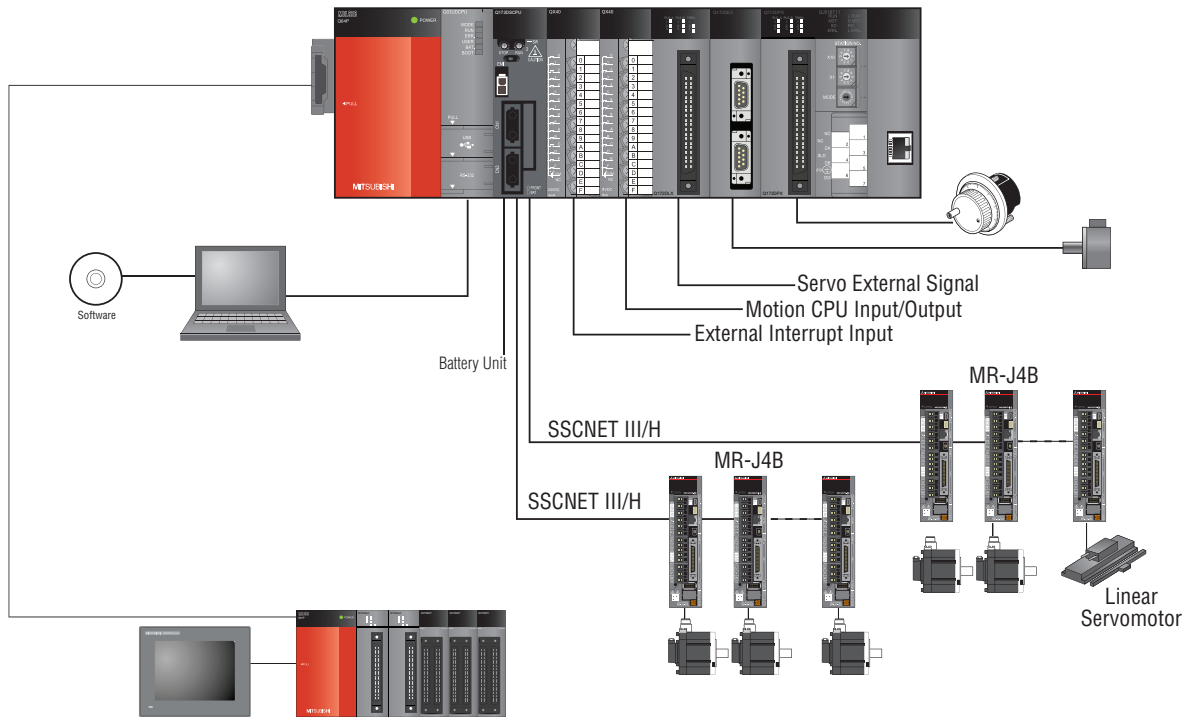


Motion CPUs for iQ Platform

The Q172DS and Q173DS Motion CPUs for the iQ Platform provide high performance for the most demanding motion applications for the food and beverage, packaging, automotive, and printing industries.



