YASKAWA

Handling Robot in Clean Room
MOTOMAN-MCL, MFL Series

Certified for
ISO9001 and
ISO14001

JAB
QMS Accreditation
R009

JQA-0813

JQA-EM0924

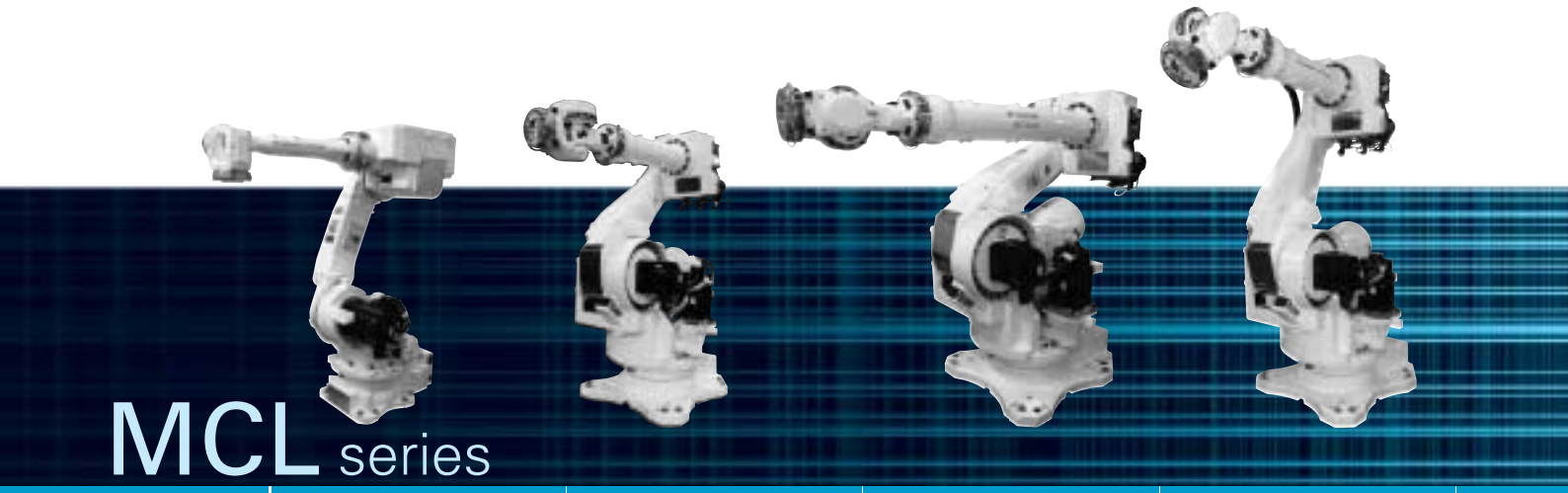
High-speed Handling of Large or Heavy Loads

Handling in clean rooms can be automated and productivity improved.

MOTOMAN-MCL Series Vertically Articulated Robot with 6 axes

Robot postures can be easily changed. The robot can reverse or slant an object before placing on cassettes or other containers.

- A wide range of models are available
- High-speed handling of a large or heavy load with a wide range of motion



MCL series

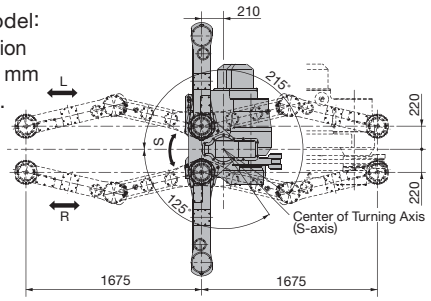
MOTOMAN-	MCL50	MCL130	MCL165-100	MCL165
Payload kg	50	130	100	165
Horizontal Reach mm	Min: 500; Max: 2046	Min: 729; Max: 2650	Min: 950; Max: 3001	Min: 729; Max: 2650
Vertical Reach mm (measured from the floor)	2441 See p. 4	3130 See p. 5	3480 See p. 6	3130 See p. 7

Features of Horizontally Articulated Robots

1 Flexible system layout in smaller space

An entire manipulator can be fit in the turning radius of a glass substrate. The horizontally articulated robots have a long up-and-down axis stroke with a low path line as well as a long pullback stroke so they can be installed at ideal locations for multi-level cassettes.

MFL2200D model: Effective extension stroke of ±1675 mm is now available.



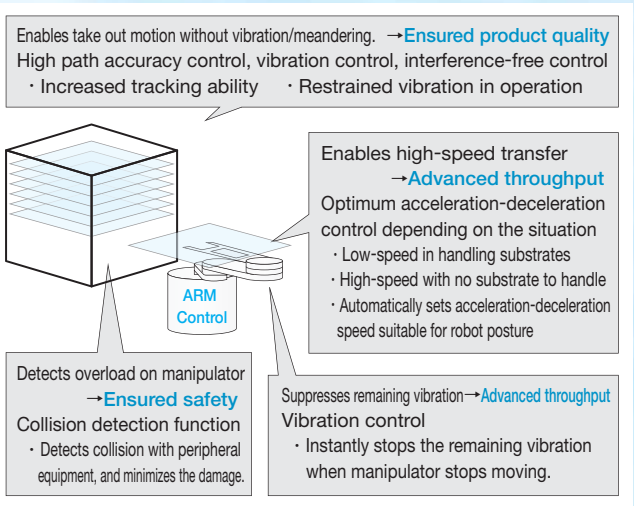
2 Reduced running costs with high cleanliness

High cleanliness is ensured by using drive axes built with a high-reliability, enclosed structure. Running cost will be reduced, because maintenance is easy without the need for exhaust fans and filters.

3 Variety of Useful Functions for Handling Large Glass Substrates

●ARM (Advanced Robot Motion) Control

The ARM control enables high-speed and high-accuracy handling for high throughput.

