

YASKAWA

Handling Robot for Picking and Packing MOTOMAN-MPP and MPK Series

MPP Series
MPK Series



Certified for
ISO9001 and
ISO14001



JAB
QMS Accreditation
R009



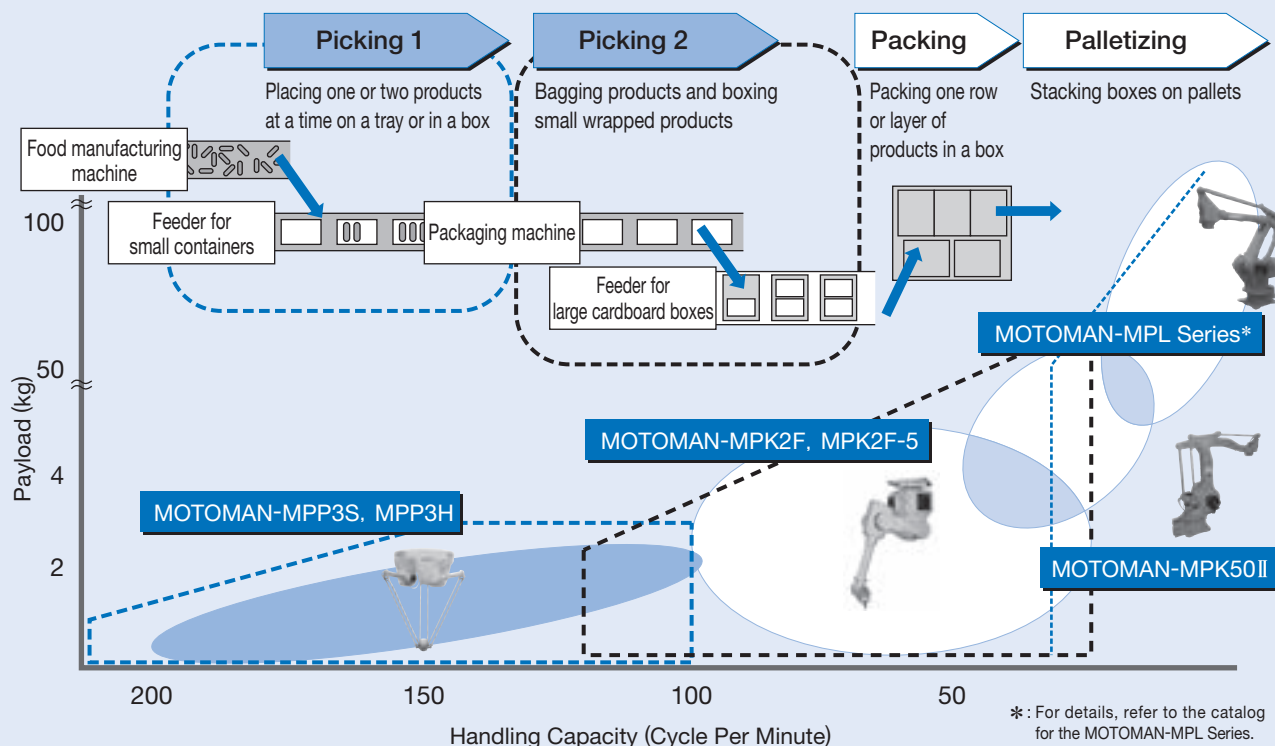
JQA-0813



JQA-EM0202

Automated transfer systems for picking and packing processes of food, pharmaceuticals, and cosmetics.

Example of food manufacturing



Picking MOTOMAN- MPP3S, MPP3H

High productivity

The MPP series of robots can be installed in close proximity in a small space. As the best in their class, they also enable high-speed handling*¹ with a large motion range and improve productivity.

- 150 cpm*² with a 3 kg load and 230 cpm*³ with a 1 kg load are possible.
- Allowable inertia of the wrist is 0.017 kg·m², and high-speed handling with two hands is possible.

* 1: Handling in Adept cycle (25 mm × 305 mm × 25 mm) without positioning limit. Does not include the time for using suction to grab a workpiece.

* 2: Cycle per minute

* 3: With a limit in continuous operations

- Wiring and piping work can be easily performed through the hollow section (80 mm dia.) located at the center of the body.

