



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 G.m.b.H.

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

KAWASAKI MACHINE SYSTEMS KOREA, LTD.

3rd Floor (307), Industrial Complex Support Bldg., 637,
Kojan-Dong, Namdong-Gu, Incheon, 405-817, Korea
www.kawasakirobot.co.kr
Phone: +82-32-821-6941
Fax: +82-32-821-6947

Agent



Kawasaki Robot F series

Simple and friendly

Fseries

Japan & Asia



Breathing new life into production lines Adapting to changing environments

In 1969, Kawasaki Heavy Industries developed the first industrial robots manufactured in Japan. Since then Kawasaki has maintained its role as a pioneer in the robot industry and is now directing its experience and technology, built up over four decades, into the small to medium size "F series" manipulator.

The F series is the ultimate worker combining high speed with a lightweight and slender arm design. In addition, the entire range is composed of modular units allowing both the reach and payload capacity to be readily altered.

The F series, together with the advanced "D series" controller, breathes new life into production lines.



Simple  friendly
Kawasaki Robot

Features

1 Reduced cycle time

Maximum speed has been increased by the incorporation of high-powered miniature motors and high-efficiency speed reduction gears into a lightweight manipulator. This higher speed, together with improved acceleration, results in a considerable reduction in cycle time.

2 Compact work cell layout

The F series arms have a very small footprint and slender profile. The narrow arm width, in particular, and the elimination of offset facilitates the design of extremely compact work cells. The smooth contours of the robust wrist enable it to accommodate external harness cables and hoses without difficulty.

3 Arm configuration tailored to system requirements

The configuration of the arm can be selected from a wide range of reach and payload combinations. If the customers process or application needs to be changed, updated or expanded then the modular construction of the F series arm makes it possible to alter the reach, payload capacity or performance to suit. This is achieved by using "conversion packages" as shown in the diagram below.

Models that satisfy arc welding specifications, cleanroom specifications, washdown specifications and even wall mounting specifications are available for your application.



Handling of small-size engine case

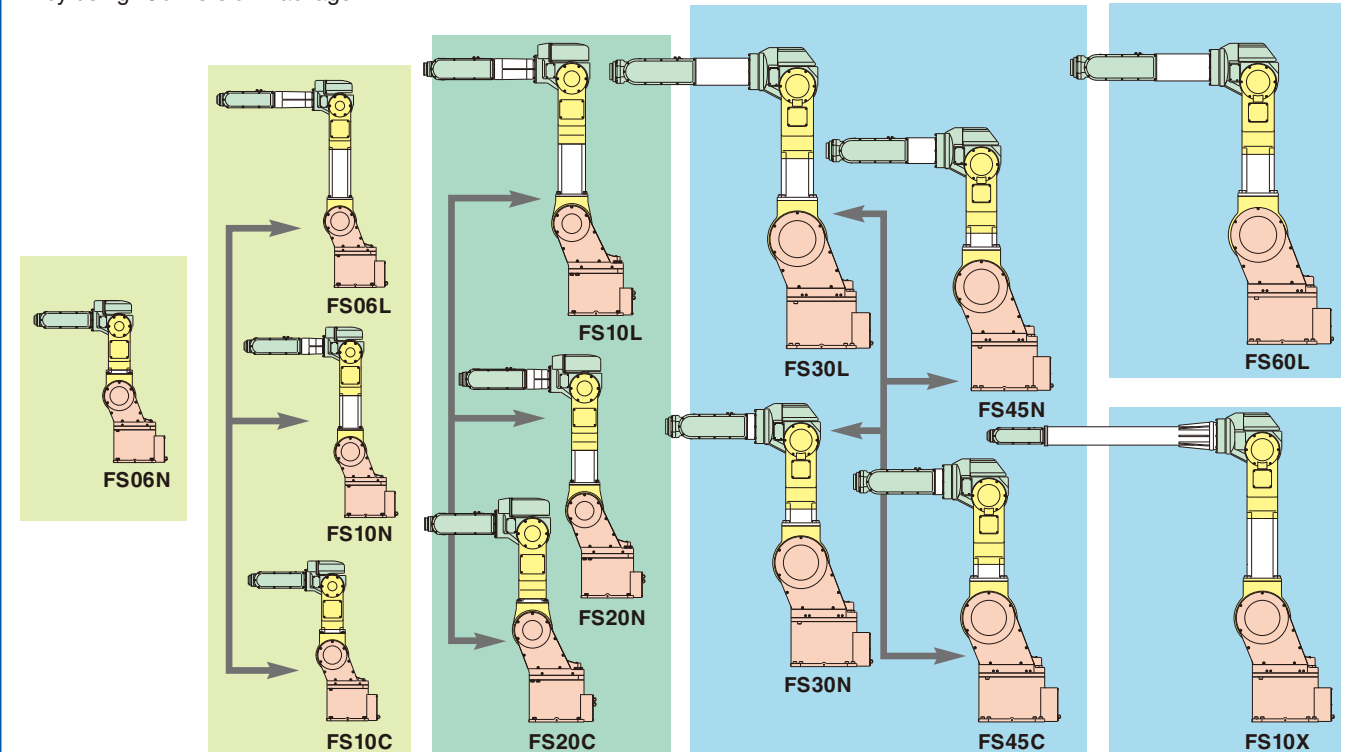


Depalletizing system of connecting rod

FS Series Conversion Chart

↔ show the convertible types by using "Conversion Package"

Common Upper Arm Common Base Unit
Common Lower Arm Distance Piece



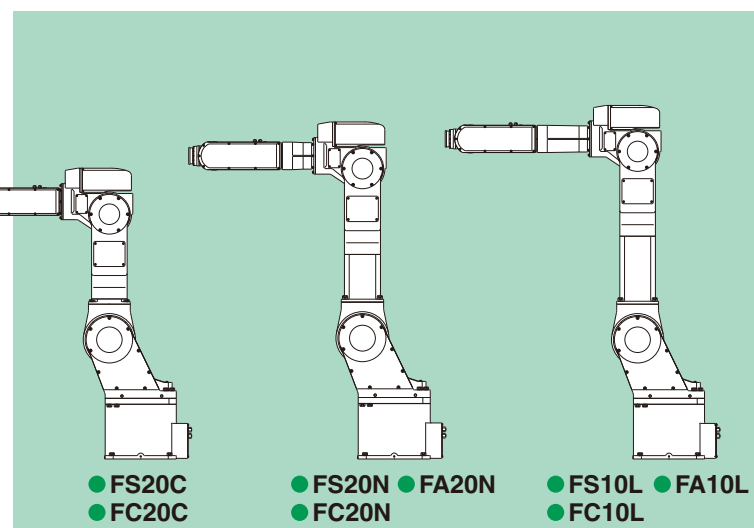
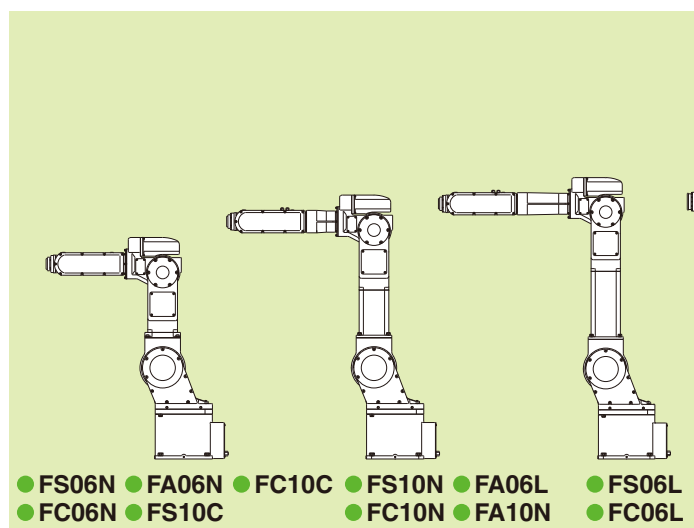
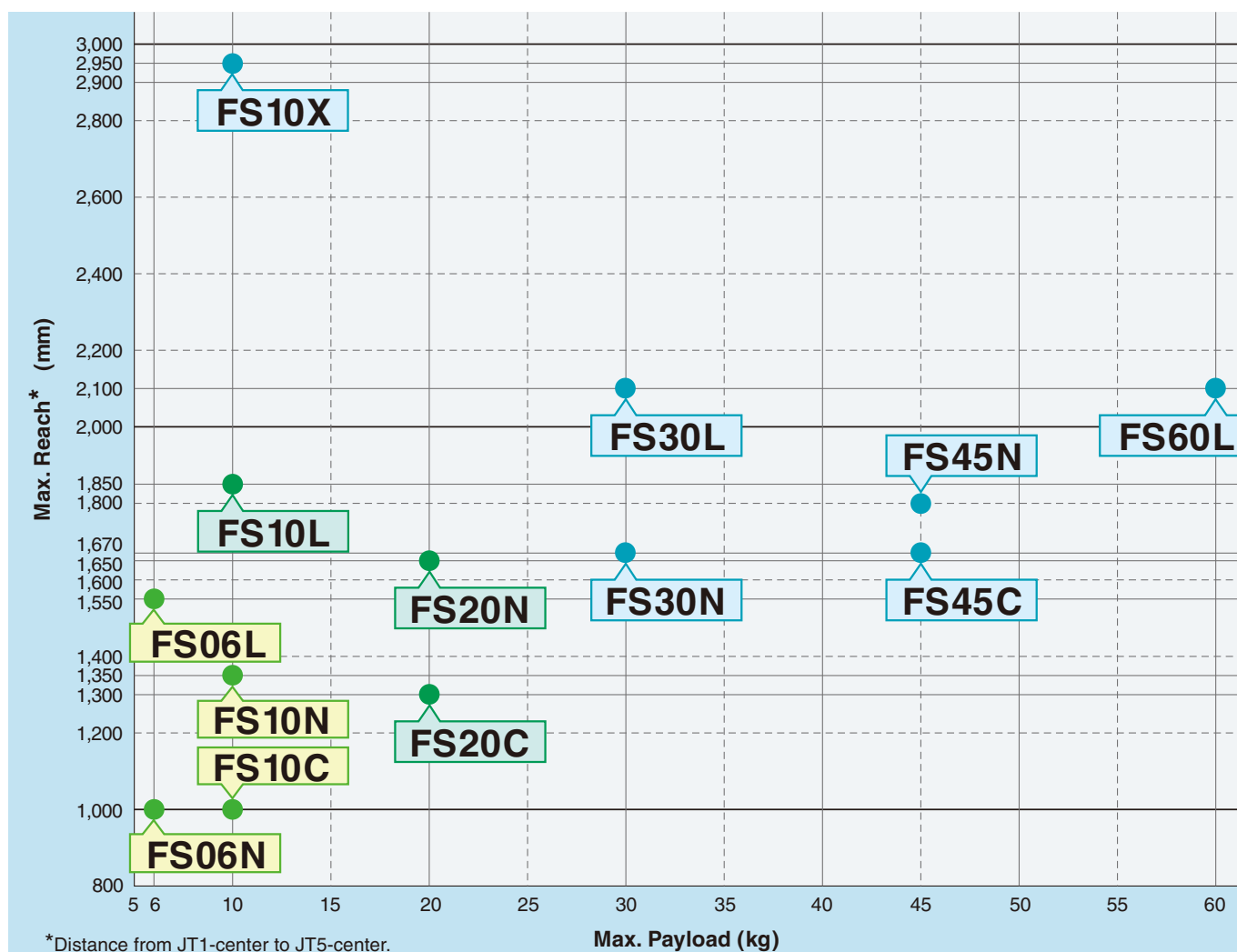
Molten aluminum ladling process work for aluminum casting parts



