



# MITSUBISHI ELECTRIC SERVO SYSTEM CONTROLLER

# Migration Guide of Motion Controller [Q17nCPUN(-T) ⇒ Q17nDSCPU]





(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 Q173D(S)CPU/Q172D(S)CPU Users manual for a description of the Motion controller safety precautions.

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



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



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

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.
- lacktriangle Be sure to ground the Motion controller, servo amplifier and servomotor. (Ground resistance : 100  $\Omega$  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.
- To maintain the safety of the programmable controller system against unauthorized access from external devices via the network, take appropriate measures. To maintain the safety against unauthorized access via the Internet, take measures such as installing a firewall.

#### (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.

# **∆** CAUTION

- 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.
- 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.

# **⚠** CAUTION

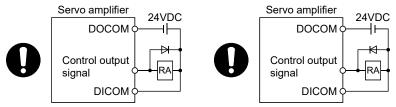
- The Motion controller, servo amplifier and servomotor are precision machines, so do not drop or apply strong impacts on them.
- Securely fix the Motion controller, servo amplifier and servomotor to the machine according to the instruction manual. If the fixing is insufficient, these may come off during operation.
- 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.

Foringen	Conditions					
Environment	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	According to each instruction manual					
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.
- When fumigants that contain halogen materials such as fluorine, chlorine, bromine, and iodine are used for disinfecting and protecting wooden packaging from insects, they cause malfunction when entering our products.
  - Please take necessary precautions to ensure that remaining materials from fumigant do not enter our products, or treat packaging with methods other than fumigation (heat method). Additionally, disinfect and protect wood from insects before packing products.

# **ACAUTION**

- 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.



For the sink output interface

For the source output interface

- 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 position 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

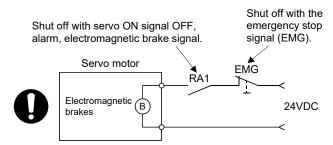
- Immediately turn OFF the power if smoke, abnormal sounds or odors are emitted from the Motion controller, servo amplifier or servomotor.
- Always execute a test operation before starting actual operations after the program or parameters have been changed or after maintenance and inspection.
- Do not 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 the User's 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.)

# **♠**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 Electric 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**

Print Date	Manual No.	Revision
Jan., 2019	L(NA)03121ENG-A	First edition

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#### INTRODUCTION

Please read this manual carefully so that equipment is used to its optimum.

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# 1. OVERVIEW OF MIGRATION FROM Q17nCPUN(-T) TO Q17nDSCPU

#### 1.1 Benefits of Migration

Migrating from the existing system using Q173CPUN(-T)/Q172CPUN(-T) Motion controllers to a new system using iQ Platform Motion controllers Q173DSCPU/Q172DSCPU (hereinafter called Q17nDSCPU), which support the programs on the Q173CPUN(-T)/Q172CPUN(-T), is recommended. We also recommend migrating servo amplifiers to the MR-J4 series at the same time

Migrating not only allows the system to run for longer periods, but also has the following advantages.

(1) High-speed operation and high functionality of the Motion controller The Motion controller Q17nDSCPU achieves the maximum operation cycle of 0.22 ms/4 axes, enabling a dramatically fast operation.

The controller also achieves further advanced motion control with a wide variety of motion control functions.

- → Increased productivity from higher speeds and functionality of the Motion controller
- (2) High-speed communication by SSCNETIII/H Speeding up and improving noise tolerance of servo system network communications are achieved by optical communication. A long distance cable of 100 m can be also used.
  - → Increased speeds over the entire facility
- (3) Servo amplifier MR-J4 and servo motor MELSERVO-J4

The servo amplifier MR-J4 series achieves high performance operation with a variety of functions including one-touch tuning, a 22-bit high resolution encoder (4194304 pulse/rev), and 2.5 kHz speed frequency response. The product line includes multi-axis servo amplifiers that contribute to energy saving, space saving, and reduced wiring of a machine. The MR-J4 series compatible rotary servo motor, HG series, enables to output high torque at high speed. Linear servo motors and direct drive motors are also available. Select the motor type according to your application from our extensive product lines.

→ Increase of applications, improved performance, energy saving, downsizing, and reduced wiring of drive systems

#### (4) Lower maintenance cost

After 5 years of usage, the products will need maintenance, such as replacement of the whole circuit board due to the life of components including electrolytic capacitors and memories. To use the system the longest possible, an early migration to the latest model is recommended in terms of performance and quality.

→ Increased equipment longevity

# 1.2 Main Target Models for Migration

The main target models and operating system software for replacement described in this section are as follows.

If you are using special operating system software or application-specific operating system software, contact your local sales office.

#### (1) Modules/Cables

Product name	Model		Model		
1 Toddet Harrie	before migration		after migration		
	Q172CPUN		Q172DSCPU <sup>(Note-1)</sup>		
Matian CDU mandula	Q173CPUN-T Q173CPUN-T		Q173DSCPU <sup>(Note-1), (Note-2)</sup>		
Motion CPU module			Q172DSCPU <sup>(Note-1), (Note-3)</sup>		
			Q173DSCPU <sup>(Note-1), (Note-2), (Note-3)</sup>		
Battery unit	Q170BAT (Order if necessary)		Unnecessary (A battery is set in the Motion CPU battery holder unit.)		
Dividing unit	Q173DV		-		
Servo external signals interface module	Q172LX		Q172DLX		
	Q172EX		[Synchronous encoder interface		
Serial absolute synchronous	Q172EX-S1		module]		
encoder interface module	Q172EX-S2		Q172DEX		
	Q172EX-S3				
Manual pulse generator	Q173PX		0470000		
interface module	Q173PX-S1		Q173DPX		
Serial absolute synchronous	MR-HENC		←(same as the left)		
encoder	Q170ENC		Q171ENC-W8		
	MR-JHSCBL□M-H,L		←(same as the left)		
Serial absolute synchronous	(For MR-HENC)				
encoder cable(Note-4)	Q170ENCCBL□M		←(same as the left)		
	(For Q170ENC)		(For Q171ENC-W8)		
Manual pulse generator	MR-HDP01		←(same as the left)		
000 1/5 h 1	A10BD-PCF		-		
SSC I/F board	A30BD-PCF		_		
SSC I/F card	A30CD-PCF		_		
SSCNET cable <sup>(Note-4)</sup>	Q172J2BCBL□M Q172J2BCBL□M-B Q173J2BCBL□M Q173J2B3CBL□M Q173J2B3CBL□M Q173J2B4CBL□M Q172HBCBL□M Q172HBCBL□M-B Q173HBCBL□M Q173HBCBL□M Q173HBCBL□M		[SSCNETIII cable] MR-J3BUS□M MR-J3BUS□M-A MR-J3BUS□M-B <sup>(Note-5)</sup>		

#### (Continued)

Product name Model before migration		Model after migration
SSC I/F board cable <sup>(Note-4)</sup>	Q170BDCBL□M	_
SSC I/F card cable <sup>(Note-4)</sup>	Q170CDCBL□M	_
T	A31TU-D3K13	-
Teaching unit	A31TU-DNK13	
	Q170TUD3CBL3M	_
Cable for teaching unit	Q170TUDNCBL3M	
	Q170TUDNCBL03M-A	
Short-circuit connector for	Q170TUTM	_
teaching unit	A31TUD3TM	

(Note-1): Q17nDSCPU cannot be used in combination with Q17nHCPU(-T)/Q17nCPUN(-T).

(Note-2): If the number of axes used in the system with Q173CPUN(-T) is 16 or less, Q172DSCPU can be also selected.

(Note-3): Q17nDSCPU does not support teaching units.

(Note-4): "□" indicates the cable length.

(015: 0.15m, 03: 0.3m, 05: 0.5m, 1: 1m, 5: 5m, 10: 10m, 20: 20m, 30: 30m, 40: 40m, 50: 50m)

(Note-5): For a long distance cable of up to 100 m or an ultra-long bending life cable, contact Mitsubishi Electric System & Service Co., Ltd.

OVERSEAS SERVICE SECTION (Email: osb.webmaster@melsc.jp)

#### (2) Operating system software

Before migration				After migration		
CPU model	OS Type	OS model		CPU model	OS Type	OS model
Q173CPUN(-T)	0) // 0	SW6RN-SV13QB	4	Q173DSCPU	0) // 0	SW8DNC-SV13QJ
Q172CPUN(-T)	SV13	SW6RN-SV13QD		Q172DSCPU	SV13	SW8DNC-SV13QL
Q173CPUN(-T)		SW6RN-SV22QA	ĺ	Q173DSCPU		SW8DNC-SV22QJ
Q172CPUN(-T)	SV22	SW6RN-SV22QC		Q172DSCPU	SV22	SW8DNC-SV22QL

(Note): The operating system software (SV22) is installed at the time of product purchase.

# (3) Servo amplifiers and servo motors

Before migration from Q17nCPUN(-T)		A	DSCPU		
Serv	o amplifier	Servo motor	Servo amplifier Servo me		Servo motor
MR-J2S	MR-J2S-□B	HC-KFS□	MR-J4	MR-J4-□B(-RJ)	HG-KR□
series		HC-MFS□	series	MR-J4W2-□B	HG-MR□
		HC-SFS□		MR-J4W3-□B	HG-SR□
		HC-LFS□			HG-RR□
		HC-RFS□			HG-UR□
		HA-LFS□			HG-JR□
		HC-UFS□			
MR-J2M	MR-J2M-□DU	HC-KFS□			
series		HC-MFS□			
		HC-UFS□			
MR-H	MR-H□B(N)	HA-FF□			
series		HA-FH□			
		HA-LH□			
		HA-MH□			
		HA-SH□			
		HA-UH□			
		HC-KF□			
		HC-MF□			
		HC-RF□			
		HC-SF□			
		HC-UF□			
		HA-LF□			
MD 10		HA-LH□K			
MR-J2 series	MR-J2-□B	HC-MF□			
series		HA-FF□			
		HC-SF□			
		HA-RF□			
MR-J2-Jr	MD 10 00DE	HC-UF□		MD 14W2 0202D2	
MR-J2-Jr series	MR-J2-03B5	HC-AQ□(B)D		MR-J4W2-0303B6	HG-AK□(B)D
3C11C3		HC-AQ□(B)S			HG-AK□(B)

# 1. OVERVIEW OF MIGRATION FROM Q17nCPUN(-T) TO Q17nDSCPU

#### (4) Servo system network

Item		SSCNET SERVO EVETEN CONTROLLER NETWORK	SSCNETIII/H SERVO SYSTEM CONTROLLER METRODEX	
Communications m	nedium	Metal cable	Optical fiber cable	
Communications s	peed	5.6 Mbps	150 Mbps	
Communications	Send	0.88 ms/1.77 ms/3.55 ms	0.22 ms/0.44 ms/0.88 ms	
cycle	Receive	3.55ms	0.22 ms/0.44 ms/0.88 ms	
Number of control a	axes	Up to 8 axes/line	Up to 16 axes/line	
Transmission dista	nce	Maximum overall distance: 30 m	[Standard code for inside panel and standard cable for outside panel]  Up to 20 m between stations  Maximum overall distance: 320 m (20 m × 16 axes)  [Long distance cable]  Up to 100 m between stations  Maximum overall distance: 1600 m (100 m × 16 axes)	