Flexible and high-speed handling is maximized through combined use of a double conveyor synchronization function, vision function, and production management function.

Even higher productivity can be achieved with Yaskawa's original robot design

Cycle times can be reduced with shorter suction time in addition to high-speed robot movements. The hollow structure of the robot (first in the industry) enables the installation of air valves inside the parallel link arms. The structure shortens the length of piping drastically, which achieves a reduction in the cycle time.

Large motion range with a small installation space

- MPP3S Range of motion : 800mm(dia.)×200mm(H)
Footprint : 650mm(dia.)
- MPP3H Range of motion : 1300mm(dia.)×300mm(H)
(Widest in its class)
Footprint : 750mm(dia.)

High level of cleanliness

The MPP series of robots are designed to maintain high level of cleanliness for food handling.

- Ball joints are free of grease because self-lubricating material approved by the Food Sanitation Law of Japan is used.
- Because they can be mounted on ceilings and maintenance is done from the top downwards, damage or contamination of workpieces and conveyors is prevented if a work tool, part, or grease falls during maintenance.
- The surface of the body, excluding arms, is smooth and easy to clean.
- Can be washed with acid- or alkaline-based disinfectant.
- Clean Class: ISO class 5



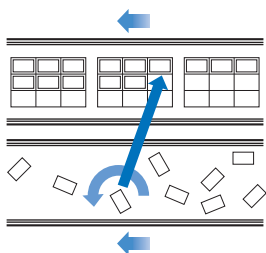
MPP3S and MPP3H are certified for cleanroom application by Fraunhofer IPA.



Picking MOTOMAN- MPK2F, MPK2F-5

High productivity

With the fastest motion speed in their class, the MOTOMAN-MPK2F and MPK2F-5 can quickly transfer many workpieces in a short period. Smooth, 24-hour continuous operation is possible with high precision.

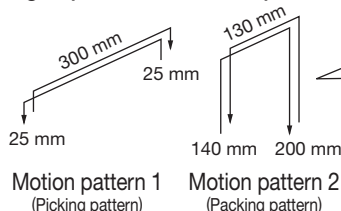


High-speed positioning

- Simultaneous positioning & transfer
- Max. speed of T-axis increased to 2000°/s



High-speed, continuous operation



Cycle time*

- Motion pattern 1
0.47 s
(128 cycles/min: 2 kg)
- Motion pattern 2
0.86 s
(70 cycles/min: 2 kg)

* : Does not include the time for grabbing and releasing a workpiece.

High level of cleanliness

Countermeasures against contamination

Manipulator's high level of cleanliness guarantees safety and sanitation of the transferred products.

Protection against corrosion & dust

- Exposed parts made from corrosion-resistant materials with surface treatment and washable coating
- Cable and hoses protected in hollow shaft of arm (built-in wiring and piping)

Protection against lubricants (grease)

- Multi-layered sealing construction on all drive shafts
- Food-grade lubricant used (NSF H1 registered)

Washability (Disinfectant)

Stain-resistant surface and structure, washable coating, and water proofing against daily disinfectant washing.

Protection against dirt & particles

- No depressions of grooves to hold dirt
- Particles do not collect or adhere.

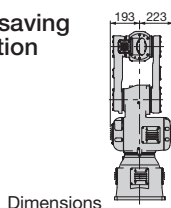
Protection against disinfectant washing

- Washable coating withstands daily washing
- Can be washed with acid- or alkaline-based disinfectant.
- Water-proof performance conforms to IP67 specifications for the wrist arm (with tools mounted).

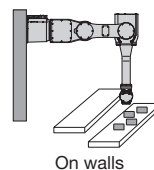
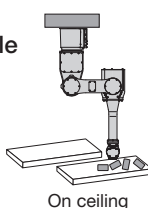
High flexibility in layout design

Enables flexibility regardless of space restrictions or installation method for high-density layouts.

Space-saving installation



All installation methods possible



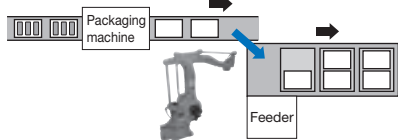
Packing MOTOMAN- MPK50II

High productivity

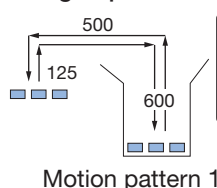
With a high payload and the highest speed in its class, many more workpieces can be picked up and packed in a short period of time.