Caulking work of oil hydraulic pump

A full line-up of modular robotic manipulators

•Assembly/handling/sealing specifications (FS series)



■ Ordering Code

Kawasaki Robot
Fseries

Type name profile

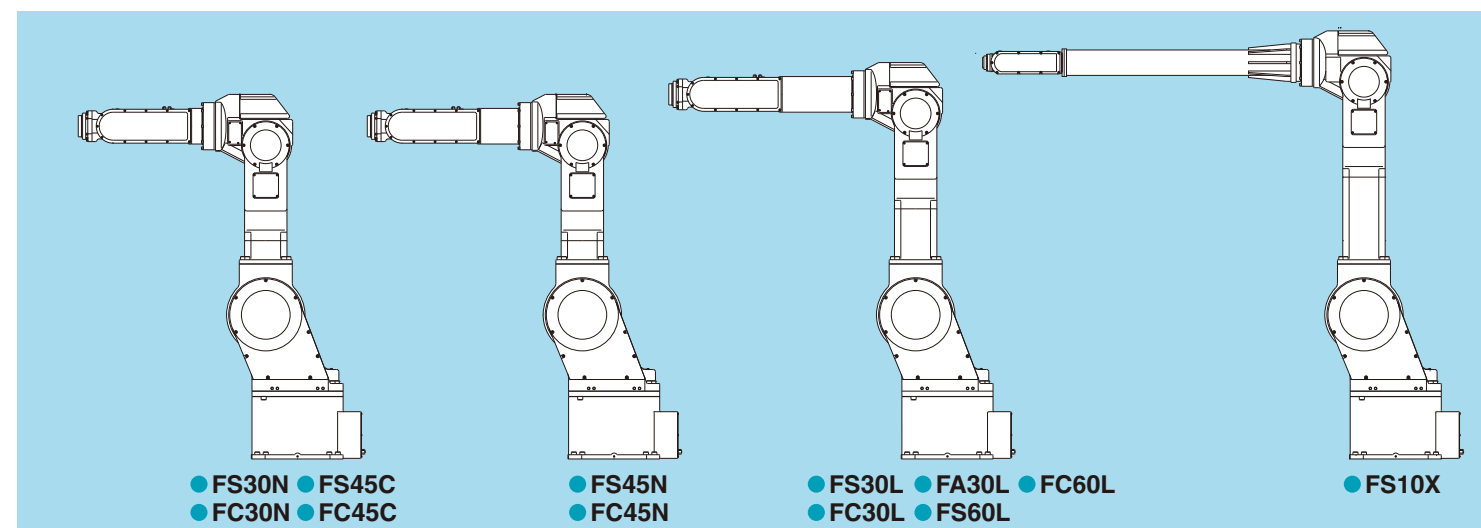
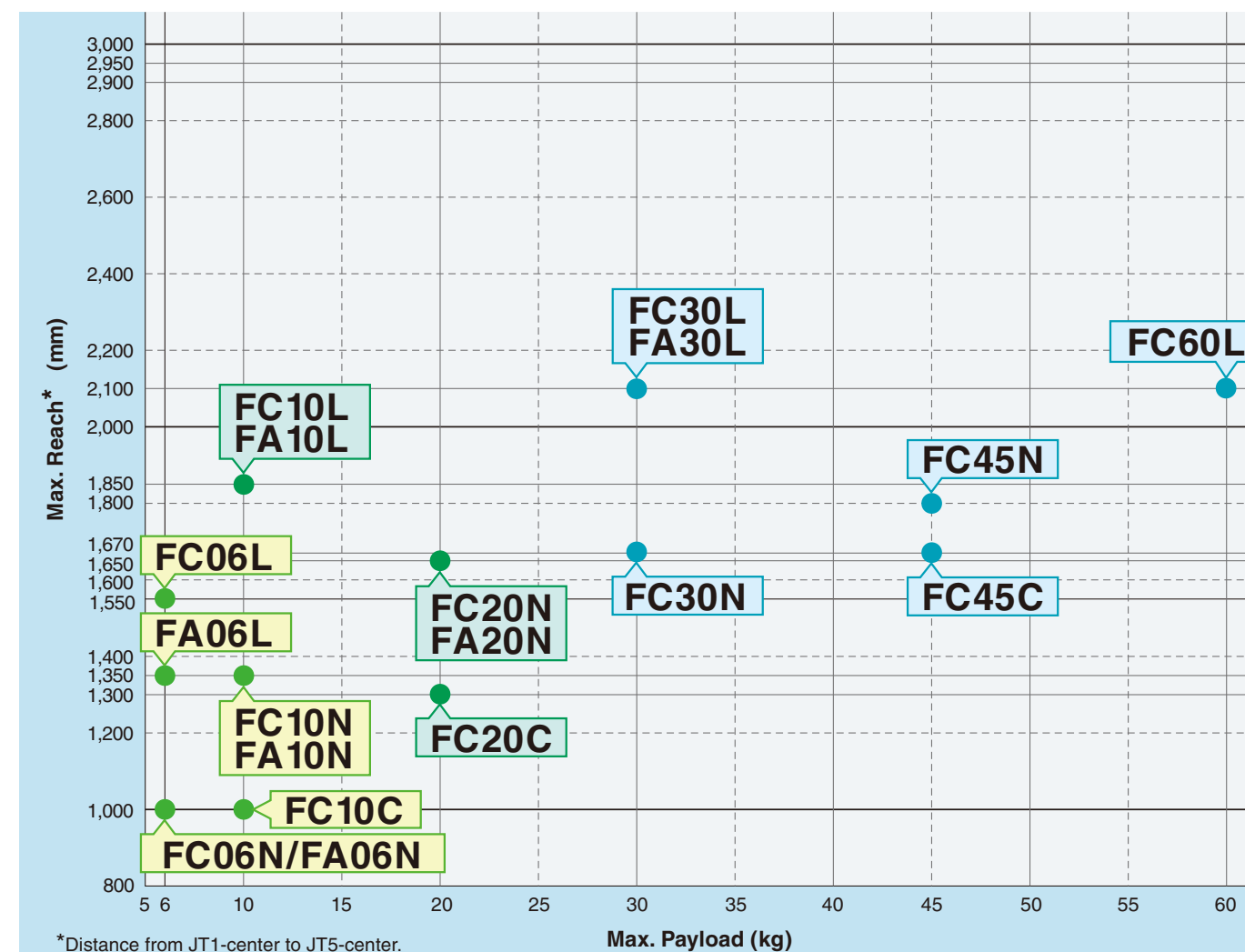
Series Name: F S 06 N

Application: S: Assembly/handling/sealing specifications
C: Cleanroom specifications
A: Arc welding specifications

Reach Type: C: Compact L: Long
N: Nomal X: Extra Long

Max. Payload: 06: 6 kg 20: 20 kg 45: 45 kg
10: 10 kg 30: 30 kg 60: 60 kg

•Cleanroom specifications (FC series) •Arc welding specifications (FA series)



•Standard specifications (Refer to page 7 for optional equipment.)