Motion Controller CPUs

Model Number	Q173DSCPU	Q172DSCPU
Stocked Item	S	S
Number of Control Axes	32 axes	16 axes
Operation Cycle (Operation Cycle Setting)	0.2ms, 0.4ms, 0.8ms, 1.7ms, 3.5ms, 7.1ms	
Control Modes	PTP (Point to Point) control, Speed control, Speed-position control, Fixed-pitch feed, Constant speed control, Position follow-up control, Speed control with fixed position stop, Speed switching control, High-speed oscillation control, Synchronous control (SV22)	
Interpolation Functions	Linear interpolation (Up to 4 axes), Circular interpolation (2 axes), Helical interpolation (3 axes)	
Control Modes	PTP(Point to Point) control, Speed control, Speed-position control, Fixed-pitch feed, Constant speed control, Position follow-up control, Speed control with fixed position stop, Speed switching control, High-speed oscillation control, Synchronous control (SV22)	
Acceleration/ Deceleration Control	Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration, Advanced S-curve acceleration/deceleration	
Compensation	Backlash compensation, Electronic gear, Phase compensation (SV22)	
Programming Language	Motion SFC, Dedicated instruction, Mechanical support language (SV22)	
Servo Program Capacity	16k steps	
Number of Positioning Points	3200 points (Positioning data can be set indirectly)	
Peripheral I/F	Via PLC CPU (USB, RS-232, Ethernet)	
Home Position Return Function	Proximity dog type (2 types), Count type (3 types), Data set type (2 types), Dog cradle type, Stopper type (2 types), Limit switch combined type, Scale home position signal detection type (Home position return re-try function provided, home position shift function provided)	
JOG Operation Function	Provided	
Manual Pulse Generator Operation Function	Possible to connect 3 modules (Q173DPX use), Possible to connect 1 module (Internal I/F use) (*5)	
Speed-Torque Control	Speed control without positioning loops, Torque control without positioning loops, Tightening & Press-fit control	
Synchronous Encoder	Possible to connect 12 modules (SV22 use)	
M-Code Function	M-code output function provided, M-code completion wait function provided	
Limit Switch Output Function	Number of output points 32 points, Watch data: Motion control data, Word device	
ROM Operation Function	Provided	
High-Speed Reading Function	8 points (Via Input module, Via tracking of Q172DEX/Q173DPX), 4 points (Via Q17_DSCPU's Internal I/F)	
Mark Detection Function	Function	Continuous Detection mode, Specified Number of Detections mode, Ring Buffer mode
	Mark Detection Signal	4 points (Via Q17_DSCPU's Internal I/F), Bit device, Q172DLX (DOG / CHANGE)
	Mark Selection Setting	32
Torque limit Value Change Function	Forward new torque value, Reverse new torque value	
Target Position Change Function	Provided	
Servo Parameter Change Function	Provided	
Servo Amplifier Control Mode Switching Function	Gain switching function, PI-PID control, Control loop changing (semi closed loop control, fully closed loop control)	
Optional Data Monitor Function	6 setting/axes (MR-J4-B's SSCNETIII/H use)	
Forced Stop Function	Motion controller forced stop (EMI terminal, System setting), Forced stop terminal of servo amplifier	
Number of Input/Output Points	Total 256 points (Q17_DSCPU's Internal I/F 4 points + I/O module)	
Clock Function	Provided	
Security Function	Password registration, Password for every motion SFC programs, Software security key function	
All Clear Function	Delete all user data in Motion CPU	
Remote Operation	Remote RUN/STOP, Remote latch clear	
Digital Oscilloscope Function	Bit data: 16 channels, Word data: 16 channels (*4)	
Amplifier-less Operation Function	Provided	
Absolute Position System	Made compatible by setting battery to servo amplifier. (Possible to select the absolute data method or incremental method for each axis)	
Number of SSCNET III Systems (*1)	2 systems	1 system
Motion Related Interface Module	Q172DLX: 4 modules usable Q172DEX: 6 modules usable (*2) Q173DPX: 4 modules usable (*3)	Q172DLX: 1 module usable Q172DEX: 6 modules usable (*2) Q173DPX: 4 modules usable (*3)
Internal Current	Q173DS: 1.75A (*6) Q173D: 1.25A Q173D-S1: 1.30A	Q172DS: 1.44A (*6) Q172D: 1.25A Q172D-S1: 1.30A
Dimensions W x D x H mm (in)	27.4 x 120.3 x 120.5 (1.08 x 4.74 x 4.74)	
Weight (kg)	0.38	

Notes:

- The SSCNETIII compatible servo amplifier can be used, but the SSCNET compatible servo amplifier cannot be used.
- Q172DEX cannot be used in SV13.
- When using the incremental synchronous (SV22 use), you can use the number of modules in the specification. When connecting the manual pulse generator, you can use only 1 module.
- 8CH word data and 8CH bit data can be displayed in real time.
- When the manual pulse generator is used with the Q17_DSCPU's internal I/F, do not set the Q173DPX in the System Settings.
- The current consumption (0.2A) of manual pulse generator/incremental synchronize encoder connected to the internal I/F connector is not contained.

