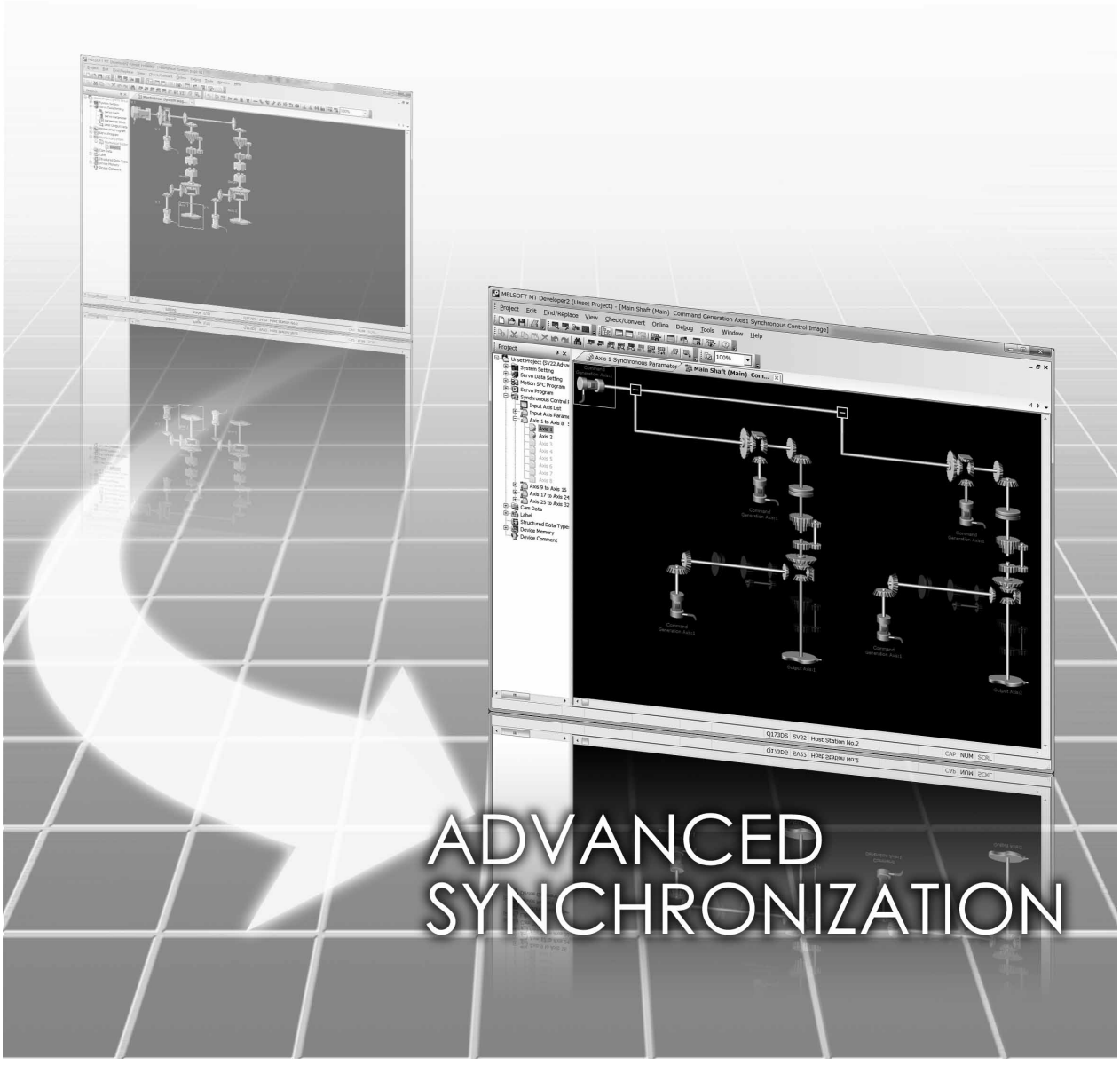
for a greener tomorrow

MITSUBISHI ELECTRIC
Changes for the Better

Mitsubishi Servo System Controllers

<Motion controller>

Replacement Virtual mode with Advanced synchronous control



● SAFETY PRECAUTIONS ●

(Please read these instructions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
These precautions apply only to this product. Refer to the 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".

⚠DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by ⚠ CAUTION may also be linked to serious results.
In any case, it is important to follow the directions for usage.

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

For Safe Operations

1. Prevention of electric shocks

⚠DANGER

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

2. For fire prevention

⚠CAUTION

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

3. For injury prevention

⚠CAUTION

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

4. Various precautions

Strictly observe the following precautions.

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

(1) System structure

⚠CAUTION

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

⚠CAUTION

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

(2) Parameter settings and programming

⚠CAUTION

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

⚠CAUTION

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

(3) Transportation and installation

⚠CAUTION

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

⚠CAUTION

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

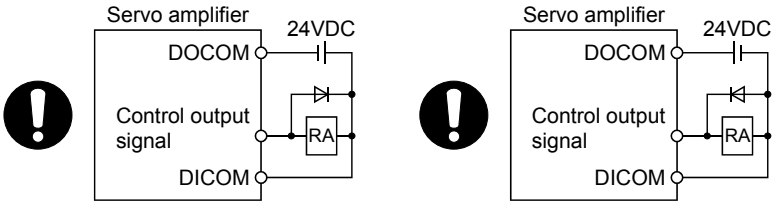
Environment	Conditions	
	Motion controller/Servo amplifier	Servomotor
Ambient temperature	According to each instruction manual.	0°C to + 40°C (With no freezing) (32°F to + 104°F)
Ambient humidity	According to each instruction manual.	80% RH or less (With no dew condensation)
Storage temperature	According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

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

(4) Wiring

⚠CAUTION

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



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 value motor has been replaced, always perform a home position return.
- Before starting test operation, set the parameter speed limit value to the slowest value, and make sure that operation can be stopped immediately by the forced stop, etc. if a hazardous state occurs.

(6) Usage methods

⚠CAUTION

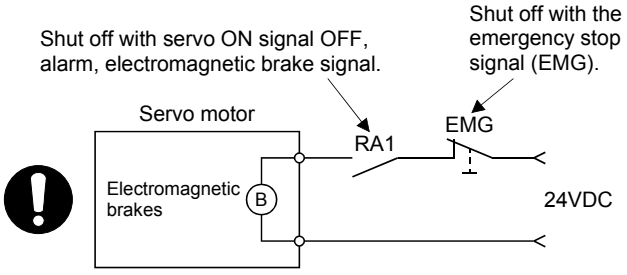
- Immediately turn OFF the power if smoke, abnormal sounds or odors are emitted from the Motion controller, servo amplifier or servomotor.
- Always execute a test operation before starting actual operations after the program or parameters have been changed or after maintenance and inspection.
- Do not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

(8) Maintenance, inspection and part replacement

⚠CAUTION

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

(9) About processing of waste

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

⚠CAUTION

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

(10) General cautions

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

REVISIONS

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

Print Date	*Manual Number	Revision
Jan., 2016	L(NA)03123-A	First edition

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<Guide Book Configuration>

This document is composed of the following parts.

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SAFETY PRECAUTIONS
DOCUMENT STRUCTURE

Section 1. PROCEDURE FOR SWITCHING TO ADVANCED SYNCHRONOUS CONTROL

This chapter explains the procedure for switching to advanced synchronous control.

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MEMO

Section1. PROCEDURE FOR SWITCHING TO ADVANCED SYNCHRONOUS CONTROL

1. OVERVIEW

This document describes the method and details to change the MELSEC Q-series Motion controller synchronous control function SV22 from a mechanical system program (Virtual mode switching method) to the synchronous control parameters (Advanced synchronous control method).
Chapter 2 gives details of parameter conversion by engineering tool to change the mechanical system program to the advanced synchronous control.
Chapter 3 gives the details of required program revision. Change the program as needed according to this chapter.

1.1 Target Models and Version

- Target models for conversion

SV22 (Virtual mode switching method) – Mechanical system program

- A series
(DOS version/Windows version)
A171SHCPU
A172SHCPU
A173UHCPU
A273UHCPU
A273UHCPU-S3

- Q series
(MT Developer/MT Developer2)
Q172CPU/Q173CPU
Q172HCPU/Q173HCPU
Q172DCPU/Q173DCPU/Q170MCPU
Q172DSCPU/Q173DSCPU
Q170MSCPU/Q170MSCPU-S1

SV22 (Advanced synchronous control method) – Synchronous control parameter

- Q series
(MT Developer2 only)
Q172DSCPU/Q173DSCPU
Q170MSCPU/Q170MSCPU-S1

- Supported version

MELSOFT MT Works2 version 1.68W or later

1.2 Outlined Diagram

All the data contained in the mechanical system program page are converted to synchronous control parameters for the advanced synchronous control.

- Module configuration of mechanical system
- Parameters for each module of mechanical system

⇨ Reflected to the synchronous control parameter

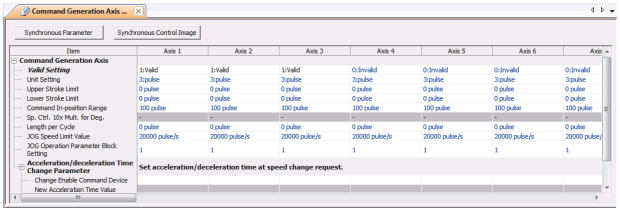
Virtual Mode Switching Method – Mechanical System program