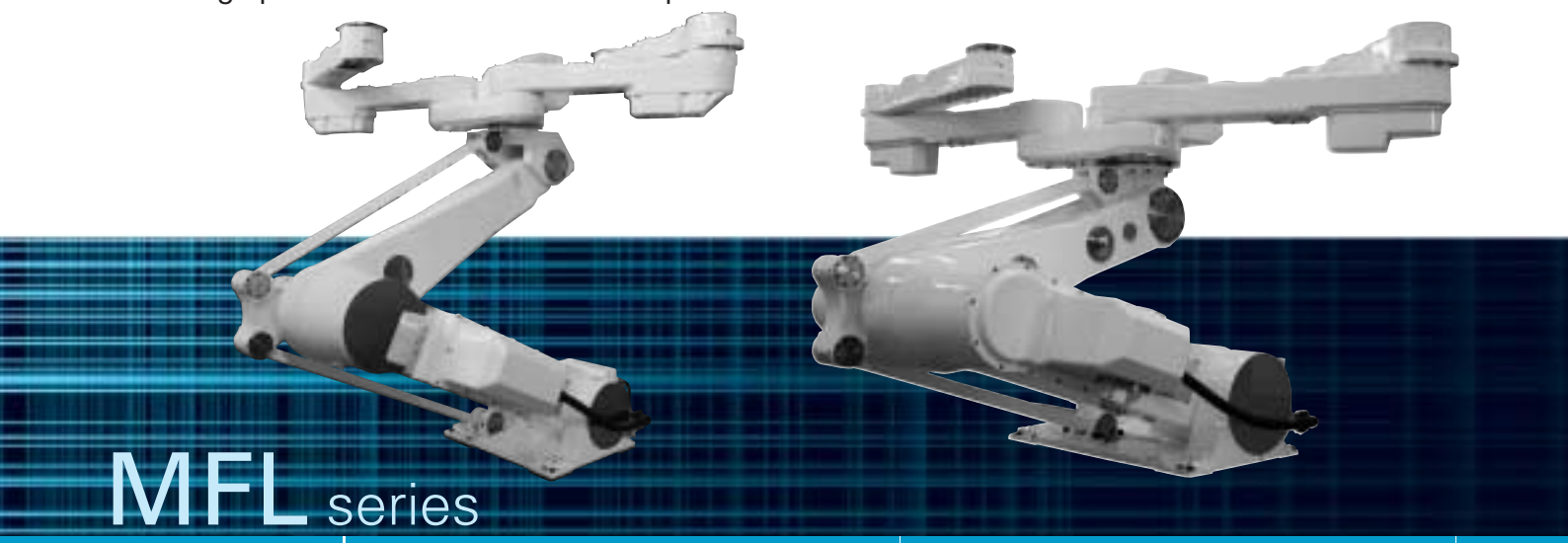


MOTOMAN-MFL Series

Horizontally Articulated Robot with 4 Axes

Ideal systems can be built for a horizontal transfer in clean rooms.

- Response to glass substrate of the 6th & the 7th generations
- Installation in small space possible because of a shorter turning radius
- Long up-and-down stroke with a low path line



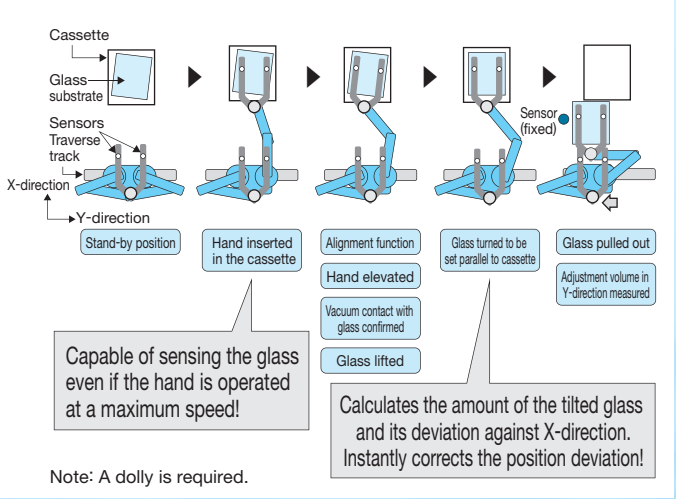
MOTOMAN-		MFL2200D -1840/-2440/-2650	MFL2400D -1800/-2400
Payload	kg	50/arm (Single-arm model is also available.)	80/arm (Single-arm model is also available.)
Back-and-Forth Stroke	mm	±1675	±2240
Up/Down Axis Motion Range	mm	Three types: 1840, 2440, and 2650	Two types: 1800 and 2400

See p. 8

See p. 9

●Alignment Function (Option)

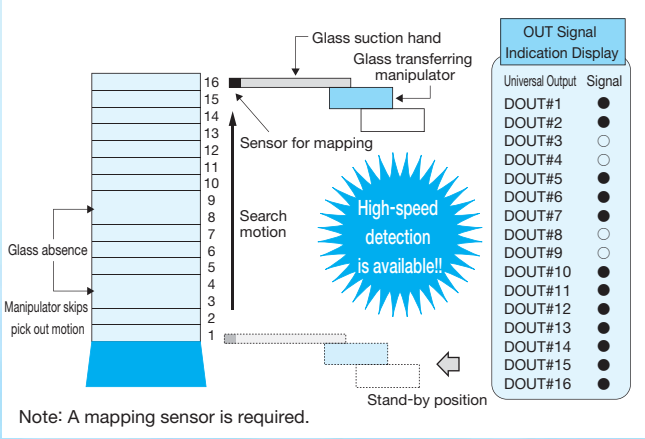
- No alignment devices required.
- Enables high-speed detection without stopping the manipulator in detecting glass position.



Note: A dolly is required.

●Mapping Function(Option)

- Enables high-speed detection from bottom to top of the cassette. Reduces cycle time by skipping pick up motions for blank space in the cassette.
- Enables high-speed communication with an interface to other devices including your host computer.



Note: A mapping sensor is required.

MOTOMAN-MCL50

6-Axis vertically articulated robot, 50 kg payload

ISO Class 5

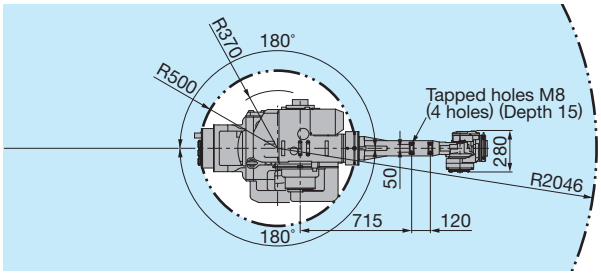
Wide range of motion for heavy-weight handling

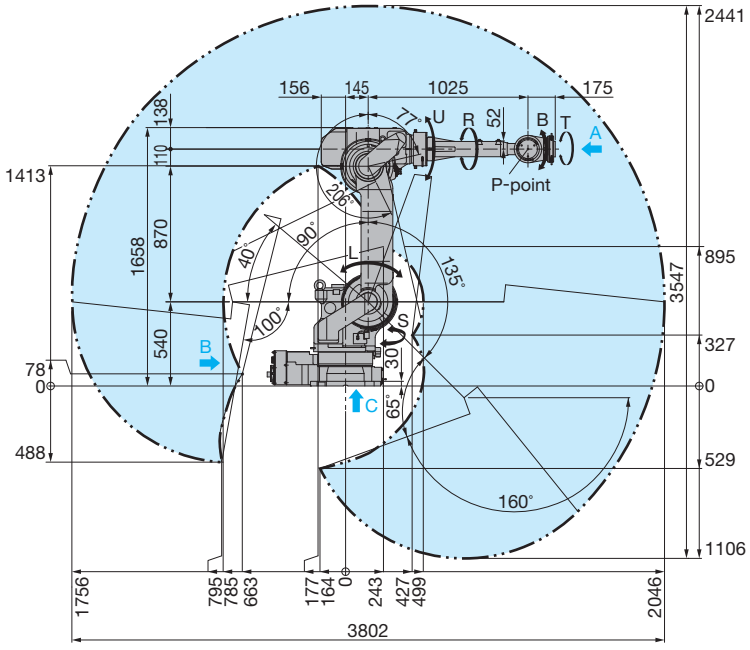
Heavy weight handling is achieved because of the high degree of freedom and the wide working envelope (R2046 mm).

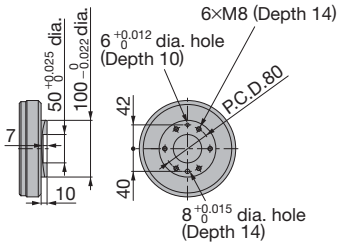
Space-saving

The small radius of the interference area (R370 mm) saves installation space and makes the design of the system layout more flexible.

