YASKAWA

New Generation Robots

MOTOMAN-SDA, SIA Series

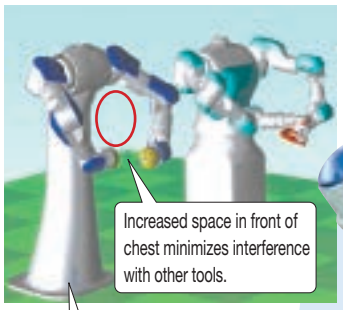
New Generation Robots to Enrich Our Futures

Dual-arm Robot

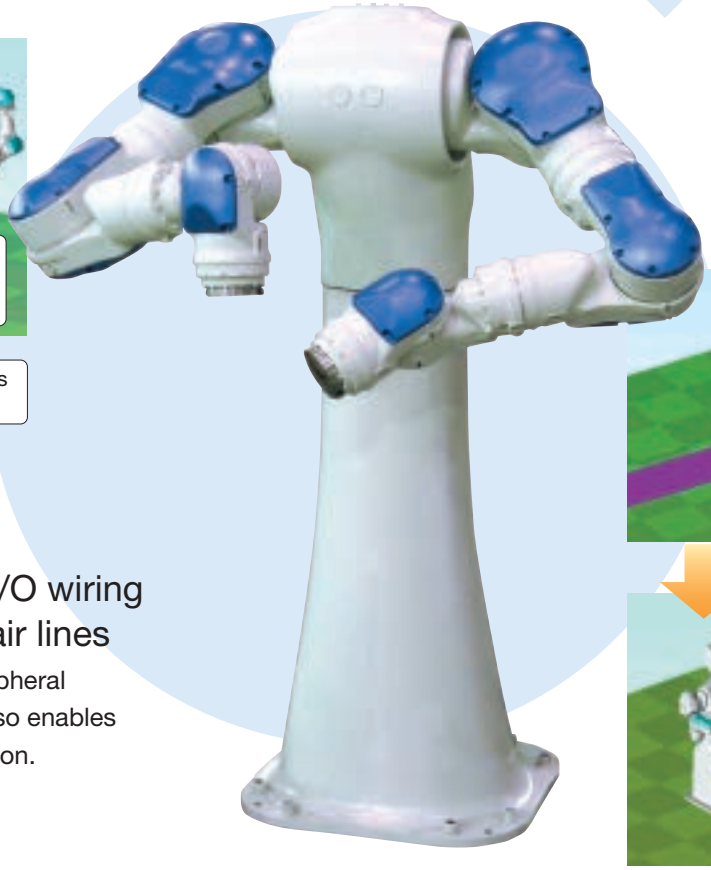
Slim body and arms for easy installation in the same space as human workers

The SDA dual-arm robot is designed to resemble a human figure.
The robot has slim arms that are the same size as a human's arms and seven joints in each arm.
Manual work can be automated without changing the existing layout of the facility because of the robot's human-like size.
The coordinated operation of 15 axes (seven axes for each arm and one at waist) allows the robot to move efficiently with greater dexterity and eliminates the need for specialized facilities for the robot.

1. Human-like size and performance

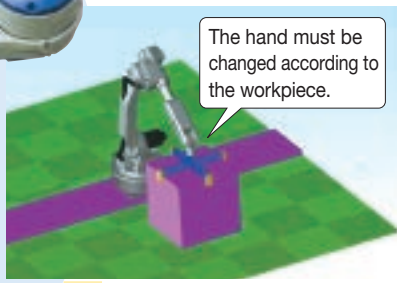


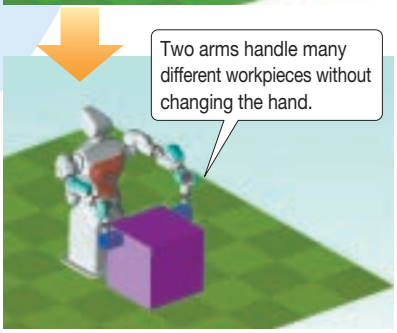
Broadened range of applications with slim body and 7-axis arms



2. Versatility

- Holding of workpieces with both arms
- Positioning
- Freely transfer workpieces from one arm to the other
- Independent control





3. Internal user I/O wiring harness and air lines

Besides eliminating peripheral interference, the SDA also enables complete offline simulation.

Product Line Dual-arm Robot

MOTOMAN-SDA5D/F
Payload: 5 kg/arm (10 kg/dual arms)

MOTOMAN-SDA10D/F
Payload: 10 kg/arm (20 kg/dual arms)

MOTOMAN-SDA20D/F
Payload: 20 kg/arm (40 kg/dual arms)

MOTOMAN leads the way in the new era and consistently offers new solutions to improve and to enhance the efficiency and quality of production lines.
The MOTOMAN-SDA and -SIA series are new generation robots with unconventional robot forms (dual-arm and 7-axis single-arm) and human-like movements that are changing the relationship between humans and robots and the concept of manufacturing. Now is the beginning of a new future that transcends our imaginations.

7-axis Single-arm Robot

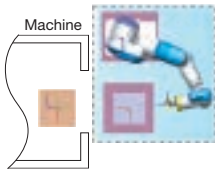
Slim arm for flexible movements in narrow spaces

The SIA single-arm robot resembles a human arm.
With seven joints like a human arm, the SIA robot has a high degree of freedom and it can bend, twist, or extend itself even in narrow spaces. This enables a space-saving, high-density layout.