■All data of mechanical system

Axis 1 Axis 2 Axis 3

Advanced Synchronous Control Method – Synchronous Control Parameter

■ Input axis parameter

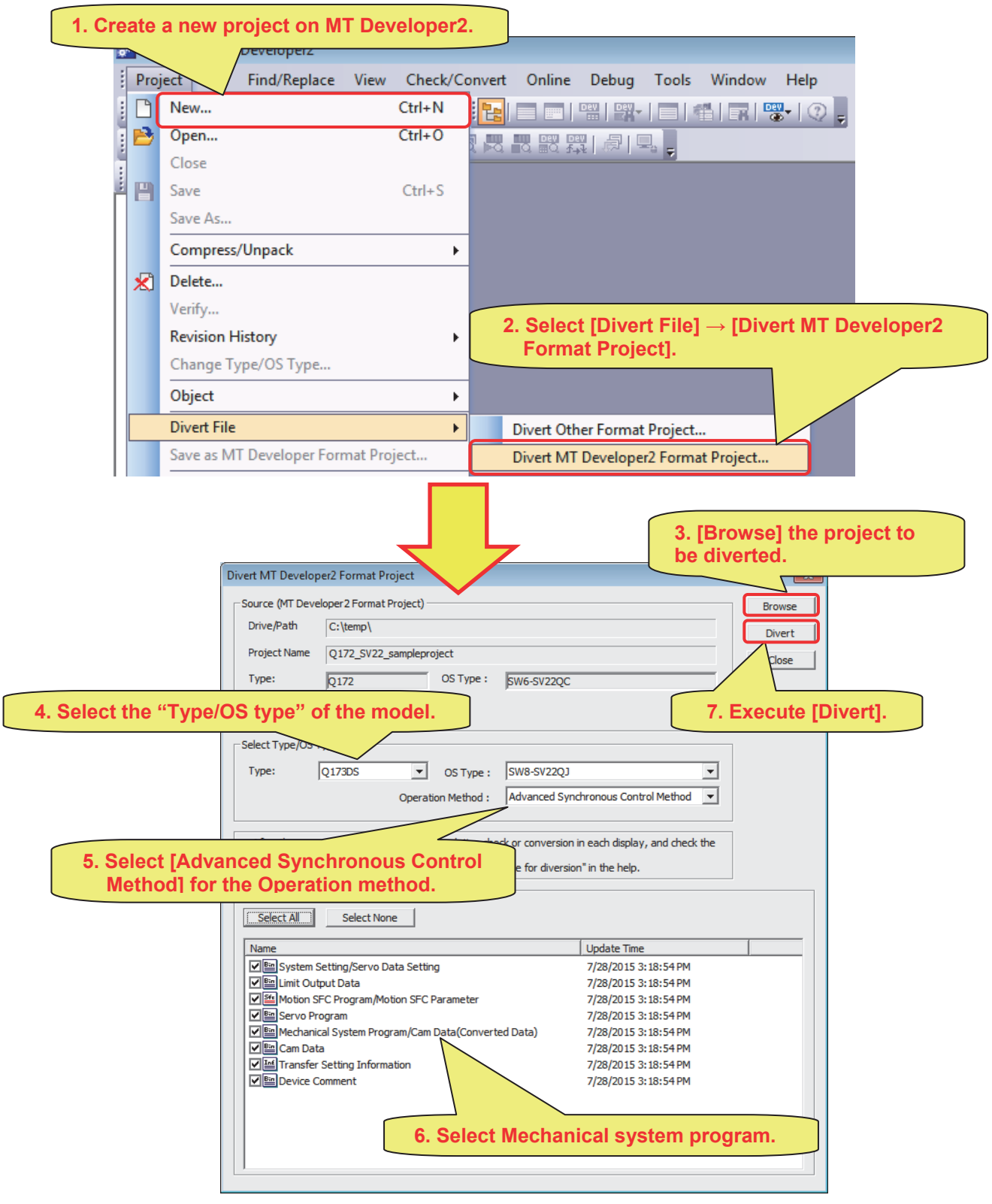


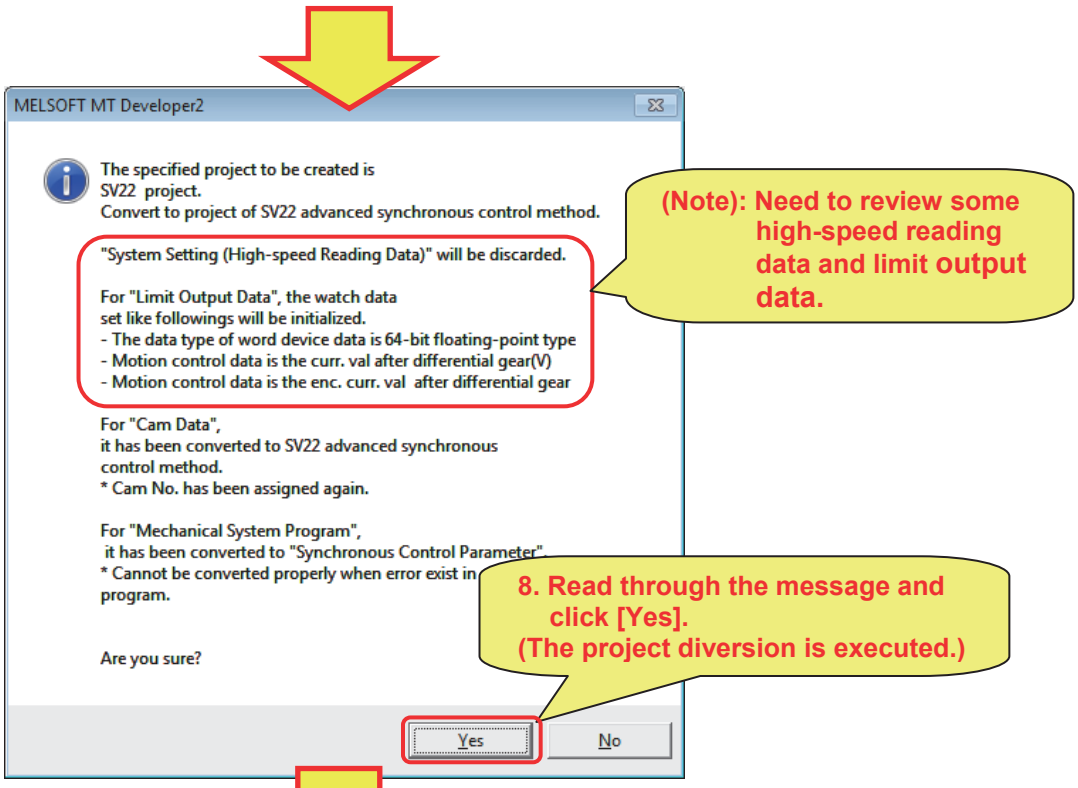
■ Synchronous control parameter for each axis

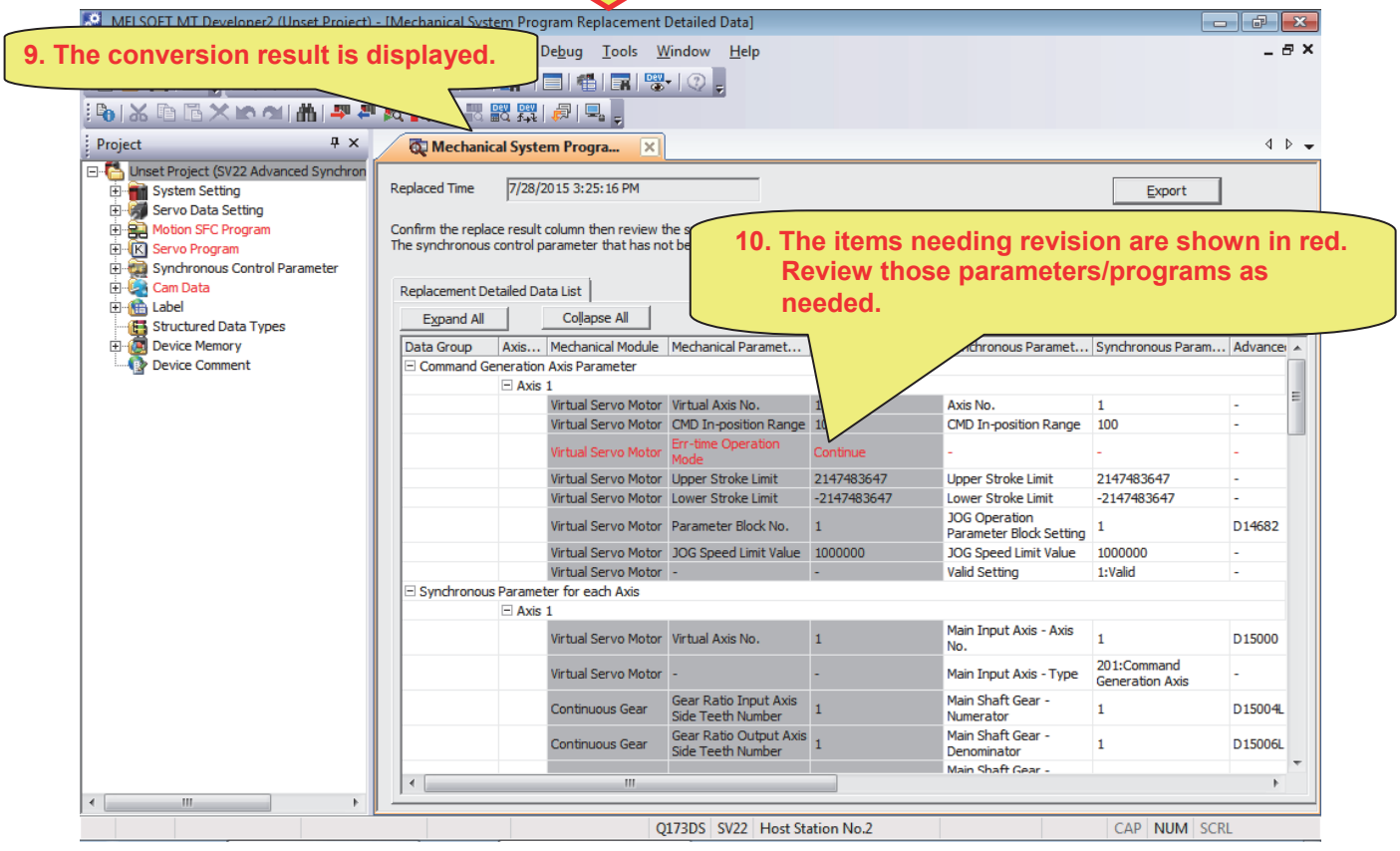
Axis 1 Axis 2 Axis 3

2. PROCEDURE FOR PARAMETER CONVERSION BY ENGINEERING TOOL

The Parameter diversion/conversion function of MELSOFT MT Works2 automatically converts the parameters. However, some of the programs and parameters cannot be converted, so be sure to review them individually. (Refer to Chapter 3.)







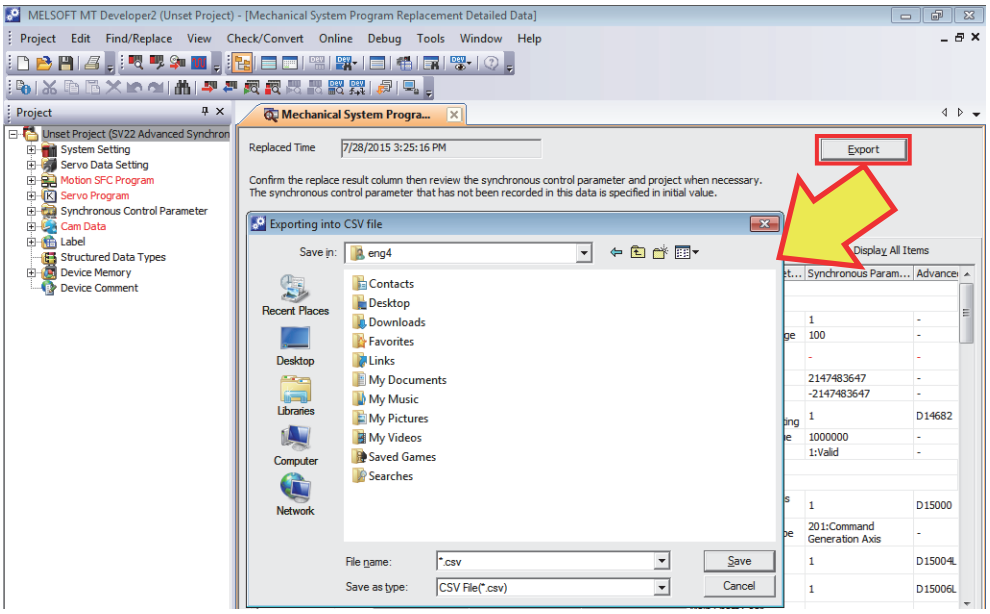
Diversion is completed.

(Information) When you check the parameter conversion result later

The mechanical system program replacement detailed data cannot be opened again once closing them. When you want to check them later, it can be opened in Excel, etc. by exporting the detailed data.
The exporting and checking method for those data are as follows.