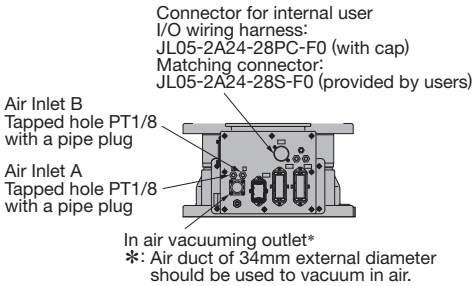
Dimensions Unit : mm : P-point Maximum Envelope



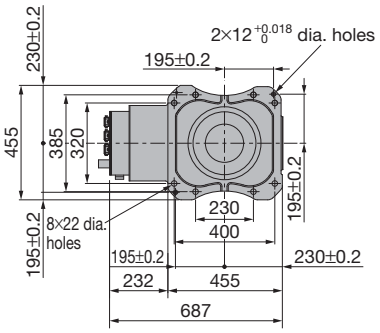




View A



View B



View C

Manipulator Specifications

Model		MOTOMAN-MCL50
Type		YR-MCL0050-A00
Structure		Vertically articulated, 6 degrees of freedom
Payload		50 kg
Repeatability*1		±0.07 mm
Range of Motion	S-axis (turning)	−180° - +180°
	L-axis (lower arm)	−90° - +135°
	U-axis (upper arm)	−160° - +260°
	R-axis (wrist roll)	−360° - +360°
	B-axis (wrist pitch/yaw)	−125° - +125°
	T-axis (turning)	−360° - +360°
Maximum Speed	S-axis (turning)	2.97 rad/s, 170°/s
	L-axis (lower arm)	2.97 rad/s, 170°/s
	U-axis (upper arm)	2.97 rad/s, 170°/s
	R-axis (wrist roll)	3.49 rad/s, 200°/s
	B-axis (wrist pitch/yaw)	3.32 rad/s, 190°/s
	T-axis (turning)	4.36 rad/s, 250°/s

Allowable Moment	R-axis (wrist roll)	196 N·m
	B-axis (wrist pitch/yaw)	196 N·m
	T-axis (turning)	127 N·m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	13 kg·m²
	B-axis (wrist pitch/yaw)	13 kg·m²
	T-axis (turning)	5.5 kg·m²
Painting Color		Munsell notation N9.5 or equivalent
Approx. Mass		550 kg
Clean Class*2		ISO class 5
Ambient Conditions	Temperature	+15 to +35°C
	Humidity	20% to 80%RH (non-condensing)
	Vibration	4.9 m/s² or less
	Others	• Free from corrosive gasses or liquids, or explosive gasses • Clean and dry • Free from excessive electrical noise
Power Requirement*3		4.5 kVA

*1 : Conforms to JIS B 8432.
*2 : Conforms to ISO-14644 standards (The above of the wrist flange surrounded by a down flow of 0.4m/s or more.)
*3 : Power requirement varies in accordance with applications and motion patterns.
Note : SI units are used for specifications.

MOTOMAN-MCL130

6-Axis vertically articulated robot, 130 kg payload

ISO Class 6

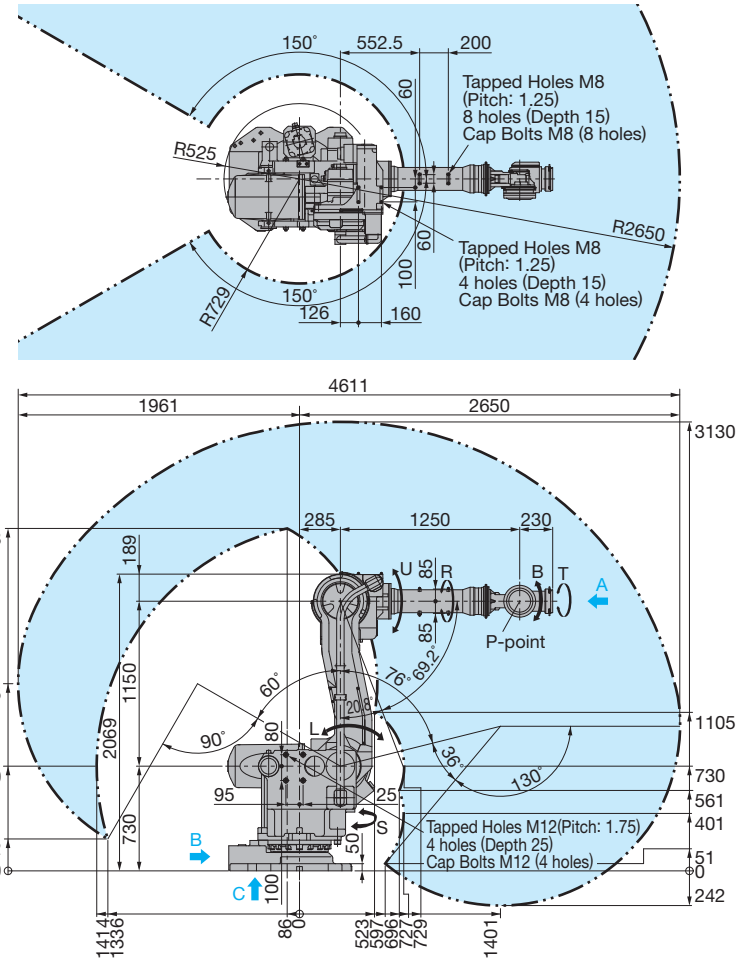
Excellent handling performance with high degree of freedom

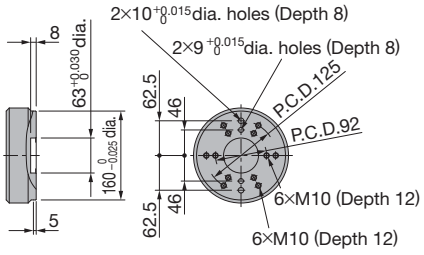
The MOTOMAN-CR130 and -CR165 are 6-axes, vertically articulated robots with 130-kg or 165-kg payloads and can handle heavy workpieces at high speeds while changing orientation.

Wide range of motion for flexible system layout

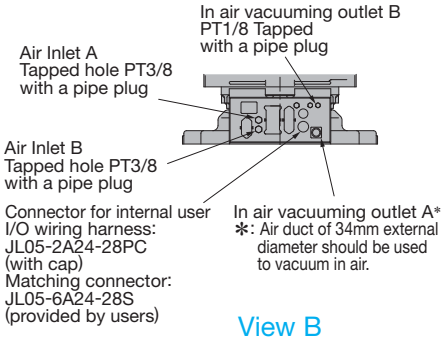
The MOTOMAN-CR130/CR-165, with a maximum reach of 2650 mm and a maximum height of 3130 mm, can transfer workpieces from a position that is lower and closer than ever to another position that is higher and farther away than ever before, so a flexible system layout is possible.

