

YASKAWA

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

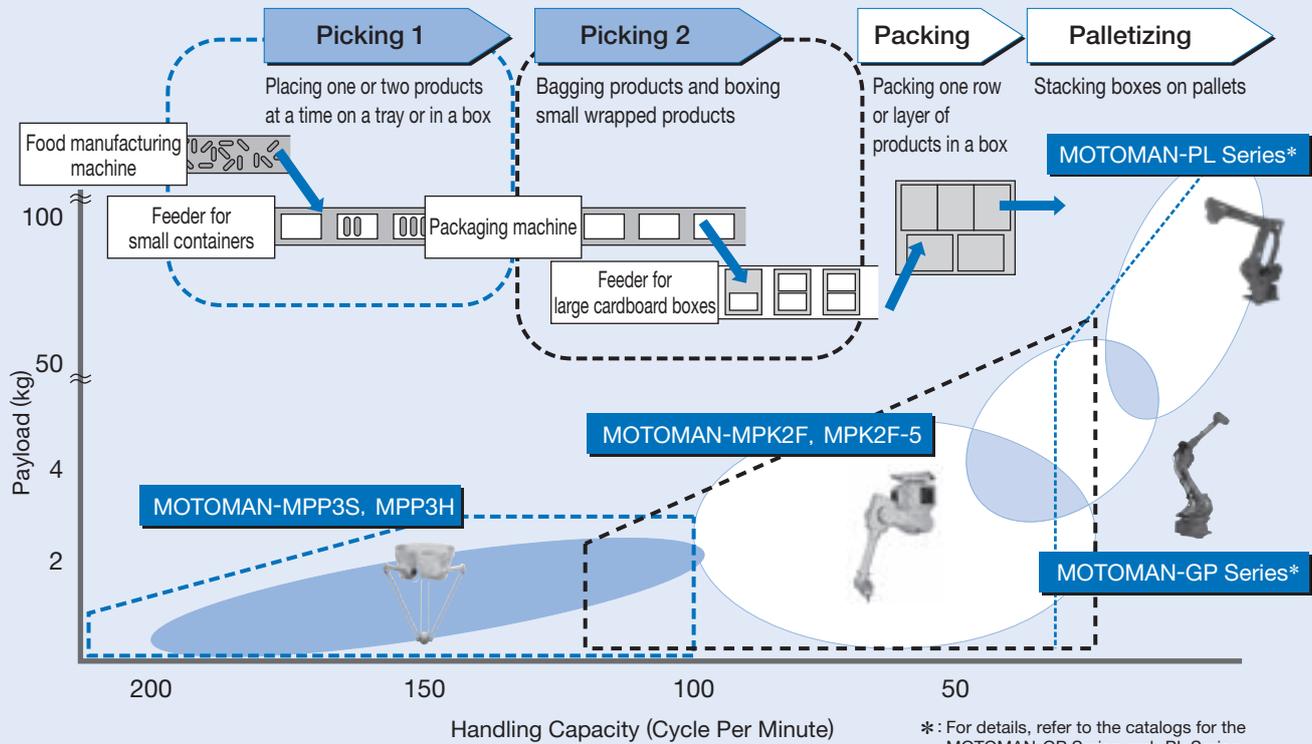


MPP Series
MPK Series



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



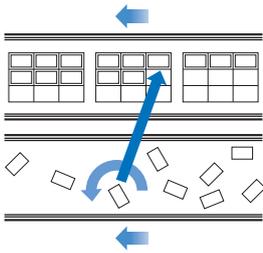
MPP3S and MPP3H are certified for cleanroom application by Fraunhofer IPA.



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.

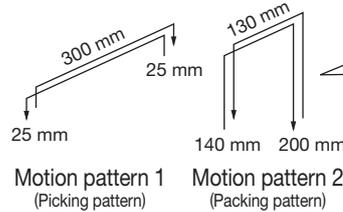


High-speed positioning

- 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)

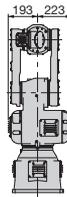
Stain-resistant surface and structure, washable coating, and water proofing against daily disinfectant washing.

