



# MITSUBISHI CNC NC Specification Selection Guide M800/M80/C80 Series



- M800W Series
- M800S Series
- M80W Series
- M80 Series
- C80 Series

Global Player Contents

# GLOBAL IMPACT OF MITSUBISHI ELECTRIC







Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

# Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximizing the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

### **Energy and Electric Systems**

A wide range of power and electrical products from generators to large-scale displays.

### **Electronic Devices**

A wide portfolio of cutting-edge semiconductor devices for systems and products.

### **Home Appliance**

Dependable consumer products like air conditioners and home entertainment systems.

### **Information and Communication Systems**

Commercial and consumer-centric equipment, products and systems.

# **Industrial Automation Systems**

Maximizing productivity and efficiency with cutting-edge automation technology.

# **OVERVIEW**

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# **CNC LINEUP**

# **M800W**



# **Premium CNC provides** expandability and flexibility

- ·Separated type, a control unit separated from
- ·Windows-based display is included in the lineup, which provides excellent expandability
- · Four expansion slots are provided as standard specifications, allowing for expansion using option

# M800S

**CNC LINEUP** 



# High-grade CNC well suited to high-speed high-accuracy machining and multi-axis multi-part system control

- •Panel-in type, a control unit with integrated display
- •Multi-CPU architecture allows for high performance and high functional graphics
- •Windows-less display provides easy operability

# **M80W**



# Standard CNC with expandability and flexibility

- ·Separated type, a control unit separated from display
- ·Windows-based display is included in the lineup, which provides excellent expandability
- Packaged type for selecting a machine type easily
- •Two expansion slots are provided as standard specifications, allowing for expansion using option cards slot

# **M80**



# Standard CNC provides high productivity and easy operability

- •Panel-in type, a control unit with integrated display
- Provided in package (TypeA/TypeB) for easier
- Windows-less based display provides easy operability

# **C80**



# iQ Platform compatible CNC C80 Series incorporated with Mitsubishi's state-of-the-art technologies

- · Easy linkage with many and varied MELSEC units.
- •MELSEC sequencer for PLC and GOT2000 for display unit are used.
- •Three of C80 can be mounted on one base and the control system with up to 21 part systems/48 axes can be established.

# **SELECTION PROCEDURE**

### Selection procedure flow chart

# Start selecting the NC specifications!

### Check the machine type and specifications STEP 1



- Machine type: lathe / machining center / grinding machine / special-purpose machine, etc.
- Details of control, required accuracy, with/without auxiliary axes (for workpiece feeding, turret, etc.)

### STEP 2 Decide the NC specifications



- Number of axes, axis configuration, number of part systems, with/without spindles, number of I/O points
- · Check the position detection method and detection performance (absolute/relative position, number of pulses)
- · Select the size of the display unit, keyboard

### STEP 3 Decide the servo motor

P72



- Select the servo motor capacity (NC Servo Selection)
- · Check the outline dimensions, encoder, and whether it has a scale or break

### STEP 4 Decide the spindle motor

P78



- · Check the spindle's base/maximum rotation speed, output, torque, outline dimensions and whether it has a keyway
- · Frame-type or built-in spindle motor
- · With/without optional specifications (orientation, spindle/C-axis, synchronization, etc.)
- · Check the C axis accuracy and the speed (when C axis is used)

### STEP 5 Decide the drive unit

P104



- · Check the capacity and the dimensions of a drive unit
- Check the power regeneration/resistor regeneration

### STEP 6 Decide the power supply unit



Select the power supply unit only when a power regenerative drive unit is used (NC Servo Selection)

### STEP 7 Decide the hardware options

P37,P53,P132



Check the options

(manual pulse generator, synchronous encoder, availability of network connection and PLC connection, etc.)

· Check the required cables and connectors (In some cases, customers may need to prepare cables and connectors themselves.)

### STEP 8 Decide the software options

P11



Check the number of programs stored (memory capacity), number of variable sets, etc.

· Check the required functions

# Check the development tools

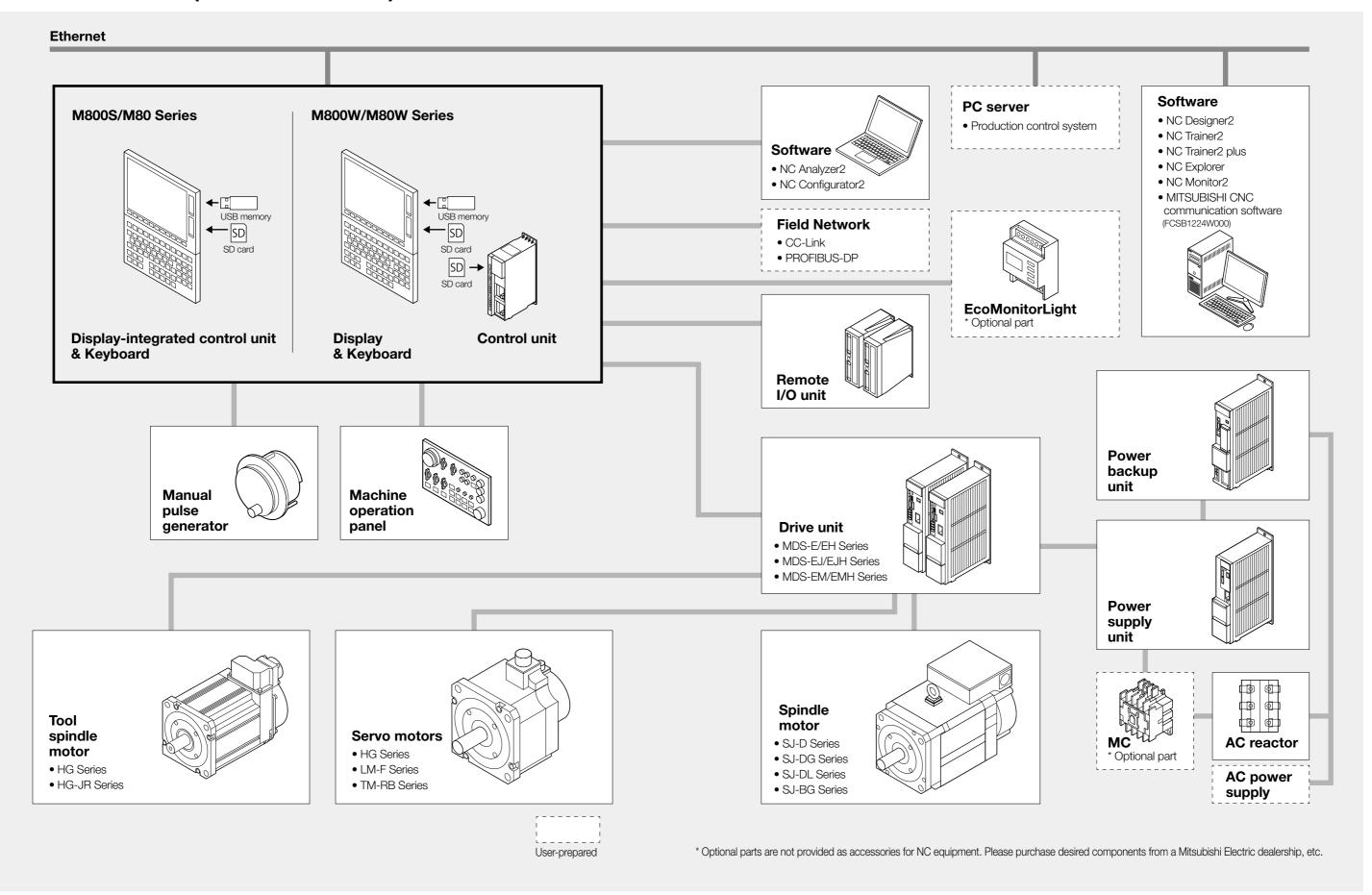
P149



Check the screen development tool (when screen customization is required)

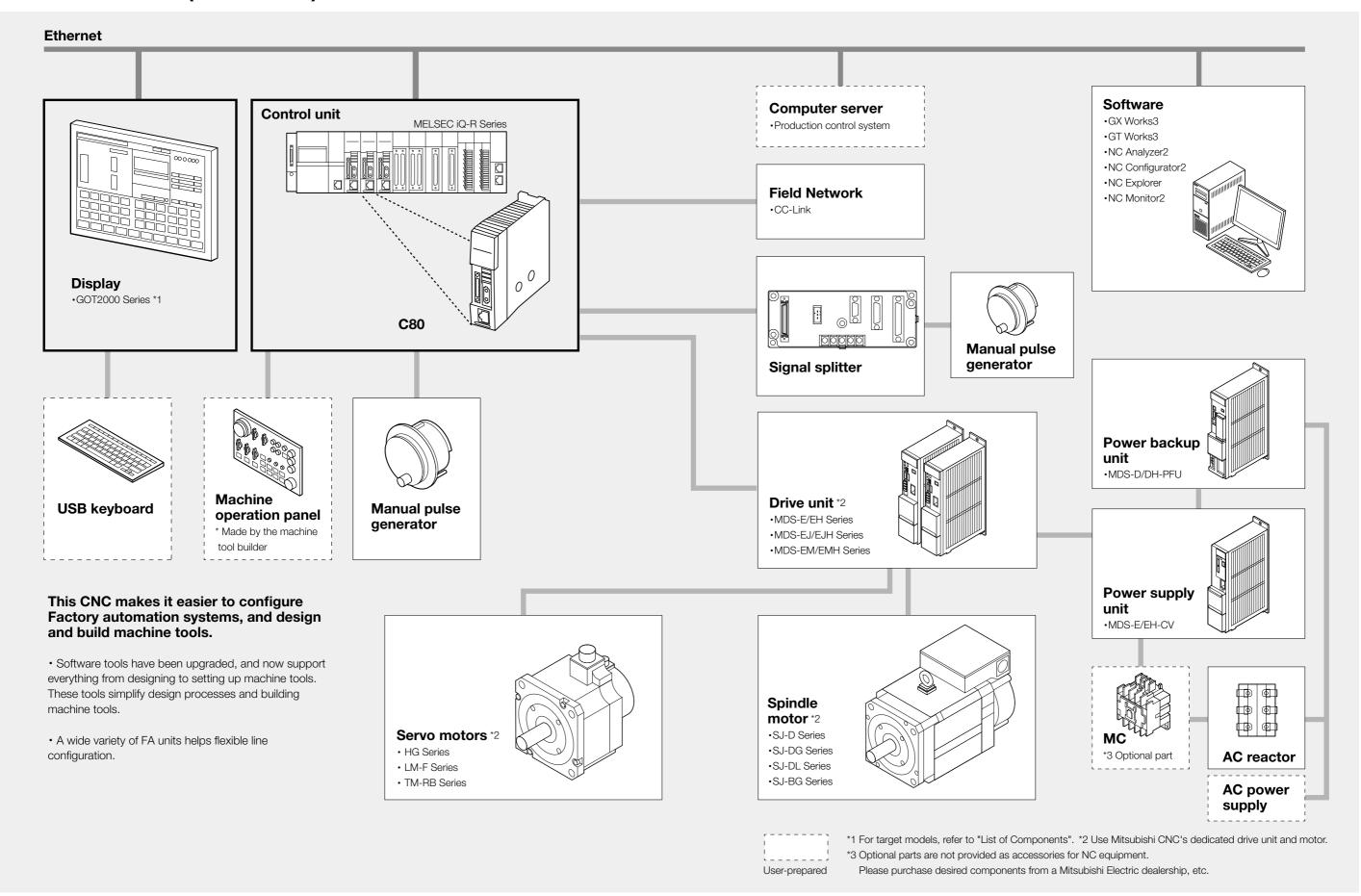
# NC specification selection completed!

# PRODUCT LINES (M800/M80 Series)



**PRODUCT LINES (C80 Series)** 

# **PRODUCT LINES (C80 Series)**



# M800/M80/C80 SERIES LINEUP

				I		Lathe system	T		Ī
		in the second of		a one one	AAA A	o dell'accional	al de la		
		(Display/Control u	nit separated-type)	(Display/Control	unit integrated-type)	(Display/Control unit separated-type)	(Display/Control ur	nit integrated-type)	
			/ Series		S Series	M80W Series	M80 S		C80 Series
Mode	el name	M850W	M830W	M850S	M830S	_	TypeA	TypeB	_
	Max. number of axes (NC axes + Spindles + PLC axes)	3	2		32	12	12	9	16
Z	Max. number of NC axes (in total for all the part systems)				32	10	10	7	16
Number of control axes	Max. number of spindles		 B		8	4+G/B(*1)	4+G/B(*1)	3	4
rofo	Max. number of PLC axes		3 3		8	6	410/2		8
ontro	Max. number of PLC indexing axes		3 3		8	4		1	8
axes	Number of simultaneous contouring control axes	8	4	8	4	4		1	4
	Max. number of NC axes in a part system	1	2		12	8	8	5	8
Max.	number of part systems (main + sub)		 B		8	4	4	2	3
	number of main part systems				8	2	2	2	3
Max.	number of sub part systems		 B		8	2	2	1	2
	unit-side High-speed program server mode	Avai	lable		_	Available	_		_
Display	unit-side High-speed program server mode	Available/— (*2)		Available		Available/— (*2)	Avai	lable	_
Front	-side SD card mode	Avai	lable	Ava	ailable	Available	Avai	lable	_
Least	command increment	1r	nm	1	nm	0.1µm	0.1	μm	0.1µm
Least	control increment	1r	nm	1	nm	1nm	1n	nm	1nm
Numl	per of tool offset sets	9:	99	999		256	256	99	256
Max.	program capacity	2,000kB (5,120m) (1,000)		2,000kB (5,120m) (1,000)		500kB (1,280m) (1,000)	500 (1,28 (1,0	30m)	500kB (1,280m) (1,000)
Max.	PLC program capacity [steps]	512	,000	51:	2,000	64,000	64,000	32,000	Available (MELSEC)
Multi-p	project [number of PLC projects stored]		6		6	3 3	1	1	_
Intera	active cycle insertion				Avai	lable			_
High-s	peed machining mode I maximum [kBPM]	30	3.7	3	3.7	33.7	33.7	_	Available
High-s	peed machining mode II maximum [kBPM]	10	68	-	168	67.5	67.5	_	Available
High-sp	peed high-accuracy control I maximum [kBPM]	67	7.5	6	7.5	33.7	33.7	_	Available
High-sp	peed high-accuracy control II maximum [kBPM]	10	68	-	168	67.5	67.5	_	Available
High-sp	need high-accuracy control III maximum [kBPM]	d high-accuracy control III maximum [kBPM]				_			
High-	accuracy control				Available			_	Available
SSS	control (Super Smooth Surface)				Available			_	_
Tolera	ance control				Available			_	_
CC-L	ink (Master/Local)				Avai	lable			Available (MELSEC)
PROF	FIBUS-DP (Master)	Available							_
MES	interface library				Avai	lable			_
Smar	t Safety observation					Available			
Displa	ay unit <sup>(⊲)</sup>	horizontal tou type touchscre	screen, 19-type chscreen, 15- en, or 10.4-type an be selected	10.4-type	uchscreen or touchscreen selected	19-type touchscreen, 19-type horizontal touchscreen, 15-type touchscreen, 10.4-type touchscreen, or 8.4-type can be selected	10.4-type, to	uchscreen, uchscreen or be selected	12.1-type touchscreen, 10.4-type touchscreen, 8.4- type touchscreen or 5.7-type touchscreen can be selected
Wind	ows®8 selection(*3)	Availab	le/— (*2)		_	Available/— (*2)	_	_	_

* Maximum specifications including optional specifications are listed. Refer to the Specifications List for the details of	each option.
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<sup>(\*1)</sup> G/B: Guide Bush

M800/M80/C80 SERIES LINEUP

					N	lachining center syste	m				
		S cost and S		and the same		To make the state of the state	al de al la company				
		(Display/Control u	nit separated-type)	(Display/Control u	nit integrated-type)	(Display/Control unit separated-type)	(Display/Control u	nit integrated-type)			
Mode	el name	M800V	V Series	M8008	S Series	M80W Series	M80	Series	C80 Series		
IVIOUE	a riairie	M850W	M830W	M850S	M830S	_	TypeA	TypeB	_		
	Max. number of axes (NC axes + Spindles + PLC axes)	3	32	3	32	11	11	9	16		
Z	Max. number of NC axes (in total for all the part systems)	1	16	1	16	8	8	5	16		
Number of control axes	Max. number of spindles		4		4	2		2	7		
of co	Max. number of PLC axes		8		8	6		6	8		
ontrol	Max. number of PLC indexing axes		8		8	4		4	8		
axes	Number of simultaneous contouring control axes	8	4	8	4	4		4	4		
	Max. number of NC axes in a part system	1	12	1	12	8	8	5	8		
Max. ı	number of part systems (main + sub)		2		2	2	2	1	7		
Max.	number of main part systems		2		2	2	2	1	7		
Max.	number of sub part systems		2		2	_	_	_	_		
Control	unit-side High-speed program server mode	Ava	ilable	-	_	Available	-	_	_		
Display	unit-side High-speed program server mode	Availab	ole/— (*2)	Ava	ilable	Available/— (*2)	Avai	ilable	_		
Front	-side SD card mode	Ava	ilable	Ava	ilable	Available	Avai	ilable	_		
Least	command increment	11	nm	11	nm	0.1µm	0.1	μm	0.1µm		
Least	control increment	11	nm	11	nm	1nm	1r	nm	1nm		
Numb	per of tool offset sets	9	99	999		400	400	400	400		
Max.	program capacity	2,000kB (5,120m) (1,000)		2,000kB (5,120m) (1,000)		500kB (1,280m) (1,000)	(1,2	0kB 80m) 000)	500kB (1,280m) (1,000)		
Max.	PLC program capacity [steps]	512	,000	512	,000	64,000	64,000	32,000	Available (MELSEC)		
Multi-p	project [number of PLC projects stored]		6		6	3	3	1	_		
Intera	ctive cycle insertion								_		
High-s	peed machining mode I maximum [kBPM]	33	3.7	3	3.7	33.7	33.7	16.8	Available		
High-s	peed machining mode II maximum [kBPM]	1	68	1	68	67.5	67	7.5	Available		
High-sp	eed high-accuracy control I maximum [kBPM]	6	7.5	6	7.5	33.7	30	3.7	Available		
High-sp	need high-accuracy control II maximum [kBPM]	1	68	1	68	67.5	67	7.5	Available		
High-sp	eed high-accuracy control III maximum [kBPM]	2	70	2	70	135	135	_	Available		
High-	accuracy control					Available					
SSS	control (Super Smooth Surface)					Available					
Tolera	ance control					Available					
CC-L	ink (Master/Local)				Avai	lable			Available (MELSEC)		
PROF	FIBUS-DP (Master)		Available								
MES	interface library				Avai	lable			_		
	t Safety observation					Available					
	ay unit <sup>(3)</sup>	horizontal tou type touchscre				19-type touchscreen, 19-type horizontal touchscreen, 15-type touchscreen, 10.4-type touchscreen,	10.4-type, to	uchscreen, ouchscreen or n be selected	12.1-type touchscreen, 10.4-type touchscreen, 8.4 type touchscreen or 5.7-typ touchscreen can be selecte		
- 1		touchscreen can be selected can be selected  Available/— [2]				or 8.4-type can be selected  Available/— (*2)  —			100010010011001100		

<sup>(\*2)</sup> Windows-based dispaly unit/Windows-less displpay unit

<sup>(\*3)</sup> For details, refer to "CNC SYSTEM CONTROL UNIT/DISPLAY UNIT" to be described.

# CNC SYSTEM M800/M80/C80 SERIES SPECIFICATIONS LIST

OStandard △Optional □Selection Specifications of separated-type display are classified with "Windows-based" and "Windows-less"

				Lathe	system				Machining center system M800W			
class	M8	Men						M80 C80 M80 M80				
	M850W	M830W	M850S	M830S	_	TypeA	TypeB	_	M850W	M830W		
ontrol axes												
Control axes  1 Number of basic control axes (NC axes)	02	02	02	02	02	02	02	02	03	03		
· · · · ·	∩16	016	016	016					016	016		
2 Max. number of axes (NC axes + Spindles + PLC axes)	△32	∆32	∆32	∆32	12	12	9	16	∆32	∆32		
1 Max. number of NC axes (in total for all the part syste	ems) ○16 △32	O16 ∆32	O16 ∆32	O16 ∆32	10	10	7	16	016	016		
2 Max. number of spindles	8	8	8	8	4+G/B*	4+G/B*	3	4	4	4		
3 Max. number of PLC axes	8	8	8	8	6	6	6	8	8	8		
4 Max. number of PLC indexing axes	8	8	8	8	4	4	4	8	8	8		
5 Number of simultaneous contouring control axes	8	4	8	4	4	4	4	4	8	4		
6 Max. number of NC axes in a part system	O8 ∆12	O8 ∆12	O8 ∆12	O8 ∆12	8	8	5	8	O8 ∆12	O8 ∆12		
7 Axis name extension	0	0	0	0	0	0	0	_	0	0		
Control part system												
1 Standard number of part systems	1	1	1	1	1	1	1	1	1	1		
2 Max. number of part systems (main + sub)	O4 ∆8	O4 ∆8	O4 ∆8	O4 ∆8	04	04	02	∆3	02	02		
1 May symbol of main part a ptoma	04	04	04	04	00	00	00	A 0	00	00		
1 Max. number of main part systems	△8	∆8	∆8	∆8	02	02	02	∆3	02	02		
2 Max. number of sub part systems	04	04	04	04	02	02	01	Δ2	02	02		
Control axes and operation modes	△8	△8	△8	△8								
1 Tape (RS-232C input) mode	0	0	0	0	0	0	0	_	0	0		
2 Memory mode	0	0	0	0	0	0	0	0	0	0		
3 MDI mode	0	0	0	0	0	0	0	0	0	0		
4 High-speed program server mode												
Control unit-side High-speed program server mode	Δ	Δ	_	_	0	_	_		Δ	Δ		
2 Display unit-side High-speed program server mode	Δ/—	Δ/—	Δ	Δ	0/—	0	0	_	Δ/—	Δ/—		
5 Front-side SD card mode	0	0	0	0	0	0	0		0	0		
6 Front-side USB memory mode	0	0	0	0	0	0	0		0	0		
out command							Ū					
Data increment												
1 Least command increment												
Least command increment 1µm	0	0	0	0	0	0	0	0	0	0		
Least command increment 0.1µm	0	0	0	0	0	0	0	0	0	0		
Least command increment 0.01µm (10nm)	Δ	Δ	Δ	Δ		_	_		Δ	Δ		
Least command increment 0.001µm (1nm)  Least control increment	Δ	Δ	Δ	Δ	_		_		Δ	Δ		
Least control increment 0.01µm (10nm)	0	0	0	0	0	0	0	0	0	0		
Least control increment 0.001µm (1nm)	0	0	0	0	0	0	0	0	0	0		
3 Indexing increment	0	0	0	0	0	0	0	0	0	0		
Unit system												
1 Inch / Metric changeover	0	0	0	0	0	0	0	0	0	0		
2 Input command increment tenfold	_	_	_	_	_	_	_	_	0	0		
Program format		L										
1 Program format												
1 Format 1 for Lathe (G Code List 2, 3)	0	0	0	0	0	0	0	0	_	_		
2 Format 2 for Lathe (G Code List 4, 5)	0	0	0	0	0	0	0	0		_		
3 Special format for lathe (G Code List 6, 7)	0	0	0	0	0	0	0	0	<u> </u>	_		
4 Format 1 for Machining center		_	_	_	_	_	_		0	0		
5 Format 2 for Machining center (M2 format)		_	_	_	_	_	_	_	0	0		
6 MITSUBISHI CNC special format	0	0	0	0	0	0	0	0		_		
2 Program format switch	Δ	Δ	Δ	Δ	_	_	_	_	_	_		
Command value		I		I								
1 Decimal point input I, II	0	0	0	0	0	0	0	0	0	0		
2 Absolute / Incremental command	0	0	0	0	0	0	0	0	0	0		
3 Diameter / Radius designation	0	0	0	0	0	0	0	0	_	_		
4 Diameter / Radius designation switch	0	0	0	0	0	0	_		0	0		
ositioning / Interpolation												
Positioning										_		
Positioning     Unidirectional positioning	0	0	0	0	0	0	0	0	Δ	Ο		
2 Linear / Circular interpolation			_				_		Δ			
1 Linear interpolation	0	0	0	0	0	0	0	0	0	0		
<u> </u>												
2 Circular interpolation (Center / Radius designation)	0	0	0	0	0	0	0	0	0	0		
		1 .	1 -		0	I ~	0	0	0	0		
3 Helical interpolation	0	0	0	0	0	0	~	0		~		

	Mac	chining o	enter sys	tem		
B.40					000	0
	00S	M80W	M80	80 M80	C80	General explanation
M850S	M830S	_	TypeA	TypeB		
03	03	03	03	03	03	
016	016	11	11	9	16	The NC axis, spindle, and PLC axis are generically called the control axis.
△32	△32					The NC axis can be manually or automatically operated using a machining program. The PLC axis can be controlled using a sequence program.
016	016	8	8	5	16	The number of axes that is within the max. number of control axes, and that does not exceed the max. number given for the NC axis, spindle and PLC axis, can be used.
4	4	2	2	2	7	* G/B: Guide Bush
8	8	6	6	6	8	The number of PLC axes available to be used as indexing axis.
8	4	4	4	4	4	Number of axes with which simultaneous interpolation control is possible.
08	08	8	8	5	8	Max. number of NC axes possible to control in the same part system.
Δ12 O	∆12 O	0	0	0		The axis name (command axis name) to issue the absolute/incremental value command to NC control axis can be expanded to two letters.
1	1	1	1	1	1	One part system is the standard.
02	02	02	02	01	△7	B MOCA MOS
02	02	02	02	01	Δ7	- [M800/M80] Up to eight part systems for a lathe system, and up to two part systems for a machining center system.
J2	02	02	- 02		Δ1	[C80] Up to three part systems for a lathe system, and up to seven part systems for a machining center system.
02	02					
0	0	0	0	0	_	In this mode, operation is performed using the machining program data from the RS-232C interface built in the CNC unit.
0	0	0	0	0	0	Machining programs stored in the memory of the CNC module are run.  MDI data stored in the memory of the CNC unit are executed.
_	_	0	_	_	_	The machining program stored in SD card can be operated by installing a SD card in the control unit SD card interface.
Δ	Δ	0/—	0	0	_	The machining program stored in the built-in disk of the display unit can be operated.  The built-in disk of the display unit is mounted in the personal computer for M800W/M80W (Windows-based display unit). For M800S/M80,
0	0	0	0	0		the SD card inserted into SD card I/F on the back of the display unit is equivalent to the built-in disk of the display unit.  The machining program stored in a SD card can be operated. This SD card is installed to the front-side SD card VF.
0	0	0	0	0		The machining program stored in a USB memory can be operated. This USB memory is installed to the front-side USB memory I/F.
0	0	0	0	0	0	The data increment handled in the controller includes the input setting increment and command increment. Each type is set with parameters.  Possible to command in increments of 0.001mm (linear axis) and 0.001° (rotary axis).
0	0	0	0	0	0	Possible to command in increments of 0.0001mm (linear axis) and 0.0001° (rotary axis).
Δ	Δ	_	_	_	_	Possible to command in increments of 0.00001mm (linear axis) and 0.00001° (rotary axis).
Δ	Δ	_	_	_		Possible to command in increments of 0.000001mm (linear axis) and 0.000001° (rotary axis).
0	0	0	0	0	0	The least control increment determines the CNC's internal operation accuracy.  Possible to control in increments of 0.00001mm (linear axis) and 0.00001° (rotary axis).
0	0	0	0	0	0	Possible to control in increments of 0.000001mm (linear axis) and 0.000001° (rotary axis).
0	0	0	0	0	0	This function limits the command value for the rotary axis.
						The unit systems of the data handled in the controller include the metric system and inch system. The type can be designated with a
0	0	0	0	0	0	parameter and a machining program.  The program's command increment can be multiplied by an arbitrary scale with the parameter designation. This function is valid when a
0	0	0	0	0	0	decimal point is not used for the command increment.
	Ι					G code (program) format
_	_	_	_	_		e ooo gragarijimma
_	_	_	_	_	_	G code list for the lathe system. The G code list is selected by parameter.
		_				
0	0	0	0	0	0	G code list for the machining center system. The G-code list is selected by parameter.
		_				The formats of the fixed cycle for turning machining (G77 to G79), compound type fixed cycle for turning machining (G71 to G76) and fixed
						cycle for drilling (G80 to G89) can be switched to the MITSUBISHI CNC special formats.  This function is designed to switch the program format (G code list) using G codes or PLC signal. When you run a lathe-based multi-tasking machine,
_	-	-	-	_	_	and if you change to the G code list of machining center system, you can use a free-curved surface machining program made with CAM without modifying the program.
0	0	0	0	0	0	For the decimal point input type 1, the unit of the last digit of a command without a decimal point is the same as that of the least command increment. For decimal point input type 2, the last digit of a command without a decimal point is interpreted in millimeters during the metric
						mode, in inches in the inch mode, or in seconds for a time-based command.  When axis coordinate data are issued in a machining program command, either the incremental command method, which commands a
0	0	0	0	0	0	relative distance from the current position, or the absolute command method, which commands a movement to a designated position in a
						predetermined coordinate system, can be selected.  The designation method of an axis command value can be changed over with parameters between the radius designation or diameter
_	-	_	-	-	_	designation. When the diameter designation is selected, the scale of the length of the selected axis is doubled. (moves only half (1/2) the commanded amount)
0	0	_	<u> </u>	_	_	
_		_			^	This function carries out positioning at high speed using a rapid traverse rate with the travel command value given in the program.
Ο Δ	Ο	0	0	0	Ο Δ	The G code command always moves the tool to the final position in the direction determined by parameters.
			_	_		
0	0	0	0	0	0	Linear interpolation is a function that moves a tool linearly by the travel command value supplied in the program at the cutting feedrate designated by the F code.
0	0	0	0	0	0	This function moves a tool along a circular arc on the plane selected by the travel command value supplied in the program.
0	0	0	0	0	0	With this function, any two of three axes intersecting orthogonally are made to perform circular interpolation while the third axis performs linear interpolation in synchronization with the arc rotation. This control can be exercised to machine large-diameter screws or 3-dimensional
						cams.
Δ	Δ	0	0		Δ	This function interpolates arcs where the start point and end point are not on the circumference of the same circle into spiral shapes.

OStandard  $\triangle$ Optional  $\square$ Selection Specifications of separated-type display are classified with "Windows-based" and "Windows-less"

		dard Zoptional Eselection Specifications of separated-type									Mach	nining	
		class	B.A.O.	00W	B.A.O.	Lathe s			80	C00	center system M800W		
			M850W	M830W	M850S	M830S	M80W	M80	M80	C80	M850W	M830W	
_	Ŧ		VVUCOIVI	IVIOSUVV	NIOSUS	IVIOSUS		TypeA	ТуреВ		WUCOIN	IVIOSUVV	
	5	Cylindrical interpolation	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ	
	6	Polar coordinate interpolation	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ	
	7	Milling interpolation	Δ	Δ	Δ	Δ	0	0	0	Δ	_	_	
	8	Hypothetical axis interpolation	_	_	_	_	_	_	_	_	Δ	Δ	
:	3 C	urve interpolation		I								I	
	1	Involute interpolation	_	_	_	_	_	_	_	_	Δ	Δ	
	2	Exponential interpolation	Δ	Δ	Δ	Δ	_		_	_	Δ	Δ	
	3	Spline interpolation (G05.1Q2 / G61.2)	_	_	_	_	_	_	_	_	Δ	Δ	
	4	NURBS interpolation	_	_	_	_	_	_	_	_	Δ	Δ	
	5	3-dimensional circular interpolation	_	_	_	_	_	_	_	_	Δ	Δ	
	6	Spline interpolation2 (G61.4)	_	_	_	_	_	_	_	_	Δ	Δ	
4 F	eec												
·	$\overline{}$	pedrate	1000	4000	1000	4000	1000	1000	1000	1000	1000	1000	
	2	` '	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
	$\vdash$												
	4		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
:		eedrate input methods			0	0	0	0		0			
	1	Feed per minute (Asynchronous feed)	0	0	0	0	0	0	0	0	0	0	
	2	Feed per revolution (Synchronous feed)	0	0	0	0	0	0	0	0	Δ	Δ	
	3	Inverse time feed	_	_	_	_	_	_	_	_	Δ	Δ	
	4	F 1-digit feed	0	0	0	0	0	0	0	0	0	0	
	5	Manual speed command	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ	
	7	G00 feedrate designation (,F command)	Δ	Δ	Δ	Δ	0	0	_	Δ	Δ	Δ	
	3 O	l verride											
		Rapid traverse override	0	0	0	0	0	0	0	0	0	0	
	3	<u> </u>	0	0	0	0	0	0	0	0	0	0	
	4		0	0	0	0	0	0	0	0	0	0	
4	4 A	cceleration / Deceleration		l									
	1	Automatic acceleration / deceleration after interpolation	0	0	0	0	0	0	0	0	0	0	
	2	Rapid traverse constant inclination acceleration / deceleration	0	0	0	0	0	0	0	0	0	0	
	3	Rapid traverse constant inclination multi-step acceleration / deceleration	_	_	_	_	_	_	_	_	Δ	Δ	
ļ	5 Th	nread cutting											
	1	3( ,	0	0	0	0	0	0	0	0	Δ	Δ	
	2	9	0	0	0	0	0	0	0	0		_	
	3	Synchronous tapping  1 Synchronous tapping cycle	0	0	0	0	0	0	0	0	0	0	
				Δ	Δ		0	0			-	$\vdash$	
			Δ			Δ			0	Δ .	Δ	Δ	
		3 Deep-hole tapping cycle	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ	
	4	4 Multiple spindle synchronous tapping Chamfering	0	0	0	0	0	0	0	Δ	_		
	6		Δ	Δ	Δ	Δ	0	0	_		_	_	
	8	High-speed synchronous tapping (OMR-DD)	0	0	0	0	0	0	0	0	0	0	
	10	Thread recutting	Δ	Δ	Δ	Δ	0	0	_	Δ	_	_	
	1	Thread cutting override	Δ	Δ	Δ	Δ	0	0	_	Δ	_	_	
	12	2 Variable feed thread cutting	Δ	Δ	Δ	Δ	0	0	_	Δ	-	_	
6	_	Thread cutting time constant switch anual feed	0	0	0	0	0	0	0	_	0	0	
ſ	1		0	0	0	0	0	0	0	0	0	0	
	2		0	0	0	0	0	0	0	0	0	0	
	3	Incremental feed	0	0	0	0	0	0	0	0	0	0	
	4	Handle feed  Manual feedrate B	0	0	0	0	0	0	0	0	0	0	
	6		0			0			0		Δ	Δ	
- 1	L	I Mariada recurate D surrace specia contitor					_		_				

						[Mouu/Moujs/vv ver.c/ [Coujs/vv ver.az
	Mad	chining c	enter sys	tem		
M8	008	M80W		80	C80	General explanation
M850S	M830S	_	M80 TypeA	M80 TypeB	_	
Δ	Δ	0	0	0	Δ	This function transfers the shape that is on the cylinder's side surface (shape yielded by the cylindrical coordinate system) onto a plane, and when the transferred shape is designated in the program in the form of plane coordinates, the shape is converted into a movement along the linear and rotary axes of the original cylinder coordinates, and the contours are controlled by means of the CNC unit during machining.
Δ	Δ	_	_	_	Δ	This function converts the commands programmed by the orthogonal coordinate axes into linear axis movements (fool movements) and rotary axis movements (workpiece rotation) to control the contours. It is useful for cutting linear cutouts on the outside diameter of the workpiece, grinding cam shafts, etc.
_	_	_	_	_	_	When a laths with linear axes (X, Z axes) and rotary axis (C axis) serving as the control axes is to perform milling at a workpiece end face or in the longitudinal direction of the workpiece, this function uses the hypothetical axis Y, which is at right angles to both the X and Z axes, to enable the milling shape to be programmed as the X, Y and Z orthogonal coordinate system commands.
Δ	Δ	_	_	_	_	This function sets one of the axes of the helical interpolation or spiral interpolation, including a linear axis, as a hypothetical axis (axis with no actual movement), and performs pulse distribution. This enables SIN or COS interpolation, which corresponds to the side view (view from the hypothetical axis) of the helical interpolation or spiral interpolation.
Δ	Δ	0	0	_	_	Tools can be moved along the involute curve. This can be used for scroll machining of involute gears or compressors, and smooth accurate machining can be performed without stepping of path from the command by fine segment or without acceleration/deceleration by segment length.
Δ	Δ	_			_	With this function, the rotary axis movement is changed into exponential functions vis-a-vis the linear axis movements.
Δ	Δ	0	0	-	Δ	This function automatically generates spline curves that smoothly pass through rows of dots designated by a fine-segment machining program, and performs interpolation for the paths along the curves. This enables high-speed and high-accuracy machining.
Δ	Δ	_	_	_	_	This function realizes NUFBS curve machining by commanding NUFBS curve parameters (number of stages, weight, knot, control point). The path does not need to be replaced with fine segments.  An arc shape determined by three points (start point, intermediate point, end point) designated in the three-dimensional space can be
Δ	Δ	_	_		_	machined.
Δ	Δ	0	0	_	Δ	This function automatically generates curves that smoothly pass in the tolerance error range, and moves on the paths along the curves. This enables smooth machining.
1000	1000	1000	1000	1000	1000	The rapid traverse rate can be set independently for each axis using parameters.
1000	1000	1000	1000	1000	1000	This function specifies the feedrate of the cutting commands, and gives a command for a feed amount per spindle rotation or feed amount per minute.
1000	1000	1000	1000	1000	1000	The manual feedrates are designated as the feedrate in jog mode or incremental feed mode for manual operation and the feedrate during dy run ON for automatic operation. The manual feedrates are set using external signals.
0	0	0	0	0	0	This function multiplies the rotary axis' command speed by ten during initial inching.
0	0	0	0	0	0	By issuing a G command, the command from the block is issued directly with a numerical value following F as the feedrate per minute (mm / min or inch / min).
Δ	Δ	0	0	0	Δ	By issuing a G command, the command from the block is issued directly with a numerical value following F as the feedrate per spindle revolution (mm / rev or inch / rev).
Δ	Δ	0	0		Δ	This function can issue one block of machining time (inverse) commands in F commands, in place of normal feed commands. This enables the machining speed on the cutting surface to be constantly controlled and prevents the loss of accuracy, even if radius compensation is
						applied to the machining program that expresses the free curve surface with fine segment lines.
0	0	0	0	0	0	The feedrate registered by parameter in advance can be assigned by designating a single digit, following address F.  By enabling a manual speed command and selecting either handle feed or jog (manual) feed in the memory or MDI mode, automatic
Δ	Δ	0	0	0	Δ	operation can be carried out at this feedrate.  Feedrates can be specified for G00 (positioning command).
Δ	Δ	0	0	_	Δ	The speed of tool exchange, axis movement of gantry, etc. can be specified with the machining program so that the mechanical vibration can be suppressed.
						O carida can be careful to consul an absorbing children and carine the absorbing time to be a
0	0	0	0	0	0	Override can be applied to manual or automatic rapid traverse using the external input signal.  Override can be applied to the feedrate command designated in the machining program using the external input signal.
0	0	0	0	0	0	Override can be further applied as a second-stage override to the feedrate after the cutting feed override has been applied.
0	0	0	0	0	0	By turning on the override cancel external signal, the override is automatically set to 100% for the cutting feed during the automatic operation mode (tape, memory and MDI).
0	0	0	0	0	0	Acceleration / deceleration is automatically applied to all commands. The acceleration / deceleration patterns can be selected using a parameter from the following types: linear acceleration/deceleration, soft acceleration / deceleration, exponent function acceleration / linear deceleration and exponent function acceleration / linear deceleration.
0	0	0	0	0	0	This function performs acceleration / deceleration at a constant inclination during linear acceleration / deceleration in the rapid traverse mode. Compared to the method of acceleration / deceleration after interpolation, the constant inclination acceleration / deceleration method
Δ	Δ	0	0	0	Δ	enables improved cycle time.  This function carries out the acceleration / deceleration according to the torque characteristic of the motor in the rapid traverse mode during automatic operation. (This function is not available in manual operation.) The rapid traverse constant inclination multi-step acceleration /
						deceleration method makes for improved cycle time because the positioning time is shortened by using the motor ability to the maximum.
	Δ	0 —	0	0 -		Thread cutting with a designated lead can be performed. Inch threads are cut by designating the number of threads per inch with the E address.  By commanding the lead increment/decrement amount per thread rotation, variable lead thread cutting can be performed.
						* With digital VF spindle  This function performs tapping through synchronized control of the spindle and servo axis. This eliminates the need for floating taps and
Ο Δ	Ο	0	0	0	Ο Δ	enables tapping to be conducted at a highly accurate tapping depth.  The load applied to the tool can be reduced by designating the depth of cut per pass and cutting the workpiece to the hole bottom with a
						multiple number of passes.  In the deep-hole tapping, the load applied to the tool can be reduced by designating the depth of cut per pass and cutting the workpiece to
Δ	Δ	0	0	0	Δ	the hole bottom with a multiple number of passes.  This function enables two or more spindles to perform synchronous tapping at a time, thereby improving the tapping efficiency.
_	_		_		_	Chamfering can be enabled during the thread cutting cycle by using external signals.
_	_	_	_	_	_	Circular thread in which the lead is in longitudinal direction can be cut.
0	0	0	0	0	0	The servo axis directly detects and compensates the spindle's delay in tracking by using the communication between drive units over the high-speed optical servo network. By minimizing the synchronization error, the accuracy of the synchronous tapping is increased.
_	_	_	_	_	_	The function stores a thread groove position and compensates a start position of spindle thread cutting automatically so that the tool can pass along the memorized position of the thread groove at the thread cutting execution.
_	_	_		_	_	The thread cutting feedrate can be changed by changing the spindle override depending on rough cutting, finish machining, etc.  This function changes the cutting feedrate by the spindle override at the time of the thread cutting. The machining condition during thread
0	0	0	0	0	_	outting can be changed.  "Thread outting time constant" can be applied to the acceleration/deceleration time constant of the NC control axis during the tread outting.
0	0	0	0	0	0	The tool can be moved at the rapid traverse rate for each axis separately. Override can also be applied to the rapid traverse rate by means of
0	0	0	0	0	0	the rapid traverse override function.  The tool can be moved in the axis direction (+ or .) in which the machine is to be moved at the per-minute feedrate.
0	0	0	0	0	0	The tool can be moved for the designated amount (noremental value) in the axis direction each time the jog switch is pressed.
0	0	0	0	0	0	The machine can be moved in very small amounts by rotating the manual pulse generator.
Δ	Δ	0	0	0	0	Manual feedrate B is a function that sets an arbitrary axis feedrate from the user PLC separately from the manual feedrate.  When machining with the manual feedrate B function by moving the orthogonal axis while rotating the rotary table, the table rotation speed is
		_				controlled according to the distance from the rotation center.

				Lathe s	evetor				Mach	ining	
class	M8	00W	M8	00S	M80W	M	80	C80	center system M800W		
0.000	M850W	Ī	M850S	M830S	_	M80	M80	_	M850W	M830W	
8 Manual speed clamp	0	0	0	0	0	TypeA	TypeB	0	0	0	
7 Dwell											
1 Dwell (Time-based designation)	0	0	0	0	0	0	0	0	0	0	
2 Dwell (Revolution-based designation)	0	0	0	0	0	0	0	0	_		
Program memory / editing  1 Memory capacity		_					_				
Memory capacity (number of programs stored)											
500kB [1280m] (1000 programs) 1000kB [2560m] (1000 programs)	Δ	Ο	Ο	Ο Δ	0	0	0	0	Ο	Ο Δ	
2000kB [5120m] (1000 programs)	Δ	Δ	Δ	Δ					Δ	Δ	
2 Editing											
1 Program editing	0	0	0	0	0	0	0	0	0	0	
2 Background editing	0	0	0	0	0	0	0	0	0	0	
3 Buffer correction	0	0	0	0	0	0	0	0	0	0	
5 Multi-part system simultaneous program editing	0	0	0	0	0	0	0	0	0	0	
6 Special program editing display for synchronization between part systems	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ	
7 Finish shape view programming	Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ	
Operation and display  1 Structure of operation / display panel											
1 Color display (8.4-type LCD TFT)	_	Ι _	_		_			_	_		
2 Color touchscreen display (10.4-type LCD TFT)					_			_	_	_	
3 Color touchscreen display (15-type LCD TFT)	_	_						_	_	_	
Separated-type color display (8.4-type LCD TFT)     Separated-type color touchscreen display (10.4-type LCD TFT)			_	_			_	_	_	_	
6 Separated-type color touch screen display (15.4 type LCD TFT)			_	_		_	_	_			
7 Separated-type color touchscreen display (15-type LCD TFT / Windows8)			_	_		_	_	_			
8 Separated-type color touchscreen display (19-type LCD TFT / Windows8)			_	_		_	_	_			
9 Separated-type color touchscreen display (19-type Horizontal LCD TFT / Windows8)			_	_		_	_	_			
11 GOT (GOT2000 Series GT27 / GT25 12.1 / 10.4 / 8.4 / 5.7)		_	_	_	_	_	_	0	_	_	
2 Operation methods and functions		I					Ι				
1 Operation input	0	0	0	0	0	0	0	0	0	0	
Absolute value / Incremental value setting	0	0	0	0	0	0	0	0	0	0	
3 Multiple display connection	_	_	_	_	_	_	_	O(GOT)	_	_	
4 Common display to multiple NCs	_		_	_	_	_	_	O(GOT)	_	_	
5 Displayed part system switch	0	0	0	0	0	0	0	0	0	0	
6 Menu list	0	0	0	0	0	0	0	0	0	0	
7 Display switch by operation mode 8 External signal display switch	0	0	0	0	0	0	0	0	0	0	
9 Screen saver	0	0	0	0	0	0	0	O(GOT)	0	0	
10 Parameter guidance	0	0	0	0	0	0	0	0	0	0	
11 Alarm guidance	0	0	0	0	0	0	0	0	0	0	
12 Machining program input mistake check warning	Δ	Δ	Δ	Δ	_	_	_	_	Δ	Δ	
14 Screenshot capture	-/0	-/0	0	0	-/0	0	0	O(GOT)	-/0	-/0	
15 User selectable menu configuration	0	0	0	0	0	0	0	0	0	0	
<ul><li>16 PC-NC network automatic connection</li><li>17 Device open parameter</li></ul>	0/—	0/—	0	0	0/—	0	0		0/—	0/—	
18 SRAM open parameter	0	0	0	0	0	0	0	_	0	0	
19 MTB selectable menu configuration	0	0	0	0	0	0	0	0	0	0	
20 Remote desktop connection	-/0	-/0	Δ	Δ	-/0	0	0	_	-/0	-/0	
21 VNC server	Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ	
3 Display methods and contents			_					_	_	_	
1 Status display 2 Clock display	0	0	0	0	0	0	0	0	0	0	
3 Monitor screen display	0	0	0	0	0	0	0	0	0	0	
4 Setup screen display	0	0	0	0	0	0	0	0	0	0	
5 Edit screen display	0	0	0	0	0	0	0	0	0	0	
6 Diagnosis screen display	0	0	0	0	0	0	0	0	0	0	
7 Maintenance screen display	0	0	0	0	0	0	0	0	0	0	
8 Home application	0/—	0/—	_	_	0/—	_	_	_	0/—	0/—	
9 Home screen	0	0	0	0	0	0	0	_	0	0	
							L		I		

	Mac	hining c	antar eve	tom		
M80		M80W	enter sys	80	C80	General explanation
M850S	M830S	IVIOUVV	M80	M80	_	денега ехранацон
0	0	0	TypeA O	TypeB	0	The maximum speed for manual feed can be switched to the rapid traverse rate or the manual feed clamp speed.
0	0	0	0	0	0	The G code command temporarily stops machine movements and sets the machine in the stand-by status for the time designated in the program.
_	_	_			_	When G04 is commanded in the synchronous feed mode (G95), the machine waits for the spindle to rotate for the number of the revolutions designated.
					_	
Δ	Ο	0	0	0	0	Machining programs are stored in the NC memory, data server or external memory devices (front SD card, built-in disk of display unit, etc.). (Note) For a multi-part system, the specifications shown here is the total for all part systems.
Δ	Δ	_	_	_	_	
0	0	0	0	0	0	This function enables program editing such as correction, deletion and addition.
0	0	0	0	0	0	This function enables one machining program to be created or edited while another program is running.
0	0	0	0	0	0	During automatic operation (including memory, tape, SD card or Data Server (DS) operation) or MDI operation, this function initiates single block stop and enables the next command to be corrected or changed.
0	0	_	_	_	_	When an operation to open a machining program in the NC memory is performed on the edit screen, machining programs are opened in the right and left areas at the same time; the specified machining program of the displayed part system in the edit area being selected and the
Δ	Δ					machining program of another part system with the same name in the unselected edit area.  When the left and right edit areas are displaying the same named programs of different part systems stored on the NC memory, the display
		_	_	_		is switched to the synchronized display of the left- and right- side programs aligned using the timing synchronization symbols.  This function shows the machining shape according to the command at the time the machining program is input. The machining shape can
Δ	Δ	0	0	0	_	be confirmed easily without performing the automatic operation or the graphic check.
	_				_	
			_	_	_	
	_		_	_	_	The setting and display unit consists of the display unit and the keyboard unit.  Refer to "HARDWARE" described later for the details.
_	_		_	_	_	(Note) Only software keyboard is available and there is no hardware keyboard for the separated-type color touchscreen display (19-type LCD TFT/Windows8 or 19-type horizontal LCD TFT/Windows8).
_			_		_	
_	_		_	_	_	
		_	_	_	0	Select a GOT in its lineup. For details, refer to catalogs: "GOT2000 series".
0	0					In the later of th
1 0	0	0	0	0	0	In addition to the method of directly inputting numeric data, a method to input the operation results using four basic arithmetic operators and function symbols can be used for specific data settings.
0	0	0	0	0	0	function symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.
	_				O O(GOT)	function symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)
0 -	0 —	0 —	0 —	0 -	O O(GOT) O(GOT)	function symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)
0 — —	0 - - 0	0 — —	0 — —	0	O O(GOT)	function symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of
0 -	0 —	0 —	0 —	0 -	O O(GOT) O(GOT)	function symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.
0 - - 0 0	0 - - 0	0  0 0	0 —	- - - 0	O (GOT) O (GOT) O O	function symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.
0 - - 0 0	0 - - 0 0	0  0 0 0	0  0 0 0	0   0 0	O (GOT) O (GOT) O O O O O O (GOT)	Iunction symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.
0 - - 0 0	0  0 0	0  0 0	0  0 0	0 - - - 0	O (GOT) O (GOT) O O	function symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.
0 - - 0 0	О — — — О О О О О О О О О О О О О О О О	0 - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 — — 0 0 0	0 	O O(GOT) O O O O O O(GOT) O O O O(GOT) O O	Incition symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.
Ο Ο Ο Ο Ο Ο Ο Ο Δ Ο Ο	Ο Ο Ο Ο Ο Ο Ο Ο Ο Δ Ο Ο	0 - 0 0 0 0 0 0	0 	0 	O O(GOT) O(GOT) O O O O O O(GOT) O O O(GOT) O O O(GOT) O O O(GOT)	Iunction symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an ilegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.
О — — — — — — — — — — — — — — — — — — —	О — — — О О О О О О О О О О О О О О О О	0 	0 - 0 0 0 0	0 	O O(GOT) O(GOT) O O O O(GOT) O O O(GOT) O O O(GOT) O O O(GOT)	Uncortion symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.
О — — О О О О О О О О О О О О О О О О О	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	O	0 	0   0 0 0 0 0  0	O O(GOT) O(GOT) O O O O O O(GOT) O O O(GOT) O O O(GOT) O O O(GOT)	Unition symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system display do not be screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an ilegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / nondisplay selection.  This function supports to restore the connection when the network connection falls between the display unit and the control unit.  This function can set or change the user backed up area of the PLC device from the NC screen.
О — — О О О О О О О О О О О О О О О О О	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	0	0 	0 	O (GOT) O (GOT) O O O O O O O O O O O O O O O O O O O	Union symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / nondisplay selection.  This function supports to restore the connection when the network connection fails between the display unit and the control unit.
Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	0 0	0 	0 	O (GOT) O (GOT) O O O O O O O O O O O O O O O O O O O	Unition symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an ilegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / nondisplay selection.  This function can set or change the SRAM open area for machine tool builders from the NC screen.  Menu items on the "Monitor", "Setup" and "Edit" screen or hidden as desired. The custom screen menu items added by machine tool builders from the NC screen.
О — — О О О О О О О О О О О О О О О О О	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	0	0 	0 	O (GOT) O (GOT) O O O O O O O O O O O O O O O O O O O	United the data, the absolute fincemental settings.  When setting the data, the absolute fincemental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen display changes with the signal from PLC.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the user backed up area of the PLC device from the NC screen.  Menu items on the "Monitor", "Setup" and "Edit" screens (of MITSUBISHI standard format) can be moved within a screen or hidden as desired. The custom screen menu items added by machine tool builders, on the contrant, cannot be moved or hidden.  This function enables status confirmation and remote operation by displaying the NC screen display on the external perso
О — — О О О О О О О О О О О О О О О О О	О — — О О О О О О О О О О О О О О О О О	0 	0 	0 	O (GOT) O (GOT) O O O O O O O O O O O O O O O O O O O	United the data, the absolute incremental settings.  When setting the data, the absolute incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display in the tyruning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the user backed up area of the PLC device from the NC screen.  This function can set or change the user backed up area of the PLC device from the NC screen.  Menu items on the "Monitor", "Setup" and "Edit" screens (if MITSUBISH) standard format) can be moved within a screen or hidden as desired. The outsom screen menu items added by machine tool b
Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	0	O	0 	O O(GOT) O O O O O O O O O O O O O O O O O O O	United the data, the absolute incremental settings can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen display changes with the signal from PLC.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / nondisplay selection.  This function can set or change the user backed up area of the PLC device from the NC screen.  This function can set or change the serval open area for machine tool builders from the NC screen.  Menu items on the "Monitor", "Setup" and "Edit" screens (of MITSUBISH) standard format) can be moved with
О — — — О О О О О О О О О О О О О О О О	О — — О О О О О О О О О О О О О О О О О	O	0 	0 	O (GOT) O (GOT) O O O O O O O O O O O O O O O O O O O	United the data, the absolute incremental settings.  When setting the data, the absolute incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen display changes with the signal from PLC.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the user backed up area of the PLC device from the NC screen.  This function can set or change the user backed up area of the PLC device from the NC screen.  Menu items on the "Monitor", "Setup" and "Edit" screens (of MITSUBISHI standard format) can be moved within a screen or hidden as desired. The custom screen menu items added by machine tool builders from the NC screen.  This function can set or change the user backed up
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	0		0 	O O(GOT) O O O O O O O O O O O O O O O O O O O	United the data, the absolute incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the user backed up area of the PLC device from the NC screen.  This function can set or change the user backed up area of the PLC device from the NC screen.  Menu items on the "Monitor", "Setup" and "Edit" screens (of MITSUBISH standard format) can be moved within a screen or hidden as desired. The custom screen menu items added by machine tool builders, on the contrary, cannot be moved or hidden.  This f
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	0		0 	O O(GOT) O O O O O O O O O O O O O O O O O O O	When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the user backed up area of the PLC device from the NC screen.  This function can set or change the user backed up area of the PLC device from the NC screen.  Menu items on the "Monitor", "Setup" and "Edit" screens (of MITSUBISH standard format) can be moved within a screen or hidden as desired. The custom screen menu items added by machine tool builders, on the contrary, cannot be moved or hidden.
Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	Ο Ο Ο Ο Ο Ο Ο Ο Δ Δ Δ Ο Ο Ο Ο Ο Ο Ο Ο	O		0 	O (GOT) O (GOT) O O O O O O O O O O O O O O O O O O O	When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an ilegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the sprayed order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the SPAM open area for machine tool builders, not the NC screen.  This function can set or change the sprayed order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change displayed.  Verious information related to operat
О — — О О О О О О О О О О О О О О О О О	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	O		0 	O O(GOT) O O O O O O O O O O O O O O O O O O O	When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to eight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Lising an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The memu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight OFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Guidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function supports to restore the connection when the network connection fails between the display unit and the control unit.  This function can set or change the SPAM open area for mean menu in the "Monitor", "Setup" and "Edit" screens, and to change display of non-display selection.  This function can set or change the SPAM open area for the PLC device from the NC screen.  Menu items on the "Monitor", "Setup" and "Edit" screens (of MITSUBSH) standard format) can be moved writhin a screen or hidden as desired. The custom screen menu items added by machine tool builders, on the cont
Ο	Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0 	O (GOT) O (GOT) O O O O O O O O O O O O O O O O O O O	Iunction symbols can be used for specific data settings.  When setting the data, the absolute/incremental setting can be selected from the menu.  Using an Ethernet hub, one CNC module can be connected to and switched between up to elight displays. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  Using an Ethernet hub, one display can be connected to and switched between up to 64 CNC modules. (Note that the max. number of connectable displays is limited depending on the machine operation panel specifications.)  The part system displayed on the screen can be changed.  The menu list function displays the menu configuration of each screen as a list, making it possible to directly select the menu for other screens.  The screen display changes when the screen mode selection switch is changed.  The screen display changes when the screen mode selection switch is changed.  The screen display changes with the signal from PLC.  The screen saver function protects the display unit by turning the backlight CFF after the length of time specified in a parameter.  This function displays the details of the parameters or the operation methods according to the state of the screen currently displayed.  Quidance is displayed for the alarm currently issued.  If an illegal input is found in the decimal point after the current cursor position, the cursor will move to that position, and a warning message will appear.  This function allows to output a bitmap file of a screen displayed on the setting and display unit.  This function allows to change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the display order of the main menu in the "Monitor", "Setup" and "Edit" screens, and to change display / non-display selection.  This function can set or change the SPAM open area for machine tool builders from the NC screen.  Menu Items on the "Monitor", "Setup" a

				Lathe	system					hining system	
class	M8	00W	M8	00S	M80W		80	C80			
	M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	M830V	
10 Additional languages						Турен	Турев				
1 Japanese											
2 English	0	0	0	0	0	0	0	0	0	0	
3 German 4 Italian											
4 Italian 5 French											
6 Spanish											
7 Chinese				-			-			-	
1 Traditional Chinese characters											
2 Simplified Chinese characters											
8 Korean											
9 Portuguese 10 Hungarian											
11 Dutch											
12 Swedish											
13 Turkish											
14 Polish											
15 Russian											
16  Czech ut / Output functions and devices											
Input / Output data											
Machining program input / output	0	0	0	0	0	0	0	0	0	0	
2 Tool offset data input / output	0	0	0	0	0	0	0	0	0	0	
3 Common variable input / output	0	0	0	0	0	0	0	0	0	0	
4 Parameter input / output	0	0	0	0	0	0	0	0	0	0	
5 History data output 7 System configuration data output	0	0	0	0	0	0	0	0	0	0	
nput / Output I/F			0		0			0			
1 RS-232C I/F	0	Го	0	ГО	0	0	Го	_	0	Го	
2 SD card I/F											
1 Control unit-side SD card I/F [up to 32GB]	0	0	_	_	0	_	_	_	0	0	
2 Front-side SD card I/F [up to 32GB]	0/—	0/—	0	0	0/—	0	0	_	0/—	0/—	
3 Ethernet I/F	0	0	0	0	0	0	0	O(GOT)	0	0	
4 Display unit-side data server I/F	0	0	0	0	0	0	0	_	0	0	
5 Front-side USB memory I/F [up to 32GB] 6 USB I/F (GOT front-side USB I/F)	0	0	0	0	0	0	0	0	0	0	
7 SD VF (GOT back-side SD card VF)	_	_		_	_	l _	_	0	_	<u> </u>	
Computer link											
1 Computer link B	Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ	
Others		T		T			I			1	
1 Handy terminal connection	0	0	0	0	0	0	0	_	0	0	
indle, Tool and Miscellaneous functions											
Spindle functions (S)											
1 Spindle control functions											
1 Spindle digital I/F	0	0	0	0	0	0	0	0	0	0	
2 Spindle analog I/F	0	0	0	0	0	0	0	(MELSEC)	0	0	
3 Coil switch	0	0	0	0	0	0	0	0	0	0	
4 Automatic coil switch									_	_	
	0	0	0	0	0	0	0	0	0	0	
5 Encoder input I/F 6 Spindle-mode servo motor control		Δ	Ο Δ	0	0	0	0		Δ		
	Δ			Δ						Δ	
7 Spindle-mode rotary axis control			_	_	_	_			Δ	Δ	
8 Turret gear change control	Δ	Δ	Δ	Δ	0	0	0	_	_	_	
2 S code output	0	0	0	0	0	0	0	0	0	0	
3 Constant surface speed control	0	0	0	0	0	0	0	0	0	0	
•									1	_	
4 Spindle override	0	0	0	0	0	0	0	0	0	0	
5 Multiple-spindle control											
1 Multiple-spindle control I	0	0	0	0	0	0	0	0	<u> </u>	T -	
2 Multiple-spindle control II	0	0	0	0	0	0	0	0	0	0	
6 Spindle orientation	0	0	0	0	0	0	0	0	0	0	
7 Spindle position control (Spindle / C axis control)									T		
Spindle position control (Spindle / C axis control)	0	0	0	0	0	0	0	0	0	0	
2 C axis control during Spindle synchronization	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ	
8 Spindle synchronization	+		_		<u> </u>	<u> </u>			<del>                                     </del>		
Spindle synchronization I	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	
2 Spindle synchronization II										1	
					0	0	_		T _	_	
Spindle synchronization II     Guide bushing spindle synchronization     Tool spindle synchronization I (Polygon)	Δ	Δ	Δ	Δ	0	0	_	_	_	_	

	Mad	hining c	enter sys	tem		
M80	00S	M80W	М	80	C80	General explanation
M850S	M830S	_	M80 TypeA	M80 TypeB	_	
0	0	0	0	0	0	
						Available display languages.
0	0	0	0	0	0	
0	0	0	0	0	0	
0	0	0	0	0	0	Certain kinds of data handled by the NC system can be input and output between the NC system's memory and external devices.
0	0	0	0	0	0	
0	0	0	0	0	0	
				_		
0	0	0	0	0	_	Port 1 and 2 are available with the RS-232C interface. The connection point for a connector depends on the product model.
1		0		I _		Interface card to use SD card can be attached inside the NC control unit.
0	0	0/—	0	0	_	Interface card to use SD card can be attached in front of the display unit.
0	0	0	0	0	O(GOT)	Ethernet interface card can be attached onto the NC unit.
0	0	0	0	0	_	A built-in disk of display unit can be used.
0	0	0	0	0	_	A USB memory can be mounted.
			_	_	0	Interface card to use USB memory can be attached inside the GOT.  Interface card to use SD card can be attached inside the GOT.
Δ	Δ	0	0	0	_	Computer link B is a function to receive/send data between the host computer and the CNC.
						This function controls the serial communication (RS232C) of CNC and handy terminal. Handy terminal is a downsized machine operation
0	0	0	0	0	_	panel which enables you to operate the machine including setup at hand.
						The spindle rotation speed is determined in consideration of the override and gear ratio for the S command given in automatic operation or
0	0	0	0	0	0	with manual numerical commands, and the spindle is rotated.  This interface is used to connect the digital spindle (AC spindle motor and spindle drive unit).
0	0	0	0	0	Δ	Spindle control can be executed using an analog spindle instead of the digital spindle.
					(MELSEC)	Constant output characteristics can be achieved across a broad spectrums down to the low-speed ranges by switching the spindle motor
0	0	0	0	0	0	connections. This is a system under which commands are assigned from the PLC.  Constant output characteristics can be achieved across a broad spectrums down to the low-speed ranges by switching the spindle motor
0	0	0	0	0	0	connections. This is a system under which the CNC module switches the coils automatically in accordance with the motor speed.
0	0		0	0		With this function, arbitrary pulse can be input by parameters set in R register. * Encoder expansion card is required for M800W/M80W.
Δ	Δ	0	0	0		This function controls a spindle using the combination of servo motor and servo drive unit (MDS-E Series) which controls NC axis.  This function enables a rotary axis driven by a servo motor to be controlled as a spindle. This enables lathe-turning machining, including synchronous
Δ	Δ	0	0	_	_	feed and thread cutting, to be performed in synchronization with the feedback speed of the rotary axis (spindle-mode rotary axis mode).
_	_	_	_	_	_	This function enables axes in the semi-closed system to select four types of gear ratios which are set to the spindle specification parameters according to the control input from the PLC.
0	0	0	0	0	0	When an 8-digit number following address S (S0 to S±9999999) is commanded, signed 32-bit binary data and start signal, or non-signed 32-bit binary data and start signal will be output to the PLC.
0	0	0	0	0	0	With radial direction cutting, this function enables the spindle speed to be changed in accordance with changes in the radial direction
0	0	0	0	0	0	coordinates and the workpiece to be cut with the cutting point always kept at a constant speed (constant surface speed).  This function applies override to the rotation speed of a spindle or milling spindle assigned by the machining program command during
0			<del>-</del>			automatic operation or by manual operation.  Multiple-spindle control is a function that controls all the spindles except the first spindle (main spindle) in a machine tool equipped with the
						second, third and fourth spindles (sub-spindles) in addition to the first spindle.
_	_		_	_	_	This function controls the spindles in a machine tool equipped with several spindles.  With this function, commands to the spindle are performed with one S command, and a signal from the PLC determines which spindle is
0	0	0	0	0	0	selected.
0	0	0	0	0	0	This function stops the spindle rotation at a certain position.
0	0	0	0	0	0	This function enables one spindle drive unit to be also used as the C axis (rotary axis) using an external signal.
Δ	Δ	_	_	_	Δ	This control enables C axis positioning while a long workpiece is controlled by front and back spindles that are in synchronization with each other. Under this control, the machine can perform milling at the center of workpiece.
				I		Survey on the control, the material performal till gat the center of workpiece.
	0	0	0	0	0	In a machine with two or more spindes, this function controls the rotation speed and phase of one selected spindle (synchronized spindle) in synchronization with the rotation of the other selected spindle (basic spindle). There are two methods for giving commands: G code and
0	_	0	0	0	0	PLC.  In synchronization with the rotation of the other selected spinole (basic spinole). There are two methods for giving commands: G code and PLC.
0	0			_		
	<u> </u>		_	_	_	This function is used for a machine with a spindle motor to rotate a guide bushing. It synchronizes the guide bushing spindle (G/B spindle) with the spindle motor used as a reference (basic spindle).
0			_	_	_	with the spindle motor used as a reference (basic spindle).
0			_	_	_	