Dimensions Unit : mm : P-point Maximum Envelope

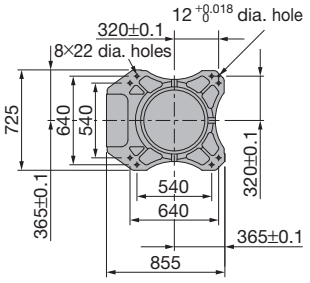




View A



View B



View C

Manipulator Specifications

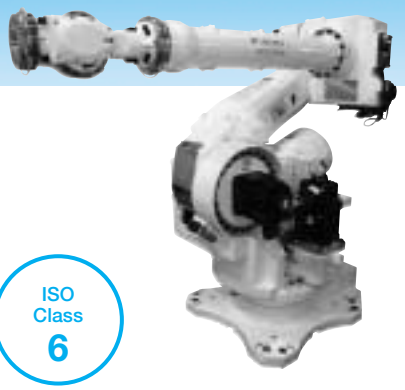
Model		MOTOMAN-MCL130
Type		YR-MCL0130-A00
Structure		Vertically articulated, 6 degrees of freedom
Payload		130 kg
Repeatability*1		±0.2 mm
Range of Motion	S-axis (turning)	−150° - +150°
	L-axis (lower arm)	−60° - +76°
	U-axis (upper arm)	−130° - +240°
	R-axis (wrist roll)	−360° - +360°
	B-axis (wrist pitch/yaw)	−130° - +130°
	T-axis (turning)	−360° - +360°
Maximum Speed	S-axis (turning)	2.27 rad/s, 130°/s
	L-axis (lower arm)	2.27 rad/s, 130°/s
	U-axis (upper arm)	2.27 rad/s, 130°/s
	R-axis (wrist roll)	3.75 rad/s, 215°/s
	B-axis (wrist pitch/yaw)	3.14 rad/s, 180°/s
	T-axis (turning)	5.24 rad/s, 300°/s

Allowable Moment	R-axis (wrist roll)	735 N·m
	B-axis (wrist pitch/yaw)	735 N·m
	T-axis (turning)	421 N·m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	45 kg·m²
	B-axis (wrist pitch/yaw)	45 kg·m²
	T-axis (turning)	15 kg·m²
Painting Color		Munsell notation N9.5 or equivalent
Approx. Mass		1300 kg
Clean Class*2		ISO class 6
Ambient Conditions	Temperature	+15 to +35°C
	Humidity	20% to 80%RH (non-condensing)
	Vibration	4.9 m/s² or less
	Others	• Free from corrosive gasses or liquids, or explosive gasses • Clean and dry • Free from excessive electrical noise • The flatness of the mounting surface must be 0.5mm or less.
Power Requirement*3		5.5 kVA

*1 : Conforms to JIS B 8432.
*2 : Conforms to ISO-14644 standards (The above of the wrist flange surrounded by a down flow of 0.4m/s or more.)
*3 : Power requirement varies in accordance with applications and motion patterns.
Note : SI units are used for specifications.

MOTOMAN-MCL165-100

6-Axis vertically articulated robot, 100 kg payload



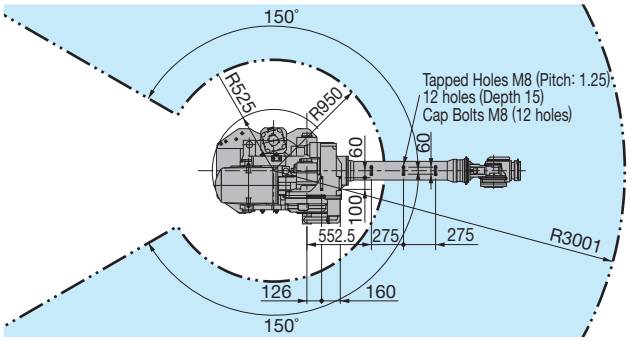
ISO Class 6

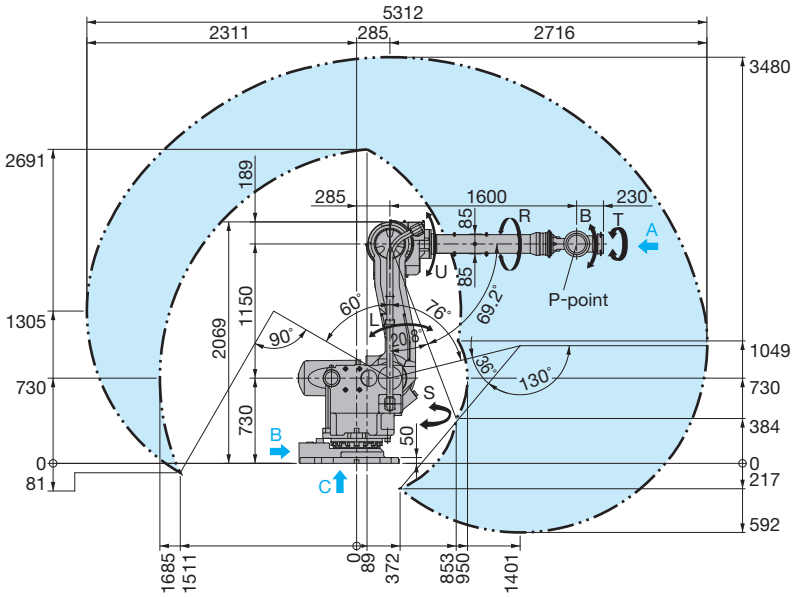
Heavy-load handling with a wide range of motion

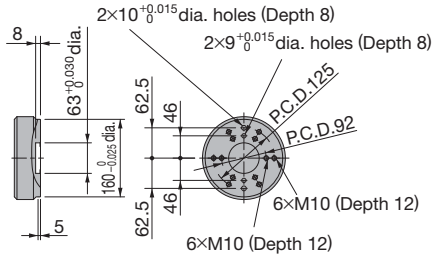
The handling of heavy loads can be easily automated and efficiency greatly improved with the MOTOMAN-MCL165-100, featuring a high payload (100 kg) and a wide motion range (radius: 3001 mm).

Dimensions

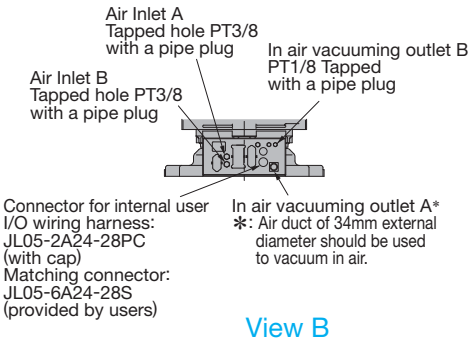
Unit : mm : P-point Maximum Envelope



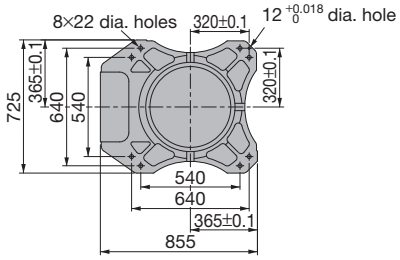




View A



View B



View C

Manipulator Specifications

Model		MOTOMAN-MCL165-100
Type		YR-MCL0165-A10
Structure		Vertically articulated, 6 degrees of freedom
Payload		100 kg
Repeatability*1		±0.3 mm
Range of Motion	S-axis (turning)	−150° - +150°
	L-axis (lower arm)	−60° - +76°
	U-axis (upper arm)	−130° - +240°
	R-axis (wrist roll)	−360° - +360°
	B-axis (wrist pitch/yaw)	−130° - +130°
	T-axis (turning)	−360° - +360°
Maximum Speed	S-axis (turning)	1.92 rad/s, 110°/s
	L-axis (lower arm)	1.92 rad/s, 110°/s
	U-axis (upper arm)	1.92 rad/s, 110°/s
	R-axis (wrist roll)	3.05 rad/s, 175°/s
	B-axis (wrist pitch/yaw)	2.53 rad/s, 145°/s
	T-axis (turning)	4.19 rad/s, 240°/s

Allowable Moment	R-axis (wrist roll)	833 N·m
	B-axis (wrist pitch/yaw)	833 N·m
	T-axis (turning)	490 N·m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	75 kg·m²
	B-axis (wrist pitch/yaw)	75 kg·m²
	T-axis (turning)	25 kg·m²
Painting Color		Munsell notation N9.5 or equivalent
Approx. Mass		1325 kg
Clean Class*2		ISO class 6
Ambient Conditions	Temperature	+15 to +35°C
	Humidity	20% to 80%RH (non-condensing)
	Vibration	4.9 m/s² or less
	Others	• Free from corrosive gasses or liquids, or explosive gasses • Clean and dry • Free from excessive electrical noise • The flatness of the mounting surface must be 0.5mm or less.
Power Requirement*3		6.0 kVA

*1 : Conforms to JIS B 8432.
*2 : Conforms to ISO-14644 standards (The above of the wrist flange surrounded by a down flow of 0.4m/s or more.)
*3 : Power requirement varies in accordance with applications and motion patterns.
Note:SI units are used for specifications.

