YASKAWA

Large Robot Optimized for Painting
MOTOMAN-MPX3500

Payload: 15 kg 6-axis Vertically Articulated

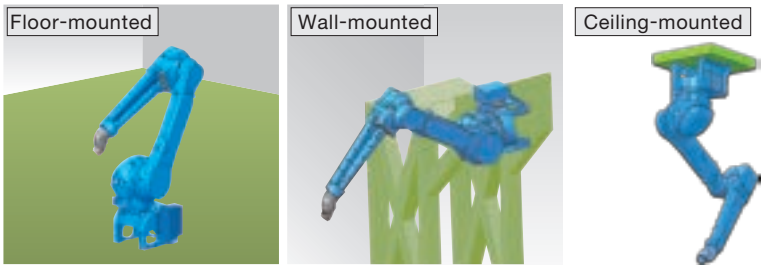
Applications: Painting automobile bodies, bumpers, construction equipment, other

MOTOMAN-MPX3500: Advanced Manipulator Designed Specifically for Painting

Flexible

Diversified installation methods to meet the needs of a variety of production line layouts

- Axes have the same motion angles for floor, wall, and ceiling mounting.
- Mounting holes located at the back section of the robot enables easy installation on a traverse track.
- Different routing support as hose ducts or carrier is in option according to paint hoses, installation conditions, and workpieces.
- Installation costs, including costs for mounting bases and reinforcing installation base, can be reduced by light manipulator.

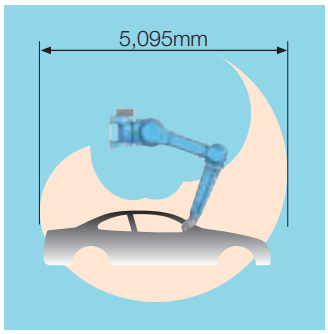


Effective

Wide motion range & space savings

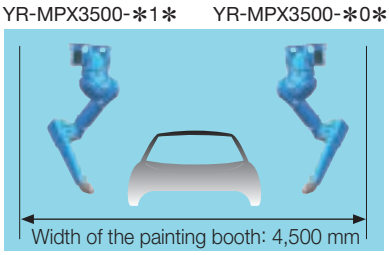
●Effective use of robot's motion range with wall mounting

Mounting the robot on the wall creates a high-density layout by reducing the length of the painting booth to make it more compact. Utility cost can be reduced.



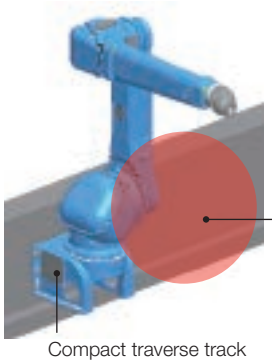
●High-density layout with a set of symmetrically-installed manipulators

A high-density layout saves space by reducing the size of the painting booth. The time required for teaching can be shortened by converting the data created for the robot on one side for the robot on the opposite side.



●Compact structure with rear installation and design without offset

- Space required for the traverse track can be made compact by vertically installing the traverse track and attaching the back of the manipulator base to the traverse track.
- The L axis is designed with no offset to enable installation of the manipulator closer to a workpiece, which saves space.
- The Interior surface of automobile body can be painted by using the MPO10 door opening robot.



Smooth motion

Fully-equipped robot with enhanced performance

●Hollow shaft structure eliminates tube interference (hollow dia: 70 mm)

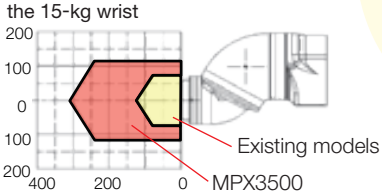
Paint hoses and cables can be routed inside the wrist to prevent interference with workpieces and peripheral devices. The large hollow diameter provides enough space for routing of cables and hoses and reduces maintenance time.

●Greater moment of inertia of the wrist section

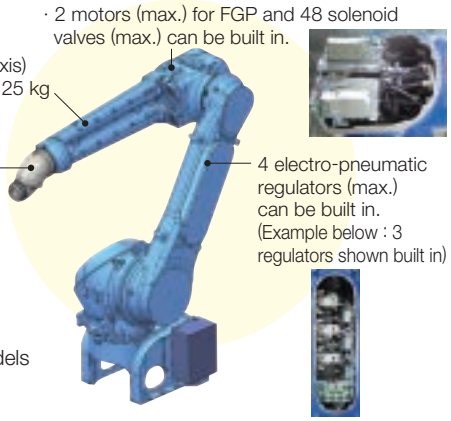
Strong enough to mount a larger bell applicator.

