system software is SV13/SV22). However, replacing A-Motion with QN-Motion is not recommended since QN-Motion is not the latest model. In order to use a system for a long time after the replacement, it is recommended to replace A-Motion with QDS-Motion or Stand-alone Motion.

5. APPENDIX

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1. OVERVIEW OF A-MOTION REPLACEMENT HANDBOOK

The following shows the essential replacement overview to renew or lengthen the working life for the system which used A-Motion.

After replacement policy have been decided, it is recommended to replace refer to the corresponding part of continuous replacement handbook, technical sheet and the manual for each model.



Mitsubishi Motion Controller
A series (small type) ("A-Motion")

2. MAIN REPLACEMENT TARGET MODEL

The main replacement target model is A series (small type) motion controllers and these options.

The motion controllers and related models that displayed in the following table have switched to the production to the order already, it is recommended to replace (transit) to the new model.

Product	Model name	Product	Model name
CPU module	A171SHCPUN	Teaching unit	A30TU
	A172SHCPUN		A30TU-E
	A173UHCPU ^(Note-1)		A30TU-S1
Main base unit	A172B		A30TU-SV42
	A175B		A30TU-SV51
	A178B		A31TU
	A178B-S1		A31TU-E
	A178B-S2		A31TU-KE
	A178B-S3		A31TU-R
PLC extension base unit	A168B		A31TU-RE
Pulse generator/synchronous encoder interface module	A171SENC		A31TU-RT
	A172SENC		A31TU-RTE
Cable for SSCNET I/F board	A270BDCBL□M		A31TU-D3KE51
Cable for SSCNET I/F card	A270CDCBL□M		A31TU-D3RKE51
		Teaching unit connection cable	A31TUCBL03M
		A31TUCBL using short circuit connector	A31SHORTCON

(Note-1): A173UHCPU-S1 also be shown as A173UHCPU in the article.

* In addition, the targets are controller OS package used in above products, software tool packages and the customized products which were derived from these products.

3. MERITS OF REPLACEMENT

It is recommended to replace A-Motion to the latest iQ Platform Motion CPU Q173DSCPU/Q172DSCPU (the following QDS-Motion) or Stand-alone Motion CPU Q170MSCPU-S1.

As the merits shown below, it is strongly recommended to use the latest module, QDS-Motion and MR-J4 amplifier.

When a servo network cannot be replaced and A-Motion is replaced with Q173CPUN/Q172CPUN (hereafter called QN-Motion), refer to "4. REPLACEMENT FROM A-MOTION TO QN-MOTION". However, replacing A-Motion with QN-Motion is not recommended since QN-Motion is not the latest model. In addition, the production of MR-J2S series servo amplifiers and HC series servo motors will stop in August, 2015. If these products need to be continuously used after the production stoppage, changing the system used to an alternative system will be required. (For details, refer to Section 4.2 to 4.3.)

In order to use a system for a long time with no system modification after the replacement, it is recommended to replace A-Motion with QDS-Motion or Stand-alone Motion.

3.1 Multiple CPU System (QDS-Motion) with Q Series PLC Module

A system with high flexibility and extensibility can be constructed using various iQ Platform-compatible modules. An equipment that match the varied request by extensive products can be selected.

--> **Takt time of Production line will be shorten by the equipment capability of expansion and high performance.**

3.2 High-speed and High Performance of Motion CPU

The operation speed of a Motion CPU can be significantly improved: a Motion CPU has an operation cycle of up to 0.22ms/4 axes (QDS-Motion SV22) or 0.44ms/4 axes (Stand-alone Motion SV22). And as there are extremely abundant motion control functions, it can support the advanced motion control.

--> **Takt time of Production line will be shorten by the high-speed motion control capability and high performance.**

3.3 High-speed, Noise Free Communication by SSCNET III(/H)

SSCNET III(/H) Servo network communication realizes high-speed response (Communication speed: 150Mbps (simplex)/300Mbps (duplex)) and eliminates the influence of noise by utilizing an optical communication system.

--> **The influence of noise by wiring can be suppressed, and the operation of equipment will be stabilized.**

3.4 MR-J4 Amplifier + HG Servo Motor (QDS-Motion)

The latest MR-J4 series includes various functions such as one-touch tuning and realizes the high performance with speed response frequency of 2.5 kHz and encoder resolution of 22 bits (4194304 pulses/rev). The quantity of rare earth metals is reduced for HG series, the servo motor series appropriate for QDS-Motion.

--> **The influence of noise by wiring can be suppressed, and the operation of equipment will be stabilized.**

3.5 Space Economization (Stand-alone Motion)

A power supply module, a PLC, and a motion controller are integrated without degrading the high performance of iQ Platform, and this contributes cost reduction and downsizing the equipment. Built the mark detection and the synchronous encoder I/F in, and it will support the packing machine system without using special module.

--> **Small-size equipment and cost performance will be compatible.**

3.6 Decrease of Maintenance Cost

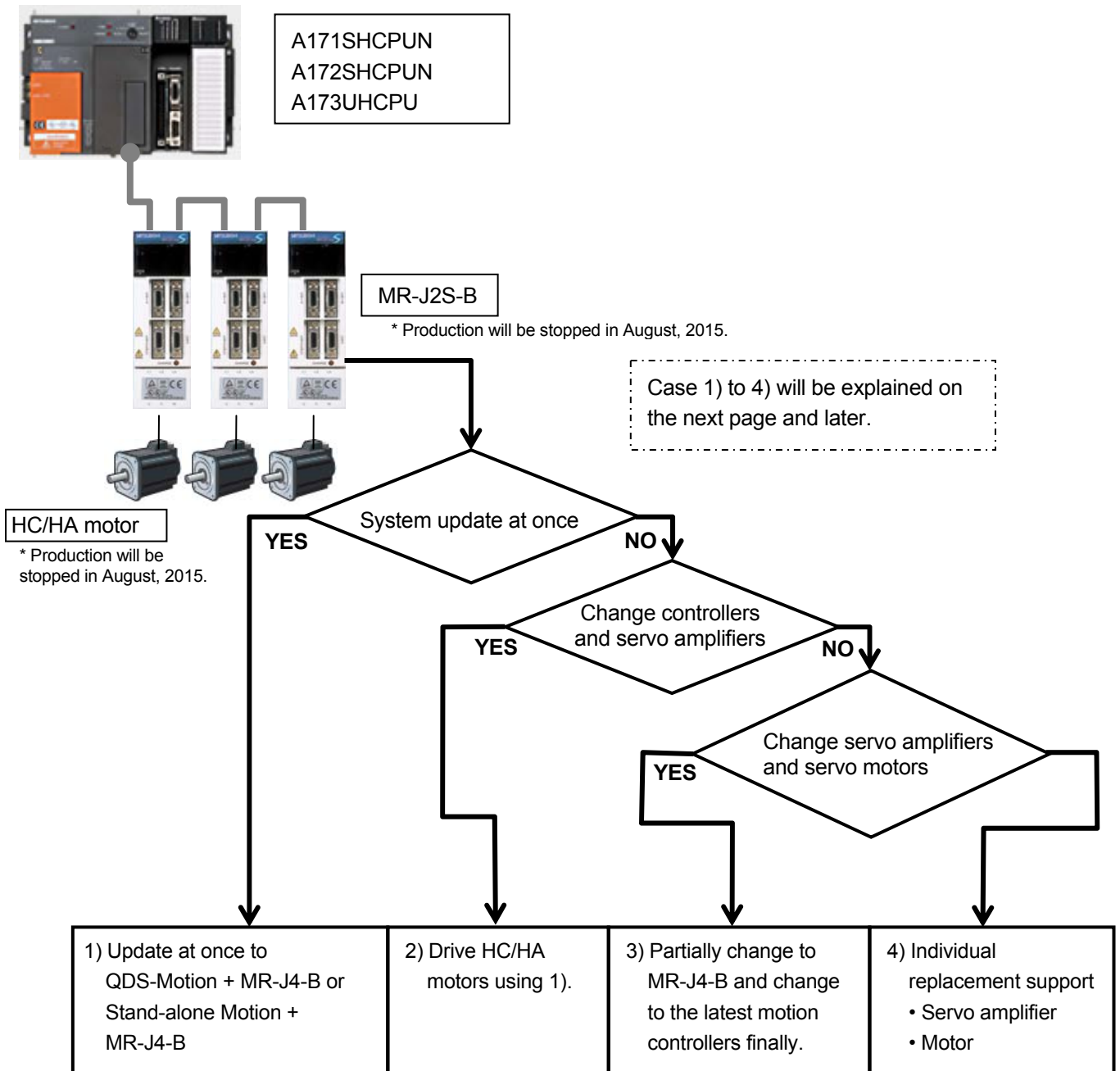
Once the product has been used for more than 5 years, it is necessary to maintain the machine such as partly replacement according to the lifespan, and the maintenance cost for power supply module replacing, electrolytic capacitor and the whole board replacing will be charged. In order to use the system for a long time, and consider the factors like performance and quality, it is recommended to replace to the latest model at early stage.

--> **Extend the lifespan of the equipment.**

4. CASE AND STUDY OF A-MOTION REPLACEMENT

The following shows the replacement case study of the system which used standard A-Motion. Although it will need some major maintenance, it is recommended to carry out the system batch update of 1) to use a system for a long time with no system modification after the maintenance.

If the batch update including the change of servo amplifiers, servo motors, and servo networks is difficult to carry out due to the period and cost of the maintenance, carry out 2) or 3). If any update will not be done, refer to 4) Individual replacement support.



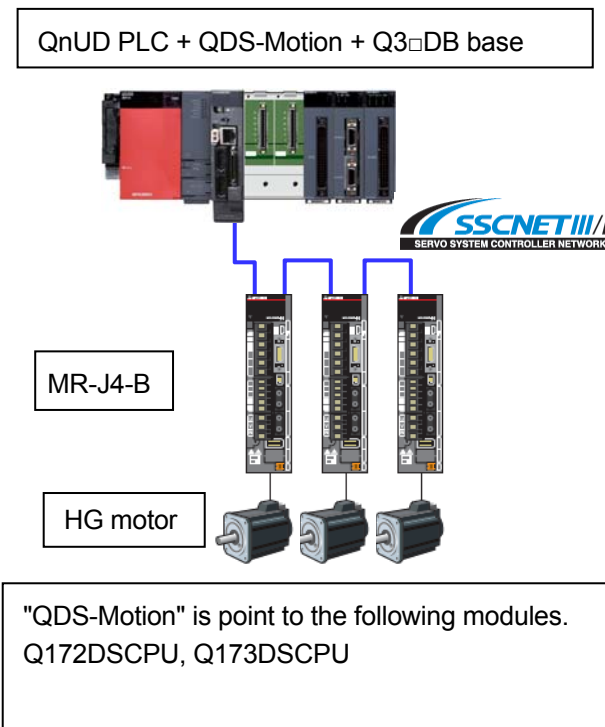
Only when equipment is completely replaced.

*1. Although it will cost a lot and take a long period for maintenance, once a system is upgraded, the system can be used for a long time after that.

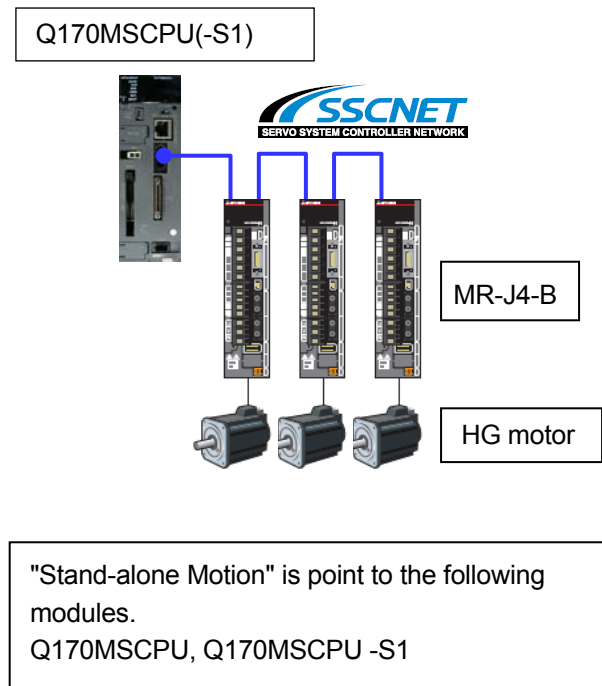
4.1 1): Update at once to QDS-Motion/Stand-alone Motion + MR-J4-B

The following shows the systems for the system batch update.

[QDS-Motion + MR-J4-B + HG motor]



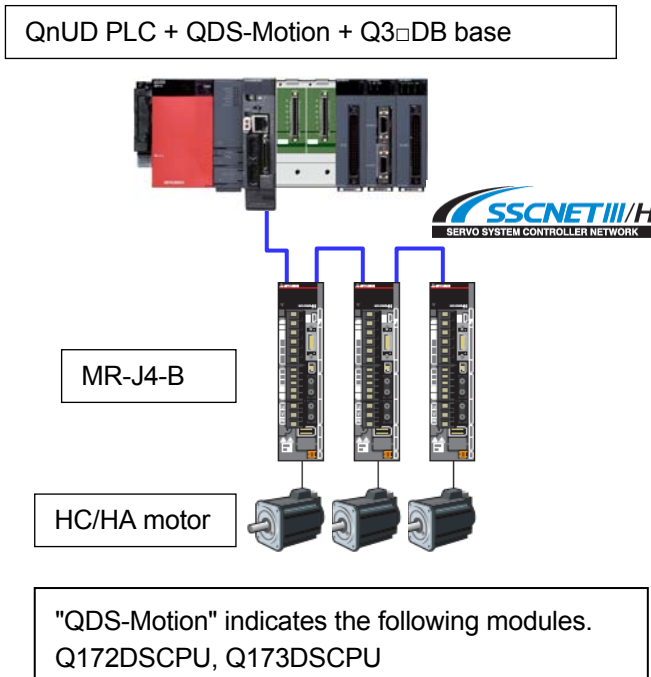
[Stand-alone Motion + MR-J4-B + HG motor]



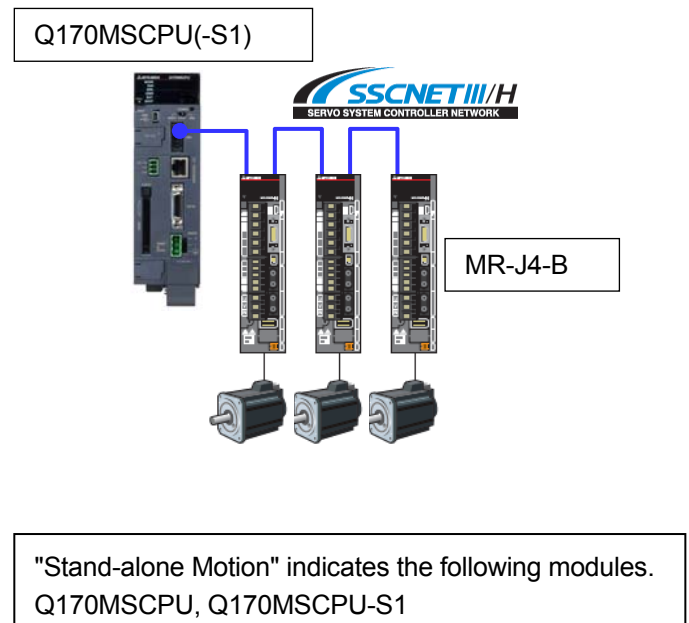
4.2 2): When only Controllers and Servo Amplifiers are Changed

The following shows the procedure for updating a system when only controllers and servo amplifiers are changed.

[QDS-Motion + MR-J4-B + HC/HA motor]



[Stand-alone Motion + MR-J4-B + HC/HA motor]



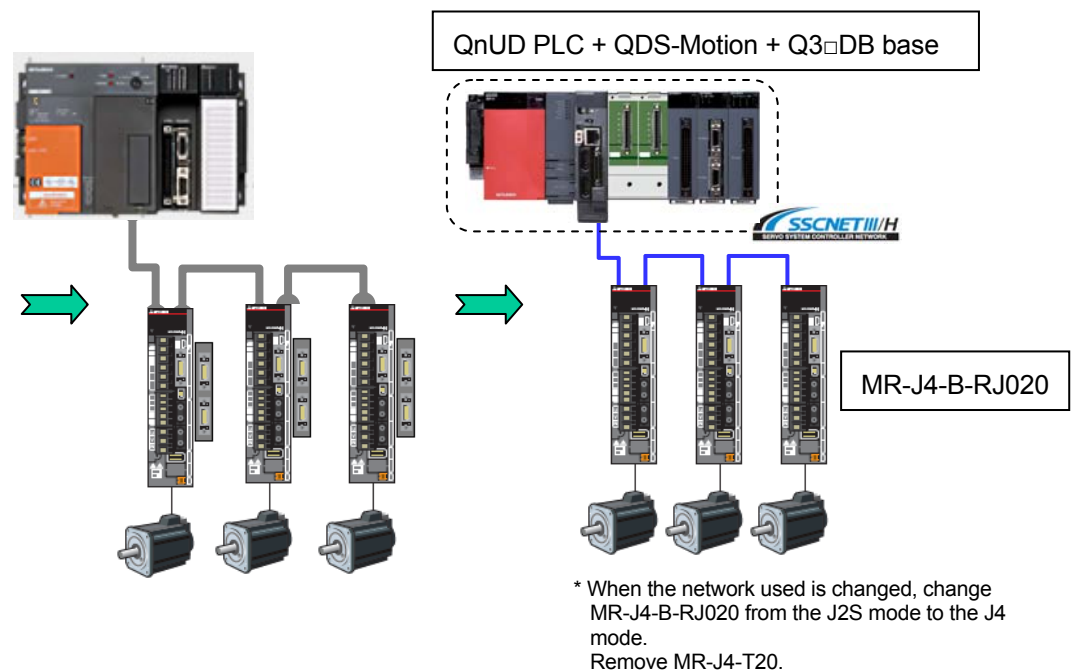
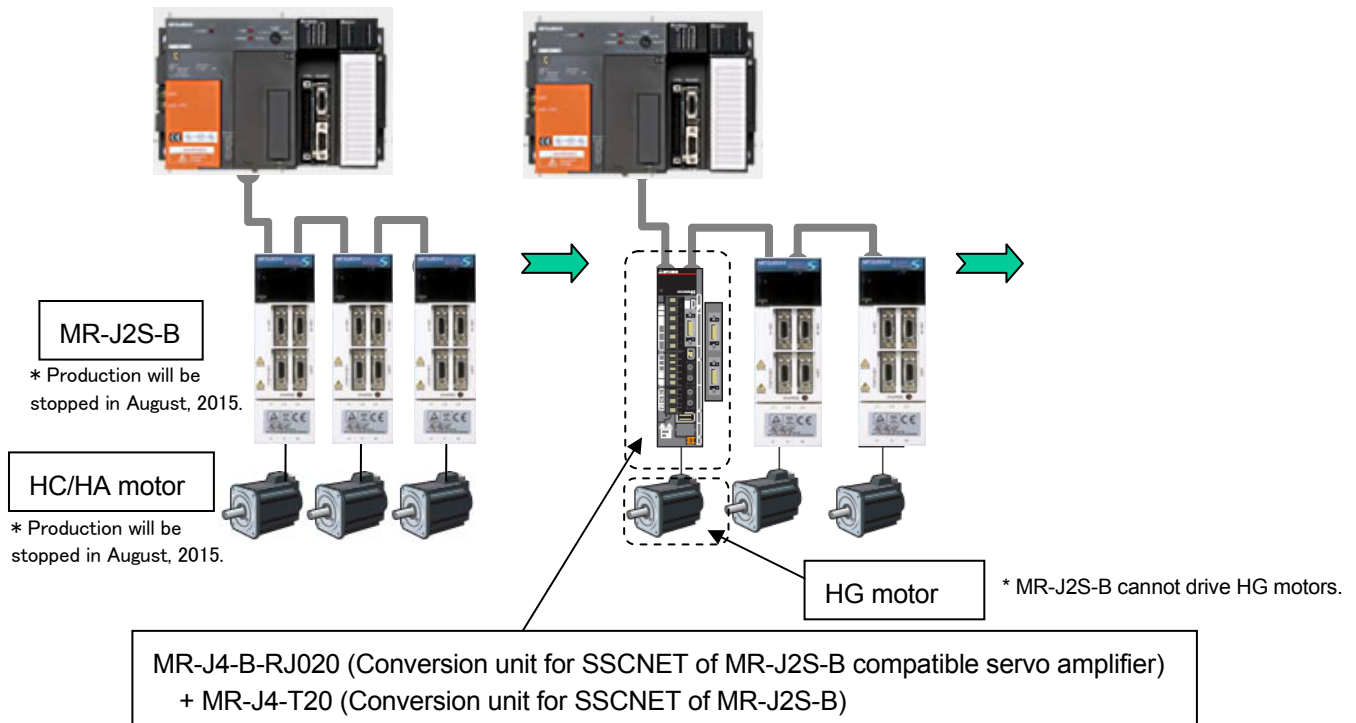
* Although HC/HA motors can be used without any change, the encoder resolution of the servo amplifier becomes 17 bits.

For the applicable servo motors and servo amplifiers, contact your local sales office.

POINT			
<ul style="list-style-type: none"> When the following HC/HA motors are used, changing the motors with HG motors and servo amplifiers with MR-J4-_B_ in a batch is recommended. (To use HG motors, the capacity of servo amplifiers may need to be changed.) 			
Existing model		Example of replacement models for batch change	
Servo motor	Servo amplifier	Servo motor	Servo amplifier
HC-LFS52	MR-J2S-60B	HG-JR73	MR-J4-70B
HC-LFS102	MR-J2S-100B	HG-JR153	MR-J4-200B
HC-LFS152	MR-J2S-200B	HG-JR353	MR-J4-350B
HA-LFS15K2(4)(B)	MR-J2S-15KB(4)	HG-JR11K1M(4)(B)	MR-J4-11KB(4)
HA-LFS22K2(4)(B)	MR-J2S-22KB(4)	HG-JR15K1M(4)(B)	MR-J4-15KB(4)
HA-LFS30K2(4)	MR-J2S-30KB(4)	HG-JR22K1M(4)	MR-J4-22KB(4)
HC-KFS46	MR-J2S-70B	HG-KR43	MR-J4-40B
HC-KFS410	MR-J2S-70B	HG-KR43	MR-J4-40B
HC-RFS103(B)G2 1/_	MR-J2S-200B	HG-SR102(B)G7 1/_	MR-J4-100B
HC-RFS203(B)G2 1/_	MR-J2S-350B	HG-SR202(B)G7 1/_	MR-J4-200B
HC-RFS353(B)G2 1/_	MR-J2S-500B	HG-SR352(B)G7 1/_	MR-J4-350B
HC-RFS103(B)G5 1/_	MR-J2S-200B	HG-SR102(B)G5 1/_	MR-J4-100B
HC-RFS203(B)G5 1/_	MR-J2S-350B	HG-SR202(B)G5 1/_	MR-J4-200B
HC-RFS353(B)G5 1/_	MR-J2S-500B	HG-SR352(B)G5 1/_	MR-J4-350B
HC-RFS103(B)G7 1/_	MR-J2S-200B	HG-SR102(B)G7 1/_	MR-J4-100B
HC-RFS203(B)G7 1/_	MR-J2S-350B	HG-SR202(B)G7 1/_	MR-J4-200B
HC-RFS353(B)G7 1/_	MR-J2S-500B	HG-SR352(B)G7 1/_	MR-J4-350B

4.3 3): Partial Update from MR-J2S-B to MR-J4-B

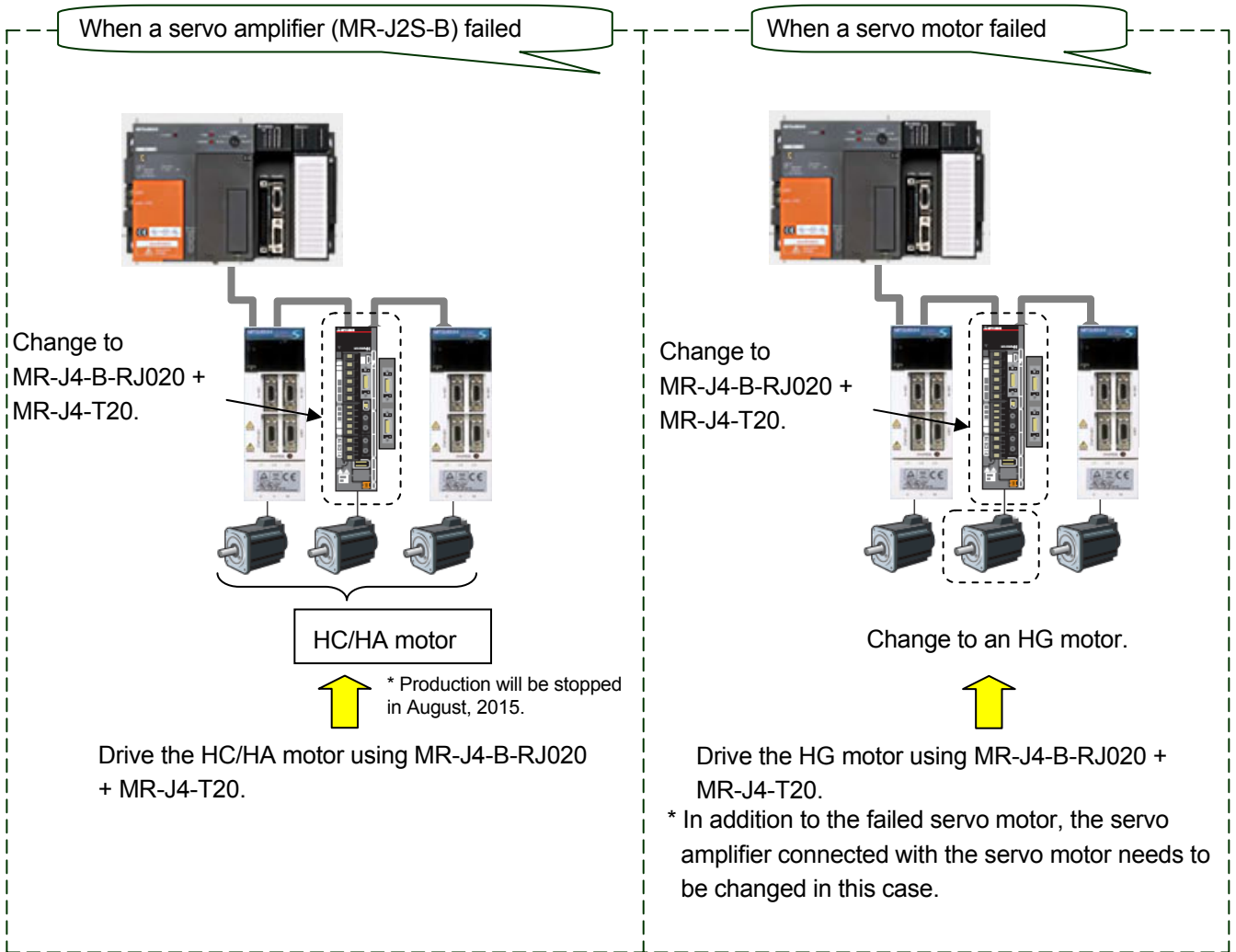
The following shows the procedure for updating a system partially.



MR-J4-B-RJ020 (Conversion unit for SSCNET of MR-J2S-B compatible servo amplifier)
+ MR-J4-T20 (Conversion unit for SSCNET of MR-J2S-B)
→ The MR-J4-B-RJ020 to which MR-J4-T20 is connected operates as MR-J2S-B.
In addition, MR-J4-B-RJ020 can drive MR-J4-compatible HG motors and MR-J2S-compatible HC/HA motors.

4.4 4): Individual Replacement Support





The following shows the system update procedure for the individual replacement.



4.5 Others

4.5.1 Combination before/after controller replacement

The following table shows combination before/after controller replacement.
Please refer to the table when transiting.


	QN-Motion (Q17nCPUN) SSCNET	QH-Motion (Q17nHCPU)  SSCNET III	QD-Motion (Q17nDCPU)  SSCNET III	QDS-Motion (Q17nDSCPU)  SSCNET III/H	Stand-alone Motion (Q170MSCPU)  SSCNET III/H
A-Motion • A17nSHCPU • A173UHCPU	△ It is recommended to transit to QDS-Motion.*1	× It is recommended to transit to QDS-Motion.	○ Refer to Section 2 in this document.	○ Refer to Section 2 in this document.	○ Refer to Section 3 in this document.
Q-Motion • Q17nCPUN		× It is recommended to transit to QDS-Motion.	○ Refer to Technical sheet: S0014CB	○ Refer to Technical sheet: S0014CB	○ ← Same as QDS-Motion
QH-Motion • Q17nHCPU			○ Refer to Technical sheet: S0013CB	○ Refer to Technical sheet: S0013CB	○ ← Same as QDS-Motion

*1 Refer to "4. REPLACEMENT FROM A-MOTION TO QN-MOTION" in this document.

However, replacing A-Motion with QN-Motion is not recommended since QN-Motion is not the latest model. In order to use a system for a long time with no system modification after the replacement, it is recommended to replace A-Motion with QDS-Motion or Stand-alone Motion.

4.5.2 Combination of controller and servo amplifier

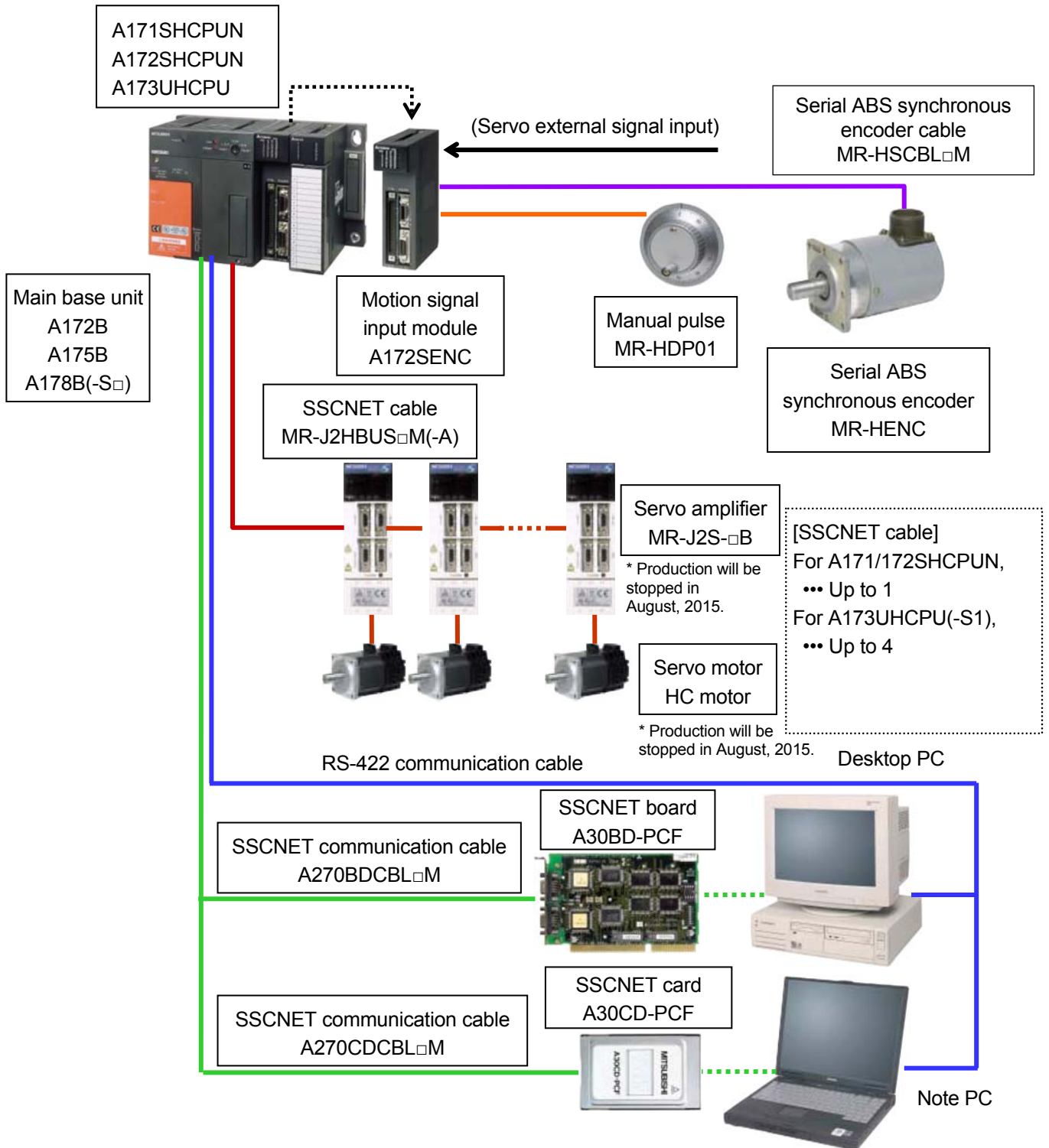
The following table shows combination of controller and servo amplifier.
Please refer to the table when transiting.

Controller \ Servo amplifier	QN-Motion (Q17nCPUN)	QH-Motion (Q17nHCPU)	QD-Motion (Q17nDCPU)	QDS-Motion (Q17nDSCPU)	Stand-alone Motion (Q170MSCPU)
MR-H-BN Production stopped in December, 2005.	○	×	×	×	×
MR-J2-B Production stopped in December, 2005.	○	×	×	×	×
MR-J2S-B MR-J2M-B Production will be stopped in August, 2015.	○	×	×	×	×
MR-J3-B	×	○	○	○ (Controller: J3 mode)	○ (Controller: J3 mode)
MR-J4-B 	○ (MR-J4-B-RJ020 +MR-J4-T20)	○ (MR-J3 compatible mode)	○ (MR-J3 compatible mode)	○	○

5. SYSTEM TRANSITION

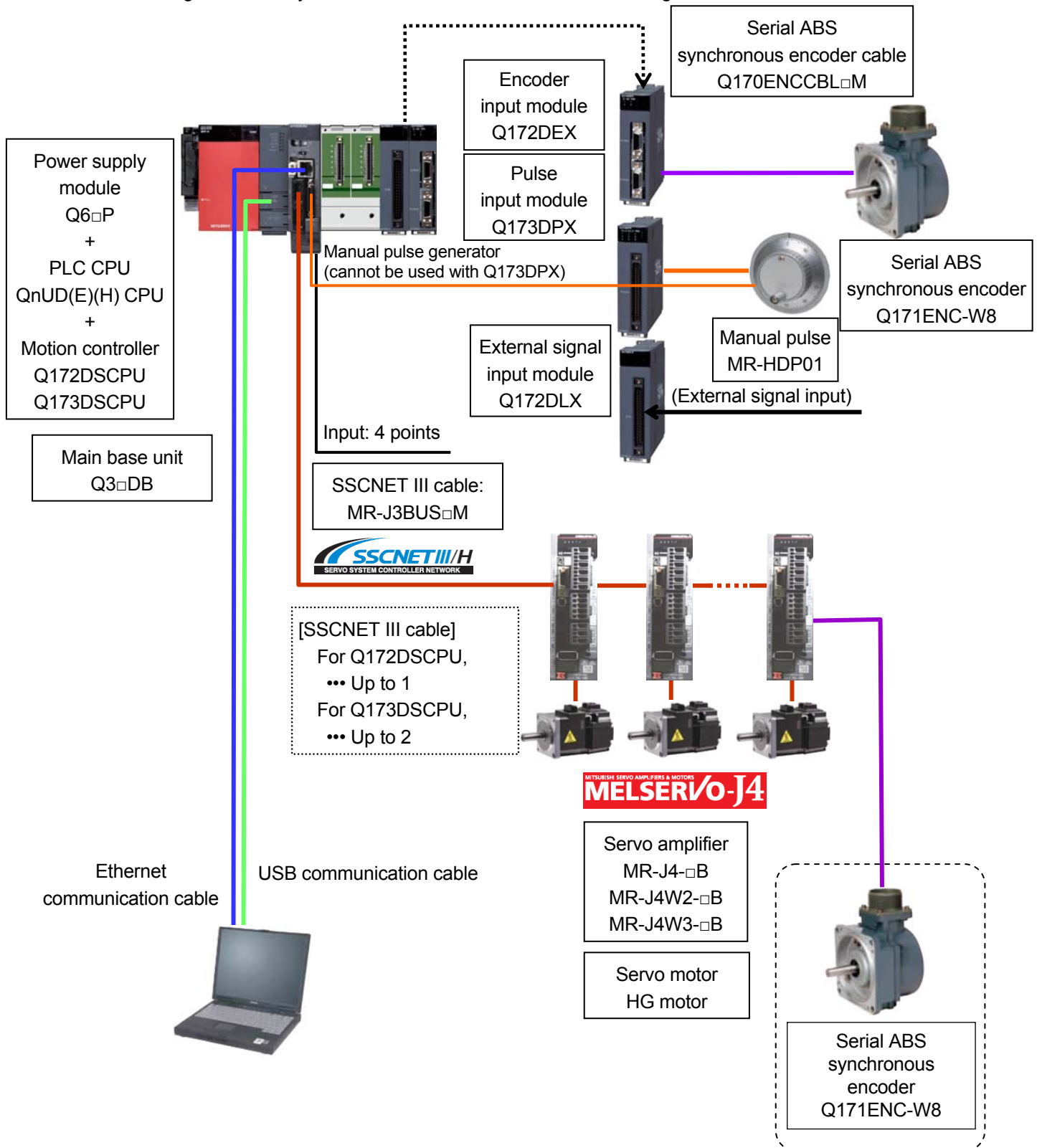
5.1 Configuration of the System Using A-Motion (before transition)

The following shows the general system chart used A-Motion.



5.2 Configuration of the System Using QDS-Motion (after transition)

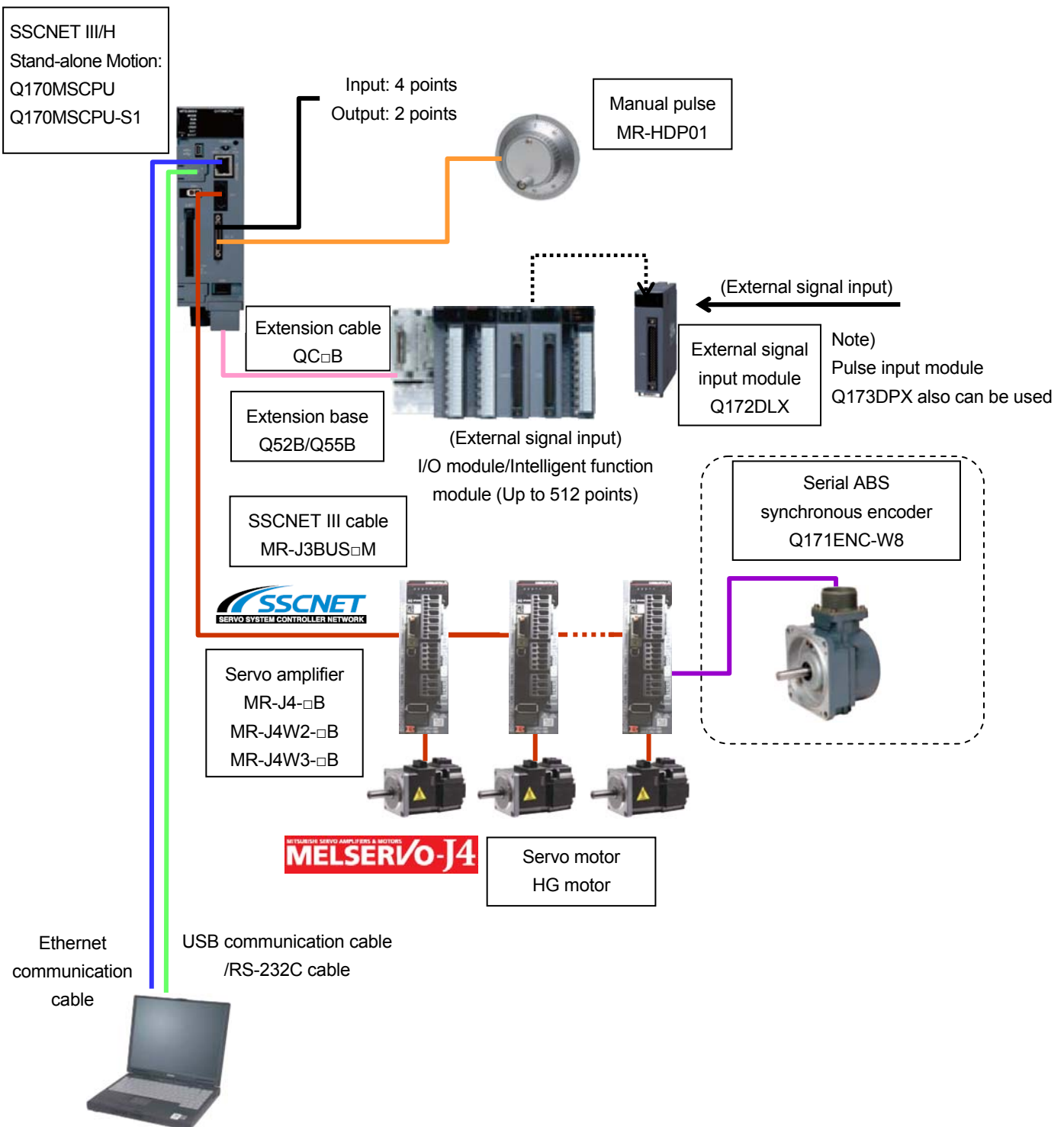
The following shows the system chart used QDS-Motion after transiting.



* Ethernet is a trademark of Xerox Corporation in the United States.

5.3 Replace to Stand-alone Motion

The following shows the system chart used Stand-alone Motion after transiting.



* Ethernet is a trademark of Xerox Corporation in the United States.

5.4 Transition of Other Configurations



5.4.1 Combination of servo amplifier and servo motor

The following table shows the combination of servo amplifier and servo motor.
Please refer to the table when transiting.

A17nSHCPUN/A173UHCPU(-S1)			Q17nDSCPU/Q170MPCPU					
			Q17nDSCPU/Q170MPCPU			Q17nDCPU/Q170MPCPU		
Series	Servo amplifier	Servo motor	Series	Servo amplifier	Servo motor	Series	Servo amplifier	Servo motor
MR-J2S Series	MR-J2S-□B	HC-KFS□	MR-J4 Series	MR-J4-□B MR-J4W2-□B MR-J4W3-□B	HG-KR□	MR-J3 Series	MR-J3-□B	HF-KP□
		HC-MFS□			HG-MR□		MR-J3W-□B	HF-MP□
		HC-SFS□			HG-SR□		MR-J3-□B-RJ006	HF-SP□
		HC-LFS□			HG-RR□		MR-J3-□B-RJ004	HF-JP□
		HC-RFS□			HG-UR□		MR-J3-□BS	HC-LP□
MR-J2M Series	MR-J2M-□DU	HC-KFS□						HC-RP□
		HC-MFS□						HC-UP□
		HC-UFS□						HA-LP□

5.4.2 Specification comparison of servo system network

The following table shows the specification comparison of servo system network.
Please refer to the table when transiting.

Item		SSCNET (A-Motion)	SSCNETIII 	SSCNETIII/H 
Communication cable		Metal cable	Optical fibre cable	
Communication speed		5,6Mbps	50Mbps	150Mbps
Cycle	Send	3.55ms	0.44ms/0.88ms	0.22ms/0.44ms/0.88ms
	Receive	3.55ms	0.44ms/0.88ms	0.22ms/0.44ms/0.88ms
The maximum number of axes of each system		8axes/system	16 axes/system	
Communication Distance		Overall length 30m	Standard code for inside panel or Standard cable for outside panel Up to 20m between stations Maximum overall length is 320m (20m × 16 axes)	
			[Long-distance cable] Up to 50m between stations Maximum overall length is 800m (50m×16axes)	[Long-distance cable] Up to 100m between stations Maximum overall length is 1600m (100m×16axes)

5.4.3 Support of operating system software

The following table shows the support of operating system software.
Please refer to the table when transiting.

CPU model	OS Type	OS model		CPU model	OS Type	OS model	CPU model	OS Type	OS model	
A173UHCPU (-S1)	SV13	SW2SRX-SV13B SW2NX-SV13B SW3RN-SV13B	→	Q173DSCPU	SV13	SW8DNC-SV13QJ	Q173DCPU (-S1)	SV13	SW8DNC-SV13QB	
	SV22	SW2SRX-SV22A SW2NX-SV22A SW3RN-SV22A			SV22	SW8DNC-SV22QJ		SV22	SW8DNC-SV22QA	
	SV43	SW2SRX-SV43A SW2NX-SV43A			SV43			SV43	SW7DNC-SV43QA	
A172SHCPUN	SV13	SW0SRX-SV13D SW0NX-SV13D SW3RN-SV13D		→	Q172DSCPU	SV13	SW8DNC-SV13QL	Q172DCPU (-S1)	SV13	SW8DNC-SV13QD
	SV22	SW0SRX-SV22C SW0NX-SV22C SW3RN-SV22C				SV22	SW8DNC-SV22QL		SV22	SW8DNC-SV22QC
	SV43	SW0SRX-SV43C SW0NX-SV43C				SV43			SV43	SW7DNC-SV43QC
A171SHCPUN	SV13	SW0SRX-SV13G SW0NX-SV13G		→	Q170MSCPU	SV13	SW8DNC-SV13QN	Q170MCPU	SV13	SW8DNC-SV13QG
	SV22	SW0SRX-SV22F SW0NX-SV22F				SV22	SW8DNC-SV22QN		SV22	SW8DNC-SV22QF
	SV43	SW0SRX-SV43F SW0NX-SV43F				SV43			SV43	SW7DNC-SV43QF

*1 For A-Motion controllers, "Motion SFC-compatible OS" and "Motion SFC non-compatible OS" are different OSs. For the motion controllers of the Q series or later, whether to use the Motion SFC or not can be selected for the same OS.

5.4.4 Correspondence of peripheral software

The following table shows the correspondence of peripheral software.
Please refer to the table when transiting.

A17nSHCPUN/A173UHCPU(-S1)			Q series Motion CPU	
Class	Type		Type	Comment
Motion program	SW2SRX-GSV□	→	<MELSOFT MT Works2> SW1DNC-MTW2-□	Please use the latest version ^(note-2)
	SW2NX-GSV□			
	SW3RNC-GSV□			
PLC program	GX Developer	<MELSOFT GX Works2> ^(note-1)	Please use the latest version ^(note-2)	
Servo amplifier	<MR Configurator> SETUP161□	<MR Configurator2> ^(note-3)	Please use the latest version	
		SW1DNC-MRC2-□		

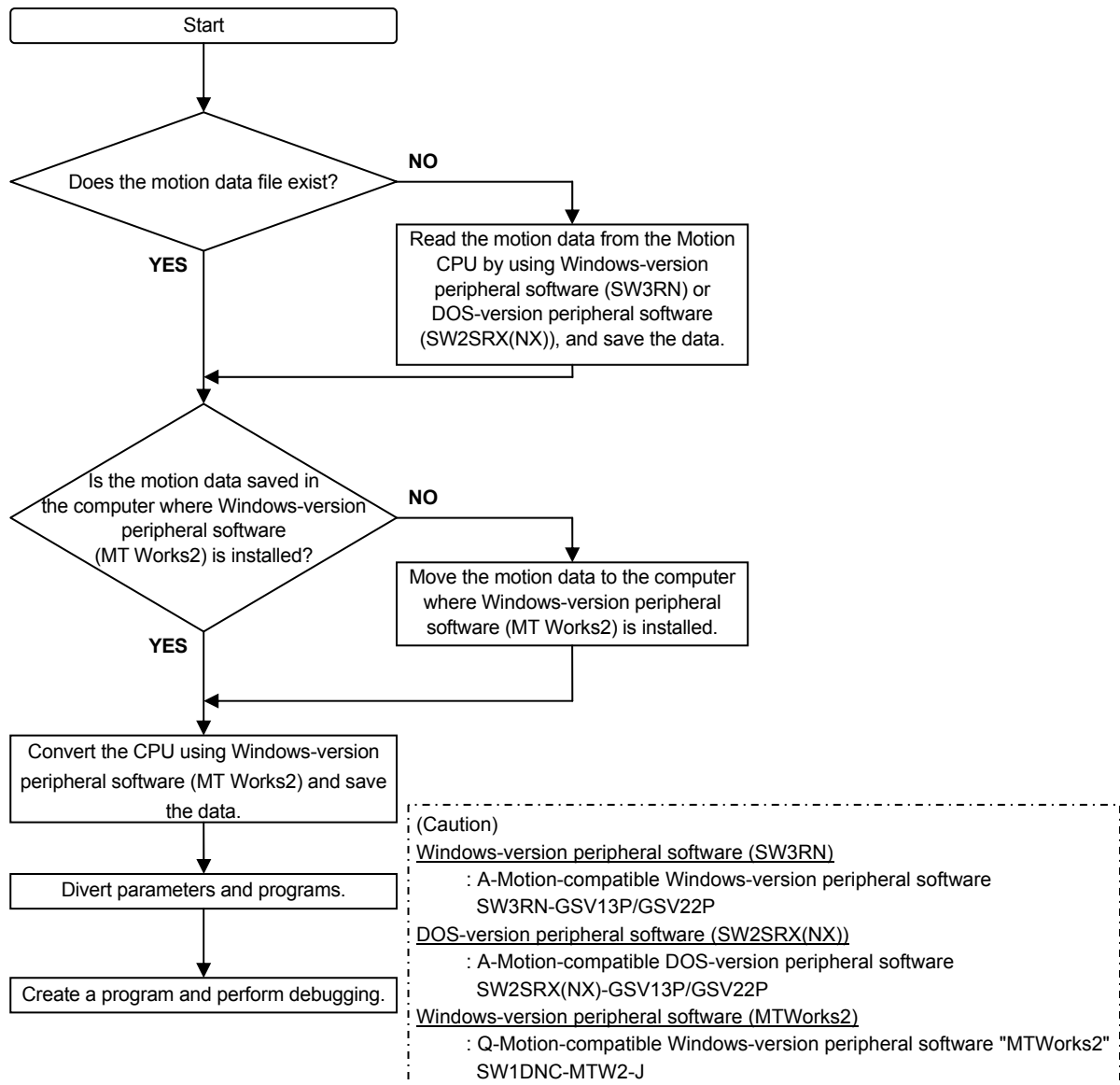
(Note-1) GX Developer is bundled in GX Works2.

(Note-2) As the latest versions of MT Works2 and GX Works2 have been released in Mitsubishi Electric FA Site, update your software to the latest version.

(Note-3) MR Configurator2 is bundled in MT Works2.

5.4.5 Outline of the motion data replacement flow

The following flowchart describes the motion data replacement procedure when the data can be diverted.



5.4.6 Precautions for replacing motion data saved with DOS-version peripheral software

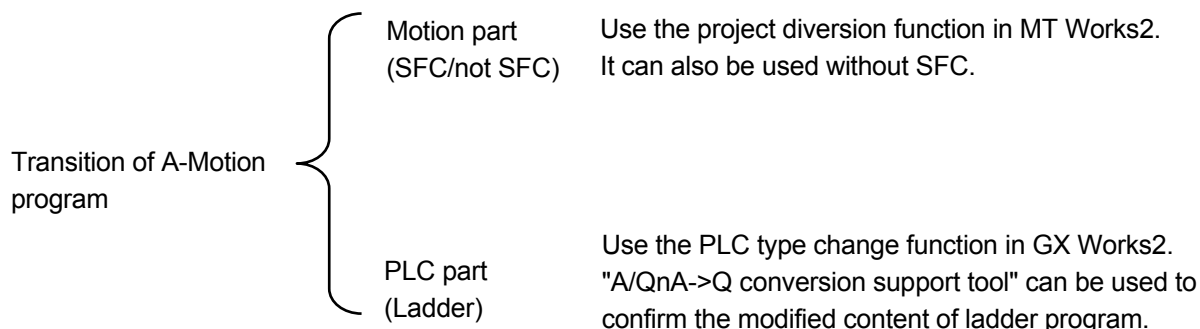
The motion data saved with DOS-version peripheral software (SW2SRX/SW2NX-GSV13P/GSV22P) is stored in "C:\GPP\USR\System name\Machine name". Extract the data from the folder.

5.4.7 Dimensions

Refer to "5. APPENDIX".

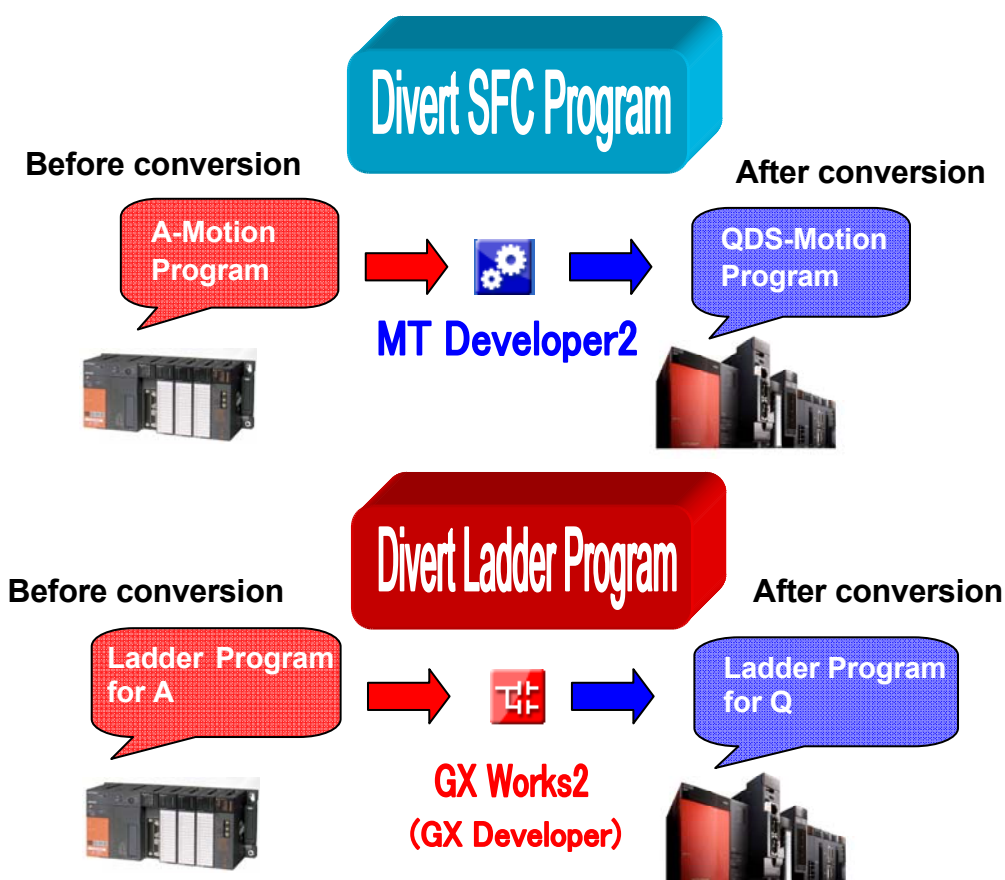
6. TRANSITION OF THE PROGRAM

The section shows the content which converts A-Motion to Q17nDS (virtual mode switching type).



When the ladder program A/QnA->Q conversion support tool used
 "A/QnA->Q conversion support tool" can be used to confirm the modified content of ladder program.
 Please download and install A/QnA->Q conversion support tool from Mitsubishi FA Site.
 For details, please refer to the A/QnA->Q conversion support tool guidebook in the same page.

Although the ladder program has been converted following the procedure, it may not be operated correctly. For the program modifications, please refer to "2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION".



6.1 Motion Project Diversion Function in MT Works2

6.1.1 Data list available for diversion or not

The following table shows the overview whether the data can be diverted or not for the diversion function of motion project in MT Works2. The data may not be diverted for the case, but more than half can be diverted.

For details, please refer to “2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION”.

Data list available for diversion or not		A171SHCPUN, A172SHCPUN		A173UHCPU		
		SV13	SV22	SV13	SV22	
System setting	System setting data	△ (Servo amplifier has been converted to MR-J3-B/MR-J4-B after diverting)				
	High speed reading data	○				
	Basic setting	× (Multiple CPU etc. must be set)				
Servo data setting	Axis data	Fixed parameter	△ (Change electronic gear)			
		Home position return data	○			
		JOG operation data	○			
		Servo parameter	Besides MR-J2S: ×, MR-J2S: ○			
	Parameter block	○				
	Limit output data	×: Not use Motion SFC ○: Use Motion SFC				
Motion SFC program	Motion SFC parameter	○				
	Motion SFC program	△ (Device must be revised)		○		
	Operation control program	△ (Device must be revised)		○		
	Transition program	△ (Device must be revised)		○		
	Conversion data	△ (Data must be converted again)				
	Automatic numbering setting	○				
Servo program		△ (Device must be reviewed)		○		
Mechanical system program	Mechanical edit data	-	△	-	○	
	Mechanical conversion data	△ (Data must be converted again)				
	Cam conversion data	-	○	-	○	
Cam data		○				
Device memory		SW3RNC-GSVE only ○ (# device only)				

○: Can be diverted (can be used directly)

△: Data must be revised

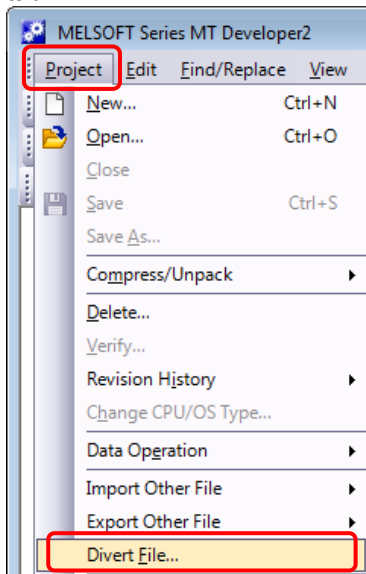
×: Must be set again

- : Data does not exist because it has not been used in diversion source (A-Motion).