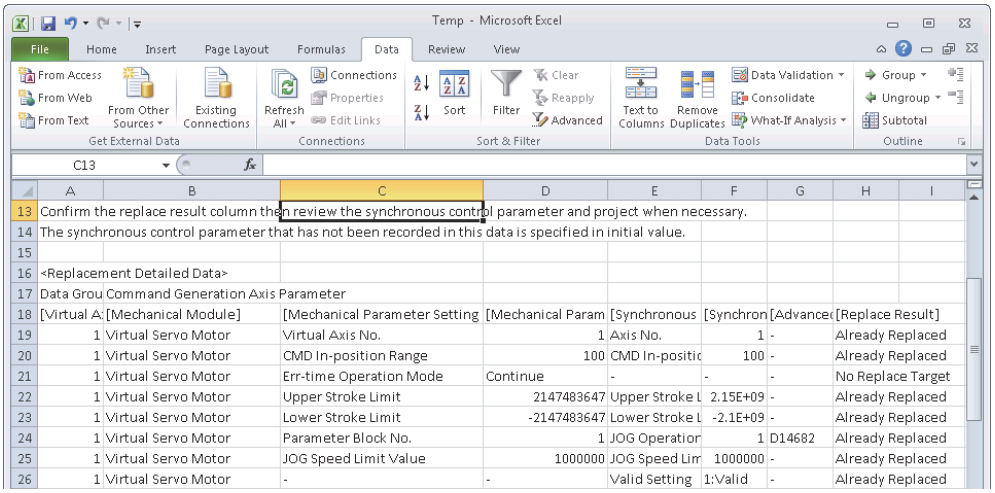
(1) Exporting the mechanical system program replacement detailed data

Click [Export] on the [Mechanical System Program Replacement Detailed Data] window.
Input the file name on the Exporting into CSV file dialog, and click [Save].



(2) Opening the exported file (by Excel, etc.)

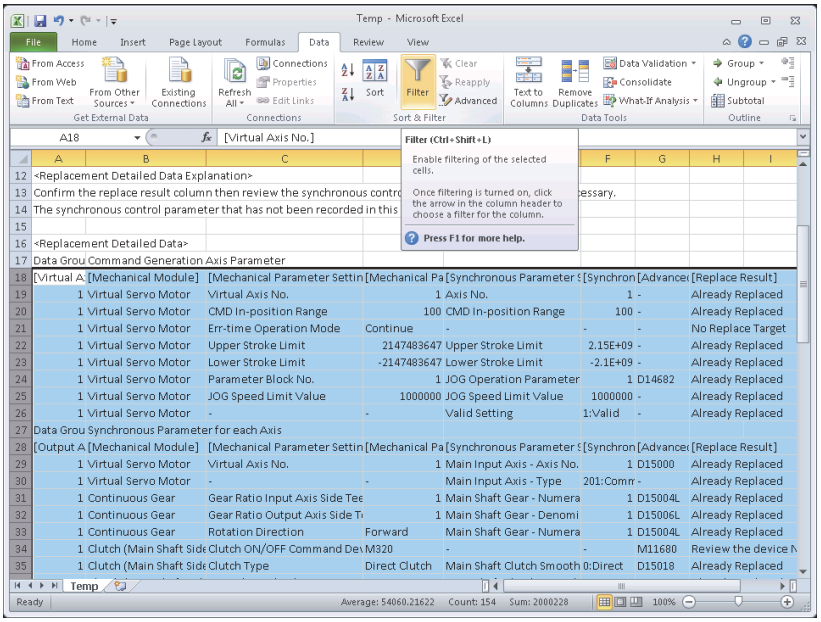
1. Open the saved data in (1).
When opening it, the raw width settings, etc. are initialized. Adjust them as needed.



	A	B	C	D	E	F	G	H	I
13	Confirm the replace result column then review the synchronous control parameter and project when necessary.								
14	The synchronous control parameter that has not been recorded in this data is specified in initial value.								
15									
16	<Replacement Detailed Data>								
17	Data Grou	Command Generation Axis Parameter							
18	[Virtual A:	[Mechanical Module]	[Mechanical Parameter Setting	[Mechanical Param	[Synchronous	[Synchron	[Advance(	[Replace Result]	
19	1	Virtual Servo Motor	Virtual Axis No.	1	Axis No.	1	-	Already Replaced	
20	1	Virtual Servo Motor	CMD In-position Range	100	CMD In-positic	100	-	Already Replaced	
21	1	Virtual Servo Motor	Err-time Operation Mode	Continue	-	-	-	No Replace Target	
22	1	Virtual Servo Motor	Upper Stroke Limit	2147483647	Upper Stroke L	2.15E+09	-	Already Replaced	
23	1	Virtual Servo Motor	Lower Stroke Limit	-2147483647	Lower Stroke L	-2.1E+09	-	Already Replaced	
24	1	Virtual Servo Motor	Parameter Block No.	1	JOG Operatior	1	D14682	Already Replaced	
25	1	Virtual Servo Motor	JOG Speed Limit Value	1000000	JOG Speed Lim	1000000	-	Already Replaced	
26	1	Virtual Servo Motor	-	-	Valid Setting	1:Valid	-	Already Replaced	

2. Optimization of displayed items

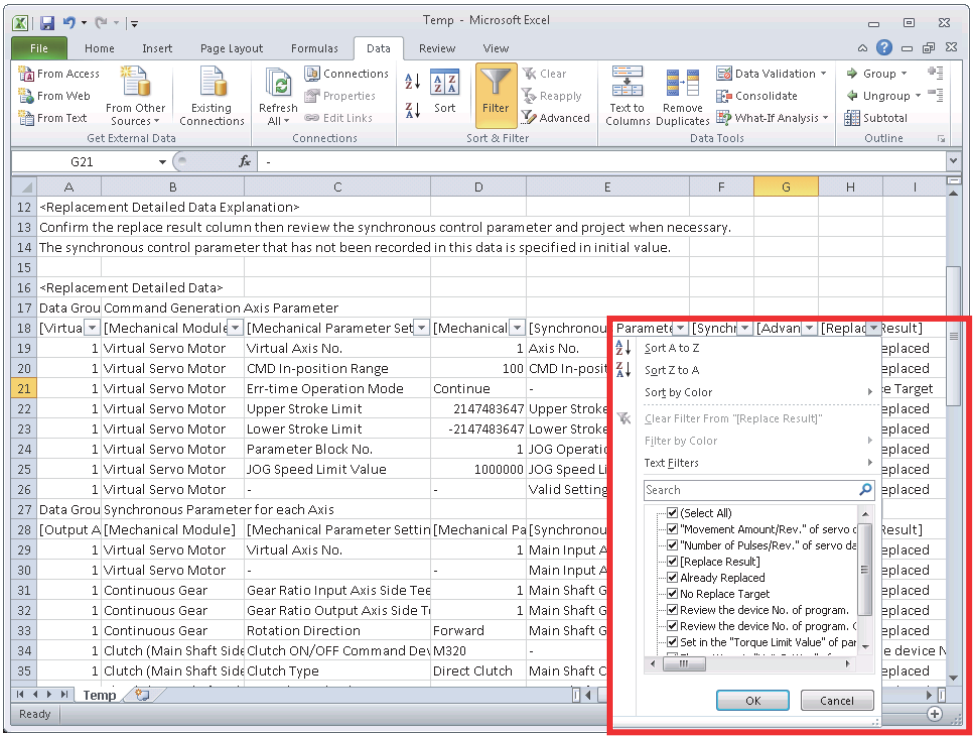
Select the [Replacement Detailed Data] portion on the sheet, and enable the Filter function (auto filter) of Excel.



3. Switching the displayed items

The displayed items can be switched by filtering the [Replacement result] raw.

e.g.) Removing a check from the [Already Replaced] box enables to display only the items needing revision.



3. CHANGES IN PROGRAM DETAILS AND REPLACEMENT METHODS

Some items of the mechanical system program cannot be converted to the advanced synchronous control parameter due to specification differences. (Since not all of the items correspond to the parameter one by one, those items cannot be automatically converted.)
Review the items unable to be automatically converted according to this chapter.

3.1 Details of the Program Revision Table

The following table chart explains the necessary revision. The details are as follows.

1. Item No.
2. Items needing revision
3. Target (To check whether the item needs revision)
4. Differences between the mechanical system and the advanced synchronous control
5. Revision procedure
6. Remarks

Device No.: Real mode only
Virtual mode only
Advanced synchronous control, etc.

For device No., such as "M3200+20n", the “n” indicates axis No. 1 to 32 (n= 0 to 31).

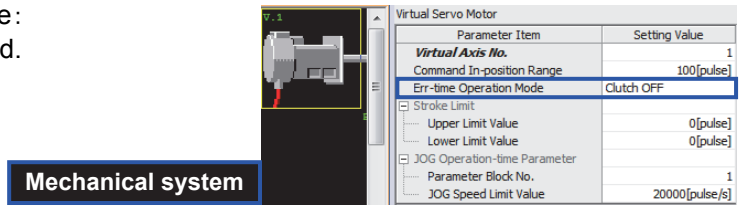
No.	1	Item	2.
Target	3.		
Changes	4.		
Replacement method	5.		
Remarks	6.		

3.2 Program Revision Details

No.	1	Item	Error/Warning

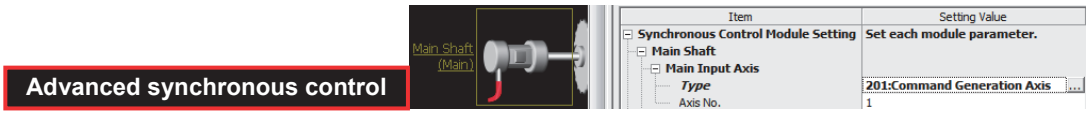
Target

Error-time Operation Mode:
When [Clutch OFF] is used.
(Default: "Continue")



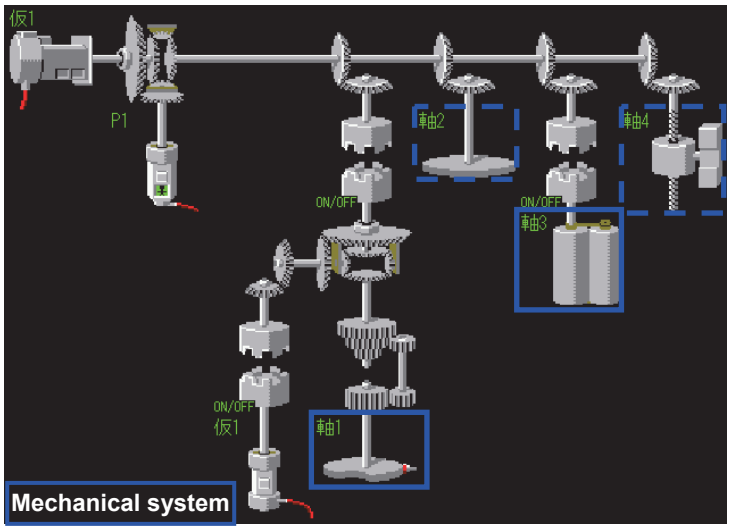
Changes

In the advanced synchronous control, there is the command generation axis equivalent to the virtual axis of the mechanical system, however, "Error-time Operation Mode" does not correspond to any item. In case a major error occurs, the operation will continue.



Replacement method

Create an additional Motion SFC program.
A major error code is stored to D7+20n. When D7+20n is not "0", a Motion SFC program which stops output axes using clutch is additionally required.
When an immediate stop is performed in the advanced synchronous control, set "[Pr.419] Composite auxiliary shaft gear D15025+150n" to [0: No input]. (Refer to the program example below.)