MOTOMAN-MCL165

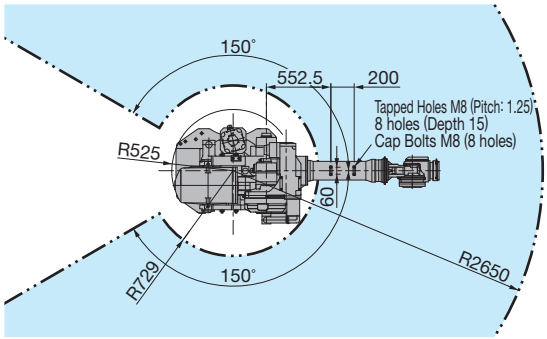
6-Axis vertically articulated robot, 165 kg payload

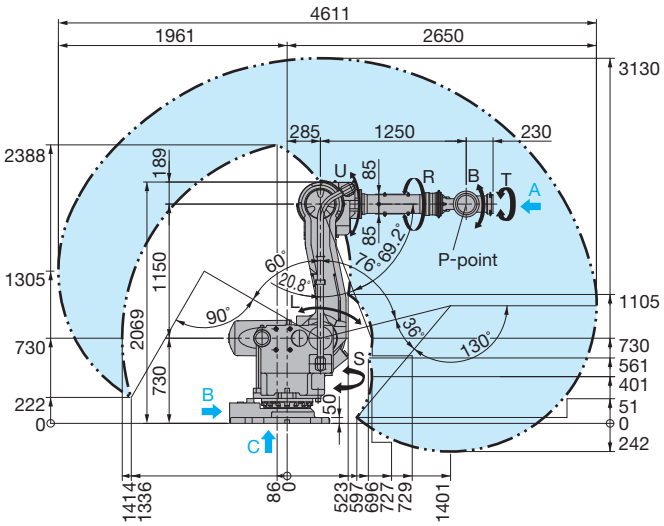
ISO Class 6

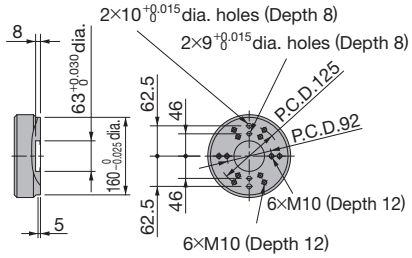
Ideal robot for handling large or heavy loads

With a high payload of 165 kg, the MOTOMAN-MCL165 is the perfect robot for handling heavy loads. System layouts can be custom designed, because the robot can handle heavy loads with a wide range of motion. The MCL165 has a maximum radial reach of 2650 mm and a maximum horizontal reach of 3130 mm.

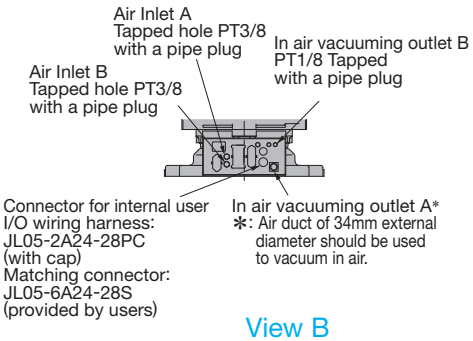
Dimensions Unit : mm : P-point Maximum Envelope



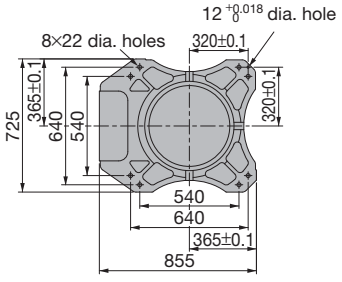




View A



View B



View C

Manipulator Specifications

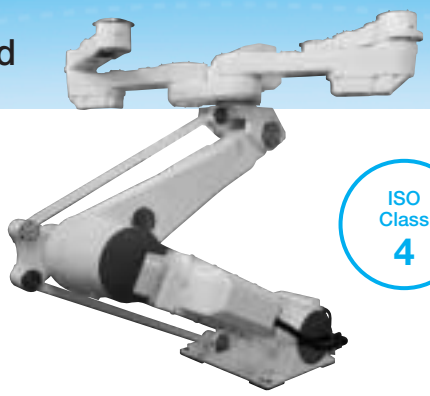
Model		MOTOMAN-MCL165
Type		YR-MCL0165-A00
Structure		Vertically articulated, 6 degrees of freedom
Payload		165 kg
Repeatability*1		±0.2 mm
Range of Motion	S-axis (turning)	−150° - +150°
	L-axis (lower arm)	−60° - +76°
	U-axis (upper arm)	−130° - +240°
	R-axis (wrist roll)	−360° - +360°
	B-axis (wrist pitch/yaw)	−130° - +130°
	T-axis (turning)	−360° - +360°
Maximum Speed	S-axis (turning)	1.92 rad/s, 110°/s
	L-axis (lower arm)	1.92 rad/s, 110°/s
	U-axis (upper arm)	1.92 rad/s, 110°/s
	R-axis (wrist roll)	3.05 rad/s, 175°/s
	B-axis (wrist pitch/yaw)	2.53 rad/s, 145°/s
	T-axis (turning)	4.19 rad/s, 240°/s

Allowable Moment	R-axis (wrist roll)	883 N·m
	B-axis (wrist pitch/yaw)	883 N·m
	T-axis (turning)	490 N·m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	51.25 kg·m²
	B-axis (wrist pitch/yaw)	51.25 kg·m²
	T-axis (turning)	15 kg·m²
Painting Color		Munsell notation N9.5 or equivalent
Approx. Mass		1300 kg
Clean Class*2		ISO class 6
Ambient Conditions	Temperature	+15 to +35°C
	Humidity	20% to 80%RH (non-condensing)
	Vibration	4.9 m/s² or less
	Others	• Free from corrosive gasses or liquids, or explosive gasses • Clean and dry • Free from excessive electrical noise • The flatness of the mounting surface must be 0.5mm or less.
Power Requirement *3		6.0 kVA

*1 : Conforms to JIS B 8432.
*2 : Conforms to ISO-14644 standards (The above of the wrist flange surrounded by a down flow of 0.4m/s or more.)
*3 : Power requirement varies in accordance with applications and motion patterns.
Note:SI units are used for specifications.