						Lathe s	system				Machining center system	
		class	M80	oow	M8	00S	M80W		80	C80		00W
			M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	M830W
П	Т	2 Tool spindle synchronization I B	Δ	Δ	Δ	Δ	0	0	0	Δ	_	_
		(Spindle-Spindle, Polygon)  Tool spindle synchronization I C			Δ	Δ						
	L	(Spindle-NC axis, Polygon)	Δ	Δ	Δ	Δ	0	0	_	Δ	_	_
	-	0 Tool spindle synchronization II (Hobbing)	Δ	Δ	Δ	Δ	0	0	_	Δ	_	_
	- 1	1 Spindle speed clamp 3 Spindle oscillation	Ο Δ	Ο Δ	Ο	Ο Δ	0	0	0	0	Ο	Ο
	_ h	4 Spindle superimposition control	Δ	Δ	Δ	Δ	0	0	_	Δ		
	-	5 Multiple spindle synchronization set control	0	0	0	0	0	0	0		_	_
	H											
	1	6 Spindle speed fluctuation detection	Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ
	2 T	iool functions (T)		I					I			
		1 Tool functions (T command)	0	0	0	0	0	0	0	0	0	0
	3 N	Aliscellaneous functions (M)		T .					Ι .			
	Ĺ	1 Miscellaneous functions	0	0	0	0	0	0	0	0	0	0
	2	<u> </u>	0	0	0	0	0	0	0	0	0	0
	3	3 M code independent output	0	0	0	0	0	0	0	0	0	0
	4	4 Miscellaneous function finish	0	0	0	0	0	0	0	0	0	0
	Ę	M code output during axis traveling	0	0	0	0	0	0	_	0	_	_
		6 Miscellaneous function command high-speed output	0	0	0	0	0	0	0	0	0	0
	42	and miscellaneous functions (B)		I					T			
	_	1 2nd miscellaneous functions	0	0	0	0	0	0	0	0	0	0
	2	2 2nd miscellaneous function name extension	0	0	0	0	0	0	0	0	0	0
9		compensation										
	1 10	ool length / Tool position						_				
	F	1 Tool length offset	0	0	0	0	0	0	0	0	0	0
	2	2 Tool position offset	_	_	_	_	_	_	_		0	0
	3	Tool compensation for additional axes	0	0	0	0	0	0	0	0	_	_
	4	Tool position compensation (G43.7)	_	_	_	_	_	_	_	_	Δ	Δ
	2 T	iool radius		I					ı			
	Ĺ	1 Tool radius compensation	_		_	_		_			0	0
	2	2 3-dimensional tool radius compensation	Δ*	Δ*	_	_	_	_	_	_	Δ	Δ
	3	3 Tool nose radius compensation (G40 / 41 / 42)	0	0	0	0	0	0	0	0	Δ	Δ
	2	4 Automatic decision of nose radius compensation direction (G46 / 40)	0	0	0	0	0	0	0	0	<u> </u>	_
	Ę	Tool radius compensation diameter designation	_	_	_	_	_	_	_	_	0	0
	3 T	ool offset amount										
	ŀ	Number of tool offset sets		ı								
		1 99 sets 2 128 sets	0	0	0	0	_		0	0	_	_
		3 200 sets		_	_	_	_	_	_	_	0	0
		4 256 sets	_	_	_	_	0	0	_	Δ	_	_
		5 400 sets 6 999 sets	Δ	Δ	Δ	Δ		_			Δ	Δ
	2	2 Offset memory	Δ									
		1 Tool shape / wear offset amount	0	0	0	0	0	0	0	0	0	0
		2 Compensation type selection by parameter	_	_	_	_	_	_	_	_	0	0
	ŀ											
	3	Number of tool offset sets allocation to part systems	0	0	0	0	0	0	0	_	0	0
10	Cod	ordinate system										
	1 C	Coordinate system type and setting										
		1 Machine coordinate system	0	0	0	0	0	0	0	0	0	0
	2	2 Coordinate system setting	0	0	0	0	0	0	0	0	0	0
	3	Automatic coordinate system setting	0	0	0	0	0	0	0	0	0	0
	4	Workpiece coordinate system selection										
		1 Workpiece coordinate system selection (6 sets)	0	0	0	0	0	0	0	0	0	0
		2 Extended workpiece coordinate system selection (48 sets) G54.1P1 to P48	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
		Extended workpiece coordinate system selection (96 sets) G54.1P1 to P96      Extended workpiece coordinate system selection (300 sets) G54.1P1 to P300		_	_		_	_	_	_	Δ	Δ
	+											
		5 External workpiece coordinate offset	0	0	0	0	0	0	0	0	0	0

	DAG:	hining o	enter sys	tem		
M8	00S	M80W		80	C80	General explanation
M850S	M830S	_	M80 TypeA	M80 TypeB	_	
_	_	_	_		_	With a machine equipped with two or more spindles under serial connection control, this function enables spindle-spindle polygon machini (IB) by controlling the rotary tool spindle rotation in synchronization with the workpiece spindle rotation. The rotary tool spindle and workpiec spindle are designated from the spindles subject to serial connection control.
_	_	_	_	_	_	This function controls the workpiece (spindle) and tool (NC axis) so that they synchronously rotate at the commanded ratio, allowing polygo machining.
_	_	_	_	_	_	This function is to cut the gear with a hob (hob cutter).
0	0	0	0	0	0	The spindle rotation speed is clamped between max. rotation speed and min. rotation speed.
_	Δ		_	_		This function reciprocates (oscillates) the spindles with designated amplitude and frequency.  Spindles are controlled by superimposing the rotation speed of one spindle on the rotary speed of other spindle. Use this function when the tool spindle needs to be rotated with the superimposed speed on the spindle rotation speed.
_	_	_	_	_	_	By setting the parameter, spindle synchronization I, tool spindle synchronization IA/IB (spindle-spindle, polygon), tool spindle synchronization II (hobbing) and spindle superimposition control can be executed simultaneously for multiple sets of spindles.
Δ	Δ	0	0	0	_	When this function is valid and the spindle actual speed fluctuates for the commanded speed by the program due to external factors such as load fluctuation, the NC outputs the signal to PLC and the operation error occurs. PLC can take the necessary measure for the fluctuat of the spindle speed using the output signal from the NC.
0	0	0	0	0	0	The tool function is commanded with an 8-digit number following the address T (T0 to T9999999) to specify the tool No. In the controller a lathe, the tool compensation (tool length compensation, tool nose wear compensation) Nos. are also indicated.
0	0	0	0	0	0	Miscellaneous function, or M function, is used to command auxiliary functions for NC, such as rotating the spindle forward / backward or
0	0	0	0	0	0	stopping it, as well as turning the cooling oil ON/OFF.  Up to four sets of M commands can be issued in a block.
0	0	0	0	0	0	When the M00, M01, M02 or M30 command is issued during an automatic operation (tape, memory, MDI) or by a manual numerical
0	0	0	0	0	0	command, the signal of this function is output. It is turned OFF after the miscellaneous function finishes or by the reset & rewind signal.  These signals inform the CNC system that a miscellaneous function (M), spindle function (S), tool function (T) or 2nd miscellaneous function (A, B, C) has been issued, and that the PLC that has received it has completed the required operation. They include miscellaneous function
	_		_	_		finish signal 1 (FIN1) and miscellaneous function finish signal 2 (FIN2).  This function controls the timing at which miscellaneous functions are output, and it outputs a miscellaneous function when the axis reache
0	0	0	0	0	0	the designated position movement.  This function shortens a processing time per miscellaneous function.
						This full click it shorter is a processing time per misoeital rector in rector.
0	0	0	0	0	0	The code data and start signals are output when an 8-digit number is assigned following the address code A, B or C. whichever does not duplicate the axis name being used.
0	0	0	0	0	0	The 2nd miscellaneous function name same as the additional axes (A, B, C) can be used by specifying the command address of the 2nd
						miscellaneous function with two characters.
0	0	0	0	0	0	These commands make it possible to control the axis movement by offsetting the position of the end point of the travel command by the amount set in the tool compensation screen.
0	0	0	0	0	0	This function uses commands to control the movement by changing the end point positions of the movement commands to positions wh
_	_		_	_		have been extended or reduced for a tool compensation amount.  The tool compensation for a lathe is valid for the X and Z axes. If an additional axis (Y axis) is added, the tool compensation will be validate for the additional axis.
Δ	Δ	_	_	_	_	The position compensation of a turning tool is executed when turning is performed in a machine of machining center system.  "Option is "turning machining tool compensation".
0	0	0	0	0	0	This function provides tool radius compensation. Through a combination of the G command and D address assignment, the actual tool center path is compensated either inside or outside the programmed path by an amount equivalent to the tool radius.
Δ	Δ	_	_	_	_	This command serves the function of compensating the spherical radius of ball end mills. It compensates the actual tool center path to be either more outside or inside the programmed path by an amount equivalent to the tool radius amount in accordance with the 3-dimension
Δ	Δ		_			vectors. "This function is available during program format switch for L system.  The tool nose of the specified tool No. is assumed to be a half circle of the radius R, and compensation is applied so that the half circle touches the programmed path. "Option for M system is "turning machining tool compensation".
_	_	_	_	_	_	The nose radius compensation direction is automatically determined from the tool tip and the specified movement vector.  Tool diameter designation handles the compensation amount as diameter value and compensates the amount set in the tool compensation.
0	0	0	0	0	0	amount screen when tool radius compensation (G41/G42) is commanded.
_	_					
0	0			_	0	
_	_				_	The number of configurable sets of tool data such as tool length compensation and tool radius compensation.
Δ	Δ	0	0	0	Δ	
Δ	Δ					
0	0	0	0	0	0	This function registers the tool shape compensation and wear compensation amounts.
0	0	0	0	0		This function switches the tool compensation type to the tool compensation type III with the parameter. This function enables tool compensation for a turning tool by registering the tool compensation amount of the base axes LIK and tool tip point for a machining center.
0	0	_	_	_	_	system.  * Variable number of per-part-system tool offset sets The number of tool offset sets can be set per part system.  There are two types of the allocation: "Arbitrary allocation" which allocates the number of tool offset sets to each part system arbitrarily and "Fixed allocation" which automatically allocates the number of tool offset sets to each part system equally, and the type can be selected using the parameter.
						This shows the coordinate systems handled by the NC. The points that can be commanded with the movement command are points in the local coordinate system or machine coordinate system.
0	0	0	0	0	0	The machine coordinate system is used to express the prescribed positions (such as the tool change position and stroke end position) that are specific to each machine, and it is automatically set immediately upon completion of the first dog-type reference position return after power ON, or immediately after power ON if the absolute position specifications apply.
0	0	0	0	0	0	By issuing a G code, the program coordinate system (zero point of program) can be changed in the workpiece coordinate system.
0	0	0	0	0	0	After turning the power ON, even without executing the reference position return, the basic machine coordinate system and the workpiece coordinate system are set automatically.
			_			When multiple workpieces with the same shape are to be machined, these commands enable the same shape to be machined by execut
0	0	0	0	0	0	a single machining program in the coordinate system of each workpiece.
Δ	Δ	0	0	0	Δ_	In addition to the six workpiece coordinate systems G54 to G59, 48/96 sets of workpiece coordinate systems can be used by assigning
/\						G54.1Pn command.
Δ	Δ	_	_		_	An external workpiece coordinate offset that serves as a reference for all the workpiece coordinate systems is available outside the workpiece

					Lathe	system				Machining	
	class	M80	00W	M8	00S	M80W	М	80	C80		system 00W
		M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	M830W
	Workpiece coordinate system preset (G92.1)	0	0	0	0	0	О	О	0	Δ	Δ
	7 Local coordinate system	0	0	0	0	0	0	0	0	0	0
8	-	0	0	0	0	0	0	0	0	0	0
9	· · ·	0	0	0	0	0	0	0	0	0	0
1	0 Origin set / Origin cancel	0	0	0	0	0	0	0	0	0	0
		0		0	0			0	0	0	
1	1 Counter set	0	0	0	0	0	0	0	0	0	0
1	3 Workpiece coordinate system shift	0	0	0	0	0	0	0	0	_	_
	leturn  I Manual reference position return	0	0	0	0	0	0	0	0	0	0
2	2 Automatic 1st reference position return	0	0	0	0	0	0	0	0	0	0
3	3 2nd, 3rd, 4th reference position return	0	0	0	0	0	0	0	0	0	0
4	4 Reference position check	0	0	0	0	0	0	0	0	0	0
1 -	5 Absolute position detection	0	0	0	0	0	0	0	0	0	0
	Tool exchange position return	0	0	0	0	0	0	0	0	0	0
	eration support functions										
	rogram control										
	1 Optional block skip	0	0	0	0	0	0	0	0	0	0
2	Optional block skip addition	0	0	0	0	0	0	0	0	0	0
	3 Single block	0	0	0	0	0	0	0	0	0	0
	rogram test	_		0		_	0			0	0
2	Dry run  Machine lock	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0
	4 Graphic check									"	
	1 Graphic check	0	0	0	0	0	0	0	_	0	0
	3 Solid program check     Graphic check rotary axis drawing	Ο	Ο	Ο	Ο	0	0	0		0	0
5	5 Graphic trace	Δ	Δ	Δ			0	0		_	
	1 Graphic trace	0	0	0	0	0	0	0		0	0
	2 Graphic trace rotary axis drawing	Δ	Δ	Δ	Δ	0	0	0		0	0
1 7	Machining time computation  Manual arbitrary reverse run (Program check operation)	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
1 -	B High-speed simple program check	0	0	0	0	0	0	0	0	0	0
	rogram search / start / stop	0		0		0	0	0	0	0	
	Program search	0	0	0	0	0	0	0	0	0	0
- 1 -	2 Sequence number search	0	0	0	0	0	0	0	0	0	0
	3 Verification stop	0	0	0	0	0	0	0	0	0	0
<del> </del>	Program restart	0	0	0	0	0	0	0	0	0	
6	5 Automatic operation start 5 NC reset	0	0	0	0	0	0	0	0	0	0
1		0	0	0	0	0	0	0	0	0	0
1 -	3 Search & Start	0	0	0	0	0	0	0	0	0	0
	0 Auto-restart	0	0	0	0	0	0	0	0	0	0
	nterrupt operation					0			0		
	Manual interruption  2 Automatic operation handle interruption	0	0	0	0	0	0	0	0	0	0
1 -											
	Manual absolute switch Thread cutting cycle retract	0	0	0	0	0	0	0	0	0	0
	5 Tapping retract	0	0	0	0	0	0	0	0	0	0
<del> </del>	6 Manual numerical value command	0	0	0	0	0	0	0	0	0	0
1						_			_	0	0
	MDI interruption	0	0	0	0	0	0	0	0	0	0
Ş	Simultaneous operation of manual and automatic modes	0	0	0	0	0	0	0	0	0	0
1	Simultaneous operation of JOG and handle modes	0	0	0	0	0	0	0	0	0	0
1	1 Reference position retract	0	0	0	0	0	0	0	0	0	0
1	2 Tool retract and return	Δ	Δ	Δ	Δ	0	0	0		Δ	Δ
-   ⊢	3 Skip retract						_	_	_	0	0
1	4 PLC interruption	0	0	0	0	0	0	0	0	0	0

[M800/M80]S/W ver.C7 [C80]S/W ver.A2

		chining co	enter sys	tem		
	00S	M80W	M M80	80 M80	C80	General explanation
M850S	M830S		TypeA	TypeB	_	
Δ	Δ	_	_	_	_	This function presets the workpiece coordinate system, which has been shifted by the programmed command or the manual operation, as the workpiece coordinate system which has been offset by the programmed command (G92.1) from the machine zero point by an amount equivalent to the workpiece coordinate offset amount.
0	0	0	0	0	0	This function is for assigning another coordinate system in the workpiece coordinate system currently selected. This enables the workpiece coordinate system to be changed temporarily.
0	0	0	0	0	0	The rotary axis includes the rotating type (short-out valid/invalid) or the linear type (workpiece coordinate position linear type, all coordinate position linear type). The workpiece coordinate position range is 0 to 359.999° for the rotating type, and 0 to 99999.999° for the linear type.
0	0	0	0	0	0	By issuing a G code, it is possible to specify the planes for the arc, tool radius compensation, coordinate rotation and other commands.
0	0	0	0	0	0	Origin set is a function that shifts the coordinate system so that the current position is set as the zero point in the workpiece coordinate system containing the workpiece coordinate system's offset value. Origin cancel is a function that manually cancels all deviated amounts,
0	0	0	0	0	0	and shifts to the designated zero point with the workpiece offset.  The relative position counter can be set to an arbitrary value from the setting and display unit screen.
_	_	_	_	_	_	When a workpiece coordinate system which is considered at programming is misaligned with an actual set workpiece coordinate or a workpiece coordinate set by automatic coordinate system setting, the measured workpiece coordinate system can be shifted to the workpiece coordinate system at the program creation so that the machining can be performed without modification of the machining program.
0	0	0	0	0	0	This function enables the tool to be returned manually to a position specific to the machine (reference position).
0	0	0	0	0	0	By commanding the G code during an automatic operation, the 1st reference position return is executed. If an intermediate point is
0	0	0	0	0	0	commanded, a positioning is made to the point at rapid traverse rate, then each axis returns to its 1st reference position.  As in the automatic 1st reference position return, by commanding the G code during an automatic operation, an axis returns to a certain
0	0	0	0	0	0	position specific to the machine (2nd/3rd/4th reference position).  By issuing a G code, a machining program where the tool is programmed to start off from the reference position and return to the reference
0	0	0	0	0	0	position can be checked if the tool will return successfully to the reference position.  With this function, a battery stores the relation of the actual machine position and the machine coordinate kept in the CNC even during the
0	0	0	0	0	0	power OFF, and an automatic operation is enabled without executing a reference position return.  By specifying the tool change position in a parameter and also assigning a tool change position return command in a machining program, the tool can be changed at the most appropriate position.
0	0	0	0	0	0	When "/" (slash code) is programmed at the head of a block, and the optional block skip input signal from the external source is turned ON
					0	for automatic operation, the block with the "/" code is skipped.  When "/n (n: 1 to 9)" is programmed at the head of a block, and the optional block skip input n signal from the external source is turned ON
0	0	0	0	0	0	for automatic operation, the block with the "/n" code is skipped.  The commands for automatic operation can be executed one block at a time (block stop) by turning ON the single block input signal.
0	0	0	0	0	0	F code feed commands for automatic operation can be switched to the manual feedrate data of the machine operation board by turning ON the dry run input signal.
0	0	0	0	0	0	When the machine lock input signal is set to ON, the CNC operations can be executed without actually moving the NC axis.  When the "External input" signal or "Miscellaneous function lock" signal is turned ON, the output signals of M, S, T, and B (2nd miscellaneous
0	0	0	0	0	0	function) will not be output to the PLC. This is useful when checking only travel commands in a program check.
0	0	0	0	0	_	
0	0	0	0	0	_	This function traces the programmed movement path without executing an automatic operation. It enables three-dimensional drawing and also rotary axis drawing. By using this function, machining programs can be checked before they are actually run.
_	_	_		_	_	
0	0	0	0	0	_	This function traces the machine tool's machine positions. It draws the movement path of an actual automatic or manual operation, and the
_	_	_	_	_	_	tool tip movement path. The function also monitors the machine operations during machining. It enables the drawing of a rotary axis as well.
Ο	Ο	0	0	0	Δ	This function analyzes the machining program without moving the axis and calculates the approximate time required for machining.  The manual arbitrary reverse run can be performed by controlling the feedrate being in the automatic operation in the memory or MDI mode
0	0	0	0	0	0	in proportion to the manual feedrate by jog or the rotation speed by manual handle.  This function checks whether a program error occurs by operating the machining program without the axes movements. The estimated
Ü		Ü				machining time can be checked in time shorter than the actual execution time of the machining program.
0	0	0	0	0	0	This function specifies the program No. of the program to run automatically and calls the program.
0	0	0	0	0	0	Blocks can be indexed by setting the program No., sequence No. and block No. of the program to run automatically.
0	0	0	0	0	0	This function enables the single block stop status to be established at any block without having to turn the SINGLE BLOCK switch ON.  When a machining program is to be resumed after suspended midway due to tool damage or for some other reason, this function searches
0	0	0	0	0	0	the program and the block to resume and enables machining to be resumed from the block.  With the input of the automatic operation start signal (change from ON to OFF), automatic operation of the program that was found by an
0	0	0	0	0	0	operation search is started by the controller (or the halted program is restarted).  This function enables the controller to be reset.
0	0	0	0	0	0	When the feed hold signal is set to ON during automatic operation, the machine feed is immediately decelerated and stopped.
0	0	0	0	0	0	If the "Search & Start" signal is input when the memory mode is selected, the designated machining program is searched and executed from the beginning.
0	0	0	0	0	0	A machining program is restarted automatically at the completion of the machining program execution.
0	0	0	0	0	0	Manual interrupt is a function that enables manual operations to be performed during automatic operation.
0	0	0	0	0	0	The handle command can interrupt and be superimposed onto a command without suspending automatic operation to move the machine by rotating the manual pulse generator during automatic operation.
0	0	0	0	0	0	The program absolute positions are updated by an amount equivalent to the distance by which the tool is moved manually when the manual absolute switch signal is turned ON.
0	0	0	0	0	0	This function suspends the thread outling cycle if a feed hold signal has been input during thread outling cycle.  If tapping is interrupted by a reset or emergency stop signal that is input during tapping and the tap is left engaged inside the workpiece, the tap tool engaged inside the workpiece can be rotated in the reverse direction so that it will be disengaged by inputting the tap retract signal.
0	0	0	0	0	0	On the screen of the setting and display unit, the M, S and T (and B when 2nd miscellaneous function is valid) commands can be executed by setting numerical values and pressing [INPUT].
0	0	0	0	0	0	This function allows a program to run the executed blocks backward after the block stop in the automatic operation.  This function enables MDI programs to be executed during automatic operation in the single block stop status. When the modal status is
0	0	0	0	0	0	changed in a MDI program, the modal status in the automatic operation mode is also changed.  This function enables manual operations to be performed during automatic operation by selecting an automatic operation mode (tape, MDI or memory) and manual mode (francile, step, jog or manual reference position return) simultaneously. (Arbitrary feed based on the PLC is also
0	0	0	0	0	0	possible.)  When executing the jog feed and handle feed, both these feeds are available without changing the mode each time by inputting the jog
0	0	0	0	0	0	mode signal and simultaneous operation of jog and handle modes signal to the control unit.  When the retract signal is turned ON during the automatic and manual operation, this function can retract the tool immediately to a set
Δ	Δ	0	0	0	_	reference position.  Even if the machining program's operation is halted and the tool is retracted to change the tool or check the workpiece, etc., the tool can be returned to the halted point (machining halted point) and resume machining.
0	0	0	0	0	0	This function is used to return in the direction opposite the travel direction when the skip signal is input during G31 command.
						The interrupt program set with the R register is executed with the signals from the PLC during single block stop in program operation or

[M800/M80]S/	141	[C80]S/W ver.A
IIVIOUU/IVIOUIO/	vv ver.u/	ICOUS/VV Ver.A

						system				Machining center system		
	class	M8	00W	M8	00S	M80W	M80	80 M80	C80	M8	00W	
		M850W	M830W	M850S	M830S	_	TypeA		_	M850W	M830V	
	n support functions											
	ining method support functions rogram											
1	Subprogram control [Layers]	010	010	010	010	010	010	010	08	010	010	
2	Figure rotation									1	1	
	Figure rotation			_	_	_		_		Δ	Δ	
	Scaling		_	_	_	_	_	_	_	Δ	Δ	
-	Axis name switch acro program	0	0	0	0	0	0	0	0		_	
	User macro [Layers]	04	04	04	04	04	04	04	04	04	04	
2	Machine tool builder macro	0	0	0	0	0	0	0	0	0	0	
3	Macro interruption	0	0	0	0	0	0	0	0	0	0	
$\vdash$	Variable command											
1 1 1	2 600 sets 3 700 sets	0	0	0	0	0	0	0	0	0	0	
	4 8000 sets	Δ	Δ	Δ	Δ	0	0		_	Δ	Δ	
	6 (600+100×number of part systems) sets	0	0	0	0	0	0	_	0	0	0	
	7 (7900+100×number of part systems) sets xed cycle	Δ	Δ	Δ	Δ	0	0		_	Δ	Δ	
	Fixed cycle for drilling	0	0	0	0	0	0	0	0	0	0	
2	Fixed cycle for drilling (Type II)	0	0	0	0	0	0	0	0	_	_	
$\vdash$	Special fixed cycle  Fixed cycle for turning machining	<u> </u>	0	0	0	0	0	0	0	Δ 0	Δ 0	
$\vdash$		Δ	Δ	Δ	Δ	0	0	0	0	<del>                                     </del>	_	
6	Compound type fixed cycle for turning machining (Type II)	Δ	Δ	Δ	Δ	0	0	0	Δ	-	_	
	Small-diameter deep-hole drilling cycle	Δ	Δ	Δ	Δ	_	_	_		0	0	
	lirror image								_	-	Τ _	
	Mirror image by parameter setting  Mirror image by external input	0	0	0	0	0	0	0	0	0	0	
	Mirror image by G code	_		_	_	_	_	_	_	0	0	
4	Mirror image for facing tool posts	0	0	0	0	0	0	0	0	<u> </u>	<u> </u>	
$\vdash$	T code mirror image for facing tool posts	0	0	0	0	0	0	0	0	<u> </u>	<u> </u>	
-	oordinate system operation	+ -					-					
1	Coordinate rotation by program	Δ	Δ	Δ	Δ	0	0		Δ	Δ	_	
	Cooldinate rotation by program	Δ	Δ	Δ	Δ	0	0		Δ	Δ	Δ	
2	Coordinate rotation by parameter		_	_	_	_	_	_	_	Δ	Δ	
$\perp$	3-dimensional coordinate conversion		_	_		_	_	_		Δ	Δ	
6 Di	imension input		1					1			1	
1	Corner chamfering / Corner R	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ	
2	Linear angle command	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ	
3	Geometric command	0	0	0	0	0	0	0	0	Δ	Δ	
			_	_	_	_	_	_		Δ	Δ	
7 Ax	xis control Chopping	+								1		
	1 Chopping	Δ	Δ	Δ	Δ	0	0	0		Δ	Δ	
2	Normal line control	+-				_		_		0	0	
H	Circular cutting	+_	<del> </del> _	_	_	_	_	_		0	0	
	lulti-part system control							I.		+ -		
1	Timing synchronization between part systems	0	0	0	0	0	0	0	0	0	0	
Ш												
_	Start point designation timing synchronization  Mixed control	0	0	0	0	0	0	0	0	0	0	
	Mixed control (cross axis control)	Δ	Δ	Δ	Δ	0	0	_	Δ	<u> </u>	_	
	2 Arbitrary axis exchange control	Δ	Δ	Δ	Δ	0	0	_	Δ	Δ	Δ	
	Control axis superimposition		1		l					1		
	1 Control axis superimposition	Δ	Δ	Δ	Δ	0	0	_	_	1 –	_	
	2 Arbitrary axis superimposition control	Δ	Δ	Δ	Δ	_	_	_	_	<u> </u>	_	
	Control axis synchronization between part systems	Δ	Δ	Δ	Δ	0	0	0	Δ	<u> </u>	_	
	Balance cut	0	0	0	0	0	0	_	0	_	_	
			-							+	-	
	Common memory for part systems  Multi-part system simultaneous thread cutting	0	0	0	0	0	0	0	0			
8	Multi-part system simultaneous thread cutting  1 Two-part system simultaneous thread cutting	Δ	Δ	Δ	Δ	0	0	I –	0	<u> </u>	T _	
										1		
1 1 1	2 Multi-part system simultaneous thread cutting	Δ		Δ	Δ	—	-	-	-	I —	-	

	Machining center system  M800S M80W M80					
M80	00S	M80W	M	80	C80	General explanation
M850S	M830S	_	M80	M80	_	
			TypeA	TypeB		
						When the same pattern is repeated during machining, the machining pattern is registered as one subprogram, which can be called from the
010	010	010	010	010	08	main program as required, thereby realizing the same machining easily. This enables the efficient use of programs.
Δ	Δ	_	_	_	_	If the same pattern is used repeatedly on a concentric circle, one of the rotary machining patterns can be registered as a subprogram. When the subprogram is called from the main program, if the rotation center is designated, a path similar to the rotary phase can be easily created
_	_	0	_		^	on the concentric circle. This simplifies the creation of a program.  The shape commanded by a program can be extended or reduced to the desired size by applying a scale factor to the movement axis
Δ	Δ	_	0	0	Δ	command position.  The axis name switch function switches the name of a command axis and a control axis.
						The dast right of switch it discloser switch has the first no or a continue to date at a control date.
04	04	04	04	04	04	In order to execute one integrated function, a group of control and arithmetic instructions can be used and registered as a macro program.
0	0	0	0	0	0	This function enables macro programs exclusively designed for use by a specific machine tool builder to be registered in addition to the regular user macro programs.
0	0	0	0	0	0	By inputting a user macro interrupt signal from the PLC, the program being currently executed is interrupted and other programs can be called instead.
			_			-
0	0	0	0	0	0	Programming can be made flexible and versatile by designating variables instead of directly assigning numbers to addresses in programs
Δ	Δ	0	0			and by supplying the values of those variables as required when running the programs.  Arithmetic operations (adding, subtracting, multiplying and dividing) can also be conducted for the variables.
Ο	Ο Δ	0	0		0	
	Δ					
0	0	0	0	0	0	
-	_	_	_	_	_	These functions enable drilling, tapping and other hole machining cycles to be assigned in a simple 1-block program. Special fixed cycles must always be used in combination with fixed cycles.
Δ	Δ	0	0	0	Δ	This arrays so dood in containation that those system.
0	0	0	0			The shape normally programmed in several blocks for rough cutting, etc. in the turning machining can be commanded in one block. This
			_			function is useful for simplifying machining programs.
	_		_	_		In deep hole drilling, cutting and retract are repeated and the workpiece is machined multiple times. In addition, when PLC signals are input
0	0	0	0	0		during cutting, the cutting for the time concerned is skipped. In this way, the load applied to the tool is reduced.
0	0	0	0	0	0	A parameter is used to designate the axis for which the mirror image function is to be executed before the machining program is run.
0	0	0	0	0	0	Signals from an external device (PLC) request the mirror image operation either during or before the execution of a machining program.
0	0	0	0	0	0	Using a program for the left or right side of an image, this function can machine the other side of the image when a left/right symmetrical
$\stackrel{\circ}{-}$			0			shape is to be cut.  With machines in which the base tool post and the facing tool post are integrated in one post, this function enables the programs prepared
			_			for cutting at the base side to be executed by the tools on the facing side as well.
-	_	_	_	_	_	When tools that correspond to tool Nos. 1 to 64 are selected (T commands) but these are the tool Nos. for which the facing tool post mirror image function has already been designated with a parameter, the status equivalent to G68 (facing tool post mirror image ON) is established.
Δ	Δ	0	0	0	Δ	When it is necessary to machine a complicated shape at a position that has been rotated with respect to the coordinate system, you can machine a rotated shape by programming the shape prior to rotation on the local coordinate system, and then specifying the parallel shift
			Ü			amount and rotation angle by means of this coordinate rotation command.
Δ	Δ	_	_	-	_	If a deviation occurs between the workpiece alignment line and the machine coordinate system's coordinate axis when the workpiece is mounted, the machine can be controlled to rotate the machining program coordinates according to the workpiece alignment line deviation.
Δ	Δ	0	0	_	Δ	With the 3-dimensional coordinate conversion function, a new coordinate system can be defined by rotating and moving in parallel the zero point in respect to the X, Y and Z axes of the currently set workpiece coordinate system.
						point in respect to the A, it also 2 axes on the contently set workpiece coordinate system.
Δ	Δ	0	0	0	Δ	This function executes corner processing by automatically inserting a straight line or arc in the commanded amount between two
		0		0		consecutive travel blocks.  The end point coordinates are automatically calculated by assigning one element (one component of the selected plane) of the end point
Δ	Δ		0		Δ	coordinates and the linear angle.  When it is difficult to find the intersection point of two straight lines with a continuous linear interpolation command, this point can be
Δ	Δ	0	0	0		calculated automatically by programming the command for the angle of the straight lines.
Δ	Δ	0	0	0	Δ	With this function, the end point position is commanded with the radius and angle.
. 1			_			This function continuously raises and lowers the chopping axis independently of program operation. During the grinding operation, chopping
Δ	Δ	0	0	0		can produce a better surface accuracy than using abrasive grain.
0	0	0	0		0	This function controls the swiveling of the C axis (rotary axis) so that the tool is always pointing in the normal line direction for the X and Y axes movement commands during program operation.
0	0	0	0	0	0	In circular cutting, a system of cutting steps are performed; first, the tool departs from the center of the circle, and by cutting along the inside circumference of the circle, it draws a complete circle, then it returns to the center of the circle.
						and the second of the second o
		0	_		0	The multi-axis, multi-part system compound control CNC system can simultaneously run multiple machining programs independently. This
0	0	0	0		0	function is used in cases when, at some particular point during operation, the operations of different part systems are to be synchronized or in cases when the operation of only one part system is required.
0	0	0	0	_	0	The synchronizing point can be placed in the middle of a block by designating the start point.
						This function enables any axis to be replaced with another axis between part systems. There are two methods for giving commands: G code
			_			and PLC.
Δ	Δ	_	_	_	_	An arbitrary axis can be exchanged freely across part systems in the multiple part systems. The machining can be freer by exchanging an axis which can be commanded for machining programs in each part system.
	_	_	_			This function enables to superimpose on and control an axis in a part system with an axis in another part system. There are two methods for giving commands: G code and PLC.
	_		_			The arbitrary control axis in other part system can be moved by superimposing on the movement command for the arbitrary control axis in
						own part system.  Synchronization control enables an arbitrary control axis in another part system to move in synchronization with the movement command
	_		_			assigned to an arbitrary control axis. There are two methods for giving commands: G code and PLC.
-	_	_	-	-	_	The deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting). In addition, since the workpiece is machined by two tools, the machining time is reduced.
	_	_	_	_	_	For a machine with multiple part systems, the common variables and tool compensation memory which exist for each part system can be
						made common to all part systems by setting the parameters.
_ [	_		_	_		This function performs synchronous thread cutting for the same spindle using the 1st and 2nd part systems.
						This function performs thread cutting for the same spindle in the different part system. This has two commands; the command (G76.1) for simultaneously cutting threads in multiple places, which is known as "multi-part system simultaneous thread cutting cycle!", and the
-	-	_	-	-	_	command (G76.2) for simultaneously cutting a thread by two part systems, which is known as "two-part system simultaneous thread cutting
						cycle II".

						Lathe	system					nining system
		class	M80	ow	M8	00S	M80W	M	80	C80	M80	
			M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	M830W
	9		0	0	0	0	0	0	0	0	0	0
	10	i i	Δ.	Δ	Δ	Δ	0	0	0	_		
		1 Single block between part systems	Δ							Δ		
		2 Dwell / Miscellaneous function time override	Δ	Δ	Δ	Δ	0	0	0	Δ	_	_
		3 Synchronization between part systems OFF	Δ	Δ	Δ	Δ	0	0	0	Δ	_	_
	11	Sub part system control I	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	_	Sub part system control II	Δ	Δ	Δ	Δ	0	0	_	Δ	_	_
9	1	lata input / output by program  Parameter input by program	0	0	0	0	0	0	0	0	0	0
	2		0	0	0	0	0	0	0	0	0	0
	$\vdash$											
	3	Tool/Material shape input by program	0	0	0	0	0	0	0	0	0	0
	5	API section and sub-section Nos. input / output by program	0	0	0	0	0	0	0	0	0	0
	_	R-Navi data input by program	_		_	_	_	_	_	_	Δ	Δ
10	-	Machining modal										
	-	Tapping mode  Cutting mode	0	0	0	0	0	0	0	0	0	0
11		ligh-speed parts machining										
	1	Rapid traverse block overlap	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
Ma	Т	nining accuracy support functions				I			I		<del>                                     </del>	
1		utomatic corner override leceleration check	0	0	0	0	0	0	0	0	0	0
2	1		0	0	0	0	0	0	О	0	0	0
	2		0	0	0	0	0	0	0	0	0	0
	3		0	0	0	0	0	0	0	0	0	0
	4	ů .	0	0	0	0	0	0	0	0	0	0
	_	Automatic error detection	Δ	Δ	Δ	Δ			L –			
1		speed and high-accuracy functions [kBPM: k Block per Minute] ligh-speed machining mode										
_	1	High-speed machining mode I (G05P1) maximum [kBPM] High-speed machining mode II (G05P2) maximum [kBPM]	∆33.7 ∆168	∆33.7 ∆168	∆33.7 ∆168	∆33.7 ∆168	O33.7 O67.5	O33.7 O67.5	_	Δ	∆33.7 ∆168	∆33.7 ∆168
2	Н	ligh-accuracy control							ı		<u> </u>	
	1	High-accuracy control (G61.1 / G08)	Δ	Δ	Δ	Δ	0	0	_	Δ	Δ	Δ
	2	Multi-part system simultaneous high-accuracy control	Δ	Δ	Δ	Δ	_	_	_	_	Δ	Δ
	3	SSS control	Δ	Δ	Δ	Δ	0	0	_	_	Δ	Δ
	4	Tolerance control	Δ	Δ	Δ	Δ	0	0	_	_	Δ	Δ
	5	Variable-acceleration pre-interpolation acceleration / deceleration	_	_	_	_	_	_	_			
	١,									_	Δ	Δ
	6	High-accuracy acceleration / deceleration time constant extension	_	_	_	_	_	_	_	_	Δ	Δ
	7	extension Axis-based acceleration tolerance control	_ Δ	<u> </u>	_ Δ	_ Δ	_ 			_ 		
3	7 H	extension Axis-based acceleration tolerance control ligh-speed high-accuracy control	Δ		Δ	Δ	_ 	_	_	_	Δ	Δ
3	7	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.1Q1) maximum [kBPM]	Δ	△67.5	△ △67.5	Δ	O33.7	O33.7			Δ Δ Δ67.5	Δ Δ
3	7 H	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.101) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III	Δ		Δ	Δ	— — — — — — — — — — — — — — — — — — —	_	_	_	Δ	Δ
3	7 H 1 2	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]	Δ Δ67.5 Δ168	△67.5 △168	Δ Δ67.5 Δ168	Δ Δ67.5 Δ168	067.5	O33.7	_ 		Δ Δ Δ67.5 Δ168	Δ Δ Δ67.5 Δ168
	7 1 2 3 4	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]	Δ Δ67.5 Δ168	△67.5 △168	Δ Δ67.5 Δ168	△67.5 △168	067.5	O33.7 O67.5	_ _ _ _		Δ Δ Δ67.5 Δ168 Δ270	Δ Δ67.5 Δ168 Δ270
	7 H 1 2 3 4 M	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control   (605.101) maximum [kBPM]  High-speed high-accuracy control II (605P10000) maximum [kBPM]  High-speed high-accuracy control III (605P20000) maximum [kBPM]  GosP20000) maximum [kBPM]  Smooth fairing	Δ Δ67.5 Δ168 —	△67.5 △168 —	Δ Δ67.5 Δ168	Δ Δ67.5 Δ168	O67.5 — —	O33.7 O67.5		Δ Δ	Δ Δ67.5 Δ168 Δ270 Δ	Δ Δ67.5 Δ168 Δ270 Δ
4	7 H 1 2 3 4 M	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]  Smooth fairing  fachining condition selection I	Δ Δ67.5 Δ168 — — —	△67.5 △168 — — —	Δ	Δ Δ67.5 Δ168 — — —	O67.5 — — —	O33.7 O67.5 —			Δ Δ67.5 Δ168 Δ270 Δ	Δ Δ67.5 Δ168 Δ270 Δ
4	7 H 1 2 3 4 M D	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]  Smooth fairing  Machining condition selection I	Δ Δ67.5 Δ168 — — —	△67.5 △168 — — —	Δ	Δ Δ67.5 Δ168 — — —	O67.5 — — —	O33.7 O67.5 —			Δ Δ67.5 Δ168 Δ270 Δ	Δ Δ67.5 Δ168 Δ270 Δ
4 5 Pri	7 H 1 2 3 4 M D D	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]  Smooth fairing  Machining condition selection I  Direct command mode  mamning support functions	Δ	Δ67.5 Δ168 ————————————————————————————————————	Δ	Δ	O67.5 — — O	O33.7 O67.5 — — —		Δ Δ - - 0	Δ Δ67.5 Δ168 Δ270 Δ Ο	Δ Δ67.5 Δ168 Δ270 Δ
4 5 Pri 1 3	7 H 1 2 3 4 M D D Ir	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]  Smooth fairing  fachining condition selection I  sirrect command mode  mamming support functions  layback	Δ	Δ67.5 Δ168 — — — —  Δ	Δ	Δ Δ67.5 Δ168	O67.5	O33.7 O67.5 — — O	- - - -	Δ Δ - - 0	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο	Δ Δ67.5 Δ168 Δ270 Δ Ο —
4 5 Pri 1 3	7 H 1 2 3 4 M D COGIT	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]  Smooth fairing  fachining condition selection I  sirect command mode  mamming support functions  layback  iteractive cycle insertion	Δ	Δ67.5 Δ168 Ο Δ Δ	Δ Δ67.5 Δ168 — — —  Δ Δ Δ	Δ67.5 Δ168 Δ Δ	O67.5	O33.7 O67.5 — — — —		Δ Δ - - - -	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Δ	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Ο Δ
4 5 Pn 1 3 4	7 H 1 2 3 4 M D D Irr S G	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]  Smooth fairing  fachining condition selection I  sirect command mode  ramming support functions  layback  iteractive cycle insertion  imple programming (NAVI MILL / LATHE)	Δ	Δ67.5 Δ168 — — Ο Δ Δ	Δ Δ67.5 Δ168	Δ Δ67.5 Δ168	O67.5  -  O -  O -  O O	O33.7 O67.5		Δ Δ - - 0	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Δ Δ Δ	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Ο Δ
4 5 Pn 1 3 4 5	7 H 1 2 3 4 M D D Irr S G G	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.1Q1) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]  Smooth fairing  fachining condition selection I  sirrect command mode  mamming support functions  layback  interactive cycle insertion  imple programming (NAVI MILL / LATHE)  a code guidance	Δ	Δ67.5 Δ168 Ο Δ Δ Δ Δ	Δ	Δ	067.5 - 0 - 0 0			Δ Δ - - 0	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Δ Δ Δ	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Ο Δ
4 5 Pri 1 3 4 5 7	7 H 1 2 3 4 M D T Ogr P Ir S G	extension  Axis-based acceleration tolerance control ligh-speed high-accuracy control High-speed high-accuracy control I (G05.10.1) maximum [kBPM] High-speed high-accuracy control II (G05P100.0) maximum [kBPM] High-speed high-accuracy control III (G05P2000.0) maximum [kBPM] Smooth fairing  Machining condition selection I  Direct command mode mamming support functions layback interactive cycle insertion imple programming (NAVI MILL / LATHE) is code guidance	Δ	Δ67.5 Δ168 Ο Δ Δ Δ Δ	Δ	Δ	067.5 - 0 - 0 0			Δ Δ - - 0	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Δ Δ Δ	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Ο Δ
4 5 Pro 1 3 4 5 7	7 H 1 2 3 4 M D Ir S G D hine	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control   (305.101) maximum [kBPM]  High-speed high-accuracy control II (305P10000) maximum [kBPM]  High-speed high-accuracy control III (305P10000) maximum [kBPM]  GosP20000) maximum [kBPM]  Smooth fairing  fachining condition selection I  firect command mode  famming support functions  flayback  interactive cycle insertion  imple programming (NAVI MILL / LATHE)  a code guidance  IXF data input  e accuracy compensation	Δ	Δ67.5 Δ168 Ο Δ Δ Δ Δ	Δ	Δ	067.5 - 0 - 0 0			Δ Δ - - 0	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Δ Δ Δ	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Δ Δ
4 5 Pro 1 3 4 5 7 Sta 1	7 H 1 2 3 4 N D Irrogr	extension  Axis-based acceleration tolerance control  ligh-speed high-accuracy control  High-speed high-accuracy control I (G05.101) maximum [kBPM]  High-speed high-accuracy control II (G05P10000) maximum [kBPM]  High-speed high-accuracy control III (G05P20000) maximum [kBPM]  Smooth fairing  Machining condition selection I  Direct command mode  mamming support functions  Mayback  Interactive cycle insertion  imple programming (NAVI MILL / LATHE)  à code guidance  IXF data input  e accuracy compensation  accuracy compensation	Δ	Δ67.5 Δ168 Ο  Δ  Δ  Δ  Δ  Δ	Δ	Δ	067.5 - 0 - 0 0 0		- - - - - - 0 0	- Δ Δ 	Δ Δ67.5 Δ168 Δ270 Δ Ο Ο Δ Δ Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο Ο	Δ Δ67.5 Δ168 Δ270 Δ

[M800/M80]S/W ver.C7 [Ci	8015/V	V ver.A
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Mesons	Machining center system						[moonmooler Total
M800 M900 M900 M900 M900 M900 M900 M900		Mad	hining c	enter sys	tem		
Models Models — Type A Type B — Type A Type B — Service of the control of the con			M80W			C80	General explanation
Copy in the copy and the copy a	M850S	M830S	_			_	
	0	0	0	0	_	0	Separate programs, used in each part system, can be managed under a common name in a multi-part system.
The contribution of the co							
Segment can be considered under the multiple controlled programme of the control							been stopped by single block stop, the other part systems pause in the cycle operation.
colors managed and patterns by depth of colors growther performance or constraint of all programs colors that is the large and the colors of t					_	_	systems can be maintained when the multiple machining programs are operated with override.
A PORT OF THE CONTROL	_	_	_	_	_	_	relation among part systems by single block operation with part systems synchronized or variation of a machining program feedrate by dry run. This function is effective mainly in blocking the cycle operation pause or feedrate variation in only some of part systems when the sub
Pick surface and operation a	Δ	Δ	_	_	_	_	This function activates and operates any non-operating part system (sub part system) in the multi-part system. An auxiliary axis machining
O         O         O         O         D         The value of the exciption commoning explanes asserted and in the end or during using commoning. The for compression control, the base and the degly date the product program or common in the first commoning and control of the QU and program draws do not be after the production of the QU and program draws do not be with the Production of the QU and program draws do not be with the Production of the QU and program draws do not be with the QU and program draws do not be written to the production of the	_	_	_	_	_	_	This function activates and operates any non-operating part system (sub part system) in the multi-part system. Using sub part systems
O         O         O         O         D         The value of the exciption commoning explanes asserted and in the end or during using commoning. The for compression control, the base and the degly date the product program or common in the first commoning and control of the QU and program draws do not be after the production of the QU and program draws do not be with the Production of the QU and program draws do not be with the Production of the QU and program draws do not be with the QU and program draws do not be written to the production of the				_	_		
Services part to the control of the							
O O O O O O O O O O O O O O O O O O O	_	_		_	-		
A A O O O — — — Secretary of the A Device of the Company of the Co							program.
A	0	0	0	0	0	0	system variables.
A	Δ	Δ	0	0	_		
The function enables for new black to later (principle) without wasting for prostroming (ACI) or reference position mature (ACI) or reference position or reference position mature (ACI) or reference position mature (ACI) or reference position mature (ACI) or reference position (ACI) or reference position mature (ACI) or reference	_			_			
A DO	0	0	0	0	0	0	When a cutting mode command is issued, the CNC system is set to the cutting mode that enables a smoothly cut surface.
Speciment read-lining surface distribution due to increase in the cutting loads when cutting comes, the function audomatically applies an owner to the cutting strate of the cutting at the command reads the high edge accurate machining.    August	Δ	Δ	0	0	0	Δ	
O O O O O O O O O O O O O O O O O O O							
O   O   O   O   O   O   O   O   O   O	0	0	0	0	0	0	
design of feederfals, and prevents a corner from being machined round.    Columbia   Col	0	0	0	0	0	0	
This function is affective to reduce the extension of cycle time for the culting at the corner and reader the high edge accurate machining.    A33,7	_			_			
This function is effective to reduce the extension of cycle time for the outling at the corner and reside the high edge accurate machining.  A 33.7 C 33.7 C 33.7 C 33.7 C 33.7 C 36.5 A  This function is effective to reduce an amochining program that approximates a fee curve with fine segments at a high speed.  A 168 C 97.5 C 97.5 C 97.5 A  This function caused by delige in notifying program that approximates a fee curve with fine segments at a high speed.  A 2 C C C C C C C C C C C C C C C C C C							change of feedrate, and prevents a corner from being machined round.
A 168		_		_	_	_	This function is effective to reduce the extension of cycle time for the cutting at the corner and realize the high edge accurate machining.
A 168							
A A O O O A Machining errors caused by delay in control systems can be inhibited. This function is useful for machining which needs to make an edge of a corner or multiple and in the present of the control of control delays.  A O O O A A Machining errors caused by delays in control systems can be inhibited. This function is useful for machining which needs to make an edge of a corner or multiple and in fight specific report of the present in the control of control delays.  A O O O A A Machining errors caused by delays in control systems can be inhibited. This function is useful for machining which needs to make an edge of a corner or multiple control. This function is useful for machining which needs to make an edge of a corner or multiple control. The specific report of the present the present of the control of the present function is present to the present function in great systems.  A A O O O A Machining errors caused by delays in control systems can be inhibited. This function is presented to the present function is presented by the present systems. The systems can be inhibited. This function can present the present function is presented or the present function is presented or the present function is presented in the present function is presented or the	△33.7	∆33.7	033.7	033.7	016.8	Δ	This function guess a modelining greaters that approximates a free guess with the comments at a kink accord
A D O O — A soomer or reduce an error form an inner route of curved shape.  A D O O — A soomer or reduce an error form an inner route of curved shape.  A D O O — A soomer or reduce an error form an inner route of curved shape.  A D O O — A soomer or reduce an error form an inner route of curved shape.  A D O O O A soomer or reduce an error form an inner route of curved shape.  A D O O O A soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D O O O A Soomer or reduce an error form an inner route of curved shape.  A D D O O O O A Soomer or reduce an exposure of the route of the	△168	△168	067.5	067.5	067.5	Δ	- mis function runs a machining program that approximates a free curve with line segments at a night speed.
A A O O O O O O O O O O O O O O O O O O			0	0	0	^	
which are imited by the parameter. *Up to 2 part systems.  With SSS SQLess Smooth Surface location the large area shall information is used instead of just the angle between the blocks. Thus, optimum speed control that is not adversely effected by minute steps or valveness is possible. This enables machining with a fewer sorrathes and steakes and the cutting surface compared to the normal enables processes of the cutting surface compared to the normal enables of cutting fleet or conduct the SSS control to the second or following part systems. Multiple part systems simulateness help-accuracy function is required to conduct the SSS control to the second or following part systems.  A A O O O A This surface machining shall be accelerated within the Steam's range. The desired machining seek can be obtained with arriveless of the second machining seek can be detained and surface of the second machining seek can be detained in the second machining seek can be detained to each seek the control deceleration to each seak. Therefore, the acceleration of the seek with high responsiveness can be larger than before so that cycle time can be reduced sepacially in the indexing machining.  A B O O O O O O O O O O O O O O O O O O							High-accuracy control and high-speed machining mode are available respectively in all part systems. The simultaneous usage of high-
A         A         O         O         A           A         O         O         A         confirmal speed control that is not adversely affected by minute steps or walvies is possible. This enables machining with a fewer scratches and stresses, compared to the notify further.           A         A         O         O         A         Enables the smooth of the sex will fully be country further in required to conduct the SSS control in the second or following part systems. The further can require the control that the second and part systems. The further can be included separately as the part system only included the control of the sex with high responsiveness can be larger than before so that cycle time can be reduced expectally in the indexing and part systems only in the state of the sex with high responsiveness can be larger than before so that cycle time can be reduced expectally in the indexing and part systems only in the part of the sex with high responsiveness can be larger than before so that cycle time can be reduced expectally in the indexing and part systems only in the part of the sex with high responsiveness can be larger than before so that cycle time can be reduced expectally in the indexing and the sex with high responsiveness can be larger than before so that cycle time can be reduced expectally in the indexing and the sex with high responsiveness can be larger than before so that cycle time can be reduced expectation. The part system only in the indexing and the sex with high responsiveness can be larger than before so that cycle time can be reduced expectation. The part system only in the indexing of the sex with high responsiveness can be larger than before so that the sex with high responsiveness can be larger than before so that the sex with high responsiveness can be larger than before so that th		Δ				Δ	which are limited by the parameter. * Up to 2 part systems
Multiple part systems smillutaneous high-accountsy function is regulated to conduct the SSS control in the second or following part systems. This function enables the smooth operation within the tolerance error range. The desiend machining result can be beliared with simple parameter adjustment.    A	Δ	Δ	0	0	0	Δ	optimum speed control that is not adversely affected by minute steps or waviness is possible. This enables machining with a fewer scratches
A A O O O A parameter adjustment.  This function can perform the acceleration / deceleration during SSS control by eating diverse acceleration to each axis. Therefore, the acceleration for the axis with high responsiveness can be larger than before so that cycle time can be reduced especially in the indexing machining.  A A — — — — — This extends the upper limit of outling feed time constant from 5,000(ms) for acceleration/deceleration before interpolation.  1 Institution of the axis with high responsiveness can be larger than before so that cycle time can be reduced especially in the indexing machining.  A A — — — — — The acceleration to be generated at a seam between blocks is evaluated for each axis to control deceleration so that the seam is passed at the optimum speed. This enables highly accurate edge machining.  A 667.5 A67.5 O67.5 O67.5 O67.5 A another interpolation of the optimum speed. This enables highly accurate edge machining.  A 168 A168 O67.5 O67.5 O67.5 O67.5 A another interpolation of the optimum speed. This enables highly accurate edge machining disk with free curves. This function is also useful in machining which needs to make an edge at a corner or reduce a path error from inner route of curved the package the high-accuracy control mode is turned ON automatically.  A A O O O A A Apath can be smoothly at two speed or a much machining program. This function is also useful in machining which needs to make an edge at a corner or reduce a path error from inner route of curved. This function is also useful in machining which needs to make an edge at a corner or reduce a path error from inner route of curved shape because the high-accuracy control mode is turned ON automatically.  A A D O O O O O O T The machining program with a program analysis and interpolation to a reach machining program by a segment program of the individual program with a program program of the individual program with a processing speed.  D O O O O O O O O O O O O O O O O O O							Multiple part systems simultaneous high-accuracy function is required to conduct the SSS control in the second or following part systems.
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	Δ	Δ	0	0	0	Δ	parameter adjustment.
A A — — — This part system only  The acceleration to be generated at a seam between blocks is evaluated for each axis to control deceleration so that the seam is passed at the optimum speed. This enables highly accurate edge machining.  Δ67.5 Δ67.5 O33.7 O33.7 O33.7 Δ  Δ168 Δ168 O67.5 O67.5 O67.5 Δ  Δ270 D135 D135 — Δ  Δ α α machining program that approximates a free curve with fine segments can be run at a high speed and with a high accuracy. This function is effective in decreasing the cycle time of machining dies with free curves. This function is also useful in machining which needs to make an edge at a corner or reduce a path error from liner route of curved shape because the high-accuracy control mode is turned ON automatically.  A path can be emotitiven by compensating commanded positions of a machining program. This function is useful when executing a fine segment program to machine smoothly, at low speed or a rough machining program. This function is useful when executing a fine segment program to machine smoothly, at low speed or a rough machining program with long segment to machine smoothly.  The machining condition parameter set which consists of parameters related to the high-accuracy control can be configured in advance for each machining application (such as application) (such as application) (such as application) (such as application) from the machining or die machining process (such as rough or finishing), and it can be switched according to the purpose.  By reducing the load application (such as application) from the machining or die machining program analysis and interpolation to the minimum possible level, the machining programs expressed in fine segments are executed at a high processing speed.  This function enables creation of a program while proceeding with sample machining program on the edit screen. The cycle can easily be inserted by editing data in an interactive vindow.  Go of O O O O O O O O O O O O O O O O O O	Δ	Δ	_	_	_	_	acceleration for the axis with high responsiveness can be larger than before so that cycle time can be reduced especially in the indexing
A G7.5 O33.7 O33.7 O33.7 A A machining program that approximates a free curve with fine segments can be run at a high speed and with a high accuracy. This function is effective in decreasing the cycle time of machining dies with free curves. This function is also useful in machining which needs to make an edge at a corner or reduce a path error from inner route of curved shape because the high-accuracy control mode is turned ON automatically.  A D O O O O O O O O O O O O O O O O O O	Δ	Δ	_	_	_	_	
Δ168 Δ168 O67.5 O67.5 O67.5 Δ  Δ270 Δ270 1135 O135 — Δ  tunction is effective in decreasing the cycle time of machining des with free curses. This function is also useful in machining within needs to make an edge at a corner or reduce a path error from inner route of curved shape because the high-accuracy control mode is turned ON automatically.  A Δ Ο Ο Ο — Δ Apath can be smoothen by compensating commanded positions of a machining program. This function is useful when executing a fine segment program to machine smoothly, at low speed or a rough machining program with long segment to machine smoothly. The machining condition particles restarted to the high-accuracy control can be configured in advance or each machining application (such as part machining) or machining program with long segment to machine smoothly. The machining condition particles are switched according to the purpose.  — — — — — By reducing the load application (such as part machining) or machining process (such as rough or finishing), and it can be switched according to the purpose.  — By reducing the load application (such as part machining or did machining) or machining process (such as rough or finishing), and it can be switched according to the purpose.  — — — — By reducing the load application (such as part machining or did machining) or machining process (such as rough or finishing), and it can be switched according to the purpose.  — — — — This function enables creation of a program while proceeding with sample machining by manual (handle or job) feed or mechanical handle feed.  — — — This function enables to interactively insert a cycle to assist in the machining and setup for the program opening on the edit screen. The cycle can easily be inserted by editing data in an interactive window.  — Create a part program by using NAVI MILLI (for machining opening on NAVI LATHE (for lathe system).  — — — — — — — — — This function allows you to bright ferror an external I/O device through DXF data input window, extract the figure element dat	Δ	Δ	_	_	_	_	
Δ168 Δ168 O67.5 O67.5 O67.5 Δ  Δ270 Δ270 1135 O135 — Δ  tunction is effective in decreasing the cycle time of machining des with free curses. This function is also useful in machining within needs to make an edge at a corner or reduce a path error from inner route of curved shape because the high-accuracy control mode is turned ON automatically.  A Δ Ο Ο Ο — Δ Apath can be smoothen by compensating commanded positions of a machining program. This function is useful when executing a fine segment program to machine smoothly, at low speed or a rough machining program with long segment to machine smoothly. The machining condition particles restarted to the high-accuracy control can be configured in advance or each machining application (such as part machining) or machining program with long segment to machine smoothly. The machining condition particles are switched according to the purpose.  — — — — — By reducing the load application (such as part machining) or machining process (such as rough or finishing), and it can be switched according to the purpose.  — By reducing the load application (such as part machining or did machining) or machining process (such as rough or finishing), and it can be switched according to the purpose.  — — — — By reducing the load application (such as part machining or did machining) or machining process (such as rough or finishing), and it can be switched according to the purpose.  — — — — This function enables creation of a program while proceeding with sample machining by manual (handle or job) feed or mechanical handle feed.  — — — This function enables to interactively insert a cycle to assist in the machining and setup for the program opening on the edit screen. The cycle can easily be inserted by editing data in an interactive window.  — Create a part program by using NAVI MILLI (for machining opening on NAVI LATHE (for lathe system).  — — — — — — — — — This function allows you to bright ferror an external I/O device through DXF data input window, extract the figure element dat							, , , , , , , , , , , , , , , , , , , ,
Δ270         Δ135         O135         O 135         A path can be smoothen by compensating commanded positions of a machining program. This function is useful when executing a fire segment program to machine smoothly at low speed or a rough machining program. This function is useful when executing a fire segment program to machine smoothly at low speed or a rough machining program. This function can be segment and program to machine smoothly at low speed or a rough machining program. This function can be segment and program to machine smoothly at low speed or a rough machining program. This function can be segment and program analysis of parameters related to the high-accuracy control can be configured in advance for each machining program analysis and interpolation to the minimum possible level, the machining programs expressed in fine segments are executed at a high processing speed.           O O O O O O O O O O This function enables to interactively insert a cycle to assist in the machining by manual (handle or job) feed or mechanical handle feed.           A D O O O O O O O O O O O O O O O O O O							
A path can be smoothen by compensating commanded positions of a machining program. This function is useful when executing a fine segment program to machine smoothly at low speed or a rough machining program with long segment to machine smoothly.  The machining condition parameter set which consists of parameters related to the high-accuracy control can be configured in advance of or each machining application (such as part machining or machining) or machining process (such as rough or finishing), and it can be switched according to the purpose.  — — — — — By reducing the load applied during the NC program analysis and interpolation to the minimum possible level, the machining programs expressed in fine segments are executed at a high processing speed.  — — — — This function enables creation of a program while proceeding with sample machining by manual (handle or job) feed or mechanical handle feed.  — A — O — O — This function enables to interactively insert a cycle to assist in the machining and setup for the program opening on the edit screen. The cycle can easily be inserted by editing data in an interactive window.  — Create a part program by using NAVI MILL (for machining center system) or NAVI LATHE (for lathe system).  G code guidance is a function to display illustration of the contents or movements of the commanded format for the G code currently under editing. This is used when creating or editing a machining program.  This function allows you to import a DXF drawing file from an external I/O device through DXF data input window, extract the figure element data from the drawing. Extracted data can be set as arbitrary shape data or as hole position data to the cycle being edited using the interactive cycle insertion function.  — This function compensates the error (backlash) produced when the direction of the machine system is reversed.  — This function compensates the error (backlash) produced when the direction of the machine system is reversed.					007.5		make an edge at a corner or reduce a path error from inner route of curved shape because the high-accuracy control mode is turned ON
segment program to machine smoothly, at low speed or a rough machining program with long segment to machine smoothly.  The machining condition parameter set which consists of parameters related to the high-accuracy control can be configured in advance for each machining application (such as part machining or machining) or machining process (such as rough or finishing), and it can be switched according to the purpose.  — — — — — — — By reducing the load pipel during the NC program analysis and interpolation to the minimum possible level, the machining programs expressed in fine segments are executed at a high processing speed.  This function enables creation of a program while proceeding with sample machining by manual (handle or job) feed or mechanical handle feed.  A A O O O — This function enables to interactively insert a cycle to assist in the machining and setup for the program opening on the edit screen. The cycle can easily be inserted by editing data in an interactive window.  A A O O O — Create a part program by using NAVI MILL (for machining center system) or NAVI LATHE (for laths system).  G code guidance is a function to display illustration of the contents or movements of the commanded format for the G code currently under editing. This is used when creating or editing a machining program.  This function allows you to import a DXF drawing file from an external I/O device through DXF data input window, extract the figure element data from the drawing. Extracted data can be set as arbitrary shape data or as hole position data to the cycle being edited using the interactive cycle insertion function.  Machine accuracy can be improved by compensating the errors in the screw pitch intervals among the mechanical errors (production errors, wear, etc.) of the feed screws.					_		·
switched according to the purpose.  By reducing the NC program analysis and interpolation to the minimum possible level, the machining programs expressed in fine segments are executed at a high processing speed.  This function enables creation of a program while proceeding with sample machining by manual (handle or job) feed or mechanical handle feed.  This function enables creation of a program while proceeding with sample machining by manual (handle or job) feed or mechanical handle feed.  This function enables to interactively insert a cycle to assist in the machining and setup for the program opening on the edit screen. The cycle can easily be inserted by editing data in an interactive window.  This function enables to interactively insert a cycle to assist in the machining and setup for the program opening on the edit screen. The cycle can easily be inserted by editing data in an interactive window.  Ceale a part program by using NAVI MILL (for machining center system) or NAVI LATHE (for lethe system).  Goode guidance is a function to display illustration of the contents or movements of the commanded format for the Goode currently under editing. This is used when creating or editing a machining program.  This function allows you to import a DNF drawing file from an external I/O device through DNF data input window, extract the figure element data from the drawing. Extracted data can be set as arbitrary shape data or as hole position data to the cycle being edited using the interactive cycle insertion function.  This function compensates the error (backlash) produced when the direction of the machine system is reversed.  Machine accuracy can be improved by compensating the errors in the screw pitch intervals among the mechanical errors (production errors, wear, etc.) of the feed screws.							segment program to machine smoothly at low speed or a rough machining program with long segment to machine smoothly.  The machining condition parameter set which consists of parameters related to the high-accuracy control can be configured in advance
expressed in fine segments are executed at a high processing speed.  O O O O O O O This function enables creation of a program while proceeding with sample machining by manual (handle or job) feed or mechanical handle feed.  This function enables to interactively insert a cycle to assist in the machining and setup for the program opening on the edit screen. The cycle can easily be inserted by editing data in an interactive window.  O O O O Create a part program by using NAVI MILL (for machining center system) or NAVI LATHE (for laths system).  G code guidance is a function to display illustration of the contents or movements of the commanded format for the G code currently under editing. This is used more reating or editing a machining program.  This function allows you to import a DXF drawing file from an external I/O device through DXF data input window, extract the figure element data from the drawing. Extracted data can be set as arbitrary shape data or as hole position data to the cycle being edited using the interactive cycle insertion function.  O O O O O This function compensates the error (backlash) produced when the direction of the machine system is reversed.  Machine accuracy can be improved by compensating the errors in the screw pitch intervals among the mechanical errors (production errors, wear, etc.) of the feed screws.			O			0	switched according to the purpose.
Seed	_	_		_	_	_	
A A O O O Create a part program by using IAVI MILL (for machining and setup for the program opening on the edit screen. The cycle can easily be inserted by editing data in an interactive window.  Create a part program by using IAVI MILL (for machining center system) or NAVI LATHE (for lathe system).  G code guidance is a function to display illustration of the contents or movements of the commanded format for the G code currently under editing. This is used when creating or editing a machining program.  This function allows you to import a DXF drawing file from an external I/O device through DXF data input window, extract the figure element data from the drawing. Extracted data can be set as arbitrary shape data or as hole position data to the cycle being edited using the interactive cycle insertion function.  This function compensates the error (backlash) produced when the direction of the machine system is reversed.  Machine accuracy can be improved by compensating the errors in the screw pitch intervals among the mechanical errors (production errors, wear, etc.) of the feed screws.		0	0	0		0	
A A O O O O Create a part program by using NAVI MILL (for machining center system) or NAVI LATHE (for lathe system).  O O O O O O O O O O O O O O O O O O O							This function enables to interactively insert a cycle to assist in the machining and setup for the program opening on the edit screen. The cycle
G code guidance is a function to display illustration of the contents or movements of the commanded format for the G code currently under editing. This is used when creating or editing a machining program.  — — — — — — — — — — — — — — — — — — —							
- In the color of the machine system of the color of the machine system is reversed.  - In the function allows you to import a DNF drawing file from an external I/O device through DNF data input window, extract the figure element data from the drawing. Extracted data can be set as arbitrary shape data or as hole position data to the cycle being edited using the interactive cycle insertion function.    O   O   O   O   O   O   O   O   This function compensates the error (backlash) produced when the direction of the machine system is reversed.    O   O   O   O   O   O   O   Machine accuracy can be improved by compensating the errors in the screw pitch intervals among the mechanical errors (production errors, wear, etc.) of the feed screws.							G code guidance is a function to display illustration of the contents or movements of the commanded format for the G code currently under
interactive cycle insertion function.  O O O O O This function compensates the error (backlash) produced when the direction of the machine system is reversed.  O32 O32 O16 O16 O16 O10 O10 Machine accuracy can be improved by compensating the errors in the screw pitch intervals among the mechanical errors (production errors, wear, etc.) of the feed screws.			· ·				This function allows you to import a DXF drawing file from an external I/O device through DXF data input window, extract the figure element
O32 O16 O16 O16 O10 Machine accuracy can be improved by compensating the errors in the screw pitch intervals among the mechanical errors (production errors, wear, etc.) of the feed screws.			_			_	
O32 O16 O16 O16 O10 Machine accuracy can be improved by compensating the errors in the screw pitch intervals among the mechanical errors (production errors, wear, etc.) of the feed screws.							
US2 US2 UT6 UT6 UT6 UT6 UT6 UT6 Wear, etc.) of the feed screws.	0	0	0	0	0	0	
O O O Machine accuracy can be improved by compensating the relative error between machine axes, such as a production error or aging.	032	032	016	016	016	010	
		0	0	0	0	0	Machine accuracy can be improved by compensating the relative error between machine axes, such as a production error or aging.