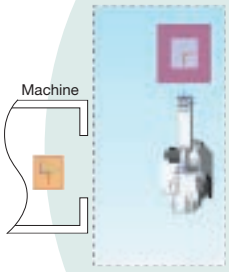
1. Space-saving and high-density layout

Installation in narrow spaces between machines is now possible. Optimal for high-density layouts.

7-axis robot requires less space than 6-axis robot.



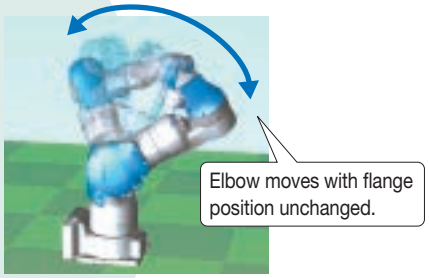
Installation example of 7-axis robot



Installation example of 6-axis robot

2. Flexibility

- **Elbow movement (unique and unprecedented feature in the industry)**
  The 7-axis configuration has enabled the angle of the elbow to be changed without affecting the tool position or posture.



- **Flexible reach (to rear of workpiece)**
  The arm's flexibility enables the SIA robot to be installed in high-density layout without interference and to enter narrow spaces inaccessible to humans.

- **Many installation options**
  The SIA robot can be installed in many ways without affecting functionality: on the floor, wall, ceiling, or slope.

3. Internal user I/O wiring harness and air lines

Besides eliminating peripheral interference, the SIA also enables complete offline simulation.

Product Line 7-axis Single-arm Robot

MOTOMAN-SIA5D/F
Payload: 5 kg

MOTOMAN-SIA10D/F
Payload: 10 kg

MOTOMAN-SIA20D/F
Payload: 20 kg

MOTOMAN-SIA30D
Payload: 30 kg

MOTOMAN-SIA50D
Payload: 50 kg

New MOTOMAN Designs and Applications

Designed to Reduce Human Workload for Better Labor Conditions & Pursuit of Human-Robot Coexistence

MOTOMAN-SDA Series

Applications

Dual-arm Robot

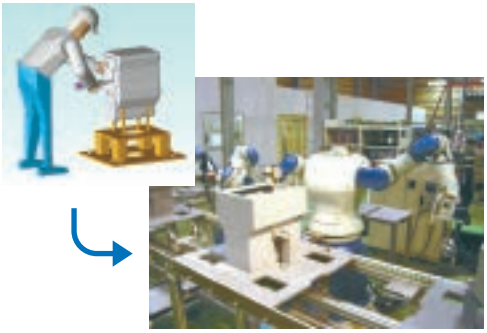
Improvement on Logistic process

- Handling parts with dual arm gripping action
- Continuous handling without a temporary stand or a reverse jig
- Distribution of parts for each process

Improvement on Assembling process

- Jigless assembly with dual arms
- Jigless positioning with dual arms
- High-accuracy assembly with high-speed, high-precision movements

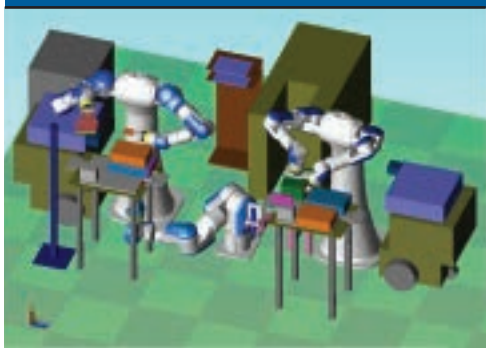
Assembly of Automobile Engine



Sorting with Returnable Cases

Distributing of Parts

Assembly and Testing



Coordinated Operation with Welding Robot

Other Applications

- Assembly of LCD panels
- Assembly of electrical appliances/lighting
- Assembly of cable harnesses
- Handling, turning, and assembly of automotive parts
- Handling of lengthy automotive parts
- Transfer of beverage packs
- Transfer of returnable cases in containers

Technical Consulting	For more information on how to introduce the new generation robots into your system, contact your nearest Yaskawa representative.

MOTOMAN-SIA Series

7-axis Single-arm Robot

Improvement on Logistic process

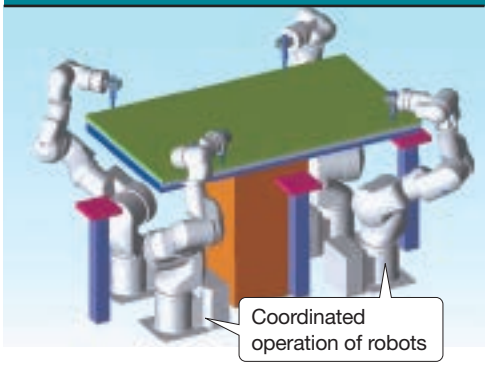
- Installation in narrow spaces between machines
- Reach into narrow spaces
- Lifting operation (from below)