Best in its class
with a moment of inertia that is 1.3 to 2 times greater than earlier models.

Center of gravity of the 15-kg wrist



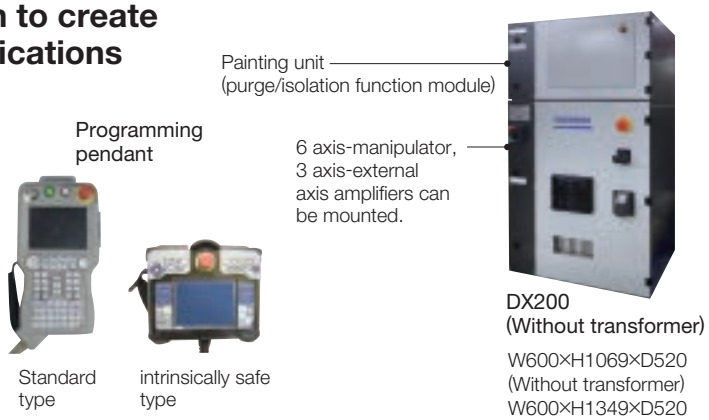
●Great versatility that supports multi-color painting and bell applicators.



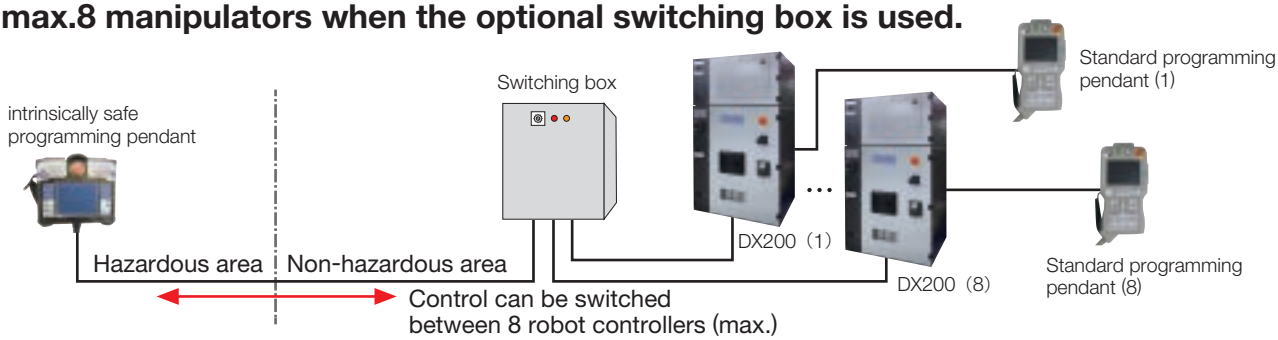
New DX200 robot controller with improved functions for painting

Smaller controller in unit configuration to create the optimal structure for painting applications

- The painting unit (purge/isolation function module) is mounted on the standard robot controller to create the ideal controller for painting applications.
- The height of the controller is reduced by 30% in comparison with earlier models.
- Amplifiers for the manipulator's 6 axes and amplifiers for 3 external axes can be mounted without changing external dimensions.
- Two types of programming pendants are available: standard type and intrinsically safe type (can be placed in hazardous area).

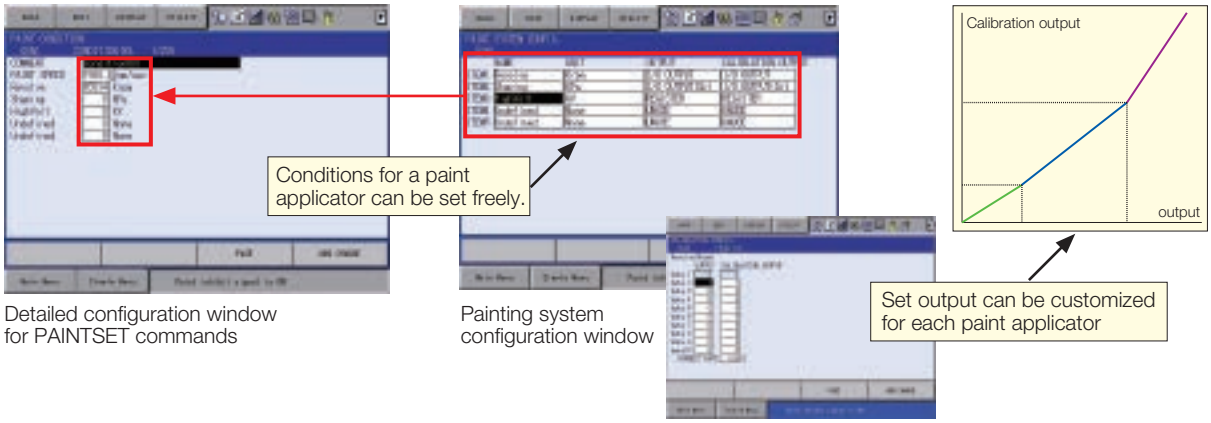


One intrinsically safe programming pendant can control max.8 manipulators when the optional switching box is used.



