



CAUTIONS TO BE TAKEN TO ENSURE SAFETY

- For those persons involved with the operation / service of your system, including Kawasaki Robot, they must strictly observe all safety regulations at all times. They should carefully read the Manuals and other related safety documents.
- Products described in this catalogue are general industrial robots. Therefore, if a customer wishes to use the Robot for special purposes, which might endanger operators or if the Robot has any problems, please contact us. We will be pleased to help you.
- Be careful as Photographs illustrated in this catalogue are frequently taken after removing safety fences and other safety devices stipulated in the safety regulations from the Robot operation system.

INQUIRIES

KAWASAKI HEAVY INDUSTRIES, LTD.
www.khi.co.jp/robot/

Tokyo Head Office/Robot Division
World Trade Center Bldg., 4-1, Hamamatsu-cho 2-chome, Minato-ku, Tokyo 105-6116, Japan
Phone: +81-3-3435-6908
Fax: +81-3-3437-9880

Akashi Works/Robot Division
1-1, Kawasaki-cho, Akashi, Hyogo 673-8666, Japan
Phone: +81-78-921-2946
Fax: +81-78-923-6548

KAWASAKI ROBOTICS (U.S.A.), INC.

28140 Lakeview Drive, Wixom, MI 48393, U.S.A.
www.kawasakirobot.com
Phone: +1-248-446-4100
Fax: +1-248-446-4200

KAWASAKI ROBOTICS (UK) LTD.

Units 6 & 7, Easter Court, Europa Boulevard, Westbrook Warrington WA5 7ZB, United Kingdom
www.kawasakirobot.uk.com
Phone: +44-1925-71-3000
Fax: +44-1925-71-3001

KAWASAKI ROBOTICS GmbH

29 Sperberweg, 41468 Neuss, Germany
www.kawasakirobot.de
Phone: +49-2131-34260
Fax: +49-2131-3426-22

KAWASAKI MACHINE SYSTEMS KOREA, LTD.

69BL-1LT, 638, Gojan-Dong, Namdong-Gu, Incheon, 405-817, Korea
www.kawasakirobot.co.kr
Phone: +82-32-821-6941
Fax: +82-32-821-6947

KAWASAKI ROBOTICS (TIANJIN) CO., LTD.

Hongtai Industrial Park B-1 Taifeng road 87
Tianjin Economic-Technological Development Area, China
www.kawasakirobot.cn
Phone: +86-22-5983-1888
Fax: +86-22-5983-1889

Agent

* Materials and specifications are subject to change without notice.



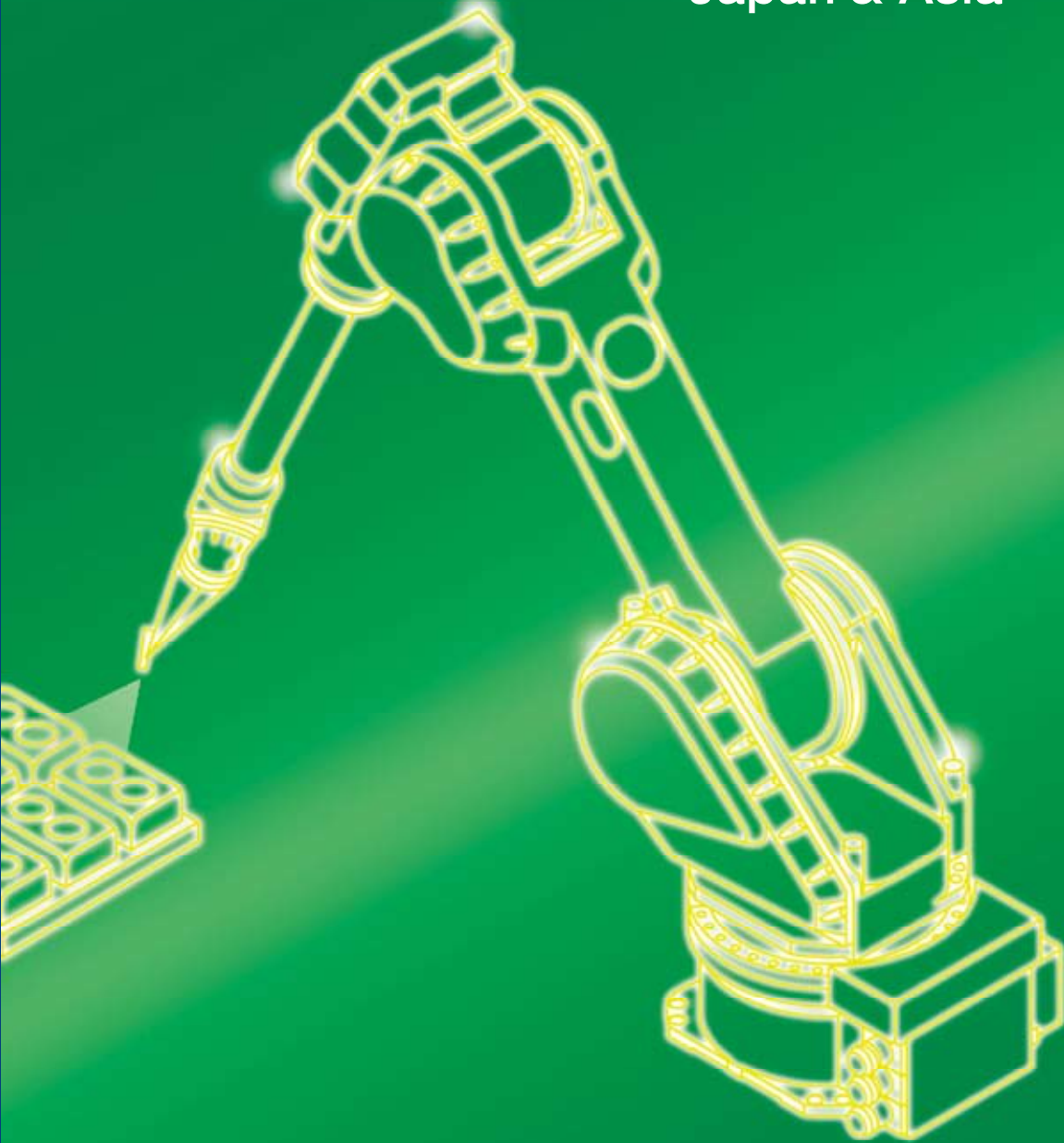
Kawasaki Robot K series

Simple and friendly

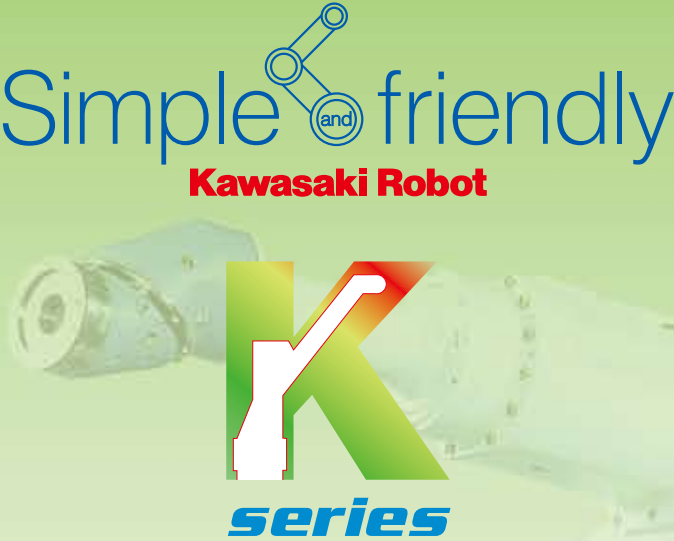
Kseries

**Explosion-proof specification
painting robot &
Painting package cell**

Japan & Asia



A selection of robots is available to match your painting application.



Manipulators

The “K-series” Kawasaki robot is an explosion-proof painting robot its development based on our concept “Simple and Friendly”.
The choice of robots available enables any painting application both large and small to be covered. The fully integrated hose system provides maximum protection against external dust and dirt.



Painting Line for Car Bumpers

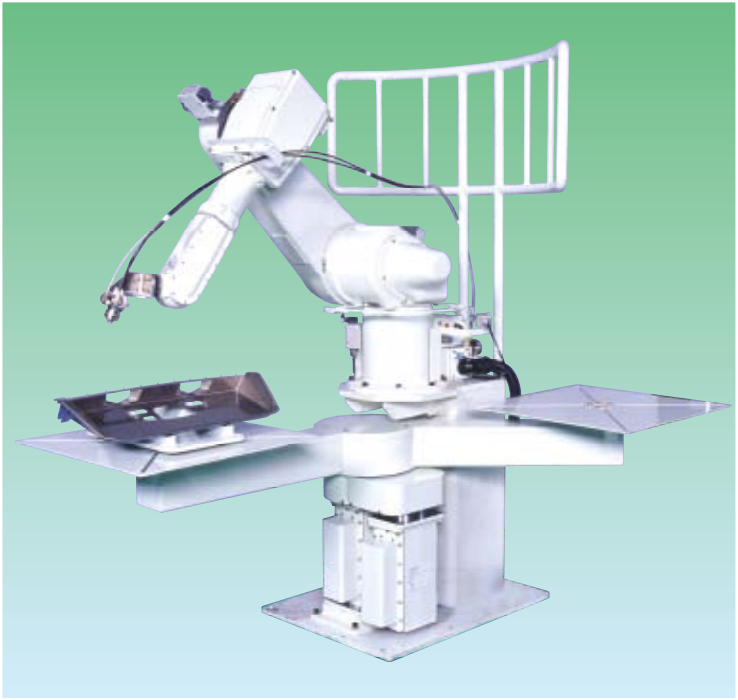


Automobile body coating line
Photo : Mazda's 3 wet-on coating system clear coating process

Our robot is available in a “package cell” allowing production to commence almost instantly.