Safety Signal Module

Model Number		Q173DSXY (*1)
Stocked Item		S
Input Signals	Number of Input Points	32 points x 2 systems (PLC CPU control 32 points + Motion CPU control 32 points, Safety input 20 points x 2 systems, Feedback inputs for outputs 12 points x 2 systems)
	Input Isolation Method	Photocoupler
	Rated Input Voltage	24VDC (+10/-10%), Negative Common Type
	Max. Input Current	Approx. 4mA
	Input Resistance	Approx. 8.2kΩ
	Input ON Voltage/Current	20VDC or more/3mA or more
	Input OFF Voltage/Current	5VDC or less/1.7mA or less
	Input Response Time	PLC CPU control I/O: 10ms (digital filter's default value); Motion CPU control I/O: 15ms (CR filter)
	Input Common Method	32 points/common (separate commons for the PLC CPU control I/O and the Motion CPU control I/O)
Input Operation Indicator LED	32 points (indication for PLC CPU control)	
Output Signals	Number of Output Points	12 points x 2 systems (PLC CPU control 12 points + Motion CPU control 12 points)
	Output Isolation Method	Photocoupler
	Rated Output Voltage	24VDC (+10/-10%), Source type
	Max. Load Current	(0.1A x 8 points, 0.2A x 4 points) x 2 systems, common current: each connector 1.6A or less
	Max. Inrush Current	0.7A 10ms or less (1.4A, 10ms or less for 0.2A output pin)
	Response Time	1ms or less
	Output Common Method	12 points/common (separate commons for the PLC CPU control I/O and the Motion CPU control I/O)
Output Operation Indicator LED	Shared with inputs	
Safety Specifications (*2)	Functions According to IEC61800-5-2	STO, SS1, SS2, SOS, SLS, SBC, SSM (IEC61800-5-2 : 2007) and Safety I/Os
	Safety Performance	EN ISO 13849-1 Category3 PL d, EN 61800-5-2/IEC 61508 Part 1-7 : 1998/2000, EN 62061 SIL CL 2
	Mean Time to Dangerous Failure (MTTFd)	169 years or more (theoretical value)
	Diagnostic Convergence (DCavq)	Low
	Probability of Dangerous Failure per Hour (PFH)	2.17E-8 (1/h)
Number of I/O Occupying Points		32 points
Communication Between PLC CPUs		Parallel bus communication (via main base unit)
Communication Between Motion CPUs		Serial communication (RS-485), RIO cable
Number of Installed Modules		Up to 3 modules; (Max. number of input points: 60 points x 2 systems; Max. number of output points: 36 points x 2 systems)
5VDC Internal Current Consumption		0.20A (TYP. all points ON)
Weight (kg)		0.15
Dimensions (H x W x D) mm (inch)		98 x 27.4 x 90 (3.86 x 1.08 x 3.54)

Notes:

1. Install Q173DSXY to the main base unit. Do not install to the extension base unit.
2. These functions are certified by Certification Body only for the combination of Q173DSXY and "QnUD(E)(H)CPU", the following PLC CPU modules. QnUD (E)(H) CPU : Q03UDCPU, Q03UDECPU, Q04UDHCPU, Q04UDEHCPU, Q06UDHCPU, Q06UDEHCPU, Q10UDHCPU, Q10UDEHCPU, Q13UDHCPU, Q13UDEHCPU, Q20UDHCPU, Q20UDEHCPU, Q26UDHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU

External Signal Interface Module

Model Number	Q172DLX	
Stocked Item	S	
Number of Inputs	Servo external signals: 32 points (Upper stroke limit, Lower stroke limit, Stop input, Proximity DOG/Speed-position switching signal) (4 points x 8 axes)	
Input Method	Sink/Source type	
Isolation Method	Photocoupler	
Rated Input Voltage	12/24VDC	
Rated Input Current	12VDC 2mA/24VDC 4mA	
Operating Voltage Range	10.2 to 26.4VDC (12/24VDC +10/-15%, ripple ratio 5% or less)	
ON Voltage/Current	10VDC or more/2.0mA or more	
OFF Voltage/Current	1.8VDC or less/0.18mA or less	
Input Resistance	Approx. 5.6KΩ	
Response time of the Upper/Lower Stroke Limit and STOP Signal	OFF – ON ON – OFF	1ms
Response Time of the Proximity DOG, Speed-Position Switching Signal	OFF – ON ON – OFF	0.4ms/0.6ms/1ms (CPU parameter setting, Default 0.4ms)
Common Terminal Arrangement	32 points/common (common terminal: B1, B2)	
Indicates to Display	ON indication (LED)	
External Connector Type	40 pin connector	
Applicable Wire Size	0.3mm ²	
Applicable Connector for the External Connection	A6CON1 (Attachment), A6CON2, A6CON3 (Optional)	
Applicable Connector/Terminal Block Converter Module	A6TBXY36, A6TBXY54, A6TBXY70 (Optional)	
Number of I/O Occupying Points	32 points (I/O allocation: Intelligent, 32 points)	
Internal Current Consumption (5VDC) (A)	0.06	
Weight (kg)	0.15	
Dimensions (mm (inch)) W x H x D	27.4 x 98 x 90 (1.08 x 3.86 x 3.54)	

