



General-Purpose AC Servo

MELSERVO

Capacity Selection Software

MODEL

MRZJW3-MOTSZ111E

Installation Guide

To optimize the use of the capacity selection software, please read over this Installation Guide before using the software. After reading the Installation Guide, always place it in a safe place.

● Safety Instructions ●

(Always read these instructions before using the equipment.)

Do not attempt to install, operate, maintain or inspect the servo amplifier and servo motor until you have read through this Installation Guide, and appended documents carefully and can use the equipment correctly. Do not use the servo amplifier and servo motor until you have a full knowledge of the equipment, safety information and instructions.

In this Installation Guide, the safety instruction levels are classified into "WARNING" 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 injury to personnel or may cause physical damage.


Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

What must not be done and what must be done are indicated by the following diagrammatic symbols.



Indicates what must not be done. For example, "No Fire" is indicated by .



Indicates what must be done. For example, grounding is indicated by .

In this Installation Guide, instructions at a lower level than the above, instructions for other functions, and so on are classified into "POINT".

After reading this Installation Guide, always keep it accessible to the operator.

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The capacity selection software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Check the results against your own requirements ensuring that you have an adequate safety margin in the calculated result of the selected system in reserve.

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1. INTRODUCTION

1. INTRODUCTION

1.1 Specifications

The capacity selection software is designed to properly select the capacity of a servo motor required for machine structure. By entering the specifications data of the machine used, the servo amplifier series and the servo motor series, the software selects the optimum capacity of the servo motor.

(1) Combination of Servo Amplifier and Servo Motor

Servo motor series	Servo amplifier series										
	MR-J2S-A MR-J2S-B MR-J2S-CP	MR-J2S-A1 MR-J2S-B1 MR-J2S-CP1	MR-J2S-A4 MR-J2S-B4	MR-J2M	MR-J3-A MR-J3-B MR-J3-B-RJ006 MR-J3-T	MR-J3-A1 MR-J3-B1 MR-J3-B1-RJ006 MR-J3-T1	MR-J3-A4 MR-J3-B4 MR-J3-B4-RJ006 MR-J3-T4	MR-E-A/AG	MR-J3-B-RJ004	MR-J3-B4-RJ004	
HC-KFS	○	○		○							
HC-MFS	○	○		○							
HC-SFS	○		○								
HC-RFS	○										
HC-UFS	○	○		○							
HC-LFS	○										
HA-LFS	(Note 1) ○		○								
HF-KP					○	○					
HF-MP					○	○					
HF-SP					○		○				
HF-KE								○			
HF-SE								○			
HA-LP					(Note 2) ○		(Note 3) ○				
HC-UP					○						
HC-RP					○						
HC-LP					○						
LM-H2									○		
LM-F									○	○	
LM-U2									○		

Note 1. For MR-J2S-CP, servo motor 7kW or less is compatible.

2. For MR-J3-B-RJ006/MR-J3-T, servo motor 25kW or less is compatible.

3. For MR-J3-B-RJ006/MR-J3-T, servo motor 22kW or less is compatible.

(2) Specifications List

Item	Specifications	
Model	MRZJW3-MOTSZ111E	
Machine component	Ball screw horizontal, ball screw vertical, rack and pinion, roll feed, rotary table, cart, elevator, conveyor, generic (direct inertia input), linear servo	
Result output	Item	Selected servo amplifier type, selected servo motor type, selected regenerative resistor type, load inertia moment, load inertia moment ratio, peak torque, peak torque ratio, effective torque, effective torque ratio, regenerative power (Note), regenerative power ratio
	Print	Entered specifications, operation pattern, calculation process, feed rate (servo motor speed) vs. torque graph in selection process, and selection results are printed.
	Data save	Entered specifications, operation pattern and selection results are saved with a file name.
Inertia moment and tension calculation function	Cylinder, square block, converted load, linear movement, hanging, cone, conical base	

Note. The MR-J2M outputs regenerative energy.

1. INTRODUCTION

1.2 Required system configuration

The following components are required to use the capacity selection software. Configure the system according to the Installation Guide of each equipment.

Equipment		(Note 1) Description
(Note 2, 3) Personal computer	OS	IBM PC/AT compatible where the English version of Windows® 98, Windows® Me, Windows® 2000 Professional, Windows® XP Professional, Windows® XP Home Edition, Windows Vista® Home Basic, Windows Vista® Home Premium, Windows Vista® Business, Windows Vista® Ultimate, Windows Vista® Enterprise operates
	Processor	Pentium® 133MHz or more (Windows® 98, Windows® 2000 Professional) Pentium® 150MHz or more (Windows® Me) Pentium® 300MHz or more (Windows® XP Professional, Windows® XP Home Edition) 32-bit (x86) processor of 1GHz or higher (Windows Vista® Home Basic, Windows Vista® Home Premium, Windows Vista® Business, Windows Vista® Ultimate, Windows Vista® Enterprise)
	Memory	24MB or more (Windows® 98) 32MB or more (Windows® Me, Windows® 2000 Professional) 128MB or more (Windows® XP Professional, Windows® XP Home Edition) 512MB or more (Windows Vista® Home Basic) 1GB or more (Windows Vista® Home Premium, Windows Vista® Business, Windows Vista® Ultimate, Windows Vista® Enterprise)
	Hard Disk	40MB or more of free space
Browser		Internet Explorer 4.0 or more
Display		One whose resolution is 800 × 600 or more and that can provide a high color (16 bit) display. Connectable with the above personal computer.
Keyboard		Connectable with the above personal computer.
Mouse		Connectable with the above personal computer.
Printer		Connectable with the above personal computer.

Note 1. Windows and Windows Vista are the registered trademarks of Microsoft Corporation in the United States and other countries.

Pentium is the registered trademarks of Intel Corporation.

2. On some personal computers, this software may not run properly.
3. 64-bit Windows XP and 64-bit Windows Vista are not supported.

1. INTRODUCTION

1.3 Basic terms

1) Mouse pointer

An on-screen arrow which moves with movements of the mouse.

2) Point

To move the mouse pointer to a particular item or position on the screen.

3) Click

To press and release the left button of the mouse once.

4) Double-click

To press and release the left button of the mouse twice.

5) Drag

To hold down the left button of the mouse and move the mouse.

6) Focus

Highlights characters, button or the like when the menu or button is ready to accept an input from the keyboard.

7) Text box

Box used to enter characters.

8) List box

Box used to select one of several items.



9) Combo box


Box used to select one of several items.



10) Check box

Box used to select one or more of several items. When a choice is made a mark appears in the box.

11) Option button

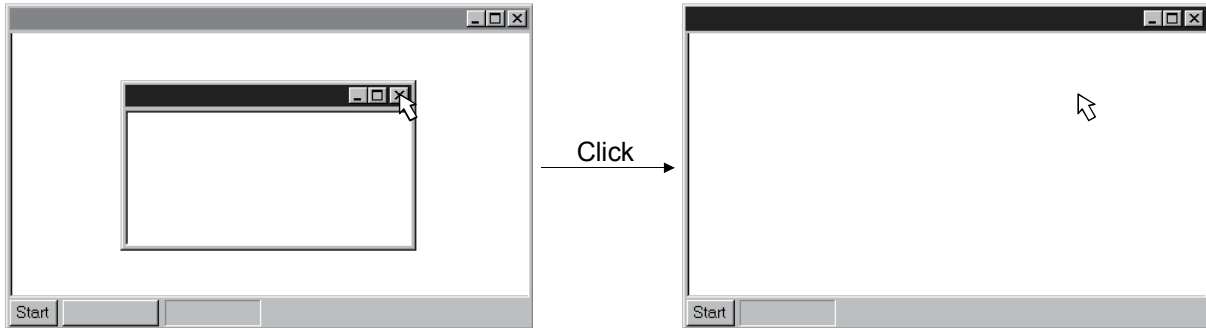
Button used to select only one of several items. When a choice is changed  moves to a new choice.

1. INTRODUCTION

1.4 Basic operations

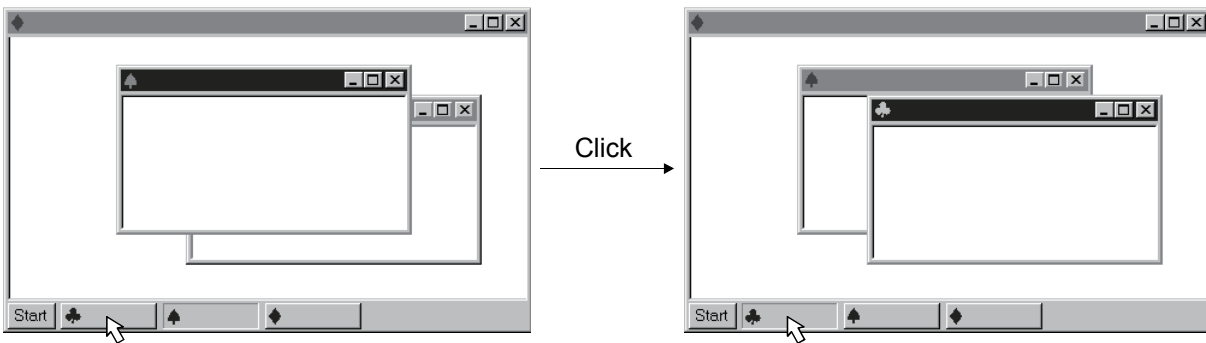
(1) Closing the window

Click the closing bottom at top right corner of the window.



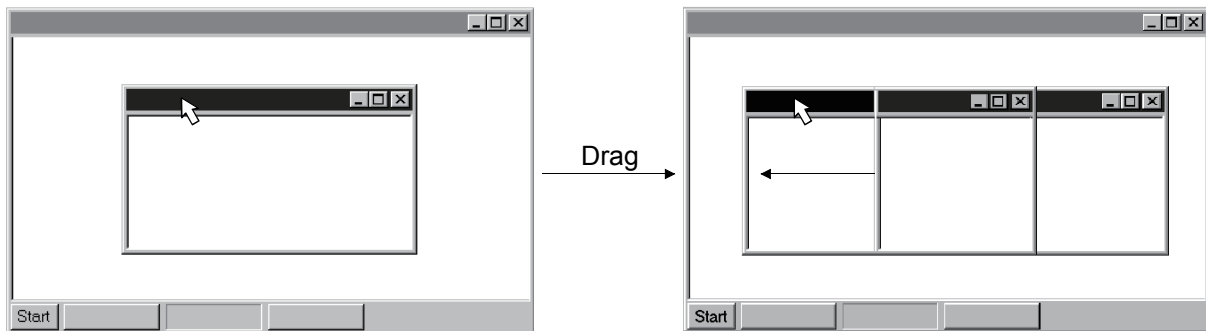
(2) Moving the focus from one window to another

Click the button of the task bar corresponding to the window to be used.



(3) Moving the window

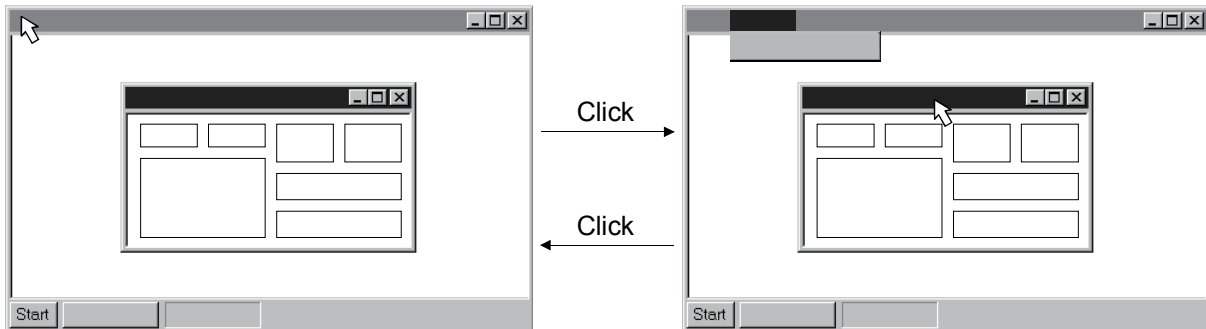
Point to the title bar, drag the window to the required position, and release the button.



1. INTRODUCTION

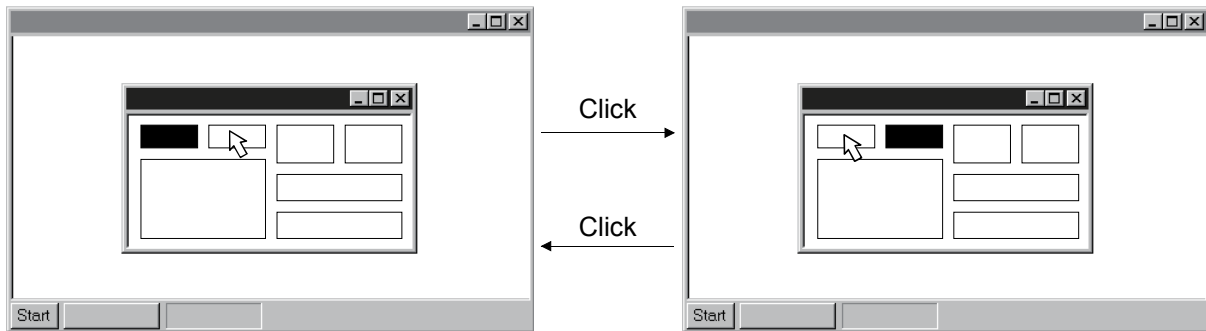
(4) Moving the focus to the menu bar

Click the menu bar. To move the focus to a window, click the window.



(5) Moving the focus inside the window

Click the object to be operated (such as a text box). When the object to be operated is a button, clicking it will start its processing.



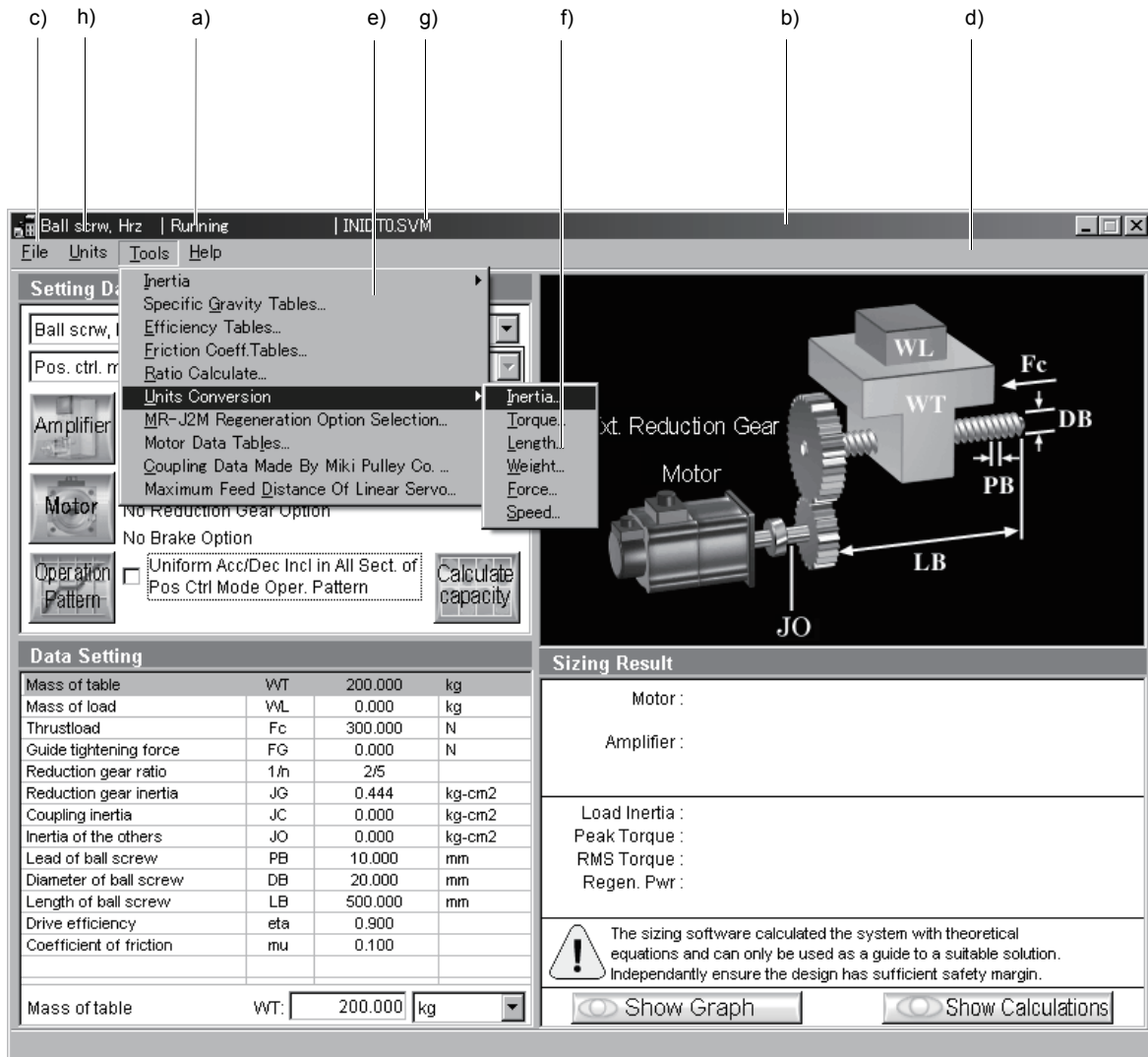
<Short-cut keys>

Any of the following short-cut keys may be used to perform operation from the keyboard.

Intended operation	Keyboard
End program	"Alt" + "F4"
Show start menu	"Ctrl" + "Esc"
Change window	"Alt" + "Tab"
Change object	"Tab"

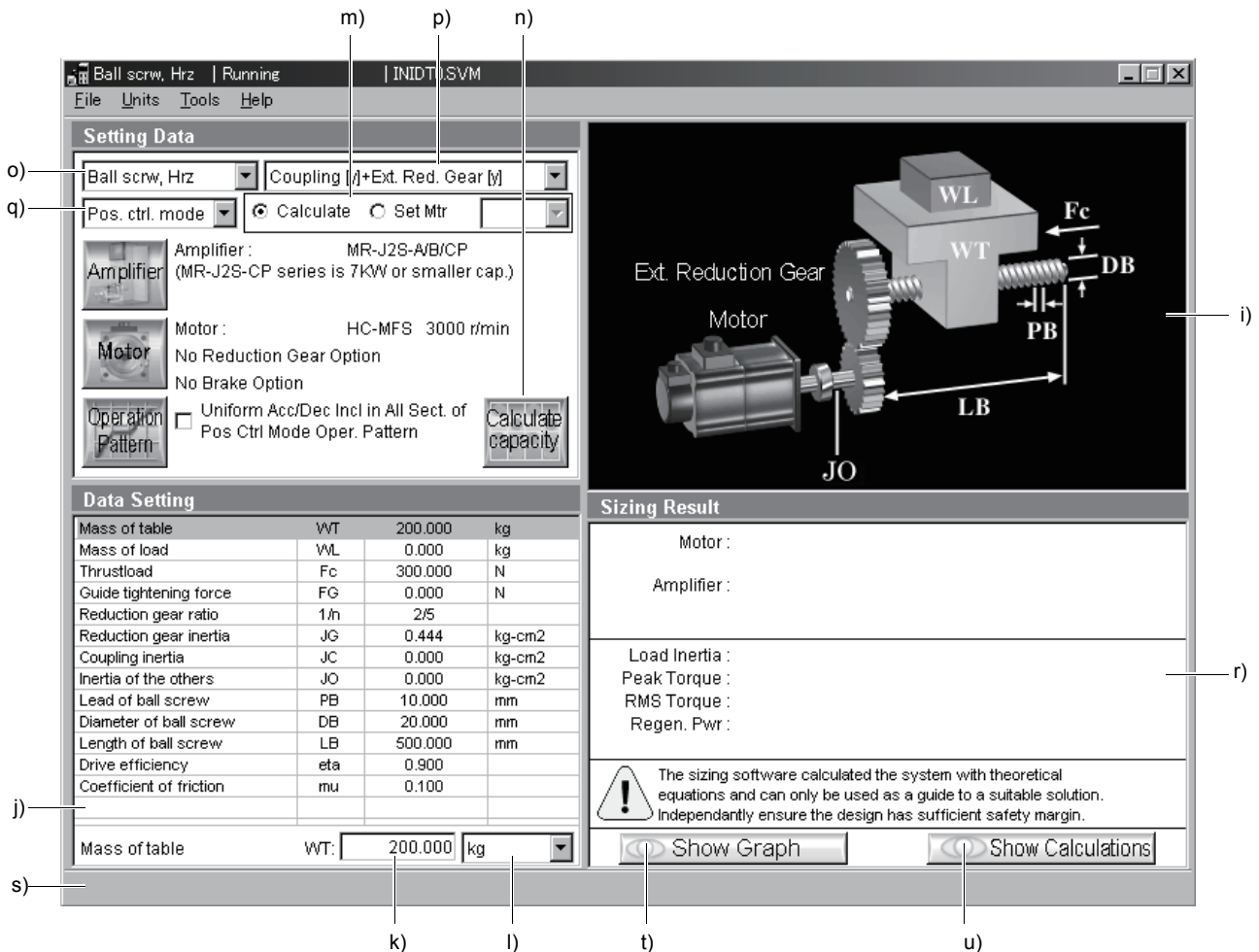
1. INTRODUCTION

1.5 Screen definitions



- a) Title
Shows the title which has been set.
- b) Title bar
- c) Menu title
- d) Menu bar
Shows the menu title.
- e) Menu
Command menu in tier 1
- f) Submenu
Command menu in tier 2
- g) File name
Shows the file name being selected.
- h) Mechanical components name
Shows the mechanical components name selected.

1. INTRODUCTION



- i) Machine structure illustration area
Shows a machine structure diagram.
- j) Data Setting area
Shows the machine specifications, items and data.
- k) Machine specifications entry area
Enter data in machine specifications.
- l) Unit area
Select the unit for the data of machine specifications.
- m) Calculation mode selection area
Set Calculation or Motor Size (Specifying thrust and executing calculation).
- n) Calculate capacity button
Click this button to start automatic calculation.
- o) Mechanical Components Selection combo box
Select the mechanical components
- p) Select Coupling and External Reduction Gear combo box
Select whether to use the coupling and external reduction gear or not.
- q) Servo Control Mode
Select the control mode of servo amplifier.
- r) Sizing result display area
Shows the results of selecting the servo motor, servo amplifier and regenerative option and the results of calculating load inertia, peak torque, effective torque and regenerative power (At MR-J2M, it is regenerative energy.).
- s) Message display area
Shows a comment or error message. This area is normally blue, but turns to red when showing an error message.
- t) Show Graph button
Click this button to show the calculation result is displayed in graph.
- u) Show Calculations button
Click this button to show the calculation process.

2. CAPACITY SELECTION PROCEDURE

2. CAPACITY SELECTION PROCEDURE

2.1 Capacity selection sequence

The following operation flowchart introduces a general operation procedure for capacity selection.

POINT
<ul style="list-style-type: none"> For the MR-J2M, select the servo amplifier (drive unit) and servo motor on an axis-by-axis basis, and after making selection for all axes, select the regenerative options with the "MR-J2M Regeneration Option Selection" command of "Tools".

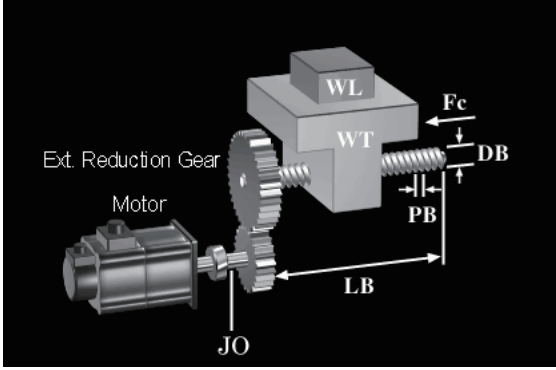
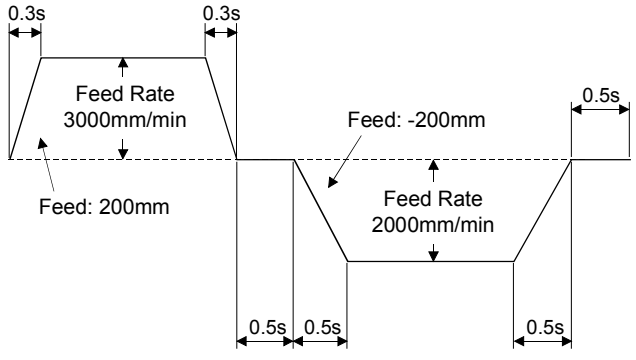
Procedure	Operation	Description
1	System start-up	Windows is started up, and the capacity selection software is started.
2	Initial value read	Select "Open Project" to initialize or read data.
3	Mechanical components selection	Select the machine type from 10 machine components.
4	Calculation mode selection	Select "Calculate" or "Set Mtr ("Specifying thrust and executing calculation" for linear servo amplifier)". 1. Calculate Calculation is made on the basis of the entered machine specifications to select the capacities of the servo amplifier and servo motor. The selected capacities of the servo amplifier model name, servo motor model name and regenerative option model name of are displayed together with calculation results. 2. Set Mtr ("Specifying thrust and executing calculation" for linear servo amplifier)". Calculation is made to specify the capacity of the servo amplifier. (Calculation for specifying thrust of linear servo amplifier)
5	Servo amplifier series selection	Select the series name of the servo amplifier to be selected.
6	Servo motor series selection	Select the series name of the servo motor to be selected.
7	Motor option selection	When the motor is selected, the Motor Options window will appear automatically. Select whether to use the rated speed the reduction gear or not, the reduction gear ratio, and whether to use the electromagnetic brake or not.
8	Coupling/external reduction gear selection	Select whether to use the coupling and external reduction gear or not in the connection of the servo motor and machine.
9	Machine specifications entry	Enter the values of machine specifications displayed on the basis of the mechanical components selected. They may also be calculated and substituted using various tool windows.
10	Operation pattern entry	Enter the operation pattern of the servo motor.
11	Selection operation execution	Click the "Calculate capacity" button to execute capacity selection.
12	Result confirmation	Confirm the selection results. To change the mechanical components or any of the machine specifications, only that item may be changed and operation performed again.
13	Regenerative option selection	For the MR-J2M, perform this operation to select the regenerative option. For the servo amplifier other than the MR-J2M, this operation is not necessary.
14	Printing	In printing, the Mechanical Components, machine specifications and Sizing Result are printed.
15	Data save	In data save, Mechanical Components, machine specifications (including units) and Sizing Result may be saved with file name.
16	End	Terminate the capacity selection software.