- **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

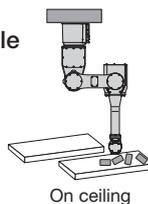
Enables flexibility regardless of space restrictions or installation method for high-density layouts.

Space-saving installation

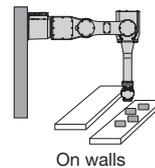


Dimensions

All installation methods possible



On ceiling



On walls



On floors

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.

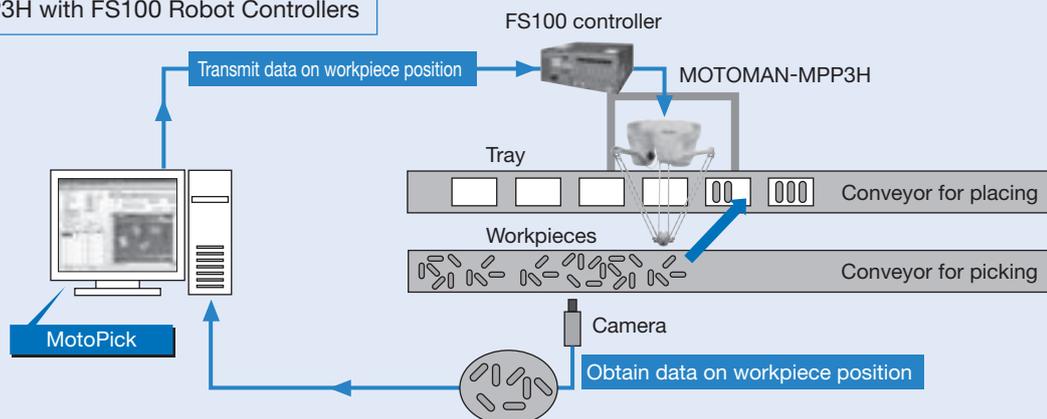
• Vision function

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



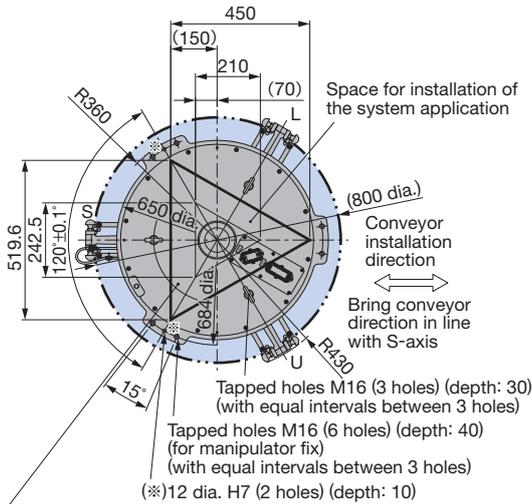


MOTOMAN-MPP3S/MPP3H

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

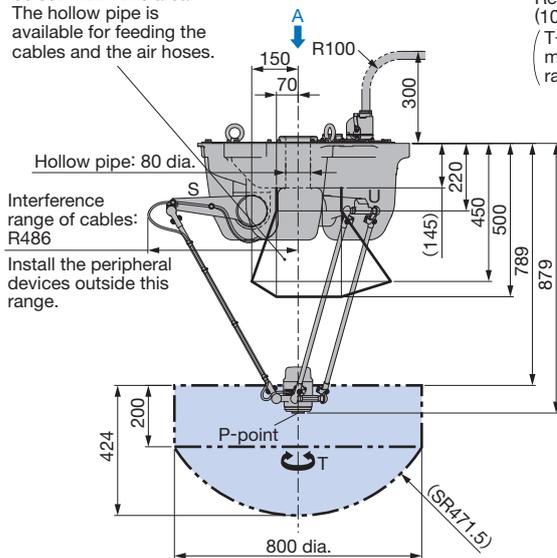
■ Dimensions Units : mm : P-point Maximum Envelope