Improvement on Assembling process

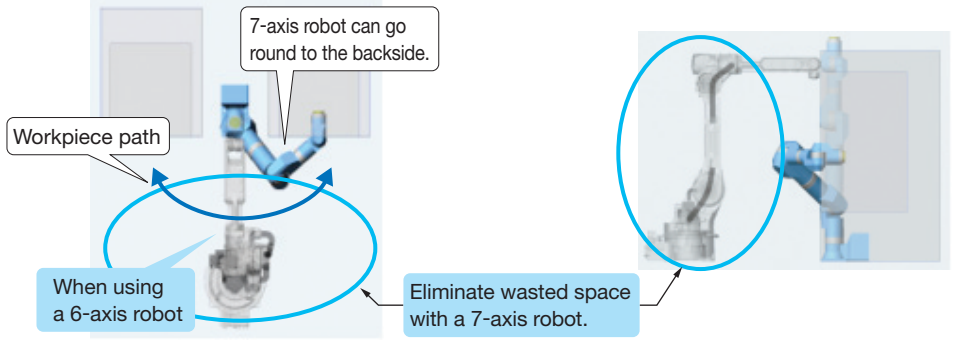
- Assembly in high-density layout of robots
- Coordinated assembling operation of several robots without interference

Attachment and Removal of Workpieces for NC Machines

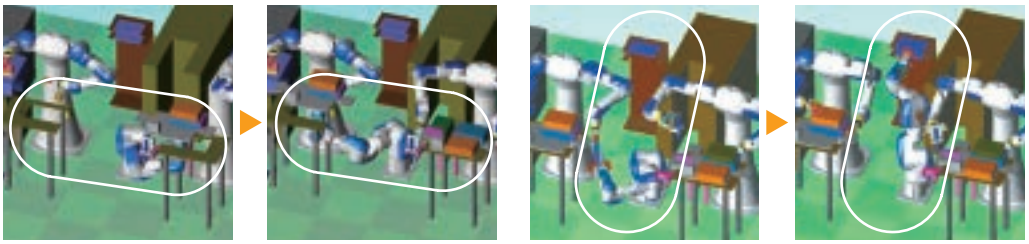
Assembly with 7-axis Robots in High-Density Layout



Handling between Machines in Limited Spaces (Wraparound movement)



Transfer of Workpieces



Example 1 : Transfer workpieces from right to left with only a single-arm robot

Example 2 : Transfer workpieces from front to rear in minimal space

Technical Consulting	For more information on how to introduce the new generation robots into your system, contact your nearest Yaskawa representative.

Dual-arm Robot

MOTOMAN-SDA5D/F

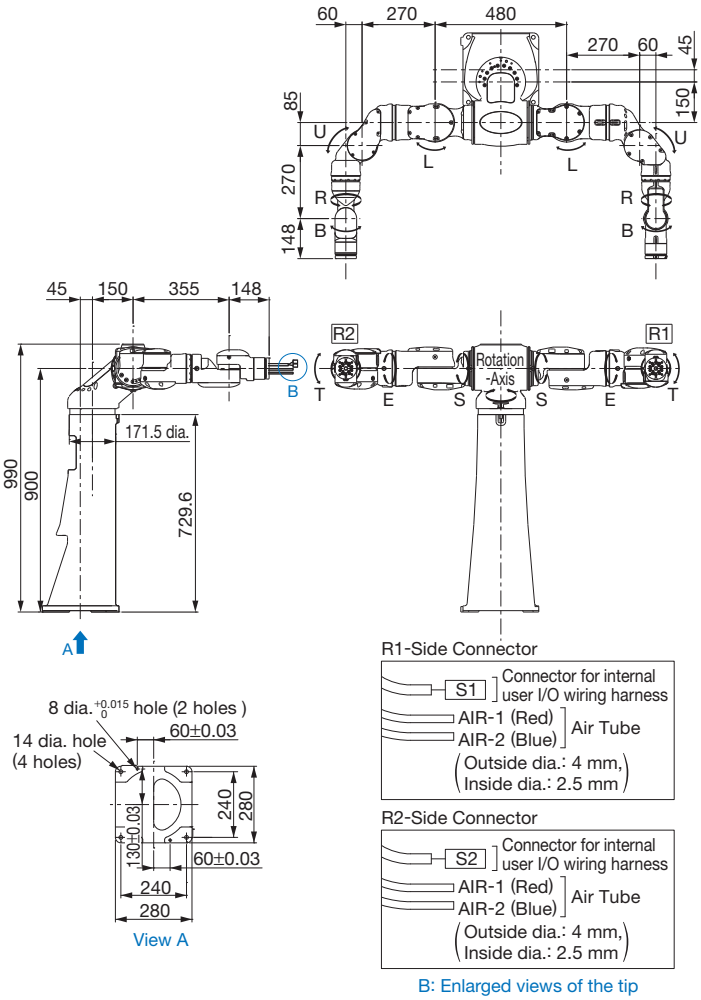
Dual-arm | 15 axes | Payload: 5 kg/arm (10 kg/dual arms)

The MOTOMAN-SDA5D/F is a dual-arm robot with a 5 kg payload per arm (dual arm: 10 kg).
For small parts assembly and handling applications, this robot allows a more compact facility layout.

Features

- The arms have been slimmed by employing a newly-developed miniaturized actuator for the wrist section, which comes closest to the parts and products. This has greatly reduced the interference of the arms with parts and products as well as interference between the two arms themselves.
- With a repetitive positioning accuracy of ±0.06 mm, the robot is ideal for small parts assembly processes that require delicate work to be performed with high accuracy.
- The maximum range of motion can be maintained using an ingenious mechanism for the arm joints that prevents the range of motion from being restricted even when downsizing robots.