2. CAPACITY SELECTION PROCEDURE

2.2 Capacity selection example

This section offers an example of capacity selection for a machine having particular specifications.

2.2.1 Machine specifications

Item	Setting																																																				
Mechanical Components	Ball screw, Hz 																																																				
Machine specifications	<table border="0"> <tr> <td>Mass of table</td> <td>WT:</td> <td>250.000</td> <td>kg</td> </tr> <tr> <td>Mass of load</td> <td>WL:</td> <td>20.00</td> <td>kg</td> </tr> <tr> <td>Thrust load</td> <td>FC:</td> <td>350.000</td> <td>N</td> </tr> <tr> <td>Guide tightening force</td> <td>FG:</td> <td>1.000</td> <td>N</td> </tr> <tr> <td>Reduction gear ratio</td> <td>1/n:</td> <td>1/3</td> <td></td> </tr> <tr> <td>Reduction gear inertia</td> <td>JG:</td> <td>0.700</td> <td>kg · cm²</td> </tr> <tr> <td>Coupling inertia</td> <td>JC:</td> <td>0.400</td> <td>kg · cm²</td> </tr> <tr> <td>Inertia of the others</td> <td>JO:</td> <td>0.500</td> <td>kg · cm²</td> </tr> <tr> <td>Lead of ball screw</td> <td>PB:</td> <td>10.000</td> <td>mm</td> </tr> <tr> <td>Diameter of ball screw</td> <td>DB:</td> <td>10.000</td> <td>mm</td> </tr> <tr> <td>Length of ball screw</td> <td>LB:</td> <td>600.000</td> <td>mm</td> </tr> <tr> <td>Drive efficiency</td> <td>η:</td> <td>0.900</td> <td></td> </tr> <tr> <td>Coefficient of friction</td> <td>μ:</td> <td>0.100</td> <td></td> </tr> </table>	Mass of table	WT:	250.000	kg	Mass of load	WL:	20.00	kg	Thrust load	FC:	350.000	N	Guide tightening force	FG:	1.000	N	Reduction gear ratio	1/n:	1/3		Reduction gear inertia	JG:	0.700	kg · cm ²	Coupling inertia	JC:	0.400	kg · cm ²	Inertia of the others	JO:	0.500	kg · cm ²	Lead of ball screw	PB:	10.000	mm	Diameter of ball screw	DB:	10.000	mm	Length of ball screw	LB:	600.000	mm	Drive efficiency	η :	0.900		Coefficient of friction	μ :	0.100	
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Length of ball screw	LB:	600.000	mm																																																		
Drive efficiency	η :	0.900																																																			
Coefficient of friction	μ :	0.100																																																			
Operation pattern																																																					
Servo response level	High response																																																				
Servo amplifier	MR-J2S-A/B/CP series																																																				
Servo motor	HC-MFS 3000r/min series																																																				
Servo motor option	1/5 precision speed reducer No brake option																																																				
Data file	test1. svm																																																				
Title name	test 1																																																				

2. CAPACITY SELECTION PROCEDURE


2.2.2 Operation

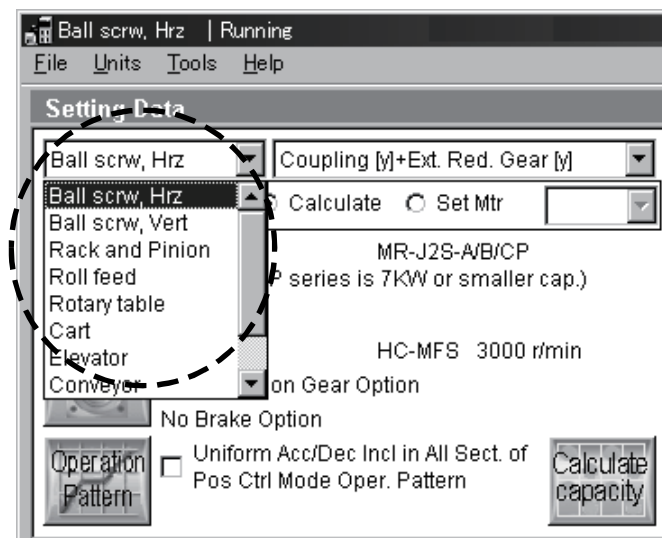
Here, capacity selection is selected based on the machine specifications of section 2.2.1. For the other operation procedures, refer to sections 1.4 and 3.2.

(1) Start-up of the capacity selection software

- 1) Click the "Start" button of the task bar to open the menu.
- 2) Point to "Programs", point to "MELSERVO" and point to "MOTSZ_SoftWare".
- 3) Click "MOTSZ111E".

(2) Machine component selection

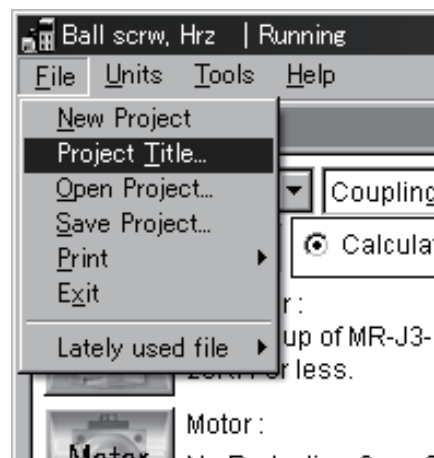
- 1) Clicking  in the Mechanical Components combo box inside the Setting Data area opens the following menu.



- 2) Click "Ball screw, Hrz".

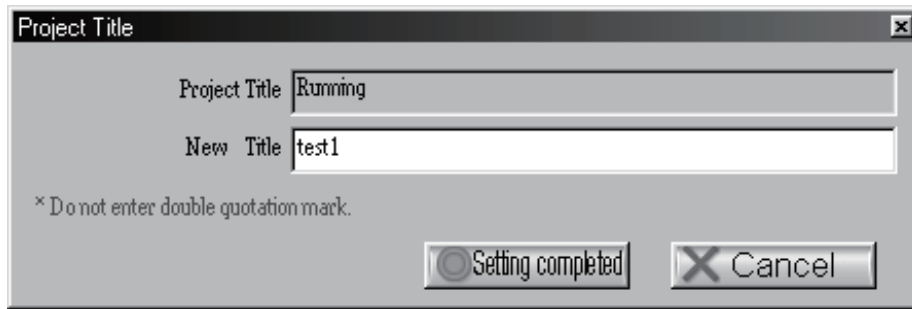
(3) Title

- 1) Click "File" on the menubar to open the menu.
- 2) Click "Project Title".




2. CAPACITY SELECTION PROCEDURE

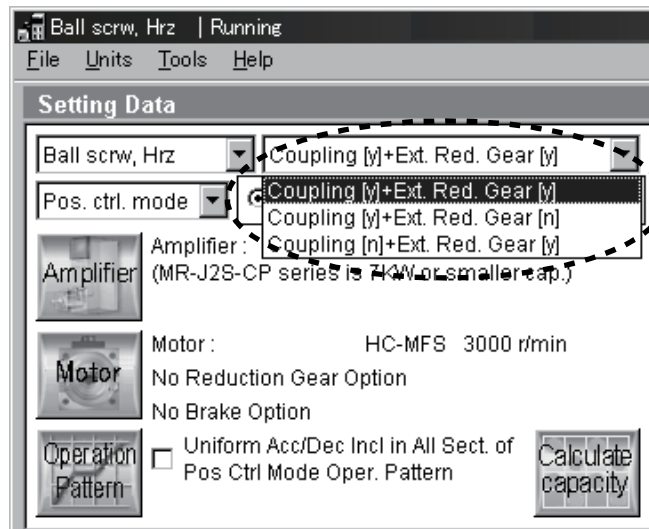
When "Project Title" is clicked, the following window appears.



- 3) Enter "test1" in the New Title field.
- 4) Click the "Setting completed" button.

(4) Select Coupling and External Reduction Gear selection


- 1) Click  in the Select Coupling and External Reduction Gear combo box inside the Setting Data area to open the menu.

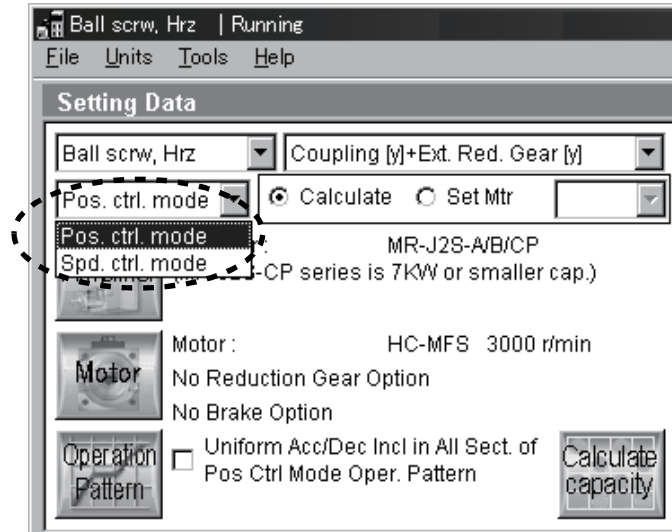


- 2) Click "Coupling [y] + Ext. Reduction Gear [y]".

2. CAPACITY SELECTION PROCEDURE

(5) Servo control mode

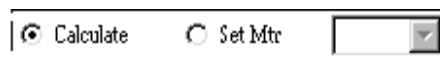
- 1) Click  in the Servo Control Mode combo box inside the Setting Data area to open the menu.



- 2) Click "Pos. ctrl. mode".

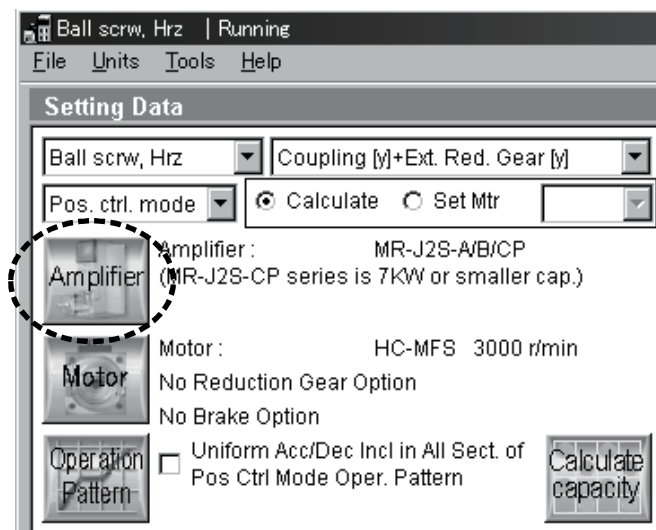
(6) Calculation mode selection

Click the "Calculate" in the Calculation Mode Selection area to select the automatic calculation mode.



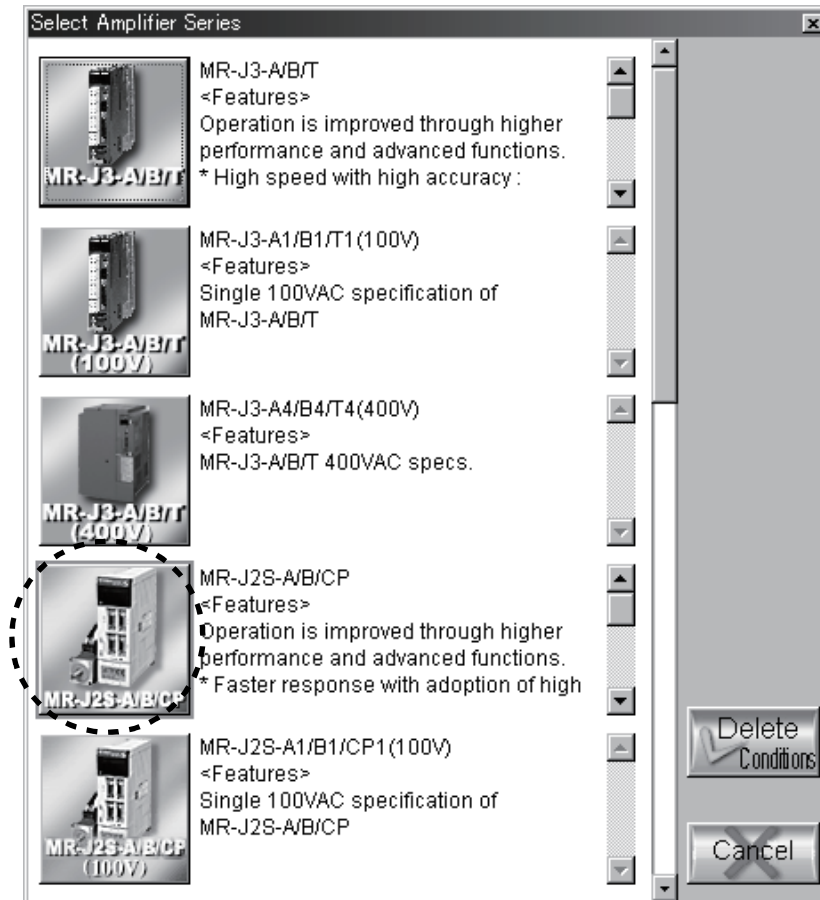
(7) Servo amplifier series selection

- 1) Click the Data Setting area to click the "Amplifier" button.



2. CAPACITY SELECTION PROCEDURE

When "Amplifier" button is clicked, the following window appears.



2) Click "MR-J2S-A/B/CP" button.

When selection is made, servo amplifier series is displayed in the selected Amplifier field of the Setting Data area.

To change the set servo amplifier series, click the "Delete Conditions" button.

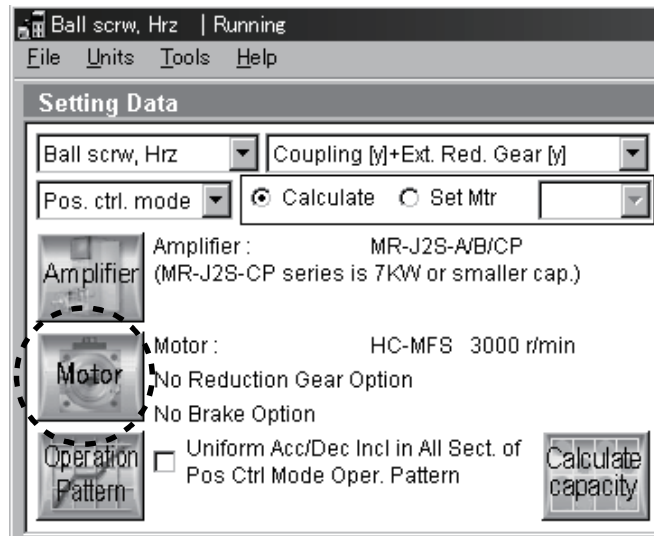
When the "Delete Conditions" button is clicked, the set amplifier series and motor series are cleared. Therefore, reset their series.

2. CAPACITY SELECTION PROCEDURE

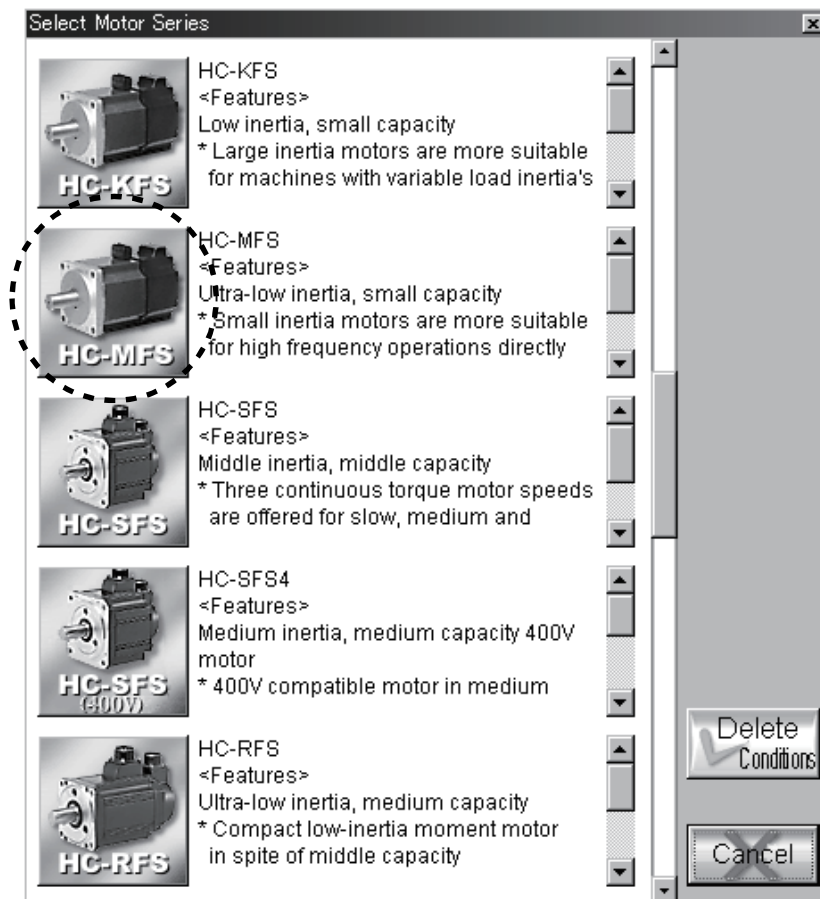
(8) Servo motor selection

(a) Servo motor series selection

1) Click the Setting Data area to click the "Motor" button.



When "Motor" is clicked, the following window appears.



2) Click "HC-MFS" button.

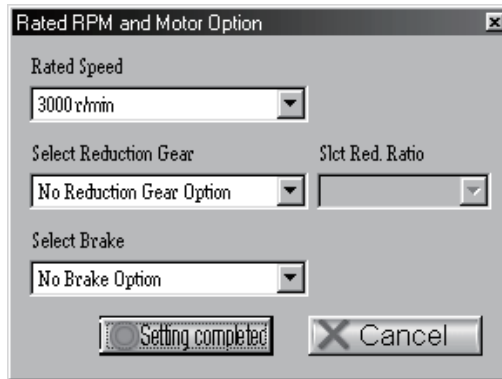
To change the set servo motor series, click the "Delete Conditions" button.

When the "Delete Conditions" button is clicked, the set amplifier series and motor series are cleared. Therefore, reset their series.


2. CAPACITY SELECTION PROCEDURE

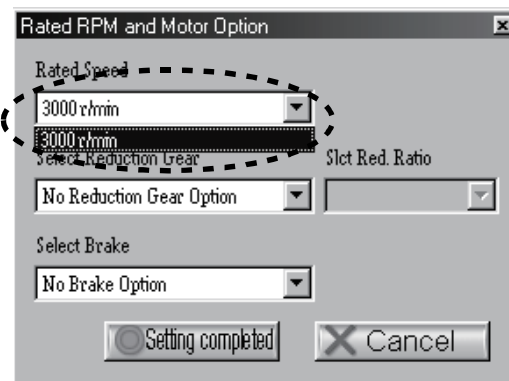
(b) Select Rated Speed • Servo motor option selection


After selecting the motor, the following window appears.

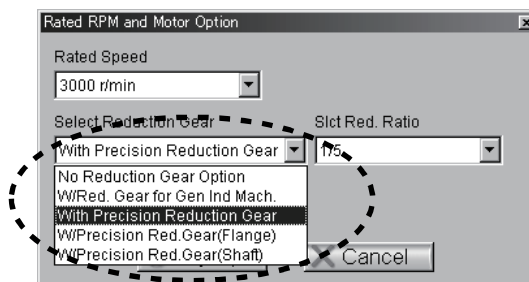


In this window, select the rated speed, brake and reduction gear.

- 1) Selecting the rated speed. Click  in the Rated Speed combo box to open the combo box, and click "3000r/min". (The HC-MFS series has only 3000r/min.)




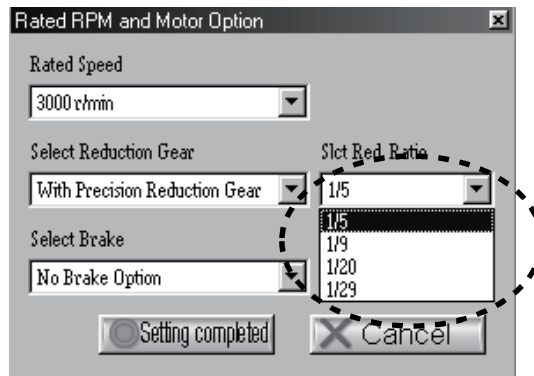
- 2) Selecting the reduction gear. Clicking  in the Select Reduction Gear combo box open the following menu.




- 3) Click "With Precision Reduction Gear" from the menu.

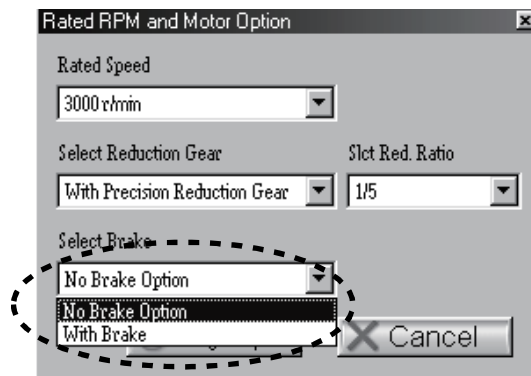
2. CAPACITY SELECTION PROCEDURE

- 4) Selecting the reduction ratio. Clicking  in the Select Reduction Ratio combo box open the following menu.



- 5) Click "1/5" from the menu.

- 6) Selecting the brake. Clicking  in the Select Brake combo box open the following menu.



- 7) Click "No Brake Option" from the menu.

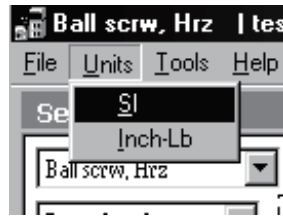
- 8) Click the "Setting completed" button to close the Rated RPM and Motor Option window.

When setting is completed, servo motor series, rated speed, servo motor option are displayed in the Motor field of the Setting Data area.

2. CAPACITY SELECTION PROCEDURE

(9) Units selection

- 1) Click "Units" on the menu bar to open the menu.
- 2) Click "SI".



(10) Machine specifications entry

(a) Entry of machine specifications data

Enter the machine specifications data given in section 2.2.1.

Move the focus to the required item in the Data Setting area and enter its value in the machine specifications entry area.

Example: To enter Reduction Gear Ratio

- 1) Click "Reduction Gear Ratio" in the Data Setting area.

The Machine specifications input area will change as shown below.

Reduction gear ratio	1/m:	<input type="text" value="2/5"/>
----------------------	------	----------------------------------

- 2) Enter "1/3" from the keyboard.

Reduction gear ratio	1/m:	<input type="text" value="1/3"/>
----------------------	------	----------------------------------

- 3) Press the "Enter" to set.

When setting is made, the old value in the Data Setting area is replaced by the new value entered. Similarly, set all machine specifications data.

2. CAPACITY SELECTION PROCEDURE

(11) Operation pattern

- 1) Click the Setting Data area to click the "Operation Pattern" button. When "Operation Pattern" button is clicked the following window appears.

Position Control Mode Operation Pattern

*Required Items Low Resp Stop. Stb. Time sec

No.	spd. chg	* Feed [mm]	*Either One		Accel. Time [sec]	Decel. Time [sec]	Pause time [sec]	Load Mass	Ld. Str
			Pos. Time [sec]	Feed Rate [mm/min]					
1	<input type="checkbox"/>	200.000	1.200	12000.000	0.157	0.157	0.800	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

If there is only one type of operational pattern, please set only one, do not set to more than one. Graph shows the data which includes the settling time.

Feed Rate mm/min Clear

Calculate pattern
Show Graph
Exit from Entry
Cancel


- 2) Move the focus to the corresponding items and enter the operation pattern values. In this example, no value is entered into "Pos. Time".

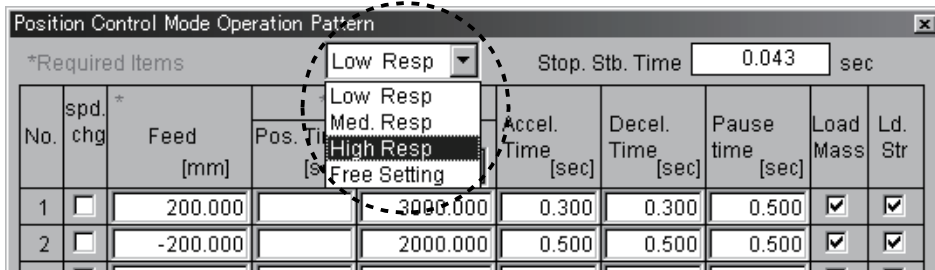
Position Control Mode Operation Pattern

*Required Items Low Resp Stop. Stb. Time sec

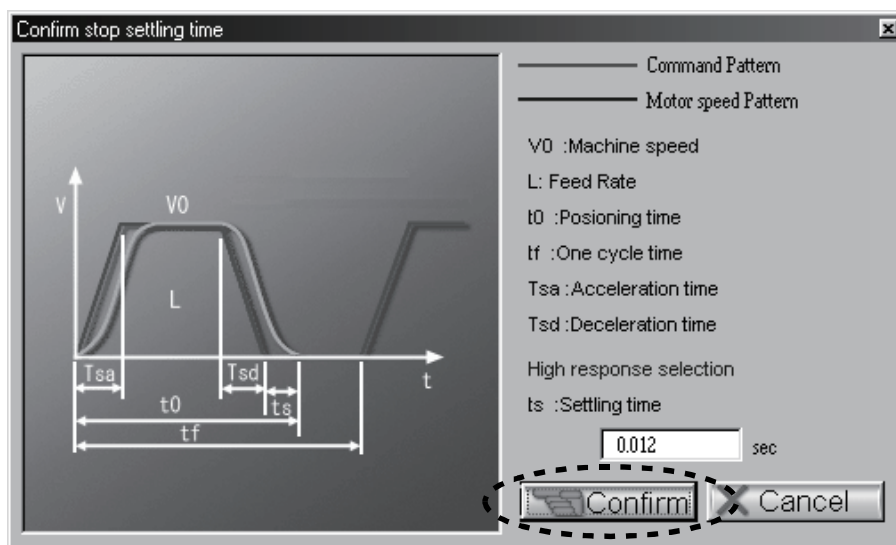
No.	spd. chg	* Feed [mm]	*Either One		Accel. Time [sec]	Decel. Time [sec]	Pause time [sec]	Load Mass	Ld. Str
			Pos. Time [sec]	Feed Rate [mm/min]					
1	<input type="checkbox"/>	200.000		3000.000	0.300	0.300	0.500	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>	-200.000		2000.000	0.500	0.500	0.500	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

2. CAPACITY SELECTION PROCEDURE

- 3) Clicking  in the Response Level Setting combo box inside the Position Control Mode Operation Pattern window opens the following menu.