(Note): Each of the axes connected to clutches, marked with blue frames, is detached by Composite auxiliary shaft gear in the advanced synchronous control.

<Program example>
The program below changes [Composite auxiliary shaft gear] for axis 1 to [0: No input].

```
[F0]
D15025 = 0
```

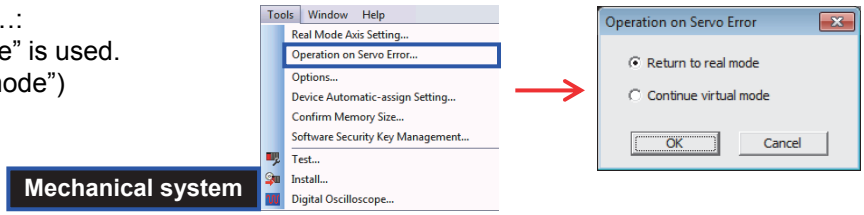
Remarks

Axes cannot be detached immediately using clutch in "One-shot OFF" or "Address mode".
Therefore, the composite auxiliary shaft gear is required to detach axes.

No.	2	Item	Error/Warning

Target

Operation on Servo Error…:
When “Return to real mode” is used.
(Default: “Return to real mode”)



Changes

In the advanced synchronous control, “Error-time Operation Mode” does not correspond to any item. When a servo error occurs, “[St.380] Synchronous control M10880+n” is turned OFF for only the target axes. After the stop processing of output axes, the synchronous control ends when the Start accept flag M2001+n is turned OFF. Other input/output axes continue the synchronous control.
(Refer to “2.3 Stop Operation of Output Axis” of the SV22 Programming Manual (Advanced Synchronous Control) [type Q173D(S)/Q173D(S)].)

Revision method

Create an additional Motion SFC program.
When a servo error is detected, the Servo error detection M2408+20n is turned ON. When M2408+20n is turned ON, a Motion SFC program to immediately stop all synchronized output axes (*) and release the synchronous control is additionally required.
When performing a rapid stop on other output axes, turn the rapid stop command M3201+20n ON. Turn ON the Command generation axis rapid stop command M10961+20n to stop command generation axes. When the Zero speed #8011+20n:b3 is turned ON after the rapid stop is performed, the synchronous control can be released by turning OFF Synchronous control start M12000+n.
(Refer to the program example below.)

(Note): In the virtual mode of the mechanical system program, all synchronized output axes rapidly stop when a servo error is detected.

<Program example>
The program below performs a rapid stop on the command generation axis 1 after a servo error on axis 1 is detected and releases the axis-1 synchronous control.

```
[G0]
M2408
[F0]
SET M10961
[G1]
#8011.3
[F1]
RST M12000
```

Remarks

To perform the synchronous control after the servo error is released, turn OFF the Rapid stop command M3201+20n and the Command generation axis rapid stop command M10961+20n.
(Refer to the program example below.)

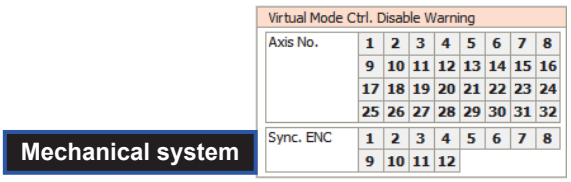
<Program example>
The program below turns OFF the Rapid stop command and the Command generation axis rapid stop command for axis 1.

```
[F0]
RST M3201
RST M10961
```

No.	3	Item	Error

Target

When the Virtual mode continuation operation disable warning signal M2418+20n (Output axes) or Virtual mode continuation operation disabled warning signal (*) M4642+4n (Synchronous encoder axis) is used.



(Note): When the synchronous control or the system is restarted, this signal checks whether the servo motor moves from the previous position.

Changes

The advanced synchronous control does not have the Virtual mode continuation operation disable warning signal (output axes) and the Virtual mode continuation operation disabled warning signal (synchronous encoder axis).

Revision method

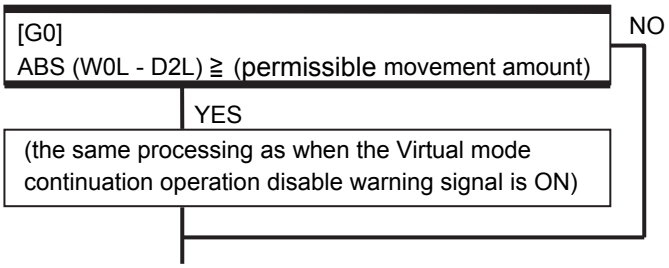
Change the Motion SFC program

1. Virtual mode continuation operation disable warning signal (output axes)
   While synchronous control is being executed, latch the Real current value D2+20n, D3+20n to other devices.
   When starting the synchronous control, compare them with Real current value D2+20n, D3+20n.
   If the compared value exceeds the permissible movement amount, perform the remedy same as when the Virtual mode continuation operation disable warning signal is ON.
   (Refer to program example 1 below.)

<Program example 1>
The program below latches the axis-1 real current value on the user arbitrary device W0L.
Execute the program below while the synchronous control is performed.

```
[F0]
W0L = D2L
```

Program description: The axis-1 real current value is compared with the permissible movement amount. If the compared value exceeds the permissible movement amount, the same processing will be taken as when the Virtual mode continuation operation disable warning signal is ON.
Execute the program below while the synchronous control is performed.



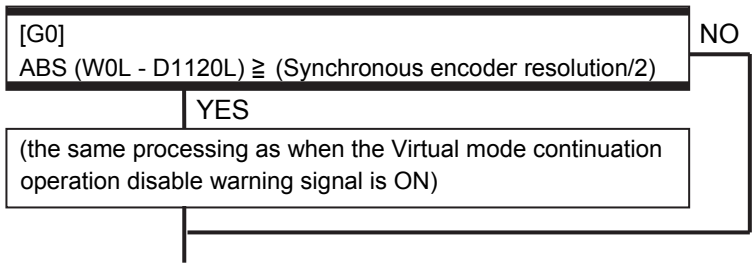
Revision method

2. Virtual mode continuation operation disable warning signal (synchronous encoder axis)
Always latch the synchronous encoder current value D1120+10n, D1121+10n to other devices.
At the system power-on, compare them with the synchronou encoder current value D1120+10n, D1121+10n. If they differ, take the same processing as when the Virtual mode continuation operation disable warning signal is ON.
(Refer to program example 2.)

<Program example 2>
The program below latches the axis-1 synchronou encoder current value on the user arbitrary device W0L.
Execute the program below while the synchronous control is performed.

```
[F0]
W0L = D1120L
```

Program description: The latched, axis-1 synchronous encoder value is compared with the current value. If the value diffrence is more than half rotation, the same processing will be taken as when the Virtual mode continuation operation disable warning signal is ON.
Execute the following program at the system power-on.



(Note): If the difference between the current value of the synchronous encoder at the Multiple CPU power-on and the final value of that in virtual mode is more than half the rotation of the synchronous encoder, the Virtual mode continuation operation disable warning signal will be ON

Remarks

1. The Virtual mode continuation operation disable warning signal (Output axes) will be ON when the following three are executed.
(1) Home position return, (2) Current value change, (3) Fixed pitch feed, speed control (I) and (II), speed/position controls.

Do not perform comparison with the real current value in this case in the advanced synchronous control.

No.	4	Item	Drive module (Virtual servo motor)

Target

When the External stop input disable at start command M4809+20n is used in the virtual mode.

Changes

The operation cannot be started while an external stop signal is being inputted in the advanced synchronous control.

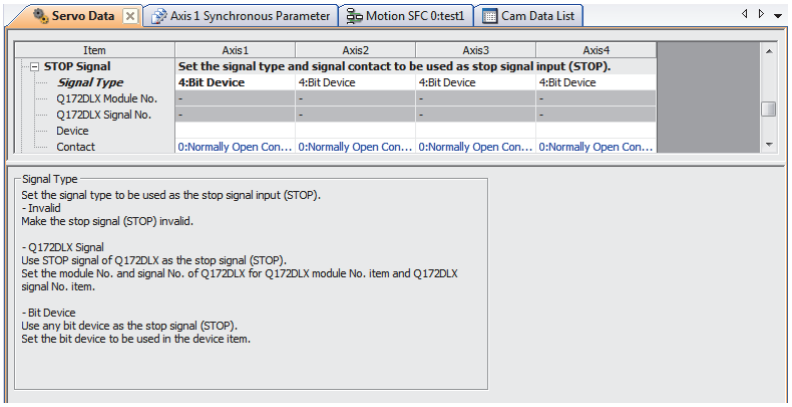
Revision method

Review the Motion SFC program and the system so that external STOP inputs are turned OFF at start of the synchronous control. (Refer to the program example below.)

There are two methods external STOP input.
1. STOP input signal of the Q172DLX servo external signal interface module

2. Bit device

An optional bid device can be specified as an input signal.



<Program example>
The program below turns OFF the STOP signal X0.
Execute the program at the synchronous control start.

```
[F0]
RST X0
```

Remarks

In the real mode, the M3209+20n is the External stop input disable at start command.

No.	5	Item	Transmission module (clutch)

Target

When the ON address of the address clutch is same as the OFF address

Changes

When the ON of the address clutch is the same value as the OFF, the following operations are executed when the specified address is passed.

	Main shaft clutch ON/OFF status is ON before the specified address is passed.	Main shaft clutch ON/OFF status is OFF before the specified address is passed.
Mechanical system	ON → OFF	OFF → ON
Advanced synchronous control	ON → ON (No change)	OFF → OFF (No change)

Revision method

Create an additional Motion SFC program.
Execute the following action every time the specified address is passed. Check whether the clutch is turned ON → OFF or OFF → ON next time with [St.420] Main shaft clutch ON/OFF status M10560+10n.

1. When the clutch is turned OFF→ON next time (It is OFF currently)
   Set [Pr.405] Main shaft clutch control setting D15008+150n or [Pr.422] Auxiliary shaft clutch control setting D15030+150n to H0004 (ON control mode: Address mode, OFF control mode: Invalid)

<Program example 1>
The program below sets the Main shaft clutch control setting or the Auxiliary shaft clutch control setting for axis 1 to H0004 (ON control mode: Address mode, OFF control mode: Invalid).

```
[F0]
D15008 = H0004
```

or

```
[F0]
D15030 = H0004
```

2. When the clutch is turned ON → OFF next time (It is ON currently)
   Set [Pr.405] Main shaft clutch control setting D15008+150n or [Pr.422] Auxiliary shaft clutch control setting D15030+150n to H0042 (ON control mode: Clutch command leading edge, OFF control mode: Address mode) so that ON control is not executed.