			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Lathe	system				Machining center system	
		class	M8	00W	M8	00S	M80W	М	80	C80		system DOW
		5.000	M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	M830W
П	4	External machine coordinate system compensation	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	5	Circular error radius compensation	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	6	Ball screw thermal expansion compensation	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	7	Rotation center error compensation	_	_	_	_	_	_	_	_	Δ	Δ
	8	Position-dependent gradually increasing-type backlash compensation	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	9	Two-way pitch error compensation	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	11	Spatial error compensation	_	_	_	_	_	_	_	_	Δ	Δ
2	2 Dy	namic accuracy compensation										
	1	Smooth high-gain (SHG) control	0	0	0	0	0	0	0	0	0	0
	2	Dual feedback	0	0	0	0	0	0	0	0	0	0
	3	Lost motion compensation	0	0	0	0	0	0	0	0	0	0
	4	OMR II (Backlash with filter)	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	6	OMR-FF	Δ	Δ	Δ	Δ	0	0	_	Δ	Δ	Δ
Ш	7	Distance-coded reference position detection	Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ
		mation support functions easurement										
H	1	Skip										
		1 Skip	0	0	0	0	0	0	0	0	0	0
		2 Multiple-step skip	0	0	0	0	0	0	0	0	0	0
		4 PLC skip	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
		5 Speed change skip	Δ	Δ .	Δ .	Δ .		_	_		Δ	Δ .
	-	6 Torque limitation skip	Δ	Δ	Δ	Δ	0	0	_	Δ	Δ	Δ
	2		0	0	0	0	0	0	0	0	0	0
	3	Manual tool length measurement 1	0	0	0	0	0	0	0	0	0	0
	4	Manual tool length measurement 2	0	0	0	0	0	0	0	0	0	0
	5	Workpiece coordinate offset measurement	0	0	0	0	0	0	0	0	_	_
	6	Workpiece position measurement	_	_	_	_	_	_	_	_	0	0
	7	Rotation measurement	_	_	_	_	_	_	_	_	0	0
	8	Rotation center error measurement	_	_	_	_	_	_	_	_	Δ	Δ
L	9	Workpiece installation error measurement	_	_	_	_	_	_		_	Δ	
2	2 To	ol life management  Tool life management										
	-	1 Tool life management I	0	0	0	0	0	0	0	0	0	0
		2 Tool life management II	0	0	0	0	0	0	0	0	0	0
		3 Tool life management III	_	_	_	_	_	_	_	_	0	0
	2	Number of tool life management sets							I			l
		99 sets	_	_	_	_	_	_	0	_	_	_
		128 sets 200 sets	0	0	0	0	_	_	   _	0	0	0
		256 sets			_	_	0	0	_	Δ	_	_
		400 sets	Δ	Δ	Δ	Δ	_		_		Δ	Δ
	L	999 sets	Δ	Δ	Δ	Δ	_	_	_	_	Δ	Δ
	3	Tool life management set allocation to part systems	0	0	0	0	0	0	0	0	0	0
3	3 Ot	hers										
	1	Programmable current limitation	0	0	0	0	0	0	0	0	0	0
	2	Auto power OFF	0	0	0	0	0	0	0	_	0	0
	4	Load monitoring I	Δ	Δ	Δ	Δ	_	_	_	_	Δ	Δ
	5		0/—	0/—	_	_	0/—	_	_	_	0/—	0/—
15.0	6	PLC axis current limit	_		_		_	_		0	_	<u> </u>
		ty and maintenance fety switches										
	1	Emergency stop	0	0	0	0	0	0	0	0	0	0
	2	Data protection key	0	0	0	0	0	0	0	0	0	0
ıL		<u> </u>	1							_	1	

						[M800/M80]S/W ver.C7   [C80]S/W ver.A2
	Mad	chining c	enter sys	tem		
M8	00S	M80W		80	C80	General explanation
M850S	M830S	_	M80 TypeA	M80 TypeB	_	
Δ	Δ	0	O	О	Δ	The coordinate system can be shifted by inputting a compensation amount from the PLC. This compensation amount will not appear on the
Δ	Δ	0	0	0	Δ	counters (all counters including machine position).  With commands designated during arc outting, this function compensates movement toward the inside of the arcs caused by a factor such
Δ	Δ	0	0	0	Δ	as servo delay.  This compensates the axis feed error caused by a ball screw's thermal expansion, etc. using the values set by the PLC.
Δ	Δ	_	_	_	_	In a machine with a rotary axis, there may be a case where the actual rotation center deviates from the programmed rotation center. (In other
		_	_	_		words, "machine rotation center error" may be observed.) Higher accuracy machining can be realized by compensating this error.  With this function, the gradually increasing-type lost motion which depends on the distance from the point where the machine movement
Δ	Δ	0	0	0	Δ	direction is reversed can be compensated by controlling the variation of backlash compensation amount according to the distance from the direction reversal point.
Δ	Δ	0	0	0	Δ	Two-way pitch error compensation function is used to compensate the pitch error in each direction by setting the pitch error compensation amount when moving in the positive and negative direction.
Δ	Δ		_	_		This function can compensate for three-dimensional errors of a machine tool due to its linear and rotary axes. This measures the spatial errors with a measuring device, inputs the measurement results to the NC to make an error data file and adds the calculated compensation
						amount of the linear and rotary axes to the drive command position to perform the compensation.
0	0	0	0	0	0	This is a high-response and stable position control method using the servo system. SHG control realizes an approximately three-fold position
						loop gain compared to the conventional control method.  Use position feedback with a motor-side encorder in ranges with high acceleration to enable stable control. In ranges with low acceleration,
0	0	0	0	0	0	use position feedback with the machine-side encorder (scale). This will make it possible to increase the position loop gain. A machine-side encorder (scale) is separately required.
0	0	0	0	0	0	This function compensates the error in protrusion shapes caused by lost motion at the arc quadrant changeover section during circular cutting.
						The OMR (Optimal Machine Response) control function estimates the machine or motor model (moment of inertia, clone friction, viscosity
Δ	Δ	0	0	0	Δ	coefficient, etc.) that can cause a path error (deviation of the actual tool path from the programmed path). High-accuracy machining is achieved by carrying out feed forward control based on that model. This allows error cased by quadrant protrusions during circular
						interpolation or quadrants on the inner side of the path to be greatly reduced. OMR-II is a function that focuses on the quadrant protrusions, and improves the path error with this. Quadrant path compensation is included in OMR-II.
Δ	Δ	0	0	0	Δ	OMR-FF control enables fine control by generating feed forward inside the drive unit and can realize the strict feedback control to the program command than the conventional high-speed accuracy control.
Δ	Δ	0	0	0	_	This is a function where a distance-coded reference scale is used to establish the reference point in the relative position detection system.
0	0	0	0	0	0	When the external skip signal is input during linear interpolation using the G31 command, machine feeding is stopped immediately and the remaining distance is discarded to execute the commands in the next block.
0	0	0	0	0	0	This function realizes skipping by designating a combination of skip signals for each skip command.
Δ	Δ	0	0	0	Δ	This function enables skip operations to be performed by signals which are input from the user PLC.
Δ	Δ		_	_	_	This function is used to change the feed rate or to stop the movement by inputting the skip signal during the linear interpolation.  Axis movement is performed in the torque limited status, and the axis movement command is suspended to proceed to the next block when
Δ	Δ	_	_	_	_	the current command value reaches the designated torque skip value and the torque skip turns ON.  This function moves the tool in the direction of the tool measurement position by the commanded value between the measurement start
0	0	0	0	0	0	position and measurement position. It stops the tool as soon as it reaches the sensor and calculates the difference between the coordinates
0	0	0	0	0	0	where the tool has stopped and the command coordinates. It registers this difference as the tool length compensation amount for that tool.  Simple measurement of the tool length is done without a sensor.
						[M system] When the tool is positioned at the reference position, this function measures the distance from the reference position to the tool tip and registered it as the tool length compensation amount.
0	0	0	0	0	0	[L system] A device with a built-in touch sensor is used. Simply by causing the tool nose to touch the touch sensor in manual feed, the tool compensation amount can be calculated and stored in tool compensation amount memory.
	_	_	_	_	_	The external workpiece coordinate offset data for the Z axis can be set by cutting the workpiece face by means of manual operations and
						inputting the workpiece measurement signal.  The workpiece position measurement function is used to measure each axis' coordinate by installing a sensor on the spindle and the sensor
0	0	0	0	0	0	contacting the workpiece with the manual feed or handle feed. The surface, hole center and width center coordinates are calculated from the measured coordinates, and those calculated results are set in the workpiece coordinate offset.
0	0	0	0	0	0	The offset of the rotary coordinate system (rotation center and rotation angle) is measured, and the results are set to the workpiece coordinate system offset (rotation center) and the parameters.
Δ	Δ	_	_	_	_	This function executes automatic measurement with the touch sensor on the reference sphere to calculate the rotation center error compensation amount.
Δ	_	_	_	_	_	This function executes automatic measurement with the touch sensor to calculate the workpiece installation error compensation amount.
0	0	0	0	0	0	The tool usage is monitored by accumulating each tool's usage time or the frequency of use.
						[M system] A spare tool change function is added to the tool life management I.
0	0	0	0	0	0	[L system] The life of each tool (time and frequency) is controlled, and when the life is reached, a spare tool of the same type is selected from the same group.
0	0	0	0	0	0	The tool usage is monitored by accumulating each tool's usage time and the frequency of use. This function is not controlled by the group No.
			_			
	_		_	_		-
0	0	0	0	0	0	The max. sets of tools available for tool life management
_	_		_		_	
Δ	Δ		_	_		-
						*Variable number ofmanagement tools The number of tool life management tools can be set per part system.
0	0	_	_	-	_	There are two types of the allocation: "Arbitrary allocation" which allocates the number of tool life management tools to each part system
						arbitrarily and "Fixed allocation" which automatically allocates the number of tool life management tools to each part system equally, and the type can be selected using the parameter.
	_	_	_			This function allows the current limit value of the NC axis to be changed to a desired value in the program, and is used for the workpiece
0	0	0	0	0	0	Auto power OFF function notifies that the control unit's power can be turned OFF after shutting the display unit down by entering "automatic
0	0	0	0	0	_	power OFF request* signal from user PLC to NC.
Δ	Δ		_	_	_	This function aims at detecting tool wear or degradation by detecting and monitoring the actual load (current value) on spindle and NC axes on a real time basis.
		0/—	_		_	This function turns the power supply ON / OFF, synchronizing the NC control unit and the HMI screen.
_	_	_	_		0	A current limit is available for the PLC axis as well as for the NC axis. This function can be used for actions such as stopper operation.
0	0	0	0	0	0	All operations are stopped by the emergency stop signal input and, at the same time, the drive section is stopped and the movement of the machine is stopped.
0	0	0	0	0	0	With the input from the user PLC, it is possible to prohibit the parameter setting or deletion, and the program edit from the setting and display unit.
			I			C III.

					Lathe	system					nining system
	class	M8	00W	M8	00S	M80W	М		C80		00W
		M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	M830W
П	olay for ensuring safety										
$\vdash$	NC warning	0	0	0	0	0	0	0	0	0	0
$\perp$	NC alarm	0	0	0	0	0	0	0	0	0	0
$\overline{}$	Operation stop cause  Emergency stop cause	0	0	0	0	0	0	0	0	0	0
-	Thermal detection	0	0	0	0	0	0	0	0	0	0
_	Battery alarm / warning	0	0	0	0	0	0	0	0	0	0
$\neg$	ection		I		I						I
_	Stroke end (Over travel)	0	0	0	0	0	0	0	0	0	0
-	Stored stroke limit  1 Stored stroke limit I/II	0	0	0	0	0	0	0	0	0	0
	2 Stored stroke limit IB	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
-	3 Stored stroke limit IIB	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
+	4 Stored stroke limit IC Stroke check before travel	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
+		+								Δ.	Δ
+	Chuck / Tailstock barrier check	0	0	0	0	0	0	0	0		
5	Interlock	0	0	0	0	0	0	0	0	0	0
6	External deceleration	0	0	0	0	0	0	0	0	0	0
7	Interference check III	Δ	Δ	Δ	Δ	_	_		_	Δ	Δ
	3D machine interference check	_	_	_	_	_	_	_	_	Δ	Δ
-	Door interlock  1 Door interlock I	0	0	0	0	0	0	0	0	0	0
-	2 Door interlock II	0	0	0	0	0	0	0	0	0	0
0	Parameter lock	0	0	0	0	0	0	0	0	0	0
1	Program protection (Edit lock B, C)	0	0	0	0	0	0	0	0	0	0
2	Program display lock	0	0	0	0	0	0	0	0	0	0
13	Data protection by user's level	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
5	Vertical axis pull-up	0	0	0	0	0	0	0	0	0	0
6	Machine group-based alarm stop	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
7	Interference check between part systems	0	0	0	0	0	0	_	_	_	_
18	Spindle protection	0	0	0	0	0	0	0	_	0	0
$\neg$	ntenance and troubleshooting		ı		I						Г
1	Operation history	0	0	0	0	0	0	0	0	0	0
$\rightarrow$	Data sampling	0	0	0	0	0	0	0	0	0	0
-	NC data backup	0	0	0	0	0	0	0	0	0	0
4	Servo tuning support  NC Analyzer2 (Note 1)	0	0	0	0	0	0	0	0	0	0
5 .	Automatic backup	0	0	0	0	0	0	0	O(GOT)	0	0
$\neg$	Application error detection	0/—	0/—	_	_	0/—	_	_	-	0/—	0/—
$^{+}$	Email notification to operator	Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ
+	NC Configurator2 (Note 2)	0	0	0	0	0	0	0	0	0	0
+			_								
+	Diagnosis data output	0	0	0	0	0	0	0	0	0	0
	Backup / Restore ctional safety	_		_		_	_	_	0	_	
$\neg$	Safety observation	Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ
-1	Smart Safety observation	+ -		<del>-</del>		<u> </u>	+ -			<del>-</del>	
2		Δ	Δ	Δ	Δ	0			Δ	Δ	Δ
	1 Safety-related I/O observation	1		Δ	Δ	0			Δ	Δ	Δ
-	2 Emergency stop observation	Δ	Δ	Δ	l .						
-	Emergency stop observation  Drive safety function	Δ	Δ	Δ							
-	2 Emergency stop observation	Δ	Δ	Δ	Δ	0			Δ	Δ	Δ
-	Emergency stop observation  Drive safety function				Δ	0			Δ	Δ	Δ
	Emergency stop observation  Drive safety function  SLS (Safety-Limited Speed)	Δ	Δ	Δ		_					

(Note 1) Please contact us to purchase this tool.

CNC SYSTEM

(Note 2) Please contact us to purchase a full function version. A limited function version is also available free of charge.

						[M800/M80]S/W ver.C7 [C80]S/W ver.A2	
	Mad	chining c	enter sys	stem			
M8	008	M80W		180	C80	General explanation	
M850S	M830S	_	M80 TypeA	M80 TypeB	_		
0	0	0	0	0	0	Warnings are output by the CNC system. When one of these warnings occurs, a warning number is output to the PLC and a description of the warning appears on the screen. Operation can be continued without taking further action.	
0	0	0	0	0	0	The alarms are output by the CNC system. When one of these alarms occurs, an alarm number is output to the PLC, and a description of the alarm appears on the screen. Operation cannot be continued without taking remedial action.	
0	0	0	0	0	0	The stop cause of automatic operation is shown on the display.	
0	0	0	0	0	0	When the "EMG" (emergency stop) message is displayed in the operation status area of the display, the cause of the emergency stop can be confirmed.	
0	0	0	0	0	0	When overheating is detected in the control unit, an overheat signal is output at the same time as the alarm is displayed.  When it is time to change the batteries, an alarm and warning are displayed.	
		_				3	
0	0	0	0	0	0	Limit switches and dogs are attached to the machine, and when a limit switch has kicked a dog, the movement of the machine is stopped by the signal input from the limit switch.	
0	0	0	0	0	0		
Δ	Δ	0	0	0	Δ	This function sets the areas prohibited for the tool to enter. There are multiple types of prohibitions according to the prohibited range and	
Δ	Δ	0	0	0	Δ	method.	
Δ	Δ	0	0	0	Δ	By commanding, from the program, the boundary for prohibiting machine entry as a coordinate position in the machine coordinate system,	
Δ	Δ	0	0	0	Δ	entry into the inner side of that boundary can be prohibited.  By limiting the tool nose point movement range, this function prevents the tool from colliding with the chuck or tail stock because of a	
_	_	_	_	_	_	programming error.	
0	0	0	0	0	0	The machine movement will decelerate and stop as soon as the interlock signal, serving as the external input, is turned ON. When the interlock signal is turned OFF, the machine starts moving again.	
0	0	0	0	0	0	This function reduces the feedrate to the deceleration speed set by the parameter when the external deceleration input signal has been set to ON.	
Δ	Δ	_	_	_	_	By checking the relative relation between interference objects, the interference can be prevented from occurring. One interference object is defined by one to sixteen tridimensional objects. The maximum definable number is 128 for the interference objects and is 256 for the tricimensional objects.	
_	_	_	_	_	_	The machine pre-reads the position to be moved during the operation to check the interference by the 3D model (machine, tool and jig) registered in advance. When an interference is predicted, an alarm will be shown immediately and all the axes will be decelerated to stop.	
0	0	0	0	Το	0	Under the CE marking scheme of the European safety standards (machine directive), the opening of any protection doors while a machine is	
0	0	0	0	0	0	moving is prohibited. When the door open signal is input from the PLC, this function first decelerates, stops all the control axes, establishes the ready OFF status, and then shuts off the drive power inside the servo drive units so that the motors are no longer driven.	
0	0	0	0	0	0	This function is used to prohibit the changing of machine parameters.	
0	0	0	0	0	0	The edit lock function B or C inhibits machining program B or C (group by machining program numbers) from being edited or erased when these programs require protection.	
0	0	0	0	0	0	This function allows the display of only a target program (label address 9000) to be disabled for the program display in the monitor screen, etc.	
Δ	Δ	0	0	0	Δ		
0	0	0	0	0	0	This function prevents the tool from breakage, through pulling up the cutting tool during emergency stop or instantaneous power interruption at low cutting speed.	
Δ	Δ	0	0	0	Δ	When an alarm occurs for an axis, this function performs an alarm stop only for the axes in a machine group to which the axis belongs.	
-	_	_	_	_	_	This function checks the relative position of up to six cuboids (referred to as interfering objects) all the time, and if a command which causes the interfering objects to collide with each other is issued, the function stops the axis movement to prevent the interference in advance. Such interference can be prevented by covering the tool post, etc. with cuboids.	
0	0	0	0	0	_	* Up to 4 part systems This function consists of a function of calculating the equivalent load ratio of spindle motor and a function of outputting the equivalent load ratio and temperature of spindle motor to the log file.	
	I			T		This is a maintenance function which is useful for tracing down the history and NC operation information and analyzing problems, etc. This	
0	0	0	0	0	0	information is saved in the history data file, and can be displayed on the screen and output to a file.	
0	0	0	0	0	0	The NC data sampling function samples the NC internal data (speed output from NC to drive unit, and feedback data from the drive unit, etc.). This data can be output as text data.	
0	0	0	0	0	0	The NC data back up function backs up the NC parameters, etc., on a built-in disk of display unit or SD card. The data can also be restored.	
0	0	0	0	0	0	With this function, the servo parameters can be automatically adjusted by connecting the CNC and NC Analyzer2, which is an application that runs on a regular personal computer.	
0	0	0	0	0	O(GOT)	With this function, system data, ladder program and custom software can be automatically backed up in case of system failure.  Application error detection function observes applications such as MITSUBISHI standard screen or custom screen. When an error such as	
	_	0/—			_	screen lock is detected, this function saves information and data in the log to investigate the causes easily.  This function enables NC to transmit emails to network-connected email servers (SMTP servers). With this function, the NC can send emails	
Δ	Δ	0	0	0	_	to PCs and mobile terminals away from machines. You are able to know machining conditions (such as machining completion, stop and failure) even if you are in remote places.	
0	0	0	0	0	0	NC Configurator/2 runs on a personal computer to edit the NC data files required for NC control and machine operations such as parameters, tool data and common variables.	
0	0	0	0	0	0	With this function, the information indicating the replacement cycle of the service parts used in NC, drive or motor can be output to the ZR registers.	
_		_	_		0	This function saves (backs up) the screen data and each controller (PLC, CNC) data to a GOT's memory card or USB memory. It also reloads (restores) that data to each device.	
Δ	Δ	0	0	0		The safety observation function ensures safe access to the machine's working parts (e.g. for adjustment or preparation) without shutting off	
		0				the power, which reduces the time required to restart the machine.	
Δ	Δ	0			Δ	Using the dual circuits for processing signals input/output to/from the machine (safety signal compare sequence) and dual execution of safety signal process logic made by users (safety PLC), if no circuit has broken down, the other circuit can detect errors, which improves the safety of signal process. *Safety card is required for M80.	
Δ	Δ	0			Δ	Emergency stop signal is doubled and observed to see whether there is any error. When one emergency stop signal is in open state, the whole system can be set in emergency stop condition. *Safety card is required for M80.	
Δ	Δ	0			Δ	Axis speed (command speed, FB speed) is observed doubly to see whether the speed exceeds the safe speed. * Safety card is required for M80.	
Δ	Δ	0			Δ	Axis absolute position (command position, FB position) is observed doubly to see whether the position exceeds the safe position range. * Safety card is required for M80.	
Δ	Δ	0			Axis stop speed (command speed, FB speed) is observed doubly whether the speed exceeds the safe stop speed.  Axis stop position (command position, FB position) is observed doubly whether the position exceeds the safe stop position range.  Disserve axis stop position deviation (difference between command position and FB position) doubly to see whether the deviation except the safe stop position deviation.		
		0				*Safety card is required for M80.  This function uses the safety signals to inform that the axis speed (command speed, FB speed) is equal to or below the safe speed. *Safety	
Δ	Δ				Δ	card is required for M80.	

 $OS tandard \ \triangle Optional \ \Box Selection \ \ Specifications \ of separated-type \ display \ are \ classified \ with \ "Windows-based" \ and \ "Windows-less"$ 

					Lathe	system				Machining center system	
clas	s	M8	00W	M8	00S	M80W		80	C80	M8	oow
		M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	M830W
5 SBC / SBT (Safe Brake	e Control / Safe Brake Test)	Δ	Δ	Δ	Δ	0			Δ	Δ	Δ
6 SCA (Safe Cam)		Δ	Δ	Δ	Δ	0			Δ	Δ	Δ
7 SS1 / SS2 (Safe Stop)		Δ	Δ	Δ	Δ	0			Δ	Δ	Δ
8 STO (Safe Torque Off)		Δ	Δ	Δ	Δ	0			Δ	Δ	Δ
Drive system											
1 Servo / Spindle											
1 Feed axis											
1 MDS-E-Vx											
2 MDS-EH-Vx											
3 MDS-EJ-Vx 4 MDS-EJH-Vx											
5 MDS-EM-SPVx											
6 MDS-EMH-SPVx											
2 Spindle				_			_			_	
1 MDS-E-SPx											
2 MDS-EH-SPx											
3 MDS-EJ-SPx											
5 MDS-EM-SPVx											
6 MDS-EMH-SPVx											
4 Power supply											
1 MDS-E-CV											
2 MDS-EH-CV											
Machine support functions  1 PLC											
1 Built-in PLC processing mod	de	0	0	0	0	0	0	0	_	0	0
2 PLC functions											
Built-in PLC basic function	n	0	0	0	0	0	0	0	∆ (MELSEC)	0	0
1 Index modification		0	0	0	0	0	0	0	∆ (MELSEC)	0	0
2 Multi-program [numbe	r of programs]	0120	0120	0120	0120	060	060	060	∆ (MELSEC)	0120	0120
3 Multi-project [number of	of projects stored]										
Number of PLC project		0	0	0	0		_	0	_	0	0
Number of PLC project		Δ	Δ	Δ	Δ	0	0	_	_	Δ	Δ
Number of PLC project	ts: 6	Δ	Δ	Δ	Δ		_		_	Δ	Δ
4 Function block (FB)		0	0	0	0	0	0	0	(MELSEC)	0	0
5 Label programming		0	0	0	0	0	0	0	(MELSEC)	0	0
2 PLC exclusive instruction		0	0	0	0	0	0	0	(MELSEC)	0	0
3 PLC support functions											
Alarm message display		0	0	0	0	0	0	0	_	0	0
2 Operator message displa		0	0	0	0	0	0	0	0*	0	0
3 Memory switch (PLC swit		-									
1 Memory switch (PLC s 2 Memory switch (PLC s		0	0	0	0	0	0	0		0	0
3 Memory switch (PLC s	<u> </u>	Δ	Δ	Δ	Δ					Δ	Δ
4 Load meter display	annon il 20 holl irg	0	0	0	0	0	0	0	0	0	0
5 User PLC version display		0	0	0	0	0	0	0	0	0	0
6 Ladder program writing d		0	0	0	0	0	0	0	Δ (MELSEC)	0	0
7 PLC program protection		0	0	0	0	0	0	0	∆ (MELSEC)	0	0
4 Built-in PLC capacity											
1 Standard PLC capacity [r		0128000	0128000	0128000	0128000	O64000	O64000	O32000	∆ (MELSEC)	0128000	O128000
2 Large PLC capacity: 2560		Δ	Δ	Δ	Δ					Δ	Δ
3 Large PLC capacity: 5120 5 Machine contact input / outp		Δ 0	Ο Ο	Δ 0	0	0	0	0	△ (MELSEC)	0	0
6 Ladder monitor		0	0	0	0	0	0	0	O(GOT)	0	0
									(32.)		

	50S M830S _ M80 M80 _					
M8	008	M80W			C80	General explanation
M850S	M830S	_	M80 TypeA	M80 TypeB	_	
Δ	Δ	0			Δ	The brakes connected to motors are activated by this function. Because there are two circuits for activating the brakes, one circuit can activate the brakes even when the other circuit is broken down. Furthermore, Safe Brake Test (SBT) can diagnose the circuits for activating the breaks and the effectiveness of the brakes (deterioration due to abrasion, etc.).
Δ	Δ	0			Δ	* Safety card is required for M80.  This function uses the safety signals to inform that the axis absolute position (command position, FB position) is within the range of safe
Δ	Δ	0			Δ	position. "Safety card is required for MBO.  [Safe stop 1 (SS1)] STO function is activated after an axis is decelerated and the speed (command speed, FB speed) becomes equal to or below the safe stop speed.  [Safe stop 2 (SS2)] SVO function is activated after an axis is decelerated and the speed (command speed, FB speed) becomes equal to or below the safe stop speed.
_	_				_	* Safety card is required for M80.  This function shuts OFF power supply to axes. Because there are two power shutoff circuits, one circuit can shut OFF the power supply even
Δ	Δ	0			Δ	when the other circuit is broken down. * Safety card is required for M80.
						CNC-dedicated drive units, spindle motors, and servo motors are used.
						An exclusive sequence program that controls various signals between the controller and the machine to realize the operations applicable to
0	0	0	0	0	-	each machine can be created and built in.
0	0	0	0	0	Δ	
					(MELSEC)	
0	0	0	0	0	(MELSEC)	
0.400	0.400	0.00	0.00	0.00	Δ	
0120	0120	O60	O60	O60	(MELSEC)	[M800/M80]  Basic commands (bit processing commands): 43 commands including LD, LDI, OR, ORI, AND, ANI, OUT, PLS, etc.
						Function commands: 188 commands including data transfer, 4 basic arithmetic operations, logic arithmetic operations, large/small
0	0	_		0		identification, binary/BCD conversion, branching, conditional branching, decoding, encoding, etc.
Δ	Δ	0	0	_		For the details, refer to the manual of MITSUBISHI Programmable Controller "MELSEC iQ-R series".
Δ	Δ	_			_	
0	0	0	0	0	(MELSEC)	
					(IVILLOLO)	
0	0	0	0	0	(MELSEC)	
0	0	0	0	0	Δ	PLC-dedicated instruction is provided for some limited applications, enabling a complex machining process, which is difficult to carry out
<u> </u>					(MELSEC)	only by the basic instructions and function instructions.
0	0	0	0	0	<u> </u>	The contents of the alarms which have occurred during sequence (user PLC) processing can be displayed on the setting and display unit.
	-				<del>-</del>	Ine contents of the alarms which have occurred during sequence (user PLO) processing can be displayed on the setting and display unit.  When some conditions occur where you wish to inform a messages to the operator, an operator message can be displayed separately from
0	0	0	0	0	0*	the alarm message.
						*Only the macro alarm message can be displayed.
0	0	0	0	0	<u> </u>	
Δ	Δ	<u> </u>	<u> </u>		<u> </u>	PLC switches can be set on the setting and display unit screen, and the ON / OFF control executed.
Δ	Δ	_	_		_	
0	0	0	0	0	0	A load meter can be displayed on the setting and display unit.
0	0	0	0	0	0	The user PLC version can be displayed in the software list on the Software Configuration screen.
0	0	0	0	0	Δ	Ladder program can be edited while PLC is running. This function is available, either by GX Developer or PLC onboard edit.
					(MELSEC) △	
0	0	0	0	0	(MELSEC)	For PLC data protection, the file password can be set to each file of PLC data.
-					Δ	[M800/M80]
0128000	0128000	O64000	O64000	O32000	(MELSEC)	In the program memory, it is possible to store the system area of parameters, intelligent function module parameters, sequence programs,
Δ	Δ					device comments, and device initial values. [C80]
Δ	Δ	_	_	_		For the details, refer to the manual of MITSUBISHI Programmable Controller "MELSEC iQ-R series".
0	0	0	0	0	Δ MELCEC)	[M800/M80] The operation panel I/O unit or the remote I/O unit is selected based on the types of input signals (sink/source) or output signals (source) available for input or output and the number of contacts required.
					(MELSEC)	[C80]
						[M800/M80]
0	0	0	0	0	O(GOT)	This function enables the operating status of the sequence circuit to be checked on the controller's setting and display unit.  [C30] This function enables to display on GOT the operating status of the sequence circuit to be checked. "Sequence program monitor" (GOT2000)
0	Ο Ο	0	0	0	(MELSEC)	For the details, refer to the manual of MITSUBISHI Programmable Controller "MELSEC iQ-R series".  [M800/M80] The operation panel I/O unit or the remote I/O unit is selected based on the types of input signals (sink/source) or output signals available for input or output and the number of contacts required.  [C80] The device is selected from the I/O modules of the MITSUBISHI Programmable Controller "MELSEC IQ-R Series".  [M800/M80] This function enables the operating status of the sequence circuit to be checked on the controller's setting and display unit.  [C80]

[M800/M80]S/W ver.C7 [C80]S/W ver.A2

					Lathe					center	nining system
	class	M8	00W	M8	00S	M80W		80	C80	M8	00W
		M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	M830V
7	PLC development										
	1 On-board development	0	0	0	0	0	0	0	O(GOT)	0	0
	2 MELSEC development tool (GX Developer)	0	0	0	0	0	0	0	_	0	0
	3 MELSEC development tool (GX Works3) (Note 1)		_	_	_		_		0		_
8	PLC parameter				_		_	_			
	1 PLC constant (150 points) 2 PLC constant extension (Up to 755 points)	0	0	0	0	0	0	0	0	0	0
9		- 0	1 0	0						-	
_	1 Ethernet connection	0	0	0	0	0	0	0	0	0	0
	2 CC-Link connection	0	0	0	0	0	0	0	Δ	0	0
	3 CC-Link IE field network connection						_		(MELSEC) △		
10	Pallet program registration				_		_		(MELSEC)	Δ	Δ
	achine construction			_		_			_		
$\neg$			Τ .								
1	Servo OFF	0	0	0	0	0	0	0	0	0	0
2	Axis detachment	0	0	0	0	0	0	0	0	0	0
3	Synchronous control	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
4	Inclined axis control	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
5	Position switch	024	024	024	024	024	024	024	0*	024	024
7	Index table indexing	0	0	0	0	0	0	0	0	0	0
8	Tool length compensation along the tool axis	Δ*	Δ*	Δ*	Δ*	_	_	_	_	Δ	Δ
9	Tool handle feed & interruption		_	_	_		_	_	_	Δ	Δ
10	Tool center coordinate display	_	_	_	_	_	_	_	_	Δ	Δ
11	Tool center point control	_	_	_	_	_	_	_	_	Δ	Δ*
12	Inclined surface machining command	Δ	Δ	Δ	Δ	0	0	_	_	Δ	Δ
	Simple inclined surface machining command	Δ	Δ	Δ	Δ	0	0	_	_		_
14	3-dimensional tool radius compensation (Tool's vertical-direction compensation)	Δ*	Δ*	Δ*	Δ*	_	_	_	_	Δ	Δ
15	Workpiece installation error compensation	Δ*	_	Δ*	_	_	_	_	_	Δ	_
16	3-dimensional manual feed	Δ	Δ	Δ	Δ	0	0	_	_	Δ	Δ
17	D No. i										
20	R-Navi Real-time tuning	+-			_	_	_			Δ	Δ
	1 Real-time tuning 1 (speed gain)	Δ	Δ	Δ	Δ	0	0	_	_	Δ	Δ
	2 Real-time tuning 2 (rapid traverse time constant)	Δ	Δ	Δ	Δ	0	0	_	_	Δ	Δ
21	Constant torque control	Δ	Δ	Δ	Δ	0	0	_	_	_	_
22	External encoder position output I/F	0	0	0	0	0	0	0	_	0	0
PL	C operation										
1	Arbitrary feed in manual mode	0	0	0	0	0	0	0	0	0	0
2	Circular feed in manual mode	Δ	Δ	Δ	Δ	_	_	_	_	Δ	Δ
3	PLC axis control	0	0	0	0	0	0	0	0	0	0
5	PLC axis indexing	0	0	0	0	0	0	0	0	0	0
6	NC axis / PLC axis switchover	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	C interface			- 4							
$\neg$						^	_				_
1	CNC control signal	0	0	0	0	0	0	0	0	0	0
2	CNC status signal	0	0	0	0	0	0	0	0	0	0
3	PLC window	0	0	0	0	0	0	0	0	0	0
	External search	0	0	0	0	0	0	0	0	0	0
4 l											. ~
4 5		0	0	0	0	0	0	0	0	0	0

		B.500	2014/		Lattie	<u> </u>				center system M800W	
	class		oow 		00S	M80W	M80	80 M80	C80		
		M850W	M830W	M850S	M830S	_	TypeA	TypeB	_	M850W	M830W
7	PLC development										
	1 On-board development	0	0	0	0	0	0	0	O(GOT)	0	0
	2 MELSEC development tool (GX Developer)	0	0	0	0	0	0	0	_	0	0
	3 MELSEC development tool (GX Works3) (Note 1) PLC parameter	_	_	_	_		_	_	0	_	
0	1 PLC constant (150 points)	0	0	0	0	0	0	0	0	0	0
	2 PLC constant extension (Up to 755 points)	0	0	0	0	_	_		_	0	0
9	GOT connection										
	1 Ethernet connection	0	0	0	0	0	0	0	Δ	0	0
	2 CC-Link connection	0	0	0	0	0	0	0	(MELSEC)	0	0
	3 CC-Link IE field network connection	_	_	_	_	_	_	_	∆ (MELSEC)	_	_
10	Pallet program registration		_	_	_		_	_	(IVIELSEC)	Δ	Δ
	achine construction										
1	Servo OFF	0	0	0	0	0	0	0	0	0	0
2	Axis detachment	0	0	0	0	0	0	0	0	0	0
3	Synchronous control	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
4	Inclined axis control	Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
-	Desition outleb	001	00:	60.	001	00:	60.	00:	0.1	60.	604
5	Position switch	024	024	024	024	O24	024	024	0*	024	024
7	Index table indexing	0	0	0	0	0	0	0	0	0	0
8	Tool length compensation along the tool axis	Δ*	Δ*	Δ*	Δ*	_	_	_	-	Δ	Δ
-											
9	Tool handle feed & interruption	_	_	_	_	_	_	_	_	Δ	Δ
10	Tool center coordinate display	_	_	_	_	_	_	_	_	Δ	Δ
										_	
11	Tool center point control	_	_	_	_	_	_	_	_	Δ	Δ*
12	Inclined surface machining command	Δ	Δ	Δ	Δ	0	0	_	_	Δ	Δ
	Simple inclined surface machining command					0	0				
13	Simple inclined surface machining command	Δ	Δ	Δ	Δ	0	0	_	_	_	
14	3-dimensional tool radius compensation	Δ*	Δ*	Δ*	Δ*	_	_	_	_	Δ	Δ
-	(Tool's vertical-direction compensation)										
15	Workpiece installation error compensation	Δ*	–	Δ*	_	_	_	_	–	Δ	-
16	3-dimensional manual feed	Δ	Δ	Δ	Δ	0	0	_	-	Δ	Δ
17		_	_	_	_	_	_	_	_	Δ	Δ
20	Real-time tuning										
	1 Real-time tuning 1 (speed gain)	Δ	Δ	Δ	Δ	0	0	_	–	Δ	Δ
	2 Real-time tuning 2 (rapid traverse time constant)	Δ	Δ	Δ	Δ	0	0	_	-	Δ	Δ
21	Constant torque control		_	_	_	0	0				
	oonstant torque contitu	Δ	Δ	Δ	Δ	U	0	_		_	
22	External encoder position output I/F	0	0	0	0	0	0	0	_	0	0
	C operation										
3 PL		0	0	0	0	0	0	0	0	0	0
2	-	Δ	Δ	Δ	Δ	_	_	_	_	Δ	Δ
! ⊢	PLC axis control	0	0	0	0	0	0	0	0	0	0
	PLC axis indexing	0	0	0	0	0	0	0	0	0	0
6		Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
	C interface			Δ		0				4	Δ
1	CNC control signal	0	0	0	0	0	0	0	0	0	0
2		0	0	0	0	0	0	0	0	0	0
	OTTO STATEM										
	Pl C window										
3	PLC window	0	0	0	0	0	0	0	0	0	0
4		0	0	0	0	0	0	0	0	0	0
	Direct Screen Selection	0	0	0	0	0	0	0	0	0	0
6	Buzzer sound control	0	0	0	0	0	0	0	_	0	0

		OS M80W M80 C80				
M8	00S	M80W			C80	General explanation
M850S	M830S	_	M80 TypeA	M80 TypeB	-	
0	0	0	0	0	O(GOT)	On-board refers generically to the PLC related operations carried out with the CNC unit. The Mitsubishi CNC on-board realizes functions and operations similar to the MELSEC Series ladder development tool (GX Developer).
0	0	0	0	0	_	This function enables the data of the PLC contained inside the NC system to be developed and debugged using the GX Developer.
		_	_	_	0	Using GX Works3, the sequence programs of the MELSEC CPU can be developed and debugged.
0	0	0	0	0	0	The PLC constants set with the data type, and the bit selection parameters set with the bit types can be specified on the screen as the
0	0		_	_	_	parameters to use in the built-in PLC.
0	0	0	0	0	0	
0	0		0	0	Δ	
0	0	0	0	0		For connecting a MITSUBISHI Graphic Operation Terminal (GOT), refer to the GOT Catalogs.
_	-	_	-	-	(MELSEC)	
Δ	Δ	_	_	_	_	Pallet program function assists the machining setups as it allows machining programs to be registered for each pallet of the auto pallet changer.
						on an agor.
0	0	0	0	0	0	When the servo OFF signal (per axis) is input, the corresponding axis is set in the servo OFF state. When the moving axis is mechanically clamped, this function is designed to prevent the servo motor from being overloaded by the clamping force.
0	0	0	0	0	0	This function enables the control axis to be released from control.
Δ		0	0	0	Δ	The synchronous control is a control method whereby both master and slave axes are controlled with the same travel command by designating the travel command for the master axis also to the slave axis. This function is assumed to be used in such equipment as large
		_	_			machine tools, which drive one axis with two servo motors.  Even when the control axes in a machine are mounted at an angle other than 90 degrees, this function enables it to be programmed and
Δ	Δ	0	0	0	_	controlled in the same way as with an orthogonal axis.
024	024	024	024	024	0*	Instead of a dog switch on a machine's axis, a hypothetical dog switch is established using a parameter to set a coordinate position to show the axis name and the hypothetical dog position. When the machine reaches the position, a signal is output to the PLC interface.
0	0	0	0	0	0	*24 points for each part system and 32 points for the whole PLC axes.  The indexing of the index table can be performed by setting the index axes.
						(1) Changing the tool length compensation along the tool axis and compensation amount  Even if the tool axis direction is not the Z axis direction because the rotary axis is rotated, the tool can be compensated in the tool axis direction.
Δ	Δ	_	_	_	_	(2) Machine configuration
						The tool length compensation along the tool axis is carried out in respect to the direction of the tool nose axis (rotary axis).  * This function is available during program format switch for L system.
Δ		_	-	-	_	This function makes it possible to move the axis with the manual pulse generator in the tool axis direction, tool diameter direction X and tool diameter direction Y in the hypothetical coordinate system over the tool axis.
Δ	Δ	_				The tool center coordinates, handle interrupt amount (tool axis movement) and tool center point speed are displayed during the tool center point control function, tool length compensation along the tool axis function, and tool handle feed & interrupt function (tool axis direction
						handle feed, tool handle interrupt, tool diameter direction handle feed, nose center rotation handle feed).
Δ	Δ*	0*	0*	_	_	This function controls so that the position command in a machining program is at the tool center point in the coordinate system (table coordinate system) which rotates together with the workpiece.
Δ	Δ	0	0	_	Δ	* Restrained to 4-axis simultaneous contouring for M830/M80W/M80A  An arbitrary spatial plane defined with this function can be machined using normal program commands.
						* This includes simple tool center point control.  This function is used when a lathe with the orthogonal axes XYZ and the turret with B axis performs the milling on the inclined surface in the
						end face direction. This allows the operator to perform cutting on an inclined surface with no need for considering the inclination angle.
Δ		_	_	_	_	This function is to compensate the tool radius of the 5-axis machine with two rotary axes, in accordance with the change of the workpiece direction and inclination of the tool due to the movement of the rotary axis.
						*This function is available during program format switch for L system.  This function is used for a 5-axis machine. This compensates the error when a workpiece is placed off the workpiece coordinate system to
Δ	-	_	_	_	_	enable machining according to the program.  * This function is available during program format switch for L system.
Δ	Δ	0	0		Δ	By selecting the hypothetical coordinate system to be machined, axis can be moved with manual feed (JOG, HANDLE or INCREMENTAL) in the coordinate system with this function. It can be easy to setup because multiple axes is moved by NC according to the tool angle or the
						inclination of the table.
Δ	Δ	0	0		_	This provides easy setup of index machining (multiple/inclined surface machining) using a rotary axis.
^		0	0			This function estimates the inertia (or workpiece weight) of mechanical system and changes the speed control gain automatically according
Δ	Δ	-				to the estimation results to suppress mechanical vibration. Users can expect suppression of vibration caused by inertia fluctuation, as well as reduction of machining time through adaptation of appropriate speed control gain.
Δ		0	0	_	_	This function estimates the inertia (or workpiece weight) of mechanical system and optimizes the acceleration/deceleration time constant automatically according to the estimation results. It achieves the cycle time reduction when the inertia of workpiece to machine changes
						significantly.  The servo motor of the axis designated for [Constant torque control] outputs the torque set by the parameter in a constant direction.
_	-	_	_	_	_	The servo motor of the axis designated for [Proportional torque stopper control] generates the torque set by the parameter in the stopper direction.
0	0	0	0	0		This function outputs the position (angle) of external encoder to PLC device based on the input pulses from the encoder. This function can be used to monitor the position of angular head which the external encoder is connected to. * Encoder expansion card is required for M800W/
						M80W
0	0	0	0	0	0	This function enables the feed directions and feed rates of the control axes to be controlled using commands from the user PLC.
Δ	Δ	_				By specifying a hypothetical coordinate on the machine coordinate from the user PLC, oblique linear interpolation or circular interpolation is executed with jog / handle feed, manual rapid traverse or incremental feed of either X axis or Y axis.
0	0	0	0	0	0	This function allows independent axes to be controlled with PLC-based commands, separately from the NC control axes.
0	0	0	0	0	0	PLC axis indexing allows a PLC axis to function as an auxiliary axis with no need for changing the user ladder used conventionally for an auxiliary axis.
Δ	Δ	0	0	0	Δ	By setting positioning points (stations) in advance, positioning control can be performed simply by designating a positioning point No. (station
						No.).
0	0	0	0	0	0	Control commands to the CNC system are assigned from the PLC. Input signals with skip inputs that respond at high speed can also be used.
0	0	0	0	0	0	The status signals are output from the CNC system. They can be utilized by referencing them from the PLC.
						[M800/M80] This function uses the "read window" or "write window" assigned to the R register's user area to read and write the CNC operation status,
0	0	0	0	0	0	axis information, parameters and tool data, etc. [C80]
						This function uses the "read window" or "write window to read and write the CNC operation status, axis information, parameters and tool data, etc.
0	0	0	0	0	0	This function enables searching of the program to automatically start from the PLC. The program No., block No. and sequence No. can be designated. In addition, the details of the search in progress can be read.
0	0	0	0	0	0	This signal allows an automatic transition to the alarm display screen when an alarm occurs.
0	0	0	0	0	-	This function gives a buzzer mounted on the NC keyboard by operating the PLC device. This is effective in applications of sounding a buzzer such as during the alarm occurrence, or for the program operation end notification.
				-		

Machining center system

(Note 1) Please contact us to purchase this tool.

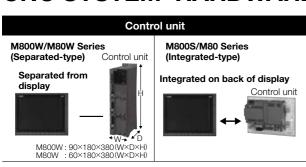
					Lathe	system					nining system
	class	M80	OOW	M8	00S	M80W	М	80	C80		DOW
		M850W	M830W	M850S	M830S	_	M80 TypeA	M80 TypeB	_	M850W	
5 M	achine contact I/O							, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
1	Operation Panel I/O										
	1 DI:64 / DO:64	□/—	□/—	_	_	□/—	_	_	_	□/—	□/—
	2 DI:64 / DO:64+SDI:8	□/—	□/—	_	_	□/—	_	_	_	□/—	□/—
	3 DI:96 / DO:64	—/□	—/□			—/□			_	—/□	-/-
2	Remote I/O										
	1 DI:32 / DO:32								_		
	2 DI:64 / DO:48								_		
	3 DI:64 / DO:48+AO:1								_		
	5 DI:16 / DO:8								_		
	6 DI:32 / DO:32+SDI:8 / SDO:4								_		
	7 SDI:8 / SDO:4										
6 E>	ternal PLC link										
1	CC-Link (Master / Local)								△ (MELSEC)		
2	PROFIBUS-DP (Master)								_		
3	CC-Link IE Field network (Master / Local)	_	_	_	_	_	_	_	△ (MELSEC)	_	_
7 Ins	stalling S/W for machine tools								(1122020)		
1	, · · · ·	0	0	0	0	0	0	0	_	0	0
	Customization data storage capacity [MB]			6	6		6	6	_		
	2 Customization working memory size [MB]	6	6	6	6	3	3	3	_	6	6
2	User-defined key	0	0	0	0	0	0	0		0	0
3	EZSocket I/F (Note 1)	0	0	0	0	0	0	0	Δ	0	0
4		Δ	Δ	Δ	Δ	0	0	0	Δ	Δ	Δ
5	Custom API library	0	0	0	0	0	0	0	_	0	0
6	MES interface library	Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ
7	SLMP Server	0	0	0	0	0	0	0	_	0	0
8	Mitsubishi CNC communication software FCSB1224W000 (Note 1)	0	0	0	0	0	0	0	_	0	0
10	GOT2000 screen design tool GT Works3	_		_	_		_	_	0	_	_
8 0	hers										
1		Δ	Δ	Δ	Δ	0	0	0	_	Δ	Δ
2											
	1 NC Monitor2 (Note 1)	0	0	0	0	0	0	0	0	0	0
	2 NC Explorer (Note 3)	0	0	0	0	0	0	0	0	0	0
3	Automatic operation lock	0	0	0	0	0	0	0	0	0	0
4	Power consumption computation	0	0	0	0	0	0	0	0	0	0
5	EcoMonitorLight connection	0	0	0	0	0	0	0	_	0	0
6	GOT Window	_	_	_	_	_	_	_	0	_	_
7	Log Viewer	_	_	_	_	_	_	_	0	_	_

**CNC SYSTEM** 

(Note 1) Please contact us to purchase this tool. (Note 3) This tool is free of charge. Please contact us.

						[INIDOD/INIDOJD/WV Val.O7   CODJD/WV Val.Az	
	Mad	chining c	enter sys	tem			
M8	00S	M80W	M	80	C80	General explanation	
M850S	M830S	_	M80	M80	_		
			TypeA	TypeB			
		□/—					
$\vdash \equiv$		□/—			<del>                                     </del>	Some types of signals can be input/output from the operation panel I/O unit according to the type and No. of contacts.	
$\vdash$		_/D			<del>                                     </del>	outre types of signals can be input output from the operation panel to drift according to the type and two, of contacts.	
		7					
					_		
						The remote I/O unit equipped with the maximum number of DI/DO points is the one with 64 points for DI and 48 points for DO. Multiple	
						remote I/O units can be used as long as the total number of occupied stations is 64 or less.  * Safety card is required for M80 when using ""Dl:32/DO:32+SDl:8/SDO:4*" or ""SDl:8/SDO:4*".	
					_	Calcif Ca	
					_		
						[M800/M80]  NC unit can be directly connected to the network to serve as the master/local station of the MELSEC CC-Link.	
					Δ	[C80]	
					(MELSEC)	Refer to manuals of each unit of MITSUBISHI Programmable Controller "MELSEC iQ-R series" for information on the function and the	
						performance.  NC can input / output devices to / from slave stations as a master station of PROFIBUS-DP communication by connecting to PROFIBUS-	
						DP-capable slave stations.	
_	_	_	_	_	Δ	Refer to manuals of each unit of MITSUBISHI Programmable Controller "MELSEC iQ-R series" for information on the function and performance.	
					(MELSEC)	performance.	
0	0	0	0	0	_		
6	6		6	6	_	It is an optional function that allows a user-created screen or window to be displayed as an HMI screen or another application on the screen.	
6	6	3	3	3		* Capacity depends on memory space for M800W/M80W	
0	0	0	0	0	<del> </del>	This function allows an arbitrary character string to be assigned to a key and makes it easy to input a typical character string.	
0	0	0	0	0	Δ	This middleware makes it easy to develop applications having the Windows interface.	
Δ	Δ	0	0	0	Δ	APLC (Advanced Programmable Logic Controller) release is a function that allows the user-generated C language module to be called from	
						the NC. Control operations that are difficult to express in a sequence program can be created with the C language.  This function is designed to interface an NC with an application developed by a user. You can set and refer the data for NC using this function.	
0	0	0	0	0	-	* Please contact us for details.	
Δ	Δ	0	0	0	_	The MES interface library function links the NC internal data and the database of information system (manufacturing execution system)	
-						without a communication gateway.  Transfers data using the SLMP between an NC and an external device. This function enables easy connection with external devices and	
0	0	0	0	0	_	read/write NC data through the Ethernet cable.	
0	0	0	0	0	_	The software designed to help development of an application with Windows interface for Mitsubishi computerized numerical controller. The product can accelerate development by using OLE interface common to computerized numerical controller without knowing internal processing	
						of the machine.	
		_	_		0	This integrated software is used to create professional screen designs for GOTs.	
Δ	Δ	0	0	0		This function locks the operations of the NC if the release code is not entered before the specified time limit.	
0	0	0	0	0	0	NC Monitor2 is a PC software tool that monitors information in the NC unit connected with the Ethernet.	
0	0	0	0	0	0	NC Explorer is a software tool to operate the machining data files of each NC unit connected with a host personal computer by Ethernet connection from the Explorer on the host personal computer.	
0	0	0	0	0	0	Automatic operation lock function prevents the falsification of APLC (C language module) by a third party.	
0	0	0	0	0	0	Present power consumption and accumulated power consumption can be acquired with this function. The present power consumption notifies the instantaneous power consumption and the accumulated power consumption notifies the integrated value of the present power	
						consumption.	
0	0	0	0	0	-	NC system can collect and manage the electric power of the machine tool which is measured by the energy measuring unit "EcoMonitorLight (sold separately)".	
_	_	_	_	_	0	This is the interface to display the variety of NC data on GOT connected to the CNC CPU.  This reads out the running machining program No., the running machining program and the coordinate values, etc. by the device read	
						command.	
-	_	_	–	_	0	This function enables the recorded data by the data sampling function of the NC to display with a graph on the GOT, and to store the data as a file.	
						WIN 10 11001	

# **CNC SYSTEM HARDWARE**



		[mm]
	Machine operation pa	anel
FCU8-KB921 FCU8-KB923	Key switch: 55 points, LED: 55 points MITSUBISHI standard key layout	KB921/922: 260 KB923/924: 290
FCU8-KB922 FCU8-KB924	Key switch: 55 points, LED: 55 points Custom specification key layout	140
FCU8-KB931	Rotary switch (Spindle override, cutting override) Selective switch (memory protection) Emergency stop button	140

Display	Keyboard	M800W Series	M800S Series	M80W Series	M80 Series
19-type Touchscreen	-	365 Windows based	_	365 Windows based	_
19-type, horizontal Touchscreen	-	440 Windows based	_	440 Windows based	_
15-type Touchscreen	FCU8-KB083 Clear key Full keyboard	400 Windows- based display can be selected	400 320 140	400 Windows- 320 based display can be selected	320 140
10.4-type Touchscreen	FCU8-KB047 Clear key Full keyboard	290 220	290 220 160	290	290
10.4-type Touchscreen	FCU8-KB041 Clear key ONG(XZF) layout for L system FCU8-KB046 Clear key ONG(XYZ) layout	220	290 140	290 140	290 140
10.4-type Touchscreen	FCU8-KB048 Clear key ABC layout	290 230 220	290 230	290 230	290 230
8.4-type	FCU8-KB026 Clear key ONG(XYZ) layout FCU8-KB028 Clear key ONG(XYZ) layout	_	ı	260 140	260 140
8.4-type	FCU8-KB029 Clear key ONG layout	_	<u> </u>	260	260

# **CNC SYSTEM CONTROL UNIT/DISPLAY UNIT**

# [M800/M80 Series]

# ■Display unit/control unit separated-type

# CNC System

Series	Model name	System type	NC control unit
M800W Series	M850W	FCA850U	FCU8-MA041-001
	M830W	FCA830U	FCU8-MU042-001
M80W Series	M80W	FCA80U	FCU8-MU044-001

# CNC System

Classification		Туре	Type Remarks		ed Series M80W
Windows-based display unit	19-type vertical color	FCU8-DU191-75		M800 O	-
	LCD touchscreen	FCU8-DU191-77		-	0
	19-type horizontal color LCD	FCU8-DU192-75	Personal computer (FCU8-PC231) and built-in disk unit (FCU8-CF001-001) are prepared at the	0	-
	touchscreen	FCU8-DU192-77	same time.	-	0
	15-type color LCD touchscreen	FCU8-DU181-34		0	-
		FCU8-DU181-36		-	0
	15-type color LCD	FCU8-DU181-31	Graphic control unit (FCU8-GC211-001) is prepared at the same time.	0	-
	touchscreen	FCU8-DU181-32		-	0
Windows-less display unit	10.4-type color LCD	FCU8-DU141-31		0	-
	touchscreen	FCU8-DU141-32		-	0
	8.4-type color LCD	FCU8-DU121-12		-	0

# ■Display unit/control unit integrated-type

Series	Model name	System type	NC control unit	Display unit
	M850S	FCA850H-8S	FCU8-MA542-001	FCU8-DU181-31 (15-type color LCD touchscreen)
M800S Series		FCA850H-4S	PC06-IVIA542-001	FCU8-DU141-31 (10.4-type color LCD touchscreen)
IVIOUUS SEI IES	M830S	FCA830H-8S	ECLIO MILIE 42 001	FCU8-DU181-31 (15-type color LCD touchscreen)
	IVIOSOS	FCA830H-4S	FCU8-MU542-001	FCU8-DU141-31 (10.4-type color LCD touchscreen)
		FCA80H-8A	FCU8-MU512-001	FCU8-DU181-32 (15-type color LCD touchscreen)
	M80 TypeA	FCA80H-4A		FCU8-DU141-32 (10.4-type color LCD touchscreen)
M80 Series		FCA80P-2A		FCU8-DU121-12 (8.4-type color LCD)
IVIOU Series		FCA80H-8B		FCU8-DU181-32 (15-type color LCD touchscreen)
	M80 TypeB	FCA80H-4B	FCU8-MU511-001	FCU8-DU141-32 (10.4-type color LCD touchscreen)
		FCA80P-2B		FCU8-DU121-12 (8.4-type color LCD)

# [C80 Series]

# **■CNC-CPU** unit

Product	Model	Remarks
CNC control module	R16NCCPU	

# ■GOT2000 related unit

# SD card

Product	Model	Model code	Remarks
SD card	NZ1MEM-2GBSD	1WC535	2GB SD memory card for GOT

# GT27 Model

Pr	oduct	Model	Model code	Remarks
	GT2712	GT2712-STBA	1EA780	12.1" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) AC100-240V User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
		GT2712-STBD	1EA781	12.1" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	OT0710	GT2710-STBA	1EA770	10.4" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) AC100-240V User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	GT2710	GT2710-STBD	1EA771	10.4" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	GT2708	GT2708-STBA	1EA740	8.4** SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) AC100-240V User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
GT27 Model		GT2708-STBD	1EA741	8.4** SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	GT2710	GT2710-VTBA	1EA760	10.4" VGA [640×480 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) AC100-240V User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	G12/10	GT2710-VTBD	1EA761	10.4" VGA [640×480 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	GT2708	GT2708-VTBA	1EA730	8.4** VGA [640×480 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) AC100-240V User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	G12708	GT2708-VTBD	1EA731	8.4** VGA [640×480 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	GT2705	GT2705-VTBD	1EA721	5.7** VGA [640×480 dots] TFT color LCD 65536 colors (Multi-touch compliant) 24VDC User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
		GT25-12PSCC	1EK307	For 12.1"" Clear type, Transparent, With a hole for the USB environmental protection cover, A set of 5 sheets.
Drotootico	oboot	GT25-10PSCC	1EK304	For 10.4"" Clear type, Transparent, With a hole for the USB environmental protection cover, A set of 5 sheets.
Protective	SHEEL	GT25-08PSCC	1EK301	For 8.4"" Clear type, Transparent, With a hole for the USB environmental protection cover, A set of 5 sheets.
		GT25-05PSCC	1EK316	For 5.7" Clear type, Transparent, With a hole for the USB environmental protection cover, A set of 5 sheets.

### GT25 Model

Proc	Product		Model code	Remarks
	GT2512	GT2512-STBA	1EA580	12.1" SVGA [800x600 dots] TFT color LCD 65536 colors AC100-240V, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	G12512	GT2512-STBD	1EA581	12.1" SVGA [800x600 dots] TFT color LCD 65536 colors 24VDC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
GT25 Model	GT2510	GT2510-VTBA	1EA560	10.4** VGA [640×480 dots] TFT color LCD 65536 colors AC100-240V, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
G125 Model		GT2510-VTBD	1EA561	10.4** VGA [640x480 dots] TFT color LCD 65536 colors 24VDC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
		GT2508-VTBA	1EA530	8.4" VGA [640x480 dots] TFT color LCD 65536 colors AC100-240V, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	GT2508		1EA531	8.4" VGA [640x480 dots] TFT color LCD 65536 colors 24VDC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.