MOTOMAN-MFL2200D-2650

4-Axis horizontally articulated robot, 50 kg/arm payload



ISO Class 4

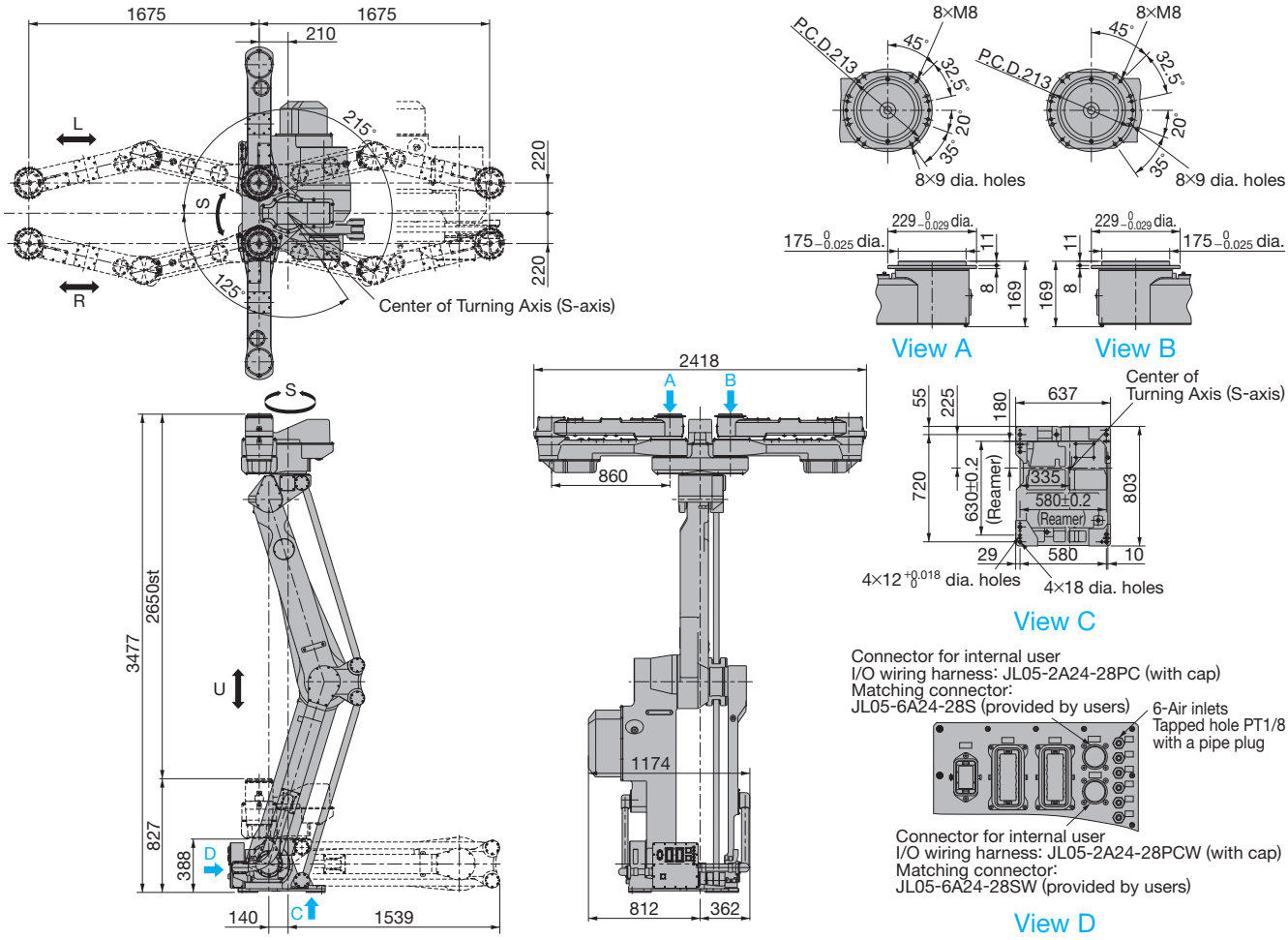
High-speed transfer to multi-level cassettes

The horizontally articulated robots can handle the 6th generation of glass substrates (1500 mm × 1850 mm). Large LCD glass substrates can be loaded to or unloaded from multi-level cassettes at high speeds by using a long up-and-down stroke (1840 mm, 2440 mm, or 2650 mm), a low path line, and double arms.

Single-armed model is also available.

Dimensions

Unit : mm : P-point Maximum Envelope



Manipulator Specifications

Model			MOTOMAN-MFL2200D-2650
Type			YR-MFL050D-A20
Structure			Horizontally articulated, 4 degrees of freedom
Payload			50kg/arm
Repeatability*1			±0.2 mm
Range of Motion	U-axis	(up/down)	2650 mm
	S-axis	(turning)	−215° - +125°
	L-, R-axis	(sideways)	−1675 mm - +1675 mm
Maximum Speed	U-axis	(up/down)	1330 mm/s max.
	S-axis	(turning)	3.14 rad/s, 180°/s
	L-, R-axis	(sideways)	3250 mm/s max.
Allowable Moment	L-, R-axis	(sideways)	250 N·m

Allowable Inertia ($GD^2/4$)	L-, R-axis (sideways)	50 kg·m²
Painting Color		Munsell notation N9.5 or equivalent
Approx. Mass		1020 kg
Clean Class*2		ISO class 4
Ambient Conditions	Temperature	+15 to +25°C
	Humidity	20% to 80%RH (non-condensing)
	Vibration	4.9 m/s² or less
	Others	• Free from corrosive gasses or liquids, or explosive gasses • Clean and dry • Free from excessive electrical noise • The flatness of the mounting surface must be 0.5mm or less.
Power Requirement*3		3.5 kVA

*1 : Conforms to JIS B 8432.
*2 : Conforms to ISO-14644 standards (The above of the wrist flange surrounded by a down flow of 0.4m/s or more.)
*3 : Power requirement varies in accordance with applications and motion patterns.
Note:SI units are used for specifications.