MOTOMAN-MPP3S



View A

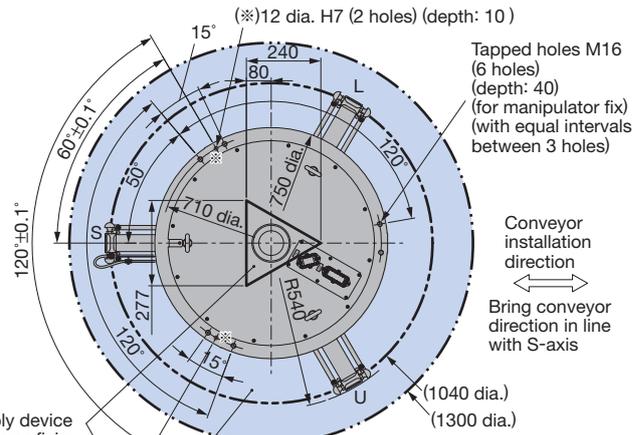
The air supply device and the air hose fixing jig can be set within this area. The hollow pipe is available for feeding the cables and the air hoses.



Recommended range of motion (1040 dia. × 300 (H)) (T-axis unit may vibrate when it moves outside the recommended range of motion.)

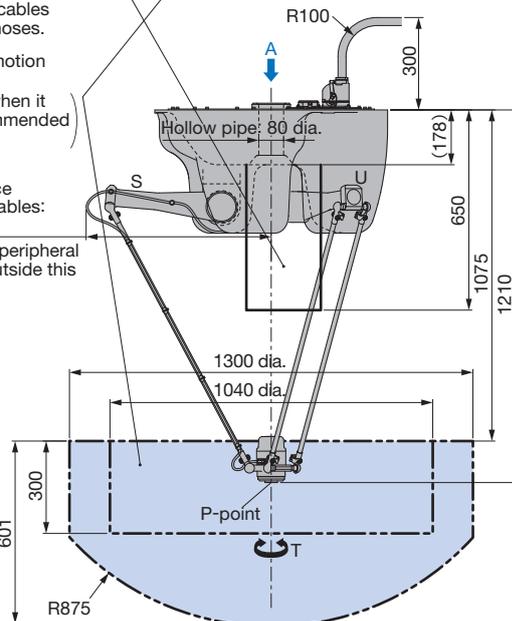
Interference range of cables: R596
Install the peripheral devices outside this range.

MOTOMAN-MPP3H



View A

The air supply device and the air hose fixing jig can be set within this area. The hollow pipe is available for feeding the cables and the air hoses.



■ 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
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	<ul style="list-style-type: none"> Free from corrosive gas or liquid, or explosive gas or liquid Free from excessive electrical noise (plasma)
Power Requirements*3		1.5 kVA

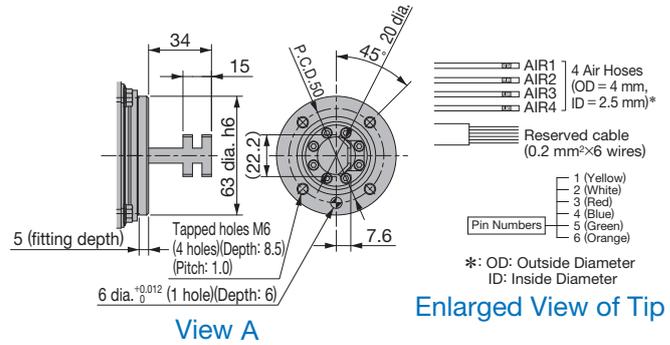
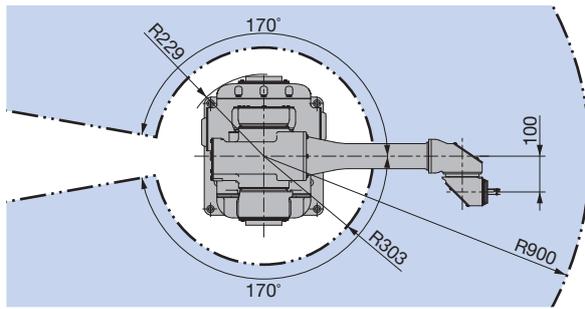
- *1 : Conforms to ISO 9283.
 - *2 : Conforms to ISO 14644-1.
MPP3S and MPP3H are certified for cleanroom application by Fraunhofer IPA.
 - *3 : Varies in accordance with applications and motion patterns.
 - *4 : Recommended range of motion is 1040 mm (dia.) × 300 mm (H).
T-axis unit may vibrate when 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.