Package Cell

If a quick response is required to a painting application, the “Kawasaki Heavy Industries” package cell is ready to meet your needs.
The packaged cell arrives as a compact unit. It can be easily installed in a limited space and allowing the painting process to begin immediately.



Servo twister + KF121



Servo shuttle + KF193

Manipulators



1

A varied line-up of robots

Kawasaki offers four basic types of robot from the KF121 for small work-piece to the KG264 for the automobile inner and outer chassis painting. A Choice of robot for all applications and installations is available.

2

Arm's built-in hoses

Each type of robot are fitted with built-in hoses as standard. Internally fitting the hoses minimises the opportunity of mist and spray sticking to tubing and from dust being adhere to the workpeice. These internal hoses are either 40 mm or 70 mm in diameter.



Arm with internal hose

3

Enhanced peripheral units

A control panel is provided to enhance the ease of system building and interface with either a robot travel unit, work-piece transfer unit, rotation unit etc.

4

Significant painting experience

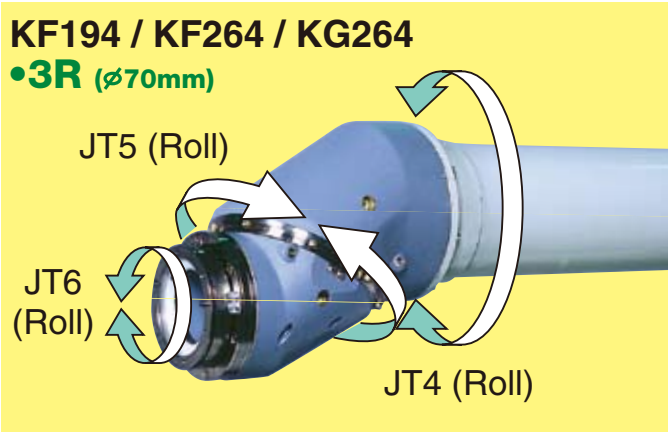
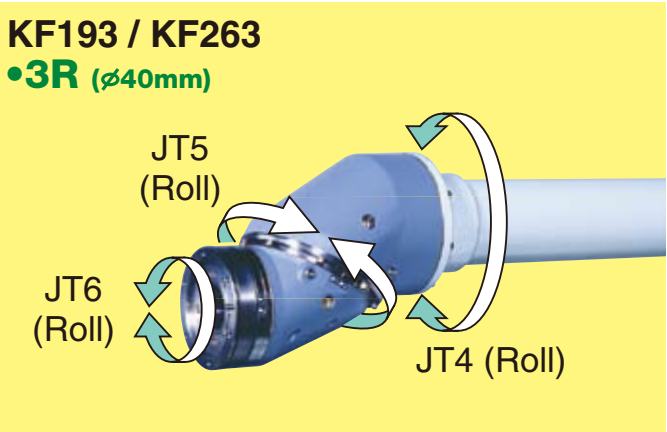
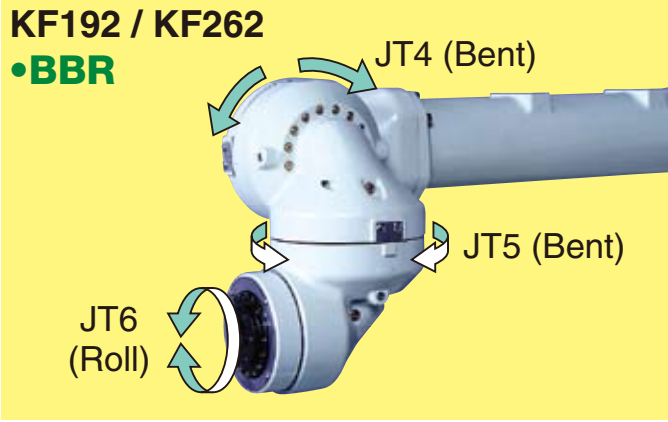
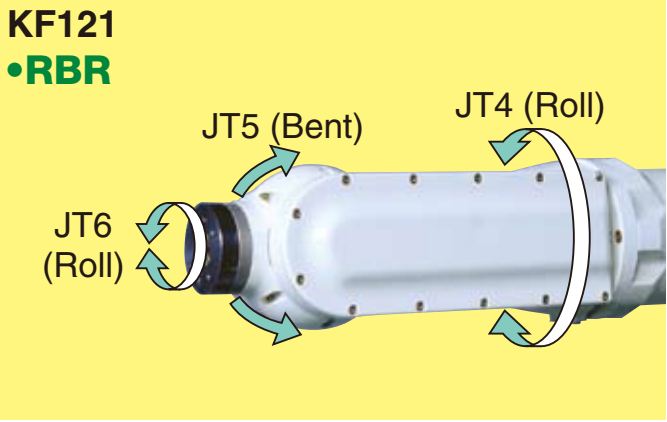
Gathering 30 years of painting robot experience has enabled Kawasaki to put together a robot that will match your every need. The K series has used this information and is now equipped with more advanced functions than ever, resulting in a robot of great capability.

5

Customer support

Our professional staff will be available for support from the initial planning stage right up to system start up. This service will be of great benefit to those new to painting applications.