MOTOMAN-MFL2400D-2400

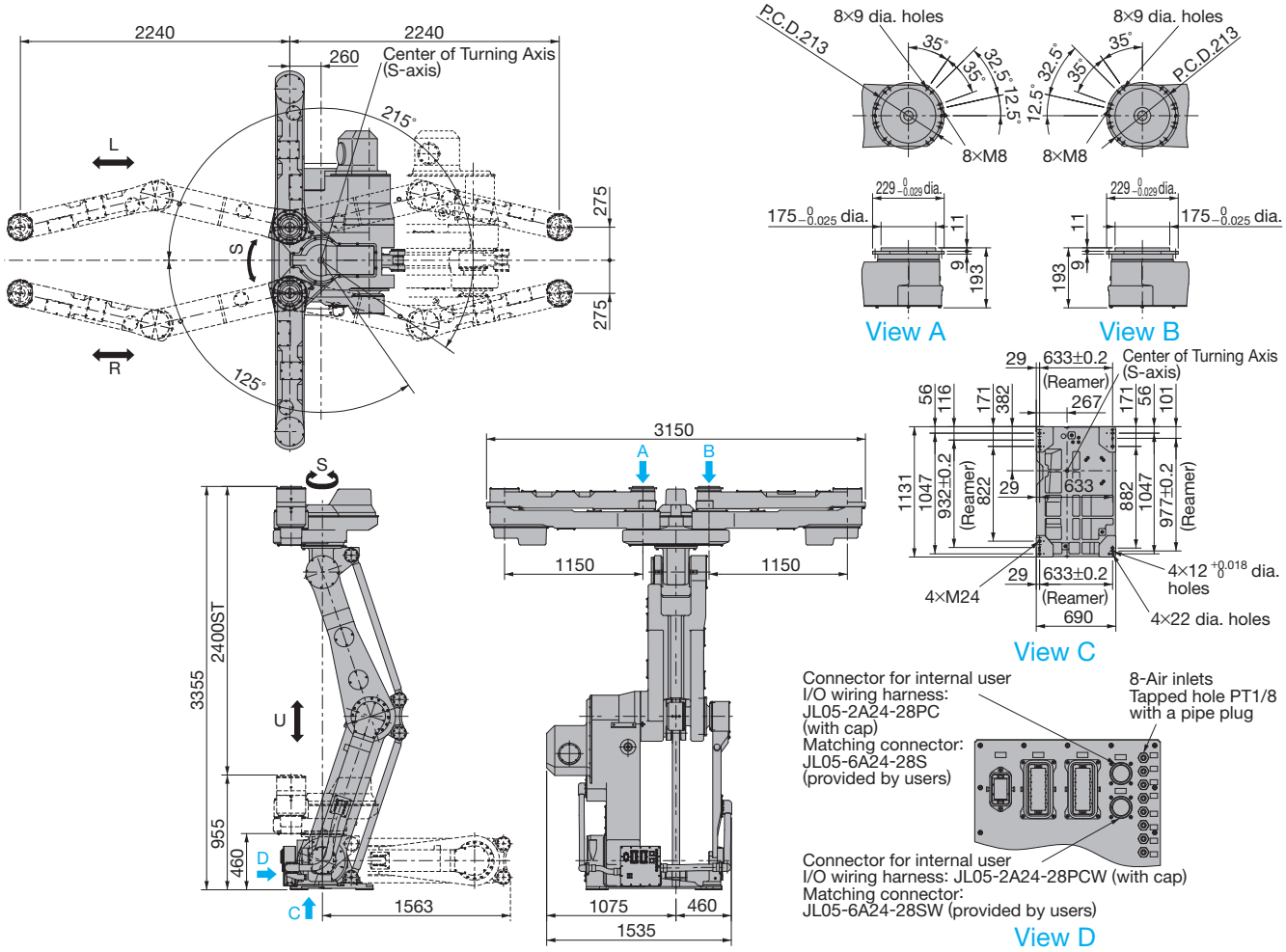
4-Axis horizontally articulated robot, 80 kg/arm payload

Flexible handling system for different levels of cassettes

The horizontally articulated robots can handle the 7th generation of glass substrates (1870 mm × 2200 mm). Large LCD glass substrates can be handled with double arms at a maximum speed of 3600 mm/s. A wide range of motion is realized with a low path line and a long up-and-down stroke (1800 mm or 2400 mm). These features contribute to higher throughput.

Single-armed model is also available.

Dimensions Unit : mm : P-point Maximum Envelope



Manipulator Specifications

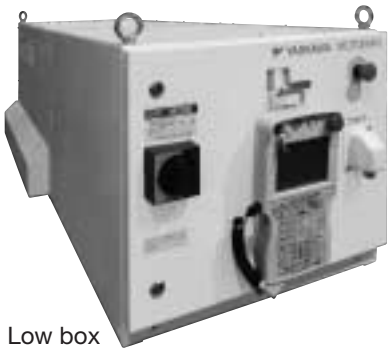
Model			MOTOMAN-MFL2400D-2400
Type			YR-MFL080D-A10
Structure			Horizontally articulated, 4 degrees of freedom
Payload			80kg/arm
Repeatability*1			±0.2 mm
Range of Motion	U-axis	(up/down)	2400 mm
	S-axis	(turning)	−215° - +125°
	L-, R-axis	(sideways)	−2240 mm - +2240 mm
Maximum Speed	U-axis	(up/down)	1000 mm/s max.
	S-axis	(turning)	3.14 rad/s, 180°/s
	L-, R-axis	(sideways)	3600 mm/s max.
Allowable Moment	L-, R-axis	(sideways)	410 N·m

Allowable Inertia ($GD^2/4$)	L-, R-axis (sideways)	92.5 kg·m²
Painting Color		Munsell notation N9.5 or equivalent
Approx. Mass		1400 kg
Clean Class*2		ISO class 4
Ambient Conditions	Temperature	+15 to +25°C
	Humidity	20% to 80%RH (non-condensing)
	Vibration	4.9 m/s² or less
	Others	• Free from corrosive gasses or liquids, or explosive gasses • Clean and dry • Free from excessive electrical noise • The flatness of the mounting surface must be 0.5mm or less.
Power Requirement*3		5.0 kVA

*1 : Conforms to JIS B 8432.
*2 : Conforms to ISO-14644 standards (The above of the wrist flange surrounded by a down flow of 0.4m/s or more.)
*3 : Power requirement varies in accordance with applications and motion patterns.
Note:SI units are used for specifications.

Robot Controller DX100 (Designed for use in clean rooms)

Robot controller can control up to 72 axes (8 robots). Its higher instruction processing speed, increased functions, and slim profile minimize the space required for production equipment and improve productivity.
The multi-window display function is added to the amazingly small and lightweight programming pendant to largely improve operability. The speed reducer life analysis function and troubleshooting function are also provided to reduce maintenance time.



Low box

Tall box

Specifications

Controller	Configuration	Dust proof
	Dimensions*	Tall box : 800 mm (W) × 900 mm (H) × 550 mm (D) Low box : 600 mm (W) × 550 mm (H) × 1500 mm (D)
	Mass	200kg
	Cooling System	Indirect cooling
	Ambient Temperature	During operation : 0℃ to +25℃ / During storage : –10℃ to +60℃
	Relative Humidity	90% max. (non-condensing)
	Power Supply	Three-phase 200/220 VAC (+10% to –15%) at 60 Hz (Japan) Three-phase 200 VAC (+10% to –15%) at 50 Hz (Japan)
	Grounding	Grounding resistance : 100Ω or less
	Digital I/Os	Specialized signals : 23 inputs and 5 outputs General signals : 40 inputs and 40 outputs Max.I/O (optional) : 2048 inputs and 2048 outputs
	Positioning System	By serial encoder
	Programming Capacity	JOB : 200,000 steps, 10,000 instructions CIO ladder : 20,000 steps max.
	Expansion Slots	PCI : 2 slots for main CPUs, 1 slot for servo CPU and 1 additional slot for sensor board
	LAN (Connection to Host)	1 (10BaseT/100BaseTX)
	Interface	RS-232C : 1ch
	Control Method	Software servo control
	Drive Units	For robot axes : One drive unit for AC servo with 6 axes For external axes : Optional
	Painting Color	Munsell notation 5Y 7/1 (reference value)

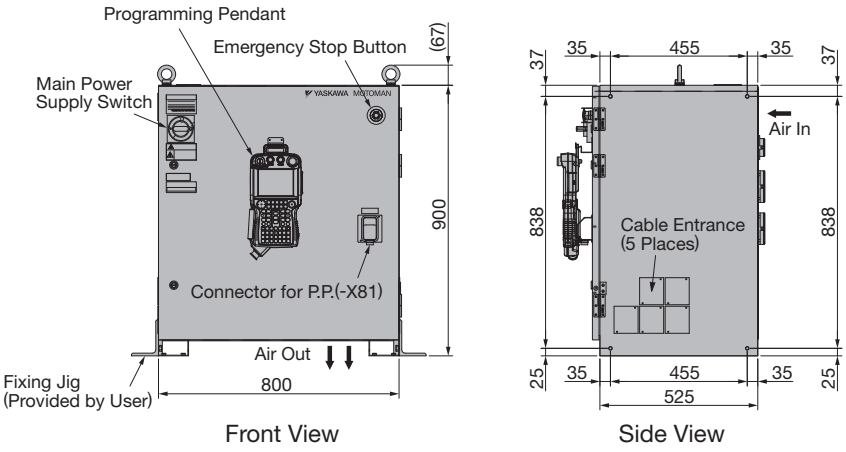
∗ : Does not include protruding parts.