Type		FS06N FC06N FA06N	FS06L FC06L	FA06L	FS10C FC10C	FS10N FC10N FA10N	FS10L FC10L FA10L	FS20C FC20C	FS20N FC20N FA20N
Degrees of Freedom		6 axes							
Max. Payload		6kg	6kg	6kg	10kg	10kg	10kg	20kg	20kg
Max.Stroke	JT1: Arm rotation	±160°	±160°	±160°	±160°	±160°	±160°	±160°	±160°
	JT2: Arm out-in	+140°~-105°	+140°~-105°	+140°~-105°	+140°~-105°	+140°~-105°	+140°~-105°	+140°~-105°	+140°~-105°
	JT3: Arm up-down	+120°~-155°	+120°~-155°	+120°~-155°	+120°~-155°	+120°~-155°	+120°~-155°	+120°~-155°	+120°~-155°
	JT4: Wrist swivel	±270°	±270°	±270°	±270°	±270°	±270°	±270°	±270°
	JT5: Wrist bent	±145°	±145°	±145°	±145°	±145°	±145°	±145°	±145°
	JT6: Wrist twist	±360°	±360°	±360°	±360°	±360°	±360°	±360°	±360°
Max.Speed	JT1: Arm rotation	240°/s	200°/s	200°/s	200°/s	200°/s	160°/s	160°/s	160°/s
	JT2: Arm out-in	200°/s	140°/s	140°/s	140°/s	140°/s	140°/s	140°/s	140°/s
	JT3: Arm up-down	250°/s	200°/s	200°/s	200°/s	200°/s	160°/s	160°/s	160°/s
	JT4: Wrist swivel	430°/s	360°/s	430°/s	360°/s	360°/s	330°/s	330°/s	330°/s
	JT5: Wrist bent	430°/s	360°/s	430°/s	360°/s	360°/s	330°/s	330°/s	330°/s
	JT6: Wrist twist	720°/s	600°/s	720°/s	600°/s	600°/s	500°/s	500°/s	500°/s
Moment	JT4: Wrist swivel	12.0N·m	12.0N·m	12.0N·m	21.5N·m	21.5N·m	21.5N·m	39.3N·m	39.3N·m
	JT5: Wrist bent	12.0N·m	12.0N·m	12.0N·m	21.5N·m	21.5N·m	21.5N·m	39.3N·m	39.3N·m
	JT6: Wrist twist	6.0N·m	6.0N·m	6.0N·m	9.8N·m	9.8N·m	9.8N·m	19.6N·m	19.6N·m
Moment of Inertia	JT4: Wrist swivel	0.24kg·m ²	0.24kg·m ²	0.24kg·m ²	0.63kg·m ²	0.63kg·m ²	0.63kg·m ²	0.88kg·m ²	0.88kg·m ²
	JT5: Wrist bent	0.24kg·m ²	0.24kg·m ²	0.24kg·m ²	0.63kg·m ²	0.63kg·m ²	0.63kg·m ²	0.88kg·m ²	0.88kg·m ²
	JT6: Wrist twist	0.07kg·m ²	0.07kg·m ²	0.07kg·m ²	0.15kg·m ²	0.15kg·m ²	0.15kg·m ²	0.25kg·m ²	0.25kg·m ²
Position Repeatability		±0.05mm	±0.1mm	±0.1mm	±0.05mm	±0.1mm	±0.1mm	±0.1mm	±0.1mm
Max. Reach *1		1,000mm	1,550mm	1,350mm	1,000mm	1,350mm	1,850mm	1,300mm	1,650mm
Mass		165kg	170kg	170kg	165kg	170kg	280kg	275kg	280kg
Max. Linear Speed		8,000mm/s	9,200mm/s	8,250mm/s	6,200mm/s	8,100mm/s	9,400mm/s	6,900mm/s	8,500mm/s
Body Color		Munsell 10GY9/1 equivalent							
Installation		Floor, Ceiling or Shelf mount							
Environmental Condition	Ambient Temperature	0 ~ 45 °C							
	Relative Humidity	35 ~ 85 % (No dew, nor frost allowed)							
	Vibration	Less than 0.5G							
	Others	The robot installing place should be free from : •inflammable or corrosive liquid or gas •electric noise interference							
Pneumatic Circuit		Double solenoid valve : 1 Circuit *3							
Degree of Protection		IP 65 equivalent							
Max. Payload on Upper Arm		Please contact us							
Recommended Controller*2		D20							

*1: Distance from JT1-center to JT5-center. *2: Consult us separately for the FC series controller. *3: Not available on the FA series.



•Standard specifications (Refer to page 7 for optional equipment.)

Type		FS30N FC30N	FS30L FC30L FA30L	FS45C FC45C	FS45N FC45N	FS60L FC60L	FS10X
Degrees of Freedom		6 axes					
Max. Payload		30kg	30kg	45kg	45kg	60kg	10kg
Max.Stroke	JT1: Arm rotation	±160°	±160°	±160°	±160°	±160°	±160°
	JT2: Arm out-in	+140°~-105°	+140°~-105°	+140°~-105°	+140°~-105°	+140°~-105°	+140°~-105°
	JT3: Arm up-down	+120°~-155°	+120°~-155°	+120°~-155°	+120°~-155°	+120°~-155°	+120°~-155°
	JT4: Wrist swivel	±270°	±270°	±270°	±270°	±270°	±270°
	JT5: Wrist bent	±130°	±130°	±130°	±130°	±130°	±145°
	JT6: Wrist twist	±360°	±360°	±360°	±360°	±360°	±360°
Max.Speed	JT1: Arm rotation	160°/s	160°/s	160°/s	160°/s	160°/s	160°/s
	JT2: Arm out-in	140°/s	140°/s	140°/s	140°/s	100°/s	140°/s
	JT3: Arm up-down	160°/s	160°/s	160°/s	160°/s	110°/s	200°/s
	JT4: Wrist swivel	240°/s	240°/s	240°/s	240°/s	180°/s	300°/s
	JT5: Wrist bent	240°/s	240°/s	240°/s	240°/s	175°/s	360°/s
	JT6: Wrist twist	340°/s	340°/s	340°/s	340°/s	260°/s	600°/s
Moment	JT4: Wrist swivel	176.4N·m	176.4N·m	176.4N·m	176.4N·m	235.2N·m	21.5N·m
	JT5: Wrist bent	176.4N·m	176.4N·m	176.4N·m	176.4N·m	235.2N·m	21.5N·m
	JT6: Wrist twist	98.0N·m	98.0N·m	98.0N·m	98.0N·m	130.3N·m	9.8N·m
Moment of Inertia	JT4: Wrist swivel	7.2kg·m ²	7.2kg·m ²	10.8kg·m ²	10.8kg·m ²	24.8kg·m ²	0.63kg·m ²
	JT5: Wrist bent	7.2kg·m ²	7.2kg·m ²	10.8kg·m ²	10.8kg·m ²	24.8kg·m ²	0.63kg·m ²
	JT6: Wrist twist	3.3kg·m ²	3.3kg·m ²	5.0kg·m ²	5.0kg·m ²	6.7kg·m ²	0.15kg·m ²
Position Repeatability		±0.15mm	±0.15mm	±0.15mm	±0.15mm	±0.15mm	±0.23mm
Max. Reach *1		1,670mm	2,100mm	1,670mm	1,800mm	2,100mm	2,950mm
Mass		575kg	585kg	575kg	580kg	585kg	580kg
Max. Linear Speed		8,900mm/s	11,100mm/s	8,900mm/s	9,700mm/s	9,000mm/s	15,000mm/s
Body Color		Munsell 10GY9/1 equivalent					
Installation		Floor, Ceiling or Shelf mount					
Environmental Condition	Ambient Temperature	0 ~ 45 °C					
	Relative Humidity	35 ~ 85 % (No dew, nor frost allowed)					
	Vibration	Less than 0.5G					
	Others	The robot installing place should be free from : •inflammable or corrosive liquid or gas •electric noise interference					
Pneumatic Circuit		Double solenoid valve : 1 Circuit *3					
Degree of Protection		IP 65 equivalent					
Max. Payload on Upper Arm		Please contact us					
Recommended Controller*2		D22					

*1: Distance from JT1-center to JT5-center. *2: Consult us separately for the FC series controller. *3: Not available on the FA series.





•F series Options

Type		Assembly/handling/sealing specifications					Cleanroom specifications			Arc welding specifications
		FS06N FS06L	FS10C FS10N FS10L FS10X	FS20C FS20N	FS30N FS30L	FS45C FS45N FS60L	FC06N/L FC10C/N/L FC20C/N	FC30N/L FC45C/N	FC60L	
Pneumatic Circuit (Solenoid valve)	1 Double Solenoid Valve+0 Single Solenoid Valve	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	
	2 Double Solenoid Valve+0 Single Solenoid Valve	●	●	●	●	●	●	●	●	
	3 Double Solenoid Valve+0 Single Solenoid Valve				●	●		●		
	1 Double Solenoid Valve+1 Single Solenoid Valve	●	●	●	●	●	●	●	●	
	1 Double Solenoid Valve+2 Single Solenoid Valve				●	●		●		
	2 Double Solenoid Valve+1 Single Solenoid Valve				●	●		●		
	0 Double Solenoid Valve+1 Single Solenoid Valve	●	●	●	●	●	●	●	●	
	0 Double Solenoid Valve+2 Single Solenoid Valve	●	●	●	●	●	●	●	●	
	0 Double Solenoid Valve+3 Single Solenoid Valve				●	●		●		
External Sensor Harness (4 Circuits, 1,200 mm, 6 Lines)		●	●	●	●	●	●	●	●	
Option Internal Harness (7 Pair)						●		●	●	
Restriction of Motion Range (Mechanical)	JT1 (10° Pitch)	●	●	●	●	●	●	●	●	●
	JT2 (22.5° Pitch)	●	●	●	●	●	●	●	●	●
	JT2 (22.5° Pitch)	●	●	●	●	●	●	●	●	●
* Traverse Unit	Max. Speed 1,000 mm/s				●	●				●
	Max. Speed 1,200 mm/s	●	●	●						●
Installation Base (Riser)	300 mm	●	●	●	●	●	●	●	●	●
	600 mm	●	●	●	●	●	●	●	●	●
Base Plate 750 mm x 750 mm x 25 mm		●	●	●	●	●	●	●	●	●
Zeroing Surface Protect Cover		●	●	●	●	●	Standard	Standard	Standard	●
Wall Mounting		●	●	●	●	●	●	●	●	
Environment Resistance	Air Purge (Change of internal piping)	●	●	●	●	●				●
	Air Purge (with Air dryer)	●	●	●	●	●				●
	Air Purge (with Freeze air dryer)	●	●	●	●	●				●
	Air Vacuum (Change of internal piping)	●	●	●	●	●	Standard	Standard	Standard	
Option for Arc Welding Robot	Torch Holder with Shock Absorber									●
	Cable Hanger with Supporting Rubber									●
	Torch Bracket	Std. Bracket (350A)								
		Std. Bracket (500A)								
	Positioner	200 kg 1 Axis								●
		200 kg 2 Axes								●
		1,000 kg 1 Axis								●
		1,000 kg 2 Axes								●
	Hyper Arc									●
	RTPM (Arc sensor)									●
	ACV (Arc sensor for TIG welding)									●
	3D Laser sensor									●

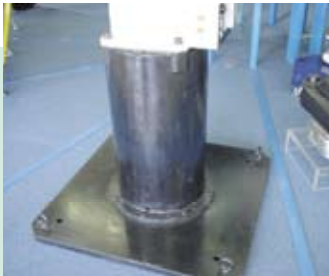
*The stroke of traverse unit is 1,000mm or more. The unit of extension is 500 mm.