Variation of Wrists



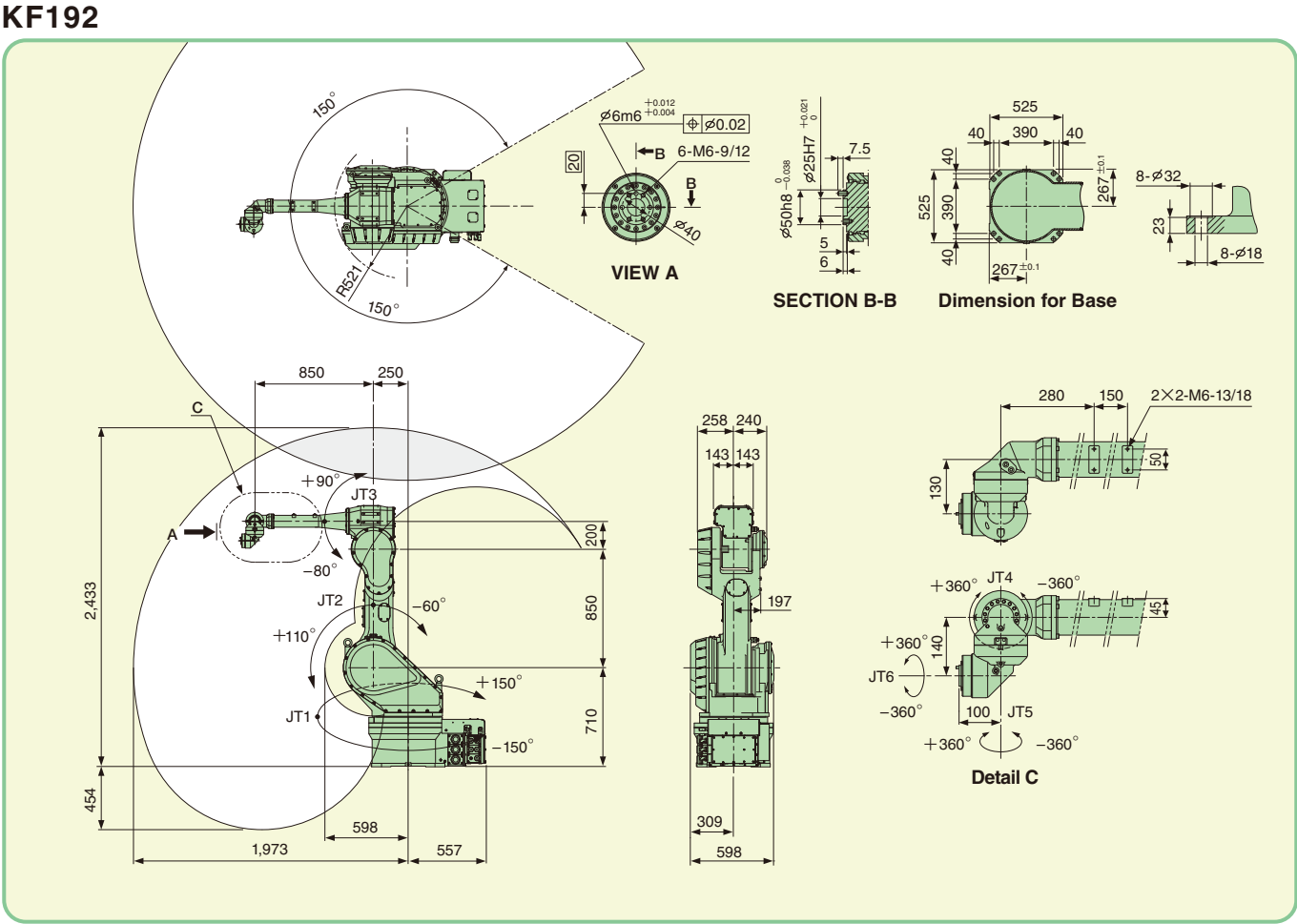
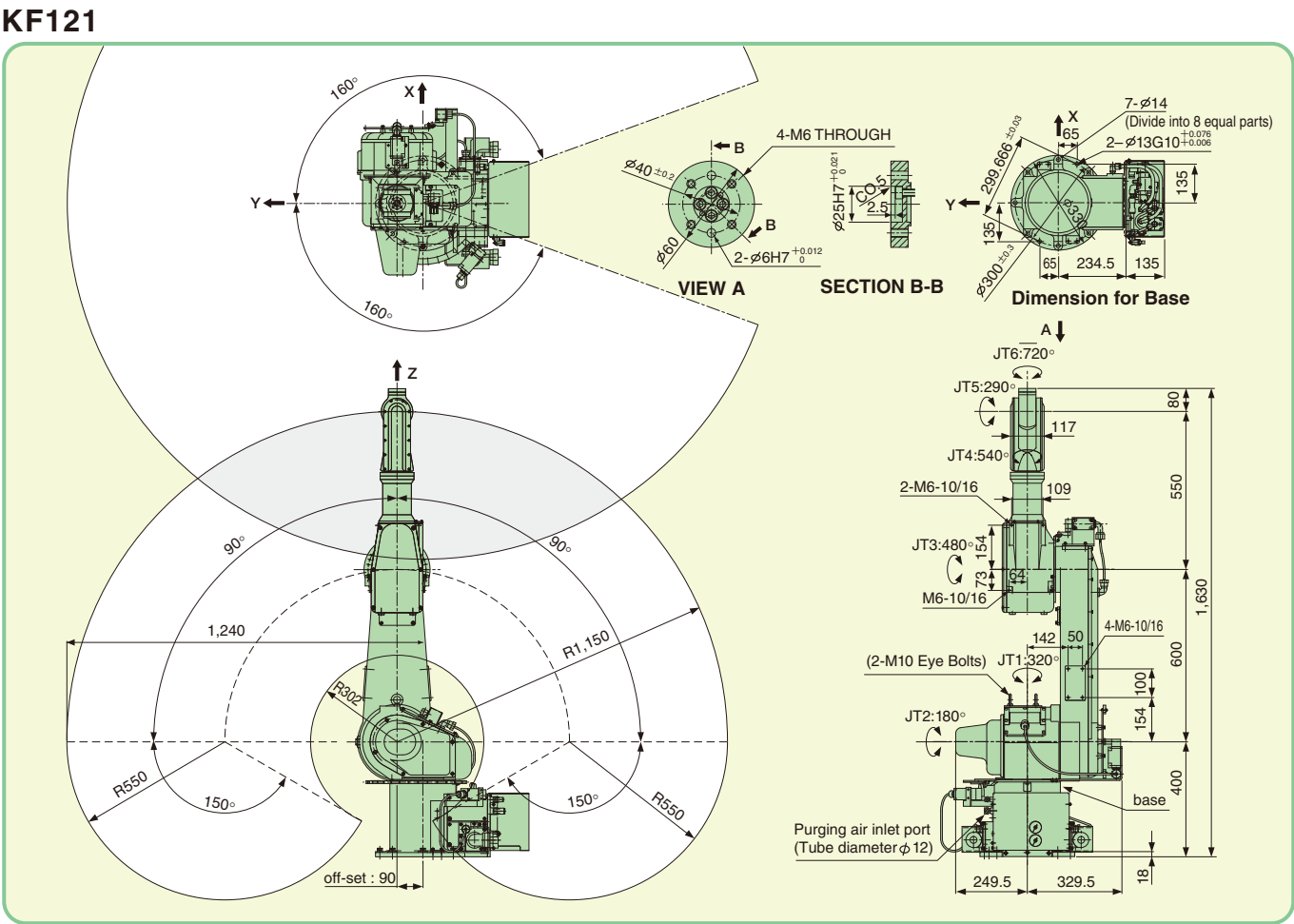
Specifications

Model		KF121	KF192	KF193	KF194	KF262	KF263	KF264	KG264	
Degrees of Freedom		6 axes								
Wrist Type		RBR	BBR	3R∅40 (Hose Built-in)	3R∅70 (Hose Built-in)	BBR	3R∅40 (Hose Built-in)	3R ∅70 (Hose Built-in)		
Axis Work Envelope	Max. Stroke	JT1 (Turning)	±160°	±150°					±120°	
		JT2 (lower arm)	±90°	+110° ~ -60°					+120° ~ -60°	
		JT3 (Upper arm)	+150°	+90° ~ -80°					+90° ~ -65°	
		JT4	±270°	±360°	±720°	±720°	±360°	±720°		
		JT5	±145°	±360°	±720°	±720°	±360°	±720°		
		JT6	±360°	±360°	±410°	±410°	±360°	±410°		
	Max. Speed		1.5 m/s	2.0 m/s					1.5 m/s	
Repeatability		±0.2 mm	±0.5 mm							
Max. Reach		1,240 mm	1,973 mm	1,973 mm	1,978 mm	2,665 mm	2,665mm	2,668 mm	2,665 mm	
Max. Payload		5 kg	Wrist: 12 kg Arm: 20 kg						Wrist: 20 kg Arm: 30 kg	
Moment	JT4	7.8 N·m	33.3 N·m	33.2 N·m	35.3 N·m	33.3 N·m	33.2 N·m	35.4 N·m	79.9 N·m	
	JT5	7.8 N·m	28.8 N·m	26.7 N·m	27.7 N·m	28.8 N·m	26.7 N·m	27.7 N·m	61.3 N·m	
	JT6	2.9 N·m	7.9 N·m	7.9 N·m	7.9 N·m	7.9 N·m	7.9 N·m	7.9 N·m	15.6 N·m	
Moment of Inertia	JT4	0.17 kg·m ²	1.28 kg·m ²	1.27 kg·m ²	1.44 kg·m ²	1.28 kg·m ²	1.27 kg·m ²	1.45 kg·m ²	3.33 kg·m ²	
	JT5	0.17 kg·m ²	0.96 kg·m ²	0.82 kg·m ²	0.89 kg·m ²	0.96 kg·m ²	0.82 kg·m ²	0.89 kg·m ²	1.95 kg·m ²	
	JT6	0.06 kg·m ²	0.11 kg·m ²	0.11 kg·m ²	0.10 kg·m ²	0.11 kg·m ²	0.11 kg·m ²	0.11 kg·m ²	0.12 kg·m ²	
Mass		140 kg	690 kg	720 kg	750 kg	720 kg	740 kg	770 kg	795 kg	
Explosion Protection		Combination of pressurized type and intrinsically safety type (Expib IIBT4 / Exib IIBT4)								
Ambient Temperature Range		0 ~ 40 °C								
Body Color		Munsell 10GY9/1 equivalent								

Maximum reach : The RBR (Roll Bend Roll) wrist refers to the distance from the centre of JT1 to the centre of JT5.
The BBR (Bend Bend Roll) wrist is the distance from the top arm centre line to the JT4 axis.
The 3R (Roll Roll Roll) wrist is the distance from JT1 to the axis cross-point between JT4 and JT5.

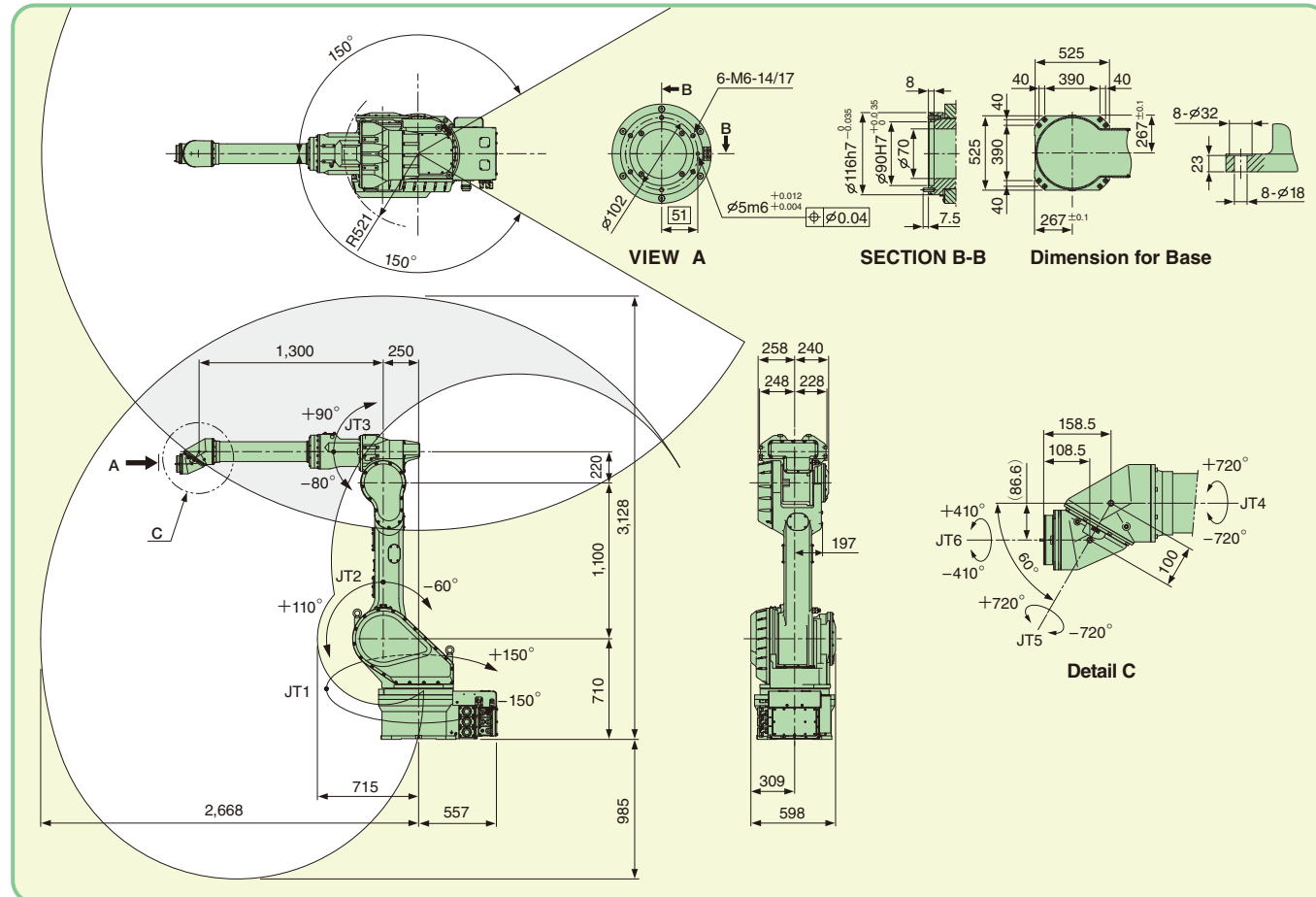
Other options or Software : Please contact us.