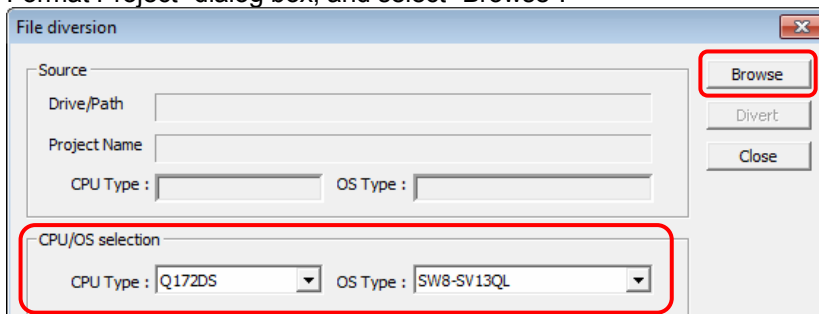
6.1.2 Motion program diversion procedure in MT Works2

The following describes the procedure for diverting an A173UHCPU/A17nSHCPUN project using MT Works2. For details, refer to "2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION". For details, please refer to "2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION"

- 1) Start MT Developer2, and select "Divert File" --> "Diversion of Other Format Project" from the "Project" tab.



- 2) Specify the CPU type, OS type, and operation method after the replacement in the "Diversion of Other Format Project" dialog box, and select "Browse".



•
Omitted below
•

10) Input "Workspace Name", "Project Name", and "Title", and select "Save".

Workspace Name : Q172DS Replacement File
Project Name : Q172DS Replacement File
Title: A -> Q Converting File
Save Cancel
Save as a Single File Format Project... Switch the window by clicking this button when you want to use single file format project. (MELSOFT Navigator does not support this format.)

11) Select "Yes".

MELSOFT Series MT Developer2
The specified project does not exist.
Do you want to create a new project?
Yes No

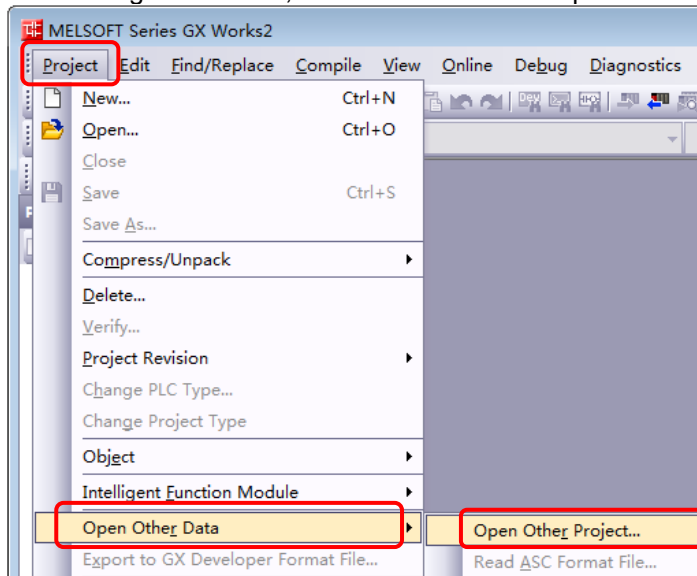
Please refer to "4.1 Data list available for diversion or not (SV13/SV22)", and set the data that cannot be diverted if necessary. And for the multiple-CPU parameter setting, please refer to "2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION" and the user's manual for the using module.

6.2 Ladder Program Diversion Function in GX Works2

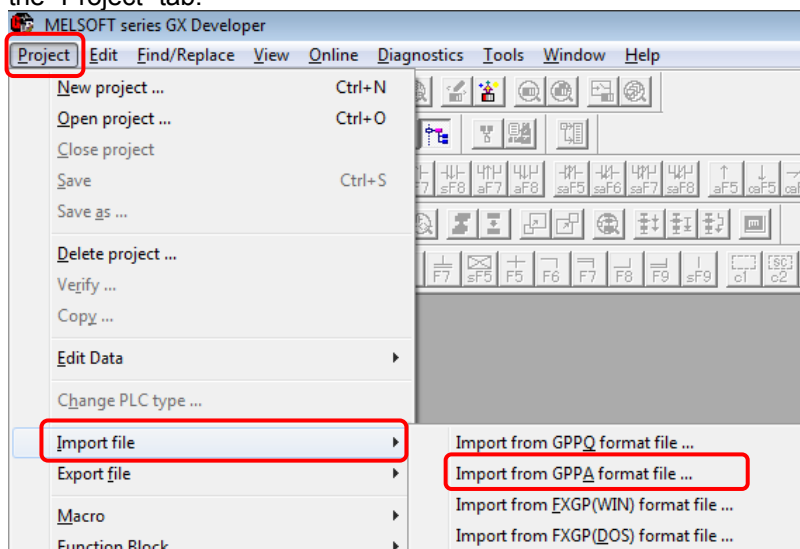
6.2.1 Ladder program diversion procedure in GX Works2

This section explains the conversion overview of a ladder program for A-Motion controller (SCPU). For details of ladder program created by GX Developer, please refer to "2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION".

1) After starting GX Works2, select "Start GX Developer" from the "Project" tab.

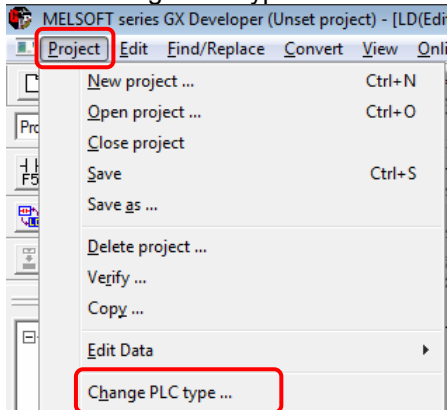


2) The following shows the conversion of ladder program created by SW3RNC-GSVE. (GPPA file format) After GX Works2/GX Developer is started, select "Import file" --> "Import from GPPA format file" from the "Project" tab.

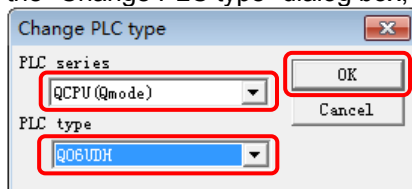


•
Omitted below
•

9) Select "Change PLC type" from the "Project" tab in GX Developer.

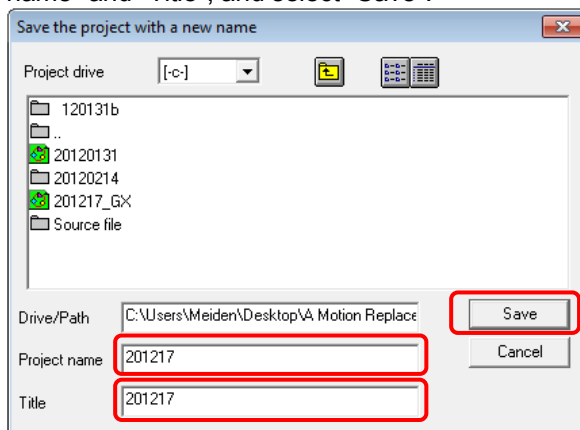


10) Specify the PLC series (QCPU(Qmode)) and PLC type (QnUD(E)(H)CPU) after the replacement in the "Change PLC type" dialog box, and select "OK".

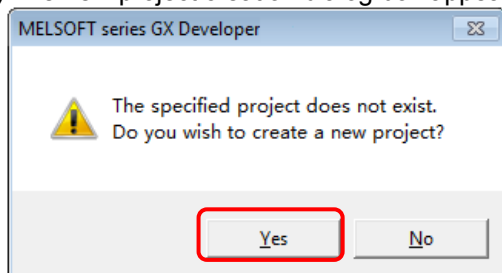


•
Omitted below
•

14) When "Save as" is selected from the "Project" tab, the following dialog box appears. Input "Project name" and "Title", and select "Save".



15) The new project creation dialog box appears. Select "Yes".



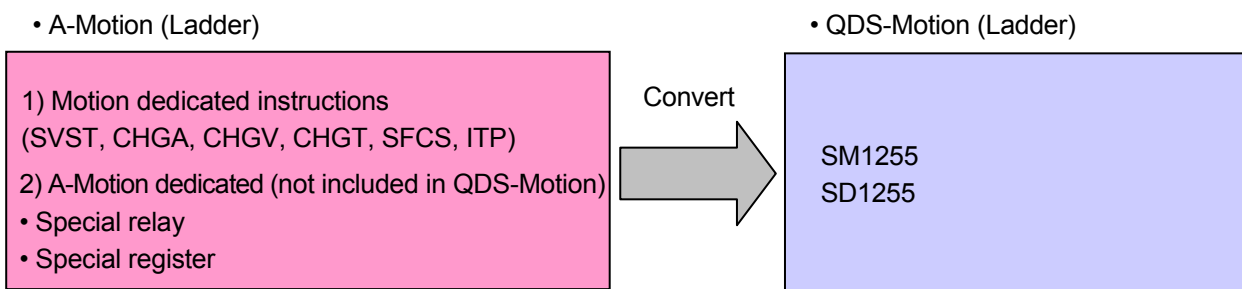
6.2.2 The process after diverting the ladder program in GX Works2

Although the ladder program has been diverted by GX Works2, the dedicated instructions and dedicated devices for A-Motion may not be converted automatically, please correct it manually as follows. And, there is also a tool called "A/QnA->Q conversion support tool" to support the process.

For details, please refer to "2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION".

- 1) Motion dedicated instructions
(SVST, CHGA, CHGV, CHGT, SFCS, ITP)
--> Convert to SM1255.
- 2) A-Motion dedicated (not included in QDS-Motion)
 - Special relay
 - Special register--> Convert to SM1255 and SD1255.

As it has been converted as above, please remember using content of these devices in the pre-converted program (A-Motion ladder), and change the converted content in SM1255, SD1255 to Q17nDSCPU Motion dedicated instructions and other bit device after converting. (Please refer to the user's manual of each CPU module and the programming manual)



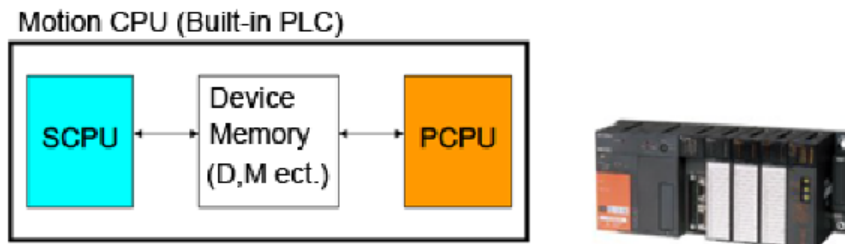
As it has been converted as above, please remember using content of these devices in the pre-converted program (A-Motion ladder), and change the converted content in SM1255, SD1255 to Q17nDSCPU Motion dedicated instructions and other bit device after converting.

6.3 Precautions of Program Transition

6.3.1 Precautions of shared device memory transition between SCPU (PLC) and PCPU (Motion CPU)

PLC CPU and Motion CPU are integrated in A-Motion, while these are not integrated in QDS-Motion. And the shared device memory can be used by the Multiple CPU high speed transmission (+ automatic refresh). Therefore it is necessary to execute the automatic refresh setting and allocate to the Motion CPU device which used PLC CPU after the project diversion. Pay attention to the number of automatic refresh block because the limit is 32 in Q173DSCPU/Q172DSCPU.

A-Motion

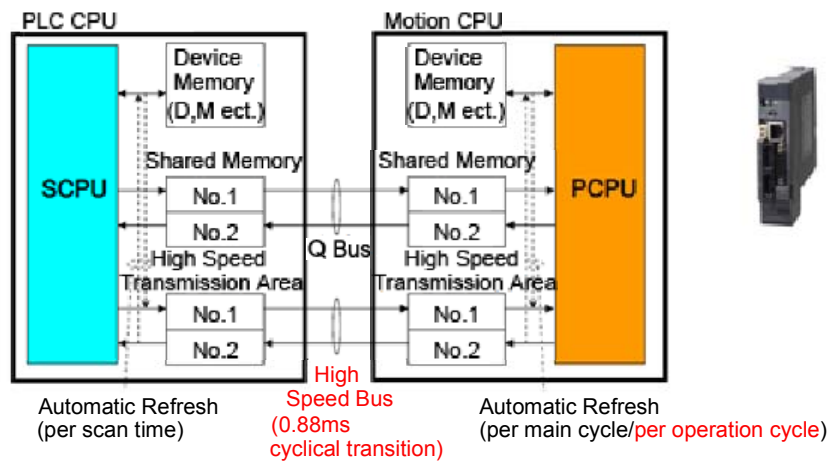


[Advantage]

- SCPU (PLC CPU) and PCPU (Motion CPU) was loaded in one unit
- The device memory has been shared and it can be accessed from two CPUs



QDS-Motion



[Advantage]

- 0.88ms cyclical transition can be done in high speed transmission area
- Automatic refresh per operation cycle is possible

7. RELEVANT DOCUMENTS

Please refer to the following documents. And it can be downloaded from Mitsubishi Electric FA Site whenever you want.

<http://www.MitsubishiElectric.co.jp/fa/>

7.1 Relevant Catalogs

Motion Controller Q17nDSCPU/Q170MSCPU,
Simple Motion Module QD77MS/QD77GF



L(NA) 03062

Motion Controller
Q17nDCPU



L(NA)03036

MELSERVO-J4



L(NA) 03058

MELSERVO-J2-Super Transition Guide



L(NA)03091

7.2 Relevant Manuals

Q170M(S) Series User's Manual

NEW Q170MSCPU User's Manual

IB-0300212

Q173D(S)/Q172D(S) Series User's Manual

Q173D(S)CPU/Q172D(S)CPU User's Manual

IB-0300133

Q173D(S)/Q172D(S) Series Programming Manual

Programming Manual (COMMON) [type Q173D(S)/Q172D(S)]

IB-0300134

Q173D(S)/Q172D(S) Series Programming Manual

SV13/22Programming Manual (Motion SFC) [type Q173D(S)/Q172D(S)]

IB-0300135

Q173D(S)/Q172D(S) Series Programming Manual

SV13/22Programming Manual (REAL MODE) [type Q173D(S)/Q172D(S)]

IB-0300136

Q173D(S)/Q172D(S) Series Programming Manual

SV22Programming Manual (VIRTUAL MODE) [type Q173D(S)/Q172D(S)]

IB-0300137

Q173D(S)/Q172D(S) Series Programming Manual

SV22Programming Manual (Advanced Synchronous Control) [type Q173DS/Q172DS]

IB-0300198

NEW MR-J4 Series Transition from MELSERVO-J2-Super/J2M Series to J4 Series Handbook

[L\(NA\)03093](#)

MR-J4 Series MR-J4-_B(-RJ) SERVO AMPLIFIER INSTRUCTION MANUAL

[SH-030106](#)

MR-J4 Series MR-J4 Servo amplifier Instructions and Cautions for Safe Use of AC Servos

[IB-0300175E](#)

MR-J4 Series MELSERVO-J4 Servo amplifier INSTRUCTION MANUAL TROUBLE SHOOTING

[SH-030109](#)

MR-J4 Series MR-J4W2-_B/MR-J4W3-_B SERVO AMPLIFIER INSTRUCTION MANUAL

[SH-030105](#)

MR-J4 Series Conversion Unit for SSCNET of MR-J2S-B Compatible AC Servo
MR-J4-_B_-RJ020/MR-J4-T20 SERVO AMPLIFIER INSTRUCTION MANUAL

[SH-030125](#)

MR-J4 Series Instructions and Cautions for Drive of HC/HA Series Servo Motor with
MR-J4-_B_-RJ020 Servo Amplifier

[SH-030127](#)

MR-J4 Series Conversion unit for SSCNET of MR-J2S-B MR-J4-T20 Installation Guide

[IB-0300204E](#)

MR-J3 Series MR-J3-_B SERVO AMPLIFIER INSTRUCTION MANUAL

[SH-030051](#)

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1. OVERVIEW

This article explains the change content when replace the system using A173UHCPU/A172SHCPUN/A171SHCPUN with the system using Q173DSCPU/Q172DSCPU. Please read A173UHCPU as A173UHCPU-S1.

2. EQUIPMENT CONFIGURATION, AVAILABLE SOFTWARE

Please prepare module, servo amplifier, operating system software and engineering environment according to the table in this article.

2.1 Equipment Correspondence

It is necessary to use the supported product in iQ Platform, when using Q173DSCPU/Q172DSCPU.

Product		Use A17nSHCPUN/A173UHCPU		Use Q17nDSCPU	
		Model name		Model name	
PLC CPU module		<ul style="list-style-type: none"> • A173UHCPU • A172SHCPUN • A171SHCPUN 		QnUD(E)(H)CPU	
Motion CPU module		<ul style="list-style-type: none"> • A173UHCPU • A172SHCPUN • A171SHCPUN 		Q173DSCPU	
Main base unit		<ul style="list-style-type: none"> • A172B • A175B • A178B(-S□) 		Q3□DB (high speed main base unit)	
Forced stop input cable		-		Q170DEMIBC□M	
Connector for forced stop input cable		-		Q170DEMICON	
Servo external signals interface module		A171SENC		Q172DLX ^(Note-1)	
Synchronous encoder interface module		A172SENC		Q172DEX	
Manual pulse generator interface module		MR-HENC		Q173DPX ^(Note-2)	
Serial ABS synchronous encoder		-		<--(same as left)	
Serial ABS synchronous encoder cable	For MR-HENC	MR-HSCB□M		Q171ENC-W8	
	For Q171ENC	-		MR-JHSCB□M	
Battery	For CPU module	A6BAT is built in CPU module		Q170ENC□M	
	For synchronous encoder	-		Q6BAT is built in CPU module	
Manual pulse generator		MR-HDP01		A6BAT is built in Q172DEX	
SSCNET(III) cable		<ul style="list-style-type: none"> • MR-HBUS□M • MR-J2HBUS□M-A (cable for SSCNET)		<--(same as left)	
				<ul style="list-style-type: none"> • MR-J3BUS□M • MR-J3BUS□M-A • MR-J3BUS□M-B (cable for SSCNET III)	

(Note-1): Motion CPU built-in I/F (input 4 points) can be used.

(Note-2): Manual pulse/INC synchronous encoder (1 module) in Motion CPU built-in I/F can be used.

<Precautions>

- Main base unit can use Multiple CPU high speed main base unit (Q3□DB) only.
- SSCNET communication between personal computer using SSC I/F servo (A10BD-PCF/A30BD-PCF) and SSC I/F card (A30CD-PCF) and Motion CPU module is not corresponding in Q173DSCPU/Q172DSCPU.
- Q173DSCPU/Q172DSCPU cannot be used to combine with Q173HCPUN(-T)/Q172HCPUN(-T)/Q173CPUN(-T)/Q172CPUN(-T).
- Q173DSCPU/Q172DSCPU are not compatible with teaching units.

2.2 Servo Amplifier Correspondence

The servo system network is changed from SSCNET to SSCNET III or SSCNET III/H. Use a servo amplifier compatible with SSCNET III or SSCNET III/H. Select a servo motor that can be connected with an SSCNET III or SSCNET III/H-compatible servo amplifier.

<Amplifier correspondence>

Use A17nSHCPUN/A173UHCPU			Use Q17nDSCPU		
Product		Model name	Product		Model name
Servo amplifier	MR-H series	MR-H-□BN	Servo amplifier	MR-J3 series	• MR-J3(W)-□B(S)
	MR-J2S series	MR-J2S-□B		MR-J4 series	• MR-J4(W□)-□B
	MR-J2 series	MR-J2-□B			* It will operate in MR-J3 compatibility mode when mixed with MR-J3.
	MR-J2-Jr series	MR-J2-03B5			

<Specification compare of servo system network>

Item		SSCNET (A-Motion)	SSCNET III	SSCNET III/H
Communication media		Metal cable	Optical fiber cable	
Communication speed		5.6Mbps	50Mbps	150Mbps
Communication cycle	Sending	3.55ms	0.44ms/0.88ms	0.22ms/0.44ms/0.88ms
	Receiving	3.55ms	0.44ms/0.88ms	0.22ms/0.44ms/0.88ms
Maximum number of control axes per system		8 axes/system	16 axes/system	
Transmission distance		Overall length is 30m	[Standard code for inside panel/standard cable for outside panel] Up to 20m between stations Maximum overall length is 320m (20m x 16 axes)	
			[Long distance cable] Up to 50m between stations Maximum overall length is 800m (50m x 16 axes)	[Long distance cable] Up to 100m between stations Maximum overall length is 1600m (100m x 16 axes)

For the communication with servo amplifiers, "SSCNET III" or "SSCNET III/H" must be set for each system in the SSCNET setting of the system setting. For details, refer to MR-J4 SERVO AMPLIFIER INSTRUCTION MANUAL.

2.3 Operating System Software Correspondence

Use operating system for Q173DSCPU/Q172DSCPU.

The latest version of SV22 has been installed in Q173DSCPU/Q172DSCPU with shipment.

Download the latest version of operating system besides SV22 from Mitsubishi Electric FA Site for use.

Application	Use A17nSHCPUN/A173UHCPU			Use Q17nDSCPU	
	Model name			Model name	
For conveyor assembly (SV13)	For A173UHCPU	SW2SRX-SV13B	-->	For Q173DSCPU	SW8DNC-SV13QJ
		SW2NX-SV13B			
		SW3RN-SV13B			
	For A172SHCPUN	SW0SRX-SV13D		For Q172DSCPU	SW8DNC-SV13QL
		SW0NX-SV13D			
		SW3RN-SV13D			
	For A171SHCPUN	SW0SRX-SV13G		For Q173DSCPU	SW8DNC-SV22QJ
		SW0NX-SV13G			
		SW2SRX-SV22A			
For automatic machinery (SV22)	For A173UHCPU	SW2NX-SV22A	-->	For Q173DSCPU	SW8DNC-SV22QJ
		SW3RN-SV22A			
		SW0SRX-SV22C			
	For A172SHCPUN	SW0NX-SV22C		For Q172DSCPU	SW8DNC-SV22QL
		SW3RN-SV22C			
		SW0SRX-SV22F			
	For A171SHCPUN	SW0NX-SV22F			

2.4 Engineering Environment

The following shows the engineering environment supported in Q173DSCPU/Q172DSCPU.

For the following purchase software, the latest version of which can download from Mitsubishi Electric FA Site and update.

Product	Model name	Available version	Remark
MELSOFT MT Works2	SW1DNC-MTW2-□	Ver.1.53F or later	
MR Configurator2 ^(Note-1) ^(Note-2)	SW1DNC-MRC2-□	Ver.1.12N or later	
MELSOFT GX Works2 ^(Note-3)	SW1DNC-GXW2-□	Ver.1.53F or later	Execute the installation of GX Developer when installing GX Works2.

(Note-1): MR Configurator2 is bundled in MT Works2.

(Note-2): MR Configurator2 can be installed after downloading from Mitsubishi Electric FA Site in the personal computer in which GX Works2 or MT Works2 is installed.

(Note-3): GX Developer also can be installed together when install MELSOFT GX Works2.

In "2.4.3 Diversion procedure in PLC CPU side", GX Developer is necessary to convert sequence program.

3. DIFFERENCES BETWEEN Q173DSCPU/Q172DSCPU AND A173UHCPU/A172SHCPUN/A171SHCPUN

3.1 Differences between Q173DSCPU/Q172DSCPU and A173UHCPU/A172SHCPUN/A171SHCPUN

3.1.1 Differences list

Item	Q17nDSCPU	A17nSHCPUN/A173UHCPU			Points of replacement	
		A171SH	A172SH	A173UH		
Peripheral I/F	<ul style="list-style-type: none"> • USB/RS-232/Ethernet (Via PLC CPU) • PERIPHERAL I/F (Motion CPU manager) 	RS422/SSCNET			Communicate with peripheral by corresponding I/F.	
Battery	Q6BAT is built in (3.0V)	A6BAT is built in (3.6V)			Pay attention to the using battery is different.	
Forced stop input	<ul style="list-style-type: none"> • Use EMI terminal of Motion CPU module • Use device specified by forced stop input setting in the system setting 	Use EMG terminal of main base unit			Always use a forced stop input cable (Please fabricate it by customers.).	
Multiple CPU high speed transmission memory for data transfer between CPU modules	Included	-			-	
I/O points	8192 points	2048 points	8192 points		-	
Device	Internal relays (M)	12288 points	Total point is 2048 in shared M,L,S	Total point is 8192 in shared M,L,S	Left described devices is shared in A-Motion but not shared in QDS-Motion. Execute automatic refresh setting if necessary. Refer to Section 2.5 for details.	
	Latch relays (L)	None(M latch can be set in latchsetting)				
	Step relays (S)	-				
	Link relays (B)	8192 points	1024 points	8192 points		
	Timer s (T)	-	256 points	2048 points		
	Counters (C)	-	256 points	2048 points		
	Data registers (D)	8192 points	1024 points	8192 points		
	Link registers (W)	8192 points	1024 points	8192 points		
	Annunciators (F)	2048 points	256 points	2048 points		
	File registers (R)	-	Up to 8192 points			
	Special relays (M)	-	256 points			
	Special relays (SM)	2256 points	-			
	Special registers (D)	-	256 points			
	Special registers (SD)	2256 points	-			
	Motion registers (#)	12288 points	-	8192 points (Motion SFC OS only)		
	Multiple CPU shared devices (U□G)	Up to 14336 points ^(Note-1)	-			
Coasting timers (FT)	1point(888μs)	-				
Motion dedicated PLC instruction	D(P).DDRD, D(P).DDWR, D(P).SFCS, D(P).SVST, D(P).CHGT, D(P).CHGT2, D(P).CHGV, D(P).CHGVS ^(Note-2) , D(P).CHGA, D(P).CHGAS ^(Note-2) , D(P).GINT	CHGT, CHGV, CHGA			Replace motion dedicated PLC instruction with D(P).*** instruction. (Refer to SV13/22 Programming Manual (Motion SFC) [type Q173D(S)/Q172D(S)].)	
		SVST (Non Motion SFC OS only)				
Motion module	SV13	Q172DLX, Q173DPX	A171SENC, A172SENC		Please use Q172DLX, Q172DEX, Q173DPX for motion module in the system which used Q173DSCPU/Q172DSCPU. In the system using Q173DSCPU/Q172DSCPU, please install motion modules on the I/O slot 3 and later.	
	SV22	Q172DLX, Q172DEX ^(Note-3) , Q173DPX	A171SENC, A172SENC			
	Installation position	Motion module cannot be installed in I/O slot 0 to 2	Motion module can be installed in motion I/O slot only			

* Synchronous encoders can be used via MR-J4-□B-RJ.

(Note-1): The maximum number of devices varies depending on the system setting.

(Note-2): Only for SV22 advanced synchronous control

(Note-3): It can be mounted main base unit only

(Continued)

Item		Q17nDSCPU	A17nSHCPUN/A173UHCPU			Points of replacement
			A171SH	A172SH	A173UH	
System setting		<ul style="list-style-type: none"> • QnUD(E)(H)CPU will be No.1 • Use multiple CPU high-speed main base units (Q35DB, Q38DB, Q312DB). 	<ul style="list-style-type: none"> • Multiple CPU is unsupported • Use normal main base units (A172B, A175B, A178B, A178B-S1, A178B-S2, A178B-S3). 			Use the system combining with available unit.
Servo system network		SSCNET III/H, SSCNET III	SSCNET			
Teaching unit		Unusable	Usable			-
CPU shared memory	Multiple CPU high speed transmission area	Provided	Device shared between SCPU and PCPU			Assign the device which used in PLC CPU by automatic refresh setting manually to Motion CPU device after project diversion.
	Use memory	Multiple CPU high speed transmission area of CPU shared memory				
Automatic refresh	Automatic refresh setting	Can be set in the range of 32				
	Multiple CPU high speed refresh function	Provided				
LED display		7-segment LED status display	Each LED of RUN, ERR			-
Latch range setting	Latch (1)	Latch clear (1) of remote latch clear can clear in latch clear (1) (2)	Latch range setting is 1 setting only. Clear by L.CLR switch.			Please execute latch clear in MT Works2.
	Latch (2)	Can be cleared by latch clear (1) (2) of remote latch clear				
All clear function		Execute it by installation mode	None			-
Self diagnosis error		When the error of Motion CPU occurs independently, set it in the range of 10000 to 10999 according to the classification of error in diagnosis error (SD0). At this moment, self diagnosis error flag (SM1) and diagnosis error flag (SM0) are also ON.	Even if the error of PCPU occurs, self diagnosis error will not occur.			Correct the program if necessary.
Motion error detection flag (M2039)		No matter which error occurs, M2039 will be ON in Motion CPU.	-	Depending on the type of an error that occurred, M2039 is turned ON. (Only when SFC is used)		Correct the program if necessary.
Latch clear		Remote operation	L.CLR switch			-
RUN/STOP		Remote operation, RUN/STOP switch	RUN/STOP switch			-
ROM writing		<ul style="list-style-type: none"> • Execute in RAM operation mode/ROM operation mode (installation switch operation of Motion CPU module is not necessary) • Data of MT Works2 can be wrote to ROM directly 	None			-
ROM operation mode		Select by rotary switch	None			-

(Continued)

Item	Q17nDSCPU	A17nSHCPUN/A173UHCPU			Points of replacement
		A171SH	A172SH	A173UH	
Installation mode	Select by rotary switch	Select by dip switch			-
Mechanical system program (SV22)	Ball screw and electronic gear setting of rotary table can be automatically calculated from the setting value of "Number of Pulses/Rev." and "Travel Value/Rev." of fixed parameter.	Ball screw and electronic gear setting of rotary table are set respectively in mechanical system program.			-
Operation cycle (default value)	SV13 0.22ms/1 to 4 axes 0.44ms/5 to 10 axes 0.88ms/11 to 24 axes 1.77ms/25 to 32 axes	3.5ms/1 to 4 axes	3.5ms/1 to 8 axes	3.5ms/1 to 20 axes 7.1ms/21 to 32 axes	When the operation cycle is set as default (automatic), the operation cycle will change. Operation cycle changes as left describing, and the program execution timing will change, so set the fixed operation cycle if necessary.
	SV22 0.44ms/1 to 6 axes 0.88ms/7 to 16 axes 1.77ms/17 to 32 axes The operation cycle setting (0.2 [ms]/0.4 [ms]) can be configured. (Note-1) (Note-2)	3.5ms/1 to 4 axes	3.5ms/1 to 8 axes	3.5ms/1 to 12 axes 7.1ms/13 to 24 axes 14.2ms/25 to 32 axes	

(Note-1): The following restrictions are applied when the communication method is "SSCNET III".

- When the operation cycle is 0.2 [ms], set "0 to 3" for the axis select switch setting of the servo amplifier, and configure the system setting.
- When the operation cycle is 0.4 [ms], set "0 to 7" for the axis select switch setting of the servo amplifier, and configure the system setting.

For details, refer to the instruction manual of the servo amplifier.

(Note-2): When MR-J4W3-□B (Software version: A2 or earlier) or MR-J3W-□B is used, set 0.4 [ms] or more for the operation cycle.

3.1.2 Difference between self diagnosis error and Motion (SFC) error history

Self diagnosis error code		Description	Error flag state ○: ON ×: OFF					
Q17nDSCPU (SD0)	A17nSHCPU/ A173UHCPU (D9008)		Self diagnosis error flag		Motion (SFC) error history		Motion error detection flag	
			Q17nDSCPU (SM1)	A17nSHCPU N/A173UHCPU (M9008)	Q17nDSCPU (#8640 + 12n) [*]	(SFC version only) A172SHCP UNA173U HCPU (#8000 + 8n) [*]	Q17nDSCPU (M2039)	(SFC version only) A172SHCP UN/ A173UHCP U (M2039)
1 to 9999	10 to 84	Self diagnosis error besides Motion CPU independent error	○	○	○	×	○	×
10002	-	Minor/major error (command generation axis)	○	×	○	×	○	×
10003	-	Minor/major error	○	×	○	○	○	○
10004	-	Minor/major error (virtual servo motor axis)	○	×	○	○	○	○
10005	-	Minor/major error (synchronous encoder axis)	○	×	○	○	○	○
10006	-	Servo error	○	×	○	○	○	○
10006	-	Servo warning	○	×	○	○	○	○
10007	-	Servo program setting error	○	×	○	○	○	○
10008	-	Mode switching error	○	×	○	○	○	○
10009	-	Manual pulse axis setting error	○	×	○	○	○	○
10010	-	Test mode requirement error	○	×	○	○	○	○
10011	-	WDT error	○	×	○	○	○	○
-	-	Personal computer link communication error	×	×	×	○	×	○
10014	-	System setting error	○	×	○	×	○	×
10015	-	Servo amplifier (MR-J4-□B) servo error	○	×	○	×	○	×
10016	-	Motion slot error	○	×	○	×	○	×
10020	-	Motion SFC control error (F/FS)	○	×	○	○	○	○
10021	-	Motion SFC control error (G)	○	×	○	○	○	○
10022	-	Motion SFC control error (K or others (not F, FS, G))	○	×	○	○	○	○
10023	-	Motion SFC control error (Motion SFC chart)	○	×	○	○	○	○
10030	-	Motion CPU internal bus error	○	×	○	×	○	×
10042	-	SSCNET III/H head unit error	○	×	○	×	○	×
10050	-	Safety observation error (alarm) occurrence	○	×	○	×	○	×
10051	-	Safety observation error (warning) occurrence	○	×	○	×	○	×

*: n shows the value (n=0 to 7) corresponding to motion error history.

3.1.3 Item that is necessary to change/revise with the change of servo system network

Item	Difference		Change/Revise content
	Q17nDSCPU	A17nSHCPUN/ A173UHCPU	
System setting/SSCNET configuration	Q172DSCPU: 1 system Q173DSCPU: 2 systems (up to 16 axes/system)	A171SHCPUN: 1 system A172SHCPUN: 1 system A173UHCPU: 4 systems (up to 8 axes/system)	Configure the rotary switch setting of the servo amplifier according to the SSCNET configuration.
Electronic gear	Number of pulses per revolution: 1 to 2147483647[pulse] Travel value per revolution: 1 to 2147483647[pulse]	Number of pulses per revolution: 1 to 65535[pulse] Travel value per revolution: 1 to 65535[pulse]	Change the number of pulses per revolution and the travel value per revolution of the fixed parameter according to the resolution per revolution of the connected servo motor.
Connect/disconnect of SSCNET communication when servo amplifier power supply is OFF	When an SSCNET III cable or a servo amplifier in the middle of the SSCNET system is replaced while the multiple CPU system is on, use the connect/disconnect function of the SSCNET communication.	SSCNET cables or servo amplifiers in the middle of the SSCNET system can be replaced while the system is on.	When the power supply servo amplifier is OFF/ON in SSCNET system, use connect/disconnect function of SSCNET communication. For details, refer to Motion controller Q series programming manual (common) (Q173D(S)CPU/Q172D(S)CPU) (IB-0300126) and "4.11.1 Connect/disconnect function of SSCNET communication".
Battery break warning/ battery warning	Servo error code 2102(92): Battery break warning 2116(9F): Battery warning	Servo error code 2102(9F): Battery warning 2103(92): Battery break warning	Correct the program using the left servo error code.

3.2 Device Comparison

3.2.1 I/O device

	Q17nDSCPU	A173UHCPU	A172SHCPUN	A171SHCPUN
X/Y0	User device (8192 points)	User device (8192 points)	User device (2048 points)	
X/Y7FF				
X/Y800		/		
X/Y1FFF				

3.2.2 Internal relay

(1) SV13

	Q173DSCPU	Q172DSCPU	A173UHCPU	A172SHCPUN	A171SHCPUN		
M0	User device (2000 points)		User device (2000 points)	User device (1600 points)			
M1600				Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)		
M1680				Unusable (40 points)	Unusable (120 points)		
M1680							
M1760				Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)		
M1800					Unusable (80 points)		
M1880				Common device (320 points)	Common device (320 points)	Common device (88 points)	
M1960							
M2000							
M2047				Unusable (80 points)	Unusable (80 points)	/	
M2048							
M2320	Status of each axis (20 points x 16 axes)	Status of each axis (20 points x 32 axes)					
M2400	User device (320 points)						
M2720	Unusable (32 points)		Unusable (160 points)				
M3040	Common device (command signal) (64 points)						
M3072	Unusable (64 points)						
M3136	Command signal of each axis (20 points x 32 axes)	Command signal of each axis (20 points x 16 axes)	Command signal of each axis (20 points x 32 axes)				
M3200							
M3520	User device (4351 points)	User device (4671 points)	User device (4351 points)				
M3840							
M8191							

(2) SV22 Real mode

	Q173DSCPU	Q172DSCPU	A173UHCPU	A172SHCPUN	A171SHCPUN
M0	User device (2000 points)		User device (2000 points)	User device (1360 points)	
M1360				Synchronous encoder axis status (4 points x 1 axis)	
M1364				User device (236 points)	
M1600				Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)
M1680					
M1760					
M1800					
M1880				Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)
M1960					
M2000				Common device (320 points)	
M2047	Common device (320 points)				
M2048					
M2320	Unusable (80 points)		Unusable (80 points)		
M2400	Status of each axis (20 points x 32 axes)	Status of each axis (20 points x 16 axes)	Status of each axis (20 points x 32 axes)		
M2720		User device (320 points)			
M3040	Unusable (32 points)				
M3072	Common device (command signal) (64 points)		Unusable (160 points)		
M3136	Unusable (64 points)				
M3200	Command signal of each axis (20 points x 32 axes)	Command signal of each axis (20 points x 16 axes)	Command signal of each axis (20 points x 32 axes)		
M3520		User device (320 points)			
M3840	Unusable (160 points)				
M4000	Virtual servo motor axis status ^(Note-1) (20 points x 32 axes)	Virtual servo motor axis status ^(Note-1) (20 points x 16 axes)	User device (800 points)		
M4320		User device (320 points)			
M4640	Synchronous encoder axis status (4 points x 12 axes)		Synchronous encoder axis status (4 points x 4 axes)		
M4656					
M4688	Unusable ^(Note-1) (112 points)				
M4800	Virtual servo motor axis command signal ^(Note-1) (20 points x 32 axes)	Virtual servo motor axis command signal ^(Note-1) (20 points x 16 axes)	User device (3536 points)		
M5120		User device (320 points)			
M5440	Synchronous encoder axis command signal (4 points x 12 axes)				
M5488	User device (2704 points)				
M8191					

(Note-1): This device can be used as a user device when used only in the SV22 real mode.

(3) SV22 Virtual mode

	Q173DSCPU	Q172DSCPU	A173UHCPU	A172SHCPUN	A171SHCPUN			
M0	User device (2000 points)		User device (2000 points)	User device (1360 points)				
M1200				Virtual servo motor axis status (20 points x 8 axes)	Virtual servo motor axis status ^{(Note-1)(Note-2)} (20 points x 4 axes)			
M1280					User device ^(Note-2) (80 points)			
M1360				Synchronous encoder axis status (4 points x 1 axis) ^(Note-2)				
M1364				Unusable ^(Note-2) (36 points)				
M1400				Virtual servo motor axis command signal (20 points x 8 axes)	Virtual servo motor axis command signal ^{(Note-1)(Note-2)} (20 points x 4 axes)			
M1480					User device ^(Note-2) (80 points)			
M1560				Synchronous encoder axis command signal (4 points x 1 axis) ^(Note-2)				
M1564				Unusable (36 points)				
M1600				Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)			
M1680					Unusable			
M1760				Unusable (40 points)				
M1800				Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)			
M1880					Unusable (80 points)			
M1960				Common device (320 points)		Common device (88 points)		
M2000						Common device (320 points)		
M2048				Unusable (80 points)				
M2320				Unusable (80 points)				
M2400				Status of each axis (20 points x 32 axes)	Status of each axis (20 points x 16 axes)			Status of each axis (20 points x 32 axes)
M2720					User device (320 points)			
M3040	Unusable (32 points)		Unusable (160 points)					
M3072	Common device (command signal) (64 points)							
M3136	Unusable (64 points)							
M3200	Command signal of each axis (20 points x 32 axes)	Command signal of each axis (20 points x 16 axes)	Command signal of each axis (20 points x 32 axes)					
M3520		User device (320 points)						
M3840	Unusable (160 points)		Unusable (160 points)					

(Continued)

	Q173DSCPU	Q172DSCPU	A173UHCPU	A172SHCPUN	A171SHCPUN
M4000	Virtual servo motor axis status (Note-1)(Note-3) (20 points x 32 axes)	Virtual servo motor axis status ^{(Note-1)(Note-3)} (20 points x 16 axes)	Virtual servo motor axis status ^{(Note-1)(Note-3)} (20 points x 32 axes)	/	
M4320		User device ^(Note-3) (320 points)			
M4640	Synchronous encoder axis status (4 points x 12 axes) ^(Note-3)		Synchronous encoder axis status ^(Note-3) (4 points x 4 axes)		
M4656			Unusable ^(Note-3) (144 points)		
M4688			Unusable (112 points) ^(Note-3)		
M4800	Virtual servo motor axis command signal ^{(Note-1), (Note-3)} (20 points x 32 axes)	Virtual servo motor axis command signal ^{(Note-1), (Note-3)} (20 points x 16 axes)	Virtual servo motor axis command signal ^{(Note-1)(Note-3)} (20 points x 32 axes)		
M5120		User device ^(Note-3) (320 points)			
M5440	Synchronous encoder axis command signal ^(Note-3) (4 points x 12 axes)		Synchronous encoder axis command signal ^(Note-3) (4 points x 4 axes)		
M5456			Unusable ^(Note-3) (32 points)		
M5488			User device ^(Note-4) (2704 points)		
M8191			User device ^(Note-4) (2704 points)		

(Note-1): Only the area of axis set by mechanical system program is occupied. The area of unused axis set by mechanical system program can be used by user.

(Note-2): When using virtual mode, do not set latch range as M1200 to M1599.

(Note-3): When using virtual mode, do not set latch range as M4000 to M5487.

(Note-4): Cam axis command signal and smoothing clutch completion signal can be set to any device by parameter.

3.2.3 Data register

(1) SV13

	Q173DSCPU	Q172DSCPU	A173UHCPU	A172SHCPUN	A171SHCPUN
D0	Monitor device of each axis (20 points x 32 axes)	Monitor device of each axis (20 points x 16 axes)	Monitor device of each axis (20 points x 32 axes)	User device (800 points)	
D320		User device (320 points)			
D640	Control change register (2 points x 32 axes)	Control change register (2 points x 16 axes)	Control change register (2 points x 32 axes)		
D672		User device (32 points)			
D704	Common device (command signal) (54 points)		Common device (96 points)		
D758	Unusable (42 points)				
D800	User device (7392 points)		User device (7392 points)	Monitor device of each axis (20 points x 8 axes)	Monitor device of each axis (20 points x 4 axes)
D880				Unusable (80 points)	
D960				Control change register (6 points x 4 axes)	
D984				Unusable (24 points)	
D1008				Common device (16 points)	
D1024					
D8191					

(2) SV22 Real mode

	Q173DSCPU	Q172DSCPU	A173UHCPU	A172SHCPUN	A171SHCPUN
D0	Monitor device of each axis (20 points x 32 axes)	Monitor device of each axis (20 points x 16 axes)	Monitor device of each axis (20 points x 32 axes)	User device (748 points)	
D320		User device (320 points)			
D640	Control change register (2 points x 32 axes)	Control change register (2 points x 16 axes)	Control change register (2 points x 32 axes)		
D672		User device (32 points)			
D704	Common device (command signal) (54 points)		Common device (96 points)	Synchronous encoder axis monitor device (4 points x 1 axis)	
D748				User device (48 points)	
D752					
D758	Unusable (42 points)				
D800	Virtual servo motor axis monitor device (10 points x 32 axes)	Virtual servo motor axis monitor device (10 points x 16 axes)	User device (320 points)	Monitor device of each axis (20 points x 8 axes)	Monitor device of each axis (20 points x 4 axes)
D880		User device (160 points)			Unusable (80 points)
D960				Control change register (6 points x 8 axes)	Control change register (6 points x 4 axes)
D984		Unusable (24 points)			
D1008				Common device (16 points)	
D1024					
D1120	Synchronous encoder axis monitor device (10 points x 12 axes)		Synchronous encoder monitor device (6 points x 4 axes)	/	
D1144					
D1240	Cam axis monitor device (10 points x 32 axes)	Cam axis monitor device (10 points x 16 axes)	User device (7048 points)		
D1400		User device (6792 points)			
D1560	User device (6632 points)				
D8191					

(3) SV22 Virtual mode

	Q173DSCPU	Q172DSCPU	A173UHCPU	A172SHCPUN	A171SHCPUN
D0	Monitor device of each axis (20 points x 32 axes)	Monitor device of each axis (20 points x 16 axes)	Monitor device of each axis (20 points x 32 axes)	(670 points)	
D320		User device (320 points)			
D640	Control change register (2 points x 32 axes)	Control change register (2 points x 16 axes)	Control change register (2 points x 32 axes)		
D672		User device (32 points)		User device (8 points)	
D670					Current value of differential gear of synchronous encoder axis main shaft ^(Note-1) (2 points x 1 axis)
D678				Unusable (12 points)	
D686				Virtual servo motor axis monitor device ^(Note-1) (6 points x 8 axes)	Virtual servo motor axis monitor device ^(Note-1) (6 points x 4 axes)
D688					
D700				Synchronous encoder axis monitor device (4 points x 1 axis) ^(Note-1)	
D704		Unusable (8 points)			
D724	Common device (command signal) (54 points)	Common device (96 points)	Cam axis monitor device ^(Note-1) (5 points x 8 axes)	Cam axis monitor device ^(Note-1) (5 points x 4 axes)	
D748					User device (20 points)
D752	Unusable (42 points)				
D758	Virtual servo motor axis monitor device ^(Note-1) (6 points x 16 axes) Current value after differential gear of virtual servo motor axis main shaft (4 points x 16 axes) ^(Note-1)	Virtual servo motor axis monitor device ^(Note-1) (6 points x 32 axes) Current value after differential gear of virtual servo motor axis main shaft (4 points x 32 axes) ^(Note-1)	Monitor device of each axis ^(Note-1) (20 points x 8 axes)	Monitor device of each axis (20 points x 4 axes)	
D800				Unusable (80 points)	
D880	User device (160 points)	Control change register (6 points x 8 axes)	Control change register (6 points x 4 axes)		
D960			Unusable (24 points)		
D984	Common device (16 points)				
D1008					
D1024					

(Continued)

	Q173DSCPU	Q172DSCPU	A173UHCPU	A172SHC PUN	A171SHC PUN
D1120	Synchronous encoder axis monitor device (6 points x 12 axes) Current value after differential gear of synchronous encoder axis main shaft (4 points x 12 axes)		Synchronous encoder axis monitor device ^(Note-1) (6 points x 4 axes) Current value after differential gear of virtual servo motor axis main shaft (4 points x 4 axes)	/	/
D1160			Unusable (80 points)		
D1240	Cam axis monitor device ^(Note-1) (10 points x 32 axes)	Cam axis monitor device ^(Note-1) (10 points x 16 axes)	Cam axis monitor device ^(Note-1) (10 points x 32 axes)		
D1400					
D1560	User device (6632 points)	User device (6792 points)	User device (6632 points)		
D8191					

(Note-1): Only the areas of axes set with the mechanical system program are occupied. The areas of the axes not used by the mechanical system program can be used by users.

3.2.4 Motion register

	Q17nDSCPU	(SFC version only) A173UHCPU/A172SHCPUN	(SFC version only) A171SHCPUN	
#0	User device (8000 points)	User device (8000 points)		
#8000	Monitor device (640 points)	SFC error history (8 times) (64 points)	Past 7 times error information (oldest error information)	
#8008			Past 6 times error information	
#8016			Past 5 times error information	
#8024			Past 4 times error information	
#8032			Past 3 times error information	
#8040			Past 2 times error information	
#8048			Past 1 times error information	
#8056			Latest errors information	
#8064			Unusable (128 points)	
#8191				
#8192				
#8640	Motion error history device (96 points)			
#8736	Product information list device (16 points)			
#8752	System area (3536 points)			
#12287				

3.2.5 Special relay

Device number		Name	Remark
Q17nDSCPU	A17nSHCPUN/ A173UHCPU		
SM60	M9000	Fuse blown detection	
-	M9002	I/O module verification error	
-	M9004	MINI link error	A173UHCPU only
SM53	M9005	AC DOWN detection	Q17nDSCPU: AC/DC DOWN detection
SM52	M9006	Low battery	
SM51	M9007	Low battery latch	
SM1	M9008	Self diagnosis error	
-	M9009	Annunciator detection	
SM0	M9010	Diagnosis error flag	
-	M9011	Operation error flag	
-	M9012	Carry flag	
-	M9016	Data memory clear flag (all data)	
-	M9017	Data memory clear flag (non-latch data)	
-	M9020	User timing clock No.0	
-	M9021	User timing clock No.1	
-	M9022	User timing clock No.2	
-	M9023	User timing clock No.3	
-	M9024	User timing clock No.4	
-	M9025	Clock data set requirement	Clock data of CPU No.1 is operating.
SM211	M9026	Clock data error	
-	M9027	Clock data display	
SM801	M9028	Clock data reading requirement	
-	M9029	Data communication requirement batch processing	A173UHCPU only
-	M9030	0.1 second clock	
-	M9031	0.2 seconds clock	
-	M9032	1 second clock	
-	M9033	2 seconds clock	
-	M9034	1 minute clock	
SM400	M9036	Always ON	
SM401	M9037	Always OFF	
-	M9038	Only 1 scan is ON after RUN	
-	M9039	RUN flag (only 1 scan is OFF after RUN)	
-	M9040	PAUSE enabled coil	
-	M9041	PAUSE status contact	
-	M9042	Stop status contact	
-	M9043	Sampling trace completion	
-	M9044	Sampling trace	
-	M9045	Reset watchdog timer (WDT)	
-	M9046	Sampling trace	A173UHCPU only
-	M9047	Sampling trace preparation	A173UHCPU only
-	M9049	Switch output characters number	
-	M9051	CHG command execution inhibition	A173UHCPU only
-	M9052	Switch SEG command	
-	M9053	Switch EI/DI command	
-	M9054	STEP RUN flag	
-	M9055	Status latch completion	

(Continued)

Device number		Name	Remark
Q17nDSCPU	A17nSHCPUN/ A173UHCPU		
-	M9056	Main side P, I setting requirement	
-	M9057	Sub side P, I setting requirement	
-	M9058	Main side P, I setting completion	
-	M9059	Sub side P, I setting completion	
-	M9065	Partition processing execution detection	
-	M9066	Partition processing requirement flag	
-	M9070	Required search time of A8UPU/A8PUJ	
SM512	M9073	Motion CPU WDT error	
SM500	M9074	PCPU preparation completion	
SM501	M9075	Test mode requirement error	
SM502	M9076	Forced stop input flag	
SM513	M9077	Manual pulse axis setting error flag	
SM510	M9078	Test mode requirement error	
SM516	M9079	Servo program setting error flag	
-	M9081	Communication requirement register area BUSY signal	
-	M9084	Error check	
-	M9091	Command error flag	
-	M9094	I/O exchange flag	
-	M9100	SFC program existence	
-	M9101	Start/stop SFC program	
-	M9102	Start status of SFC program	
-	M9103	Continuous transition existence	
-	M9104	Continuous transition prevention flag	
-	M9108	Start step transition monitoring timer (support to D9108)	
-	M9109	Start step transition monitoring timer (support to D9109)	
-	M9110	Start step transition monitoring timer (support to D9110)	
-	M9111	Start step transition monitoring timer (support to D9111)	
-	M9112	Start step transition monitoring timer (support to D9112)	
-	M9113	Start step transition monitoring timer (support to D9113)	
-	M9114	Start step transition monitoring timer (support to D9114)	
-	M9180	Active step sampling trace completion flag	
-	M9181	Active step sampling trace execution flag	
-	M9182	Enable active step sampling trace	
-	M9196	Operation output of block stop	
-	M9197	Fuse blown/I/O verification error display switching	
-	M9198		
-	M9199	Data return of online sampling trace status latch	

* The special relay of Q17nDSCPU is in Motion CPU side.

Refer to the manual of PLC CPU for the special relay in PLC CPU side.

3.2.6 Special register

Device number		Name	Remark
Q17nDSCPU	A17nSHCPUN/ A173UHCPU		
SD60	D9000	Fuse blown	
-	D9002	I/O module verification error	
-	D9004	MINI link error	A173UHCPU only
SD53	D9005	AC DOWN counter	
SD0	D9008	Self diagnosis error	
-	D9009	Detection of annunciator	
-	D9010	Error step	SD1: Diagnosis error occurrence time (calendar, month)
-	D9011	Error step	SD2: Diagnosis error occurrence time (date, hour)
-	D9014	I/O control method	SD5: Error common information
SD203	D9015	CPU operation status	
-	D9016	A17nSHCPUN: ROM/RAM setting A173UHCPU: Program number	
-	D9017	Minimum scan time (10ms unit)	SD520: Current main cycle (1ms unit)
-	D9018	Scan time (10ms unit)	SD521: Maximum main cycle (1ms unit)
-	D9019	Maximum scan time (10ms unit)	SD524: Maximum operation cycle (1μs unit)
-	D9020	Constant scan (10ms unit)	A173UHCPU only SD523: Motion setting operation cycle (1μs unit)
-	D9021	Scan time (1ms unit)	A173UHCPU only SD522: Motion operation cycle (1μs unit)
-	D9022	Time (1 second unit)	A173UHCPU only
SD210	D9025	Clock data (calendar, month)	
SD211	D9026	Clock data (date, hour)	
SD212	D9027	Clock data (minute, second)	
SD213	D9028	Clock data (week)	
-	D9035	Expansion file register	A173UHCPU only
-	D9036	For specifying extended file register device	A173UHCPU only
-	D9037	number	
-	D9038	LED display priority order	
-	D9039		
-	D9044	For sampling trace	A173UHCPU only
-	D9049	Work area for SFC	A173UHCPU only
-	D9050	SFC program error number	A173UHCPU only
-	D9051	Error block	A173UHCPU only
-	D9052	Error step	A173UHCPU only
-	D9053	Error transition	A173UHCPU only
-	D9054	Error sequence step	A173UHCPU only
-	D9055	Status latch	A173UHCPU only
-	D9072	PLC communication check	A173UHCPU only
-	D9081	Number of communication requirement register free area	A173UHCPU only
-	D9085	Setting register of time check value	A173UHCPU only
-	D9090	Number of boards in special function module over	A173UHCPU only
-	D9091	Detailed error number	
-	D9092		
-	D9094	Exchange I/O start I/O number	

(Continued)

Device number		Name	Remark
Q17nDSCPU	A17nSHCPU/ A173UHCPU		
-	D9100	Fuse blown module	A173UHCPU only
-	D9101		
-	D9102		
-	D9103		
-	D9104		
-	D9105		
-	D9106		
-	D9107		
-	D9116	I/O module verification error	A173UHCPU only
-	D9117		
-	D9118		
-	D9119		
-	D9120		
-	D9121		
-	D9122		
-	D9123		
-	D9124	Number of annunciator detection	
-	D9125	Annunciator detection number	
-	D9126		
-	D9127		
-	D9128		
-	D9129		
-	D9130		
-	D9131		
-	D9132		
-	D9180	A173UHCPU: Unusable	A17nSHCPU: Limit switch output status storage area
-	D9181		
SD510	D9182	Q17nDSCPU, A173UHCPU:	Test mode requirement error
SD511	D9183		
SD512	D9184	P CPU error cause	
SD513	D9185	Q17nDSCPU, A173UHCPU: Manual pulse axis setting error	A17nSHCPU: Servo amplifier classification A17nSHCPU: Manual pulse axis setting error information
SD514	D9186		
SD515	D9187		
-	D9188	A173UHCPU: Unusable	A17nSHCPU: Test mode requirement error
SD516	D9189	Error program No.	
SD517	D9190	Error item information	
SD502	D9191	Q17nDSCPU, A173UHCPU: Servo amplifier installation information	A17nSHCPU: Servo amplifier installation information
SD503	D9192		A17nSHCPU: Area for manual pulse (P1) smoothing magnification setting
-	D9196	Personal computer link communication error code	

(Continued)

Device number		Name	Remark
Q17nDSCPU	A17nSHCPUN/ A173UHCPU		
D752	D752	Q17nDSCPU, A173UHCPU: Area for manual pulse 1 (P1) smoothing magnification setting	A17nSHCPU: Unusable
D753	D753	Q17nDSCPU, A173UHCPU: Area for manual pulse 2 (P2) smoothing magnification setting	
D754	D754	Q17nDSCPU, A173UHCPU: Area for manual pulse 3 (P3) smoothing magnification setting	
-	D760	A173UHCPU: Limit switch output disable setting area for Axis 1 to 32	
-	D761		
-	D762		
-	D763		
-	D764		
-	D765		
-	D766		
-	D767		
-	D768		
-	D769		
-	D770		
-	D771		
-	D772		
-	D773		
-	D774		
-	D775	A173UHCPU: Limit switch output status storage area for Axis 1 to 32	A17nSHCPU: Cam axis monitor device • A172SHCPUN: 5 points x 8 axes • A171SHCPUN: 5 points x 4 axes
-	D776		
-	D777		
-	D778		
-	D779		
-	D780		
-	D781		
-	D782		
-	D783		
-	D784		
-	D785	A173UHCPU: Servo amplifier classification	Q17nDSCPU: #8000 + 20n (1 axis/word) A173UHCPU: D792 to (4 axes/word)
-	D786		
-	D787		
-	D788		
-	D789		
-	D790		
-	D791		
-	D792		
-	D793		
-	D794		
-	D795		
-	D796		
-	D797		
-	D798		
-	D799		

* The special register of Q17nDSCPU is in Motion CPU side.
About the special register of PLC CPU side, refer to the manual of PLC CPU.