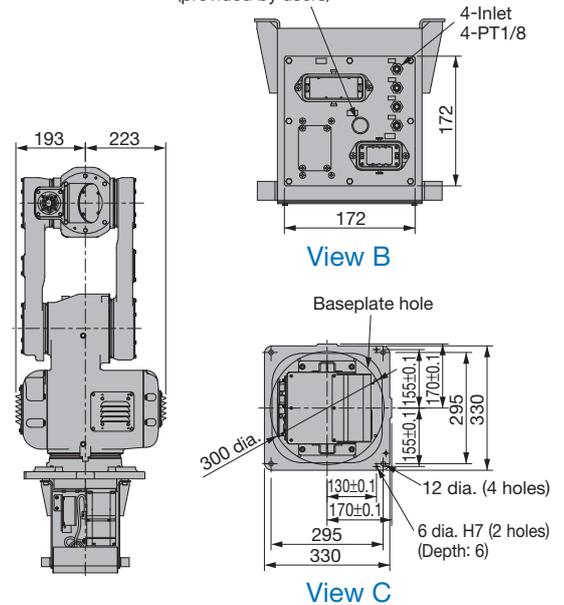
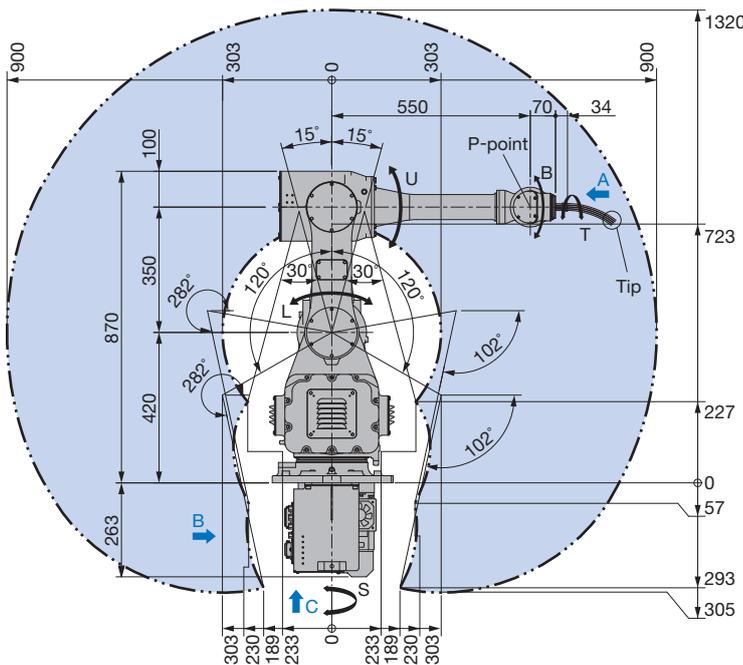
MOTOMAN-MPK2F