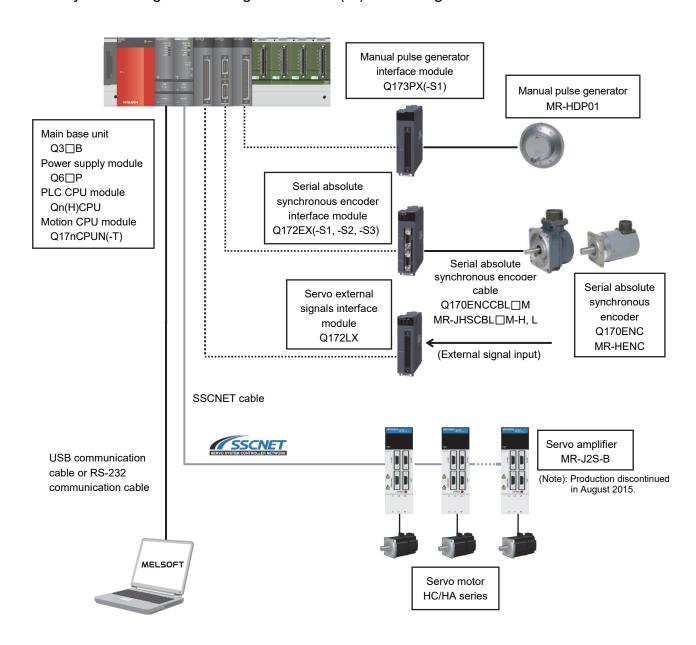
#### (5) Engineering environment (required)

Product name	Model	Version
MELSOFT MT Works2	SW1DND-MTW2-E	Ver.1.34L or later
MELSOFT GX Works2	SW1DNC-GXW2-E	Ver.1.84N or later
MELSOFT MR Configurator2 (Note-1)	SW1DNC-MRC2-E	Ver.1.12N or later

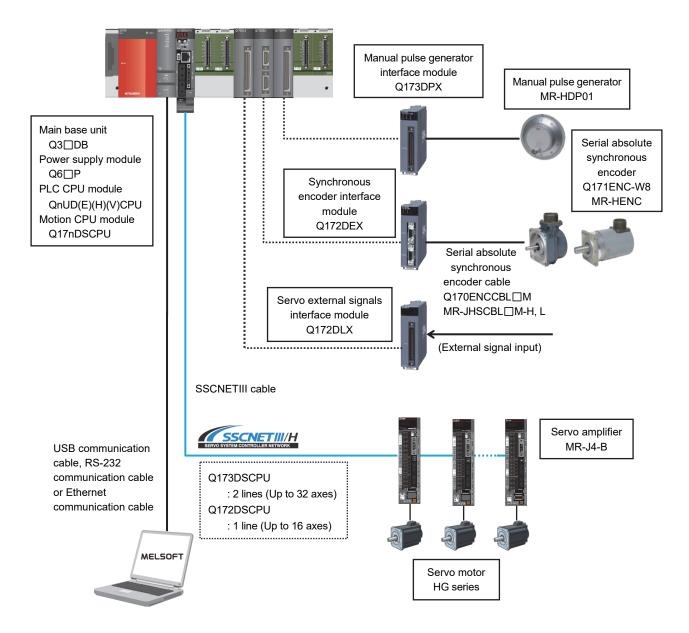
(Note-1): The Servo Setup Software MRZJW3-SETUP161E is required when a combination of MR-J4-B-RJ020 and MR-J4-T20 is used as MR-J2S-B.

## 1.3 System Configuration

#### 1.3.1 System configuration using Q17nCPUN(-T) before migration



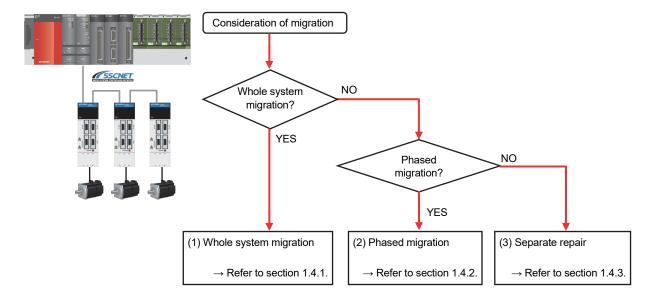
## 1.3.2 System configuration using Q17nDSCPU after migration



Note) There is a restriction on installation position of Motion modules (Q172DLX, Q172DEX, Q173DPX). Refer to 2.4.2 (3) for details.

#### 1.4 Case Study on Migration

The following describes a case study for migrating the existing system using Q17nCPUN(-T).



#### (1) Whole system migration (recommended)

The controller, servo amplifiers, servo motors, and servo system network are replaced simultaneously. Although a large-scale installation is required, the whole system migration allows the system to operate for longer periods. (Refer to section 1.4.1.)

# (2) Phased migration (When the whole system migration is difficult due to the installation period and cost.)

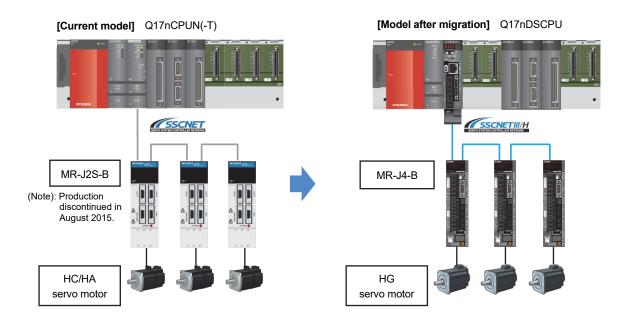
The MR-J2S-B servo amplifiers are gradually replaced with the MR-J4-B servo amplifiers, and then the controller is eventually replaced with Q17nDSCPU in the final phase. (Refer to section 1.4.2.)

#### (3) Separate repair

This is a replacement method for when the servo amplifier or the servo motor malfunctions. (Refer to section 1.4.3.)

# 1.4.1 Whole system migration (recommended)

The following shows the system when the whole system migration takes place.

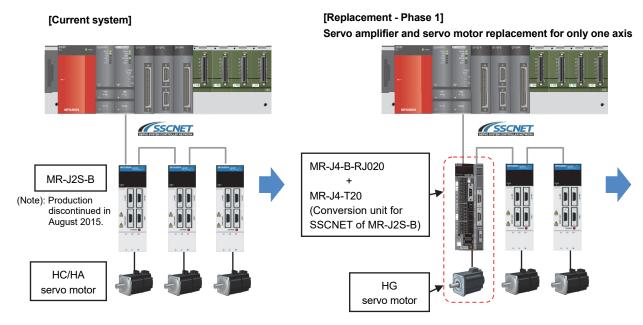


#### [Changes in the system]

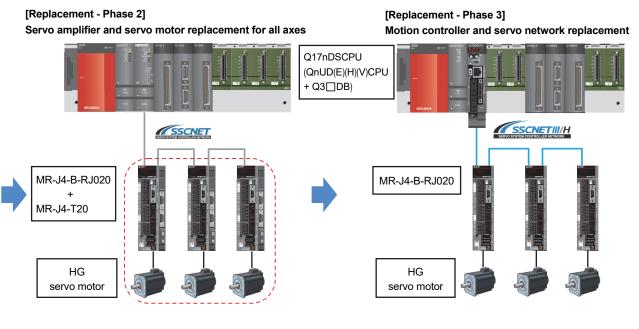
Product name	Model before migration		Model after migration	
Main base unit	Q3□B		Q3□DB	
PLC CPU module	Qn(H)CPU		QnUD(E)(H)(V)CPU	
Motion CPU module	Q17nCPUN(-T)		Q17nDSCPU	
Motion modules	Q172LX		Q172DLX	
	Q172EX(-S1,-S2,-S3)	7	Q172DEX	
	Q173PX(-S1)	1	Q173DPX	
Servo amplifier	MR-J2S-B		MR-J4-B	
Servo motor	HC/HA series		HG series	

#### 1.4.2 Phased migration

The following shows the procedure for the phased migration in which the MR-J2S-B servo amplifiers are gradually replaced with the MR-J4-B servo amplifiers, and eventually the controller is replaced with Q17nDSCPU in the final phase.



(Note): For replacing the servo amplifier or the servo motor, refer to section "1.4.3 Separate repair".



(Note): MR-J4-B-RJ020 + MR-J4-T20

MR-J4-B-RJ020 connected to MR-J4-T20 operates as MR-J2S-B. In addition, MR-J4-B-RJ020 can drive both MR-J4 compatible HG servo motors and MR-J2S compatible HC/HA servo motors.

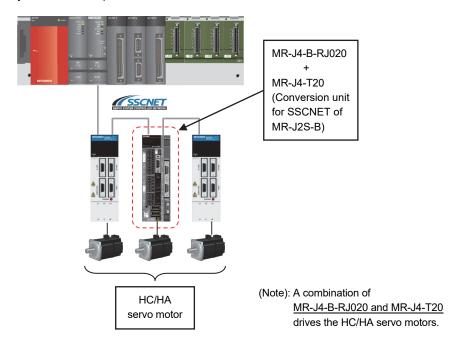
(Note): When replacing the servo system network, change the operation mode of MR-J4-B-RJ020 from the J2S mode to the J4 mode.

(Note): Remove MR-J4-T20.

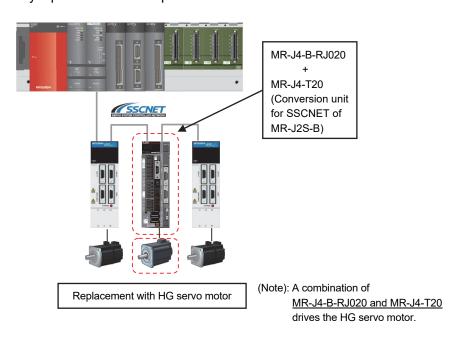
### 1.4.3 Separate repair

The following shows the procedure for the separate repair.

(1) When the MR-J2S-B servo amplifier has malfunctioned Replace only the servo amplifier.



(2) When the HC/HA servo motor has malfunctioned Simultaneously replace the servo amplifier and the malfunctioned servo motor.



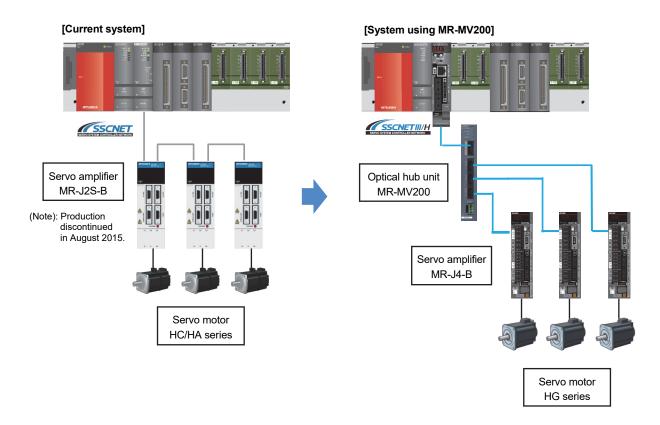
#### 1.4.4 Precautions for powering off only a desired servo amplifier

Changing the servo amplifier connection method from SSCNET (metal cables) to SSCNETIII/H (optical fiber cables) makes the Motion controller communicate with servo amplifiers on the second axis and after via the servo amplifier of a preceding axis. Thus, powering OFF the servo amplifier on a preceding axis cuts off communication with all servo amplifiers on subsequent axes.

Use the SSCNETIII/H compatible MR-MV200 optical hub unit for powering off only a desired servo amplifier.

Refer to section 1.4.5 for details of the MR-MV200 optical hub unit.