Motion Range & Dimensions

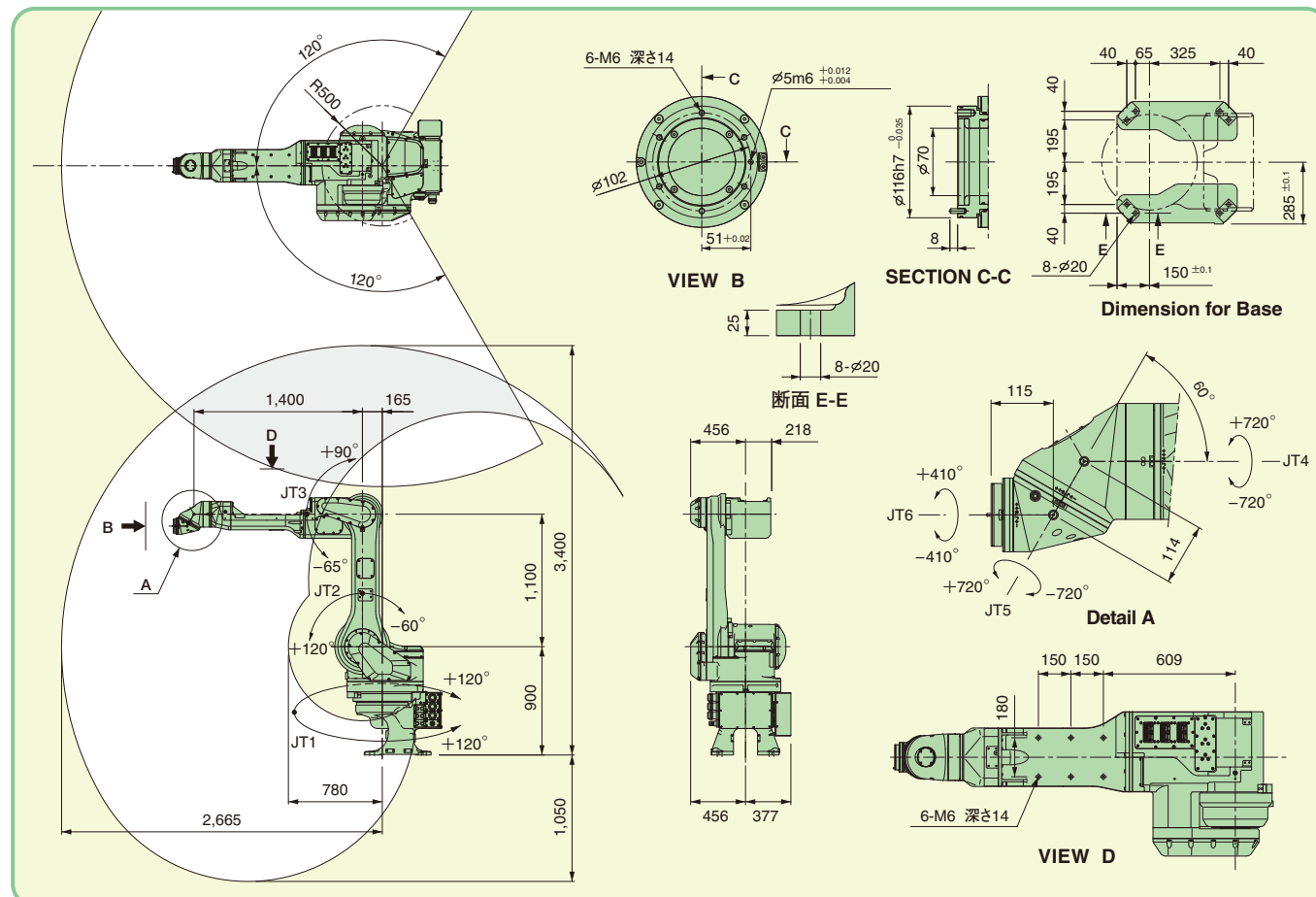


Motion Range & Dimensions

KF264



KG264



Controller (E25/E27)

E CONTROLLER

The E-Controller, with unprecedented quality and compact size, was created in response to customer demand. Kawasaki's collaboration of past achievements and experience has led to the development of the most technically advanced controller available. This industry leading design provides increased performance and easy operation that exceeds expectations.

•Features

1 Compact

By reducing the controller's footprint and overall volume, high-density layouts are more easily achieved.

2 Explosion-proof teach pendant

The explosion-proof feature on the color LCD with a large-sized touch panel allows for teaching, editing, and monitoring information such as current position and I/O signals in the explosion-proof area, and it is possible to customize the interface panel according to user preference. The backlight allows for clear view of the screen in dark locations.

3 User-friendly operation system

The operation system has now fully matured into a more user-friendly design. An operator can switch on the motors and activate the cycle start all from the teach pendant, allowing for a more convenient system control. Two information screens can be displayed simultaneously, providing access to different types of information (for example, positional information and signal information).

4 Painting unit control functions (option)

By controlling the CCV, electropneumatic regulator, and the rotation function of the discharge rate control gear pump, using the controller's CPU board for robot, this low cost, flexible system corresponds to various paint units. It is also equipped with a function that allows the set up of painting conditions and discharge rate calibration on the teach pendant screen.

5 Using the latest technologies

The enhanced CPU capacity has resulted in more accurate trajectory control, faster program execution, and quicker saving and loading of files, as well as other advantages. In addition, the memory has been expanded to allow for higher program storage capacity. A USB port is available as a standard external storage conduit.

6 Easier maintenance

With modular components and fewer cables, Kawasaki has developed a controller that is compact, and easy to maintain. A host of maintenance functions are available, including the DIAG function for self-diagnostics, a maintenance support function that can handle not only hardware errors but also application errors, a Web server that allows remote diagnostics, and more.

7 Highly expandable

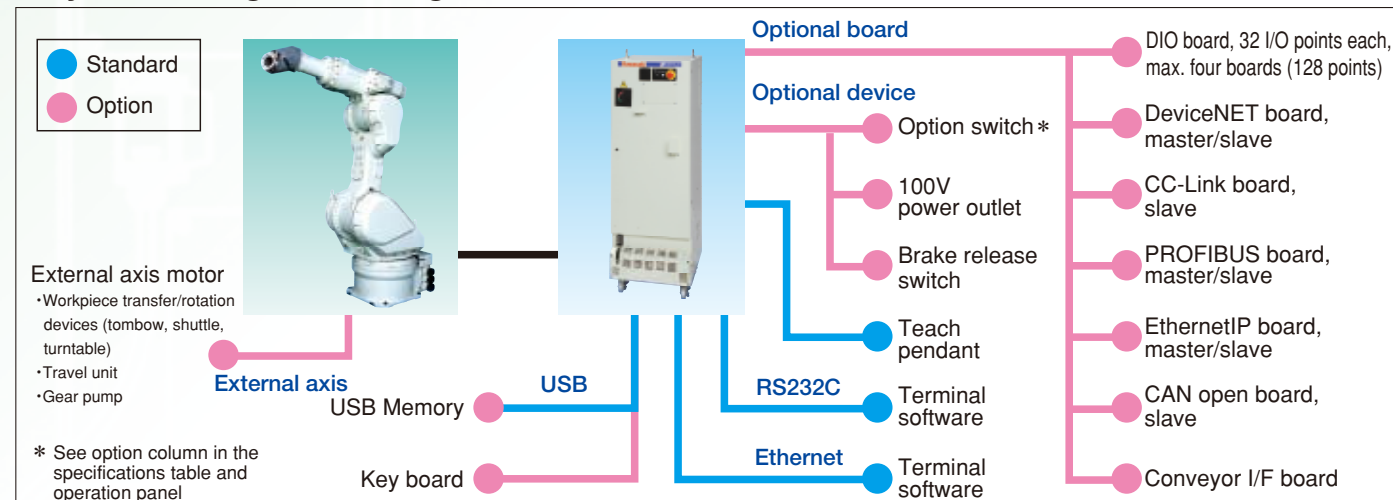
By installing an additional amplifier, and adding workpiece transfer devices (tombow, shuttle, turntable, etc.), travel unit and gear pump, etc., the system can accept up to three external axes. The system is compatible with a large number of field buses for controlling peripheral devices. Combination with software sequencer function (KLogic), which can be edited on the teach pendant, allows easy structuring of a highly sophisticated system.