Painting control function

Names, units, and output mode for 5 items (max.) can be configured in the PAINTSET, which is customized for painting-specific commands. In PAINTSET, the output can be calibrated for output to the paint applicator that is actually used.



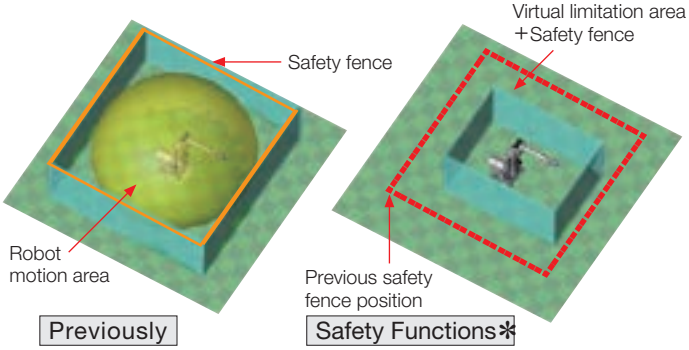
Function to estimate the remaining product life of speed reducer for life cycle management

Torque amplitude of a speed reducer is monitored and a warning signal is output when the amplitude exceeds the thresholds that have been set. Transition of torque amplitude can be displayed in a graph in a display window of the programming pendant.

Smaller booth with use of the safety function (optional)

The size of painting booth can be reduced by limiting the manipulator's movements within a range specified by the safety function.

* The safety function calculates the position and speed of the robot, and cuts off servo power to stop the robot completely if the safety function calculates that any part of the robot may move beyond the specified area. With this function, the robot will not move out of the specified area even when coasting.