Dimensions Units: mm



B: Enlarged views of the tip

Manipulator Specifications

Model		MOTOMAN-SDA5D/F*3
Controlled Axis		15 (Articulated) [7 axes for left arm (R1), 7 axes for right arm (R2), 1 rotary axis]
Payload		5 kg/arm
Repeatability*1		±0.06 mm
Range of Motion	Rotation	-170° - +170°
	S-axis (lifting)	R1 : -90° - +270° , R2 : -270° - +90°
	L-axis (lower arm)	-110° - +110°
	E-axis (elbow twist)	-170° - +170°
	U-axis (upper arm)	-90° - +115°
	R-axis (upper arm twist)	-180° - +180°
	B-axis (wrist pitch/yaw)	-110° - +110°
	T-axis (wrist twist)	-180° - +180°
Maximum Speed	Rotation	3.14 rad/s, 180°/s
	S-axis (lifting)	3.49 rad/s, 200°/s
	L-axis (lower arm)	3.49 rad/s, 200°/s
	E-axis (elbow twist)	3.49 rad/s, 200°/s
	U-axis (upper arm)	3.49 rad/s, 200°/s
	R-axis (upper arm twist)	3.49 rad/s, 200°/s
	B-axis (wrist pitch/yaw)	4.01 rad/s, 230°/s
	T-axis (wrist twist)	6.11 rad/s, 350°/s
Allowable Moment	R-axis (upper arm twist)	14.7 N · m
	B-axis (wrist pitch/yaw)	14.7 N · m
	T-axis (wrist twist)	7.35 N · m
Allowable Inertia ($GD^2/4$)	R-axis (upper arm twist)	0.45 kg · m^2
	B-axis (wrist pitch/yaw)	0.45 kg · m^2
	T-axis (wrist twist)	0.11 kg · m^2
Approx. Mass		110 kg
Power Requirements*2		2.0 kVA*4
Ambient Conditions	Temperature	0°C to +40°C
	Humidity	20% to 80%RH(non-condensing)
	Vibration	Less than 4.9 m/s^2
	Others	• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to water, oil or dust • Free from excessive electrical noise (plasma)

∗1 : Conforms to ISO 9283.
∗2 : Varies in accordance with applications and motion patterns.
∗3 : The letter "F" at the end of the model number indicates that an FS100 controller is used to control the robot. When a DX100 controller is used, the model number will have the letter "D" at the end.
∗4 : SDA5F requires 1.5 kVA.
Note : SI units are used for the specifications.

MOTOMAN-SDA10D/F

Dual-arm | 15 axes | Payload: 10 kg/arm (20 kg/dual arms)

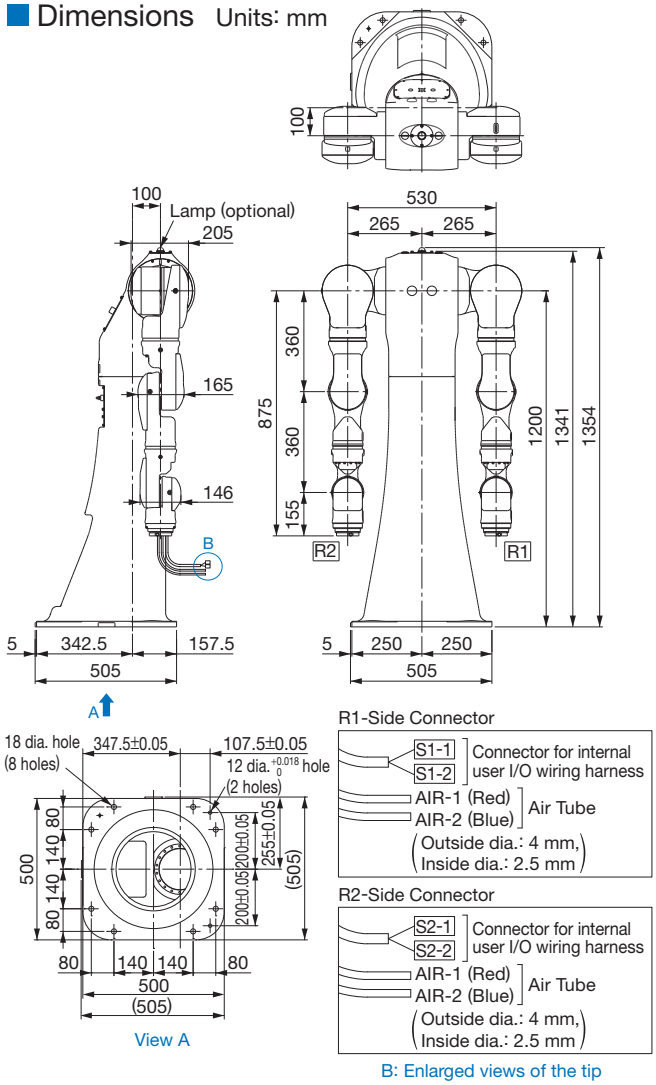
The MOTOMAN-SDA10D/F is human-sized and has two 7-axis arms that enable human-like movements.
Capable of assembling and handling heavy objects up to 10 kg per arm (dual arm: 20 kg). Can be easily installed in existing production lines without changing the layout because of the robot's human-like size.