Laser Sensor



External Sensor Harness



Installation Base (Riser) (600 mm)



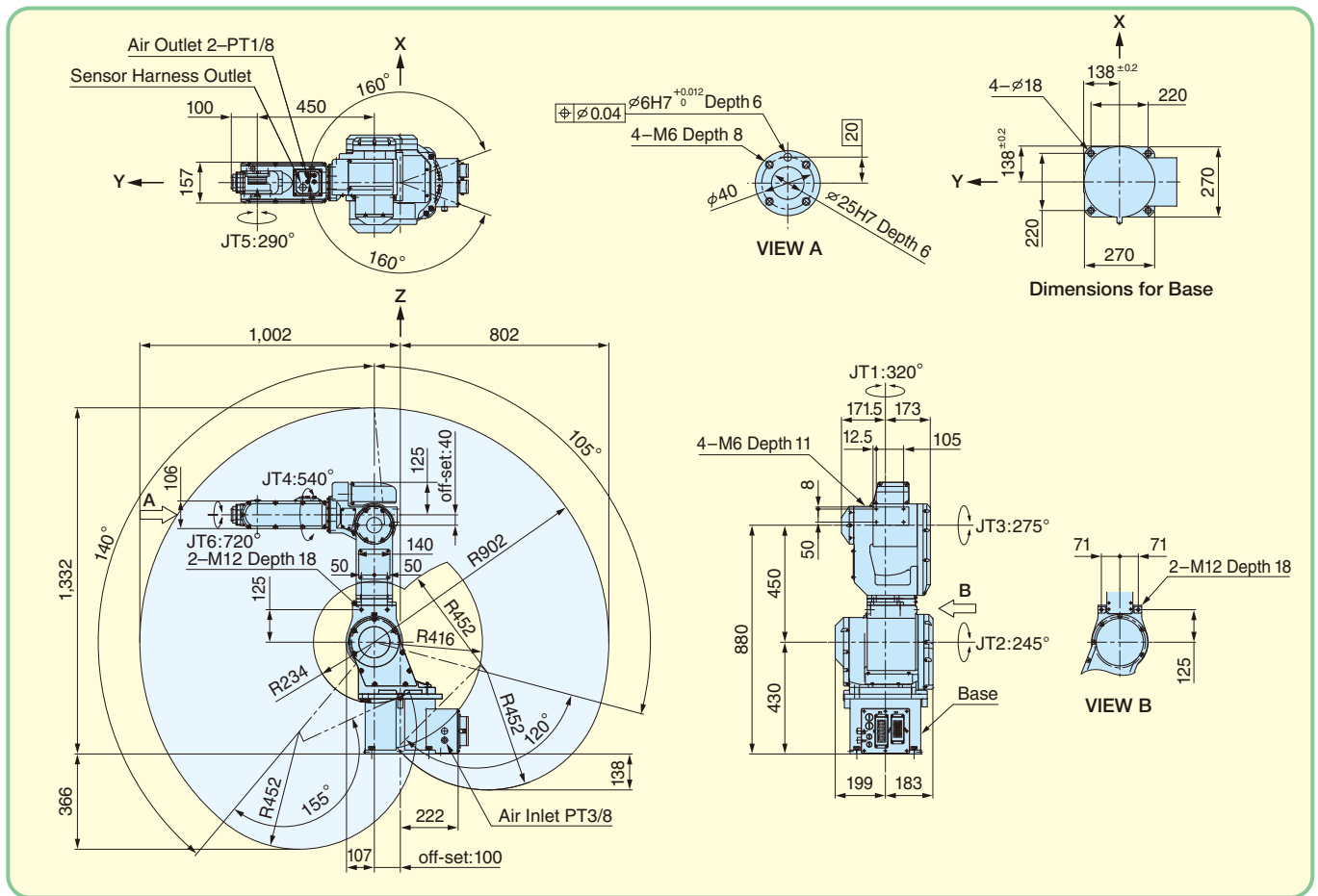
Touch Holder with Shock Absorber



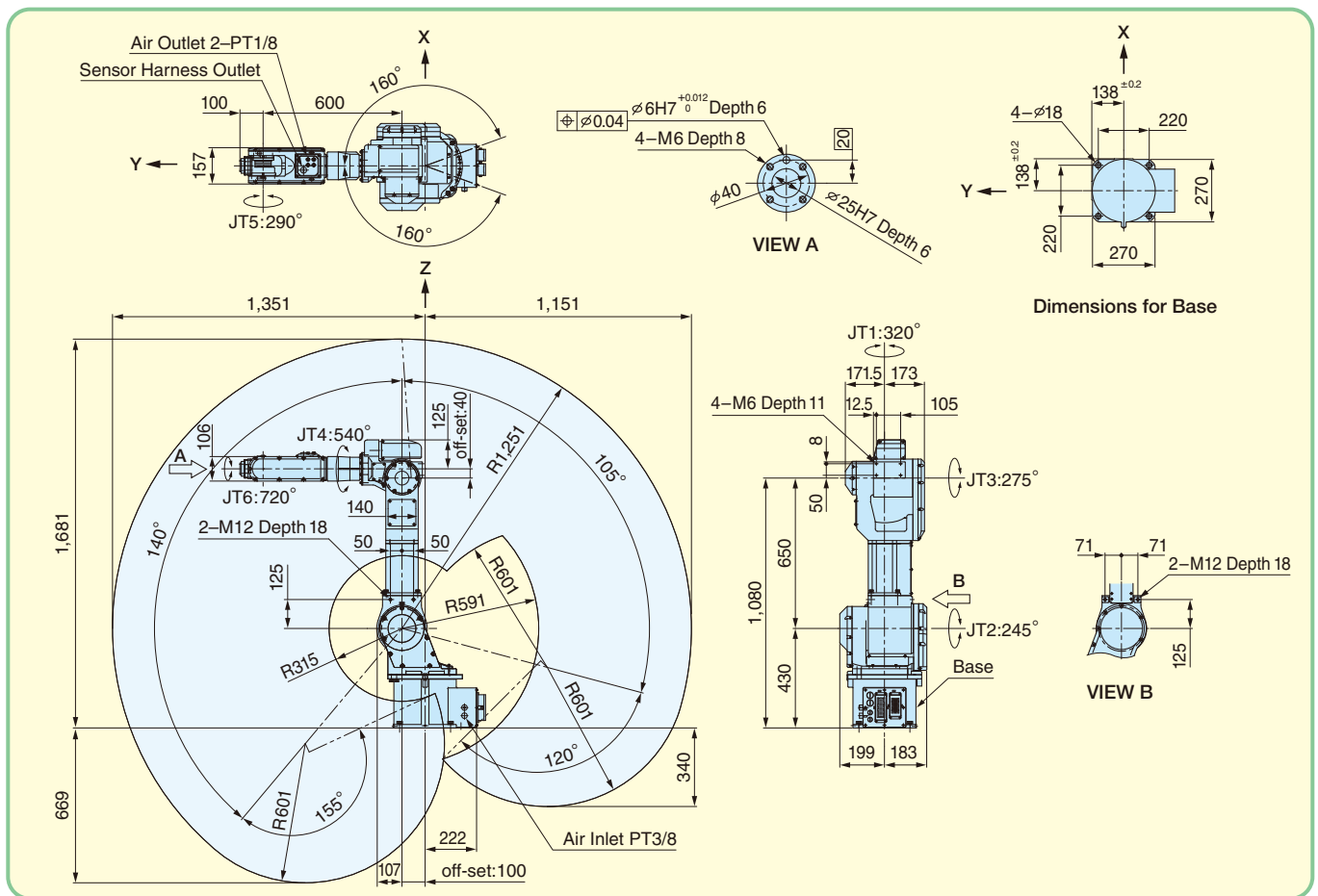
Hyper Arc

•Motion Range & Dimensions

●FS06N ●FC06N ●FA06N ●FS10C ●FC10C

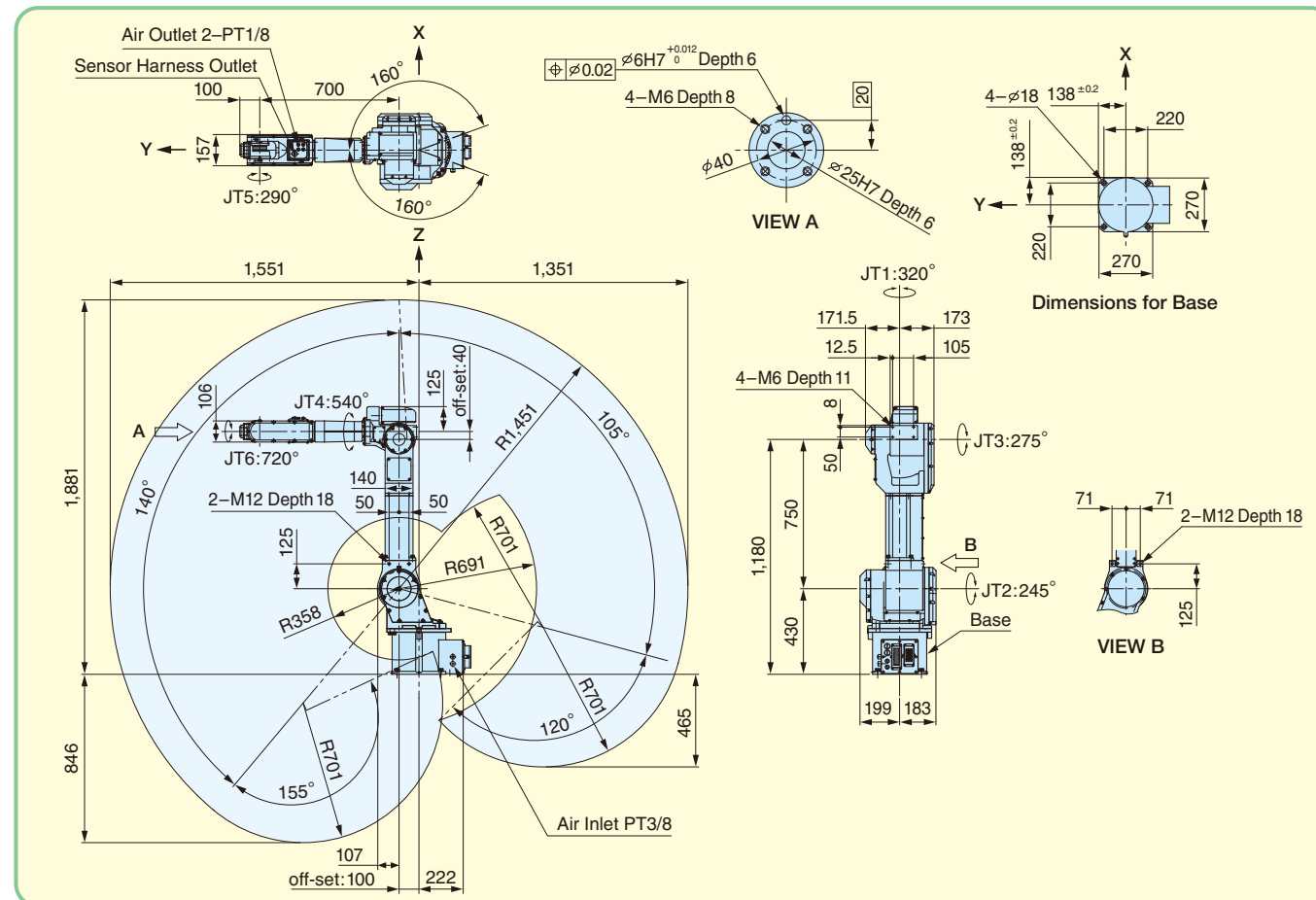


●FS10N ●FC10N ●FA06L ●FA10N

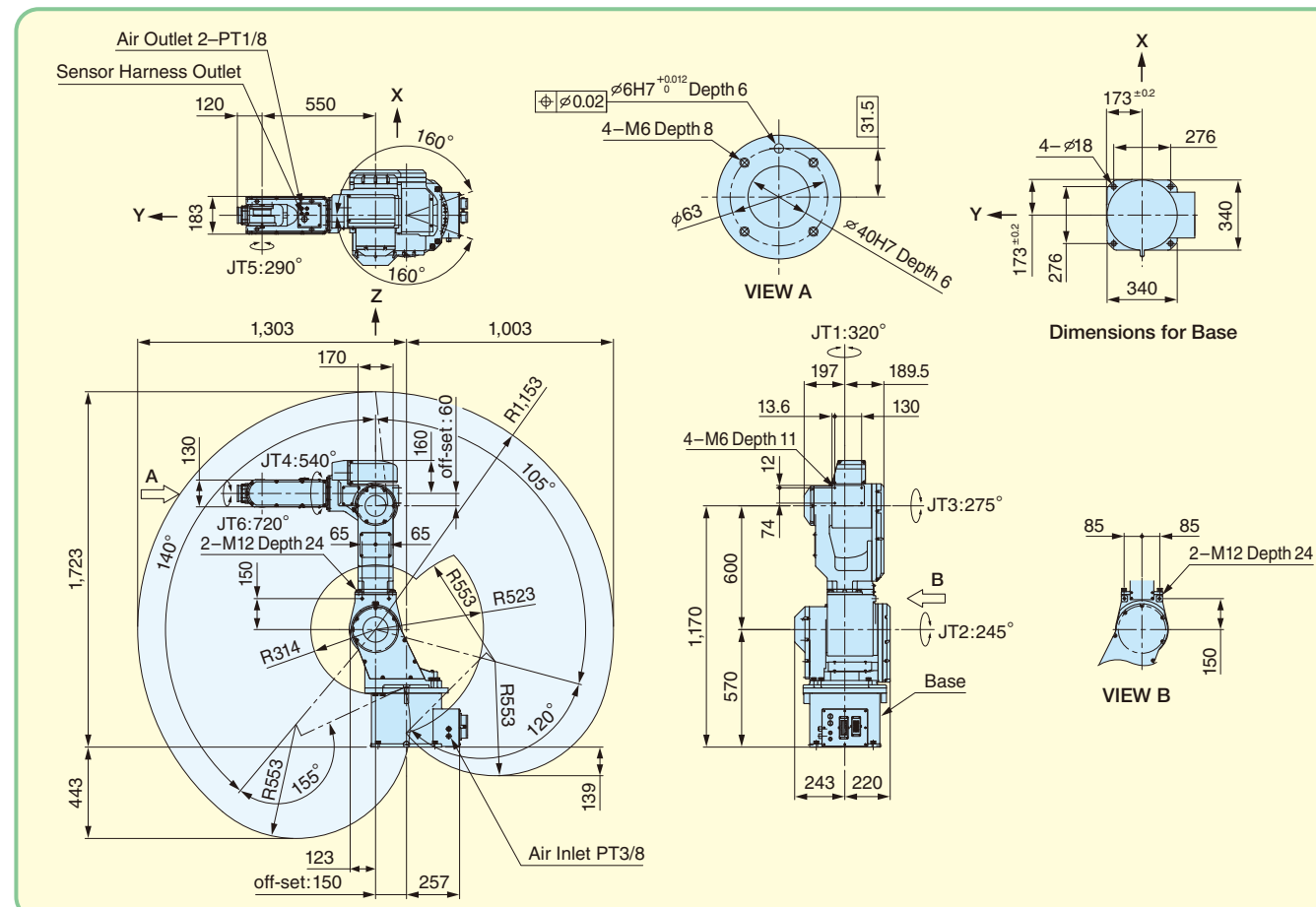


- Motion Range & Dimensions

●FS06L ●FC06L

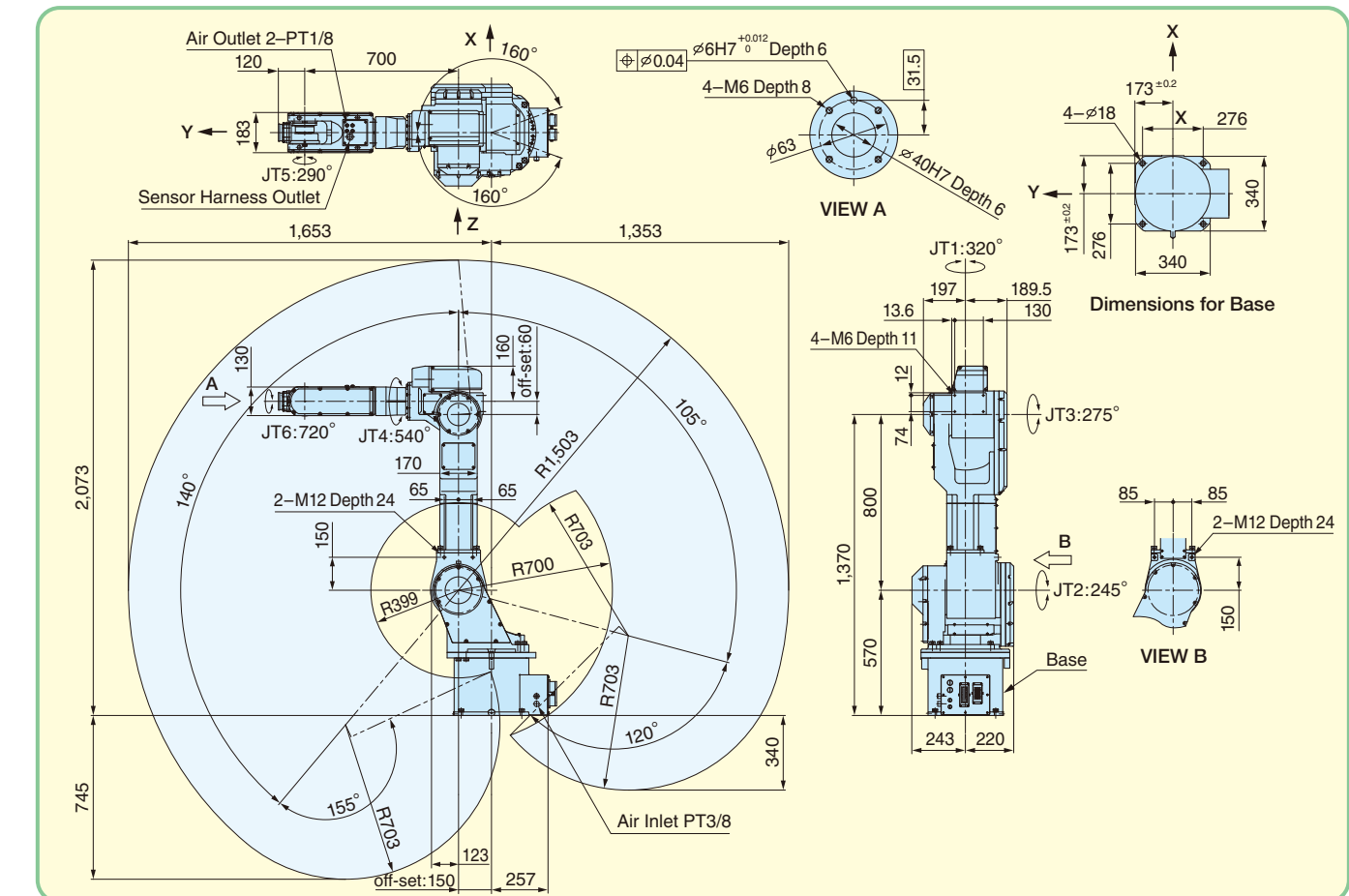


●FS20C ●FC20C

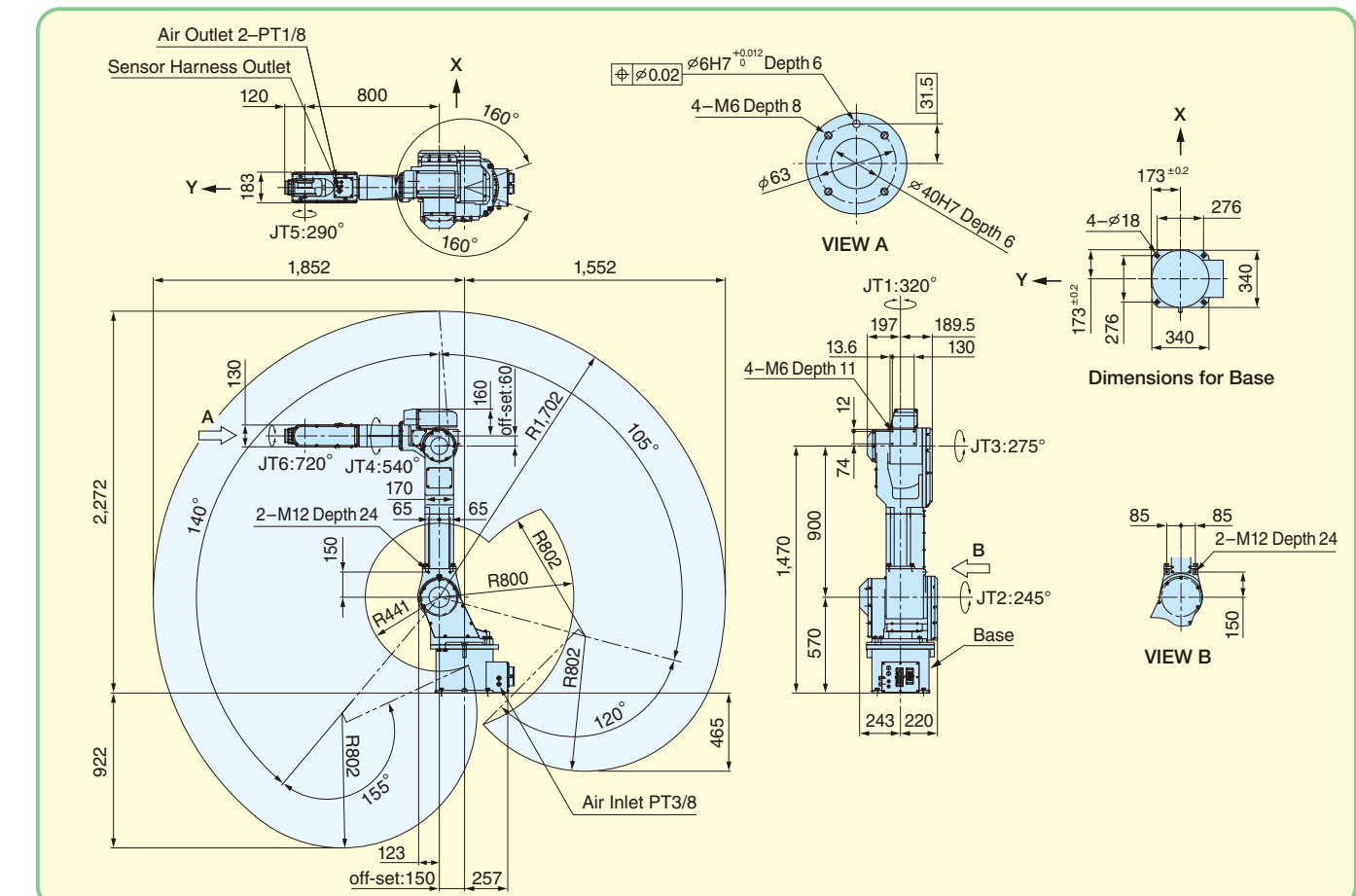


- Motion Range & Dimensions

●FS20N ●FC20N ●FA20N

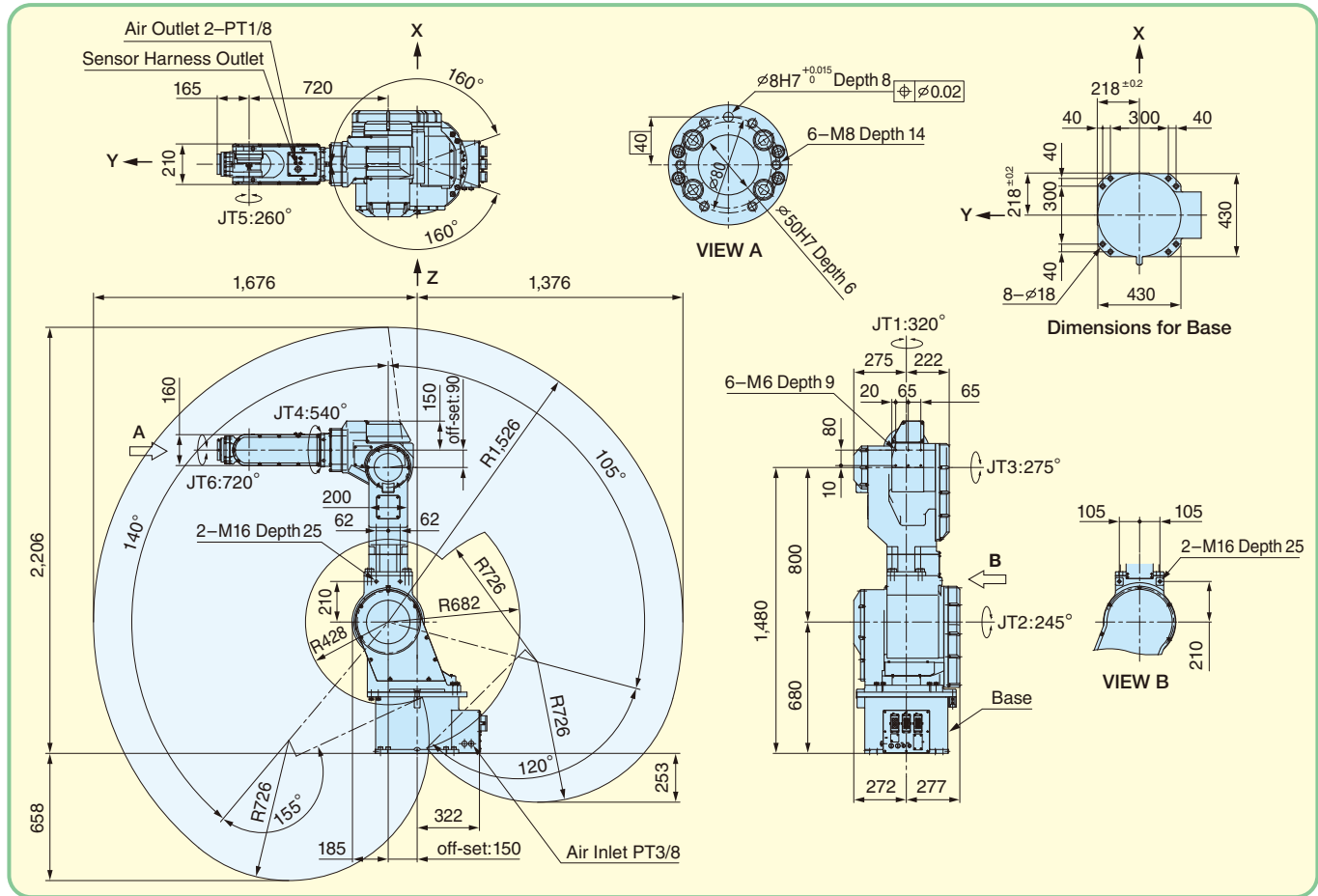


●FS10L ●FC10L ●FA10L

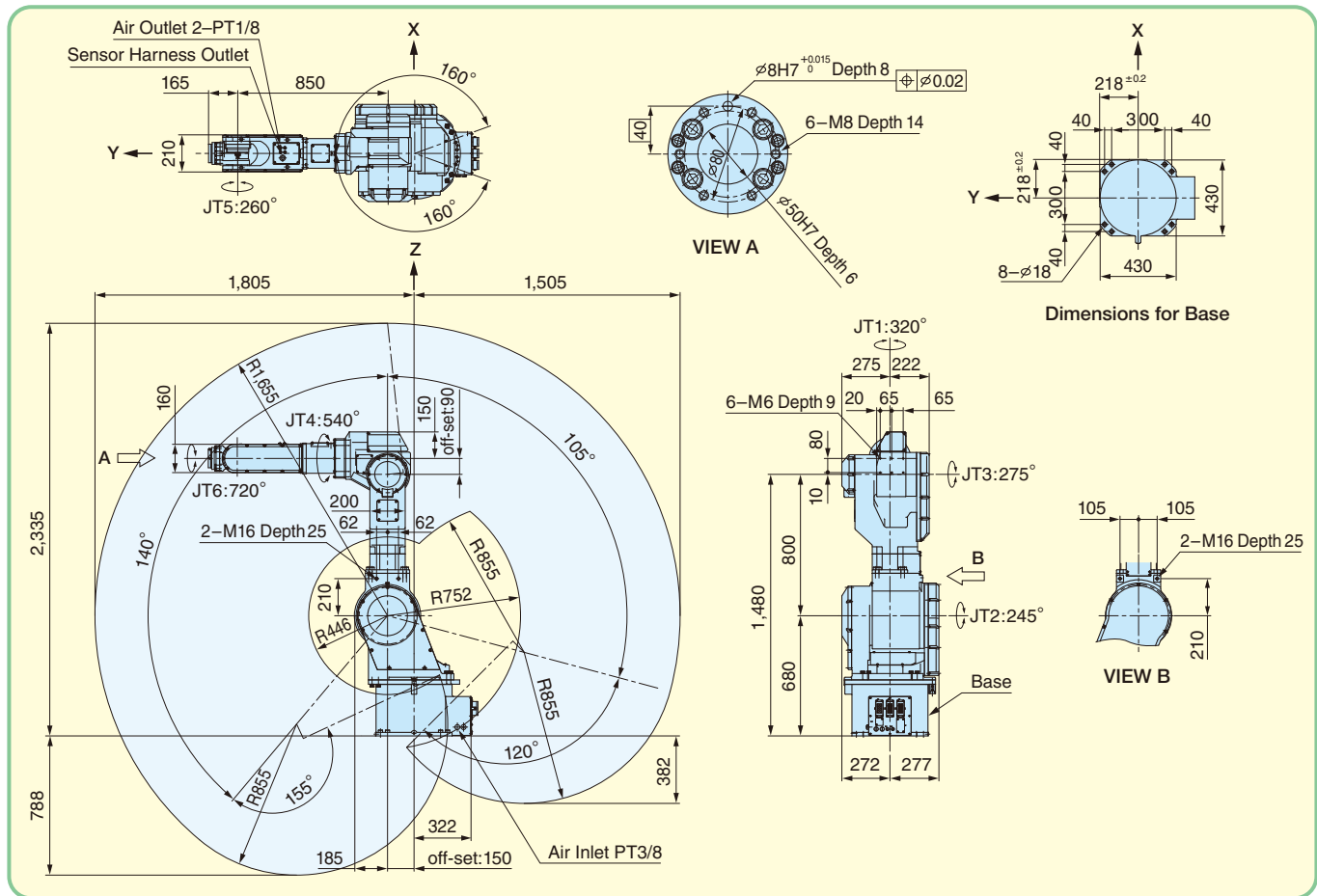


•Motion Range & Dimensions

•FS30N •FC30N •FS45C •FC45C

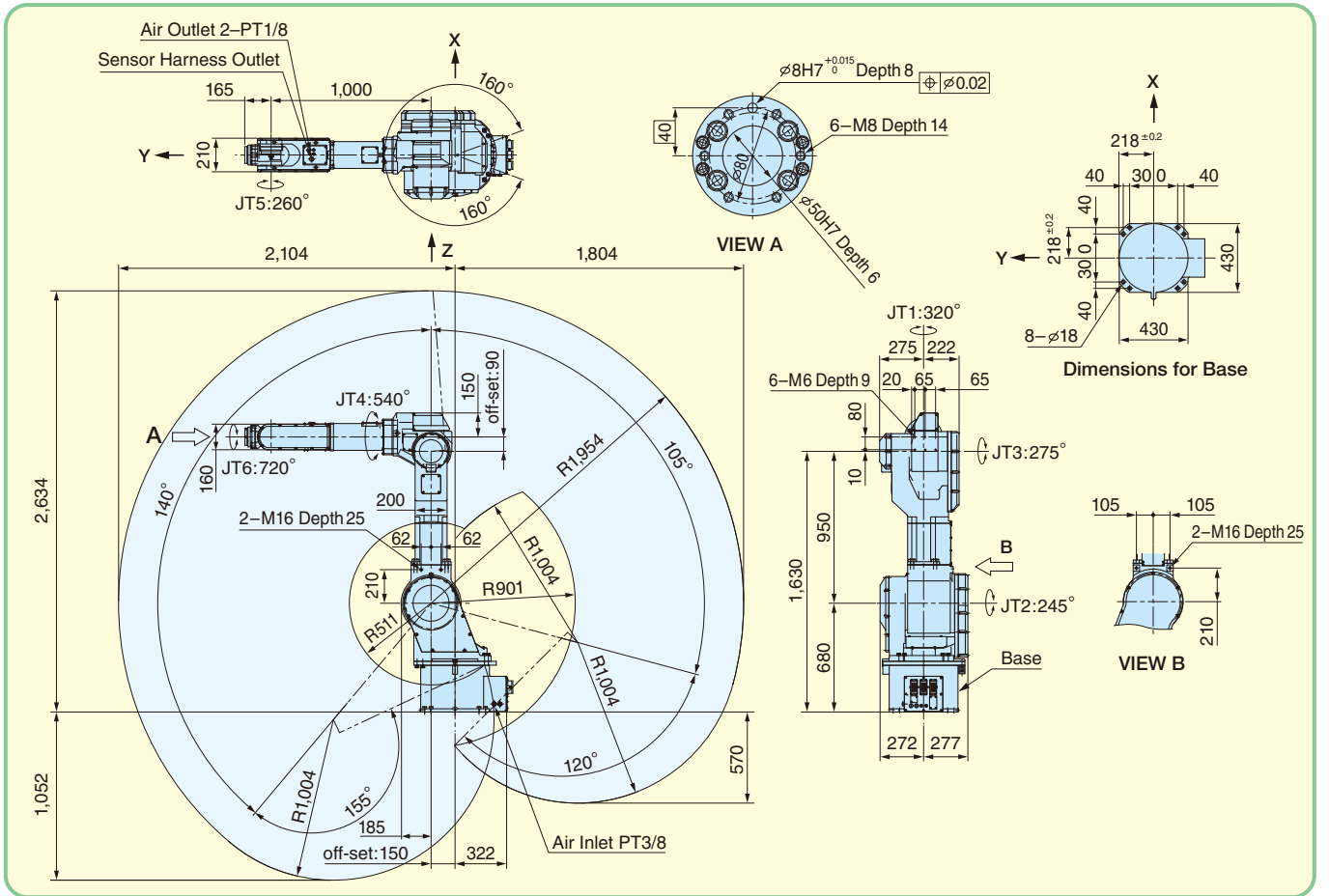


•FS45N •FC45N

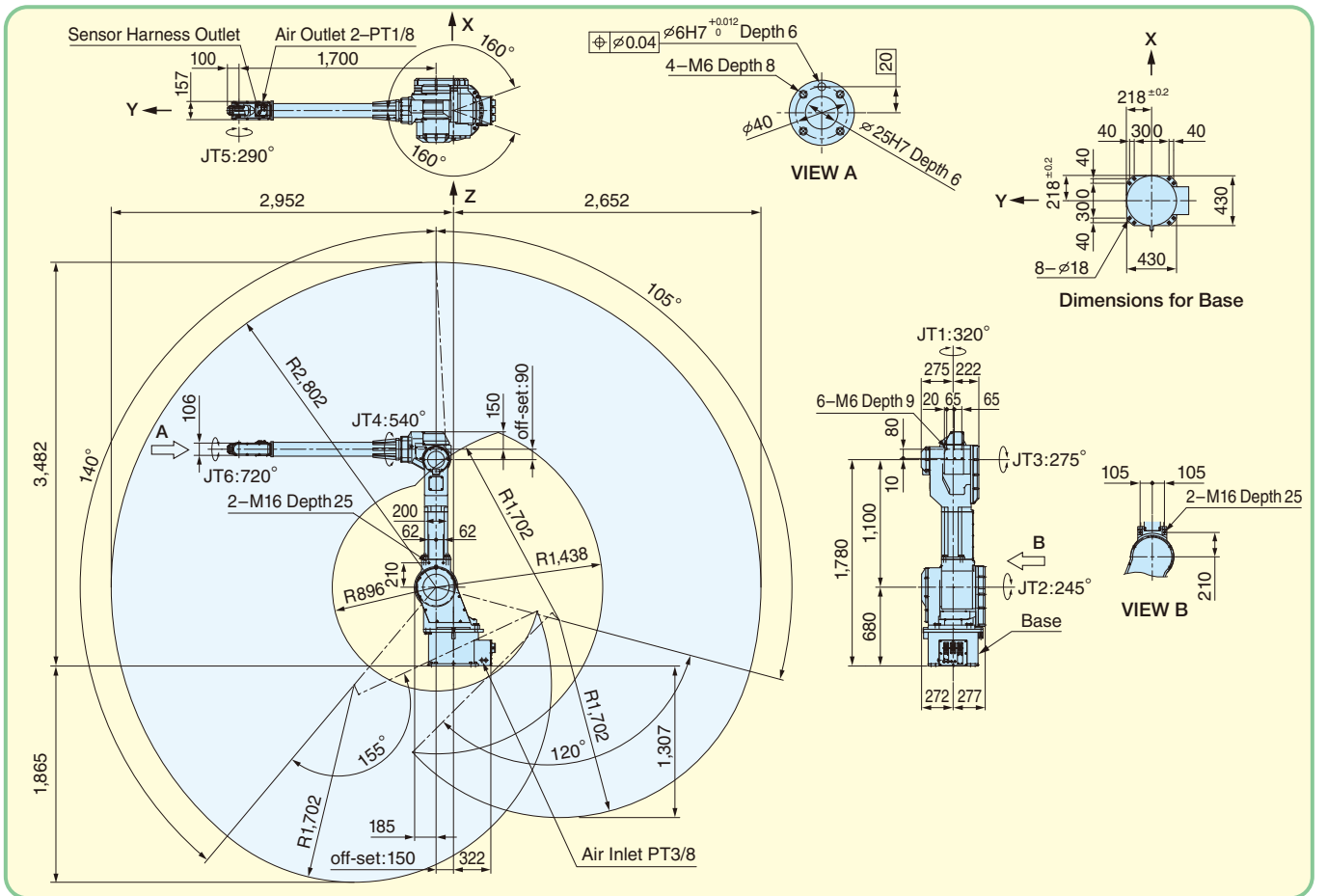


•Motion Range & Dimensions

•FS30L •FC30L •FA30L •FS60L •FC60L



•FS10X



D Controller D20/22

•Features

1 Ergonomic operating environment to reduce teaching time

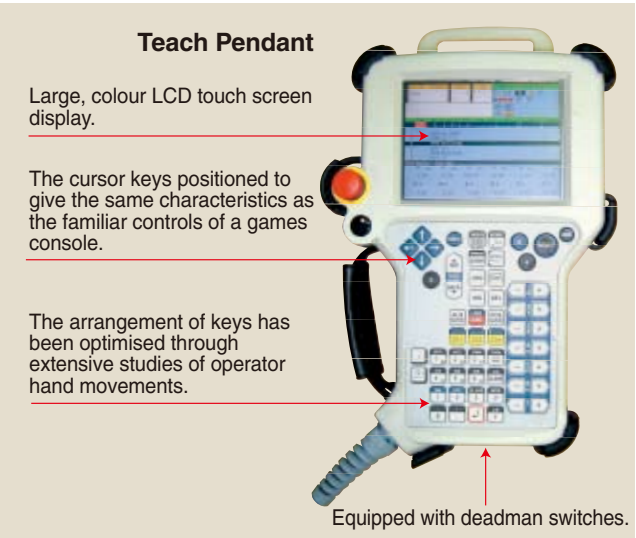
The Teach Pendant utilises a combination of operator keypad and an easy to read 6.4" colour LCD touch screen. The utilisation of this keypad along with improved hardware capabilities results in significant improvements in key response.

The key arrangement, optimised for quick and simple data entry, in conjunction with a large, easy to read colour LCD touch screen provides the user with an ergonomic platform for the control and operation of the robot.