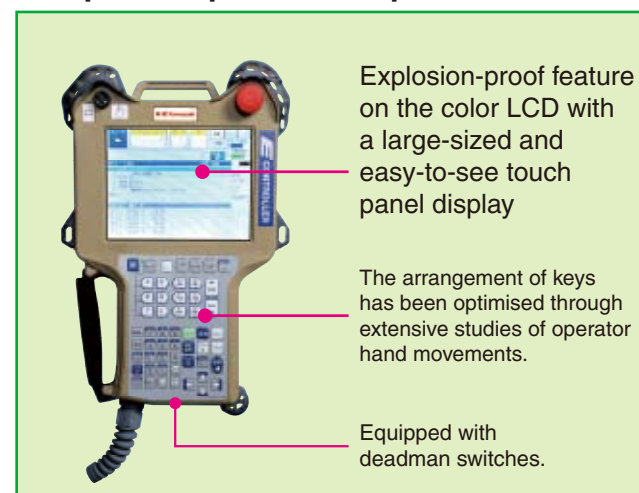
Specifications

		Standard	Option
Model		E25/27	
Dimensions		W500×D550×H1,400 mm	
Structure		Self-standing main enclosure	
Number of Controlled Axes		6 axes	Max. 9 axes
Drive System		Full digital servo system	
Coordinate Systems		Joint, Base, Tool	Fixed tool point
Types of Motion Control		Joint/Linear, Circular Interpolated motion	
Programmig		Point to point teaching or language based programming	
Memory Capacity		8MB (Approx. 80,000 steps)	
General Purpose Signals	External Operation	Motor power Off, Hold	
	Input	32 Channels	128 Channels
	Output	32 Channels	128 Channels
Operation Panel		E-Stop switch, teach/repeat switch, control power light (Cycle start, motor-on, hold/run, errors, and error reset are activated from the teach pendant.)	
Cable Length	Teach Pendant	5 m	5 m, 15 m, 20 m, 25 m
	Robot-Controller	6 m	Possible to extend up to 40 m
Mass		120 Kg	
Power Reruirements	E25	AC200-220V ±10%, 50/60Hz, 3Φ, Max.10kVA	
	E27	AC200-220V ±10%, 50/60Hz, 3Φ, Max.5.6kVA	
		Class D ground (Standard for robots) Class A ground (for intrinsic explosion-proof safety circuit)	
Environmental Condition		Ambient Temperature:0~45°C, CRelative Humidity:35~85% (No dew, nor frost allowed)	
Body Color		Munsell 10GY9/1 equivalent	
Teach Pendant		TFT color LCD display with touch-panel, E-Stop switch, teach lock switch, deadman switch	
Auxiliary storage unit		USB Memory	
Interface		USB, Etherne (100BASE-TX), RS232C	

System configuration diagram

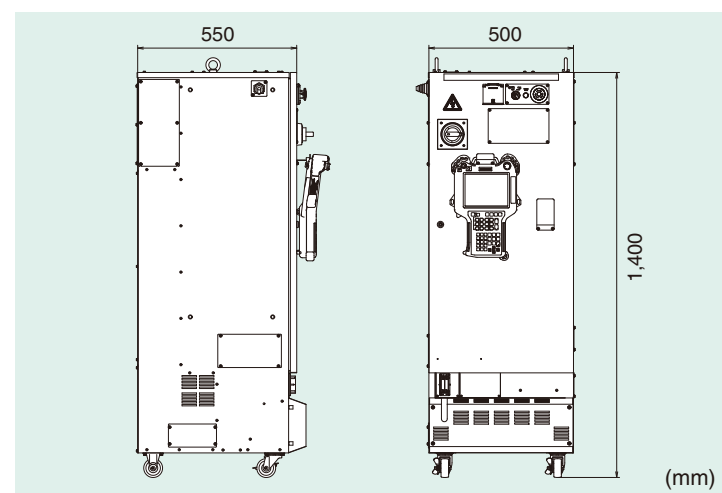


Explosion-proof teach pendant



External View and Dimensions

E25/E27



Peripheral Equipment

High quality and efficient spray painting can be achieved by combining high performance work piece transfer/rotation devices, paint spray control systems of advanced technology as well as highly developed paint spray robots and atomizers.

Kawasaki's various types of peripheral equipment present with ideal paint spray facilities.

Package Cells

To meet customer needs, we offer packaged cells in various sizes and configurations, these cells are named, servo twister, servo tombow, servo shuttle, servo spinner, servo turntable and servo wing.

Painting unit control panel (air panel)

The painting unit control panel allows control of the changes to the discharge rate, atomizing air and air patterns to meet complex work applications.

Functions such as automatic color change and automatic washing for each specified cycle could be incorporated to suit the customers needs.



Painting unit control panel

Robot travel unit

Robot travel units synchronises robot operation with external servo drives, thus allowing the painting process to take place on a moving component. Robot travel units can be used during the painting of automobiles, construction machinery, and septic tanks.

"KOSMOS" line control software

In painting processes where two or more robots are in operation, the KOSMOS line control panel provides real time status information and access to production management information.

Line monitoring function

The LCD screen lets you observe the status of the entire system such as work-piece type, color, coating robot and peripheral unit operation, painting conditions, system errors etc.

Data setting function

The graphical interface of the touch panel allows the setting and changing of the coating requirements and coating unit control panel.

Paint flow rate, atomizing air pressure, pattern air pressure and the other painting requirement settings.

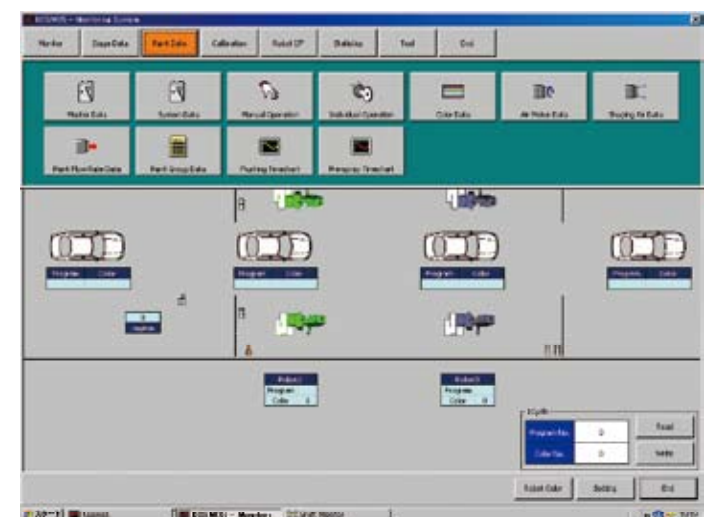
Time chart setting for color change, gun cleaning etc.

Program number setting for each work-piece type and color.

CCV number setting for each color

Statistical functions

Available data for production management include, production statistics, error statistics, paint consumption, etc.



Line control panel

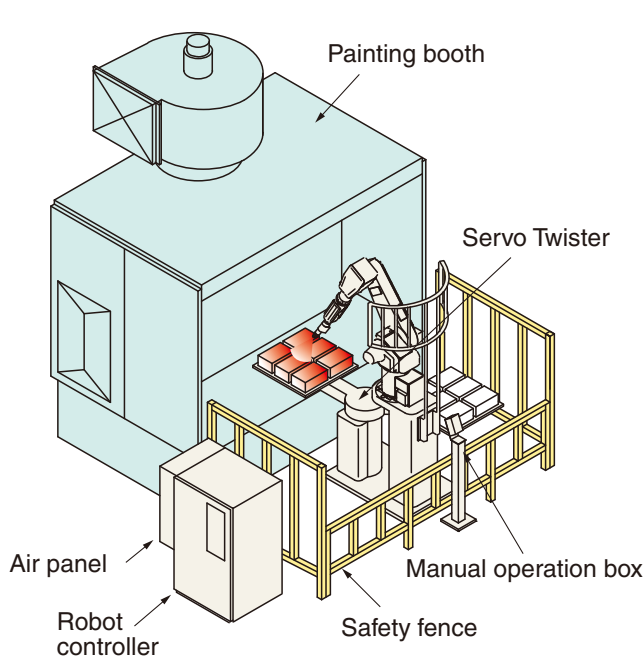
Small sized painting applications

Servo Twister

A compact but sophisticated system

Features

- 1. Small installation space**
The minimum installation space required for this system is 2,200 mm wide x 1,966 mm deep for a 600 x 600 mm table. Such compactness allows you to install the system in a narrow hand-blowing booth.
- 2. Rotary table functions**
In spite of its small size the following functions are available, rotary coating, indexed coating, and rotary table synchronisation.
- 3. 6-axis robots**
The Servo Twister installation uses a 6-axis, articulated robot.
- 4. Shared coating program**
The integration of the robot and painting table into one unit allows for programs to be shared by more than one robot.
- 5. Short installation time**
The servo twister cell can be built before delivery, so that the installation time is as shortened and in production as soon as possible.