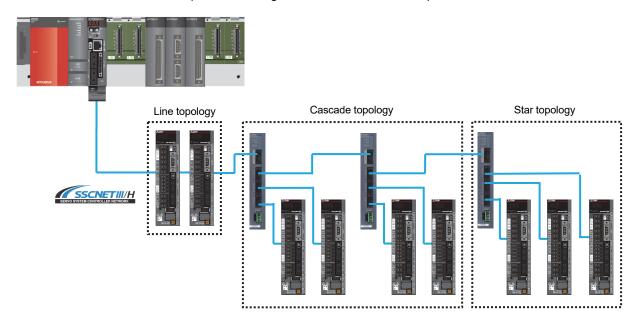
The current system and the migrated system with the MR-MV200 are shown below.



# 1.4.5 Configuration when the MR-MV200 optical hub unit is used

The MR-MV200 can branch a single SSCNETIII/H network line in three separate directions (three outputs per one input).

A connection example when using the MR-MV200 and the specifications are shown below.



Item	Description
Input voltage [V]	21.6 to 26.4 VDC (24 VDC ± 10 %)
Consumption current [A]	0.2
Mass [kg]	0.22
Mounting method	Directly mounted to the control panel or with DIN rail
Cable length [m]	Up to 100
Number of optical hub units	Up to 16 units/line
Number of servo amplifiers	Up to 16 axes/line
Exterior dimensions [mm]	168 (H) x 30 (W) x 100 (D)

#### 1.5 Project Diversion

The following functions can convert the projects of Q17nCPUN(-T) into those of Q17nDSCPU. For the procedure for project diversion, refer to section "2.4.2 Project diversion procedures by engineering environment".

#### (1) Motion CPU project

"Project diversion function" and "Change Type/OS Type function" of MELSOFT MT Works2

# "Project diversion function" or "Change Type/OS Type function"



#### (2) PLC CPU project

"Change PLC type function" of MELSOFT GX Works2

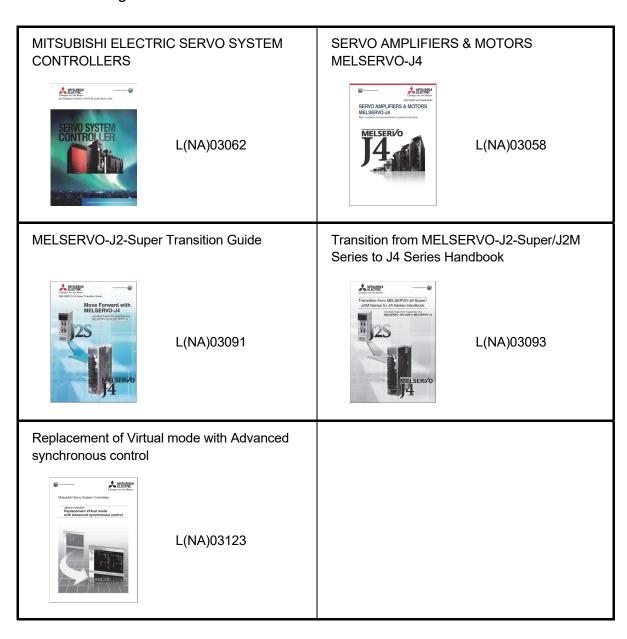
# "Change PLC Type function"



#### 1.6 Relevant Documents

Refer to the following relevant documents for the replacement.

#### 1.6.1 Relevant catalogs



#### 1.6.2 Relevant manuals

# (1) Motion controller

Manual title	Manual No.
Q173D(S)CPU/Q172D(S)CPU Motion Controller User's Manual	IB-0300133
Q173D(S)CPU/Q172D(S)CPU Motion Controller Programming Manual (COMMON)	IB-0300134
Q173D(S)CPU/Q172D(S)CPU Motion Controller (SV13/SV22) Programming Manual (Motion SFC)	IB-0300135
Q173D(S)CPU/Q172D(S)CPU Motion Controller (SV13/SV22) Programming Manual (REAL MODE)	IB-0300136
Q173D(S)CPU/Q172D(S)CPU Motion Controller (SV22) Programming Manual (VIRTUAL MODE)	IB-0300137
Q173D(S)CPU/Q172D(S)CPU Motion Controller (SV22) Programming Manual (Advanced Synchronous Control)	IB-0300198

# (2) Servo amplifier

Manual title	Manual No.
MR-J4B_(-RJ) SERVO AMPLIFIER INSTRUCTION MANUAL	SH-030106
MR-J4 Servo amplifier Instructions and Cautions for Safe Use of AC Servos	IB-0300175E
MELSERVO-J4 Servo amplifier INSTRUCTION MANUAL TROUBLE SHOOTING	SH-030109
MR-J4W2B/MR-J4W3B/MR-J4W2-0303B6 SERVO AMPLIFIER INSTRUCTION MANUAL	SH-030105
Conversion Unit for SSCNET of MR-J2S-B Compatible AC Servo MR-J4BRJ020/MR-J4-DU_BRJ020/MR-CR55K_/MR-J4-T20 SERVO AMPLIFIER INSTRUCTION MANUAL	SH-030125
Instructions and Cautions for Drive of HC/HA Series Servo Motor with MR-J4BRJ020 Servo Amplifier	SH-030127
Conversion unit for SSCNET of MR-J2S-B MR-J4-T20 Installation Guide	IB-0300204E

# 2. DETAILS OF MIGRATION FROM Q17nCPUN(-T) TO Q17nDSCPU

# 2.1 Table of Components and Software

Prepare modules, servo amplifiers, operating system software, and an engineering environment according to the following tables in this section.

Product name	Model before migration		Model after migration			
	Q172CPUN	ł		Q172DSCPU <sup>(Note-1)</sup>		
	Q173CPUN Q172CPUN-T		Q173DSCPU <sup>(Note-1), (Note-2)</sup>			
Motion CPU module			Q172DSCPU <sup>(Note-1), (Note-3)</sup>			
	Q173CPUN-T		Q173DSCPU <sup>(Note-1), (Note-2)</sup>			
PLC CPU module	Qn(H)CPU		QnUD(E)(H)(V)CPU	, ,		
Main base unit	Q3□B	1	Q3 DB <sup>(Note-4)</sup>			
Cable for forced stop input			Q170DEMICBL M(Note-5)	Use		
Connector for forced stop input cable	-		Q170DEMICON <sup>(Note-6)</sup>	either of them		
Servo external signals interface module	Q172DLX		Q172DLX			
	Q172EX		[Synchronous encoder int	erface		
Serial absolute synchronous	Q172EX-S1		module] Q172DEX			
encoder interface module	Q172EX-S2		•			
	Q172EX-S3		<u> </u>			
Manual pulse generator	Q173PX		Q173DPX			
interface module	Q173PX-S1					
Serial absolute synchronous	MR-HENC		←(same as the left)			
encoder	Q170ENC		Q171ENC-W8	Q171ENC-W8		
Serial absolute synchronous	MR-JHSCBL□M-H,L (For MR-HENC)		←(same as the left)			
encoder cable	Q170ENCCBL□M		←(same as the left)			
	(For Q170ENC)		(For Q171ENC-W8)			
Battery unit	Q170BAT (Order if necessary)		Unnecessary (A battery is set in the Motion CPU battery holder unit.)			
	A6BAT		Q6BAT			
	(For Motion CPU module)		(For Motion CPU module)			
Battery	A6BAT		←(same as the left)			
	(For synchronous encoder)					
Manual pulse generator	MR-HDP01		←(same as the left)			
Dividing unit	Q173DV		_			

#### (Continued)

Product name	Model before migration		Model after migration
SSCNET cable <sup>(Note-7)</sup>	Q172J2BCBL M Q172J2BCBL M-B Q173J2BCBL M Q173J2B2CBL M Q173J2B3CBL M Q173J2B4CBL M Q172HBCBL M Q172HBCBL M Q173HBCBL M Q173HBCBL M Q173HBCBL M	•	[SSCNETIII cable] MR-J3BUS□M MR-J3BUS□M-A MR-J3BUS□M-B <sup>(Note-8)</sup>
Teaching unit	A31TU-D3K13 A31TU-DNK13		-
Cable for teaching unit	Q170TUD3CBL3M Q170TUDNCBL3M Q170TUDNCBL03M-A		-
Short-circuit connector for teaching unit	Q170TUTM A31TUD3TM		-

- (Note-1): Q17nDSCPU cannot be used in combination with Q17nHCPU(-T)/Q17nCPUN(-T).
- (Note-2): If the number of axes used in the system with Q173CPUN(-T) is 16 or less, Q172DSCPU can be also selected.
- (Note-3): Q17nDSCPU does not support teaching units.
- (Note-4): Only Multiple CPU high speed main base unit (Q3 □ DB) can be used.
- (Note-5): Use the cable for forced stop input (sold separately). The forced stop cannot be released without using it.
- (Note-6): A specialized tool is required when fabricating a forced stop input cable by user. Refer to "Q173D(S)CPU/Q172D(S)CPU User's Manual" for details.
- (Note-7): "□" indicates the cable length.
  (015: 0.15m, 03: 0.3m, 05: 0.5m, 1: 1m, 5: 5m, 10: 10m, 20: 20m, 30: 30m, 40: 40m, 50: 50m)
- (Note-8): For a long distance cable of up to 100 m or an ultra-long bending life cable, contact Mitsubishi Electric System & Service Co., Ltd.
  - OVERSEAS SERVICE SECTION (Email: osb.webmaster@melsc.jp)

# 2.1.1 Servo amplifiers and servo motors

The servo system network is changed from SSCNET to SSCNETIII/H. Select a SSCNETIII/H compatible servo amplifier and a servo motor connectable to the selected servo amplifier.

Before migrating from Q17nCPUN(-T)			A	After migrating to Q17nDSCPU		
Servo	o amplifier	Servo motor	Se	Servo motor		
MR-J2S	MR-J2S-□B	HC-KFS□	MR-J4	MR-J4-□B(-RJ)	HG-KR□	
series		HC-MFS□	series	MR-J4W2-□B	HG-MR□	
		HC-SFS□		MR-J4W3-□B	HG-SR□	
		HC-LFS□			HG-RR□	
		HC-RFS□			HG-UR□	
		HA-LFS□			HG-JR□	
		HC-UFS□				
MR-J2M	MR-J2M-□DU	HC-KFS□				
series		HC-MFS□				
		HC-UFS□				
MR-H	MR-H□B(N)	HA-FF□				
series		HA-FH□				
		HA-LH□				
		HA-MH□				
		HA-SH□				
		HA-UH□				
		HC-KF□				
		HC-MF□				
		HC-RF□				
		HC-SF□				
		HC-UF□				
		HA-LF□				
		HA-LH□K				
MR-J2	MR-J2-□B	HC-MF□				
series		HA-FF□				
		HC-SF□				
		HA-RF□				
		HC-UF□				
MR-J2-Jr	MR-J2-03B5	HC-AQ□(B)D		MR-J4W2-0303B6	HG-AK□(B)D	
series		HC-AQ□(B)S			HG-AK□(B)	

#### [Comparison of servo system network]

ltem		SSCNET SERVO EVETEN CONTROLLER NETWORK		SSCNETIII/H SERVO SYSTEM CONTROLLER NETWORK
Communications m	nedium	Metal cable		Optical fiber cable
Communications s	peed	5.6 Mbps		150 Mbps
Communications	Send	0.88 ms/1.77 ms/3.55 ms		0.22 ms/0.44 ms/0.88 ms
cycle	Receive	3.55ms		0.22 ms/0.44 ms/0.88 ms
Number of control	axes	Up to 8 axes/line		Up to 16 axes/line
Transmission dista	nce	Maximum overall distance:		[Standard code for inside panel and standard cable for
		30 m	,	outside panel]
				Up to 20 m between stations
				Maximum overall distance: 320 m (20 m × 16 axes)
				[Long distance cable]
				Up to 100 m between stations
				Maximum overall distance: 1600 m (100 m × 16 axes)

# 2.1.2 Operating system software

Use the operating system software for Q17nDSCPU.