<Program example 2>
The program below sets the Main shaft clutch control setting or the Auxiliary shaft clutch control setting for axis 1 to H0042 (ON control mode: Clutch command leading edge, OFF control mode: Address mode).

```
[F0]
D15008 = H0042
```

or

```
[F0]
D15030 = H0042
```

Remarks

The following are the ON/OFF address of the advanced synchronous control.
[Pr.407]/[Pr.424] Main shaft/Auxiliary shaft clutch ON address:
D15010+150n, D15011+150n / D15032+150n, D15033+150n
[Pr.409]/[Pr.426] Main shaft/ Auxiliary shaft clutch OFF address:
D15014+150n, D15015+150n / D15036+150n, D15037+150n

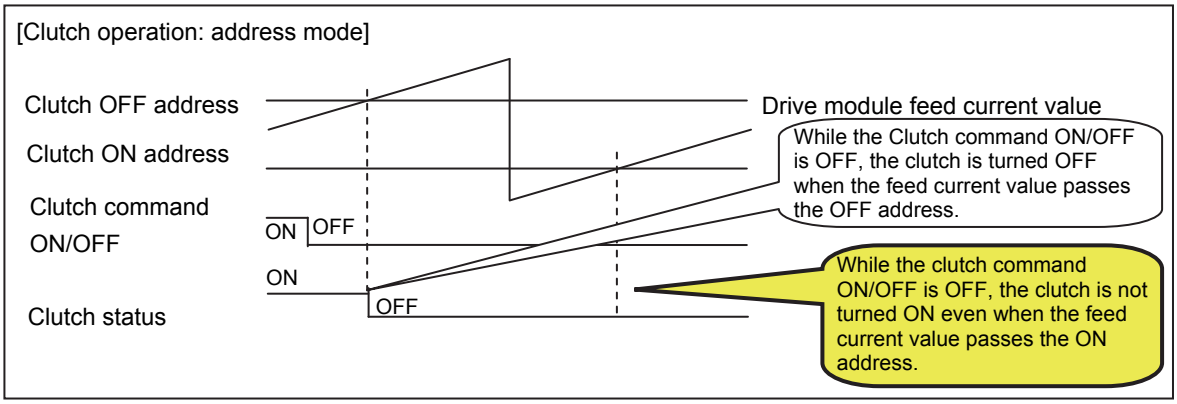
No.	6	Item	Transmission module (clutch)

Target

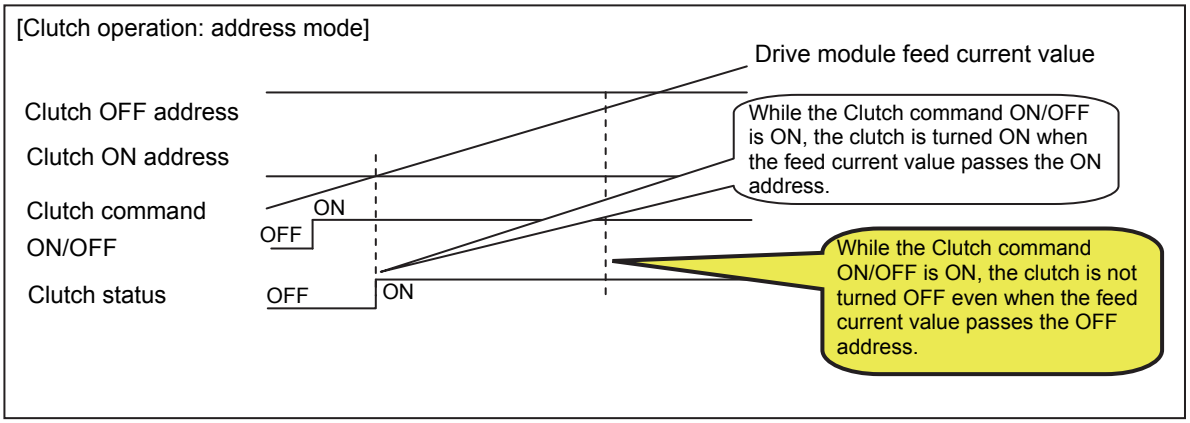
When the Clutch command ON/OFF device is operated so that the clutch status will not be changed even when the feed current value passes the clutch ON or OFF addresses.

The following three cases are the targets.

1. When the clutch operation mode is the address mode and the Clutch command ON/OFF device is OFF.
   Clutch operation: The clutch OFF status will not become ON status even when the feed current value passes the set address of the clutch ON address setting device.

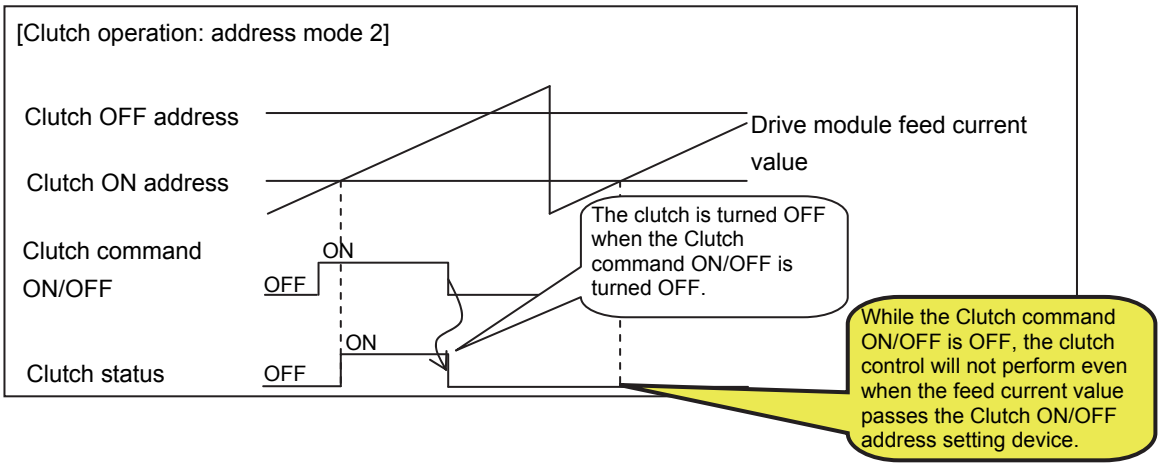


2. When the clutch operation mode is the address mode and the Clutch command ON/OFF device is ON.
   Clutch operation: The clutch in ON status will not become OFF status even when the feed current value reaches the set address of the Clutch OFF address setting device.



Target

3. When the clutch operation mode is the address mode 2 and the Clutch command ON/OFF device is OFF.
   Clutch operation: The clutch OFF status will not perform clutch control even when the feed current value passes the set address of the Clutch ON/OFF address setting device.



Changes

In he advanced synchronous control, there is no devices equivalent to the Clutch command ON/OFF device of the mechanical system program.

Revision method

Create an additional Motion SFC program.

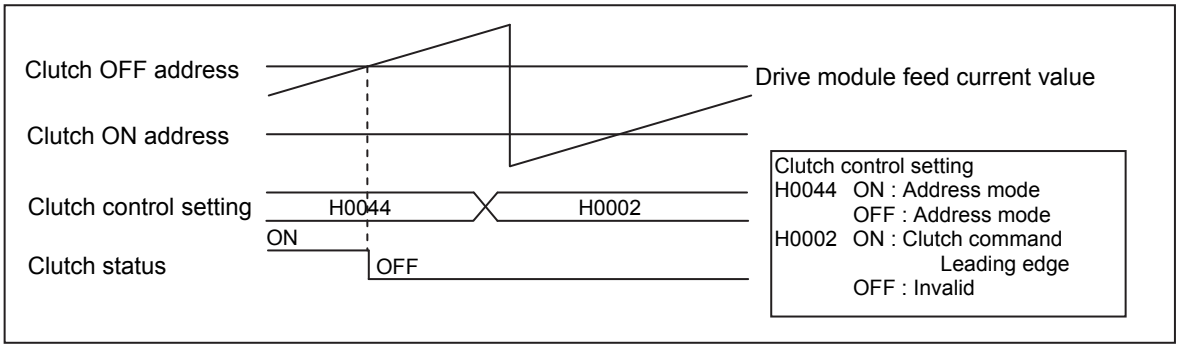
For 1.
While the clutch is in OFF status, change [Pr.405] Main shaft clutch control setting D15008+150n or [Pr.422] Auxiliary shaft clutch control setting D15030+150n from H0044 (ON control mode: Address mode, OFF control mode: Address mode) to H0002 (ON control mode: Clutch command leading edge, OFF control mode: Invalid).

<Program example 1>
The program below changes the Main shaft clutch control setting or the Auxiliary shaft clutch control setting to H0002 (ON control mode: Clutch command leading edge, OFF control mode: Invalid) for axis 1.
Execute the following program while the clutch is in OFF status.

```
[F0]
D15008 = H0002
```

or

```
[F0]
D15030 = H0002
```



Revision method

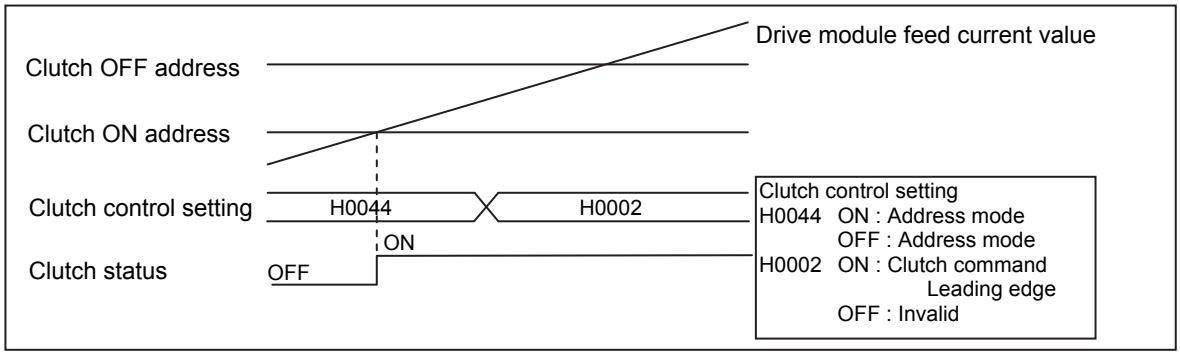
For 2.
While the clutch is in ON status, change [Pr.405] Main shaft clutch control setting D15008+150n or [Pr.422] Auxiliary shaft clutch control setting D15030+150n from H0044 (ON control mode: Address mode, OFF control mode: Address mode) to H0002 (ON control mode: Clutch command leading edge, OFF control mode: Invalid).

<Program example 2>
The program below sets the Main shaft clutch control setting or the Auxiliary shaft clutch control setting to H0002 (ON control mode: Clutch command leading edge, OFF control mode: Invalid) for axis 1.
Execute the following program while the clutch is in ON status.

```
[F0]
D15008 = H0002
```

or

```
[F0]
D15030 = H0002
```



For 3.
While [Rq.400] Main shaft clutch command M11680+10n or [Rq.403] Auxiliary shaft clutch command M11684+10n is OFF, change [Pr.405] Main shaft clutch control setting D15008+150n or [Pr.422] Auxiliary shaft clutch control setting D15030+150n from H0044 (ON control mode: Address mode, OFF control mode: Address mode) to H0001 (ON control mode: Clutch command ON/OFF, OFF control mode: Invalid).
The Main shaft clutch command or the Auxiliary shaft clutch command can be turned OFF when the Main shaft clutch control setting or the Auxiliary shaft clutch control setting is changed.