2 kg payload, R900 mm maximum reach

■ Dimensions Units : mm P-point Maximum Envelope



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



Manipulator Specifications

Model	MOTOMAN-MPK2F		Allowable Moment	B-axis (wrist pitch/yaw)	3.5 N·m	
Type	Floor mount, built-in base type	YR-MPK002F-A00	Allowable Inertia (GD ² /4)	T-axis (wrist twist)	1.5 N·m	
	Ceiling mount, built-in base type	YR-MPK002F-A01		B-axis (wrist pitch/yaw)	0.065 kg·m ²	
Controlled Axis	5 (vertically articulated)		T-axis (wrist twist)	0.012 kg·m ²	Mass	
Payload	2 kg		Mass	72 kg		
Repeatability*1	±0.5 mm		Ambient Conditions	Temperature	0°C to +40°C	
Range of Motion	S-axis (turning)	-170° - +170°		Humidity	20% to 80%RH (non-condensing)	
	L-axis (lower arm)	-120° - +120°		Vibration	4.9 m/s ² (0.5 G) or less	
	U-axis (upper arm)	-102° - +282°		Others	<ul style="list-style-type: none"> Free from corrosive gas or liquid, or explosive gas or liquid Free from exposure to oil, or dust Free from excessive electrical noise (plasma) 	
	B-axis (wrist pitch/yaw)	-150° - +150°				
	T-axis (wrist twist)	-270° - +270°				
Maximum Speed	S-axis (turning)	5.59 rad/s, 320°/s	Power Requirements*2	2.0 kVA		
	L-axis (lower arm)	5.76 rad/s, 330°/s				
	U-axis (upper arm)	5.76 rad/s, 330°/s				
	B-axis (wrist pitch/yaw)	6.63 rad/s, 380°/s				
	T-axis (wrist twist)	34.9 rad/s, 2000°/s				

*1 : Conforms to ISO 9283.

*2 : Varies in accordance with applications and motion patterns.

Note : SI units are used for the specifications.



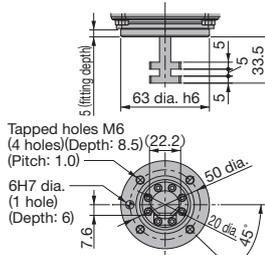
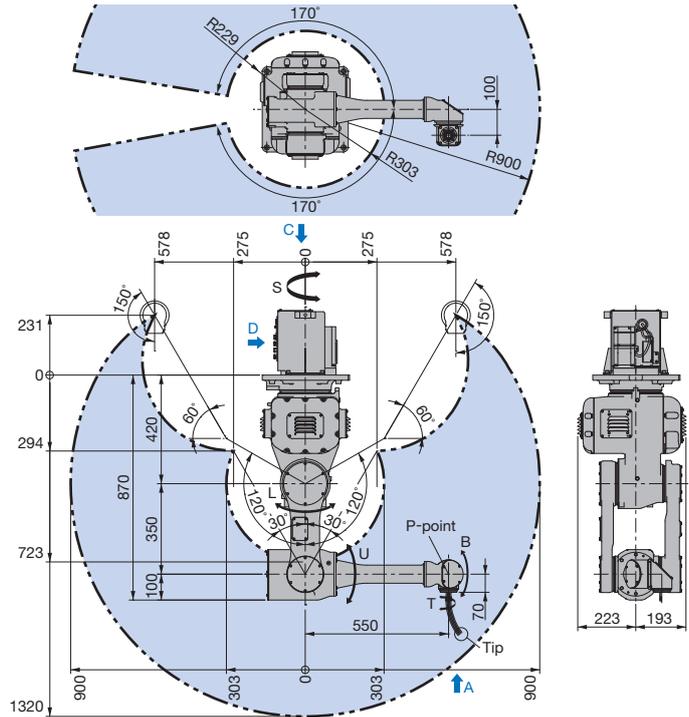
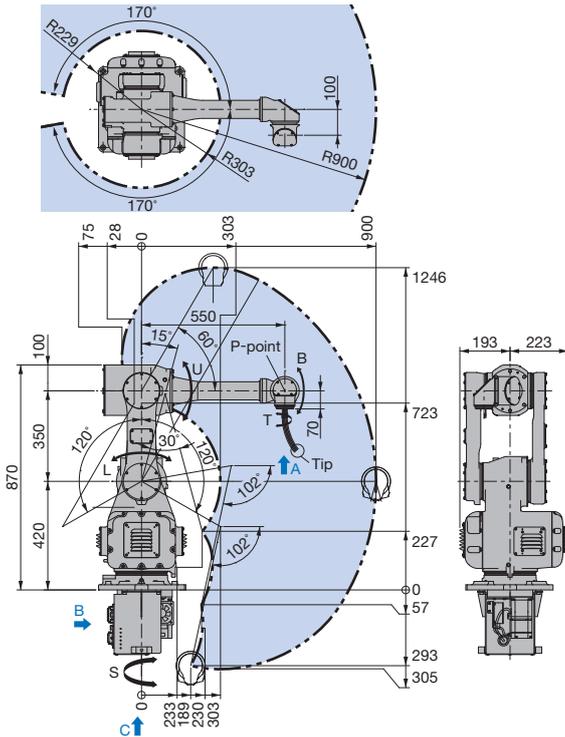
MOTOMAN-MPK2F-5