Features

- Same level of capability as a human in assembling and handling heavy objects.
- Human-like flexibility of motions achieved by having two arms with 7 axes each and a rotary axis at the waist.
- High-precision movement for accuracy.
- Enhanced acceleration performance for reduced operating time.
- Independent control and operation of two arms for higher efficiency.
- Keep costs low as the two arms can transfer workpieces from arm to arm and turn them without using a temporary stand or a reverse jig.
- Environmental resistance: model with drip-proofing is available. Protection level: IP65 for arm and IP50 for base. (Not acceptable to SDA10D/F flange at tip. A different model with a waterproof flange is available.)

Notes : 1. Conduct a warming-up operation when the robot is to be used at low temperatures (10 degrees Celsius or lower).
2. Contact your Yaskawa representative for details.

Dimensions Units: mm



B: Enlarged views of the tip

Manipulator Specifications

Model			MOTOMAN-SDA10D/F*3
Controlled Axis			15 (Articulated) [7 axes for left arm (R1), 7 axes for right arm (R2), 1 rotary axis]
Payload			10 kg/arm
Repeatability*1			±0.1 mm
Range of Motion	R1 · R2	Rotation	-170° - +170°
		S-axis (lifting)	-180° - +180°
		L-axis (lower arm)	-110° - +110°
		E-axis (elbow twist)	-170° - +170°
		U-axis (upper arm)	-135° - +135°
		R-axis (upper arm twist)	-180° - +180°
		B-axis (wrist pitch/yaw)	-110° - +110°
		T-axis (wrist twist)	-180° - +180°
Maximum Speed	R1 · R2	Rotation	2.27 rad/s, 130°/s
		S-axis (lifting)	2.97 rad/s, 170°/s
		L-axis (lower arm)	2.97 rad/s, 170°/s
		E-axis (elbow twist)	2.97 rad/s, 170°/s
		U-axis (upper arm)	2.97 rad/s, 170°/s
		R-axis (upper arm twist)	3.49 rad/s, 200°/s
		B-axis (wrist pitch/yaw)	3.49 rad/s, 200°/s
		T-axis (wrist twist)	6.98 rad/s, 400°/s
Allowable Moment	R-axis (upper arm twist)		31.4 N · m
	B-axis (wrist pitch/yaw)		31.4 N · m
	T-axis (wrist twist)		19.6 N · m
Allowable Inertia ($GD^2/4$)	R-axis (upper arm twist)		1.0 kg · m^2
	B-axis (wrist pitch/yaw)		1.0 kg · m^2
	T-axis (wrist twist)		0.4 kg · m^2
Approx. Mass			220 kg
Power Requirements*2			2.5 kVA*4
Ambient Conditions	Temperature		0°C to +40°C
	Humidity		20% to 80%RH(non-condensing)
	Vibration		Less than 4.9 m/s^2
	Others		• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to water, oil or dust • Free from excessive electrical noise (plasma)

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∗3 : The letter "F" at the end of the model number indicates that an FS100 controller is used to control the robot. When a DX100 controller is used, the model number will have the letter "D" at the end.
∗4 : SDA10F requires 2.0 kVA.
Note : SI units are used for the specifications.

Dual-arm Robot

MOTOMAN-SDA20D/F

Dual-arm | 15 axes | Payload: 20 kg/arm (40 kg/dual arms)

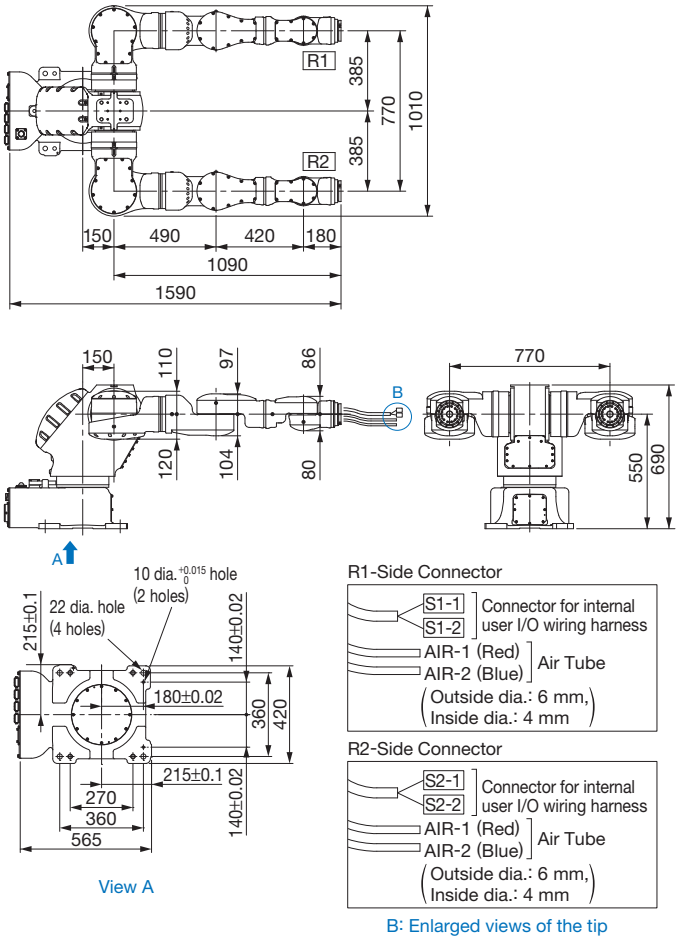
The MOTOMAN-SDA20D/F is a high-payload robot that is capable of handling heavy objects up to 20 kg per arm (dual arm: 40 kg).
Same as the SDA10D/F, the SDA20D/F has fifteen controlled axes and realizes human-like flexibility of movement.