Functions

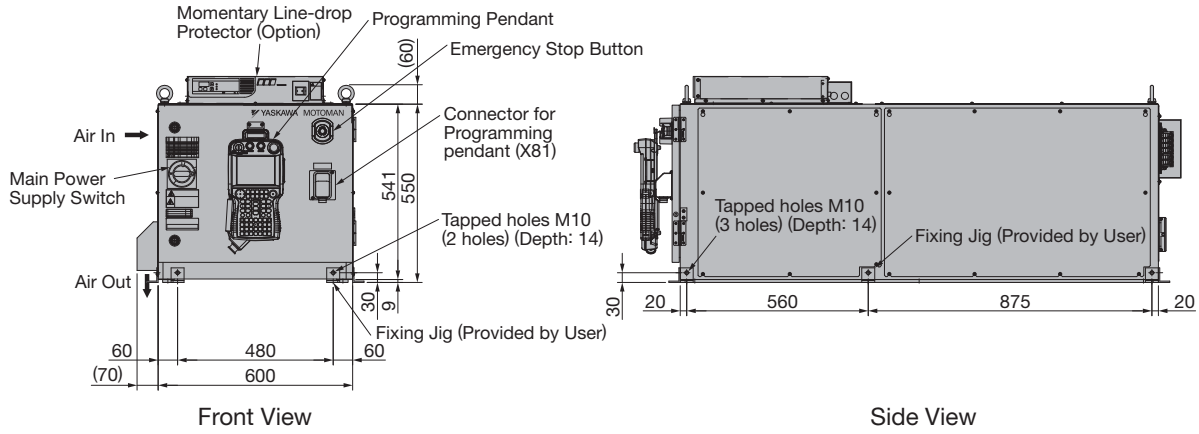
Operation	Coordinate System	Includes joint, rectangular/cylindrical, tool, and user coordinates
	Modification of Teaching Points	Adding, deleting or correcting robot axes and external axes.
	Inching Operation	Allows inching
	Locus Confirmation	Includes forward/reverse and continuous feeding
	Speed Adjustment	Allows automatic speed adjustment to match cycle time
	Timer Setting	Possible every 0.01s
	Short-cut Function	Includes direct-open function, multi-window display function, touch panel
	Interface	RS-232C (1ch) for FC1/FC2, one CF card, and USB memory
	Application Supported	Arc welding, spot welding, handling, general, jig-less, etc.
Safety Features	Essential Measures	Japanese Industrial Standard (JIS)
	Teach Lock Mode	Prohibits playback panel operation during teaching
	Collision Proof Frames	Includes doughnut-sector frame, cubic frame (user coordinates)
	Self-diagnosis	Classifies errors and two types of alarms (major and minor) and displays the data
	User Alarm Display	Displays alarm messages for peripheral devices
	Machine Lock	Allows test-run of peripheral devices without robot motion
	Door Interlock	Allows door to open only when main power switch is OFF.
Maintenance Functions	System Monitoring Time Display	Controls power-ON time, servo power-ON time, playback time, moving time, operating time
	Alarm Display	Displays alarm messages including troubleshooting, and alarm history
	I/O Diagnosis	Provides simulated enabled/disabled output possible
	T.C.P. Calibration	Automatically calibrates parameters for end effectors
Programming Functions	Programming	Interactive Programming
	Language	Robot language: INFORM Ⅲ
	Robot Motion Control	Includes joint coordinates, linear/circular interpolation, and tool coordinates
	Speed Setting	Uses percentage for joint coordinates, 0.1 mm/s, for interpolations, angular velocity for TCP fixed motion
	Program Control Instruction	Includes jump, call, timer, pause, execution of some instructions during robot motion
	Device Instructions	Includes device instruction corresponding to each application (ARCON, ARCOFF etc.)
	Variables	Global, local variables
	Types	Byte, integer, double integer, real, character, position
	I/O Instructions	Includes discrete I/O control and pattern I/O processing
Global Standard		CE marking (optional)

Dimensions mm

• Tall box



• Low box



Programming Pendant

The special programming pendant for robots in the MOTOMAN-MCL and –MFL series has a touch panel with many icons and pictures for greater visibility and operability. The programming pendant can significantly improve efficiency in debugging at startup.

Specifications

Dimensions	169 (W) × 314.5 (H) × 50 (D) mm
Mass	0.990kg
Material	Reinforced plastics
Operation Device	Select keys, axes 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 memory interface device
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-MCL, MFL Series

Sales Department

HEAD OFFICE
2-1 Kurosaki-Shiroishi, Yahatanishi-ku, Kitakyushu, Fukuoka 806-0004, Japan
Phone: +81-93-645-7703 Fax: +81-93-645-7802

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

YASKAWA Europe GmbH (Robotics Division)
Yaskawastrasse 1, 85391, Allershausen, Germany
Phone: +49-8166-90-100 Fax: +49-8166-90-103

YASKAWA Nordic AB
Bredbandet 1vån. 3 varvsholmen 392 30 Kalmar, Sweden
Phone: +46-480-417-800 Fax: +46-480-417-999

YASKAWA Electric (China) Co., Ltd.
12F, Carlton Bldg., No.21 HuangHe Road, HuangPu District, Shanghai 200003, China
Phone: +86-21-5385-2200 Fax: +86-21-5385-3299

YASKAWA SHOUGANG ROBOT CO., LTD.
No.7 Yongchang North Road, Beijing E&T Development Area China 100176
Phone: +86-10-6788-2858 Fax: +86-10-6788-2878

YASKAWA India Private Ltd. (Robotics Division)
#426, Udyog Vihar Phase-Ⅳ, Gurgaon, Haryana, India
Phone: +91-124-475-8500 Fax: +91-124-475-8542

YASKAWA Electric Korea Co., Ltd
9F, Kyobo Securities Bldg., 26-4, Yeouido-dong, Yeongdeungpo-gu, Seoul 150-737, Korea
Phone: +82-2-784-7844 Fax: +82-2-784-8495

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

YASKAWA Electric (Singapore) PTE Ltd
151 Lorong Chuan, #04-02A New Tech Park, Singapore 556741
Phone: +65-6282-3003 Fax: +65-6289-3003

YASKAWA Electric (Thailand) Co., Ltd.
252/125-126 27th Floor, Tower B Muang Thai-Phatra Complex Building,
Rachadaphisek Road, Huaykwang, Bangkok 10320, Thailand
Phone: +66-2693-2200 Fax: +66-2693-4200

PT. YASKAWA Electric Indonesia
Menara Anugrah Lantai 1, Kantor Taman E.3.3, Jl. Mega Kuningan Lot 8.6-8.7,
Kawasan Mega Kuningan, Jakarta, Indonesia
Phone: +62-21-57941845 Fax: +62-21-57941843

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.

© 2014 YASKAWA ELECTRIC CORPORATION. All rights reserved.

LITERATURE NO. KAEP C940580 02A

Published in Japan June 2014 12-01 ⟨1⟩-1
13-12-36