5 kg payload, R900 mm maximum reach

■ Dimensions Units : mm : P-point Maximum Envelope

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

Ceiling-mounted Type, Built-in Base Type
Model: YR-MPK002F-A20



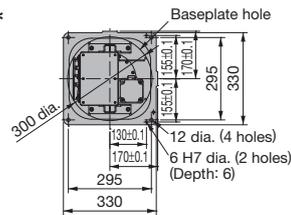
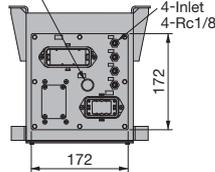
AIR1 4 Air Hoses
AIR2 (OD = 4 mm,
ID = 2.5 mm)*
AIR4

Reserved cable
(0.2 mm²×6 wires)

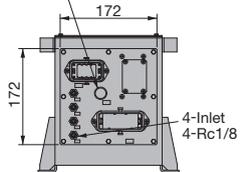
Pin Numbers
1 (Yellow)
2 (White)
3 (Red)
4 (Blue)
5 (Green)
6 (Orange)

*: OD: Outside Diameter
ID: Inside Diameter

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



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



View A

Enlarged View of Tip

View B

View C

View D

Manipulator Specifications

Model	MOTOMAN-MPK2F-5	
Type	YR-MPK002F-A10 (Floor mount, built-in base type)	YR-MPK002F-A20 (Ceiling mount, built-in base type)
Controlled Axis	5 (vertically articulated)	
Payload	5 kg	
Repeatability*1	±0.5 mm	
Range of Motion	S-axis (turning)	-170° - +170°
	L-axis (lower arm)	-120° - +120°
	U-axis (upper arm)	-102° - +60° -60° - +240°
	B-axis (wrist pitch/yaw)	-15° - +15°*3
	T-axis (wrist twist)	-270° - +270°
Maximum Speed	S-axis (turning)	5.59 rad/s, 320°/s
	L-axis (lower arm)	5.76 rad/s, 330°/s
	U-axis (upper arm)	5.76 rad/s, 330°/s
	B-axis (wrist pitch/yaw)	6.63 rad/s, 380°/s
	T-axis (wrist twist)	34.9 rad/s, 2000°/s

Allowable Moment	B-axis (wrist pitch/yaw)	2.26 N·m
	T-axis (wrist twist)	0 N·m
Allowable Inertia (GD ² /4)	B-axis (wrist pitch/yaw)	0.065 kg·m ²
	T-axis (wrist twist)	0.012 kg·m ²
Mass		72 kg
Ambient Conditions	Temperature	0°C to +40°C
	Humidity	20% to 80%RH (non-condensing)
	Vibration	4.9 m/s ² (0.5 G) or less
	Others	<ul style="list-style-type: none"> 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		1.5 kVA

*1 : Conforms to ISO 9283.

*2 : Varies in accordance with applications and motion patterns.