Features

- Handling of heavy objects up to 20 kg per arm (dual arm: 40 kg).
- High-speed and high-precision operation.
- Human-like flexibility of motions achieved by having two arms with 7 axes each and a rotary axis at the waist.
- The design of the hands can be simplified even when holding large objects since the robot can carry workpieces using both arms.
- Environmental resistance: model with drip-proofing is available.
  Protection level: IP65 for arm and IP54 for base.
  (Not acceptable to SDA20D/F flange at tip. A different model with a waterproof flange is available.)

Notes : 1. Conduct a warming-up operation when the robot is to be used at low temperatures (10 degrees Celsius or lower).
2. Contact your Yaskawa representative for details.

Dimensions Units: mm



View A

B: Enlarged views of the tip

Manipulator Specifications

Model			MOTOMAN-SDA20D/F*3
Controlled Axis			15 (Articulated) [7 axes for left arm (R1), 7 axes for right arm (R2), 1 rotary axis]
Payload			20 kg / arm
Repeatability*1			±0.1 mm
Range of Motion	R1 · R2	Rotation	-180° - +180°
		S-axis (lifting)	-180° - +180°
		L-axis (lower arm)	-110° - +110°
		E-axis (elbow twist)	-170° - +170°
		U-axis (upper arm)	-130° - +130°
		R-axis (upper arm twist)	-180° - +180°
		B-axis (wrist pitch/yaw)	-110° - +110°
		T-axis (wrist twist)	-180° - +180°
Maximum Speed	R1 · R2	Rotation	2.18 rad/s, 125°/s
		S-axis (lifting)	2.27 rad/s, 130°/s
		L-axis (lower arm)	2.27 rad/s, 130°/s
		E-axis (elbow twist)	2.97 rad/s, 170°/s
		U-axis (upper arm)	2.97 rad/s, 170°/s
		R-axis (upper arm twist)	3.49 rad/s, 200°/s
		B-axis (wrist pitch/yaw)	3.49 rad/s, 200°/s
		T-axis (wrist twist)	6.98 rad/s, 400°/s
Allowable Moment		R-axis (upper arm twist)	58.8 N · m
		B-axis (wrist pitch/yaw)	58.8 N · m
		T-axis (wrist twist)	29.4 N · m
Allowable Inertia ($GD^2/4$)		R-axis (upper arm twist)	4.0 kg · m^2
		B-axis (wrist pitch/yaw)	4.0 kg · m^2
		T-axis (wrist twist)	2.0 kg · m^2
Approx. Mass			380 kg
Power Requirements*2			3.5 kVA*4
Ambient Conditions		Temperature	0℃ to +40℃
		Humidity	20% to 80%RH (non-condensing)
		Vibration	Less than 4.9 m/s^2
		Others	• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to water, oil or dust • Free from excessive electrical noise (plasma)

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*2 : Varies in accordance with applications and motion patterns.
*3 : The letter "F" at the end of the model number indicates that an FS100 controller is used to control the robot. When a DX100 controller is used, the model number will have the letter "D" at the end.
*4 : SDA20F requires 3.0 kVA
Note : SI units are used for the specifications.

7-axis Single-arm Robot

MOTOMAN-SIA5D/F

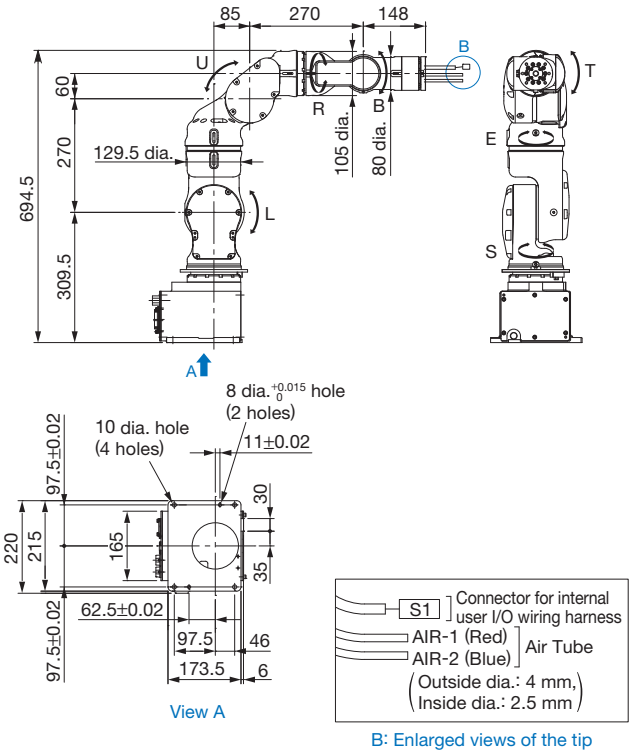
Single-arm | 7 axes | Payload: 5 kg

The MOTOMAN-SIA5D/F features seven controlled axes with a 5 kg payload. Ideal for handling small objects in applications that require the robot to be installed in a limited space, and where a high level of positioning accuracy is needed.