In terms of programming, the new controller is upward compatible, supporting existing conventional controllers, with the main concepts of operation being the same. Using the Simplified Operation (Block) teaching system from Kawasaki original menu, teaching can be carried out quickly and efficiently.



Teaching Screen
Simplified Operation (Block) teaching system by block selection



2 Dedicated software for a wide range of applications

Software is available to simplify the programming for a variety of applications such as palletising, handling, spot-welding, sealing and arc welding. In addition, Kawasaki AS Language, a highly sophisticated robot programming language, expands the possibilities for advanced motion and process control. With available options including servo welding, network support function and high performance vision Kawasaki can deliver a solution to even the most complex customer application.

3 Enhanced control through new technology

Processing capability has been upgraded through the incorporation of a state of the art CPU and multi processors whilst motion control performance, such as path accuracy and cycle time, has benefited from the application of fully digital servos. Furthermore the possibility of a system failure can now be reduced to a minimum by the inclusion of functions for collision detection and, in the event of an emergency stop, path recovery.

4 High expansion capability simplifies system upgrades

•Control of peripheral equipment

The Kawasaki system is compatible with, not only standard digital I/O, but also a variety of Fieldbus I/O systems such as DeviceNet, CC-Link, Profibus and Interbus-S enabling straightforward connection to a wide range of peripheral equipment.

A built in sequencer, using Kawasaki K-Logic, is also available making it possible to configure a highly advanced control system with minimum cost.

•Network Communications

The system supports network communications through Ethernet allowing data transfer between the controller and host computer e.g. program upload and download. Web server functions can also be utilised for remote access to the controller via the Internet or an intranet enabling remote diagnostics and monitoring of robot status.

•Expansion of Multi-Axis

An additional 2 axes can be easily incorporated into the standard 6-axis controller. Three or more additional axes (9 axes or more including the robot arm) are available by the selection of SSCNET compatible motors. Therefore, a multi-axis system can be easily configured to meet the customer requirements.

5 Innovative design for ease of maintenance