High-speed packing

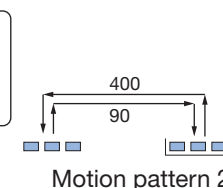
Increased efficiency by transferring and packing many workpieces from a single row or layer at one time.



High-speed handling



Cycle time*
• **1.1 s**
(55 cycles/min: 30 kg)



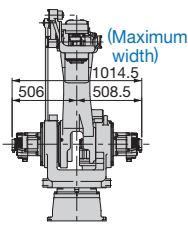
Cycle time*
• **0.6 s**
(100 cycles/min: 40 kg)

* : Does not include the time for grabbing and releasing a workpiece.

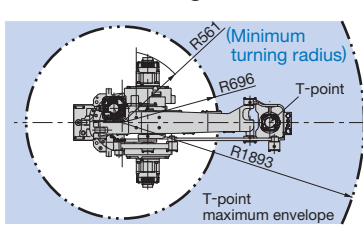
Space-saving installation

Compact design increases usability in restricted spaces or in high-density layouts.

Shortened maximum width



Minimized minimum turning radius



Multi-purpose

With a high-payload, a wide motion range, and a wide variety of the components, the MOTOMAN-MPK50II can be used as a palletizing robot for small workpieces.

Max. payload: 50 kg

Can transfer many workpieces at one time, can operate packing

Wide motion range (Palletizing also possible)

Maximum horizontal reach (T-point): 1893 mm,
Vertical motion range: 1668 mm,
S-axis turning range: -180° - +180°

Wide variety of components

One cable (23-core), two air hoses (dia.: 10 mm), and one tube for field-bus cable (dia.: 12 mm) accommodated in hollow arm.

Protection Class

Body: IP54 (optional: IP65), Wrist: IP67

Options

Food-grade lubricant for food machinery

Controller with best functions and performance for handling and assembly applications

Optimum controller for handling and assembly

Supports robots with a payload of 20 kg or less

- Fits in a 19 inch rack and can be installed under conveyors.
- Improved performance and high-speed control obtained by improving resolutions for I/O commands as well as by reducing time for ladder scanning.
- High-speed positioning achieved by suppressing vibration of hands (MPP3S/MPP3H/MPK2F/MPK2F-5).
- Commands specifically designed for workpiece handling with synchronized conveyors.



Open controller

The FS100 robot controller offers an environment and functions that enable users to develop optimum application programs for their own use.

Functions	Descriptions	Remarks
MotoPlus	Allows users to customize application programs for robot control · Users can create robot control programs in C and install them in the controller.	MotoPlusIDE (development environment) is optional.
MotomanSync Optional	Allows users to directly control the FS100 controller from the host controller by using the FS100 as servers. · Robots can be controlled directly from the host computer.	Compatible host computers: Windows, MP3200 controllers, Rockwell PLC*
Pendant Customization Optional	Provide the function to develop application programs for the programming pendant · WindowsCE application programs developed by users can be incorporated in the programming pendant.	—

*: Compatible with 1756-L61 ControlLogix and 1756-L35E CompactLogix controllers.

Main Hardware Options

- Programming pendant
- External axis (max.: 2 axes)
- I/O module (28 points, NPN or PNP)
- Counter module (2 channels)
- Analog input module (8 channels)
- Analog output module (4 channels)
- Major fieldbus interface boards
DeviceNet (master/slave), CC-Link (slave), PROFIBUS (slave), EtherNet/IP (slave, I/O communications)

Main Optional Functions

- Conveyor synchronization
- TCP
- Relative job
- Coordinated control
- Servo float
- Energy saving mode (with servomotor turn off limit)
- Software pendant
- Network (data transfer, FTP, Ethernet server)
- Bilingual display (Shown in the required language.)
- Vision function
- External reference point control
- Independent control
- Search
- Automatic backup

Low floor-type controller that can be stacked up. The amplifier for three external axes and other options that previously required attachment tools can now be housed inside a standard cabinet, reducing the required space for installation by up to 50%. The safety functions have been strengthened by improving the safety performance of the speed limiting function and tool switching monitoring function.