Features

- High degree of motion like a human arm with its 7-axis arm.
- The arm has been slimmed by employing newly-developed miniaturized actuator for the wrist section, greatly reducing the interference of the arm with the workpiece.
- The maximum range of motion can be maintained using an ingenious mechanism for the arm joints that prevents the range of motion from being restricted even when downsizing robots.
- Light and weighs only 30 kg, so many installation choices are available: floor, ceiling, or wall.
- Environmental resistance: model for clean-room use is available.
  Cleanness level: ISO class 5 and complies with ISO 14644 standards when downflow of robot environment is 0.4 m/s or faster.
  Notes : 1. Conduct a warming-up operation when the robot is to be used at low temperatures (10 degrees Celsius or lower).
  2. Contact your Yaskawa representative for details.
- By utilizing internal user I/O wiring harness and air lines integrated in the arm, layout can be planned offline without worrying about peripheral interference.
  (Internal user I/O wiring harness and air lines specifications: two air lines and eight-core cables)
  Note : External axis specification for a hand can be accommodated. Contact your Yaskawa representative regarding your requirements.

Dimensions Units: mm



B: Enlarged views of the tip

Manipulator Specifications

Model		MOTOMAN-SIA5D/F*3
Controlled Axis		7 (Vertically articulated)
Payload		5 kg
Repeatability*1		±0.06 mm
Range of Motion	S-axis (turning)	-180° - +180°
	L-axis (lower arm)	-110° - +110°
	E-axis (elbow twist)	-170° - +170°
	U-axis (upper arm)	-90° - +115°
	R-axis (wrist roll)	-180° - +180°
	B-axis (wrist pitch/yaw)	-110° - +110°
	T-axis (wrist twist)	-180° - +180°
Maximum Speed	S-axis (turning)	3.49 rad/s, 200°/s
	L-axis (lower arm)	3.49 rad/s, 200°/s
	E-axis (elbow twist)	3.49 rad/s, 200°/s
	U-axis (upper arm)	3.49 rad/s, 200°/s
	R-axis (wrist roll)	3.49 rad/s, 200°/s
	B-axis (wrist pitch/yaw)	4.01 rad/s, 230°/s
	T-axis (wrist twist)	6.11 rad/s, 350°/s
Allowable Moment	R-axis (wrist roll)	14.7 N · m
	B-axis (wrist pitch/yaw)	14.7 N · m
	T-axis (wrist twist)	7.35 N · m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	0.45 kg · m^2
	B-axis (wrist pitch/yaw)	0.45 kg · m^2
	T-axis (wrist twist)	0.11 kg · m^2
Approx. Mass		30 kg
Power Requirements*2		1.0 kVA
Ambient Conditions	Temperature	0℃ to +40℃
	Humidity	20% to 80%RH (non-condensing)
	Vibration	Less than 4.9 m/s^2
	Others	• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to water, oil or dust • Free from excessive electrical noise (plasma)

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∗3 : The letter "F" at the end of the model number indicates that an FS100 controller is used to control the robot. When a DX100 controller is used, the model number will have the letter "D" at the end.
Note : SI units are used for the specifications.

7-axis Single-arm Robot

MOTOMAN-SIA10D/F

Single-arm | 7 axes | Payload: 10 kg

The MOTOMAN-SIA10D/F is a robot with seven controlled axes and a 10 kg payload that is more compact than the SIA20D/F.
Optimal for handling small objects in limited space.