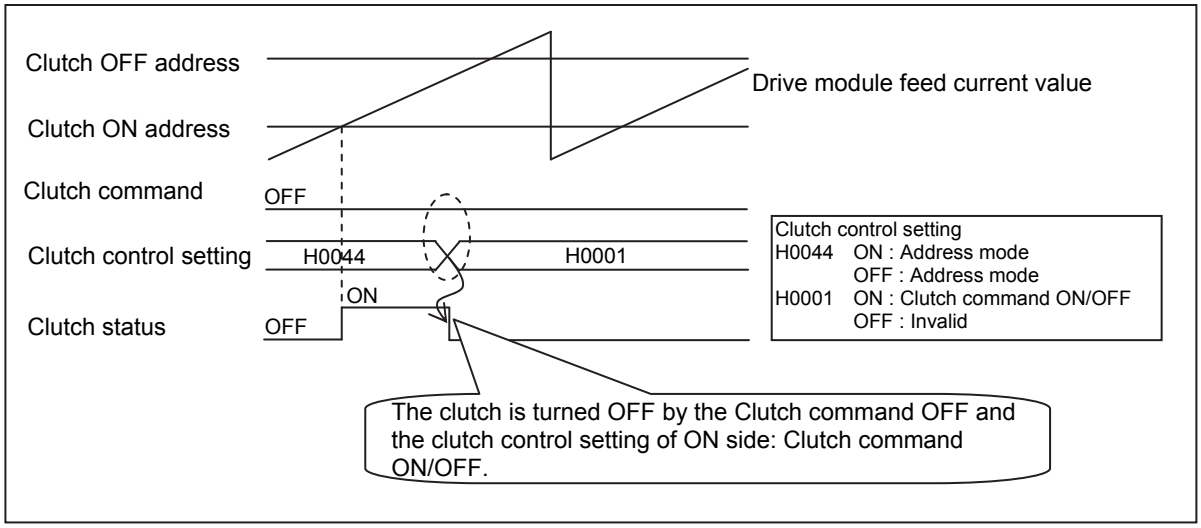
<Program example 3>
The program below turns OFF the Main shaft clutch command or the Auxiliary shaft clutch command for axis 1 and changes the [Pr.405] Main shaft clutch control setting or [Pr.422] Auxiliary shaft clutch control setting to H0001 (ON control mode: Clutch command ON/OFF, OFF control mode: Invalid).

```
[F0]
RST M11680
D15008 = H0001
```

or

```
[F0]
RST M11684
D15030 = H0001
```

Revision method



Remarks

The following are the ON/OFF address of the advanced synchronous control.

[Pr.407]/[Pr.424] Main shaft/ Auxiliary shaft clutch ON address:

D15010+150n, D15011+150n / D15032+150n, D15033+150n

[Pr.409]/[Pr.426] Main shaft/ Auxiliary shaft clutch OFF address:

D15014+150n, D15015+150n / D15036+150n, D15037+150n

No.	7	Item	Transmission module (Speed change gear)

Target

When the speed change gear ratio exceeds the upper limit or the lower limit.

Mechanical system

Parameter Item	Setting Value
Speed Change Ratio Upper Limit	65535
Speed Change Ratio Lower Limit	1
Speed Change Ratio Setting Device	D2000
Smoothing Time Constant	10[ms]

Changes

In the advanced synchronous control, there is no upper/lower limit on the speed change gear.

Revision method

Create an additional Motion SFC program.

Before changing [Pr.436] Speed change ratio 1: Numerator D15048+150n, D15049+150n, add the program that compensates the value within the limit, and store the speed change ratio.

(Note): There are two types of speed chage gear: the speed change gear 1 and 2. Above describes the speed change gear1. For the speed change gear 2, read the device (D15054+150n, D15055+150n) for the gear 2.

Advanced synchronous control

Speed Change Gear 1	
Speed Change Gear Arrangement	3:After Auxiliary Shaft Compo...
Speed Change Gear Smoothing Time Constant	10 ms
Speed Change Ratio	
Numerator	1
Denominator	10000

Remarks

In the virtual mode, the speed change gear ratio is fixed to a specified value when the value become outside of the upper/lower limit.

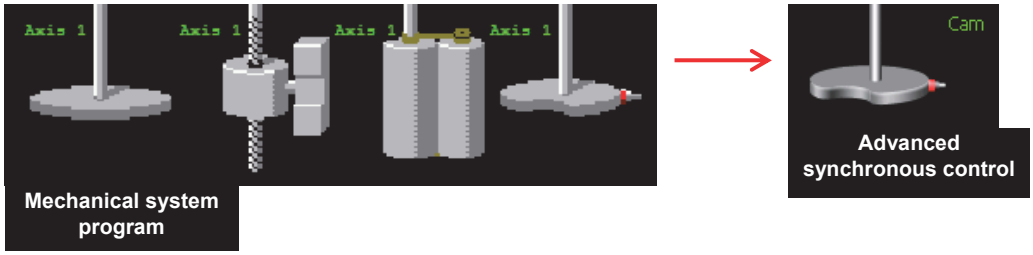
No.	8	Item	Output module

Target

All output modules

Changes

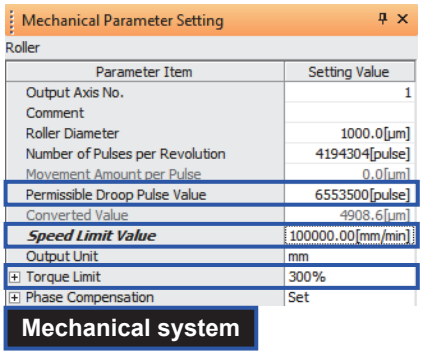
All output modules change to cams. Except for cams, the cam No.0 (Linear cam) is applied.



Revision method

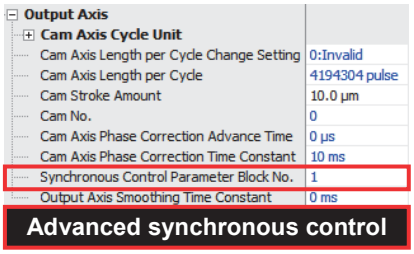
Basic operation does not change.
Howevewr, the following items are not provided. Revise the corresponding part of the Motion SFC program.

1. Speed Limit Value (except for cam)
   In the mechanical system program, a minor error occurs when the speed limit value is exceeded. (The speed will not be fixed.)
   If the Motion SFC program currently takes a remedy to a minor error, make the program so that the Command speed #8004+20n, #8005+10n is monitored with the Motion SFC program and the same error remedy is also taken when the specified speed is exceeded.
   (Refer to the program example 1)



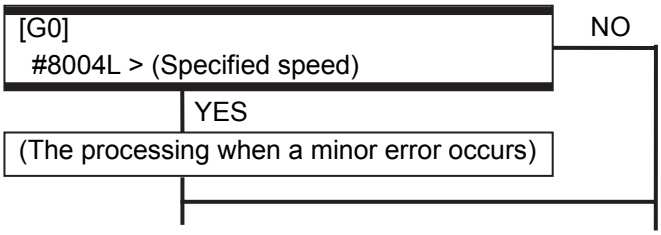
2. Permissible Droop Pulse Value (except for cam)
   In the mechanical system program, when the deviation counter value exceeds the permissible droop pulse value, a minor error occurs. (Operation continues.)
   If the Motion SFC program currently takes a remedy to a minor error, make the program so that the deviation counter value D4+20n, D5+20n is monitored with the Motion SFC program and the same error remedy is also taken when the deviation counter value exceeds the permissible droop pulse value.
   (Refer to the program example 2.)

3. Torque limit value (All)
   In the advance synchronous control, the torque limit value of parameter block is referenced.
   Create a parameter block for the limit value and specify it.
   Use CHGT instruction of the Motion SFC program or D(P).CHGT instruction of the sequence program when changing it.

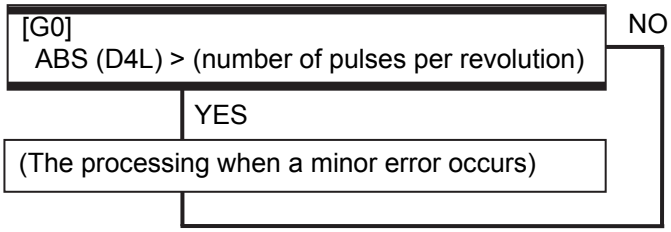


Revision method

<Program example 1>
The program below monitors the axis-1 command speed and takes the same processing as when a minor error occurs, If the specified speed is exceeded.
The following processing is repeated as a fixed-cycle task.



<Program example 2>
The program below monitors the deviation counter for axis 1 and takes the same processing as when a minor error occurs, if the number of pulses per revolution is exceeded.
The following processing is repeated as a fixed-cycle task.



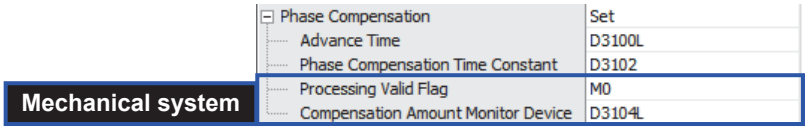
Remarks

In the mechanical system program, if the limit value (1., 2., or 3. on the previous page) is exceeded, M2407+20n is turned ON and the minor error code for each case is stored to D6+20n.

No.	9	Item	Output module

Target

1. When the Phase compensation processing valid flag is used.
2. When the Phase compensation amount monitor device is used.



Changes

1. In the advanced synchronous control, there is no Phase compensation processing valid flag.
2. In the advanced synchronous control, the unit for [Md.406] Cam axis phase compensation amount D13610+30n, D13611+30n is set to [Pr.438] Cam axis cycle unit setting D15058+150n.

Revision method

1. When the Phase compensation processing valid flag is used, the Motion SFC program needs to be changed.

   (1) When turning ON the Phase compensation processing valid flag
   Store a value except for "0" to [Pr.444] Cam axis phase compensation advance time D15066+150n, D15067+150n.

   (2) When turning OFF the Phase compensation processing valid flag
   Store "0" to [Pr.444] Cam axis phase compensation advance time D15066+150n, D15067+150n.

2. When the Phase compensation amount monitor device is used on the program, unit conversion is required.

Remarks

In the advanced synchronous control, the phase compensation processing can be invalid by storing "0" to [Pr.444] Cam axis phase compensation advance time D15066+150n, D15067+150n.

No.	10	Item	Output module (Cam)

Target

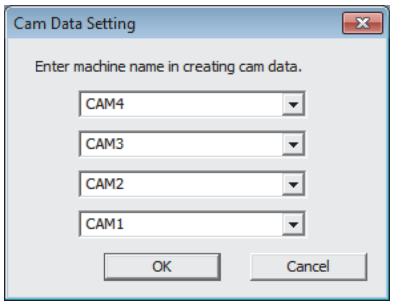
When the cam No. is not set consecutively.

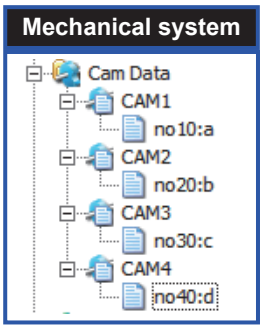
Changes

The cam No. is reassigned.

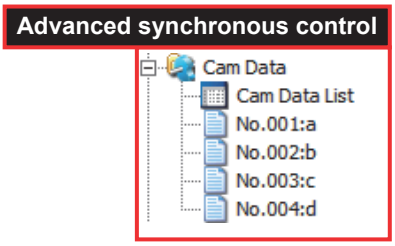
Revision method

In the mechanical system program, when mechanical system program conversion is executed, a setting item, “Specify Cam Data”, which allocates 100 offset by each cam No. is required to set.
In the example on the right, 101 to 164 are allocated as the cam No. for CAM3.
(e.g.: [No.30 : c] of CAM3 on the right means cam No. “130”.)
Similarly, “201” to “264” is for CAM2, and “301” to “364” is for CAM1.





When the mechanical system program is converted to the advanced synchronous control, 1 to 256 are allocated consecutively for the cam settings in the mechanical system screen above with the blue frame, regardless of the settings in the “Specify Cam Data”. The converted cam data becomes as the screen with the red frame.