# **CNC SYSTEM I/O UNIT AND OTHERS**

# [M800/M80 Series]

# **■List of Units**

	ication	Туре	Remarks		Supporte M800S		
Operation Panel I/O U	Jnit]			INGOON	Innonna	INOON	IVIO
o portatorni a tori vi o		FCU8-DX830	DI: 64-points 24V/0V common type, DO: 64-points source type, Manual pulse generator input: 3ch, Remote I/O 2.0 I/F, RIO occupied stations (fixed): 1 to 4 and 7 to 14, RIO extensible stations: 5, 6, 15 to 64 (For Windows-based display unit)	0	-	0	-
DI 24V/0V common input		FCU8-DX730	DI: 64-points 24V/OV common type, DO: 64-points source type, Manual pulse generator input: 3ch, Remote I/O 2.0 I/F, RIO occupied stations (fixed): 1, 2 and 7 to 12, RIO extensible stations: 3 to 6 and 15 to 64 (For Windows-less display unit)	0	-	0	-
	DO Source output	FCU8-DX750	DI: 96-points 24V/OV common type, DO: 64-points source type, Manual pulse generator input: 3ch, Remote I/O 2.0 I/F, RIO occupied stations (fixed): 1 to 3 and 7 to 12, RIO extensible stations: 4 to 6 and 13 to 64	-	0	-	0
		FCU8-DX760	DI: 96-points 24V/OV common type, DO: 96-points source type, Manual pulse generator input: 3ch, Remote I/O 2.0 I/F, RIO occupied stations (fixed): 1 to 4 and 7 to 12, RIO extensible stations: 5, 6 and 13 to 64	-	0	-	0
DI 24V/0V common input Safety DI 24V/0V common input	DO Source output	FCU8-DX837	DI: 64-points 24V/OV common type, DO: 64-points source type, Safety DI: 8-points 0V common type, Manual pulse generator input: 3ch, Remote I/O 2.0 I/F, RIO occupied stations (fixed): 1 to 4 and 7 to 14, RIO extensible stations: 5, 6 and 15 to 64 (For Windows-based display unit)	0	-	0	-
DI 24V/0V common input Al analog input	DO Source output AO Analog output	FCU8-DX761	DI: 96-points 24V/OV common type, DO: 64-points source type, AI: 1 point, AO: 1 point, Manual pulse generator input: 3ch, Remote I/O 2.0 I/F, RIO occupied stations (fixed): 1 to 5 and 7 to 12, RIO extensible stations: 6 and 13 to 64	-	0	-	0
[Remote I/O Unit]							
DI 24V/0V common		FCU8-DX220	DI: 32-points 24V/0V common type, DO: 32-points source type, Number of occupied stations: 1	0	0	0	0
input	DO Source output	FCU8-DX230	DI: 64-points 24V/0V common type, DO: 48-points source type, Number of occupied stations: 2	0	0	0	0
DI 24V/0V common	DO Source output	FCU8-DX231	DI: 64-points 24V/0V common type, DO: 48-points source type, AO: 1 point,	0	0	0	0
Al analog input	AO Analog output  AO Analog output	FCU8-DX202	Number of occupied stations: 2 Al: 4 points, AO: 1 point,	0	0	0	0
Ai anaiog input	AO Arialog output	FC06-DX202	Number of occupied stations: 1  DI: 16-points 0V common type (3mA/point), DO: 8-points source type (2A/point),	0		0	
DI 0V common input	DO Source output	FCU8-DX213	Number of occupied stations: 1		0	0	0
·	(large capacity)	FCU8-DX213-1	DI: 16-points 0V common type (9mA/point), DO: 8-points source type (2A/point), Number of occupied stations: 1	0	0	0	0
Thermistor input (12 points)		FCU8-DX408	Thermistor input: 12 points  Number of occupied stations: 3		0	0	0
Safety DI 0V common	Safety DO Source	FCU8-DX654	Safety DI: 8-points 0V common type (3mA/point) Safety DO: 4-points source type (2A/point) Number of occupied stations: 2	0	0	0	0
input	output (large capacity)	FCU8-DX654-1	Safety DI: 8-points 0V common type (9mA/point) Safety DO: 4-points source type (2A/point) Number of occupied stations: 2	0	0	0	0
DI 24V/0V common input Safety DI 0V common input		FCU8-DX651	DI: 32-points 24V/0V common type, DO: 32-points source type, Safety DI: 8-points 0V common type, Safety relay: 4-points (non-voltage contact), Relay contact welding detection Number of occupied stations: 3	0	0	0	0
[Function Expansion L	_	I		1		1	
Encoder (manual pulse generator) I/F expansion unit		FCU8-EX544	Encoder input 1ch 5V manual pulse generator input 2ch	0	-	0	-
Functional safety expansion unit		E0110 E11100	Smart Safety observation	_		-	0
Functional safety expa		FCU8-EX133	Smart Safety observation	_	_		
Functional safety expa [Communication Expa	ansion Unit]						
Functional safety expa Communication Expa CC-Link expansion ur	ansion Unit] nit	FCU8-EX561	CC-Link 1ch	0	0	0	
Functional safety expa [Communication Expa CC-Link expansion ur PROFIBUS-DP maste	ansion Unit] nit er unit	FCU8-EX561 FCU8-EX563	CC-Link 1ch PROFIBUS-DP 1ch	0	0	0	0
Functional safety expa (Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a	ansion Unit] nit er unit	FCU8-EX561	CC-Link 1ch	0	0	_	0
Functional safety expa [Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit	ansion Unit] nit er unit adapter unit	FCU8-EX561 FCU8-EX563 FCU8-EX565	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used)	0 0	0 0	0	C
Functional safety expa [Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit [Side Memory I/F Unit	ansion Unit] nit er unit adapter unit	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit lid (resin molded article), metal plate, etc.	0 0 0 -	0 0 0	0	0
Functional safety expa [Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit [Side Memory I/F Unit	ansion Unit] nit or unit adapter unit	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer)	0 0 0	0 0 0	0 0	0
Functional safety exparagramments of Communication Exparagramments of Co-Link expansion urp PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit (Side Mermony I/F Unit Side memory I/F Unit (Manual Pulse General)	ansion Unit] nit er unit adapter unit ]	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit lid (resin modded article), metal plate, etc. Exclusive for 19-type display unit	0 0 0	0 0 0	0 0	0
Functional safety expar (Communication Expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit (Side Memory I/F Unit Side memory I/F Unit (Manual Pulse Genera 5V Manual pulse genera 12V Manual pulse genera	ansion Unit] nit er unit adapter unit ] attorj erator	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit tid (resin molded article), metal plate, etc. Exclusive for 19-type display unit	0 0 0 0	0 0 0 0 0 0	0 0	0 0 0
Functional safety expa [Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit [Side Memory I/F Unit Side memory I/F Unit [Manual Pulse Genera 50 Manual pulse genera 120 Manual pulse genera 120 Manual pulse genera 120 Manual pulse genera	ansion Unit] init or unit adapter unit   adapter unit   ator] erator nerator	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703 FCU8-EP201-2 UFO-01-2Z9 HD60C OSE1024-3-15-68 OSE1024-3-15-68-8	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit tid (resin molded article), metal plate, etc. Exclusive for 19-type display unit  Input 5VDC, 100pulse/rev Input 12VDC, 25 pulse/rev Input 5VDC, 1024 pulse/rev, 6000r/min, 68-square flange Input 5VDC, 1024 pulse/rev, 8000r/min, 68-square flange	0 0 0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0 0	000000000000000000000000000000000000000
Functional safety expa [Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit [Side Memory I/F Unit Side memory I/F Unit [Manual Pulse Genera 5V Manual pulse genera 12V Manual pulse gere [Encoder] Synchronous feed encommunication	ansion Unit] init or unit adapter unit   adapter unit   ator] erator nerator	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703 FCU8-EP201-2 UFO-01-2Z9 HD60C OSE1024-3-15-68 OSE1024-3-15-68-8	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit Idl (resin molded article), metal plate, etc. Exclusive for 19-type display unit  Input 5VDC, 100pulse/rev Input 12VDC, 25 pulse/rev Input 5VDC, 1024 pulse/rev, 6000r/min, 68-square flange	0 0 0	0 0 0 0 0	0 0 0	000000000000000000000000000000000000000
Functional safety expa (Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit (Side Memory I/F Unit Side memory I/F Unit (Manual Pulse Genera 5V Manual pulse genera 12V Manual pulse general	ansion Unit] init or unit adapter unit   adapter unit   ator] erator nerator	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703 FCU8-EP201-2 UFO-01-2Z9 HD60C OSE1024-3-15-68 OSE1024-3-15-68-8	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit lid (resin molded article), metal plate, etc. Exclusive for 19-type display unit  Input 5VDC, 100pulse/rev Input 12VDC, 25 pulse/rev Input 5VDC, 1024 pulse/rev, 6000r/min, 68-square flange Input 5VDC, 1024 pulse/rev, 6000r/min, 160-square flange Input 5VDC, 1024 pulse/rev, 6000r/min, 160-square flange	0 0 0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0 0	000000000000000000000000000000000000000
Functional safety expa [Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit [Side Memory I/F Unit Side memory I/F Unit [Manual Pulse Genera 5V Manual pulse genera 12V Manual pulse ger [Encoder] Synchronous feed end [Handy Terminal]	ansion Unit] init or unit adapter unit   adapter unit   ator] erator nerator	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703 FCU8-EP201-2 UFO-01-2Z9 HD60C OSE1024-3-15-68-8 OSE1024-3-15-160	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit lid (resin molded article), metal plate, etc. Exclusive for 19-type display unit  Input 5VDC, 100pulse/rev Input 12VDC, 25 pulse/rev Input 5VDC, 1024 pulse/rev, 6000r/min, 68-square flange Input 5VDC, 1024 pulse/rev, 6000r/min, 160-square flange Input 5VDC, 1024 pulse/rev, 6000r/min, 160-square flange	0 0 0 0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0 0 0 0	
Functional safety expa [Communication Expa CC-Link expansion ur PROFIBUS-DP maste EtherNet/IP scanner/a Option relay unit [Side Memory I/F Unit Side memory I/F Unit [Manual Pulse Genera 5V Manual pulse general 12V Manual pulse general [Encoder] Synchronous feed end [Handy Terminal] Handy terminal [Thermistor Sets] Thermistor	ansion Unit] init or unit adapter unit  adapter unit  adapter unit  arator prator nerator coder	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703 FCU8-EP201-2 UFO-01-2Z9 HD60C OSE1024-3-15-68-8 OSE1024-3-15-160	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit Idl (resin molded article), metal plate, etc. Exclusive for 19-type display unit  Input 5VDC, 100pulse/rev Input 12VDC, 25 pulse/rev Input 12VDC, 25 pulse/rev Input 5VDC, 1024 pulse/rev, 6000r/min, 68-square flange Input 5VDC, 1024 pulse/rev, 6000r/min, 160-square flange Input 5VDC, 1024 pulse/rev, 6000r/min, 160-square flange	0 0 0 0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0
Functional safety expainable formunication Expansion ure precedent of the process	ansion Unit] nit er unit adapter unit adapter unit  adapter unit  adapter unit  coder	FCU8-EX561 FCU8-EX563 FCU8-EX565 FCU8-EX702 FCU8-EX703  FCU8-EP201-2  UFO-01-2Z9 HD60C  OSE1024-3-15-68 OSE1024-3-15-68-0 OSE1024-3-15-160  HG1TS812JH-MK1346-L5  PT3C-51F-M2 10P	CC-Link 1ch PROFIBUS-DP 1ch EtherNet/IP 1ch (Only LAN1, LAN2 cannot be used) For communication expansion unit 1ch (*1) For communication expansion unit 2ch (*1)  SDHC 1ch, USB2.0 1ch USB communication (between side memory I/F PCB and personal computer) Unit lid (resin molded article), metal plate, etc. Exclusive for 19-type display unit  Input 5VDC, 100pulse/rev Input 12VDC, 25 pulse/rev Input 12VDC, 25 pulse/rev Input 5VDC, 1024 pulse/rev, 6000r/min, 68-square flange Input 5VDC, 1024 pulse/rev, 6000r/min, 160-square flange Input 5VDC, 1024 pulse/rev, 6000r/min, 160-square flange	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	000000000000000000000000000000000000000

DI: Digital input signals, DO: Digital output signals, AI: Analog input signals, AO: Analog output signals

<sup>(\*1)</sup> This is required when communication expansion unit is used in M800S/M80 series.

# [C80 Series]

MELSEC iQ-R Series modules

Pro	duct	Model	Model code	Remarks
710		R04CPU	1FMA00	Program capacity, 40K steps; basic operation processing speed (LD instruction), 0.98 ns
		R08CPU	1FMA01	Program capacity, 80K steps; basic operation processing speed (LD instruction), 0.98 ns
PLC CPU		R16CPU	1FMA02	Program capacity, 160K steps; basic operation processing speed (LD instruction), 0.98 ns
		R32CPU	1FMA03	Program capacity, 320K steps; basic operation processing speed (LD instruction), 0.98 ns
SD memory card		R120CPU	1FMA04	Program capacity, 1200K steps; basic operation processing speed (LD instruction), 0.98 ns
SD memory card Extended SRAM cassette		NZ1MEM-2GBSD	1WC535	SD memory card, 2G bytes
Extended SRAM cassette		NZ2MC-1MBS	1FMB00	1M bytes
		R35B	1FME00	5 slots, for MELSEC iQ-R Series modules
Main base		R38B	1FME01	8 slots, for MELSEC iQ-R Series modules
		R312B	1FME02	12 slots, for MELSEC iQ-R Series modules
Evtension hase		R65B	1FME07	5 slots, for MELSEC iQ-R Series modules
Extension base		R68B	1FME06	8 slots, for MELSEC iQ-R Series modules
		R612B	1FME05	12 slots, for MELSEC iQ-R Series modules
		RQ65B	1FME08	5 slots, for MELSEC-Q Series modules
RQ extension bas	se	RQ68B	1FME03	8 slots, for MELSEC-Q Series modules
		RQ612B	1FME04	12 slots, for MELSEC-Q Series modules
		RC06B	1FM001	0.6 m cable for extension and RQ extension base units
Eutonoion cololo		RC12B	1FM002	1.2 m cable for extension and RQ extension base units
Extension cable		RC30B	1FM003	3 m cable for extension and RQ extension base units
		RC50B	1FM004	5 m cable for extension and RQ extension base units
		R61P	1FMC00	AC power supply; input, 100 to 240 V AC; output, 5 V DC/6.5 A
Dower or make		R62P	1FMC02	AC power supply; input, 100 to 240 V AC; output, 5 V DC/3.5 A, 24 V DC/0.6 A
Power supply		R63P	1FMC01	DC power supply; input, 24 V DC; output, 5 V DC/6.5 A
		R64P	1FMC03	AC power supply; input, 100 to 240 V AC; output, 5 V DC/9 A
	AC	RX10	1FM103	AC input, 16 points; 100120 V AC (50/60 Hz)
long et	DC(Positive Common/	RX40C7	1FM100	DC input, 16 points; 24 V DC, 7.0 mA
Input	Negative Common	RX41C4	1FM101	DC input, 32 points; 24 V DC, 4.0 mA
	Shared Type)	RX42C4	1FM102	DC input, 64 points; 24 V DC, 4.0 mA
	Relay	RY10R2	1FM153	Relay output, 16 points; 24 V DC/2 A, 240 V AC/2 A
	Torresistan	RY40NT5P	1FM150	Transistor (sink) output, 16 points; 12 to 24 V DC, 0.5 A
	Transistor (Sink)	RY41NT2P	1FM151	Transistor (sink) output, 32 points; 12 to 24 V DC, 0.2 A
Output	(Oli IK)	RY42NT2P	1FM152	Transistor (sink) output, 64 points; 12 to 24 V DC, 0.2 A
Transistor (Source)	Toursisten	RY40PT5P	1FM154	Transistor (source) output, 16 points; 12 to 24 V DC, 0.5 A
		RY41PT1P	1FM155	Transistor (source) output, 32 points; 12 to 24 V DC, 0.1 A
	(Source)	RY42PT1P	1FM156	Transistor (source) output, 64 points; 12 to 24 V DC, 0.1 A
I/O acarabia ad	DC input/	DLI40C4NITOD	1FM200	DC input, 32 points; 24 V DC, 4.0 mA
I/O combined	transistor output	RH42C4NT2P	I FIVIZUU	Transistor (sink) output, 32 points; 12 to 24 V DC, 0.2 A
		A6CON1	13L101	Soldering 32 point-connector (40-pin connector)
Connector		A6CON2	13L102	Solderless terminal connection 32 point-connector (40-pin connector)
COLLIGCTOL		A6CON3	13L103	Flat-cable pressure displacement 32 point-connector (40-pin connector)
		A6CON4	13L124	Soldering 32 point-connector (40-pin connector, bidirectional cable mountable)
Spring clamp ten	ninal block	Q6TE-18SN	1W4299	For 16-point I/O modules, 0.31.5 mm² (2216 AWG)
Connector/termir	al block	A6TBX70	13L112	For positive common input modules (3-wire type)
conversion modu		A6TBXY36	13L106	For positive common input modules and sink output modules (standard type)
		A6TBXY54	13L109	For positive common input modules and sink output modules (2-wire type)
		AC05TB	13L006	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 0.5 m
Connector/		AC10TB	13L007	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 1 m
terminal block		AC20TB	13L008	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 2 m
conversion	cable	AC30TB	13L009	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 3 m
module		AC50TB	13L010	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 5 m
		AC80TB	13L026	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 8 m* *Common current 0.5 A or lower
		AC100TB	13L027	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 10 m* *Common current 0.5 A or lower
Relay terminal mo	odule	A6TE2-16SRN	13L131	For 40-pin connector 24 V DC transistor output modules (sink type)
		AC06TE	13L021	For A6TE2-16SRN, 0.6 m
Relay terminal		AC10TE	13L022	For A6TE2-16SRN, 1 m
module	cable	AC30TE	13L023	For A6TE2-16SRN, 3 m
		AC50TE	13L024	For A6TE2-16SRN, 5 m
		AC100TE	13L025	For A6TE2-16SRN, 10 m
	Voltage input	R60ADV8	1FM503	8 channels for voltage inputs -1010 V DC, -3200032000; 80 μs/CH
Analog input	Current input	R60ADI8	1FM504	8 channels for current inputs 020 mA DC/032000; 80 μs/CH
	Voltage/ current input	R60AD4	1FM501	4 channels for voltage/current inputs -1010 V DC, -3200032000; 020 mA DC, 032000; 80 µs/CH
	Voltage output	R60DAV8	1FM505	8 channels for voltage outputs -3200032000, -1010 V DC; 80 µs/CH
Analog output	Current output	R60DAI8	1FM506	8 channels for current outputs 032000, 020 mA DC; 80 µs/CH
	Voltage/ current output	R60DA4	1FM502	4 channels for voltage/current outputs -3200032000, -1010 V DC; 032000, 020 mA DC; 80 μs/CH
	Platinum temperature-	R60TCRT4	1FY40E	RTD (Pt100, JPt100), 4 channels for input
	measuring resistor	R60TCRT4BW	1FY40F	RTD (Pt100, JPt100), 4 channels for input, heater disconnection detection
Temperature control	<u> </u>	R60TCTRT2TT2	1FY40C	Thermocouple (B, R, S, K, E, J, T, N, U, L, PL@, WSRe/W26Re), 4 channels for input (2 channels can also be used for RTD input)
OO, ILIOI	Thermocouple	R60TCTRT2TT2BW	1FY40D	Thermocouple (B, R, S, K, E, J, T, N, U, L, PL@, WSRe/W26Re), 4 channels for input (2 channels can also be used for RTD input), heater disconnection detection
		I .	I	Le or a more san also be deed for the inputy floater also of flootion account

Pr	oduct	Model	Model code	Remarks
High-speed counter		RD62P2	1FM50B	5/12/24 V DC input, 2 channels; counting speed, max. 200k pulse/s; external output, transistor (sink type)
		RD62D2	1FM50C	Differential input, 2 channels; max. counting speed, 8M pulse/s; external output, transistor (sink type)
		RD62P2E	1FM50D	5/12/24 V DC input, 2 channels; counting speed, max. 200k pulse/s; external output, transistor (source type)
Ethernet		RJ71EN71	1FM601	1 Gbps/100 Mbps/10 Mbps, 2 ports Multi-network connectivity (Ethernet/CC-Link IE)
		RJ71C24	1FM604	Max. 230.4 kbps; RS-232, 1 channel; RS-422/485, 1 channel
Serial communication		RJ71C24-R2	1FM605	Max. 230.4 kbps; RS-232, 2 channels
		RJ71C24-R4	1FM606	Max. 230.4 kbps; RS-422/485, 2 channels
MES Interface		RD81MES96	1FTD00	1000BASE-T/100BASE-TW10BASE-T Database connection (MX MESInterface-R is required)
CC-Link IE Control		RJ71GP21-SX	1FM602	1 Gbps, fiber-optic cable, control/normal station
CC-Link IE Field		RJ71GF11-T2	1FM600	1 Gbps, master/local station
CC-Link		RJ61BT11	1FM603	Max. 10 Mbps, master/local station, CC-Link Ver.2 supported
	Screw terminal	AJ65SBTB1-32D	1W5141	Input 32 points: 24VDC (positive/negative common shared) 1-wire type Terminal block type Response time 1.5ms
CC-Link	block type	AJ65SBTB1-32TE1	1W5452	Output 32 points: 12/24VDC (0.5A) Transistor output (source type) 1-wire type Terminal block type
Remote I/O module	Waterproof	AJ65FBTA4-16DE	1W5108	Input 24VDC (negative common) 4-wire type Thin, waterproof type Response time 1.5ms
Hoddie	connector type	AJ65FBTA2-16TE	1W5103	Output 16 points: 12/24VDC (1.0A) Transistor output (source type) 2-wire type Thin, waterproof type

### MELSEC Q Series modules

IVIELSEC Q			Mandal ands	Describe
Pro	duct	Model	Model code	
Extension base		Q63B	1W4E07	3 slots, 1 power supply module required, for Q Series modules
		Q65B	1W4E03	5 slots, 1 power supply module required, for Q Series modules
		Q68B	1W4E04	8 slots, 1 power supply module required, for Q Series modules
24010011001		Q612B	1W4E05	12 slots, 1 power supply module required, for Q Series modules
		Q52B	1W4E14	2 slots, power supply module not required, for Q Series modules
		Q55B	1W4E15	5 slots, power supply module not required, for Q Series modules
		QC05B	1W4006	0.45 m cable for connecting extension base unit
		QC06B	1W4000	0.6 m cable for connecting extension base unit
Extension cable		QC12B	1W4001	1.2 m cable for connecting extension base unit
EXTENSION CADIE		QC30B	1W4002	3m cable for connecting extension base unit
		QC50B	1W4003	5m cable for connecting extension base unit
		QC100B	1W4004	10m cable for connecting extension base unit
		Q61P	1W4C11	Input voltage: 100240 V AC, output voltage: 5 V DC, output current: 6A
Power supply		Q63P	1W4C02	Input voltage: 24 V DC, output voltage: 5 V DC, output current: 6A
. опо сарру		Q64PN	1W4C12	Input voltage: 100240 V AC, output voltage: 5 V DC, output current: 8.5A
Outrout	Transistor	QY68A	1W4310	8 points, 524 V DC, 2 A/point, 8 A/module, response time: 10 ms, sink/source type,
Output	(Independent)	Q100A	1004310	18-point terminal block, with surge suppression, all points independent
Analog output	Voltage/current	Q62DA-FG	1W4571	2 channels, input (resolution): 012000, -1200012000, -1600016000, output: -1212 V DC, 022 mA
Arialog output	output	Q02DA-FG	1004571	DC, conversion speed: 10 ms/2 channels, 18-point terminal block, channel isolated
	Optical loop (SI)	QJ71I P21-25	1W4516	SI/QSI/H-PCF/broadband H-PCF fiber optic cable, dual loop,
MELSECNET/H	Optical loop (Si)	Q071LF21-25	1004516	control network (control/normal station) or remote I/O network (remote mater station)
IVIELSEGINE I/FI	Coaxial bus	QJ71BR11	1W4511	3C-2V/5C-2V coaxial cable, single bus,
	Coaxiai bus	QU/ IBRI I	1004511	control network (control/normal station) or remote I/O network (remote master station)
FL-net(OPCN-2) Ver.2.00		QJ71FL71-T-F01	1W4593	10BASE-T, 100BASE-TX
AS-I		QJ71AS92	1W4524	Master station, AS-Interface Specification Version 2.11 compatible
DeviceNet		QJ71DN91	1W4518	Master station/local station combined use, for QCPU, DeviceNet(Release2.0) compatible.
Devicemel		I GUT I DINS I	1004516	At the time of making Arrangement doc, please issue a Juchu-Shinsei sheet.

### Peripheral unit

Pro	duct	Model	Remarks
	Dual-signal modules	R173SXY	IO redundant monitoring module (Up to three modules)
Dualainnal	Terminal block	FA-TBS40P	Terminal block conversion (separately prepared: Mitsubishi Electric Engineering) UL supported
Dual signal module	Terminal block	FA-LTB40P	Terminal block conversion (separately prepared: Mitsubishi Electric Engineering)
module	Cable	FA-CBL□□FMV-M	Terminal block conversion connection cable (length $\square\square$ = 05: 0.5m, 10: 1m, 20: 2m, 30: 3m, 50: 5m) (separately prepared: Mitsubishi Electric Engineering)
Signal splitter		FCU7-HN387	Option (Necessary when manual pulse generator is used for two or three axes)

# Parts

Product	Model	Remarks
Manualantan	UFO-01-2Z9	5V specification
Manual pulse generator	HD60C	12V specification, for the operation board signal splitter connection, 12V power supply separately necessary
	OSE 1024-3-15-68	6000 r/min, no straight type connector enclosed, new JIS key, 68 square flange
Encoder	OSE 1024-3-15-68-8	8000 r/min, no straight type connector enclosed, 68 square flange
	OSE 1024-3-15-160	6000 r/min, no straight type connector enclosed, new JIS key, 160 square flange
Cross spelings splets	Grounding plate D	With cable clamp A(2)
Grounding plate	Grounding plate E	With cable clamp B(1)

CNC

SYSTEM

# **CNC SYSTEM GENERAL CONNECTION DIAGRAM**

# ■M800W Series Windows-based display unit (19-type)

Dotted lines indicate the sections prepared by the machine tool builder <> Angle brackets indicates attached cable of unit Display unit Added onto back of Personal computer unit FCU8-DU191-75 FCU8-DU192-75 FCU8-PC231 Side memory I/F unit FCU8-EP201-2 LVDS1 \square <J09 SD LVDS2 L1 L2 L3 CFast unit FCU8-CF001-001 CFast CFAST INV T Stored in USB2-1 1 <J290> personal computer unit USB2-2 ON ON MENUKE MC 0 0 USB2-4 RS232C -(MC)-USB2-5 USB2-6 DD J070/071 ☐ DCIN USB3-1 USB3-2 24VDC power supply Keyboard unit DCON. FCU8-KB04x/KB083 ACIN Operation panel I/O unit FCU8-DX830/837 <G402> 5V : J023/J024/J025 Manual pulse generator (5V/12V) 12V: J020/J021/J022 No safety signal input DX837 With safety signal input **○** • • 868 Safety signal input CG32 (Safety signal input is DX837 only.) Max. 8 points CG33 CG34 Emergency stop switch EMG DUD DOIN RIO3EXT 🗅 24VDC To the next remote I/O FCU8-DX2xx/DX6xx/DX4xx (R2-TM) Control unit FCU8-MA041/MU042 (Note 1) J395/J396 Remote I/O unit DCIN DI:CJ31/33 To the next remote I/O or 1ch : J030 FCU8-DX2xx/DX6xx/DX4xx Max. 32 units for each port RIO4 RIO5 RIO6 RIO7 Manual pulse G430 Emergency stop switch J120 FXT1 D J070/071 € FCU8-EX54x 24VDC EXT2 FCU8-EX54x SD memory SD card EXT3 FCU8-EX56x

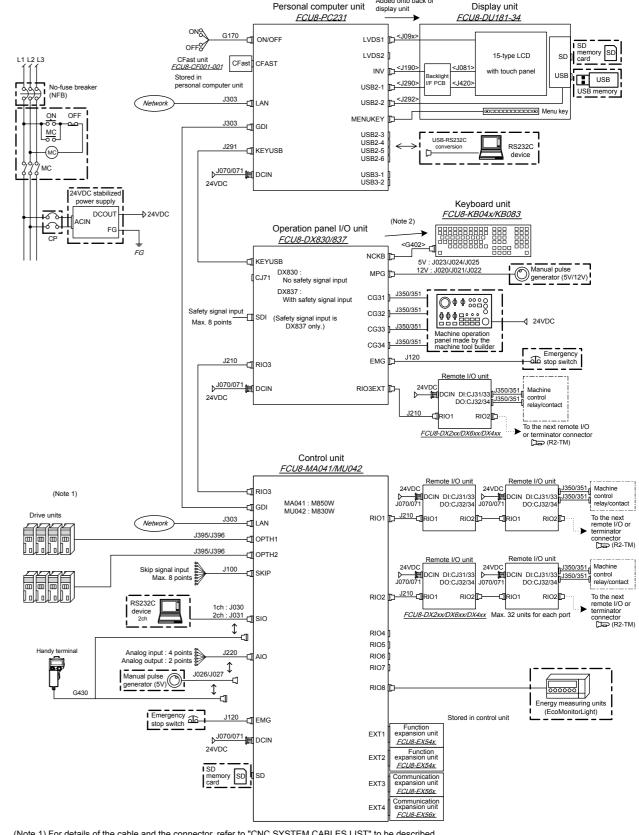
(Note 1) For details of the cable and the connector, refer to "CNC SYSTEM CABLES LIST" to be described.

(Note 2) For connections of the drive units, refer to "DRIVE SYSTEM SYSTEM CONFIGURATION DRAWING" to be described

(Note 3) When using a keyboard unit, install the operation panel I/O unit on the back of the keyboard unit. When not using a keyboard unit, install the operation panel I/O unit on the back of the display unit.

# ■M800W Series Windows-based display unit (15-type)

Dotted lines indicate the sections prepared by the machine tool builder <> Angle brackets indicates attached cable of unit



(Note 1) For details of the cable and the connector, refer to "CNC SYSTEM CABLES LIST" to be described.

(Note 2) For connections of the drive units, refer to "DRIVE SYSTEM SYSTEM CONFIGURATION DRAWING" to be described

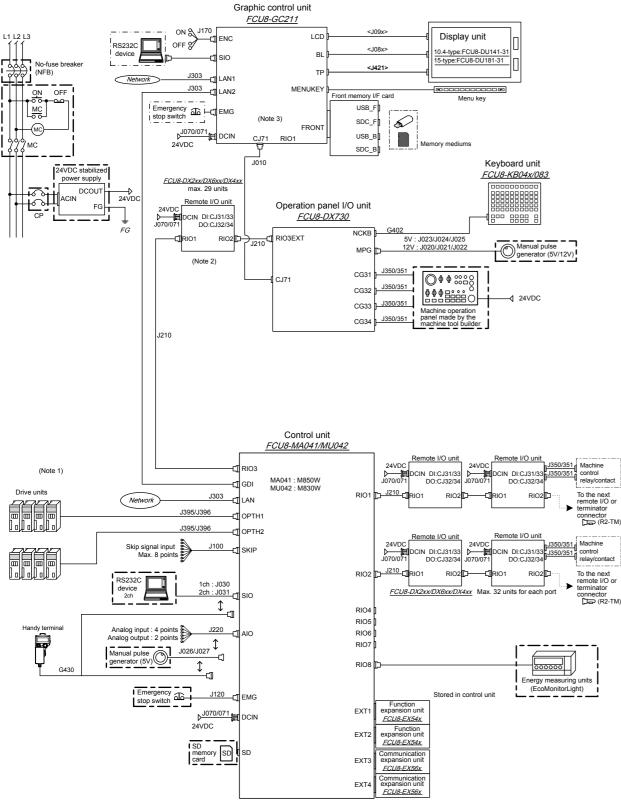
(Note 3) When using a keyboard unit, install the operation panel I/O unit on the back of the keyboard unit.

# ■M800W Series Windows-less display unit (10.4-type/15-type)

Dotted lines indicate the sections prepared by the machine tool builder.

<> Angle brackets indicates attached cable of unit.

**CNC SYSTEM** 



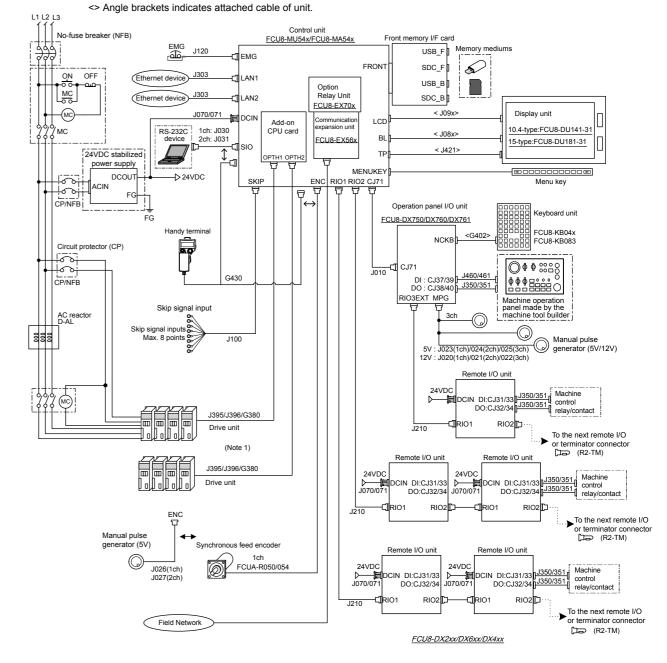
(Note 1) For details of the cable and the connector, refer to "CNC SYSTEM CABLES LIST" to be described.

(Note 2) For connections of the drive units, refer to "DRIVE SYSTEM SYSTEM CONFIGURATION DRAWING" to be described. (Note 3) When connecting a remote I/O unit to the 3rd RIO channel, insert it between the control unit and operation panel I/O unit.

(Note 4) There is no need to connect a terminator R2-TM to the graphic control unit.

### ■M800S Series

Dotted lines indicate the sections prepared by the machine tool builder.



# ■M80W Series Windows-based display unit (19-type)

Dotted lines indicate the sections prepared by the machine tool builder <> Angle brackets indicates attached cable of unit Display unit Added onto back of Personal computer unit FCU8-DU191-77 FCU8-DU192-77 FCU8-PC231 Side memory I/F unit FCU8-EP201-2 LVDS1 \square <J09 LVDS2 L1 L2 L3 CFast unit FCU8-CF001-001 CFast CFAST INV T Stored in USB2-1 1 <J290> personal computer unit USB2-2 ON + 0 0 + MENUKEY MC 0 0 USB2-4 RS232C USB2-5 USB2-6 DD J070/071 ☐ DCIN USB3-1 USB3-2 24VDC power supply Keyboard unit DCOU FCU8-KB04x/KB083 ACIN Operation panel I/O unit FCU8-DX830/837 <G402> 5V : J023/J024/J025 Manual pulse generator (5V/12V) 12V: J020/J021/J022 No safety signal input DX837 With safety signal input Safety signal input CG32 (Safety signal input is DX837 only.) Max. 8 points CG33 CG34 Emergency stop switch EMG DUN DCIN RIO3EXT 🗅 24VDC To the next remote I/O FCU8-DX2xx/DX6xx/DX4xx (R2-TM) Control unit FCU8-MU044 (Note 1) J395/J396 Remote I/O unit DCIN DI:CJ31/33 1ch : J030 FCU8-DX2xx/DX6xx/DX4xx Max. 32 units for each port G430 Emergency stop switch J120 LT EMG FXT1 D<sup>J070/071</sup> **(=** FCU8-EX54x 24VDC SD memory SD card EXT3 FCU8-EX56x

(Note 1) For details of the cable and the connector, refer to "CNC SYSTEM CABLES LIST" to be described.

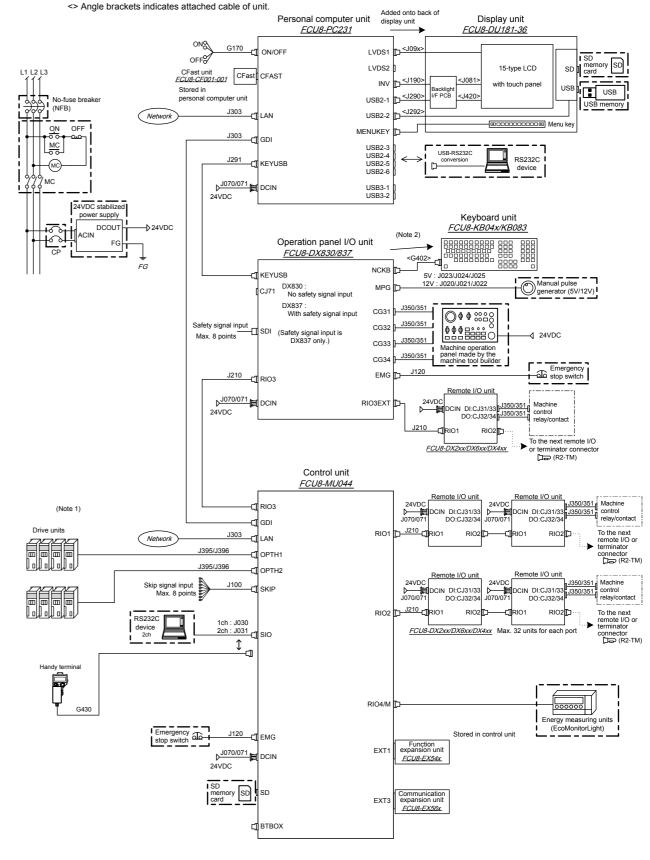
(Note 2) For connections of the drive units, refer to "DRIVE SYSTEM SYSTEM CONFIGURATION DRAWING" to be described.

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(Note 3) When using a keyboard unit, install the operation panel I/O unit on the back of the keyboard unit. When not using a keyboard unit, install the operation panel I/O unit on the back of the display unit.

# ■M80W Series Windows-based display unit (15-type)

Dotted lines indicate the sections prepared by the machine tool builder.



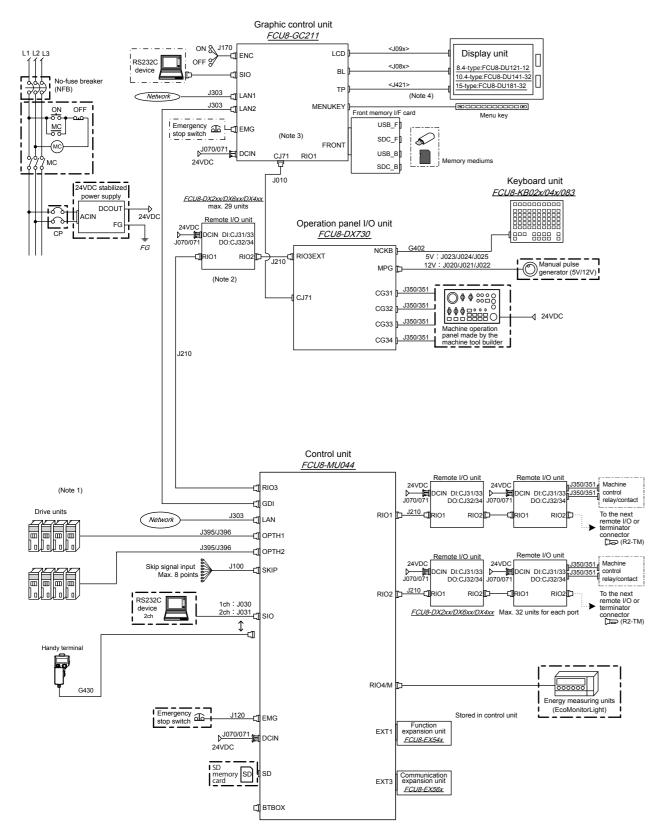
(Note 1) For details of the cable and the connector, refer to "CNC SYSTEM CABLES LIST" to be described. (Note 2) For connections of the drive units, refer to "DRIVE SYSTEM SYSTEM CONFIGURATION DRAWING" to be described. (Note 3) When using a keyboard unit, install the operation panel I/O unit on the back of the keyboard unit.

## ■M80W Series Windows-less display unit (8.4-type/10.4-type/15-type)

Dotted lines indicate the sections prepared by the machine tool builder.

<> Angle brackets indicates attached cable of unit.

**CNC SYSTEM** 



(Note 1) For details of the cable and the connector, refer to "CNC SYSTEM CABLES LIST" to be described. (Note 2) For connections of the drive units, refer to "DRIVE SYSTEM SYSTEM CONFIGURATION DRAWING" to be described.

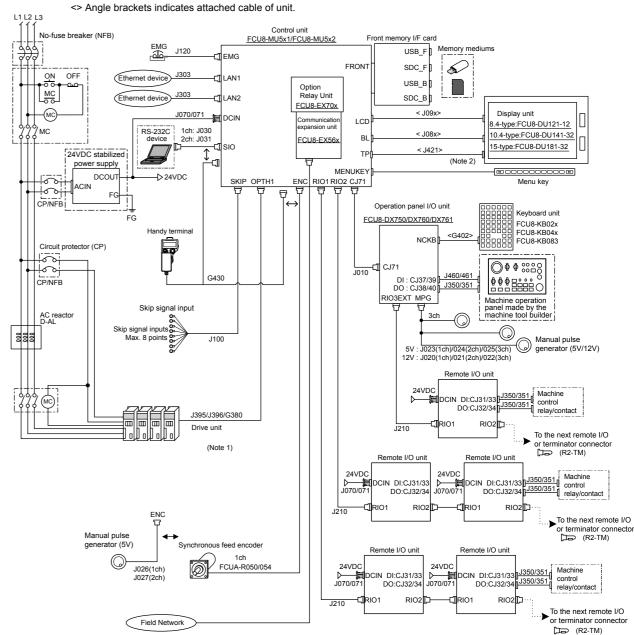
(Note 3) When connecting a remote I/O unit to the 3rd RIO channel, insert it between the control unit and operation panel I/O unit.

(Note 4) There is no need to connect a terminator R2-TM to the graphic control unit.

(Note 5) The 8.4-type display unit is incompatible with the touchscreen. TP connector is not used

## ■M80 Series without smart safety observation

Dotted lines indicate the sections prepared by the machine tool builder.



FCU8-DX2xx/DX4xx

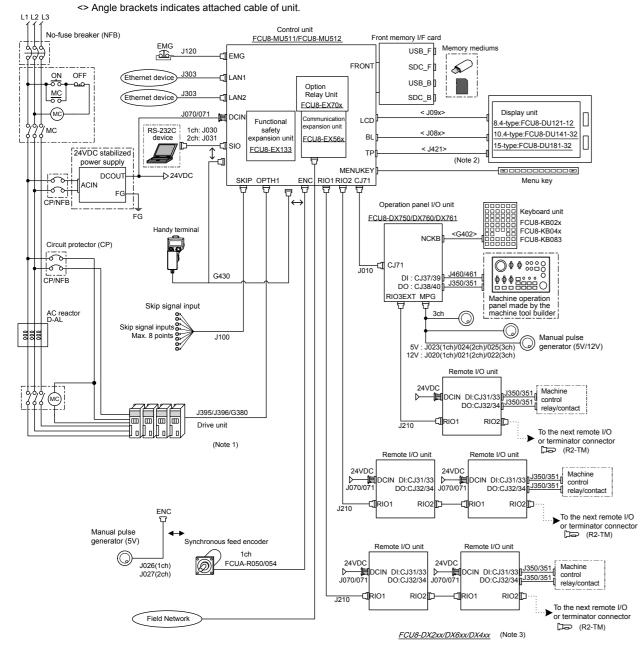
(Note 1) For details of the cable and the connector, refer to "CNC SYSTEM CABLES LIST" to be described.

(Note 2) For connections of the drive units, refer to "DRIVE SYSTEM SYSTEM CONFIGURATION DRAWING" to be described.

(Note 3) The 8.4-type display unit is incompatible with the touchscreen. TP connector is not used.

### ■M80 Series with smart safety observation

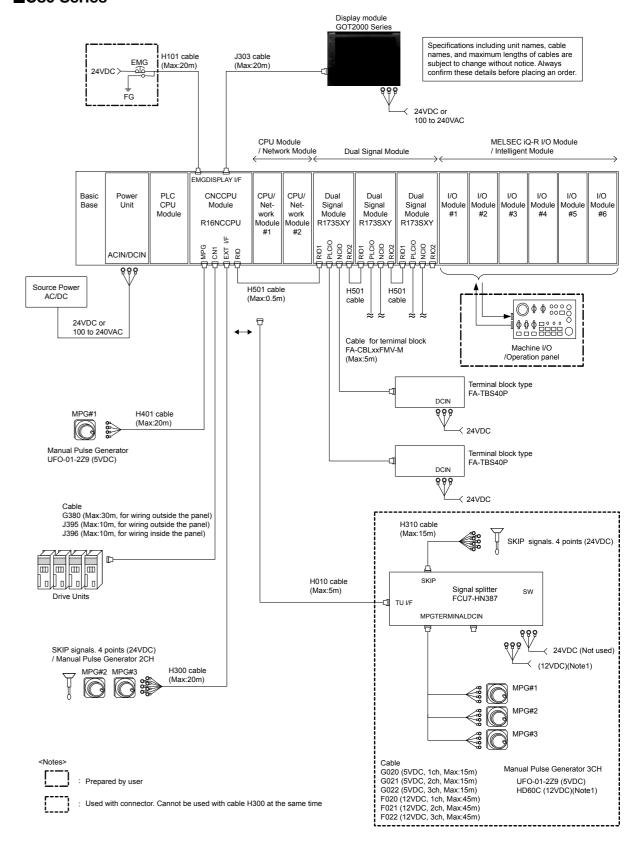
Dotted lines indicate the sections prepared by the machine tool builder.



### (Note 1) For details of the cable and the connector, refer to "CNC SYSTEM CABLES LIST" to be described.

(Note 4) The safety remote I/O unit is available only when the functional safety expansion unit is mounted.

### **■**C80 Series



(Note 1) HD60C (12VDC) requires another power source12VDC.

(Note 2) A CPU module can be mounted on the CPU slot of the base unit or the slot No. 0 to 6. A slot between CPU modules can be left empty for reservation. Note that you cannot mount an I/O module or intelligent function module on a slot between CPU modules.

<sup>(</sup>Note 2) For connections of the drive units, refer to "DRIVE SYSTEM SYSTEM CONFIGURATION DRAWING" to be described.

<sup>(</sup>Note 3) The 8.4-type display unit is incompatible with the touchscreen. TP connector is not used.

# **CNC SYSTEM LIST OF CABLES**

# [M800/M80 Series]

	Application	Туре	Length	Contents			ed mo	
		J291 L0.15M	(m) 0.15		M800W	M800S	M80W	M80
(1)	Connection cable between personal computer unit	J291 L0.5M	0.10	KEYUSB KEYUSB		_	0	_
(.,	and operation panel I/O unit	J291 L1.0M	1	JSSIL***M				
		G071 L0.12M	0.12	DCOUT DCIN	+			$\vdash \vdash$
(2)	24VDC relay cable for MITSUBISHI CNC machine	G071 L0.5M	0.5			0	0	
(-)	operation panel	G071 L1M	1					
		G170 L1M	1	- d				
	ON/OFF switch cable	G170 L2M	2	ON/OFF				
(3)	(ON/OFF switch - Personal computer unit)	G170 L3M G170 L5M	3 5		0	_	0	_
	(for Windows-based display unit)	G170 L10M	10					
		G170 L15M	15		-			
		G430 3M	3	Control Handy				
(4)	Cable for connection to handy terminal	G430 5M	5	unit terminal	0	0	0	0
		G430 10M	10	Cotrol panel terminal block				
(5)	Cable for MITSUBISHI CNC machine operation panel (Cable between main panel and sub panel)	G460 0.5M	0.5	SUBP RSW1  RSW2  SW-NO SW-C	0	0	0	0
		J170 L1M	1					
	ON/OFF switch cable	J170 L2M J170 L3M	2	1:050				
(6)	(ON/OFF switch - Graphic control unit) (for Windows-less display uniut)	J170 L5M	5		0	-	0	-
	tion with acoustics and play at that	J170 L10M	10					
		J170 L15M	15		-			
		J220 L2M	2	AIO				
(7)	Analog output cable	J220 L3M	3		0	_	_	-
		J220 L7M	7					
		J221 L2M	2	AIO				
(8)	Analog input/output cable (for remote I/O unit)	J221 L3M	3		0	0	0	0
L		J221 L7M	7	L=0				
		J224 L1M	1					
		J224 L2M J224 L3M	2					
(9)	Analog input/output cable (for operation panel I/O unit)	J224 L5M	5		_	0	_	0
(3)	, along in pair output cause from operation pailed i/O unity	J224 L7M J224 L10M	7 10					
		J224 L10M J224 L15M	10	<del></del>				
		J224 L20M	20					
(40)	Operation panel I/O interface cable	J010 L0.5M (for 8 4/10 4-type display)	0.5	CJ71 CJ71				
(10)	(for Windows-less display unit of M800W/M80W)	(for 8.4/10.4-type display) J010 L1M	1		0	0	0	0
		J020 L1M	1					
		J020 L2M	2					
		J020 L3M J020 L5M	3 5	MPG				
(11)	Manual pulse generator cable (12V) : 1ch	J020 L7M	7		0	0	0	0
		J020 L10M	10	l alph				
		J020 L15M J020 L20M	15 20					
		J020 L30M	30					
		J021 L1M	1					
		J021 L2M J021 L3M	2					
		J021 L5M	5	MPG				
(12)	Manual pulse generator cable (12V) : 2ch	J021 L7M	7		0	0	0	0
		J021 L10M J021 L15M	10 15					
		J021 L15M J021 L20M	20					
		J021 L30M	30					

			1					
	Application	Туре	Length (m)	Contents			ed mo M80W	
		J022 L1M J022 L2M	1 2					
		J022 L2M	3	F				
		J022 L5M	5	MPG				
(13)	Manual pulse generator cable (12V): 3ch	J022 L7M	7		0	0	0	0
		J022 L10M	10					
		J022 L15M	15					
		J022 L20M	30					
		J022 L30M J023 L1M	1					
		J023 L1W	2					
		J023 L3M	3					
	Manual and a secondary solds (5) A state	J023 L5M	5	MPG				
14)	Manual pulse generator cable (5V): 1ch	J023 L7M	7		0	0	0	0
		J023 L10M	10					
		J023 L15M	15					
		J023 L20M	20					
		J024 L1M	1					
		J024 L2M	3					
		J024 L3M J024 L5M	5	MPG				
15)	Manual pulse generator cable (5V): 2ch	J024 L7M	7		0	0	0	0
		J024 L10M	10					
		J024 L15M	15	-				
		J024 L20M	20					
		J025 L1M	1					
		J025 L2M	2					
		J025 L3M	3	MPG 🚍				
16)	Manual pulse generator cable (5V) : 3ch	J025 L5M	5		0	0	0	0
-,	, , , , ,	J025 L7M	7			_	-	-
		J025 L10M	10					
		J025 L15M J025 L20M	15 20					
		J025 L20M	1					
		J026 L2M	2					
		J026 L3M	3					
	Manual pulse generator cable (5V): 1ch	J026 L5M	5	MPG	_	_	_	
17)	(for connection to control unit)	J026 L7M	7		0	0	0	0
		J026 L10M	10					
		J026 L15M	15					
		J026 L20M	20					
		J027 L1M	1					
		J027 L2M	2					
	Manual mulas assertan ashla (5) A . Osh	J027 L3M J027 L5M	3 5	MPG				
18)	Manual pulse generator cable (5V) : 2ch (for connection to control unit)	J027 L5W	7		0	0	0	0
	(IOI OOI II OOI OI I O OOI II OI OI II II	J027 L10M	10					
		J027 L15M	15					
		J027 L20M	20					
		J030 L1M	1					
		J030 L2M	2	SIO				
19)	RS-232C I/F cable: 1ch	J030 L3M	3					
. 0)	(for control unit)	J030 L5M	5	SIO1				
		J030 L7M	7	——————————————————————————————————————				
		J030 L10M	10		-	-	-	
		J031 L1M	1	<b>#</b>				
		J031 L2M	2	SIO SIO1				
		J031 L3M						
20)	RS-232C I/F cable: 2ch		3		0	0	0	0
-,	(for control unit)	J031 L5M	5			"	"	-
		J031 L7M	7	SIO2				
			_	\ <b>1</b>				
		J031 L10M	10	<del>-</del>				
		J070 L1M	1					
		J070 L2M	2					
		J070 L3M	3	DCIN				
241	24VDC power coble	J070 L5M	5			_	_	_
∠1)	24VDC power cable	J070 L7M J070 L10M	7		0	0	0	0
		J070 L10M	15					
		J071 L20M						
		(for long distance)	20					
		J100 L1M	1					
			2					
		J100 L2M						
		J100 L2M J100 L3M	3	SKIP				
221	SKIP input cable	J100 L3M J100 L5M	3 5					
22)	SKIP input cable	J100 L3M J100 L5M J100 L7M	3 5 7	SKIP	0	0	0	0
22)	SKIP input cable	J100 L3M J100 L5M	3 5		0	0	0	0

	Application	Туре	Length (m)	Contents			M80W	
		J120 L1M J120 L2M	1 2					
		J120 L3M	3					
		J120 L5M	5	EMG				
(23)	Emergency stop cable	J120 L7M	7		0	0	0	0
		J120 L10M	10					
		J120 L15M J120 L20M	15 20					
		J120 L30M	30					
		J121 L1M	1					
		J121 L2M	2					
		J121 L3M	3	EMC				
(0.4)	Emergency stop cable for MITSUBISHI CNC machine	J121 L5M	5 7	EMG				
(24)	operation panel	J121 L7M J121 L10M	10		0	0	0	0
		J121 L15M	15					
		J121 L20M	20					
		J121 L30M	30					
		J210 L0.3M	0.3					
		J210 L1M	1					
		J210 L2M J210 L3M	2					
		J210 L3M J210 L5M	5	RIO RIO				
(25)	Remote I/O 2.0 communication cable	J210 L3M	7		0	0	0	0
		J210 L10M	10					
		J210 L15M	15					
		J210 L20M	20					
		J210 L30M	30					
		J303 L1M	1					
		J303 L2M J303 L3M	2					
		J303 L5M	5					
(26)	LAN straight cable	J303 L7M	7	LAN LAN	0	0	0	0
,		J303 L10M	10					
		J303 L15M	15					
		J303 L20M	20					
		J303 L30M	30					
		J350 L1M	1	M800W/M80W:CJ31,CJ32,CJ33,CJ34,CG31,CG32,CG33,CG34				
(27)	DI/DO cable (connectors at both ends)	J350 L2M	2	M800S/M80:CJ31,CJ32,CJ33,CJ34,CJ38,CJ40,CJ42		0	0	0
(21)	Divido cable (conhectors at both ends)	J350 L3M	3					
		J350 L5M	5	<u>                                     </u>				
(28)	DI/DO cable (connector at one end)	J351	3	M800W/M80W:CJ31,CJ32,CJ33,CJ34,CG31,CG32,CG33,CG34 M800S/M80:CJ31,CJ32,CJ33,CJ34,CJ38,CJ40,CJ42	0	0	0	0
		J460 L1M	1	CJ37,CJ39 CJ37,CJ39				
	DI/DO cable (connectors at both ends)	J460 L2M	2	<del>rin i</del> n				
(29)	(for operation panel I/O unit)	J460 L3M	3		-	0	-	0
		J460 L5M	5	<u> </u>				
(30)	DVDO cable (connector at one end) (for operation panel I/O unit)	J461	3	CJ37,CJ39	_	0	_	0
(31)	Synchronous encoder - control unit (straight, with connector) (for FCU8-EX544 (M800W/M80W))	FCUA-R050-5M	5	ENC 0	0	0	0	0
		FCUA-R054-3M	3					
	Synchronous encoder - control unit	FCUA-R054-5M	5	ENC				
(32)	(right angle, with connector)	FCUA-R054-10M	10		0	0	0	0
	(for FCU8-EX544 (M800W/M80W))	FCUA-R054-15M	15	الق				
		FCUA-R054-20M	20					
(33)	Cable for emergency stop release	G123	_	EMG	0	0	0	0
(34)	Terminator for remote I/O interface	R2-TM	_	One terminator is required to be installed at the final end of remote IO unit.	0	0	0	0

# **■**Cable connector sets for CNC

	Application	T		mtomto	Su	Supported mode				
	Application	Туре		ntents	M800W M800S		M80W	M80		
(1)	General I/O units (for SKIP,SIO,MPG,AIO)	FCUA-CS000	Connector (3M) 10120-3000PE x 2pcs.	Shell kit (3M) 10320-52F0-008 x 2pcs.	0	0	0	0		
(2)	Emergency stop connector (for EMG)	50-57-9403 16-02-0103	Connector (MOLEX) 50-57-9403 x 1pc.	Gold contact (MOLEX) 16-02-0103 x 3pcs.	0	0	0	0		
(3)	Connector kit for RIO2.0 unit	RIO2 CON	Connector (Tyco Electronics) 1-1318119-3 x 2pcs.	Contact (Tyco Electronics) 1318107-1 x 8pcs.	0	0	0	0		
(O)	CONTRICTOR NICE, UNIT	HIO2 CON	Connector (Tyco Electronics) 2-178288-3 x 1pc.	Contact (Tyco Electronics) 1-175218-5 x 3pcs.						
(4)	24VDC power supply connector (for DCIN)	FCUA-CN220	Connector (Tyco Electronics) 2-178288-3 x 1pc.	Contact (Tyco Electronics) 1-175218-5 x 3pcs.	0	0	0	0		
(5)	DI/DO connector (for operation panel I/O unit (M800W/M80W)) (for remote I/O unit) DO connector (for operation panel I/O unit (M800S/M80))	7940-6500SC 3448-7940	Connector (3M) 7940-6500SC x 4pcs.	Strain relief (3M) 3448-7940 x 4pcs.	0	0	0	0		
(6)	DI connector (for operation panel I/O unit)	7950-6500SC 3448-7950	Connector (3M) 7950-6500SC x 2pcs.	Strain relief (3M) 3448-7950 x 2pcs.	0	_	0	_		
(7)	ON/OFF switch connector	50-57-9404 16-02-0103	Connector (MOLEX) 50-57-9404 x 1pc.	Contact (MOLEX) 16-02-0103 x 4pcs.	0	_	0	_		
(8)	CJ71 connector	2-1318119-4 1318107-1	Connector (Tyco Electronics) 2-1318119-4 x 1pc.	Contact (Tyco Electronics) 1318107-1 x 8pcs.	_	0	_	0		
(9)	THERMISTOR connector (for thermistor input unit)	37104-2165- 000FL 10P	Connector (3M) 37104-2165-000FL x 10pcs.		0	0	0	0		

# [C80 Series]

	Application	Туре	Length (m)	Contents	Supported model
		H101 L0.5M	0.5		
		H101 L1M	1		
		H101 L2M	2		
		H101 L3M	3	EMG	
(1)	Emergency stop cable	H101 L5M	5		Emergency stop input cable,
		H101 L7M	7		maximum length: 20m
		H101 L10M	10		
		H101 L15M	15		
		H101 L20M	20		
		J303 L1M	1		
		J303 L2M	2		
		J303 L3M	3	DISPLAY DISPLAY	
(2)	Display communication cable (Shielded twisted pair cable)	J303 L5M	5	DISPLAY DISPLAY	Display interface, maximum length: 20m
	(Grinded twisted pair casis)	J303 L10M	10		maximum longur. 2011
		J303 L15M	15		
		J303 L20M	20		
		H300 L0.5M	0.5		
		H300 L1M	1	_	
		H300 L2M	2	EXTI/F	Skip/manual pulse generator
	Skip/manual pulse generator input cable (For CNC CPU unit)	H300 L3M	3		input interface,
(3)		H300 L5M	5		maximum length: 20m (Note) This cable cannot
		H300 L7M	7		be used together
		H300 L10M	10		with the H010 cable.
		H300 L15M	15		
		H300 L20M	20		
		H310 L0.5M	0.5		
		H310 L1M	1		
		H310 L2M	2	SKIP	Chin innut interfere
(4)	Skip input poble (For signal polittor)	H310 L3M	3		Skip input interface when signal splitter is used,
(4)	Skip input cable (For signal splitter)	H310 L5M	5		maximum length: 15m
		H310 L7M	7		lengui. Tom
		H310 L10M	10		
		H310 L15M	15		
		H401 L0.5M	0.5		
		H401 L1M	1		
		H401 L2M	2		
	Manual and a samual and a late	H401 L3M	3	MPG	Manual pulse
(5)	Manual pulse generator cable (For CNC CPU unit)	H401 L5M	5		generator (1ch), maximum length: 20m
		H401 L7M	7		(5V power supply type)
		H401 L10M	10		
		H401 L15M	15		
		H401 L20M	20		
		H501 L0.1M	0.1		
(6)	Safety signal unit connection cable	H501 L0.2M	0.2	RIO RIO	Between safety signal units,
(0)		H501 L0.3M	0.3		maximum length: 0.5m
		H501 L0.5M	0.5		
		H010 L0.5M	0.5		Signal colittor connection
		H010 L1M	1	EXT I/F NC I/F	Signal splitter connection cable, maximum length: 5m
(7)	Signal splitter connection cable	H010 L2M	2	28 1 1 28	(Note) This cable cannot be used together
		H010 L3M	3	50 <b>(4)</b> 25 (4) 50	with the H300 cable.
		H010 L5M	5		

	Application	Туре	Length (m)	Contents	Supported model
		F020 L0.5M	0.5		
		F020 L1M	1		
		F020 L2M	2		
		F020 L3M	3		Manual pulse generator (1ch), maximum length: 45m
(8)	Manual pulse generator cable (For signal splitter)	F020 L5M	5		(12V power supply type)
		F020 L7M	7		12V power supply separately necessary
		F020 L10M	10		
		F020 L15M	15		
		F020 L20M	20		
		F021 L0.5M	0.5		
		F021 L1M	1	<del>-</del>	
		F021 L2M	2		Manual nules assesses
	Manual pulsa generator cable	F021 L3M	3		Manual pulse generator (2ch), maximum length: 45n
(9)	Manual pulse generator cable (For signal splitter)	F021 L5M	5	MPG WPG	(12V power supply type)
		F021 L7M	7		12V power supply separately necessary
		F021 L10M	10		
		F021 L15M	15		
		F021 L20M	20		
		F022 L0.5M	0.5		
		F022 L1M	1		
		F022 L2M	2		Manual pulse generator
	Manual pulse generator cable (For signal splitter)	F022 L3M	3		(3ch), maximum length: 45n
(10)		F022 L5M	5		(12V power supply type) 12V power supply
		F022 L7M	7		separately necessary
		F022 L10M	10		
		F022 L15M	15		
		F022 L20M	20		
		G020 L0.5M	0.5		
		G020 L1M	1		
		G020 L2M	2		
(11)	Manual pulse generator cable	G020 L3M	3		Manual pulse generator (1ch), maximum length: 15n
	(For signal splitter)	G020 L5M	5		(5V power supply type)
		G020 L7M	7		
		G020 L10M	10		
		G020 L15M	15		
		G021 L0.5M	0.5		
		G021 L1M	1		
		G021 L2M	2		Manual pulse generator
(12)	Manual pulse generator cable	G021 L3M	3		(2ch), maximum length: 15n
	(For signal splitter)	G021 L5M	5	MPG \\	(5V power supply type)
		G021 L7M	7		
		G021 L10M	10		
		G021 L15M	15		
		G022 L0.5M	0.5		
		G022 L1M	1		
		G022 L2M	2		Manual pulse senses to
(13)	Manual pulse generator cable	G022 L3M	3		Manual pulse generator (3ch), maximum length: 15n
	(For signal splitter)	G022 L5M	5		(5V power supply type)
		G022 L7M	7		
		G022 L10M	10		
		G022 L15M	15		

# **DRIVE SYSTEM**

### **Drive unit**



### **High-performance Servo/ Spindle Drive Units** MDS-E/EH Series

- •The servo control-dedicated core processor realizes improved control speed, leading to enhanced basic performance. When combined with a higher resolution motor sensor and advanced high-speed optical communication, this drive contributes to high-speed, high-accuracy control.
- an anti-misinsertion mechanism. This helps to eliminate connection errors. •Improved diagnostic and preventive-maintenance

•The motor power connector is equipped with

- features.
- ·Safe Torque Off (STO) and Safe Brake Control (SBC) are also incorporated as additional safety features.



# Multi-hybrid **Drive Units** MDS-EM/EMH Series

- •The multi-hybrid drive units are capable of driving a maximum of three servo axes and one spindle. This contributes to the downsizing of machines and offers technical advantages.
- •The motor power connector is equipped with an anti-misinsertion mechanism. This helps to eliminate connection errors.
- ·Safe Torque Off (STO) and Safe Brake Control (SBC) are also incorporated as additional safety features.
- •Fan unit contributes to easier fan exchange. •MDS-EMH 400V system drive unit is available.



### All-in-one **Compact Drive Units** MDS-EJ/EJH Series

- ·Ultra-compact drive units with built-in power supplies contribute to smaller control panel
- •The 2-axis type is added for further downsizing.
- •The servo control-dedicated core processor realizes an increase in control speed, leading to improved basic performance. When combined with a higher resolution motor sensor and enhanced high-speed optical communication, this drive contributes to high-speed, high-accuracy control.
- · Safe Torque Off (STO) and Safe Brake Control (SBC) are also incorporated as additional safety features.
- •MDS-EJH 400V system drive unit is available



# **High-performance Spindle Motors** SJ-D Series

Spindle motor

- ·Motor energy loss has been significantly reduced by optimizing the magnetic circuit.
- ·High-speed bearings are incorporated as a standard feature, helping to achieve higher speed, lower vibration and improved durability.
- Normal SJ-D Series 3.7 to 11 [kW] Compact & light SJ-DJ Series 5.5 to 15 [kW] •Maximum speed 10,000 or 12,000 [r/min]



# **High-output, High-torque Spindle Motors SJ-DG Series**

- · Addition of S3 rating (%ED rating) has improved output and torque acceleration/deceleration characteristics.
- ·Balance adjustment ring added to the counter-load side for fine tuning.
- •Range S3 rating: 5.5 to 15 [kW]
- •Maximum speed 10,000 or 12,000 [r/min]



## Low-inertia, High-speed **Spindle Motors** SJ-DL Series

- •This series of spindle motors is dedicated to use in tapping machines that require faster drilling and tapping.
- •The latest design technologies have made it possible to attain lower vibration and greater rigidity even with the lighter weight.
- •Range 0.75 to 7.5 [kW]

# Servo motors

**DRIVE SYSTEM** 







# Medium-inertia, High-accuracy, Linear **High-speed Motors HĞ Series**

- ·Sensor resolution has been significantly improved. The servo motors, which boast smooth rotation and outstanding acceleration capabilities, are well-suited to serve as feed axes of machine tools.
- •Range: 0.2 to 9 [kW]
- •Maximum rotation speed: 4,000 or 5,000 [r/min]
- ·Safety support sensors are included as standard specification. Sensor connectors are screw-locked and have enhanced vibration resistance. Three sensor resolutions (i.e., 1, 4 and 67 million pulses/rev) are available.
- •This can also be used as a tool spindle motor. Small-sized connector allows horizontal cable connection, which helps to save space in machines. (Note 2)

# **Servo Motors LM-F Series**

- •Use in clean environments is possible since no ball screws are used, eliminating possible contamination from grease.
- · Elimination of transmission mechanisms, including backlash, enables smooth, quiet operation even at high speeds.

Maximum thrust: 900 to 18,000 [N·m]

# **Direct-drive Servo Motors TM-RB Series**

- ·High-torque, direct-drive motors combined with high-gain control provide guick acceleration and positioning, which makes rotation smoother.
- ·Suitable for rotary axes that drive tables or spindle heads.
- Range:

Maximum torque: 36 to 1,280 [N·m]



# **Built-in Spindle Motors SJ-BG Series**

- •The electrical design has been optimized to increase the continuous rated torque per unit volume, contributing to the downsizing of spindle units.
- ·Options for mold specification and cooling jacket specification are prepared.