3.2.7 Other devices

Item	Q17nDSCPU	A173UHCPU	A17nSHCPUN
Personal computer link communication error flag	-	M2034	
PCPU preparation completion flag	SM500	M9074	
Home position return re-travel value	D9 + 20n ^(Note-1) (data abbreviated to 1 word) #8006 + 20n, #8007 + 20n ^(Note-1) (Referred to at monitoring)	D9 + 20n ^(Note-1)	D811 + 20n ^(Note-1)
Travel value change register	Any device (enable set D16 + 20n, D17 + 20n) ^(Note-1)	D16 + 20n ^(Note-1) , D17 + 20n ^(Note-1)	D815 ^(Note-1) + 20n
Indirectly designated device (word device)	D0 to D8191	D800 to D8191	D0 to D799
	W0 to W1FFF	W0 to W1FFF	W0 to W3FF
	#0 to #7999	#0 to #7999 (Motion SFC (real mode) only)	#0 to #7999 (Motion SFC of A172SH (real mode) only)
	U□\G10000 to U□\G(10000 + p - 1) ^{(Note-2)(Note-4)}	-	-
Indirectly designated device (bit device)	X0 to X1FFF ^(Note-3)	X0 to X1FFF	X0 to X7FF
	Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
	M0 to M8191	M/L0 to M/L8191	M/L0 to M/L2047
	-	M9000 to M9255	M9000 to M9255
	B0 to B1FFF	B0 to B1FFF	B0 to B3FF
	F0 to F2047	F0 to F2047	F0 to F255
	U□\G10000.0 to U□\G(10000 + p - 1).F ^{(Note-2)(Note-4)}	-	-
Enable specified device in high speed reading function	D0 to D8191	D800 to D3069, D3080 to D8191	D0 to D799
	W0 to W1FFF	W0 to W1FFF	W0 to W3FF
	U□\G10000 to U□\G(10000 + p - 1) ^{(Note-2)(Note-4)}	-	-

(Note-1): n shows the value (axis No.1 to 32: n=0 to 31) corresponding to axis No.

(Note-2): p is the user free area points of the Multiple CPU high speed transmission area in each CPU.

□: First I/O number of CPU module

(Note-3): In PXn + 0 to PXn + F, the input devices assigned to the motion CPU built-in I/F (DI), PXn + 4 to PXn + F are fixed to 0 and cannot be used.

(Note-4): Setting is available only for the devices of the own CPU.

(Continued)

Item		Q17nDSCPU	A173UHCPU	A17nSHCPUN
Limit switch output data	Output device	X0 to X1FFF	X0 to X1FFF	X0 to X7FF
		Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
		M0 to M8191	M0 to M8191	M0 to M2047
		-	L0 to L8191	L0 to L2047
		B0 to B1FFF	B0 to B1FFF	B0 to B3FF
	U□\G10000.0 to U□\G(10000 + p - 1).F (Note-2)(Note-5)	-	-	
	Watch data	D0 to D8191	D0 to D8191	D0 to D1023
		W0 to W1FFF	W0 to W1FFF	W0 to W3FF
		#0 to #9215	#0 to #8191	#0 to #8191
		U□\G10000 to U□\G(10000 + p - 1) (Note-2)(Note-5)	-	-
		-	Absolute address (H0 to HFFFFFFF)	Absolute address (H0 to HFFFFFFF)
	ON section setting	D0 to D8191	D0 to D8191	D0 to D1023
		W0 to W1FFF	W0 to W1FFF	W0 to W3FF
		#0 to #9215	#0 to #8191	#0 to #8191
		Constant (Hn/Kn) (Note-4)	Constant (Hn/Kn) (Note-4)	Constant (Hn/Kn) (Note-4)
		U□\G10000 to U□\G(10000 + p - 1) (Note-2)(Note-5)	-	-
	Output enable/disable bit	X0 to X1FFF (Note-3)	X0 to X1FFF	X0 to X7FF
		Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
		M0 to M8191	M0 to M8191	M0 to M2047
		-	L0 to L8191	L0 to L2047
B0 to B1FFF		B0 to B1FFF	B0 to B3FF	
F0 to F2047		F0 to F2047	F0 to F255	
SM0 to SM1999		M9000 to M9255	M9000 to M9255	
Forced output bit	-	TT0 to TT2047	TT0 to TT255	
	-	TC0 to TC2047	TC0 to TC255	
	-	CT0 to CT1023	CT0 to CT255	
	-	CC0 to CC1023	CC0 to CC255	
	U□\G10000.0 to U□\G(10000 + p - 1).F (Note-2)(Note-5)	-	-	
	-	-	-	
Mechanical system program	Clutch status	Any device (M2160 to M2223 can also be set)	M2160 to M2223 (unnecessary to set in mechanical system program)	A171SHCPUN: M1984 to M1991 A172SHCPUN: M1984 to M1999 (unnecessary to set in mechanical system program)
	Cam axis command signal (cam/ball screw switch command)	Any device (M5488 to M5519 can also be set.)	-	-
	Smoothering clutch completion signal	Any device (M5520 to M5583 can also be set.)	-	-

(Note-1): n indicates a value corresponding to an axis No. (Axis No.1 to 32: n = 0 to 31)

(Note-2): p is the user free area points of the Multiple CPU high speed transmission area in each CPU.

□: Start I/O number of CPU module

(Note-3): In PXn + 0 to PXn + F, the input devices assigned to the motion CPU built-in I/F (DI), PXn + 4 to PXn + F are fixed to 0 and cannot be used.

(Note-4): The setting range depending on setting unit.

(Note-5): Setting is available only for the devices of the own CPU.

4. DIVERSION OF PROJECT CREATED BY A173CPUN/A172CPUN

4.1 Data List Available for Diversion or Not (SV13/SV22)

		Motion SFC is not compatible				Motion SFC is compatible				Remark	
		A17nSHCPUN		A173UHCPU		A172SHCPUN		A173UHCPU			
		SV13	SV22	SV13	SV22	SV13	SV22	SV13	SV22		
System setting	System setting data					△				Note-1	
	High speed reading data					○					
	Basic setting data					×				Note-2	
Servo data setting	Axis data	Fixed parameter					△				Note-3
		Home position return data					○				
		JOG operation data					○				
		Servo parameter					△				Note-3
	Parameter block					○					
	Limit output data					×				Note-4	
Servo program		△		○		△		○		Note-5, Note-6	
Motion SFC program	Motion SFC parameter					○					
	Motion SFC program					△		○		Note-5	
	Operation control program					△		○		Note-5	
	Transition program					△		○		Note-5	
	Conversion data					△				Note-8	
	Automatic numbering setting					○					
Mechanical system program	Mechanical edit data			△		○		△		Note-5, Note-7	
	Mechanical conversion data			△		△		△		Note-8	
	Cam conversion data			○		○		○			
	Real mode axis information			○		○		○			
Cam data				○		○		○			
Device memory		○ (SW3RNC-GSVE only)									
Backup data						×				Note-8	
Communication setting						×				Note-8	

- : Can be diverted
- △: Data must be revised
- ×: Must be set again

(Note-1) System setting data

- Motion dedicated module of slot 0 to 1
Motion dedicated module cannot be attached to slot 0 to 1 in Q17nDSCPU. Move it slot 3 or later.
- Pulse/synchronous encoder I/F module A172SENC
A172SENC module is converted to Q172DLX. Manual pulse/synchronous encoder setting are deleted.
Set Q172DEX, Q172DLX, or Q173DPX if necessary.
- Limit output module A1SY42 (when Motion SFC is not compatible with OS)
Limit output module A1SY42 is not diverted.
- Axis No. setting of external input signal module
Axis No. setting of external input signal module in Q17nDSCPU is moved to servo external signal parameter in servo data.
- Servo amplifier setting
The servo amplifier is converted to MR-J4-B when SSCNET III/H is selected, or converted to MR-J3-B when SSCNET III is selected.
Others besides servo amplifier (inverter etc.) are deleted.

(Note-2) Basic setting data

It is necessary to set Multiple CPU in QDS-Motion. Set according to system.

(Note-3) Fixed parameter, servo parameter (servo amplifier besides MR-J2S)

Fixed parameter (Number of Pulses/Rev. and Travel Value/Rev.) is not converted. Servo parameter is initialized.

Revise parameter with servo amplifier after changing.

(Note-4) Limit output data (when Motion SFC is not compatible with OS)

Data is deleted because of incompatibility. Revise the data.

(Note-5) Servo program, Motion SFC program, mechanical system program

- Motion dedicated device

Assignment of Motion dedicated device is different between A17nSHCPUN/A173UHCPU and QDS-Motion.

Change Motion dedicated device.

(Note-6) Servo program

- Word points of indirect device

There are changes of word points between A17nSHCPUN/A173UHCPU and QDS-Motion.

Execute conversion check and revise if necessary.

(Note-7) Mechanical system program

- Unit setting of output axis

Unit settings of fixed parameter and output axis are set respectively in A-Motion, but fixed parameter is set only in Q17nDSCPU. Revise the unit settings when unit settings of fixed parameter and output axis are different.

(Note-8) Conversion data, setting data

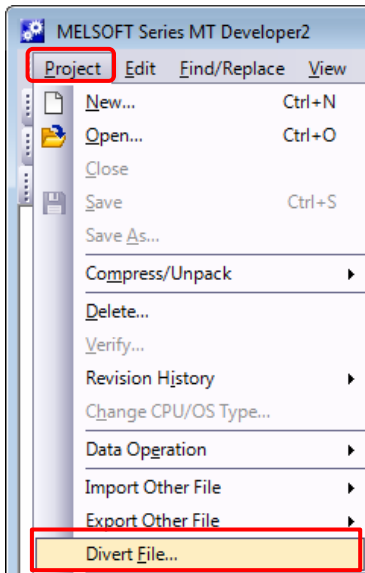
It cannot be diverted because CPU is different. Convert/set the data again.

4.2 Program Diversion Procedure in Motion CPU Side

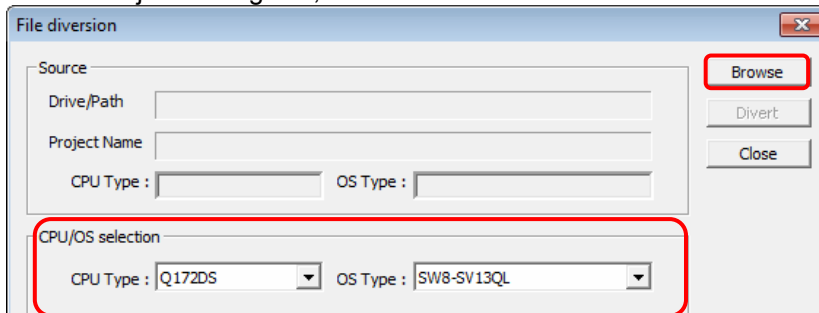
4.2.1 Diversion procedure using MT Developer2

The following shows an example of procedures for replacing an A-Motion CPU side project with a QDS-Motion CPU project using MT Developer2. Always backup the project before the program replacement.

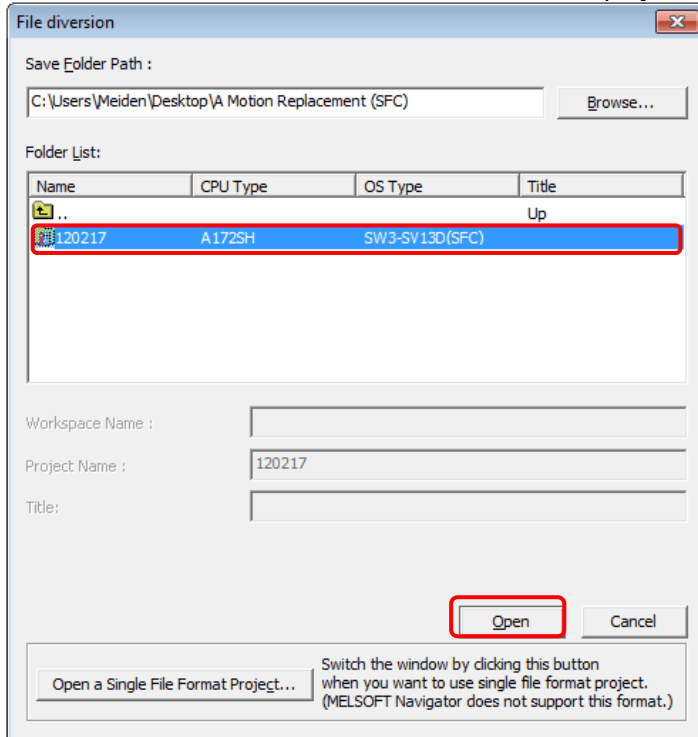
- 1) Start MT Developer2, and select "Divert File" --> "Diversion of Other Format Project" from the "Project" tab.



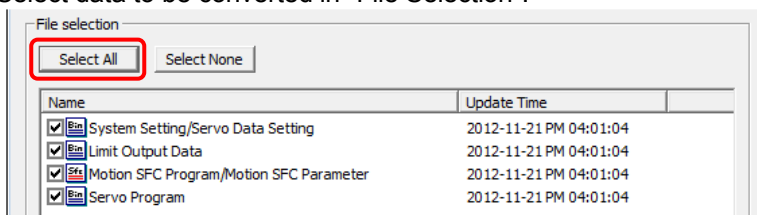
- 2) Specify the CPU type, OS type, and operation method after the replacement in the "Diversion of Other Format Project" dialog box, and select "Browse".



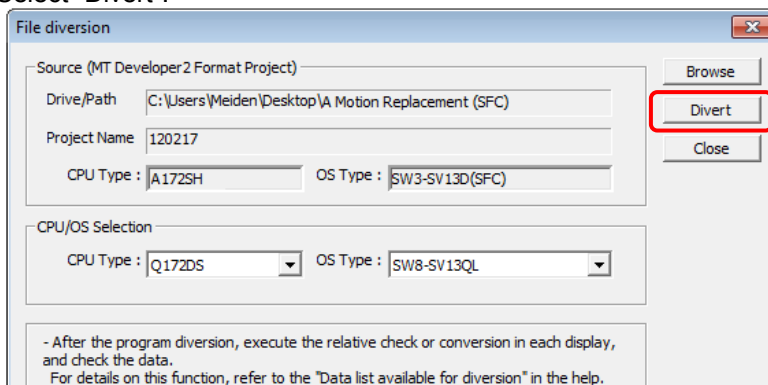
3) Select "Browse" in Save Folder Path and the source project from "Folder List", and click "Open".



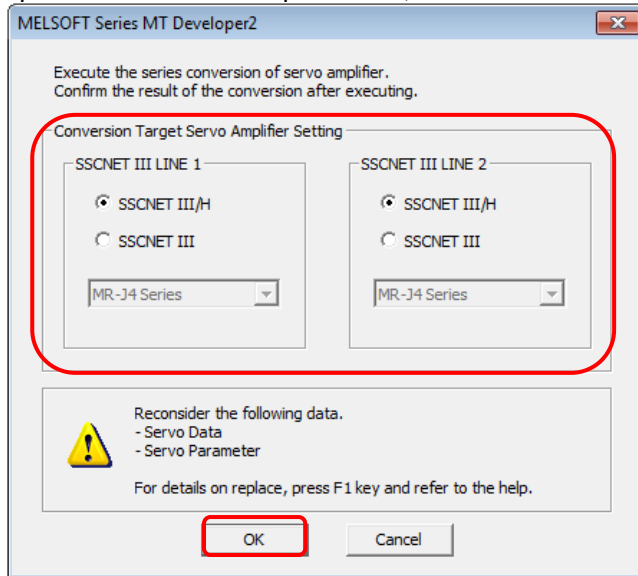
4) Select data to be converted in "File Selection".



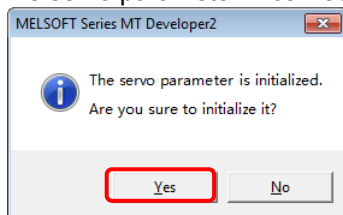
5) Select "Divert".



- 6) Convert the series of the servo amplifier. Select the servo amplifier series and servo system network specification after the replacement, and select "OK".

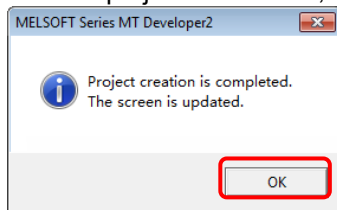


- 7) The servo parameter initialization dialog box appears. To initialize the servo parameters, select "Yes".

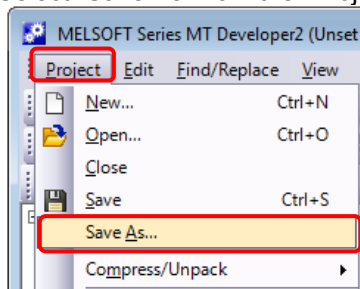


- 8) The conversion of the project is completed. Select "OK".

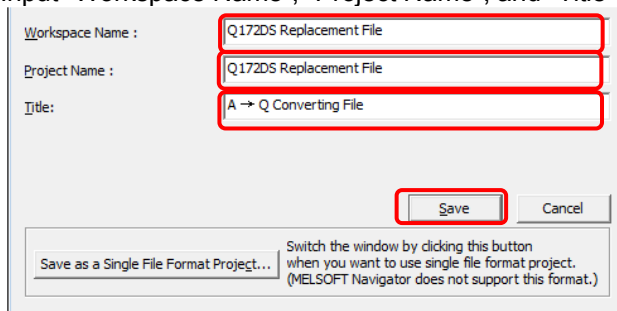
After the project conversion, make the cross comparison or check the data on each screen.



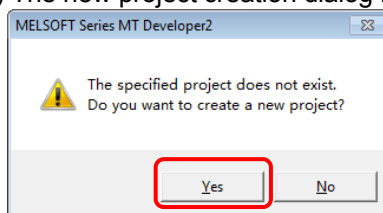
- 9) Select "Save As" from the "Project" tab to save the project after the conversion.



10) Input "Workspace Name", "Project Name", and "Title", and select "Save".



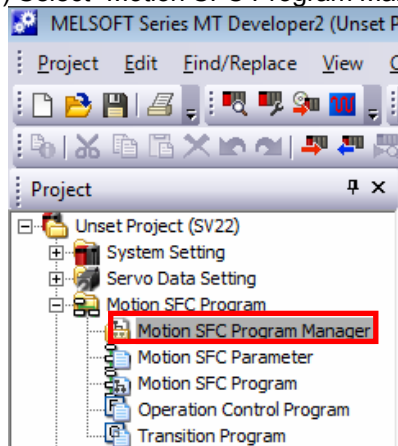
11) The new project creation dialog box appears. Select "Yes".



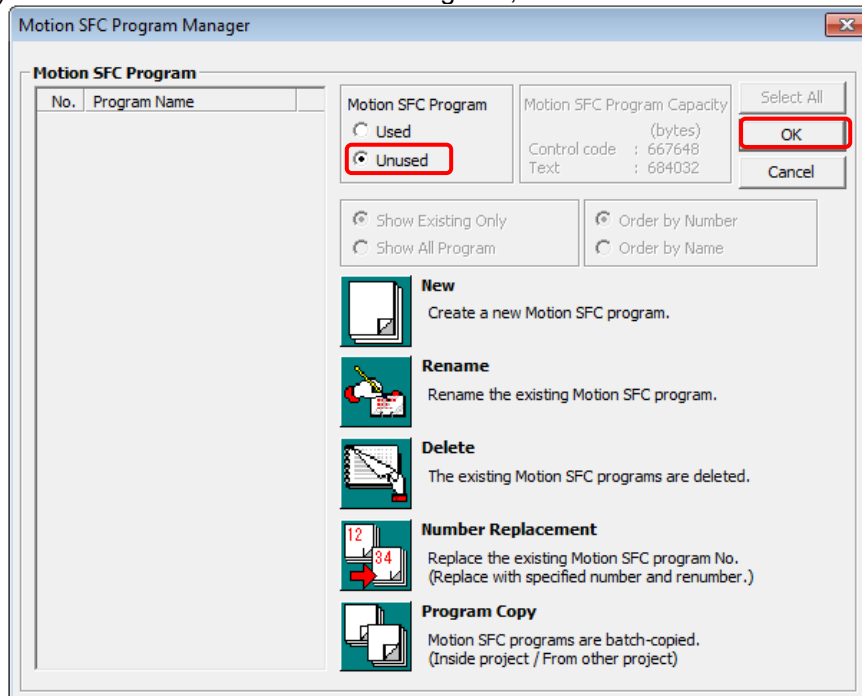
4.2.2 Without using SFC

When no SFC program is used in the A-Motion CPU side program (Diversion source) and servo parameters other than SFC programs are diverted, perform the following procedure after the operation of 11).

1) Select "Motion SFC Program Manager".



2) Select "Unused" for "Motion SFC Program", and select "OK".



About the file converted by MT Woks2, refer to "2.4.1 Data list available for diversion or not (SV13/SV22)", and then set the data which can not be diverted if necessary. About the setting of Multiple CPU parameter, refer to "2.3 Differences between Q173DSCPU/Q172DSCPU and A173UHCPU/A172SHCPUN/A171SHCPUN", "QCPU User's Manual (Multiple CPU System) Model Name: SH-080475", "Programming Manual (COMMON) [compatible with Q173D(S)/Q172D(S)] Model Name: 1XB921" and then set.

4.2.3 Precautions for diverting cam data

To edit cam data, read the data directly using "Read Other Type Cam Data".

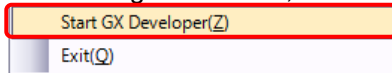
4.3 Program Diversion Procedure in PLC CPU Side

4.3.1 Conversion procedure of a sequence project for QnUD(E)(H)CPU using GX Works2/ GX Developer

The following describes an example of the procedure for replacing a sequence project using GX Developer. Always backup the project before the replacement.

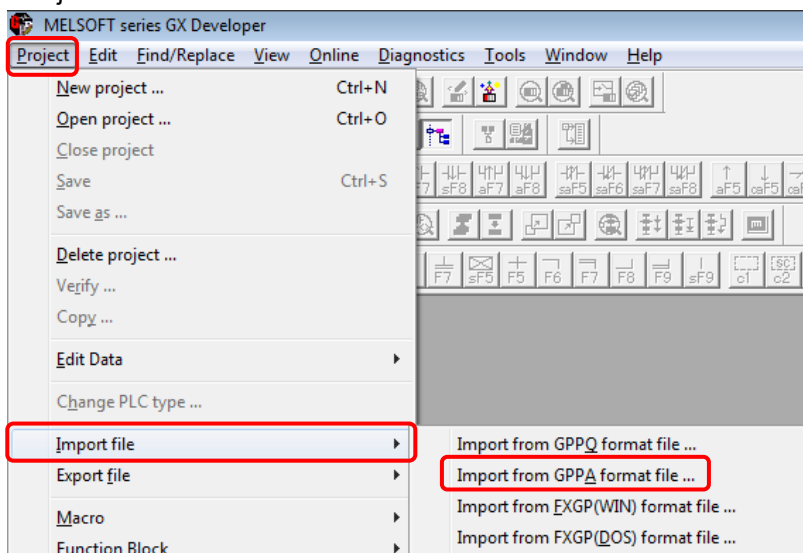
(1) Conversion of sequence program created by SW3RNC-GSVE/SW2□-GSVE

1) After starting GX Works2, select "Start GX Developer" from the "Project" tab.



2) The following shows the conversion of a sequence program created by SW3RNC-GSV/SW2□-GSV (GPPA file format).

After GX Developer is started, select "Import file" --> "Import from GPPA format file" from the "Project" tab.



Caution 1: Storage location of an execution file

The execution file in the GPPA format is usually stored in the following folder.

- Folder structure

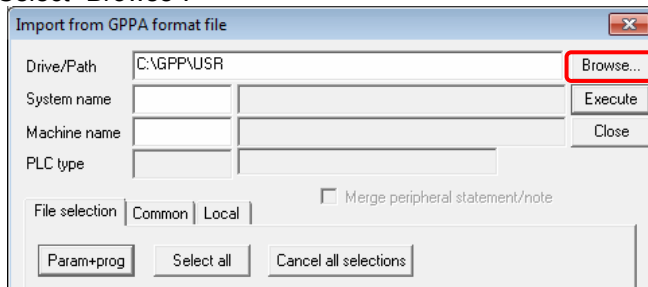
"C drive (route drive)" --> "GPP" --> "USR" --> "System name" --> "Machine name (folder which includes the gppa.cnf file)"

Caution 2: Name of diversion source project

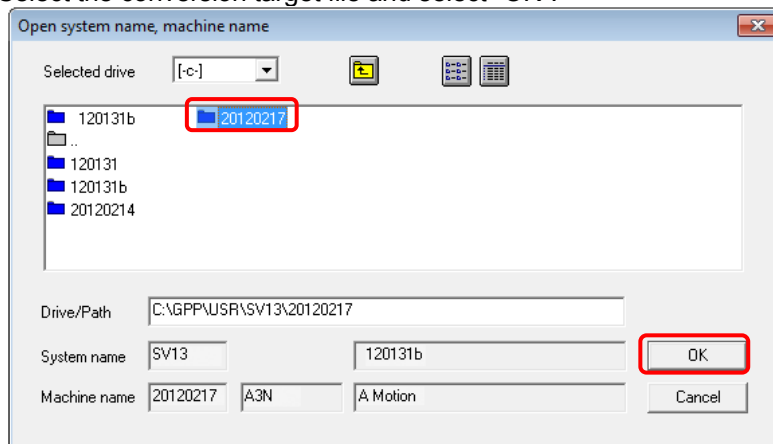
When name of diversion source project exceeds 8 characters, it can not be read.

Change the name so that the number of characters is within the limit and execute the conversion operation.

3) Select "Browse".

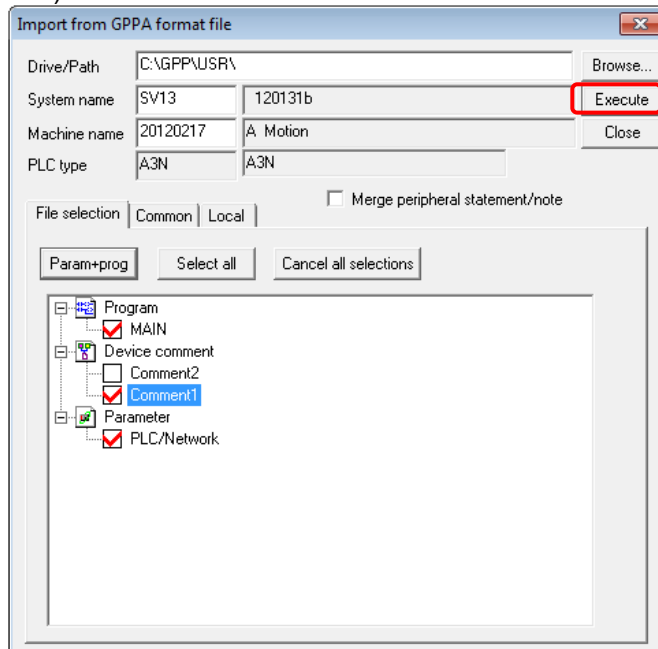


4) Select the conversion target file and select "OK".

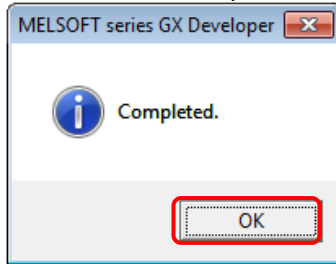


5) Check the conversion targets (Program/Device comment/Parameter), and select "Execute".

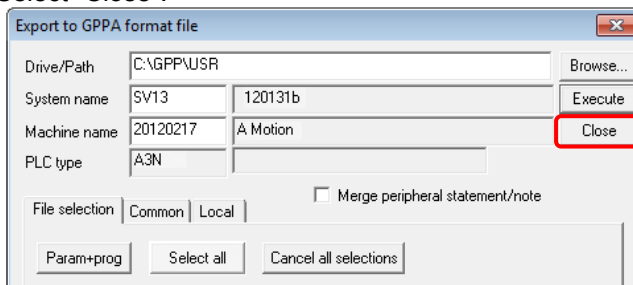
Note) Either "Comment 1" or "Comment 2" will be selected for device comment.



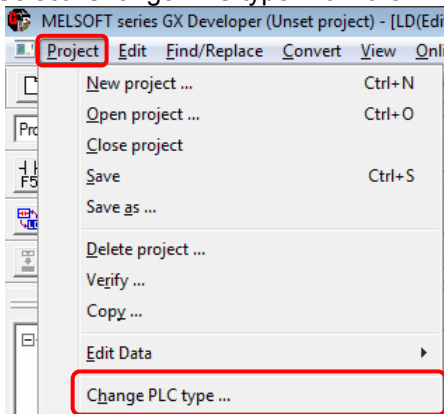
6) The conversion completion dialog box appears. Select "OK".



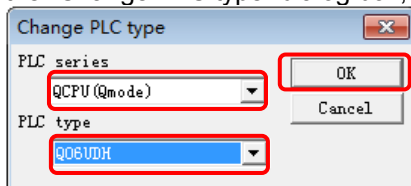
7) Select "Close".



8) Select "Change PLC type" from the "Project" tab in GX Developer.



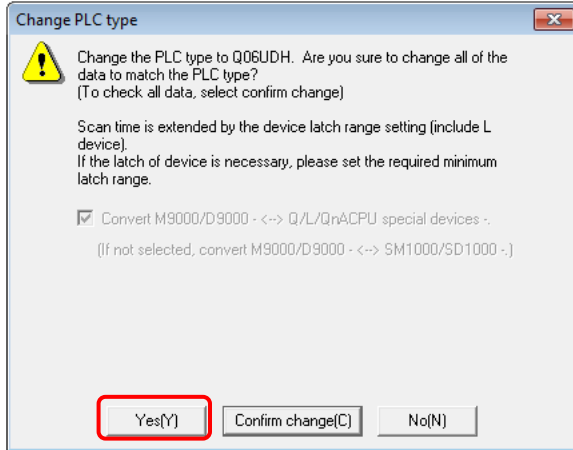
9) Specify the PLC series (QCPU(Qmode)) and PLC type (QnUD(E)(H)CPU) after the replacement in the "Change PLC type" dialog box, and select "OK".



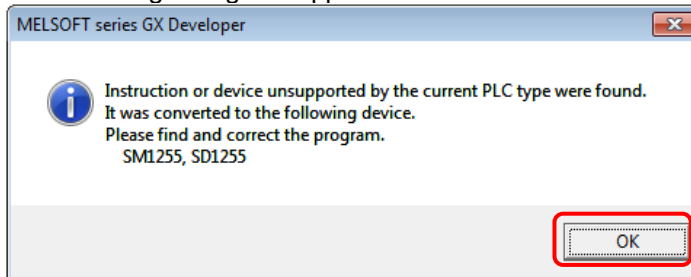
10) The "Change PLC type" dialog box appears. Select "Yes".

Note) In this replacement handbook, "Yes" is selected because the changes will be checked later by using a support tool.

When the supporting tool is not used, select "Confirm change".

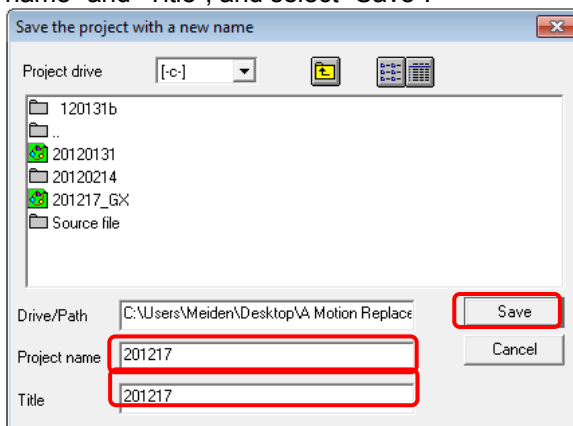


11) The following dialog box appears. Select "OK".

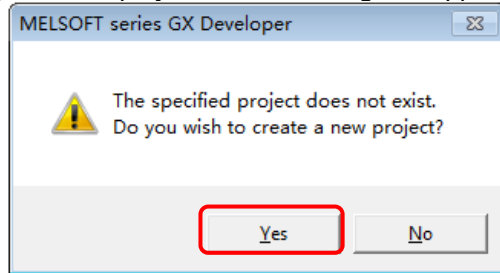


Some devices cannot be replaced properly and are forcibly converted to "SM1255" or "SD1255". Refer to the explanation about the usage of the A/QnA->Q conversion support tool described later and replace those devices with appropriate ones.

12) When "Save as" is selected from the "Project" tab, the following dialog box appears. Input "Project name" and "Title", and select "Save".



13) The new project creation dialog box appears. Select "Yes".



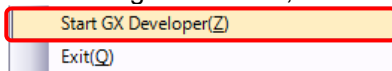
Although the sequence program has been converted following this procedure, it may not be operated correctly.

Be sure to refer to the manual after Section 5 for program correction.

(2) Conversion of sequence program for A-Motion created by GX Developer

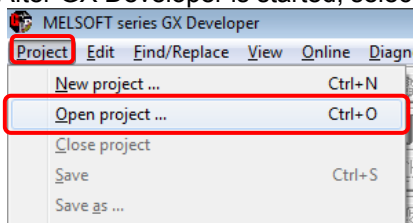
The following describes an example of the procedure for replacing a sequence project using GX Developer. Always backup the project before the replacement.

1) After starting GX Works2, select "Start GX Developer" from the "Project" tab.

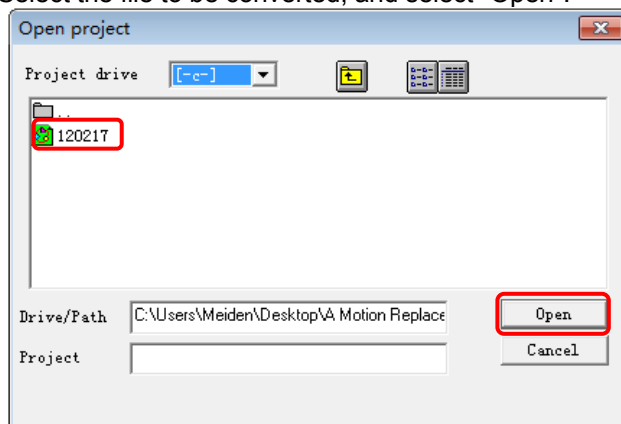


2) The following shows the conversion of a sequence program for A-Motion created by GX Developer (GPPW file format).

3) After GX Developer is started, select "Open project" from the "Project" tab.



4) Select the file to be converted, and select "Open".



For the following conversion operations, refer to (1) **SW3RNC-GSVE/SW2□-GSVE sequence program conversion procedure after 8).**

5. USING A/QnA->Q CONVERSION SUPPORT TOOL IN SEQUENCE PROGRAM

To confirm the converted content of the sequence program, use "A/QnA->Q conversion support tool". Please download and install the A/QnA->Q conversion support tool from Mitsubishi Electric FA Site. For details, refer to A/QnA->Q conversion support tool guidebook in the same page.

To download the tool, access the Mitsubishi Electric FA Site (<http://www.mitsubishielectric.co.jp/fa/index.html>) and as follows.

<http://www.mitsubishielectric.co.jp/fa/download/software/search.do?mode=software&kisyu=%2Fplca&lang=2&select=0&softid=0>

5.1 Preparation for Using Support Tool

To use the support tool, prepare the following.

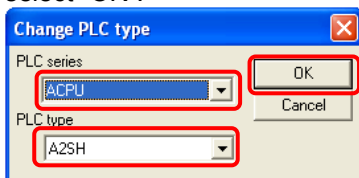
- 1) Source sequence program (for compare)
- 2) Target sequence program (converted program in QnUD(E)(H)CPU)
- 3) "A/QnA->Q conversion support tool" (please get it from Mitsubishi Electric FA Site)
- 4) "A/QnA->Q conversion support tool guidebook" (please get it from Mitsubishi Electric FA Site)
- 5) GX Developer (GX Works2)

Caution

Convert 1) into a project whose CPU type is changed to A2SH or A3U and save the project using GX Developer as follows. The conversion method is same as "Section 2.4.3 Program diversion procedure in PLC CPU side"

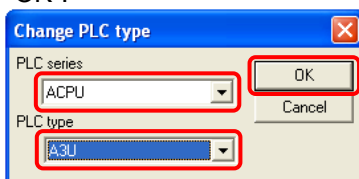
- A171SHCPUN and A172SHCPUN

Select "ACPU" for PLC series and "A2SH" for PLC type in the "Change PLC type" dialog box, and select "OK".

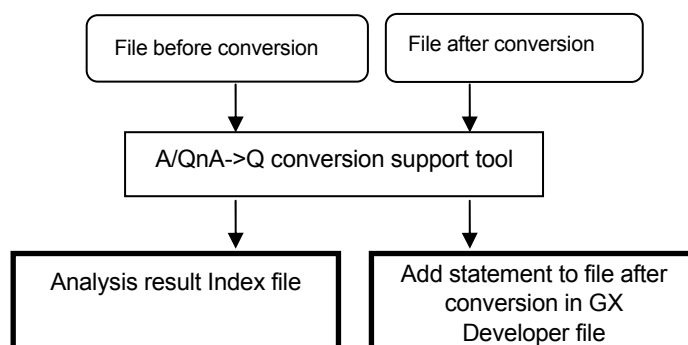


- A173UHCPU

Select "ACPU" for PLC series and "A3U" for PLC type in the "Change PLC type" dialog box, and select "OK".

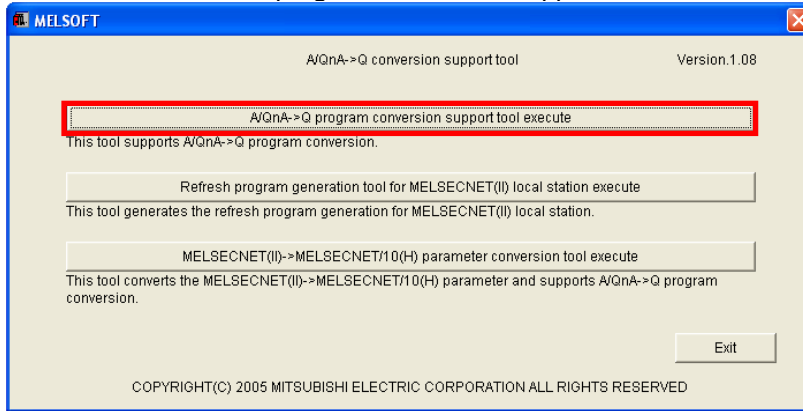


*** This operation is necessary to use A/QnA->Q program conversion support tool.**

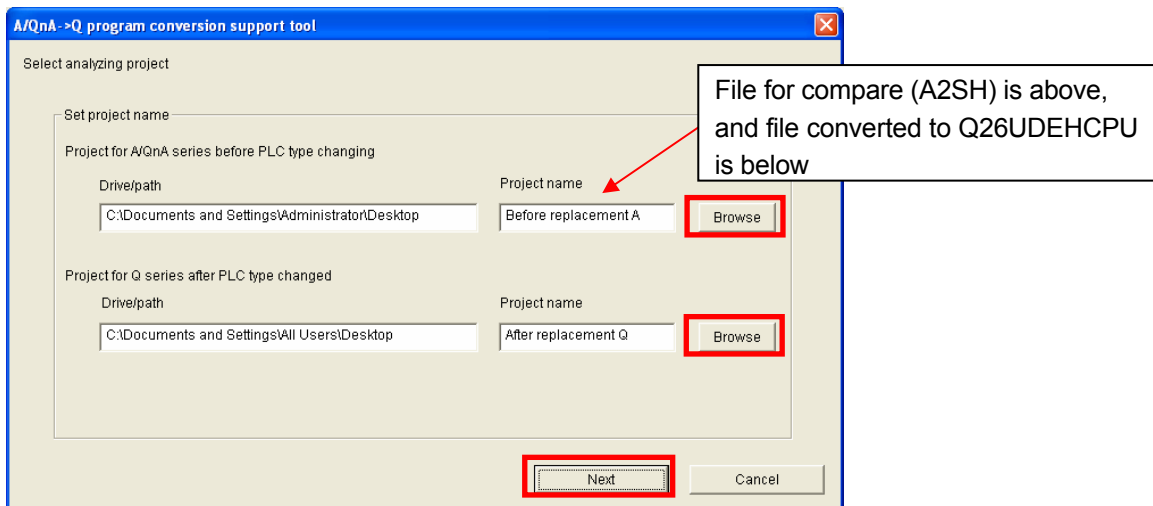


5.2 Using Procedure of Support Tool

- 1) Click "Start" --> "MELSOFT Application" --> "AQConvSupport" to start the support tool.
Then select "A/QnA->Q program conversion support tool execute".



- 2) The "A/QnA->Q program conversion support tool" dialog box appears. Specify a source file in the GPPA format, A2SH file, or A3U file for "Project for A/QnA series before PLC type changing". Specify the file converted to the QnUD(E)(H)CPU type file for "Project for Q series after PLC type changed", and select "Next".



Then execute the operation according to A/QnA->Q conversion support tool guidebook.

3) Created file

Once the operation is completed by following the description in A/QnA->Q Conversion Support Tool Operation Guide, an analysis result Index file (HTML document) and a GX Developer file in which statements of the modifications are embedded are created in the specified folder.



4) Display

• Index file of analysis result

The following shows an example of the execution results of the analysis result index file.

A/QnA→Q conversion support tool Version.1.08

Analyzing result

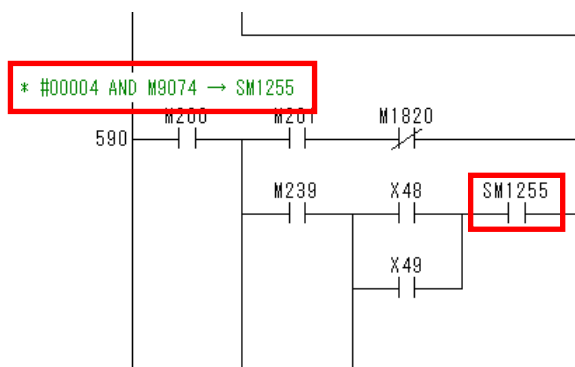
Project for A/QnA series before PLC type changing	C:\Documents and Settings\All Users\Desktop\Replacement	For replacement tool (A172→A2SH)
Project for Q series after PLC type changed	C:\Documents and Settings\All Users\Desktop\Replacement	For replacement tool (A172→Q26UDEH)

	Detection number	Analyzing result display	
Main program	43	List Display	
Special M/D unconverted in PLC type change	20	Device number order	Step number order
Instruction unconverted in PLC type change	18	According to instruction name	Step number order
Program for special function module necessary to check	5	According to special function module	Step number order

• Statement is embedded in GX Developer file

The following shows an example of the execution results of the GX Developer file in which statements are embedded.

"Statement display" or "Ctrl + F7" displays the contents that need to be modified.



* In the case described above, the device M9074 has been replaced with the device SM1255. Correct the device to an appropriate one.

5.3 Sequence Program Correction in Created Embedding File

5.3.1 Correction of special relay/special register

The special relay that cannot be converted from A-Motion is converted to "SM1255", and the special register that cannot be converted from A-Motion is converted to "SD1255". Modify the devices according to a between-the-lines statement.

5.3.2 Correction of motion dedicated instructions

A-Motion-dedicated instructions (SVST, CHGA, CHGV, CHGT, SFCS, ITP) are converted to "SM1255". Modify the devices according to a between-the-lines statement.

5.3.3 Others

Confirm the details of user's manual and programming manual in each CPU module and then correct. Or, for use method of GX Developer etc., refer to each product manual.

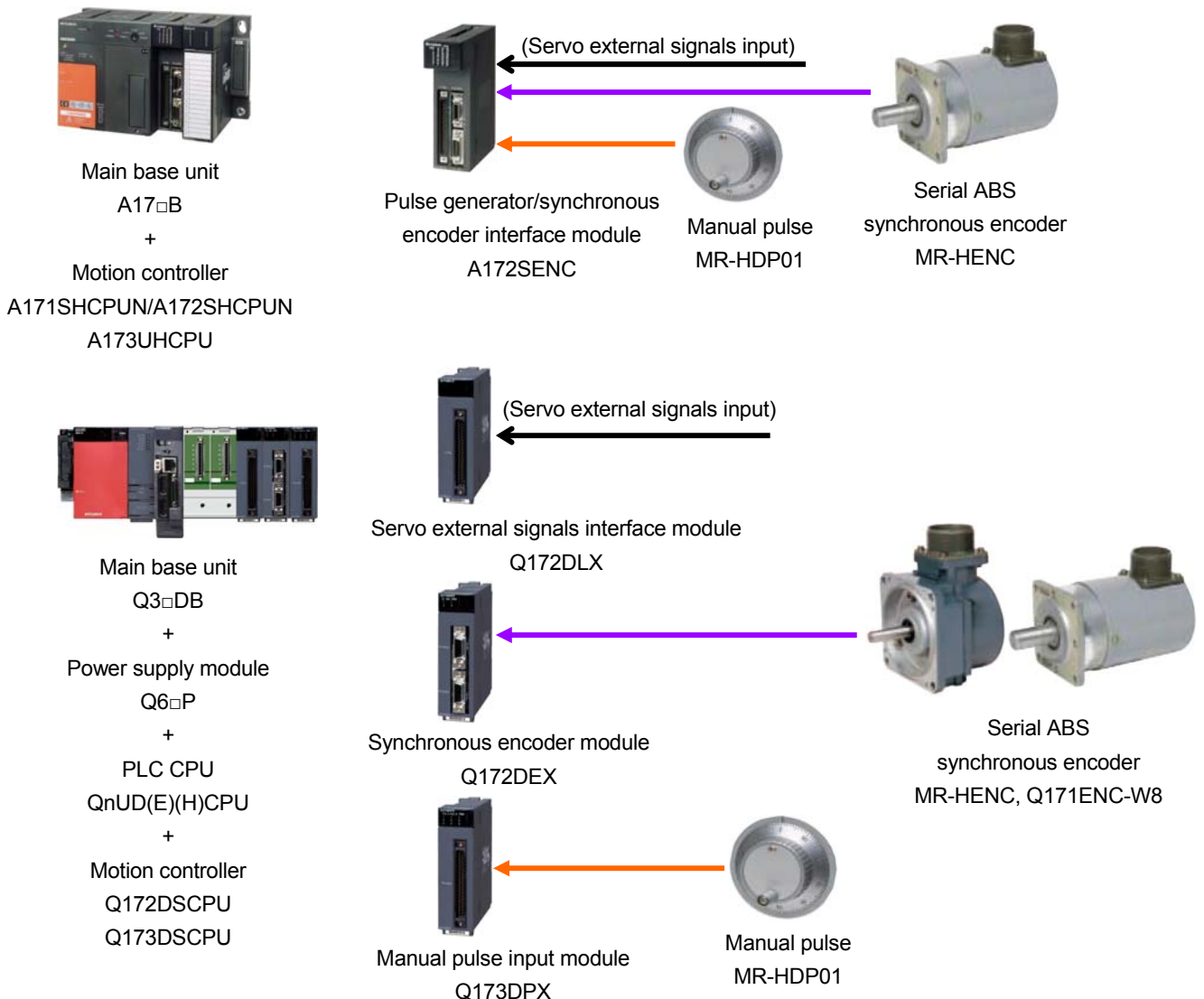
6. POINTS AND PRECAUTIONS OF REPLACEMENT

6.1 Difference of Motion CPU Configuration

6.1.1 System configuration

The differences between basic system of A-Motion and basic system of QDS-Motion are shown in the following chart.

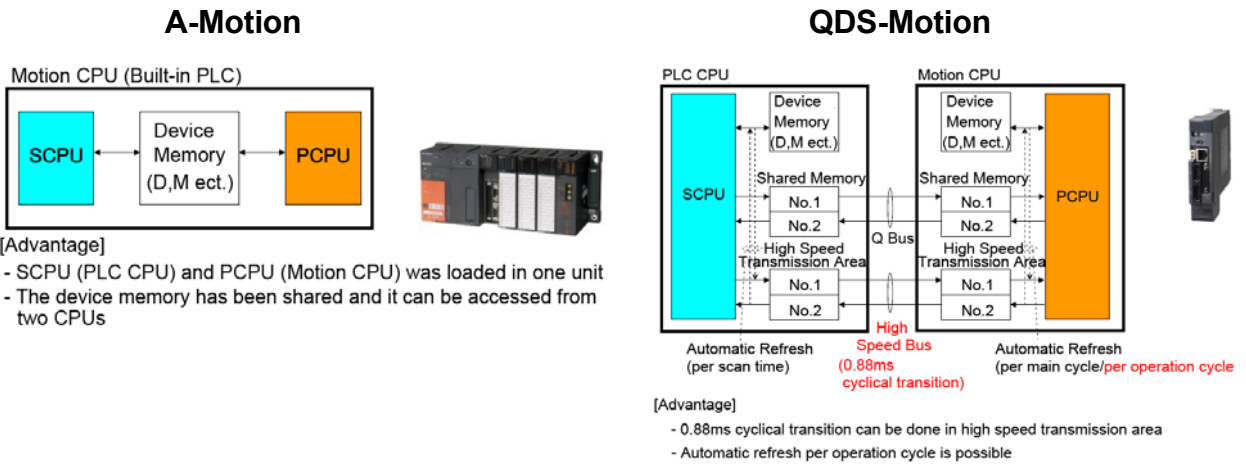
- The PLC function and the motion function are integrated in one A-motion CPU. However, in QDS-motion, they are in different CPUs.
- A-Motion is compatible with SSCNET as a servo system network, but QDS-Motion is compatible with SSCNET III or SSCNET III/H. Servo amplifiers connectable to each motion are also different.
- A motion module A172SENC (Pulse generator/synchronous encoder interface module) is replaced with a motion module Q172DLX (Servo external signal interface module), Q172DEX (Synchronous encoder interface module), or Q173DPX (Manual pulse generator interface module).
- A base unit is changed to a Q series multiple CPU high speed base unit. As a result, motion modules (Q172DLX, Q173DEX, and Q173DPX) cannot be installed in the CPU slot and Slot 0 to 2.
- For the connection between QDS-Motion and a personal computer, RS-422 and SSCNET cannot be used. Connect them with Ethernet (Direct connection to QDS-Motion), USB, RS-232, or Ethernet (Connection via PLC).



6.1.2 Shared device

In A-motion, the PLC and Motion functions are integrated in an A-motion CPU. Thus, the both function shares the memory. In QDS-Motion, a PLC CPU and a Motion CPU are divided as different modules. Thus, configuring some settings (assignment to the multiple CPU shared devices/automatic refresh setting) is required to share the memory.

For details, refer to "QCPU User's Manual (Multiple CPU System) Model Code SH-080475", "Programming Manual (COMMON) [compatible with Q173D(S)/Q172D(S)] Model Code: 1XB921".



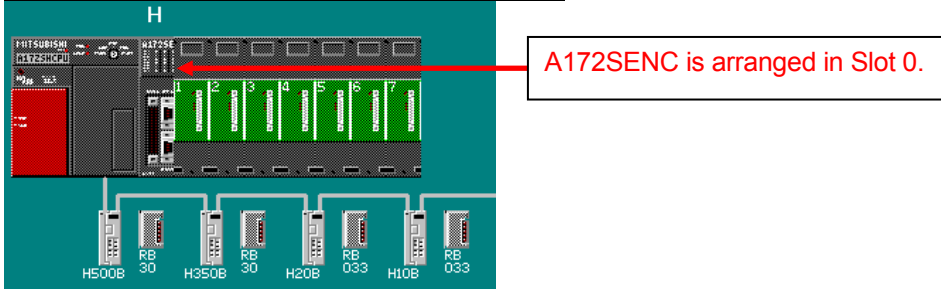
About shared device memory, after diverting the project, execute the automatic refresh setting. It is necessary to distribute the device being used by PLC CPU to the device of Motion CPU.

6.2 Precautions about Replacement

6.2.1 Slot position (system setting)

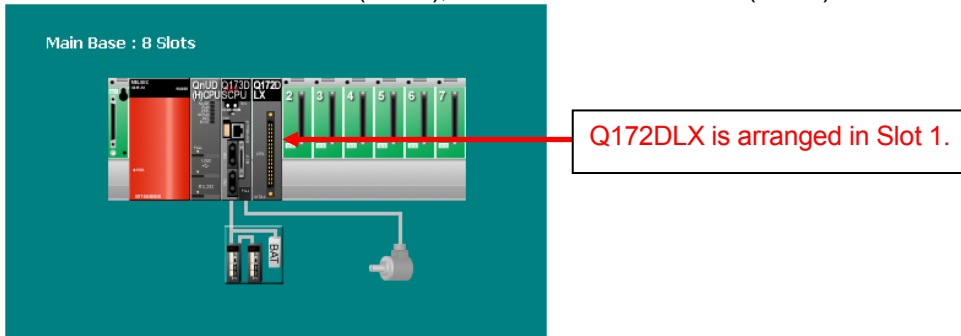
When the motion module (A172SENC) used in A-Motion is replaced with a QDS-Motion controller, the slot position for installing the motion module will change as follows. (For the QDS-Motion, motion modules (Q172DLX, Q172DEX, Q173DPX) cannot be installed on the CPU slot and the I/O slot 0 to 2.)

Example) Place A172SENC in slot 0 in A-Motion



↓ Convert A172SHCPU to Q173DSCPU

A172SHCPU to Q173DSCPU (Slot 0), A172SENC to Q172DLX (Slot 1)



↓

If executing relative check in above screen, the following error will occur.

Checking for Basic Setting/System Structure/SSCNET Structure...

Error: System Structure Main Base - Slot 1 Motion Slot Setting - Motion module cannot be set in the CPU slot of main base or I/O slot 0 to 2.

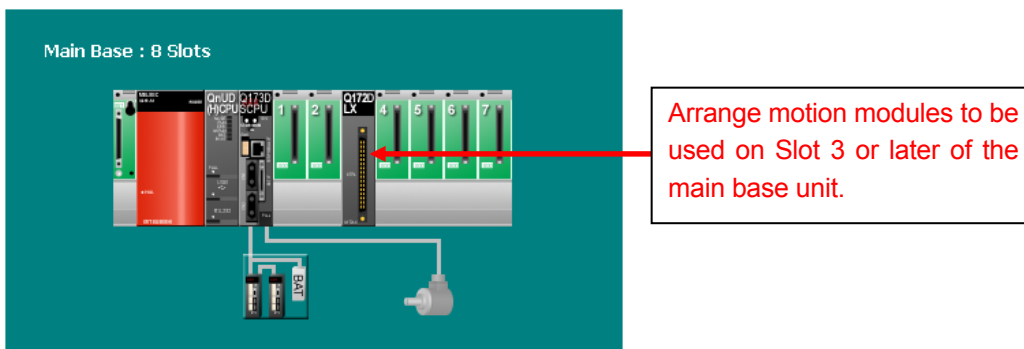
Error: System Structure Main Base - Slot 2 Motion Slot Setting - Motion module cannot be set in the CPU slot of main base or I/O slot 0 to 2.

↓

To clear errors, install motion modules (Q172DLX, Q172DEX, Q173DPX) on Slot 3 or later of the main base unit.

When an A program is converted to a Q program, A172SENC is automatically converted to Q172DLX.

When Q172DEX or Q173DPX is used with QDS-Motion, change and add modules.

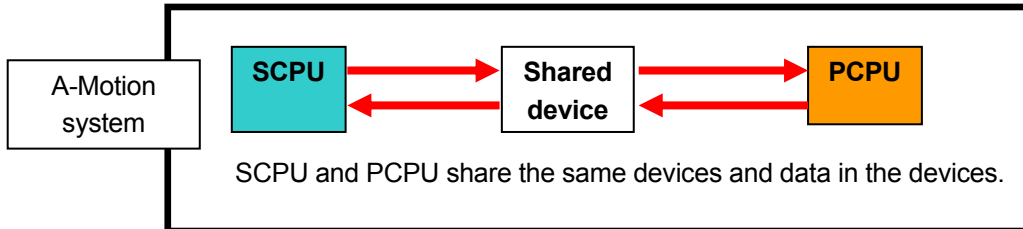


6.2.2 Communication data device between PLC CPU and Motion CPU

(1) Shared devices between PLC CPU (SCPU) and Motion CPU (PCPU)

- A-Motion

Example) Since both SCPU and PCPU share the same devices, PCPU (SCPU) can use the data that SCPU (PCPU) stored in the devices for some processing.