Careful design to reduce wiring and to utilise, where possible, component modules enables quick and efficient repairs and replacement. Software functions such as Data Storage allow detailed recording of various machine states, with the stored information output in spreadsheet format to aid analysis.

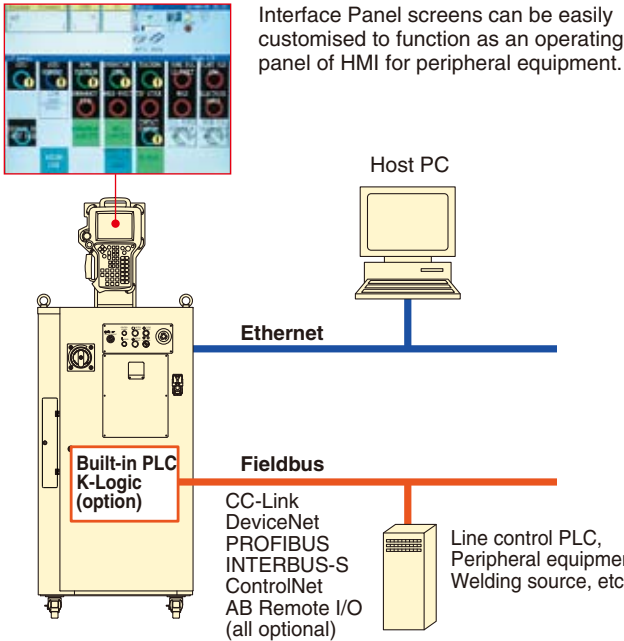
Maintenance support functions indicate troubleshooting procedures in the event of a failure and the Web Server function enable diagnostics to be effected remotely.

•Specifications

		Standard	Option
Model		D20 / D22	
Structure		Self-standing main enclosure	
Number of Controlled Axes		6 axes	Max. 16 axes (Please contact us when using 7 axes or more.)
Servo Motor		AC servo motor	
Position Detector		Absolute encoder	
Drive System		Full digital servo system	
Programming		Block teaching or AS language	
Coordinate Systems		Joint, Base, Tool	Fixed tool point
Types of Motion Control		Joint/Linear, Circular Interpolated motion	
General Purpose Signals	External Operation	Motor power Off, Hold	
	Input	32 Channels (Includes dedicated signals)	64/96/128 Channels (Includes dedicated signals)
	Output	32 Channels (Includes dedicated signals)	64/96/128 Channels (Includes dedicated signals)
Memory Capacity		1 MB (Includes system memory): Approx. 5,000 steps	4 MB (Includes system memory): Approx. 35,000 steps
External Strage		PCMCIA Card slot	
Communication Interface	PC, Network etc.	RS-232C	RS-485, Ethernet (Please contact us.)
	Fieldbus		CC-Link, DeviceNet, PROFIBUS-S, ControlNet, AB Remote I/O (Please contact us.)