# **Tool Spindle Motors HG-JR** Series

- · Compact tool spindle motors are designed to have the small, high-output characteristics of servo motors yet offer high-speed rotation (8,000r/min). These motors contribute to downsizing spindle size, like rotary tool
- •Product line: 0.75 to 1.5 [kW]
- •Maximum rotation speed: 8,000 [r/min]
- ·Small-sized connector allows horizontal cable connection, which helps to save space in machines. (Note 2)

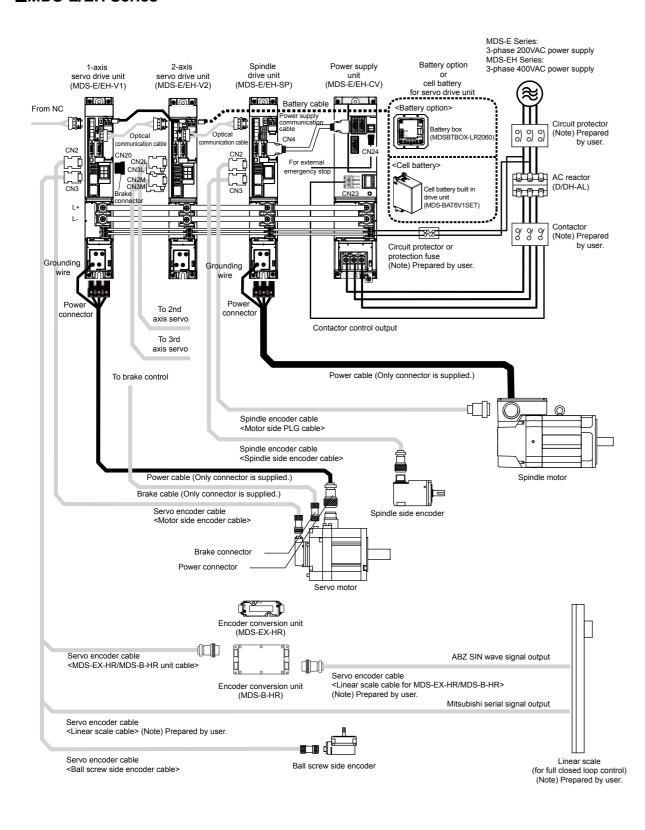
(Note 1) For servo motors only (Note 2) Options supported. (Flange size 90SQ only) \* Use Mitsubishi CNC's dedicated drive unit and motor.

# **DRIVE SYSTEM SYSTEM CONFIGURATION**

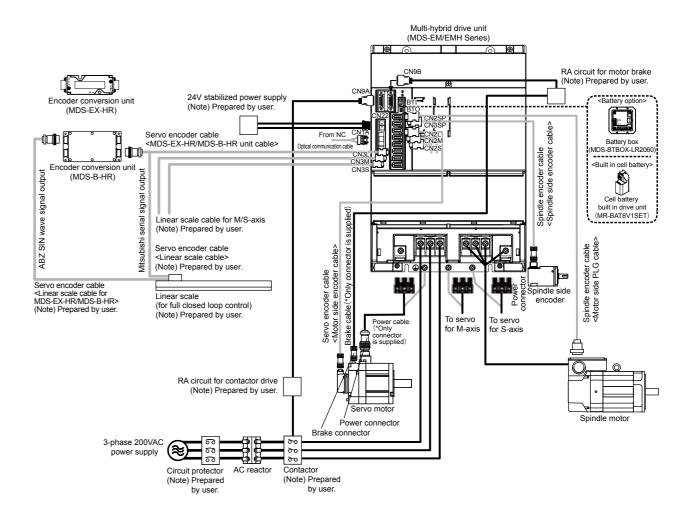
## **■**MDS-E/EH Series

DRIVE

SYSTEM



## **■**MDS-EM/EMH Series

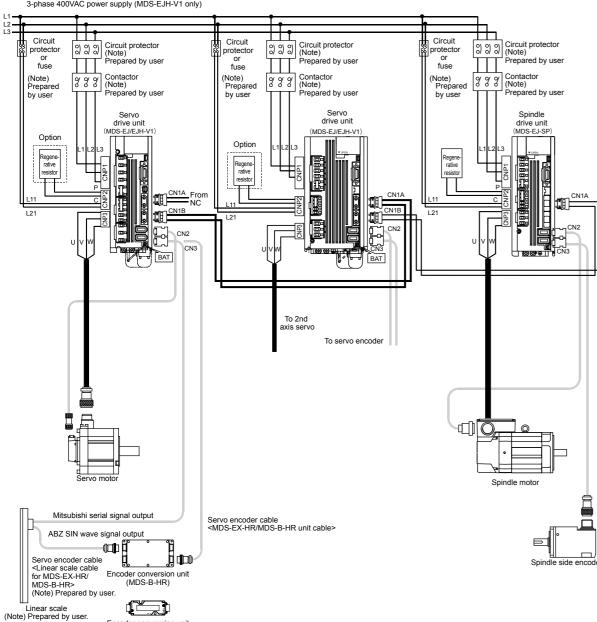


# **■**MDS-EJ/EJH Series

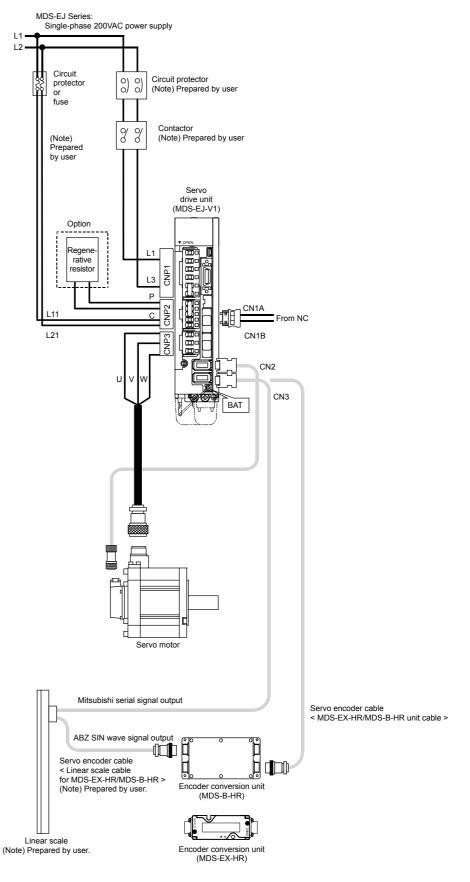
**DRIVE SYSTEM** 

MDS-EJ Series: 3-phase 200VAC power supply MDS-EJH Series: 3-phase 400VAC power supply (MDS-EJH-V1 only)

Encoder conversion unit (MDS-EX-HR)



# <For single-phase power supply>



DRIVE SYSTEM

# **DRIVE SYSTEM SPECIFICATIONS**

	Item	MDS-E-V1/V2/V3	MDS-EH-V1/V2	MDS-EM/EMH-SPV3	MDS-EJ/EJH-V1
	1.1 Full closed loop control	•	•	•	•
1 Base control	1.2 Position command synchronous control	•	•	•	•
functions	1.3 Speed command synchronous control	● (Note 2)	•	-	-
	1.4 Distance-coded reference position control	•	•	•	•
	2.1 Torque limit function (stopper function)	•	•	•	•
	2.2 Variable speed loop gain control	•	•	•	•
	2.3 Gain changeover for synchronous tapping control	•	•	•	•
	2.4 Speed loop PID changeover control	•	•	•	•
0.0	2.5 Disturbance torque observer	•	•	•	•
2 Servo control	2.6 Smooth High Gain control (SHG control)	•	•	•	•
function	2.7 High-speed synchronous tapping control	_			
	(OMR-DD control)	•	•	•	•
	2.8 Dual feedback control	•	•	•	•
	2.9 HAS control	•	•	•	•
	2.10 OMR-FF control	•	•	•	•
	3.1 Jitter compensation	•	•	•	•
	3.2 Notch filter	Variable frequency: 4	Variable frequency: 4	Variable frequency: 4	Variable frequency: 4
	3.2 Notch filter	Fixed frequency: 1	Fixed frequency: 1	Fixed frequency: 1	Fixed frequency: 1
	3.3 Adaptive tracking-type notch filter	•	•	•	•
3 Compensation	3.4 Overshooting compensation	•	•	•	•
control function	3.5 Machine end compensation control	•	•	•	•
	3.6 Lost motion compensation type 2	•	•	•	•
	3.7 Lost motion compensation type 3	•	•	•	•
	3.8 Lost motion compensation type 4	•	•	•	•
	4.1 Deceleration control at emergency stop	•	•	•	•
	4.2 Vertical axis drop prevention/pull-up control	•	•	•	•
	4.3 Earth fault detection	•	•	•	•
4 Protection	4.4 Collision detection function	•	•	•	•
function	4.5 SLS (Safely Limited Speed) function (Note 1)	•	•	•	•
	4.6 Fan stop detection	•	•	•	•
	4.9 STO (Safe Torque Off) function	•	•	•	•
	4.10 SBC (Safe Brake Control) function	•	•	•	•
	5.2 Motor brake control function	•	•	•	•
5 Sequence	5.4 Specified speed output	•	•	•	-
function	5.5 Quick READY ON sequence	•	•	•	-
	6.1 Monitor output function	•	•	•	•
6 Diagnosis function	6.2 Machine resonance frequency display function	•	•	•	•
<b>J</b>	6.3 Machine inertia display function	•	•	•	•

(Note 1) 4.5 SLS (Safely Limited Speed) function is set on NC side.

(Note 2) Always set L-axis as primary axis and M-axis as secondary axis for the speed command synchronous control using MDS-E-V3. Other settings cause the initial parameter error alarm.

	Item	MDS-E-SP	MDS-EH-SP	MDS-E-SP2	MDS-EM/EMH-SPV3	MDS-EJ-SP
	1.1 Full closed loop control	•	•	•	•	•
	1.5 Spindle's continuous position loop control	•	•	•	•	•
	1.6 Coil changeover control	•	•	-	•	-
	1.7 Gear changeover control	•	•	•	•	•
1 Base control	1.8 Orientation control	•	•	•	•	•
functions	1.9 Indexing control	•	•	•	•	•
	1.10 Synchronous tapping control	•	•	•	•	•
	1.11 Spindle synchronous control	•	•	•	•	•
	1.12 Spindle/C axis control	•	•	•	•	•
	1.13 Proximity switch orientation control	•	•	● (Note 1)	•	•
	2.1 Torque limit function	•	•	•	•	•
	2.2 Variable speed loop gain control	•	•	•	•	•
	2.5 Disturbance torque observer	•	•	•	•	•
	2.6 Smooth High Gain control (SHG control)	•	•	•	•	•
2 Spindle control	2.7 High-speed synchronous tapping control (OMR-DD control)	•	•	•	•	•
functions	2.8 Dual feedback control	•	•	•	•	•
	2.11 Control loop gain changeover	•	•	•	•	•
	2.12 Spindle output stabilizing control	•	•	•	•	•
	2.13 High-response spindle acceleration/ deceleration function	•	•	•	•	•
	3.1 Jitter compensation		_			•
	3.1 Sitter compensation	Variable frequency: 4				
3 Compensation	3.2 Notch filter	Fixed frequency: 1				
control function	3.3 Adaptive tracking-type notch filter	•	•	•	•	•
oontroi idriotion	3.4 Overshooting compensation	•	•	•	•	•
	3.6 Lost motion compensation type 2	•	•	•	•	•
	3.9 Spindle motor temperature compensation function	•	•	•	•	•
	4.1 Deceleration control at emergency stop	•	•	•	•	•
4 Protection	4.3 Earth fault detection	•	•	•	•	•
function	4.5 SLS (Safely Limited Speed) function	•	•	•	•	•
TUTIONOT	4.6 Fan stop detection	•	•	•	•	•
	4.9 STO (Safe Torque Off) function	•	•	•	•	•
5 Sequence function	5.4 Specified speed output	•	•	•	•	-
5 Sequence function	5.5 Quick READY ON sequence	•	•	•	•	_
	6.1 Monitor output function	•	•	•	•	•
	6.2 Machine resonance frequency display function	•	•	•	•	•
O Dia anno air fana ti	6.3 Machine inertia display function	•	•	•	•	•
6 Diagnosis function	6.4 Motor temperature display function	•	•	•	•	•
	6.5 Load monitor output function	•	•	•	•	•
	6.6 Open loop control function	•	•	•	•	

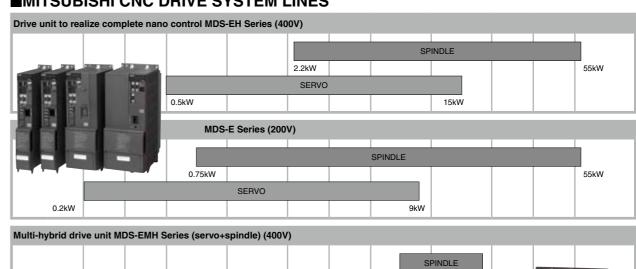
(Note 1) As for 2-axis spindle drive unit, setting is available only for one of the axes. (Note 2) 4.5 SLS (Safely Limited Speed) function is set on NC side.

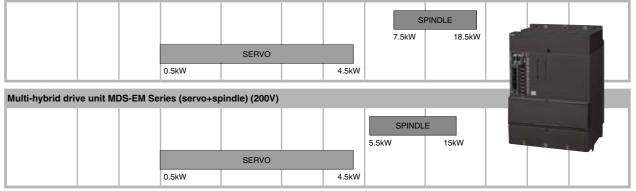
# <Power Supply>

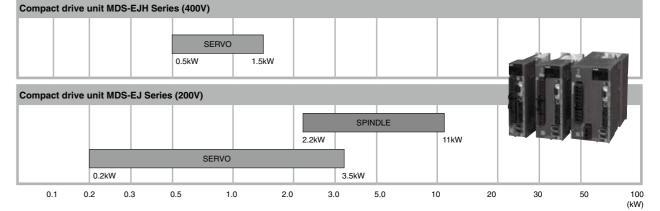
	Item	MDS-E-CV	MDS-EH-CV	MDS-EM/EMH built-in converter	MDS-EJ/EJH-V1 built-in converter	
1 Base control functions	1.14 Power regeneration control	•	•	•	-	-
I base control functions	1.15 Resistor regeneration control	-	-	-	•	•
	4.6 Fan stop detection	•	•	•	•	•
	4.7 Open-phase detection	•	•	•	-	-
	4.8 Contactor weld detection	•	•	•	•	•
4 Protection function	4.11 Deceleration and stop function at power failure (Note 1)	•	•	-	-	-
	4.12 Retraction function at power failure (Note 2)	•	•	-	-	-
	5.1 Contactor control function	•	•	•	•	•
5 Sequence function	5.3 External emergency stop function	•	•	•	•	•
	5.5 High-speed ready ON sequence	•	•	•	-	-
C Diagnosis function	6.7 Power supply voltage display function	•	•	•	_	_
6 Diagnosis function	6.8 Drive Unit Diagnosis Display Function	•	•	•	•	•

(Note 1) The power backup unit and resistor unit option are required. (Note 2) The power backup unit and capacitor unit option are required.

# **■**MITSUBISHI CNC DRIVE SYSTEM LINES



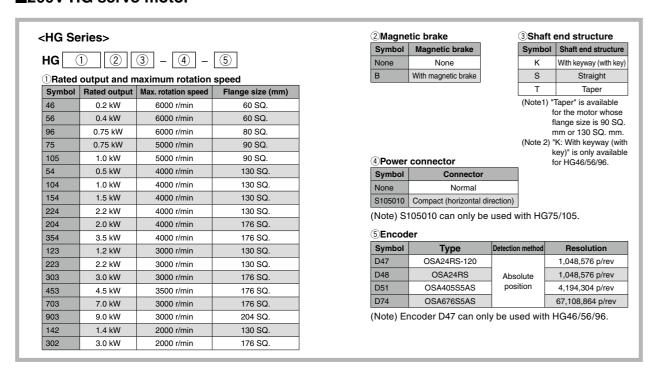




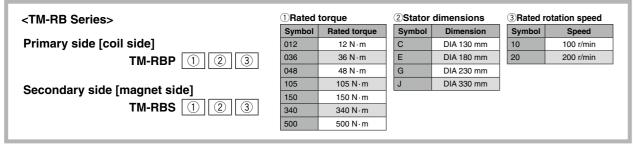
Compatible motors' rated capacity

# **DRIVE SYSTEM TYPE**

### ■200V HG servo motor

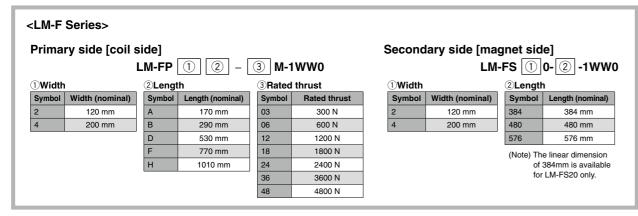


### ■200V Direct-drive motor



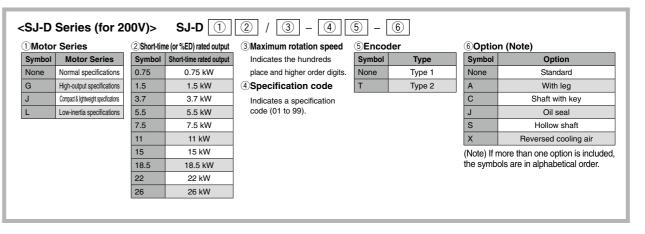
(Note) This explains the model name system of a direct-drive motor, and all combinations of motor types listed above do not exist.

### ■200V Linear servo motor

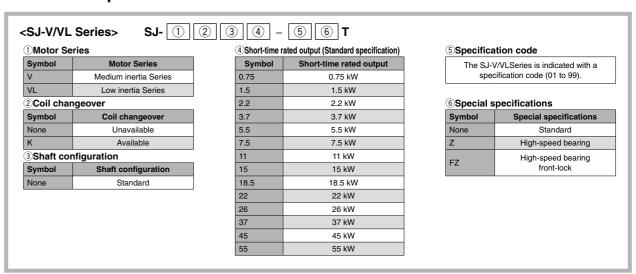


(Note) This explains the model name system of a linear servo motor, and all combinations of motor types listed above do not exist.

# ■200V SJ-D spindle motor



# ■200V SJ-V spindle motor

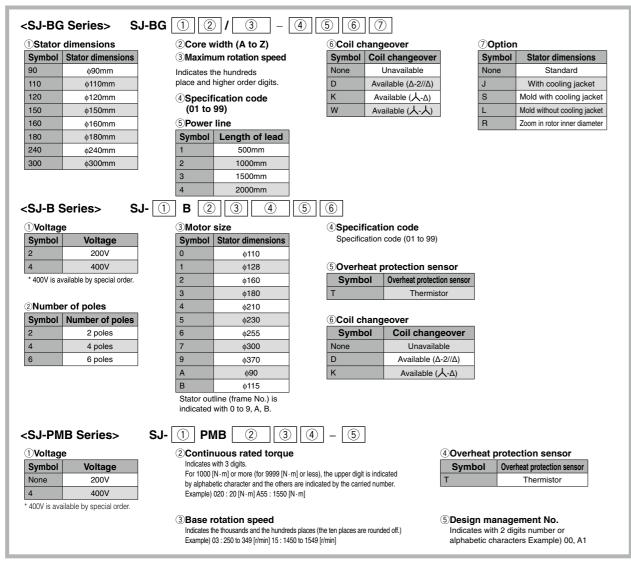


(Note) This explains the model name system of a spindle motor, and all combinations of motor types listed above do not exist.

SYSTEM

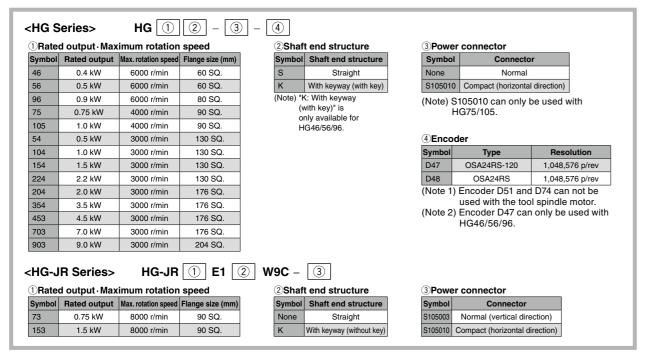
6

## **■200V** Built-in spindle motor

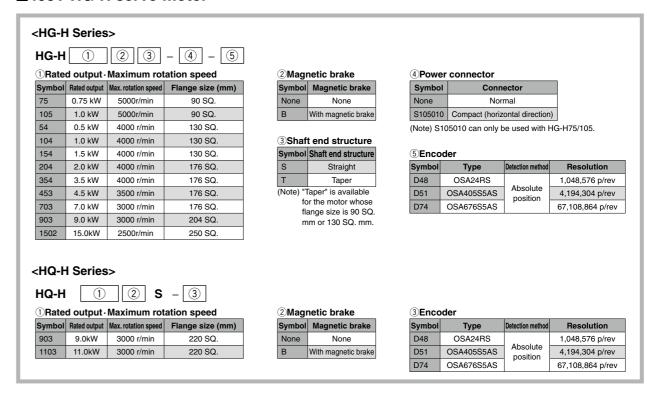


(Note) This explains the model name system of a spindle motor, and all combinations of motor types listed above do not exist.

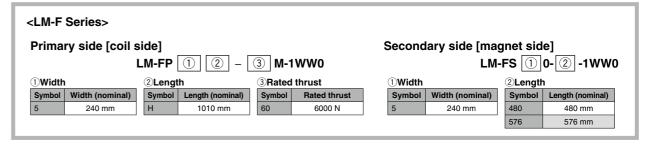
# ■200V Tool spindle motor



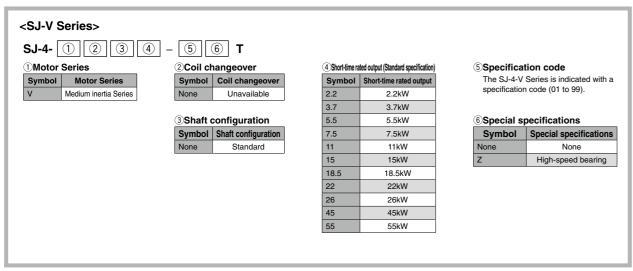
### ■400V HG-H servo motor



### ■400V Linear servo motor

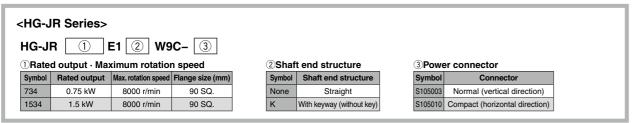


#### ■400V SJ-4-V spindle motor



(Note 1) The built-in spindle motor is available by special order.
(Note 2) This explains the model name system of a spindle motor, and all combinations of motor types listed above do not exist.

#### **■**400V Tool spindle motor



## **DRIVE SYSTEM SERVO MOTOR 200V**

#### **■**HG Series

	Motor type		HG46	HG56	HG96		
	1-axis type	MDS-E-V1-	20	20	20		
	2-axis type	MDS-E-V2-	20	20	20 40		
Compatible drive unit	3-axis type	MDS-E-V3-	20	20	20 40		
	Multi-hybrid type	MDS-EM-SPV3-	-	_	xxx40*		
	Regenerative resistor type	MDS-EJ-V1-	10	15	30		
Output Stall torque Max. torque	8	[N·m] 8 6 4 2	2.5	5.0	2.4		
Rated output		[kW]	0.2	0.4	0.75		
Max. rotation s	speed	[r/min]		6000			
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	0.234	0.379	1.27		
Motor inertia w	vith a brake	[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	0.261	0.407	1.37		
	on (The shaft-through por and brake connector port		IP67				
	ke, Straight shaft)	[mm]	60 SQ.	60 SQ.	80 SQ.		
Flange fitting of		[mm]	φ50	φ50	φ70		
Shaft diameter		[mm]	φ14	φ14	φ19		
Mass (with a b	rake)	[kg]	1.2(1.6)	1.6(2.0)	2.9(3.7)		
Absolute position encoder compatible drive unit	1,048,576[p/rev](	D47)	E, EJ	E, EJ	E, EM, EJ		

	Motor type		HG75	HG105	HG54	HG104	HG1	54
	1-axis type	MDS-E-V1-	20	20	40	40	80	-
	2-axis type	MDS-E-V2-	20	20	40	40	80	_
	2-axis type	IVIDS-E-V2-	40	40	80	80	160	_
Compatible	3-axis type	MDS-E-V3-	20	20	40	40	_	40
drive unit	3-axis type	WD3-L-V3-	40	40	40	40	_	40
anno anno	Multi-hybrid type	MDS-EM-SPV3-	xxx40*	xxx40*	xxx40*	xxx40*	xxx80*	_
					xxx80*	xxx80*	200120	
	Regenerative resistor type	MDS-EJ-V1-	30	30	30	40	80	)
		[N·m] 50					42.0	
Output		40					72.0	
Stall torque		30				23.3		23.7
Max. torque		20	8.0	11.0	13.0		9.0	7.0.
		10 0	2.0	3.0	2.9	5:9		
Rated output [kW]		0.75	1.0	0.5	1.0	1.5	5	
Max. rotation s	speed	[r/min]	5000	5000	4000	4000	400	
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	2.62	5.12	6.13	11.9	17.	
Motor inertia v	vith a brake	[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	2.70	5.20	8.26	14.0	20.	
Degree of protection	on (The shaft-through po	rtion is excluded.)	IP67	IP67	IP67	IP67	IP67	
Outline dimena (Without a bra D48 encoder)	sion drawing ke, Straight shaft,		90 SQ.	90 SQ. 163.5	130 SQ.	130 SQ.	130 \$	5Q.
(Note) The total length will be 3.5mm longer when using a D51or D74 encoder.		127.5	163.5	118.5	140.5	162.5		
Flange fitting of	diameter	[mm]	φ80	ф80	φ110	φ110	φ11	0
Shaft diameter [mm]		φ14	φ14	φ24	φ24	φ24		
Mass (with a b		[kg]	2.6(3.6)	4.4(5.3)	4.8(6.7)	6.5(8.5)	8.3(1	1.0)
Absolute position 67,108,864 [p/rev] (D74)		- ' '	Е	E	E	E	E	
encoder compatible	, , , ,	` '	E	E	E	E	E	E
drive unit	1,048,576 [p/rev]	(D48)	EM, EJ	EM, EJ	EM, EJ	EM, EJ	EM, EJ	

\*Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

#### **■**HG Series

	Motor type		HG224	HG	204		HG354		
	1-axis type	MDS-E-V1-	80	-	80	-	_	160	
	2-axis type	MDS-E-V2-	80 160	-	80 160	-	-	160 160W	
Compatible	3-axis type	MDS-E-V3-	_	_	-	-	_	-	
drive unit	Multi-hybrid type	MDS-EM-SPV3-	xxx80* 200120	-	xxx80* 200120	-	200120	-	
	Regenerative resistor type	MDS-EJ-V1-	80	80	-	100	-	-	
Output Stall torque Max. torque		[N·m] 50 40 30 20 10	12.0	13.7	13.7	65.0	75.0	90:0	
Rated output [kW]		2.2	2.0			3.5			
Max. rotation s	Max. rotation speed [r/min]		4000	40	00	3500	40	00	
Motor inertia	Motor inertia [x10 <sup>-4</sup> kg⋅m²]		23.7	38	3.3		75.0		
Motor inertia w	Motor inertia with a brake [x10 <sup>-4</sup> kg⋅m²]		25.9	47	7.9		84.7		
Degree of protection	n (The shaft-through po	ortion is excluded.)	IP67	IP	67		IP67		
(Without a brake D48 encoder)	Outline dimension drawing (Without a brake, Straight shaft, D48 encoder)		130 SQ.	176	<u>sa.</u>		176 SQ.		
(Note) The total length will be 3.5mm longer when using a D51or D74 encoder.		184.5	143.5		183.5				
Flange fitting d	iameter	[mm]	φ110	φ11	4.3		φ114.3		
Shaft diameter	Shaft diameter [mm]		φ24	ф35		ф35			
Mass (with a brake) [kg]		10.0(12.0)	12.0(		19.0(25.0)				
Absolute position	67,108,864 [p/re		E	-	E	-	-		
encoder compatible drive unit	4,194,304 [p/rev] 1,048,576 [p/rev]		E EM, EJ	EJ	E EM	EJ	EM	E	

	Motor type		HG123	HG223	HG303	HG	453
	1-axis type	MDS-E-V1-	20	40	80	-	160
	2-axis type	MDS-E-V2-	20 40	40 80	80 160	-	160 160W
Compatible drive unit	3-axis type	MDS-E-V3-	20 40	40	-	-	-
arive unit	Multi-hybrid type	MDS-EM-SPV3-	xxx40*	xxx40* xxx80*	xxx80* 200120	200120	-
	Regenerative resistor type	MDS-EJ-V1-	40	40	80	-	-
Output Stall torque Max. torque		[N·m] 100 80 60 40 20 0	7.0 17.0	32.0	64.0	90.0	122.0
Rated output		[kW]	1.2	2.2	3.0	4	.5
Max. rotation speed [r/min]		[r/min]	3000	3000	3000	35	00
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	11.9	23.7	75.0	112	2.0
Motor inertia v	vith a brake	[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	14.0	25.9	84.7	12	2.0
Degree of protection	on (The shaft-through po	ortion is excluded.)	IP67	IP67	IP67	IP	67
D48 encoder)	ke, Straight shaft,	[mm]	130 SQ.	130 SQ.	176 SQ.	176	<u>so.</u>
(Note) The total length will be 3.5mm longer when using a D51or D74 encoder.		140.5	184.5	183.5		5	
Flange fitting of	diameter	[mm]	φ110	φ110	φ114.3	φ11	4.3
Shaft diameter [mm]		ф24	ф24	ф35	φί	35	
Mass (with a brake) [kg]		6.5(8.5)	10.0(12.0)	19.0(25.0)	25.0(	31.0)	
Absolute position	67,108,864 [p/re	ev] (D74)	E	E	E	-	
encoder compatible	4,194,304 [p/rev	/] (D51)	E	E	E	EM	E
drive unit	1,048,576 [p/rev	/] (D48)	EM, EJ	EM, EJ	EM, EJ	⊏IVI	

\*Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

#### **■**HG Series

	Motor type		HG703	HG903	HG142	HG302	
	1-axis type	MDS-E-V1-	160W	320	20	40	
	2-axis type	MDS-E-V2-	160W	-	20 40	40 80	
Compatible drive unit	3-axis type	MDS-E-V3-	-	-	20 40	40	
arive unit	Multi-hybrid type	MDS-EM-SPV3-	-	-	xxx40*	xxx40* xxx80*	
	Regenerative resistor type	MDS-EJ-V1-	-	-	40	40	
Output Stall torque Max. torque		[N·m] 200 150 100 50	49.0	58.8	11.0 26.5	50.0	
Rated output		[kW]	7.0	9.0	1.4	3.0	
Max. rotation s	speed	[r/min]	3000	3000	2000	2000	
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	154.0	196.0	17.8	75.0	
Motor inertia v	vith a brake	[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	164.0	206.0	20.0	84.7	
Degree of protecti	ion (The shaft-through po	ortion is excluded.)	IP67	IP67	IP67	IP67	
D48 encoder)	ike, Straight shaft,	[mm]	176 SQ.	204 SQ.	130 SQ.	176 SQ.	
(Note) The total length will be 3.5mm longer when using a D51or D74 encoder.		[11111]	263.5	330	162.5	183.5	
Flange fitting of	diameter	[mm]	ф114.3	φ180	ф110	φ114.3	
Shaft diamete	r	[mm]	φ35	φ42	φ24	φ35	
Mass (with a b	orake)	[kg]	32.0(38.0)	43.0(49.0)	8.3(11.0)	19.0(25.0)	
Absolute position	67,108,864 [p/re	v] (D74)			Е	E	
encoder compatible drive unit 4,194,304 [p/rev] 1,048,576 [p/rev]			E	E	E, EM, EJ	E, EM, EJ	

\*Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

## **DRIVE SYSTEM DIRECT-DRIVE MOTOR 200V ■TM-RB Series**

Matartura	Primary	side type	TM-RBP012C20	TM-RBP036E20	TM-RBP048G20	TM-RBP105G10	
Motor type	Secondary	y side type	TM-RBS012C20	TM-RBS036E20	TM-RBS048G20	TM-RBS105G10	
	1-axis type	MDS-E-V1-	40	80	80	160	
Compatible	2-axis type	MDS-E-V2-	40	80	80	160	
drive unit	Regenerative resistor type	MDS-EJ-V1-	40	80	80	100	
		[N·m] 300					
		250				260	
		200					
Output Rated torque (liquid-cooling)		150			144		
Max. torque				108		105	
		100	36	36	48		
		50	12				
		0					
Rated output [W]		252	754	1005	1100		
Max. rotation speed [r/min]		500	500	500	250		
$Motor inertia \qquad \qquad [\times 10^4 kg \cdot m^2]$		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	22	127	280	395	
Degree of prot	ection		IP00	IP00	IP00	IP00	
Outline dimension drawing		[mm]	76 DIA 56 DIA 130	DIA 100 DIA 180	DIA 130 DIA 230	DIA 130 DIA 230	
Mass [kg]	Primary side (c		3.9	7.1	10	13	
iviass [kg]	Secondary side	(magnet)	1.7	3.7	5	7	

-axis type   MDS-E-V1-   160   160   320   320W    -axis type   MDS-E-V2-   160   160   -	Motor type	Primary s	side type	TM-RBP105G20	TM-RBP150G20	TM-RBP340J20	TM-RBP500J20
Compatible   Regenerative   Regene	wotor type	Secondary	side type	TM-RBS105G20	TM-RBS150G20	TM-RBS340J20	TM-RBS500J20
Regenerative   Rege		1-axis type	MDS-E-V1-	160	160	320	320W
N-m   1400   1280   1	Compatible	2-axis type	MDS-E-V2-	160	160	-	-
1200   1000	drive unit		MDS-EJ-V1-	-	-	-	-
Dutput Rated torque (liquid-cooling)							1280
Output         800 hated torque (liquid-cooling)         800 hate torque (liquid-cooling)         800 hate torque (liquid-cooling)         800 hate torque (liquid-cooling)         800 hate torque (liquid-cooling)         375 hate torque (liquid-cooling)         375 hate torque (liquid-cooling)         340 hate torque (liquid-cooling)         150 hate torque (liquid-cooling)         150 hate torque (liquid-cooling)         105 hate torque (liquid-cooling)         104 hate torque (liquid-cooling) <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							
Rated torque (liquid-cooling)	Output					850	
Max. torque			800				
A00   200   105   280   150   150   150   150   150   160	Max. torque		600				
Company   Comp	·	_	400	260		340	
Primary side (coil)   13   16   33   41     10471				105	150		
Max. rotation speed [r/min] 500 500 400 400 400 Motor inertia [x10*kg·m²] 395 510 2778 3538 Degree of protection IP00 IP00 IP00 IP00 IP00 IP00 IP00 IP0							
Motor inertia   [x10 <sup>4</sup> kg·m²]   395   510   2778   3538     Degree of protection   IP00   IP00   IP00     Duttine dimension drawing   DiA 130   DiA 230   DiA 205   DiA 330     DiA 230   DiA 330   DiA 330   DiA 330   DiA 330     DiA 330   DiA 330   DiA 330   DiA 330   DiA 330     Dia 330   DiA 330   DiA 330   DiA 330   DiA 330   DiA 330     Dia 205   DiA 330   Di					-		· ·
Degree of protection IP00 IP00 IP00 IP00  Outline dimension drawing  DIA 130  DIA 230  DIA 230  DIA 330							
Outline dimension drawing							
Mass	Outline dimension drawing		[mm]	DIA 130	DIA 130	DIA 205	
		Primary side (co	oil)	13	16	33	41
	Mass [kg]			7	9	20	26

(Note 1) The encoder should be procured by the user.
(Note 2) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

## **DRIVE SYSTEM LINEAR SERVO MOTOR 200V**

#### **■LM-F Series**

Matartuna	Primary s	side type	LM-FP2A-03M-1WW0	LM-FP2B-06M-1WW0	LM-FP2D-12M-1WW0	LM-FP2F-18M-1WW0	
Motor type	Secondary	side type	LM-FS20-□-1WW0	LM-FS201WW0	LM-FS201WW0	LM-FS20-□-1WW0	
	1-axis type	MDS-E-V1-	40	40	80	160	
	2-axis type	MDS-E-V2-	40	40	80	160	
Compatible drive unit	3-axis type	MDS-E-V3-	40	40	-	-	
drive driit	Regenerative resistor type	MDS-EJ-V1-	40	40	80	-	
		[N] 6000				5400	
		5000				0400	
Thrust force		4000			3600		
Continuous (na	tural-cooling)				0000		
Continuous (liq		3000		1800		1800	
Maximum		2000		1800	1200		
		1000	900 150 300	300 -600	600	900	
Rated thrust [N]		[N]	300	600	1200	1800	
Maximum speed (Note 1) [m/s]		2.0	2.0	2.0	2.0		
Magnetic attraction force [N]		2500	4500	9000	13500		
Degree of prot	ection		IP00	IP00	IP00	IP00	
Outline dimension drawing		[mm]	170 384 480 576 1000 120 19.5	290 480 576 1000 120 19.5	530 480 576 1000 1000 120 19.5	770 480 576 1000	
	Primary side (co	sil\	120 120 5	120 120	120 120 19.5 18	150 === 19.5 120 120	
	1 milary side (CO	,,,,	5.8(384mm)	3	10	21	
Mass [kg]	Secondary side (magnet)		5.8(384mm) 7.1(480mm) 9.0(576mm)	7.1(480mm) 9.0(576mm)	7.1(480mm) 9.0(576mm)	7.1(480mm) 9.0(576mm)	

Motor type	Primary :	side type	LM-FP4B-12M-1WW0	LM-FP4D-24M-1WW0	LM-FP4F-36M-1WW0	LM-FP4H-48M-1WW0	
wotor type	Secondary	/ side type	LM-FS40-□-1WW0	LM-FS40-□-1WW0	LM-FS40-□-1WW0	LM-FS401WW0	
	1-axis type	MDS-E-V1-	80	160	320	320	
Campatible	2-axis type	MDS-E-V2-	80	160	_	_	
Compatible drive unit	3-axis type	MDS-E-V3-	-	-	-	-	
unve unit	Regenerative resistor type	MDS-EJ-V1-	80	-	-	-	
Thrust force Continuous (na Continuous (liq Maximum		[N] 20000 15000 10000 5000	3600 600 1200	7200	10800	14400 2400 2400	
Rated thrust		[N]	1200	2400	3600	4800	
Maximum spe	ed (Note 1)	[m/s]	2.0	2.0	2.0	2.0	
Magnetic attra	ction force	[N]	9000	18000	27000	36000	
Degree of prot	ection		IP00	IP00	IP00	IP00	
Outline dimension drawing		[mm]	290 290 1000 19.5 200	530 480 576 1000 1000 19.5 200 19.5	770 480 576 1000 200 19.5	1010 488 570 1000 200 200 19.	
	Primary side (co	oil)	14	28	42	56	
Mass [kg]	Secondary side (magnet)		13.5(480mm) 16.0(576mm)	13.5(480mm) 16.0(576mm)	13.5(480mm) 16.0(576mm)	13.5(480mm) 16.0(576mm)	

(Note 1) The maximum speed in actual use is either the linear scale's maximum speed or this specified value, whichever is smaller. (Note 2) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

#### **■LM-F Series (Dual-axis drive unit)**

Materities	Primary s	side type	LM-FP2A-03M-1WW0	LM-FP2B-06M-1WW0	LM-FP2D-12M-1WW0	LM-FP2F-18M-1WW0	
Motor type	Secondary	side type	LM-FS20-□-1WW0	LM-FS201WW0	LM-FS201WW0	LM-FS201WW0	
	1-axis type	MDS-E-V1-	80	80	160	320	
Compatible	2-axis type	MDS-E-V2-	80	80	160	-	
drive unit	Regenerative resistor type	MDS-EJ-V1-	80	80	-	-	
[N] 12000 10000 Thrust force 8000 Continuous (natural-cooling) Continuous (liquid-cooling) Maximum 4000		1800 300_600		7200 2400 1200	3600 1800		
Rated thrust		0	600	1200	2400	2000	
Maximum spec	od (Noto 1)	[N] [m/s]	2.0	2.0	2400	3600 2.0	
	ion force (per motor)		2500	4500	9000	13500	
Degree of prot	<u> </u>	[IN]	IP00	IP00	IP00	IP00	
Outline dimension drawing		[mm]	Primary side Secondary side  384 480 576 1000 120 19.5	290 480 576 120 120 120	530 480 576 120 120 120 120	770 480 576	
	Primary side (co	oil)	5×2	9×2	18×2	27×2	
Mass [kg]			5.8(384mm) 7.1(480mm) 9.0(576mm)	7.1(480mm) 9.0(576mm)	7.1(480mm) 9.0(576mm)	7.1(480mm) 9.0(576mm)	

Material	Primary s	side type	LM-FP4B-12	M-1WW0	LM-FP4D-24	M-1WW0	
Motor type	Secondary	side type	LM-FS40-	]-1WW0	LM-FS40-	]-1WW0	
	1-axis type	MDS-E-V1-	160	)	320	)	
Compatible	2-axis type	MDS-E-V2-	160	)	-		
drive unit	Regenerative resistor type	MDS-EJ-V1-	ı		-		
		[N] 16000 14000				14400	
		12000					
Thrust force	_	10000					
Continuous (nat		8000		7200			
Continuous (lic Maximum	luid-cooling)	6000			480	,	
40			240		2400	<u> </u>	
		2000	1200	<u> </u>	2400		
		0					
Rated thrust [N]			240	0	4800		
Maximum spee		[m/s]	2.0		2.0		
	on force (per motor)	[N]	900		18000		
Degree of prote	ection		IP00	)	IP00	)	
Outline dimension drawing		[mm]		480 576 290 000 50 19.5		30 480 576 300 19.5 200 19.5	
	Primary side (co	oil)	14×	2	28×	2	
Mass [kg]	Secondary side	·	13.5(480 16.0(576		13.5(480mm) 16.0(576mm)		

(Note 1) The maximum speed in actual use is either the linear scale's maximum speed or this specified value, whichever is smaller. (Note 2) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

## **DRIVE SYSTEM SPINDLE MOTOR 200V**

#### **■SJ-D Series (Normal specifications)**

	Motor type		SJ-D3.7/100-01	SJ-D5.5/100-01	SJ-D5.5/120-01		SJ-D5.5/120-02		
	1-axis type	MDS-E-SP-	80	80	80	-	160	200	
Compatible	2-axis type	MDS-E-SP2-	80 16080(M)	80 16080(M)	80 16080(M)	-	16080(L)	-	
drive unit	Multi-hybrid type	MDS-EM-SPV3-	-	100xx*	100xx*	100xx*	160xx*	200xx*	
	Regenerative resistor type	MDS-EJ-SP-	80	100	100	-	-	-	
Output Acceleration/Deceleration  %ED rating  Short-time rating  Continuous rating		3.7 2 2 0 1500 6000 10000 fmin	5.5 6 4 2 0 1500 6000 10000 r/min	kW 5.5 6 4 3.7 2 0 1500 6000 12000 r/min	r/min	kW 15 10 9.2 3.7 5.5 3.7 5 2000 2800 6000 8000 12000 r/min	kW 15 10 4 3.7 3.7 5 5.5 5.5 3.7 5 0 1700 4500 8000 12000 r/min		
			Short-time (15min)	Short-time (30min)	Short-time (30min)	%ED rating (25%ED)⊠	%ED rating (25%ED)	%ED rating (25%ED)	
Standard output	t during acceleration/dec	celeration [kW]	3.7	5.5	5.5	7.5	9.2	10.4	
Actual accelerat	tion/deceleration output	(Note 2) [kW]	4.4	6.6	6.6	9	11.0	12.5	
Continuous ba	Continuous base rotation speed [r/min]		1500	1500	1500		2800		
Max. rotation s	Max. rotation speed in constant output range [r/min]		6000	6000	6000		8000		
Maximum rota	ation speed	[r/min]	10000	10000	12000		12000		
Continuous ra	ated torque	[N·m]	14.0	23.6	23.6		12.6		
Motor inertia		[kg·m²]	0.0074	0.013	0.013		0.0074		
Degree of protect	ion (The shaft-through por	tion is excluded.)	IP54	IP54	IP54	IP54			
Outline dimen			174 SQ.	174 SQ.	174 SQ.		174 SQ.		
drawing (flang	ge type)	[mm]	327	417	417		327		
Flange fitting diameter [mm]		φ150	φ150	φ150		φ150			
Shaft diameter [mm]		φ28	ф28	ф28		ф28			
Mass		[kg]	26	39	39		26		
With leg			Possible	Possible	Possible		Possible		

	Motor type		SJ-D7.5/100-01	SJ-D7.5/120-01	SJ-D11/100-01	SJ-D15/80-01	SJ-D18.	.5/80-01
	1-axis type	MDS-E-SP-	160	160	160	200	240	320
	2-axis type	MDS-E-SP2-	16080(L)	16080(L)	16080(L)	-		-
Compatible drive unit	Multi-hybrid type	MDS-EM-SPV3-	100xx*	100xx*	160xx*	200xx*		_
unve unit	Regenerative resistor type	MDS-EJ-SP-	120	120	160	-	-	-
Output %ED rating Short-time rat Continuous ra			KW 8 6.5 6.5 4 2 0 1500 6000 10000 r/min	KW 8 6 5.5.5 6 4 2 0 1500 6000 12000 r/min	kW 15 11 11 15 15 15 15 15 15 15 15 15 15	18.5 20 15 15 10 15 0 150 4500 6000 8000 1500 4500 6000 8000 17min WED rating (25%ED)\( \frac{1}{2} \)	18.5 20 15 15 10 15 0 1500 6000 8000 r/min	25 20 18.5 10 1500 4500 6000 8 %ED rating (25%ED)
Oter-denderster	4 design lesselies (d	and and an Italian	Short-time (30min)	Short-time (30min)	Short-time (30min)	Short-time (30min)	Short-time (30min)	Short-time (30min)
	ut during acceleration/d		7.5 9	7.5	11	18.5	18.5	
	ation/deceleration outp	. ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-	9	13.2	22.2	22.2	30.0
	ase rotation speed	[r/min]	1500	1500	1500	1500		00
	speed in constant outp		6000	6000	4500	6000	60	
Maximum rot		[r/min]	10000 35.0	12000 35.0	10000 47.7	8000 70.0	80 95	
Continuous ra Motor inertia	aled lorque	[N·m]	0.023	0.023	0.031	0.086	0.	
	tion (The shaft-through po	[kg·m²]	0.023 IP54	0.023 IP54	IP54	IP54	IP.	
Outline dimer drawing (flan		[mm]	204 SQ. 439	204 SQ. 439	204 SQ. 489	260 SQ.	468.	
Flange fitting		[mm]	φ180	φ180	φ180	ф230	ф2	30
Shaft diamete	er	[mm]	φ32	ф32	ф48	ф48	φ4	
Mass		[kg]	53	53	64	93	10	
With leg			Possible	Possible	Possible	under development	under dev	elopment/

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination. (Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### **■SJ-D Series (Normal specifications)**

	Motor type			2/80-01	SJ-D26/80-01
	1-axis type	MDS-E-SP-	240	320	320
Compatible	2-axis type	MDS-E-SP2-		_	-
drive unit	Multi-hybrid type	MDS-EM-SPV3-		_	-
anto anno	Regenerative resistor type	MDS-EJ-SP-		-	-
Output %ED rating Short-time ra Continuous ra			22 10 1500 6000 80000 r/min Short-time (30min)	8W 40 30 18.5 0 1500 4500 6000 8000 r/min %ED rating (25%ED) Short-time (30min) ■	kW 40 30 20 10 1500 4500 6000 8000 rimin %ED rating (25%ED) ⊠ Short-time (30min) □
Standard output	t during acceleration/c	deceleration [kW]	22.0	30.0	35.0
	ation/deceleration outp		26.4	36.0	42.0
Continuous b	ase rotation speed	[r/min]	15	500	1500
Max. rotation s	peed in constant out	out range [r/min]	60	000	6000
Maximum rota	ation speed	[r/min]	80	000	8000
Continuous ra	ated torque	[N·m]	1	18	140
Motor inertia		[kg·m²]	0.	14	0.16
Degree of protect	tion (The shaft-through po	ortion is excluded.)	IP	54	IP54
Outline dimer	nsion drawing	[mm]	260	50.	260 SQ.
(mango typo)			538.	5	583.5
Flange fitting		[mm]		230	ф230
Shaft diamete	er	[mm]		55	ф55
Mass		[kg]	1	31	147
With leg			under de	velopment	under development

#### **■SJ-D Series (Hollow shaft specifications)**

**DRIVE SYSTEM** 

	Motor type			SJ-D5.5/120-02T-S			
		MDS-E-SP-	-	160	200		
		MDS-E-SP2-	_	16080(L)	_		
Compatible		MDS-EM-SPV3-	100xx*	160xx*	200xx*		
drive unit	Paganarativa	MDS-EJ-SP-	-	-	-		
Output Acceleration/l %ED rating Short-time rat Continuous ra			8 7.5 3.7 4 2 0 12000 r/min %ED rating (25%ED)⊠	kW 15 10 9.2 5.5 5.5 3.7 5 0 2000 2800 6000 8000 12000 r/min %ED rating (25%ED)⊠	kW 15 10 10 10 170 450 800 12000 17min %ED rating (25%ED) ⊠		
Standard outpu	t during acceleration/dec	celeration [kW]	7.5	9.2	10.4		
	ation/deceleration output		9	11.0	12.5		
Continuous b	ase rotation speed	[r/min]	2800				
Max. rotation s	peed in constant outpu	t range [r/min]		8000			
Maximum rota	ation speed	[r/min]		12000			
Continuous ra	ated torque	[N·m]	12.6				
Motor inertia		[kg·m²]	0.0075				
Degree of protect	tion (The shaft-through port	ion is excluded.)	IP54				
Outline dimer (flange type)	nsion drawing	[mm]		174 SQ.			
Flange fitting diameter [mm]			ø150				
Shaft diameter		[mm]	φ150 φ28				
Mass		[kg]		24			
With leg		. 03		Not possible			

<sup>\*</sup> Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### **■SJ-DG Series (High-output specifications)**

	Motor type		SJ-DG3.7/120-03T	SJ-DG5.5/120-04T	SJ-DG7.5/120-05T	SJ-DG11/100-03T	SJ-DG11	/120-03T
	1-axis type	MDS-E-SP-	160	160	160	200	160	200
0	2-axis type	MDS-E-SP2-	-	-	-	-	16080(L)	-
Compatible drive unit	Multi-hybrid type	MDS-EM-SPV3-	160xx*	160xx*	160xx*	200xx*	160xx*	200xx*
unve unit	Regenerative resistor type	MDS-EJ-SP-	-	-	-	-	-	-
Output %ED rating Short-time rating Continuous rating		8W 6 4 3.7 2 0 1500 7000 1000012000 frini	8 6 5.5 4 2 1500 5500 7000 12000 r/min	10 5 7.5 0 1500 5500 8000 12000 r/min	12 6 7.5 0 1500 4500 6000 10000 r/min	kW 20 15 11 10 7.5 0 12000 12000 1700 1700 1700 1700 1700	20 15 10 17.5 0 1500 4500 6000 12000	
			%ED rating (25%ED)⊠ Short-time (15min)□	%ED rating (25%ED)∑ Short-time (30min)☐	%ED rating (25%ED) Short-time (30min)	%ED rating (25%ED)  Short-time (30min)  ■	%ED rating (25%ED) Short-time (30min)	%ED rating (25%ED)  Short-time (30min)  ■
Standard outpu	t during acceleration/d	leceleration [kW]	5.5	7.5	11.0	15.0	11.0	15.0
Actual accelera	tion/deceleration outp	out (Note 2) [kW]	6.6	9.0	13.2	18.0	13.2	18.0
Continuous b	ase rotation speed	[r/min]	1500	1500	1500	1500	1500	1500
Max. rotation s	peed in constant outp	out range [r/min]	10000	7000	8000	6000	60	00
Maximum rota	ation speed	[r/min]	12000	12000	12000	10000	120	000
Continuous ra	ated torque	[N·m]	14.0	23.6	35.0	47.7	47	7.7
Motor inertia		[kg·m²]	0.0066	0.012	0.022	0.029	0.0	29
Degree of protect	ion (The shaft-through po	ortion is excluded.)	IP54	IP54	IP54	IP54	IP	54
Outline dimer	sion drawing	[mm]	174 SQ.	174 SQ.	204 SQ.	204 SQ.	204	so.
(flange type)			327	417	439	489	489	
Flange fitting	diameter	[mm]	φ150	ф150	φ180	ф180	φ1	80
Shaft diamete	er	[mm]	ф28	ф28	ф32	φ48	φ4	18
Mass		[kg]	24	37	50	61	6	1
With leg			Not possible	Not possible	Not possible	Not possible	Not po	ssible

<sup>\*</sup> Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### ■SJ-DJ Series (Compact & lightweight specifications)

	Motor type		SJ-DJ5.5/100-01	SJ-DJ5.5/120-01	SJ-DJ7.5/100-01
	1-axis type	MDS-E-SP-	80	80	160
Compatible	2-axis type	MDS-E-SP2-	80 16080(M)	80 16080(M)	16080(M)
drive unit	Multi-hybrid type	MDS-EM-SPV3-	100xx*	100xx*	100xx*
	Regenerative resistor type	MDS-EJ-SP-	100	100	120
Output %ED rating Short-time ra Continuous ra			8 5.5 3.7 4 2 0 10000 rmin %ED rating (25%ED)	5.5 4 0 0 1500 4500 12000 rmin %ED rating (25%ED)	7.5 6 1500 2000 4500 10000 rmin Short-time (15min)
Standard outpu	it during acceleration/d	leceleration [kW]	5.5	5.5	7.5
Actual accelera	ation/deceleration outp	out (Note 2) [kW]	6.6	6.6	9
Base rotation	Short-time	[r/min]	1500	1500	1500
speed	Continuous	[r/min]	2000	2000	2000
Max. rotation s	speed in constant outp	out range [r/min]	4500	4500	4500
Maximum rot	ation speed	[r/min]	10000	12000	10000
Continuous ra	ated torque	[N·m]	17.7	17.7	26.3
Motor inertia		[kg·m²]	0.0074	0.0074	0.013
Degree of protec	tion (The shaft-through po	ortion is excluded.)	IP54	IP54	IP54
	nsion drawing	[mm]	174 SQ.	174 SQ.	174 SQ.
			327	327	417
Flange fitting		[mm]	φ150	φ150	φ150
Shaft diameter	er	[mm]	ф28	φ28	φ28
Mass		[kg]	26	26	39
With leg			Possible	Possible	Possible

	Motor type	SJ-DJ7.5/120-01	SJ-DJ11/100-01	SJ-DJ15/80-01
	1-axis type MDS-E-SP-	160	160	200
	2-axis type MDS-E-SP2	16080(L)	16080(L)	_
Compatible drive unit	Multi-hybrid type MDS-EM-SPV3	100xx*	160xx*	200xx*
drive unit	Regenerative resistor type MDS-EJ-SP-	120	160	-
Output %ED rating Short-time ra Continuous ra		7.5 6 15.5 1500 2000 4500 12000 1500 2000 4500 17000 1700 1700 17000	16 12 8 7.5 1500 2000 4500 10000 rmin Short-time (15min)	150 2000 4000 8000 minin %ED rating (15%ED) Short-time (15min)
Standard outpu	ut during acceleration/deceleration [kW	7.5	11	15
	ation/deceleration output (Note 2) [kW		13.2	18
Base rotation	Short-time [r/min		1500	1500
speed	Continuous [r/min		2000	2000
Max. rotation s	speed in constant output range [r/min	4500	4500	4000
Maximum rot			10000	8000
Continuous ra	ated torque [N·m	26.3	35.8	52.5
Motor inertia	[kg·m²	0.013	0.023	0.031
Degree of protec	tion (The shaft-through portion is excluded.	IP54	IP54	IP54
Outline dimer	nsion drawing [mm	174 SQ.	204 SQ.	204 SQ.
(flange type)		417	439	489
Flange fitting	diameter [mm		φ180	φ180
Shaft diamete	er [mm		ф32	φ48
Mass	[kg		53	64
With leg		Possible	Possible	Possible

#### **■SJ-DL Series (Low-inertia specification)**

	Motor type	SJ-DL0.75/100-01	SJ-DL1.5/100-01	SJ-DL3.7/240-01T
	1-axis type MDS-E-SF	- 20	40	200
	2-axis type MDS-E-SF	2- 20	40	-
Compatible drive unit	Multi-hybrid type MDS-EM-SP	<del>-</del>	-	200xx*
unve unit	Regenerative resistor type MDS-EJ-S	P	-	-
Output Acceleration/ Short-time rai Continuous ra	ting 🖾 🗆 🗆	kW 1.5 1.0 0.9 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	1.5 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.0 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	15 15 15 15 15 15 15 15 15 15 15 15 15 1
Standard output	t during acceleration/deceleration [k	M) 0.9	1.5	15.0
	ation/deceleration output (Note 2) [k	4	1.8	18.0
	ase rotation speed [r/m	1	1500	3000
	peed in constant output range [r/m	1	10000	24000
Maximum rot			10000	24000
Continuous ra			4.77	4.8
Motor inertia	[kg·r	0.0011	0.0019	0.0024
Degree of protect	tion (The shaft-through portion is exclude		IP54	IP54
	nsion drawing [m	130 SQ.	130 SQ.	130 SQ.
Flange fitting	diameter [m	m]	φ110	φ110
Shaft diameter	er [m	2	ф22	ф22
Mass	[1	g] 10	14	17
With leg		Not possible	Not possible	Not possible

	Motor type	SJ-DL5.5/150-01T	SJ-DL5.5/200-01T	SJ-DL7.5/150-01T
	1-axis type MDS-E-SP-	160	160	160
	2-axis type MDS-E-SP2-	16080(L)	16080(L)	16080(L)
Compatible	Multi-hybrid type MDS-EM-SPV3-	160xx*	- T0000(L)	160xx*
drive unit	Regenerative resistor type MDS-EJ-SP-	-	-	-
Output Acceleration/ Short-time rat Continuous ra	Deceleration	kW 15 10 5.5 3,7 0 2500 3000 4200 15000 rmin Short-time (15min) (30min)	kW 15 10 11 5.5 3.7 5 0 15000 20000 2500 3000 4200	kW 15 10 7.5 5.5 5.5 5.5 0 1500 1800 8000 15000 r/min Short-time(30min)
Standard output	ut during acceleration/deceleration [kW]	11	11	11
	ation/deceleration output (Note 2) [kW]	13.2	13.2	13.2
	pase rotation speed [r/min]	2500	2500	1500
	speed in constant output range [r/min]	15000	20000	8000
Maximum rot		15000	20000	15000
Continuous ra	1	14.1	14.1	35.0
Motor inertia	[kg·m²]	0.0046	0.0046	0.016
	tion (The shaft-through portion is excluded.)	0.0046 IP54	IP54	0.016 IP54
Dograd or protect	The state arroady person to exceeded.	174 SQ.	174 SQ.	204 SQ.
(flange type)	nsion drawing [mm]	377	377	489
Flange fitting	diameter [mm]	φ150	φ150	φ180
Shaft diamete	er [mm]	ф28	ф28	ф32
Mass	[kg]	30	30	56
With leg		Not possible	Not possible	Not possible

<sup>\*</sup> Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

(Note 3) %ED is a load time ratio of operating time relative to a 10-minute cycle time. At 25%ED, for example, the operating time is 2.5 minutes and non-operation time is 7.5 minutes of a 10-minute cycle time.