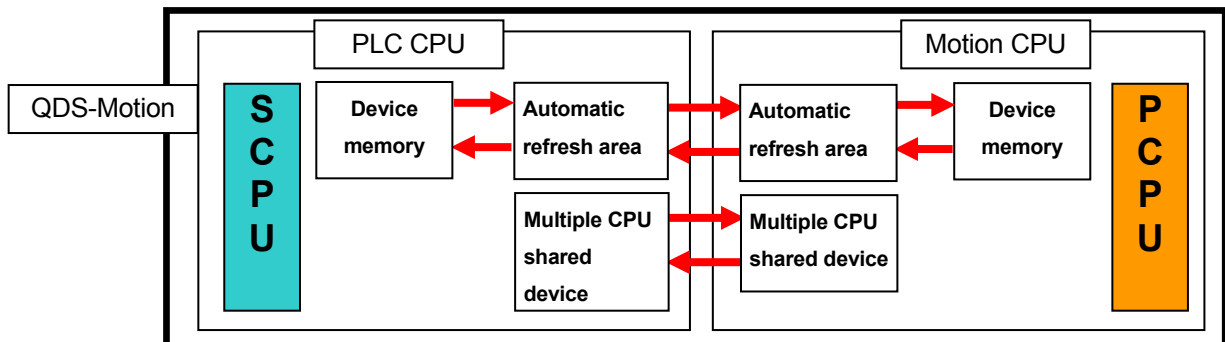


- QDS-Motion

Example)

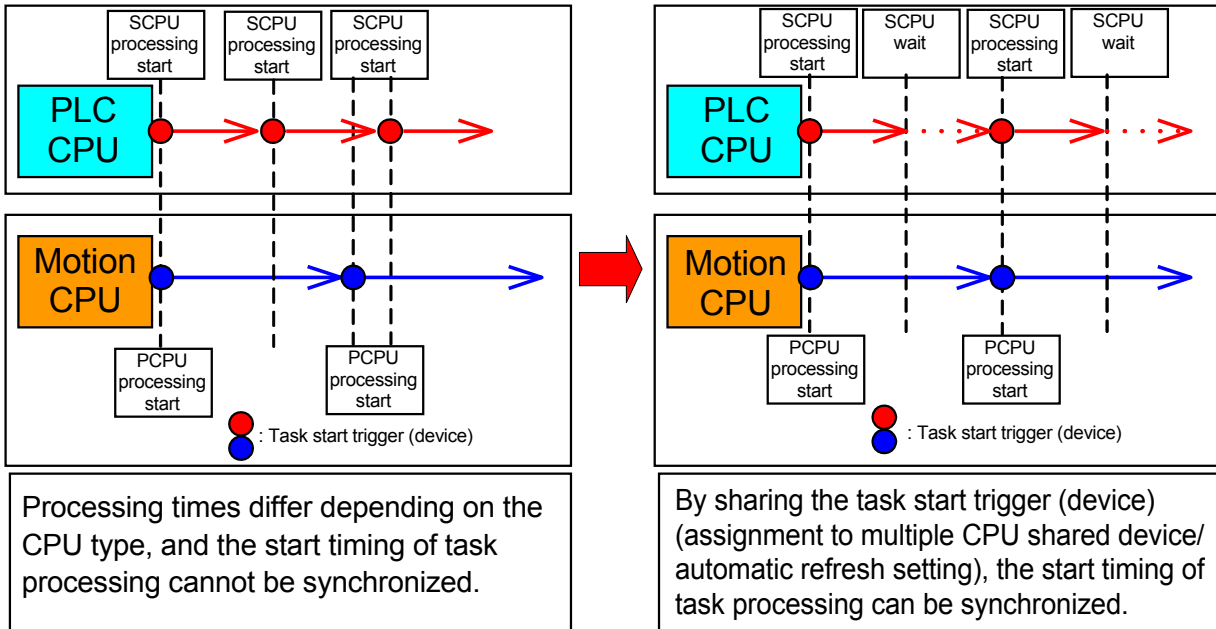
Since a PLC CPU and a Motion CPU operate as different CPUs, some settings (assignment to multiple CPU shared device/automatic refresh setting) are required to share the same devices.

By configuring these settings, both CPUs can share the same data for some processing.



(2) Obtain synchrony between SCPU and PCPU

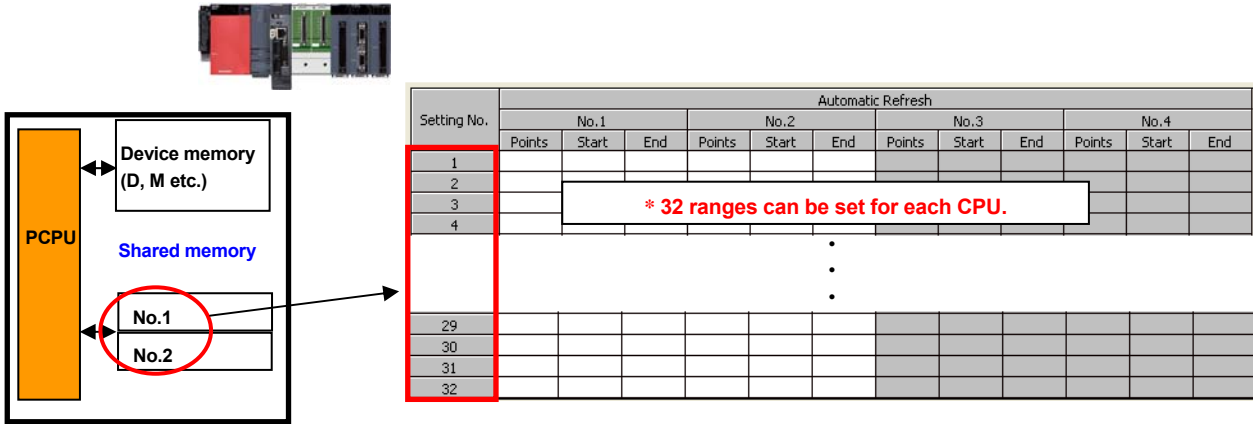
Since QDS-Motion has a PLC CPU and a Motion CPU as different modules, the task processing time differs. To synchronize the start timing of task processing, configure some settings (assignment to multiple CPU shared device/automatic refresh setting) for the task start trigger (device).



For details of (1) and (2), refer to "QCPU User's Manual (Multiple CPU System) Model code: SH-080485ENG" and "Programming Manual (COMMON) [type Q173D(S)/Q172D(S)] Model Code: 1XB928", and set common devices.

6.2.3 Block number of refresh setting and total points number restriction

In QDS-Motion, the automatic refresh function is added as a new function that A-motion does not have. Automatic refresh settings of 32 ranges (total 14K points) can be configured for each CPU.



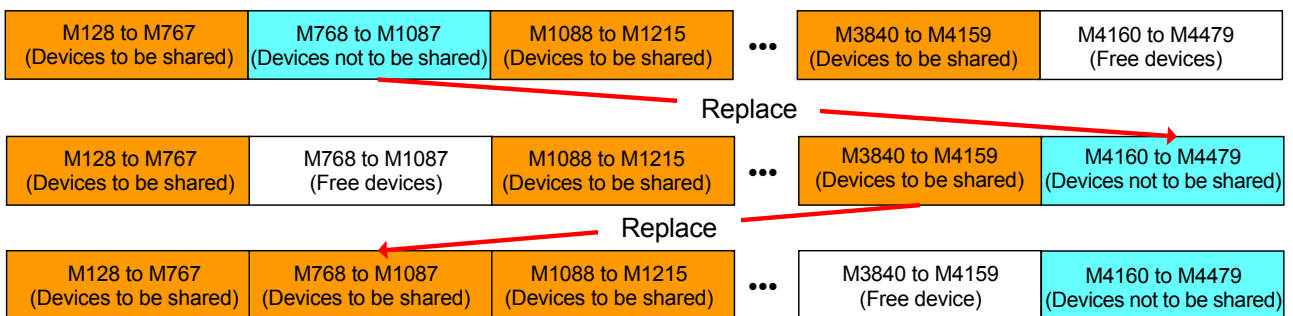
The following explains the replacement method of devices.

Example)

The following shows the replacement procedure for when devices 1) to 4) are assigned.

- 1) M128 to M767 (640 points) and M1088 to M1215 (320 points): Device ranges to be shared
- 2) M768 to M1087 (320 points): Device range not to be shared
- 3) M3840 to M4159 (320 points): Device range to be shared
- 4) M4160 to M4479 (320 points): Free device range

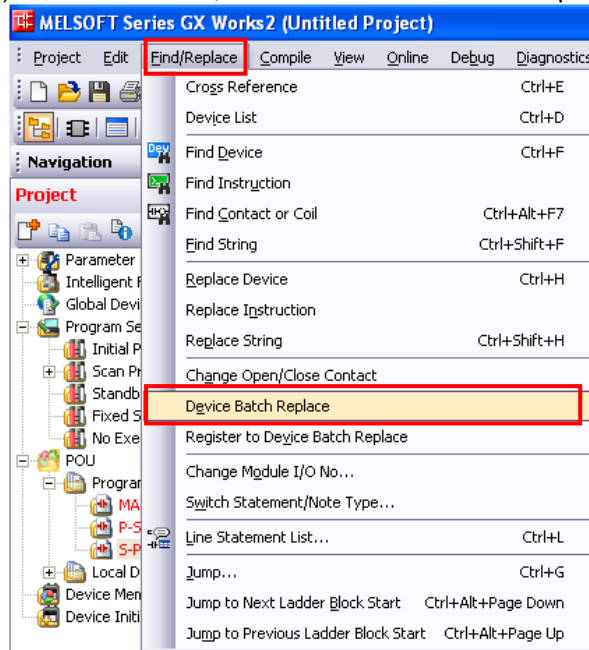
Procedure: Replace 2) devices with 4) devices. --> Replace 3) devices with 2) free devices.



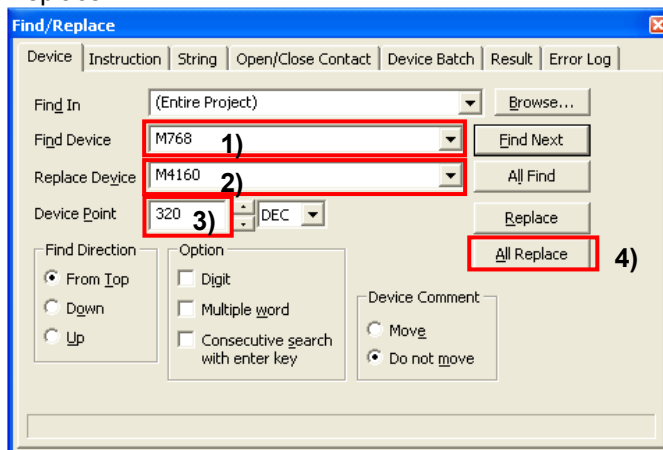
Device number batch replacement procedure

The following shows the procedure for replacing devices in a PLC side project using GX Works2. Always backup the project before the replacement of devices.

- 1) Start GX Works2, and select "Device Batch Replace" from the "Find/Replace" tab.

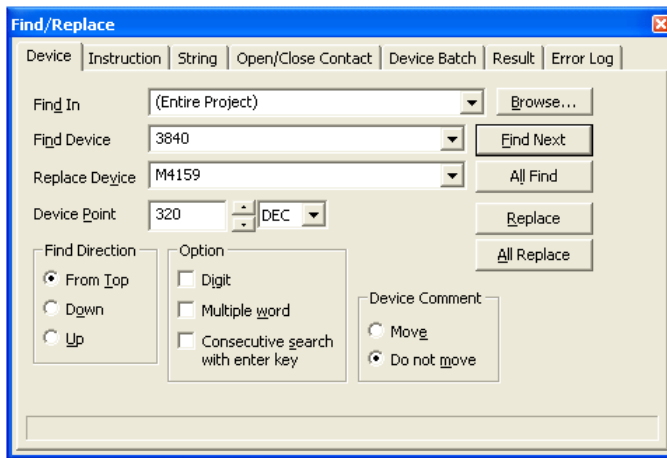


- 2) Select the "Device" tab, and input "Find Device", "Replace Device", and "Device Point". Select "All Replace".



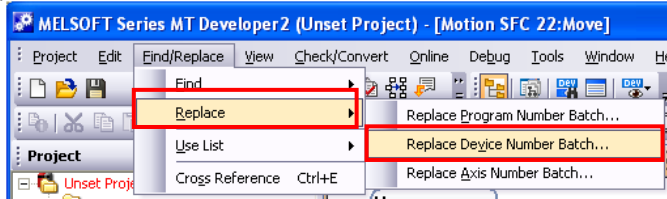
- 1) Input the start device before the replacement in Find Device.
- 2) Input the start device after the replacement in Replace Device.
- 3) Input device points to replace.

3) Replace "M3840 to M4159" with device numbers of "M768 to M1087" by the same method as 2).

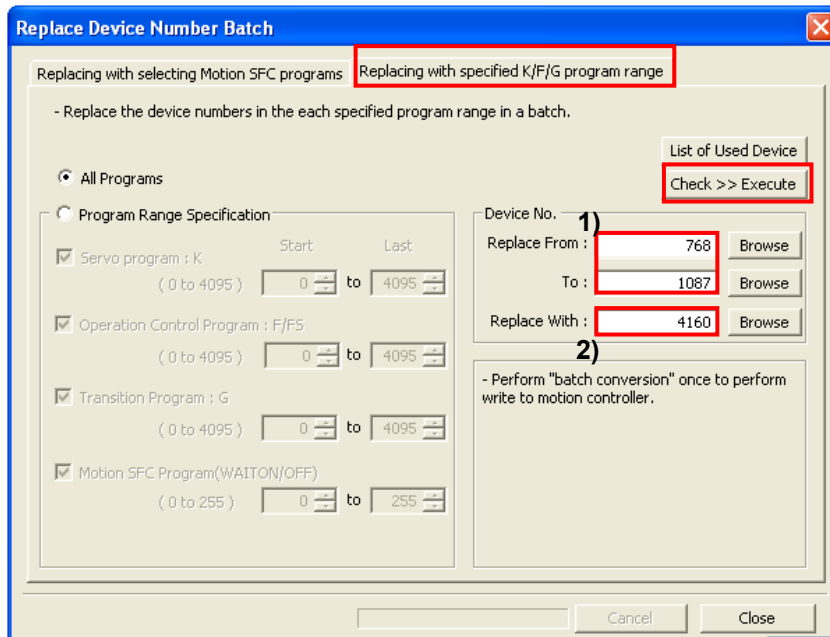


The following shows the procedure for replacing devices in a motion side project using MT Developer2. Always backup the project before the replacement of devices.

- 1) Start MT Developer2, and select "Replace Device Number Batch" from the "Find/Replace" tab.

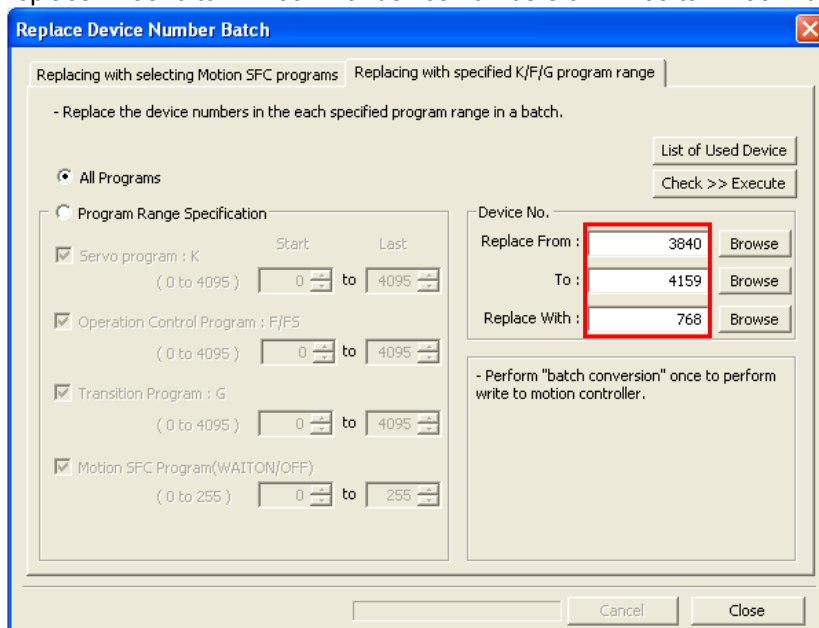


- 2) Select "Replacing with specified K/F/G program range" and input "Replace From:/To:" and "Replace With:" in "Device No.". Select "Check >> Execute".



- 1) Specify the end device from start device before conversion.
- 2) Specify start device after conversion.

- 3) Replace "M3840 to M4159" with device numbers of "M768 to M1087" by the same method as 2).



6.2.4 Timer devices and counter devices

In A-Motion, a PLC CPU and a motion PU share T (Timer device) and C (Counter device). However, after the transition to QDS-Motion, T/C cannot be referred to from the Motion CPU. Instead, when the same function is used with the QDS-Motion CPU, the TIME instruction can be used.

When the PLC CPU is synchronized with the Motion CPU using T/C of the PLC CPU, set an interlock by configuring some settings (T/C assignment to multiple CPU shared devices/automatic refresh setting).

6.2.5 Indirect designation of servo program

About indirect designation of servo program, because word length is changed from 16 bit to 32 bit by replacement, use word number should be 2 (even number).

• Indirect designation of servo program in A-Motion

[K 101]			
1 VPR			
Axis	1	D 815	PLS
Speed		D 112	PLS/sec
P.B.			1



• After the conversion from A-Motion to QDS-Motion

[K 101 : Real]			
1 VPR			
Axis	1		
-> Travel		D 816	PLS
Speed		D 112	PLS/sec
P.B.			1



• Error content and measures when execute program conversion in QDS-Motion

Error: [K101] The device No. is odd. [DSRP.] :The device No. in the item specified by 2 words is odd. [RMDY.] :Set an even number.
 Error: [K106] The device No. is odd. [DSRP.] :The device No. in the item specified by 2 words is odd. [RMDY.] :Set an even number.
 Error: [K107] The device No. is odd. [DSRP.] :The device No. in the item specified by 2 words is odd. [RMDY.] :Set an even number.



Indirect setting : Number of words used : 2 (even)
 D0 to D6191 W0000 to W1FFF #0 to #7999
 U[]G10000 to U[]G(10000+n-1)
 [] : CPU No., n : The user setting area points of the Multiple CPU high speed transmission area for each CPU.
 No.1:3E0, No.2:3E1, No.3:3E2, No.4:3E3
 (Cannot specify number of the CPU module beyond the number of multiple CPU system.)



• Change the device number to an even number and modify all the related devices.

[K 101 : Real]			
1 VPR			
Axis	1		
-> Travel		D 816	PLS
Speed		D 112	PLS/sec
P.B.			1

6.2.6 Parameter block

Since QDS-Motion's error check function is improved, errors and warnings may be displayed to the parameter to which A-Motion does not display errors and warnings. Correct the errors according to the content of the errors and warnings.

Example) A-Motion

	Block1	Block2
Interpolation Control Unit	PULSE	PULSE
Speed Limit Value	100000[PLS/s]	100000[PLS/s]
Acceleration Time	1000[ms]	500[ms]
Deceleration Time	1200[ms]	500[ms]
Rapid Stop Deceleration Time	1200[ms]	500[ms]

• After the conversion from A-Motion to QDS-Motion

Item	Block No.1	Block No.2
Parameter Block	Set the data such as the acceleration/	
Interpolation Control Unit	3:PLS	3:PLS
Speed Limit Value	100000[PLS/s]	100000[PLS/s]
Acceleration Time	1000[ms]	500[ms]
Deceleration Time	1200[ms]	500[ms]
Rapid Stop Deceleration Time	1200[ms]	1000[ms]

• Error contents and measures

Checking for Parameter Block...
Warning: Parameter Block Block No.2 Rapid Stop Deceleration Time - The rapid stop deceleration time exceeds the deceleration time. Rapid Stop Deceleration Time <= Deceleration Time
 Warning: Parameter Block Block No.6 Rapid Stop Deceleration Time - The rapid stop deceleration time exceeds the deceleration time. Rapid Stop Deceleration Time <= Deceleration Time
 Warning: Parameter Block Block No.7 Rapid Stop Deceleration Time - The rapid stop deceleration time exceeds the deceleration time. Rapid Stop Deceleration Time <= Deceleration Time

In the above case, set the sudden stop deceleration time to be equal to the deceleration time setting value (500ms or shorter).

Note that the error check becomes stricter than before the replacement as the above case.

3. REPLACEMENT PROPOSAL FROM A-MOTION TO STAND-ALONE MOTION

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1. OVERVIEW

This article explains the change content when replace the system using

A173UHCPU/A172SHCPUN/A171SHCPUN with the system using Q170MSCPU(-S1). Besides, about A173UHCPU-S1, it can be read as A173UHCPU in another way. Q170MSCPU-S1 is the capacity expansion version of Q170MSCPU. Refer to the 7th section about the main differences with Q170MSCPU.

2. EQUIPMENT CONFIGURATION, AVAILABLE SOFTWARE

Please prepare module, servo amplifier, operating system software and engineering environment according to the table in this article.

2.1 Equipment Correspondence

It is necessary to use the supported product in iQ Platform, when using Q170MSCPU(-S1).

Product	Use A173UHCPU, A17nSHCPUN		Use Q170MSCPU(-S1)	
	Model name		Model name	
Motion CPU module PLC CPU section	<ul style="list-style-type: none"> • A173UHCPU • A172SHCPUN • A171SHCPUN 		Q170MSCPU (recognized as Q03UDCPU) Q170MSCPU-S1 (recognized as Q06UDHCPU)	
Motion CPU module Motion CPU section	<ul style="list-style-type: none"> • A173UHCPU • A172SHCPUN • A171SHCPUN 		Q170MSCPU(-S1)	
Main base unit	<ul style="list-style-type: none"> • A172B • A175B • A178B(-S□) 		-	
Extension base unit	<ul style="list-style-type: none"> • A1S6□B • A168B • A6□B 		Q5□B, Q6□B	7 units (up to 64 slots) ^(Note-1)
Power supply module (when an extension base unit Q6□B is used)	-		Q61P, Q62P, Q63P, Q64PN	
Forced stop input cable	-		-> Fabricate this cable by customers.	
Connector for forced stop input cable	-		FK-MCP1.5/3-ST-3.81 (standard accessory)	
Servo external signal interface module	A171SENC		Q172DLX ^(Note-2)	Use if necessary ^(Note-2)
Manual pulse interface module	A172SENC		Q173DPX ^(Note-3)	
Serial ABS synchronous encoder	MR-HENC		Q171ENC-W8 ^(Note-4)	
Serial ABS synchronous encoder cable	MR-HSCBL□M (between A-Motion and MR-HENC)		Q170ENC CBL□M-A ^(Note-4) (between MR-J4-□B-RJ and Q171ENC-W8)	
Battery	For CPU module	Connect A6BAT to the CPU module	Connect Q6BAT to the CPU module	
	For synchronous encoder		Connect MR-BAT6V1SET to MR-J4-□B-RJ ^(Note-4)	
Manual pulse generator	MR-HDP01		<-- (same as left)	
SSCNET(III) cable	<ul style="list-style-type: none"> • MR-HBUS□M • MR-J2HBUS□M-A (cable for SSCNET)		<ul style="list-style-type: none"> • MR-J3BUS□M • MR-J3BUS□M-A • MR-J3BUS□M-B (cable for SSCNET III)	

(Note-1): Use 8 slots as free slots of the main base unit.

(Note-2): Motion CPU built-in I/F (input 4 points) can be used.

(Note-3): Manual pulse/INC synchronous encoder (1 module) in Motion CPU built-in I/F can be used.

(Note-4): When a serial ABS synchronous encoder is used with Q170MSCPU(-S1), connect the encoder to the servo amplifier MR-J4-□B-RJ.

<Precautions>

- Q170MSCPU(-S1) is not compatible with teaching units.

2.2 Servo Amplifier Correspondence

The applicable servo system network is changed from SSCNET to SSCNET III or SSCNET III/H. Use servo amplifiers compatible with SSCNET III or SSCNET III/H. Select a servo motor that can be connected with an SSCNET III or SSCNET III/H-compatible servo amplifier.

<Amplifier correspondence>

Use A17nSHCPU/A173UHCPU			-->	Use Q17nDSCPU		
Product		Model name		Product		Model name
Servo amplifier	MR-H series	MR-H-□BN	Servo amplifier	MR-J3 series	• MR-J3(W)-□B(S)	
	MR-J2S series	MR-J2S-□B		MR-J4 series	• MR-J4(W□)-□B * Operates in the MR-J3 compatibility mode when mixed with MR-J3.	
	MR-J2 series	MR-J2-□B				
	MR-J2-Jr series	MR-J2-03B5				

<Specification compare of servo system network>

Item		SSCNET (A-Motion)	-->	SSCNET III	SSCNET III/H
Communication media		Metal cable		Optical fiber cable	
Communication speed		5.6Mbps	50Mbps		150Mbps
Communication cycle	Sending	3.55ms	0.44ms/0.88ms	0.22ms/0.44ms/0.88ms	
	Receiving	3.55ms	0.44ms/0.88ms	0.22ms/0.44ms/0.88ms	
Maximum number of control axes per system		8 axes/system	16 axes/system		
Transmission distance		Overall length is 30m	[Standard cord for inside panel/Standard cable for outside panel] Up to 20m between stations Maximum overall length is 320m (20m x 16 axes)		
			[Long-distance cable] Up to 50m between stations Maximum overall length is 800m (50m x 16 axes)	[Long-distance cable] Up to 100m between stations Maximum overall length is 1600m (100m x 16 axes)	

For the communication with servo amplifiers, "SSCNET III" or "SSCNET III/H" must be set for each system in the SSCNET setting of the system setting.

When "SSCNET III/H" is set, MR-J4(W)-□B can be used. When "SSCNET III" is set, MR-J3(W)-□B can be used.

When MR-J4(W) (MR-J3 compatibility mode compatible product) is connected to the system where "SSCNET III" is set, the servo amplifier operates in the MR-J3 compatibility mode (SSCNET III). However, if the MR-J4(W) that was once connected to "SSCNET III/H" is connected to "SSCNET III", an alarm may occur. For details, refer to MR-J4 SERVO AMPLIFIER INSTRUCTION MANUAL.

2.3 Operating System Software Correspondence

Use operating system for Q170MSCPU(-S1).

The latest version of SV22 has been installed in Q170MSCPU(-S1) with shipment.

Download the latest version of operating system besides SV22 from Mitsubishi Electric FA Site for use.

Application	Use A17nSHCPUN/A173UHCPU		Use Q170MSCPU(-S1)		
	Model name		Model name		
For conveyor assembly (SV13)	For A173UHCPU	SW2SRX-SV13B	-->	For Q170MSCPU(-S1)	SW8DNC-SV13QN
		SW2NX-SV13B			
		SW3RN-SV13B			
	For A172SHCPUN	SW0SRX-SV13D			
		SW0NX-SV13D			
		SW3RN-SV13D			
For A171SHCPUN	SW2SRX-SV13G				
	SW0NX-SV13G				
For automatic machinery (SV22)	For A173UHCPU	SW2SRX-SV22A	-->	For Q170MSCPU(-S1)	SW8DNC-SV22QN
		SW2NX-SV22A			
		SW3RN-SV22A			
	For A172SHCPUN	SW0SRX-SV22C			
		SW0NX-SV22C			
		SW3RN-SV22C			
For A171SHCPUN	SW0SRX-SV22F				
	SW0NX-SV22F				

2.4 Engineering Environment

The following shows the engineering environment supported in Q170MSCPU(-S1).

For the following purchase software, the latest version of which can download from Mitsubishi Electric FA Site and update.

Product	Model name	Available version	Remark
MELSOFT MT Works2	SW1DNC-MTW2-□	Ver.1.56J or later	
MR Configurator2 ^(Note-1) ^(Note-2)	SW1DNC-MRC2-□	Ver.1.18U or later	
MELSOFT GX Works2 ^(Note-3)	SW1DNC-GXW2-□	Ver.1.77F or later	Execute the installation of GX Developer when installing GX Works2.

(Note-1): MR Configurator2 is bundled in MT Works2.

(Note-2): MR Configurator2 can be installed after downloading from Mitsubishi Electric FA Site in the personal computer in which GX Works2 or MT Works2 is installed.

(Note-3): GX Developer also can be installed together when install MELSOFT GX Works2.

In "3.4.3, Diversion procedure in PLC CPU side", GX Developer is necessary to convert sequence program.

3. DIFFERENCES BETWEEN Q170MSCPU(-S1) AND A173UHCPU/A172SHCPUN/A171SHCPUN

3.1 Differences between Q170MSCPU(-S1) and A173UHCPU/A172SHCPUN/A171SHCPUN

Differences list

Item	Q170MSCPU(-S1)	A17nSHCPUN/A173UHCPU			Points of replacement
		A171SH	A172SH	A173UH	
Peripheral I/F	<ul style="list-style-type: none"> • USB/RS-232 (Via PLC CPU) • PERIPHERAL I/F (Motion CPU manager) 	RS422/SSCNET			Communicate with peripheral by corresponding I/F.
Battery	Q6BAT is built in (3.0V)	A6BAT is built in (3.6V)			Pay attention to the using battery is different.
Forced stop input	<ul style="list-style-type: none"> • Use EMI connector of Motion CPU module • Use device specified by forced stop input setting in the system setting 	Use EMG terminal of main base unit			Always use a forced stop input cable (Please fabricate it by customers). The forced stop cannot be released without using it.
Multiple CPU high speed transmission memory for data transfer between CPU modules	Included	-			-
I/O points	8192 points	2048 points		8192 points	-
Device	Internal relays (M)	12288 points	Total point is 2048 in shared M,L,S		Total point is 8192 in shared M,L,S
	Latch relays (L)	None (M latch can be set in latchsetting)			
	Step relays (S)	-			
	Link relays (B)	8192 points	1024 points	8192 points	The devices on the left are shared in A-Motion but not shared in Stand-alone Motion. Execute automatic refresh setting if necessary. Refer to Section 3.5 for details.
	Timers (T)	-	256 points	2048 points	
	Counters (C)	-	256 points	2048 points	
	Data registers (D)	8192 points	1024 points	8192 points	
	Link registers (W)	8192 points	1024 points	8192 points	
	Annunciators (F)	2048 points	256 points	2048 points	
	File registers (R)	-	Up to 8192 points		
	Special relays (M)	-	256 points		
	Special relays (SM)	2256 points	-		
	Special registers (D)	-	256 points		
	Special registers (SD)	2256 points	-		
	Motion registers (#)	12288 points	-	8192 points (Motion SFC OS only)	-
Multiple CPU shared devices (U□\G)	Up to 14336 points ^(Note-1)	-		-	
Coasting timers(FT)	1point(888μ s)	-		-	
Motion dedicated sequence instruction	D(P).DDRD, D(P).DDWR, D(P).SFCS, D(P).SVST, D(P).CHGT, D(P).CHGT2, D(P).CVGV, D(P).CHGVS ^(Note-2) , D(P).CHGA, D(P).CHGAS ^(Note-2) , D(P).GINT	CHGT, CHGV, CHGA			Replace motion dedicated PLC instruction with D(P).*** instruction. Refer to (Q173D(S) CPU/Q172 D(S) CPU Motion controller (SV13/SV22) programming manual (Motion SFC).)
		SVST (Non Motion SFC OS only)			
		-	SFCS, ITP (Motion SFC OS only)		

(Continued)

Item		Q170MSCPU(-S1)	A17nSHCPUN/A173UHCPU			Points of replacement
			A171SH	A172SH	A173UH	
Motion module	SV13	Q172DLX, Q173DPX	A171SENC, A172SENC			Please use Q172DLX or Q173DPX for motion module in the system which used Q170MSCPU(-S1). ^(Note-3)
	SV22	Q172DLX, Q173DPX	A171SENC, A172SENC			
	Loading position	Used in extension base	Only in motion I/O slot can motion module be installed			Used in extension base. Refer to Section 3.2.1 Equipment correspondence.

(Note-1): The number of available points differs depending on the system setting.

(Note-2): Only for SV22 advanced synchronous control.

(Note-3): When a serial ABS synchronous encoder is used with Q170MSCPU(-S1), connect the encoder to the servo amplifier MR-J4-□ B-RJ.

(Continued)

Item		Q170MSCPU(-S1)	A17nSHCPUN/A173UHCPU			Points of replacement
			A171SH	A172SH	A173UH	
System setting		<ul style="list-style-type: none"> PLC section is Q03UD (when Q170MSCPU is used) or Q06UDH (when Q170MSCPU-S1 is used) Use Q5□B, Q6□B when it is extension base unit. 	<ul style="list-style-type: none"> Not corresponding to Multiple CPU Main base unit is A17□B (A172B, A175B, A178B, A178B-S1, A178B-S2, A178B-S3) 			Use the system combining with available unit.
Servo system network		SSCNET III/H, SSCNET III	SSCNET			-
Teaching unit		Unusable	Usable			-
CPU shared memory	Multiple CPU high speed transmission area	Provided	Device shared between SCPU and PCPU			Assign the device which used in PLC CPU by automatic refresh setting manually to Motion CPU device after project diversion.
Automatic refresh	Use memory	Multiple CPU high speed transmission area of CPU shared memory				
	Automatic refresh setting	Settable in 32 range				
	Multiple CPU high speed refresh function	Provided				
LED display		7-segment LED display	Each LED of RUN, ERR			-
Latch range setting	Latch (1)	Latch clear (1) of remote latch clear can clear in latch clear (1) (2)	Latch range setting is 1 setting only. Clear by L.CLR switch.			Please execute latch clear in MT Works2.
	Latch (2)	Can be cleared by latch clear (1) (2) of remote latch clear				
Clear all function		Execute by installation mode	None			-
Self diagnosis error		When the error occurs in the Motion CPU itself, set 10000 to 10999 according to the error type in the diagnosis error (SD0). Both self diagnosis error flag (SM1) and diagnosis error flag (SM0) are ON.	Even if the error of PCPU occurs, self diagnosis error does not occur.			Correct the program if necessary.
Motion error detection flag (M2039)		No matter which error occurs, M2039 is ON in Motion CPU.	-	Errors will not occur but M2039 is ON according to the classification of errors when using SFC.		Correct the program if necessary.
Latch clear		Remote operation	L.CLR switch			-
RUN/STOP		Remote operation, RUN/STOP switch	RUN/STOP switch			-
ROM write		<ul style="list-style-type: none"> Execute in RAM operation mode/ROM operation mode (installation switch operation of Motion CPU module is not necessary) Data of MT Works2 can be wrote to ROM directly 	None			-
Mode operated by ROM		Select by rotary switch	None			-
Installation mode		Select by rotary switch	Select by dip switch			-

(Continued)

Item	Q170MSCPU(-S1)	A17nSHCPUN			Points of replacement
		A171SH	A172SH	A173UH	
Mechanical system program (SV22)	Ball screw and electronic gear setting of rotary table can be automatically calculated from the setting value of "Number of Pulses/Rev." and "Travel Value/Rev." of fixed parameter.	Ball screw and electronic gear setting of rotary table are set respectively in mechanical system program.			-
Operation cycle (default value)	SV13 0.22ms/1 to 4 axes 0.44ms/5 to 10 axes 0.88ms/11 to 16 axes Possible to set 0.2 [ms] in operation cycle setting ^(Note-1)	3.5ms /1 to 4 axes	3.5ms /1 to 8 axes	3.5ms /1 to 20 axes 7.1ms /21 to 32 axes	When the operation cycle is set as default (automatic), the operation cycle will change. Operation cycle changes as left describing, and the program execution timing will change, so set the fixed operation cycle if necessary.
	SV22 0.44ms/1 to 6 axes 0.88ms/7 to 16 axes Possible to set 0.2 [ms] in operation cycle setting ^(Note-2)	3.5ms /1 to 4 axes	3.5ms /1 to 8 axes	3.5ms /1 to 12 axes 7.1ms /13 to 24 axes 14.2ms /25 to 32 axes	

(Note-1): The following restrictions are applied when the communication method is "SSCNET III"

- When the operation cycle is 0.2 [ms], set "0 to 3" for the axis select switch setting of the servo amplifier, and configure the system setting.
- When the operation cycle is 0.4 [ms], set "0 to 7" for the axis select switch setting of the servo amplifier, and configure the system setting.

For details, refer to the instruction manual of the servo amplifier.

(Note-2): When MR-J4W3-□B (Software version: A2 or earlier) or MR-J3W-□B is used, set 0.4 [ms] or more for the operation cycle.

Difference between self diagnosis error and Motion (SFC) error history

Self diagnosis error code		Description	Error flag status ○: ON ×: OFF					
Q170MSCP U(-S1) (SD0)	A17nSHCP UN/ A173UHCP U (D9008)		Self diagnosis error flag		Motion (SFC) error history		Motion error detection Flag	
			Q170MSCP U(-S1) (SM1)	A17nSHCP UN/ A173UHCP U(M9008)	Q170MSCP U(-S1) (#8640 + 12n)*	(SFC version only) A172SHCP UN/ A173UHCP U (#8000 + 8n)*	Q170MSCP U(-S1) (M2039)	(SFC version only) A172SHCP UN/ A173UHCP U(M2039)
1 to 9999	10 to 84	Self diagnosis error besides Motion CPU independent error	○	○	○	×	○	×
10002	-	Minor/major error (command generation axis)	○	×	○	×	○	×
10003	-	Minor/major error	○	×	○	○	○	○
10004	-	Minor/major error (virtual servo motor axis)	○	×	○	○	○	○
10005	-	Minor/major error (synchronous encoder axis)	○	×	○	○	○	○
10006	-	Servo error	○	×	○	○	○	○
10006	-	Servo warning	○	×	○	○	○	○
10007	-	Servo program setting error	○	×	○	○	○	○
10008	-	Mode switching error	○	×	○	○	○	○
10009	-	Manual pulse axis setting error	○	×	○	○	○	○
10010	-	Test mode requirement error	○	×	○	○	○	○
10011	-	WDT error	○	×	○	○	○	○
-	-	Personal computer link communication error	×	×	×	○	×	○
10014	-	System setting error	○	×	○	×	○	×
10015	-	Servo amplifier (MR-J4-□B) servo error	○	×	○	×	○	×
10016	-	Abnormal motion slot	○	×	○	×	○	×
10020	-	Motion SFC control error (F/FS)	○	×	○	○	○	○
10021	-	Motion SFC control error (G)	○	×	○	○	○	○
10022	-	Motion SFC control error (K or others (not F, FS, G))	○	×	○	○	○	○
10023	-	Motion SFC control error (Motion SFC chart)	○	×	○	○	○	○
10030	-	Motion CPU internal bus error	○	×	○	×	○	×
10042	-	SSCNET III/H head unit error	○	×	○	×	○	×
10050	-	Safety observation error (alarm) occurrence	○	×	○	×	○	×
10051	-	Safety observation error (warning) occurrence	○	×	○	×	○	×

*: n shows the value (n= 0 to 7) corresponding to motion error history.

Item that is necessary to change/revise with the change of servo system network

Item	Difference		Change/Revise content
	Q170MSCPU(-S1)	A17nSHCPUN/ A173UHCPU	
System setting/SSCNET configuration	Q170MSCPU(-S1): 1 system (up to 16 axes/system)	A171SHCPUN: 1 system A172SHCPUN: 1 system A173UHCPU: 4 system (up to 8 axes/system)	Execute rotary switch setting of amplifier and the connection of amplifier combining with SSCNET configuration.
Electronic gear	Number of pulses per revolution: 1 to 2147483647[pulse] Travel value per revolution: 1 to 2147483647[pulse]	Number of pulses per revolution: 1 to 65535[pulse] Travel value per revolution: 1 to 65535[pulse]	Change the "Number of Pulses/Rev." and "Travel Value/Rev." of fixed parameter combining with resolution per revolution of the connecting servo motor.
Connect/disconnect of SSCNET communication when servo amplifier power supply is OFF	When an SSCNET III cable or a servo amplifier in the middle of the SSCNET system is replaced while the multiple CPU system is on, use the connect/disconnect function of the SSCNET communication.	SSCNET cables or servo amplifiers in the middle of the SSCNET system can be replaced while the system is on.	When the power supply servo amplifier is OFF/ON in SSCNET system, use connect/disconnect function of SSCNET communication. For details, refer to Motion controller Q series programming manual (common) (Q173D(S)CPU/Q172D(S)CPU) (IB-0300126) and "Connect/disconnect function of SSCNET communication".
Battery break warning/ battery warning	Servo error code 2102(92): Battery break warning 2116(9F): Battery warning	Servo error code 2102(9F): Battery warning 2103(92): Battery break warning	Correct the program using the left servo error code.

3.2 Device Comparison

3.2.1 I/O device

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN
X/Y0	User device (8192 points)	User device (8192 points)	User device (2048 points)	
X/Y7FF				
X/Y800				
X/Y1FFF				

3.2.2 Internal relay

(1) SV13

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN		
M0	User device (2000 points)	User device (2000 points)	User device (1600 points)			
M1600			Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)		
M1680			Unusable (40 points)	Unusable (120 points)		
M1760						
M1800			Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)		
M1880				Unusable (80 points)		
M1960			Common device (88 points)			
M2000						
M2047						
M2048						
M2320	Unusable (80 points)	Unusable (80 points)	/			
M2400	Status of each axis (20 points x 16 axes)	Status of each axis (20 points x 32 axes)				
M2720	User device (320 points)					
M3040	Unusable (32 points)	Unusable (160 points)				
M3072	Common device (command signal) (64 points)					
M3136	Unusable (64 points)					
M3200	Command signal of each axis (20 points x 16 axes)	Command signal of each axis (20 points x 32 axes)			/	
M3520	User device (4672 points)	User device (4351 points)				
M3840						
M8191						

(2) SV22 Real mode

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN
M0	User device (2000 points)	User device (2000 points)	User device (1360 points)	
M1360			Synchronous encoder axis status (4 points x 1 axis)	
M1364			User device (236 points)	
M1600			Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)
M1680			Unusable (40 points)	Unusable (120 points)
M1760				
M1800			Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)
M1880				Unusable (40 points)
M1960			Common device (88 points)	
M2000			Common device (320 points)	Common device (320 points)
M2048	Unusable (80 points)	Unusable (80 points)		
M2320	Status of each axis (20 points x 16 axes)	Status of each axis (20 points x 32 axes)		
M2400	User device (320 points)			
M2720	Unusable (32 points)	Unusable (160 points)		
M3040	Common device (command signal) (64 points)			
M3072	Unusable (64 points)			
M3136	Command signal of each axis (20 points x 16 axes)	Command signal of each axis (20 points x 32 axes)		
M3200	User device (320 points)			
M3520	Unusable (160 points)	User device (800 points)		
M3840	Virtual servo motor axis status ^(Note-1) (20 points x 16 axes)			
M4000	User device (320 points)			
M4320	Synchronous encoder axis status (4 points x 12 axes)	Synchronous encoder axis status (4 points x 4 axes)		
M4640	Unusable ^(Note-1) (112 points)	User device (3536 points)		
M4656				
M4688	Virtual servo motor axis status ^(Note-1) (20 points x 16 axes)			
M4800	User device (320 points)			
M5120				

(Note-1): This device can be used as a user device when used only in the SV22 real mode.

3. REPLACEMENT PROPOSAL FROM A-MOTION TO STAND-ALONE MOTION

(Continued)

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN
M5440	Synchronous encoder axis command signal (4 points x 12 axes)	User device (3536 points)	/	
M5488	User device (2704 points)			
M8191				

(3) SV22 Virtual mode

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN		
M0	User device (2000 points)	User device (2000 points)	User device (1360 points)			
M1200			Virtual servo motor axis status (20 points x 8 axes)	Virtual servo motor axis status ^(Note-1) ^(Note-2) (20 points x 4 axes)		
M1280				User device ^(Note-2) (80 points)		
M1360			Synchronous encoder axis status (4 points x 1 axis) ^(Note-2)			
M1364			Unusable ^(Note-2) (36 points)			
M1400			Virtual servo motor axis command signal (20 points x 8 axes)	Virtual servo motor axis command signal ^(Note-1) ^(Note-2) (20 points x 4 axes)		
M1480				User device ^(Note-2) (80 points)		
M1560			Synchronous encoder axis command signal (4 points x 1 axis)			
M1564			Unusable (36 points)			
M1600			Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)		
M1680				Unusable (120 points)		
M1760			Unusable (40 points)			
M1800			Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)		
M1880				Unusable (80 points)		
M1960			Common device (88 points)			
M2000			Common device (320 points)	Common device (320 points)		
M2048			Unusable (80 points)	Unusable (80 points)		
M2320			Status of each axis (20 points x 16 axes)	Status of each axis (20 points x 32 axes)		
M2400			User device (320 points)			
M2720			Unusable (32 points)	Unusable (160 points)		
M3040	Common device (command signal) (64 points)					
M3072	Unusable (64 points)					
M3136	Command signal of each axis (20 points x 16 axes)					
M3200	User device (320 points)	Command signal of each axis (20 points x 32 axes)				
M3520	Unusable (160 points)	Unusable (160 points)				
M3840	Virtual servo motor axis status (20 points x 16 axes) ^(Note-1) ^(Note-3)	Virtual servo motor axis status ^(Note-1) ^(Note-3) (20 points x 32 axes)				
M4000	User device (320 points) ^(Note-1) ^(Note-3)					
M4320						

(Continued)

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN
M4640	Synchronous encoder axis status (4 points x 12 axes) ^(Note-3)	Synchronous encoder axis status ^(Note-3) (4 points x 4 axes)	/	/
M4656		Unusable (144 points) ^(Note-3)		
M4688		Unusable (112 points) ^(Note-3)		
M4800	Virtual servo motor axis command signal (20 points x 16 axes) ^{(Note-1)(Note-3)}	Virtual servo motor axis command signal ^{(Note-1) (Note-3)} (20 points x 32 axes)		
M5120				
M5440	Synchronous encoder axis command signal (4 points x 12 axes) ^(Note-3)	Synchronous encoder axis command signal ^(Note-3) (4 points x 4 axes)		
M5456		Unusable (32 points) ^(Note-3)		
M5488	User device (2704 points) ^(Note-4)	User device (2704 points) ^(Note-4)		
M8191				

(Note-1): Only the area of axis set by mechanical system program is occupied. The area of unused axis set by mechanical system program can be used by user.

(Note-2): When using virtual mode, do not set latch range as M1200 to M1599.

(Note-3): When using virtual mode, do not set latch range as M4000 to M5487.

(Note-4): Cam axis command signal and smoothing clutch completion signal can be set to any device by parameter.

3.2.3 Data register

(1) SV13

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN	
D0	Monitor device of each axis (20 points x 16 axes)	Monitor device of each axis (20 points x 32 axes)	User device (800 points)	/	
D320	User device (320 points)				
D640	Control change register (2 points x 16 axes)				
D672	User device (32 points)				
D704	Common device (command signal) (54 points)	Common device (96 points)			
D758	Unusable (42 points)				
D800	User device (7392 points)	User device (7392 points)	Monitor device of each axis (20 points x 8 axes)	Monitor device of each axis (20 points x 4 axes)	
D880				Unusable (80 points)	
D960				Control change register (6 points x 8 axes)	Control change register (6 points x 4 axes)
D984					Unusable (24 points)
D1008				Common device (16 points)	
D1023				/	
D1024				/	
D8191		/			

(2) SV22 Real mode

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN
D0	Monitor device of each axis (20 points x 16 axes)	Monitor device of each axis (20 points x 32 axes)	User device (748 points)	
D320	User device (320 points)			
D640	Control change register (2 points x 16 axes)	Control change register (2 points x 32 axes)		
D672	User device (32 points)			
D704	Common device (54 points)	Common device (96 points)	Synchronous encoder axis monitor device (4 points x 1 axis)	
D748			User device (48 points)	
D752				
D758	Unusable (42 points)			
D800	Virtual servo motor axis monitor device ^(Note-1) (10 points x 16 axes)	User device (320 points)	Monitor device of each axis (20 points x 8 axes)	Monitor device of each axis (20 points x 4 axes)
D880				Unusable (80 points)
D960	User device (160 points)		Control change register (6 points x 8 axes)	Control change register (6 points x 4 axes)
D984				Unusable (24 points)
D1008			Common device (16 points)	
D1024				
D1120	Synchronous encoder axis monitor device ^(Note-1) (10 points x 12 axes)	Synchronous encoder axis monitor device (6 points x 4 axes) ^(Note-1)	/	
D1144				
D1240	Cam axis monitor device ^(Note-1) (10 points x 16 axes)	User device (7048 points)		
D1400	User device (6792 points)			
D8191				

(Note-1): Only the area of axis set by mechanical system program is occupied. The area of unused axis set by mechanical system can be used by user.

(3) SV22 Virtual mode

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN	
D0	Monitor device of each axis (20 points x 16 axes)	Monitor device of each axis (20 points x 32 axes)	User device (670 points)		
D320	User device (320 points)				
D640	Control change register (2 points x 16 axes)	Control change register (2 points x 32 axes)	Current value after differential gear of virtual servo motor axis main shaft ^(Note-1) (2 points x 8 axes)	Current value after differential gear of virtual servo motor axis main shaft ^(Note-1) (2 points x 4 axes)	
D670				User device (8 points)	
D678	User device (32 points)	Common device (96 points)	Current value after differential gear of synchronous encoder axis main shaft ^(Note-1) (2 points x 1 axis)		
D686			Unusable (12 points)		
D688			Virtual servo motor axis monitor device ^(Note-1) (6 points x 8 axes)	Virtual servo motor axis monitor device ^(Note-1) (6 points x 4 axes)	
D700				User device (24 points)	
D704	Common device (command signal) (54 points)	Common device (96 points)	Synchronous encoder axis monitor device (4 points x 1 axis)		
D724			Unusable (8 points)		
D748			Cam axis monitor device ^(Note-1) (5 points x 8 axes)	Cam axis monitor device ^(Note-1) (5 points x 4 axes)	
D752				User device (20 points)	
D758	Unusable (42 points)	Virtual servo motor axis monitor device ^(Note-1) (6 points x 32 axes) Current value after differential gear of virtual servo motor axis main shaft ^(Note-1) (4 points x 32 axes)	Monitor device of each axis (20 points x 4 axes)		
D760			Unusable (80 points)		
D780	User device (160 points)	Virtual servo motor axis monitor device ^(Note-1) (6 points x 32 axes) Current value after differential gear of virtual servo motor axis main shaft ^(Note-1) (4 points x 32 axes)	Control change register (6 points x 8 axes)	Control change register (6 points x 4 axes)	
D800				Unusable (24 points)	
D880			Common device (16 points)		
D960					
D984					
D992					
D1008					
D1024					

(Continued)

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN
D1120	Synchronous encoder axis monitor device (6 points x 12 axes) Current value after differential gear of synchronous encoder axis main shaft (4 points x 12 axes)	Synchronous encoder axis monitor device ^(Note-1) (6 points x 4 axes) Current value after differential gear of synchronous encoder axis main shaft (4 points x 4 axes)	/	/
D1160		Unusable (80 points)		
D1240	Cam axis monitor device ^(Note-1) (10 points x 16 axes)	Cam axis monitor device ^(Note-1) (10 points x 32 axes)		
D1400	User device (6792 points)	User device (6632 points)		
D1560 D8191				

(Note-1): Only the areas of axes set with the mechanical system program are occupied. The areas of the axes not used by the mechanical system program can be used by users.

3.2.4 Motion register

	Q170MSCPU(-S1)	A173UHCPU	A172SHCPUN	A171SHCPUN	
#0 #7999	User device (8000 points)	User device (8000 points)	/	/	
#8000	Monitor device (640 points)	Past 7 times error information (oldest error information)			
#8008		Past 6 times error information			
#8016		Past 5 times error information			
#8024		Past 4 times error information			
#8032		Past 3 times error information			
#8040		Past 2 times error information			
#8048		Past 1 time error information			
#8056		Latest error information			
#8064		Unusable (128 points)			
#8192		Motion error history device (96 points)			/
#8640	Product information list device (16 points)				
#8736	System area (3536 points)				
#8752 #12287					

3.2.5 Special relay

Device number		Name	Remark
Q170MSCPU (-S1)	A17nSHCPUN/ A173UHCPU		
SM60	M9000	Fuse blown detection flag	
-	M9002	I/O module verification error	
-	M9004	MINI link error	A173UHCPU only
SM53	M9005	AC DOWN detection flag	Q170MSCPU (-S1): AC/DC DOWN detection
SM52	M9006	Low battery flag	
SM51	M9007	Low battery latch flag	
SM1	M9008	Self diagnosis error flag	
-	M9009	Annunciator detection	
SM0	M9010	Diagnosis error flag	
-	M9011	Operation error flag	
-	M9012	Carry flag	
-	M9016	Data memory clear flag (all data)	
-	M9017	Data memory clear flag (not latch data)	
-	M9020	User timing clock No.0	
-	M9021	User timing clock No.1	
-	M9022	User timing clock No.2	
-	M9023	User timing clock No.3	
-	M9024	User timing clock No.4	
-	M9025	Clock data set requirement	Clock data of CPU No.1 is operating.
SM211	M9026	Clock data error	
-	M9027	Clock data display	
SM801	M9028	Clock data reading requirement	
-	M9029	Data communication requirement batch processing	A173UHCPU only
-	M9030	0.1 second clock	
-	M9031	0.2 second clock	
-	M9032	1 second clock	
-	M9033	2 seconds clock	
-	M9034	1 minute clock	
SM400	M9036	Always ON	
SM401	M9037	Always OFF	
-	M9038	Only 1 scan is ON after RUN	
-	M9039	RUN flag (only 1 scan is OFF after RUN)	
-	M9040	PAUSE enable coil	
-	M9041	PAUSE status contact	
-	M9042	Stop status contact	
-	M9043	Sampling trace completion	
-	M9044	Sampling trace	
-	M9045	Reset watchdog timer (WDT)	
-	M9046	Sampling trace	A173UHCPU only
-	M9047	Sampling trace preparation	A173UHCPU only
-	M9049	Switch output characters number	
-	M9051	CHG command execution inhibition	A173UHCPU only
-	M9052	Switch SEG command	
-	M9053	Switch EI/DI command	
-	M9054	STEP RUN flag	
-	M9055	Status latch completion flag	

3. REPLACEMENT PROPOSAL FROM A-MOTION TO STAND-ALONE MOTION CONTROLLER

(Continued)

Device number		Name	Remark
Q170MSCPU (-S1)	A17nSHCPUN/ A173UHCPU		
-	M9056	Main side P, I setting requirement	
-	M9057	Sub side P, I setting requirement	
-	M9058	Main side P, I setting completion	
-	M9059	Sub side P, I setting completion	
-	M9065	Partition processing execution detection	
-	M9066	Partition processing requirement flag	
-	M9070	Needed search time of A8UPU/A8PUJ	
SM512	M9073	Motion CPU WDT error flag	
SM500	M9074	PCPU preparation completion flag	
SM501	M9075	Test mode flag	
SM502	M9076	Forced stop input flag	
SM513	M9077	Manual pulse axis setting error flag	
SM510	M9078	Test mode requirement error flag	
SM516	M9079	Servo program setting error flag	
-	M9081	Communication requirement register area BUSY signal	
-	M9084	Error check	
-	M9091	Command error flag	
-	M9094	I/O exchange flag	
-	M9100	SFC program existence	
-	M9101	Start/stop SFC program	
-	M9102	Start status of SFC program	
-	M9103	Continuous transition existence	
-	M9104	Continuous transition prevention flag	
-	M9108	Start step transition monitoring timer (support to D9108)	
-	M9109	Start step transition monitoring timer (support to D9109)	
-	M9110	Start step transition monitoring timer (support to D9110)	
-	M9111	Start step transition monitoring timer (support to D9111)	
-	M9112	Start step transition monitoring timer (support to D9112)	
-	M9113	Start step transition monitoring timer (support to D9113)	
-	M9114	Start step transition monitoring timer (support to D9114)	
-	M9180	Active step sampling trace completion flag	
-	M9181	Active step sampling trace execution flag	
-	M9182	Enable active step sampling trace	
-	M9196	Operation output of block stop	
-	M9197	Fuse blown/I/O verification error display switching	
-	M9198		
-	M9199	Data return of online sampling trace status latch	

* The special relay of Q170MSCPU(-S1) is in Motion CPU side.

Refer to the manual of PLC CPU for the special relay in PLC CPU side.