Before migration				After migration			
CPU model	OS Type	OS model		CPU model	OS Type	OS model	
Q173CPUN(-T)		SW6RN-SV13QB	4	Q173DSCPU		SW8DNC-SV13QJ	
Q172CPUN(-T)	SV13	SW6RN-SV13QD		Q172DSCPU	SV13	SW8DNC-SV13QL	
Q173CPUN(-T)	0) (0.0	SW6RN-SV22QA	,	Q173DSCPU	0.400	SW8DNC-SV22QJ	
Q172CPUN(-T)	SV22	SW6RN-SV22QC		Q172DSCPU	SV22	SW8DNC-SV22QL	

(Note): The operating system software (SV22) is installed at the time of product purchase.

# 2.1.3 Engineering environment (required)

The engineering environment that supports Q17nDSCPU is as follows.

Product name	Model	Version
MELSOFT MT Works2	SW1DND-MTW2-E	Ver.1.34L or later
MELSOFT GX Works2	SW1DNC-GXW2-E	Ver.1.84N or later
MELSOFT MR Configurator2 (Note-1)	SW1DNC-MRC2-E	Ver.1.12N or later

(Note-1): The Servo Setup Software MRZJW3-SETUP161E is required when a combination of MR-J4-B-RJ020 and MR-J4-T20 is used as MR-J2S-B.

# 2.2 Differences Between Q17nCPUN(-T) and Q17nDSCPU

#### (1) Performance and specifications

► An item that requires a setting change at migration.

Ito	Models Q		Q173CPUN(-T)	Q172CPUN(-T)	Q173DSCPU	Q172DSCPU	Points for migration	
Nu	Number of control axes		Up to 32	Up to 8	Up to 32		-	
Ор	SV13		0.88ms/ 1 to 8 axes 1.77ms/ 9 to 16 axes 3.55ms/17 to 32 axes		0.44ms/ 5 0.88ms/11	to 4 axes to 10 axes to 24 axes to 32 axes	If the operation cycle is set as default (automatic), the operation cycle will be changed.  Set an operation cycle where	
cyc (de	cie fault)	SV22	0.88ms/ 1 to 4 axes 1.77ms/ 5 to 12 axes 3.55ms/13 to 24 axes 7.11ms/25 to 32 axes		0.44ms/ 1 to 6 axes 0.88ms/ 7 to 16 axes 1.77ms/17 to 32 axes		necessary because the change in the operation cycle may change program execution timing. (Refer to section 2.2(6).)	
Co	ntrol met	rhods	Positioning control Speed/position s Fixed-pitch feed, control, Position f Speed switch High-speed osc Synchronous o (Virtual	witching control, Constant speed follow-up control, hing control, control (SV22	Speed/position of Fixed-pitch feed control, Position Speed switching control with fixed High-speed ose Speed-tord Tightening & p Synchronous con mode switching r	ol, Speed control, switching control, constant speed follow-up control, g control, Speed ed position stop, cillation control, que control, ress-fit control, trol (SV22 (Virtual nethod/Advanced control method))	-	
	Internal (M)	relays	_ ,, , , ,		12288 points		Latch relay (L) is integrated into internal relay (M). Refer to 2.4.2(5) for replacing the latch	
	Latch relay (L)		Total 8192 points		None (Latch for M is possible by latch setting)		relay with internal relay. After the replacement, set the latch range in the latch range setting.	
	Special	relay (M)	256 pc	oints	_	-	Special relay (M)/special register (D)	
	Special (SM)	relay	-		2256 points		of Q17nCPUN have been changed to SM/SD devices respectively in	
Device	Special register (D) Special register (SD)		256 p	oints	-		Q17nDSCPU. (Refer to 2.3.2, 2.3.3, 2.4.2(5) for	
0			-		ر 2256	ooints	details.)	
	Motion (#)	register	8192 p	points	12288	points	Due to the expansion of Motion devices, device assignments of monitor devices, etc. have been partially changed. (Refer to 2.3.1, 2.4.2(5).)	
	Multiple area de (U□\G)	vices	-		Up to 14336 points		-	

#### (Continued)

	inded)			I	1		
Item	Models	Q173CPUN(-T)	Q172CPUN(-T)	Q173DSCPU	Q172DSCPU	Points for migration	
Motion dedicated PLC instruction		S(P).DDRD, S(P).DDWR, S(P).SFCS, S(P).SVST, S(P).CHGT, S(P).CHGV, S(P).CHGA, S(P).GINT		D(P).DDRD, D(P).DDWR, D(P).SFCS, D(P).SVST, D(P).CHGT, D(P).CHGT2, D(P).CHGV, D(P).CHGVS, D(P).CHGA, D(P).CHGAS, D(P).GINT		▶ Replace the Motion dedicated PLC instruction S(P). ☐ with D(P). ☐. (Refer to "Q173D(S)CPU/Q172D(S)CPU Motion Controller Programming Manual (COMMON).)	
Interlock condition		Interlock condition by high speed interrupt accept flag from CPU□ to the self CPU is necessary. □:CPU No.		continuously without interlock condition by high speed interrupt accept flag from CPU□ to the self CPU.		The interlock condition is not necessary in the new system, however, there is no problem if the condition remains in the program because the accept flag is always OFF.	
	SV13	Q172LX,	Q173PX	Q172DLX,	Q173DPX	The Q172DEX can be installed only in	
	SV22	Q172LX, Q17	2EX, Q173PX	Q172DLX, Q172	DEX, Q173DPX	the main base unit.	
Moti mod			otion modules can be installed to I/O slot No. 0 to 2.		annot be installed No. 0 to 2.	Change the installation position of Motion modules if they are installed i the I/O slot No.0 to 2. Be sure to instathem in I/O slot No.3 or later. (Refer to section 2.4.2(3).)	
Serv sign	o external al	Q172LX signal		Q172DLX signal, DI signal, Bit device, Amplifier input		▶ When the servo external signals are used, review the settings.	
Sha men	red CPU nory	H0 to HFFF (4096 words)		H0 to H5F0F (24335 words)		-	
CPU sł	Access by Multiple CPU shared memory	Not po	ssible	Possible		-	
CPU shared memory	Multiple CPU high speed transmission area	Not pro	ovided	Provided		The communication area of Q17nCPUN(-T) cannot be used. By changing CPU type in MELSOFT MT Works2, the communication area is automatically changed to high-speed transmission area.	
Auto	Memory	Automatic refresh area in CPU shared memory		Multiple CPU high speed transmission area in CPU shared memory		[Automatic refresh setting] The existing data is automatically changed to the data type for the	
Automatic refresh	Automatic refresh setting	4 range setti	4 range settings possible 32 range settings possible		ings possible	Multiple CPU high-speed transmission area at Motion CPU project diversion	
efresh	Multiple CPU high speed refresh function	CPU		ided			

### (Continued)

Models	Q173CPUN(-T)	Q172CPUN(-T)	Q173DSCPU	Q172DSCPU	Points for migration
Cancelling errors of Multiple CPU	[Self-diagnostic error code]  • 10000: M2039 OFF  • Less than 10000:  M9060 OFF→ ON  (The error code needs to be stored to the special register of D9060.)		M2039	) OFF	
Self-diagnostic errors	Motion CPU-specific errors  →"10000" is stored in the diagnostic error (D9008).  At this time, the self-diagnostic error flag (M9008) and the diagnostic error flag (M9010) do		Motion CPU-specific errors  →10000 to 10999 are stored in the diagnostic error (SD0) (the stored value varies depending on the error.)  Self-diagnostic error flag (SM1) and diagnostic error flag (SM0) turn ON.		Revise the programs.
Motion SFC error detection flag (M2039)	It depends on the M2039 is turne		M2039 will turn Of occurred in the		
Battery	Install A6BAT (external battery) if continuous power failure occurs for 1 month or more.  Q6BAT must be installed		be installed	The Motion CPU data is not latched without a battery.	
Forced stop input	Use the devices set in the forced stop input setting in the system setting.		<ul> <li>Use the EMI terminal of Motion CPU module.</li> <li>Use the devices set in forced stop input setting in the system setting.</li> </ul>		Be sure to use the cable for forced stop input (sold separately). The forced stop cannot be released without using it.
Peripheral I/F	USB/RS-232	2/SSCNET	USB/RS-23 (via PL0 / PERIPHI (Motior	ERAL I/F	Use a compatible I/F to communicate with peripheral devices.  If PC link communication is used, replace it with USB communication.  In that case, replace the existing cable with the A-miniB USB cable as well.
System setting	CPU No.1: Qn(H     The main base u		CPU No.1: QnUD(E)(H)(V)     The main base unit: Multiple CPU high speed main base unit (Q35DB/Q38DB/Q312DB) must be used.		Use compatible module combination.
Servo system network	SSCN	NET	SSCNETIII/H	or SSCNETIII	-
Combination of Motion CPU modules	Possible to Q17nHC		Possible to use with Q17nDCPU(-S1)		Use iQ Platform compatible Motion CPU modules.
CPU empty slot	Not settable be modu		Settable betwee	n CPU modules	-
RUN/STOP	RUN/STO	P switch	RUN/STC	•	-

# 2. DETAILS OF MIGRATION FROM Q17nCPUN(-T) TO Q17nDSCPU

### (Continued)

	Models	Q173CPUN(-T)	Q172CPUN(-T)	Q173DSCPU	Q172DSCPU	Points for migration				
Items		Q1/30FUN(-1)	Q I / ZOF UN(-1)	Q173D3CPU	Q112D3CFU	Fullis for Hilgration				
LED displa	у	MODE, RUN, ERR, M.RUN,  BAT, BOOT 7-segment LED display  on LED display		LED display	_					
ROM writin	ng	Rom writing is the installation r written i	mode/the mode	<ul> <li>ROM writing is executed with the mode operated by RAM.</li> <li>ROM writing can be executed for the data of MELSOFT MT Works2.</li> </ul>		-				
Mode swite	ching	Select a mode w	vith a dip switch.	Select a mode wi	th a rotary switch.	-				
Mechanica program (S	-	The electronic gea screws and rotary in mechanical sy	table is settable	"Number of pulses per rotation" and		screws and rotary table are diverted from the values of fixed parameter "Number of pulses per rotation" and		screws and rotary table are diverted from the values of fixed parameter		Refer to section 2.4.2 (4).
Latch range	Latch (1)	Range in which the latch can be cleared with the latch clear Range in which the latch can be cleared with latch clear (1) and latch clear (1) (2) of remote latch clear								
setting	Latch (2)	Range in which the latch cannot be cleared with the latch clear  Range in which the latch can be cleared with latch clear (1) (2) of remote latch clear		ch clear (1) (2) of	Review the latch settings as needed.					
Latch clear	operation	L.CLR	switch		peration of MT Works2					
All clear fu	nction	Turn OFF PLC re and test mode C to execute	ON flag (M9075)		MT Works2 to all clear.	-				
Digital osc function	illoscope	<ul><li>Word 4CH, Bit 8</li><li>Real-time displa</li><li>Sampling points</li></ul>	у	Word 16CH, Bit 16CH     Real-time display     Sampling points: Up to 8192		-				
Security fu	• Protection by password • Protection by password • Software security key		-							
Operating software in method	-	• MELSOFT MT V • MT Developer	Vorks2	• MELSOFT MT W	/orks2	_				

#### Q173CPUN-T Q172CPUN Q173CPUN Q172CPUN-T Q173DSCPU Q172DSCPU Exterior dimensions [mm] RS-232 27. 4 79.5 114.3 98.0[H] × 27.4[W] × 114.3[D] 120.5[H] × 27.4[W] × 120.3[D] Internal current 1.25 1.56 1.14 1.45 1.75 1.44 consumption (5 VDC)[A] Mass 0.23 0.24 0.22 0.23 0.38 [kg]

## (2) Exterior dimensions and mass

#### (3) Base unit

When the existing system is migrated to Q17nDSCPU, the main base unit needs to be replaced with "Multiple CPU high-speed transmission main base unit". With the new main base unit, Motion modules cannot be installed in the CPU slots and I/O slot No. 0 to 2. Be sure to install them in I/O slot No.3 or later.