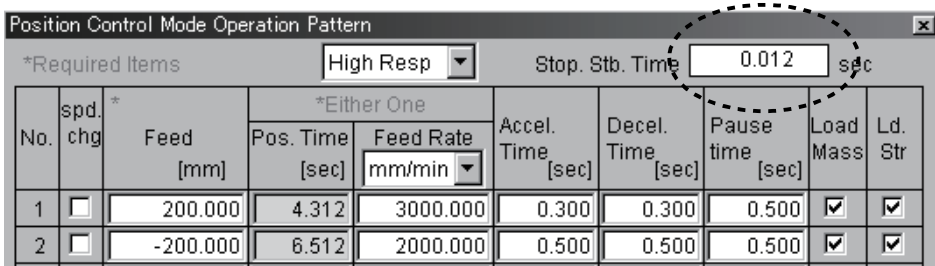


- 4) When "High Response" is clicked, the following window is displayed. Settling time at High Response is "0.012s".



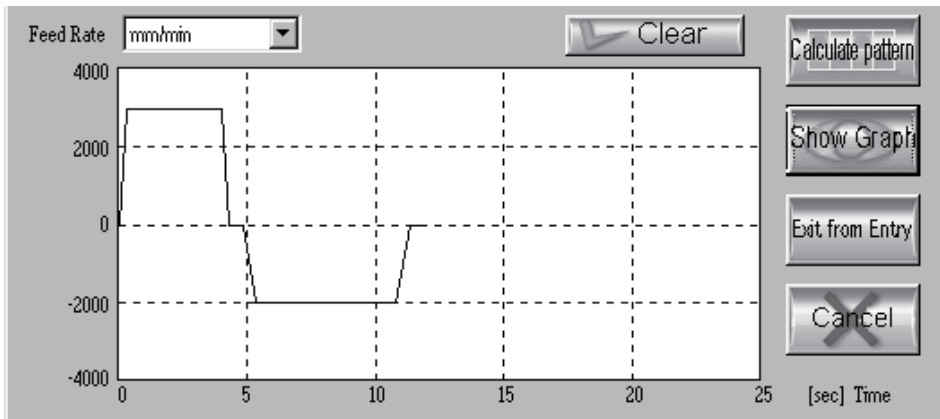
- 5) Click "Confirm" button in the "Confirm stop setting time" window.

When "Confirm" button is clicked, "0.012" is displayed in the "Stopping Stabilization Time" field inside the "Position Control Mode Operation Pattern" window.



2. CAPACITY SELECTION PROCEDURE

- 6) Click the "Calculate pattern" button to determine the operation pattern.
- 7) Click the "Show Graph" button to display the operation pattern graph.

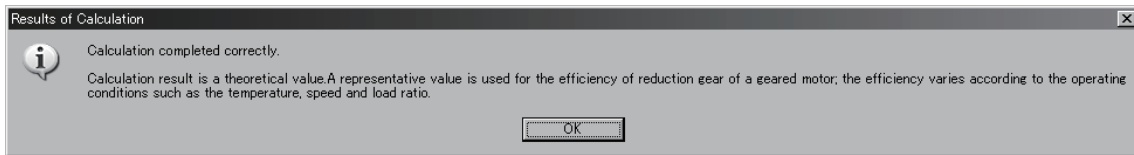


- 8) Click the "Exit from Entry" button to close the Position Control Mode Operation Pattern window.


2. CAPACITY SELECTION PROCEDURE

(12) Selection operation execution

Click the "Calculate capacity" button to execute capacity selection. When the following screen is displayed, click the "OK" button.



The selection and calculation results are displayed in the Sizing Result area.

Sizing Result		
Motor :HC-MFS053G2(1/5) [50 W]		
Amplifier :MR-J2S-10A/B/CP Regeneration needless		
Load Inertia :	0.143 [kg-cm ²]	7.5Times
Peak Torque :	0.149 [N-m]	93.1%
RMS Torque :	0.116 [N-m]	72.3%
Regen. Pwr :	0.000 [W]	0.0%
 The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independently ensure the design has sufficient safety margin.		
<input type="checkbox"/> Show Graph		<input type="checkbox"/> Show Calculations

Selection and calculation results

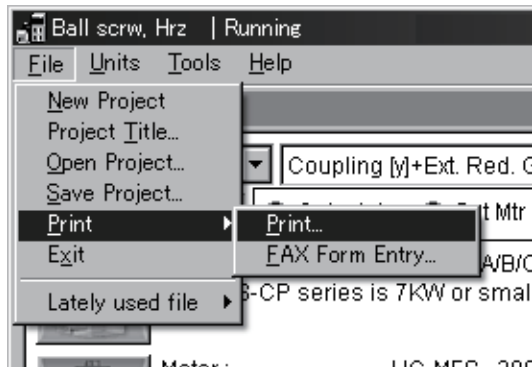
Servo motor	HC-MFS053G2 (1/5 with precision reduction gear) [50W]	
Servo amplifier	MR-J2S-10A/B/CP Regeneration needless	
Load inertia	0.143 [kg · cm ²]	7.5 times
Peak torque	0.149 [N · m]	93.1%
Effective torque	0.116 [N · m]	72.3%
Regenerative power	0.000 [W]	0.0%

This machine allows use of the HC-MFS053G2 (1/5 with precision reduction gear). Load inertia at the servo motor shaft of this machine is 0.143 [kg · cm²] or 7.5 times large than the servo motor shaft inertia. Required peak torque is 0.149 [N · m] and effective torques is 0.116 [N · m], which are 93.1% and 72.3% of the rated torque, respectively. Also, this machine does not require a regenerative option.

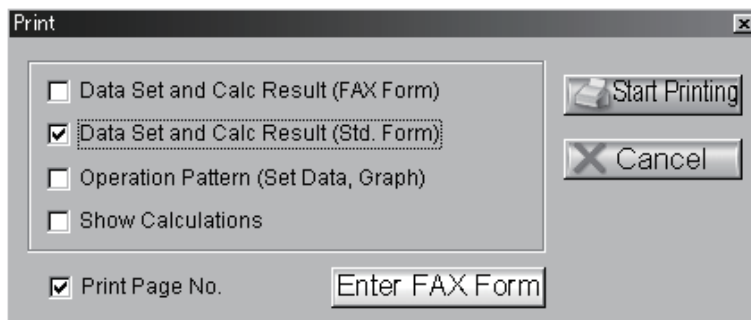
2. CAPACITY SELECTION PROCEDURE

(13) Printing

- 1) Click "File" on the menubar to open the menu.
- 2) Point to the "Print" and click "Print".



- 3) To print the screen, click "Data Set and Calc Result (Standard Form)" in the Print window. The check box turns to .



2. CAPACITY SELECTION PROCEDURE

4) Click "Start printing" button.

When printing is a started, the results are printed out as shown below.

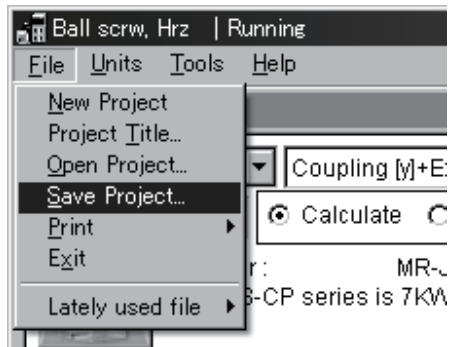
[Data Set and Calc Result (Std. Form)]

Ball scrw, Hrz. Running		INIDT0.SVM																			
Machine Components	Ball scrw, Hrz.																				
Coupling/Ext. Red. Gear	Coupling [y]+Ext. Red. Gear [y]																				
Servo Control Mode	Pos. ctrl. mode																				
Calculation Mode	Calculate																				
Selected Amplifier	MR-J2S-A/B/CP	Motor :HC-MFS053G2(1/5) [50 W]																			
Selected Motor Series	HC-MFS 3000 r/min	Amplifier :MR-J2S-10A/B/CP																			
With Precision Reduction Gear	1/5(1/5)	Regeneration needless																			
No Brake Option		Load Inertia : 0.143 [kg-cm ²] 7.5Times Peak Torque : 0.149 [N-m] 93.1% RMS Torque : 0.116 [N-m] 72.3% Regen. Pwr : 0.000 [W] 0.0%																			
Mass of table	WT 250.000 kg																				
Mass of load	WL 20.000 kg																				
Thrustload	Fc 350.000 N																				
Guide tightening force	FG 1.000 N																				
Reduction gear ratio	1/n 1/3																				
Reduction gear inertia	JG 0.700 kg-cm ²																				
Coupling inertia	JC 0.400 kg-cm ²																				
Inertia of the others	JO 0.500 kg-cm ²																				
Lead of ball screw	PB 10.000 mm																				
Diameter of ball screw	DB 10.000 mm																				
Length of ball screw	LB 600.000 mm																				
Drive efficiency	eta 0.900																				
Coefficient of friction	mu 0.100																				
The sizing software calculates according to theoretical equations but it does not guarantee the result of sizing. Do a capacity selection by considering factors which may increase load torque and/or load inertia.																					
<table border="1"> <thead> <tr> <th>Feed Rate [mm/min]</th> <th>Torque [N-m]</th> <th>Ld. Ratio [%]</th> </tr> </thead> <tbody> <tr> <td>4000</td> <td>1</td> <td>625.000</td> </tr> <tr> <td>2000</td> <td>0.5</td> <td>312.500</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>-2000</td> <td>-0.5</td> <td>-312.500</td> </tr> <tr> <td>-4000</td> <td>-1</td> <td>-625.000</td> </tr> </tbody> </table>				Feed Rate [mm/min]	Torque [N-m]	Ld. Ratio [%]	4000	1	625.000	2000	0.5	312.500	0	0	0	-2000	-0.5	-312.500	-4000	-1	-625.000
Feed Rate [mm/min]	Torque [N-m]	Ld. Ratio [%]																			
4000	1	625.000																			
2000	0.5	312.500																			
0	0	0																			
-2000	-0.5	-312.500																			
-4000	-1	-625.000																			
		Time [sec]																			

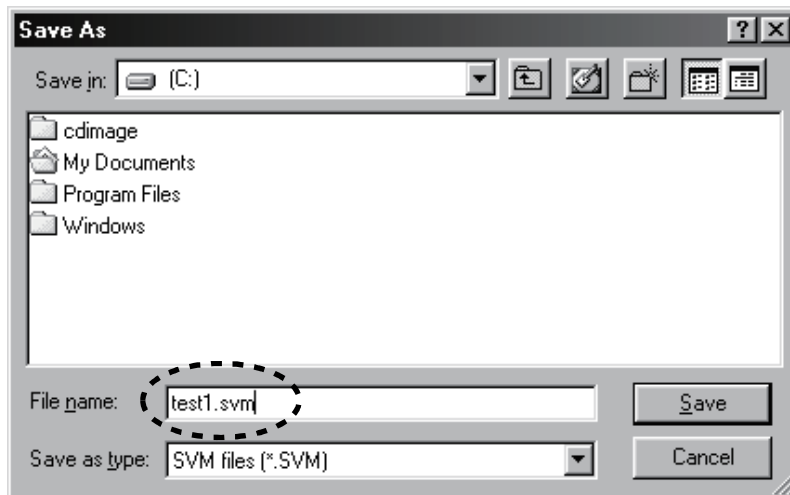
2. CAPACITY SELECTION PROCEDURE

(14) Data save

- 1) Click "File" on the menubar to open the menu.
- 2) Click "Save project".



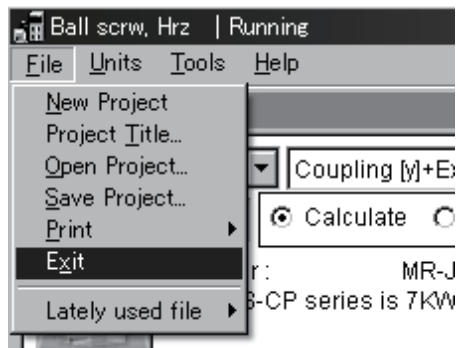
- 3) Enter file name "test1.svm".



- 4) Click the "Save" button to execute save.

(15) End

- 1) Click "File" on the menubar to open the menu.
- 2) Click "Exit".



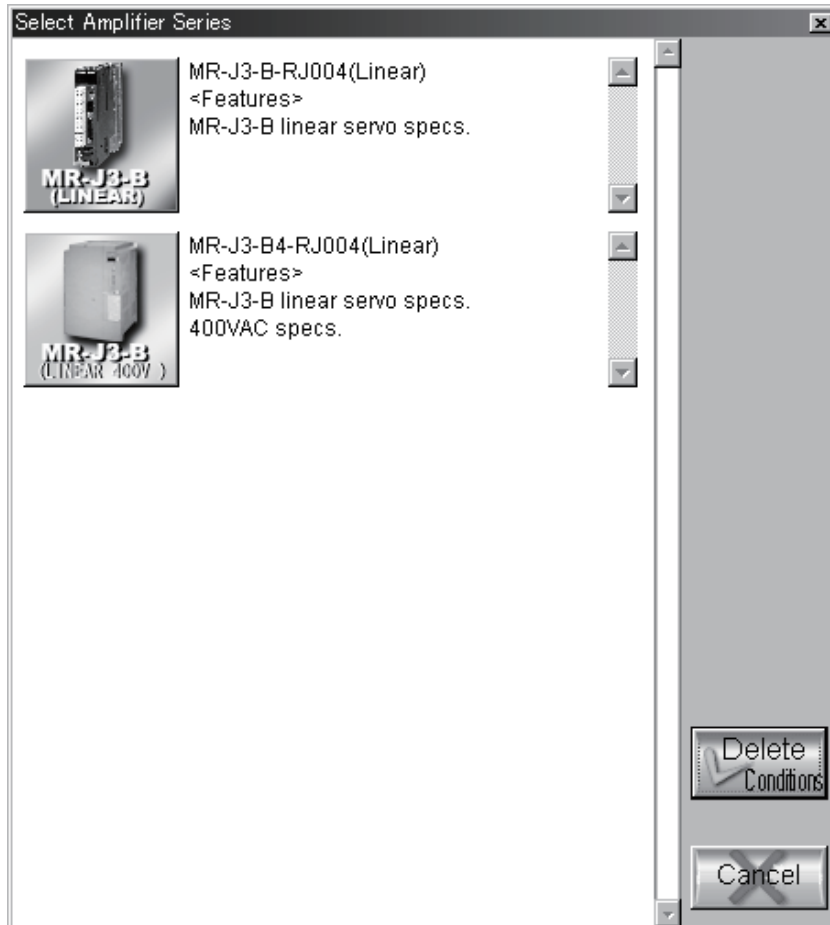
2. CAPACITY SELECTION PROCEDURE

2.2.3 Operation (linear servo)

This section shows windows and operations for the selection of linear servo capacity, which are different in section 2.2.2. For the fundamental capacity selection procedure, refer to section 2.2.2.

(1) Servo amplifier series selection

1) To display the following window, click "Amplifier" button in "Setting Data" area.



2) Select a series.

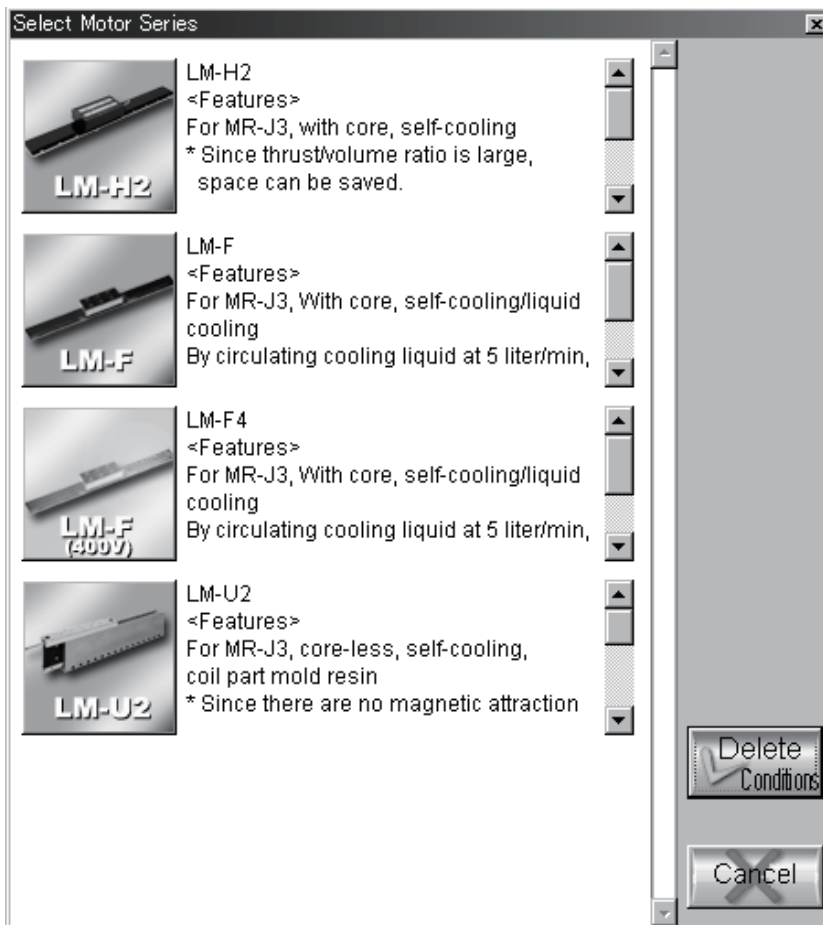
After selecting a series, the servo amplifier series is displayed in the selected amplifier series field in "Setting Data" area.

2. CAPACITY SELECTION PROCEDURE

(2) Linear servo motor selection

(a) Linear servo series selection

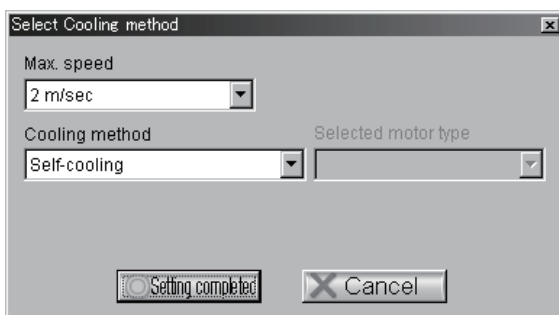
1) To display the following window, click "Motor" button in "Setting Data" area.



2) Select a series.

(b) Cooling method selection

After selecting a motor, the following window is displayed.



Select a Max. speed and a cooling method.

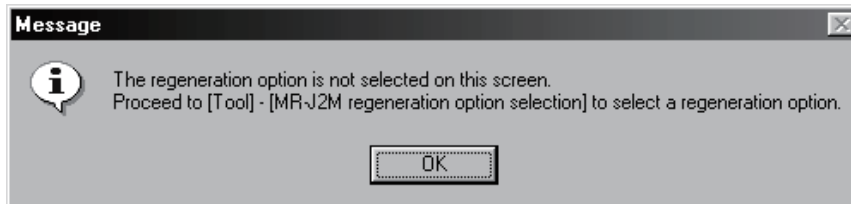
2. CAPACITY SELECTION PROCEDURE

2.3 Selection of regenerative option for MR-J2M

(1) Axis-by-axis capacity calculation

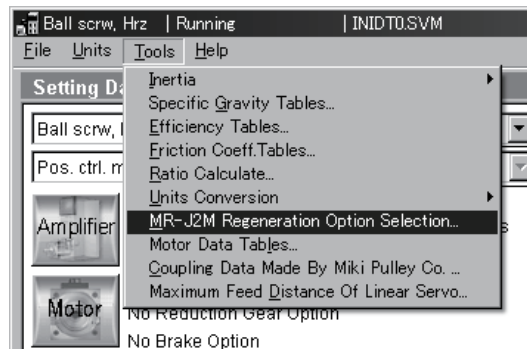
Calculate the capacity of each axis in advance according to section 2.2.2, and save the calculation results.

The following message appears when calculation is made after selection of the MR-J2M in section 2.2.2 (7) Servo amplifier series selection.



(2) Displaying the Select MR-J2M Regeneration Option window

- 1) Click "Tools" on the menubar to open the menu.
- 2) Click "MR-J2M Regenerative Option Selection"



2. CAPACITY SELECTION PROCEDURE

When "MR-J2M Regeneration Option Selection" is clicked, the following window appears.

(3) Configuration entry

Enter the number of axes into the Component Axis field. Selection can be made between 4 and 8 axes. Then enter the voltage of the main circuit input power supply into the Source Voltage field. The power supply voltage entry range is 170V to 253V.

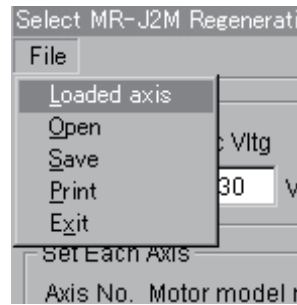
(4) Each axis setting entry

- 1) Click the of the axis number to be set. The following figure assumes that Axis 1 has been selected.

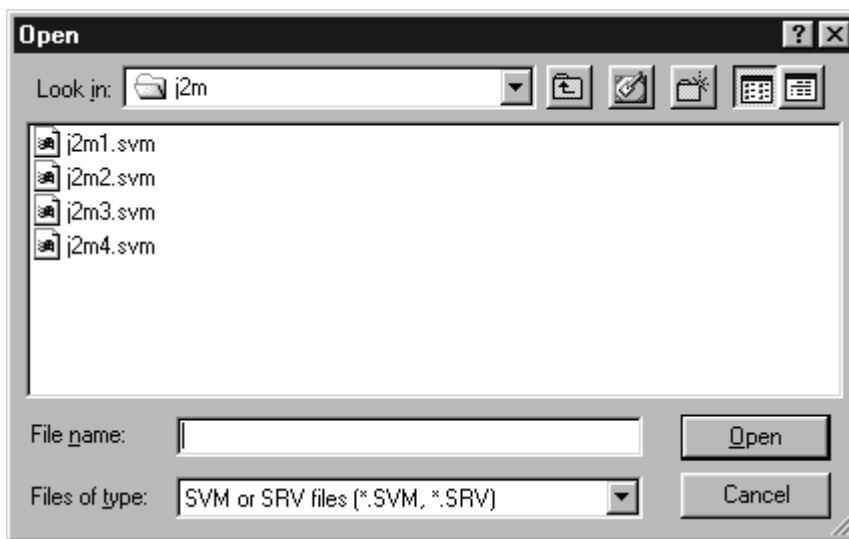
Axis No.	Motor model name	Drive Unit Model	Regen. Eng.	Peak Torque	Cycle Time	Simul. Rgn. Grp.
<input checked="" type="radio"/> 1						
<input type="radio"/> 2						
<input type="radio"/> 3						
<input type="radio"/> 4						

2. CAPACITY SELECTION PROCEDURE

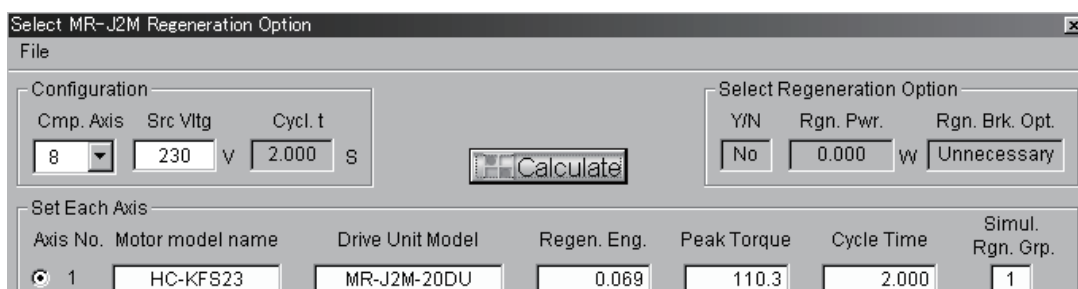
- 2) Click "File" on the menu bar in the Select MR-J2M Regeneration Option window, and click "Loaded axis".



- 3) When "Loaded axis" is clicked, the following window appears.



- 4) Select the file to be set (j2ml.svm in this case), and click the "Open" button. Selecting the file changes the window as shown below.



When there are two or more axes, repeat the same operation for Axis 2 and later.

POINT
<ul style="list-style-type: none"> Each axis setting entry is performed using direct entry in the next section (5) or "Loaded axis" that reads the file (***.svm). "Loaded axis" cannot read the file if its capacity has not been calculated after selection of "MR-J2M" in the servo amplifier series selection.

2. CAPACITY SELECTION PROCEDURE

(5) When editing the values

The "Motor model name", "Drive Unit Model", "Regen. Eng", "Peak Torque", "Cycle Time" and "Simul. Rgn Grp" can be changed as desired. After selecting the axis number whose values will be changed, set the required items. After making selection and entry, click the "Set" button to determine the value. Click the "Clear" button to erase the set value.