Teach Pendant		6.4 in. TFT color LCD with touch panel, 640 x 480 VGA, Emergency stop SW., Teach Lock SW., Deadman SW. 58 Hard keys (Robot manual operation keys, Cursor keys, etc.)	
Operation Panel		Basic switches: Motor power On, Cycle start, Error reset, Emergency stop, RUN/HOLD, TEACH/REPEAT, etc.	
Cable Length	Teach Pendant	5 m	10 m, 15 m (Please contact us about other cable length)
	Robot-Controller	5 m	10 m, 15 m (Please contact us about other cable length)
Dimensions		W600 x D550 x H1,200 (mm)	
Mass		D20: Approx. 105 kg D22: Approx. 120 kg	D20: Approx. 155 kg D22: Approx. 190 kg (with Transformer)
Power Requirements	D20	AC200/220V ±10 %, 50/60 Hz, 3-phase, 5.6 kVA	AC380/400/415/440V ±10 %, 50/60 Hz, 3-phase, 5.6 kVA
	D22	AC200/220V ±10 %, 50/60 Hz, 3-phase, 11 kVA	AC380/400/415/440V ±10 %, 50/60 Hz, 3-phase, 11 kVA
Robot Dedicated Grounding		Less than 100 max. Leakage current: 100 mA	Less than 100 max. Leakage current: 10 mA (with Transformer)
Environmental Condition	Ambient Temperature	0 ~ 45 °C	
	Relative Humidity	35 ~ 85 % (No dew, nor frost allowed)	
Color		Munsell 10GY9/1 equivalent	

[Accessories Included] Communication terminal software with PC
[Optional Accessories] Teach pendant holder, Brake release SW., Plug for auto running without A teach pendant, RS-232C Cable (1.5m, 3m), PC card, etc.
Other options or software: Please contact us.

System expansion by communications



•External View and Dimensions