3.2.6 Special register

Device number		Name	Remark
Q170MSCPU (-S1)	A17nSHCPUN/ A173UHCPU		
SD60	D9000	Fuse blown	
-	D9002	I/O module verification error	
-	D9004	MINI link error	A173UHCPU only
SD53	D9005	AC DOWN counter	
SD0	D9008	Self diagnosis error	
-	D9009	Detection of annunciator	
-	D9010	Error step	SD1: Diagnosis error occurrence time (calendar, month)
-	D9011	Error step	SD2: Diagnosis error occurrence time (date, hour)
SD203	D9015	CPU operation status	
-	D9016	A17nSHCPUN: ROM/RAM setting A173UHCPUN: Program number	
-	D9017	Minimum scan time (10ms unit)	SD520: Current main cycle (1ms unit)
-	D9018	Scan time (10ms unit)	SD521: Maximum main cycle (1ms unit)
-	D9019	Maximum scan time (10ms unit)	SD524: Maximum operation cycle (1μs unit)
-	D9020	Constant scan (10ms unit)	A173UHCPU only SD523: Motion setting operation cycle (1μs unit)
-	D9021	Scan time (1ms unit)	A173UHCPU only SD522: Motion operation cycle (1μs unit)
-	D9022	Time (1 second unit)	
SD210	D9025	Clock data (calendar, month)	
SD211	D9026	Clock data (date, hour)	
SD212	D9027	Clock data (minute, second)	
SD213	D9028	Clock data (0, week)	
-	D9035	Expansion file register	A173UHCPU only
-	D9036	For specifying extended file register device number	A173UHCPU only
-	D9037		
-	D9038		
-	D9039	LED display priority order	
-	D9044	For sampling trace	A173UHCPU only
-	D9049	Work area for SFC	A173UHCPU only
-	D9050	SFC program error number	A173UHCPU only
-	D9051	Error block	A173UHCPU only
-	D9052	Error step	A173UHCPU only
-	D9053	Error transition	A173UHCPU only
-	D9054	Error sequence step	A173UHCPU only
-	D9055	Status latch	A173UHCPU only
-	D9072	PLC communication check	A173UHCPU only
-	D9081	Number of communication requirement register free area	A173UHCPU only
-	D9085	Setting register of time check value	A173UHCPU only
-	D9090	Number of boards in special function module over	A173UHCPU only
-	D9091	Detail error number	
-	D9092		
-	D9094	Exchange I/O start I/O number	

(Continued)

Device number		Name	Remark
Q170MSCPU (-S1)	A17nSHCPUN/ A173UHCPU		
-	D9100	Fuse blown module	A173UHCPU only
-	D9101		
-	D9102		
-	D9103		
-	D9104		
-	D9105		
-	D9106		
-	D9107		
-	D9116	I/O module verification error	A173UHCPU only
-	D9117		
-	D9118		
-	D9119		
-	D9120		
-	D9121		
-	D9122		
-	D9123		
-	D9124	Number of annunciator detection	
-	D9125	Annunciator detection number	
-	D9126		
-	D9127		
-	D9128		
-	D9129		
-	D9130		
-	D9131		
-	D9132		
-	D9180	A173UHCPU: Unusable	A17nSHCPUN: Limit switch output status storage area
-	D9181		
SD510	D9182	Q170MSCPU(-S1), A173UHCPU: Test mode requirement error	
SD511	D9183		
SD512	D9184	PCPU error cause	
SD513	D9185	Q170MSCPU(-S1), A173UHCPU: Manual pulse axis setting error information	A17nSHCPUN: Servo amplifier classification
SD514	D9186		A17nSHCPUN: Manual pulse axis setting error information
SD515	D9187		
-	D9188	A173UHCPU: Unusable	A17nSHCPUN: Test mode requirement error information
SD516	D9189	Error program No.	
SD517	D9190	Error item information	
SD502	D9191	Q170MSCPU(-S1), A173UHCPU: Servo amplifier installation information	A17nSHCPUN: Servo amplifier installation information
SD503	D9192		A17nSHCPUN: Area for manual pulse (P1) smoothing magnification setting
-	D9196	Personal computer link communication error code	

(Continued)

Device number		Name	Remark		
Q170MSCPU (-S1)	A17nSHCPUN/ A173UHCPU				
D752	D752	Q170MSCPU(-S1), A173UHCPU: Area for manual pulse 1 (P1) smoothing magnification setting	A17nSHCPUN: Unusable		
D753	D753	Q170MSCPU(-S1), A173UHCPU: Area for manual pulse 2 (P2) smoothing magnification setting			
D754	D754	Q170MSCPU(-S1), A173UHCPU: Area for manual pulse 3 (P3) smoothing magnification setting			
-	D760	A173UHCPU: Limit switch output disable setting area for Axis 1 to 32			
-	D761				
-	D762				
-	D763				
-	D764				
-	D765				
-	D766				
-	D767				
-	D768				
-	D769				
-	D770				
-	D771				
-	D772				
-	D773				
-	D774				
-	D775	A17nSHCPUN: Cam axis monitor device • A172SHCPUN: 5 points x 8 axes • A171SHCPUN: 5 points x 4 axes			
-	D776				
-	D777				
-	D778				
-	D779				
-	D780				
-	D781				
-	D782				
-	D783			A173UHCPU: Limit switch output status storage area for Axis 1 to 32	
-	D784				
-	D785				
-	D786				
-	D787				
-	D788				
-	D789				
-	D790				
-	D791				
-	D792				
-	D793				
-	D794				
-	D795	A173UHCPU: Servo amplifier classification	Q170MSCPU(-S1): #8000 + 20n (1 axis/word) A17nSHCPUN: D792 to (4 axes/word) A173UHCPU: D792 to (4 axes/word)		
-	D796				
-	D797				
-	D798				
-	D799				

* The special register of Q170MSCPU(-S1) is in Motion CPU side.
About the special register of PLC CPU side, refer to the manual of PLC CPU.

3.2.7 Other devices

Item	Q170MSCPU(-S1)	A173UHCPU	A17nSHCPUN
Personal computer link communication error flag	-	M2034	
PCPU preparation completion flag	SM500	M9074	
Home position return re-travel value	D9 + 20n ^(Note-1) (data abbreviated to 1 word) #8006 + 20n, #8007 + 20n ^(Note-1) (Referred to at monitoring)	D9 + 20n ^(Note-1)	D811 + 20n ^(Note-1)
Travel value change register	Any device (enable set D16 + 20n and D17 + 20n) ^(Note-1)	D16 + 20n, D17 + 20n ^(Note-1)	D815 ^(Note-1) + 20n
Indirectly designated device (word device)	D0 to D8191	D800 to D8191	D0 to D799
	W0 to W1FFF	W0 to W1FFF	W0 to W3FF
	#0 to #7999	#0 to #7999 (Motion SFC (real mode) only)	#0 to #7999 (Motion SFC of A172SH (real mode) only)
	U□\G10000 to U□\G(10000 + p - 1) ^{(Note-2) (Note-4)}	-	-
Indirectly designated device (bit device)	X0 to X1FFF ^(Note-3)	X0 to X1FFF	X0 to X7FF
	Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
	M0 to M8191	M/L0 to M/L8191	M/L0 to M/L2047
	-	M9000 to M9255	M9000 to M9255
	B0 to B1FFF	B0 to B1FFF	B0 to B3FF
	F0 to F2047	F0 to F2047	F0 to F255
	U□\G10000.0 to U□\G(10000 + p - 1).F ^{(Note-2) (Note-4)}	-	-
Enable specified device in high speed reading function	D0 to D8191	D800 to D3069, D3080 to D8191	D0 to D799
	W0 to W1FFF	W0 to W1FFF	W0 to W3FF
	U□\G10000 to U□\G(10000 + p - 1) ^{(Note-2) (Note-4)}	-	-

(Note-1): n shows the value (axis No.1 to 16: n= 0 to 15) corresponding to axis No.

(Note-2): p is the user free area points of the Multiple CPU high speed transmission area of each CPU.

□: First I/O number of CPU module

(Note-3): In PXn + 0 to PXn + F, the input devices assigned to the motion CPU built-in I/F (DI), PXn + 4 to PXn + F are fixed to 0 and cannot be used. (n = Start input number)

(Note-4): Setting is available only for the devices of the own CPU.

(Continued)

Item	Q170MSCPU(-S1)	A173UHCPU	A17nSHCPUN	
Limit switch output data	Output device	X0 to X1FFF	X0 to X1FFF	X0 to X7FF
		Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
		M0 to M8191	M0 to M8191	M0 to M2047
		-	L0 to L8191	L0 to L2047
		B0 to B1FFF	B0 to B1FFF	B0 to B3FF
	U□\G10000.0 to U□\G(10000 + p - 1).F ^{(Note-2) (Note-5)}	-	-	
	Watch data	D0 to D8191	D0 to D8191	D0 to D1023
		W0 to W1FFF	W0 to W1FFF	W0 to W3FF
		#0 to #9215	#0 to #8191	#0 to #8191
		U□\G10000 to U□\G(10000 + p - 1) ^{(Note-2) (Note-5)}	-	-
	ON section setting	-	Absolute address (H0 to HFFFFFFF)	Absolute address (H0 to HFFFFFFF)
		D0 to D8191	D0 to D8191	D0 to D1023
W0 to W1FFF		W0 to W1FFF	W0 to W3FF	
#0 to #9215		#0 to #8191	#0 to #8191	
Output enable/disable bit	Constant (Hn/Kn) ^(Note-4)	Constant (Hn/Kn) ^(Note-4)	Constant (Hn/Kn) ^(Note-4)	
	U□\G10000 to U□\G(10000 + p - 1) ^{(Note-2) (Note-5)}	-	-	
	Forced output bit	X0 to X1FFF ^(Note-3)	X0 to X1FFF	X0 to X7FF
		Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
M0 to M8191		M0 to M8191	M0 to M2047	
-		L0 to L8191	L0 to L2047	
Mechanical system program	B0 to B1FFF	B0 to B1FFF	B0 to B3FF	
	F0 to F2047	F0 to F2047	F0 to F255	
	SM0 to SM1999	M9000 to M9255	M9000 to M9255	
	-	TT0 to TT2047	TT0 to TT255	
	-	TC0 to TC2047	TC0 to TC255	
	-	CT0 to CT1023	CT0 to CT255	
	-	CC0 to CC1023	CC0 to CC255	
	U□\G10000.0 to U□\G(10000 + p - 1).F ^{(Note-2) (Note-5)}	-	-	
Clutch status	Any device (M2160 to M2223 can also be set.)	M2160 to M2223 (unnecessary to set in mechanical system program)	A171SHCPU: M1984 to M1991 A172SHCPU: M1984 to M1999 (unnecessary to set in mechanical system program)	
Cam axis command signal (cam/ball screw switching instruction)	Any device (M5488 to M5519 can also be set.)	-	-	
Smoothing clutch completion signal	Any device (M5520 to M5583 can also be set.)	-	-	

(Note-1): n shows the value (axis No.1 to 16: n= 0 to 15) corresponding to axis No.

(Note-2): p is the user free area points of the Multiple CPU high speed transmission area of each CPU.

□: Start I/O number of CPU module

(Note-3): In PXn + 0 to PXn + F, the input devices assigned to the motion CPU built-in I/F (DI), PXn + 4 to PXn + F are fixed to 0 and cannot be used.

(Note-4): The setting range depending on setting unit.

(Note-5): Setting is available only for the devices of the own CPU.

Confirm use status for "cross reference" etc. in MT Works2, and change to the device number of Q170MSCPU(-S1).

4. DIVERSION OF PROJECT CREATED BY A173UHCPU/A172SHCPUN/A171SHCPUN

4.1 Data List Available for Diversion or Not (SV13/SV22)

		Motion SFC is not compatible				Motion SFC is compatible				Remark		
		A17nSHCPUN		A173UHCPU		A172SHCPUN		A173UHCPU				
		SV13	SV22	SV13	SV22	SV13	SV22	SV13	SV22			
System setting	System setting data									△	Note-1	
	High speed reading data									○		
	Basic setting data									×	Note-2	
Servo data setting	Axis data	Fixed parameter									△	Note-3
		Home position return data									○	
		JOG operation data									○	
		Servo parameter									△	Note-3
	Parameter block									○		
	Limit output data										×	Note-4
Servo program			△		○		△		○		Note-5, Note-6	
Motion SFC program	Motion SFC parameter									○		
	Motion SFC program						△		○		Note-5	
	Operation control program						△		○		Note-5	
	Transition program						△		○		Note-5	
	Conversion data								△		Note-8	
	Automatic numbering setting									○		
Mechanical system program	Mechanical edit data		△		○		△		○		Note-5, Note-7	
	Mechanical conversion data		△		△		△		△		Note-8	
	Cam conversion data		○		○		○		○			
	Real mode axis information		○		○		○		○			
Cam data			○		○		○		○			
Device memory										○ (SW3RNC-GSVE only)		
Backup data										×	Note-8	
Communication setting										×	Note-8	

○: Can be diverted

△: Data must be revised

×: Must be set again

(Note-1) System setting data

- About PLC/motion module

When Q170MSCPU(-S1) is used with PLCs or motion modules, an extension base unit is required.

- Pulse/synchronous encoder I/F module A172SENC

A172SENC module is converted to Q172DLX. The manual pulse generator/synchronous encoder setting is deleted.

Set Q172DLX module or Q173DPX module if necessary.

(manual pulse can also be used in internal I/F)

- Limit output module A1SY42 (when Motion SFC is not compatible with OS)

Limit output module A1SY42 is not diverted.

- Axis No. setting of external input signal module

Axis No. setting of external input signal module in Q170MSCPU(-S1) is moved to servo external signal parameter in servo data.

- Servo amplifier setting

The servo amplifier is converted to MR-J4-B when SSCNET III/H is selected, or converted to MR-J3-B when SSCNET III is selected.

Others beside servo amplifier (inverter etc.) are deleted.

(Note-2) Basic setting data

Stand-alone Motion requires the multiple CPU setting. Set according to system.

(Note-3) Fixed parameter, servo parameter (servo amplifier besides MR-J2S)

Fixed parameter (Number of Pulses/Rev. and Travel Value/Rev.) is not converted. Servo parameter is initialized.

Revise parameter with servo amplifier after changing.

(Note-4) Limit output data (when Motion SFC is not compatible with OS)

Data are deleted because of incompatibility. Revise the data.

(Note-5) Servo program, Motion SFC program, mechanical system program

- Motion dedicated device

The allocation of the motion dedicated device is different between A17nSHCPUN/A173UHCPU and Q-Motion.

Change the motion dedicated device.

(Note-6) Servo program

- Word point of indirect device

There are changes of word point between A17nSHCPUN/A173UHCPU and Q-Motion.

Execute conversion check and revise if necessary.

(Note-7) Mechanical system program

- Unit setting of output axis

Unit settings of fixed parameter and output axis are set respectively in A-Motion, but fixed parameter is set only in Q170MSCPU(-S1). Revise the unit settings when unit settings of fixed parameter and output axis are different.

(Note-8) Conversion data, setting data

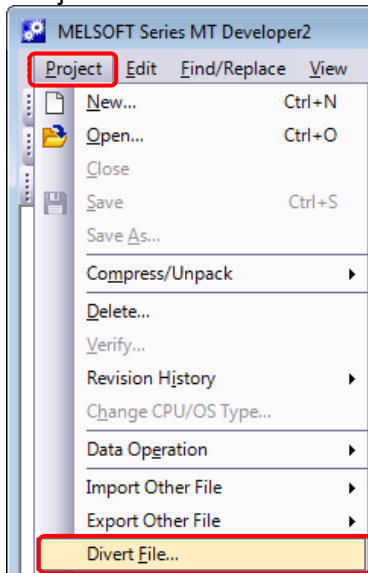
It can not be diverted because CPU is different. Convert/set the data again.

4.2 Program Diversion Procedure in Motion CPU Side

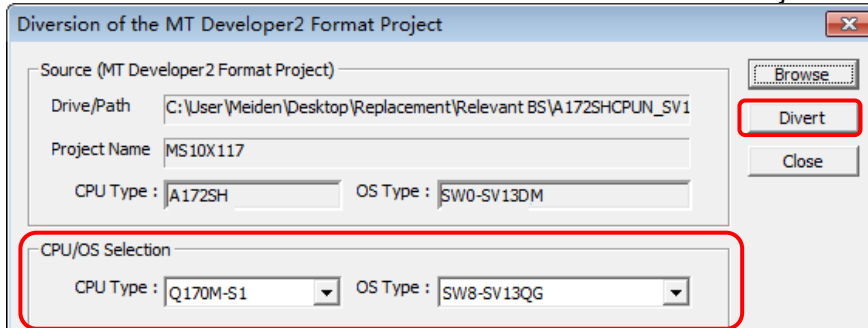
4.2.1 Diversion procedure using MT Developer2

The following shows an example of procedures for replacing an A-Motion CPU side project with a Stand-alone Motion CPU project using MT Developer2. Always backup the project before the program replacement.

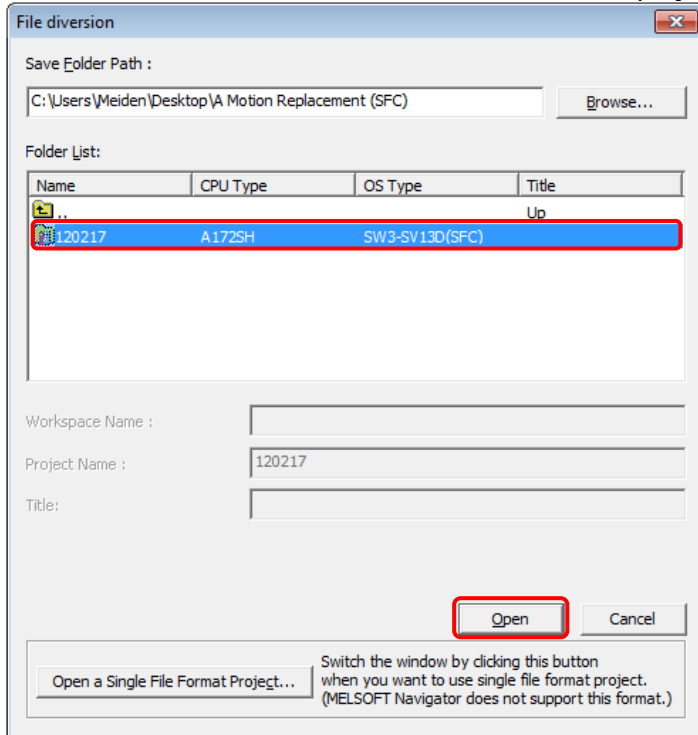
- 1) Start MT Developer2, and select "Divert File" --> "Diversion of Other Format Project" from the "Project" tab.



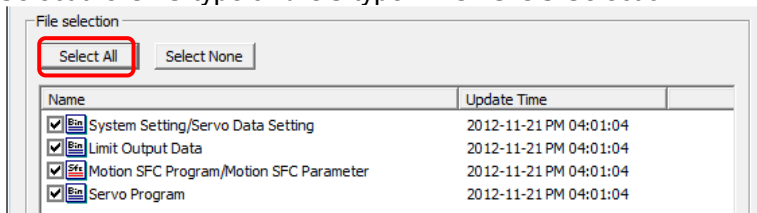
- 2) Select the "Browse" button in the "Diversion of Other Format Project" dialog box.



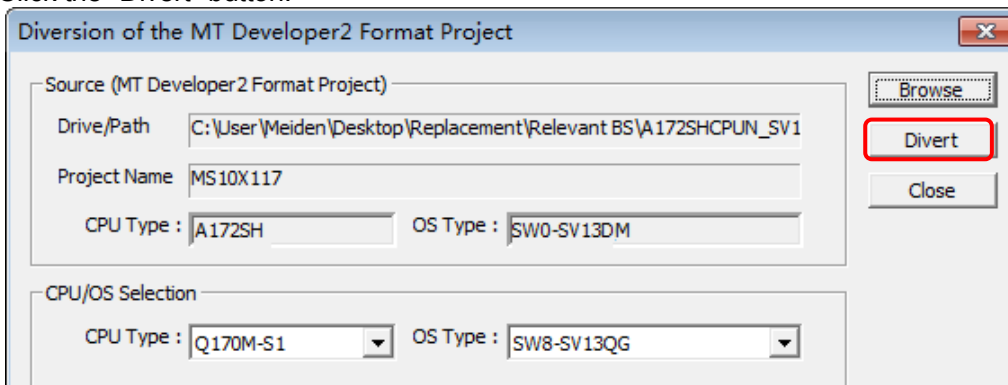
3) Select "Browse" in Save Folder Path and the source project from "Folder List", and click "Open".



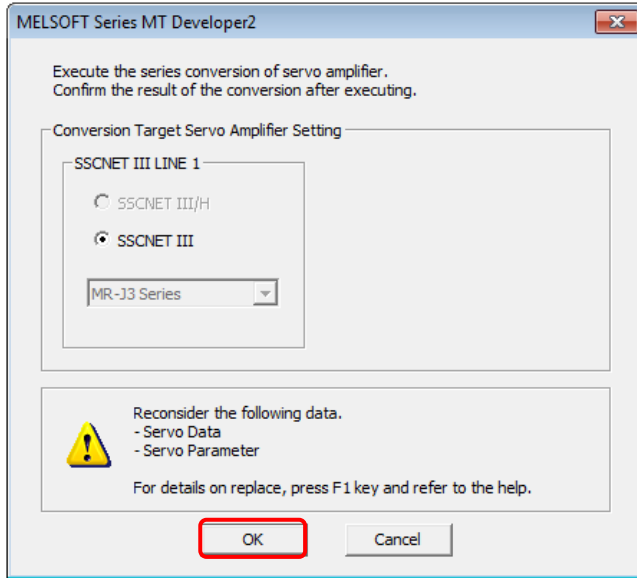
4) Select the CPU type and OS type in "CPU/OS Selection".



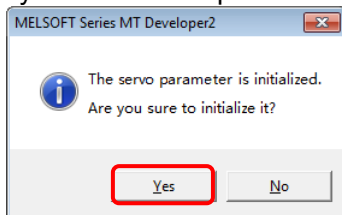
5) Click the "Divert" button.



6) Select "Divert".

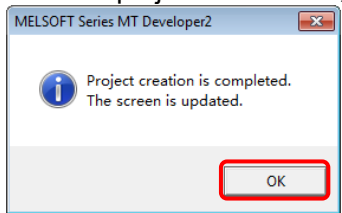


7) Execute the series conversion of the servo amplifier. Select the servo amplifier series and servo system network specification after the replacement, and select "OK".

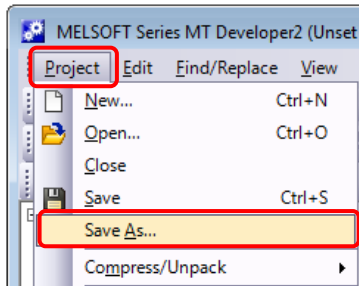


8) The conversion of the project is completed. Select "OK".

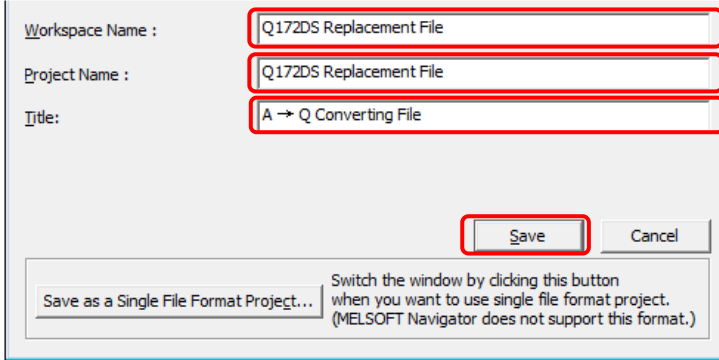
After the project conversion, make the cross comparison or check the data on each screen.



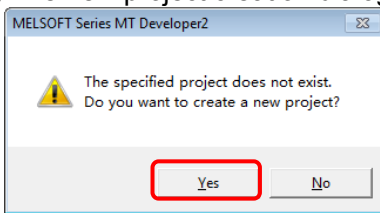
9) Select "Save As" from the "Project" tab to save the project after the conversion.



10) Input "Workspace Name", "Project Name", and "Title", and select "Save".



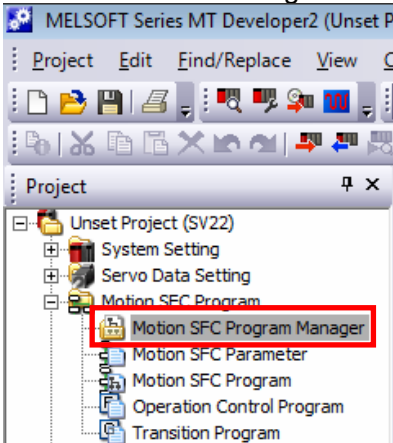
11) The new project creation dialog box appears. Select "Yes".



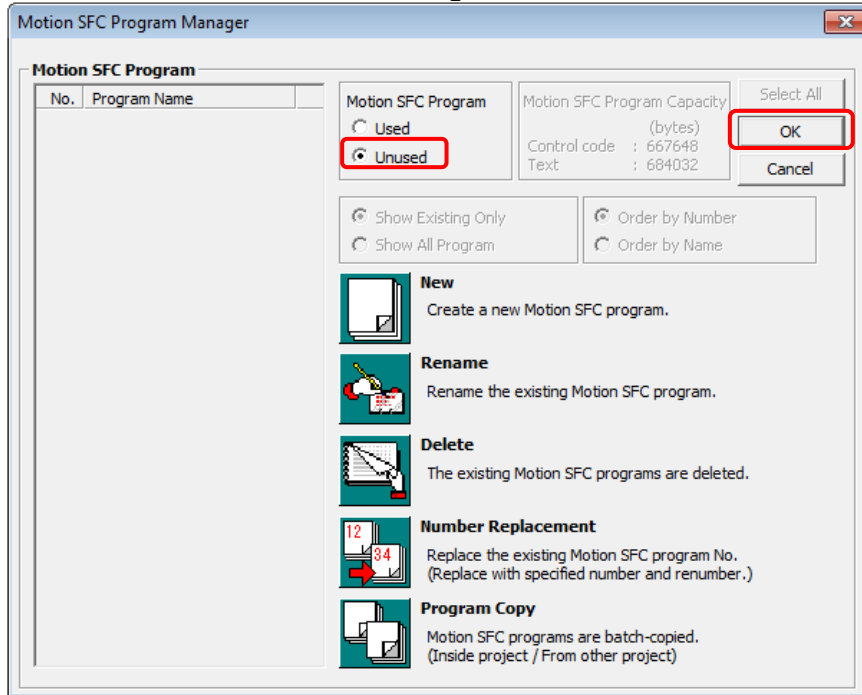
4.2.2 Without using SFC

When no SFC program is used in the A-Motion CPU side program (Diversion source) and servo parameters other than SFC programs are diverted, perform the following procedure after the operation of 11).

1) Select "Motion SFC Program Manager".



2) Select "Unused" for "Motion SFC Program", and select "OK".



About the file converted by MT Woks2, refer to "Section 3.4.1 Data list available for diversion or not (SV13/SV22)", and then set the data which can not be diverted if necessary. Besides, about the setting of Multiple CPU parameter, refer to "Section 3.3.Difference between Q170MSCPU(-S1) and A173UHCPU/A172SHCPUN/A171SHCPUN", "QCPU User's Manual (Multiple CPU System) Model Name SH-080475", "Programming Manual (COMMOM) [corresponding to Q173D(S)/Q172D(S)] Model Name: 1XB921" and then set.

4.2.3 Precautions for diverting cam data

To edit cam data, read the data directly using "Read Other Type Cam Data".

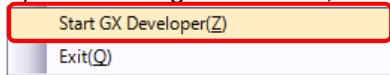
4.3 Program Diversion Procedure in PLC CPU Side

4.3.1 Conversion procedure of ladder program for QnUD(H)CPU using GX Works2/GX Developer

The following describes an example of the procedure for replacing a sequence project using GX Developer. Always backup the project before the replacement.

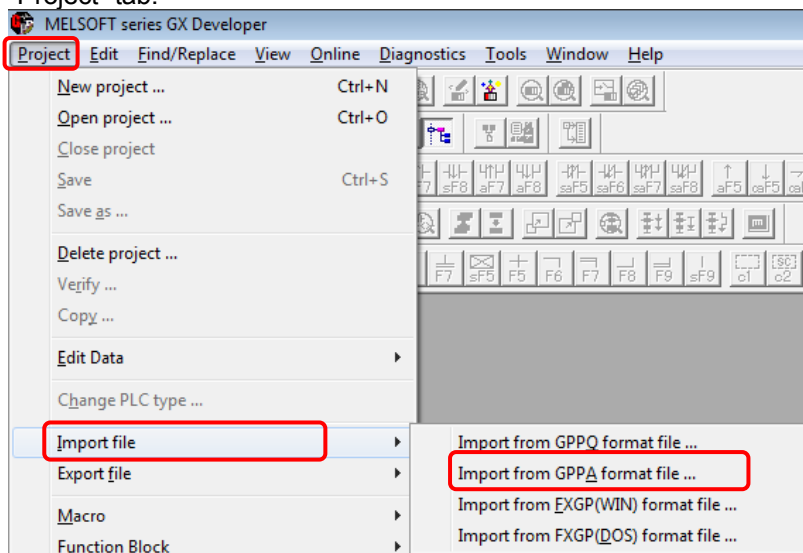
(1) Conversion of ladder program created by SW3RNC-GSVE/SW2□-GSVE

1) After starting GX Works2, select "Start GX Developer" from the "Project" tab.



2) The following shows the conversion of a sequence program created by SW3RNC-GSV/SW2□-GSV (GPPA file format).

After GX Developer is started, select "Import file" --> "Import from GPPA format file" from the "Project" tab.



Caution 1: Storage location of an execution file

The execution file in the GPPA format is usually stored in the following folder.

- Folder structure

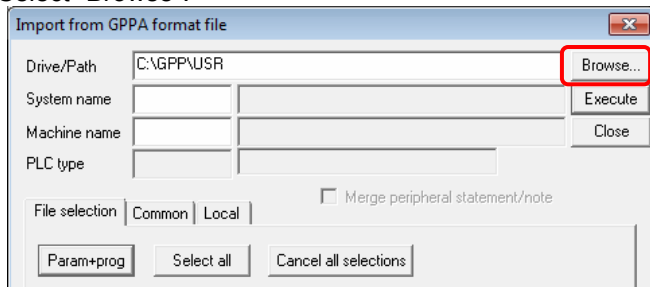
"C drive (route drive)" --> "GPP" --> "USR" --> "System name" --> "Machine name (folder which includes the gppa.cnf file)"

Caution 2: Name of diversion source project

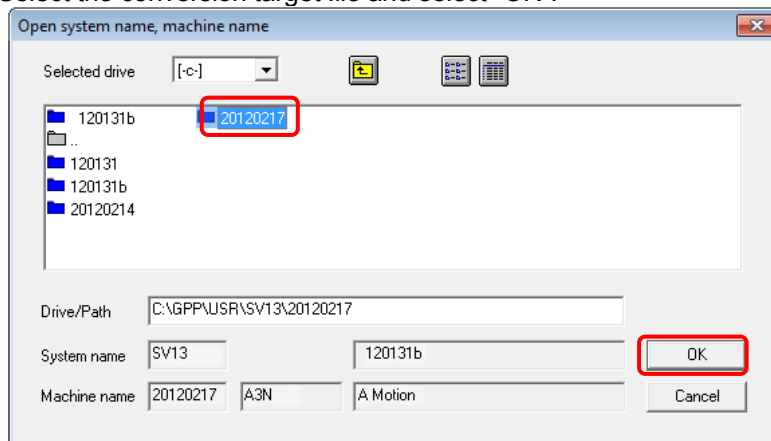
When name of diversion source project exceeds 9 characters, it can not be read.

Change the name so that the number of characters is within the limit and execute the conversion operation.

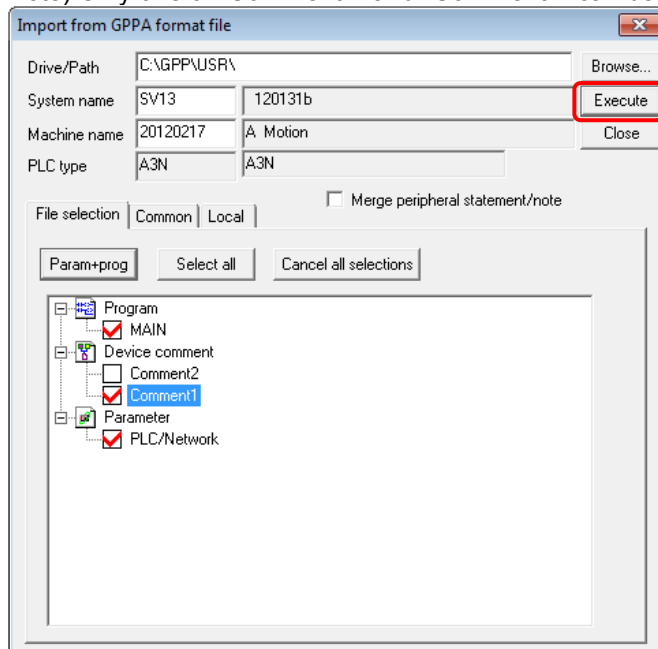
3) Select "Browse".



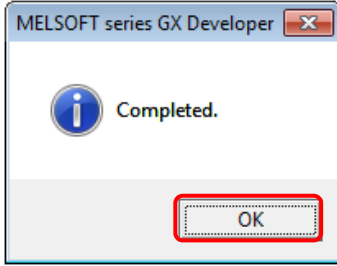
4) Select the conversion target file and select "OK".



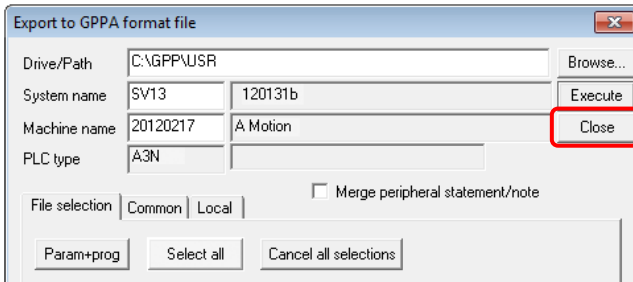
5) Check the conversion targets (Program/Device comment/Parameter), and select "Execute".
 Note) Only one of "Comment1" and "Comment2" can be selected for Device comment.



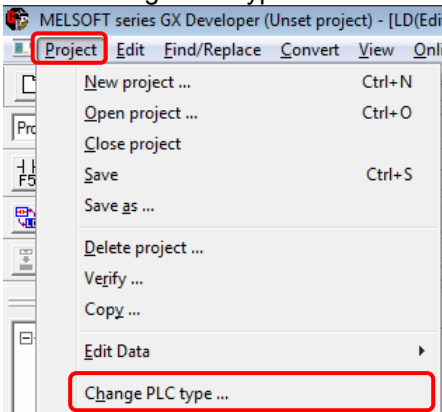
6) The conversion completion dialog box appears. Select "OK".



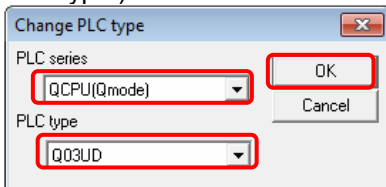
7) Select "Close".



8) Select "Change PLC type" from the "Project" tab in GX Developer.



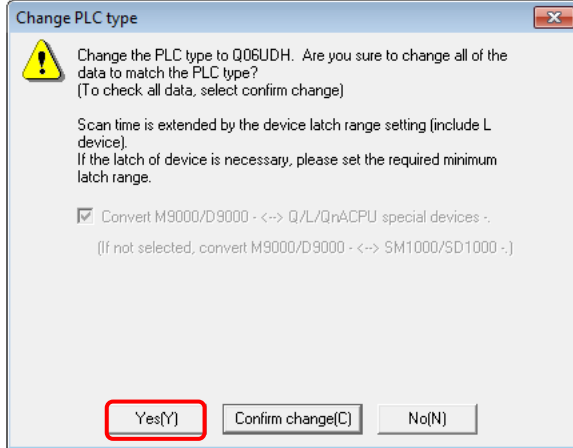
9) Specify the PLC series (QCPU(Qmode)) and PLC type (Q03UD) after the replacement in the "Change PLC type" dialog box, and select "OK". (For Q170MSPU-S1, specify "Q06UDH" for the PLC type.)



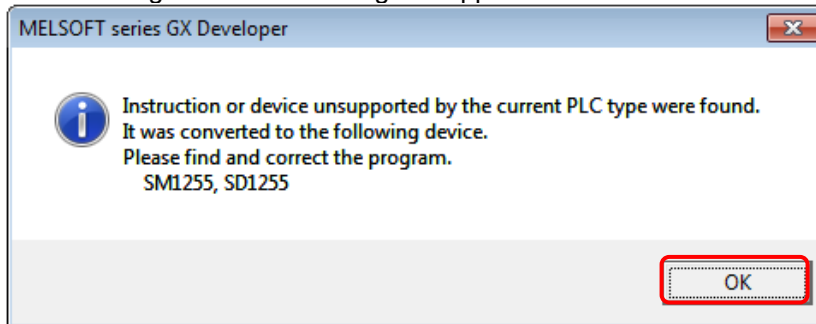
10) The "Change PLC type" dialog box appears. Select "Yes".

Note) In this replacement handbook, "Yes" is selected because the changes will be checked later by using a support tool.

When the supporting tool is not used, select "Confirm change".

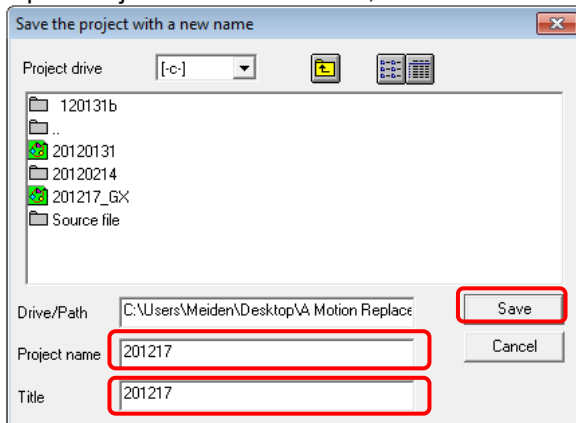


11) The following confirmation dialog box appears. Select "OK".

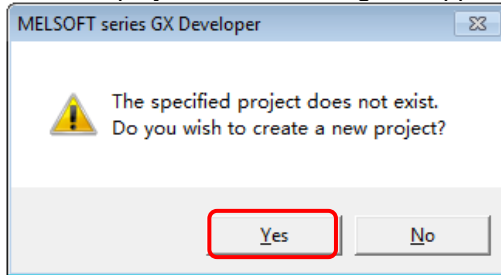


12) Select "Save as" from the "Project" tab.

Input "Project name" and "Title", and select "Save".



13) The new project creation dialog box appears. Select "Yes".



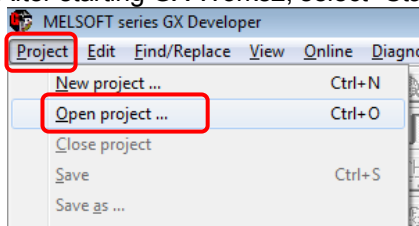
Although the sequence program has been converted by following this procedure, it may not be operated correctly. For the program modifications, refer to Section 5 and later.

To open the file in which CPU has been changed with GX Developer2 again, select "Open Other Data" --> "Open Other Project" from the "Project" tab.

(2) Conversion of ladder program for A-Motion created by GX Developer

The following describes an example of the procedure for replacing a sequence project using GX Developer. Always backup the project before the replacement.

1) After starting GX Works2, select "Start GX Developer" from the "Project" tab.



2) The following shows the conversion of a sequence program for A-Motion created by GX Developer (GPPW file format).

3) After GX Developer is started, select "Open project" from the "Project" tab.

4) Select the file to be converted, and select "Open".

For the following conversion operations, refer to (1) **SW3RNC-GSVE/SW2□-GSVE ladder program conversion procedure after 8**).

5. USING A/QnA->Q CONVERSION SUPPORT TOOL IN LADDER PROGRAM

To confirm the modified content of ladder program, use "A/QnA->Q conversion support tool".
 About the explanation, refer to "2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION".

6. POINTS AND PRECAUTIONS OF REPLACEMENT

6.1 Difference of Motion CPU Configuration

6.1.1 System configuration

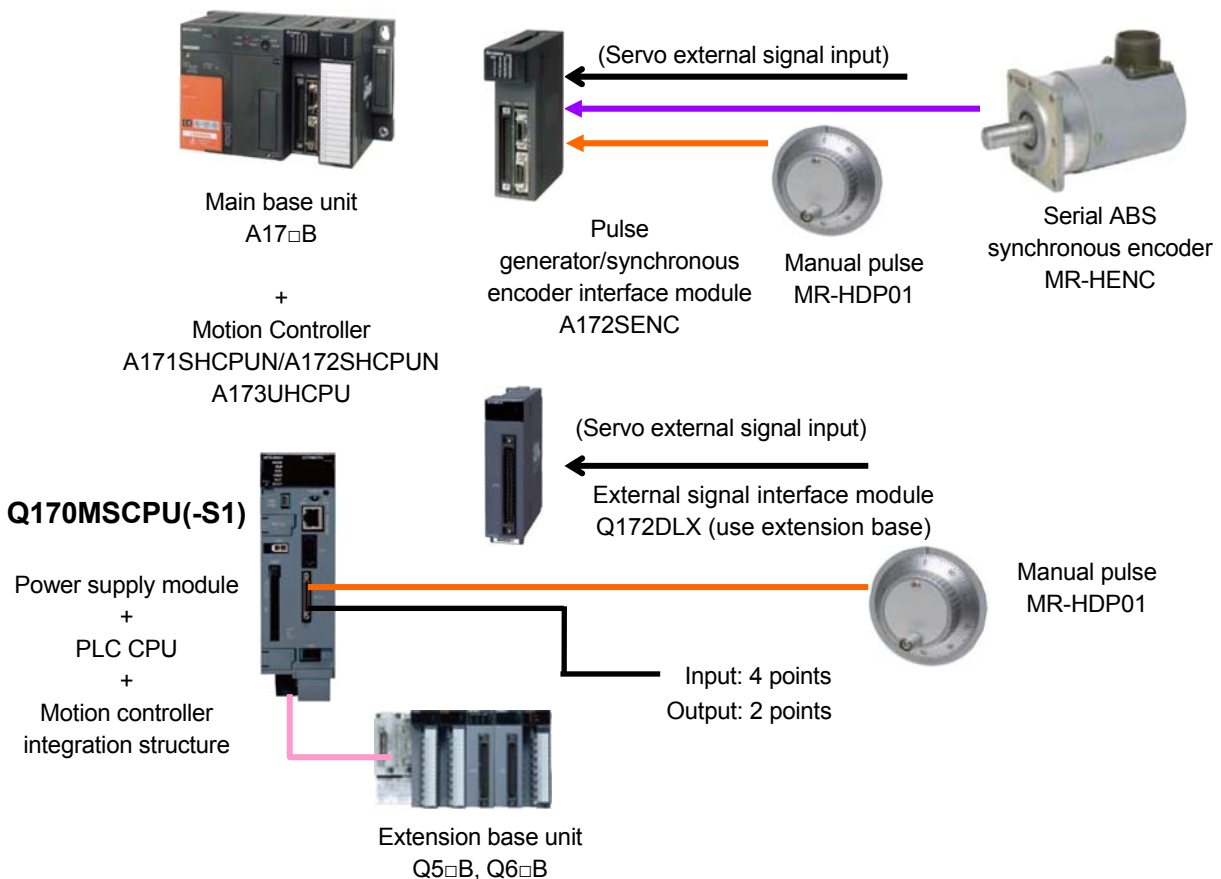
In the following chart, the difference between basic system of A-Motion and Q170MSCPU(-S1) is shown.

A-Motion corresponds to SSCNET as servo network, but Q170MSCPU(-S1) corresponds to SSCNET III. Accordingly, connectable servo amplifier will be changed.

The system configuration of A-Motion is initialized.

When Q170MSCPU(-S1) is used with PLCs or motion modules, an extension base unit (Q5□B or Q6□B) is required.

For the connection between Q170MSCPU(-S1) and a personal computer, RS-422 and SSCNET cannot be used. Connect them with USB, RS232, or Ethernet.

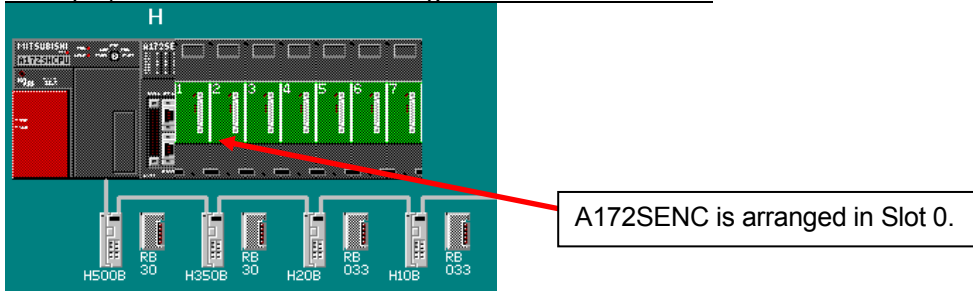


6.2 Precautions about Replacement

6.2.1 Slot position (system configuration)

When the motion module (A172SENC) used in A-motion is replaced with Q170MSCPU(-S1), the system configuration of the motion module is initialized as follows. Configure the setting again..

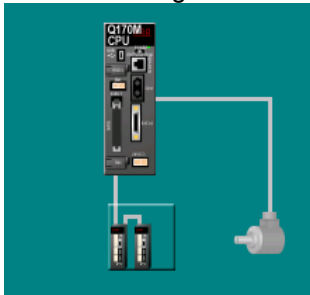
Example) When A172SENC is arranged in Slot 0 of A-Motion



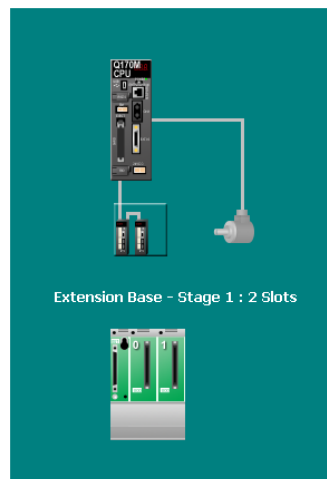
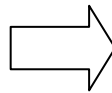
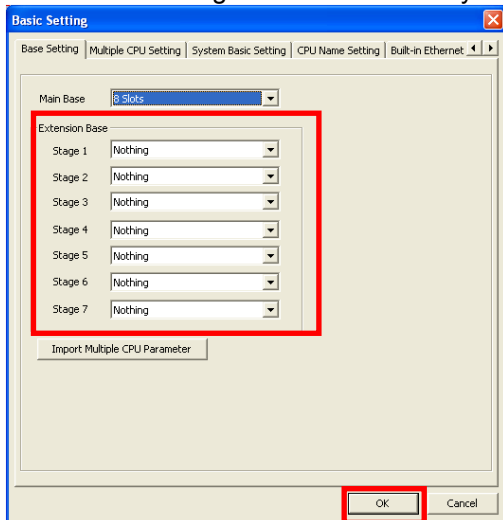
↓ A172SHCPUN is converted to Q170MSCPU(-S1)

The main base unit of A-Motion management is deleted and is converted in initialization status as follows.

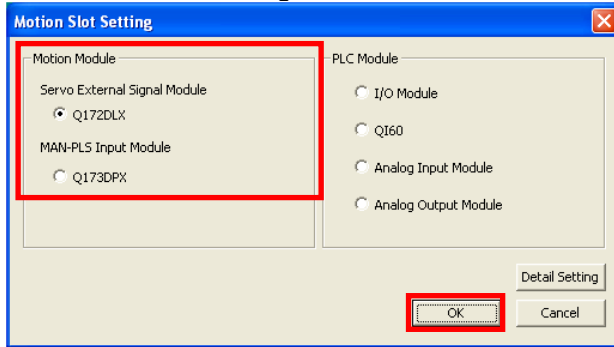
After converting A172SHCPUN to Q170MSCPU(-S1), execute as follows.



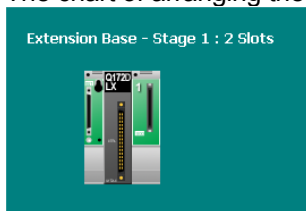
Execute the setting of extension base by "Basic Setting" --> "Base Setting" as follows.



Next, execute the setting of motion module.



The chart of arranging the motion module is as follows.



About other precautions, refer to "2. REPLACEMENT PROPOSAL FROM A-MOTION TO QDS-MOTION".

7. DIFFERENCE BETWEEN Q170MSCPU AND Q170MSCPU-S1

About the specification of Q170MSCPU-S1, the difference with Q170MSCPU is showed as center. About the content not described in this section, it has the same specification as Q170MSCPU.

Operating system software and peripheral software package use the same thing as Q170MSCPU.

7.1 Difference between Q170MSCPU and Q170MSCPU-S1

7.1.1 (1) Motion control specification

Q170MSCPU and Q170MSCPU-S1 have the same specification.

7.1.2 (2) Motion SFC performance specification

Q170MSCPU and Q170MSCPU-S1 have the same specification.

7.1.3 (3) PLC CPU part control specification

Item		Specification	
		Q170MSCPU	Q170MSCPU-S1
PLC CPU part		Q03UDCPU or equivalent	Q06UDHCPU or equivalent
	Program capacity	30k step	60k step
PLC type in creating program		Q03UD	Q06UDH
Model name displayed by system monitor		Q03UDCPU	Q06UDHCPU
Processing speed (PLC instruction)	LD instruction	0.02 μ s	0.0095 μ s
	MOV instruction	0.04 μ s	0.019 μ s
File registers (R, ZR)		98304 points	393216 points

7.1.4 (4) Power supply specification

Q170MSCPU and Q170MSCPU-S1 have the same specification.

7.1.5 (5) Battery life specification

As the program capacity increases and the processing speed is improved, the data-holding time while the power of Q170MSCPU-S1 is off is about one tenth of the data-holding time of Q170MSCPU. (The data-holding time varies greatly depending on the energization rate and ambient temperature of when data is held. For details, refer to Q170MSCPU/Q170MSCPU-S1 User's Manual.)

Select an appropriate battery for the usage environment.

4. REPLACEMENT FROM A-MOTION TO QN-MOTION

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1. OVERVIEW

This article explains the changes when a system using A173UHCPU/A172SHCPUN/A171SHCPUN (A-Motion) is replaced with a system using Q173CPUN/Q172CPUN (QN-Motion). For A173UHCPU-S1, A173UHCPU should be read as A173UHCPU-S1.

2. EQUIPMENT CONFIGURATION, AVAILABLE SOFTWARE

Please prepare modules, operating system software, and engineering environment according to the table in this article.

2.1 Equipment Correspondence

When Q173CPUN/Q172CPUN is used, use the products that support Q series.

Product		When A17nSHCPUN/A173UHCPU is used	When Q17nCPUN is used	
			Q172CPUN	Q173CPUN
PLC CPU module		<ul style="list-style-type: none"> • A173UHCPU • A172SHCPUN • A171SHCPUN 	QnHCPU	
Motion CPU module			Q173CPUN(-T) Q172CPUN(-T)	
Main base unit		<ul style="list-style-type: none"> • A172B • A175B • A178B(-S□) 	Q3□B	
Servo external signals interface module		A171SENC A172SENC	Q172LX	
Synchronous encoder interface module			Q172EX Q172EX-S2	
Manual pulse generator interface module			Q173PX	
Serial ABS synchronous encoder		MR-HENC	<-- (same as left)	
		-	Q170ENC	
Serial ABS synchronous encoder cable	For MR-HENC	MR-HSCBL□M	MR-JHSCBL□M	
	For Q170ENC	-	Q170ENCCBL□M	
Battery	For CPU module	A6BAT is built in CPU module.	→ Connect a built-in rechargeable battery or A6BAT from the external battery module (Note-1).	
	For synchronous encoder		A6BAT is built in Q172EX(-S2).	
Manual pulse generator		MR-HDP01	<-- (same as left)	
SSCNET cable (Note-2)	<u>When MR-H servo amplifier is used</u>	MR-HBUS□M	<u>With external battery</u> • Q172HBCBL□M-B <u>Without external battery</u> • Q172HBCBL□M	<u>With external battery</u> • Q173DVCBL□M + MR-J2HBUS□M <u>Without external battery</u> • Q173HB△CBL□M
	<u>When MR-J2S servo amplifier is used</u>	MR-J2HBUS□M-A	<u>With external battery</u> • Q172J2BCBL□M-B <u>Without external battery</u> • Q172J2BCBL□M	<u>With external battery</u> • Q173DVCBL□M + MR-J2HBUS□M-A <u>Without external battery</u> • Q173J2B△CBL□M

(Note-1): For QN-Motion, the long-term backup is available by using an external battery (A6BAT) in addition to the short-term backup with a built-in rechargeable battery.

When the external battery (A6BAT) is used, use the battery with Q173DV (when Q173CPUN is used) or Q170BAT (when Q172CPUN is used).

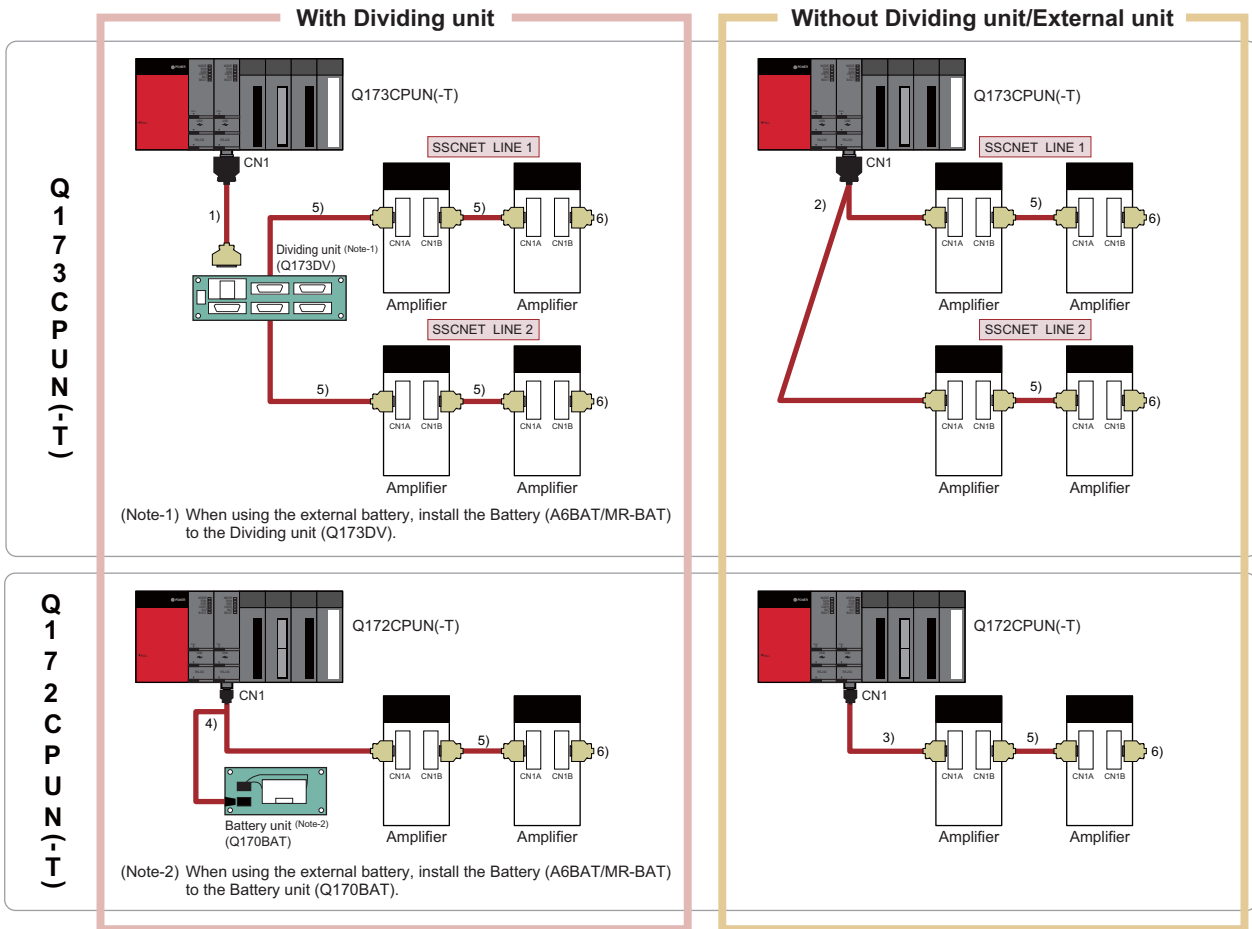
(Note-2): The models of SSCNET cables and others to be used differ depending on whether the external battery is used or not.

<Precautions>

- In addition to USB and RS-232C, SSCNET can also be used for the communication between Q173CPUN/Q172CPUN and a personal computer by using an SSCNET I/F board (A10BD-PCF/A30BD-PCF) or SSCNET I/F card (A30CD-PCF).
- iQ Platform modules cannot be used in the combination of the multiple CPU modules.
- Q173CPUN-T and Q172CPUN-T are compatible with teaching units (A31TU-D3□/A31TU-DN□).