(6) Calculation

After setting the values of all axes, click the "Calculate" button. The selection results are displayed in the Select Regeneration Option field.

(7) About simultaneous regeneration group setting

POINT
<ul style="list-style-type: none"> Examination must be made separately if moving speeds differ from normal and all axes may decelerate simultaneously in home position return, etc.

When multiple axes are operated, deceleration and lowering operations may be performed simultaneously during a single cycle. When these are performed simultaneously, regeneration will occur at the same time. To select the regenerative options, therefore, the patterns where deceleration and lowering operations are performed simultaneously or consecutively must be grouped.

When the operation pattern of one axis is asynchronous and its deceleration or lowering operation is rarely performed simultaneously with that of the other axes, set the simultaneous regeneration group of that axis to "0". When multiple axes decelerate or lower simultaneously, set the simultaneous regeneration group to any of "1 to 8" on a group basis. The following figure shows an example of setting the simultaneous regeneration groups.

Axis No.	Operation Pattern	Simultaneous Regeneration Group
1		1
2		1
3		2
4		2
5		0
6		3
7		3
8		3

← 1 cycle →

3. OPERATION COMMANDS

3. OPERATION COMMANDS

3.1 How to select a command

The method of selecting the command is the operation procedures using the mouse.

There are two types of commands. Some are executed immediately by selecting them, and others require the window to be opened after selection and further settings to be made. For commands whose names are followed by.., open the window after selecting them.

The command names of unavailable commands are grayed out.

3.1.1 Command selection procedures

(1) Clicking method

1) Click the menu title on the menu bar to open the menu.

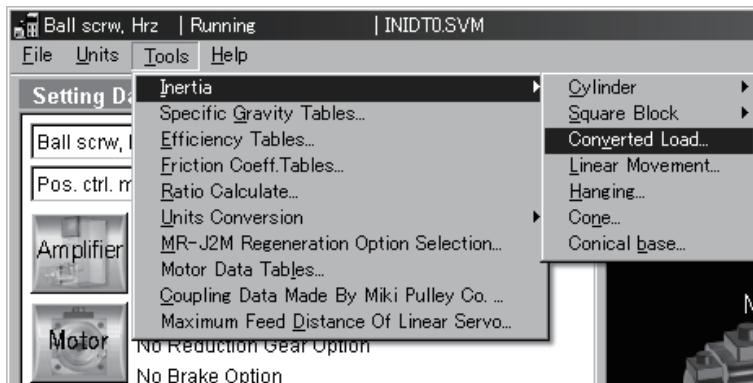
2) Point to and click the command to be selected.

Any command marked ▶ has a sub menu. Similarly click that command to select.

(2) Dragging method

Point to the menu title on the menu bar, hold down the left button and drag the mouse to the command to be selected, and release the button.

When there is a sub menu, further drag the mouse to the required command and release the button.



3. OPERATION COMMANDS

3.1.2 Operation procedures within the window

Within the operation window, enter data and/or click the button.

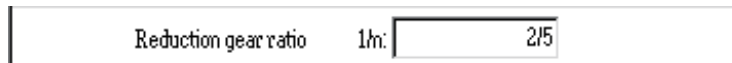
(1) Pressing a button

Click the button in the window.




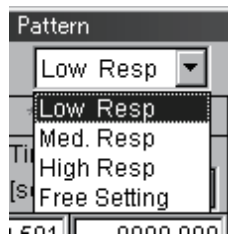
(2) Entering data

Click the machine specifications entry area to move the focus there, and input the numerical value with the keyboard.



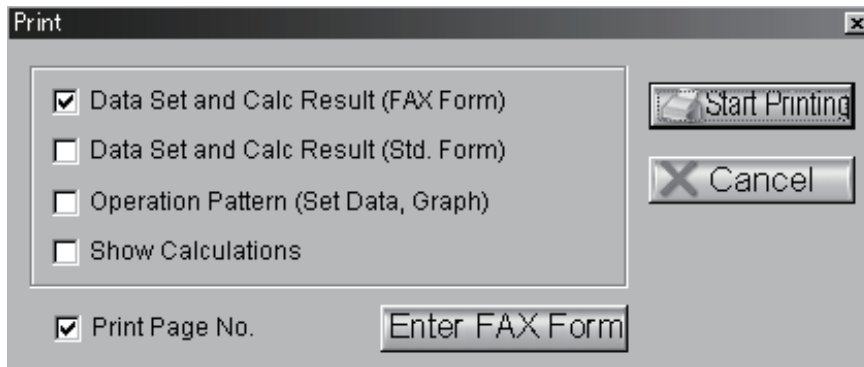
(3) Selecting the combo box data, etc.

- 1) Click the  on the right of the setting area to open the combo box.
- 2) Click the data or the like to be selected to make selection.



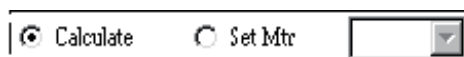
(4) Selecting the item

Click the item or check box.



(5) Pressing the option button

Click the item or button.

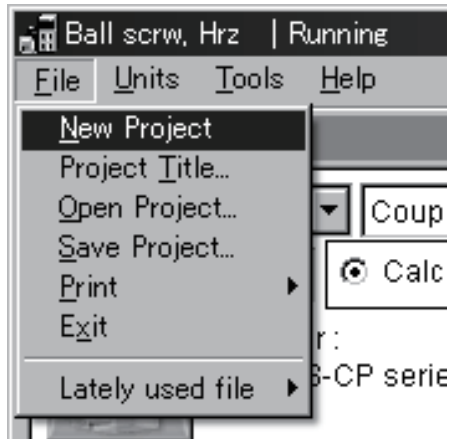


3. OPERATION COMMANDS

3.2 Description of commands

3.2.1 File

Used to save or print the data created, for example. When "File" on the menu bar is clicked, the following menu is displayed.



(1) New Project

Used to return all input data to initial values.

(2) Project Title

Used to set the title displayed on top of the window. When "Project Title" of the sub menu is clicked, the following window is displayed.



Move the focus to the New Title entry field and enter the title from the keyboard.

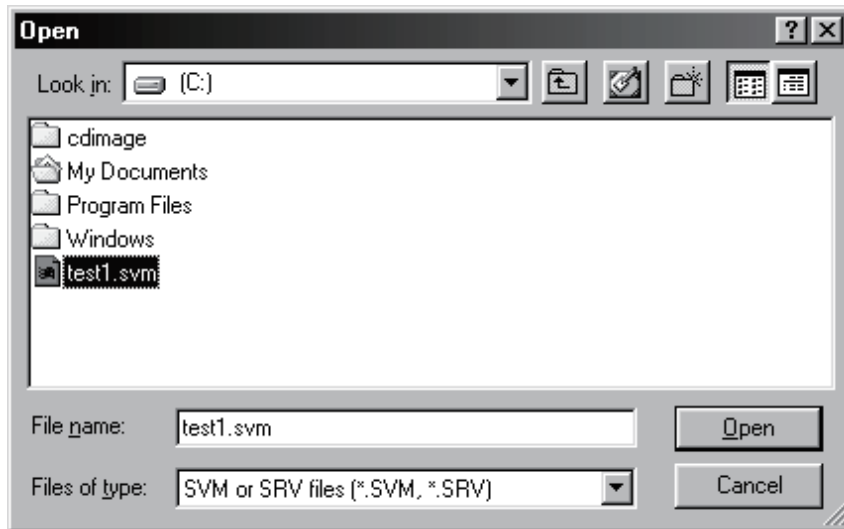
3. OPERATION COMMANDS

(3) Open Project

POINT
▪ The files saved using the old capacity selection software (MRZJW3-MOTSZ71E or earlier) can also be read. However, data are not set to the items added to MRZJW3-MOTSZ111E and later.

Used to read input data from the saved file.

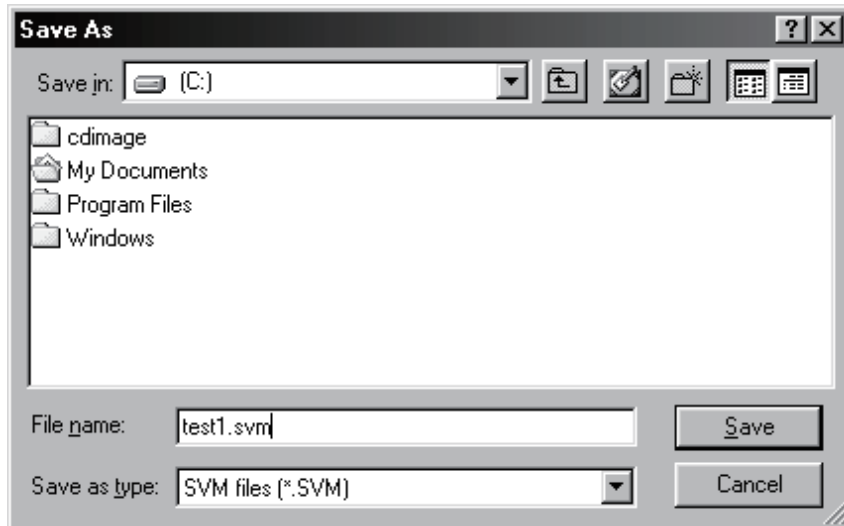
When "Open Project" of the sub menu is clicked, the window opens and the file to be opened can be specified.



(4) Save Project

Used to save the current input data.

When "Save Project" on the sub menu is clicked, the File Save window opens.

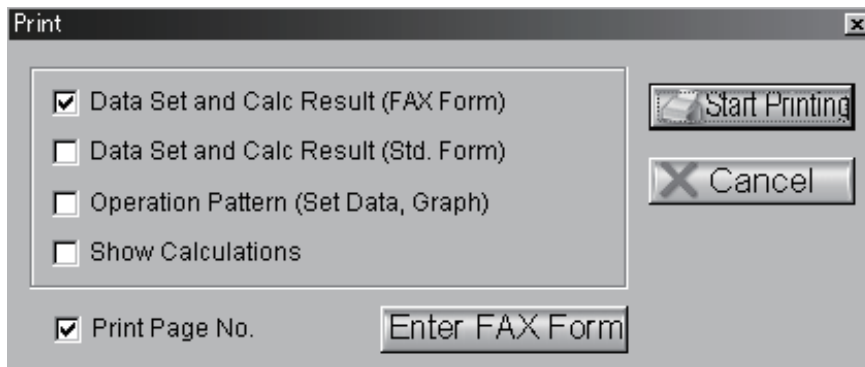


After entering or specifying the file name, click the "Save" button to save the input data by the specified file name.

3. OPERATION COMMANDS

(5) Print

Used to print input data and calculation/selection results. Pointing to "Print" on the sub menu and clicking "Print" displays the following window.



The print mode can be selected from among four different modes. Select the desired print mode. More than one mode can be selected.

POINT	
	▪ Click "Print Page No." to print the page numbers consecutively in the on-screen arrangement order of the selected item.

(a) Data Setting and Calculation Result (FAX Form)

The calculation result and FAX form of capacity selection are printed together.

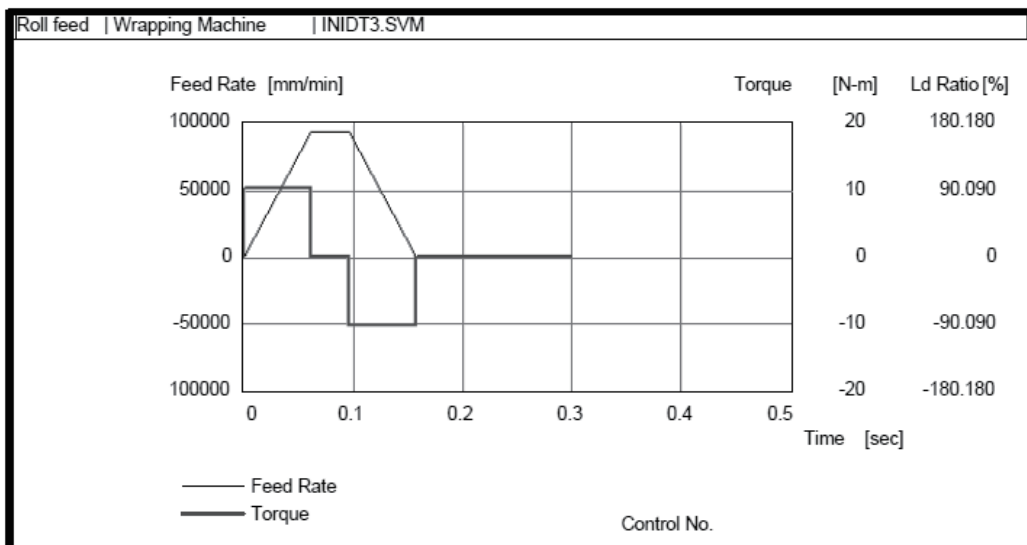
When "Data Set and Calc Result (FAX Form)" is clicked, the "Enter FAX Form" button is made clickable, enabling FAX data to be entered.

- 1) Click the or item of "Data Set and Calc Result (FAX Form)".
- 2) Click the "Enter FAX Form" button. Clicking it opens the FAX Form window. This window can also be opened by pointing to "Print" in the sub menu and clicking "FAX Form Entry".
- 3) Enter the required items and click the "Setting completed" button.
- 4) Click the "Start Printing" button in the "Print" window.

3. OPERATION COMMANDS

[Data Set and Calc Result (FAX Form)]

Roll feed Wrapping Machine INIDT3.SVM		2008/04/09																																																													
To: [FAX No.] [Company] [Division] [Name]		From: [Phone] [FAX No.] [Company] [Division] [Name]																																																													
Machine Components Coupling/Ext. Red. Gear Servo Control Mode Calculation Mode Selected Amplifier Selected Motor Series No Reduction Gear Option No Brake Option	Roll feed Coupling [y]+Ext. Red. Gear [y] Pos. ctrl. mode Calculate MR-J2S-A/B/CP HC-RFS 3000 r/min																																																														
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3. OPERATION COMMANDS

(b) Data Setting and Calculation Result (Standard Form)

Used to print the calculation result and operation pattern graph of capacity selection.

[Data Set and Calc Result (Std. Form)]

Roll feed Wrapping Machine INIDT3.SVM	
Machine Components	Roll feed
Coupling/Ext. Red. Gear	Coupling [y]+Ext. Red. Gear [y]
Servo Control Mode	Pos. ctrl. mode
Calculation Mode	Calculate
Selected Amplifier	MR-J2S-A/B/CP
Selected Motor Series	HC-RFS 3000 r/min
No Reduction Gear Option	
No Brake Option	
Tension	F 10.000 N
Reduction gear ratio	1/n 1/5
Reduction gear inertia	JG 15.000 kg-cm ²
Coupling inertia	JC 5.000 kg-cm ²
Inertia of the others	JO 2.000 kg-cm ²
Diameter of feed roll	DR 120.000 mm
Inertia per roller	JR 100.000 kg-cm ²
Drive efficiency	eta 0.800
Bearing friction coeff.	mu 0.100
Nip pressure	FG 10.000 N
Bearing diameter	d 10.000 mm

Motor :HC-RFS353 [3.5 KW]
Amplifier :MR-J2S-500A/B/CP Regeneration needless
Load Inertia : 30.000 [kg-cm ²] 3.5Times
Peak Torque : 10.484 [N-m] 94.5%
RMS Torque : 6.587 [N-m] 59.3%
Regen. Pwr : 0.000 [W] 0.0%

The sizing software calculates according to theoretical equations but it does not guarantee the result of sizing.
Do a capacity selection by considering factors which may increase load torque and/or load inertia.

Feed Rate [mm/min]	Torque [N-m]	Ld. Ratio [%]
100000	20	180.180
50000	10	90.090
0	0	0
-50000	-10	-90.090
-100000	-20	-180.180

3. OPERATION COMMANDS

(c) Operation pattern (Set Data, Graph)

Used to print the data displayed in the Operation Pattern window.

[Operation Pattern (Set Data, Graph)]

Roll feed | Wrapping Machine | INIDT3.SVM

Low Resp Stop. Stb. Time 0.043 sec

No.	spd. chg	Feed [mm]	Pos. Time [sec]	Feed Rate [mm/min]	Accel. Time [sec]	Decel. Time [sec]	Pause time [sec]
1		150.000	0.200	94000.000	0.061	0.061	0.100
2							
3							
4							
5							
6							
7							
8							
9							
10							

Italic characters indicate calculated value.
 If there is only one type of operational pattern, please set only one, do not set to more than one.
 Graph shows the data which includes the settling time.
 '+' means that the check is on the operation pattern

3. OPERATION COMMANDS

(d) Show calculations

Used to print the details of calculation. For the MR-J2M, the Energy charged to the capacitors in amp., Rated power of regeneration, and Maximum regeneration time are not printed.

[Show Calculations]

Use Symbol List
(Roll feed | Wrapping Machine | INIDT3.SVM)

Symbol	Description	Data
F	:Tension	10.000 N
1/n	:Reduction gear ratio	1/5
JG	:Reduction gear inertia	15.000 kg-cm2
JC	:Coupling inertia	5.000 kg-cm2
JO	:Inertia of the others	2.000 kg-cm2
DR	:Outside diameter of feed roll	120.000 mm
JR	:Inertia per roller	100.000 kg-cm2
eta	:Drive efficiency	0.800
mu	:Bearing friction coeff	0.100
FG	:Nip pressure	10.000 N
d	:Shaft diameter of feed-roll connection	10.000 mm
*1/nm	:Reduction ratio of motor with reduction	Not Used
*Pf	:Encoder resolution	131072 pulse/rev
*Kp	:Position loop gain	70 1/sec
*JMG	:Inertia of reduction gear with motor	0.000 kg-cm2
*JMB	:Inertia of brake with motor	0.000 kg-cm2
*JM	:Motor rotor inertia	8.600 kg-cm2
g	:Gravitational acceleration	9.800 m/sec2
*Tmax	:Motor maximum torque	27.800 N-m
*Ttyp	:Motor rated torque	11.100 N-m
*Ityp	:Rated current	Not Used
*etam	:Reverse-efficiency of motor	0.900
*etaMG	:Reduction gear efficiency	1.000
*t	:Regenerative operation time	0.061 sec
*Ec	:Energy charged to the capacitors in amp.	45.000 J
*Ptyp	:Rated power of regeneration	0.000 W
*tmax	:Maximum regeneration time	0.061 sec
**Ims	:Continuous effective load current	Not Used

Note 1:

The data marked * is that of the servo amplifier, servo motor or regenerative resistor selected after sizing calculation.

If an error is found during calculation, the data becomes '0.000'.

Note 2:

The data with ** will be values taking into consideration the motor current of the motor selected according to the operation pattern.

3. OPERATION COMMANDS

Calculations Process
(Roll feed | Wrapping Machine | INIDT3.SVM)

Slight variation may be caused in the displayed result while values are rounded during calculation.

If the calculation result of regenerative power is zero or negative,
then 'Pr' is indicated as '0'.
If the calculation result of max regenerative power is zero or negative or 'tmax' is 0,
then 'Pmax' is indicated as '0'.

1.Feed distance/Motor Rev.

$$\begin{aligned} dS &= \pi * DR * 1/n * 1/nm \\ &= 3.1416 * 120.000 * 1/5 * 1.000 \\ &= 75.398 \text{ [mm/rev]} \end{aligned}$$

2.Electrical accuracy

$$\begin{aligned} dL &= (dS/Pf) * 1000 \\ &= (75.398/131072) * 1000 \\ &= 0.575244 \text{ [micron/pulse]} \end{aligned}$$

3.Motor rotational speed

$$\begin{aligned} N0 &= V0/dS \\ N0_1 &= 94000.000/75.398 \\ &= 1246.711 \text{ [r/min]} \quad (\text{Operation Pattern No. 1}) \end{aligned}$$

4.Stop settling time

$$\begin{aligned} ts &= 3 * 1/Kp \\ &= 3 * 1/70 \\ &= 0.043 \text{ [sec]} \end{aligned}$$

5.Total load inertia

$$\begin{aligned} JL &= JMG+JMB+\{JG+JC+JO+2*JR*(1/n)^2\}*(1/nm)^2 \\ &= 0.000 + 0.000 + \{15.000 + 5.000 + 2.000 + 2*100.000 * (1/5)^2\} * (1.000)^2 \\ &= 30.000 \text{ [kg-cm}^2\text{]} \end{aligned}$$

6.Load torque

$$\begin{aligned} TML &= \{(8*JR/(DR/10)^2)*g+FG\}*(d/2000)*\mu \\ &= \{(8*100.000/(120.000/10)^2)*9.8+10.000\}*(10.000/2000)*0.100 \\ &= 0.032 \text{ [N-m]} \\ TL &= \{F * (DR/2000)+TML\} * 1/n * 1/nm * (1/\eta)*(1/\eta MG) \\ &= \{10.000*(120.000/2000)+0.032\}*(1/5)*(1.000)*(1/0.800)*(1/1.000) \\ &= 0.158 \text{ [N-m]} \end{aligned}$$

7.Moment of inertia ratio

$$\begin{aligned} m &= JL/JM \\ &= 30.000/8.600 \\ &= 3.5 \text{ [times]} \end{aligned}$$

8.Acceleration torque

$$\begin{aligned} TMa &= \{((JL + JM)*N0)/(9.55*10000*Tsa)\} / \eta + TL \\ TMa_1 &= \{((30.000 + 8.600)*1246.711)/(9.55*10000*0.061)\} / 0.800 + (0.158) \\ &= 10.484 \text{ [N-m]} \quad (\text{Operation Pattern No. 1}) \\ TMa_Max &= 10.484 \text{ [N-m]} \quad (\text{Maximum value}) \end{aligned}$$

9.Deceleration torque

$$\begin{aligned} TMd &= -\{((JL + JM)*N0)/(9.55*10000*Tsd)\} / \eta + TL \\ TMd_1 &= -\{((30.000 + 8.600)*1246.711)/(9.55*10000*0.061)\} / 0.800 + (0.158) \\ &= -10.168 \text{ [N-m]} \quad (\text{Operation Pattern No. 1}) \\ TMd_Max &= 10.168 \text{ [N-m]} \quad (\text{Maximum value}) \end{aligned}$$

10.Peak load factor

$$\begin{aligned} Rp &= \{(\text{maximum value of } |TMa|, |TL|, |TMd|/Ttyp)\} * 100 \\ &= (10.484/11.100)*100 \end{aligned}$$

3. OPERATION COMMANDS

```

*****
Calculations Process
(Roll feed | Wrapping Machine | INIDT3.SVM)
*****

= 94.450 [%]

11.Cont. effect load torque
tc = t0 - Tsa - Tsd - ts
tc_1 = 0.200 - 0.061 - 0.061 - 0.043
= 0.035 [sec] (Operation Pattern No. 1)
TF0 = F * DR/2000 * 1/n * 1/nm * 1/eta
= 10.000 * (120.000/2000) * (1/5) * 1.000 * (1/0.800)
= 0.150 [N-m]
ta = ts + tst
ta_1 = 0.043+0.100
= 0.143 [sec] (Operation Pattern No. 1)
Trms1 = SQRT{(TMa^2*Tsa + TL^2*tc + TMd^2*Tsd + TF0^2*ta)/tf}
= SQRT{(((10.484)^2)*0.061+
((0.158)^2)*0.035+
((-10.168)^2)*0.061+
((0.150)^2)*0.143
)/0.300}
= 6.587 [N-m]

12.Effective load factor
Rrms = (Trms1/Ttyp) * 100
= (6.587/11.100)*100
= 59.340 [%]

13.Acceleration energy
Ea = (0.1047/2) * N0 * TMa * Tsa
Ea_1 = (0.1047/2) * 1246.711 * (10.484) * 0.061
= 41.739 [J] (Operation Pattern No. 1)
Ea_Sum = 0.000 [J] (Total Negative Energy)

14.Deceleration energy
Ed = (0.1047/2) * N0 * Tmd * Tsd
Ed_1 = (0.1047/2) * 1246.711 * (-10.168) * 0.061
= -40.480 [J] (Operation Pattern No. 1)
Ed_Sum = -40.480 [J] (Total Negative Energy)

15.Constant speed energy
Ef = 0.1047 * N0 * TL * tc
Ef_1 = 0.1047 * 1246.711 * (0.158) * 0.035
= 0.722 [J] (Operation Pattern No. 1)
Ef_Sum = 0.000 [J] (Total Negative Energy)

16.Absolute of -energy total
Em = |(total of negative energy in Ea,Ed,Ef)|
= 40.480 [J]

17.Regenerative power
Pr = (etam*Em - Ec)/tf
= (0.900*40.480-45.000)/0.300
= 0.000 [W] (If the result is less than 0, '0' is shown.)

18.Max. regenerative power
Emax = section energy during maximum regeneration
Pmax = (etam*Emax - Ec)/tmax
= (0.900*40.480 - 45.000)/0.061
= 0.000 [W] (If the result is less than 0, '0' is shown.)

```

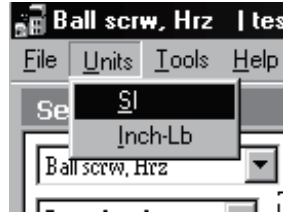
(6) Exit

Used to terminate the capacity selection software.

3. OPERATION COMMANDS

3.2.2 Units

Used to select the units used for calculation. When "Units" on the menu bar is clicked, the following menu is displayed.

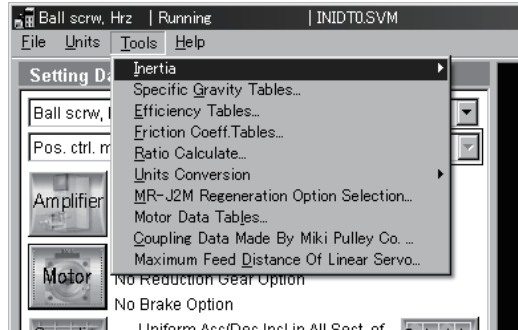


On this menu, the absolute system of units SI and inch-pound system of units are available. Changing the unit system converts the units of the input data and calculation results. For example, when SI is switched to inches-pounds, items in "m" will be expressed in "ft". Also, when the unit system is changed, the data and calculation results are converted to numerical values in new units.