Servo External Signal	Application	Number of Points
Upper Stroke Limit Input (FLS)	For detection of upper and lower stroke limits	32 points (4 points/8 axes)
Lower Stroke Limit Input (RLS)		
Stop Signal Input (STOP)	For stopping under speed or positioning control	
Proximity DOG/Speed-Position Switching Input (DOG/CHANGE)	For detection of proximity DOG at proximity DOG or count type home position return or for switching from speed to position switching control.	

Note: Signal No. 1 to 8 can be assigned to the specified axis. To make the assignment, use the system settings of the positioning software package.

Serial Absolute Synchronous Encoder and Interface Module

Model Number	Q172DEX	
Stocked Item	S	
Number of Inputs	Tracking enable signal: 2 points	
Input Method	Sink/Source type	
Isolation Method	Photocoupler	
Rated Input Voltage	12/24VDC	
Rated Input Current	12VDC 2mA/24VDC 4mA	
Operating Voltage Range	10.2 to 26.4VDC (12/24VDC +10/-15%, ripple ratio 5% or less)	
ON Voltage/Current	10VDC or more/2.0mA or more	
OFF Voltage/Current	1.8VDC or less/0.18mA or less	
Input Resistance	Approx. 5.6KΩ	
Response Time	OFF – ON ON – OFF	0.4ms/0.6ms/1ms (CPU parameter setting, Default 0.4ms)
Common Terminal Arrangement	1 point/common (Common terminal: TREN.COM)	
Display	ON indication (LED)	

Serial Absolute Synchronous Encoder Input

Model Number	Q172DEX
Applicable Signal Types	Differential-output type : (SN75C1168 or equivalent)
Transmission Method	Serial communications
Synchronous Method	Counter-clock-wise (viewed from end of shaft)
Communication Speed	2.5 Mbps
Applicable Types	Q170ENC
Position Detection Method	Absolute (ABS) method
Resolution	262144 PLS/rev (18bit)
Number of Modules	2/module
External Connector Type	20 pin connector
Applicable Connector for the External Connection	Q170ENCNS (Optional)
Applicable Wire	MB14B0023 12 Pair
Recommended Cables	Q170ENCBL_M: _ = cable length 2m (6.56 ft.), 5m (16.4 ft.), 10m (32.81 ft.), 20m (65.62 ft.), 30m (98.43 ft.), 50m (164.04 ft.) (Note)
Cable Length	Up to 50m (164.04 ft.)
Back up the Absolute Position	Depends on A6BAT/MR-BAT
Battery Service Life Time (Value in Actual)	12000 (h), (Example of encoders x 2, ambient temperature 40°C (104°F)) 24000 (h), (Example of encoders x 1, ambient temperature 40°C (104°F))
Memory of Data Exchange	None
Number of I/O Occupying Points	32 points (I/O allocation: Intelligent, 32 points)
Internal Current Consumption (5VDC) (A)	0.19
Dimensions W x H x D mm (in)	27.4 x 98 x 90 (1.08 x 3.86 x 3.54)
Weight (kg)	0.15

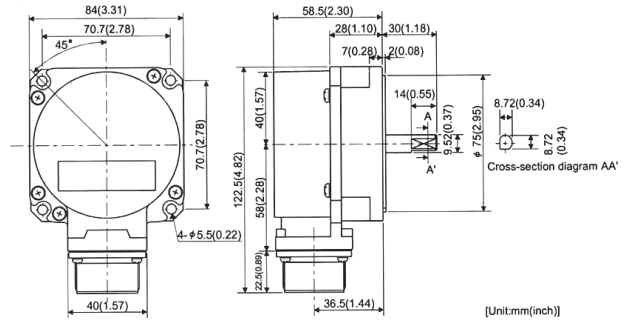
Note: Use these cables when the tracking enable signal is not used. Customer must make a cable when the tracking enable signal is used.