Safety

Improved Safety Functions (New and optional)

- The robot position is monitored by a functional safety module equipped with two CPUs, increasing safety.
- Motion is limited to a set area by monitoring the position of the robot and tool.
- The Preventive Maintenance Function for Speed Reducer can detect speed reducer faults. The Preventive Maintenance Function for Hardware can prompt you to replace hardware before it breaks.

Easy operation

- Editing or prohibiting editing instructions with the programming pendant makes controlling jobs easier. (JOB Line Comment-Out Function, JOB Line Edit-Protect Function, JOB Folder Function)

Space-saving installation

- A safety fence can be installed in an area smaller than the robot motion area to save space.
- Two DX200 robot controllers can be stacked*. Installation width can be reduced by 30% compared with two DX100 controllers installed side-by-side.

* : Some models are excluded.

Picking & Packing Software MotoPick

Optional

MotoPick provides support for picking and packing with the software applications specially designed for those operations. A pattern for the arrangement of workpieces moving on a conveyor or a pattern for picking and placing operation can be easily selected or changed on a computer. This software helps improve overall productivity in conveyor lines.

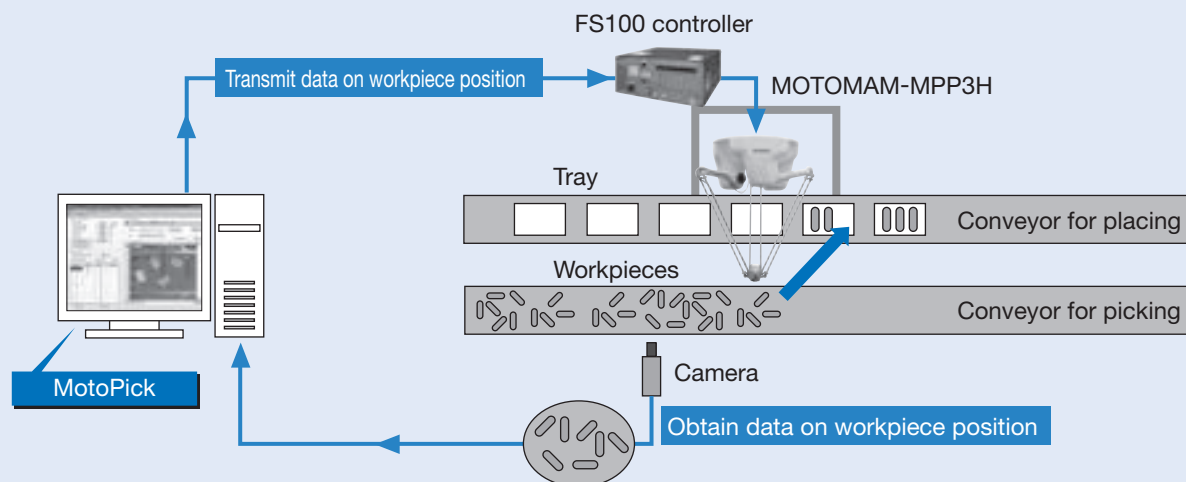
● Vision function

The camera connected to a computer running MotoPick can be adjusted and controlled. Data on positions of individual workpieces moving on a conveyor can automatically be obtained with the camera.

● Real time automatic scheduling

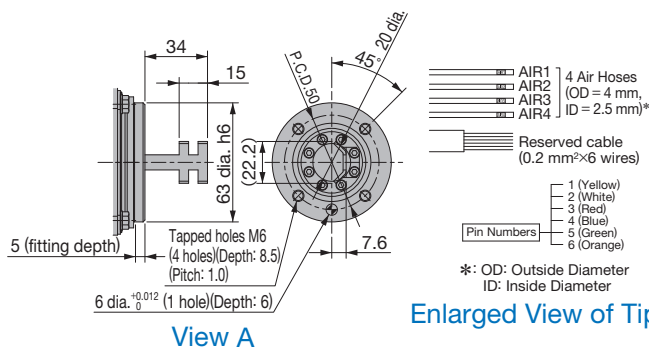
The motion patterns of the robot in pick and place applications are controlled based on the position data of workpieces that have been obtained by the camera and transferred to the robot's controller.