<sup>\*</sup> Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### ■SJ-DL Series (Hollow shaft specifications)

Compatible drive unit   Compatible unit			-	
Compatible drive unit    2-axis type   MDS-E-SP2   MDS-EM-SPV3-		Motor type		SJ-DL5.5/200-01T-S
Multi-hybrid type   MDS-EM-SPV3		1-axis type	MDS-E-SP-	160
drive unit    Multi-hybrid type   MUS-EM-SPV3-	0	2-axis type	MDS-E-SP2-	16080(L)
Regenerative resistor type MDS-EJ-SP-  Output Acceleration/Deceleration		Multi-hybrid type	MDS-EM-SPV3-	-
Output Acceleration/Deceleration Short-time rating Continuous rating  Standard output during acceleration/deceleration [kW]  Standard output during acceleration/deceleration [kW]  Actual acceleration/deceleration output (Note 2) [kW]  13.2  Continuous base rotation speed [r/min]  Max. rotation speed in constant output range [r/min]  Maximum rotation speed [r/min]  Continuous rated torque [N·m]  Motor inertia [kg·m²]  Degree of protection (The shaft-through portion is excluded.)  Outline dimension drawing (flange type)  Flange fitting diameter [mm]  Shaft diameter [mm]  \$\phi 150  Output  \$\frac{15}{1500} \frac{33}{20000}  \$\frac{15000 20000}{15000 20000}  \$\frac{15000 20000}{15000 20000}  \$\frac{15000 20000}{15000 20000}  \$\frac{11}{11}  \$\frac{1}{1500} \frac{1}{1500} \frac{1}{1500}  \$\frac{1}{1500} \frac{1}{1500} \frac{1}{1500}  \$\frac{1}{1500} \frac{1}{1500} \frac{1}{1500} \frac{1}{1500}  \$\frac{1}{1500} \frac{1}{1500} \frac{1}{1500} \frac{1}{1500}  \$\frac{1}{1500} \frac{1}{1500}	unve unit		MDS-EJ-SP-	-
Actual acceleration/deceleration output (Note 2) [kW]  Continuous base rotation speed [r/min]  Max. rotation speed in constant output range [r/min]  Maximum rotation speed [r/min]  Continuous rated torque [N·m]  Motor inertia [kg·m²]  Degree of protection (The shaft-through portion is excluded.)  Outline dimension drawing (flange type)  Flange fitting diameter [mm]  Shaft diameter [mm]  \$\phi\$150  Shaft diameter [mm]  \$\phi\$22  Mass  [kg]  28	Acceleration/I Short-time rat	ting 🔲 [	<b>-</b>	15 10 11 10 5.5 3.7 5 0 15000 20000 2500 3000 4200 rmin
Continuous base rotation speed [r/min] 2500  Max. rotation speed in constant output range [r/min] 20000  Maximum rotation speed [r/min] 20000  Continuous rated torque [N·m] 14.1  Motor inertia [kg·m²] 0.0046  Degree of protection (The shaft-through portion is excluded.)  Outline dimension drawing (flange type)  Flange fitting diameter [mm] \$\phi\$150  Shaft diameter [mm] \$\phi\$22  Mass [kg] 28	Standard outpu	t during acceleration/d	leceleration [kW]	11
Max. rotation speed in constant output range [r/min] 20000  Maximum rotation speed [r/min] 20000  Continuous rated torque [N·m] 14.1  Motor inertia [kg·m²] 0.0046  Degree of protection (The shaft-through portion is excluded.) IP54  Outline dimension drawing (flange type) [mm]  Flange fitting diameter [mm] \$\phi\$150  Shaft diameter [mm] \$\phi\$22  Mass [kg] 28	Actual accelera	ation/deceleration outp	out (Note 2) [kW]	13.2
Max. rotation speed in constant output range [r/min] 20000  Maximum rotation speed [r/min] 20000  Continuous rated torque [N·m] 14.1  Motor inertia [kg·m²] 0.0046  Degree of protection (The shaft-through portion is excluded.) IP54  Outline dimension drawing (flange type) [mm]  Flange fitting diameter [mm] \$\phi\$150  Shaft diameter [mm] \$\phi\$22  Mass [kg] 28	Continuous b	ase rotation speed	[r/min]	2500
Continuous rated torque [N·m] 14.1  Motor inertia [kg·m²] 0.0046  Degree of protection (The shaft-through portion is excluded.)  IP54  Outline dimension drawing (flange type)  Flange fitting diameter [mm] \$\phi\$150  Shaft diameter [mm] \$\phi\$22  Mass [kg] 28			out range [r/min]	20000
Motor inertia [kg·m²] 0.0046  Degree of protection (The shaft-through portion is excluded.)  174 SQ.  Outline dimension drawing (flange type)  Flange fitting diameter [mm] \$\phi\$150  Shaft diameter [mm] \$\phi\$22  Mass [kg] 28	Maximum rota	ation speed	[r/min]	20000
Degree of protection (The shaft-through portion is excluded.)  IP54  174 SQ.  Outline dimension drawing (flange type)  Flange fitting diameter [mm]	Continuous ra	ated torque	[N·m]	14.1
Outline dimension drawing (flange type)  Flange fitting diameter [mm]	Motor inertia		[kg·m²]	0.0046
Outline dimension drawing (flange type)  Flange fitting diameter [mm]	Degree of protect	tion (The shaft-through po	ortion is excluded.)	IP54
Shaft diameter         [mm]         φ22           Mass         [kg]         28		nsion drawing	[mm]	
Mass [kg] 28	Flange fitting	diameter	[mm]	φ150
1 31	Shaft diameter	er	[mm]	φ22
	Mass		[kg]	28
	With leg			Not possible

## **■**SJ-V Series (Normal specification)

DRIVE SYSTEM

	Motor type	SJ-V2.2-01T	SJ-V3.7-02ZT	SJ-V15-01ZT
	1-axis type MDS-E-SP-	40	80	200
Compatible drive unit	2-axis type MDS-E-SP2-	40	80 16080(M)	-
	Multi-hybrid type MDS-EM-SPV3-	-	-	200xx*
Output Short-time rat Continuous ra		kW 6 4 2.2.2 1.500 6000 10000 rmin Short-time (15min)	kW 6 4 3.7 2.2 0 3000 12000 15000 rmin Short-time (15min)	kW 20 15 15 10 15 10 1500 4500 8000 rmin Short-time (30min)
Standard outpu	t during acceleration/deceleration [kW]	2.2	3.7	15
	ation/deceleration output (Note 2) [kW]	2.64	4.4	18
	ase rotation speed [r/min]	1500	3000	1500
Max. rotation s	peed in constant output range [r/min]	6000	12000	4500
Maximum rota	ation speed [r/min]	10000	15000	8000
Continuous ra	ated torque [N·m]	9.5	7.0	70
Motor inertia	[kg·m²]	0.00675	0.00675	0.0575
Degree of pro	tection	IP44	IP44	IP44
Outline dimer	nsion drawing [mm]	174 SQ.	174 SQ.	250 SQ.
(flange type)		300	300	469.5
Flange fitting	diameter [mm]	φ150	φ150	ф230
Shaft diamete	er [mm]	ф28	ф28	φ48
Mass	[kg]	25	25	110
With leg		Possible	Possible	Possible

## **■SJ-V Series (Normal specification)**

	Motor type		SJ-V15-09ZT	SJ-V18.5-01ZT	SJ-V18.5-04ZT	SJ-V22-01ZT
0	1-axis type	MDS-E-SP-	200	200	240	240
Compatible drive unit	2-axis type	MDS-E-SP2-	_	-	-	-
arive unit	Multi-hybrid type	MDS-EM-SPV3-	200xx	200xx	-	-
Output Short-time rat Continuous ra			kW 20 15 15 10 50 6000 8000 rmin Short-time (30min)	kW 20 15 18.5 10 1500 4500 8000 rmin Short-time (30min)	15 10 1500 6000 8000 rmin Short-time (30min)	kW 30 22 21 18.5 10 1500 4500 8000 rmin Short-time (30min)
Standard outpu	t during acceleration/d	deceleration [kW]	15	18.5	18.5	22
Actual accelera	ation/deceleration outp	out (Note 2) [kW]	18	22.2	22.2	26.4
Continuous b	ase rotation speed	[r/min]	1500	1500	1500	1500
Max. rotation s	peed in constant outp	out range [r/min]	6000	4500	6000	4500
Maximum rota	ation speed	[r/min]	8000	8000	8000	8000
Continuous ra	ated torque	[N·m]	70	95.5	95.5	118
Motor inertia		[kg·m²]	0.0575	0.0575	0.0575	0.08
Degree of pro	otection		IP44	IP44	IP44	IP44
Outline dimer	nsion drawing	, ,	250 SQ.	250 SQ.	250 SQ.	250 SQ.
(flange type)		[mm]	469.5	469.5	469.5	539.5
Flange fitting	diameter	[mm]	φ230	ф230	ф230	ф230
Shaft diamete	er	[mm]	φ48	ф48	ф48	ф55
Mass		[kg]	110	110	110	135
With leg			Possible	Possible	Possible	Possible

	Motor type		SJ-V22-04ZT	SJ-V22-06ZT	SJ-V26-01ZT	SJ-V37-01ZT
Composible	1-axis type	MDS-E-SP-	320	240	320	400
Compatible drive unit	2-axis type	MDS-E-SP2-	-	-	-	-
unve unit	Multi-hybrid type	MDS-EM-SPV3-	-	-	-	-
Output Short-time ra Continuous ra			8W 30 22 20 18.5 10 1500 6000 8000 rmin	15 15 10 1500 9500 10000 rmin	kW 30 26 20 10 1500 6000 8000 rmin	kW 60 40 37 20 31 1150 3450 6000 rmin
			Short-time (30min)	Short-time (30min)	Short-time (30min)	Short-time (30min)
Standard outpu	it during acceleration/d	leceleration [kW]	22	15	26	37
Actual accelera	ation/deceleration outp	out (Note 2) [kW]	26.4	18	31.2	44.4
Continuous b	ase rotation speed	[r/min]	1500	1500	1500	1150
Max. rotation s	peed in constant outp	out range [r/min]	6000	9500	6000	3450
Maximum rot	ation speed	[r/min]	8000	10000	8000	6000
Continuous ra	ated torque	[N·m]	118	70.0	140	249
Motor inertia		[kg·m²]	0.08	0.0575	0.0925	0.34
Degree of pro	otection		IP44	IP44	IP44	IP44
	nsion drawing	[mm]	250 SQ.	250 SQ.	250 SQ.	320 SQ.
(flange type)			539.5	469.5	585.5	
Flange fitting	diameter	[mm]	ф230	ф230	ф230	ф300
Shaft diamete	er	[mm]	ф55	ф48	φ55	ф60
Mass		[kg]	135	110	155	300
With leg			Possible	Possible	Possible	Possible

<sup>\*</sup> Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

<sup>\*</sup> Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

## **■SJ-V Series (Normal specification)**

1-axis type   MDS-E-SP.   640   640						
Compatible drive unit   2-axis type   MDS-E-SP2-   -   -   -     -		Motor type		SJ-V45-01ZT	SJ-V55-01ZT	
Actual acceleration/deceleration output (Note 2) [kW]   Actual acceleration/deceleration/deceleration (note 3)   Actual acceleration/deceleration	Compatible			640	640	
Output Short-time rating Continuous rating  Standard output during acceleration/deceleration [kW] Actual acceleration/deceleration output (Note 2) [kW] Actual acceleration/deceleration [kW] Actual acceleration [kW] Actu				_	-	
Continuous rating	unve unit	Multi-hybrid type	MDS-EM-SPV3-	_	_	
Standard output during acceleration/deceleration [kW]	Short-time rat			45 40 45 45 0 1500 4500 6000 rmin	60 40 45 45 20 0 1150 3450 4500 rmin	
Actual acceleration/deceleration output (Note 2) [kW] 54 66  Continuous base rotation speed [r/min] 1500 1150  Max. rotation speed in constant output range [r/min] 4500 3450  Maximum rotation speed [r/min] 6000 4500  Continuous rated torque [N·m] 236 374  Motor inertia [kg·m²] 0.34 0.8475  Degree of protection IP44 IP44  Outline dimension drawing (flange type) [mm] 700  Flange fitting diameter [mm] \$300 \$450  Shaft diameter [mm] \$60 \$675  Mass [kg] 300 450	Standard output	t during acceleration/d	ecoloration [kW/]	· , , , —	· '-	
Continuous base rotation speed   (r/min   1500   1150						
Max. rotation speed in constant output range [r/min]         4500         3450           Maximum rotation speed         [r/min]         6000         4500           Continuous rated torque         [N·m]         236         374           Motor inertia         [kg·m²]         0.34         0.8475           Degree of protection         IP44         IP44           Outline dimension drawing (flange type)         [mm]         700           Flange fitting diameter         [mm]         \$300         \$450           Shaft diameter         [mm]         \$60         \$75           Mass         [kg]         300         450						
Maximum rotation speed         [r/min]         6000         4500           Continuous rated torque         [N·m]         236         374           Motor inertia         [kg·m²]         0.34         0.8475           Degree of protection         IP44         IP44           Outline dimension drawing (flange type)         [mm]         320 SQ.         480 SQ.           700         724         724           Flange fitting diameter         [mm]         \$300         \$450           Shaft diameter         [mm]         \$60         \$75           Mass         [kg]         300         450						
Continuous rated torque         [N·m]         236         374           Motor inertia         [kg·m²]         0.34         0.8475           Degree of protection         IP44         IP44           Outline dimension drawing (flange type)         [mm]         320 SQ.         480 SQ.           724         724         724           Flange fitting diameter         [mm]         \$300         \$450           Shaft diameter         [mm]         \$60         \$75           Mass         [kg]         300         450						
Motor inertia         [kg·m²]         0.34         0.8475           Degree of protection         IP44         IP44           Outline dimension drawing (flange type)         [mm]         700           Flange fitting diameter         [mm]         \$300         \$450           Shaft diameter         [mm]         \$60         \$75           Mass         [kg]         300         450				236	374	
Outline dimension drawing (flange type)  Flange fitting diameter [mm]				0.34	0.8475	
Outline dimension drawing (flange type)         [mm]           700         724           Flange fitting diameter         [mm]         \$300         \$450           Shaft diameter         [mm]         \$60         \$75           Mass         [kg]         300         450	Degree of pro	tection		IP44	IP44	
Too		ision drawing	[mm]	320 SQ.		
Shaft diameter         [mm]         \$60         \$675           Mass         [kg]         300         450	(flange type)			700		
Mass [kg] 300 450	Flange fitting	diameter	[mm]	ф300	ф450	
1 31		er			'	
With leg Possible Possible			[kg]	300	450	
	With leg			Possible	Possible	

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination. (Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

## ■SJ-V Series (Wide range constant output specification)

	Motor type		SJ-V11-01T	SJ-V11-09T	SJ-V15-03T	SJ-V18.5-03T
	1-axis type	MDS-E-SP-	160	160	200	240
Compatible	' 12-axis type MDS-E-SP2-1		16080(L)	16080(L)	-	-
drive unit	Multi-hybrid type	MDS-EM-SPV3-	160xx*	160xx*	200xx*	-
Output Short-time rating Continuous rating			kW 15 10 5.5 5.5 0 750 6000 rmin	kW 15 10 7.5 5 5 0 6000 rmin	kW 15 10 9	kW 15 10 9 9 750 6000 rmin
			Short-time (30min)	Short-time (30min)	Short-time (30min)	Short-time (30min)
	t during acceleration/o		5.5	7.5	9	11
	ation/deceleration outp	, ,, ,	6.6	9	10.8	13.2
	ase rotation speed	[r/min]	750	750 750		750
	peed in constant out		6000	6000 6000		6000
Maximum rota	ation speed	[r/min]	6000	6000 6000		6000
Continuous ra	ated torque	[N·m]	47.1	70.0	95.5	115
Motor inertia		[kg·m²]	0.03	0.0575 0.0575		0.08
Degree of pro	otection		IP44	IP44 IP44		IP44
Outline dimer	nsion drawing	[mm]	204 SQ.	250 SQ.	250 SQ.	250 SQ.
(flange type)		490	469.5	469.5	539.5	
Flange fitting	Flange fitting diameter [mm]		φ180	ф230	φ230	ф230
Shaft diamete	er	[mm]	φ48	ф48	ф48	ф55
Mass		[kg]	70	110	110	135
With leg			Possible	Possible	Possible	Possible

Motor type			SJ-V22-05T SJ-V22-09T		SJ-VK2	2-19ZT
0	1-axis type	MDS-E-SP-	320	320	32	0
Compatible drive unit 2-axis type MDS-E-SP2-				_		
unve unit	Multi-hybrid type	e MDS-EM-SPV3-	-	-	-	
Output Short-time rat Continuous ra			20 15 10 750 6000 rmin	kW 30 20 18.5 10 15 15 15 15 15 15 15 15 15 15 15 15 15	20 18.5 13 10 0 330 400 750 rmin	22 18.5 10 575 3450 600 rm
0		(1 1 2 7147	Short-time (30min)	Short-time (30min)	Short-time (10min) (15min)	Short-time (30min)
	t during acceleration		15	18.5	18.5	22
	ation/deceleration ou		18	22.2	22.2	26.4
	ase rotation spee		750	600	400	575
	speed in constant or		6000	3500	750	3450
Maximum rota		[r/min]	6000	4500	750	6000
Continuous ra	ated torque	[N·m]	140	239	310	307
Motor inertia		[kg·m²]	0.08	0.308	0.3	
Degree of pro	otection		IP44	IP44	IP44	
Outline dimer	nsion drawing	[mm]	250 SQ.	320 SQ.	320	SG.
(margo type)			539.5	631	700	
Flange fitting diameter [mm]		φ230	ф300	ф30	00	
Shaft diamete	er	[mm]	ф55	φ60	ф6	
Mass		[kg]	135	280	30	0
With leg		Possible	Possible	Possible		

<sup>\*</sup> Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### **■SJ-VL Series (Low-inertia specification)**

	Motor type		SJ-VL2.2-02ZT	SJ-VL11-02FZT	SJ-VL11-05FZT-S01 *1	SJ-VL18.5-05FZT
	1-axis type	MDS-E-SP-	40	160	160	240
Compatible	2-axis type	MDS-E-SP-	40	16080(L)	16080(L)	240
drive unit	Multi-hybrid type	MDS-EM-SPV3-	-	16000(L)	160xx*1*2	
	Multi-riyona type	MIDS-EINI-SPV3-	-	kW		-
Output Acceleration/Deceleration Short-time rating Continuous rating		2 2 1 1 0 3000 15000 rmin	15 10 11 11 15 10 15 15 10 15 15 10 10 10 10 10 10 10 10 10 10 10 10 10	kW 15 11 10 5 1.5 0 5000 18000 cmin	20 18.5 3.7 10 3000 5000 15000 rmin	
			Short-time (15min)	Short-time (15min)	Short-time (10min)	Short-time (5min) ∑(15min)
Standard outpu	t during acceleration/d	deceleration [kW]	2.2	11	11	18.5
Actual accelera	tion/deceleration outp	out (Note 2) [kW]	2.6	13.2	13.2	22.2
Continuous b	ase rotation speed	[r/min]	3000	1500	5000	3000
Max. rotation s	peed in constant outp	out range [r/min]	15000	15000	20000	15000
Maximum rota	ation speed	[r/min]	15000	15000	20000	15000
Continuous ra	ated torque	[N·m]	4.77	14.0	2.9	7.0
Motor inertia		[kg·m²]	0.0024	0.003	0.0024	0.00525
Degree of pro	tection		IP44	IP44	IP44	IP44
Outline dimer (flange type)	Outline dimension drawing [mm]		130 SQ.	174 SQ.	130 SQ.	174 SQ.
Flange fitting diameter [mm] Shaft diameter [mm]		¢110			ø150	
	er		φ22	φ28 42	φ22 20	φ28
Mass		[kg]	20	·=		40
With leg			Not possible	Not possible	Not possible	Not possible

<sup>\*</sup> Refer to "MDS-EM/EMH Series Multi-hybrid drive" in this book for compatible drive unit type.

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination. (Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

## **DRIVE SYSTEM BUILT-IN SPINDLE MOTOR 200V**

#### **■SJ-BG Series**

Motor type (Note 1)	SJ-BG090A/300-01 ☐(R)	SJ-BG090B/300-03	SJ-BG090D/300-03	SJ-BG110F/240-01
Compatible drive unit MDS-E-SP-	20	40	160	80
Output Acceleration/Deceleration  %ED rating  Continuous rating	2.0 1.5 1.1 1.0 0.75 0 7340 125000 30000 8400 10000 96ED rating(15%ED) (25%ED) (40%ED)	kW 2.0 1.5 1.0 0.5 0.00 6000 24000 30000 r/min %ED rating(10%ED) \( (40%ED) \( \)	kW 10 8 5.5 4 12000 14500 30000 r/min %ED rating(10%ED) (25%ED)  (25%ED)	kW 6 4 2 3000 1 5500 24000 3500 r/min %ED rating(15%ED)⊠ (40%ED) ☐
Standard output during acceleration/deceleration [kW]	1.5	1.5	9.0	5.5
Actual acceleration/deceleration output (Note 4) [kW]	1.8	1.8	10.8	6.6
Continuous base rotation speed [r/min]	8400	6000	6000 12000	
Maximum rotation speed [r/min]	30000	30000 30000		24000
Continuous rated torque [N·m]	0.85	1.91 4.38		9.5
Rotor inertia [kg·m²]	0.00021	0.0004 0.0008		0.0026
Outline dimension [mm] drawing	### ### ##############################	(Note 2)	(2 2) (Note 2) (Note 2) (Note 2)	(Note 2)
Mass Stator [kg]	0.7	1.2	2.6	7.4
Rotor [kg]	0.4	0.7	1.4	3.2

	0.1.704004	200 of (D)	SJ-BG120C/200-01 (R)	0100150045004
Motor type (Note 1)		SJ-BG120A/200-01 ☐(R)		SJ-BG150D/150-01
Compatible drive unit MDS-E-SP-	80		80	80
Output Acceleration/Deceleration  %ED rating Continuous rating	kW Low-speed coil kW High-speed coil 6 5.5 4 3.7 4 2 3.7 3.7 2 1.5 0 5500 16000 20000 7200 1/min 8100 r/min 8100 r/min 8200 150000 15000 15000 15000 15000 15000 15000 15000 15000 15000 15000 1		kW 6 4 3.7 2 2 2 0 1900 12000 20000 2500 r/min %ED rating(15%ED)	6 4 3.7 2 5.5 0 2500 7500 15000 r/min %ED rating(40%ED)
Standard output during acceleration/deceleration [kW]	%ED rating(10%ED)() (	15%ED) (40%ED) 5.5	(40%ED)	5.5
Actual acceleration/deceleration output (Note 4) [kW]	4.4	6.6 4.4		6.6
Continuous base rotation speed [r/min]	2500	5500	2500	2500
Maximum rotation speed [r/min]	15000	20000	20000	15000
Continuous rated torque [N·m]	5.7	2.6	8.4	14.1
Rotor inertia [kg·m²]	0.0014		0.0027	0.0057
notor mertia [kg·m]	0.0014		0.0027	0.0057
Outline dimension [mm] drawing	135	φ719.5(Note 2)	\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	(Note 2)
Mass Stator [kg]	3.	0	5.9	8.1
Rotor [kg]	1.	3	2.5	3.7

<sup>\*1</sup> The acceleration/deceleration frequency is limited by the regenerative resistor.

<sup>\*2</sup> The maximum rotation speed is 15000r/min.

<sup>(</sup>Note 1) Please contact your Mitsubishi Electric dealer for the special products not listed above.
(Note 2) These dimensions are the dimensions after machine machining.
(Note 3) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

<sup>(</sup>Note 4) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### **■SJ-BG Series**

Moto	r type (Note 1)			SJ-BG160B/150-01 (R)		SJ-BG160D/150-01 (R)	SJ-BG160D/150-02 (R)
Compatible di	rive unit MDS-E	E-SP-	40	80	160	80	160
Output Acceleration/Dec %ED rating Continuous ra	⊠⊟		kW 6 4 2 2 2 2 2 2 2 0 3500 10000 15000 r/min %ED rating(40%ED)	kW 6 4 3.7 2 2 2 0 1300 1500 15000 r/min %ED rating(40%ED)	kW 9 7.5 3 3 3 3 3 3 3 1450   6100 15000 1770   5590 r/min 2230 4100 %ED rating(10%ED)	6 4 3.7 2 0 1500 4500 15000 r/min %ED rating(40%ED)	kW 15 7.5. 0 3.7 1500 6660 15000 1700 8000 r/min 2000 11000 %ED rating(15%ED)
Standard output dur	ring acceleration/deceler	ration [kW]	3.7	3.7	(20%ED)⊟(40%ED) ☐ 7.5	5.5	(40%ED)
	/deceleration output (No	- ' '	4.44	4.44	9	6.6	9
		[r/min]	3500	1300	1770	1500	1500
Maximum rota		[r/min]	15000	15000	15000	15000	15000
Continuous ra		[N·m]	6.0	16.2	20.0	23.6	23.6
Rotor inertia	<u> </u>	[kg·m²]	0.005(0.0042)	0.005(0.0042)	0.005(0.0042)	0.0075(0.0061)	0.0075(0.0061)
Outline dimer drawing		[mm]	, ,	• 600 Note 5)		φοσ(Note 2) (φ70)(Note 5) (+159.5(Note 2)	φο()(Note 5) φ159.5(Note 5)
Mass	Stator	[kg]	7.1	7.1	7.1	10.0	11.0
IVIASS	Rotor	[kg]	2.9(2.3)	2.9(2.3)	2.9(2.3)	4.3(3.3)	4.3(3.3)

Motor type (Note 1)	SJ-BG180I	B/150-01 🗌	SJ-BG180I	D/150-01
Compatible drive unit MDS-E-SP-	40	00	40	00
Output Acceleration/Deceleration %ED rating Continuous rating	Low-speed coil    Now-speed coil   Now-s	kW 36 27 18.5 19.0 12700 t/min 12700 t/min (10%ED)[S]*1 (15%ED)[S]*1		High-speed coil  kW 36 27 18 9 0 6500 15000 r/min  %ED rating (25%ED) (40%ED)
Standard output during acceleration/deceleration [kW]	18.5	30	22	30
Actual acceleration/deceleration output (Note 4) [kW]	22.2	36	26.4	36
Continuous base rotation speed [r/min]	2300	6000	2000	6500
Maximum rotation speed [r/min]	6000	15000	6000	15000
Continuous rated torque [N·m]	45.7	29.4	71.6	32.3
Rotor inertia [kg·m²]	0.0	)12	0.0	)18
Outline dimension [mm] drawing	212 \(\hat{\chi}\) \(		475(Note 2) 475.5(Note 2)	
Mass Stator [kg]		4	2	
Rotor [kg]	5	.1	8	.0

<sup>\*1</sup> The cycle times for 10%ED rating, 15%ED rating, and 25%ED rating (Low-speed coil) are 5 minutes.

#### **■SJ-BG Series**

Motor	type (Note 1)	SJ-BG180I	F/150-01 🗌	SJ-BG180H/150-01		
Compatible dri	ve unit MDS-E-SP-	32	20	40	00	
Output Acceleration/Deceleration %ED rating Continuous rating		Low-speed coil    KW   40   30   37   30   30   30   30   30   3		Low-speed coil  kW 40 30 26 30 18.5 10 0 950 0 12810 300 1670 6000 1300 1670 6000 17	High-speed coil  kW 40 30 37 30 20 10 0 5500 9000 15000 7500 11000 r/min  %ED rating (25%ED) (40%ED)	
Standard output durin	ng acceleration/deceleration [kW]	22	37	26	37	
Actual acceleration/d	eceleration output (Note 4) [kW]	26.4	44.4	31.2	44.4	
Continuous base	rotation speed [r/min]	1650	5700	1300	5500	
Maximum rota	tion speed [r/min]	4000	15000 6000		15000	
Continuous rat	ted torque [N·m]	86.8	36.9	110	45.1	
Rotor inertia	[kg·m²]	0.0	023	0.0	029	
Outline dimension [mm]		322	φ179.5(Nate 2)	37	475(Note 2)	
Mass	Stator [kg]	2			3	
ividos	Rotor [kg]	1	0	1	2	

Matertine (Note 1)	C I DC040I	1/100 01	C I BC2001	1 /000 01	
Motor type (Note 1)  Compatible drive unit MDS-E-SP-	SJ-BG240H		SJ-BG300L/080-01 ☐ 640		
Compatible drive unit   MDS-E-SP-	400		Low-speed coil	High-speed coil	
Output Acceleration/Deceleration %ED rating Continuous rating	Low-speed coil  kW 50 40 30 20 118.5 0 485 601 1300 1500 2000 485 607 1100 1500 1600 1700 1700 1700 1700 1700 1700 17	High-speed coil  kW 50 40 40 30 20 10 2500 6600 10000 r/min  %ED rating (25%ED) 1 (40%ED)	10%-speed Coll    Collaboration   Collaboratio	Ngri-speed Coli   Ngri-speed Coli   Ngri-speed Coli   Ngri-speed Coli   Ngri-speed Coli   400	
Standard output during acceleration/deceleration [kW]	30	45	37	55	
Actual acceleration/deceleration output (Note 4) [kW]	36	54	44.4	66	
Continuous base rotation speed [r/min]	700	2500	350	1800	
Maximum rotation speed [r/min]	2000	10000	1500	8000	
Continuous rated torque [N·m]	252	99.3	600	196	
Rotor inertia [kg·m²]	0.	14	0.	48	
Outline dimension [mm] drawing	4	\$6000000000000000000000000000000000000	5	4299.5(Note 2)	
Mass Stator [kg]	6		10	07	
Rotor [kg]	3	2	6	63	

<sup>\*1</sup> The cycle times for 10%ED rating, 15%ED rating, 25%ED rating (Low-speed coil), and 25%ED rating (High-speed coil) are 5 minutes.

(Note 1) Please contact your Mitsubishi Electric dealer for the special products not listed above.

<sup>(</sup>Note 1) Please contact your Mitsubishi Electric dealer for the special products not listed above.

<sup>(</sup>Note 2) These dimensions are the dimensions after machine machining.
(Note 3) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

<sup>(</sup>Note 4) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output". (Note 5) A value in brackets is for the motor type which have (R) in the end of the type name.

<sup>(</sup>Note 2) These dimensions are the dimensions after machine machining.

(Note 3) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 4) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### **■SJ-B Series**

Motor type (Note 1)	SJ-2B4002T	SJ-2B4004T	SJ-2B4003T
Compatible drive unit MDS-E-SP-	20	40	40
Output  Acceleration/Deceleration Short-time rating  Continuous rating	0.9 0.6 0.4 0.3 0 3000 10000 17/min Short-time (15min)	kW 3 2 1.5 1 0 3000 15000 //min Short-time (15min)	kW  3  2.2  1.5  1.5  0  3000  12000  r/min  Short-time (15min)
Standard output during acceleration/deceleration [kW]	0.75	1.5	2.2
Actual acceleration/deceleration output (Note 4) [kW]	0.9	1.8	2.64
Continuous base rotation speed [r/min]	3000	3000	3000
Maximum rotation speed [r/min]	10000	15000	12000
Continuous rated torque [N·m]	1.27	2.39	4.77
Rotor inertia [kg·m²]	0.00078	0.00078	0.00138
Outline dimension [mm] drawing	(Note 2)	(2 109.5(Note 2)	010 5(Note 2)
Mass Stator [kg]	2.2	2.2	3.9
Rotor [kg]	0.9	0.9	1.7

Motor type (Note 1) SJ-2B4501TK		SJ-2B6611TK		SJ-2B4502TK			
Compatible drive unit MDS-E-SP-	20	0	2	00	3	320	
Output Acceleration Short-time rating Continuous rating	18 15	18 15 12 11 11 11 11 11 11 11 11 11 11 11 11	18	High-speed coil 15 12 15 15 16 17.5 6 10 1030 4200 7/min	kW Low-speed coil 30 20 11 10 525 1050 3000 frimi	n 2100 r/min	
	Short-time	(30min) 🔲	Short-time (15m	in) (30min)	Short-time	e (30min)	
Standard output during acceleration/deceleration [kW]	15	15	11	15	22	22	
Actual acceleration/deceleration output (Note 4) [kW]	18	18	13.2	18	26.4	26.4	
Continuous base rotation speed [r/min]	700	1320	500	1030	525	1050	
Maximum rotation speed [r/min]	2250	10000	1500	6000	3000	10000	
Continuous rated torque [N·m]	102	54.3	143	69.5	136	68.2	
Rotor inertia [kg·m²]	0.0	08	0.1	102	0.	105	
Outline dimension [mm] drawing	320	φ229.5 (Note 2)	320	φ254.5 (Note 2)	388	φ229.5 (Note 2)	
Mass Stator [kg]	25			7		37	
Rotor [kg]	18	3	1	9		24	

(Note 1) Please contact your Mitsubishi Electric dealer for the special products not listed above.
(Note 2) These dimensions are the dimensions after machine machining.
(Note 3) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.
(Note 4) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

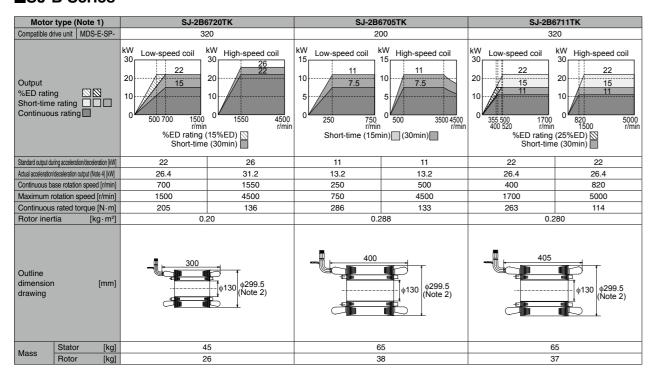
#### **■SJ-B Series**

Motor type (Note 1)	SJ-2B6	602TK	SJ-2B4	1601TK	SJ-2B	6605TK
Compatible drive unit   MDS-E-SP-	32	20	32	20	240	
Output Acceleration/Deceleration Short-time rating Continuous rating	20 15	W High-speed coil 30 22 22 15 10 1193 5500 8000 17/min (30min)	30 26 20 20 20 10 0 1250 3500 r/min	High-speed coil 30 26 22 22 20 3000 10000 1/min (30min)	18 15 15 12 6 440 1000 1500 r/mi	kW High-speed coil 18 12 15 10 1000 4000 6000 17min
Standard output during acceleration/deceleration [kW]	15	22	26	26	15	15
Actual acceleration/deceleration output (Note 4) [kW]	18	26.4	31.2	31.2	18	18
Continuous base rotation speed [r/min]	550	1193	1250	3000	440	1000
Maximum rotation speed [r/min]	2000	8000	3500	10000	1500	6000
Continuous rated torque [N·m]	191	88.0	168	70.0	239	105
Rotor inertia [kg·m²]	0.1	33	0.1	0.105		173
Outline dimension [mm] drawing	380	φ110 φ254.5 (Note 2)	380	φ95 φ254.5 (Note 2)	440	φ254.5 (Note 2)
Mass Stator [kg]	4	9	5	5	6	3
Rotor [kg]	2	5	2	4	3	33

Motor type (Note 1)	SJ-2B4	503TK	SJ-2B6	6603TK	SJ-2B4	1602TK	
Compatible drive unit   MDS-E-SP-	32	20	32	20	32	20	
Output  %ED rating  Short-time rating  Continuous rating	30 20 15 20 15		kW Low-speed coil 30		kW Low-speed coil 30 High-speed coil 30 22 22 18.5 10 10 1500 7000 10000 1700		
Standard output during acceleration/deceleration [kW]	15	22	22	22	22	22	
ctual acceleration/deceleration output (Note 4) [kW]	18	26.4	26.4	26.4	26.4	26.4	
Continuous base rotation speed [r/min]	475	1250	600	1200	720	1500	
Maximum rotation speed [r/min]	2000	10000	1500	6000	2000	10000	
Continuous rated torque [N·m]	221	115	239	119	245	118	
Rotor inertia [kg·m²]	0.1	35	0.1	173	0.1	245 118 0.135	
Outline dimension [mm] drawing	445	\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	445	\$\displays{\pi} \phi \displays{254.5} \\ \(\text{(Note 2)}\)	440	\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
					1		

(Note 1) Please contact your Mitsubishi Electric dealer for the special products not listed above.
(Note 2) These dimensions are the dimensions after machine machining.
(Note 3) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.
(Note 4) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### **■SJ-B Series**



Motor type (Note 1)	SJ-2B67	706TK	SJ-2B6	5721TK	SJ-2B	6704TK
Compatible drive unit MDS-E-SP-	400	0	32	20	3	20
Output Acceleration/Deceleration  %ED rating Short-time rating Continuous rating	36 24 26 21 18.5 26 27	30 24 18.5 20 1080 1750 (min	w-speed coil 36 24 12 0 500 1500 Short-time	kW High-speed coil 36 30 24 22 22 20 1500 3000 6000 r/min (30min)		kW High-speed coil 36 24 12 0 0 1000 3000 6000 r/min ED) (40%ED) (30min)
Standard output during acceleration/deceleration [kW]	26	30	22	30	22	30
Actual acceleration/deceleration output (Note 4) [kW]	31.2	36	26.4	36	26.4	36
Continuous base rotation speed [r/min]	450	1080	500	1500	475	1000
Maximum rotation speed [r/min]	2000	6000	1500	6000	1150	6000
Continuous rated torque [N·m]	318	133	353	140	302	175
Rotor inertia [kg·m²]	0.28	38	0.2	283	0.37	
Outline dimension [mm] drawing	405	φ299.5 (Note 2)	390	φ299.5 (Note 2)	470	φ299.5 (Note 2)
Mass Stator [kg]	65			0		83
Rotor [kg]	38		3	5		49

(Note 1) Please contact your Mitsubishi Electric dealer for the special products not listed above.

(Note 3) These dimensions are the dimensions after machine machining.

(Note 3) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 4) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### **■SJ-B Series**

Motor type	(Note 1)	SJ-2B6	5709TK	SJ-2B6	6905TK	SJ-2B	SJ-2B6908TK	
Compatible drive unit	MDS-E-SP-	40	00	32	20	320		
Output %ED rating Short-time rating Continuous ratir		24 22 15 15 150 1500 17min web 20 150 1500 1500 17min web 20 1500 1500 1500 17min web 20 1500 1500 1500 1500 1500 1500 1500 1	kW High-speed coil 36 30 24 12 22 20 1000 3000 6000 r/min (25%ED) 6 (30min)	30 26 20 22 10 420 1500 17/mir	kW High-speed coil 30 26 22 22 20 10 1000 4000 7/min (30min)	24 22 15 10 1000 1775 500 1000 1775 1000 1000	kW High-speed coil 36 22 24 12 0 450 1500 3300 r/min (50%ED)	
Standard output during acceler	ation/deceleration [kW]	22	30	26	26	22	30	
Actual acceleration/deceleration	n output (Note 4) [kW]	26.4	36	31.2	31.2	26.4	36	
Continuous base rotat	ion speed [r/min]	350	1000	420	1000	175	450	
Maximum rotation	speed [r/min]	1500	6000	1500	4000	1000	3300	
Continuous rated	torque [N·m]	409	210	500	210	819	467	
Rotor inertia	[kg·m²]	0.3	37	0.0	353	1.1	105	
Outline dimension drawing	[mm]	450	φ130 (Note 2)	465	\$4165 (Note 2)	54	φ369.5 (Note 2)	
Mass		8			10		43	
Roto	r [kg]	4	9	7	0	9	91	

Motor type (Note 1)	SJ-2B6	906TK	SJ-2B6	914TK		
Compatible drive unit MDS-E-SP-	40	00	640			
Output Acceleration/Deceleration  Short-time rating  Continuous rating	kW Low-speed coil 45 30 22 15 0 175 680 1000 r/min Short-time	kW High-speed coil 45 30 37 30 15 0 600 1800 3300 r/min	36 30 24 25 4	W High-speed coil 10 45 25 10 470 2100 3150 330 1700 (30min)		
Standard output during acceleration/deceleration [kW]	22	37	30	45		
Actual acceleration/deceleration output (Note 4) [kW]	26.4	44.4	36	54		
Continuous base rotation speed [r/min]	175	600	240	470		
Maximum rotation speed [r/min]	1000	3300	1000	3300		
Continuous rated torque [N·m]	819	477	995	508		
Rotor inertia [kg·m²]	1.1	05	1.1	1.105		
Outline dimension [mm] drawing	555	6165 (Note 2)	520	\$\delta   \delta   \qu		
Mass Stator [kg]	14		14	13		

(Note 1) Please contact your Mitsubishi Electric dealer for the special products not listed above.

(Note 3) These dimensions are the dimensions after machine machining.

(Note 3) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 4) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

#### **■SJ-PMB Series**

Motor type (Note 1)	SJ-PMB02215T-02	SJ-PMB0	4412T-B0	SJ-PMB1	14007T-01
Compatible drive unit MDS-E-SP-	240	20	00	32	20
Output %ED rating SDD Continuous rating	kW 9 6	7.5 6 7.5 3 3 3000 1/min	High-speed coil  9 7.5 6 5.5 3 0 3000 8000 r/min (25%ED)	18	High-speed coil  18 15 12 6 0 1800 6000 r/min (15%ED)
Standard output during acceleration/deceleration [kW]	5.5	7.5	7.5	15	15
Actual acceleration/deceleration output (Note 4) [kW]	6.6	9	9	18	18
Continuous base rotation speed [r/min]	1500	1200	3000	750	1800
Maximum rotation speed [r/min]	10000	3000	8000	1800	6000
Continuous rated torque [N·m]	22.3	43.8	17.5	140	58.4
Rotor inertia [kg·m²]	0.006	0.0	162	0.0	633
Outline dimension [mm] drawing	150 160 \phi139.5	225	]   \$\phi 70.6	250	φ95 φ254.5
Mass Stator [kg]	4.4	14			30
Rotor [kg]	3.7	8	.0	1	5

(Note 1) Please contact your Mitsubishi Electric dealer for the special products not listed above.

(Note 2) These dimensions are the dimensions after machine machining.

(Note 3) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 4) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

## **DRIVE SYSTEM TOOL SPINDLE MOTOR 200V**

#### **■**HG Series

				HG Series	
N	Notor type			HG□-D47	
			HG46	HG56	HG96
	1-axis type	MDS-E-SP-	20	20	20
	2-axis type	MDS-E-SP2-	20	20	20
	Regenerative resistor type	MDS-EJ-SP-	20	20	20
		[N·m] 8 ·····			
Output Rated torque		6 4	2.5	5.0	7.2
Max. torque		2 0	0.64	0.8	1.43
Rated output		[kW]	0.4	0.5	0.9
Max. rotation speed	d	[r/min]	6000	6000	6000
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	0.234	0.379	1.27
Degree of protection (The connector portion and bro			IP67	IP67	IP67
Outline dimension	drawing	[mm]	60SQ.	60SQ. 138.9	80SQ.
Flange fitting diame	eter	[mm] [mm]	φ50 φ14	φ50 φ14	φ70 φ19
Mass		[kg]	1.2	1.6	2.9

#### **■**HG-JR Series

	Matertune	HG-JR Series				
	Motor type	HG-JR73	HG-JR153			
	1-axis type MDS-E-SP-	40	80			
Compatible	2-axis type MDS-E-SP2-	40	80			
drive unit	Regenerative resistor type MDS-EJ-SP-	40	80			
	[N·m] 15					
			14.3			
Output	10	7.2				
	<u>□</u> 5	7.2	4.8			
Max. torque		2.4				
	0					
Rated output	[kW]	0.75	1.5			
Max. rotation spe		8000	8000			
Motor inertia	[×10-4kg·m²]	2.09	3.79			
Degree of protection	(The shaft-through portion is excluded.)	IP67	IP67			
		9050.	90SQ.			
Outline dimension	on drawing [mm]	145.5	199.5			
Flange fitting dia	meter [mm]	φ80	ф80			
Shaft diameter	[mm]	φ16	φ16			
Mass	[kg]	3.7	5.9			

(Note 1) The above characteristics values are representative values. The maximum current and maximum torque are the values when combined with

(Note 2) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

#### **■**HG Series

DRIVE SYSTEM

					HG S	eries		
	Motor type				HG□	]-D48		
			HG75	HG105	HG54	HG104	HG154	HG224
	1-axis type	MDS-E-SP-	20	20	40	40	80	80
Compatible	2-axis type	MDS-E-SP2-	20 40	20 40	40 80	40 80	80 16080	80 16080
drive unit	Regenerative resistor type	MDS-EJ-SP-	20	20	20	40	80	80
		[N·m] 100						
		80						
Output Rated torque		60					40.0	46.5
Max. torque	ä	40				23.3	42.0	
		20	1.8	2.4	13.0	3.2	4.8	7.0
Rated output		[kW]	0.75	1.0	0.5	1.0	1.5	2.2
Rated rotation	Rated rotation speed [r/min]		40	00		30	00	
Max. rotation s	speed	[r/min]	40	00		30	00	
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	2.62	5.12	6.13	11.9	17.8	23.7
Degree of protection	on (The shaft-through)	portion is excluded.)			IP	67		
Outline dimens (flange type)	sion drawing	[mm]	90 SQ. 127.5 127.5	90 SQ. 163.5 163.5	130 SQ. 118.5	130 SQ.	33 SG:	130 SQ. 184.5
Flange fitting of		[mm]	φ80	ф80	ф110	φ110	φ110	φ110
Shaft diameter		[mm]	φ14	φ14	φ24	φ24	φ24	φ24
Mass		[kg]	2.6	4.4	4.8	6.5	8.3	10.0

					HG Series		
	Motor type				HG□-D48		
			HG204	HG354	HG453	HG703	HG903
	1-axis type	MDS-E-SP-	80	160	160	160	320
Compatible drive unit	2-axis type	MDS-E-SP2-	80 16080	16080	16080	16080	-
anvo ann	Regenerative resistor type	MDS-EJ-SP-	80	-	-	-	-
		[N·m] 250		<u> </u>			208.0
		200 -		 	 		200.0
Output Rated torque		150		90.0	122.0	152.0	
Max. torque		100	47.0	90.0			
		50	6.4	11.1	14.3	22.3	28:6
Rated output		[kW]	2.0	3.5	4.5	7.0	9.0
Rated rotation	speed	[r/min]			3000		
Max. rotation s	peed	[r/min]			3000		
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	38.3	75.0	112.0	154.0	196.0
Degree of protection	n (The shaft-through	portion is excluded.)			IP67		
Outline dimens	sion drawing	[mm]	176 SQ.	176 SQ.	176 SQ.	176 SQ.	204 SQ.
(mag- 1980)			143.5	183.5	223.5		
Flange fitting d		[mm]	φ114.3	φ114.3	φ114.3	φ114.3	φ180
Shaft diameter		[mm]	ф35	ф35	φ35	φ35	φ42
Mass		[kg]	12.0	19.0	25.0	32.0	43.0

(Note 1) The above characteristics values are representative values. The maximum current and maximum torque are the values when combined with

(Note 2) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

## **DRIVE SYSTEM SERVO MOTOR 400V**

#### **■**HG-H Series

	Motor type		HG-H75	HG-H105	HG-H54	HG-H104	HG-H154
	1-axis type	MDS-EH-V1-	10	10	20	20	40
	2-avic type	MDS-EH-V2-	10	10	20	20	40
Compatible	2-axis type	IVIDS-EH-V2-	20	20	40	40	80
drive unit	Multi-hybrid type	MDS-EMH-SPV3-	-	_	xxx40*	xxx40*	xxx40* 10060
	Regenerative resistor type	MDS-EJH-V1	15	20	20	20	40
		[N·m] 50					
		40					42.0
		30				23.3	
Max. torque		20 10 0	2.0	3.0	2.9	5.9	9.0
Rated output [kW]		[kW]	0.75	1.0	0.5	1.0	1.5
Max. rotation sp	eed	[r/min]	50	00		4000	
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	2.62	5.12	6.13	11.9	17.8
Motor inertia wit	h a brake	[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	2.70	5.20	8.26	14.0	20.0
Degree of protection	(The shaft-through	portion is excluded.)			IP67		
Outline dimension (flange type) (Without a brake D48 encoder) (Note) The total longer when usin D74 encoder.	e, Straight shaft	[mm]	90 SQ.	90 SQ.	130 SQ.	130 SQ.	130 SQ.
Flange fitting diameter [mm]		ф80	ф80	φ110	φ110	φ110	
Shaft diameter [mm]		φ14	φ14	ф24	φ24	ф24	
Mass (with a bra	ake)	[kg]	2.62(2.70)	4.4(5.3)	4.8(6.7)	6.5(8.5)	8.3(11.0)
Absolute position	67,108,864	[p/rev] (D74)	EH	EH	EH	EH	EH
encoder compatible drive unit		[p/rev] (D51) [p/rev] (D48)	EH, EJH	EH, EJH	EH, EMH, EJH	EH, EMH, EJH	EH, EMH, EJH

	Motor type	HG-H204	HG-H354	HG-H453	HG-H703	HG-H903
	1-axis type MDS-EH-V1-	40	80	80	80W	160
	2-axis type MDS-EH-V2-	40	80	80	80W	_
Compatible	2-axis type WD3-EH-V2-	80	80W	80W	OUVV	_
drive unit	Multi-hybrid type MDS-EMH-SPV3-	xxx40* 10060	10060	10060	_	_
	Regenerative resistor type MDS-EJH-V1	-	_	_	_	_
	[N·m] 210 ···					
	180					
	150					208.0
Output	120		l			
Stall torque Max. torque	90			122.0	152.0	
iviax. torque	60		90,0	122.0		
		47.0			49.0	58.8
	30	13.7	22.5	37.2	45.0	
	0	10.7				
Rated output	[kW]	2.0	3.5	4.5	7.0	9.0
Max. rotation sp	peed [r/min]	40	00	3500	30	000
Motor inertia	[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	38.3	75.0	112.0	154.0	196.0
Motor inertia wi		47.9	84.7	122.0	164.0	206.0
Degree of protection	(The shaft-through portion is excluded.)			IP67		
D48 encoder)	e, Straight shaft, [mm]	176 SQ.	176 SQ.	176 SQ.	176 SQ.	204 SQ.
longer when us D74 encoder.	length will be 3.5mm ing a D51 or					
Flange fitting di		φ114.3	φ114.3	φ114.3	φ114.3	φ180
Shaft diameter	[mm]	ф35	ф35	ф35	ф35	ф <b>42</b>
Mass (with a br	,	12.0(18.0)	19.0(25.0)	25.0(31.0)	32.0(38.0)	43.0(49.0)
Absolute position	67,108,864 [p/rev] (D74)	EH	EH	EH		
encoder compatib drive unit	le 4,194,304 [p/rev] (D51) 1,048,576 [p/rev] (D48)	EH, EMH	EH, EMH	EH, EMH	EH	EH

<sup>(</sup>Note) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

#### **■**HG-H Series

	Notor type		HG-H1502		
	1-axis type	MDS-EH-V1-	200		
	2-axis type	MDS-EH-V2-	=		
Compatible drive unit	Multi-hybrid type	MDS-EMH-SPV3-	=		
unve unit	Regenerative resistor type	MDS-EJH-V1	-		
		[N·m] 350	320.0		
		300			
		250			
Output		200			
Stall torque  Max. torque		150	152.1		
		100			
		50			
		0			
Rated output		[kW]	15.0		
Max. rotation spee	d	[r/min]	2500		
Motor inertia		[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	489.0		
Motor inertia with a	a brake	[×10 <sup>-4</sup> kg⋅m²]	-		
Degree of protection (Th	ne shaft-through	portion is excluded.)	IP44		
Outline dimension (flange type)	drawing	[mm]	250SQ. 476		
Flange fitting diam	eter	[mm]	ф230		
Shaft diameter		[mm]	φ65		
Mass (with a brake	e)	[kg]	120		
Absolute position encoder compatible drive unit	4,194,304 [	[p/rev] (D74) [p/rev] (D51) [p/rev] (D48)	EH		

## **■**HQ-H Series

DRIVE SYSTEM

Motor type		HQ-H903	HQ-H1103
Compatible drive unit 1-axis type MI	DS-EH-V1-	160	160W
Stall torque		70.0	110.0
Output Stall torque Max. torque	[N·m] 300 - 250 - 200 - 150 - 50 - [r/min]	70	260 
	(10 <sup>-4</sup> kg·m <sup>2</sup> ]	230.0	350.0
	(10 kg·m²]	254.0	374.0
Degree of protection (The shaft-through portion		IP67	IP67
Outline dimension drawing (flange type) (Without a brake, Straight shaft, D48 encoder) (Note) The total length will be 3.5mn longer when using a D51 or D74 encoder.	[mm] n	346.5 220 SQ.	468.5 220 SQ.
Flange fitting diameter	[mm]	ф200	φ200
Shaft diameter	[mm]	φ55	φ55
Mass (with a brake)	[kg]	51.0(61.4)	74.0(84.4)
Absolute position encoder compatible drive unit 67,108,864 [p/rev 4,194,304 [p/rev 1,048,576 [p/rev	[D51)	EH	EH

(Note) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

## **DRIVE SYSTEM LINEAR SERVO MOTOR 400V**

#### **■LM-F Series**

Motor type	Primary s		LM-FP5H-60M-1WW0
wotor type	Secondary	side type	LM-FS50-□-1WW0
	1-axis type	MDS-EH-V1-	200
Compatible	2-axis type	MDS-EH-V2-	-
drive unit	Regenerative resistor type	MDS-EJH-V1-	-
		[N] 20000	18000
Thrust force		15000	
Continuous (nat		10000	6000
Continuous (liqu Maximum	uia-cooiing)	5000	3000
IVIAXIIIIUIII		0	
Rated thrust		[N]	6000
Maximum spee	ed (Note 1)	[m/s]	2.0
Magnetic attrac		[N]	45000
Degree of prote		[]	IP00
Outline dimens	sion drawing	[mm]	Primary side Secondary side  1010  1010  480 576  1000  240  240
	Primary side (co	il)	67
Mass [kg]	Secondary side	,	20.0(480mm)
	Occordally side	(magnot)	26.0(576mm)

(Note 1) The maximum speed in actual use is either the linear scale's maximum speed or this specified value, whichever is smaller. (Note 2) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

## **DRIVE SYSTEM SPINDLE MOTOR 400V**

#### **■**SJ-4-V Series (Normal)

DRIVE SYSTEM

Man		SJ-4-V2.2-03T	SJ-4-V3.7-03T	CLAVE FORT	SJ-4-V7.5-12T	C I 4 V7 E 107T
	r type			SJ-4-V5.5-07T		SJ-4-V7.5-13ZT
Compatible	MDS-EH-SP-	20	20	40	40	80
drive unit	MDS-EMH-SPV3-	-	-	-	-	80xx
Output Short-time rat Continuous ra		kW 6 4 2.2 1.5 0 1500 6000 10000 r/min Short-time (15min) □	kW 6 4 2 0 1500 6000 10000 r/min Short-time (15min)	kW 8 6 4 3.7 2 0 1500 6000 8000 r/min Short-time (30min) □	8 5.5 6 4 2 0 1500 6000 8000 r/min Short-time (30min)	kW 7.5 8 6 4 2 0 1500 1000 12000 r/min Short-time (30min) □
Standard output during ac	celeration/deceleration [kW]	2.2	3.7	5.5	7.5	7.5
Actual acceleration/decele	eration output (Note 2) [kW]	2.64	4.44	6.6	9	9
Base rotation	speed [r/min]	15	00	1500		
Maximum rotati	ion speed [r/min]	100	000	8000		12000
Continuous rate	ed torque [N·m]	9.5	14.0			35.0
Inertia	[kg·m²]	0.007	0.009	0.015	0.025	0.025
Degree of pro	otection	IP44	IP44	IP44	IP44	IP44
Outline dimension drawing (flange type)	[mm]	174 SQ.	174 SQ.	174 SQ. 425	204 SQ. 440	204 SQ. 440
Flange fitting dian		φ150	φ150	φ150	φ180	φ180
Shaft diamete		ф28	ф28	ф28	ф32	ф32
Mass	[kg]	25	30	49	60	60

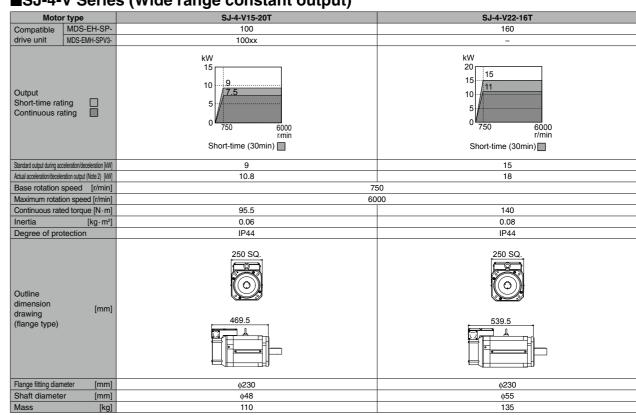
Moto	or type	SJ-4-V11-18T	SJ-4-V18.5-14T	SJ-4-V22-18ZT	SJ-4-V22-15T	SJ-4-V26-08ZT			
Compatible	MDS-EH-SP-	80	100	160	160	160			
drive unit	drive unit MDS-EMH-SPV3- 80xx		100xx	_	_	_			
Output Short-time ra Continuous ra		kW 20 15 111 150 4500 6000 r/min Short-time (30min)	18.5 20 15 15 10 150 4500 6000 fr/min Short-time (30min)	kW 20 15 15 10 5 10 10 10 10 10 10 10 10 10 10 10 10 10	kW 30 22 20 18.5	kW 30 26 20 110 10000 r/min Short-time (30min)			
Standard output during a	cceleration/deceleration [kW]	11	18.5	15	22	26			
Actual acceleration/decel	leration output (Note 2) [kW]	13.2	22.2	18	26.4	31.2			
Base rotation	speed [r/min]		1500						
Maximum rotat	tion speed [r/min]	6000	6000	8000	6000	10000			
Continuous rat	ted torque [N·m]	47.7	95.5	70.0	118	140			
Inertia	[kg·m²]	0.03	0.06	0.06	0.08	0.10			
Degree of pro	otection	IP44	IP44	IP44	IP44	IP44			
Outline dimension	[mm]	204 SQ.	250 SQ.	250 SQ.	250 SQ.	250 SQ.			
drawing (flange type)		490	469.5	469.5	539.5	585.5			
Flange fitting diar		φ180	φ230	ф230	ф230	φ230			
Shaft diamete		φ48	φ48	φ48	ф55	φ55			
Mass [kg] 70		70	110	110	135	155			

(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination. (Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output". (Note 3) The rated output is guaranteed at the rated input voltage (380 to 440VAC 50Hz / 380 to 480VAC 60Hz) to the power supply unit.

#### **■**SJ-4-V Series (Normal)

				21.11
	r type	SJ-4-V37-04ZT	SJ-4-V45-02T	SJ-4-V55-03T
Compatible	MDS-EH-SP-	200	320	320
drive unit	MDS-EMH-SPV3-	-	-	-
Output Short-time rat Continuous ra		80 40 37 20 30 30 0 1150 3450 6000 r/min Short-time (30min)	40 40 45 47 20 0 1500 4500 r/min Short-time (30min)	kW 60 45 45 45 45 45 45 1150 3450 r/min Short-time (30min)
Standard output during ac	celeration/deceleration [kW]	37	45	55
Actual acceleration/decele	ration output (Note 2) [kW]	44.4	54	66
Base rotation	speed [r/min]	1150	1500	1150
Maximum rotati	on speed [r/min]	6000	4500	3450
Continuous rate	ed torque [N·m]	249	236	374
Inertia	[kg·m²]	0.34	0.34	0.85
Degree of pro	tection	IP44	IP44	IP44
Outline dimension drawing (flange type)	[mm]	320 SQ.	320 SQ.	480 SQ.
Flange fitting dian		\$300 \$60	\$300 \$60	0450 075
		· · · · · · · · · · · · · · · · · · ·		-
Mass	[kg]	300	300	450

## ■SJ-4-V Series (Wide range constant output)



(Note 1) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

(Note 2) Actual acceleration/deceleration output is 1.2-fold of "Standard output during acceleration/deceleration" or "Short time rated output".

(Note 3) The rated output is guaranteed at the rated input voltage (380 to 440VAC 50Hz / 380 to 480VAC 60Hz) to the power supply unit.

If the input voltage fluctuates and drops below 380VAC, the rated output may not be attained.

If the input voltage fluctuates and drops below 380VAC, the rated output may not be attained.

## **DRIVE SYSTEM TOOL SPINDLE MOTOR 400V**

#### **■**HG-JR Series

Motor type		HG-JR734	HG-JR1534
Compatible drive unit 1-axis type	MDS-EH-SP-	20	40
	[N·m] 20		
Output	15		14.3
Rated torque Max. torque	10	7.2	
	5	2.4	4.8
Rated output	[kW]	0.75	1.5
Max. rotation speed	[r/min]	80	00
Motor inertia	[×10 <sup>-4</sup> kg·m <sup>2</sup> ]	2.09	3.79
Degree of protection (The shaft-through	portion is excluded.)	IP	67
		90SQ.	9080.
Outline dimension drawing	[mm]		
		145.5	199.5
Flange fitting diameter	[mm]	φ80	φ80
Shaft diameter	[mm]	ф16	φ16
Mass	[kg]	3.7	5.9

(Note) Only the combination designated in this manual can be used for the motor and drive unit. Always use the designated combination.

## **DRIVE SYSTEM DRIVE UNIT**

#### **■**MDS-E Series

#### 1-axis servo drive unit

Drive	unit type		MDS-E-V1-20 MDS-E-V1-40 MDS-E-V1-80 MDS-E-V1-160 MDS-E-V1-160W MDS-E-V1-320 MDS-E-V1-32						
Drive unit cate	nit category 1-axis servo								
Nominal maximum	current (peak)	[A]	20	40	80	160	160	320	320
Power input	Rated voltage	[V]				270 to 324DC			
Fower input	Rated current	[A]	7.0	7.0	14	30	35	45	55
	Voltage	[V]			200 to 240AC Tolera	ble fluctuation: betw	een +10% and -15%		
Control power input	Current	[A]				MAX. 0.2			
power input	Frequency	[Hz]			50/60 Tolerable	fluctuation: between	n +5% and -5%		
Control method	1				Sine	vave PWM control m	nethod		
Dynamic brake	S				Bui	lt-in			External (MDS-D-DBU)
Machine end e	ncoder					Compatible			
Degree of prote	ection				IP20	(excluding terminal l	block)		
Cooling method Forced air cooling									
Mass		[kg]	3.8 3.8 3.8 3.8 4.5 5.8 7.5						7.5
Unit outline dimension drawing A1 A1 A1 A1					A1	B1	C1	D1	

#### 2-axis servo drive unit

Drive	unit type	MDS-E-V2-20	MDS-E-V2-40	MDS-E-V2-80	MDS-E-V2-160	MDS-E-V2-160W		
Drive unit category 2-axis servo								
Nominal maximum	current (peak) [A]	20/20	40/40	80/80	160/160	160/160		
Dawer innet	Rated voltage [V]			270 to 324DC				
Power input	Rated current [A]	14	14	28	60	70		
	Voltage [V]		200 to 240AC To	olerable fluctuation: between	+10% and -15%			
Control power input	Current [A]	MAX. 0.2						
power input	Frequency [Hz]	50/60 Tolerable fluctuation: between +5% and -5%						
Control method	d		S	ine wave PWM control metho	od			
Dynamic brake	es			Built-in				
Machine end e	ncoder			Compatible				
Degree of prot	ection		I	P20 (excluding terminal block	()			
Cooling metho	d		Forced air cooling					
Mass	[kg]	3.8	3.8 3.8 3.8 5.2 6.3					
Unit outline dimension drawing A1 A1 A1 B1						C1		

#### 3-axis servo drive unit

Drive	unit type	MDS-E-V3-20	MDS-E-V3-40	MDS-E-V3-80			
Drive unit cate	gory		3-axis servo				
Nominal maximum	current (peak) [A]	20/20/20	40/40/40	80/80/80			
D	Rated voltage [V]		270 to 324DC				
Power input	Rated current [A]	21	21	42			
	Voltage [V]	200 to	240AC Tolerable fluctuation: between +10% an	d -15%			
Control power input	Current [A]	MAX. 0.2					
power input	Frequency [Hz]	50/60 Tolerable fluctuation: between +5% and -5%					
Control method	1	Sine wave PWM control method					
Dynamic brake	s	Built-in					
Machine end e	ncoder	Compatible					
Degree of prote	ection		IP20 [over all]				
Cooling metho	d	Forced a	Forced air cooling Natural-cooling				
Mass	[kg]	3.8 6.2					
Unit outline dimer	sion drawing	A	A1 B2				

#### **■**MDS-E Series

## 1-axis spindle drive unit

Drive	unit type		MDS-E-SP-20	MDS-E-SP-40	MDS-E-SP-80	MDS-E-SP-160	MDS-E-SP-200	MDS-E-SP-240	MDS-E-SP-320	MDS-E-SP-400	MDS-E-SP-640
Drive unit categ	gory	1-axis spindle									
Nominal maximum	current (peak)	[A]	20	40	80	160	200	240	320	400	640
Power input	Rated voltage	[V]					270 to 324DC				
rower input	Rated current	[A]	7.0	13	20	41	76	95	140	150	210
	Voltage	[V]			200 to	240AC Tolerable	e fluctuation: be	tween +10% an	d -15%		
Control power input	Current						MAX. 0.2				
power input	Frequency	[Hz]			5	0/60 Tolerable fl	uctuation: betwe	en +5% and -5°	%		
Control method	1					Sine wa	ve PWM control	method			
Degree of prote	ection					IP20 (e	xcluding termina	al block)			
Cooling method	i i		Forced air cooling								
Mass		[kg]	3.8 3.8 3.8 4.5 5.8 6.5 7.5 16.5 16.5					16.5			
Unit outline dimension drawing			A1	A1	A1	B1	C1	D1	D2	E1	F1

#### 2-axis spindle drive unit

Drive	unit type	MDS-E-SP2-20	MDS-E-SP2-40	MDS-E-SP2-80	MDS-E-SP2-16080				
Drive unit cate	gory		2-axis spindle						
Nominal maximum	current (peak) [A]	20/20	40/40	80/80	160/80				
Power input	Rated voltage [V]		270 to	324DC					
Fower input	Rated current [A]	14	26	40	61				
	Voltage [V]		200 to 240AC Tolerable fluctuation: between +10% and -15%						
Control power input	Current [A]	MAX. 0.2							
power input	Frequency [Hz]	50/60 Tolerable fluctuation: between +5% and -5%							
Control method	d		Sine wave PWM control method						
Degree of prote	ection		IP20 (excluding terminal block)						
Cooling method	d		Forced air cooling						
Mass	[kg]	4.5 4.5 6.5 5.2							
Unit outline dimen	sion drawing	A1	A1	B1	B1				

## Power supply unit

Power s	supply unit		MDS-E-CV-37	MDS-E-CV-75	MDS-E-CV-110	MDS-E-CV-185	MDS-E-CV-300	MDS-E-CV-370	MDS-E-CV-450	MDS-E-CV-550	
30-minute rated	d output	[kW]	3.7	7.5	11.0	18.5	30.0	37.0	45.0	55.0	
Continuous rated output [kW]		2.2	5.5	7.5	15.0	26.0	30.0	37.0	45.0		
Rated voltage [V]		[V]	200 to 240AC Tolerable fluctuation: between +10% and -15%								
Power input	Rated current	[A]	15	26	35	65	107	121	148	200	
	Voltage	[V]			200 to 240A	200 to 240AC Tolerable fluctuation: between +10% and -15%					
Control power input	Current	[A]	MAX. 0.2								
power input	Frequency	[Hz]	50/60 Tolerable fluctuation: between +5% and -5%								
Regeneration r	nethod			Power regeneration method							
Degree of prote	ection					IP20 (excluding	terminal block)				
Cooling method			Natural-	-cooling			Forced a	ir cooling			
Mass [kg]		4.0	4.0	6.0	6.0	10.0	10.0	10.0	25.5		
Unit outline dimension drawing		A2	A2	B1	B1	D1	D1	D2	F1		

#### **AC** reactor

AC reactor	model	D-AL-7.5K	D-AL-11K	D-AL-18.5K	D-AL-30K	D-AL-37K	D-AL-45K	D-AL-55K		
Compatible power supply unit type MDS-E-CV-		37, 75	110	185	300	370	450	550		
Rated capacity	[kW]	7.5	11	18.5	30	37	45	55		
Rated voltage	[V]	200 to 240AC Tolerable fluctuation: between +10% and -15%								
Rated current	[A]	27	40	66	110	133	162	198		
Frequency	[Hz]			50/60 Tolerable	fluctuation: between	n +5% and -5%				
Mass [kg]		4.2	3.7	5.3	6.1	8.6	9.7	11.5		
Unit outline dimension drawing		R1	R1	R2	R2	R3	R3	R4		

#### **■**MDS-EH Series

#### 1-axis servo drive unit

Drive	unit type		MDS-EH-V1-10	MDS-EH-V1-20	MDS-EH-V1-40	MDS-EH-V1-80	MDS-EH-V1-80W	MDS-EH-V1-160	MDS-EH-V1-160W	MDS-EH-V1-200		
Drive unit categ	gory		1-axis servo									
Nominal maximum of	Nominal maximum current (peak) [A]		10	20	40	80	80	160	160	200		
Rated voltage [V]					513 to	648DC						
Power input	Rated current	[A]	0.9	1.6	2.9	6.0	8.0	11.9	16.7	39		
Occident	Voltage	[V]		380 to 480AC Tolerable fluctuation: between +10% and -15%								
Control power input	Current	[A]		MAX. 0.1								
power iriput	Frequency	[Hz]		50/60 Tolerable fluctuation: between +5% and -5%								
Control method	ĺ		Sine wave PWM control method									
Dynamic brake	S		Built-in External (MDS-D-DBU)									
Degree of protection			IP20 ([over all] / IP00 [Terminal block TE1])									
Cooling method		Natural-cooling				Forced air cooling						
Mass	Mass [kg]		3.8	3.8	3.8	3.8	4.5	5.8	7.5	16.5		
Unit outline dimension drawing		A1	A1	A1	A1	B1	C1	D1	E1			

#### 2-axis servo drive unit

Drive	unit type		MDS-EH-V2-10	MDS-EH-V2-20	MDS-EH-V2-40	MDS-EH-V2-80	MDS-EH-V2-80W				
Drive unit cate	gory			2-axis servo							
Nominal maximum	current (peak)	[A]	10/10	10/10 20/20 40/40 80/80							
Rated voltage [V]		[V]			513 to 648DC						
Power input	Rated current	[A]	1.8	3.2	5.8	12	16				
Voltage [V]		[V]	380 to 480AC Tolerable fluctuation: between +10% and -15%								
Control power input	Current	[A]			MAX. 0.1						
power iriput	Frequency	[Hz]	50/60 Tolerable fluctuation: between +5% and -5%								
Control method	i			Sine wave PV	/M control method · Current of	control method					
Dynamic brake	s		Built-in								
Degree of protection		IP20									
Cooling method		Natural-cooling		Forced a	ir cooling						
Mass		[kg]	3.8	3.8	3.8	5.2	6.3				
Unit outline dimension drawing			A1	A1	A1	B1	C1				

#### 1-axis spindle drive unit

	<u> </u>											
Drive	unit type		MDS-EH-SP-20	MDS-EH-SP-40	MDS-EH-SP-80	MDS-EH-SP-100	MDS-EH-SP-160	MDS-EH-SP-200	MDS-EH-SP-320	MDS-EH-SP-480	MDS-EH-SP-600	
Drive unit cated	gory						1-axis spindle					
Nominal maximum	current (peak)	[A]	20	40	80	100	160	200	320	480	600	
Power input         Rated voltage         [V]           Rated current         [A]						513 to 648DC						
		[A]	10	15	21	38	72	82	119	150	200	
Oneterl	Voltage	[V]		380 to 480AC Tolerable fluctuation: between +10% and -15%								
Control power input	Current	[A]		MAX. 0.1								
power input	Frequency	[Hz]		50/60 Tolerable fluctuation: between +5% and -5%								
Control method	t					Sine wa	ve PWM control	method				
Degree of prote	ection					IP20 ([over al	l] / IP00 [Termin	al block TE1])				
Cooling method				Forced air cooling								
Mass [kg]		3.8	4.5	4.5	5.8	7.5	16.5	16.5	22.5	23.0		
Unit outline dimension drawing			A1	A1	B1	C1	D1	E1	E1	F1	F1	

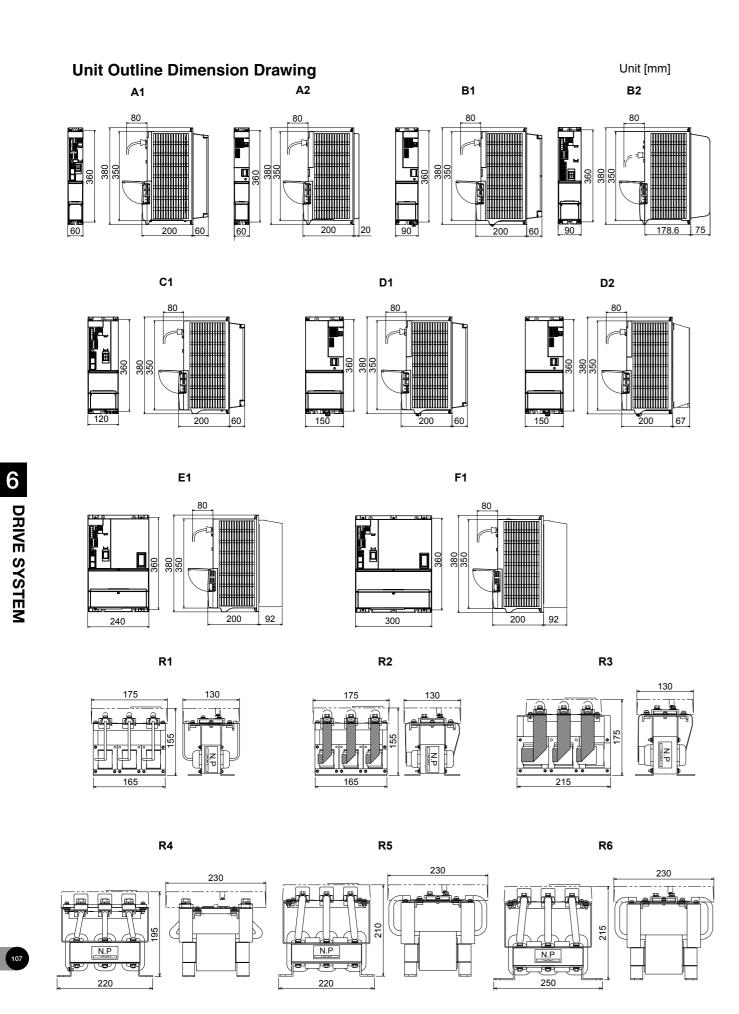
<sup>(</sup>Note) Rated output capacity and rated speed of the motor used in combination with the drive unit are as indicated when using the power supply voltage and frequency listed. The torque drops when the voltage is less than specified.