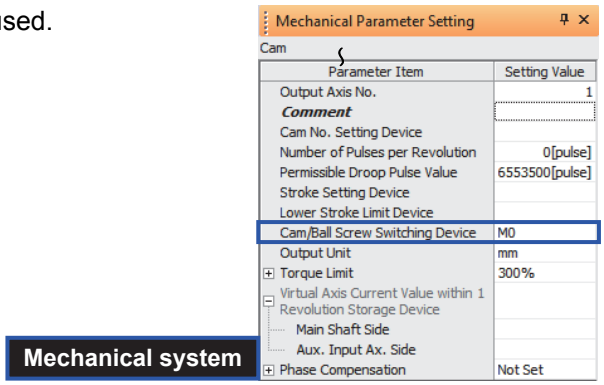
Revise the cam No. for Motion SFC programs and synchronous parameters accordingly.

Remarks

No.	11	Item	Output module (Cam)

Target

When the Cam/ball screw switching device is used.



Changes

The advanced synchronous control method does not have the Cam/ball screw switching function.

Revision method

Revise the Motion SFC program by either of the following two methods according to the application.

1. Method to release the synchronous control only on the target axis
   Turn OFF the [Rq.380] Synchronous control start M12000+n for only the target axis and perform positioning. After that, turn ON [Rq.380] Synchronous control start M12000+n again.
   When restarting the synchronous control, the current value per cycle is restored automatically by setting the [Pr.462] Cam axis position restoration object D15102+150n to “0” (Cam axis current value per cycle restoration), and [Pr.463] Setting method of cam reference position D15103+150n to “0” (Previous value).

2. Method to continue the synchronous control during ball screw operation
   The following operation sets the Cam axis current value per cycle to “0” and the cam data to linear cam.
   - Turn ON [Rq.406] Control change request command (M11688+10n) after setting [Pr.440] Cam No. D15062+150n to “0” (linear cam), [Cd.407] Synchronous control change command D15130+150n to “1” (Change cam axis current value per cycle), and [Cd.408] Synchronous control change value D15132+150n, D15133+150n to “0”.
   (Refer to the program example below)
   The setting above performs ball screw operation.

Revision method

<Program example>
The program below sets the Cam axis current value per cycle for axis 1 to “0” and the cam data to linear cam.

```
[F0]
D15062 = 0    //Set the cam No. to “0” (linear cam).
D15130 = 1    //Set the Synchronous control change command to “1” (Change cam axis current
                value per cycle)
D15132L = 0 //Set the Synchronous control change value to “0”.
SET M11688    // Turn ON the Control change request command.
```

To change it to the original cam, change [Pr.440] Cam No. D15062+150n to the original cam No., and change the Cam axis current value per cycle to “0” referring to the setting procedure above.
After that, calculate the cam axis current value per cycle by the cam position calculation: CAMPSCL, and reflect the result to the current value.
Refer to the SV13/22 Programming Manual (Motion SFC) [type Q173D(S)/Q173D(S)] for details of the cam position calculation: CAMPSCL.

If the feed current value of the cam axis is outside the stroke range when changing it to the original cam, the cam axis current value per cycle cannot be calculated. Make the feed current value within the stroke range by ball screw operation, and perform the calculation.

No.	12	Item	Output module (Cam)

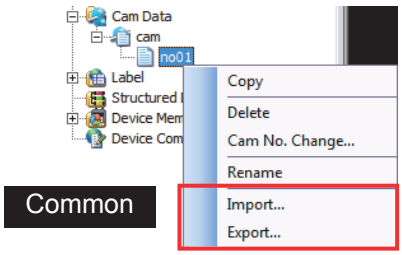
Target

Cam data is imported or exported.
(One of the function of MT Developer2)

(Note): When the exported cam data is saved.

Changes

The file format of the cam data is changed to CSV file.



Revision method

As shown below, the file format is changed.
Change the cam data file.

Mechanical system

No.	Item	Setting Range	Description
1)	Cam No.	0 to 64	The export source cam number is set when a cam number is exported. (Not used when imported) This is also available when the cam number is not set (0).
2)	Cam Mode	0, 1	Set the cam control mode. 0: Two-way Cam 1: Feed Cam
3)	Resolution	256/512/1024/2048	Set the cam resolution.
4)	Stroke Switching Position	0 to (Resolution-1)	Set the cam stroke switching position.
5)	Spare	0	-
6)	Stroke Ratio: Resolution 0 to Resolution Last-1	0 to 32767	Set the resolution number of cam stroke ratio.
7)	Start angle	0 to 360	Enter the start angle of the cam data. This is also available when the cam starting angle is not set (blank).

Advanced synchronous control (Stroke ratio data type)

No.	Item	Setting Range *1	Description
1)	Cam No.	1 to 256 1 to 1024	Set a Cam No.
2)	Control Mode	100	Set "100: stroke rate data".
3)	Resolution	256/512/1024/2048/4096/8192/16384/32768	Set the division number when separating the 1 cycle cam curve.
4)	Cam Data Start Point	0 to (Resolution -1)	Set the position of cam data corresponding with "Cam axis 1 cycle current value=0" position.
5)	Spare	0	-
6)	Stroke Ratio		
	Resolution 1 to Resolution Last	-2147483648 to 2147483647 [0.0000001%] (-214.7483648% to 214.7483647%)	Set the stroke ratio from 1 point to (cam resolution) point. 0 point stroke ratio is unnecessary to set and must keep 0%.
7)	Spare	0	MELSEC Q series import only

Remarks

- The cam data can be converted after imported to MT Developer 2 (Virtual mode) and exported to the advanced synchronous control. In that case, be careful with the cam No.
- Only the Stroke ratio data type is available in the mechanical system. The Coordinate data type is not available.
- In the advanced synchronous control, both the Stroke ratio data type and the Coordinate data type are available.

No.	13	Item	Output module (Cam)

Target

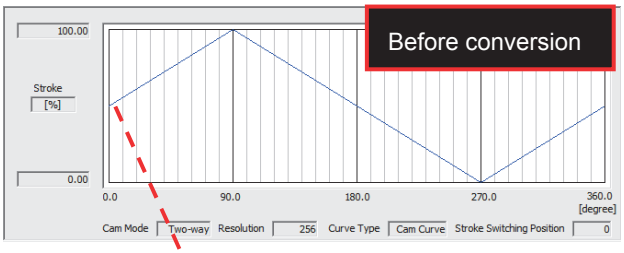
The cam data with its stroke ratio starting from except “0”

Changes

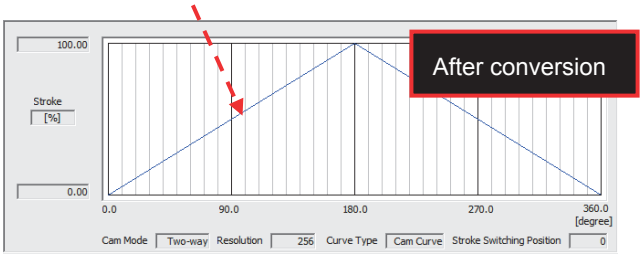
In the advanced synchronous control, cam data whose stroke ratio starts from other than “0” cannot be used.

Revision method

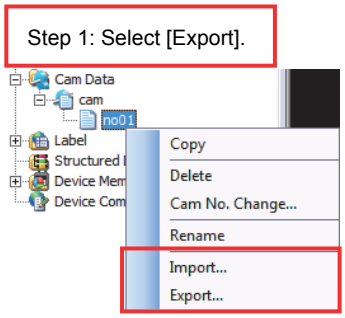
The following example uses two-way cam mode.



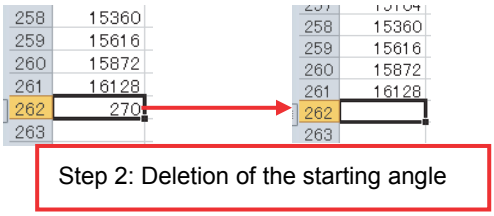
In this example, the cam data whose stroke ratio starts from except “0” is shifted for 90 degree so that the stroke ratio starts from “0”.



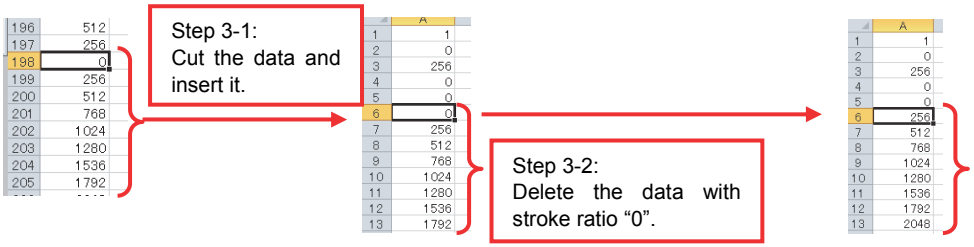
1. Export the target cam data in CSV file.



2. Delete the last data (Starting angle).



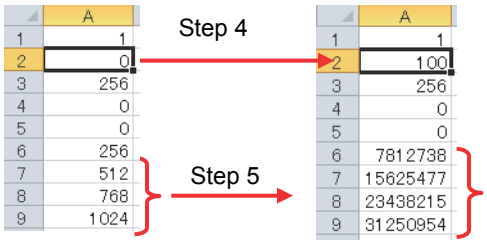
3. Open the CSV file, and cut the data from the one with stroke ratio “0” to the last data.
   Insert the cut data to the top of the Stroke ratio data, and then delete the data with stroke ratio “0”.
   (Note): In the advanced synchronous control, data with stroke ratio “0” is not required since the data always starts from “0”.



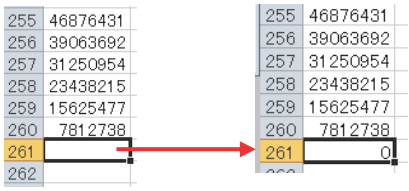
Revision method

4. Set “100” (Stroke ratio data type) in the second line of the CSV file.

5. Make each stroke ratio data 1,000,000,000/32767 times.
The 100 % of stroke ratio is 32,767 for the virtual mode and 1,000,000,000 for the advanced synchronous control.

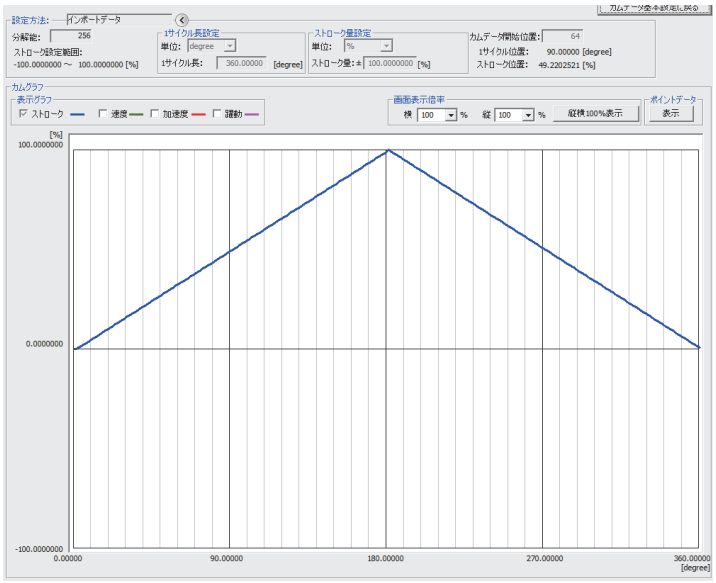


Step 6
Add the specified value to the 255 th point.