*3 : Motion range of the B-axis is the angle of the B-axis to the ground.

In some postures, the motion range of the B-axis may be limited depending on the relative angle to the upper arm.

Note : SI units are used for the specifications.

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.
- Commands specifically designed for workpiece handling with synchronized conveyors.



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
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
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.)

*: The FS100 has an open structure (IP20) and must be used in a clean environment (free from electrically-conductive dirt and dust) that meets the standard of pollution degree 2 specified in IEC60664-1.

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: JZRRCR-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.

MOTOMAN-MPP and MPK Series

YASKAWA ELECTRIC CORPORATION

2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu, 806-0004, Japan
Phone: +81-93-645-7703 Fax: +81-93-645-7802
www.yaskawa.co.jp

YASKAWA AMERICA, INC. (MOTOMAN ROBOTICS DIVISION)

100 Automation Way, Miamisburg, OH 45342, U.S.A.
Phone: +1-937-847-6200 Fax: +1-937-847-6277
www.motoman.com

YASKAWA EUROPE GmbH (ROBOTICS DIVISION)

Yaskawastrasse 1, 85391, Allershausen, Germany
Phone: +49-8166-90-100 Fax: +49-8166-90-103
www.yaskawa.eu.com

YASKAWA NORDIC AB

Verkstadsgatan 2, Box 504, SE-385 25 Torsås, Sweden
Phone: +46-480-417-800 Fax: +46-486-414-10
www.yaskawa.se

YASKAWA ELECTRIC (CHINA) CO., LTD.

22F, One Corporate Avenue, No.222 Hubin Road, Huangpu District, Shanghai 200021, China
Phone: +86-21-5385-2200 Fax: +86-21-5385-3299
www.yaskawa.com.cn

YASKAWA SHOUGANG ROBOT CO., LTD.

No.7 Yongchang North Road, Beijing E&T Development Area, Beijing 100176, China
Phone: +86-10-6788-2858 Fax: +86-10-6788-2878
www.yasr-motoman.cn

YASKAWA ELECTRIC KOREA CORPORATION

35F, Three IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, 07326, Korea
Phone: +82-2-784-7844 Fax: +82-2-784-8495
www.yaskawa.co.kr

YASKAWA ELECTRIC TAIWAN CORPORATION

12F, No.207, Sec. 3, Beishin Rd., Shindian District, New Taipei City 23143, Taiwan
Phone: +886-2-8913-1333 Fax: +886-2-8913-1513
www.yaskawa.com.tw

YASKAWA ASIA PACIFIC PTE. LTD.

30A Kallang Place, #06-01, 339213, Singapore
Phone: +65-6282-3003 Fax: +65-6289-3003
www.yaskawa.com.sg

YASKAWA ELECTRIC (THAILAND) CO., LTD.

59, 1st-5th Floor, Flourish Building, Soi Ratchadapisek 18, Ratchadapisek Road, Huaykwang, Bangkok 10310, Thailand
Phone: +66-2-017-0099 Fax: +66-2-017-0199
www.yaskawa.co.th

PT. YASKAWA ELECTRIC INDONESIA

Secure Building-Gedung B Lantai Dasar & Lantai 1 Jl. Raya Protokol Halim Perdanakusuma, Jakarta 13610, Indonesia
Phone: +62-21-2982-6470 Fax: +62-21-2982-6471
www.yaskawa.co.id

YASKAWA INDIA PRIVATE LIMITED (ROBOTICS DIVISION)

#426, Udyog Vihar Phase-IV, Gurugram, Haryana 122016, India
Phone: +91-124-475-8500 Fax: +91-124-475-8542
www.yaskawaindia.in

YASKAWA**YASKAWA ELECTRIC CORPORATION**

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply. Specifications are subject to change without notice for ongoing product modifications and improvements.

© 2009 YASKAWA ELECTRIC CORPORATION

LITERATURE NO. KAEP C940440 24F <10>-0

Published in Japan May 2021
21-04-46