Due to the changes in Motion modules installation position, the number of Motion modules may exceed the number of available I/O slots for Motion modules depending on the main base unit model. Select the one which provides enough I/O slots for your system. (In the previous system, the main base unit is available from 3-slot model (Q33B), however, for the Q17nDSCPU, the 5-slot model (Q35DB) is the one with the least slot number. Therefore, be careful with the installation position and its dimension at migration.)

## (4) Items that need a review or a change following the servo system network change

	Differ	21 /		
Items	Q17nCPUN(-T)	Q17nDSCPU	Changes/revisions	
System setting/ SSCNET configuration	Q173CPUN(-T): 4 lines (Up to 8 axes/line) Q172CPUN(-T): 1 line (Up to 8 axes/line)	Q173DSCPU: 2 lines (Up to 16 axes/line) Q172DSCPU: 1 line (Up to 16 axes/line)	Set the servo amplifier's rotary switch and connection according to the SSCNET configuration.	
Electronic gear	-	-	Change "Number of pulses per revolution" and "Movement amount per revolution" of the fixed parameters according to the resolution per the connected servo motor revolution.	
Powering OFF a servo amplifier in the same network line	If a servo amplifier is turned OFF, there is no influence on the other servo amplifiers in the same network line.	If a servo amplifier is turned OFF in the same network, the servo amplifiers connected after that one cannot be used.	Use MR-MV200 SSCNETIII/H compatible optical hub unit.	
Connect/disconnect of SSCNET communication	No special operation is required to turn OFF/ON a servo amplifier in the SSCNET network line.	Use the connect/disconnect function of SSCNET to turn OFF/ON a servo amplifier in the SSCNET network line.	This function disconnects the network connection of the servo amplifiers after the disconnected one.  In order to turn off only a specific servo amplifier, use MR-MV200 SSCNETIII/H compatible optical hub unit.	
Battery disconnection warning, Battery warning	Servo error code 2102(9F): Battery warning 2103(92): Battery disconnection warning	Servo error code 2102(92): Battery disconnection warning 2116(9F): Battery warning	Revise programs if they use the servo error codes on the left.	
Main circuit OFF warning	If the main circuit is turned OFF while the servo OFF command (M3215+20n) is ON, the main circuit OFF warning 2149(E9) will not occur.	If the main circuit is turned OFF while the servo OFF command (M3215+20n) is ON, the main circuit OFF warning 2149(E9) will occur.	The warning occurs when the main circuit is turned OFF while the servo OFF command (M3215+20n) is ON. In order not to turn ON the main circuit OFF warning 2149(E9), change the PC18 servo parameter from "0□□□(H)" to "1□□□(H)".	

## (5) Self-diagnostic error and Motion (SFC) error history

Self-diagnostic error code			o: Turns ON or Stores the value ×: Does NOT turn ON or NOT store the value						
			Self-diagnostic error flag Motion		Motion (SFC)	Notion (SFC) error history		Motion error detection flag	
Q17nCPUN(-T) (D9008)	Q17nDSCPU (SD0)	Error	Q17nCPUN(-T) (M9008)	Q17nDSCPU (SM1)	Q17nCPUN(-T) (#8000 + 8n) (Note-1)	Q17nDSCPU (#8640 + 12n) (Note-1)	Q17nCPUN(-T) (M2039)	Q17nDSCPU (M2039)	
1 to 9	999	Multiple CPU related errors	0	0	×	0	×	0	
10000	10003	Minor/major errors	×	0	0	0	0	0	
10000	10004	Minor/major errors (Virtual servo motor axis)	×	0	0	0	0	0	
10000	10005	Minor/major errors (Synchronous encoder axis)	×	0	0	0	0	0	
10000	10007	Servo program setting error	×	0	0	0	0	0	
10000	10008	Mode switching error	×	0	0	0	0	0	
10000	10009	Manual pulse generator axis setting error	×	0	0	0	0	0	
10000	10010	Test mode request error	×	0	0	0	0	0	
10000	10011	WDT error	×	0	0	0	0	0	
10000	-	PC link communication error (Note-2)	×	×	0	×	0	×	
10000	10014	System setting error	×	0	×	0	× (Note-3)	0	
-	10015	Servo error (MR-J4-□B)	×	0	×	0	×	0	
10000	10016	Motion slot fault	×	0	×	0	× (Note-4)	0	
10000	10020	Motion SFC control error (F/FS)	×	0	0	0	0	0	
10000	10021	Motion SFC control error (G)	×	0	0	0	0	0	
10000	10022	Motion SFC control error (K or others (Not F/FS, G))	×	0	0	0	0	0	
10000	10023	Motion SFC control error (Motion SFC chart)	×	0	0	0	0	0	
-	10030	Motion CPU internal bus error	×	0	×	0	×	0	
10000	10040	Inverter error	×	0	0	0	0	0	

(Note-1): "n" indicates the corresponding Motion error history (n=0 to 7).

(Note-2): The Q17nDSCPU cannot use SSCNET for the communications between the Motion controller and a personal computer.

Therefore, this error code is not necessary.

(Note-3): When the system setting error (10000) occurs in Q17nCPUN(-T), M2041 turns ON. (M2039 does not turn ON.)

(Note-4): When the Motion slot fault (10000) occurs in Q17nCPUN(-T), M2041 turns ON. (M2039 does not turn ON.)

#### (6) Operation cycle

The operation cycle settings of Q17nCPUN(-T) can be imported to Q17nDSCPU when the projects of Q17nCPUN(-T) are diverted to Q17nDSCPU in MELSOFT MT Works2. (Refer to section 2.4.2(2) for details of project diversion.)

However, if the operation cycle is set as default (automatic), the operation cycle will be changed. Set an operation cycle where necessary by following the table below because the change in the operation cycle may change program execution timing.

## [Control axes and operation cycle at default]

Item	Model	Q173CPUN(-T)	Q172CPUN(-T)	Q173DSCPU	Q172DSCPU
Number of control axes		Up to 32	Up to 8	Up to 32	Up to 16
Operation	SV13	0.88ms/ 1 1.77ms/ 9 t 3.55ms/17	to 16 axes	0.44ms/ 5 0.88ms/11	1 to 4 axes to 10 axes to 24 axes 5 to 32 axes
cycle (default)	SV22	1.77ms/ 5 t 3.55ms/13	0.88ms/ 1 to 4 axes 1.77ms/ 5 to 12 axes 3.55ms/13 to 24 axes 7.11ms/25 to 32 axes		1 to 6 axes to 16 axes 7 to 32 axes

#### [Settable operation cycle]

Q17nCPUN(-T)	Q17nDSCPU
0.88ms 1.77ms 3.55ms 7.11ms 14.2ms <sup>(Note-1)</sup>	0.22ms 0.44ms 0.88ms 1.77ms 3.55ms 7.11ms

(Note-1): Operation cycle of 14.2ms is not settable for Q17nDSCPU.

If the operation cycle of 14.2ms is set in the Q17nCPUN(-T) project, the value is changed to the "default value (automatic)" at project diversion. Review the setting as needed.

# 2.3 Comparison of Devices

# 2.3.1 Motion registers

## (1) Motion registers (Monitor devices)

Device	No.		Pomerko
Q17nCPUN(-T)	Q17nDSCPU	Name	Remarks
#8064 to #8067	#8000 to #8019	Axis 1 monitor device	
#8068 to #8071	#8020 to #8039	Axis 2 monitor device	
#8072 to #8075	#8040 to #8059	Axis 3 monitor device	
#8076 to #8079	#8060 to #8079	Axis 4 monitor device	
#8080 to #8083	#8080 to #8099	Axis 5 monitor device	
#8084 to #8087	#8100 to #8119	Axis 6 monitor device	
#8088 to #8091	#8120 to #8139	Axis 7 monitor device	
#8092 to #8095	#8140 to #8159	Axis 8 monitor device	
#8096 to #8099	#8160 to #8179	Axis 9 monitor device	
#8100 to #8103	#8180 to #8199	Axis 10 monitor device	
#8104 to #8107	#8200 to #8219	Axis 11 monitor device	
#8108 to #8111	#8220 to #8239	Axis 12 monitor device	
#8112 to #8115	#8240 to #8259	Axis 13 monitor device	
#8116 to #8119	#8260 to #8279	Axis 14 monitor device	
#8120 to #8123	#8280 to #8299	Axis 15 monitor device	These monitor devices are automatically
#8124 to #8127	#8300 to #8319	Axis 16 monitor device	converted for the new system at project
#8128 to #8131	#8320 to #8339	Axis 17 monitor device	diversion.
#8132 to #8135	#8340 to #8359	Axis 18 monitor device	ulvereien.
#8136 to #8139	#8360 to #8379	Axis 19 monitor device	
#8140 to #8143	#8380 to #8399	Axis 20 monitor device	
#8144 to #8147	#8400 to #8419	Axis 21 monitor device	
#8148 to #8151	#8420 to #8439	Axis 22 monitor device	
#8152 to #8155	#8440 to #8459	Axis 23 monitor device	
#8156 to #8159	#8460 to #8479	Axis 24 monitor device	
#8160 to #8163	#8480 to #8499	Axis 25 monitor device	
#8164 to #8167	#8500 to #8519	Axis 26 monitor device	
#8168 to #8171	#8520 to #8539	Axis 27 monitor device	
#8172 to #8175	#8540 to #8559	Axis 28 monitor device	
#8176 to #8179	#8560 to #8579	Axis 29 monitor device	
#8180 to #8183	#8580 to #8599	Axis 30 monitor device	
#8184 to #8187	#8600 to #8619	Axis 31 monitor device	
#8188 to #8191	#8620 to #8639	Axis 32 monitor device	

## (2) Each axis monitor devices

Device No. <sup>(Note-1)</sup>				
Q17nCPUN(-T)	Q17nDSCPU	Name	Remarks	
#8064+4n	#8000+20n	Servo amplifier type		
#8065+4n	#8001+20n	Motor current	These monitor devices are automatically	
#8066+4n #8067+4n	#8002+20n #8003+20n	Motor speed	converted for the new system at project diversion.	

(Note-1): "n" indicates the corresponding axis No. (Axis No.1 to 32: n=0 to 31).