3. OPERATION COMMANDS

3.2.3 Tools

Operation can be suspended temporarily to perform other operation such as inertia calculation. When "Tools" on the menu bar is clicked, the following menu appears.



(1) Inertia

Used to calculate the cylinder, square block, converted load, linear movement, hanging, cone and conical base inertia.

When this command is selected, the Inertia Calculator window appears. In the Enter Data area of the Inertia Calculator window, each data on the selected inertia is displayed. Enter data in all items and start calculation.

1) Selection of input items

Move the focus to the item (Reduction gear inertia/Coupling inertia/Inertia of the others) of the inertia of the Data Setting area. Double-click the required item of inertia.

2) Calculation of inertia

Enter data required for inertia calculation and click the "Start Calculation" button.

After calculation is over, click the "Show Calculations" button to show the calculation process.

3) Substitution for machine specifications data

Click the "Substitute" button to substitute the calculated value for the item of the inertia of the Data Setting area. At this time, Inertia Calculator window ends automatically.

4) End

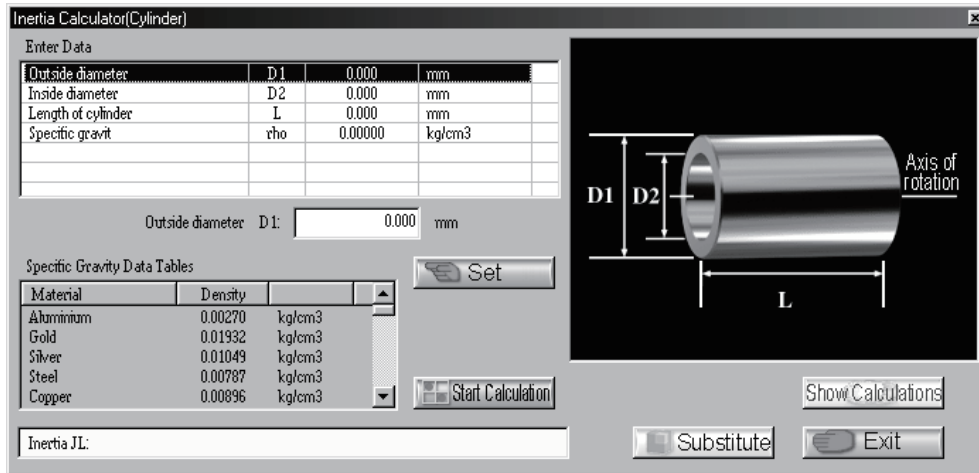
Click the "Exit" button to end.

3. OPERATION COMMANDS

(a) Cylinder

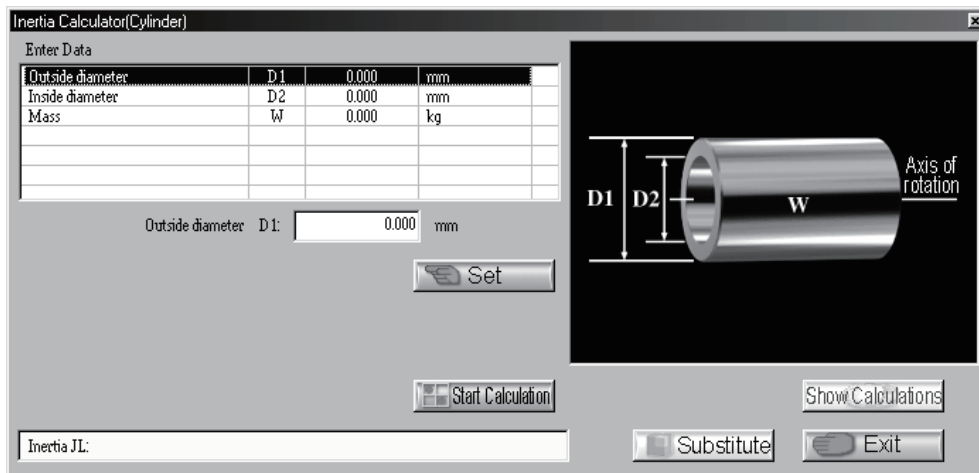
1) Enter Diameter, Length

The inertia value is calculated from the outside diameter, Inside diameter, length of cylinder and specific gravity.



2) Enter Diameter, Mass

The inertia value is calculated from the outside diameter, inside diameter and mass.

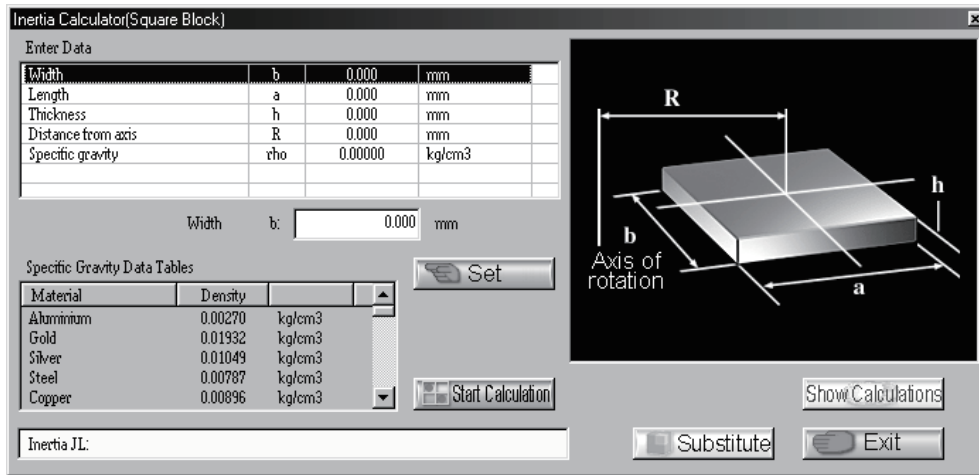


3. OPERATION COMMANDS

(b) Square Block

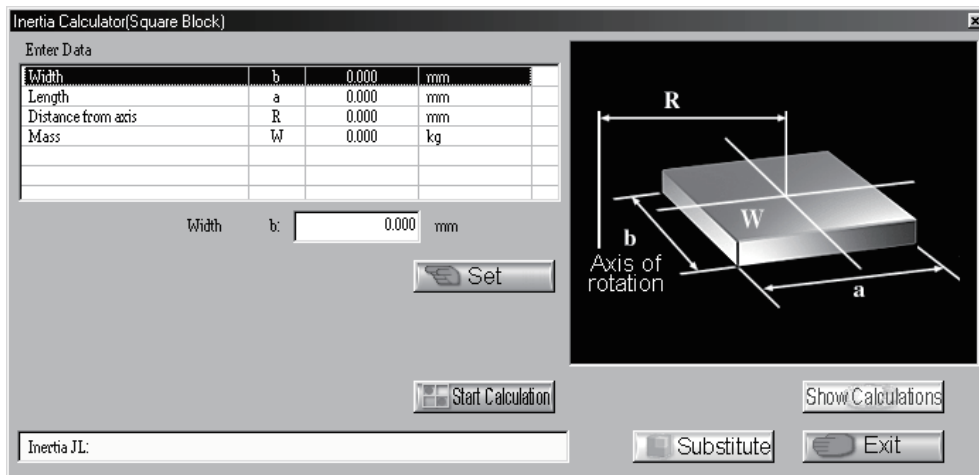
1) Enter Length, Thickness

The inertia value is calculated from the width, length, thickness, distance from axis and specific gravity.



2) Enter Length, Mass

The inertia value is calculated from the width, length, distance from axis and mass.



3. OPERATION COMMANDS

(c) Converted Load

Inertia Calculator(Converted Load)

Enter Data

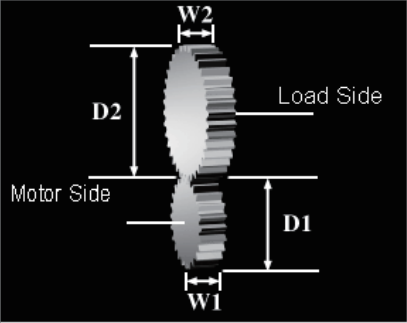
Driveside diameter	D1	50.000	mm
Driveside thickness	W1	10.000	mm
Loadside diameter	D2	200.000	mm
Loadside thickness	W2	10.000	mm
Specific gravity	rho	0.00780	kg/cm3

Driveside diameter D1: mm

Specific Gravity Data Tables

Material	Density	
Aluminium	0.00270	kg/cm3
Gold	0.01932	kg/cm3
Silver	0.01049	kg/cm3
Steel	0.00787	kg/cm3
Copper	0.00896	kg/cm3

Inertia JL:



(d) Liner Movement

Inertia Calculator(Linear Movement)

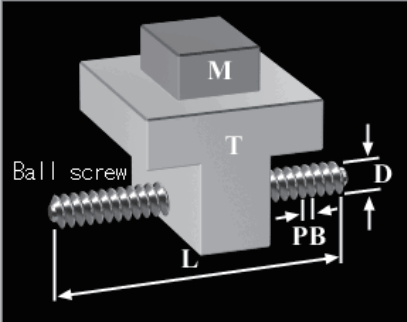
Enter Data

Ball screw diameter	D	0.000	mm
Length of ball screw	L	0.000	mm
Ball screw lead	PB	0.000	mm
Mass of load	W	0.000	kg
Mass of table	T	0.000	kg

Ball screw diameter D: mm

Calculates assuming that the material of the ball screw is steel(0.0078kg/cm3).

Inertia JL:



(e) Hanging

Inertia Calculator(Hanging)

Enter Data

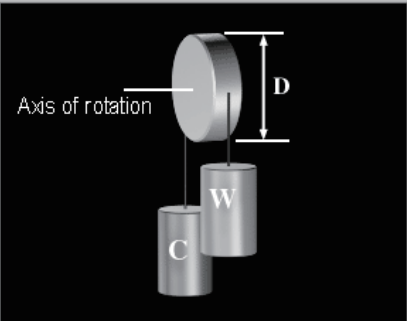
Diameter of pulley	D	0.000	mm
Thickness of pulley	L	0.000	mm
Mass of load	W	0.000	kg
Mass of counterweight	C	0.000	kg
Specific gravity	rho	0.00000	kg/cm3

Diameter of pulley D: mm

Specific Gravity Data Tables

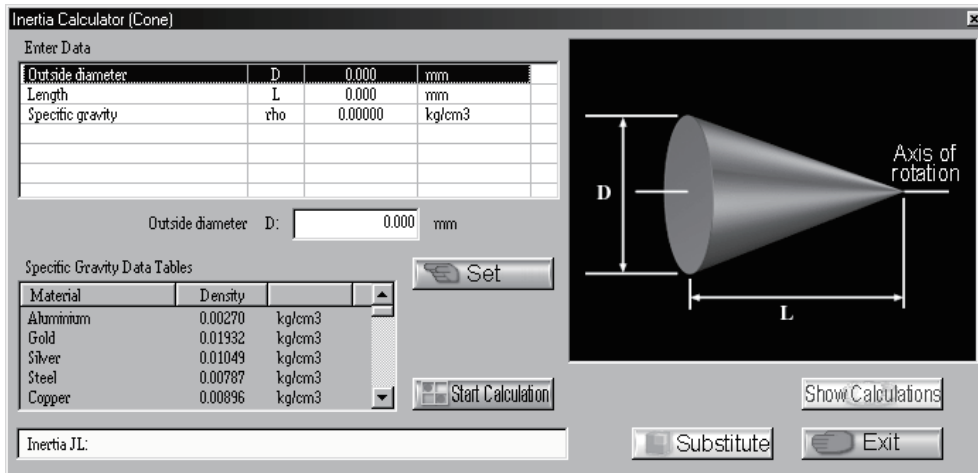
Material	Density	
Aluminium	0.00270	kg/cm3
Gold	0.01932	kg/cm3
Silver	0.01049	kg/cm3
Steel	0.00787	kg/cm3
Copper	0.00896	kg/cm3

Inertia JL:

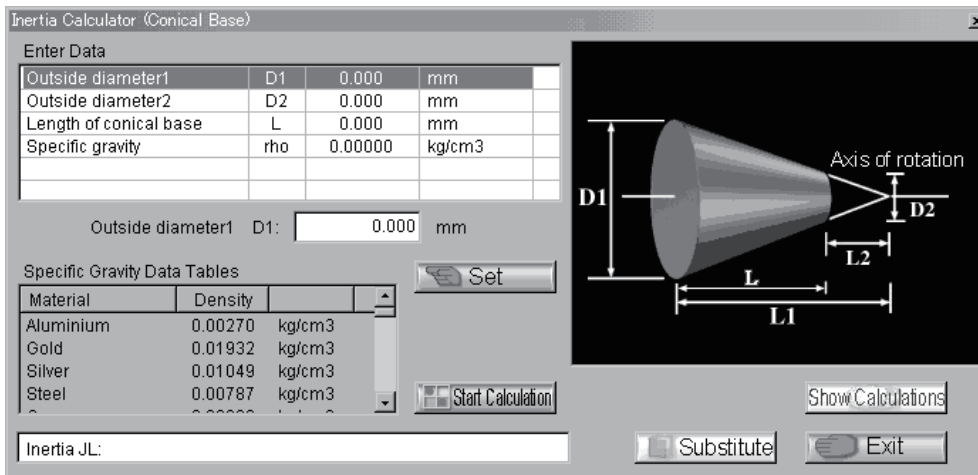


3. OPERATION COMMANDS

(f) Cone



(g) Conical base



(2) Specific Gravity Tables

Used to display the specific gravities of materials as reference data.

When "Specific Gravity Tables" on the sub menu is clicked, the following window is displayed.

Material	Density [kg/cm3]	Density [lb/inch3]
Aluminium	0.00270	0.09754
Gold	0.01932	0.69798
Silver	0.01049	0.37898
Steel	0.00787	0.28432
Copper	0.00896	0.32370
Lead	0.01136	0.41041
Nickel	0.00890	0.32153
Cast iron	0.00770	0.27818
Cast steel	0.00780	0.28179
Forged steel	0.00790	0.28541
Soft steel	0.00785	0.28360
Nickel steel	0.00787	0.28432
Silicon steel	0.00783	0.28288

POINT

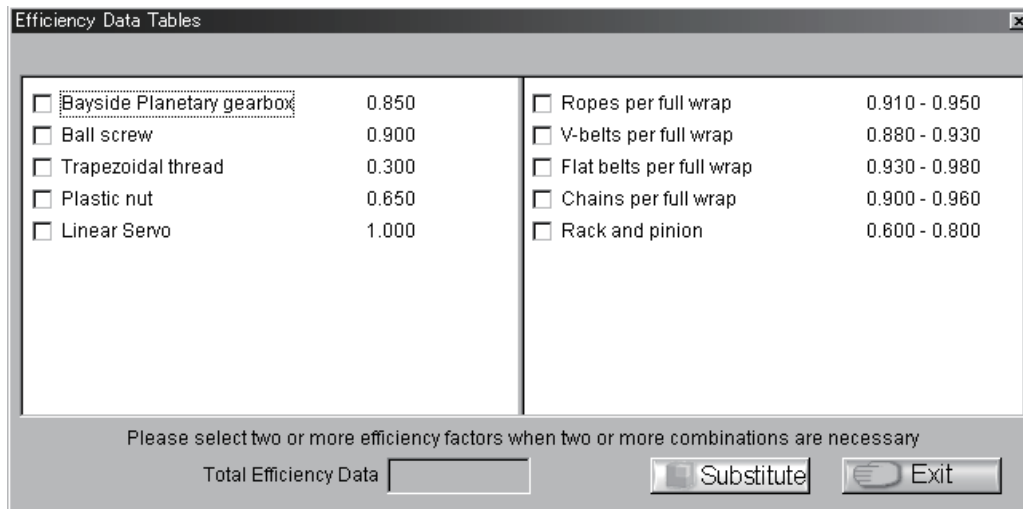
- Click the "Print" button to print the window contents. Click the "Exit" button to end.

3. OPERATION COMMANDS

(3) Efficiency Tables

Used to display the efficiencies of drives as reference data depending on conditions.

When "Efficiency Tables" on the sub menu is clicked, the following window appears.




When required, two or more efficiencies can be selected.

1) Selection of input item

Move the focus to "Drive efficiency" in the Data Setting area. Double-click "Drive efficiency".

2) Selection of efficiency

By clicking the option button to , select the required efficiency. More than one efficiency may be selected. When the data has a range, click the  button on the right of the data display section to change the data.

3) Substitution for machine specifications data

Click the "Substitute" button to substitute the value for "Drive efficiency" in the Data Setting area. At this time, Efficiency Data Tables window ends automatically.

4) End

Click the "Exit" button to end.

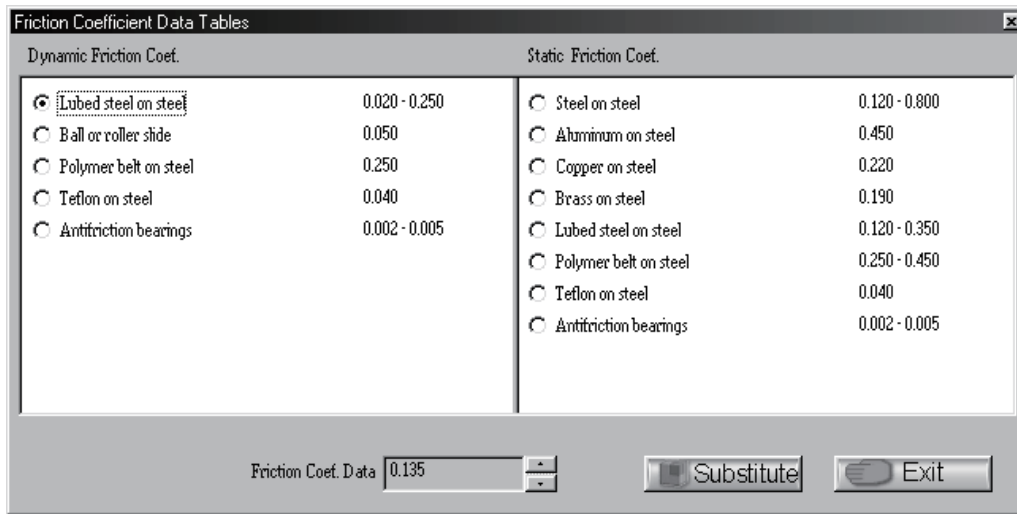
POINT
• "Efficiency Tables" has been selected on the "Tools" menu, clicking the "Substitute" button automatically enters the selected efficiency in "Drive efficiency" of the Data Setting area.

3. OPERATION COMMANDS

(4) Friction Coeff. Tables

Used to display friction coefficients as reference data depending on conditions.

When "Friction Coeff. Tables" on the sub menu is clicked.



1) Selection of input item

Move the focus to "Coefficient of friction" in the Data Setting area. Double-click "Coefficient of friction".

2) Selection of friction coefficient

By clicking the option button to , select the required friction coefficient. When the data has a range, click the button on the right of the data display section to change the data.

3) Substitution for machine specifications data

Click the "Substitute" button to substitute the value for "Coefficient of friction" in the Data Setting area. At this time, Friction Coefficient Data Tables window ends automatically.

4) End

Click the "Exit" button to end.

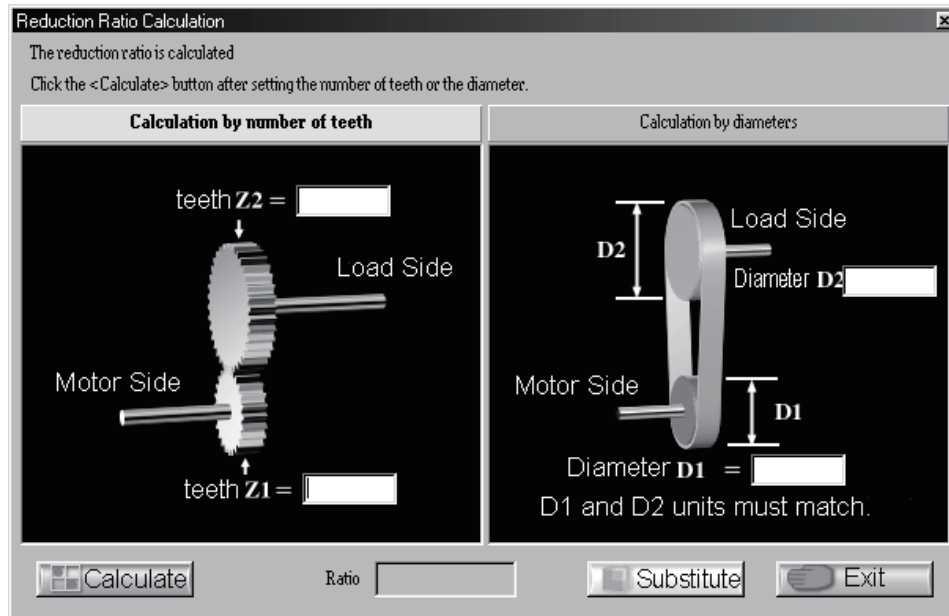
POINT
▪ "Friction Coeff. Tables" has been selected on the "Tools" menu, clicking the "Substitute" button automatically enters the selected friction coefficient in "Coefficient of friction" of the Data Setting area. If no friction coefficients are included in the selected mechanical components, the "Substitute" button appears pale and cannot be clicked.

3. OPERATION COMMANDS

(5) Ratio Calculate

Used to calculate a reduction gear ratio when gears, sprockets, pulleys or the like are used to reduce speed. Calculation by number of teeth and Calculation by diameters are available.

When "Ratio Calculate" on the sub menu is clicked, the following window is displayed.



1) Selection of input item

Move the focus to "Reduction gear ratio" in the display area.

Double-click "Reduction gear ratio".

2) Input and calculation of data

Enter required data and click the "Calculate" button.

3) Substitution for machine specifications data

Click the "Substitute" button to substitute the value for "Reduction gear ratio" in the Data Setting area. At this time, Reduction Ratio Calculation window ends automatically.

4) End

Click the "Exit" button to end.

POINT
▪ "Ratio Calculate" has been selected on the "Tools" menu, clicking the "Substitute" button automatically enters the calculated reduction gear ratio in "Reduction gear ratio" of the Data Setting area.

3. OPERATION COMMANDS

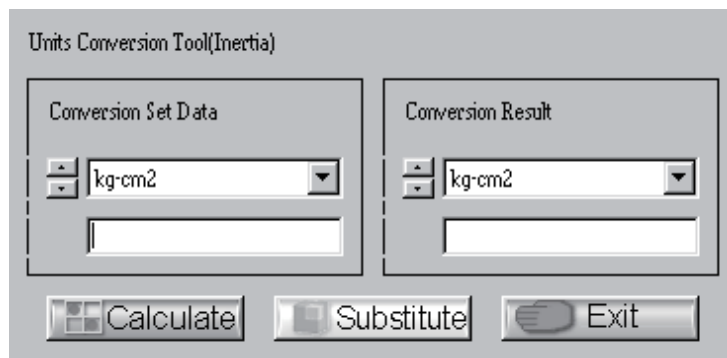
(6) Units Conversion

Calculation tool designed to convert the inertia, torque, length, weight, force or speed unit.

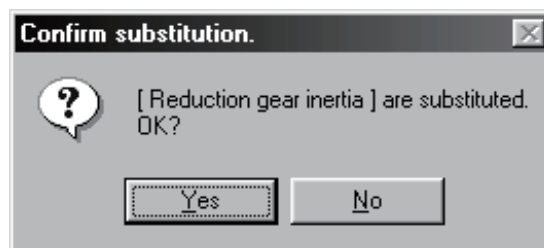
Any of the following units may be converted.

Inertia	Torque	Length	Weight	Force	Speed
kg · m ²	N · m	m	kg	N	m/min
kg · cm ²	kgf · m	cm	g	kgf	cm/min
kgf · m ²	kgf · cm	mm	lb	gf	mm/min
kgf · cm ²	gf · cm	ft	oz	lb	m/sec
kg · m · sec ²	lb·ft	inch		oz	cm/sec
kg · cm · sec ²	lb·inch				mm/sec
lb·ft ²	oz·inch				ft/min
lb·inch ²					inch/min
oz·inch ²					ft/sec
lb·ft·sec ²					inch/sec
lb·inch·sec ²					
oz·inch·sec ²					

When any command is selected, the following window appears (example: for inertia).



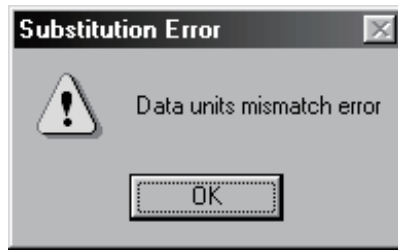
- 1) Click "Tools" of the menu bar to open the menu.
- 2) Point to the "Units conversion" and click "Inertia".
- 3) Open the Conversion Set Data combo box, choose the unit, and enter the data to be converted into the entry field.
- 4) Open the Conversion Result combo box and select the unit.
- 5) Click the "Calculate" button to start unit conversion.
- 6) By clicking the "Substitute" button, "Please click substituting value destination." is displayed in the message display section. By selecting the machine specifications in which the data is to be substituted, the following window is displayed.



3. OPERATION COMMANDS

7) If the item in which the data is to be substituted is correct, click the "OK" button.

If the unit of the machine specifications does not match the new unit, substitution cannot be made. In this case, the following window is displayed.