#### Power supply unit

Power sup	ply unit typ	е	MDS-EH-CV-37	MDS-EH-CV-75	MDS-EH-CV-110	MDS-EH-CV-185	MDS-EH-CV-300	MDS-EH-CV-370	MDS-EH-CV-450	MDS-EH-CV-550	MDS-EH-CV-750	
30-minute rated	30-minute rated output [kW]		3.7	7.5	11.0	18.5	30.0	37.0	45.0	55.0	75.0	
Continuous rated output [kW]		2.2	5.5	7.5	15	26	30	37	45	55		
Dawer innut	Rated voltage [V]				380 to	480AC Tolerable	e fluctuation: be	tween +10% and	d -15%			
Power input	Rated current	[A]	5.2	13	18	35	61	70	85	106	130	
Ozzakask	Voltage	[V]		380 to 480AC Tolerable fluctuation: between +10% and -15%								
Control power input	Current	[A]		MAX. 0.1								
power input	Frequency	[Hz]	50/60 Tolerable fluctuation: between +5% and -5%									
Main circuit me	thod		Converter with power regeneration circuit									
Degree of prote	ection					IP20 (e	xcluding termina	al block)				
Cooling method					F	orced air coolin	g					
Mass	Mass [kg]		6.0	6.0	6.0	6.0	10.0	10.0	10.0	25.5	25.5	
Unit outline dimension drawing		B1	B1	B1	B1	D1	D1	D1	F1	F1		

#### **AC** reactor

AC reactor	model	DH-AL-7.5K	DH-AL-11K	DH-AL-18.5K	DH-AL-30K	DH-AL-37K	DH-AL-45K	DH-AL-55K	DH-AL-75K	
Compatible power supply unit type MDS-EH-CV-		37, 75	110	185	300	370	450	550	750	
Rated capacity [kW]		7.5	11	18.5	30	37	45	55	75	
Rated voltage	[V]	380 to 480AC Tolerable fluctuation: between +10% and -15%								
Rated current	[A]	14	21	37	65	75	85	105	142	
Frequency	[Hz]			50/60 T	olerable fluctuatio	n: between +5% a	ınd -5%			
Mass [kg]		4.0	3.7	5.3	6.0	8.5	9.8	10.5	13.0	
Unit outline dimension of	drawing	R1	R1	R2	R2	R3	R3	R5	R6	



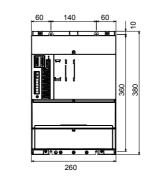
## ■MDS-EM/EMH Series

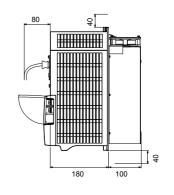
## Multi-hybrid drive unit

Drive	unit type		MDS-EM-SPV3-10040	MDS-EM-SPV3-10080	MDS-EM-SPV3-16040	MDS-EM-SPV3-16080	MDS-EM-SPV3-20080	MDS-EM-SPV3-20012				
Drive unit cate	gory				3-axis servo, 1-axis sp	pindle (with converter)						
Nominal maximum curre	nt (spindle/servo)	[A]	100/40×3	100/80×3	160/40×3	160/80×3	200/80×3	200/120×3				
Power input Rated voltage [V]			200 to	240AC Tolerable fluctua	ation: between +10% and	d -15%						
rowei iliput	Rated current	[A]	36	38	45	48	60	65				
	Voltage [V]			24DC Tolerable fluctuation: between +10% and -10%								
Control power input	Control Current [A]			MAX. 4								
power input	Frequency	[Hz]		5	0/60 Tolerable fluctuatio	n: between +5% and -5°	%					
Control method	t		Sine wave PWM control method									
Regeneration r	method		Power regeneration method									
Dynamic brake	s (servo)		Built-in									
Machine end e	ncoder (servo	)	Compatible									
Degree of protection			IP20 (excluding terminal block)									
Cooling metho	d			Forced air cooling								
Mass		[kg]	15	15	15	15	15	15				

Drive	unit type	MDS-EMH-SPV3-8040	MDS-EMH-SPV3-10040	MDS-EMH-SPV3-10060				
Drive unit cate	gory		3-axis servo, 1-axis spindle (with converter)					
Nominal maximum curre	ent (spindle/servo) [A]	80/40×3	100/40×3	100/60×3				
Dower input	Rated voltage [V]	380 to	380 to 480AC Tolerable fluctuation: between +10% and -15%					
Power input	Rated current [A]	27	34	37				
Voltage [V]		24DC Tolerable fluctuation: between +10% and -10%						
Control power input	Current [A]		MAX. 4					
power input	Frequency [Hz]	50/60 Tolerable fluctuation: between +5% and -5%						
Control method	d	Sine wave PWM control method						
Regeneration i	method	Power regeneration method						
Dynamic brake	es (servo)	Built-in						
Machine end encoder (servo)		Compatible						
Degree of protection		IP20 (excluding terminal block)						
Cooling metho	d	Forced air cooling						
Mass [kg]		15	15	15				

## Unit outline dimension drawing





## ■MDS-EJ/EJH Series

## All-in-one compact servo drive unit

Drive	unit type		MDS-EJ-V1-10	MDS-EJ-V1-15	MDS-EJ-V1-30	MDS-EJ-V1-40	MDS-EJ-V1-80	MDS-EJ-V1-100			
Drive unit cate	gory				1-axis servo (	with converter)					
Nominal maximum	current (peak)	[A]	10	15	30	40	80	100			
Power input Rated voltage [V]		[V]	3-phase or single-phase 200	to 240AC Tolerable fluctuation	on: between +10% and -15%	3-phase 200 to 240AC	Tolerable fluctuation: be	tween +10% and -15%			
Power input	Rated current	[A]	1.5	2.9	3.8	8.0	10.5	16			
	Voltage	[V]		Single-phase	200 to 240AC Tolerable	fluctuation: between +1	0% and -15%				
power input	Control Current [A]		MAX. 0.2								
power input	Frequency	[Hz]		50/60 Tolerable fluctuation: between +5% and -5%							
Control method	i				Sine wave PWN	1 control method					
Regeneration r	nethod				Power regene	eration method					
Dynamic brake	s		Built-in								
Machine end e	ncoder		Compatible								
Degree of protection			IP20								
Cooling method	d		Natural	cooling		Forced a	ir cooling				
Mass [kg]		0.8	1.0	1.4	2.1	2.1	2.3				
Unit outline dimen	Unit outline dimension drawing		J1a	J2	J3	J4a	J4a	J4b			

Drive	unit type	MDS-EJ-V2-30	MDS-EJ-V2-40				
Drive unit cate	gory	2-axis servo (v	vith converter)				
Nominal maximum	current (peak) [A]	30/30	40/40				
Bower input	Rated voltage [V]	3-phase 200 to 240AC Tolerable fluctuation: between +10% and -15%					
Power input	Rated current [A]	7.6	16.0				
	Voltage [V]	Single-phase 200 to 240AC Tolerable	fluctuation: between +10% and -15%				
Control power input	Current [A]	MAX. 0.4					
power input	Frequency [Hz]	50/60 Tolerable fluctuation: between +5% and -5%					
Control method	d	Sine wave PWM control method					
Regeneration r	nethod	Power regeneration method					
Dynamic brake	s	Built-in					
Machine end e	ncoder	Comp	atible				
Degree of protection		IP20					
Cooling metho	d	Forced air cooling					
Mass [kg]		2.0	4.6				
Unit outline dimen	sion drawing	J7	J8				

Drive	unit type		MDS-EJH-V1-10	MDS-EJH-V1-15	MDS-EJH-V1-20	MDS-EJH-V1-40			
Drive unit cate	gory			1-axis servo (v	with converter)				
Nominal maximum	current (peak)	[A]	10	15	20	40			
Danier innut	Rated voltage	[V]		3-phase 380 to 480AC Tolerable fluctuation: between +10% and -15%					
ower input Rated current [A		[A]	1.4 2.5 5.1		5.1	7.9			
	Voltage	[V]	S	Single-phase 380 to 480AC Tolerable fluctuation: between +10% and -15%					
Control power input	Current			MAX. 0.1					
power input	Frequency	[Hz]		50/60 Tolerable fluctuatio	n: between +5% and -5%				
Control method	t			Sine wave PWN	A control method				
Regeneration r	method			Power regene	eration method				
Dynamic brake	s			Bui	ilt-in				
Machine end e	ncoder			Comp	patible				
Degree of protection IP20									
Cooling method			Natural	ir cooling					
Mass [kg]		[kg]	1.7	1.7 1.7		3.6			
Unit outline dimension drawing			J <sup>.</sup>	1b	J4c	J5b			

## All-in-one compact spindle drive unit

Drive	unit type	MDS-EJ-SP-20	MDS-EJ-SP-40	MDS-EJ-SP-80	MDS-EJ-SP-100	MDS-EJ-SP-120	MDS-EJ-SP-160		
Drive unit cated	gory		1-axis spindle (with converter)						
Nominal maximum	current (peak) [A]	20	40	80	100	120	160		
Power input	Rated voltage [V		3-phase 20	00 to 240AC Tolerable flu	uctuation: between +10%	% and -15%			
Power input	Rated current [A]	2.6	9.0	10.5	16	26	35.4		
	Voltage [V		Single-phase 200 to 240AC Tolerable fluctuation: between +10% and -15%						
Control power input	Current [A]	MAX. 0.2							
power input	Frequency [Hz]		50/60 Tolerable fluctuation: between +5% and -5%						
Control method	i			Sine wave PWN	I control method				
Regeneration r	nethod			Power regene	eration method				
Degree of prote	ection	IP20 (excluding terminal block)							
Cooling method			Forced air cooling						
Mass [kg]		1.4	2.1	2.3	4.0	4.0	6.2		
Unit outline dimen	sion drawing	J3	J4a	J4b	J5a	J5a	J6		

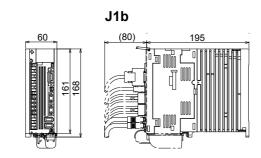
Drive unit type			MDS-EJ-SP2-20		
Drive unit cate	gory		2-axis servo (with converter)		
Nominal maximum	current (peak)	[A]	20/20		
Davier innut	Rated voltage	[V]	3-phase 200 to 240AC Tolerable fluctuation: between +10% and -15%		
Power input	Rated current	[A]	5.2		
	Voltage	[V]	Single-phase 200 to 240AC Tolerable fluctuation: between +10% and -15%		
Control power input	Current	[A]	MAX. 0.4		
power input	Frequency	[Hz]	50/60 Tolerable fluctuation: between +5% and -5%		
Control method	d		Sine wave PWM control method		
Regeneration r	method		Power regeneration method		
Degree of protection			IP20		
Cooling method			Forced air cooling		
Mass [kg]		[kg]	2.0		
Unit outline dimen	nsion drawing		J7		

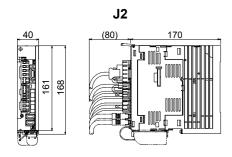
Unit [mm]

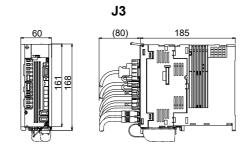
## Unit outline dimension drawing

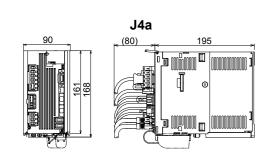
Unit [mm]

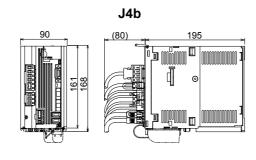
J1a

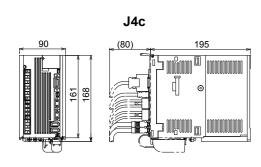


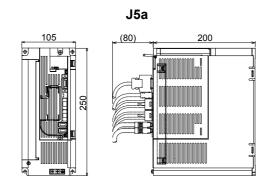


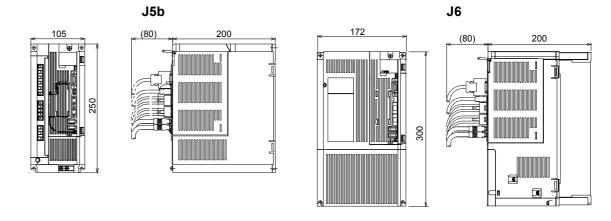


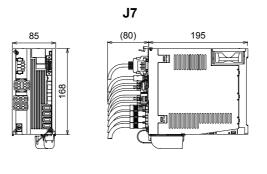


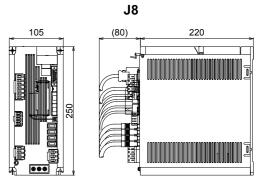












6 DRIVE SYSTEM

## DRIVE SYSTEM DEDICATED OPTIONS SERVO OPTIONS

The option units are required depending on the servo system configuration. Check the option units to be required referring the following items.

#### ■System establishment in the full closed loop control

Full closed loop control for linear axis

Mad	chine side enco	oder to be used	Encoder signal output	Interface unit	Drive unit input signal	Battery option	Remarks
	Rectangular wave signal	SR74, SR84 (MAGNESCALE)	Rectangular wave signal	-	Rectangular wave signal	-	
out	output	Various scale	Rectangular wave signal	-	Rectangular wave signal	-	
		10407 10407		IBV Series (HEIDENHAIN)	Rectangular wave signal	-	
		LS187, LS487	SIN wave signal	EIB Series (HEIDENHAIN)	Rectangular wave signal	-	
		(HEIDENHAIN)	•	APE Series (HEIDENHAIN)	Rectangular wave signal	-	
				MDS-EX-HR-11			Distance saded
Incremental	SIN wave	LS187C, LS487C	CIN wave size al	(MITSUBISHI ELECTRIC)	Mitsubishi serial	(Required)	Distance-coded reference scale
encoder	signal	(HEIDENHAIN)	SIN wave signal	EIB Series	signal	Note 1	
encoder	output			(HEIDENHAIN)			(Note 2)
				MDS-EX-HR-11			Distance-coded
		Various scale	CIN wave sizes	(MITSUBISHI ELECTRIC)	Mitsubishi serial signal	(Required)	reference scale is
		various scale	SIN wave signal	EIB Series	ivilisubistii seriai sigriai	Note 1	also available
				(HEIDENHAIN)			(Note 2)
"	Mitsubishi serial signal output	SR75, SR85 (MAGNESCALE)	Mitsubishi serial signal	-	Mitsubishi serial signal	-	
	, , , , , , , , , , , , , , , , , , ,	OSA405ET2AS, OSA676ET2AS (MITSUBISHI ELECTRIC)	Mitsubishi serial signal	-	Mitsubishi serial signal	Required	Ball screw side encoder
	Mitsubishi serial signal output	SR27, SR77, SR87, SR67A (MAGNESCALE)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
		LC195M, LC495M,LC291M (HEIDENHAIN)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	Mitsu03-4
		LC193M, LC493M (HEIDENHAIN)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	Mitsu02-4
		AT343, AT543, AT545, ST748 (Mitutoyo)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
		SAM Series (FAGOR)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
Absolute		SVAM Series (FAGOR)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
position		GAM Series (FAGOR)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
encoder		LAM Series (FAGOR)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
		RL40N Series (Renishaw)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
		AMS-ABS-3B Series (Schneeberger)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
		LMFA Series (AMO)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
		LMBA Series (AMO)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
	SIN wave	MPS Series (Mitsubishi Heavy Industries Machine Tool)	SIN wave signal	ADB-20J60 (Mitsubishi Heavy Industries Machine Tool)	Mitsubishi serial signal	Required	
	output	MPI Series (Mitsubishi Heavy Industries Machine Tool)	SIN wave signal	ADS-20J60 (Mitsubishi Heavy Industries Machine Tool)	Mitsubishi serial signal	nequired	

(Note 1) When using the distance-coded reference scale, it is recommended to use with distance-coded reference check function. In this case, the battery option is required.

(Note 2) Use the option of M800 Series for the distance-coded reference scale

#### Full closed loop control for rotary axis

Ма	Machine side encoder to be used			Interface unit	Output signal	Battery option	Remarks
	Rectangular wave signal output	Various scale	Rectangular wave signal	-	Rectangular wave signal	-	
Incremental encoder	SIN wave	ERM280 Series (HEIDENHAIN)	SIN wave signal	EIB Series (HEIDENHAIN)	Mitsubishi serial signal	-	
	signal output	Various scale	SIN wave signal	MDS-EX-HR-11 (MITSUBISHI ELECTRIC)	Mitsubishi serial signal	(Required) Note 1	Distance-coded reference scale is also available (Note 2)
		MBA405W Series (MITSUBISHI ELECTRIC)	Mitsubishi serial signal	(Provided)	Mitsubishi serial signal	Required	
	Mitsubishi serial signal output	RU77 (MAGNESCALE)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
		RCN223M, RCN227M (HEIDENHAIN)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	Mitsu02-4
		RCN727M, RCN827M (HEIDENHAIN)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	Mitsu02-4
		RA Series (Renishaw)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
Absolute		HAM Series (FAGOR)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
position encoder		WMFA Series WMBA Series WMRA Series (AMO)	Mitsubishi serial signal	-	Mitsubishi serial signal	Not required	
		MPRZ Series		ADB-20J71			
	SIN wave	(Mitsubishi Heavy Industries Machine Tool)	SIN wave signal	(Mitsubishi Heavy Industries Machine Tool)	Mitsubishi serial signal	Not required	
	signal output	MPI Series (Mitsubishi Heavy Industries Machine Tool)	SIN wave signal	ADB-20J60 (Mitsubishi Heavy Industries Machine Tool)	Mitsubishi serial signal	Required	

(Note 1) When using the distance-coded reference scale, it is recommended to use with distance-coded reference check function. In this case, the battery option is

(Note 2) Use the option of M800 Series for the distance-coded reference scale. (Note 3) Use the encoders according to each manufacturer's specifications.

#### ■System establishment in the synchronous control

#### Position command synchronous control

The synchronous control is all executed in the NC, and the each servo is controlled as an independent axis.

Therefore, preparing special options for the synchronous control is not required on the servo side.

#### Speed command synchronization control

The common position control in two axes is performed by one linear scale. Basically, the multi axis integrated type drive unit (MDS-E/EH-V2/V3) is used, and the feedback signal is divided for two axes inside the drive unit. When the two 1-axis type drive units are used in driving the large capacity servo motor, the linear scale feedback signal must be divided outside.

#### <Required option in the speed command synchronous control>

Machine side encoder to be used	For MDS-E/EH-V2/V3	For MDS-E/EH-V1×2 units	Remarks
SIN wave signal output scale	MDS-EX-HR-11	MDS-B-HR-12(P)	
Silv wave signal output scale	(Serial conversion)	(Serial conversion/signal division)	
			Including the case that an interface unit
Mitsubishi serial signal output scale	-	MDS-B-SD (Signal division)	of the scale manufacturer is used with
			SIN wave output scale.

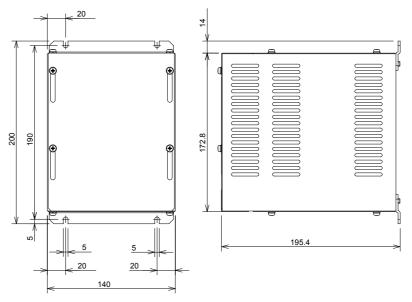
(Note) The rectangular wave signal output scale speed command synchronous control is not available.

#### **■**Dynamic brake unit (MDS-D-DBU)

#### **Specifications**

Туре	MDS-D-DBU	
Coil specifications	DC24V 160mA	
Wire size	5.5mm² or more (For IV wire)	
Compatible drive unit	MDS-E-V1-320W, MDS-EH-V1-160W or larger	
Mass	3ka	

#### **Outline dimension drawing** MDS-D-DBU



[Unit: mm]

#### **■**Battery option

This battery option may be required to establish absolute position system. Select a battery option from the table below depending on the servo system.

Ту	pe	MDS-BAT6V1SET	MR-BAT6V1SET	MDSBTBOX-LR2060	
Installation type		Drive unit with	Drive unit with	Unit and battery	
		battery holder type	battery holder type	integration type	
Hazard Class		Not applicable	Not applicable	Not applicable	
Number of		Up to 3 axes	Up to 3 axes	Up to 8 axes	
connectable ax	es	·	·	·	
Battery change	•	Possible	Possible	Possible	
Appearance			Name plate  2CR17335A WK17  11-04  BV 1650mAn  Date of mountacture		
Compatible	E/EH	0	-	0	
model	EM/EMH	-	0	0	
moder	EJ/EJH	_	0	0	

#### **■**Cell battery (MDS-BAT6V1SET)

#### **Specifications**

Pottory of	ntion tune	Cell battery	
Battery option type		MDS-BAT6V1SET	
Battery model name		2CR17335A	
Nominal voltage		6V	
Number of connectable axes (Note 3)		Up to 3 axes	
Battery continuous backu	ın timo	Up to 2 axes: Approx. 10,000 hours	
Battery Continuous backt	ip time	3 axes connected: Approx. 6,600 hours	
Back up time from batter	y warning to alarm	Up to 2 axes: Approx. 100 hours	
occurrence (Note 2)		3 axes connected: Approx. 60 hours	
	E/EH	0	
Compatible model	EM/EMH	-	
	EJ/EJH	-	

(Note 1) MDS-BAT6V1SET is a battery built in a servo drive unit. Install this battery only in the servo drive unit that executes absolute position control. (Note 2) This time is a guideline, so does not guarantee the back up time. Replace the battery with a new battery as soon as a battery warning occurs. (Note 3) When using ball screw side encoder, both ball screw side encoder and motor side encoder need to be backed up by a battery, so the number of load shaft should be two.

#### **■**Cell battery (MR-BAT6V1SET)

#### **Specifications**

Pottory o	ntion tune	Cell battery		
Battery 0	ption type	MR-BAT6V1SET (Note 1)		
Battery model name		2CR17335A		
Nominal voltage		6V		
Number of connectable a	xes (Note 3)	Up to 3 axes		
Battery continuous backu	n timo	Up to 2 axes: Approx. 10,000 hours		
Battery Continuous backu	ip time	3 axes connected: Approx. 6,600 hours		
Back up time from battery	y warning to alarm	Up to 2 axes: Approx. 100 hours		
occurrence (Note 2)		3 axes connected: Approx. 60 hours		
	E/EH	-		
Compatible model	EM/EMH	0		
	EJ/EJH	0		

(Note 1) MR-BAT6V1SET is a battery built in a servo drive unit. Install this battery only in the servo drive unit that executes absolute position control. (Note 2) This time is a guideline, so does not guarantee the back up time. Replace the battery with a new battery as soon as a battery alarm occurs. (Note 3) When using ball screw side encoder, both ball screw side encoder and motor side encoder need to be backed up by a battery, so the number of load shaft should be two.

#### ■Battery box (MDSBTBOX-LR2060)

#### **Specifications**

Dotton	option type	Battery box	
Dattery	у орцоп туре	MDSBTBOX-LR2060	
Battery model name (N	lote 1)	Size-D alkaline batteries LR20×4 pieces	
		6.0V (Unit output: BTO1/2/3)	
Nominal voltage		3.6V (Unit output: BT(3.6V)	
		1.5V (Isolated battery)	
Number of connectable	eaxes	8 axis	
Battery continuous bac	kup time (Note 2)	Approx. 10000 hours (when 8 axes are connected, cumulative time in non-energized state)	
Back up time from batt occurrence (Note 2)	ery warning to alarm	Approx. 336 hours (when 8 axes are connected)	
	E/EH	0	
Compatible model	EM/EMH	0	
	EJ/EJH	0	

(Note 1) Install commercially-available alkaline dry batteries into MDSBTBOX-LR2060. The batteries should be procured by customers. Make sure to use new batteries that have not passed the expiration date. We recommend you to replace the batteries in the one-year cycle.

(Note 2) This time is a guideline, so does not guarantee the back up time. Replace the battery with a new battery as soon as a battery warning (9F)

#### ■Ball screw side encoder OSA405ET2AS, OSA676ET2AS

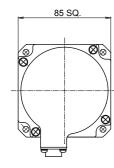
	Туре	OSA405ET2AS	OSA676ET2AS			
	Encoder resolution	4,194,304pulse/rev	67,108,864pulse/rev			
	Detection method	Absolute position method (battery backup method)				
Electrical	Accuracy (*1)	±3 se	conds			
characteristics	Tolerable rotation speed at power off (*2)	500r	/min			
	Encoder output data	Seria	I data			
	Power consumption	0.0	3A			
Mechanical	Inertia	0.5×10 <sup>-4</sup> kgm² or less				
	Shaft friction torque	0.1Nm or less				
characteristics for rotation	Shaft angle acceleration	4×10 <sup>4</sup> rad/s <sup>2</sup> or less				
rotation	Tolerable continuous rotation speed 4000r/min					
	Shaft amplitude (position 15mm from end)	0.02mm or less				
Mechanical	Tolerable load (thrust direction/radial direction)	9.8N/19.6N				
	Mass	0.6	ikg			
configuration	Degree of protection	IP67 (The shaft-through portion is excluded.)				
	Recommended coupling	Bellows	coupling			
	E/EH	0	0			
Compatible model	EM/EMH	0	=			
	EJ/EJH	0	-			

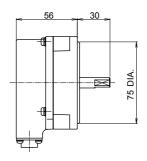
- (\*1) The values above are typical values after the calibration with our shipping test device and are not guaranteed.
- (\*2) If the tolerable rotation speed at power off is exceeded, the absolute position cannot be repaired.

#### **Outline dimension drawing**

**Specifications** 

#### OSA405ET2AS/OSA676ET2AS





[Unit:mm]

#### ■Twin-head magnetic encoder (MBA Series)

#### **Specifications**

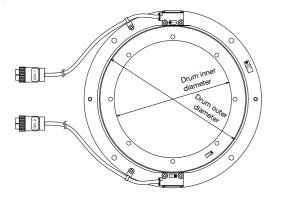
	Туре	MBA405W-BE082	MBA405W-BF125	MBA405W-BG160		
	Encoder resolution	4,000,000 pulse/rev				
	Detection method	Absolute position method (battery backup method)				
Electrical	Tolerable rotation speed at power off	3000r/min	2000r/min	1500r/min		
characteristics	Accuracy (*1) (*2)	±4 seconds	±3 seconds	±2 seconds		
Characteristics	Wave number within one rotation	512 waves	768 waves	1024 waves		
	Encoder output data	Serial data				
	Power consumption	0.2A or less				
Mechanical	Inertia	0.5×10 <sup>-3</sup> kg⋅m²	2.4×10 <sup>-3</sup> kg⋅m <sup>2</sup>	8.7×10 <sup>-3</sup> kg⋅m <sup>2</sup>		
characteristics	Tolerable angle acceleration (time of backup)	500rad/s <sup>2</sup>				
for rotation	Tolerable continuous rotation speed	3000r/min	2000r/min	1500r/min		
	Drum inner diameter	φ82mm	φ125mm	φ160mm		
Mechanical	Drum outer diameter	φ100mm	φ150.3mm	φ200.6mm		
configuration	Drum mass	0.2kg	0.46kg	1.0kg		
Comiguration	Degree of protection (*3)	IP67				
	Outline dimension	φ140mm×21.5mm	φ190mm×23.5mm	ф242mm×25.5mm		

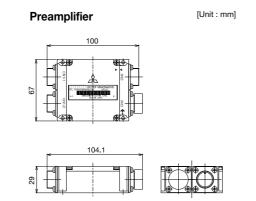
- (\*1) The values above are typical values after the calibration with our shipping test device and are not guaranteed.

  (\*2) The user is requested to install the magnetic drum and installation ring in the encoder within the accuracy range specified herein. Even when the accuracy of the encoder when shipped and when installed by the user is both within the specified range, there is a difference in the installation position. Therefore, the accuracy at the time of our shipment may not be acquired.

#### **Outline dimension drawing**

#### **Encoder**





#### DRIVE SYSTEM DEDICATED OPTIONS SPINDLE OPTIONS

According to the spindle control to be adopted, select the spindle side encoder based on the following table.

#### No-variable speed control (When spindle and motor are directly coupled or coupled with a 1:1 gear ratio)

Spindle control item	Control specifications	Without spindle side encoder	With spindle side encoder
	Normal cutting control	•	
Spindle control	Constant surface speed control (lathe)	•	
	Thread cutting (lathe)	•	
	1-point orientation control	•	
Orientation control	Multi-point orientation control	•	This normally is not used for novariable speed
	Orientation indexing	•	control.
	Standard synchronous tap	•	
Synchronous tap control	Synchronous tap after zero point		
	return	•	
Spindle synchronous	Without phase alignment function	•	
control	With phase alignment function	•	
C-axis control	C-axis control	• (Note)	•

(Note) When spindle and motor are coupled with a 1:1 gear ratio, use of a spindle side encoder is recommended to assure the precision.

#### Variable speed control (When using V-belt, or when spindle and motor are connected with a gear ratio other than 1:1)

<ul><li>Contro</li></ul>	l nossible x:	Control	not possible

		Without spindle side		With spindle side encoder	
Spindle control item	Control specifications	encoder encoder	TS5690/ERM280/ MPCI/MBE405W Series	OSE-1024	Proximity switch
	Normal cutting control	•	•	•	•
Spindle control	Constant surface speed control (lathe)	● (Note 1)	•	•	● (Note 1)
	Thread cutting (lathe)	×	•	•	×
	1-point orientation control	×	•	•	● (Note 3)
Orientation control	Multi-point orientation control	×	•	•	×
	Orientation indexing	×	•	•	×
	Standard synchronous tap	● (Note 2)	•	•	● (Note 2)
Synchronous tap control	Synchronous tap after zero point return	×	•	•	×
Spindle synchronous	Without phase alignment function	● (Note 1)	•	•	● (Note 1)
control	With phase alignment function	×	•	•	×
C-axis control	C-axis control	×	•	×	×

(Note 1) Control not possible when connected with the V-belt. (Note 2) Control not possible when connected with other than the gears.

(Note 3) When using a proximity switch, an orientation is executed after the spindle is stopped.

As for 2-axis spindle drive unit, setting is available only for one of the axes.

#### Cautions for connecting the spindle end with an OSE-1024 encoder

- [1] Confirm that the gear ratio (pulley ratio) of the spindle end to the encoder is 1:1.
- [2] Use a timing belt when connecting by a belt.

#### ■Spindle side ABZ pulse output encoder (OSE-1024 Series)

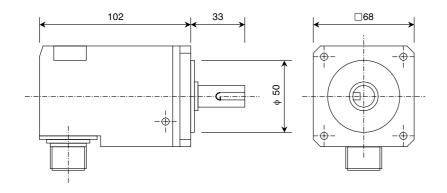
When a spindle and motor are connected with a V-belt, or connected with a gear ratio other than 1:1, use this spindle side encoder to detect the position and speed of the spindle. Also use this encoder when orientation control and synchronous tap control, etc are executed under the above conditions.

#### **Specifications**

	Туре	OSE-1024-3-15-68	OSE-1024-3-15-68-8		
Mechanical	Inertia	0.1×10 <sup>-4</sup> kgm <sup>2</sup> or less	0.1×10 <sup>-4</sup> kgm <sup>2</sup> or less		
characteristics for	Shaft friction torque	0.98Nm or less	0.98Nm or less		
rotation	Shaft angle acceleration	104rad/s2 or less	10 <sup>4</sup> rad/s <sup>2</sup> or less		
Totation	Tolerable continuous rotation speed	6000r/min	8000r/min		
	Bearing maximum non-lubrication time	20000h/6000r/min	20000h/8000r/min		
	Shaft amplitude (position 15mm from end)	0.02mm or less	0.02mm or less		
Mechanical configuration	Tolerable load (thrust direction/radial direction)	10kg/20kg Half of value during operation	10kg/20kg Half of value during operation		
	Mass	1.5kg	1.5kg		
	Degree of protection	IP	54		
	Squareness of flange to shaft	0.05mm	n or less		
	Flange matching eccentricity	0.05mm	n or less		
	E/EH	0	0		
Compatible model	EM/EMH	0	0		
	EJ/EJH	0	0		

(Note) Confirm that the gear ratio (pulley ratio) of the spindle end to the encoder is 1:1.

#### **Outline dimension drawing**



[Unit:mm]

Spindle side encoder (OSE-1024-3-15-68, OSE-1024-3-15-68-8)

#### ■Spindle side PLG serial output encoder (TS5690, MU1606 Series)

This encoder is used when a more accurate synchronous tapping control or C-axis control than OSE encoder is performed to the spindle which is not directly-connected to the spindle motor.

#### **Specifications**

	Series type						TS5690	N64xx				
	xx (The end of the	Standard connector	12	22	32	42	52	17	27	37	47	57
Sensor	type name)	Water-proof connector	19	29	39	49	59	18	28	38	48	58
	Length of lea	ıd [mm]	400±10	800±20	1200±20	1600±30	2000±30	400±10	800±20	1200±20	1600±30	2000±30
	Lead wire lea	ad-out direction		V	ertical direction	n				Shaft direction	1	
	Туре						MU160	6N601				
Detection	The number	of teeth					6	4				
Detection	Outer diame	ter [mm]					φ5:	2.8				
gear	Inner diame	ter [mm]					φ40	)H5				
	Thickness	[mm]		12								
Notched	Outer diame	ter [mm]		ф59.4								
fitting section	Outer diame tolerance	ter [mm]		-0.070 to -0.030								
The number of output	A/B phase						6	4				
pulse	Z phase						1	l				
Detection re	esolution	[p/rev]					2 mi	llion				
Absolute ac	curacy at stop	p		150"								
Tolerable sp	peed	[r/min]	40,000									
Signal outp	ut						Mitsubishi hig	h-speed seria	l			
Compatible	E/EH											
model	EM/EMH											
model	EJ/EJH											

	Series type						TS5690	N90xx				
	xx (The end of the	Standard connector	12	22	32	42	52	17	27	37	47	57
Sensor	type name)	Water-proof connector	19	29	39	49	59	18	28	38	48	58
	Length of lea	ad [mm]	400±10	800±20	1200±20	1600±30	2000±30	400±10	800±20	1200±20	1600±30	2000±30
	Lead wire lea	ad-out direction		V	ertical direction	n				Shaft direction	1	
	Туре						MU160	6N906				
Detection	The number	of teeth					9	0				
gear	Outer diame	eter [mm]					φ7	3.6				
yeai	Inner diame	ter [mm]		φ60H5								
	Thickness	[mm]		12								
Notched	Outer diame			ф79.2								
fitting section	Outer diame tolerance	eter [mm]		0 to +0.040								
The number of output	A/B phase						9	0				
pulse	Z phase						1	1				
Detection re	esolution	[p/rev]					2,880	0,000				
	curacy at sto	р					10	5"				
Tolerable sp	rable speed [r/min]			30,000								
Signal outpu				Mitsubishi high-speed serial								
Compatible	E/EH							)				
model	EM/EMH											
illouei	EJ/EJH											

	Serie	es type					TS5690	N12xx				
	xx (The end of the	Standard connector	12	22	32	42	52	17	27	37	47	57
Sensor	type name)	Water-proof connector	19	29	39	49	59	18	28	38	48	58
	Length of lea	ıd [mm]	400±10	800±20	1200±20	1600±30	2000±30	400±10	800±20	1200±20	1600±30	2000±30
	Lead wire lea	ad-out direction		V	ertical direction	n				Shaft direction	1	
	Туре						MU160	6N709				
Detection	The number	of teeth					12					
gear	Outer diame						φ10					
gear	Inner diame						φ80					
	Thickness	[mm]		12								
Notched	Outer diame	ter [mm]		φ108.8								
fitting section	Outer diame tolerance	eter [mm]					-0.015 to	+0.025				
The number of output	A/B phase			128								
pulse	Z phase			1								
Detection re	esolution	[p/rev]	4 million									
Absolute ac	accuracy at stop						10	0"				
Tolerable sp	Tolerable speed [r/min]		20,000									
Signal output		Mitsubishi high-speed serial										
Compatible	E/EH											
model	EM/EMH											
model	EJ/EJH							)				

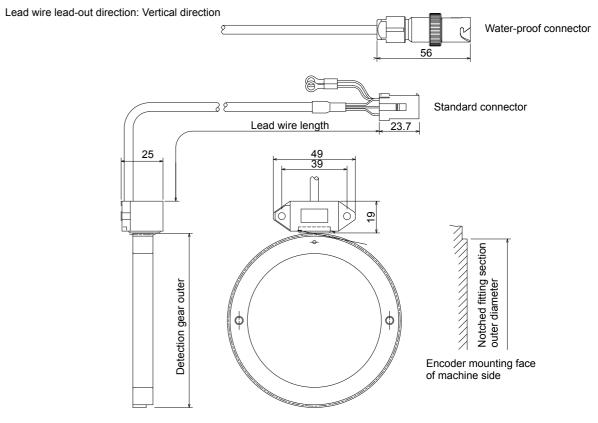
6 DRIVE SYSTEM

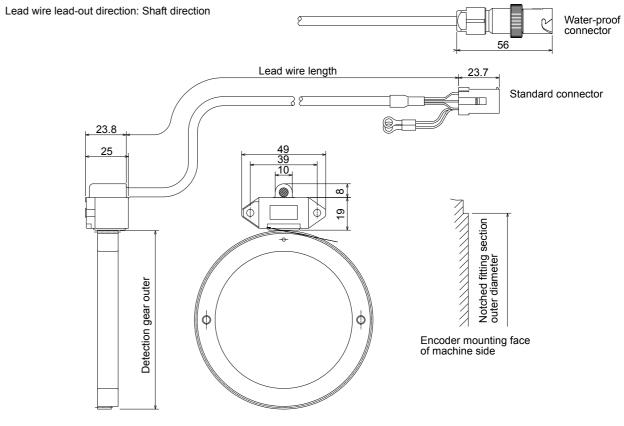
[Unit:mm]

	Series type						TS5690	N19xx				
	xx (The	Standard connector	12	22	32	42	52	17	27	37	47	57
Sensor	type name)	Water-proof connector	19	29	39	49	59	18	28	38	48	58
	Length of lea	ad [mm]	400±10	800±20	1200±20	1600±30	2000±30	400±10	800±20	1200±20	1600±30	2000±30
	Lead wire lea	ad-out direction		V	ertical direction	n				Shaft direction	า	
	Туре						MU160	6N203				
Detection	The number	of teeth					19	92				
gear	Outer diame	eter [mm]					φ15	5.2				
gear	Inner diame	ter [mm]					φ12					
	Thickness	[mm]						2				
Notched	Outer diame						φ15	8.4				
fitting section	Outer diame tolerance	eter [mm]		-0.040 to 0								
The number of output	A/B phase						19	92				
pulse	Z phase						1	1				
Detection re	esolution	[p/rev]					6 mi	llion				
Absolute ac	lute accuracy at stop						97	.5"				
Tolerable sp	Tolerable speed [r/min]		15,000									
Signal outpo	Signal output			Mitsubishi high-speed serial								
Compatible	E/EH						(					
model	EM/EMH						(					
model	EJ/EJH						(					

	Series type						TS5690	N25xx				
	xx (The end of the	Standard connector	12	22	32	42	52	17	27	37	47	57
Sensor	type name)	Water-proof connector	19	29	39	49	59	18	28	38	48	58
	Length of lea	ad [mm]	400±10	800±20	1200±20	1600±30	2000±30	400±10	800±20	1200±20	1600±30	2000±30
	Lead wire lea	ad-out direction		V	ertical direction	n				Shaft direction	1	
	Туре						MU160	6N802				
Detection	The number	of teeth					25	56				
gear	Outer diame	eter [mm]					φ20	6.4				
geai	Inner diame	ter [mm]		φ160H5								
	Thickness	[mm]		15.8								
Notched	Outer diame	eter [mm]		φ210.2								
fitting section	Outer diame tolerance	eter [mm]		+0.0 to +0.040								
The number of output	A/B phase						25	56				
pulse	Z phase						1	I				
Detection re	esolution	[p/rev]					8 mi	llion				
Absolute ac	accuracy at stop						95	5"				
Tolerable sp	rable speed [r/min]						10,0	000				
Signal outpo	al output						Mitsubishi higl	h-speed seria				
Compatible	E/EH											
model	EM/EMH							)				
model	EJ/EJH											

#### Outline dimension drawing





DRIVE SYSTEM

#### ■Twin-head magnetic encoder (MBE Series)

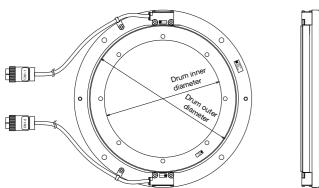
#### **Specifications**

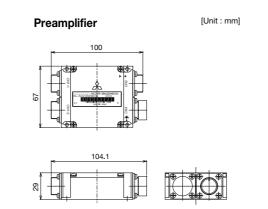
	Туре	MBE405W-BE082	MBE405W-BF125	MBE405W-BG160						
	Encoder resolution	4,000,000 pulse/rev								
	Detection method		Incremental							
Electrical	Accuracy (*1) (*2)	±4 seconds	±3 seconds	±2 seconds						
characteristics	Wave number within one rotation	512 waves	768 waves	1024 waves						
	Encoder output data	Serial data								
	Power consumption		0.2A or less							
Mechanical	Inertia	0.5×10 <sup>-3</sup> kg⋅m²	2.4×10 <sup>-3</sup> kg⋅m <sup>2</sup>	8.7×10 <sup>-3</sup> kg·m <sup>2</sup>						
characteristics for rotation	Tolerable continuous rotation speed	15000r/min	10000r/min	8000r/min						
	Drum inner diameter	φ82mm	φ125mm	φ160mm						
Mechanical	Drum outer diameter	φ100mm	φ150.3mm	φ200.6mm						
	Drum mass	0.2kg	0.46kg	1.0kg						
configuration	Degree of protection (*3)		IP67							
	Outline dimension	φ140mm×21.5mm	φ190mm×23.5mm	φ242mm×25.5mm						

- (\*1) The values above are typical values after the calibration with our shipping test device and are not guaranteed.
- (\*2) The user is requested to install the magnetic drum and installation ring in the encoder within the accuracy range specified herein. Even when the accuracy of the encoder when shipped and when installed by the user is both within the specified range, there is a difference in the installation position. Therefore, the accuracy at the time of our shipment may not be acquired.
- (\*3) It is the degree of protection when fitted with a connector.

#### **Outline dimension drawing**

#### **Encoder**





#### ■Spindle side accuracy serial output encoder (ERM280, MPCI Series)

C-axis control encoder is used in order to perform an accurate C-axis control.

Manufa	acturer	HEIDE	HEIDENHAIN					
Encoder type		ERM280 1200	ERM280 2048	MPCI Series				
Interface unit type		EIB192M C4 1200	EIB192M C6 2048	ADB-20J20				
interface unit type		EIB392M C4 1200	EIB392M C6 2048	ADB-20020				
Minimum detection	rocolution	0.0000183°	0.00005°					
Willimum detection i	esolution	(19,660,800p/rev)	(7,200,000p/rev)					
Tolerable maximum	speed	20000r/min	11718r/min	10000r/min				
	E/EH			0				
Compatible model	EM/EMH		0					
EJ/EJH		(		0				

## DRIVE SYSTEM ENCODER INTERFACE UNIT

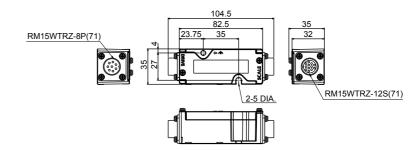
#### ■Serial output interface unit for ABZ analog encoder MDS-EX-HR

This unit superimposes the scale analog output raw waves, and generates high resolution position data. Increasing the encoder resolution is effective for the servo high-gain.

#### **Specifications**

Тур	е	MDS-EX-HR-11				
Compatible scale (example)	ole)	LS186 / LS486 / LS186C / LS486C (HEIDENHAIN)				
Signal 2-division function	1	Not possible				
Analog signal input speci	ifications	A -phase, B -phase, Z-phase (Amplitude 1Vp-p)				
Compatible frequency		Analog raw waveform max.200kHz				
Scale resolution		Analog raw waveform / 16384 division				
Input/output communicat	ion style	High-speed serial communication I/F, RS485 or equivalent				
Tolerable power voltage		5VDC±5%				
Maximum heating value		2W				
Mass		0.2kg or less				
Degree of protection		IP67				
	E/EH	0				
Compatible model	EM/EMH	0				
	EJ/EJH	0				

#### **Outline dimension drawing**



[Unit : mm]

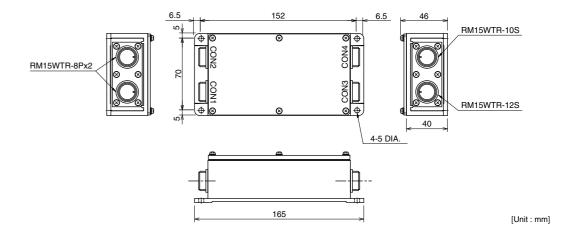
#### ■Serial output interface unit for ABZ analog encoder MDS-B-HR

This unit superimposes the scale analog output raw waves, and generates high resolution position data. Increasing the encoder resolution is effective for the servo high-gain. MDS-B-HR-12 (P) is used for the synchronous control system that 1-scale 2-drive operation is possible.

#### **Specifications**

opcomodions								
Ту	ре	MDS-B-HR-11	MDS-B-HR-12	MDS-B-HR-11P	MDS-B-HR-12P			
Compatible scale (exar	nple)		LS186 / LS186C / LS186C (HEIDENHAIN)					
Signal 2-division function	on	×	0	×	0			
Analog signal input spe	cifications		A-phase, B-phase, Z-pl	hase (Amplitude 1Vp-p)				
Compatible frequency			Analog raw wave	form max. 200kHz				
Scale resolution			Analog raw wave	form/512 division				
Input/output communic	ation style	High-speed serial communication I/F, RS485 or equivalent						
Tolerable power voltage	9	DC5V±5%						
Maximum heating value	•	2W						
Mass		0.5kg or less						
Degree of protection		ll ll	P65	IP	67			
	E/EH	0	0	0	0			
Compatible model	Compatible model EM/EMH		-	0	-			
EJ/EJH		0	0	0	0			

#### **Outline dimension drawing**



[Unit:mm]

#### ■Serial signal division unit MDS-B-SD

This unit has a function to divide the position and speed signals fed back from the high-speed serial encoder and highspeed serial linear scale. This unit is used to carry out synchronized control of the motor with two MDS-E/EH-V1 drive units.

#### **Specifications**

-					
Туре		MDS-B-SD			
Compatible servo drive	unit	MDS-E/EH-V1-□			
Input/output communic	ation style	High-speed serial communication I/F, RS485 or equivalent			
Tolerable power voltage	е	DC5V±10%			
Maximum heating value	е	4W			
Mass		0.5kg or less			
Degree of protection		IP20			
	E/EH	0			
Compatible model	EM/EMH	-			
	EJ/EJH	0			

## ■Serial output interface unit for ABZ analog encoder EIB192M (Other manufacturer's product)

#### **Specifications**

Туре	)	EIB192M A4 20μm	EIB192M C4 1200	EIB192M C4 2048		
Manufacturer		HEIDENHAIN				
Input signal			A-phase, B-phase: SIN wave 1Vpp, Z-phase	е		
Maximum input frequency	1		400kHz			
Output signal		N	1itsubishi high-speed serial signal (Mitsu02-	4)		
Interpolation division num	ber		Maximum 16384 divisions			
Compatible encoder		LS187, LS487	ERM280 1200	ERM280 2048		
Minimum detection resolu	tion	0.0012µm	0.0000183°	0.0000107°		
Willimitatif detection resolu	IIIOI1	0.0012μπ	(33,554,432p/rev)			
Degree of protection		IP65				
Outline dimension		98mm×64mm×38.5mm				
Mass		300g				
E/EH		0	0	0		
Compatible model	EM/EMH	Ō	Ō	0		
EJ/EJH		0	0	0		

# ■Serial output interface unit for ABZ analog encoder EIB392M (Other manufacturer's product)

#### Specifications

opoomoationo							
Ty	уре	EIB392M A4 20µm	EIB392M C4 1200	EIB392M C4 2048			
Manufacturer			HEIDENHAIN				
Input signal			A-phase, B-phase: SIN wave 1Vpp, Z-phase	е			
Maximum input frequer	ncy		400kHz				
Output signal			Mitsubishi high-speed serial signal (Mitsu02-	4)			
Interpolation division n	umber		Maximum 16384 divisions				
Compatible encoder		LS187, LS487	ERM280 1200	ERM280 2048			
Minimum detection res	olution	0.0012µm	0.0000183°	0.0000107°			
wiiriiiriurii detectiori res	Olution	0.0012μΠ	(19,660,800p/rev)	(33,554,432p/rev)			
Degree of protection			IP40				
Outline dimension			76.5mm×43mm×16.6mm				
Mass			140g				
	E/EH O		0	0			
Compatible model	EM/EMH	0	0	0			
	EJ/EJH	0	0	0			

#### ■Serial output interface unit for ABZ analog encoder ADB-20J Series (Other manufacturer's product) **Specifications**

Турс	Туре		ADB-20J20 ADB-20J60 ADB-20J71				
Manufacturer		Mitsubishi Heavy Industries Machine Tool Co., Ltd.					
Maximum response spee	d	10,000r/min	3,600m/min	5,000r/min	10,000r/min		
Output signal			Mitsubishi high-s	peed serial signal			
Compatible encoder		MPCI series	MPS series	MPI series	MPRZ series		
Minimum detection resolu	Minimum detection resolution		0.05µm	0.000025° (1,440,000p/rev)	0.000043° (8,388,608p/rev)		
Degree of protection		IP20					
Outline dimension		190mm×160mm×40mm					
Mass		0.9kg					
	E/EH	0	0	0	0		
Compatible model	EM/EMH	0	0	0	0		
	EJ/EJH	0	0	0	0		

## DRIVE SYSTEM DEDICATED OPTIONS DRIVE UNIT OPTION

#### **■DC** connection bar

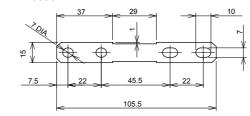
When connecting a large capacity drive unit with L+L- terminal of power supply unit, DC connection bar is required. In use of the following large capacity drive units, use a dedicated DC connection bar. The DC connection bar to be used depends on the connected power supply, so make a selection according to the following table.

#### **Specifications**

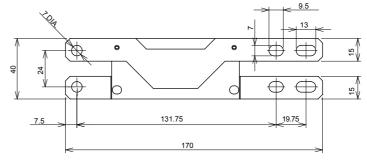
:	Series	MD	S-E	MDS-EH		
Large capacity drive unit		MDS-E-SP-400 MDS-E-SP-640	MDS-E-SP-400 MDS-E-SP-640	MDS-EH-SP-200 MDS-EH-SP-320 MDS-EH-SP-480	MDS-EH-V1-200 MDS-EH-SP-200 MDS-EH-SP-320	MDS-EH-V1-200
Power supply unit		MDS-E-CV-300 MDS-E-CV-370 MDS-E-CV-450	MDS-E-CV-550	MDS-EH-CV-550 MDS-EH-CV-750	MDS-E-CV-300 MDS-E-CV-370 MDS-E-CV-450	MDS-EH-CV-185
Required connect	tion bar	E-BAR-B0606	E-BAR-A0606 (Two-parts set)	E-BAR-A0606 (Two-parts set)	DH-BAR-B0606	DH-BAR-C0606
Commotible	E/EH	0	0	0	0	0
Compatible model	EM/EMH	_	-	_	_	_
model	EJ/EJH	-	-	-	-	-

#### **Outline dimension drawings**

#### E-BAR-A0606

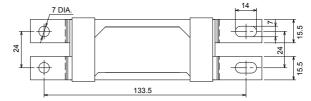


#### E-BAR-B0606



(Note) E-BAR-A0606 is a set of two DC connection bars.

#### **DH-BAR-B0606**



#### DH-BAR-C0606



#### ■Side protection cover (E-COVER-1/E-COVER-2)

Install the side protection cover outside the both ends of the connected units.

#### **■**Regenerative option

Confirm the regeneration resistor capacity and possibility of connecting with the drive unit.

The regenerative resistor generates heats, so wire and install the unit while taking care to safety. When using the regenerative resistor, make sure that flammable matters, such as cables, do not contact the resistor, and provide a cover on the machine so that dust or oil does not accumulate on the resistor and ignite.

#### Combination with servo drive unit

Corresponding	Standard bu	ıilt₋in			External of	ption regenerativ	e resistor		
servo drive unit	servo regenerative resistor		MR-RB032	MR-RB12	MR-RB32	MR-RB30	MR-RB50	MR-RB31	MR-RB51
	Mass		0.5kg	1.1kg	2.9kg	2.9kg	5.6kg	2.9kg	5.6kg
			168mm×	168mm×	150mm×	150mm×	350mm×	150mm×	350mm×
	Unit outline din	aanaian	30mm×	40mm×	100mm×	100mm×	128mm×	100mm×	128mm×
	Offic outline diff	Hension	119mm	149mm	318mm	318mm	200mm	318mm	200mm
			W1	W2	W3	W3	W4	W3	W4
	External option regenerative resistor		-	GZG200W 39OHMK	GZG200W120 OHMK ×3	GZG200W39 OHMK ×3	GZG300W39 OHMK ×3	GZG200W20 OHMK ×3	GZG300W20 OHMK ×3
			30W	100W	300W	300W	500W	300W	500W
	Regenerative capacity	Resistance value	40Ω	40Ω	40Ω	13Ω	13Ω	6.7Ω	6.7Ω
MDS-EJ-V1-10	10W	100Ω	0	0					
MDS-EJ-V1-15	10W	100Ω	0	0					
MDS-EJ-V1-30	20W	40Ω	0	0	0				
MDS-EJ-V1-40	100W	13Ω				0	0		
MDS-EJ-V1-80	100W	9Ω				0	0	0	0
MDS-EJ-V1-100	100W	9Ω				0	0	0	0

Corresponding	Standard bu	ilt-in	External option regenerative resistor					
servo drive unit	regenerative resistor		MR-RB1H-4	MR-RB3M-4	MR-RB3G-4	MR-RB5G-4 (Note 1)		
	Mass		1.1kg	2.9kg	2.9kg	5.6kg		
	I loit outling din		168mm×40mm×149mm	150mm×100mm×318mm	150mm×100mm×318mm	350mm×128mm×200mm		
	Unit outline dimension		W2	W3	W3	W4		
	Regenerative		100W	300W	300W	500W		
	capacity	Resistance value	82Ω	120Ω	47Ω	47Ω		
MDS-EJH-V1-10	20W	80Ω	0	0				
MDS-EJH-V1-15	20W	80Ω	0	0				
MDS-EJH-V1-20	100W	40Ω			0	0		
MDS-EJH-V1-40	120W	47Ω			0	0		

(Note 1) Install a cooling fan in the unit.

#### Combination with spindle drive unit

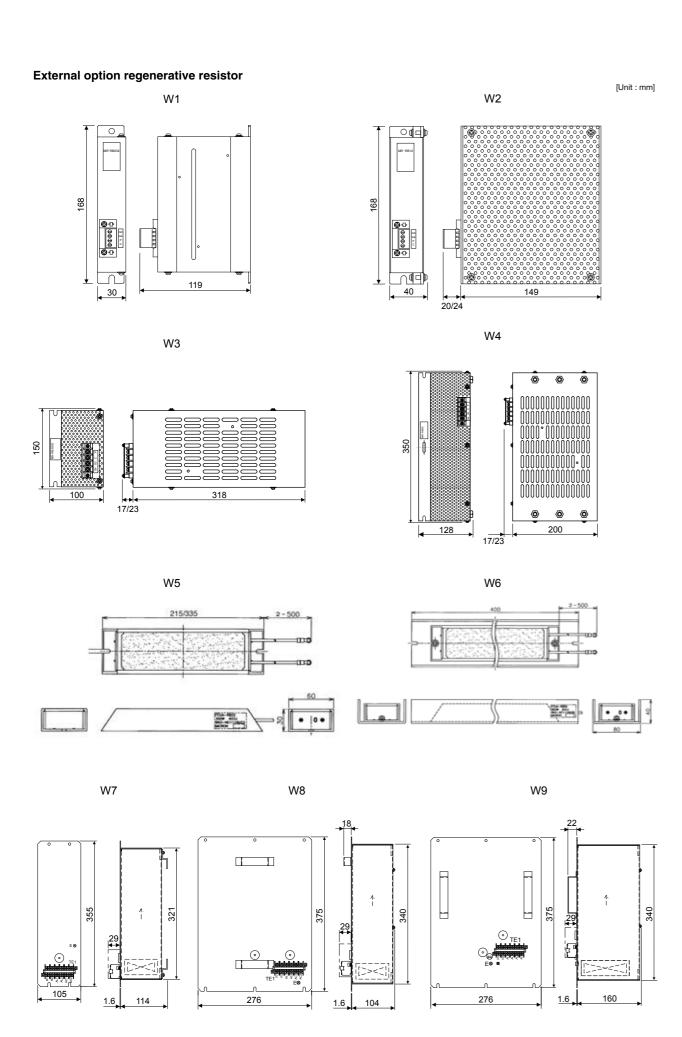


The regenerative resistor is not incorporated in the spindle drive unit. Make sure to install the external option regenerative resistor.

Corresponding		External option regenerative resistor					
spindle drive unit		MR-RB12	MR-RB32	MR-RB30	MR-RB50		
	Mass	0.8kg	2.9kg	2.9kg	5.6kg		
	Unit outline dimension	168mm×40mm×149mm	150mm×100mm×318mm	150mm×100mm×318mm	350mm×128mm×200mm		
	Unit outline dimension	W2	W3	W3	W4		
	External option regenerative resistor	GZG200W39OHMK	GZG200W120 OHMKx3	GZG200W39 OHMKx3	GZG300W39 OHMK×3		
		40014/					
	Regenerative capacity	100W	300W	300W	500W		
	Resistance value	40Ω	40Ω	13Ω	13Ω		
MDS-EJ-SP-20	-	0	0				
MDS-EJ-SP-40	_			0	0		
MDS-EJ-SP-80	-			0	0		
MDS-EJ-SP-100	-			0	0		
MDS-EJ-SP-120	-				0		
MDS-EJ-SP-160	-						

Corresponding		External option regenerative resistor							
spindle drive unit		FCUA-RB22	FCUA-RB37	FCUA-RB55	FCUA-RB75/2 (1 unit)				
	Mass	0.8kg	1.2kg	2.2kg	2.2kg				
	Unit outline dimension	30mm×60mm×215mm	30mm×60mm×335mm	40mm×80mm×400mm	40mm×80mm×400mm				
	Onit outline dimension	W5	W5	W6	W6				
	Regenerative capacity		185W	340W	340W				
	Resistance value	40Ω	25Ω	20Ω	30Ω				
MDS-EJ-SP-20	-	0	0						
MDS-EJ-SP-40	-	0	0	0	0				
MDS-EJ-SP-80	-		0	0	0				
MDS-EJ-SP-100	-			0					
MDS-EJ-SP-120	-								
MDS-EJ-SP-160	-								

		External option regenerative resistor							
Corresponding spindle drive unit		R-UNIT1	R-UNIT2	R-UNIT3	R-UNIT4	R-UNIT5	FCUA-RB55 2 units connected in parallel	FCUA-RB75/2 2 units connected in parallel	
	Mass	4.3kg	4.4kg	10.8kg	11.0kg	15.0kg	4.4kg	4.4kg	
	Unit outline dimension	355mm× 105mm× 114mm W7	355mm× 105mm× 114mm W7	375mm× 276mm× 104mm W8	375mm× 276mm× 104mm W8	375mm× 276mm× 160mm W9	40mm× 80mm× 400mm W6	40mmx 80mmx 400mm W6	
	Regenerative capacity	700W	700W	2100W	2100W	3100W	680W	680W	
	Resistance value	30Ω	15Ω	15Ω	10Ω	10Ω	10Ω	15Ω	
MDS-EJ-SP-20	-								
MDS-EJ-SP-40	-	0	0	0				0	
MDS-EJ-SP-80	-	0	0	0	0	0	0	0	
MDS-EJ-SP-100	-		0	0	0	0	0	0	
MDS-EJ-SP-120	-		0	0	0	0	0	0	
MDS-EJ-SP-160	-				0	0			



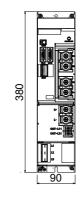
#### ■Power backup unit MDS-D/DH-PFU

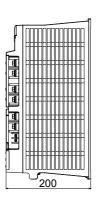
Use this unit to protect machines or drive units at power failure.