2.2 Equipment Configuration of Q173CPUN/Q172CPUN Motion

Connection method with servo amplifiers



SSCNET cable model

Application	Cable model	Cable length	Connection details
1) Q173CPUN(-T) ↔ Distribution unit	Q173DVCBL□M	0.5m, 1m	• Q173CPUN(-T) ↔ Distribution unit (Q173DV)
2) Q173CPUN(-T) ↔ Servo amplifier ^(Note-1)	Q173J2B△CBL□M ^(Note-3)	0.5m, 1m, 5m	• Q173CPUN(-T) ↔ Servo amplifier (MR-J2□-B ^(Note-4))
3) Q172CPUN(-T) ↔ Servo amplifier	Q172J2BCBL□M	0.5m, 1m, 5m	• Q172CPUN(-T) ↔ Servo amplifier (MR-J2□-B ^(Note-4))
	FR-V5NSCBL□	0.5m, 1m, 5m, 10m, 20m	• Q172CPUN(-T) ↔ FR-V5NS ^(Note-5)
4) Q172CPUN(-T) ↔ Servo amplifier ↔ Battery module	Q172J2BCBL□M-B	0.5m, 1m, 5m	• Q172CPUN(-T) ↔ Servo amplifier (MR-J2□-B ^(Note-4)) ↔ Battery module (Q170BAT)
5) Servo amplifier ↔ Servo amplifier Distribution unit ↔ Servo amplifier	MR-J2HBUS□M-A	0.5m, 1m, 5m	• Servo amplifier (MR-J2□-B ^(Note-4)) ↔ Servo amplifier (MR-J2□-B ^(Note-4)) • Distribution unit Q173DV ↔ Servo amplifier (MR-J2□-B ^(Note-4))
	Q172J2BCBL□M	0.5m, 1m, 5m	• Servo amplifier (MR-J2□-B ^(Note-4)) ↔ FR-V5NS ^(Note-5) • Distribution unit (Q173DV) ↔ FR-V5NS ^(Note-5)
	FR-V5NSCBL□	0.5m, 1m, 5m, 10m, 20m	• FR-V5NS ^(Note-5) ↔ FR-V5NS ^(Note-5)
6) Termination resistor	MR-A-TM	-	• Connect to the SSCNET last servo amplifier (MR-J2□-B ^(Note-4)).

(Note-1) Separated into the number of systems from the connector on the Q173CPUN(-T) side.

(Note-2) □: Cable length. When the cable length is 0.5m, specify 0.5 in □.

(Note-3) △: Number of separated SSCNET systems (None: 1 system, 2: 2 systems, 4: 4 systems)

(Note-4) MR-J2□-B: MR-J2S-□B/MR-J2M-P8B/MR-J2-03B5

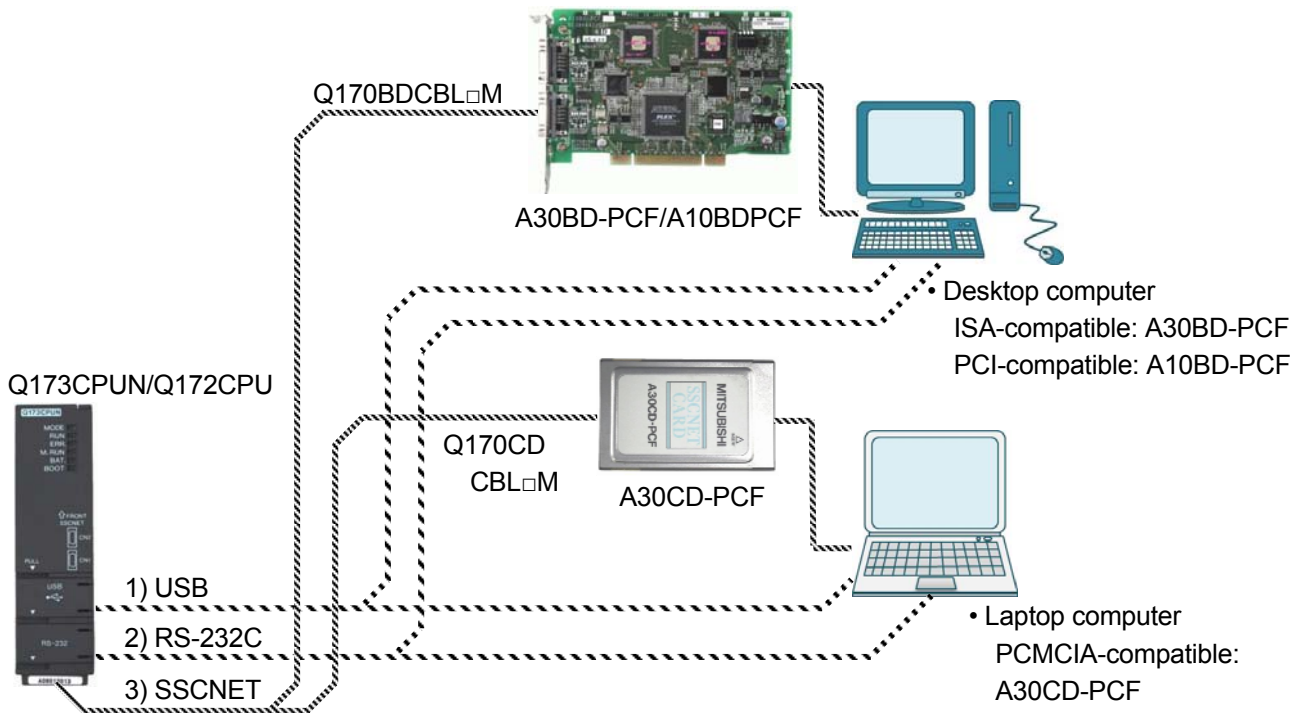
(Note-5) SSCNET communication option for the vector inverter FREQROL-V500 series

Precautions for use:

When Q173DV (External battery-mountable) is used with Q173CPUN, up to four systems (eight axes per system) can be used.

When Q173J2B△CBL□M is used with Q173CPUN, up to four systems (eight axes per system) can be used.

Connection with personal computers



When 1) USB or 2) RS-232C is used

Although RS422 is used for A-Motion, RS-232C or USB is used for Q173CPUN/Q172CPUN.

Use an appropriate cable for the desktop or laptop computer that is being used.

When 3) SSCNET is used

Although A270BDCBL□M and A270CDCBL□M cables are used for A-Motion, use Q170BDCBL□M and Q170CDCBL□M cables.

(Caution)

Using A30BD-PCF, A10BD-PCF, and A30CD-PCF are not recommended because the number of personal computers with ISA, PCI, or PCMCIA, the interfaces appropriate for them, is decreasing and these models cannot be used on Windows7 (64bit) and Windows8.

2.3 Operating System Software Correspondence

Use an operating system for Q173CPUN/Q172CPUN.

Application	When A17nSHCPUN/A173UHCPU is used		When Q17nCPUN is used	
	Model		Model	
For conveyor assembly (SV13)	For A173UHCPU	SW2SRX-SV13B	For Q173CPUN	SW6RN-SV13QB
		SW2NX-SV13B		
		SW3RN-SV13B		
	For A172SHCPUN	SW0SRX-SV13D	For Q172CPUN	SW6RN-SV13QD
		SW0NX-SV13D		
		SW3RN-SV13D		
	For A171SHCPUN	SW2SRX-SV13G	For Q173CPUN	SW6RN-SV22QA
		SW0NX-SV13G		
		SW2SRX-SV22A		
For automatic machinery (SV22)	For A173UHCPU	SW2NX-SV22A	For Q172CPUN	SW6RN-SV22QC
		SW3RN-SV22A		
		SW0SRX-SV22C		
	For A172SHCPUN	SW0NX-SV22C	For Q173CPUN	SW5RN-SV43QA
		SW3RN-SV22C		
		SW0SRX-SV22F		
	For A171SHCPUN	SW0NX-SV22F	For Q172CPUN	SW5RN-SV43QC
		SW2SRX-SV43A		
		SW2NX-SV43A		
For automatic machinery (SV43)	For A173UHCPU	SW0SRX-SV43C	For Q173CPUN	SW5RN-SV43QA
		SW0NX-SV43C		
		SW0SRX-SV43F		
	For A172SHCPUN	SW0NX-SV43F	For Q172CPUN	SW5RN-SV43QC
		SW2SRX-SV43A		
		SW2NX-SV43A		
	For A171SHCPUN	SW0SRX-SV43C	For Q173CPUN	SW5RN-SV43QA
		SW0NX-SV43C		
		SW0SRX-SV43F		
For A171SHCPUN	SW0NX-SV43F	For Q172CPUN	SW5RN-SV43QC	
	SW2SRX-SV43A			
	SW2NX-SV43A			

2.4 Engineering Environment

The following shows the engineering environment that support Q173CPUN/Q172CPUN.

After the purchase of the following software, download and update to the latest version of them from the Mitsubishi Electric FA Site.

Product	Model	Available version	Remarks
MELSOFT MT Works2	SW1DNC-MTW2-E	Ver.1.52E or later	
MELSOFT GX Works2	SW1DNC-GXW2-E	Ver.1.50C or later	Install GX Developer as well when installing GX Works2 ^(Note-1) .

(Note-1): Install GX Developer together when installing MELSOFT GX Works2.

In "Section 2.4.3 Program Diversion Procedure in PLC CPU Side", GX Developer will be required to convert a sequence program.

3. DIFFERENCES BETWEEN Q173CPUN/Q172CPUN AND A173UHCPU/A172SHCPUN/A171SHCPUN

3.1 Differences between Q173CPUN/Q172CPUN and A173UHCPU/A172SHCPUN/A171SHCPUN

3.1.1 Differences list

Item	Q17nCPUN	A17nSHCPUN/A173UHCPU			Points of replacement	
		A171SH	A172SH	A173UH		
Peripheral I/F	• USB/RS-232/SSCNET	RS422/SSCNET			Communicate with peripheral equipment using appropriate I/Fs.	
Battery	Built-in rechargeable battery (If a power failure lasts for one month or longer, add an external battery A6BAT/ MR-BAT.)	A6BAT is built in. (3.6 V)				
Forced stop input	Specify a bit device (PX, M) with a parameter (Forced stop terminals of the servo amplifier can be used).	Use EMG terminals of the main base unit.			Always use a forced stop input cable (sold separately). Otherwise, the forced stop cannot be canceled.	
I/O points	8192 points	2048 points		8192 points	-	
Device	Internal relays (M)	8192 points in total of M and L		2048 points in total (shared use of M, L, S)	8192 points in total (shared use of M, L, S)	
	Latch relays (L)					
	Step relays (S)					-
	Link relays (B)	8192 points	1024 points		8192 points	The devices on the left are shared in A-Motion but not shared in Q-Motion. Configure the automatic refresh setting if necessary. For details, refer to Chapter 5.
	Timers (T)	-	256 points		2048 points	
	Counters (C)	-	256 points		2048 points	
	Data registers (D)	8192 points	1024 points		8192 points	
	Link registers (W)	8192 points	1024 points		8192 points	
	Annunciators (F)	2048 points	256 points		2048 points	
	File registers (R)	-	Up to 8192 points			
	Special relays (M)	256 points	256 points			
	Special registers (D)	256 points	256 points			
	Coasting timers (FT)	1 point (888μs)	-			
	Motion registers (#)	8192 points	-	8192 points (Motion SFC OS only)		
	Multiple CPU shared devices (U□G)	Up to 4096 points	-			
Motion dedicated sequence instruction	S(P).SFCS, S(P).SVST, S(P).CHGA, S(P).CHGV, S(P).CHGT, S(P).DDRD, S(P).DDWD, S(P).GINT	CHGT, CHGV, CHGA			Replace motion dedicated PLC instructions with S(P).*** instructions. (Refer to Chapter 3 of SV13/22 Programming Manual (Motion SFC) [type Q173D(S)/Q172D(S)].)	
		SVST (Non Motion SFC OS only)				
Motion module	SV13	A171SENC, A172SENC			Use motion modules Q172LX, Q172EX-S2, and Q173PX in the system using Q173CPUN/Q172CPUN.	
	SV22					Q172LX, Q172EX-S2 ^(Note-1) , Q173PX
	Installation position	Motion modules can be installed in a free slot of CPU.	Motion modules can be installed in motion I/O slots only.			

(Note-1): Can be installed to main base units only.

(Continued)

Item	Q17nCPUN	A17nSHCPUN/A173UHCPU			Points of replacement	
		A171SH	A172SH	A173UH		
System setting	<ul style="list-style-type: none"> Qn(H)CPU will be CPU No.1. Use main base units Q33B, Q35B, Q38B, and Q312B. 	<ul style="list-style-type: none"> Multiple CPU system is not supported. Main base unit is A17□B. (A172B, A175B, A178B, A178B-S1, A178B-S2, and A178B-S3) 			Use appropriate units in combination.	
Servo system network	SSCNET	SSCNET			Refer to Section 3.1.3.	
Teaching unit	Usable	Usable			Use A31TU-D□ series.	
Automatic refresh	Memory to be used	Multiple CPU transmission area in CPU shared memory	SCPU and PCPU share the same devices.			After the project diversion, manually assign the devices used by the PLC CPU to devices in the Motion CPU in the automatic refresh setting.
	Automatic refresh setting	For the setting 1 to 4, devices (D/W/#/M/Y/B) of up to 2k words can be set per CPU.				
LED display	Each LED of RUN, ERR	Each LED of RUN, ERR			-	
Latch range setting	Latch (1)	Range that can be cleared with the latch clear key	Latch range setting is 1 setting only. The range is cleared with the L.CLR switch.			-
	Latch (2)	Range that cannot be cleared with the latch clear key				
All clear function	All user data and password settings are deleted.	None			-	
Self diagnosis error	Motion SFC error detection flag (M2039) turns on when an error is detected. Self diagnosis error flag (M9008) and Diagnosis error flag (M9010) does not turn on when an error is detected. When a Motion CPU-specific error occurs, the error details are set to D9008.	Even though a PCPU error occurs, a self diagnosis error will not occur.			Correct the program if necessary.	
Motion error detection flag (M2039)	No matter which error occurs, M2039 will be ON in Motion CPU.	-	Depending on the type of the error that occurred, M2039 is turned ON (only when SFC is used).		Correct the program if necessary.	
Latch clear	RESET/L.CLR switch ^(Note-1)	L.CLR switch			-	
RUN/STOP	RUN/STOP switch	RUN/STOP switch			-	
ROM writing	Execute in the installation/ROM writing mode.	None			-	
ROM operation mode	Select with the DIP switch.	None			-	
Installation mode		Select with the DIP switch.			-	

(Note-1): In the multiple CPU system, PLC CPUs/Motion CPUs of No.2 to No.4 cannot be reset individually. The whole multiple CPU system stops. To reset the whole system, reset the PLC CPU of No.1.

(Continued)

Item		Q17nCPUN		A17nSHCPUN/A173UHCPU			Points of replacement
		Q172CPUN	Q173CPUN	A171SH	A172SH	A173UH	
Operation cycle (Default value)	SV13	0.88ms/ 1 to 8 axes	0.88ms/ 1 to 8 axes 1.77ms/ 9 to 16 axes 3.55ms/ 17 to 32 axes	3.55ms/ 1 to 4 axes	3.55ms/ 1 to 8 axes	3.55ms/ 1 to 20 axes 7.11ms/ 21 to 32 axes	When the operation cycle is set as default (automatic), the operation cycle will change. The operation cycle may change as shown on the left, and the program execution timing will change. Set a fixed operation cycle if necessary.
	SV22	0.88ms/ 1 to 4 axes 1.77ms/5 to 8 axes	0.88ms/ 1 to 4 axes 1.77ms/ 5 to 12 axes 3.55ms/ 13 to 24 axes 7.11ms/ 25 to 32 axes	3.55ms/ 1 to 4 axes	3.55ms/ 1 to 8 axes	3.55ms/ 1 to 12 axes 7.11ms/ 13 to 24 axes 14.22ms/ 25 to 32 axes	

3.1.2 Differences between self diagnosis error and Motion (SFC) error history

Self diagnosis error code		Description	Error flag state ○: ON ✕: OFF			
Q17nCPUN (D9008)	A17nSHCPUN/ A173UHCPU (D9008)		Self diagnosis error flag		Motion error detection flag	
			Q17nCPUN (M2324/M9008)	A17nSHCPUN/ A173UHCPU (M9008)	Q17nCPUN (M2039)	A172SHCPUN/ A173UHCPU (M2039)
-	10	INSTRCT CODE ERR.	✕	○	✕	✕
3001 to 3013	11	PARAMETER ERROR	○	○	✕	✕
-	12	MISSING END INS.	✕	○	✕	✕
-	13	CAN'T EXECUTE (P).	✕	○	✕	✕
-	14	CHK FORMAT ERR.	✕	○	✕	✕
-	15	CAN'T EXECUTE (I)	✕	○	✕	✕
1105	20	RAM ERROR	○	○	✕	✕
-	21	OPE. CIRCUIT ERR.	✕	○	✕	✕
-	22	WDT ERROR	✕	○	✕	✕
-	24	END NOT EXECUTE	✕	○	✕	✕
-	25	WDT ERROR	✕	○	✕	✕
-	31	UNIT VERIFY ERR.	✕	○	✕	✕
1300	32	FUSE BREAK OFF	○	○	✕	✕
1413 to 1416	40	CONTROL-BUS ERR.	○	○	✕	✕
1401	41	SP.UNIT DOWN	○	○	✕	✕
-	43	I/O INT.ERROR"	✕	○	✕	✕
2121 to 2126	44	SP.UNIT LAY.EROR.	○	○	✕	✕
-	46	SP.UNIT ERROR	✕	○	✕	✕
-	47	LINK PARA.ERROR	✕	○	✕	✕
-	50	OPERATION ERROR	✕	○	✕	✕
1600 to 1601	70	BATTERY ERROR	○	○	✕	✕
1500	-	AC/DC DOWN	○	✕	✕	✕
7000 to 7003	-	MULTI CPU DOWN	○	✕	✕	✕
7010	-	MULTI EXE. ERROR	○	✕	✕	✕
7020	-	MULTI CPU ERROR	○	✕	✕	✕
10000	-	COUNT.UNIT ERROR	○	✕	○	✕

3.1.3 Items required to be changed/ revised with the servo system network change

Item	Differences		Change/Revise content
	Q17nCPUN	A17nSHCPUN/ A173UHCPU	
System setting/ SSCNET configuration	Q172CPUN: 1 system Q173CPUN: 4 systems (up to 8 axes/system)	A171SHCPUN: 1 system A172SHCPUN: 1 system A173UHCPU: 4 system (up to 8 axes/system)	Configure the rotary switch setting of servo amplifiers and connect the servo amplifiers considering the SSCNET configuration.
Home position return function	Proximity dog type (2 types), Count type (3 types), Data set type (2 types), Dog cradle type, Stopper type (2 types), Limit switch combined type (with the home position return retry function and home position shift function)	Proximity dog type, Count type, Data set type	Review this item according to the SSCNET configuration.
Manual pulse generator operation function	3 modules can be connected.	A171SHCPUN: 1 module A172SHCPUN: 1 module A173UHCPU(-S1): 3 modules	Review this item according to the SSCNET configuration.
Synchronous encoder operation function	Q172CPUN: 8 modules Q173CPUN: 12 modules	A171SHCPUN: 1 module A172SHCPUN: 1 module A173UHCPU(-S1): 4 modules	Review this item according to the SSCNET configuration.
Electronic gear	Number of pulses per revolution: 1 to 2147483647 Travel value per revolution: 1 to 2147483647 Unit magnification: None (x1)	Number of pulses per revolution: 1 to 65535 Travel value per revolution: 1 to 65535 Unit magnification: x1, x10, x100, x1000	Change the number of pulses per revolution and the travel value per revolution of the fixed parameter according to the resolution per revolution of the connected servo motor.
Forced stop input	Specify a bit device (PX, M) with a parameter (Forced stop terminals of the servo amplifier can be used).	Emergency stop of basic units (Forced stop terminals of the servo amplifier cannot be used)	Review this item because the forced stop method changes.

3.2 Device Comparison

3.2.1 I/O device

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN
X/Y0	User device (8192 points)	User device (8192 points)	User device (2048 points)	
X/Y7FF				
X/Y800				
X/Y1FFF				

3.2.2 Internal relay

(1) SV13

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN		
M0	User device (2000 points)	User device (2000 points)	User device (1600 points)			
M1600			Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)		
M1680			Unusable (40 points)	Unusable (120 points)		
M1760						
M1800			Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)		
M1880				Unusable (80 points)		
M1960			Common device (320 points)	Common device (320 points)	Common device (88 points)	
M2000						
M2047						
M2048						
M2320	Special relay allocation device (80 points)	Unusable (80 points)				
M2400	Status of each axis (20 points x 32 axes)	Status of each axis (20 points x 32 axes)				
M3040	Unusable (32 points)	Unusable (160 points)				
M3072	Common device (command signal) (64 points)					
M3136	Special relay allocation device (64 points)					
M3200	Command signal of each axis (20 points x 32 axes)	Command signal of each axis (20 points x 32 axes)				
M3840	User device (4352 points)	User device (4352 points)				
M8191						

(2) SV22 Real mode

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN	
M0	User device (2000 points)	User device (2000 points)	User device (1360 points)		
M1360			Synchronous encoder axis status (4 points x 1 axis)		
M1364			User device (236 points)		
M1600			Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)	
M1680			Unusable (40 points)	Unusable (120 points)	
M1760					
M1800			Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)	
M1880				Unusable (80 points)	
M1960			Common device (88 points)		
M2000					
M2047	Common device (320 points)				
M2048	Unusable (80 points)				
M2320	Status of each axis (20 points x 32 axes)				
M2400	Unusable (32 points)				
M3040	Unusable (160 points)				
M3072		Common device (command signal) (64 points)			
M3136		Special relay allocation device (64 points)			
M3200	Command signal of each axis (20 points x 32 axes)	Command signal of each axis (20 points x 32 axes)			
M3840	User device (800 points)	User device (800 points)			
M4640	Synchronous encoder axis status (4 points x 12 axes)	Synchronous encoder axis status (4 points x 4 axes)			
M4656					
M4688	User device (752 points)	User device (3536 points)			
M5440	Synchronous encoder axis command signal (4 points x 12 axes)				
M5488	User device (2704 points)				
M8191					

When the virtual mode is used, do not set the latch range as M4000 to M5599.

(3) SV22 Virtual mode

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN		
M0	User device (2000 points)	User device (2000 points)	User device (1360 points)			
M1200			Virtual servo motor axis status (20 points x 8 axes)	Virtual servo motor axis status ^{(Note-1)(Note-2)} (20 points x 4 axes)		
M1280				User device ^(Note-2) (80 points)		
M1360			Synchronous encoder axis status (4 points x 1 axis) ^(Note-2)			
M1364			Unusable ^(Note-2) (36 points)			
M1400			Virtual servo motor axis command signal (20 points x 8 axes)	Virtual servo motor axis command signal ^{(Note-1)(Note-2)} (20 points x 4 axes)		
M1480				User device ^(Note-2) (80 points)		
M1560			Synchronous encoder axis command signal (4 points x 1 axis) ^(Note-2)			
M1564			Unusable (36 points)			
M1600			Status of each axis (20 points x 8 axes)	Status of each axis (20 points x 4 axes)		
M1680				Unusable (120 points)		
M1760			Unusable (40 points)	Unusable (120 points)		
M1800			Command signal of each axis (20 points x 8 axes)	Command signal of each axis (20 points x 4 axes)		
M1880				Unusable (80 points)		
M1960			Common device (88 points)			
M2000			Common device (320 points)	Common device (320 points)		
M2048			Common device (320 points)	Common device (320 points)		
M2320			Special relay allocation device (80 points)	Unusable (80 points)		
M2400			Status of each axis (20 points x 32 axes)	Status of each axis (20 points x 32 axes)		
M3040			Unusable (32 points)	Unusable (160 points)		
M3072	Common device (command signal) (64 points)					
M3136	Special relay allocation device (64 points)					
M3200	Command signal of each axis (20 points x 32 axes)	Command signal of each axis (20 points x 32 axes)				
M3840	Unusable (160 points)	Unusable (60 points)				

(Continued)

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN
M4000	Virtual servo motor axis status (20 points x 32 axes) (Only mechanical system setting axes uses)	Virtual servo motor axis status ^{(Note-1)(Note-3)} (20 points x 32 axes)	/	
M4640	Synchronous encoder axis status (4 points x 12 axes)	Synchronous encoder axis status ^(Note-3) (4 points x 4 axes)		
M4656		Unusable ^(Note-3) (144 points)		
M4688	Unusable (112 points)			
M4800	Virtual servo motor axis command signal (20 points x 32 axes) (Only mechanical system setting axes uses)	Virtual servo motor axis command signal ^{(Note-1)(Note-3)} (20 points x 32 axes)		
M5440	Synchronous encoder axis command signal (4 points x 12 axes)	Synchronous encoder axis command signal ^(Note-3) (4 points x 4 axes)		
M5456				
M5488	Cam axis command signal (1 points x 32 axes) (Only mechanical system setting axes uses)	Unusable ^(Note-3) (32 points)		
M5520	Smoothing clutch completion signal (2 points x 32 axes)			
M5584	Unusable (16 points)			
M5600	User device (2592 points)			
M8191				

(Note-1): Only the areas of axes set with the mechanical system program are occupied. The areas of the axes not used by the mechanical system program can be used by users.

(Note-2): When using virtual mode, do not set latch range as M1200 to M1599.

(Note-3): When using virtual mode, do not set latch range as M4000 to M5487.

(Note-4): Cam axis command signal and smoothing clutch completion signal can be set to any device using parameters.

3.2.3 Data register

(1) SV13

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN
D0	Monitor device of each axis (20 points x 32 axes)	Monitor device of each axis (20 points x 32 axes)	User device (800 points)	
D640	Control change register (2 points x 32 axes)	Control change register (2 points x 32 axes)		
D704	Common device (96 points)	Common device (96 points)		
D800	User device (7392 points)	User device (7392 points)	Monitor device of each axis (20 points x 8 axes)	Monitor device of each axis (20 points x 4 axes)
D880				Unusable (80 points)
D960			Control change register (6 points x 8 axes)	Control change register (6 points x 4 axes)
D984				Unusable (24 points)
D1008			Common device (16 points)	
D1023				
D1024				
D8191				

(2) SV22 Real mode

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN
D0	Monitor device of each axis (20 points x 32 axes)	Monitor device of each axis (20 points x 32 axes)	User device (748 points)	
D640	Control change register (2 points x 32 axes)	Control change register (2 points x 32 axes)		
D704	Common device (96 points)	Common device (96 points)		
D748			User device (48 points)	
D752				
D800	User device (320 points)	User device (320 points)	Monitor device of each axis ^(Note-1) (20 points x 8 axes)	Monitor device of each axis (20 points x 4 axes)
D880			Unusable (80 points)	
D960			Control change register (6 points x 8 axes)	Control change register (6 points x 4 axes)
D984			Unusable (24 points)	
D1008			Common device (16 points)	
D1023				
D1024				
D1120	Synchronous encoder axis monitor device (10 points x 12 axes)	Synchronous encoder axis monitor device ^(Note-1) (6 points x 4 axes)	/	
D1144				
D1240	User device (6952 points)	User device (7048 points)		
D8191				

(Note-1): This device can be used as a user device when used only in the SV22 real mode.

(3) SV22 Virtual mode

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN				
D0	Monitor device of each axis (20 points x 32 axes)	Monitor device of each axis (20 points x 32 axes)	User device (670 points)					
D640			Control change register (2 points x 32 axes)	Control change register (2 points x 32 axes)	Current value of differential gear of virtual servo motor axis main shaft ^(Note-1) (2 points x 8 axes)	Current value of differential gear of virtual servo motor axis main shaft ^(Note-1) (2 points x 4 axes)		
D670						User device (8 points)		
D678					Current value of differential gear of synchronous encoder axis main shaft ^(Note-1) (2 points x 1 axis)			
D686					Unusable (12 points)			
D688					Common device (command signal) (96 points)	Common device (96 points)	Virtual servo motor axis monitor device ^(Note-1) (6 points x 8 axes)	Virtual servo motor axis monitor device ^(Note-1) (6 points x 4 axes)
D700								User device (24 points)
D704	Synchronous encoder axis monitor device (4 points x 1 axis) ^(Note-1)							
D724	Unusable (8 points)							
D748	Cam axis monitor device ^(Note-1) (5 points x 8 axes)	Cam axis monitor device ^(Note-1) (5 points x 4 axes)	Cam axis monitor device ^(Note-1) (5 points x 4 axes)					
D752			User device (20 points)					
D758	Virtual servo motor axis monitor devices (6 points x 32 axes)	Virtual servo motor axis monitor device ^(Note-1) (6 points x 32 axes)	Monitor device of each axis ^(Note-1) (20 points x 8 axes)	Monitor device of each axis (20 points x 4 axes)				
D760				Unusable (80 points)				
D780			Control change register (6 points x 8 axes)	Control change register (6 points x 4 axes)	Control change register (6 points x 4 axes)			
D800					Unusable (24 points)			
D880			Common device (16 points)					
D960			Current value after differential gear of virtual servo motor axis main shaft (4 points x 32 axes)	Current value after differential gear of virtual servo motor axis main shaft ^(Note-1) (4 points x 32 axes)	/			
D984								
D1008								
D1023								
D1024	/							
D1119								

(Continued)

	Q17nCPUN	A173UHCPU	A172SHCPUN	A171SHCPUN
D1120	Synchronous encoder axis monitor device (6 points x 12 axes) Current value after differential gear of synchronous encoder axis main shaft (4 points x 12 axes)	Synchronous encoder axis monitor device ^(Note-1) (6 points x 4 axes) Current value after differential gear of synchronous encoder axis main shaft (4 points x 4 axes)	/	/
D1160		Unusable (80 points)		
D1192				
D1240	Cam axis monitor device ^(Note-1) (10 points x 32 axes)	Cam axis monitor device ^(Note-1) (10 points x 32 axes)		
D1560 D8191	User device (6632 points)	User device (6632 points)		

(Note-1): Only the areas of axes set with the mechanical system program are occupied. The areas of the axes not used by the mechanical system program can be used by users.

3.2.4 Motion register

	Q17nCPUN	(SFC version only) A173UHCPU	(SFC version only) A172SHCPUN	(SFC version only) A171SHCPUN
#0 #7999	User device (8000 points)	User device (8000 points)		/
#8000	Past 7 times error information (oldest error information)	SFC Error history (8 times) (64 points)	Past 7 times error information (oldest error information)	
#8008	Past 6 times error information		Past 6 times error information	
#8016	Past 5 times error information		Past 5 times error information	
#8024	Past 4 times error information		Past 4 times error information	
#8032	Past 3 times error information		Past 3 times error information	
#8040	Past 2 times error information		Past 2 times error information	
#8048	Past 1 times error information		Past 1 times error information	
#8056	Latest error information		Latest error information	
#8064 #8191	Servo monitor device (128 points)	Unusable (128 points)		

3.2.5 Special relay

Device number			Name	Remarks
Q17nCPUN	A17nSHCPUN/ A173UHCPU			
M2320	M9000	M9000	Fuse blown detection flag	
-		M9002	I/O module verification error	
-		M9004	MINI link error	A173UHCPU only
M2321	M9005	M9005	AC DOWN detection flag	Q17nCPUN: AC/DC DOWN detection
M2322	M9006	M9006	Low battery flag	
M2323	M9007	M9007	Low battery latch flag	
M2324	M9008	M9008	Self diagnosis error flag	
-		M9009	Annunciator detection	
M2325	M9010	M9010	Diagnosis error flag	
-		M9011	Operation error flag	
-		M9012	Carry flag	
-		M9016	Data memory clear flag (all data)	
-		M9017	Data memory clear flag (non-latch data)	
-		M9020	User timing clock No.0	
-		M9021	User timing clock No.1	
-		M9022	User timing clock No.2	
-		M9023	User timing clock No.3	
-		M9024	User timing clock No.4	
M3136	M9025	M9025	Clock data set requirement	
M2328	M9026	M9026	Clock data error	
-		M9027	Clock data display	
M3137	M9028	M9028	Clock data reading requirement	
-		M9029	Data communication requirement batch processing	
-		M9030	0.1 second clock	
-		M9031	0.2 second clock	
-		M9032	1 second clock	
-		M9033	2 second clock	
-		M9034	1 minute clock	
M2326	M9036	M9036	Always ON	
M2327	M9037	M9037	Always OFF	
-		M9038	Only 1 scan is ON after RUN	
-		M9039	RUN flag (only 1 scan is OFF after RUN)	
-		M9040	PAUSE enabled coil	
-		M9041	PAUSE status contact	
-		M9042	Stop status contact	
-		M9043	Sampling trace completion	
-		M9044	Sampling trace	
-		M9045	Reset watchdog timer (WDT)	
-		M9046	Sampling trace	A173UHCPU only
-		M9047	Sampling trace preparation	A173UHCPU only
-		M9049	Switch output characters number	
-		M9051	CHG command execution inhibition	A173UHCPU only
-		M9052	Switch SEG command	
-		M9053	Switch EI/DI command	
-		M9054	STEP RUN flag	
-		M9055	Status latch completion flag	

* Q17nCPUN has only four blocks for automatic refresh. If the number of blocks is insufficient, change the device numbers of special relays to M2000s and use them.

(Continued)

Device number		Name	Remarks
Q17nCPUN	A17nSHCPUN/ A173UHCPU		
-	M9056	Main side P, I setting requirement	
-	M9057	Sub side P, I setting requirement	
-	M9058	Main side P, I setting completion	
-	M9059	Sub side P, I setting completion	
-	M9065	Partition processing execution detection	
-	M9066	Partition processing requirement flag	
-	M9070	Required search time of A8UPU/A8PUJ	
M2329	M9073	M9073	Motion CPU WDT error flag
M2330	M9074	M9074	PCPU preparation completion flag
M2331	M9075	M9075	Test mode flag
M2332	M9076	M9076	Forced stop input flag
M2333	M9077	M9077	Manual pulse axis setting error flag
M2334	M9078	M9078	Test mode requirement error flag
M2335	M9079	M9079	Servo program setting error flag
-	M9081	Communication requirement register area BUSY signal	
-	M9084	Error check	
-	M9091	Command error flag	
-	M9094	I/O exchange flag	
-	M9100	SFC program existence	
-	M9101	Start/stop SFC program	
-	M9102	Start status of SFC program	
-	M9103	Continuous transition existence	
-	M9104	Continuous transition prevention flag	
-	M9108	Start step transition monitoring timer (support to D9108)	
-	M9109	Start step transition monitoring timer (support to D9109)	
-	M9110	Start step transition monitoring timer (support to D9110)	
-	M9111	Start step transition monitoring timer (support to D9111)	
-	M9112	Start step transition monitoring timer (support to D9112)	
-	M9113	Start step transition monitoring timer (support to D9113)	
-	M9114	Start step transition monitoring timer (support to D9114)	
-	M9180	Active step sampling trace completion flag	
-	M9181	Active step sampling trace execution flag	
-	M9182	Enable active step sampling trace	
-	M9196	Operation output of block stop	
-	M9197	Fuse blown/I/O verification error display switching	
-	M9198		
-	M9199	Data return of online sampling trace status latch	

* Q17nCPUN has only four blocks for automatic refresh. If the number of blocks is insufficient, change the device numbers of special relays to M2000s and use them.

3.2.6 Special register

Device number		Name	Remarks
Q17nCPUN	A17nSHCPUN/ A173UHCPU		
D9000	D9000	Fuse blown	
-	D9002	I/O module verification error	
-	D9004	MINI link error	A173UHCPU only
D9005	D9005	AC DOWN counter	
D9008	D9008	Self diagnosis error	
-	D9009	Annunciator detection	
-	D9010	Error step	D9010: Diagnosis error occurrence time (calendar, month)
-	D9011	Error step	D9011: Diagnosis error occurrence time (date, hour)
-	D9014	I/O control method	D9014: Error information
D9015	D9015	CPU operation status	
-	D9016	A17nSHCPUN: ROM/RAM setting A173UHCPUN: Program number	
-	D9017	Minimum scan time (10ms unit)	SD520: Current main cycle (1ms unit)
-	D9018	Scan time (10ms unit)	SD521: Maximum main cycle (1ms unit)
-	D9019	Maximum scan time (10ms unit)	SD524: Maximum operation cycle (1μs unit)
-	D9020	Constant scan (10ms unit)	A173UHCPU only SD523: Motion setting operation cycle (1μs unit)
-	D9021	Scan time (1ms unit)	A173UHCPU only SD522: Motion operation cycle (1μs unit)
-	D9022	Time (1 second unit)	A173UHCPU only
D9025	D9025	Clock data (calendar, month)	
D9026	D9026	Clock data (date, hour)	
D9027	D9027	Clock data (minute, second)	
D9028	D9028	Clock data (0, week)	
-	D9035	Expansion file register	A173UHCPU only
-	D9036	For specifying extended file register device number	A173UHCPU only
-	D9037		
-	D9038		
-	D9039	LED display priority order	
-	D9044	For sampling trace	A173UHCPU only
-	D9049	Work area for SFC	A173UHCPU only
-	D9050	SFC program error number	A173UHCPU only
-	D9051	Error block	A173UHCPU only
-	D9052	Error step	A173UHCPU only
-	D9053	Error transition	A173UHCPU only
-	D9054	Error sequence step	A173UHCPU only
-	D9055	Status latch	A173UHCPU only
-	D9072	PLC communication check	A173UHCPU only
-	D9081	Number of communication requirement register free area	A173UHCPU only
-	D9085	Setting register of time check value	A173UHCPU only
-	D9090	Number of boards in special function module over	A173UHCPU only
-	D9091	Detailed error number	
-	D9092		
-	D9094	Exchange I/O start I/O number	

(Continued)

4. REPLACEMENT FROM A-MOTION TO QN-MOTION

Device number		Name		Remarks
Q17nCPUN	A17nSHCPUN/ A173UHCPU			
-	D9100			
-	D9101			
-	D9102			
-	D9103			
D9104	D9104	Q17nCPUN: Servo parameter reading request axis number	Fuse blown module	A173UHCPU only
-	D9105			
-	D9106			
-	D9107			
-	D9116			
-	D9117			
-	D9118			
-	D9119	I/O module verification error		A173UHCPU only
-	D9120			
-	D9121			
-	D9122			
-	D9123			
-	D9124	Number of annunciator detection		
-	D9125			
-	D9126			
-	D9127			
-	D9128	Annunciator detection number		A173UHCPU only
-	D9129			
-	D9130			
-	D9131			
-	D9132			
D9180	D9180	A173UHCPU: Unusable	A17nSHCPUN: Limit switch output status storage area	
D9181	D9181			
D9182	D9182	A173UHCPU: Test mode requirement error information		
D9183	D9183			
D9184	D9184	PCPU WDT error cause		
D9185	D9185			
D9186	D9186	Q17nCPUN, A173UHCPU: Manual pulse axis setting error information		A17nSHCPUN: Servo amplifier classification
D9187	D9187			A17nSHCPUN: Manual pulse axis setting error information
D9188	D9188	Q17nCPUN: Motion operation cycle	A17nSHCPUN: Test mode requirement error information A173UHCPU: Unusable	
D9189	D9189	Error program No.		
D9190	D9190	Error item information		
D9191	D9191	Q17nCPUN, A173UHCPU: Servo amplifier installation information		A17nSHCPUN: Servo amplifier installation information
D9192	D9192			A17nSHCPUN: Area for manual pulse 1 (P1) smoothing magnification setting
D9193-D9195	D9193-D9195	Q17nCPUN: Real/virtual mode switching error	A173UHCPU, A17nSHCPUN: REAL/VIRTUAL mode switching error information	
D9196	D9196	Personal computer link communication error code		

(Continued)

Device number		Name	Remarks
Q17nCPUN	A17nSHCPUN/ A173UHCPU		
D752	D752	Q17nCPUN, A173UHCPU: Area for manual pulse 1 (P1) smoothing magnification setting	A17nSHCPUN: Unusable
D753	D753	Q17nCPUN, A173UHCPU: Area for manual pulse 2 (P2) smoothing magnification setting	
D754	D754	Q17nCPUN, A173UHCPU: Area for manual pulse 3 (P3) smoothing magnification setting	
-	D760	A173UHCPU: Limit switch output status storage area for Axis 1 to 32	
-	D761		
-	D762		
-	D763		
-	D764		
-	D765		
-	D766		
-	D767		
-	D768		
-	D769		
-	D770		
-	D771		
-	D772		
-	D773		
-	D774		
-	D775	A173UHCPU: Limit switch output status storage area for Axis 1 to 32	A17nSHCPUN: Cam axis monitor device • A172SHCPUN: 5 points x 8 axes • A171SHCPUN: 5 points x 4 axes
-	D776		
-	D777		
-	D778		
-	D779		
-	D780		
-	D781		
-	D782		
-	D783		
-	D784		
-	D785		
-	D786		
-	D787		
-	D788		
-	D789		
D792	D792	Q17nCPUN, A173UHCPU: Servo amplifier classification	
D793	D793		
D794	D794		
D795	D795		
D796	D796		
D797	D797		
D798	D798		
D799	D799		

For the special registers on the PLC CPU side, refer to the manual of the PLC CPU.

3.2.7 Other devices

Item	Q17nCPUN	A173UHCPU	A17nSHCPUN
Personal computer link communication error flag	M2034	M2034	
PCPU preparation completion flag	M9074	M9074	
Home position return re-travel value	D9 + 20n ^(Note-1)	D9 + 20n ^(Note-1)	D811 + 20n ^(Note-1)
Travel value change register	D16 + 20n, D17 + 20n ^(Note-1)	D16 + 20n ^(Note-1) , D17 + 20n ^(Note-1)	D815 ^(Note-1) + 20n
Indirectly designated device (word device)	D0 to D8191	D800 to D8191	D0 to D799
	W0 to W1FFF	W0 to W1FFF	W0 to W3FF
	#0 to #7999	#0 to #7999 (Motion SFC (real mode) only)	#0 to #7999 (Motion SFC of A172SH (real mode) only)
Indirectly designated device (bit device)	X0 to X1FFF	X0 to X1FFF	X0 to X7FF
	Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
	M/L0 to M/L8191	M/L0 to M/L8191	M/L0 to M/L2047
	M9000 to M9255	M9000 to M9255	M9000 to M9255
	B0 to B1FFF	B0 to B1FFF	B0 to B3FF
	F0 to F2047	F0 to F2047	F0 to F255
Enable specified device in high speed reading function	D800 to D3069, D3080 to D8191	D800 to D3069, D3080 to D8191	D0 to D799
	W0 to W1FFF	W0 to W1FFF	W0 to W3FF

(Note-1): n indicates a value corresponding to an axis No. (Axis No.1 to 32: n = 0 to 31)

(Continued)

Item		Q17nCPUN	A173UHCPU	A17nSHCPUN
Limit switch output data	Output device	X0 to X1FFF	X0 to X1FFF	X0 to X7FF
		Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
		M0 to M8191	M0 to M8191	M0 to M2047
		L0 to L8191	L0 to L8191	L0 to L2047
		B0 to B1FFF	B0 to B1FFF	B0 to B3FF
	Watch data	D0 to D8191	D0 to D8191	D0 to D1023
		W0 to W1FFF	W0 to W1FFF	W0 to W3FF
		#0 to #8191	#0 to #8191	#0 to #8191
		Absolute address (H0 to HFFFFFFF)	Absolute address (H0 to HFFFFFFF)	Absolute address (H0 to HFFFFFFF)
	ON section setting	D0 to D8191	D0 to D8191	D0 to D1023
		W0 to W1FFF	W0 to W1FFF	W0 to W3FF
		#0 to #8191	#0 to #8191	#0 to #8191
		Constant (Hn/Kn) ^(Note-3)	Constant (Hn/Kn) ^(Note-3)	Constant (Hn/Kn) ^(Note-3)
	Output enable/disable bit	X0 to X1FFF	X0 to X1FFF	X0 to X7FF
		Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y7FF
		M0 to M8191	M0 to M8191	M0 to M2047
		L0 to L8191	L0 to L8191	L0 to L2047
		B0 to B1FFF	B0 to B1FFF	B0 to B3FF
F0 to F2047		F0 to F2047	F0 to F255	
Forced output bit	M9000 to M9255	M9000 to M9255	M9000 to M9255	
	-	TT0 to TT2047	TT0 to TT255	
	-	TC0 to TC2047	TC0 to TC255	
	-	CT0 to CT1023	CT0 to CT255	
	-	CC0 to CC1023	CC0 to CC255	
	-			
Mechanical system program	Clutch status	M2160 to M2223 (Setting in mechanical system program is not required)	M2160 to M2223 (Setting in mechanical system program is not required)	A171SHCPUN: M1984 to M1991 A172SHCPUN: M1984 to M1999 (Setting in mechanical system program is not required)
	Cam axis command signal (cam/ball screw switch command)	M5488 to M5519	-	-
	Soothing clutch completion signal	M5520 to M5583	-	-

(Note-1): n indicates a value corresponding to an axis No. (Axis No.1 to 32: n = 0 to 31)

(Note-2): p indicates the number of the user free area points in the multiple CPU high speed transmission area of each CPU.

□: Start I/O number of CPU module

(Note-3): The setting range differs depending on the setting unit.

(Note-4): Setting is available only for the devices of the own CPU.

Confirm the usage conditions using "Cross reference" or others in MT Works2, and change the device numbers to the ones of Q173CPUN/Q172CPUN.

4. DIVERSION OF PROJECT CREATED WITH A173CPUN/A172CPUN

4.1 List of Available Data for Diversion (SV13/SV22)

		Motion SFC not compatible				Motion SFC compatible				Remarks		
		A17nSHCPUN		A173UHCPU		A172SHCPUN		A173UHCPU				
		SV13	SV22	SV13	SV22	SV13	SV22	SV13	SV22			
System setting	System setting data									△	Note-1	
	High speed reading data									○		
	Basic setting data									×	Note-2	
Servo data setting	Axis data	Fixed parameter									○	
		Home position return data									○	
		JOG operation data									○	
		Servo parameter									○	
	Parameter block									○	○	
	Limit output data			×							○	Note-3
Servo program			△		○		△		○		Note-4, Note-5	
Motion SFC program	Motion SFC parameter									○		
	Motion SFC program						△		○		Note-4	
	Operation control program						△		○		Note-4	
	Transition program						△		○		Note-4	
	Conversion data									△	Note-6	
Automatic numbering setting									○			
Mechanical system program	Mechanical edit data		△		○		△		○		Note-4	
	Mechanical conversion data		△		△		△		△		Note-6	
	Cam conversion data		○		○		○		○			
	Real mode axis information		○		○		○		○			
Cam data			○		○		○		○			
Device memory		○ (SW3RNC-GSVE only)										
Backup data										×	Note-6	
Communication setting										×	Note-6	

- : Can be diverted
- △: Data must be revised
- ×: Must be set again

(Note-1) System setting data

- Pulse generator/synchronous encoder I/F module, A172SENC/A172SENC module is converted to Q172LX.
Manual pulse generator/synchronous encoder setting is deleted.
Set Q172EX-S2 or Q173PX modules if necessary.
- Limit output module A1SY42 (when a motion SFC non-compatible OS is used)
The limit output module A1SY42 is not diverted.
- Amplifier setting other than the one for servo amplifiers
Any items other than MR-J-B and servo amplifiers (including inverters) are deleted.

(Note-2) Basic setting data

Q-Motion requires the multiple CPU setting. Configure the setting according to the system.

(Note-3) Limit output data (when a motion SFC non-compatible OS is used)

This data is deleted because of its incompatibility. Revise the data.

(Note-4) Servo program, Motion SFC program, mechanical system program

- Motion-dedicated devices
Assignment of motion-dedicated devices is different between A17nSHCPUN/A173UHCPU and Q-Motion.
Change the motion-dedicated devices.

(Note-5) Servo program

- Number of words in indirect device
There are some areas where the number of words has changed between A17nSHCPUN/A173UHCPU and Q-Motion.
Execute a conversion check and revise the program if necessary.

(Note-6) Conversion data, setting data

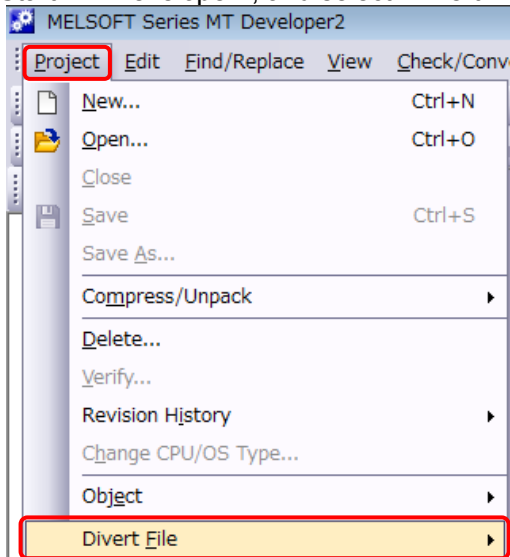
These data cannot be diverted because CPUs are different. Convert and set the data again.

4.2 Program Diversion Procedure in Motion CPU Side

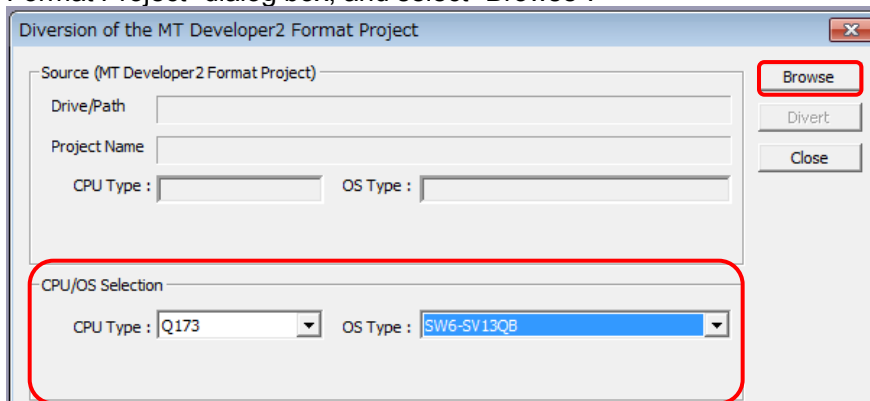
4.2.1 Diversion procedure using MT Developer2

The following shows an example of procedures for replacing an A-Motion CPU side project with a QDS-Motion CPU project using MT Developer2. Always backup the project before the program replacement.

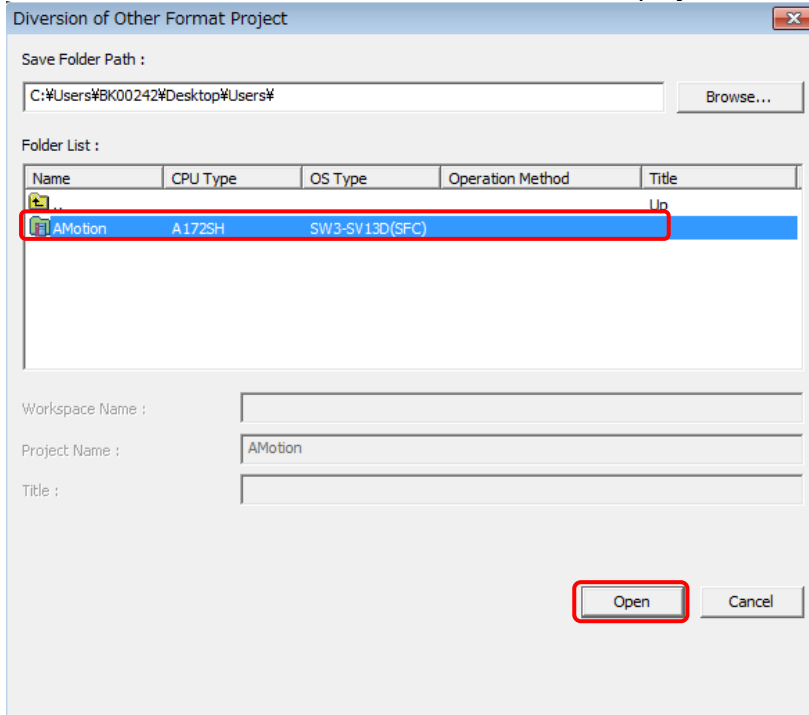
- 1) Start MT Developer2, and select "Divert File" from the "Project" tab.



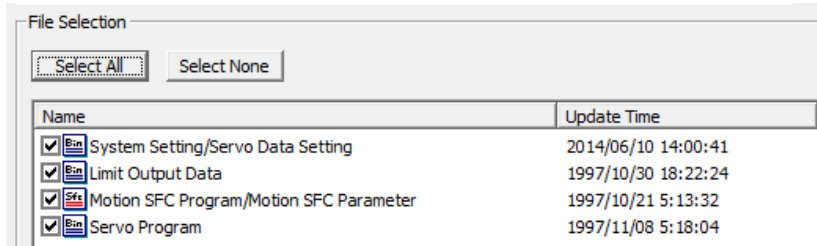
- 2) Specify the CPU type and OS type after the replacement in the "Diversion of the MT Developer2 Format Project" dialog box, and select "Browse".



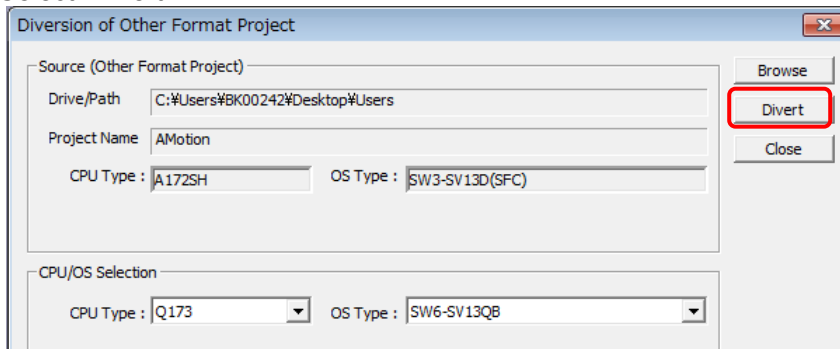
3) Select "Browse" in Save Folder Path and the source project from "Folder List", and click "Open".



4) Select data to be converted in "File Selection".

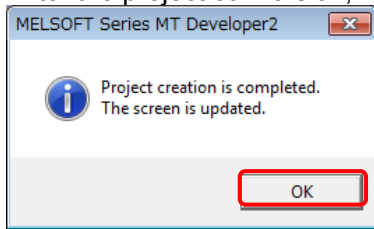


5) Select "Divert".

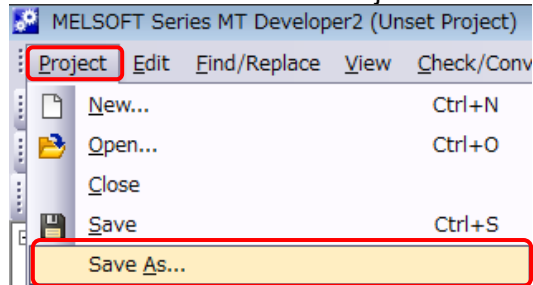


6) The conversion of the project is completed. Select "OK".

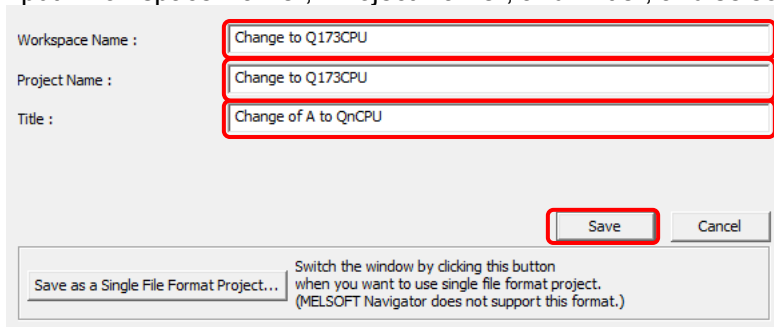
After the project conversion, make the cross comparison or check the data on each screen.



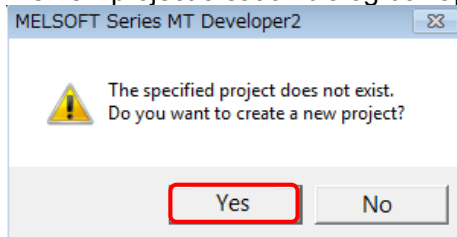
7) Select "Save As" from the "Project" tab to save the project after the conversion.



8) Input "Workspace Name", "Project Name", and "Title", and select "Save".



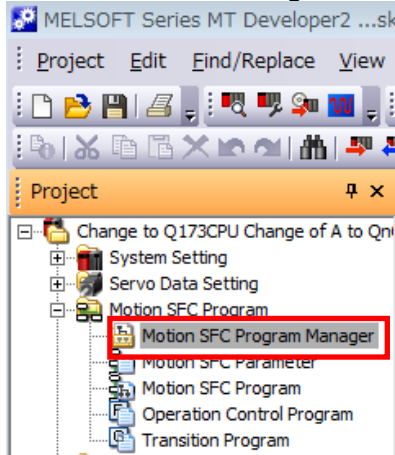
9) The new project creation dialog box appears. Select "Yes".