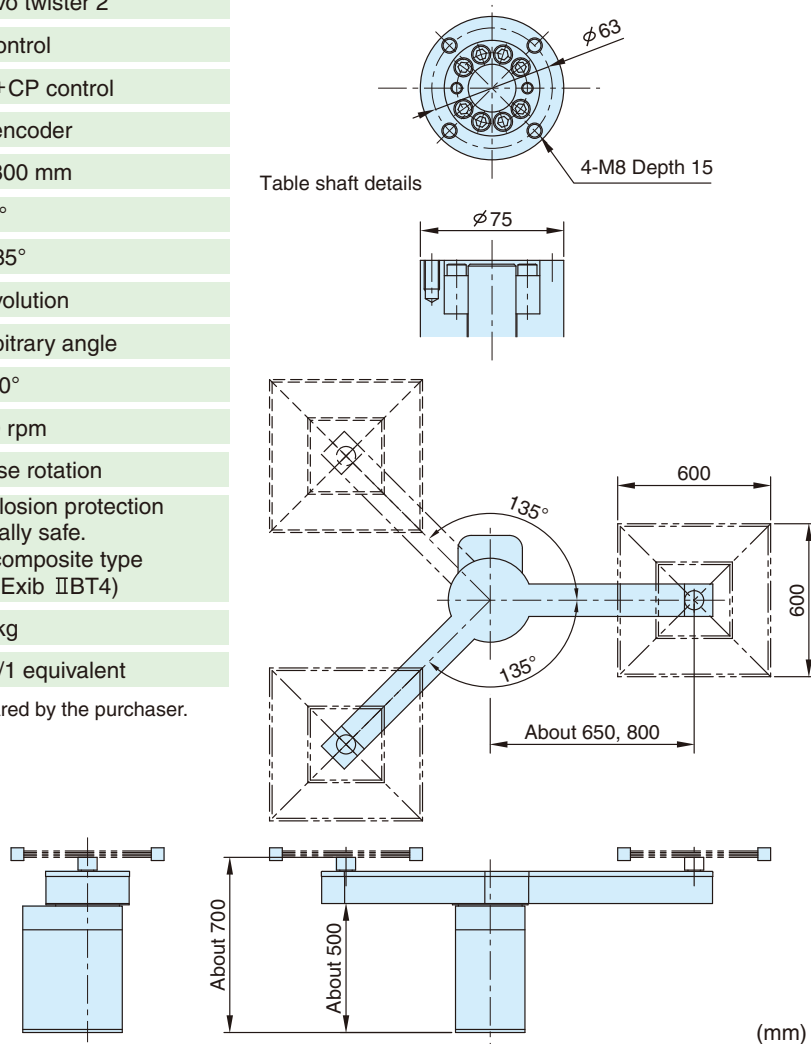


Specifications

		Standard
Table load		20 kg x 2 Table
No. of control axes		Robot 6+Servo twister 2
Control method		Servo control
Teaching playback method		PTP teaching+CP control
Position detection method		Absolute encoder
Arm	Length	650 mm, 800 mm
	Operation angle	135°
	Indexing time	1.8/135°
Table	Operation angle	Infinite revolution
	Indexing angle	90-deg and arbitrary angle
	Indexing time	0.8/90°
	Uninterrupted rotary speed	Max. 90 rpm
Rotary direction		Normal/reverse rotation
Explosion protection		Air pressurized explosion protection and intrinsically safe. Explosion-proof composite type (Expib IIBT4 / Exib IIBT4)
Mass		120 kg
Color		Munsell 10GY9/1 equivalent

Note : The work loading table and loading fixtures to be prepared by the purchaser.

External View and Dimensions



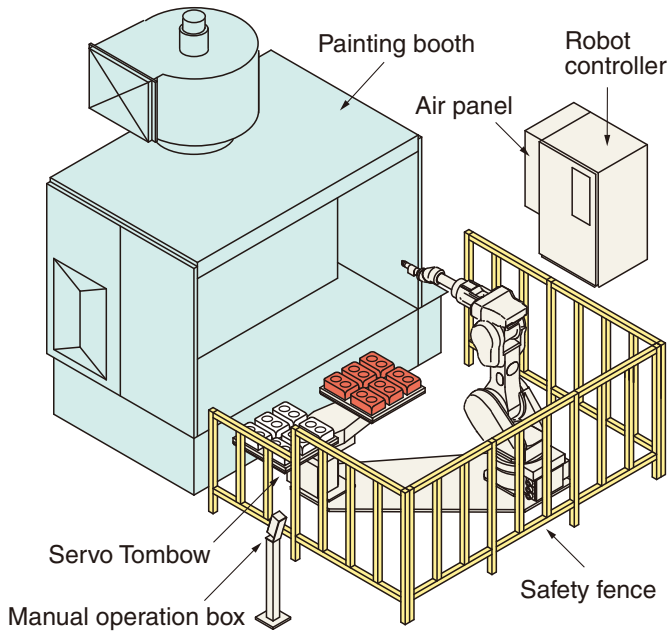
Small sized painting applications

Servo Tombow

Space saving and easy-to-install

Features

- 1. Smooth movement**
Servo motion provides smooth movement to eliminate work slippage.
- 2. Higher painting quality**
Placing the painting gun each side of the component and manually entering the painting gun correction distance can increase the painting quality. This feature is best suited for small square shaped components (electronic products such as TV frames, speaker boxes etc).
- 3. Synchronous operation with the robot**
The tombow table rotation is synchronised with the movement of the robot, this feature ensures a uniform paint finish for cylindrical shaped components such as hot plates, wooden trays, automobile hubs etc. The tombow table offers 360 degrees of rotation.
- 4. Countermeasure to paint mist accumulation**
In order to reduce the paint mist accumulation problem, work piece can be positioned above the water tank when spraying.

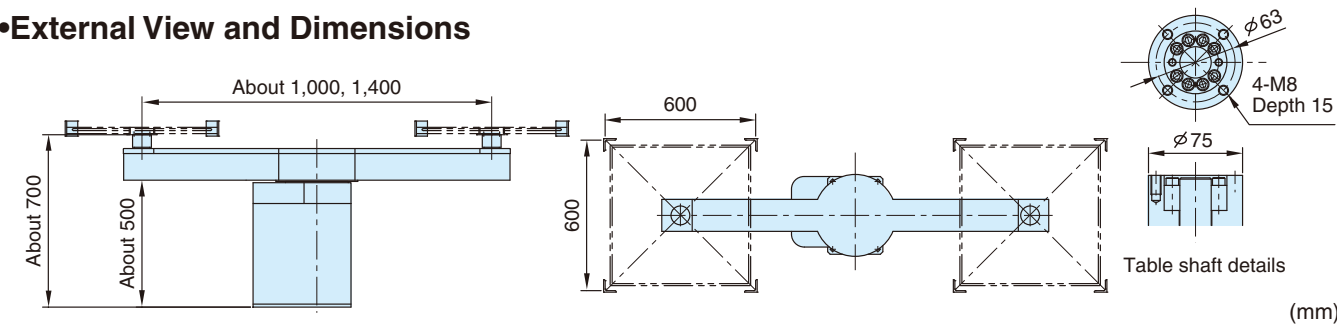


Specifications

		Standard	Heavy load carrying
Table load		20 kg x 2 Table	40 kg x 2 Table
No. of control axes		Robot 6+Servo tombow 2	
Control method		Servo control	
Teaching playback method		PTP teaching+CP control	
Position detection method		Absolute encoder	
Arm	Diameter	1,000 mm, 1,400 mm	
	Operation angle	180°	
	Indexing time	2/180°	
Table	Operation angle	Infinite revolution	
	Indexing angle	90-deg and arbitrary angle	
	Indexing time	0.8/90°	1.2/90°
	Uninterrupted rotary speed	Max. 90 rpm	Max. 45 rpm
Rotary direction		Normal/reverse rotation	
Explosion protection		Air pressurized explosion protection and intrinsically safe. Explosion-proof composite type (Expib IIBT4 / Exib IIBT4)	
Mass		110 kg (Diameter: 1,000 mm), 150 kg (Diameter: 1,400 mm)	
Color		Munsell 10GY9/1 equivalent	

Note : The standard arm lengths are 1,000 mm and 1,400 mm.
The work loading table and loading fixtures to be prepared by the purchaser.