#### **Specifications**

Power backup unit type		•	MDS-DH-PFU	MDS-D-PFU			
	Rated voltage	[V]	380 to 480AC (50/60Hz) (Exclusively for earthed-star supply system) Tolerable fluctuation : between +10% and -10%	200 to 230AC (50/60Hz) Tolerable fluctuation : between +10% and -15%			
AC Input	Frequency	[Hz]	50/60 Tolerable fluctuatio	n : between +3% and -3%			
	Rated current	[A]	2	4			
DC Innut/	Rated voltage	[V]	513 to 648DC	270 to 311DC			
DC Input/ Output	Rated current [A]		Regenerative input: MAX 200A Power running output: MAX 160A	Regenerative input: MAX 300A Power running output: MAX 200A			
	Voltage [V]		Single-phase 200 to 230VAC (50Hz or 60Hz) 50Hz at backup	Single-phase 380 to 480VAC (50Hz or 60Hz) 50Hz at backup			
	Current	[A]	MAX 2	MAX 4			
AC output for control power	Maximum number of drive unit	s to connect	6 units (except for the power supply unit)				
backup	Switching time		Within 100ms after AC inpu	t instantaneous interruption			
	Minimum backup time		75ms or more (380VAC input, at maximum number of drive units to connect)	75ms or more (200VAC input, at maximum number of drive units to connect)			
Degree of protection			IP20 [except for the terminal block and connector area]				
Cooling method			Natural-cooling				
Mass		[kg]	4	4			

Outline dimension drawing





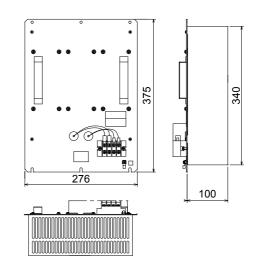
[Unit:mm]

## ■Regenerative resistor unit for power backup unit R-UNIT-6, R-UNIT-7

#### **Specifications**

Regenerative resistor type		R-UNIT-6	R-UNIT-7			
Corresponding power backup unit ty	ре	MDS-DH-PFU	MDS-D-PFU			
Resistance value	[Ω]	5	1.4			
Instantaneous regeneration capacity	[kW]	128	114			
Tolerable regeneration work amount	[kJ]	180	180			
Cooling method		Natural-cooling	Natural-cooling			
Mass	[kg]	10	10			

Outline dimension drawing



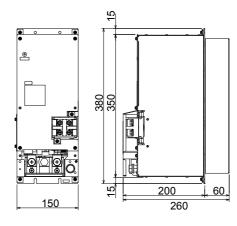
[Unit : mm]

## ■Capacitor unit MDS-D/DH-CU

#### **Specifications**

Capacito	r unit type	MDS-DH-CU	MDS-D-CU			
Compatible capacito	r unit type	MDS-DH-PFU	MDS-D-PFU			
Capacity	[μF]	7000	28000			
DC Input/Output	Rated voltage [V]	513 to 648DC	270 to 311DC			
Cooling method		Natural-cooling	Natural-cooling			
Mass	[kg]	11	11			

Outline dimension drawing



[Unit : mm]

## **DRIVE SYSTEM SELECTION OF CABLES AND CONNECTORS**

■MDS-E Series Power Cable/Connector and Brake Cable/Connector for Servo Motor Selection List

		Desir				Power Cable			Brake Cable	•												
			e unit t		Single connector	Ca	ble	Single connector	ıble													
Son	o motor type		VID3-E	_		Moto	r side		Motor side													
Gervo motor type		V1	<b>V</b> 2	<b>V</b> 3	Drive unit side	Lead out in direction of motor shaft	Lead out in opposite direction of motor shaft	Drive unit side	Lead out in direction of motor shaft	Lead out in opposite direction of motor shaft												
	HG46		20	20	- All axes CNU01SEF (AWG14) - L-axis only																	
HG Series	HG56	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	CNU01SEL (AWG14) - M-axis only CNU01SEM	MR-PWS1CBL ☐ M-A1-H ☐ : Length (m) 2, 3, 5, 7, 10	MR-PWS1CBL ☐ M-A2-H ☐ : Length (m) 2, 3, 5, 7, 10	CNU23S (AWG14)	MR-BKS1CBL ☐ M-A1-H ☐ : Length (m) 2, 3, 5, 7, 10	MR-BKS1CBL ☐ M-A2-H ☐ : Length (m) 2, 3, 5, 7, 10
	HG96		40	40	(AWG14) - S-axis only CNU01SES (AWG14)																	

		Driv	e unit	type		Power Connecto	or		Brake Connec	tor
Sen	vo motor type	1	MDS-E	-	Drive unit	Moto	r side	Drive unit	Moto	r side
		V1	V2	V3	side	Straight	Right angle	side	Straight	Right angle
	HG75□-S105010					CNP14-2S (12) Applicable cable outline	CNP14-2L (12) Applicable cable outline			
	HG105□-S105010	20	20	20		φ10 to 12 (mm)	φ10 to 12 (mm)			
	HG75		40	40						
	HG105									
	HG123				- All axes	CNP18-10S (14)	CNP18-10L (14)			
	HG142	20	20		CNU01SEF	Applicable cable outline	Applicable cable outline \$\phi10.5\$ to 14 (mm)			
	HG54				(AWG14) - L-axis only	φ10.5 to 14 (mm)				
	HG104				CNU01SEL					CNR10-R2L (6)
	HG223	40	40		(AWG14)				CNB10-R2S (6) CNB10S-R2S (6)	CNB10-R2L (6) CNB10S-R2L (6)
HG Series	HG302		80	40	- M-axis only CNU01SEM (AWG14) - S-axis only	CNP22-22S (16) Applicable cable outline  \$\phi\$12.5 to 16 (mm)	CNP22-22L (16) Applicable cable outline \$12.5 to 16 (mm)	CNU23S (AWG14)	Applicable cable outline	Applicable cable outline \$\phi 4.0 to 6.0 (mm)\$
	HG154			]	CNU01SES	CNP18-10S (14)	CNP18-10L (14)	]		
	HG224	80	80		(AWG14)	Applicable cable outline \$\phi 10.5 to 14 (mm)\$				
	HG204		160			CNP22-22S (16)	CNP22-22L (16)	1		
	HG303					Applicable cable	Applicable cable			
	HG354	100	160	1 _		outline	outline			
	HG453	160 160W			φ12.5 to 16 (mm)	φ12.5 to 16 (mm)				
	HG703	160W	160W	]		CNP32-17S (23)	CNP32-17L (23)	]		
	HG903	320	_		Terminal block connection	Applicable cable outline ¢22 to 23.8 (mm)	Applicable cable outline ¢22 to 23.8 (mm)			

#### **■MDS-E Series Encoder Cable and Connector for Servo Motor Selection List**

					Servo encoder cable									
						Motor	side encode	er cable		Ва	II screw side	encoder ca	ble	
Servo	motor		e unit t		Cable (for D48/D51/D74)		Sir	ngle connec	tor		Ball screw side encoder (OSA405ET2AS/OSA676ET2AS)			
ty	ype		VID3-E				Drive unit	Moto	r side	Ca	ble	Single connector		
		V1	V2	V3	Straight	Right angle	side	Straight	Right angle	Straight	Right angle	Straight	Right angle	
	HG46			20										
	HG56		20											
	HG96	20												
	HG75		20		20									
	HG105	1	20 40	40										
	HG123	1	40											
-	HG142	20	20								CNIVOE OD EIN	CNE10-R10S (9)	CNE10-R10L (9)	
	HG54							CNE10-R10S (9)	CNE10-R10L (9)					
	HG104	1	40			CNV2E-9P-□M □ : Length (m)		CNE10S-R10S (9)	CNE10S-R10L (9)	CNV2E-8P-LIM	CNV2E-9P-□M	CNE10S-R10S (9)	CNE10S-R10L (9)	
HG	HG223	40	80	40	2, 3, 4, 5, 7,	2, 3, 4, 5, 7,				2, 3, 4, 5, 7,	2, 3, 4, 5, 7,		Applicable	
Series	HG302	1			10, 15, 20,	10, 15, 20,	(AWG18)	cable outline 6.0 to 9.0	cable outline 6.0 to 9.0	10, 15, 20,	10, 15, 20,	cable outline 6.0 to 9.0	cable outline 6.0 to 9.0	
	HG154				25, 30	25, 30		(mm)	(mm)	25, 30	25, 30	(mm)	(mm)	
	HG224	1	80											
	HG204	80	160											
	HG303	1												
	HG354		160	_										
	HG453	160	160W											
	HG703	160W	160W											
	HG903	320	_											

## **■MDS-E Series Power Connector for Spindle Motor Selection List**

Spindle	motor type		unit type DS-E-	Power Connect	or
		SP	SP2	Drive unit side	Motor side
	SJ-D3.7/100-01			- All axes CNU01SEF (AWG14)	
	SJ-D5.5/100-01	80	80	- L-axis only CNU01SEL (AWG14)	
	SJ-D5.5/120-01		16080 (M)	<ul> <li>M-axis only CNU01SEM (AWG14)</li> <li>S-axis only CNU01SES (AWG14)</li> </ul>	
SJ-D Series (Normal)	SJ-D5.5/120-02	160 200	16080 (L)		
-	SJ-D7.5/100-01				
	SJ-D7.5/120-01	160	16080 (L)		
	SJ-D11/100-01				
SJ-D Series (Hollow shaft)	SJ-D5.5/120-02T-S	160 200	16080 (L)	Terminal block connection	
	SJ-DG3.7/120-03T				
SJ-DG Series	SJ-DG5.5/120-04T	160	-		
(High output)	SJ-DG7.5/120-05T				
	SJ-DG11/100-03T	200	-		
	SJ-DJ5.5/100-01	80	80 16080 (M)	- All axes CNU01SEF (AWG14) - L-axis only CNU01SEL (AWG14) - M-axis only CNU01SEM (AWG14) - S-axis only CNU01SES (AWG14)	
SJ-DJ Series (Compact & lightweight)	SJ-DJ5.5/120-01	80	80 16080 (M)	- All axes CNU01SEF (AWG14) - L-axis only CNU01SEL (AWG14) - M-axis only CNU01SEM (AWG14) - S-axis only CNU01SES (AWG14)	
	SJ-DJ7.5/100-01				
	SJ-DJ7.5/120-01	160	16080 (L)	Terminal block connection	
	SJ-DJ11/100-01			Terminal block connection	
	SJ-DJ15/80-01	200			_
	SJ-DL0.75/100-01	20	20	<ul> <li>- All axes CNU01SEF (AWG14)</li> <li>- L-axis only CNU01SEL (AWG14)</li> </ul>	
SJ-DL Series (Low-inertia) — SJ-DL Series (Hollow shaft)	SJ-DL1.5/100-01	40	40	- M-axis only CNU01SEM (AWG14) - S-axis only CNU01SES (AWG14)	
	SJ-DL5.5/150-01T				
	SJ-DL5.5/200-01T	160	16080 (L)		
	SJ-DL7.5/150-01T SJ-DL5.5/200-01T-S	160	16080 (L)	Terminal block connection	Terminal block connection
(Hollow Shart)	011/00047		+	- All axes CNU01SEF (AWG14)	_
	SJ-V2.2-01T	40	40 80	- L-axis only CNU01SEL (AWG14) - M-axis only CNU01SEM (AWG14)	
	SJ-V3.7-02ZT	80	16080 (M)	- S-axis only CNU01SES (AWG14)	
[	SJ-V7.5-03ZT	160	16080 (L)		
].	SJ-V11-08ZT				
	SJ-V11-13ZT	200	-		
SJ-V Series	SJ-V15-01ZT SJ-V15-09ZT		+		
(Normal)	SJ-V18.5-01ZT	200	-		
(	SJ-V18.5-04ZT		+		
ŀ	SJ-V22-01ZT	240	-		
ļ	SJ-V22-04ZT	320	_		
	SJ-V22-06ZT	240	_		
[	SJ-V26-01ZT	320	_	Terminal block connection	
[	SJ-V37-01ZT	400			
	SJ-V45-01ZT	640	_		
	SJ-V55-01ZT		+		
}	SJ-V11-01T SJ-V11-09T	160	16080 (L)		
SJ-V Series	SJ-V11-091 SJ-V15-03T	200	_		
(Wide range	SJ-V18.5-03T	240	+ _		
constant output)	SJ-V22-05T	2.0	<del>                                     </del>		
	SJ-V22-09T	320	_		
	SJ-VK22-19ZT				
SJ-VL Series	SJ-VL2.2-02ZT	40	40	- All axes CNU01SEF (AWG14) - L-axis only CNU01SEL (AWG14) - M-axis only CNU01SEM (AWG14) - S-axis only CNU01SES (AWG14)	
(Low-inertia)	SJ-VL11-02FZT	100	16000 // \		
	SJ-VL11-05FZT-S01	160	16080 (L)	Terminal block connection	
ŀ	SJ-VL18.5-05FZT	240			1

## ■MDS-E Series Encoder Cable and Connector for Spindle Motor Selection List

								Spindl	le encode	r cable				
					connecti				nen conne		spindle s	side enco	der	
		Drive	e unit	-	indle mot side PLG		Spindl	le side ac						nahla
		ty	ре	Motor				er TS5690	0 cable		dle side e			
Spindle	motor type	MD	S-E-			onnector	-		onnector	Ca	ble		gle conne	ctor er side
		SP	SP2	Cable	Drive unit side	Encoder side	Cable	Drive unit side	Encoder side	Straight	Right angle	Drive unit side	Straight	Right
	SJ-D3.7/100-01		80											angle
	SJ-D5.5/100-01	80	16080											
	SJ-D5.5/120-01		(M)											
SJ-D Series (Normal)	SJ-D5.5/120-02	160 200	16080 (L)											
, , ,	SJ-D7.5/100-01													
	SJ-D7.5/120-01	160	16080 (L)											
SJ-D Series	SJ-D11/100-01	160	16080											
(Hollow shaft)	SJ-D5.5/120-02T-S	200	(L)											
	SJ-DG3.7/120-03T													
SJ-DG Series (High output)	$\overline{}$	160	-											
(i ligi i output)	SJ-DG7.5/120-05T SJ-DG11/100-03T	200	<del> </del>											
	SJ-DJ5.5/100-01	200	80											
	SJ-DJ5.5/120-01	80	16080 (M)											
SJ-DJ Series	SJ-DJ7.5/100-01													
(Compact & lightweight)	SJ-DJ7.5/120-01	160	16080 (L)											
- I	SJ-DJ11/100-01		(=)											
	SJ-DJ15/80-01	200	_											
	SJ-DL0.75/100-01 SJ-DL1.5/100-01	20 40	20 40											
SJ-DL Series (Low-inertia)	SJ-DL1.5/100-01	40	40											
	SJ-DL5.5/200-01T	160	16080											
	SJ-DL7.5/150-01T		(L)											
SJ-DL Series (Hollow shaft)		160	16080 (L)	CNP2E-1- □M			CNP2E- 1-□M			CNP3EZ- 2P-□M	CNP3EZ- 3P-□M		CNE20- 29S (10)	CNE20- 29L (10)
(i lollow or lart)	SJ-V2.2-01T	40	40	□ : Length	CNU2S		□ : Length	CNU2S		□ : Length	n ☐ : Length		29S (10) Applicable	Applicable
	SJ-V3.7-02ZT	80	80	(m) 2, 3, 4, 5,	(AWG18)	CNEPGS	(m) 2, 3, 4, 5,	(AWG18)	CNEPGS	(m) 2, 3, 4, 5,	(m) 2, 3, 4, 5,	CNEPGS	cable outline	cable outline
	SJ-V7.5-03ZT	160	16080 (M) 16080	7, 10, 15,			7, 10, 15,			7, 10, 15,	7, 10, 15,		ф6.8 to 10	φ6.8 to 10
		160	(L)	20, 25, 30			20,25, 30			20, 25, 30	20, 25, 30		(mm)	(mm)
	SJ-V11-08ZT SJ-V11-13ZT	200	_											
	SJ-V15-01ZT	200	_											
	SJ-V15-09ZT													
SJ-V Series (Normal)	SJ-V18.5-01ZT	200	_											
, , ,	SJ-V18.5-04ZT	240	_											
	SJ-V22-01ZT	200												
	SJ-V22-04ZT SJ-V22-06ZT	320 240	_											
	SJ-V26-01ZT	320	_											
	SJ-V37-01ZT	400	_											
	SJ-V45-01ZT	640												
	SJ-V55-01ZT													
	SJ-V11-01T SJ-V11-09T	160	16080 (L)											
SJ-V Series	SJ-V15-03T	200	—											
(Wide range constant		240	-											
output)	SJ-V22-05T													
	SJ-V22-09T	320	_											
	SJ-VK22-19ZT	40	40											
CIVI Conic-	SJ-VL2.2-02ZT SJ-VL11-02FZT	40	40											
SJ-VL Series (Low-inertia)		160	16080 (L)											
	SJ-VL18.5-05FZT	240	_											

O DRIVE SYSTEM

#### ■MDS-EM Series Power Cable/Connector and Brake Cable/Connector for Servo Motor Selection List

		Drive unit		Power Cable		Brake	Cable		
			Single connector	Ca	ible	Cable			
Servo motor type	MDS-EM-		Moto	r side	Motor side				
		SPV3	Drive unit side	Lead out in direction of motor shaft	Lead out in opposite direction of motor shaft	Lead out in direction of motor shaft	Lead out in opposite direction of motor shaft		
HG Series	HG96	10040 16040	- All axes CNU01SEF(AWG14) - L-axis only CNU01SEL(AWG14) - M-axis only CNU01SEM(AWG14) - S-axis only CNU01SES(AWG14)	MR-PWS1CBL □- M-A1-H □ : Length (m) 2, 3, 5, 7, 10	MR-PWS1CBL  M-A2-H : Length (m) 2, 3, 5, 7, 10	MR-BKS1CBL  M-A1-H  : Length (m) 2, 3, 5, 7, 10	MR-BKS1CBL □ M-A2-H □ : Length (m) 2, 3, 5, 7, 10		

		Drive unit		Power Connector		Brake C	onnector
Servo m	notor type	type MDS-EM-	Drive unit side	Moto	r side	Moto	r side
		SPV3	Drive unit side	Straight	Right angle	Straight	Right angle
	HG75□-S105010			CNP14-2S (12)	CNP14-2L (12)		
	HG105□-S105010			Applicable cable outline \$\phi10\$ to 12 (mm)	Applicable cable outline \$\phi10\$ to 12 (mm)		
	HG75	10040		, , ,	, , ,		
	HG105	16040		CNP18-10S (14)			
	HG123		- All axes		CNP18-10L (14)		CNB10-R2L (6) CNB10S-R2L (6) Applicable cable outline  \$\phi4.0 \text{ to 6.0 (mm)}
	HG142		CNU01SEF	Applicable cable outline	Applicable cable outline		
	HG54		ONILIOAOEI	φ10.5 to 14 (mm)	φ10.5 to 14 (mm)		
	HG104	10040				CNB10-R2S (6) CNB10S-R2S (6)	
HG Series	HG223	10080 16040 16080 20080	(AWG14)				
nd Selles	HG302		- M-axis only CNU01SEM (AWG14) - S-axis only	CNP22-22S (16) Applicable cable outline \$12.5 to 16 (mm)	CNP22-22L (16) Applicable cable outline  \$\phi\$12.5 to 16 (mm)	Applicable cable outline \$\phi4.0\$ to 6.0 (mm)	
	HG154	10080	CNU01SES (AWG14)	CNP18-10S (14) Applicable cable outline	CNP18-10L (14) Applicable cable outline		
	HG224	16080	(AWG14)	φ10.5 to 14 (mm)	φ10.5 to 14 (mm)		
	HG204	20080 200120					
	HG303		CNP22-22S (16) Applicable cable outline				
	HG354	200120					
	HG354 HG453	200120					

#### ■MDS-EM Series Encoder Cable and Connector for Servo Motor Selection List

						able						
				Motor	side encode	r cable		Ba	all screw side	encoder cal	ole	
0		Drive unit type	Ca	ble	Si	ngle connect	tor	Ball screw side encoder (OSA405ET2AS)				
	Servo motor type		(for D48/D51)		Drive unit	Moto	r side	Ca	ble	Single connector		
			Straight	Right angle	side	Straight	Straight Right angle		Right angle	Straight	Right angle	
	HG96											
	HG75	10010										
	HG105	10040 16040										
	HG123	100-10	040 CNV2E-8P-	CNV2E-9P- □M								
	HG142					CNF10-R10S	CNF10-R10I			CNE10-R10S	CNF10-R10I	
	HG54	10040				(9) CNE10S-	(9) CNE10S-	CNV2E-8P- □M		(9) CNE10S-	(9) CNE10S-	
	HG104	10080	□M						□M			
HG Series	HG223	16080	□ : Length (m) 2, 3, 4, 5, 7,	□ : Length (m) 2, 3, 4, 5, 7,	CNU2S (AWG18)	R10S (9) Applicable	R10L (9) Applicable	□ : Length (m) 2, 3, 4, 5,7,	☐ : Length (m) 2, 3, 4, 5, 7,	R10S (9) Applicable	R10L (9) Applicable	
Corios	HG302	20080	10, 15, 20,	10, 15, 20,	( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	cable outline	cable outline	10, 15, 20,	10, 15, 20,	cable outline	cable outline	
	HG154	10080	25, 30	25, 30		φ6.0 to 9.0	φ6.0 to 9.0	25, 30	25, 30	φ6.0 to 9.0	φ6.0 to 9.0	
	HG224	16080				(mm)	(mm)			(mm)	(mm)	
	HG204	20080										
	HG303	200120										
	HG354	200120										
	HG453	200120										

# ■MDS-EM Series Power Connector, Encoder Cable, and Connector for Spindle Motor Selection List

									Spind	le encoder	cable															
			Power C	onnector	When cor	necting to motor	a spindle			When conn		spindle si	de encode	er												
		Drive unit			Motor	r side PLG	cable		side accuracy TS5690 cable		Spi	indle side (	encoder O	SE-1024 ca	ble											
	le motor ype	type MDS-EM-	Drive unit side	Motor side	Cable	Single co	Encoder	Cable	Single co	encoder Encoder		Dight angle	Sin Drive unit	gle connec	etor er side											
	SJ-D5.5/	SPV3				side	side		side	side	Straight	Right angle	side	Straight	Right angle											
	100-01 SJ-D5.5/																									
	120-01	10040																								
	SJ-D7.5/ 100-01	10080																								
SJ-D Series	SJ-D7.5/ 120-01																									
(Normal)		10040 10080																								
	SJ-D5.5/ 120-02	16040 16080																								
		20080 200120																								
	SJ-D11/ 100-01	16040 16080																								
SJ-D		10040 10080																								
Series (Hollow	SJ-D5.5/ 120-02T-S	16040 16080																								
shaft)		20080 200120																								
	SJ-DG3.7/ 120-03T																									
SJ-DG	SJ-DG5.5/	16040																								
Series (High	120-04T SJ-DG7.5/	16080																								
output)	120-05T																									
	SJ-DG11/ 100-03T	20080 200120																								
	SJ-DJ5.5/ 100-01																									
	SJ-DJ5.5/ 120-01	10040			CNP2E- 1-□M □ · Length			CNP2E- 1-□M			CNP3EZ- 2P-□M	CNP3EZ- 3P-□M		CNE20- 29S (10)	CNE20- 29L (10)											
SJ-DJ Sorios	SJ-DJ7.5/	10040 10080	Terminal block	block	block	block	block	block	block	block	block	block	block	block	Terminal block	□ : Length (m)	CNU2S (AWG18)	CNEPGS	□ : Length (m)	CNU2S (AWG18)	CNEPGS	(m)	□ : Length (m)	CNU2S (AWG18)	Applicable cable	cable
Series (Compact &	100-01 SJ-DJ7.5/		connection	connection	7, 10, 15,	V G 10)		2, 3, 4, 5, 7, 10, 15,	(		7, 10, 15,	2, 3, 4, 5, 7, 10, 15,	(	outline \$\phi 6.8 to 10												
lightweight	120-01 SJ-DJ11/	16040			20, 25, 30			20, 25, 30			20, 25, 30	20, 25, 30		(mm)	(mm)											
	100-01 SJ-DJ15/	16080																								
	80-01	200120																								
SJ-DL Series	SJ-DL5.5/ 150-01T	16040																								
(Low- inertia)	SJ-DL7.5/ 150-01T	16080																								
	SJ-V7.5- 03ZT	16040 16080																								
	SJ-V11- 08ZT	10000																								
SJ-V	SJ-V11-																									
Series (Normal)	13ZT SJ-V15-	20080																								
( 121112)	01ZT SJ-V15-	200120																								
	09ZT SJ-V18.5-																									
	01ZT SJ-V11-																									
SJ-V Series	01T	16040 16080																								
(Wide range	SJ-V11- 09T																									
constant output)	SJ-V15- 03T	20080 200120																								
SJ-V Series	SJ-VL11- 02FZT	16040																								
(Hollow shaft)	SJ-VL11- 05FZT-S01	16080																								

# ■MDS-EJ Series Power Cable/Connector and Brake Cable/Connector for Servo Motor Selection List

				Power Cable		Brake Cable			
			Single connector	Ca	Cable				
	Dr			Motor side		Motor side			
Servo motor type		V1	Drive unit side	Lead out in direction of motor shaft	Lead out in opposite direction of motor shaft	Lead out in direction of motor shaft	Lead out in opposite direction of motor shaft		
	HG46	10		MR-PWS1CBL □	MR-PWS1CBL □	MR-BKS1CBL □	MR-BKS1CBL □		
HG Series	HG56	15	Supplied for each drive unit	M-A1-H □ : Length (m)	M-A2-H □ : Length (m)	M-A1-H □ : Length (m)	M-A2-H		
	HG96	30	each drive unit	2, 3, 5, 7, 10	2, 3, 5, 7, 10	2, 3, 5, 7, 10	□ : Length (m) 2, 3, 5, 7, 10		

			P	ower Connector		Brake C	onnector
Servo	motor type	Drive unit type MDS-EJ-	Drive unit side	Moto	r side	Moto	r side
		V1		Straight	Right angle	Straight	Right angle
	HG75□-S105010			CNP14-2S (12) Applicable cable	CNP14-2L (12) Applicable cable		
	HG105□-S105010	30		outline \$\phi\$10 to 12 (mm)	outline \$\phi 10 to 12 (mm)		
	HG75						
	HG105						
	HG54			CNP18-10S (14)	CNP18-10L (14)		
	HG104			Applicable cable outline	Applicable cable outline		
	HG123			φ10.5 to 14 (mm)	φ10.5 to 14 (mm)		
	HG142					CNB10-R2S (6)	CNB10-R2L (6)
HG Series	HG223	40	Supplied for each drive unit			CNB10S-R2S (6) Applicable cable outline	CNB10S-R2L (6) Applicable cable outline
	HG302		each dive drift	CNP22-22S (16) Applicable cable outline  \$\phi\$12.5 to 16 (mm)	CNP22-22L (16) Applicable cable outline  \$\phi\$12.5 to 16 (mm)	φ4.0 to 6.0 (mm)	φ4.0 to 6.0 (mm)
	HG154			CNP18-10S (14) Applicable cable	CNP18-10L (14) Applicable cable		
	HG224	80		outline \$\phi\$10.5 to 14 (mm)	outline \$\phi10.5 to 14 (mm)		
	HG204			CNP22-22S (16)	CNP22-22L (16)		
	HG303			Applicable cable outline	Applicable cable outline		
	HG354	100		φ12.5 to 16 (mm)	φ12.5 to 16 (mm)		

#### ■MDS-EJ Series Encoder Cable and Connector for Servo Motor Selection List

						Sei	rvo encoder	cable			
				Motor s	ide encod	ler cable		Ва	II screw side	encoder ca	ble
		Drive unit	Ca	ble	S	ingle conne	ctor	Ball scr	ew side enco	der (OSA40	5ET2AS)
Servo	motor type	type MDS-EJ-		18/D51)	Drive	Moto	r side	Ca	ble	Single c	onnector
		V1	Straight	Right angle	unit side	Straight	Right angle	Straight	Right angle	Straight	Right angle
	HG46	10									
	HG56	15	]								
	HG96		]								
	HG75	30									
	HG105	30									
	HG54	1	CNV2E-8P-	CNV2E-9P-		CNE10-	CNE10-	CNV2E-8P-	CNV2E-9P-	CNE10-	CNE10-
	HG104		□М	□M		R10S (9) CNE10S-	R10L (9) CNE10S-	□M	□М	R10S (9) CNE10S-	R10L (9) CNE10S-
HG	HG123	1	: Length	: Length	CNU2S	R10S (9)	R10L (9)	: Length	: Length	R10S (9)	R10L (9)
Series	HG142	40	(m) 2, 3, 4, 5, 7,	(m) 2, 3, 4, 5, 7,	(AWG18)	Applicable	Applicable	(m) 2, 3, 4, 5, 7,	(m) 2, 3, 4, 5, 7,	Applicable	Applicable
	HG223	1	10, 15, 20,	10, 15, 20,		cable outline 6.0 to 9.0	cable outline \$\phi6.0\$ to 9.0	10, 15, 20,	10, 15, 20,	cable outline \$\phi6.0\$ to 9.0	cable outline 6.0 to 9.0
	HG302	1	25, 30	25, 30		(mm)	(mm)	25, 30	25, 30	(mm)	(mm)
	HG154		1				. ,			, ,	' '
	HG224	300									
	HG204	80									
	HG303	1									
	HG354	100									

# ■MDS-EJ Series Power Connector, Encoder Cable, and Connector for Spindle Motor Selection List

			Power	Cable					Spindl	e encoder	cable				
			When co to a spino	nnecting dle motor	When cor	necting to motor	a spindle		V	Vhen conn	ecting to a	spindle si	de encode	r	
		Drive unit			Motor	r side PLG	cable		ide accuracy rS5690 cable		Spi	ndle side e	ncoder O	SE-1024 ca	ible
	e motor	type	Drive unit side	Motor side		Single co	onnector		Single co	onnector	Ca	ble	Sin	gle connec	ctor
L	/pe	MDS-EJ-	Side	side	Cable	Drive unit		Cable	Drive unit		Straight	Right angle	Drive unit	Encod	er side
		SP				side	side		side	side	Ottaignt	riigin aligie	side	Straight	Right angle
	SJ-D3.7/ 100-01	80	Supplied for each drive unit												
	SJ-D5.5/														
	100-01	100													
SJ-D	SJ-D5.5/														
Series	120-01														
(Normal)	SJ-D7.5/ 100-01														
	SJ-D7.5/	120			CNP2E-			CNP2E-			CNP3EZ-	CNP3EZ-		CNE20-	CNE20-
	120-01				_ 1□M			_ 1-□M			_2P-□M	3P-□M		29S (10)	29L (10)
	SJ-D11/	160	Townsiand	Terminal block	□: Length	CNU2S	CNEPGS	: Length	CNU2S	CNEPGS	☐ : Length (m)	-	CNU2S	Applicable cable	Applicable cable
	100-01	160	Terminal block	connection	(m) 2, 3, 4, 5,	(AWG18)	CNEPGS	(m) 2, 3, 4, 5,	(AWG18)	CINEPGS	2, 3, 4, 5,	(m) 2345	(AWG18)	outline	outline
	SJ-DJ5.5/		connection	0011110001011	7, 10, 15,			7, 10, 15,				7, 10, 15,			\$6.8 to 10
	100-01	100			20, 25, 30			20, 25, 30				20, 25, 30		(mm)	(mm)
0101	SJ-DJ5.5/ 120-01														
SJ-DJ (Compact	SJ-DJ7.5/		-												
&	100-01														
	SJ-DJ7.5/	120													
	120-01														
	SJ-DJ11/ 100-01	160													

#### ■MDS-EH Series Power Connector and Brake Connector for Servo Motor Selection List

		Drive u	nit type		Power Connecto	or		Brake Connec	tor
Serv	o motor type		EH-	Drive unit	Moto	r side	Drive unit	Moto	r side
		V1	V2	side	Straight	Right angle	side	Straight	Right angle
	HG-H75□- S105010 HG-H105□- S105010 HG-H75	10	10 20	- All axes CNU01SEF (AWG14)	CNP14-2S (12) Applicable cable outline  \$\phi\$10 to 12 (mm)	CNP14-2L (12) Applicable cable outline  \$\phi\$10 to 12 (mm)			
	HG-H105			- L-axis only CNU01SEL	CNP18-10S (14)	CNP18-10L (14)			
	HG-H54	00	20	(AWG14)	Applicable cable outline	Applicable cable outline			
	HG-H104	20	40	- M-axis only	φ10.5 to 14 (mm)	φ10.5 to 14 (mm)			
HG-H	HG-H154	40	40	CNU01SEM (AWG14)					
Series	HG-H204	40	80	- S-axis only	CNP22-22S (16)	CNP22-22L (16)		CNB10-R2S (6) CNB10S-R2S (6)	CNB10-R2L (6) CNB10S-R2L (6)
	HG-H354	80	80	CNU01SES	Applicable cable	Applicable cable	CNU23S (AWG14)	Applicable cable	Applicable cable
	HG-H453	00	80W	(AWG14)	outline	outline	(AVVG14)	outline	outline
	HG-H703	80W	80W		φ12.5 to 16 (mm)	φ12.5 to 16 (mm)		φ4.0 to 6.0 (mm)	φ4.0 to 6.0 (mm)
	HG-H903	160	_		CNP32-17S (23) Applicable cable outline  \$\phi\$22 to 23.8 (mm)	CNP32-17L (23) Applicable cable outline  \$\phi\$22 to 23.8 (mm)			
	HG-H1502	200	_	Terminal block	Terminal bloc	k connection			
HQ-H	HQ-H903	160	_	connection	CNP32-17S (23) Applicable cable	CNP32-17L (23) Applicable cable			
Series	HQ-H1103	160W	_		outline \$\phi22 \to 23.8 \text{ (mm)}	outline \$\phi22 to 23.8 (mm)			

#### **■MDS-EH Series Encoder Cable and Connector for Servo Motor Selection List**

							Serv	o encoder o	able			
					Motor	side encode	er cable		Bal	I screw side	encoder ca	able
Serv	o motor	Drive u	nit type		ible	Sir	ngle connec	tor		Ball screw s A405ET2AS		-
t	уре	MIDS	)-EN-	(IOF D46/	D51/D74)	Drive unit	Moto	r side	Ca	ble	Single co	onnector
		V1	V2	Straight	Right angle	side	Straight	Right angle	Straight	Right angle	Straight	Right angle
	HG-H75	10	10									
	HG-H105	10	20									
	HG-H54	20	20									
	HG-H104	20	40				CNE10-	CNE10-			CNE10-	CNE10-
	HG-H154	40	40	CNV2E-8P-	CNV2E-9P-		R10S (9)	R10L (9)	CNV2E-8P- □M	CNV2E-9P-	R10S (9)	R10L (9)
HG Series	HG-H204	40	80	☐ : Length	☐ : Length	0.11.100	CNE10S-	CNE10S-	□: Length	☐ : Length	CNE10S-	CNE10S-
Conco	HG-H354	80	80	(m)	(m)	CNU2S (AWG18)	R10S (9) Applicable	R10L (9) Applicable	(m)	(m)	R10S (9) Applicable	R10L (9) Applicable
	HG-H453	00	80W	2, 3, 4, 5, 7,	2, 3, 4, 5, 7,	( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	cable outline	cable outline	2, 3, 4, 5, 7,	2, 3, 4, 5, 7,	cable outline	cable outline
	HG-H703	80W	80W	10, 15, 20, 25, 30	10, 15, 20, 25, 30		φ6.0 to 9.0	φ6.0 to 9.0	10, 15, 20, 25, 30	10, 15, 20, 25, 30	φ6.0 to 9.0	φ6.0 to 9.0
	HG-H903	160	_	]			(mm)	(mm)	.,		(mm)	(mm)
	HG-H1502	200	_	]								
HQ	HQ-H903	160	_	]								
Series	HQ-H1103	160W	_	]								

#### **■MDS-EH Series Power Connector for Spindle Motor Selection List**

Spindle	motor type	Drive unit type MDS-EH-	Power Connect	or
		SP	Drive unit side	Motor side
	SJ-4-V2.2-03T	20		
	SJ-4-V3.7-03T	20	- All axes CNU01SEF (AWG14)	
	SJ-4-V5.5-07T	40	- L-axis only CNU01SEL (AWG14)	
	SJ-4-V7.5-12T	40	- M-axis only CNU01SEM (AWG14)	
	SJ-4-V7.5-13ZT	80	- S-axis only CNU01SES (AWG14)	
	SJ-4-V11-18T	80		
SJ-4-V Series (Normal)	SJ-4-V18.5-14T	100		
(INOITIAI)	SJ-4-V22-15T			
	SJ-4-V22-18ZT	160		Terminal block connection
	SJ-4-V26-08ZT			
	SJ-4-V37-04ZT	200		
	SJ-4-V45-02T	320	Terminal block connection	
	SJ-4-V55-03T	320		
SJ-4-V Series (Wide range	SJ-4-V15-20T	100		
constant output)	SJ-4-V22-16T	160		

## ■MDS-EH Series Encoder Cable and Connector for Spindle Motor Selection List

							Spind	le encode	cable				
				connectin			٧	Vhen conn	ecting to a	spindle s	ide encode	er	
		Drive unit type	Moto	r side PLG	cable		le side acc		Spi	ndle side e	encoder O	SE-1024 ca	able
Spind	lle motor	MDS-EH-		Single c	onnector		Single co	onnector	Ca	ble	Sin	gle conne	ctor
t	ype	SP	Cable	Drive unit side	Encoder side	Cable	Drive unit side	Encoder side	Straight	Right angle	Drive unit side	Encod Straight	er side Right angle
	SJ-4-V2.2- 03T SJ-4-V3.7- 03T	20											ungic
	SJ-4-V5.5- 07T SJ-4-V7.5- 12T	40											
	SJ-4-V7.5- 13ZT SJ-4-V11- 18T	80											
SJ-4-V Series	SJ-4- V18.5-14T	100	CNP2E-1-			CNP2E-			CNP3EZ-	CNP3EZ-			CNE20-29L
(Normal)	SJ-4-V22- 15T SJ-4-V22- 18ZT SJ-4-V26- 08ZT	160	□M □: Length (m) 2, 3, 4, 5, 7, 10, 15, 20, 25, 30	CNU2S (AWG18)	CNEPGS	1-□M □ : Length (m) 2, 3, 4, 5, 7, 10, 15, 20, 25, 30	CNU2S (AWG18)	CNEPGS	2P-□M □: Length (m) 2, 3, 4, 5, 7, 10, 15, 20, 25, 30	3P-□M □: Length (m) 2, 3, 4, 5, 7, 10, 15, 20, 25, 30	CNEPGS	(10) Applicable cable outline  \$\phi6.8\$ to 10 (mm)	(10) Applicable cable outline \$\phi6.8\$ to 10 (mm)
	SJ-4-V37- 04ZT	200											
	SJ-4-V45- 02T SJ-4-V55- 03T	320											
SJ-4-V Series (Wide	SJ-4-V15- 20T	100											
range constant output))	SJ-4-V22- 16T	160											

#### ■MDS-EMH Series Power Connector and Brake Connector for Servo Motor Selection List

		Drive unit		Power Connector		Brake Co	onnector	
Serv	vo motor type	type MDS-EMH-	Drive unit side	Moto	r side	Motor side		
	SPV3 HG-H54 8040			Straight	Right angle	Straight	Right angle	
	HG-H54	8040	- All axes	CNP18-10S (14)	CNP18-10L (14)			
	HG-H104	10040	CNU01SEF (AWG14)	Applicable cable outline	Applicable cable outline	CND10 D00 (6)	CND10 DOL (6)	
HG-H	HG-H154	8040	- L-axis only CNU01SEL (AWG14)	φ10.5 to 14 (mm)	φ10.5 to 14 (mm)	CNB10-R2S (6) CNB10S-R2S (6)	CNB10-R2L (6) CNB10S-R2L (6) Applicable cable outline	
Series	HG-H204	10040 10060	- M-axis only CNU01SEM (AWG14)	CNP22-22S (16)	CNP22-22L (16)	Applicable cable outline \$\phi 4.0 to 6.0 (mm)		
	HG-H354 10060	- S-axis only	Applicable cable outline	ine Applicable cable outline	φ4.0 t0 0.0 (ΠΠη)	φ4.0 to 6.0 (mm)		
	HG-H453	10060	CNU01SES (AWG14)	φ12.5 to 16 (mm)	φ12.5 to 16 (mm)			

#### **■MDS-EMH Series Encoder Cable and Connector for Servo Motor Selection List**

						Serv	o encoder c	able			
				Motor	side encode	r cable		Ba	II screw side	encoder cal	ble
Serve	o motor	Drive unit type		ble	Sir	ngle connect	tor			side encoder 5ET2AS)	
t	ype	MDS-EMH-	(TOP D4	18/D51)	Drive unit	Motor side		Ca	ble	Single connector	
		CNV2F-8P- CNV2F			side	Straight	Right angle	Straight	Right angle	Straight	Right angle
	HG-H54	8040	CNIVOE OD	CNIVOE OD		CNE10-R10S	CNE10-R10L	CNV2E-8P-	CNV2E-9P-	CNE10-R10S	CNE10-R10L
	HG-H104	10040		□M		(9)	(9)			(9)	(9)
HG-H	HG-H154	8040	☐ : Length	☐ : Length	CNU2S	CNE10S- R10S (9)	CNE10S- R10L (9)	☐ : Length	☐ : Length	CNE10S- R10S (9)	CNE10S- R10L (9)
Series	HG-H204	10040 10060	(m) 2, 3, 4, 5, 7,	(m) 2, 3, 4, 5, 7,	(AWG18)	Applicable	Applicable	(m) 2, 3, 4, 5, 7,	(m) 2, 3, 4, 5, 7,	Applicable	Applicable
		10000	10, 15, 20,	10, 15, 20,		cable outline	cable outline	10, 15, 20,	10, 15, 20,	cable outline	cable outline
	HG-H354	10060	25. 30	25, 30		φ6.0 to 9.0	φ6.0 to 9.0	25, 30	25. 30	φ6.0 to 9.0	φ6.0 to 9.0
	HG-H453		_==, 00	_==, 00		(mm)	(mm)		_==, 00	(mm)	(mm)

# ■MDS-EMH Series Power Connector, Encoder Cable, and Connector for Spindle Motor Selection List

									Spindle	e encode	r cable				
			Power	Cable		connection			Whe	en conne	cting to a	spindle	side enco	oder	
		Drive			Motor	side PLG	cable		e side ac er TS5690		Spino	lle side e	ncoder O	SE-1024	cable
	motor	unit type MDS- EMH-	Drive unit	Motor			gle ector			gle ector	Ca	ble	Sing	gle conne	ctor
Ly	pe	EIVIN-	side	side	Cable	Drive	Encoder	Cable	Drive	Encoder		Right	Drive	Encod	er side
		SPV3				unit side	side		unit side	side	Straight	angle	unit side	Straight	Right angle
SJ-4-V Series (Normal)	SJ-4- V7.5- 13ZT SJ-4- V11-18T SJ-4- V18.5- 14T	8040 10040 10060	Terminal block	block	CNP2E-1- □M □ : Length (m)	CNU2S (AWG18)	CNEPGS	CNP2E- 1-□M □: Length (m)	CNU2S (AWG18)	CNEPGS	(m)	CNP3EZ- 3P-□M □ : Length (m)	CNU2S (AWG18)	cable	CNE20- 29L (10) Applicable cable
SJ-4-V Series (Wide range constant output)	SJ-4- V15-20T	10060	connection	connection	2, 3, 4, 5, 7, 10, 15, 20, 25, 30			2, 3, 4, 5, 7, 10, 15, 20, 25, 30				2, 3, 4, 5, 7, 10, 15, 20, 25, 30		outline \$\phi 6.8 to 10 (mm)	outline φ6.8 to 10 (mm)

#### ■MDS-EJH Series Power Connector and Brake Connector for Servo Motor Selection List

		Drive unit		Power Connector		Brake C	onnector
Serv	vo motor type	type MDS-EJH-	Drive unit side	Moto	r side	Moto	r side
		V1		Straight	Right angle	Straight	Right angle
	HG-H75□-S105010	15		CNP14-2S (12)	CNP14-2L (12)		
	HG-H105□-S105010	20		Applicable cable outline	Applicable cable outline		
	11011100010	20		φ10 to 12 (mm)	φ10 to 12 (mm)	OND 40 D00 (0)	ONID40 POL (0)
HG-H	HG-H75	15	Supplied for			CNB10-R2S (6) CNB10S-R2S (6)	CNB10-R2L (6) CNB10S-R2L (6)
Series	HG-H105		each drive unit	CNP18-10S (14)	CNP18-10L (14)	Applicable cable outline	Applicable cable outline
	HG-H54	20		Applicable cable outline	Applicable cable outline	φ4.0 to 6.0 (mm)	φ4.0 to 6.0 (mm)
	HG-H104			φ10.5 to 14 (mm)	φ10.5 to 14 (mm)		
	HG-H154	40					

#### **■MDS-EJH Series Encoder Cable and Connector for Servo Motor Selection List**

						Serv	o encoder c	able				
				Motor	side encode	r cable		Ва	II screw side	encoder ca	ble	
Serve	o motor	Drive unit type		ble	Si	ngle connect	or	Ball scre	ew side enco	oder (OSA40	ET2AS)	
t	ype	MDS-EJH-	(for D4	48/D51) Drive u				Cable		Single connector		
	V1 Straight Right ar			Right angle	side	Straight	Right angle	Straight	Right angle	Straight	Right angle	
	HG-H75 15	15	CNV2E-8P-	CNV2E-9P-		CNE10-R10S	CNE10-R10L	CNV2E-8P-	CNV2E-9P-	CNE10-R10S	CNE10-R10L	
	HG-H105		□M □M			(9) CNE10S-	(9) CNE10S-	□M □ : Length	□M □ : Length	(9) CNE10S-	(9) CNE10S-	
HG-H Series	HG-H54	20	(m)	(m)   (m)		(m) CNU2S (AWG18)	R10S (9) Applicable	R10L (9) Applicable	(m)	(m)	R10S (9) Applicable	R10L (9) Applicable
	HG-H104		2, 3, 4, 5, 7, 10, 15, 20,	2, 3, 4, 5, 7, 10, 15, 20,	, , ,	cable outline 66.0 to 9.0	cable outline	2, 3, 4, 5, 7, 10, 15, 20,	2, 3, 4, 5, 7, 10, 15, 20,	cable outline 6.0 to 9.0	cable outline	
	HG-H154	40	10, 15, 20, 25, 30	25, 30		φο.0 to 9.0 (mm)	φ6.0 to 9.0 (mm)	25, 30	25, 30	φο.υ ιο 9.υ (mm)	φ6.0 to 9.0 (mm)	

## **DRIVE SYSTEM LIST OF CABLES**

[Manufacturer (Column and figure on the left show drive unit side.)]

a : Honda Tsushin Kogyo b : Japan Aviation Electronics Industry c : Hirose Electric d : 3M e : J.S.T. f : DDK g : Tyco Electronics

#### <Optical communication cable>

	Item		Length	Contents	Ma	nu-	Com	patible m	odel
	itelli	Model	(m)	Contents	fact	urer	E/EH	EM/EMH	EJ/EJH
		J396 L0.3M	0.3						
		J396 L0.5M	0.5						
	Optical communication cable	J396 L1M	1			a	0	0	0
	For wiring between drive units (inside panel)	J396 L2M	2		a	a		~	
		J396 L3M	3						
		J396 L5M	5						
For	Optical communication cable	J395 L3M	3	3					
CN1A/	For wiring between drive units (outside panel)	J395 L5M	5			a	0	0	
CN1A/	For wiring between NC-drive units	J395 L7M	7		a	a		"	
OPT1A	For willing between NC-unive units	J395 L10M	10		а				
OFTIA		G380 L5M	5						
		G380 L10M	10						
	Optical communication cable	G380 L12M	12	and the state of t					
	For wiring between drive units (outside panel)	G380 L15M	15		g	g	0	0	0
	For willing between drive units (outside parier)	G380 L20M	20	40					
		G380 L25M	25						
		G380 L30M	30						

(Note1) For details on the optical communication cable, refer to the section "Optical communication cable specification" in Specifications Manual of each drive unit.

#### <Battery cable and connector>

	Item		Length	Contents	Manu-		Compatible model		
	item	Model	(m)	Contents		urer	E/EH	EM/EMH	EJ/EJH
		DG30-0.3M	0.3						
		DG30-0.5M	0.5						
	Battery cable	DG30-1M	1.0					0	
	(For drive unit - battery box,	DG30-2M	2.0		e	e	0		_
	For drive unit - battery box,	DG30-3M	3.0		E	"			-
For drive	For drive driit - drive driit)	DG30-5M	5.0						
unit		DG30-7M	7.0						
		DG30-10M	10.0						
	Battery cable (For drive unit - drive unit)	MR-BT6V2CBL0.3M	0.3						0
		MR-BT6V2CBL1M	1	TB	е	е	_	_	

#### <Power supply communication cable and connector>

	Item		Contents		Manu-		Com	patible m	odel
	item	Model	(m)	Contents	facturer		E/EH	EM/EMH	EJ/EJH
For CN4/9	Power supply communication cable	SH21	0.35 0.5 1 2 3		d	d	0	-	-
	Power supply communication cable connector set	FCUA-CS000	-		d	d	0	-	-
For CN23	Contactor control output connector Applicable cable outline: 0.85mm² to 3.5mm²	CNU23SCV2 (AWG14) These connectors are			€	e e	0	-	-
TOT CINES	Applicable cable outline: 0.85mm <sup>2</sup> Finish outside diameter: to φ4.2mm	supplied for each power supply unit.	_		€	•	0	-	-
For CN24	External emergency stop input connector	CNU24S (AWG24)	-		f		0	-	-

#### <Power backup unit connector>

	Item	Model	Length (m)	Contents	Ma fact	nu-	Compatib D-PFU	ole model DH-PFU
For CN43	Input/output connector for power backup unit	CNU43S (AWG22)	-	ı	f	f	0	0
For TE1	Power connector for power backup unit	CNU01SPFU	-		•	e	0	0
		(AWG14)	-	(جرب)	•	e	0	0

#### <STO input connector>

	Item		Length	Contents	Manu-	Com	npatible m	odel
			(m)	Contents	facturer	E/EH	EM/EMH	EJ/EJH
	STO cable	MR-D05UDL3M-B	-		g	0	-	0
For CN8	STO short-circuit connector	These connectors are supplied for each drive unit.	-	Required when not using dedicated wiring STO function.	g	0	-	0

#### <Servo encoder cable and connector>

	и	Mandal	Length	0	Ma	nu-	Com	patible m	nodel
	Item	Model	(m)	Contents	fact	urer	E/EH	EM/EMH	EJ/EJH
		CNV2E-8P-2M	2						
		CNV2E-8P-3M	3						
		CNV2E-8P-4M	4						
		CNV2E-8P-5M	5						
		CNV2E-8P-7M	7		d	f	0	0	0
		CNV2E-8P-10M	10		l "	١.١		~	~
		CNV2E-8P-15M	15						
		CNV2E-8P-20M	20						
		CNV2E-8P-25M	25						
For	For HG/HG-H, HQ-H	CNV2E-8P-30M	30						
CN2/3	Motor side encoder cable (for D48/D51/D74)	CNV2E-9P-2M	2						
		CNV2E-9P-3M	3						
		CNV2E-9P-4M	4						
		CNV2E-9P-5M	5						
		CNV2E-9P-7M	7		d	f	0	0	0
		CNV2E-9P-10M	10		ď	١.١			
		CNV2E-9P-15M	15						
		CNV2E-9P-20M	20						
		CNV2E-9P-25M	25						
		CNV2E-9P-30M	30						
For motor	Motor side encoder connector/	CNE10-R10S(9)	-			f	0	0	0
encoder/ Ball	Ball screw side encoder connector	CNE10-R10L(9)	-	4		f	0	0	0
screw side	Applicable cable outline ₀6.0 to 9.0mm	CNE10S-R10S(9)	-	480		f	0	0	0
encoder	Applicable cable outline φ6.0 to 9.0mm	CNE10S-R10L(9)	-			f	0	0	0

	Item	Model	Length	Contents	Ma	nu-		patible m	
	iteiii		(m)	Contents	fact	urer	E/EH	EM/EMH	EJ/EJH
		CNV2E-HP-2M	2						
		CNV2E-HP-3M	3						
		CNV2E-HP-4M	4						
		CNV2E-HP-5M	5						
CN3	MDS-EX-HR/MDS-B-HR unit cable	CNV2E-HP-7M	7		d	c	0	0	0
0.10	INDO EXTINUMBO BY IN CAME CASIC	CNV2E-HP-10M	10	F-1	~	•	_		_
		CNV2E-HP-15M	15						
		CNV2E-HP-20M	20						
		CNV2E-HP-25M	25						
		CNV2E-HP-30M	30	_					
For MDS- EX-HR/ MDS-B- HR unit	MDS-EX-HR/MDS-B-HR connector (For DRIVE, CON1, 2: 1) (For SCALE, CON3: 1) Applicable cable outline \( \phi 8.5 \) to 11mm	CNEHRS(10)	-	bb		С	0	0	0
		CNV2E-D-2M	2		$\vdash$				$\vdash$
		CNV2E-D-3M	3						
		CNV2E-D-4M	4						
		CNV2E-D-5M	5		İ	İ			i i
- ON	MD0 D 0D 11 11	CNV2E-D-7M	7	5-4	١.	١.			i i
For CN3	MDS-B-SD unit cable	CNV2E-D-10M	10		d	d	0	-	- 1
		CNV2E-D-15M	15						
		CNV2E-D-20M	20						
		CNV2E-D-25M	25		1				
		CNV2E-D-30M	30						
For MDS- B-SD unit	MDS-B-SD connector (Two-piece set)	FCUA-CS000	-	<b>P</b> 4	d	d	0	-	-
For CN2/3	Encoder connector	CNU2S(AWG18)	-		(	d	0	0	0

#### <Brake cable and connector>

6 DRIVE SYSTEM

	Item	Model	Length	Contents	Manu-	Con	odel	
	iteili	Wodel	(m)	Contents	facturer	E/EH	EM/EMH	EJ/EJH
	Brake connector for	CNB10-R2S(6)	-		f	0	0	0
	<200V Series> HG <400V Series>	CNB10-R2L(6)	-	•	f	0	0	0
	HG-H, HQ-H	CNB10S-R2S(6)	-		f	0	0	0
For	Applicable cable outline \$\phi4.0\$ to 6.0mm	CNB10S-R2L(6)	-	4	f	0	0	0
motor brake	Brake cable for HG46/56/96 Lead out in direction of motor shaft	MR-BKS1CBL 2M-A1-H MR-BKS1CBL 3M-A1-H MR-BKS1CBL 5M-A1-H MR-BKS1CBL 7M-A1-H MR-BKS1CBL 10M-A1-H	2 3 5 7 10		b	0	0	0
	Brake cable for HG46/56/96 Lead out in opposite direction of motor shaft	MR-BKS1CBL 2M-A2-H MR-BKS1CBL 3M-A2-H MR-BKS1CBL 5M-A2-H MR-BKS1CBL 7M-A2-H MR-BKS1CBL 10M-A2-H	2 3 5 7 10	——————————————————————————————————————	b	0	0	0
For CN20	Brake connector for motor brake control output	CNU23S(AWG14)	-	1	f	0	-	-

#### <Power connector>

	Item	Model	Length (m)	Contents	Manu- facturer		patible n	
	Power connector for <200V Series> HG75, 105, 54, 104, 154, 224, 123, 223, 142 HG-JR73, 153□-S105003	CNP18-10S(14)	-	0=	f	0	0	0
	HG-H73, 153L-S105003 <400V Series> HG-H75, 105, 54, 104, 154 HG-JR734, 1534⊡-S105003 Applicable cable outline ∳10.5 to 14mm	CNP18-10L(14)	-	(F)	f	0	0	0
	Power connector for <200V Series> HG204, 354, 303, 453, 302 <400V Series>	CNP22-22S(16)	-		f	0	0	0
	HG-H204, 354, 453, 703  Applicable cable outline \$\phi\$12.5 to 16mm	CNP22-22L(16)	-		f	0	0	0
For motor	Power connector for <200V Series> HG703, 903 <400V Series>	CNP32-17S(23)	-	0=	f	0	-	-
power	HG-H903 HQ-H903,1103 Applicable cable outline ¢22 to 23.8mm	CNP32-17L(23)	-		f	0	-	-
	Power connector for <200V Series> (CMG75, 105□-S105010 HG-JR73, 153□-S105010 HG-JR73, 153□-S105010 HG-JR734, 1534□-S105010 (CMG-JR734, 1534□-S105010 HG-JR734, 1534□-S105010	CNP14-2S(12)	-	0=	f	0	0	0
		CNP14-2L(12)	-		f	0	0	0
	Power cable for HG46/56/96 Lead out in direction of motor shaft	MR-PWS1CBL 2M-A1-H MR-PWS1CBL 3M-A1-H MR-PWS1CBL 5M-A1-H MR-PWS1CBL 7M-A1-H MR-PWS1CBL 10M-A1-H	2 3 5 7		b	0	-	0
	Power cable for HG46/56/96 Lead out in opposite direction of motor shaft	MR-PWS1CBL 2M-A2-H MR-PWS1CBL 3M-A2-H MR-PWS1CBL 5M-A2-H MR-PWS1CBL 7M-A2-H MR-PWS1CBL 10M-A2-H	2 3 5 7		b	0	0 0 - - 0	0
	Power connector for MDS-E-V1-20 to 160 MDS-E-V2-20 to 160 MDS-E-V3-20 to 40 MDS-E-SP-20 to 80	- All axes CNU01SEF(AWG14) - L-axis only CNU01SEL(AWG14)		38	е	0		
For TE1	MDS-E-SP2-20 to 80 MDS-E-SP2-16080 (L-axis) MDS-EH-V1-10 to 80W MDS-EH-V2-10 to 80W MDS-EH-SP-20 to 80	· M-axis only CNU01SEM(AWG14) · S-axis only CNU01SES(AWG14)	-	( <u> </u>	е		_	_
	Power connector for	CNU01SECV(AWG14)	_		е		_	_
	MDS-E-CV-37/75	, ,		G II TOO	е			
For CN31	Power connector for MDS-EM/EMH Series	· All axes CNU01SEF(AWG14) · L-axis only CNU01SEL(AWG14)	_	39	е	-	0	-
L/M/S		· M-axis only CNU01SEM(AWG14) · S-axis only CNU01SES(AWG14)		G I Table	е			
	Control power connector for MDS-EM/EMH Series  Applicable cable outline \( \phi 0.5 \) to 1.25mm	RCN22	-	=	f	_	0	-
For CN22	Control power connector for MDS-EM/EMH Series Applicable cable outline \( \phi 1.25 \) to 2.2mm	RCN22S	-	=	f	_	0	-

## <Drive unit side main circuit connector>

	Item	Model	Length	Contents	Manu-		patible m	
	I.C.III	mouer	(m)		facturer	E/EH	EM/EMH	EJ/EJH
			-	000000	е	-	-	0
	For MDS-EJ-V1-10, 15, 30 For MDS-EJ-SP-20	These connectors are supplied for	-		е	-	-	0
	Applicable cable outline: 0.8mm2 to 2.1mm2 Finish outside diameter: to φ3.9mm	each drive unit.	-		е	-	-	0
			-		е	-	-	0
	For MDS-EJ-V1-40, 80  Applicable cable outline: (For CNP1, for CNP3)		е	-	-	0		
For drive	1.25mm2 to 5.5mm2 (For CNP2) 0.14mm2 to 2.1mm2 Finish outside diameter: (For CNP1, for CNP3) to \(\phi.4.7mm\) (For CNP2) to \(\phi.3.9mm2\)	These connectors are supplied for	-		е	-	-	0
unit		each drive unit.	-		е	-	-	0
			-		е	ı	-	0
			-	000000	е	ı	-	0
	For MDS-EJH-V1-10,15,20,40 Applicable cable outline:0.8mm2 to 2.1mm2	These connectors are supplied for	-		е	-	-	0
	Finish outside diameter: to \$\phi 3.9mm	each drive unit.	-		е	-	-	0
			-		е	-	-	0

## <Spindle encoder cable and connector>

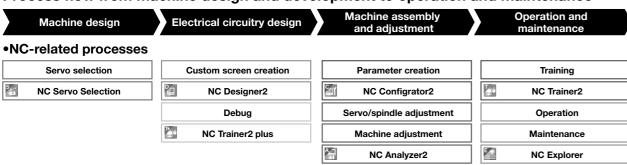
	Item		Length	Contents	Ma			patible m	
	item	Model	(m)	Contents	fact	urer	E/EH	EM/EMH	EJ/EJH
		CNP2E-1-2M	2						
		CNP2E-1-3M	3						
		CNP2E-1-4M	4						
	Motor side PLG cable	CNP2E-1-5M	5						
For CN2	Spindle side accuracy encoder	CNP2E-1-7M	7		d	g	0	0	0
1 01 CIV2	TS5690 cable	CNP2E-1-10M	10		ď	y			
	1 33030 Cable	CNP2E-1-15M	15						
		CNP2E-1-20M	20						
		CNP2E-1-25M	25						
		CNP2E-1-30M	30						
		CNP3EZ-2P-2M	2						
		CNP3EZ-2P-3M	3						
		CNP3EZ-2P-4M	4						
		CNP3EZ-2P-5M	5						
		CNP3EZ-2P-7M	7		۱,	f	0	0	0
		CNP3EZ-2P-10M	10	E	l u	'	0		- U
		CNP3EZ-2P-15M	15		d				
		CNP3EZ-2P-20M	20						
		CNP3EZ-2P-25M	25						
For CN3	Spindle side encoder OSE-1024 cable	CNP3EZ-2P-30M	30					_	
FOI CINS		CNP3EZ-3P-2M	2						
		CNP3EZ-3P-3M	3						
		CNP3EZ-3P-4M	4						
		CNP3EZ-3P-5M	5						
		CNP3EZ-3P-7M	7		d	f	0	0	0
		CNP3EZ-3P-10M	10		ď	'			0
		CNP3EZ-3P-15M	15						
		CNP3EZ-3P-20M	20						
		CNP3EZ-3P-25M	25						
		CNP3EZ-3P-30M	30						
	Motor side PLG connector			50					
	Spindle side accuracy encoder	CNEPGS	-		و	q	0	0	0
For	TS5690 connector				`				
spindle	Spindle side encoder			-n1880h			_	_	_
motor	OSE-1024 cable	CNE20-29S(10)	-	<b>0□</b>	1	f	0	0	0
				ın l			_		
	Applicable cable outline ₀6.8 to 10mm	CNE20-29L(10)	-		'	f	0	0	0
For CN2/3	Spindle encoder drive unit side connector	CNU2S(AWG18)	-		(	t	0	0	0

## **■**MEMO

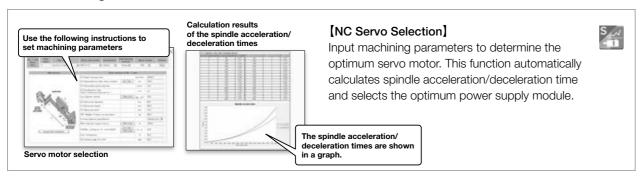
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#### **SOFTWARE TOOLS**

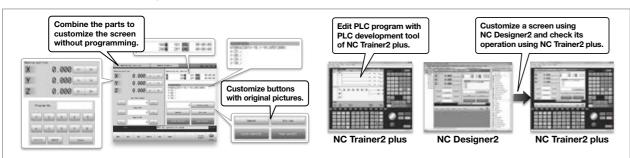
#### Process flow from machine design and development to operation and maintenance



#### Machine design



#### •Electrical circuitry design



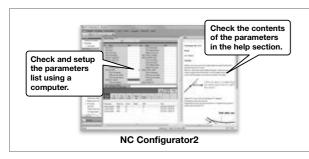
#### [NC Designer2]

We provide a developmental environment where the MTB can customize screens easily. Two types of screen development methods are available; the interpreter system (programming without C++) for simple screen development, and the compiler system with a complex controller (programming with C++).

#### (NC Trainer2 Plus)

NC Trainer2 plus supports customization development; it helps to program the ladder programming of the user PLC to be developed by machine tool builders and debug it and check the operations of customized screens.

#### Machine assembly and adjustment



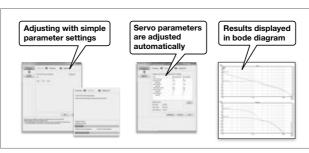
#### [NC Configurator2]

NC parameters required for NC control or machine operation can be edited on a computer. It is also possible to create initial parameters simply by inputting the machine configuration.

## c a

NC Monitor2

#### •Machine assembly and adjustment

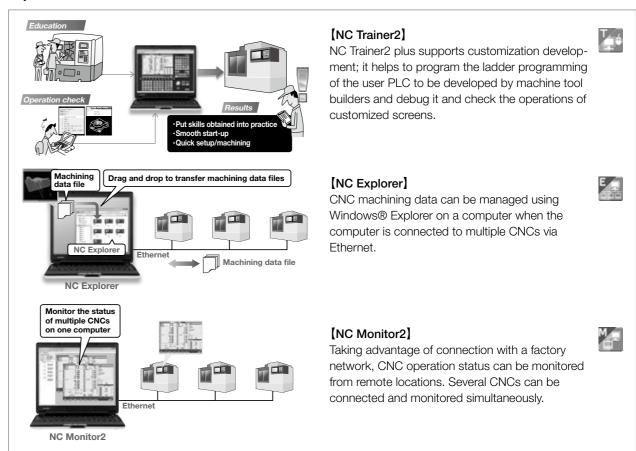


#### [NC Analyzer2]

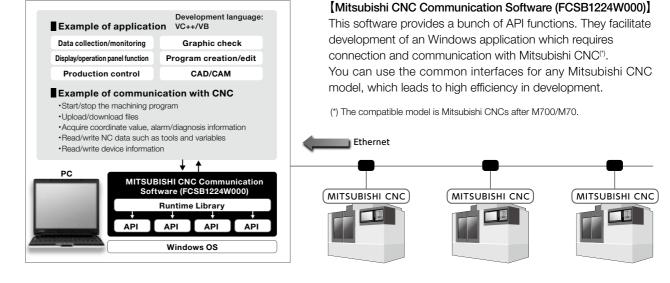


Servo parameters can be adjusted automatically by measuring and analyzing machine characteristics. Measurement and analysis can be done by running a servo motor using the machining program for adjustment, or using the vibration signal. This function can sample various types of data.

#### Operation and maintenance



#### Application development support



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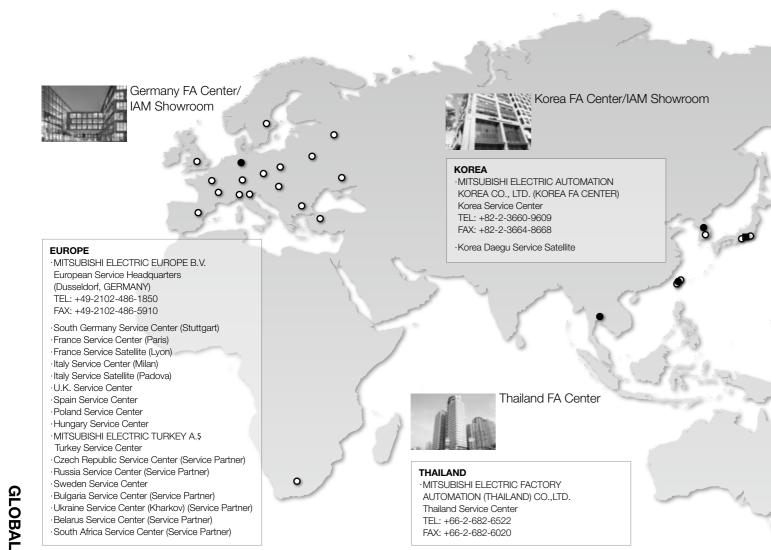
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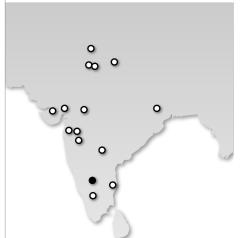
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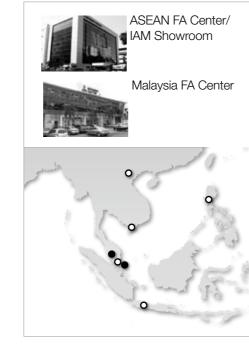
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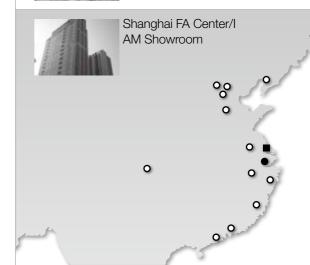
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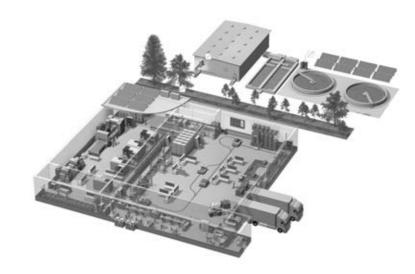
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