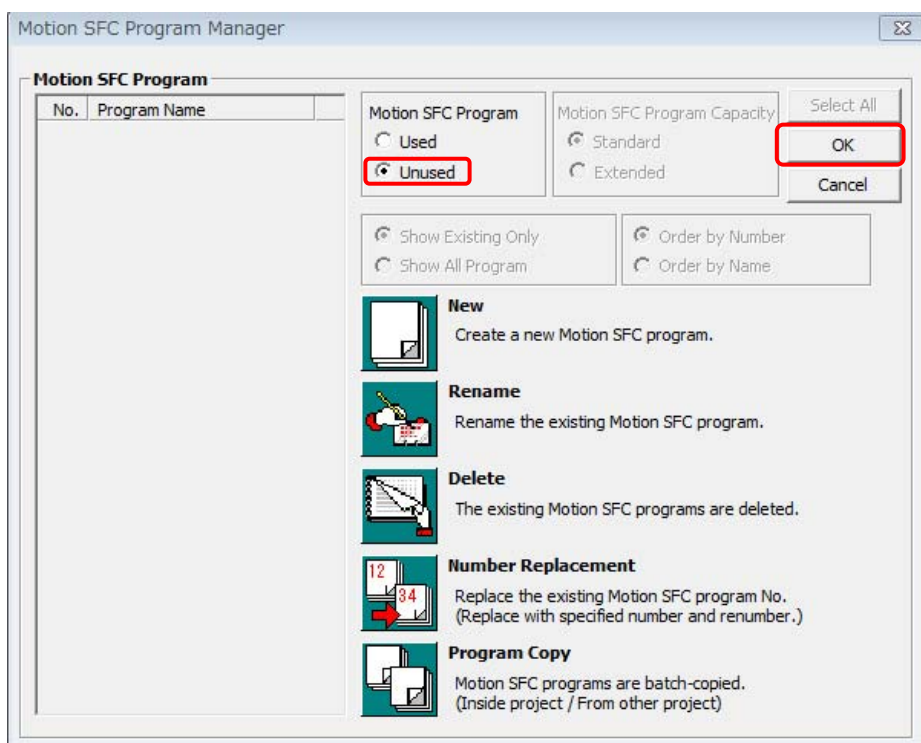
4.2.2 When SFC is not used

When no SFC program is used in the A-Motion CPU side program (Diversion source) and servo parameters and others are diverted, perform the following procedure after the operation of 9).

- 1) Select "Motion SFC Program Manager".



- 2) Select "Unused" for "Motion SFC Program", and select "OK".



For the file converted using MT Works2, refer to "4.1 List of Available Data for Diversion (SV13/SV22)", and set the data that cannot be diverted if necessary. For the multiple CPU parameter setting, refer to "3.Differences between Q173CPUN/Q172CPUN and A173UHCPU/A172SHCPUN/A171SHCPUN", "QCPU User's Manual (Multiple CPU System) Model code: SH-080485ENG", and "Q173CPU(N)/Q172CPU(N) User's Manual Model code: 1XB780".

4.2.3 Precautions for diverting cam data

To edit cam data, read the data directly using "Read Other Type Cam Data".

4.3 Program Diversion Procedure in PLC CPU Side

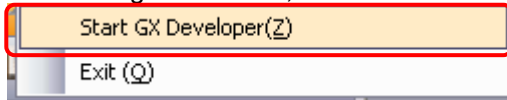
4.3.1 Conversion procedure of sequence program for Qn(H)CPU using GX Works2/ GX Developer

The following describes an example of the procedure for replacing a sequence project using GX Developer.

Always backup the project before the replacement.

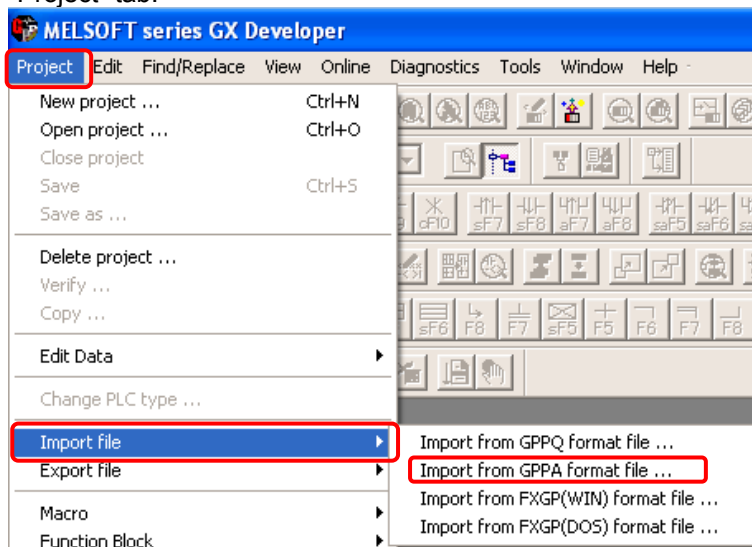
(1) Conversion of a sequence program created by SW3RNC-GSV/SW2□-GSV

1) After starting GX Works2, select "Start GX Developer" from the "Project" tab.



2) The following shows the conversion of a sequence program created by SW3RNC-GSV/ SW2□-GSV (GPPA file format).

After GX Developer is started, select "Import file" --> "Import from GPPA format file" from the "Project" tab.



Caution 1: Storage location of an execution file

The execution file in the GPPA format is usually stored in the following folder.

- Folder structure

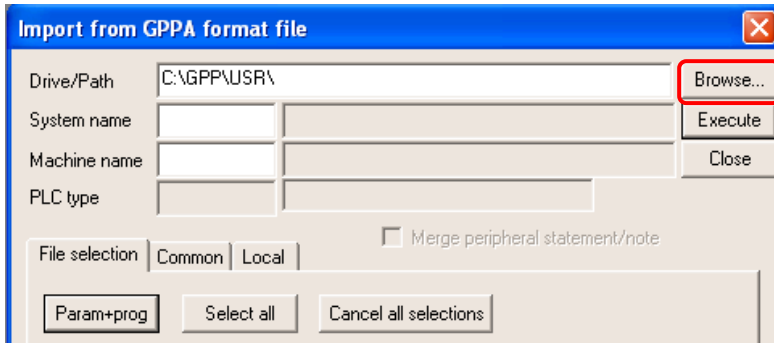
"C drive (route drive)" --> "GPP" --> "USR" --> "System name" --> "Machine name (folder which includes the gppa.cnf file)"

Caution 2: Name of diversion source project

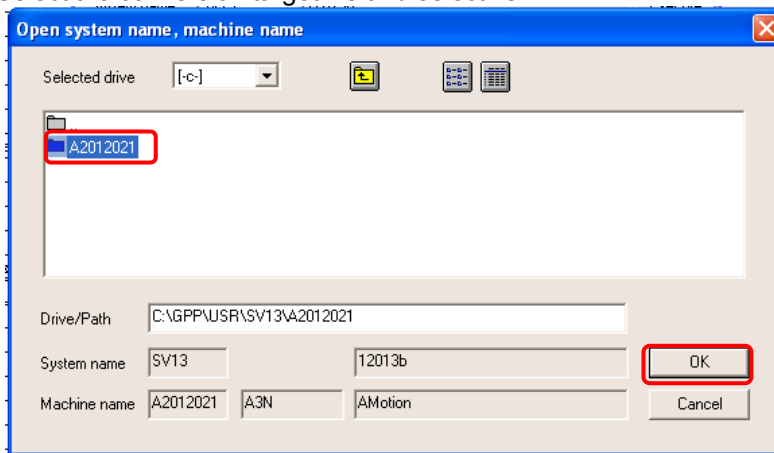
When the diversion source project name is 9 characters or more, the project cannot be read.

Change the name so that the number of characters is within the limit and execute the conversion operation.

3) Select "Browse".

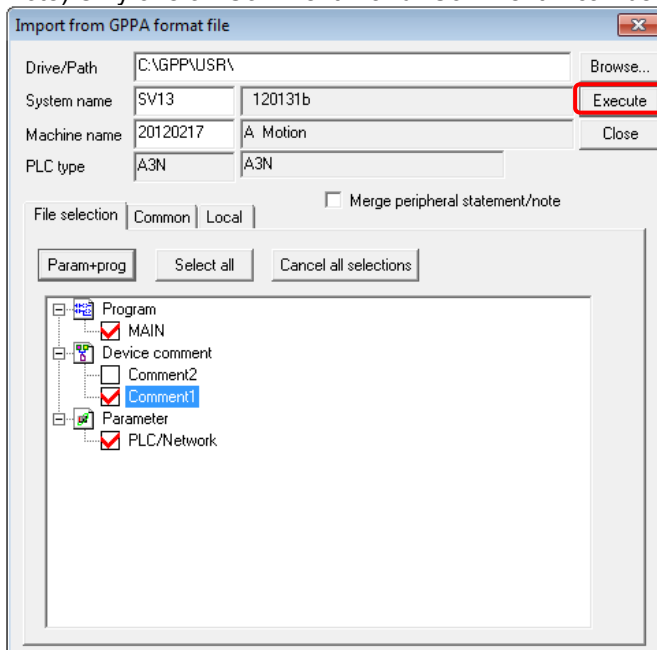


4) Select the conversion target file and select "OK".



5) Check the conversion targets (Program/Device comment/Parameter), and select "Execute".

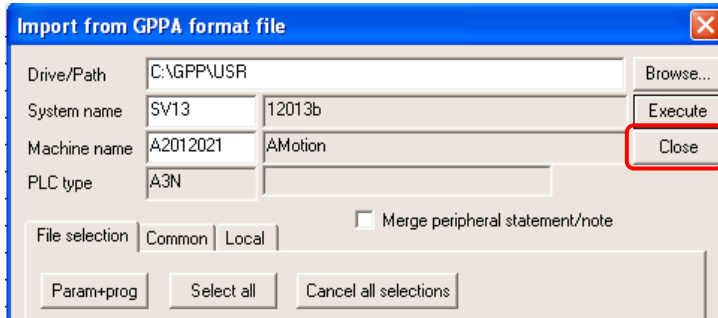
Note) Only one of "Comment1" and "Comment2" can be selected for Device comment.



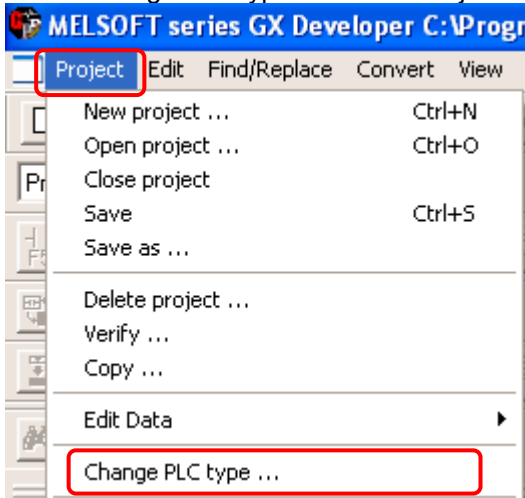
6) The conversion completion dialog box appears. Select "OK".



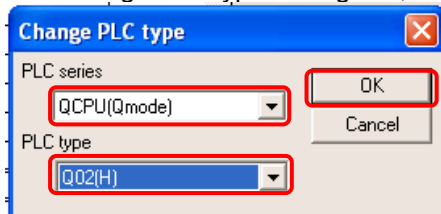
7) Select "Close".



8) Select "Change PLC type" from the "Project" tab in GX Developer.



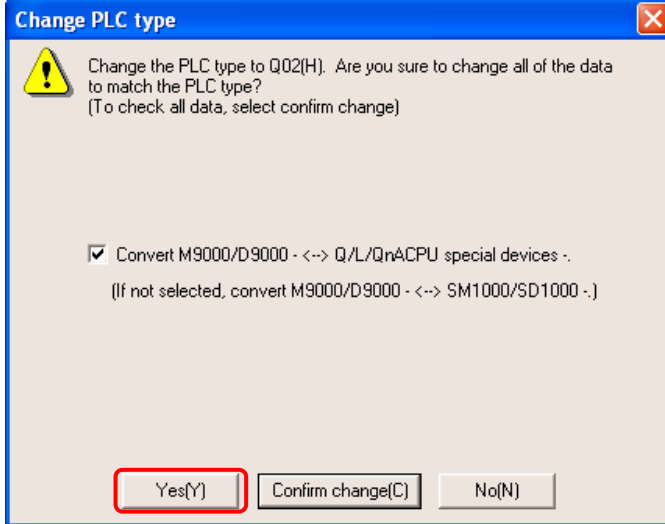
9) Specify the PLC series (QCPU(Qmode)) and PLC type (QnUD(E)(H)CPU) after the replacement in the "Change PLC type" dialog box, and select "OK".



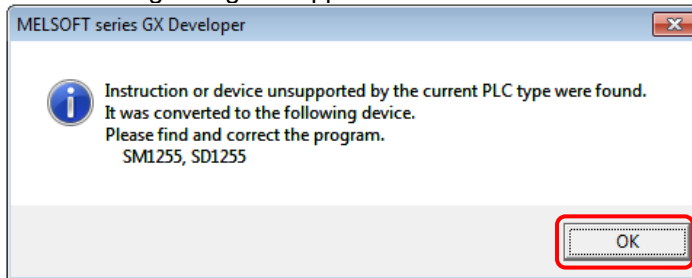
10) The "Change PLC type" dialog box appears. Select "Yes".

Note) In this replacement handbook, "Yes" is selected because the changes will be checked later by using a support tool.

When the supporting tool is not used, select "Confirm change".

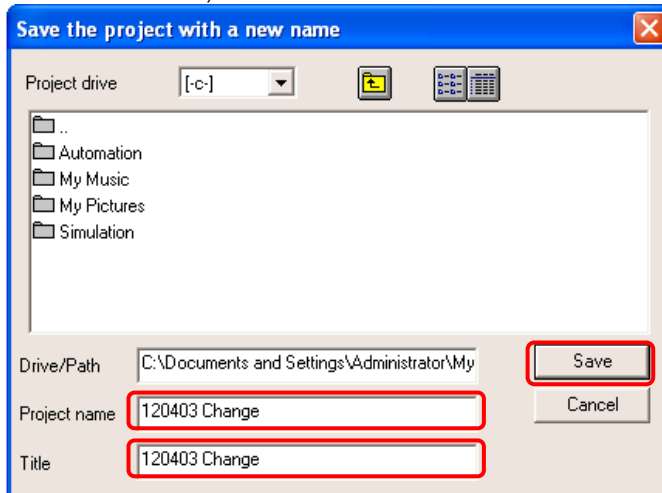


11) The following dialog box appears. Select "OK".

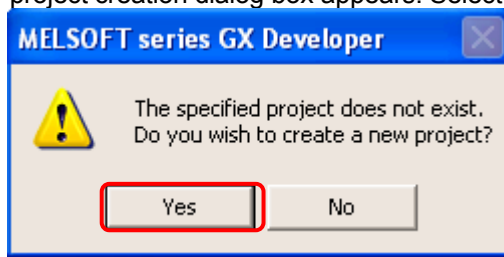


Some devices cannot be replaced properly and are forcibly converted to "SM1255" or "SD1255". Refer to the explanation about the usage of the A/QnA->Q conversion support tool described later and replace those devices with appropriate ones.

12) When "Save as" is selected from the "Project" tab, the following dialog box appears. Input "Project name" and "Title", and select "Save".



13) The new project creation dialog box appears. Select "Yes".

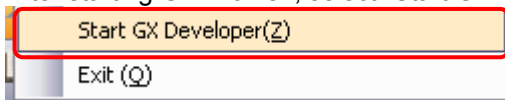


Although the sequence program has been converted by following this procedure, it may not be performed correctly. For the program modifications, refer to Section 5 and later.

(2) Conversion of a sequence program for A-Motion created by GX Developer

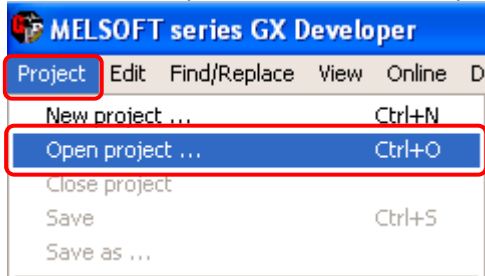
The following describes an example of the procedure for replacing a sequence project using GX Developer. Always backup the project before the replacement.

1) After starting GX Works2, select "Start GX Developer" from the "Project" tab.

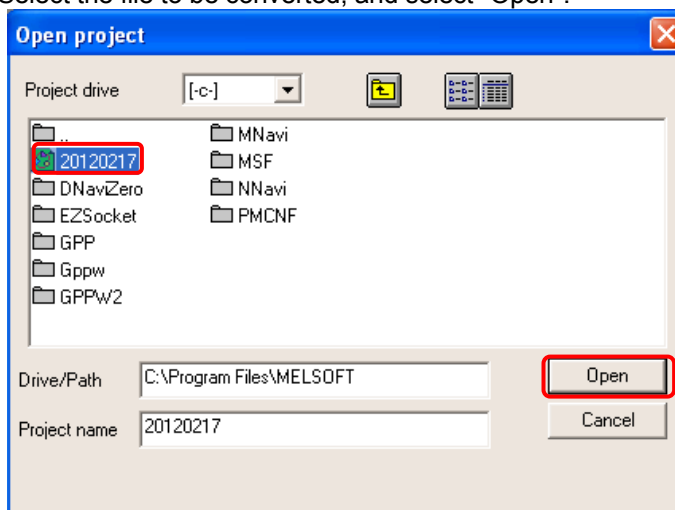


2) The following shows the conversion of a sequence program for A-Motion that created by GX Developer (GPPW file format).

3) After GX Developer is started, select "Open project" from the "Project" tab.



4) Select the file to be converted, and select "Open".



For the following conversion operations, refer to Step 8) and later of (1) Conversion of a sequence program created by SW3RNC-GSV/SW2□-GSV.

5. USING A/QnA->Q CONVERSION SUPPORT TOOL FOR SEQUENCE PROGRAMS

To confirm the converted content of the sequence program, **use "A/QnA->Q conversion support tool"**. Please download and install the A/QnA->Q conversion support tool from Mitsubishi Electric FA Site. For details, refer to A/QnA->Q Conversion Support Tool Operation Guide on the same page.

To download the tool, access the Mitsubishi Electric FA Site (<http://www.mitsubishielectric.co.jp/fa/index.html>) and as follows.

<http://www.mitsubishielectric.co.jp/fa/download/software/search.do?mode=software&kisyu=%2Fplca&lang=2&select=0&softid=0>

5.1 Preparation for Using Support Tool

To use the support tool, prepare the following.

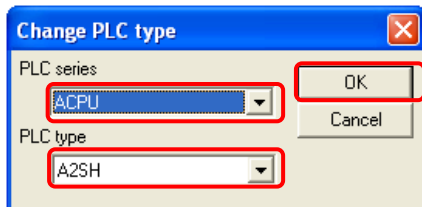
- 1) Diversion source sequence program (for comparison)
- 2) Target sequence program (program converted for Qn(H)CPU)
- 3) A/QnA->Q conversion support tool (Obtain this tool from Mitsubishi Electric FA Site.)
- 4) A/QnA->Q Conversion Support Tool Operation Guide (Obtain this guidebook from Mitsubishi Electric FA Site.)
- 5) GX Developer (GX Works2)

Caution

Convert 1) into a project whose CPU type is changed to A2SH or A3U and save the project using GX Developer as follows. The conversion method is the same as the one described in "2.4.3 Program Diversion Procedure in PLC CPU Side".

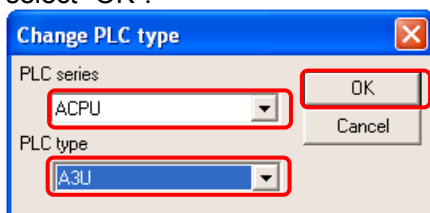
- For A171SHCPUN and A172SHCPUN

Select "ACPU" for PLC series and "A2SH" for PLC type in the "Change PLC type" dialog box, and select "OK".

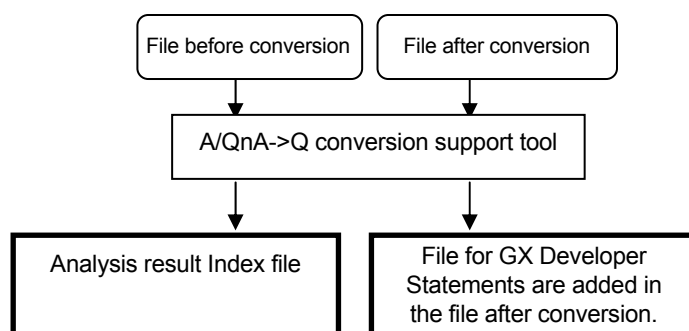


- For A173UHCPU

Select "ACPU" for PLC series and "A3U" for PLC type in the "Change PLC type" dialog box, and select "OK".

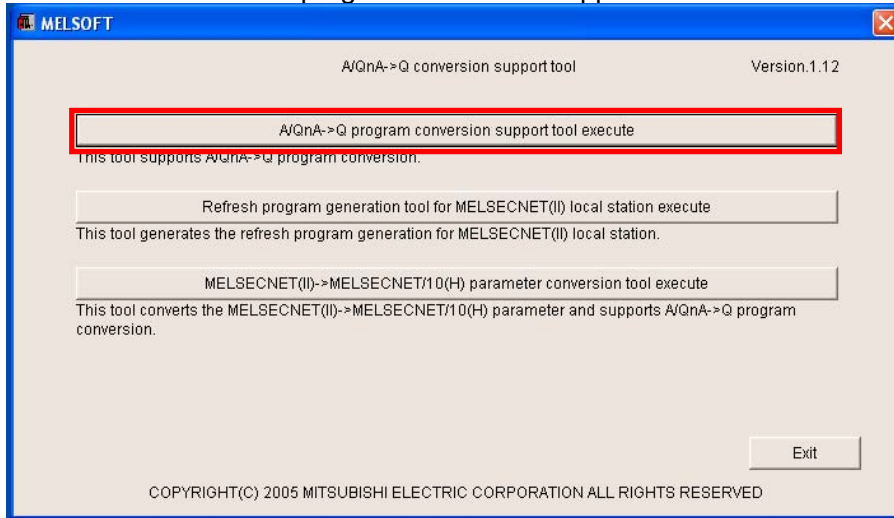


*** This operation is necessary to use the A/QnA->Q program conversion support tool.**

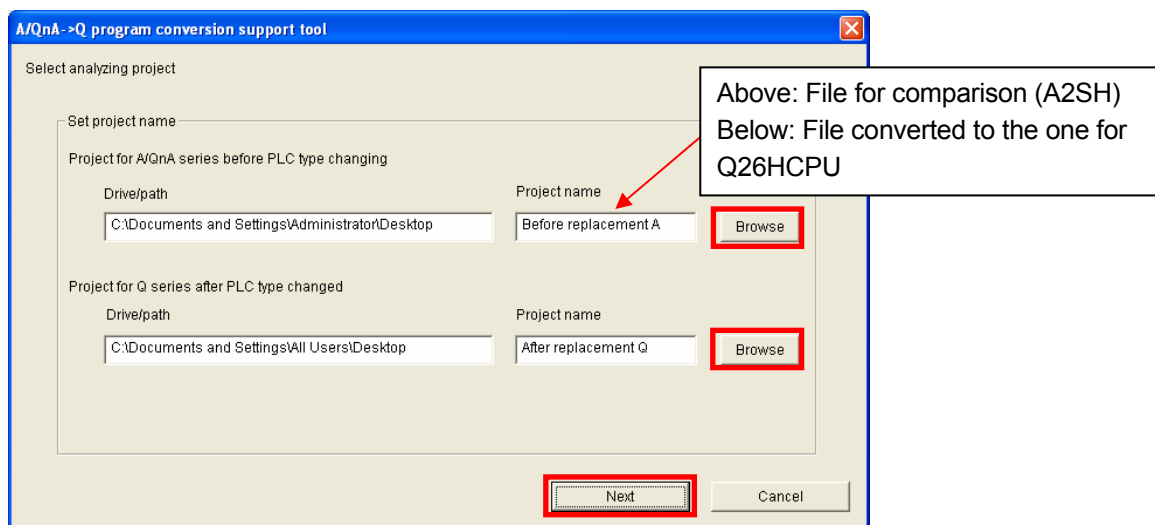


5.2 Using Procedure of Support Tool

- 1) Click "Start" --> "MELSOFT Application" --> "AQcnvSupport" to start the support tool.
Then select "A/QnA->Q program conversion support tool execute".



- 2) The "A/QnA->Q program conversion support tool" dialog box appears. Specify a source file in the GPPA format, A2SH file, or A3U file for "Project for A/QnA series before PLC type changing". Specify the file converted to the QnUD(E)(H)CPU type file for "Project for Q series after PLC type changed", and select "Next".



After this procedure, follow the description in A/QnA->Q Conversion Support Tool Operation Guide.

3) Created file

Once the operation is completed by following the description in A/QnA->Q Conversion Support Tool Operation Guide, an analysis result Index file (HTML document) and a GX Developer file in which statements of the modifications are embedded are created in the specified folder.

Name	Size	Type
Q Series		File Folder
Index.htm	3 KB	HTML Document

4) Display

• Analysis result index file

The following shows an example of the execution results of the analysis result index file.

A/QnA→Q conversion support tool Version.1.08

Analyzing result

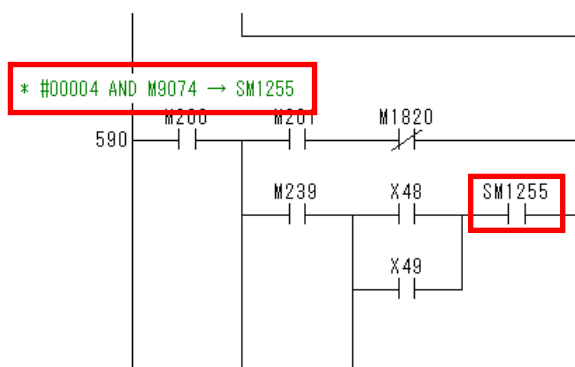
Project for A/QnA series before PLC type changing	C:\Documents and Settings\All Users\Desktop\Replacement	For replacement tool (A172→A2SH)
Project for Q series after PLC type changed	C:\Documents and Settings\All Users\Desktop\Replacement	For replacement tool (A172→Q26UDEH)

	Detection number	Analyzing result display	
Main program	43	List Display	
Special M/D unconverted in PLC type change	20	Device number order	Step number order
Instruction unconverted in PLC type change	18	According to instruction name	Step number order
Program for special function module necessary to check	5	According to special function module	Step number order

• GX Developer file in which statements are embedded

The following shows an example of the execution results of the GX Developer file in which statements are embedded.

"Statement display" or "Ctrl + F7" displays the contents that need to be modified.



* In the case described above, the device M9074 has been replaced with the device SM1255. Correct the device to an appropriate one.

5.3 Correction of the Sequence Program in Created Embedded File

5.3.1 Correction of special relay/special register

The special relay that cannot be converted from A-Motion is converted to "SM1255", and the special register that cannot be converted from A-Motion is converted to "SD1255". Modify the devices according to a between-the-lines statement.

5.3.2 Correction of motion-dedicated instructions

A-Motion-dedicated instructions (SVST, CHGA, CHGV, CHGT, SFCS, ITP) are converted to "SM1255". Modify the devices according to a between-the-lines statement.

5.3.3 Others

Confirm the details of user's manual and programming manual for each CPU module and correct required items. For the usage of GX Developer and others, refer to manuals of each product.

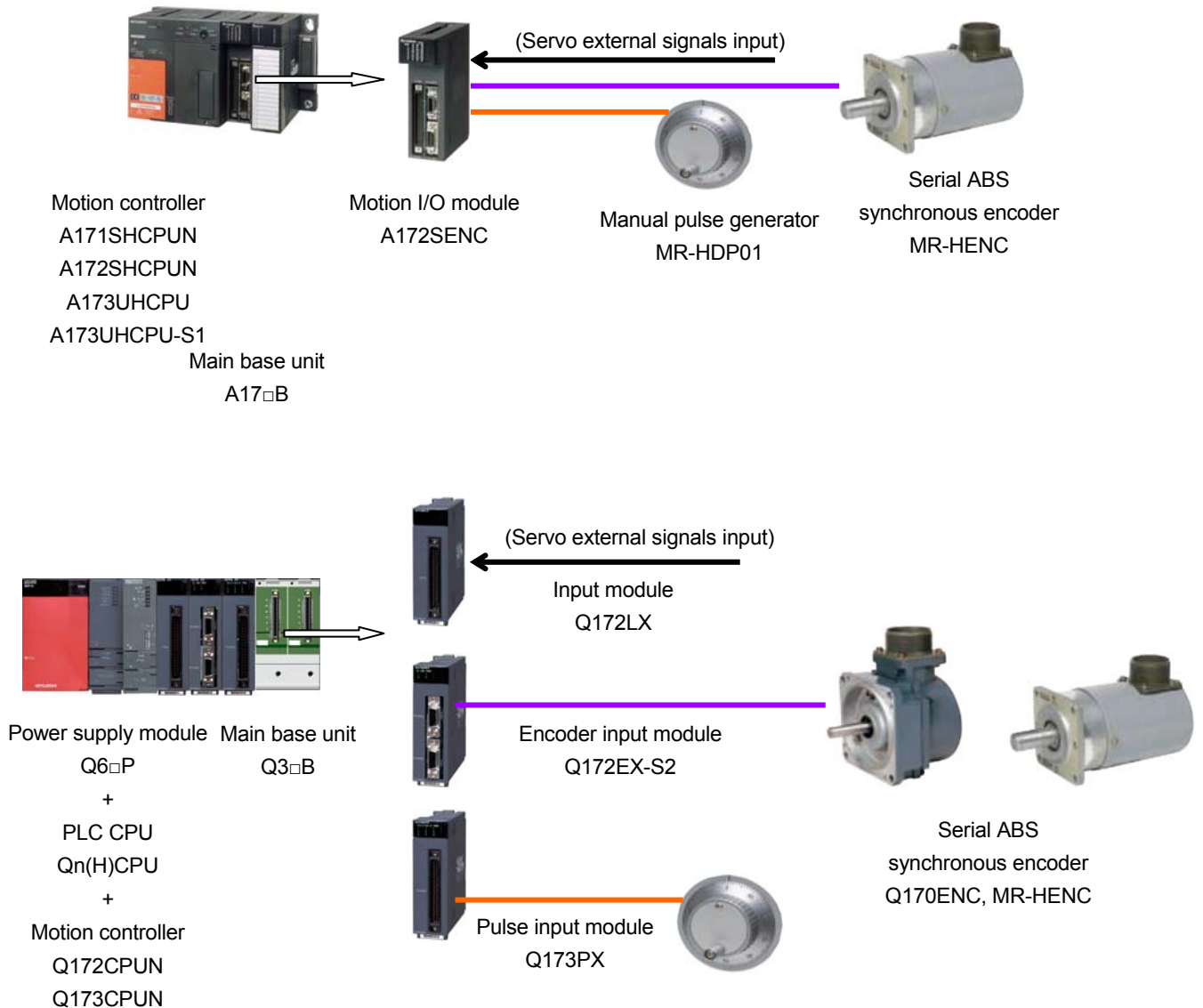
6. POINTS AND PRECAUTIONS OF REPLACEMENT

6.1 Difference of Motion CPU Configuration

6.1.1 System configuration

The following figure shows the differences between the basic system of A-Motion and basic system of QDS-Motion.

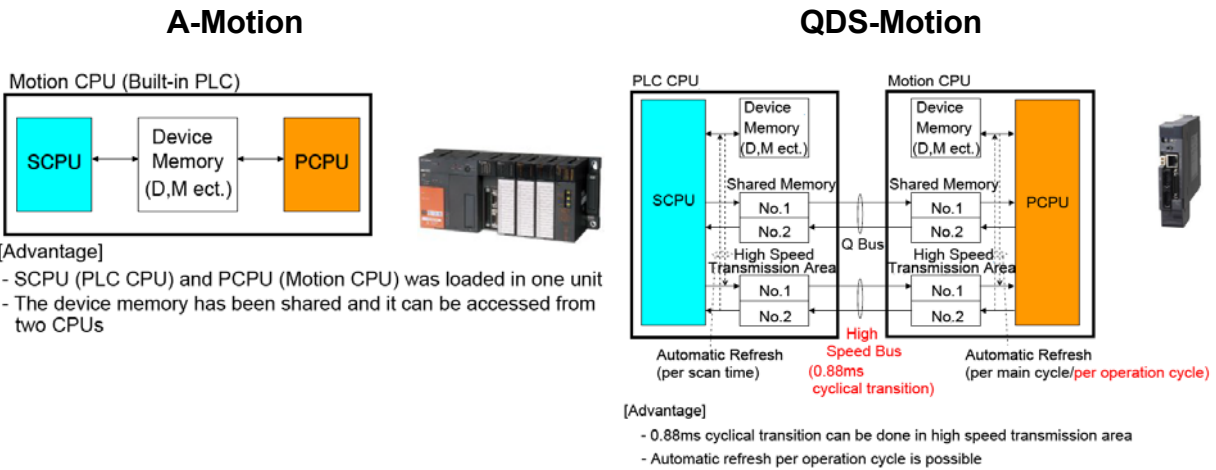
- The PLC function and the motion function are integrated in one A-motion CPU. However, in QDS-motion, they are in different CPUs.
- A-Motion is compatible with SSCNET as a servo system network, but QDS-Motion is compatible with SSCNET III or SSCNET III/H. Servo amplifiers connectable to each motion are also different.
- A motion module A172SENC (Pulse generator/synchronous encoder interface module) is replaced with a motion module Q172DLX (Servo external signal interface module), Q172DEX (Synchronous encoder interface module), or Q173DPX (Manual pulse generator interface module).
- A base unit is changed to a Q series multiple CPU high speed base unit. As a result, motion modules (Q172DLX, Q173DEX, and Q172DPX) cannot be installed in the CPU slot and Slot 0 to 2.



6.1.2 Shared device

In A-motion, the PLC and Motion functions are integrated in an A-motion CPU. Thus, the both function shares the memory. In QDS-Motion, a PLC CPU and a Motion CPU are divided as different modules. Thus, configuring various settings (Assignment to the multiple CPU shared devices/automatic refresh setting) is required to share the memory.

For details, refer to "QCPU User's Manual (Multiple CPU System) Model code: SH-080485ENG", "Programming Manual (COMMON) [type Q173D(S)/Q172D(S)] Model Code: 1XB928".



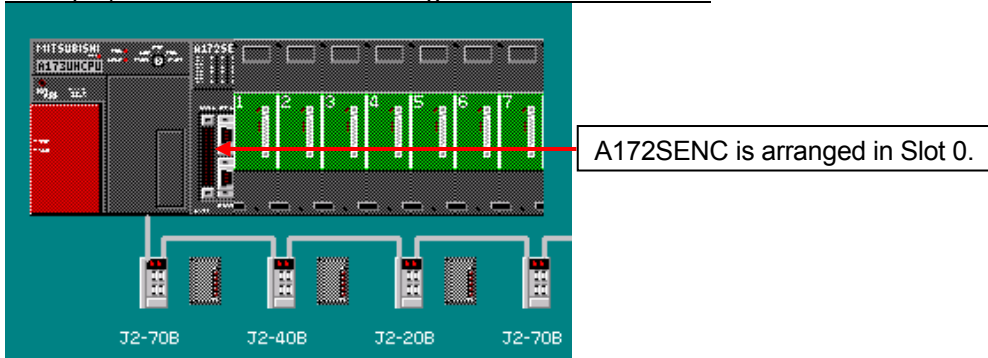
After diverting the project, execute the automatic refresh setting to share the device memory. It is necessary to assign the devices being used by the PLC CPU to the devices of the Motion CPU.

6.2 Precautions on Replacement

6.2.1 Slot position (system setting)

When a motion module used in A-Motion is replaced with a Q-Motion module, the slot position will change.

Example) When A172SENC is arranged in Slot 0 in A-Motion

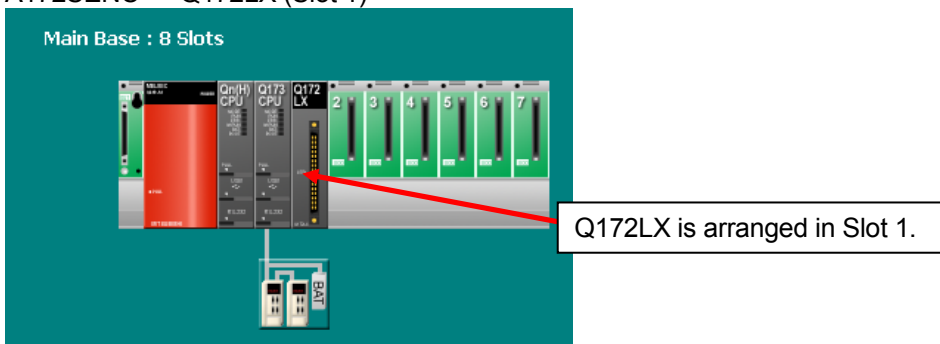


↓ A172SHCPU is converted to Q172CPUN.

The conversion is executed as follows.

A172SHCPU → Q172CPUN (Slot 0)

A172SENC → Q172LX (Slot 1)



6.2.2 Restrictions on the number of blocks and total points in the refresh setting

In Q-Motion, an automatic refresh function is one of the specifications added from A-Motion. The number of blocks for the automatic refresh is limited to 4 blocks in Q173CPUN/Q172CPUN.

The diagram shows a vertical orange bar labeled 'PCPU' on the left. To its right are two boxes: 'Device memory (D, M)' and 'Shared memory'. The 'Shared memory' box contains 'No.1' and 'No.2', with 'No.1' circled in red. A red arrow points from the circled 'No.1' to the 'Automatic Refresh' table in the screenshot below.

MELSOFT Series MT Developer2 - Automatic Refresh Setting List (Unset Project)

CPU	CPU Specific Send Range		
	Points	Start	End
No.1	0	----	----
No.2	0	----	----
No.3			
No.4			

*** The number of blocks for automatic refresh is 32.**

Caution) Offset (Hex.) from starting address of the automatic refresh area. Refer to the user's manual of the each CPU about the starting address.

Setting No.	Automatic Refresh											
	No.1			No.2			No.3			No.4		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
1												
2												
3												
4												

Close

6.2.3 Timer counter

T (Timer device) and C (Counter device) can be used in A-Motion, but they cannot be used in Q-Motion. When T and C are used on the motion SFC side, use the TIME instruction as an alternative method.

6.2.4 Parameter block

Since the error check function is improved in Q-Motion, errors and warnings will be displayed in the parameter in which errors and warnings were not displayed in A-Motion after the replacement. Correct the errors according to the content of the errors and warnings.

Example) A-Motion

	Block1	Block2
Interpolation Ctrl. Unit	PULSE	PULSE
Sp.Restriction	100000[PLS/sec]	100000[PLS/sec]
Acceleration Time	1000[msec]	500[msec]
Deceleration Time	1200[msec]	500[msec]
Rapid Stop Dec. Time	1200[msec]	1000[msec]

• CPU module is changed from A-Motion to Q-Motion using MT2

Item	Block No. 1	Block No. 2
Parameter Block	Set the data such as the acceleration/decelera	
Interpolation Control Unit	3:PLS	3:PLS
Speed Limit Value	100000[PLS/s]	100000[PLS/s]
Acceleration Time	1000[ms]	500[ms]
Deceleration Time	1200[ms]	500[ms]
Rapid Stop Deceleration Time	1200[ms]	1000[ms]

• Error contents and measures

Checking for Parameter Block...
 Warning: Parameter Block Block No.2 Rapid Stop Deceleration Time - The rapid stop deceleration time exceeds the deceleration time. Rapid Stop Deceleration Time <= Deceleration Time
 Warning: Parameter Block Block No.6 Rapid Stop Deceleration Time - The rapid stop deceleration time exceeds the deceleration time. Rapid Stop Deceleration Time <= Deceleration Time
 Warning: Parameter Block Block No.7 Rapid Stop Deceleration Time - The rapid stop deceleration time exceeds the deceleration time. Rapid Stop Deceleration Time <= Deceleration Time

In the above case, set the sudden stop deceleration time to be equal to the deceleration time setting value (500ms or shorter).

Note that the error check becomes stricter than before the replacement as the above case.

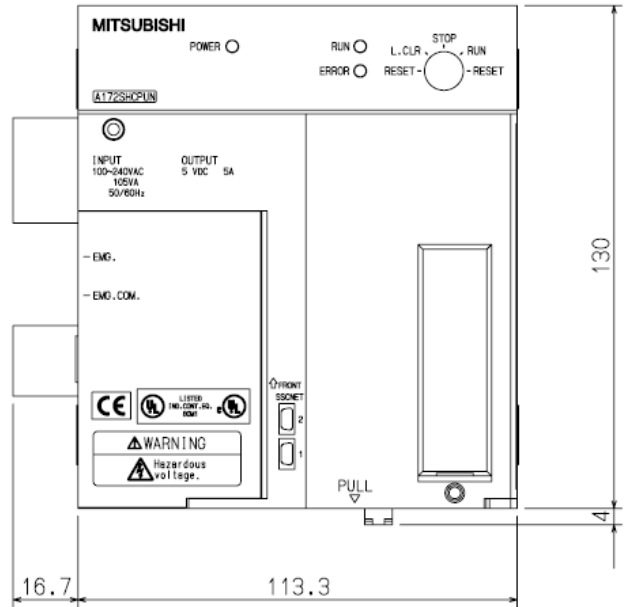
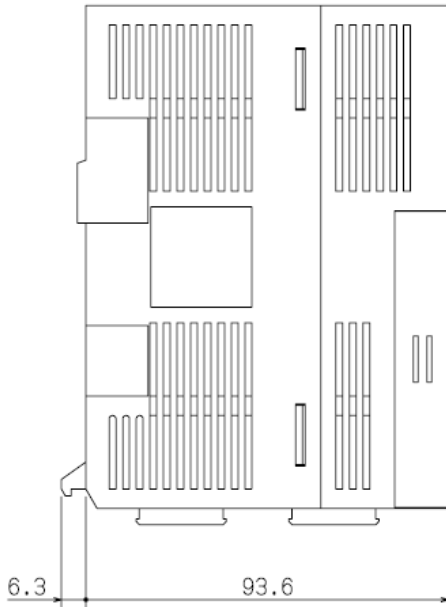
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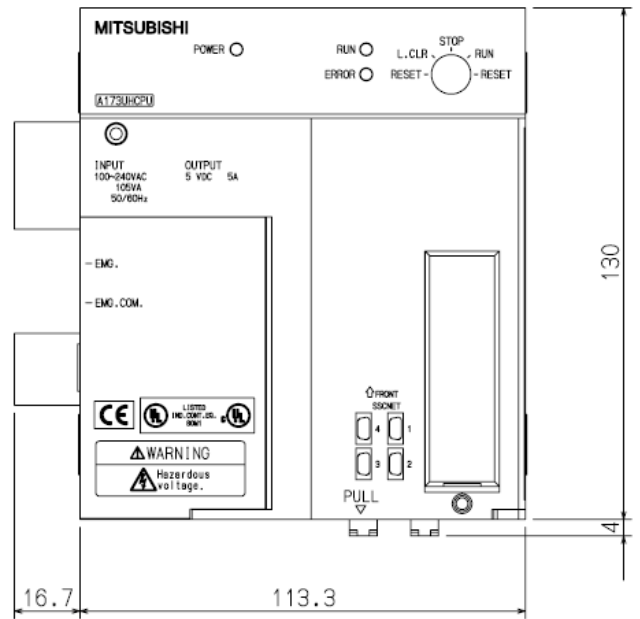
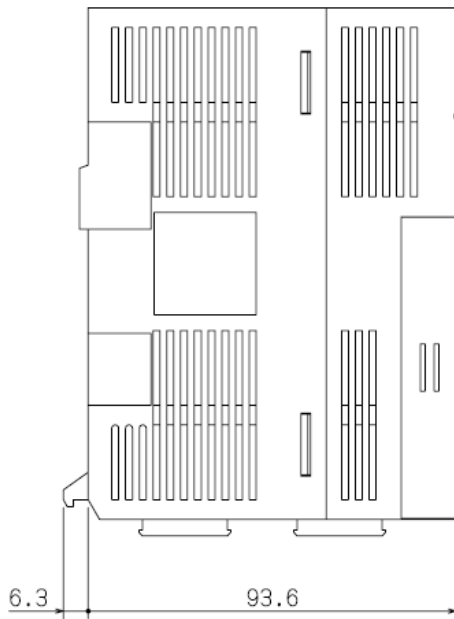
1. OUTLINE DIMENSIONS

1.1 Outline Dimensions of A Series (small type)

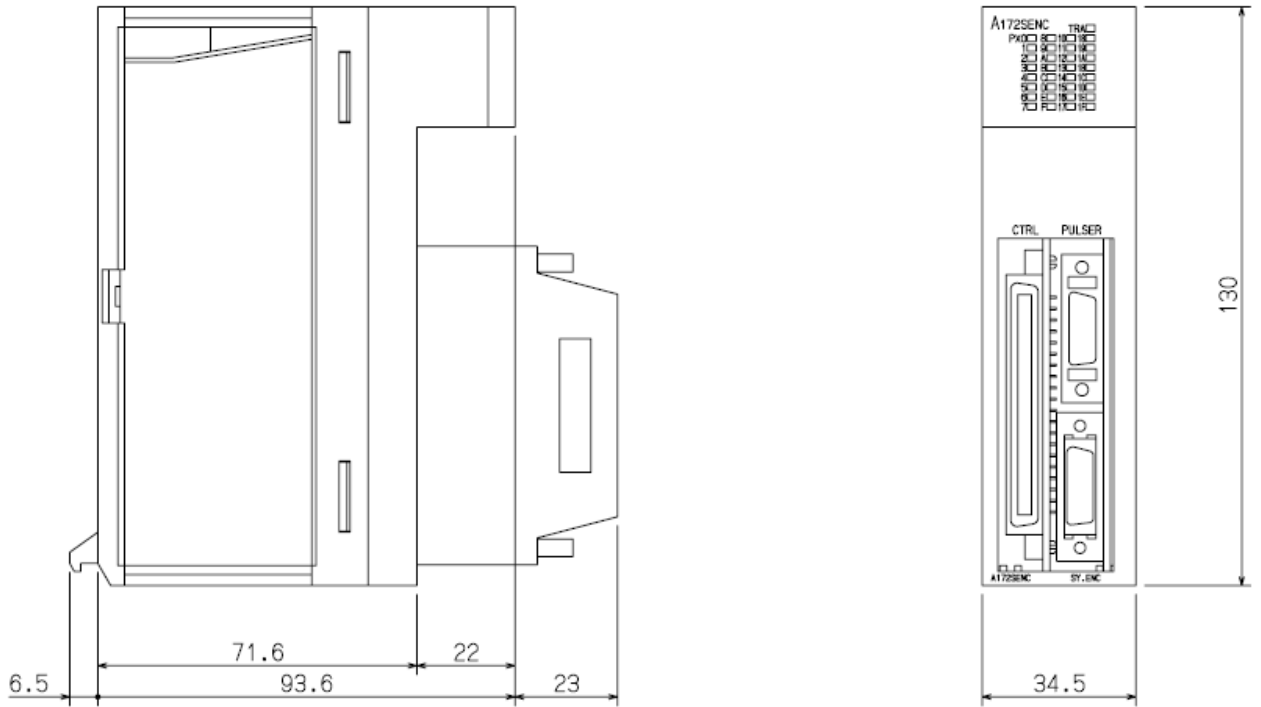
1.1.1 A17nSHCPUN



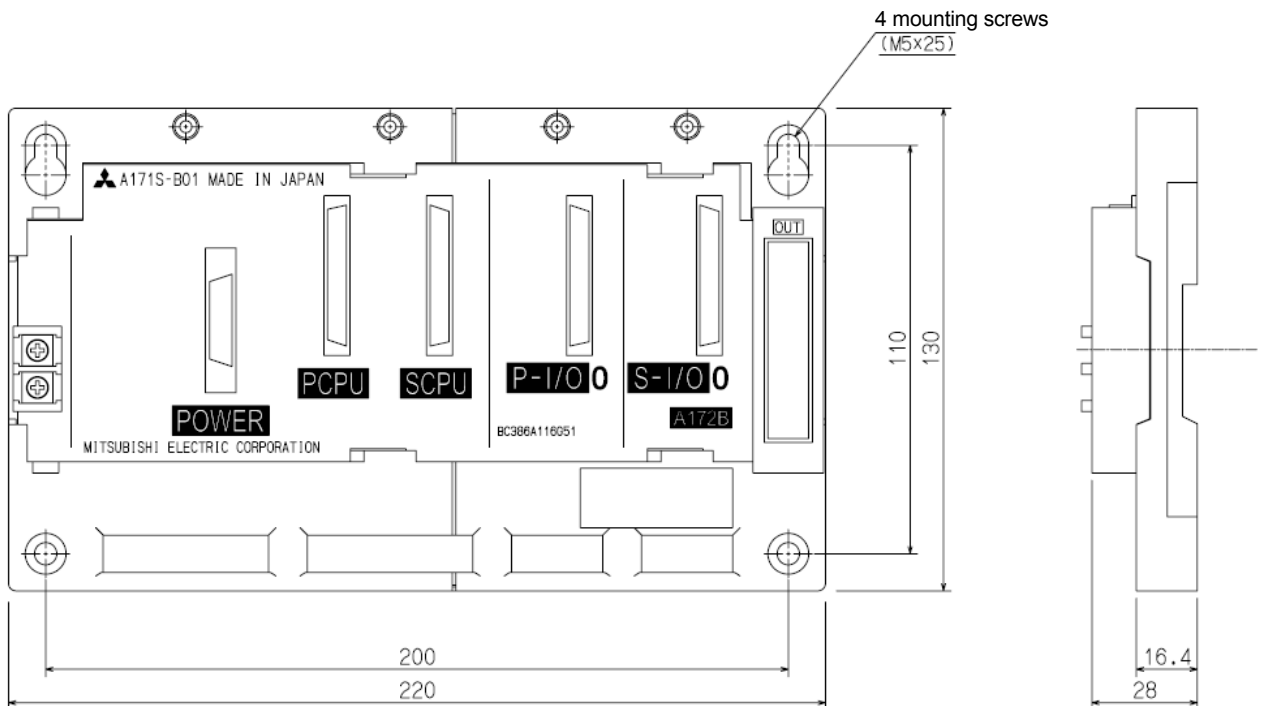
1.1.2 A173UHCPU(-S1)



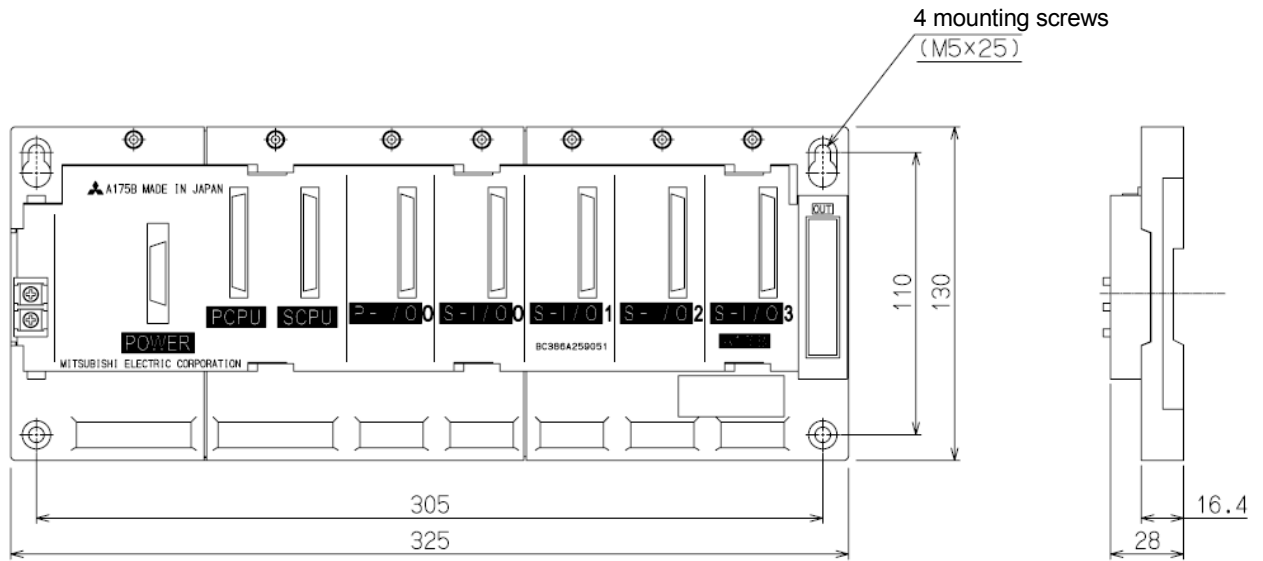
1.1.3 A172SENC



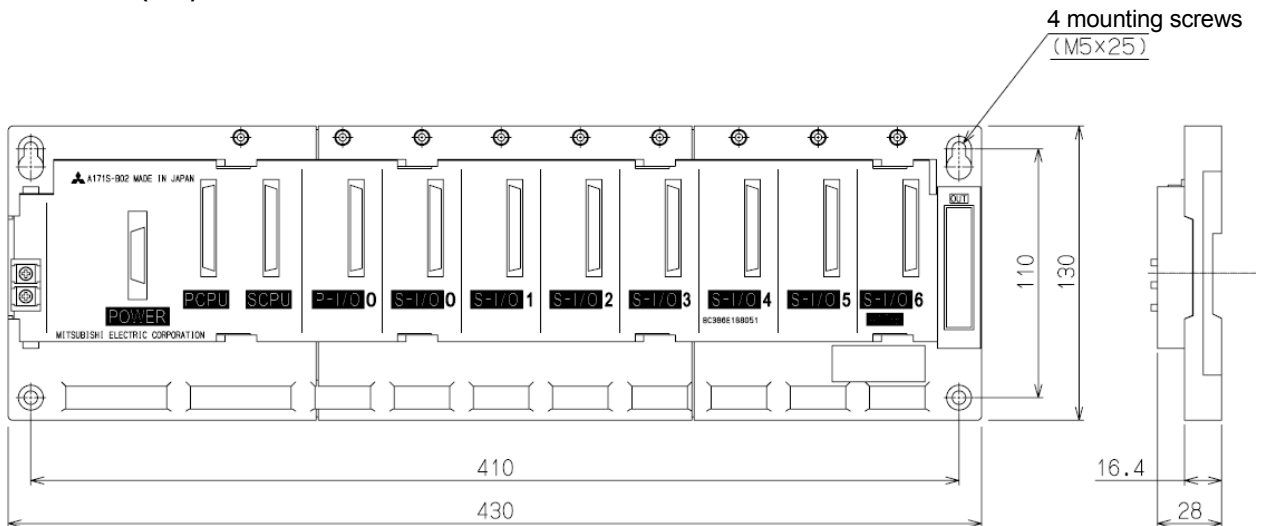
1.1.4 A172B



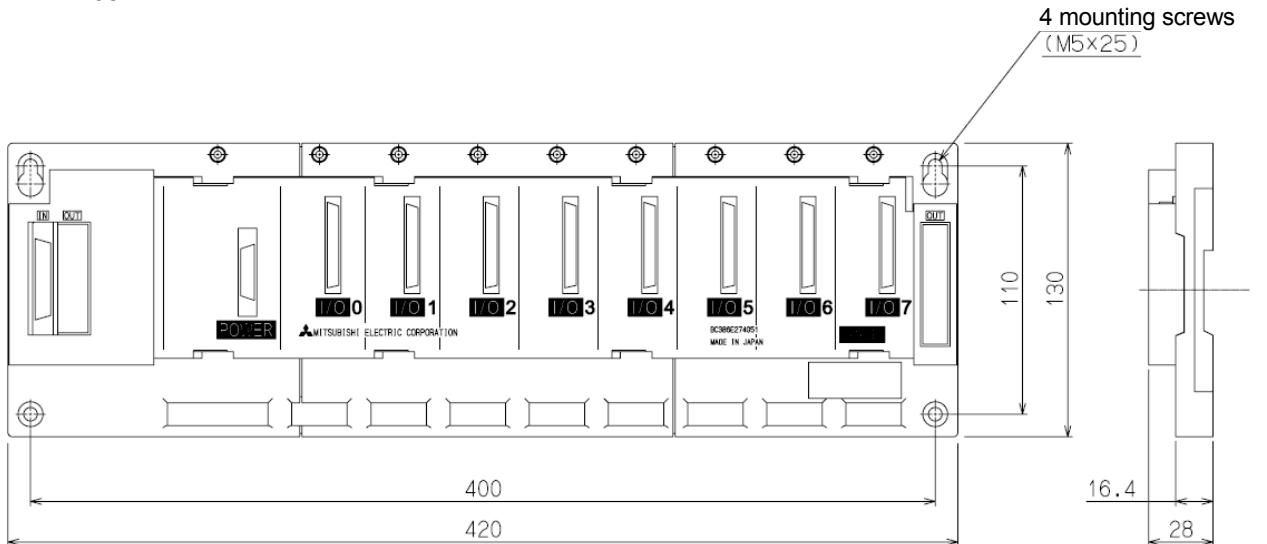
1.1.5 A175B



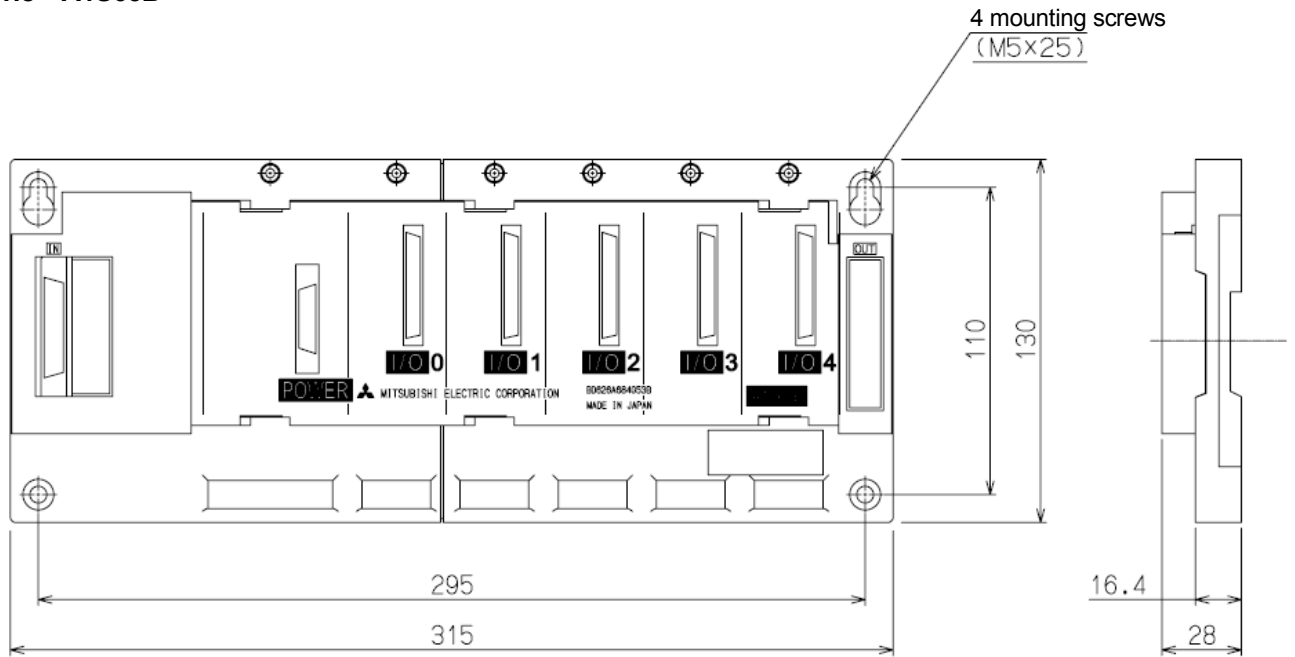
1.1.6 A178B(-S)