External View and Dimensions



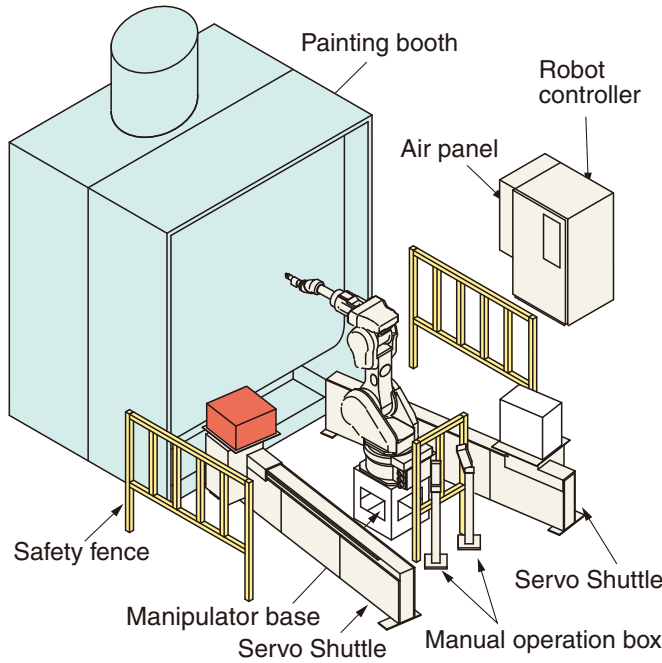
Medium sized work-piece painting cell

Servo Shuttle

Ultimate “table painting” type

Features

- 1. Improvement in productivity**
Servo motion provides high speed work transfer and table rotation with shock-less smooth start and stop motion, and also enables continuous rotation tracking with robot and any stand-by position of feeder.
- 2. Higher coating quality**
Controlling the position of the table provides the optimum painting position. This combined with the high-speed, high-precision robot with the servo shuttle enables high-quality painting.
- 3. Simple teaching**
The simple teaching function provided by the KF series painting robot eliminates time-consuming program teaching.
- 4. Increased table load**
The system can be used for painting large TV cabinets, sanitary ware, automobile instrument panels etc.
- 5. Simple installation**
This complete package is simple to install, but will provide for the painting of the most complex of components.

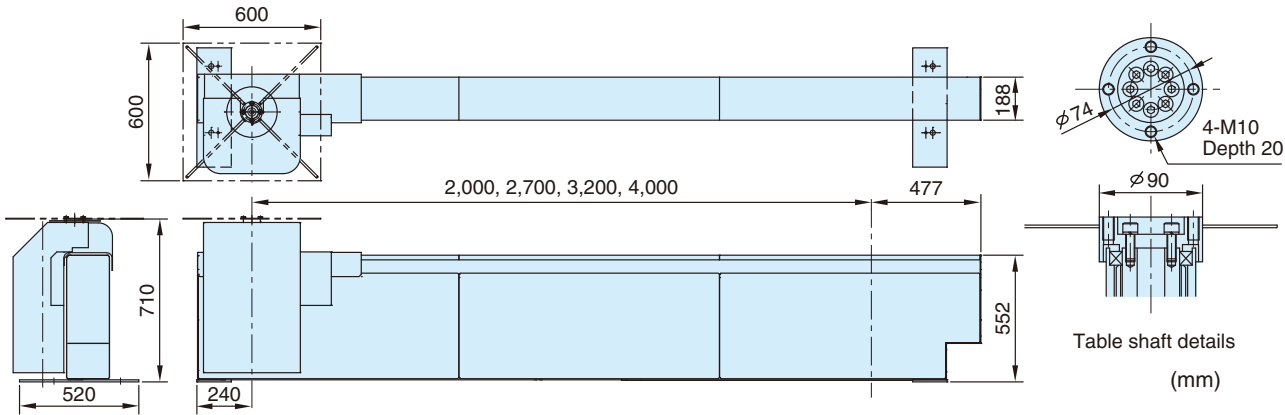


Specifications

		Standard	Heavy load carrying
Table load		20 kg x 2 Table	60kg x 2 Table
No. of control axes		Robot 6+ Servo shuttle 2	
Control method		Servo control	
Teaching playback method		PTP teaching+CP control	
Position detection method		Absolute encoder	
Shuttle	Stroke	2,000 mm, 2,700 mm, 3,200 mm, 4,000 mm	
	Max. speed	1,000 mm/sec	
Table	Operation angle	Infinite revolution	
	Indexing angle	90-deg and arbitrary angle	
	Indexing time	0.8/90°	1.2/90°
	Uninterrupted rotary speed	Max. 90 rpm	Max. 45 rpm
	Rotary direction	Normal/reverse rotation	
Intermediate stop function		The intermediate stop function and multiple coating control function are available.	
Explosion protection		Air pressurized explosion protection and intrinsically safe. Explosion-proof composite type (Expib II BT4 / Exib II BT4)	
Mass		One side: 230 kg to 310 kg	One side: 350 kg to 405 kg
Color		Munsell 10GY9/1 equivalent	

Note : The work loading table and loading fixtures to be prepared by the purchaser.

External View and Dimensions



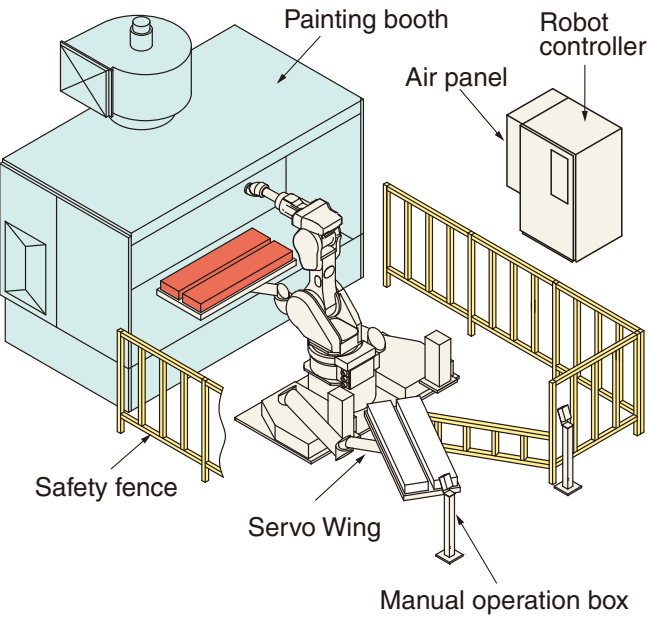
Medium sized work-piece painting cell

Servo Wing

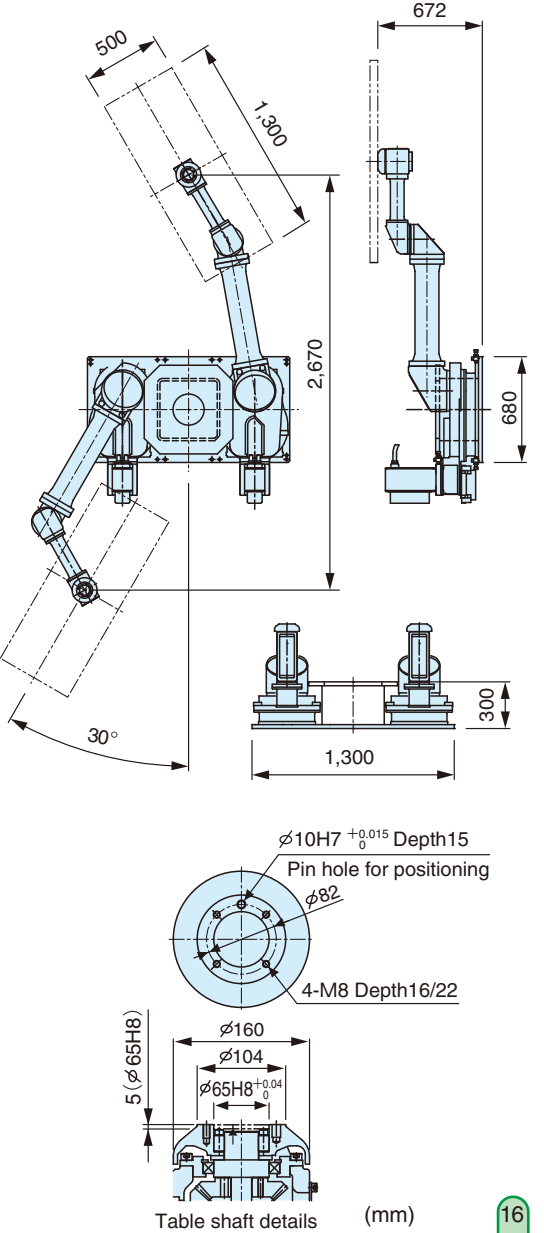
The installation space for “Table Painting” was made even smaller.

Features

- 1. Space Saving**
While applicable to work-piece having a size larger than in servo shuttle, the installation space is made small. The set positions of the left and right workpieces become closer and the workpiece loading and unloading work will be reduced.
- 2. Even Small-sized Robots Cope with Large Work-pieces.**
Since the painting positions set by the left and right arms can be the same(one position), the distance between the workpiece and the robot became close, and painting became possible with robots that are smaller than in the conventional servo-shuttle.
- 3. Reduction of Teaching Work**
Since the painting positions set by the left and right arms can be the same(one position), the painting programs can be made into one program, and the time required for the teaching can be shortened.
- 4. Countermeasures for the Paint Mist**
Sine the arms are slim with no fixed rails, painting can be conducted on the surface of the water, and soiling of the booth can be reduced. In addition, the turbulence of the air flow inside of the painting booth can be minimized.
- 5. Short Construction Period**
Since delivery will be made in a set-up state, the construction period will be one day at the shortest. Production can be started immediately.