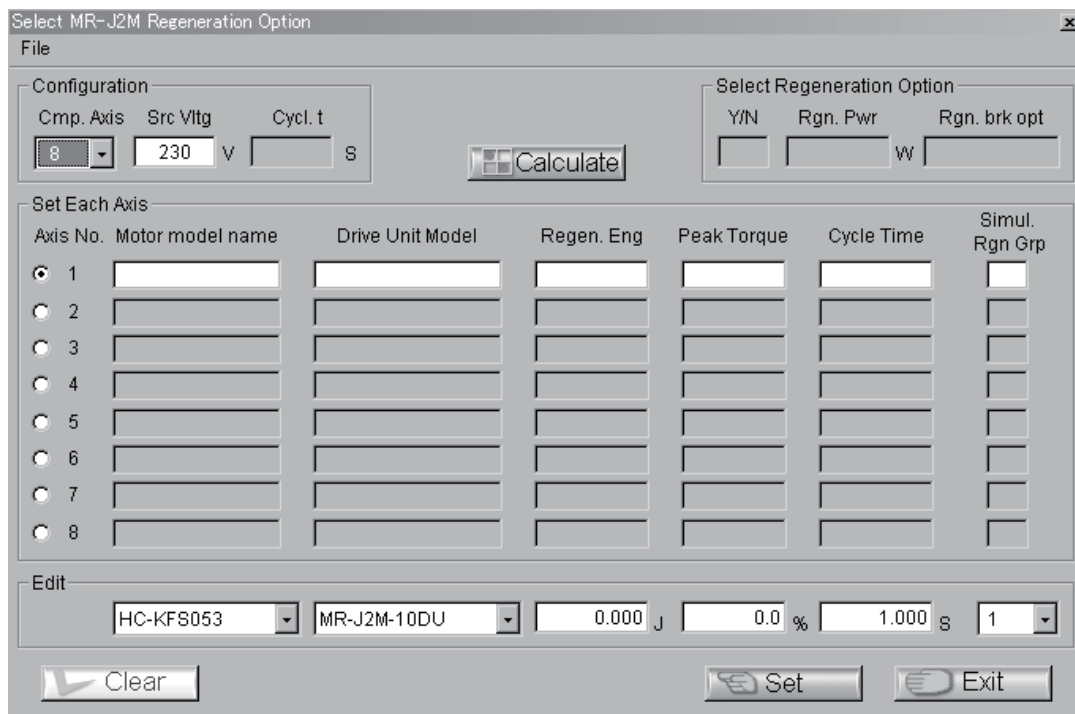


8) Click the "Exit" button of Unit Conversion Tool (Inertia) to exit.

(7) MR-J2M Regeneration Option Selection

Used to select the regenerative options for the MR-J2M. After selecting the MR-J2M capacities, select whether or not to use the regenerative options calculated for all axes and the regenerative option model names.

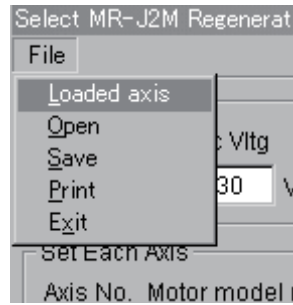
Clicking "MR-J2M Regeneration Option Selection" in the sub menu displays the following window.



Refer to Section 2.3 for the operation procedure in "MR-J2M Regeneration Option Selection".

3. OPERATION COMMANDS

(a) File



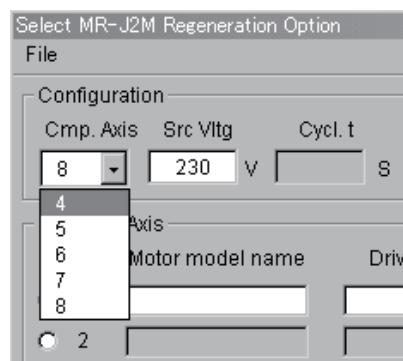
The commands have the following functions.

Command	Description
Loaded axis	Reads the Motor model name, Drive Unit Model, Regenerative Energy, Peak Torque and Cycle Time from the file of the capacity selection result in each axis (***.srv). Can also read the data of both the new capacity selection file (***.svm) and old capacity selection file (***.srv).
Open	Reads the file saved in MR-J2M Regeneration Option Selection (***.mro).
Save	Saves the data selected in MR-J2M Regeneration Option Selection (***.mro).
Print	Prints the data selected in MR-J2M Regeneration Option Selection.
Exit	Ends MR-J2M Regeneration Option Selection. It can also be ended by clicking the "Exit" button.

(b) Help

By clicking "Help" on the menu bar, the explanation of the simultaneous regeneration group setting can be browsed.

(c) Configuration field



The contents of the configuration field are as follows.

Item	Description
Component axis	Select the number of axes. The entry range is 4 to 8 axes.
Source Voltage	Set the voltage (V) of the main circuit power supply. The entry range is 170 to 253V.
Cycle Time	Shows the maximum cycle time in a multiple-axis system.

3. OPERATION COMMANDS

(d) Editing field

The "Motor model name", "Drive Unit Model", "Regene. Eng", "Peak Torque", "Cycle Time" and "Simul. Rgn Grp" of each axis can be changed as desired. After selecting the axis number whose values will be changed, set the required items. After making selection and entry, click the "Set" button to determine the value. Click the "Clear" button to erase the set value.



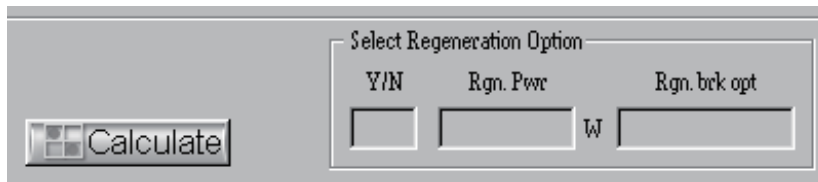
Item	Description
Motor model name	Make selection from the motor model name obtained by capacity selection.
Drive Unit Model	Make selection from the drive unit model name obtained by capacity selection.
Regenerative Energy	Enter the regenerative energy obtained by capacity selection.
Peak Torque	Enter the peak torque obtained by capacity selection.
Cycle Time	Enter the cycle time obtained by capacity selection.
Simultaneous Regeneration Group	Group the axes on a simultaneous regeneration basis. (1 to 8: Synchronous, 0: Asynchronous)

(e) Each axis setting

The values entered in the edit field and the values entered using "Loaded Axis" are displayed. The editing target is the axis selected with the option button.

(f) Calculation

After setting the values of all axes, click the "Calculate" button to display the selection results in the Select Regeneration Option field.



The contents of the Regeneration Option Selection field are as follows.

Item	Description
Y/N	Shows whether the regenerative option is required or not as a result of calculation. Y: Required N: Not required
Regenerative Power [W]	Shows the calculation result of the entire regenerative power.
Regenerative Option	Shows the regenerative option model name to be used.

Continuous permissible power	Maximum regenerative power	Regenerative option
0W		Not required
Less than 30W	Less than 3063W	MR-RB032
Less than 100W	Less than 4712W	MR-RB14
Less than 300W		MR-RB34
Less than 500W		MR-RB54
500W or more		No applicable one

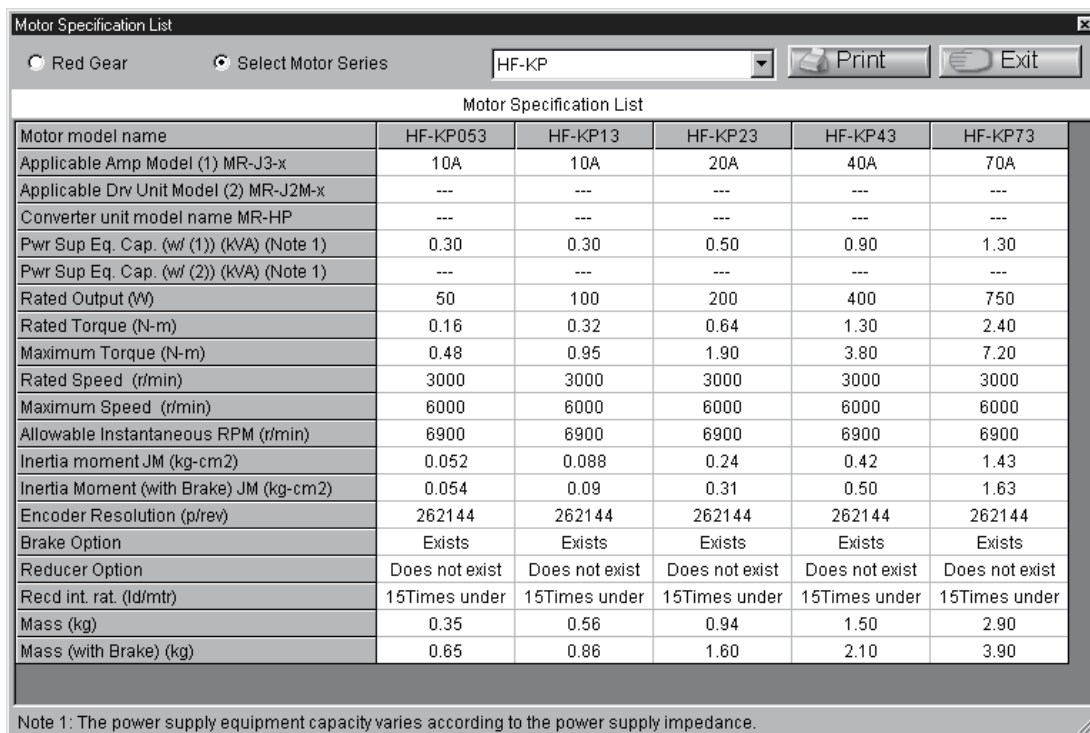
3. OPERATION COMMANDS

(8) Motor Data Tables

Used to display the servo motor specifications as reference data. The following specifications are displayed.

Motor model name	
Applicable Amp Model	
Applicable Drv Unit Model	
Converter unit model name	
Pwr Sup Eq. Cap.	(kVA)
Rated Output	(W)
Rated Torque	(N · m)
Maximum Torque	(N · m)
Rated Speed	(r/min)
Maximum Speed	(r/min)
Allowable Instantaneous RPM	(r/min)
Inertia moment JM	(kg · cm ²)
Inertia Moment (with Brake)JM	(kg · cm ²)
Encoder Resolution	(P/rev)
Brake Option	
Reducer Option	
Recommended inertia ratio	(lb/mtr)
Mass	(kg)
Mass (with Brake)	(kg)

When "Motor Data Tables" on the sub menu clicked, the following window appears.



Motor Specification List					
Motor model name	HF-KP053	HF-KP13	HF-KP23	HF-KP43	HF-KP73
Applicable Amp Model (1) MR-J3-x	10A	10A	20A	40A	70A
Applicable Drv Unit Model (2) MR-J2M-x	---	---	---	---	---
Converter unit model name MR-HP	---	---	---	---	---
Pwr Sup Eq. Cap. (w/ (1)) (kVA) (Note 1)	0.30	0.30	0.50	0.90	1.30
Pwr Sup Eq. Cap. (w/ (2)) (kVA) (Note 1)	---	---	---	---	---
Rated Output (W)	50	100	200	400	750
Rated Torque (N·m)	0.16	0.32	0.64	1.30	2.40
Maximum Torque (N·m)	0.48	0.95	1.90	3.80	7.20
Rated Speed (r/min)	3000	3000	3000	3000	3000
Maximum Speed (r/min)	6000	6000	6000	6000	6000
Allowable Instantaneous RPM (r/min)	6900	6900	6900	6900	6900
Inertia moment JM (kg·cm ²)	0.052	0.088	0.24	0.42	1.43
Inertia Moment (with Brake) JM (kg·cm ²)	0.054	0.09	0.31	0.50	1.63
Encoder Resolution (p/rev)	262144	262144	262144	262144	262144
Brake Option	Exists	Exists	Exists	Exists	Exists
Reducer Option	Does not exist	Does not exist	Does not exist	Does not exist	Does not exist
Recd int. rat. (ld/mtr)	15Times under	15Times under	15Times under	15Times under	15Times under
Mass (kg)	0.35	0.56	0.94	1.50	2.90
Mass (with Brake) (kg)	0.65	0.86	1.60	2.10	3.90

Note 1: The power supply equipment capacity varies according to the power supply impedance.

- 1) Click either "Red Gear" or "Select Motor Series" to select the data to be displayed.
When "Select Motor Series" has been selected, also select the servo motor series.
- 2) Click the "Exit" button to end.

3. OPERATION COMMANDS

(9) Coupling Data Manufactured by Miki Pulley Co., Ltd

The specifications of coupling manufactured by Miki Pulley Co., Ltd are displayed as reference data. When "Coupling data manufactured by Miki Pulley Co., Ltd" on the sub menu is clicked, the following window appears.

Servomotor rated output [kW]	Motor model name	Motor specification				Specification manufactured by Miki Pulley Co., Ltd.	
		Rated speed [r/min]	Rated torque [Nm]	Maximum torque [Nm]	Shaft diameter [mm]	Type SFC...	Twisted rigidity [Nm/rad]
0.05	HC-KFS053	3000	0.16	0.48	8	010SA	670
	HC-MFS053						
0.1	HC-KFS13	3000	0.32	0.95	8	020SA	1600
	HC-UFS13						
0.2	HC-KFS23	3000	0.64	1.9	14	030SA	3200
	HC-UFS23						
0.4	HC-KFS43	3000	1.3	3.8	14	035SA	7100
	HC-UFS43						
0.5	HC-SFS52	2000	2.39	7.17	24	050SA	18000
	HC-SFS53	3000	1.59	4.77			
0.75	HC-KFS73	3000	2.4	7.2	19	040SA	8800
	HC-UFS73	3000	2.4	7.2	19	040SA	8800
0.85	HC-SFS81	1000	8.12	24.4	24	060SA	36000

(10) Maximum Feed Distance of Linear Servo

When the number of linear servo motor secondary side (magnet) is input, the maximum feed distance of linear servo amplifier can be calculated. Click the "Maximum Feed Distance of Linear Servo" and the window as shown below will be displayed.

Primary side(coil) of linear servomotor
 LM-H2P1A-06M 128 mm

Secondary side(magnet) of linear servomotor

LM-H2S10-288	288 mm	<input type="text"/>	pieces
LM-H2S10-384	384 mm	<input type="text"/>	pieces
LM-H2S10-480	480 mm	<input type="text"/>	pieces
LM-H2S10-768	768 mm	<input type="text"/>	pieces

Maximum feed distance mm

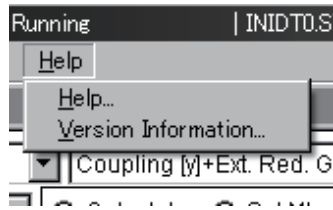
Exit

- 1) Select the linear servo motor primary side (coil).
- 2) Input the number of the linear servo motor secondary side (magnet).
 The maximum feed distance of linear servo amplifier can be calculated with the combinational input numbers.

3. OPERATION COMMANDS

3.2.4 Help


When "Help" on the menu bar is clicked, the following menu appears.



(1) Help

Used to display the Help screen. How to use this software, etc. can be browsed.

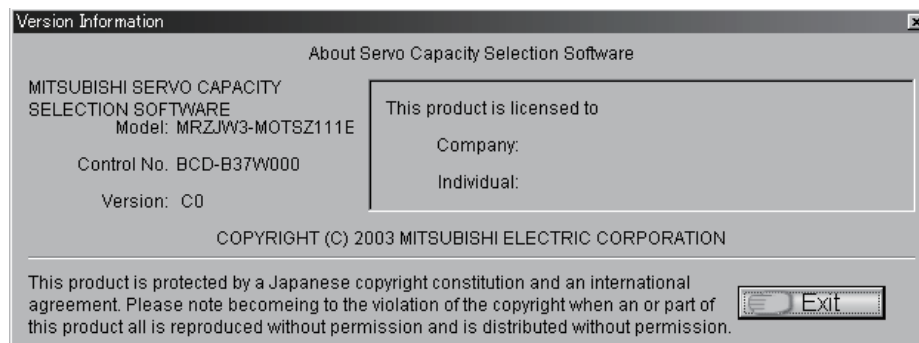
How to close the Help screen

Click the  on the top right of help for capacity selection software window.

(2) Version Information

Used to display the version of the capacity selection software.


Click the "Exit" button to end.

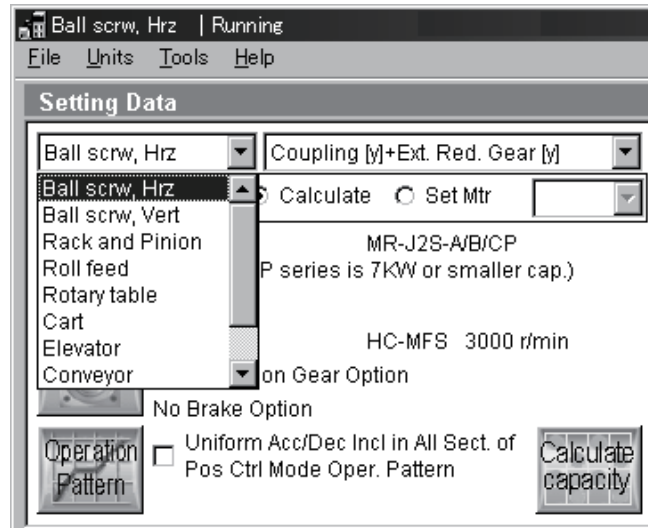


3. OPERATION COMMANDS

3.3 Entry of Mechanical components data

3.3.1 Application

Used to select the mechanical components. Clicking  in the Mechanical Components Selection combo box of the Data Setting area displays the following menu.



The following machine components are available.


(1) Ball screw, Horizontal

Data Setting

Mass of table	WT	200.000	kg
Mass of load	WL	0.000	kg
Thrustload	Fc	300.000	N
Guide tightening force	FG	0.000	N
Reduction gear ratio	1/n	2/5	
Reduction gear inertia	JG	0.444	kg-cm2
Coupling inertia	JC	0.000	kg-cm2
Inertia of the others	JO	0.000	kg-cm2
Lead of ball screw	PB	10.000	mm
Diameter of ball screw	DB	20.000	mm
Length of ball screw	LB	500.000	mm
Drive efficiency	eta	0.900	
Coefficient of friction	mu	0.100	

Sizing Result

Motor :
Amplifier :
Load Inertia :
Peak Torque :
RMS Torque :
Regen. Pwr :

 The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.

3. OPERATION COMMANDS

(2) Ball screw, Vertical

Setting Data

Ball scrw, Vert | Coupling [y]+Ext. Red. Gear [y]

Pos. ctrl. mode | Calculate Set Mtr

Amplifier: MR-J2S-A/B/CP
(MR-J2S-CP series is 7KW or smaller cap.)

Motor: HC-MFS 3000 r/min
No Reduction Gear Option
No Brake Option

Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern

Data Setting

Mass of table	WT	180.000	kg
Mass of load	WL	50.000	kg
Mass of counterweight	WC	150.000	kg
Thrustload	Fc	2.000	N
Guide tightening force	FG	0.500	N
Reduction gear ratio	1/n	1/2	
Reduction gear inertia	JG	1.000	kg-cm2
Coupling inertia	JC	0.200	kg-cm2
Inertia of the others	JO	0.000	kg-cm2
Lead of ball screw	PB	10.000	mm
Diameter of ball screw	DB	20.000	mm
Length of ball screw	LB	1000.000	mm
Drive efficiency	eta	0.900	

Mass of table WT: 180.000 kg

Sizing Result

Motor:

Amplifier:

Load Inertia:

Peak Torque:

RMS Torque:

Regen. Pwr:

Warning: The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.

(3) Rack and Pinion

Setting Data

Rack and Pinion | Coupling [y]+Ext. Red. Gear [y]

Pos. ctrl. mode | Calculate Set Mtr

Amplifier: MR-J3-A/B/T
The lineup of MR-J3-IT and MR-J3-IB-RJ006 is 25KW or less.

Motor: HF-SP 2000 r/min
WRed. Gear for Gen Ind Mach. 1/17(1/17)
With Brake

Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern

Data Setting

Mass of table	WT	1000.000	kg
Mass of load	WL	80.000	kg
Thrustload	Fc	0.000	N
Reduction gear ratio	1/n	1.0000	
Reduction gear inertia	JG	0.000	kg-cm2
Coupling inertia	JC	5.000	kg-cm2
Inertia of the others	JO	0.000	kg-cm2
Diameter of pinion	DP	180.000	mm
Width of pinion	WP	50.000	mm
Drive efficiency	eta	0.800	
Coefficient of friction	mu	0.100	

Mass of table WT: 1000.000 kg

Sizing Result

Motor:

Amplifier:

Load Inertia:

Peak Torque:

RMS Torque:

Regen. Pwr:

Warning: The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.

3. OPERATION COMMANDS

(4) Roll feed

Setting Data

Roll feed: [Coupling [y]+Ext. Red. Gear [y]]

Pos. ctrl. mode: Calculate Set Mtr

Amplifier: MR-J3-AB/T
The lineup of MR-J3-[T] and MR-J3-[B]-RJ006 is 25KW or less.

Motor: HF-SP 2000 r/min
No Reduction Gear Option
No Brake Option

Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern

Data Setting

	F	10.000	N
Tension			
Reduction gear ratio	1/n	1/5	
Reduction gear inertia	JG	15.000	kg-cm2
Coupling inertia	JC	5.000	kg-cm2
Inertia of the others	JO	2.000	kg-cm2
Diameter of feed roll	DR	120.000	mm
Inertia per roller	JR	100.000	kg-cm2
Drive efficiency	eta	0.800	
Bearing friction coeff	mu	0.100	
Nip pressure	FG	10.000	N
Bearing diameter	d	10.000	mm

Tension F: 10.000 N

Sizing Result

Motor:

Amplifier:

Load Inertia:

Peak Torque:

RMS Torque:

Regen. Pwr:

Warning: The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.

Show Graph Show Calculations

(5) Rotary table

Setting Data

Rotary table: [Coupling [y]+Ext. Red. Gear [y]]

Pos. ctrl. mode: Calculate Set Mtr

Amplifier: MR-J3-AB/T
The lineup of MR-J3-[T] and MR-J3-[B]-RJ006 is 25KW or less.

Motor: HF-SP 2000 r/min
No Reduction Gear Option
No Brake Option

Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern

Data Setting

	WT	2000.000	kg
Mass of table			
Mass of load	WL	0.000	kg
Position of load center	LWV	0.000	mm
Inertia of load on table	JU	0.000	kg-cm2
Diameter of support part	DH	1800.000	mm
Diameter of rotary table	DT	2200.000	mm
Diameter of main shaft	DS	60.000	mm
Length of main shaft	LS	150.000	mm
Reduction gear ratio	1/n	1/121	
Reduction gear inertia	JG	4.500	kg-cm2
Coupling inertia	JC	25.000	kg-cm2
Inertia of the others	JO	0.000	kg-cm2
Coefficient of friction	mu	0.050	
Drive efficiency	eta	0.980	

Mass of table WT: 2000.000 kg

Sizing Result

Motor:

Amplifier:

Load Inertia:

Peak Torque:

RMS Torque:

Regen. Pwr:

Warning: The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.

Show Graph Show Calculations

3. OPERATION COMMANDS

(6) Cart

Setting Data

Cart | Coupling [y]+Ext. Red. Gear [y]

Pos. ctrl. mode | Calculate Set Mtr

Amplifier: MR-J3-AB/T
The lineup of MR-J3-[]T and MR-J3-[]B-RJ006 is 25KW or less.

Motor: HF-SP 2000 r/min
No Reduction Gear Option
No Brake Option

Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern

Data Setting

Mass of cart	WV	200.000	kg
Mass of load	WL	50.000	kg
Diameter of wheel	Ds	100.000	mm
Mass of wheel	Ws	2.000	kg
Number of drive wheels	p	4	
Reduction gear ratio	1:n	1/4	
Reduction gear inertia	JG	5.000	kg-cm2
Coupling inertia	JC	5.000	kg-cm2
Inertia of the others	JO	5.000	kg-cm2
Coefficient of friction	mu	0.200	
Drive efficiency	eta	0.800	

Mass of cart WV: 200.000 kg

Sizing Result

Motor :
Amplifier :
Load Inertia :
Peak Torque :
RMS Torque :
Regen. Pwr :

! The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independently ensure the design has sufficient safety margin.

(7) Elevator

Setting Data

Elevator | Coupling [y]+Ext. Red. Gear [y]

Pos. ctrl. mode | Calculate Set Mtr

Amplifier: MR-J3-AB/T
The lineup of MR-J3-[]T and MR-J3-[]B-RJ006 is 25KW or less.

Motor: HF-SP 2000 r/min
No Reduction Gear Option
With Brake

Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern

Data Setting

Mass of lift head	WH	400.000	kg
Mass of load	WL	50.000	kg
Mass of counterweight	WC	350.000	kg
Thrustload	Fc	0.000	N
Mass of chain	Wc	10.000	kg
Reduction gear ratio	1:n	1/4	
Reduction gear inertia	JG	10.000	kg-cm2
Coupling inertia	JC	5.000	kg-cm2
Inertia of the others	JO	5.000	kg-cm2
Diameter of sprocket	DS	364.000	mm
Width of sprocket	WS	20.000	mm
Number of sprockets	z	2	
Drive efficiency	eta	0.700	

Mass of lift head WH: 400.000 kg

Sizing Result

Motor :
Amplifier :
Load Inertia :
Peak Torque :
RMS Torque :
Regen. Pwr :

! The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independently ensure the design has sufficient safety margin.

3. OPERATION COMMANDS

(8) Conveyor

Setting Data

Conveyor Coupling [y]+Ext. Red. Gear [y]
 Pos. ctrl. mode Calculate Set Mtr

Amplifier: MR-J3-AB/T
 The lineup of MR-J3-[T] and MR-J3-[B]-RJ006 is 25KW or less.

Motor: HC-RP 3000 r/min
 No Reduction Gear Option
 No Brake Option

Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern

Data Setting

Mass of moving part	WT	40.000	kg
Mass of load	WL	10.000	kg
Reduction gear ratio	1/h	0.1500	
Reduction gear inertia	JG	10.000	kg-cm2
Coupling inertia	JC	0.100	kg-cm2
Inertia of the others	JO	1.000	kg-cm2
Diameter of roll	DR	86.000	mm
Inertia of roll	JR	85.000	kg-cm2
Number of rolls	z	2	
Drive efficiency	eta	0.800	
Coefficient of friction	mu	0.100	
Incline angle	theta	0.000	deg

Mass of moving part WT: 40.000 kg

Sizing Result

Motor :
 Amplifier :
 Load Inertia :
 Peak Torque :
 RMS Torque :
 Regen. Pwr :

Diagram: Ext. Reduction Gear, Motor, JO, WL, WT, DR, theta

Text: For an inclined conveyor (0 deg. < theta < 90deg.), elevation and load torque (due to effects of gravity) increase with forward rotation and decrease with reverse rotation.