Conveyor Synchronization System for the MPP3H with FS100 Robot Controllers





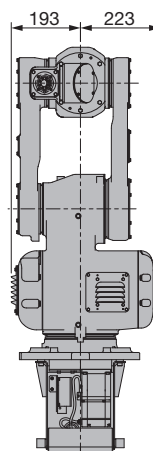
FS100



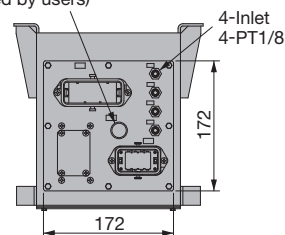
View A

Enlarged View of Tip

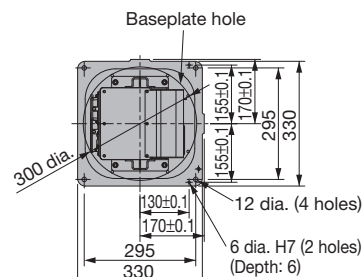
Connector for internal user I/O wiring harness:
RM15WTRZ-10P (with cap)
Matching connector:
RM15WTPZ-10S*HIROSE*
(provided by users)



View B



View C



7

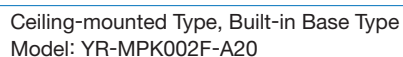
Allowable Moment	B-axis (wrist pitch/yaw)	3.5 N·m
	T-axis (wrist twist)	1.5 N·m
Allowable Inertia (GD²/4)	B-axis (wrist pitch/yaw)	0.065 kg·m²
	T-axis (wrist twist)	0.012 kg·m²
Mass		72 kg
Ambient Conditions	Temperature	0°C to +40°C
	Humidity	20% to 80%RH (non-condensing)
	Vibration	4.9 m/s² (0.5 G) or less
	Others	• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to oil, or dust • Free from excessive electrical noise (plasma)
Power Requirements*2		2.0 kVA

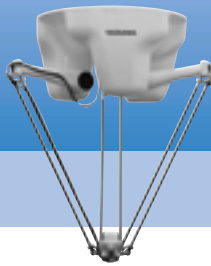
Note: SI units are used for the specifications.



FS100

Floor-mounted Type, Built-in Base Type
Model: YR-MPK002F-A10





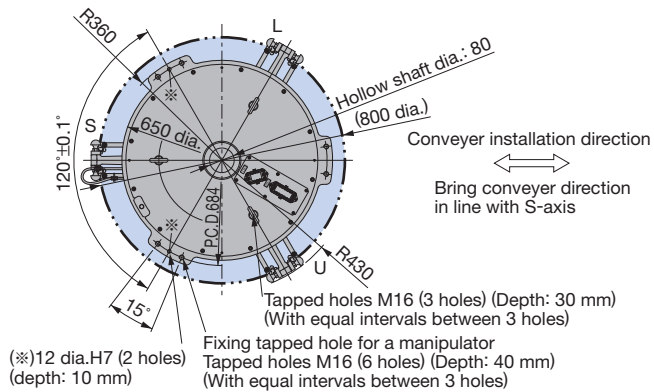
MOTOMAN-MPP3S/MPP3H

3 kg payload, maximum reach 800 mm (dia.) × 200 mm (H) (MPP3S)
1300 mm (dia.) × 300 mm (H) (MPP3H)