Large Robot Optimized for Painting

MOTOMAN-MPX3500

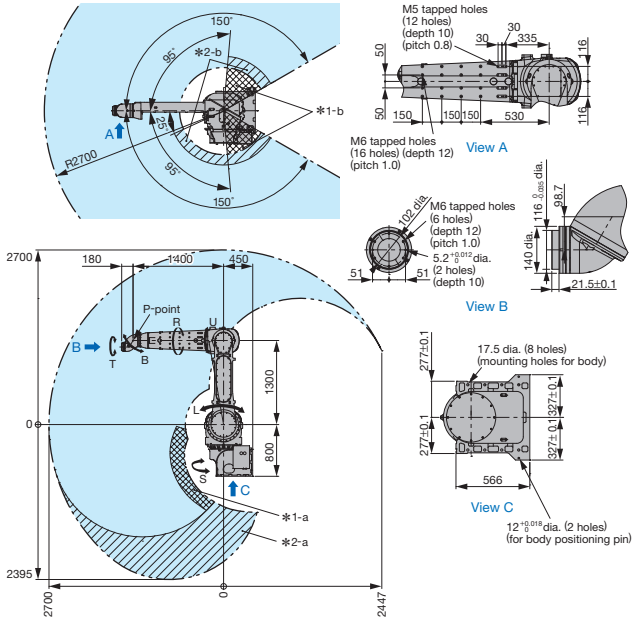
Manipulator Specifications

Items		Specifications
Type		YR-MPX3500-∗0∗, YR-MPX3500-∗1∗
Controlled Axis		6 (vertically articulated)
Payload		Wrist (T-axis): 15 kg, Arm (U-axis): 25 kg*5
Repeatability*1		±0.15 mm
Range of Motion	S-axis (turning)	−150°−+150°(wall mounted: −60°−+240°)
	L-axis (lower arm)	− 65°−+140°
	U-axis (upper arm, lower arm)	− 65°−+ 90°
	R-axis (wrist roll)	−720°−+720°
	B-axis (wrist pitch/yaw)	−720°−+720°
	T-axis (wrist twist)	−720°−+720°
Maximum Speed		2.0 m/s
Maximum Speed of Individual Axes	S-axis (turning)	1.75 rad/s, 100°/s
	L-axis (lower arm)	1.75 rad/s, 100°/s
	U-axis (upper arm)	1.92 rad/s, 110°/s
	R-axis (wrist roll)	5.24 rad/s, 300°/s
	B-axis (wrist pitch/yaw)	6.28 rad/s, 360°/s
	T-axis (wrist twist)	6.28 rad/s, 360°/s
Allowable Moment	R-axis (wrist roll)	93.2 N·m (9.5 kgf·m)
	B-axis (wrist pitch/yaw)	58.8 N·m (6.0 kgf·m)
	T-axis (wrist twist)	19.6 N·m (2.0 kgf·m)
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	3.75 kg·m²
	B-axis (wrist pitch/yaw)	2.225 kg·m²
	T-axis (wrist twist)	0.2 kg·m²
Hollow Wrist Diameter		70 mm
Approx. Mass		590 kg
Ambient Conditions	Temperature	0 °C to +40 °C
	Humidity	20% to 80%RH (non-condensing)
	Vibration acceleration	4.9 m/s² (0.5 G) or less
	Altitude	1000 m or less
	Others	Free from excessive electrical noise (plasma) Free from strong magnetic fields
Certification of Explosion Protection*2		TIIS (Japan), FM (North America), ATEX (Europe), KCs (Korea), Taiwan
Power Requirements*3		3.0 kVA
Mounting*4		Floor, ceiling, wall

∗1: Conforms to ISO 9283.
∗2: Contact your Yaskawa representative regarding the approval status of certifications that are not listed in the table.
∗3: Varies in accordance with applications and motion patterns.
∗4: Ceiling and wall-mounting installation methods are optional.
∗5: These payloads are correlated. They change depending on the weights of attachments on the arm and wrist.
Note: SI units are used for the specifications.

Dimensions Units: mm : P-point Maximum Envelope

Note: The following figure shows the dimensions of YR-MPX3500-∗0∗ model.
Refer to individual dimension diagrams for detailed dimensions and specifications for other models.



∗1: 1-a is outside the motion range when the S-axis motion range is 1-b (+95° to +150° and −95° to −150°).
∗2: 2-a is outside the motion range when the S-axis motion range is 2-b (+25° to +150° and −95° to −150°).

DX200 Controller Specifications

Items	Specifications
Configuration	Dust proof structure IP54
Dimensions	600 (W)×520 (D)×1060 (H) mm (without transformer) 600 (W)×520 (D)×1340 (H) mm (with transformer)
Approx. Mass	150 kg (without transformer) / 250 kg (with transformer)
Cooling System	Indirect cooling
Ambient Temperature	During operation: 0 °C to +45 °C, During storage: −10 °C to +60 °C
Relative Humidity	10% to 90%RH (non-condensing)
Vibration etc.	4.9 m/s² (0.5 G) or less, must be installed in a non-hazardous area
Power Supply	Without transformer: Three-phase 200 VAC (+10% to −15%), 50/60 Hz (±2%) Three-phase 220 VAC (+10% to −15%), 60 Hz (±2%) With transformer: Asia Three-phase 380 VAC (+10% to −15%), 50/60 Hz (±2%) North America Three-phase 480 VAC (+10% to −15%), 50/60 Hz (±2%) Europe Three-phase 400 VAC (+10% to −15%), 50/60 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 (Specialized allocation: 24 inputs and 24 outputs, General allocation: 16 inputs and 16 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: 1 ch
Control Method	Software servo control
Drive Units	SERVOPACK for AC servomotors (For robot + external axis (optional))

∗: When using the Intrinsically safe programming pendant, ground to a resistance of 10 Ω or less via the specified terminal.

Programming Pendant Specifications

【Standard】

Items	Specifications
Dimensions	169 (W)×50 (D)×314.5 (H) mm
Approx. Mass	0.990 kg
Material	Reinforced plastics
Operation Device	Compact flash card interface device, USB port (1 port)
Display	5.7-inch color LCD, touch panel 640×480 pixels (Alphanumeric characters, Chinese characters, Japanese letters, and others)
IEC Protection Class	IP65
Cable Length	Standard: 8 m, Max.: 36 m (with optional extension cable)

【Intrinsically safe】

Items	Specifications
Dimensions	235 (W)×78 (D)× 203 (H) mm
Approx. Mass	1.30 kg (except the cable)
Material	Reinforced plastics
Display	5.7-inch monochrome LCD, backlit white LED, touch panel 320× 240 pixels (Alphanumeric characters, Chinese characters, Japanese letters, and others)
Explosion Protection Standard	TIIS (Japan). FM (North America). ATEX (Europe). KCs (Korea)
IEC Protection Class	IP54
Cable Length	Standard: 8 m (20 m cable is optional), Max.: 50 m (with optional extension cable)

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