### (3) Motion registers (Motion error history)

Device No.		Name	Damanika	
Q17nCPUN(-T)	Q17nDSCPU	Name	Remarks	
#8000 to #8007	#8640 to #8651	Seventh error information in past (Oldest error information)		
#8008 to #8015	#8652 to #8663	Sixth error information in past	Check the device status (whether the device is	
#8016 to #8023	#8664 to #8675	Fifth error information in past	currently used or not) with Cross reference of	
#8024 to #8031	#8676 to #8687	Fourth error information in past	MELSOFT MT Wroks2, and then change the device No. for the Q17nDSCPU.	
#8032 to #8039	#8688 to #8699	Third error information in past	Refer to section 2.3.5 for details of Cross	
#8040 to #8047	#8700 to #8711	Second error information in past	Reference.	
#8048 to #8055	#8712 to #8723	First error information in past	Troisiones.	
#8056 to #8063	#8724 to #8735	Latest error information		

Device N	No. <sup>(Note-1)</sup>			
Q17nCPUN(-T)	Q17nDSCPU	Name	Remarks	
#8000+8n	#8640+12n	Error Motion SFC program No.		
#8001+8n	#8641+12n	Error type		
#8002+8n	#8642+12n	Error program No.	Check the device status (whether the device is	
#8003+8n	#8643+12n	Error block No./Motion SFC list/	currently used or not) with Cross reference of	
#6003+611	#0043+1211	Line No./Axis No.	MELSOFT MT Wroks2, and then change the	
#8004+8n	#8644+12n	Error code	device No. for the Q17nDSCPU.	
#8005+8n	#8645+12n	Error occurrence time	Refer to section 2.3.5 for details of Cross	
#6005+611	#0045+1211	(Year/month)	Reference.	
#8006+8n	#8646+12n	Error occurrence time (Day/hour)		
#9007±9n	#8647+12n	Error occurrence time		
#0007+011	#8007+8n #8647+12n (Minute/second)			
-	#8648+12n	Error setting data information		
-	#8649+12n	Unusable	New device in Q17nDSCPU	
	#8650+12n	From autting data	New device in Q1/11DSCP0	
_	#8651+12n	Error setting data		

(Note-1): "n" indicates the corresponding Motion error history (n=0 to 7).

# 2.3.2 Special relays

	Device No.			
Q17nCPUN(-T)	Device assignment for M9000 to M9255	Q17nDSCPU	Name	Remarks
M9000/M2320	SM2000	SM60	Fuse blown detection	
M9005/M2321	SM2005	SM53	AC/DC DOWN detection	
M9006/M2322	SM2006	SM52	Battery low	
M9007/M2323	SM2007	SM51	Battery low latch	
M9008/M2324	SM2008	SM1	Self-diagnostic error	
M9010/M2325	SM2010	SM0	Diagnostic error	
M9025/M3136	-	-	Clock data set request	Operated on the No.1 CPU clock data
M9026/M2328	SM2026	SM211	Clock data error	
M9028/M3137	SM2028	SM801	Clock data read request	
M9036/M2326	SM2036	SM400	Always ON	
M9037/M2327	SM2037	SM401	Always OFF	
M9060/M3138	SM2060	-	Diagnostic error reset	Use M2039 for error reset operation.
M9073/M2329	SM2073	SM512	Motion CPU WDT error	The error cause is stored in SD512.
M9074/M2330	SM2074	SM500	PCPU READY complete	
M9075/M2331	SM2075	SM501	Test mode ON	
M9076/M2332	SM2076	SM502	External forced stop input	
M9077/M2333	SM2077	SM513	Manual pulse generator axis setting error	
M9078/M2334	SM2078	SM510	TEST mode request error	
M9079/M2335	SM2079	SM516	Servo program setting error	
M9104/M3139	SM2104	-	Servo parameter read request	Servo parameters can be read
M9105/M2344	SM2015	-	Servo parameter reading	individually in Q17nDSCPU. (Refer to "Q173D(S)CPU/ Q172D(S)CPU Programming Manual (COMMON)" for details.)
M9216/M2345	SM2216	SM528	No.1 CPU MULTR complete	
M9217/M2346	SM2217	SM529	No.2 CPU MULTR complete	
M9218/M2347	SM2218	SM530	No.3 CPU MULTR complete	
M9219/M2348	SM2219	SM531	No.4 CPU MULTR complete	
M9240/M2336	SM2240	SM240	No.1 CPU resetting	
M9241/M2337	SM2241	SM241	No.2 CPU resetting	
M9242/M2338	SM2242	SM242	No.3 CPU resetting	
M9243/M2339	SM2243	SM243	No.4 CPU resetting	
M9244/M2340	SM2244	SM244	No.1 CPU error	
M9245/M2341	SM2245	SM245	No.2 CPU error	
M9246/M2342	SM2246	SM246	No.3 CPU error	
M9247/M2343	SM2247	SM247	No.4 CPU error	

#### [Point

When Q17nCPUN(-T) projects are converted into Q17nDSCPU projects by "file conversion", M9000 to M9255 are automatically assigned as shown above in the column of "Device assignment for M9000 to M9255" in the table, however, M2320 to M3139 are not automatically converted.

# 2.3.3 Special registers

	Device No.			
Q17nCPUN(-T)	Device assignment for D9000 to D9255	Q17nDSCPU	Name	Remarks
D9000	SD2000	SD60	Fuse blown No.	
D9005	SD2005	SD53	AC/DC DOWN counter No.	
D9008	SD2008	SD0	Latest self-diagnostic error code	Error codes for errors found by diagnosis are stored as hexadecimal notation data.
D9010	SD2010	SD1	Clock time for diagnostic error occurrence (Year, month)	
D9011	SD2011	SD2	Clock time for diagnostic error occurrence (Day, hour)	The clock time information that SD0 data was updated is stored as BIN code.
D9012	SD2012	SD3	Clock time for diagnostic error occurrence (Minute, second)	
D9013	SD2013	SD4	Error information categories	
D9014	SD2014	SD5		
_	_	SD6 to SD15	Error common information	N
-	-	SD16 to SD26	Error individual information	New device in Q17nDSCPU
D9015	SD2015	SD203	Operating status of CPU	
D9017	SD2017	SD520	Scan time	
D9019	SD2019	SD521	Maximum scan time	
D9025	SD2025	SD210	Clock data (Year, month)	
D9026	SD2026	SD211	Clock data (Day, hour)	1
D9027	SD2027	SD212	Clock data (Minute, second)	The clock data is stored as BIN code.
D9028	SD2028	SD213	Clock data (Day of week)	1
D9060	SD2060	-	Diagnostic error reset error No.	Errors are reset by M2039.
D9061	SD2061	SD395	Multiple CPU No.	
D9104	SD2104	SD805	Servo parameter read request Axis No.	
D9182	SD2182	SD510	Test mode request error	
D9183	SD2183	SD511	information	
D9184	SD2184	SD512	Motion CPU WDT error cause	
D9185	SD2185	SD513		
D9186	SD2186	SD514	Manual pulse generator axis	
D9187	SD2187	SD515	setting error	
D9188	SD2188	SD522	Motion operation cycle	
D9189	SD2189	SD516	Error program No.	
D9190	SD2190	SD517	Error item information	
D9191	SD2191	SD502	Servo amplifier loading	
D9192	SD2192	SD503	information	
D9193	SD2193	SD504	Real mode/virtual mode	
D9194	SD2194	SD505	switching error information	
D9195	SD2195	SD506	PC link communication error	Q17nDSCPU is not compatible with PC
D9196	SD2196	-	codes	link communication.

# 2. DETAILS OF MIGRATION FROM Q17nCPUN(-T) TO Q17nDSCPU

#### (Continued)

	Device No.			
Q17nCPUN(-T)	Device assignment for D9000 to D9255	Q17nDSCPU	Name	Remarks
D9197	SD2197	SD523	Operation cycle of the Motion CPU setting	
D9200	SD2200	SD200	State of switch	
D9201	SD2201	-	State of LED	

### [Point]

When Q17nCPUN(-T) projects are converted into Q17nDSCPU projects by "file conversion", D9000 to D9255 are automatically assigned as shown above in the column of "Device assignment for D9000 to D9255" in the table.

## 2.3.4 Other devices

Items		Q17nCPUN(-T) Q17nDSCPU			
	M2320 to M2399	Special relay allocated devices (Status)	Unusable		
Internal relays/	M2400 to M3039	Device area of 9 axes or more is not usable as user devices in Q172CPUN(-T).	Device area of 17 axes or more is usable as user devices in Q172DSCPU.		
data registers	M3136 to M3199	Special relay allocated devices (Command signal)	Unusable		
	M3200 to M3839	Device area of 9 axes or more is	5		
	D0 to D639	not usable as user devices in	Device area of 17 axes or more is usable as user devices in Q172DSCPU.		
	D640 to D703	Q172CPUN(-T).	user devices in Q172D3G1 U.		
Personal computer link	c communication error	M2034	(Not compatible with personal computer link communication.)		
PCPU ready complete	flag	M9074	SM500		
Real mode axis informa	ation register	D790, D791	SD500, SD501		
Servo amplifier type		D792 to D799	#8000+20n		
		2.02.00	(Stores the servo amplifier type code)		
Home position return re-travel value		D9+20n	D9 + 20n (Data shortened to 1 word) #8006+20n, #8007+20n		
Travel value change registers		D16+20n, D17+20n	Optional device (D16+20n and D17+20n are also usable.)		
Coasting timer		FT (888µs)	FT (888µs) SD720, SD721 (444µs) <sup>(Note-1)</sup> SD722, SD723 (222µs) <sup>(Note-1)</sup>		
		D800 to D8191	D0 to D8191		
Indirect setting devices		W0 to W1FFF	W0 to W1FFF		
(Word devices)		#0 to #7999	#0 to #7999		
		-	U□\G10000 to U□\G(10000+p-1) (Note-2)		
Indirect setting devices (Bit devices)		X0 to X1FFF	X0 to X1FFF (Note-3)		
		Y0 to Y1FFF	Y0 to Y1FFF		
		M/L0 to M/L8191	M0 to M8191		
		M9000 to M9255	<del>-</del>		
		B0 to B1FFF	B0 to B1FFF		
		F0 to F2047	F0 to F2047		
		-	U□\G10000.0 to U□\G(10000+p-1).F (Note-2)		
High-speed reading fur	nction	D800 to D3069, D3080 to D8191	D0 to D8191		
settable devices		W0 to W1FFF	W0 to W1FFF		
		_	U□\G10000 to U□\G(10000+p-1) (Note-2)		

#### (Continued)

Items		Q17nCPUN(-T)	Q17nDSCPU
		X0 to X1FFF	X0 to X1FFF (Note-3)
		Y0 to Y1FFF	Y0 to Y1FFF
	Output device	M0 to M8191	M0 to M8191
		L0 to L8191	-
		B0 to B1FFF	B0 to B1FFF
		_	U□\G10000.0 to U□\G(10000+p-1).F <sup>(Note-2)</sup>
		D0 to D8191	D0 to D8191
	NA/atala data	W0 to W1FFF	W0 to W1FFF
<u></u>	Watch data	#0 to #8191	#0 to #9215
Limit switch output data		-	U ☐ \G10000 to U ☐ \G(10000+p-1) (Note-2)
swit		D0 to D8191	D0 to D8191
ch o		W0 to W1FFF	W0 to W1FFF
utpı	ON section setting	#0 to #8191	#0 to #9215
sb tr	-	Constant (Hn/Kn) (Note-4)	Constant (Hn/Kn) <sup>(Note-3)</sup>
ata			U□\G10000 to U□\G(10000+p-1) <sup>(Note-2)</sup>
		X0 to X1FFF	X0 to X1FFF (Note-3)
		Y0 to Y1FFF	Y0 to Y1FFF
	Output enable/disable bit, Forced output bit	M0 to M8191	M0 to M8191
		L0 to L8191	-
		B0 to B1FFF	B0 to B1FFF
		F0 to F2047	F0 to F2047
		M9000 to M9255	SM0 to SM1999
		_	U ☐ \G10000.0 to U ☐ \G(10000+p-1).F (Note-2)
		M2160 to M2223	Outional desire
	Clutch status	(No additional settings required	Optional device (Device settings required on mechanical system
Μe		on the mechanical system	program. M2160 to M2223 are also available.)
cha		program)	program. Wz 100 to Mzzzzo aro aloo avallable.
nica		M5488 to M5519	Optional device
$\sim$	Cam axis command signal	(No additional settings required	(Device settings required on mechanical system
	(Cam/ball screw switching command)	on the mechanical system	program. M5488 to M5519 are also available.)
າ pro		program)	
ogra		M5520 to M5583	Optional device
3	Smoothing clutch complete signal	(No additional settings required	(Device settings required on mechanical system
	gg	on the mechanical system	program. M5520 to M5583 are also available.)
		program)	, ,

(Note): "n" indicates the corresponding axis No. (Axis No.1 to 32: n=0 to 31).