Synchronous Encoder (Optional)

Model Number	Q170ENC
Stocked Item	S
Resolution	262144 PLS/rev
Transmission Method	Serial Communications (Connected to Q172EX-S2/S3)
Direction on Increase	Counter clockwise (viewed from end of shaft)
Protective Construction (*1)	IP65 (dust proof, waterproof) except for the shaft-through portion
Permitted Speed at ON	3600 r/min
Permitted Speed at OFF (*2)	500 r/min
Permitted Axis Load	Radial load: Max 19.6N; Thrust load: Max 9.8N
Runout at Input Shaft Tip	0.02 mm (0.00079 in) or less; 15 mm (0.59 in) from tip
Recommended Coupling	Bellows coupling
Permissible Angular Acceleration	40,000 rad/s ²
Internal Current Consumption (A)	0.2
Connecting Cable	Q170ENCBL_M: _ = cable length 2m (6.56 ft.), 5m (16.4 ft.), 10m (32.8 ft.), 20m (65.6 ft.), 30m (98.4 ft.), 50m (164.04 ft.)
Communication Method	Differential driver/receiver conforming to RS-422A
Transmission Distance	Up to 50m (164.04 ft)
Operating Temperature	-5°C to 55°C (23 to 131°F)
Weight kg (lbs)	0.6 (1.3)

Notes:

1. If an "o-ring" is required, please purchase separately.
2. If it exceeds a permitted speed at power OFF, a position displacement is generated.



Manual Pulse Generator and Interface Module

Model Number	Q173DPX
Stocked Item	S
Number of Inputs	Tracking enable signal: 3 points
Input Method	Sink/Source type
Isolation Method	Photocoupler
Rated Input Voltage	12/24VDC
Rated Input Current	12VDC 2mA/24VDC 4mA
Operating Voltage Range	10.2 to 26.4VDC (12/24VDC +10/-15%, ripple ratio 5% or less)
ON Voltage/Current	10VDC or more / 2.0 mA or more
OFF Voltage/Current	1.8VDC or less / 0.18 mA or less
Input Resistance	Approx. 5.6KΩ
Common Terminal Arrangement	1 point/common (Common terminal: TREN.COM)
Display	ON indication (LED)

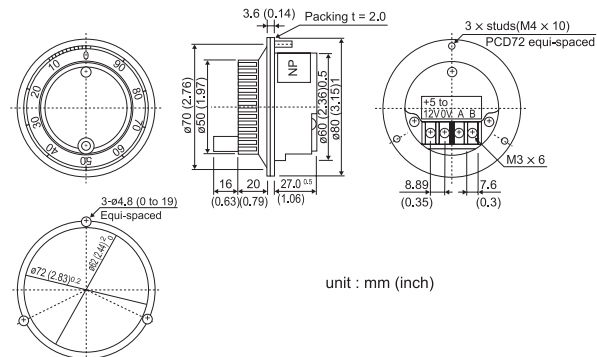
Manual Pulse Generator (Optional)

Model Number	MR-HDP01
Stocked Item	S
Pulse Resolution	25 PLS/rev (100 PLS/rev at magnification of 4)
Output Method	Voltage - output (power supply voltage - 1V or more), Output current = Up to 20 mA
Power Supply Voltage	4.5 to 13.2VDC (*1)
Consumption Current	60
Life	1,000,000 revolutions at 200 r/min
Permitted Axis Load	Radial load : Max. 19.6N; Thrust load : Max. 9.8N
Pulse Signal Status	2 signals: A phase, B: phase, 90° phase difference
Friction Torque	0.06N/m (at 20°C (68°F))
Operating Temperature	-10°C to +60°C (14°F to 140°F)
Weight kg (lbs)	0.4 (0.88)

Note 1: If using an external power supply, it needs to be 5VDC.