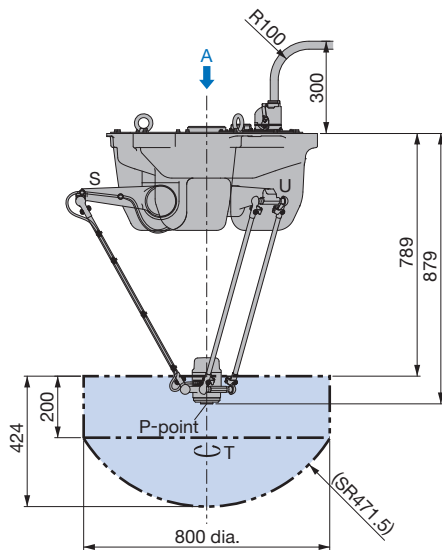
FS100

■ Dimensions Units : mm  : P-point Maximum Envelope

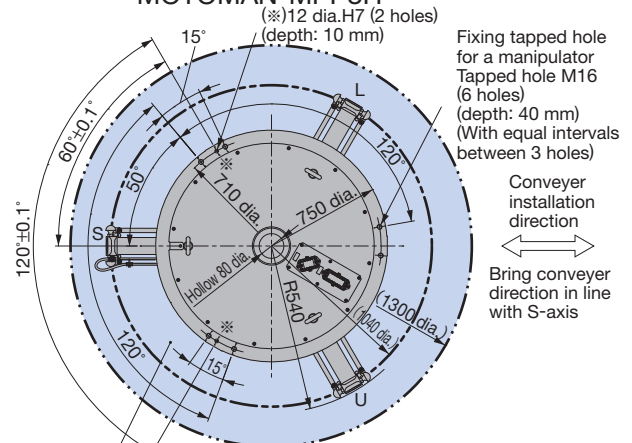
MOTOMAN-MPP3S



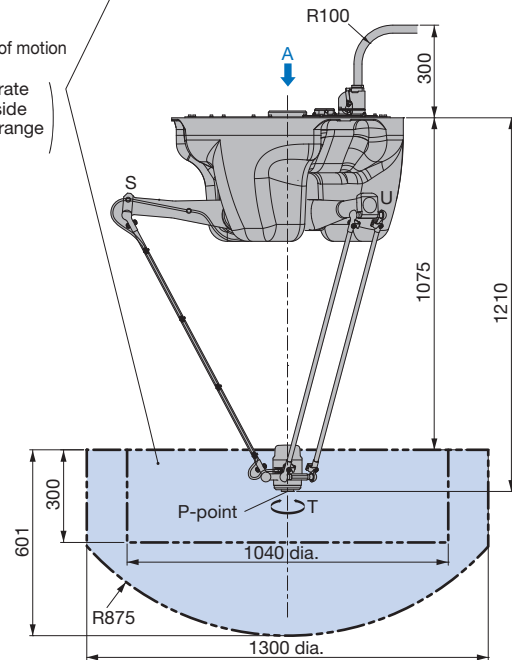
View A



MOTOMAN-MPP3H



View A



■ Manipulator Specifications

Model	MOTOMAN-	MPP3S	MPP3H
Type	YR-MPP003S-A00	YR-MPP003H-A00	
Controlled Axis	4 (parallel link)		
Payload	3 kg		
Repeatability*1	±0.1 mm		
Repeatability (T-axis rotation)	±1 arc-min or less		
Range of Motion	800 mm (dia.) × 200 mm (H) 1300 mm (dia.) × 300 mm (H)*4		
Cycle Time for 25 × 305 × 25 mm motion pattern	1 kg: 230 cpm*5 3 kg: 150 cpm		
T-axis	Range of Motion	-360° - +360°	
	Allowable Inertia (GD ² /4)	1 kg: 0.0013 kg·m ² or less 3 kg: 0.017 kg·m ² or less	1 kg: 0.0013 kg·m ² or less 2 kg: 0.009 kg·m ² or less 3 kg: 0.017 kg·m ² or less
Mass		95 kg	115 kg
IEC Protection Class	IP67		
Clean Class*2	ISO class 5		

Model	MOTOMAN-	MPP3S	MPP3H
Ambient Conditions	Temperature	0°C to +40°C	
	Humidity	20% to 80%RH (non-condensing)	
	Vibration	4.9 m/s ² (0.5G) or less	
	Others	- Free from corrosive gas or liquid, or explosive gas or liquid - Free from excessive electrical noise (plasma)	
Power Requirements*3		1.5 kVA	

*1 : Conforms to ISO 9283.
 *2 : Cleanroom standards: ISO14644-1
 MPP3S and MPP3H are certified for cleanroom application by Fraunhofer IPA.
 *3 : Varies in accordance with applications and motion patterns.
 *4 : Recommended range of motion is 1040 mm (dia.) × 300 mm (H).
 T-axis unit may vibrate when it moves outside the recommended range of motion.
 *5 : With a limit in continuous operations
 (No continuous operation limit: 185 cpm or less)
 Note : SI units are used for the specifications.