External View and Dimensions



Specifications

		Standard
Table load		30 kg x 2 Table
No. of control axes		Robot 6+ Servo wing 2
Control method		Servo control
Teaching playback method		PTP teaching+CP control
Position detection method		Absolute encoder
Arm	Stroke	2,670mm
	Max. speed	540° mm/sec
Table	Operation angle	Infinite revolution
	Indexing angle	90-deg and arbitrary angle
	Indexing time	1.2/90°
	Uninterrupted rotary speed	Max. 90 rpm
	Rotary direction	Normal/reverse rotation
Intermediate stop function		The intermediate stop function and multiple coating control function are available.
Explosion protection		Air pressurized explosion protection and intrinsically safe. Explosion-proof composite type (Expib BT4 / Exib BT4)
Mass		970kg
Color		Munsell 10GY9/1 equivalent

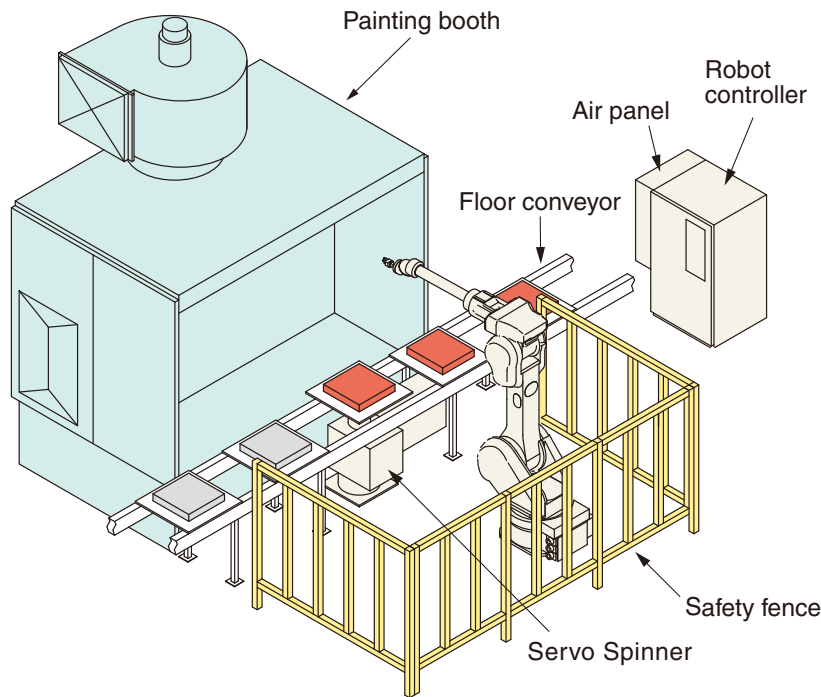
Medium sized work-piece painting cell

Servo Spinner

A new dimension in “line coating”

Features

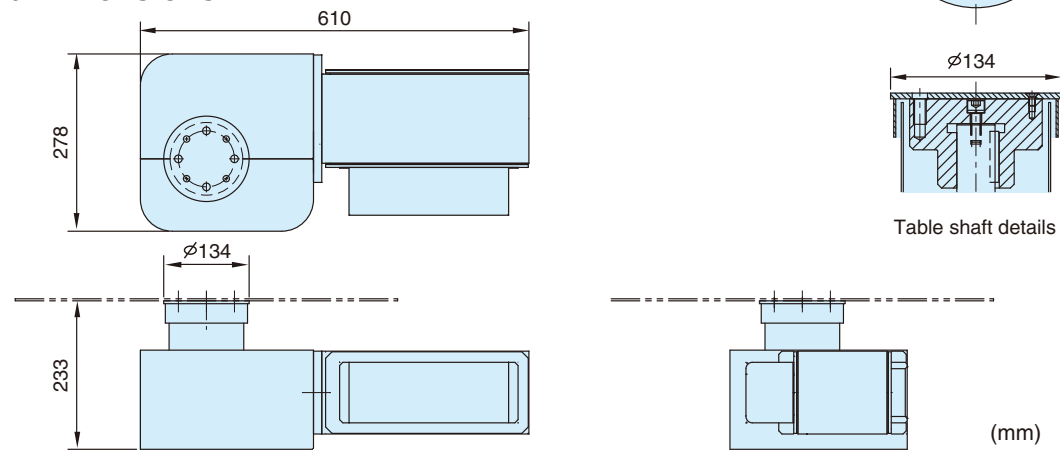
- 1. Flexible component placement
Any painting position is possible to meet the component placement this reduces booth contamination.
- 2. Uninterrupted painting
The robot wait time can be reduced to the minimum as painting can be performed with the table rotating.



Specifications

		Standard	Heavy load carrying
Table load		20 kg	60 kg
No. of control axes		Robot 6+Servo Spinner 1	
Control method		Servo control	
Teaching playback method		PTP teaching+CP control	
Position detection method		Absolute encoder	
Table	Operation angle	Infinite revolution	
	Indexing angle	90-deg and arbitrary angle	
	Indexing time	0.8/90°	1.1/90°
	Uninterrupted rotary speed	Max. 90 rpm	Max. 45 rpm
Rotary direction		Normal/reverse rotation	
Explosion protection		Air pressurized explosion protection and intrinsically safe. Explosion-proof composite type (Expib ⅡBT4 / Exib ⅡBT4)	
Mass		60 kg	
Color		Munsell 10GY9/1 equivalent	

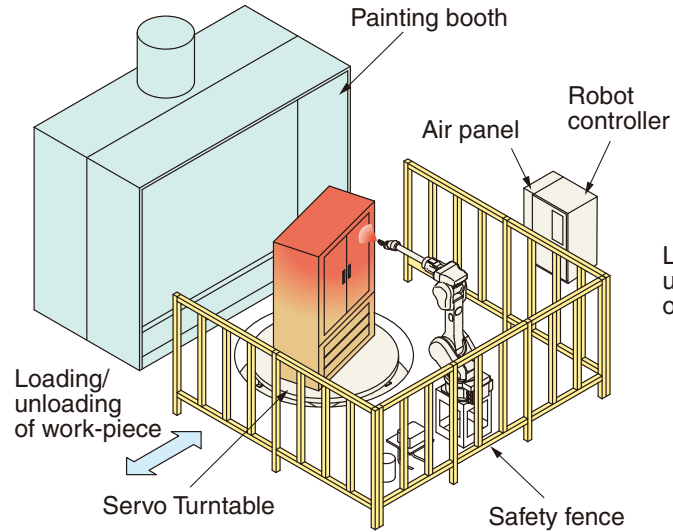
External View and Dimensions



Large sized work-piece painting cell

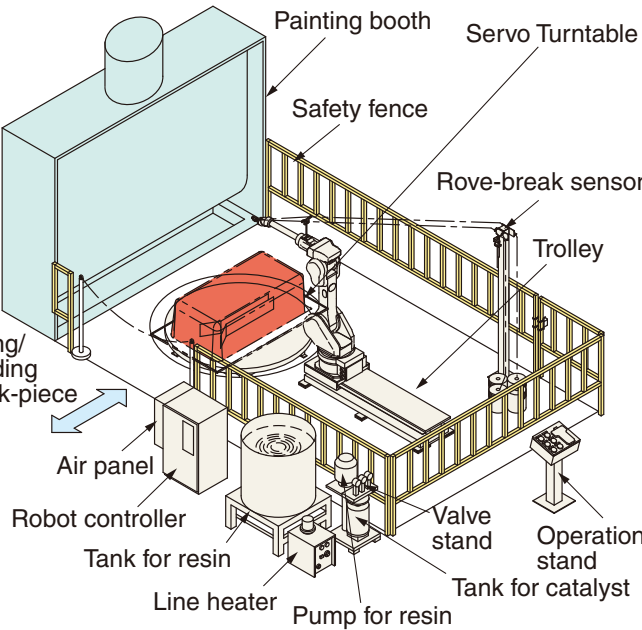
Servo Turntable

Complete surface painting is possible with uninterrupted turntable rotation



Standard System

- 1. The integrated control of the robot and table allows any painting position to be achieved according to the work shape.
- 2. The system can be applied to various types of painting such as synchronous control, arbitrary-angle indexing, paint spraying with continuous rotation of the table.



FRP System

- 1. The travel unit enlarge of the robot. It allows painting of large size work pieces (furniture, vending machines, bathtubs etc).
- 2. Kawasaki offers a total package including the FRP spray-up unit and roving shortage detection unit.

Specifications

		Standard	Heavy load carrying
Table load		Max. 500 kg	Max. 1,000 kg
No. of control axes		Robot 6+Servo Turntable 1	
Control method		Servo control	
Teaching playback method		PTP teaching+CP control	
Position detection method		Absolute encoder	
Table	Operation angle	Infinite revolution	
	Indexing angle	90-deg and arbitrary angle	45-deg., 90-deg., 180-deg and arbitrary angle
	Indexing time	2.5/90°	5/90°
	Uninterrupted rotary speed	Max. 10 rpm	Max. 5 rpm
Rotary direction		Normal/reverse rotation	
Explosion protection		Air pressurized explosion protection and intrinsically safe. Explosion-proof composite type (Expib ⅡBT4 / Exib ⅡBT4)	
Mass		510 kg	560 kg
Table	Diameter	ø650 mm, ø1,000 mm, ø1,500 mm, ø2,000 mm	
	High	450 mm	
Color		Munsell 10GY9/1 equivalent	
Foot switch function (Option)		Uninterrupted normal rotation, rotation stop	Uninterrupted rotation, 45-deg., 90-deg., 180-deg., indexing (changeable indexing angle), rotation stop

External View and Dimensions