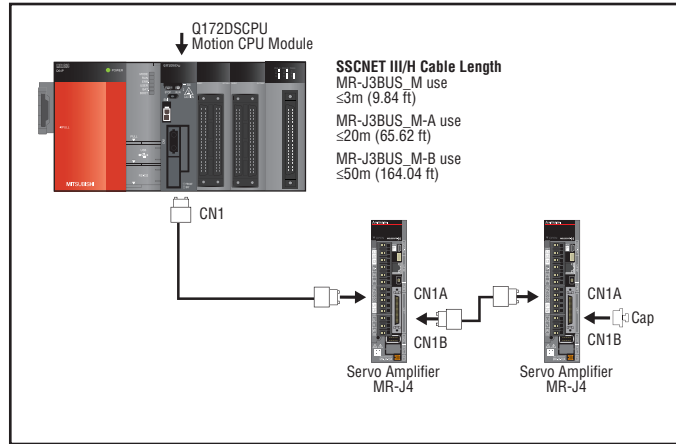
Serial Absolute Synchronous Encoder I/F

Model Number	Q173DPX	
Number of Modules (Max.)	3 per module	
Voltage-output/ Open Collector	High Voltage	3.0 to 5.25VDC
	Low Voltage	0 to 1.0VDC
Differential-Output Type (26LS31 or Equivalent)	High Voltage	2.0 to 5.25VDC
	Low Voltage	0 to 0.8VDC
Input Frequency	Max. 200kpps (After magnification by 4)	
Applicable Types	Voltage-output type/Open-collector type (5VDC), Recommended product: MR-HDP01; Differential-output type: (26LS31 or equivalent)	
External Connector Type	40 pin connector	
Applicable Wire Size	0.3mm ²	
Applicable Connector for the External Connection	A6CON1 (Attachment) A6CON2, A6CON3 (Optional)	
Applicable Connector/ Terminal Block Converter Module	A6TBXY36, A6TBXY54, A6TBXY70 (Optional)	
Cable Length	Voltage-Output/ Open Collector Output Type	30m (98.43 ft.)
	Differential-Output Type	(Open collector output type: 10m (32.81 ft.))
Number of I/O Occupying Points	32 points (I/O allocation: Intelligent, 32 points)	
Internal Current Consumption	0.38	
Dimensions W x H x D mm (in)	27.4 x 98 x 90 (1.08 x 3.86 x 3.54)	
Weight (kg)	0.15	

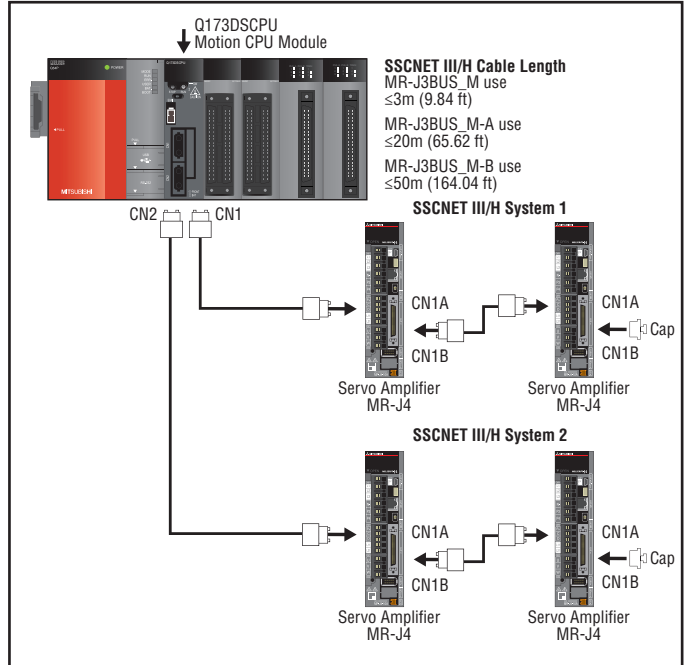


Miscellaneous Parts, Cables and Connectors

Connection between Q172DSCPU and MR-J4 Servo Amplifiers



Connection between Q173DSCPU and MR-J4 Servo Amplifiers



Miscellaneous Parts

Model Number	Description	Stocked Item
Q6BAT	Battery for memory data backup of SRAM built-in Motion CPU	S
A6BAT	Battery for data backup of the Q170ENC	S
MR-J3USBCBL3M	USB cable from PC to PLC CPU (3M)	S
SC-Q	RS-232 cable from PC to PLC CPU	S
Q173DSD0-1M	Interface Cable, Differential Type, 1.0m	S
Q173DSD0-2M	Interface Cable, Differential Type, 2.0m	S
Q173DSD0-5M	Interface Cable, Differential Type, 5.0m	S
Q173DSV0-1M	Interface Cable, Voltage Type, 1.0m	S
Q173DSV0-2M	Interface Cable, Voltage Type, 2.0m	S
Q173DSV0-5M	Interface Cable, Voltage Type, 5.0m	S