Warning: The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.

(9) Generic

Setting Data

Generic Coupling [y]+Ext. Red. Gear [y]
 Pos. ctrl. mode Calculate Set Mtr

Amplifier: MR-J3-AB/T
 The lineup of MR-J3-[T] and MR-J3-[B]-RJ006 is 25KW or less.

Motor: HF-SP 2000 r/min
 No Reduction Gear Option
 No Brake Option

Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern

Data Setting

Load torque	TL1	0.000	N-m
Loaded shaft torque	TL2	50.000	N-m
Ld. shft imbalance trq	TU	1.000	N-m
Load inertia	JL1	1.000	kg-cm2
Coupling inertia	JC	1.000	kg-cm2
Reduction gear ratio	1/h	1.0000	
Reduction gear inertia	JG	1.000	kg-cm2
Inertia of the others	JO	10.000	kg-cm2
Feed distance/load rev	dSL	50.000	mm/rev
Drive efficiency	eta	0.800	

Load torque TL1: 0.000 N-m

Sizing Result

Motor :
 Amplifier :
 Load Inertia :
 Peak Torque :
 RMS Torque :
 Regen. Pwr :

Diagram: Ext. Reduction Gear, Motor, JO, Load, JL1, TL2, TL1

Warning: The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.

3. OPERATION COMMANDS

(10) Linear Servo

The screenshot displays the 'Linear Servo' software interface. The window title is 'Linear Servo | Linear Servo | INIDT11.SVM'. The menu bar includes 'File', 'Units', 'Tools', and 'Help'.

Setting Data:

- Linear Servo (dropdown)
- Pos. ctrl. mode (dropdown)
- Buttons: Calculate (checked), Set Force (unchecked)
- Amplifier: MR-J3-B-RJ004(Linear)
- Motor: LM-H2 2 m/sec
- Self-cooling (checkbox)
- Operation Pattern: Uniform Acc/Dec Incl in All Sect. of Pos Ctrl Mode Oper. Pattern
- Calculate capacity (button)

Diagram: A 3D perspective view of a linear servomotor. A load mass $M1$ is shown on top of the primary side. Forces F_s (sliding resistance) and F_c (friction) are indicated. The weight WT of the table is also shown. Labels identify the 'Primary side of linear servomotor' and 'Secondary side of linear servomotor'.

Data Setting:

Mass of table	WT	5.000	kg
Mass of load	M1	0.000	kg
Thrustload	Fc	0.500	N
Sliding resistance	Fs	0.000	N
Coefficient of friction	mu	0.001	
Mechanical sys efficiency	eta	1.000	

Mass of table WT: 5.000 kg

Sizing Result:

Motor :
Amplifier :

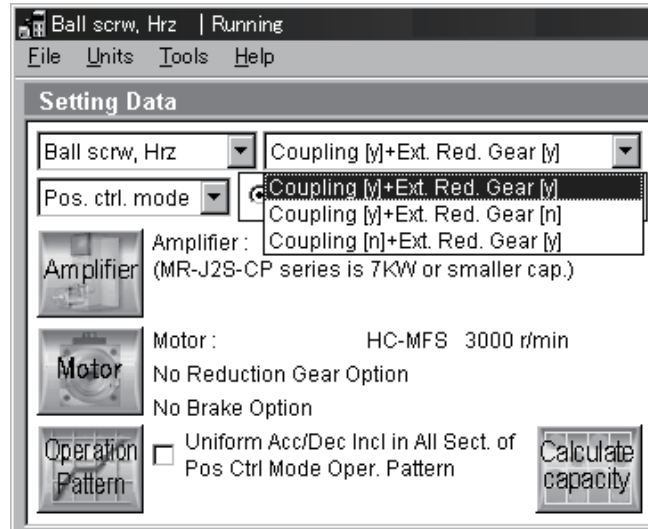
Load mass :
Peak thrust :
RMS thrust :
Regen. Pwr :

Warning: The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.

Buttons: Show Graph, Show Calculations

3. OPERATION COMMANDS

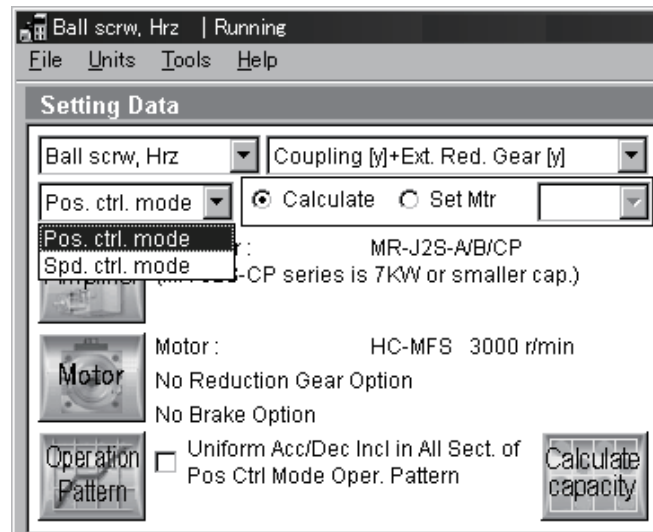
3.3.2 Coupling and external reduction gear selection



Select whether to use the coupling and external reduction gear or not.

Depending on whether they are used or not, the machine structure diagram and data setting items change.

3.3.3 Control mode selection

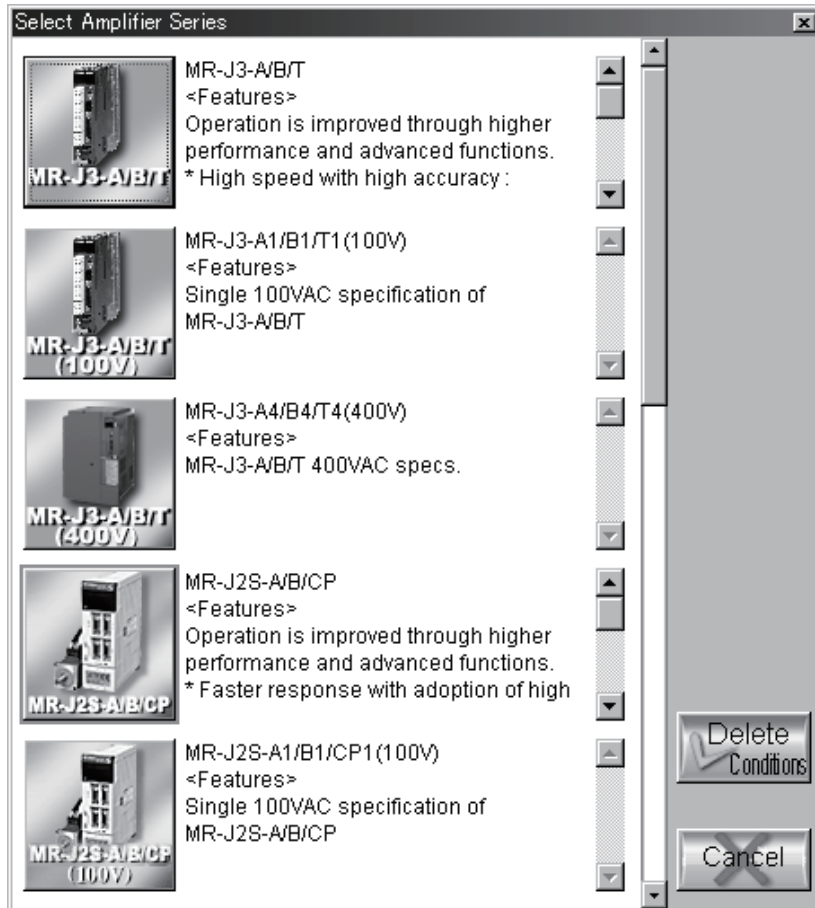


Select the mode used for capacity calculation from the Servo Control Mode combo box.

3. OPERATION COMMANDS

3.3.4 Amplifier selection

Used to select the series of the servo amplifier. Clicking the "Amplifier" button in the Data Setting area displays the following window appears.



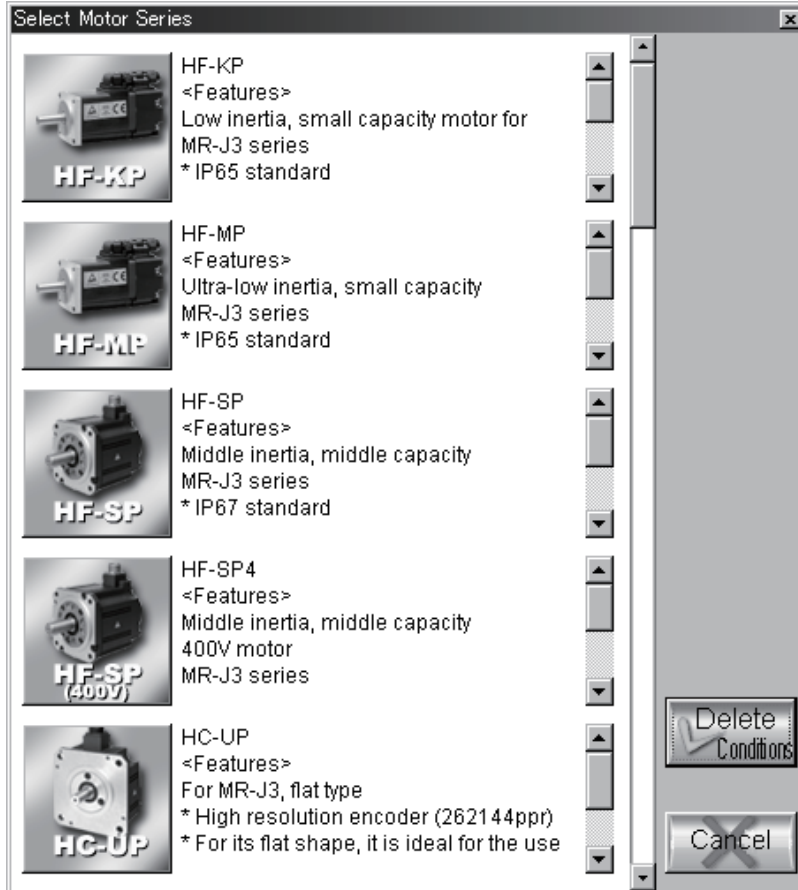
3. OPERATION COMMANDS

3.3.5 Motor selection

(1) Servo motor series selection

Used to select the series and rated speed of the servo motor.

Clicking the "Motor" button in the Data Setting area displays the following window appears.

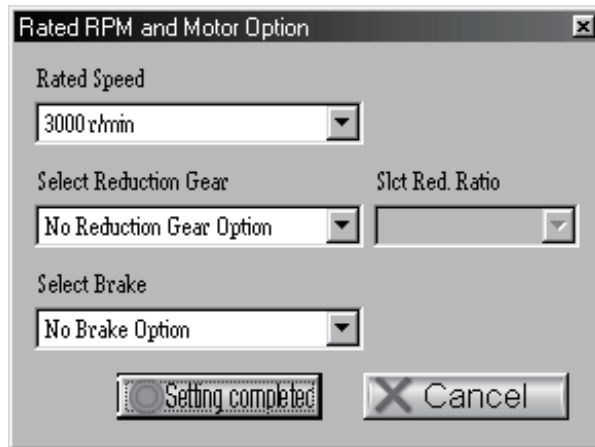


The servo motor series which cannot be driven by the servo amplifier selected are grayed out and unavailable.

3. OPERATION COMMANDS

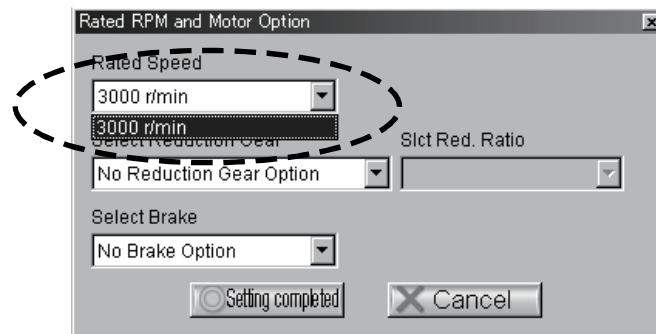
(2) Select Rated Speed • Servo motor option selection


After the operation in (1) of this section is performed, the Rated RPM and Motor Options window is displayed automatically.

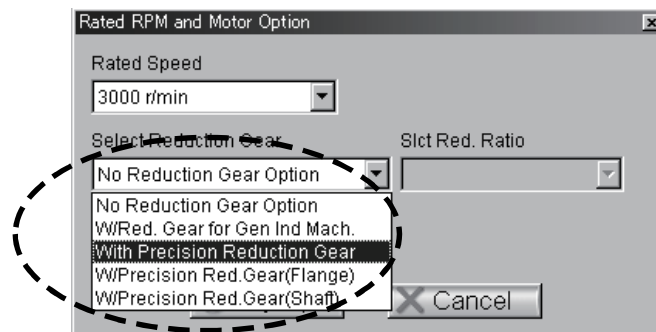


In this window, Select Rated Speed, Brake and Reduction Gear.

- 1) Click  on the right of Rated Speed to make selection.

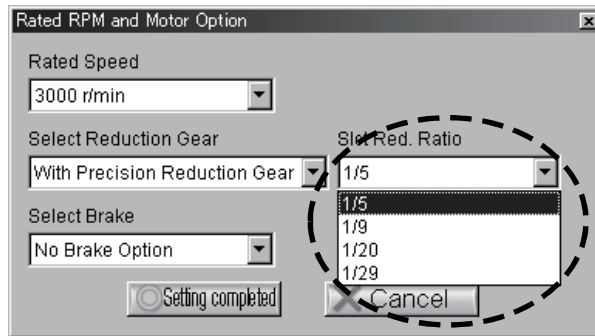


- 2) Click  on the right of Select Reduction Gear (No Reduction Gear Option, With Reduction Gear for General Industrial Machine, With Precision Reduction Gear) to make selection.




When With Reduction Gear has been selected as the servo motor option, Further, the Select Reduction Ratio window is made selectable. Choose the reduction ratio.

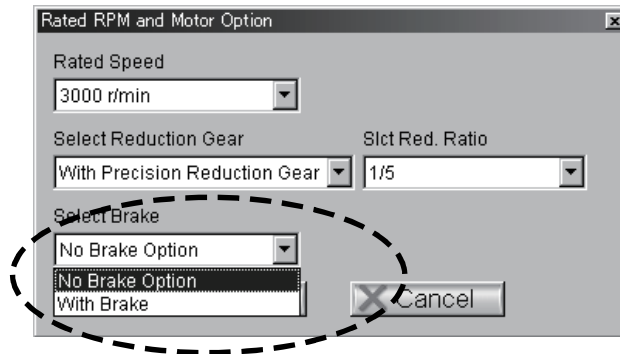
3. OPERATION COMMANDS



The reduction ratio may only be chosen out of those available for the speed reducer selected in the Motor Option window.

3) Click  on the right of Select Reduction Ratio to make selection.

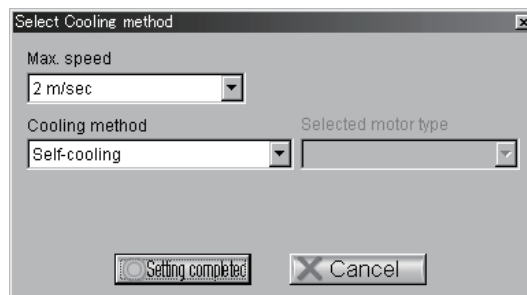
4) Selecting the brake. Click  on the right of Select Brake to make selection.



5) After selecting, click the "Setting completed" button in the Rated RPM and Motor Option window to terminate the window.


(3) Cooling method selection (for linear servo amplifier)

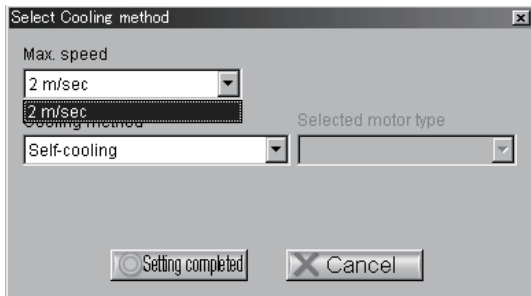
For the linear servo amplifier, the cooling method selection window will be displayed after the operation described in the above section (1).




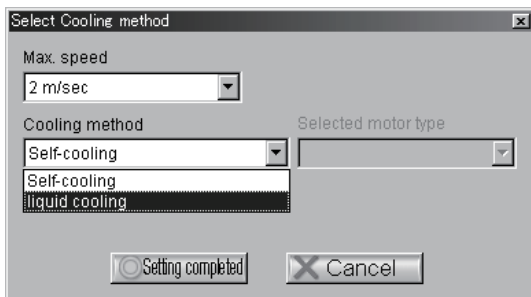
At this time, select the max. speed, cooling method, and selecting motor model.


3. OPERATION COMMANDS

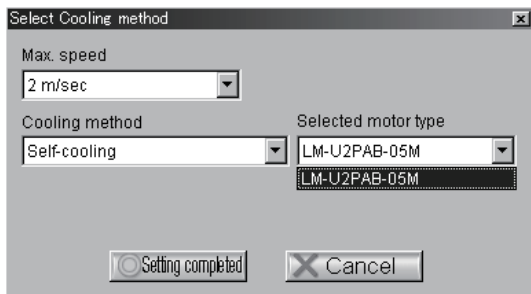
- 1) Click  at the box showing a max. speed to display the combo box, and then select a servo motors max. speed.



- 2) Click  at the box showing a cooling method to display the combo box, and then select a cooling method (from Self-cooling or Liquid-cooling).



- 3) If there are same thrust, resulted from calculating to specify thrust, click  at the box showing a selected motor model to display the combo box and then select a motor model.



- 4) To close cooling method selection window, click, "Setting completed" button.

When the setting is completed, a servo motor series, a max. speed, and a cooling method in the selected motor series field in setting data are displayed.

3. OPERATION COMMANDS

3.3.6 Entry of machine specifications and execution of selection/calculation

In the Data Setting area, each data on the selected machine component is displayed. Enter data in all items and start selection/calculation.

(1) Selection of input item

Move the focus to the item in the Data Setting area in which data will be entered.

(2) Display of input unit

By moving the focus to the unit area, the units that can be selected is displayed. Choose the unit to be used.

(3) Data entry

Move the focus to the machine specifications entry area and enter data from the key board.

POINT
▪ To change the unit of data to be entered, move the focus to the unit field, open the combo box, and select the unit.

(4) Data setting

Press the "Enter" to set the data. Upon data setting, the corresponding data in the Data Setting area is updated.

3. OPERATION COMMANDS

3.3.7 Operation pattern entry

Click the "Operation Pattern" button to open the Operation Pattern window. The operation pattern differs in setting items between the position control mode and speed control mode.

(1) In the speed control mode

Set the operation pattern by entering the Initial Speed, Last Speed, and Time items. The initial speed of No. 1 is set to "0" and the other initial speeds are set to the values of the previous final speeds automatically.

The screenshot shows the 'Speed Control Mode Operation Pattern' window. It features a table for defining operation patterns and a graph for visualizing the feed rate profile.

No.	Initial Speed mm/min	Last Speed mm/min	Time [sec]	Load Mass	Ld. Str
1	0.000	12000.000	0.157	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	12000.000	12000.000	0.843	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	12000.000	0.000	0.157	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	0.000	0.000	0.843	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Below the table, there is a 'Feed Rate' graph. The y-axis is labeled 'Feed Rate' and ranges from -20000 to 20000. The x-axis is labeled 'Time[sec]' and ranges from 0 to 2.5. The graph shows a trapezoidal profile: it starts at 0, rises to 12000 mm/min at 0.157s, remains constant at 12000 mm/min until 0.843s, and then falls to 0. A 'Clear' button is located above the graph. To the right of the graph are three buttons: 'Show Graph', 'Exit from Entry', and 'Cancel'. A note at the bottom of the table area reads: 'If there is only one type of operational pattern, please set only one, do not set to more than one.'

a) Setting Unit Selection combo box

Select the unit of the speed to be entered.

b) Operation pattern entry area

Enter the final speed and time. Clicking No. displays the Single Line Editing menu ("Insert Line", "Delete Line", "Copy Line", "Paste Line"). Line-by-line editing can be performed after selection of the menu item.

3. OPERATION COMMANDS

c) Load Mass, Load Antidrag Setting check box

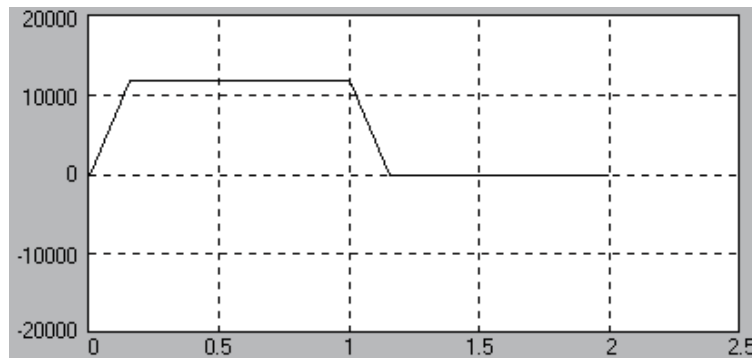
For the Ball screw Horizontal, Ball screw Vertical, Rack and Pinion, Rotary table, Cart, Elevator, Conveyor, Generic or Linear servo, check boxes will be displayed. The check boxes are all checked in the initial setting.

d) Clear button

Clicking the "Clear" button clears all data and returns to the initial setting. (However, the check boxes will not be cleared.)

e) Show Graph button

Clicking the "Show Graph" button displays the operation pattern in the graph display area (f).



g) Graph Display Unit Selection combo box

The unit of the vertical axis in the displayed graph can be converted.

h) Cancel button

Clicking the "Cancel" button discards all the set data and closes the Speed Control Mode Operation Pattern window.

i) Exit from Entry button

Clicking the "Exit from Entry" button determines the setting and closes the window.

3. OPERATION COMMANDS

(2) In the position control mode

The operation pattern can be determined by entering the items in any of the following three methods.

- Method in which the Feed, Positioning Time, Feed Rate, Acceleration Time, Deceleration Time and Pause time are all entered to determine the operation pattern.
- Method in which the Feed, Positioning Time, and the items of known values are entered to determine the operation pattern.
- Method in which the Feed, Feed Rate, and the items of known values are entered to determine the operation pattern.

In any of the above methods, enter the required items and click the "Calculate pattern" button to determine the operation pattern.

Position Control Mode Operation Pattern

*Required Items: **Low Resp** Stop. Stb. Time: **0.043** sec

No.	spd. chg	Feed [mm]	*Either One			Decel. Time [sec]	Pause time [sec]	Load Mass	Ld. Str
			Pos. Time [sec]	Feed Rate [mm/min]	Accel. Time [sec]				
1	<input type="checkbox"/>	50.000	0.501	9000.000	0.100	0.150	0.150	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	-270.000	1.200	17381.974	0.200	0.250	0.160	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	70.000	0.570	10000.000	0.300			<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	<input type="checkbox"/>	150.000	1.022	12000.000	0.350	0.400	0.170	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

If there is only one type of operational pattern, please set only one, do not set to more than one. Graph shows the data which includes the settling time.

Feed Rate: **mm/min** Clear Calculate pattern Show Graph Exit from Entry Cancel

[sec] Time

- a) Setting Unit Selection combo box
Select the unit of the speed to be entered.

3. OPERATION COMMANDS

b) Operation pattern entry area

Enter the feed, positioning time, feed rate, acceleration time, deceleration time, and pause time. Clicking No. displays the Single Line Editing menu ("Insert Line", "Delete Line", "Copy Line", "Paste Line"). Line-by-line editing can be performed after selection of the menu item.

c) Load Mass, Load Antidrag Setting check box

For the Ball screw Horizontal, Ball screw Vertical, Rack and Pinion, Rotary table, Cart, Elevator, Conveyor, Generic or Linear servo, check boxes will be displayed. The check boxes are all checked in the initial setting.

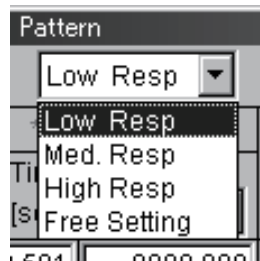
d) In-Process Speed Change Setting check box

When deceleration is not made and it is desired to change the acceleration time, click the "In-Process Speed Change" check box to turn it ON. "Decel. Time" and "Pause Time" of the line turned ON cannot be entered.

e) Response Level Selection combo box

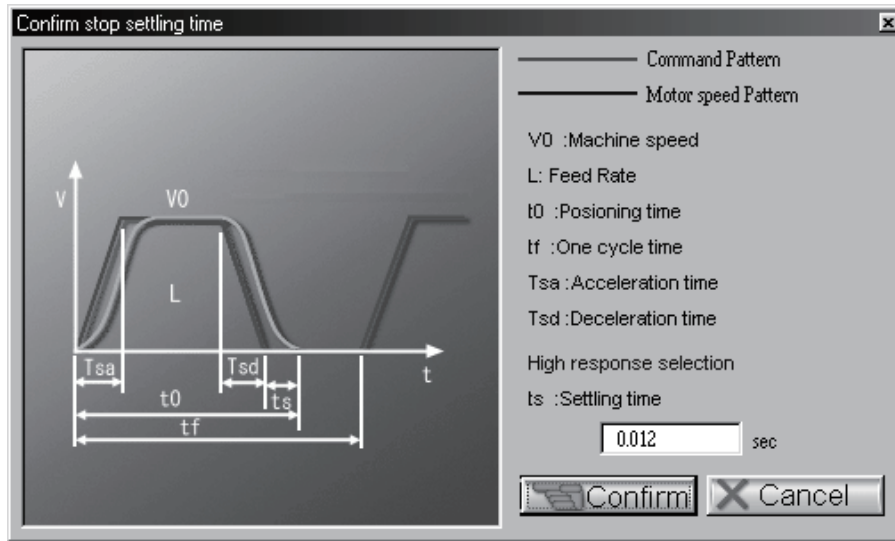
POINT
▪ Set the servo response level correctly. Otherwise, correct selection and calculation results cannot be obtained.