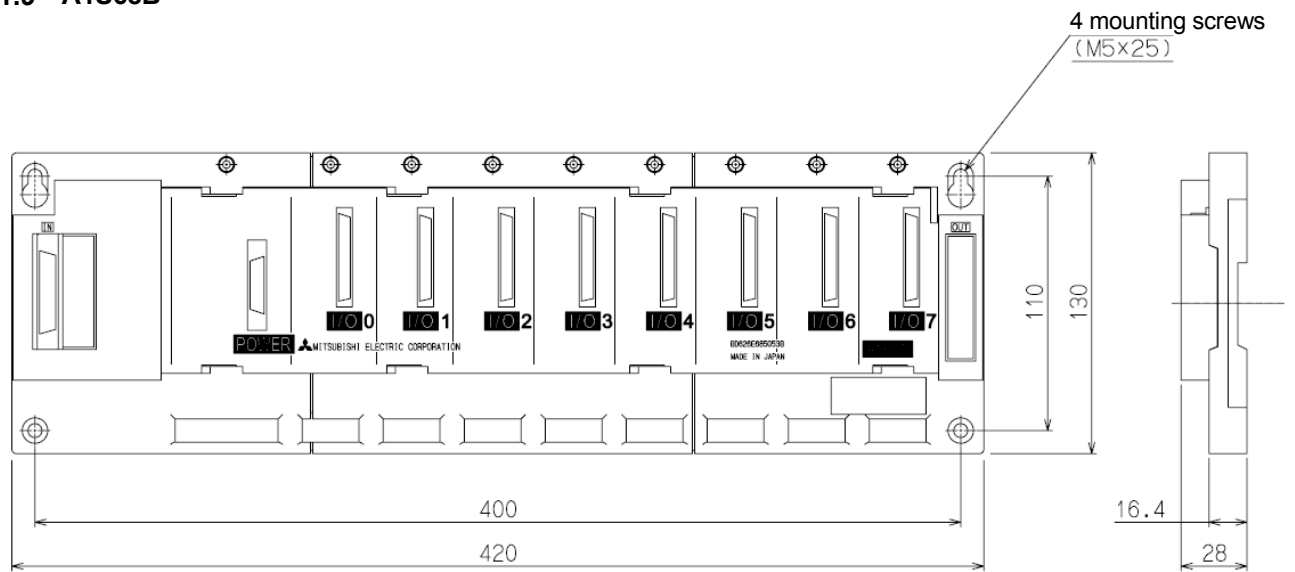
1.1.7 A168B



1.1.8 A1S65B

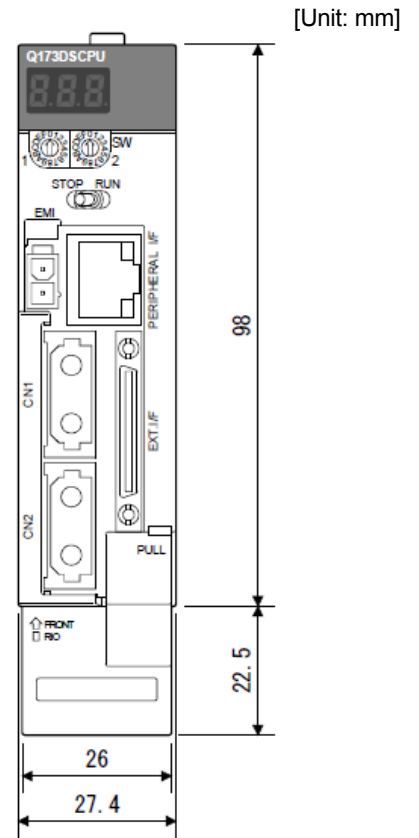
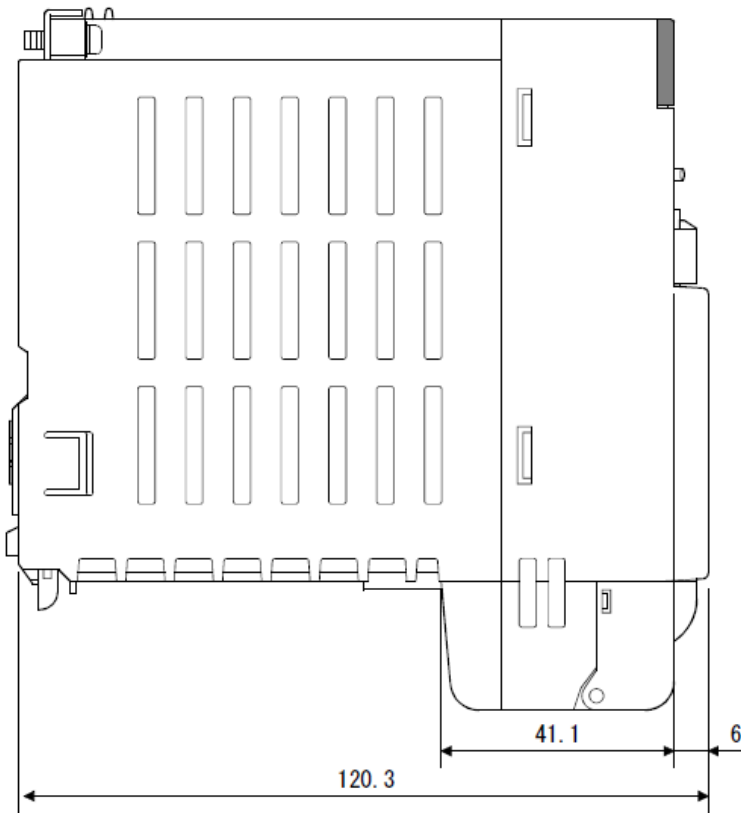


1.1.9 A1S68B

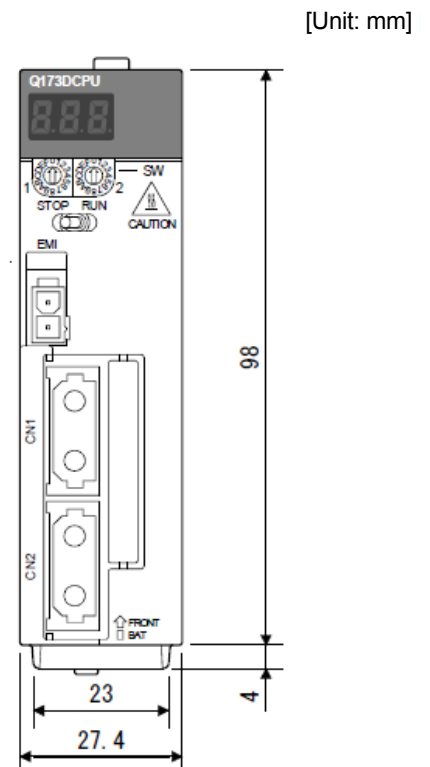
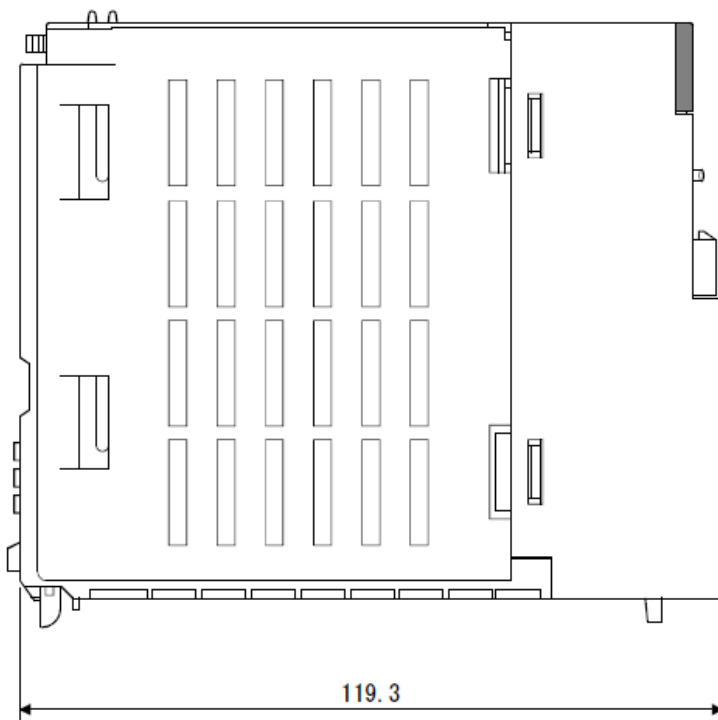


1.2 Outline Dimensions of QD(S) Series

1.2.1 Q17nDSCPU

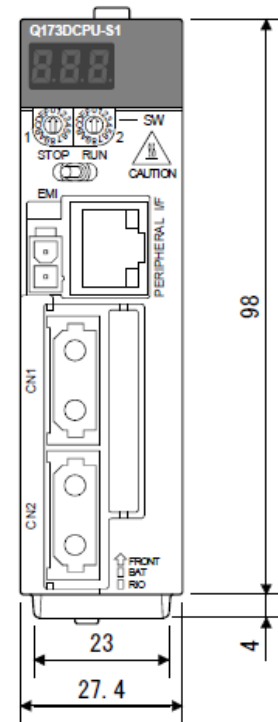
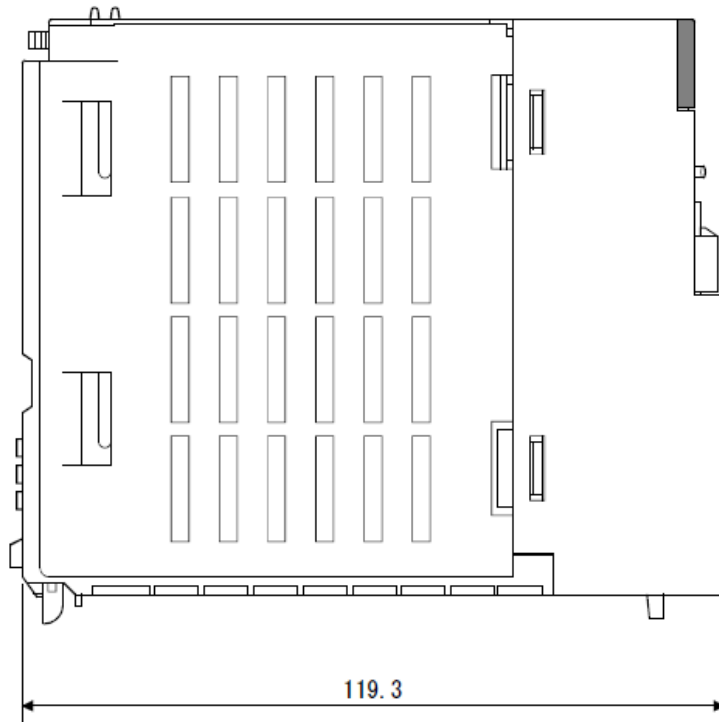


1.2.2 Q17nDCPU

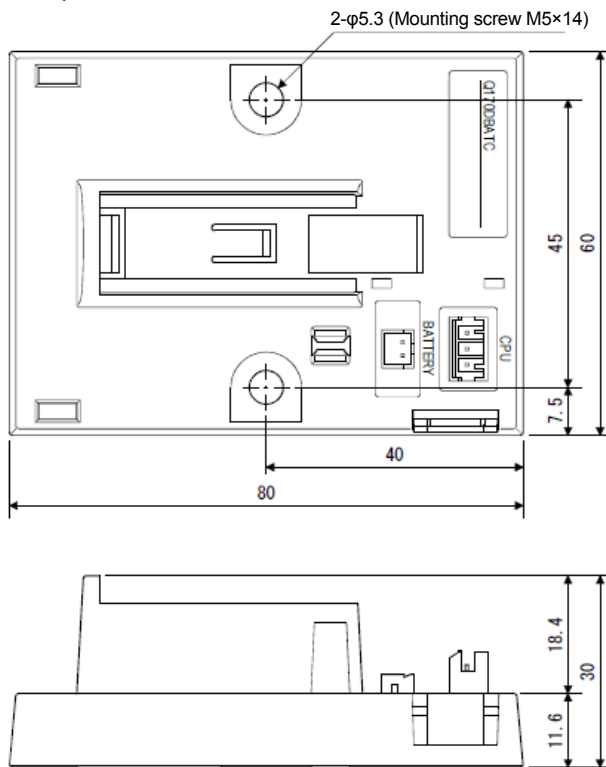


1.2.3 Q17nDCPU-S1

[Unit: mm]

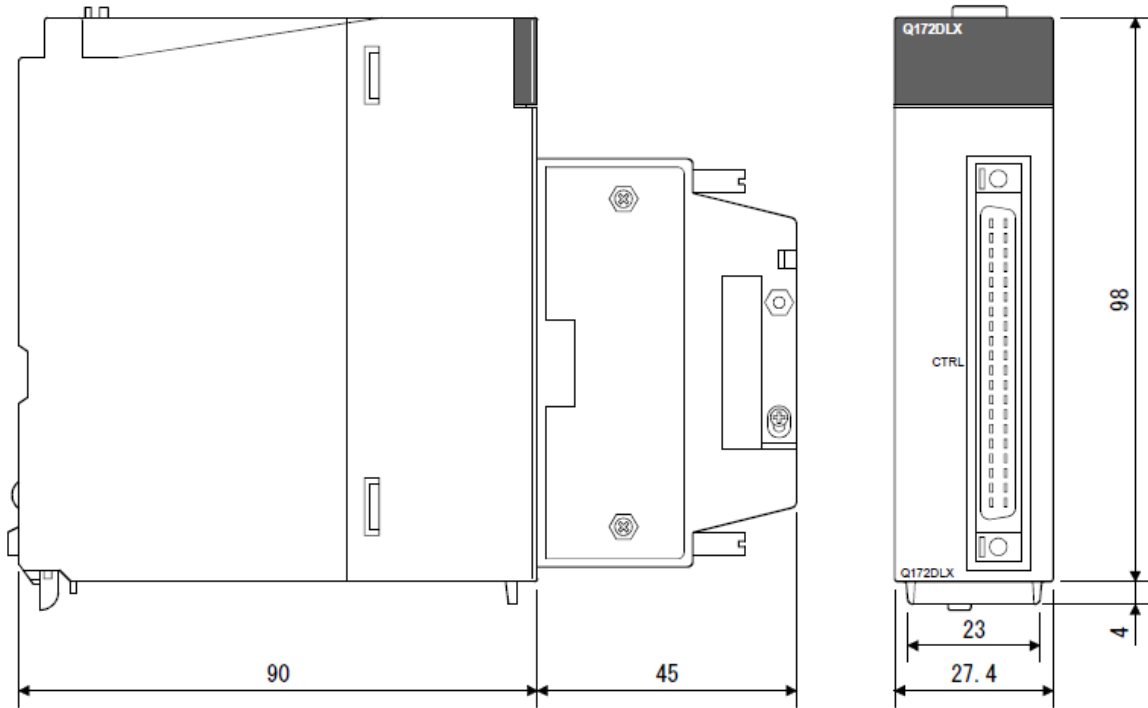


1.2.4 Q170DBATC



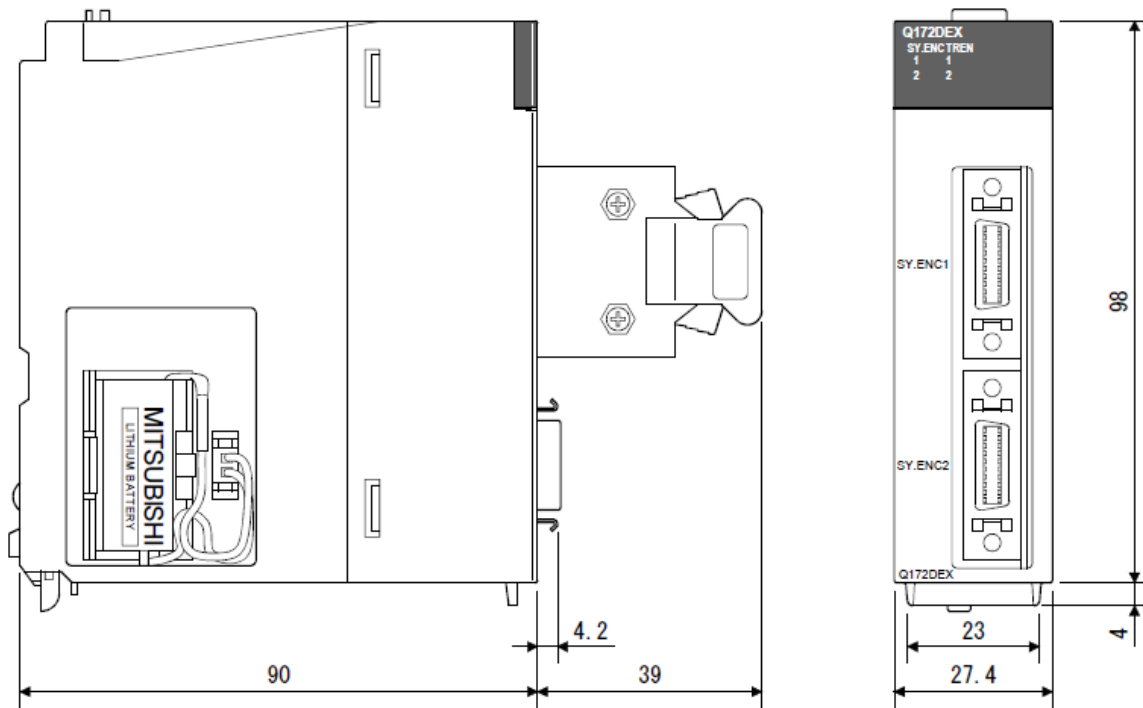
1.2.5 Q172DLX

[Unit: mm]



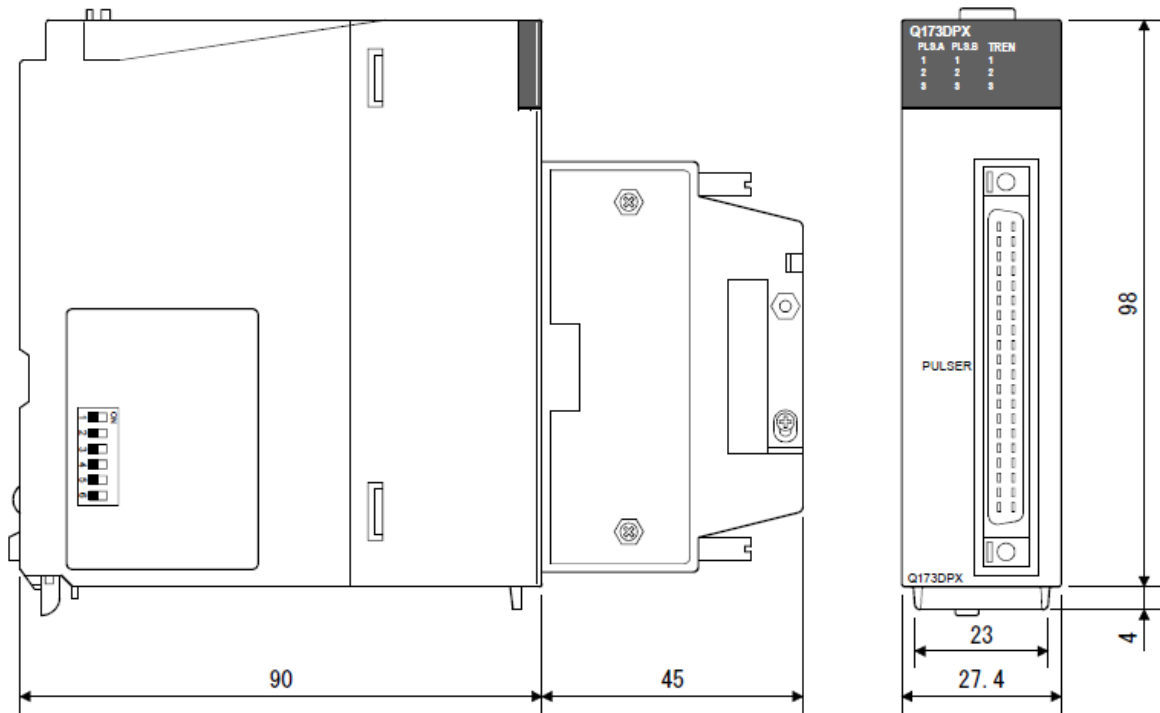
1.2.6 Q172DEX

[Unit: mm]



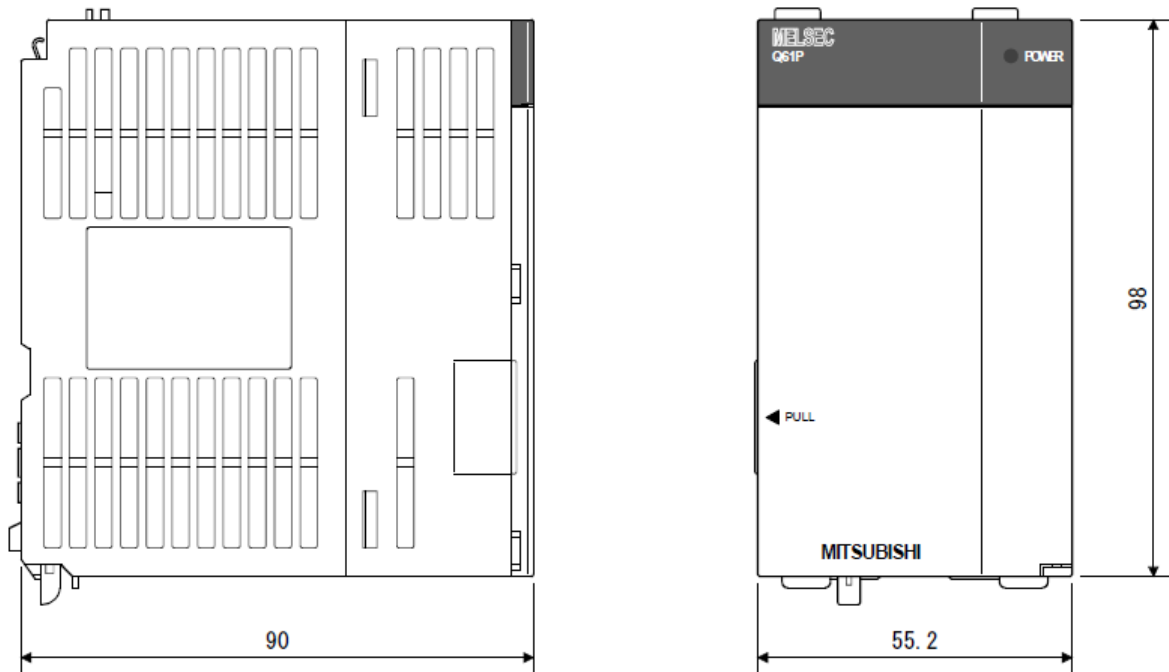
1.2.7 Q173DPX

[Unit: mm]

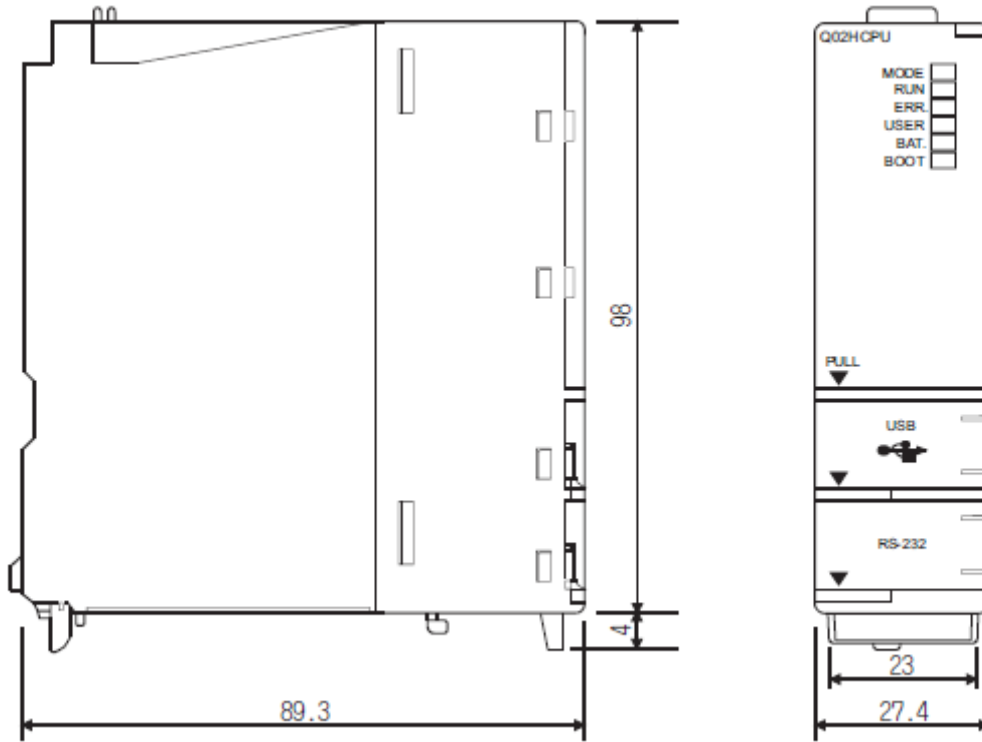


1.2.8 Q61P/Q62P/Q63P

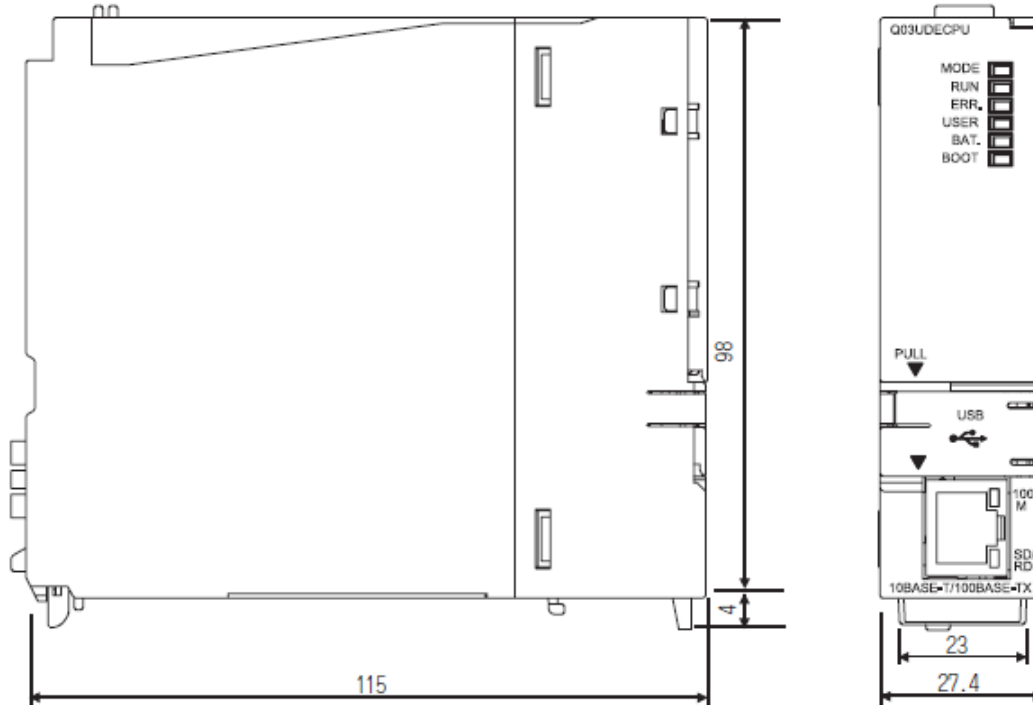
[Unit: mm]



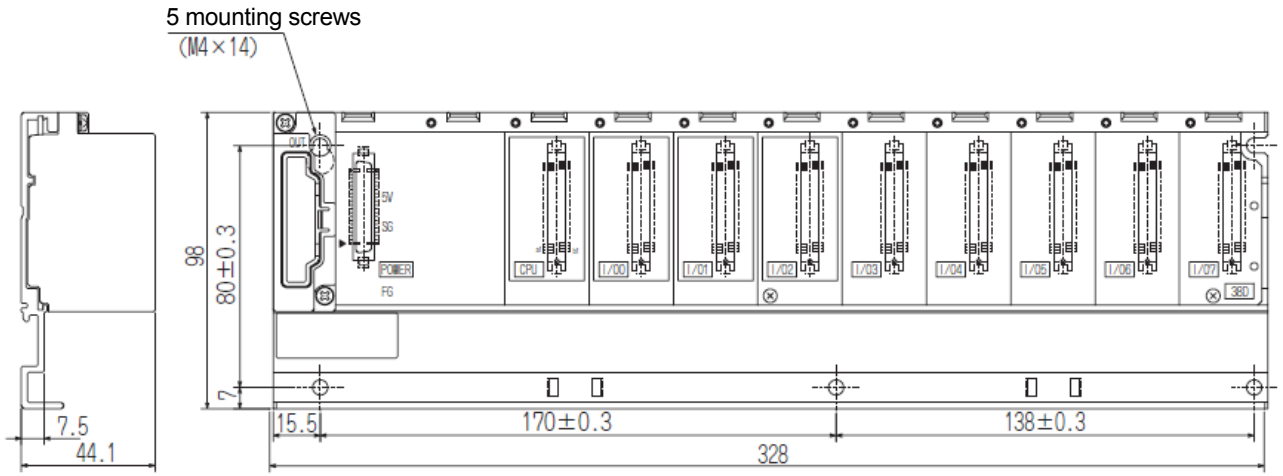
1.2.9 QnHCPU



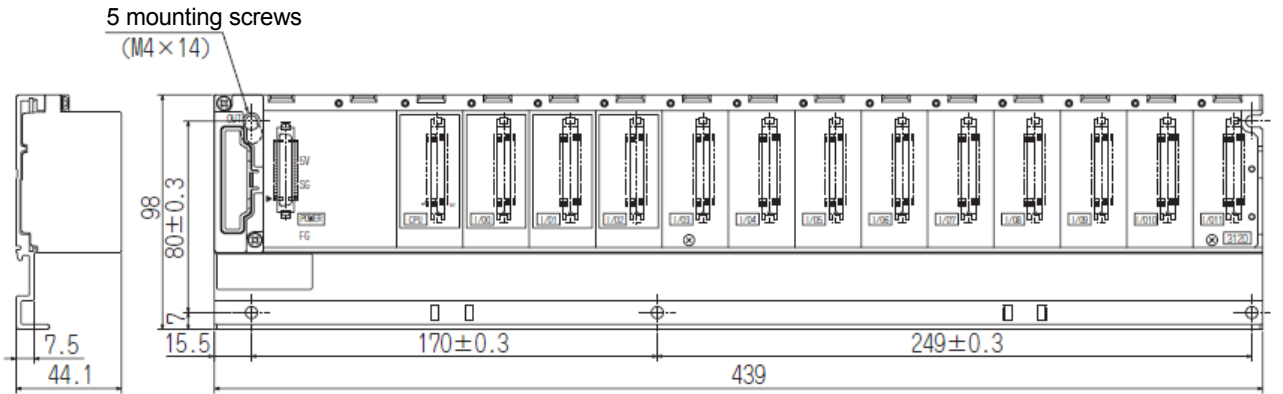
1.2.10 QnUDE(H)CPU



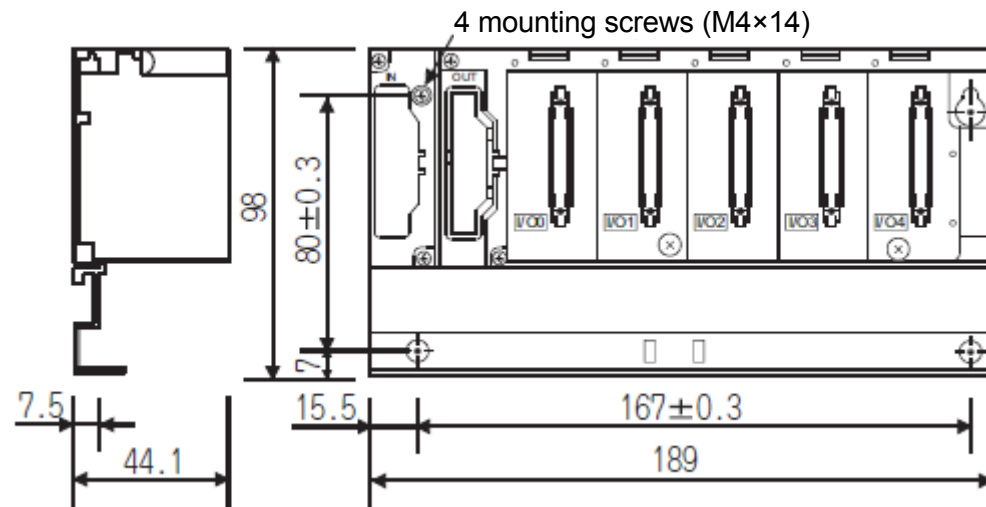
1.2.11 Q38DB



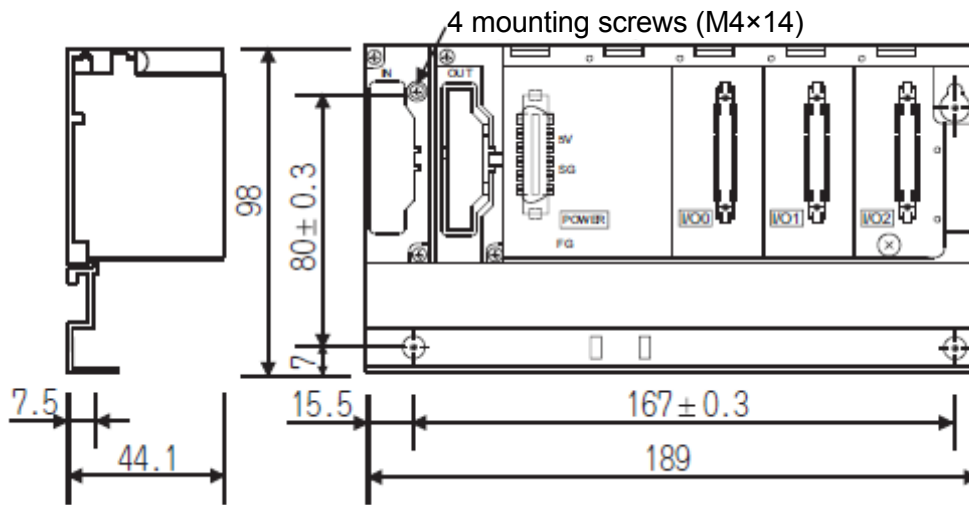
1.2.12 Q312DB



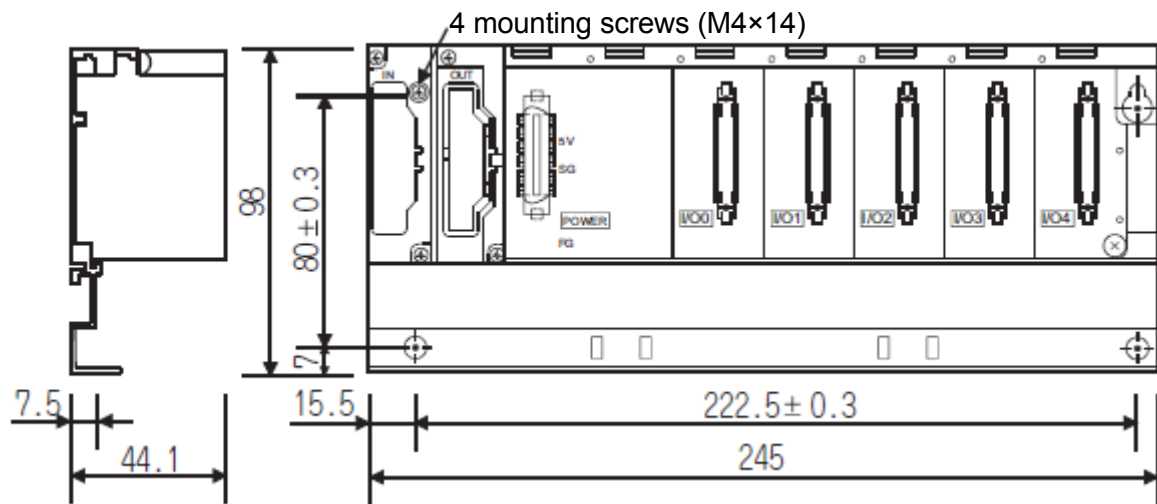
1.2.13 Q55B



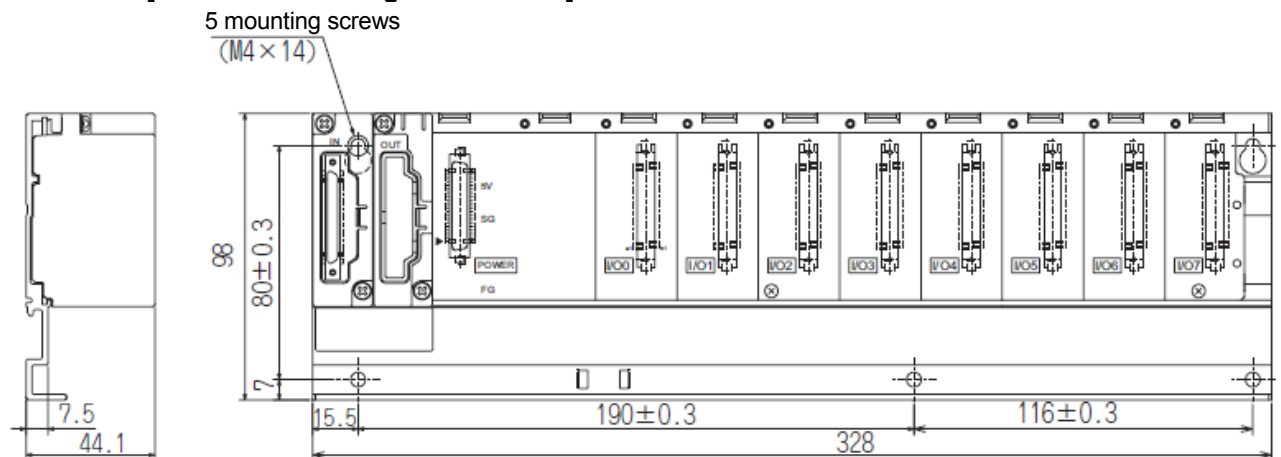
1.2.14 Q63B



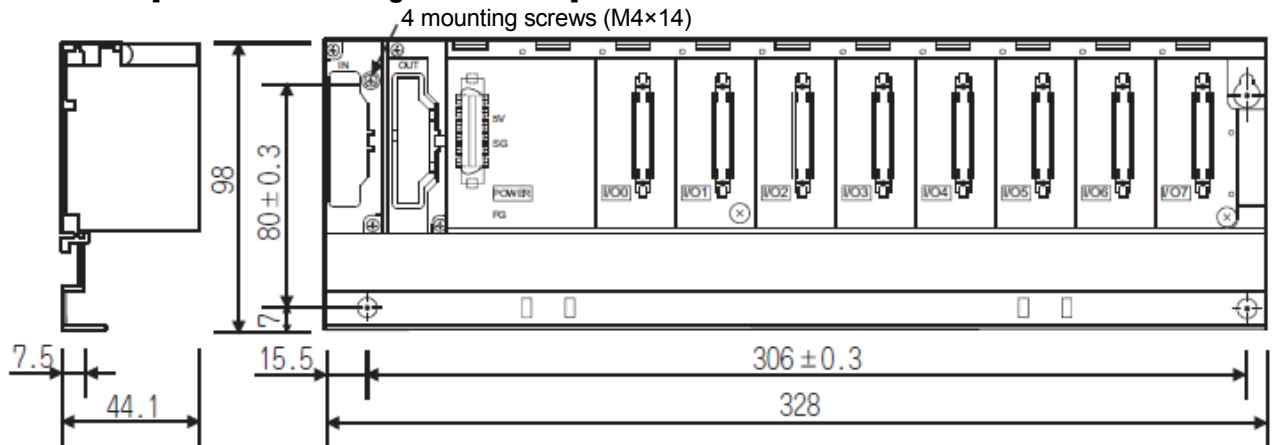
1.2.15 Q65B



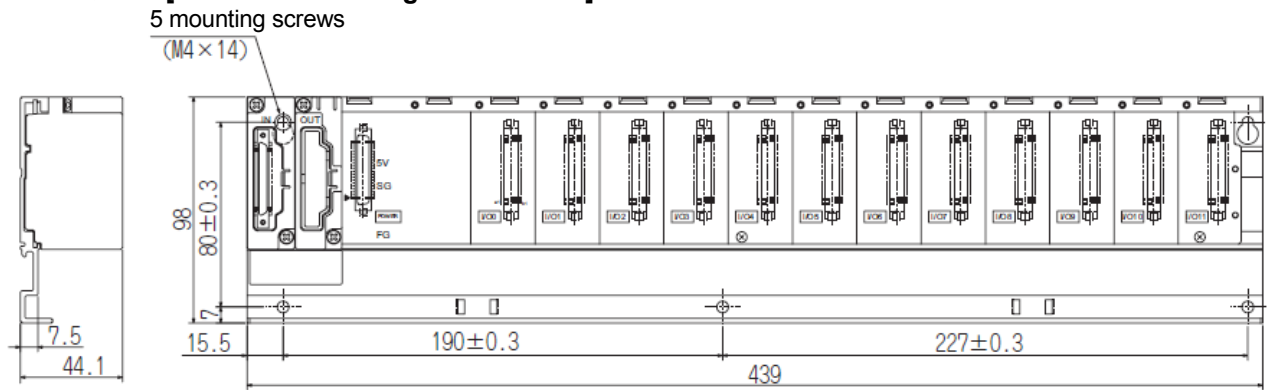
1.2.16 Q68B [Base unit mounting hole: 5 holes]



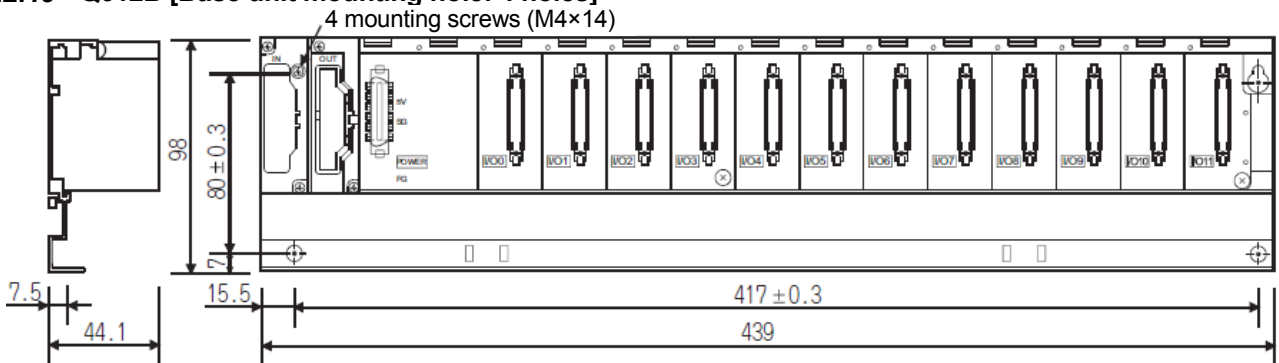
1.2.17 Q68B [Base unit mounting hole: 4 holes]



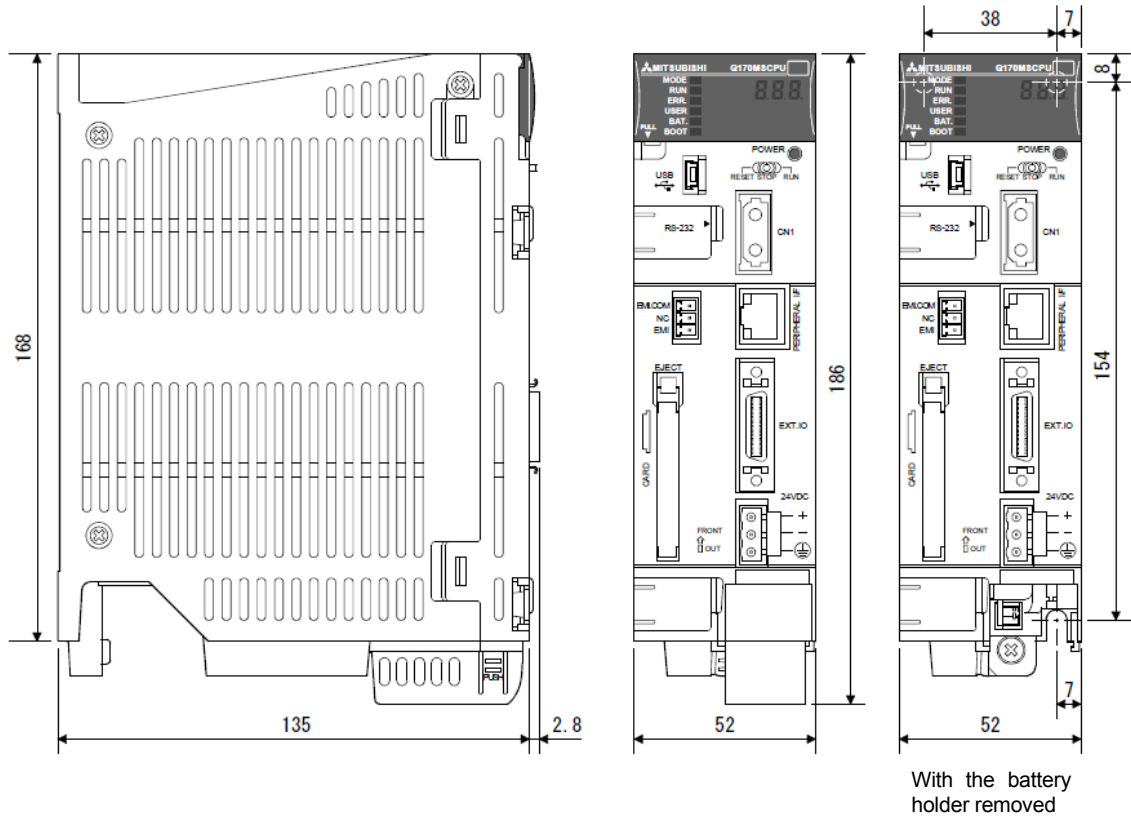
1.2.18 Q612B [Base unit mounting hole: 5 holes]



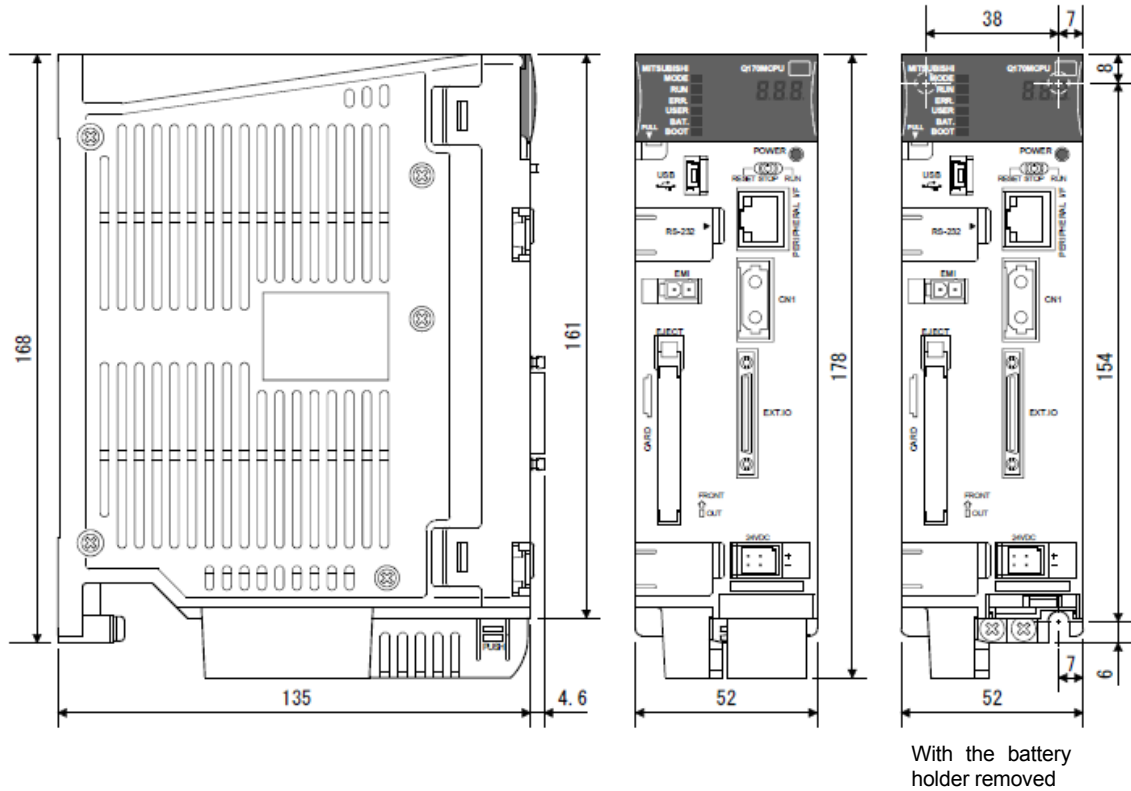
1.2.19 Q612B [Base unit mounting hole: 4 holes]



1.3 Outline Dimensions of Stand-alone Motion
1.3.1 Q170MSCPU(-S1)



1.3.2 Q170MCPUCPU



WARRANTY

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

1. Gratis Warranty Term and Gratis Warranty Range

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Gratis Warranty Term]

The term of warranty for Product is thirty six (36) months after your purchase or delivery of the Product to a place designated by you or forty two (42) months from the date of manufacture whichever comes first "Warranty Period". Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

[Gratis Warranty Range]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule.
It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
 - 1) A failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - 2) A failure caused by any alteration, etc. to the Product made on your side without our approval
 - 3) A failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - 4) A failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - 5) Any replacement of consumable parts (battery, fan, etc.)
 - 6) A failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - 7) A failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - 8) Any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Onerous Repair Term after Discontinuation of Production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued.
The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product; However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

4. Exclusion of Loss in Opportunity and Secondary Loss from Warranty Liability

Whether under or after the term of warranty, we assume no responsibility for any damages arisen from causes for which we are not responsible, any losses of opportunity and/or profit incurred by you due to a failure of the Product, any damages, secondary damages or compensation for accidents arisen under a specific circumstance that are foreseen or unforeseen by our company, any damages to products other than the Product, and also compensation for any replacement work, readjustment, start-up test run of local machines and the Product and any other operations conducted by you.

5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Precautions for Choosing the Products

(1) For the use of our Motion controller, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in Motion controller, and a backup or fail-safe function should operate on an external system to Motion controller when any failure or malfunction occurs.

(2) Our Motion controller is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.

In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.

We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

Transition from A17nSHCPUN/A173UHCPU Series to Q Series Handbook



Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

Country/Region	Sales office	Tel/Fax
USA	MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch Mariano Escobedo #69, Col. Zona Industrial, Tlalnepantla Edo, C.P.54030, Mexico	Tel : +52-55-3067-7500 Fax : -
Brazil	MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA. Rua Jussara, 1750- Bloco B Anexo, Jardim Santa Cecilia, CEP 06465-070, Barueri - SP, Brasil	Tel : +55-11-4689-3000 Fax : +55-11-4689-3016
Germany	MITSUBISHI ELECTRIC EUROPE B.V. German Branch Gothaer Strasse 8, D-40880 Ratingen, Germany	Tel : +49-2102-486-0 Fax : +49-2102-486-1120
UK	MITSUBISHI ELECTRIC EUROPE B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.	Tel : +44-1707-28-8780 Fax : +44-1707-27-8695
Italy	MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch Centro Direzionale Colleoni - Palazzo Sirio Viale Colleoni 7, 20864 Agrate Brianza(Milano) Italy	Tel : +39-039-60531 Fax : +39-039-6053-312
Spain	MITSUBISHI ELECTRIC EUROPE, B.V. Spanish Branch Carretera de Rubí, 76-80-Apdo. 420, 08173 Sant Cugat del Vallés (Barcelona), Spain	Tel : +34-935-65-3131 Fax : +34-935-89-1579
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Czech Republic	MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch Avenir Business Park, Radlicka 751/113e, 158 00 Praha5, Czech Republic	Tel : +420-251-551-470 Fax : +420-251-551-471
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Russia	MITSUBISHI ELECTRIC EUROPE B.V. Russian Branch St. Petersburg office Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; RU-195027 St. Petersburg, Russia	Tel : +7-812-633-3497 Fax : +7-812-633-3499
Sweden	MITSUBISHI ELECTRIC EUROPE B.V. (Scandinavia) Fjellievägen 8, SE-22736 Lund, Sweden	Tel : +46-8-625-10-00 Fax : +46-46-39-70-18
Turkey	MITSUBISHI ELECTRIC TURKEY A.Ş Ümraniye Branch Şerifali Mahallesi Nutuk Sokak No:5, TR-34775 Ümraniye, İstanbul, Turkey	Tel : +90-216-526-3990 Fax : +90-216-526-3995
UAE	MITSUBISHI ELECTRIC EUROPE B.V. Dubai Branch Dubai Silicon Oasis, P.O.BOX 341241, Dubai, U.A.E.	Tel : +971-4-3724716 Fax : +971-4-3724721
South Africa	ADROIT TECHNOLOGIES 20 Waterford Office Park, 189 Witkoppen Road, Fourways, Johannesburg, South Africa	Tel : +27-11-658-8100 Fax : +27-11-658-8101
China	MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. No.1386 Hongqiao Road, Mitsubishi Electric Automation Center, Shanghai, China	Tel : +86-21-2322-3030 Fax : +86-21-2322-3000
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Korea	MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD. 7F-9F, Gangseo Hangang Xi-tower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 157-801, Korea	Tel : +82-2-3660-9510 Fax : +82-2-3664-8372/8335
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Thailand	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD. 12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpan, Khet Yannawa, Bangkok 10120, Thailand	Tel : +66-2682-6522 to 6531 Fax : +66-2682-6020
Indonesia	PT. MITSUBISHI ELECTRIC INDONESIA Gedung Jaya 11th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia	Tel : +62-21-3192-6461 Fax : +62-21-3192-3942
Vietnam	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Unit 01-04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam	Tel : +84-8-3910-5945 Fax : +84-8-3910-5947
India	MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch Emerald House, EL -3, J Block, M.I.D.C Bhosari, Pune - 411026, Maharashtra, India	Tel : +91-20-2710-2000 Fax : +91-20-2710-2100
Australia	MITSUBISHI ELECTRIC AUSTRALIA PTY. LTD. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245

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