6. Add the following value to the last data.
Two-way cam: 0
Feed cam: 100

7. Save it in CSV file, and import it to the advanced synchronous control project.
The cam data with stroke ratio starting from “0” is imported.



Remarks

No.	14	Item	Output module (Cam)

Target

When the Cam reference position setting command M3214+20n is used.

Changes

In the advanced synchronous control, there is no Cam reference position setting command.
The “Setting method of cam reference position” is required to set.

Revision method

Change a parameter or create an additional Motion SFC program.
Change it according to the application. (Refer to the program example below.)

1. When the Cam reference position setting command is ON.
   Set the [Pr.462] Cam axis position restoration object D15102+150n to “0” (Cam axis current value per cycle restoration), [Pr.463] Setting method of cam reference position D15103+150n to “2” (Feed current value).

<Program example>
The program below sets the Cam axis position restoration object to “0” and the Setting method of cam reference position to “2” (Feed current value) for axis 1.

```
[F0]
D15102 = 0 // Set the Cam axis position restoration object to “0” (Cam axis current value per
              cycle restoration)
D15103 = 2 //Set the Setting method of cam reference position to “2” (Feed current value).
```

2. When the Cam reference position setting command is OFF.
   Set [Pr.462] Cam axis position restoration object D15102+150n to “0” (Cam axis current value per cycle restoration), [Pr.463] Setting method of cam reference position D15103+150n to “0” (Previous value).

<Program example>
The program below sets the Cam axis position restoration object to “0” (Cam axis current value per cycle restoration) and the Setting method of cam reference position to “0” (Previous value).

```
[F0]
D15102 = 0 // Set the Cam axis position restoration object to “0” (Cam axis current value per
              cycle restoration)
D15103 = 0 // Set the Setting method of cam reference position to “0” (Previous value)
```

Remarks

No.	15	Item	Device allocation

Target

All programs

Changes

The device allocation is changed.

Revision method

Change device allocation for Motion CPU, PLC CPU, and GOT etc. which have device settings.

[An example needing device change]
- Automatic refresh setting
  (including high-speed refresh)

Setting No.	Automatic Refresh				CPU Specific Send Range(U3E0\)	
	Points (*)	Start	End		Start	End
1	16	M0	M255	<--	G16952	G16967
2	200	D2000	D2199	<--	G16968	G17167
3						

- Latch range setting

Latch Range

	Sym.	Device Range	Latch(1) Start	Latch(1) End	Latch(2) Start	Latch(2) End
Internal Relay	M	0 to 8191	0	255		
Link Relay	B	0 to 1FFF				
Annunciator	F	0 to 2047				
Data Register	D	0 to 8191	0	200		
Link Register	W	0 to 1FFF				

Latch(1):It is possible to clear using the remote operation (latch clear (1), (1)(2)).
Latch(2):It is possible to clear using the remote operation (latch clear (1)(2)).

- Motion SFC program

- Sequence program
  (including Inline ST, etc.)

- Network setting (CC-Link, etc.)

(Note): When the data is managed collectively with BMOV instruction, etc., note that whether those data use devices is difficult to be confirmed.

Remarks

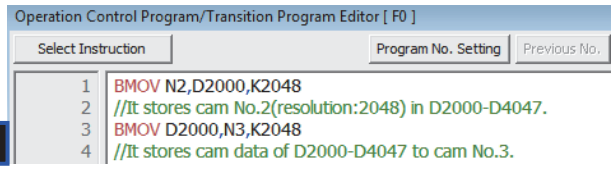
Many of the indirectly specifiable devices in the mechanical system are changed to fixed parameters. The scan time of the Motion CPU or the PLC CPU can be shortened by reducing items for latch or automatic refresh by setting them consecutively.

No.	16	Item	Program (Motion SFC)

Target

When cam data is transmitted (reading/writing) with BMOV instruction.

Mechanical system



Changes

In the advanced synchronous control, the Motion SFC instructions for cam data operation (CAMWR, CAMRD) are used.
Cam operation cannot be performed with BMOV.

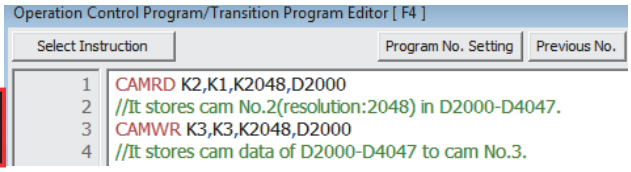
Revision method

1. CAMRD instruction is used for cam data reading
   Input {CAMRD [Cam No.],K1,[Resolution],[Start device]}.

2. CAMWR instruction is used for cam writing.
   Input {CAMWR [Cam No.],K1,[Resolution],[Start device]}

(Refer to the SV13/22 Programming Manual (Motion SFC) [type Q173D(S)/Q173D(S)].)

Advanced synchronous control



(Note): The second argument “K1” indicates the start position of cam data which executes the reading and the writing. In the mechanical system, “K1” is used since partial reading/writing cannot be executed.

Remarks

In the advanced synchronous control, CAMWR2 instruction is also available for cam data writing as well as CAMWR instruction above. When using these instructions, the written data is not saved. (BMOV instruction in the mechanical system can save the written data.)

3.3 Other Changes and Precautions

- The Smoothing clutch complete signal in the mechanical system is changed to the Clutch smoothing status for the advanced synchronous control, and the operation has been changed. ([St.421] /[St.424] Main shaft/Auxiliary shaft clutch smoothing status M10561+10n/ M10563+10n)

- The speed change gear smoothing is changed from exponential system to linear system.

- The Roller cycle speed storage register D0+20n, D1+20n is changed to the Feed current value in the advanced synchronous control (because the roller is changed to linear cam.) If necessary, use the Command speed #8004+20n, #8005+20n.

- The advanced synchronous control method does not have the Error search output axis No. storage register D808+10n. If necessary, create a program which reads the error axis No. when an error occurs.

RELEVANT DOCUMENTS

Please refer to the following documents.

Relevant Manuals

Q173D(S)CPU/Q172D(S)CPU Motion Controller Use's Manual
IB-0300133

Programming Manual (COMMON) [type Q173D(S)/Q172D(S)]
IB-0300134

SV13/22 Programming Manual (Motion SFC) [type Q173D(S)/Q172D(S)]
IB-0300135

SV13/22 Programming Manual (REAL MODE) [type Q173D(S)/Q172D(S)]
IB-0300136

SV22 Programming Manual (VIRTUAL MODE) [type Q173D(S)/Q172D(S)]
IB-0300137

Programming Manual (Safety Observation) [type Q173D(S)/Q172D(S)]
IB-0300198

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Mitsubishi Servo System Controllers

Country/Region	Sales office	Tel/Fax
USA	Mitsubishi Electric Automation, Inc. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	Mitsubishi Electric Automation, Inc. Mexico Branch Mariano Escobedo #69, Col.Zona Industrial, Tlalnepantla Edo. Mexico, C.P.54030	Tel : +52-55-3067-7500 Fax : –
Brazil	Mitsubishi Electric do Brasil Comercio e Servicos Ltda. Rua Jussara, 1750- Bloco B Anexo, Jardim Santa Cecilia, CEP 06465-070, Barueri - SP, Brasil	Tel : +55-11-4689-3000 Fax : +55-11-4689-3016
Germany	Mitsubishi Electric Europe B.V. German Branch Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany	Tel : +49-2102-486-0 Fax : +49-2102-486-1120
UK	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, UK-Hatfield, Hertfordshire, AL10 8XB, U.K.	Tel : +44-1707-28-8780 Fax : +44-1707-27-8695
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Direzionale Colleoni - Palazzo Sirio, Viale Colleoni 7, 20864 Agrate Brianza (Milano), Italy	Tel : +39-039-60531 Fax : +39-039-6053-312
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi, 76-80-Apdo. 420, 08190 Sant Cugat del Valles (Barcelona), Spain	Tel : +34-935-65-3131 Fax : +34-935-89-1579
France	Mitsubishi Electric Europe B.V. French Branch 25, Boulevard des Bouvets, 92741 Nanterre Cedex, France	Tel : +33-1-55-68-55-68 Fax : +33-1-55-68-57-57
Czech Republic	Mitsubishi Electric Europe B.V. Czech Branch Avenir Business Park, Radlicka 751/113e, 158 00 Praha 5, Czech Republic	Tel : +420-251-551-470 Fax : +420-251-551-471
Poland	Mitsubishi Electric Europe B.V. Polish Branch ul. Krakowska 50, 32-083 Balice, Poland	Tel : +48-12-347-65-00 Fax : +48-12-630-47-01
Russia	Mitsubishi Electric (Russia) LLC St. Petersburg Branch Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; 195027 St. Petersburg, Russia	Tel : +7-812-633-3497 Fax : +7-812-633-3499
Sweden	Mitsubishi Electric Europe B.V. (Scandinavia) Fjelievagen 8, SE-22736 Lund, Sweden	Tel : +46-8-625-10-00 Fax : +46-46-39-70-18
Turkey	Mitsubishi Electric Turkey A.S. Umraniye Branch Serifali Mahallesi Nutuk Sokak No:5, TR-34775 Umraniye / Istanbul, Turkey	Tel : +90-216-526-3990 Fax : +90-216-526-3995
UAE	Mitsubishi Electric Europe B.V. Dubai Branch Dubai Silicon Oasis, P.O.BOX 341241, Dubai, U.A.E.	Tel : +971-4-3724716 Fax : +971-4-3724721
South Africa	Adroit Technologies 20 Waterford Office Park, 189 Witkoppen Road, Fourways, South Africa	Tel : +27-11-658-8100 Fax : +27-11-658-8101
China	Mitsubishi Electric Automation (China) Ltd. Mitsubishi Electric Automation Center, No.1386 Hongqiao Road, Shanghai, China	Tel : +86-21-2322-3030 Fax : +86-21-2322-3000
Taiwan	SETSUYO ENTERPRISE CO., LTD. 6F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan	Tel : +886-2-2299-2499 Fax : +886-2-2299-2509
Korea	Mitsubishi Electric Automation Korea Co., Ltd. 7F-9F, Gangseo Hangang Xi-tower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 07528, Korea	Tel : +82-2-3660-9510 Fax : +82-2-3664-8372/8335
Singapore	Mitsubishi Electric Asia Pte. Ltd. 307 Alexandra Road, Mitsubishi Electric Building, Singapore 159943	Tel : +65-6473-2308 Fax : +65-6476-7439
Thailand	Mitsubishi Electric Factory Automation (Thailand) Co., Ltd. 12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpang, Khet Yannawa, Bangkok 10120, Thailand	Tel : +66-2682-6522 to 6531 Fax : +66-2682-6020
Indonesia	PT. Mitsubishi Electric Indonesia Gedung Jaya 11th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia	Tel : +62-21-3192-6461 Fax : +62-21-3192-3942
Vietnam	Mitsubishi Electric Vietnam Company Limited Unit 01-04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam	Tel : +84-8-3910-5945 Fax : +84-8-3910-5947
India	Mitsubishi Electric India Pvt. Ltd. Pune Branch Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune - 411026, Maharashtra, India	Tel : +91-20-2710-2000 Fax : +91-20-2710-2100
Australia	Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS: 1-14 , YADA-MINAMI 5, HIGASHI-KU, NAGOYA , JAPAN

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