SSCNETIII and SSCNETIII/H Cables

Model Number	Description	Stocked Item
MR-J3BUS015M	0.15M SSCNET III (plastic) cable	S
MR-J3BUS03M	0.3M SSCNET III (plastic) cable	S
MR-J3BUS05M	0.5M SSCNET III (plastic) cable	S
MR-J3BUS1M	1M SSCNET III (plastic) cable	S
MR-J3BUS3M	3M SSCNET III (plastic) cable	S
MR-J3BUS5M-A	5M SSCNET III (plastic) cable	S
MR-J3BUS10M-A	10M SSCNET III (plastic) cable	S
MR-J3BUS20M-A	20M SSCNET III (plastic) cable	S
MR-J3BUS30M-B	30M SSCNET III (glass) cable	S
MR-J3BUS40M-B	40M SSCNET III (glass) cable	-
MR-J3BUS50M-B	50M SSCNET III (glass) cable	-

Cables and Connectors for Special Function Modules

Model Number	Description	Stocked Item
A6CON1	Q173DPX connector to use the manual pulse generator and incremental synchronous encoder or Q172DLX connector to use the servo external input signals	S
A6TBXY36	Q172DLX terminal block conversion module - Sink Type I/O (Standard type)	S
A6TBXY54	Q172DLX terminal block conversion module - Sink Type I/O (2-wire type)	-
A6TBXY70	Q172DLX terminal block conversion module - Sink Type I/O (3-wire type)	-
AC05TB	0.5M cable from Q172DLX to A6TBXY__ terminal block conversion module	S
AC10TB	1M cable from Q172DLX to A6TBXY__ terminal block conversion module	S
AC20TB	2M cable from Q172DLX to A6TBXY__ terminal block conversion module	S
AC30TB	3M cable from Q172DLX to A6TBXY__ terminal block conversion module	S
AC50TB	5M cable from Q172DLX to A6TBXY__ terminal block conversion module	S
AC80TB	8M cable from Q172DLX to A6TBXY__ terminal block conversion module	-
AC100TB	10M cable from Q172DLX to A6TBXY__ terminal block conversion module	-
Q170ENCNS	Connector set for the Q170ENC absolute synchronous encoder	S
Q170ENCCBL2M	2M cable from the Q172DEX to the Q170ENC absolute synchronous encoder	S
Q170ENCCBL5M	5M cable from the Q172DEX to the Q170ENC absolute synchronous encoder	S
Q170ENCCBL10M	10M cable from the Q172DEX to the Q170ENC absolute synchronous encoder	S
Q170ENCCBL20M	20M cable from the Q172DEX to the Q170ENC absolute synchronous encoder	-
Q170ENCCBL30M	30M cable from the Q172DEX to the Q170ENC absolute synchronous encoder	-
Q170ENCCBL50M	50M cable from the Q172DEX to the Q170ENC absolute synchronous encoder	-

Cables for Forced Stop Input Connector (EMI)

Model Number	Description	Stocked Item
Q170DEMICBL05M	0.5M cable for EMI connector on CPU	S
Q170DEMICBL1M	1M cable for EMI connector on CPU	S
Q170DEMICBL3M	3M cable for EMI connector on CPU	S
Q170DEMICBL5M	5M cable for EMI connector on CPU	S
Q170DEMICBL10M	10M cable for EMI connector on CPU	S
Q170DEMICBL15M	15M cable for EMI connector on CPU	S
Q170DEMICBL20M	20M cable for EMI connector on CPU	S
Q170DEMICBL25M	25M cable for EMI connector on CPU	S
Q170DEMICBL30M	30M cable for EMI connector on CPU	S

Operating and Programming Software

Motion Controller Engineering Software

Motion SFC programming, parameter setting, and the digital oscilloscope function, etc. are available. With these various features, this software supports all necessary steps including system configuration, programming, debugging, and maintenance of Motion controllers.

Model Number	Stocked Item	Description
MT-WORKS2-C1	S	Single user license - can be used on 1 computer at a time; Installation manual included
MT-WORKS2-C5	-	5 user license - can be used on up to 5 computers at a time
MT-WORKS2-C10	-	10 user license - can be used on up to 10 computers at a time
MT-WORKS2-C25	-	25 user license - can be used on up to 25 computers at a time
MT-WORKS2-C50	-	50 user license - can be used on up to 50 computers at a time