<sup>(</sup>Note-1): Special register (SD720 to SD723) have been added for the coasting timer. Read SD720 and SD722 by two words unit.

<sup>(</sup>Note-2): "p" indicates user setting area points of Multiple CPU high speed transmission area in each CPU.

<sup>(</sup>Note-3): The range of "PXn+4 to PXn+F" cannot be used (fixed at 0) for the input device (PXn+0 to PXn+F) allocated to the built-in interface in Motion CPU (DI). (n: First input No.)

<sup>(</sup>Note-4): The setting range varies depending on the unit.

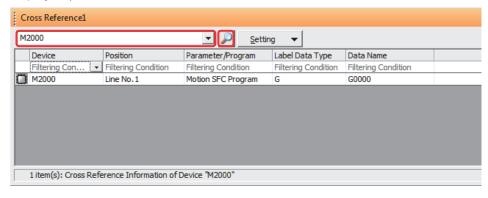
#### 2.3.5 Cross reference

The following shows how to use Cross reference.

- 1) Start MELSOFT MT Works2. Read the project to be diverted.
- 2) Select "Cross Reference" from "Find/Replace" menu.



When the searched device is currently used, information such as where it is used in the program will be displayed. (If the device is not currently used, no such information will be displayed.)



### 2.4 Project Diversion

### 2.4.1 List of divertible/not divertible data (SV13/SV22)

Q17nCPUN(-T) data name	Divertible/not divertible	Remarks
System settings		
Basic settings		
Base setting	0	
Multiple CPU setting	0	(Note-1)
System basic setting	0	
SSCNET setting	0	(Note-2)
System configuration	0	(Note-3)
SSCNET configuration	0	(Note-4)
High-speed read data	0	
Servo data settings		
Servo data	0	(Note-5)
Servo parameter	0	(Note-6)
Parameter block	0	
Limit output data	0	
Motion SFC programs		
Motion SFC parameter	0	
Motion SFC program	0	(Note-7)
Se <u>rvo programs</u>		
K mode allocation	0	SV22 only
Servo program	0	
Mechanical system program	0	SV22 only
Cam data (conversion data)	0	SV22 only
Device memory	0	
Backup data	×	
Communication setting	0	(Note-8)

o: Divertible, x: Not divertible

- (Note-1): The automatic refresh setting in Q17nCPUN(-T) will be reflected to that of Multiple CPU high-speed transmission area.
  - Refer to section 2.4.3 for automatic refresh setting after project diversion.
- (Note-2): Select SSCNETIII or SSCNETIII/H at SSCNET setting.
- (Note-3): Change the installation position of Motion modules (Q172LX, Q172EX, Q173PX) if they are installed in the I/O slot No.1 to 2. Be sure to install them in I/O slot No.3 or later.

  Refer to 2.4.2(3) for system configuration after project diversion.
- (Note-4): The existing servo amplifier model is replaced according to the selected communication type (SSCNET) in SSCNET setting. Refer to MELSOFT MT Developer2 Help for servo amplifier replacement.
- (Note-5): Review the fixed parameters according to the resolution per servo motor revolution. (Number of pulses per revolution and movement amount per revolution)
- (Note-6): Refer to "MELSOFT MT Developer2 Help" for conversion rules for servo parameters.
- (Note-7): When Motion registers (Monitor devices) are used in the program, they need to be changed. For details of "Batch replacement of device numbers", refer to 2.4.2(5).
- (Note-8): When the communication setting of Q17nCPUN(-T) is RS-232/USB (Motion internal I/F) or SSCNET, review the setting.

## 2.4.2 Project diversion procedures by engineering environment

The following shows the project diversion procedures for PLC CPU and Motion CPU.

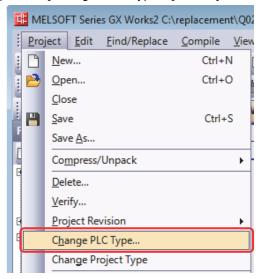
(1) Procedures for PLC CPU projects diversion by MELSOFT GX Works2 Use the "PLC type change function" of MELSOFT GX Works2.

Refer to "GX Works2 Version 1 Operating Manual (Common)" for restrictions on the programmable controller type changes.

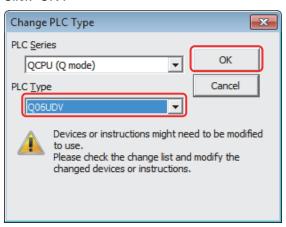
In addition, refer to the following Technical Bulletins for details of the programmable controller type changes.

(Note): Contact your local sales office for details.

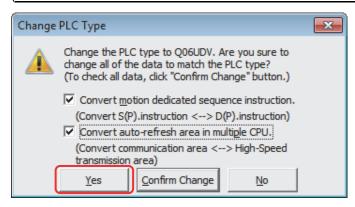
- Method of replacing Basic model QCPU with Universal model QCPU (FA-A-0054)
- Method of replacing High Performance model QCPU with Universal model QCPU (FA-A-0001)
- Method of replacing High Performance model QCPU with Universal model QCPU (Introduction) (FA-A-0209)
- 1) Start MELSOFT GX Works2. Read the project to be diverted.
- 2) Select [Change PLC Type...] in "Project" menu to open "Change PLC Type" screen.



3) Select the replaced PLC CPU model for "PLC Type" (the setting example below: Q06UDV). Click "OK".

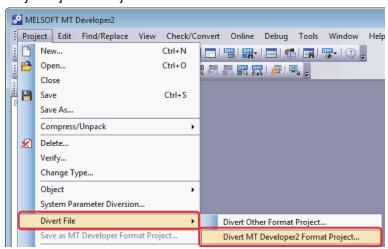


At conversion, the screen below appears. Click "Yes".
 (Motion dedicated PLC instruction conversion will be executed.)

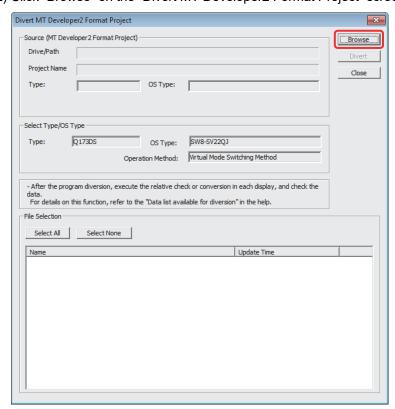


The diversion is complete.

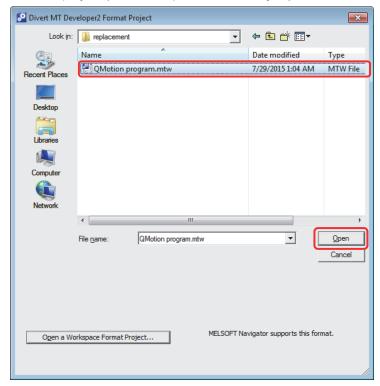
- (2) Procedures for Motion CPU projects diversion by MELSOFT MT Developer2 Motion CPU projects can be diverted by "Project diversion function" or "Change type/OS type function" of MELSOFT MT Developer2. Even if Motion SFC is not used, these functions can be used for project diversion.
  - (a) Project diversion function
    - 1) Start MELSOFT MT Developer2. Select [Divert file] [Divert MT Developer2 Format Project...] from "Project" menu.



2) Click "Browse" on the "Divert MT Developer2 Format Project" screen.



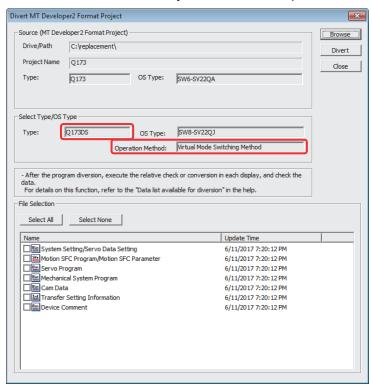
3) Select the project to be diverted on the file selection window. Click [Open] to update the selected project (MT Developer2 Format Project).

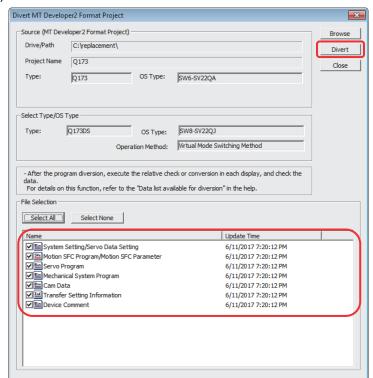


4) Select the replaced model for [Select Type/OS Type] (the setting example below: Q173DSCPU).

When SV22 is selected for OS type, the "Operation Method" is required to set, however, there is no need to change the original setting because "Virtual Mode Switching Method" is already selected.

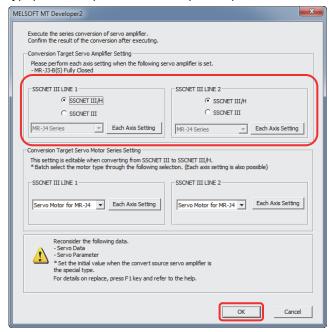
(When setting "Advanced synchronous control method", refer to "Replacement of Virtual mode with advanced synchronous control").



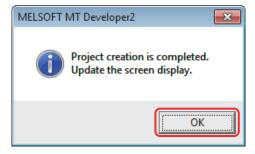


5) Check the box of the data to be diverted in the "File Selection". Click "Divert".

6) When "System Setting/Servo Data Setting" is selected in "File Selection" in 5), execute the series conversion of the servo amplifier. Select the network to be used (SSCNET type) for the replaced servo amplifiers (for Q17nDSCPU), and click [OK].



- (Note): Refer to "Q173D(S)CPU/Q172D(S)CPU Motion Controller User's Manual" for the servo system networks supported by the replaced servo amplifiers and SSCNETIII compatible devices (SSCNETIII or SSCNETIII/H).
- (Note): When servo parameters settings are changed from "MR-J2S series" to "MR-J4 series", the parameters conversion is carried out based on conversion rules. However, when converting parameters of the models older than MR-J2S series (MR-H-B, MR-H-BN, MR-J-B, MR-J2-B, MR-J2Jr-B), the servo parameters are initialized.
  Refer to "MELSOFT MT Developer2 Help [Appendix] [Servo parameter conversion]" for the conversion rules.
- 7) When the project diversion completion message appears, click [OK].

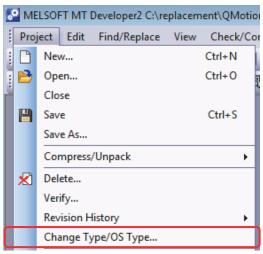


The diversion is completed.

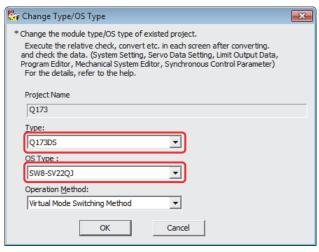
If the operation cycle is set as default (automatic), the operation cycle will be changed. Set an operation cycle where necessary because the change in the operation cycle may change the program execution timing. (Refer to section 2.2(6).)