FS100 CONTROLLER

■ FS100 Controller Specifications

Items	Specifications
Configuration	Open structure (IP20)
Dimensions	470 (W)×420 (D)×200 (H) mm (Does not include protruding parts.)(Possible to control two external axes)
Mass	20 kg
Manipulator	MOTOMAN-MPP3S, -MPP3H, -MPK2F, -MPK2F-5
Cooling System	Direct cooling
Ambient Temperature	During operation: 0°C to +40°C During storage : -10°C to +60°C
Relative Humidity	90% max. (non-condensing)
Power Supply	Three-phase 200/220 VAC (+10% to -15%), 50/60 Hz
Grounding	Grounding resistance: 100 Ω or less
Digital I/Os	Specialized signals: 10 inputs and 1 output General signals : 28 inputs and 28 outputs Max. I/O (optional) : 1024 inputs and 1024 outputs
Positioning System	Serial communications (absolute encoder)
Programming Capacity	JOB: 10,000 steps, 1,000 instructions CIO ladder: 1,500 steps max.
Expansion Slots	MP2000 bus × 5 slots
LAN (Connection to Host)	1 (10BASE-T/100BASE-TX)
Interface	RS-232C: 1ch
Control Method	Software servo control
Drive Units	For robot axes: One drive unit for AC servo with 4 to 6 axes (depend on the type) For external axes: Two more axes can be added. (Can be installed in the controller.)

■ Programming Pendant Specifications Optional

Items	Specifications
Dimensions	169 (W)×50 (D)×314.5 (H) mm
Mass	0.990 kg
Material	Reinforced plastics
Operation Device	Select keys, axis keys (8 axes), numerical/application keys, Mode switch with key (mode: teach, play, and remote), emergency stop button, enable switch, compact flash card interface device (compact flash is optional.), USB port (1 port)
Display	640×480 pixels color LCD, touch panel (Alphanumeric characters, Chinese characters, Japanese letters, Others)
IEC Protection Class	IP65
Cable Length	Standard: 8 m, max.: 20 m (with optional extension cable)

Note: A programming pendant or a dummy connector is required with the FS100. (Sold separately.)

- Programming pendant (model: JZRCR-YPP03-1)
For maintenance, the programming pendant is required. One programming pendant can be used with more than one controller.
- Dummy connector (model: CBL-FRC063-2)
The dummy connector must be inserted when the programming pendant is not connected or when the software pendant is used.

DX200 CONTROLLER

■ DX200 Controller Specifications

Items	Specifications
Configuration	Dust proof (IP54)
Dimensions	600 (W)×520 (D)×730 (H) mm (Possible to control three external axes)
Mass	100 kg max.
Manipulator	MOTOMAN-MPK50II
Cooling System	Indirect cooling
Ambient Temperature	During operation: 0°C to +45°C During storage : -10°C to +60°C
Relative Humidity	90% max. (non-condensing)
Power Supply	Three-phase 200 VAC (+10% to -15%), 50/60 Hz (±2%) Three-phase 220 VAC (+10% to -15%), 60 Hz (±2%)
Grounding	Grounding resistance: 100 Ω or less
Digital I/Os	Specialized signals: 28 inputs and 7 outputs General signals : 40 inputs and 40 outputs Max. I/O (optional) : 4096 inputs and 4096 outputs
Positioning System	Serial communications (absolute encoder)
Programming Capacity	JOB: 200,000 steps, 10,000 instructions CIO ladder: 20,000 steps max.
Expansion Slots	PCI: 2 slots
LAN (Connection to Host)	1 (10BASE-T/100BASE-TX)
Interface	RS-232C: 1ch
Control Method	Software servo control
Drive Units	SERVOPACK for AC servomotors (can control up to 9 axes)

■ Programming Pendant Specifications

Items	Specifications
Dimensions	169 (W)×50 (D)×314.5 (H) mm
Mass	0.990 kg
Material	Reinforced plastics
Operation Device	Select keys, axis keys, numerical/application keys, mode selector switch with keys (mode: teach, play, and remote), emergency stop button, enable switch, compact flash card interface device (compact flash is optional.), USB port (1 port)
Display	5.7-inch color LCD, touch panel 640×480 pixels (Alphanumeric characters, Chinese characters, Japanese letters, Others)
IEC Protection Class	IP65
Cable Length	Standard: 8 m, max.: 36 m (with optional extension cable)

MOTOMAN-MPP and MPK Series

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YASKAWA

YASKAWA ELECTRIC CORPORATION

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