Set the response level of the servo according to the track ability of the machine. Set "Low Response" when machine track ability is low, or "High Response" when it is high. There are three servo response levels. "Low Response", "Medium Response" and "High Response". Depending on the setting, the position loop gain (Kp) changes. Open the Servo Response Level Selection combo box and select the servo response level.



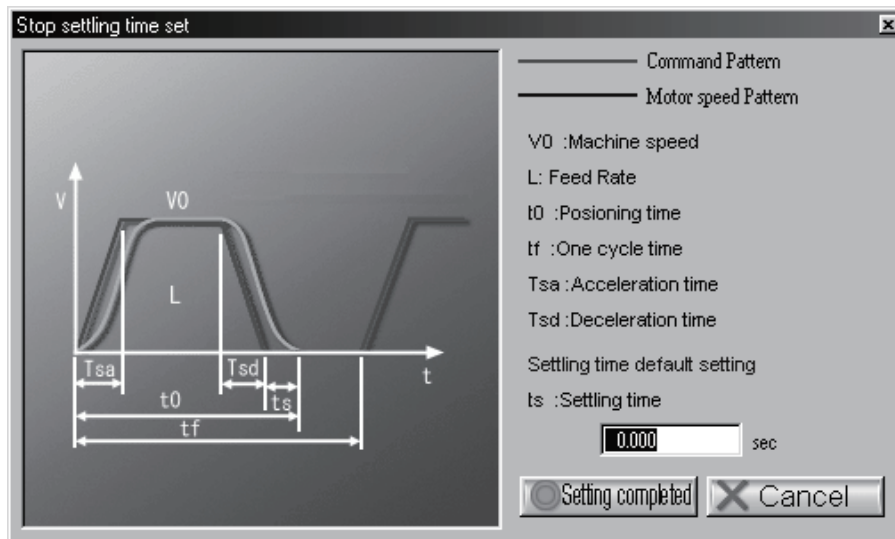
3. OPERATION COMMANDS

Selecting the response level opens the following window and displays the settling time (t_s) of the servo motor. (The figure shows the case of high response.)



Click the "Confirm" button to close the window.

Selecting "Free Setting" opens the following window. The settling time (t_s) can be set as desired.



After setting, click the "Setting completed" button to close the window.

f) Confirm stop settling time area
The set settling time is displayed.

g) Clear button
Clicking the "Clear" button clears all data.
(Clicking the "Clear" button clears all data and returns to the initial setting. (However, the check boxes of Load Mass and Ld. Str will not be cleared.))

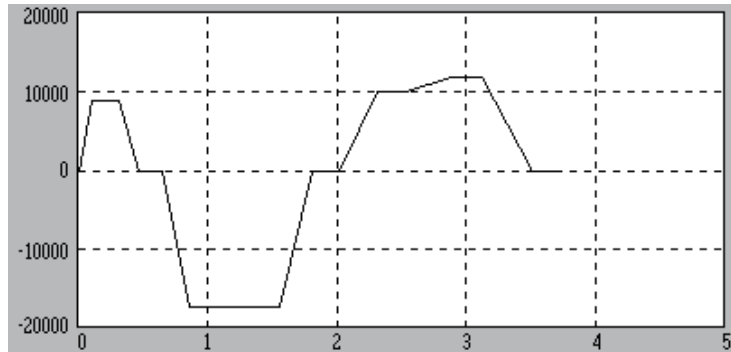
3. OPERATION COMMANDS

h) Pattern calculation button

Clicking the "Calculate pattern" button calculates indefinite items to determine the operation pattern.

i) Show Graph button

Clicking the "Show Graph" button displays the operation pattern in the graph display area (j).



k) Graph Display Unit Selection combo box

The unit of the vertical axis in the displayed graph can be converted.

l) Cancel button

Clicking the "Cancel" button discards all the set data and closes the Position Control Mode Operation Pattern window.

m) Exit from Entry button

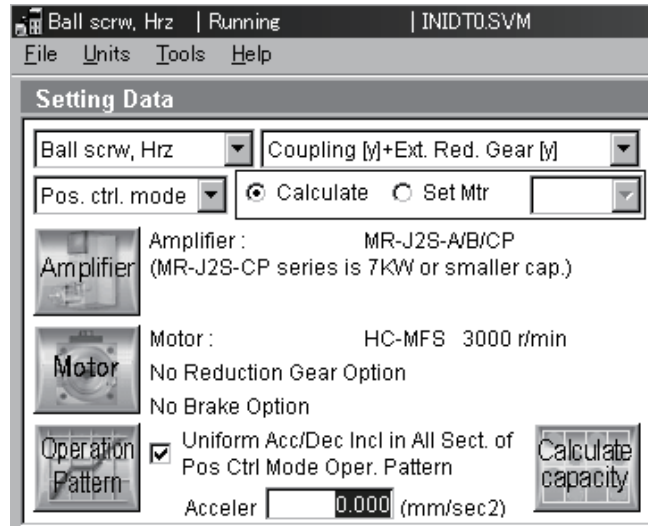
Clicking the "Exit from Entry" button determines the setting and closes the window.

3. OPERATION COMMANDS

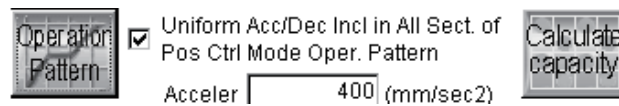
(3) When fixing the acceleration during acceleration/deceleration

In the position control mode, the acceleration during acceleration/deceleration can be fixed.

- 1) Clicking the "Uniform Accel./Decel. Inclination in All Intervals of Position Control Mode Operation Pattern" check box displays the acceleration entry area.



- 2) Enter any acceleration. (Set 400mm/s² as an example.)



- 3) Clicking the "Operation Pattern" button displays the Position Control Mode Operation Pattern window.

3. OPERATION COMMANDS

Position Control Mode Operation Pattern

*Required Items Stop. Stb. Time sec

No.	spd. chg	* Feed [mm]	*Either One		Accel. Time [sec]	Decel. Time [sec]	Pause time [sec]	Load Mass	Ld. Str
			Pos. Time [sec]	Feed Rate [mm/min]					
1	<input type="checkbox"/>	200.000	1.200	12000.000	0.157	0.157	0.800	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

If there is only one type of operational pattern, please set only one, do not set to more than one. Graph shows the data which includes the settling time.

Feed Rate

- 4) Delete the value in the "Pos. Time" field and click the "Operation Pattern" button. This calculates the "Pos. Time", "Accel. Time" and "Decel. Time".

Position Control Mode Operation Pattern

*Required Items Stop. Stb. Time sec

No.	spd. chg	* Feed [mm]	*Either One		Accel. Time [sec]	Decel. Time [sec]	Pause time [sec]	Load Mass	Ld. Str
			Pos. Time [sec]	Feed Rate [mm/min]					
1	<input type="checkbox"/>	200.000	1.543	12000.000	0.500	0.500	0.800	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>							<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

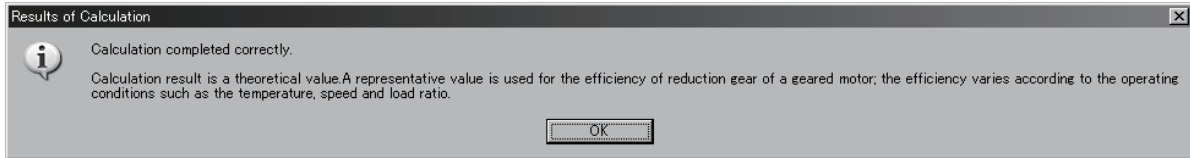
- 5) Clicking the "Exit from Entry" button determines the setting and close the window.

3. OPERATION COMMANDS

3.3.8 Execution of capacity selection (Calculate)


(1) Capacity calculation

- 1) Click the "Calculate" option button and click the "Calculate capacity" button to start calculation.
On completion of selection/calculation, the following window will appear.



- 2) Click the "OK" button to continue.

In the Sizing Result area, the types of the servo motor, servo amplifier and regenerative option are displayed as selection results, and the load inertia, peak torque, RMS torque, regenerative power are displayed as calculation results.

Sizing Result		
Motor :HC-MFS23 [200 W]		
Amplifier :MR-J2S-20A/B/CP Regeneration needless		
Load Inertia :	1.353 [kg-cm ²]	15.4Times
Peak Torque :	0.671 [N-m]	104.8%
RMS Torque :	0.295 [N-m]	46.2%
Regen. Pwr :	0.000 [W]	0.0%
 The sizing software calculated the system with theoretical equations and can only be used as a guide to a suitable solution. Independantly ensure the design has sufficient safety margin.		
<input type="button" value="Show Graph"/>		<input type="button" value="Show Calculations"/>

a) — Motor :HC-MFS23 [200 W]
b) — Amplifier :MR-J2S-20A/B/CP
Regeneration needless
c) — Load Inertia : 1.353 [kg-cm²] 15.4Times
d) — Peak Torque : 0.671 [N-m] 104.8%
e) — RMS Torque : 0.295 [N-m] 46.2%
f) — Regen. Pwr : 0.000 [W] 0.0%
g) —
h) —

The above window represents the following contents.

- a) The servo motor used is the HC-MFS23.
- b) The servo amplifier used is the MR-J2S-20A/B/CP, the regenerative option does not use it.
- c) The load inertia at the servo motor shaft of the machine is 1.353 (kg · cm²) or 15.4 times greater than the servo motor shaft inertia.
- d) The peak torque is 0.671 [N · m] or 104.8% of the rated servo motor torque.
- e) The required effective torque is 0.295 [N · m] or 46.2% of the rated servo motor torque.
- f) The regenerative power generated is 0 [W].

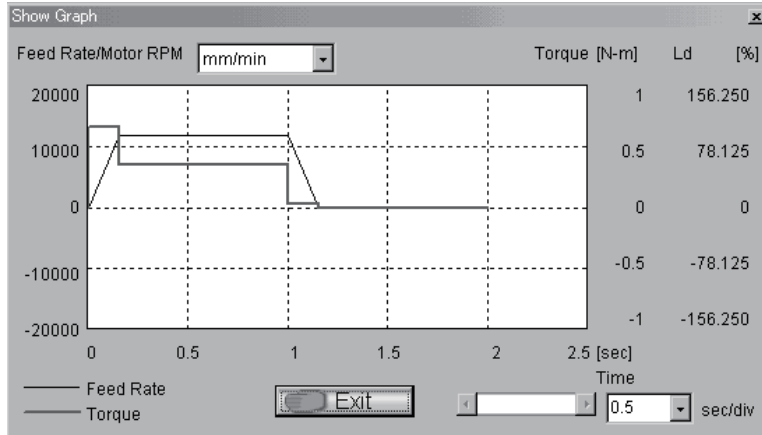
3. OPERATION COMMANDS

(2) Show Graph • Show Calculations

The calculation results of capacity selection are displayed in a graphical form. Also, the calculation process is displayed.

a) Show Graph

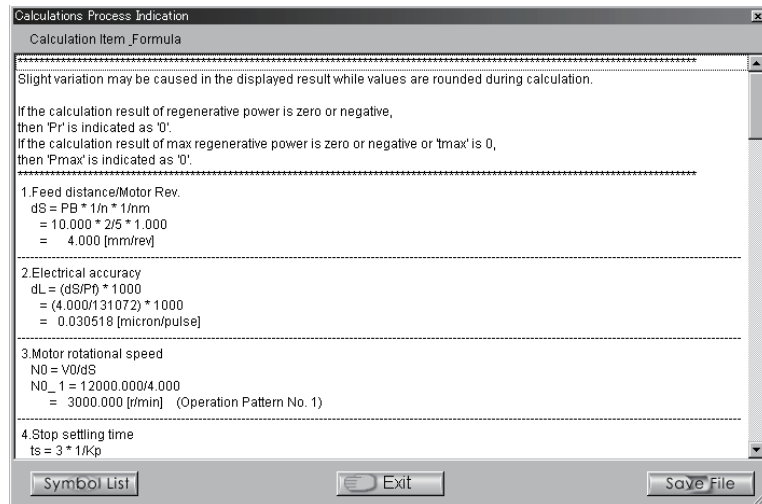
Click the "Show Graph" button ((1) 2) g) in this section) to display the calculation result graph as shown below.



Click the "Exit" button to end the window.

b) Show Calculations

Click the "Show Calculations" button ((1) 2) h) in this section) to browse the calculation process as shown below.



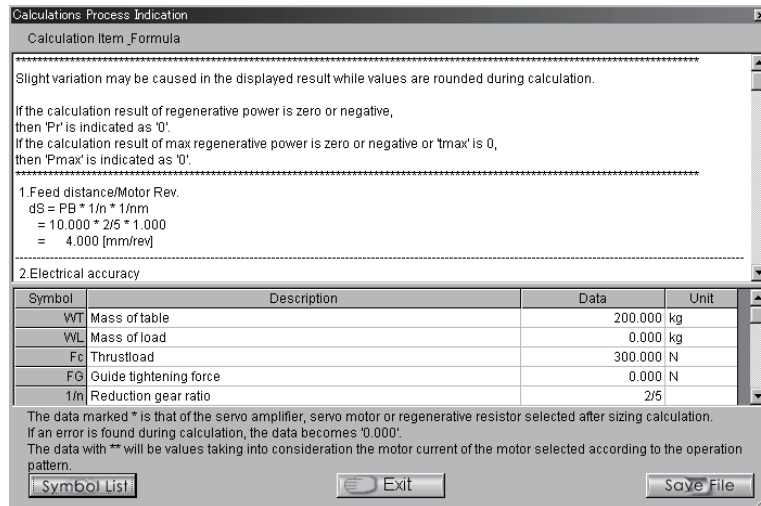
Click the "Exit" button to end the window.

3. OPERATION COMMANDS

The following describes "Symbol List" and "Save File" on the Show Calculations screen.

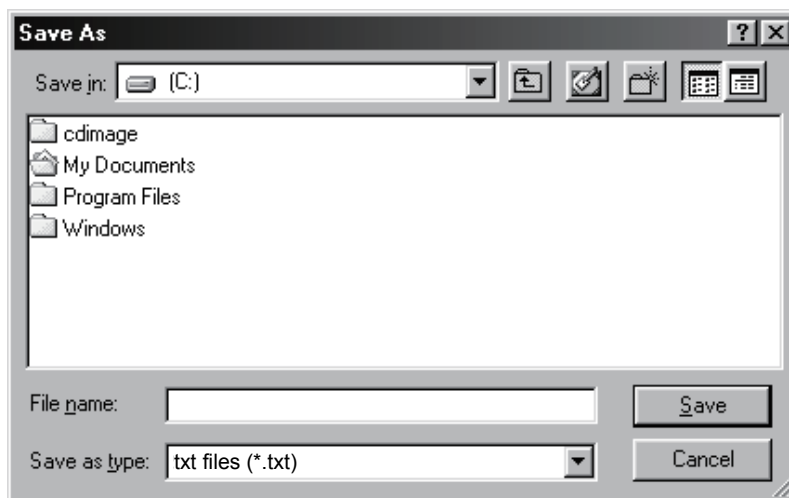
1) Symbol List

Click the "Symbol List" button to display the Symbol List at the bottom of the Show Calculations window. Click it again to undisplay the Symbol List.



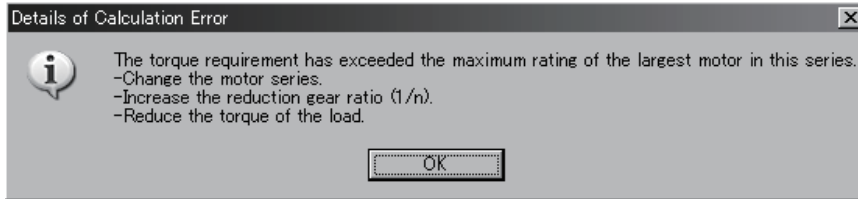
2) Save File

Click the "Save File" button to display the dialog box for saving a file. Specify a save destination, enter a file name and click the "Save" button to save the text files of "Symbol List" and "Calculations" into the save destination.

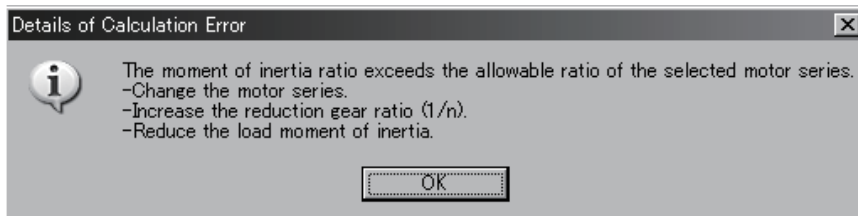


3. OPERATION COMMANDS

If selection cannot be made, the following error window appears. As its cause is displayed in the message display area, reexamine the set values and selection of the data to eliminate the error.



If the load inertia of the machine to the servo motor shaft has exceeded the recommended load inertia ratio as a result of calculation, the following warning window appears. In this case, an error will not occur but the load inertia ratio in the calculation/selection results is displayed in red number. Follow the prompt in the window and reexamine the set values and selection of the data to eliminate the warning.



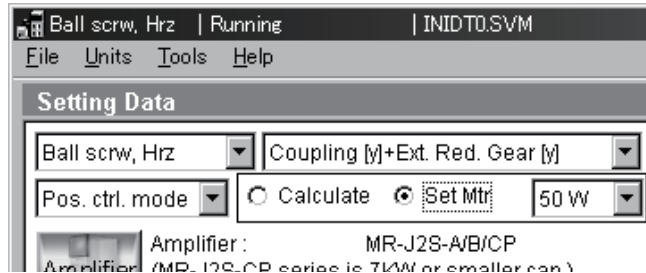
POINT
▪ For the MR-J2M, select the regenerative option in "MR-J2M Regeneration Option Selection" of "Tools".

3. OPERATION COMMANDS

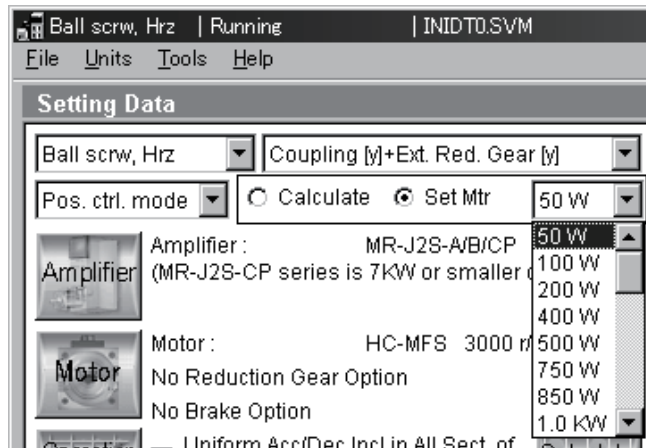
3.3.9 Starting calculation with capacity specified

Before starting selection/calculation of servo amplifiers but linear servo amplifiers, the servo motor capacity can be specified. When starting calculation with the servo motor capacity specified, the servo motor amplifier series must be reselected.

- 1) Click the "Set Mtr" option button.



- 2) Open the combo box in the Set Motor Size and select the capacity to be specified.



- 3) Click the "Operation Pattern" button. Refer to section 3.3.7 for the operation pattern operation.

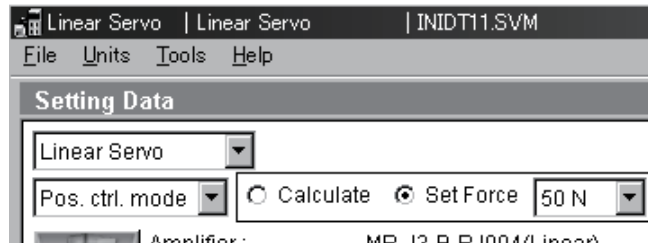
3. OPERATION COMMANDS

3.3.10 Specifying thrust and executing calculation (linear servo)

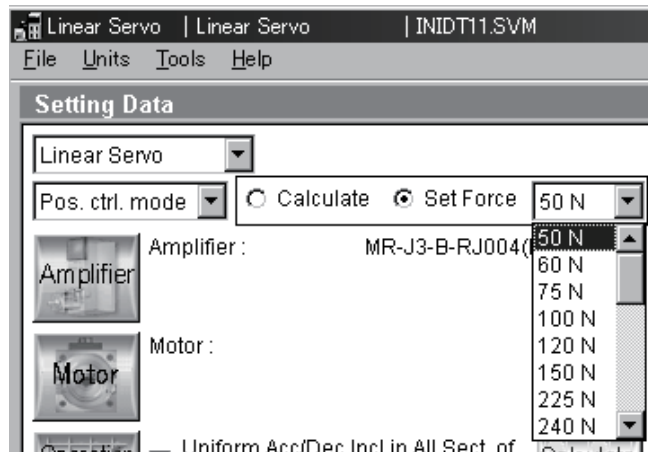
Before executing selection and calculation, servo motor thrust can be specified in advance.

When calculating with specified thrust, selecting a servo motor series and a servo amplifier series are required once again.

- 1) Click the option, "Set Force" button.



- 2) Click the button on the right side of the box, and then select a specifying thrust from the combo box in the Calculation Mode Selection area.



- 3) Click, " Operation Pattern" button.

For the operation of, "Operation Pattern", refer to section 3.3.7.

REVISIONS

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

Print Data	Manual Number	Revision	
Jul., 2003	IB(NA)0300073-A	First edition	
Dec., 2003	IB(NA)0300073-B	Section 1.1 (1)	Servo amplifier MR-J3-A and Servo motor HF-KP are added.
		Section 1.2	The descriptions of personal computer and OS are modified.
		Section 1.5	Partially modified.
		Section 2.2.2 (7)	The servo amplifier series selection screen is changed.
		Section 2.2.2 (8)(a)	The servo motor series selection screen is changed.
		Section 2.2.2 (11)	The screen is partially changed.
		Section 2.2.2 (13)	The screen is partially changed.
		Section 2.3 (4)	The screen is partially changed.
		Section 3.2.1 (6)(a)	The screen is partially changed.
		Section 3.2.1 (6)(b)	The screen is changed.
		Section 3.2.1 (6)(c)	The screen is changed.
		Section 3.2.1 (6)(d)	The screen is changed.
		Section 3.2.3 (1)(d)	The screen is changed.
		Section 3.2.3 (2)	The screen is changed.
		Section 3.2.3 (4)	POINT is partially changed.
		Section 3.2.3 (8)	The screen is changed.
		Section 3.2.4 (2)	The screen is changed.
		Section 3.3.4	The screen is changed.
		Section 3.3.5	The screen is changed.
		Section 3.3.7 (1)	The screen is partially changed.
		Section 3.3.7 (2)	The screen is partially changed.
		Section 3.3.7 (3)	The screen is partially changed.
Mar., 2004	IB(NA)0300073-C	Section 1.1 (1)	Servo amplifier MR-E-A/AG and Servo motor HF-SP, HF-KE and HF-SE are added.
Jul., 2007	IB(NA)0300073-D	Section 1.1	Servo amplifiers MR-J3-A1/A4 • MR-J3-B (1)/B4 • MR-J3-B(4)-RJ006 • MR-J3-T(1)/T4 are added. Servo motor HALP is added. Note 2 and 3 are changed.
		Section 1.2	The description of Pentium is modified, and Note 1 is changed.
		Chapter 2	The descriptions of "shaft" are changed to "axis".
		Section 2.2.2 (7)	The screen is changed, and the sentences are added.
		Section 2.2.2 (8)	The sentences are added.
		Section 2.3 (2) – (4), (7)	The screen is changed.
		Chapter 3	The descriptions of "shaft" are changed to "axis".
		Section 3.1.1 (2)	The screen is changed.
		Section 3.2.1 (6) (d)	The calculation process description is added.
		Section 3.2.3	The screen is changed.
		Section 3.2.3 (1) (g)	The screen is changed.
		Section 3.2.3 (9)	Added.
		Section 3.2.4 (2)	The version is changed.
		Section 3.3.4	The screen is changed.

Print Data	Manual Number	Revision	
Jul., 2007	IB(NA)0300073-D	Section 3.3.5 Section 3.3.8	The screen is changed. (2) is added.
May, 2008	IB(NA)0300073-E	Section 1.1 Section 1.2 Section 1.4 Section 1.5 Section 2.1 Section 2.2.2 Section 2.2.3 Section 2.3 Section 3.1.1 Section 3.1.2 Section 3.2.1 Section 3.2.3 Section 3.2.4 Section 3.3.1 Section 3.3.2 Section 3.3.3 Section 3.3.5 Section 3.3.7 Section 3.3.8 Section 3.3.9 Section 3.3.10	Servo amplifier MR-J3-B-RJ004 and MR-J3-B4-RJ004 are added. Servo motor LM-H2 · LM-F and LM-U2 are added. The system configuration table is changed. Short-cut keys are partially changed. The screen is changed. The sentences are partially reviewed. The sentences are partially reviewed. The screen is changed. The sentences are partially reviewed. The screen is changed. The item of "Operation (linear servo)" is added. The screen is changed. The screen is changed. The screen is changed. The screen is changed. The item of (5) "Save as new project defaults" is deleted. The sentences are partially reviewed. The screen is changed. The item of (10) "Maximum feed distance of linear servo amplifier" is added. The screen is changed. The screen is changed. The item of (10) "Linear servo screen" is added. The screen is changed. The screen is changed. The screen is changed. The item of (3) "Cooling system selection (linear servo)" is added. The screen is changed. The sentences are partially reviewed. The screen is changed. The screen is changed. The sentences are partially reviewed. The item of "Specifying thrust and executing calculation (linear servo)" is added.

MODEL	
MODEL CODE	



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