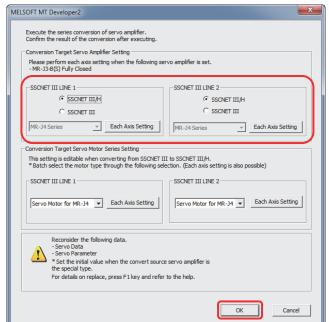
Though the project has been diverted, conversion of Motion SFC programs and servo programs has not finished yet. Make sure to execute [Project Batch Check/Conversion] before writing to the Motion controller.

- (b) Change type/OS type change function
  - 1) Start MELSOFT MT Developer2. Select [Change Type/OS Type...] in "Project" menu to open "Change Type/OS Type" screen.



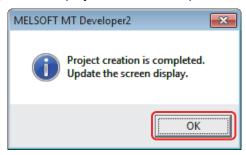
2) Select the replaced Motion CPU (the setting example below: Q173DSCPU) for "Type" and the new operating system software type for "OS Type". Click "OK".





3) Execute the series conversion of the servo amplifier. Select the network to be used (SSCNET type) for the replaced servo amplifiers (for Q17nDSCPU), and click [OK].

- (Note): Refer to "Q173D(S)CPU/Q172D(S)CPU Motion Controller User's Manual" for the servo system networks supported by the replaced servo amplifiers and SSCNETIII compatible devices (SSCNETIII or SSCNETIII/H).
- (Note): When servo parameters settings are changed from "MR-J2S series" to "MR-J4 series", the parameter conversion is carried out based on conversion rules. However, when converting parameters of the models older than MR-J2S series (MR-H-B, MR-H-BN, MR-J-B, MR-J2-B, MR-J2Jr-B), the servo parameters are initialized.
  - Refer to "MELSOFT MT Developer2 Help [Appendix] [Servo parameter conversion]" for the conversion rules.
- 4) When the project diversion completion message appears, click [OK].



The diversion is completed.

If the operation cycle is set as default (automatic), the operation cycle will be changed. Set an operation cycle where necessary because the change in the operation cycle may change the program execution timing. (Refer to section 2.2(6).)

Though the project has been diverted, conversion of Motion SFC programs and servo programs has not finished yet. Make sure to execute [Project Batch Check/Conversion] before writing to the Motion controller.

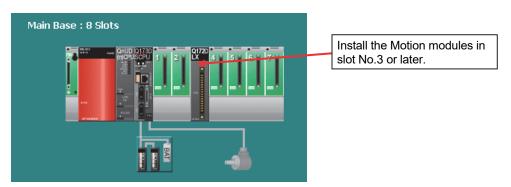
#### (3) Slot installation position (system setting)

The installation position of Motion modules (Q172LX, Q172EX(-S1, -S2, -S3), Q173PX) will need to change depending on its position.

(For Q17nDSCPU, Motion modules (Q172DLX, Q172DEX, Q173DPX) <u>cannot be installed</u> in CPU slot and I/O slot No. 0 to 2 of the main base unit.

When the existing Q17nCPUN(-T) programs are converted to the programs for the new system, the existing Motion modules (Q172LX, Q172EX(-S1, -S2, -S3), Q173PX) are automatically changed to the corresponding modules in the new system (Q172DLX, Q172DEX, Q173DPX), however, the slot installation position is not automatically changed. If the existing Motion modules are installed in slot No.1 to 2, move them into the slot No.3 or later

Due to the changes of Motion modules installation position, the number of Motion modules may exceed the number of available I/O slots for Motion modules depending on the main base unit model. Select the one which provides enough I/O slots for your system.



#### (4) Mechanical system program

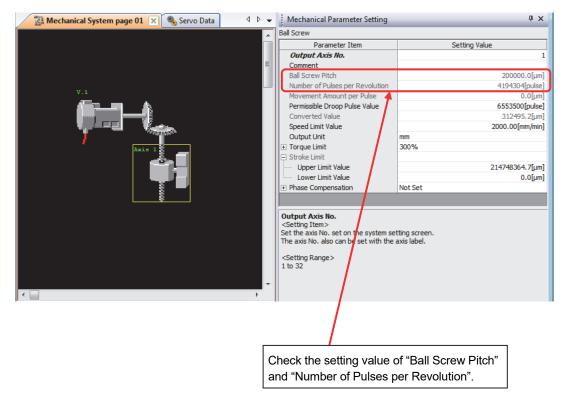
The electronic gear settings of output modules (ball screw, rotary table) on mechanical system program differ between Q17nCPUN(-T) and Q17nDSCPU.

When diverting the mechanical system program in (2) in this section, be sure to check the output module settings after diversion.

The following shows the electronic gear setting of mechanical system program.

Output module	Electronic goar actting	Setting method			
Output module	Electronic gear setting	Q17nCPUN(-T)	Q17nDSCPU		
Ball screw	Ball screw pitch, Number of pulses per revolution	Mechanical	Fixed parameter "Number of pulses per revolution"		
Rotary table	Number of pulses per revolution	system program	"Movement amount per revolution"		

[Ex.: When a ball screw is set as the output module in Q173DSCPU (SV22 mechanical system program)]



- (5) Batch replacement of devices numbers by MELSOFT MT Developer2
  - (a) Motion register

The Motion register is expanded and the device assignment is changed when Q17nCPUN(-T) is replaced with Q17nDSCPU. When the Motion register "#8000 to #8191" are used in Q17nCPUN(-T), replace them by referring to "2.3.1 Motion registers".

(b) Special device

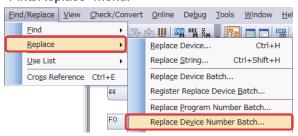
When special devices are used, replace them by referring to "2.3.2 Special relays" and "2.3.3 Special registers" in this document.

Special devices (M9000 to M9255, D9000 to D9255) are replaced with SM devices (SM2000 to SM2255) and SD devices (SD2000 to SD2255).

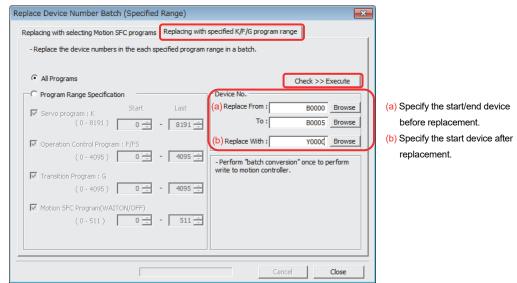
e.g.) M9074 (PCPU READY complete) is automatically converted to SM2074 when the CPU type is changed. Change SM2074 manually to the Q17nDSCPU special relay (SM500).

The following shows the procedure for the batch replacement of the device numbers.

1) Start MELSOFT MT Developer2, and select [Replace Device Number Batch...] from "Find/Replace" menu.



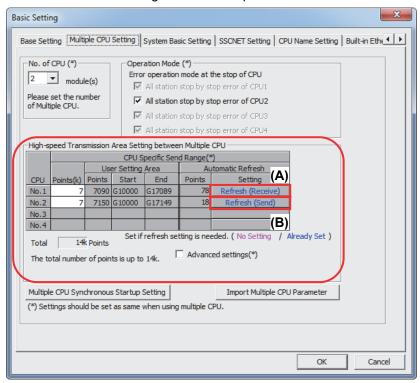
2) Select "Replacing with specified K/F/G program range" tab. Enter the device numbers in [Replace From:] [To:], and [Replace With:]. Click [Check >> Execute].



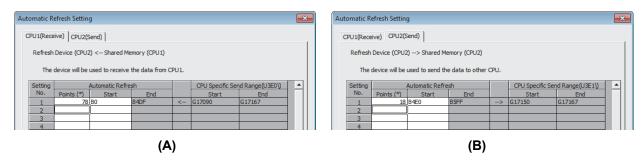
## 2.4.3 Auto refresh settings after project diversion

The following shows how to check the automatic refresh settings.

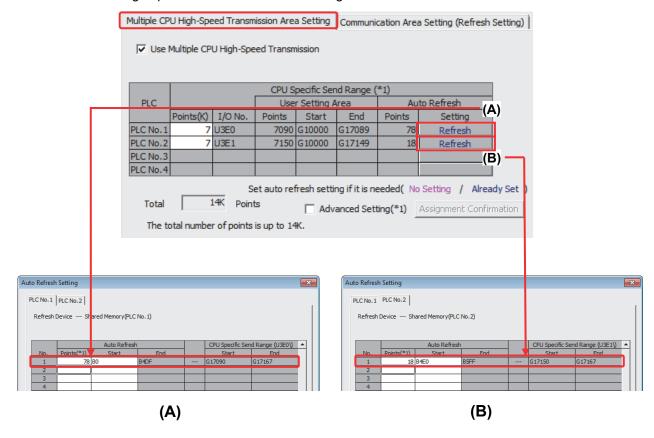
- (1) Auto refresh setting in MELSOFT MT Developer2
  - (a) Select [System Setting] [Basic Setting] in the project window to open the "Basic Setting" screen. Select [Multiple CPU Setting] tab and confirm the details of "High-speed Transmission Area Setting between Multiple CPU".



(b) Click (A) and (B) on the screen above, and check the detailed settings of the automatic refresh.



- (2) Auto refresh setting in MELSOFT GX Works2
  - (a) Select [Parameter] [PLC Parameter] in the project window to open the "Q Parameter Setting" screen. Select [Multiple CPU Setting] tab and confirm the details of "Multiple CPU High-speed Transmission Area Setting".



#### 2.4.4 Shared device

The shared device memory of Q17nDSCPU enables high-speed transmission (+ automatic refresh).

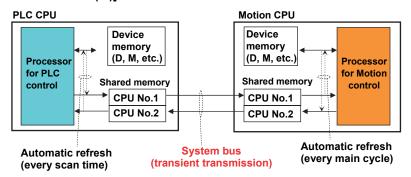
The following shows the main differences.

Items	Q17nCPUN(-T)	Q17nDSCPU	
Transmission cycle	Operation cycle (Transient)	0.88ms (Cyclic)	
Auto refresh setting	4 range settings	32 range settings	
Number of refresh words per CPU	Up to 8k words	Up to 14k words	

The Q17nDSCPU is equipped with High-speed transmission bus only, and therefore "Multiple CPU High Speed Transmission Area Setting" needs to be set on PLC CPU side.

Refer to "QCPU User's Manual (Multiple CPU System)" and "Q173D(S)CPU/Q172D(S)CPU Motion Controller Programming Manual (COMMON)" for details.

#### [Qn(H)CPU + Q17nCPUN(-T)]

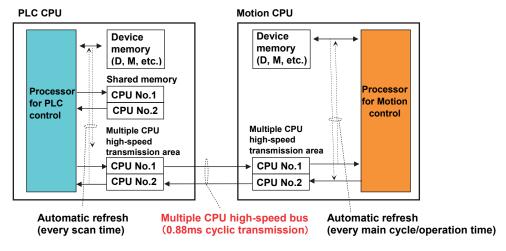


#### [Features]

- Each CPU module has its own device memory
- Each CPU shares data by mutually check the other CPU shared memory (Automatic refresh is executed by scan time or main cycle)



## [QnUD(E)(H)(V)CPU + Q17nDSCPU]



#### [Features]

- Cyclic transmission per 0.88 ms is possible through multiple CPU high-speed transmission area.
- Automatic refresh can be executed at operation time.

## WARRANTY

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

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

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

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

[Gratis Warranty Term]

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

[Gratis Warranty Range]

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

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

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

#### 3. Overseas service

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

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

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

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

#### 5. Changes in product specifications

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

#### 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.

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# Migration Guide of Motion Controller [Q17nCPUN(-T) ⇒ Q17nDSCPU]

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