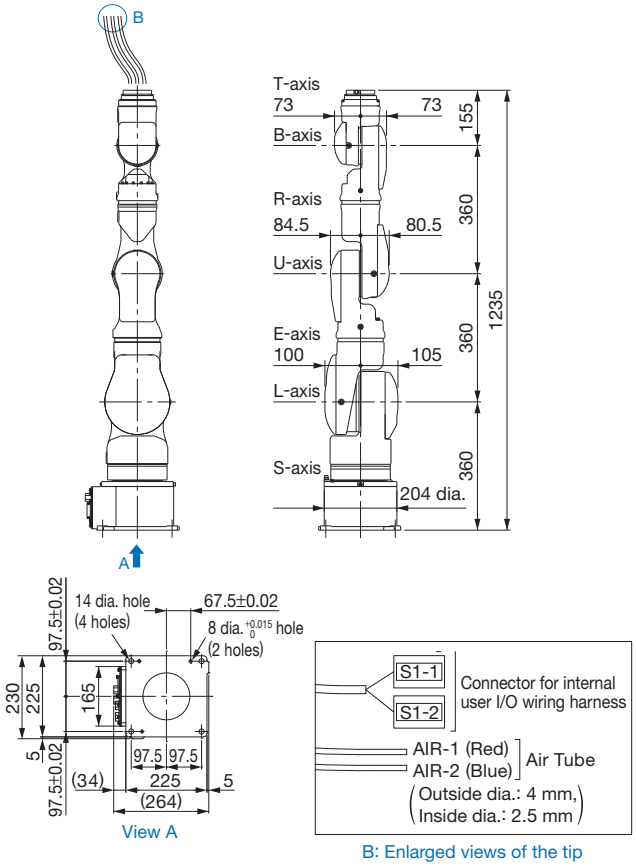
Features

- High degree of motion like a human arm with its 7-axis arm.
- The high flexibility of motion makes operation possible even in narrow spaces that are inaccessible to humans.
- Folds to compact size when not in use.
- Many installation options: on the floor, wall, ceiling, or slope
- Optimal for handling small objects.
- Environmental resistance: models with drip-proofing and for clean-room use are available.
  - Drip-proof protection level: IP65 for arm and IP50 for base.(Not acceptable to SIA10D/F flange at tip. A different model with a waterproof flange is available.)
  - Cleanness level: ISO class 5 and complies with ISO 14644 standards when downflow of robot environment is 0.4 m/s or faster.

  Notes : 1. Conduct a warming-up operation when the robot is to be used at low temperatures (10 degrees Celsius or lower).
  2. Contact your Yaskawa representative for details.
- By utilizing internal user I/O wiring harness and air lines integrated in the arm, layout can be planned offline without worrying about peripheral interference.
  (Internal user I/O wiring harness and air lines specifications: two air hoses and twelve-core cables)

  Note : External axis specification for a hand can be accommodated. Contact your Yaskawa representative regarding your requirements.

Dimensions Units: mm



B: Enlarged views of the tip

Manipulator Specifications

Model		MOTOMAN-SIA10D/F*3
Controlled Axis		7 (Vertically articulated)
Payload		10 kg
Repeatability*1		±0.1 mm
Range of Motion	S-axis (turning)	-180° - +180°
	L-axis (lower arm)	-110° - +110°
	E-axis (elbow twist)	-170° - +170°
	U-axis (upper arm)	-135° - +135°
	R-axis (wrist roll)	-180° - +180°
	B-axis (wrist pitch/yaw)	-110° - +110°
	T-axis (wrist twist)	-180° - +180°
Maximum Speed	S-axis (turning)	2.97 rad/s, 170°/s
	L-axis (lower arm)	2.97 rad/s, 170°/s
	E-axis (elbow twist)	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)	3.49 rad/s, 200°/s
	T-axis (wrist twist)	6.98 rad/s, 400°/s
Allowable Moment	R-axis (wrist roll)	31.4 N · m
	B-axis (wrist pitch/yaw)	31.4 N · m
	T-axis (wrist twist)	19.6 N · m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	1.0 kg · m^2
	B-axis (wrist pitch/yaw)	1.0 kg · m^2
	T-axis (wrist twist)	0.4 kg · m^2
Approx. Mass		60 kg
Power Requirements*2		1.5 kVA*4
Ambient Conditions	Temperature	0°C to +40°C
	Humidity	20% to 80%RH(non-condensing)
	Vibration	Less than 4.9 m/s^2
	Others	• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to water, oil or dust • Free from excessive electrical noise (plasma)

∗1 : Conforms to ISO 9283.
∗2 : Varies in accordance with applications and motion patterns.
∗3 : The letter "F" at the end of the model number indicates that an FS100 controller is used to control the robot. When a DX100 controller is used, the model number will have the letter "D" at the end.
∗4 : SIA10F requires 1.0 kVA.
Note : SI units are used for the specifications.

MOTOMAN-SIA20D/F

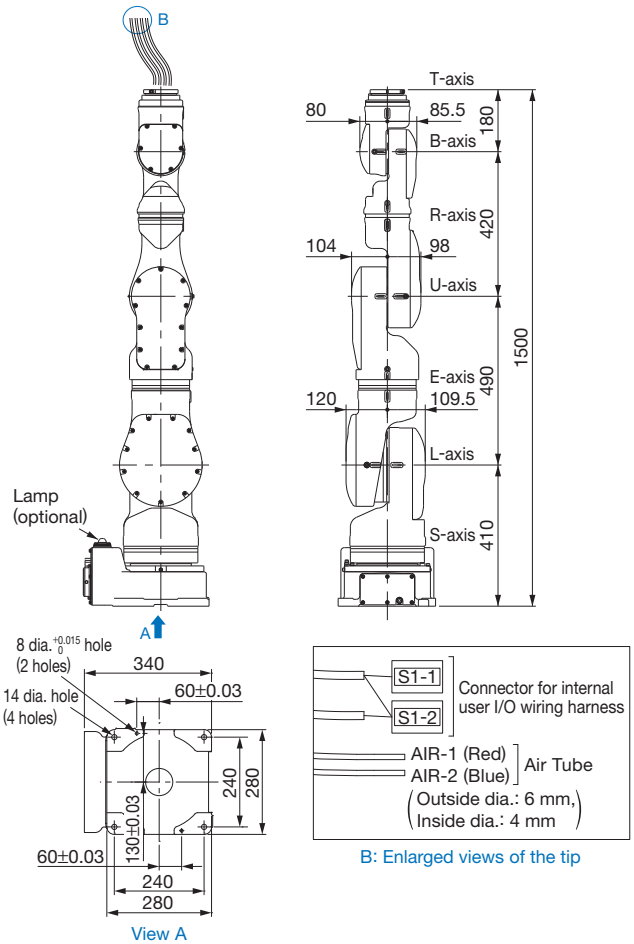
Single-arm | 7 axes | Payload: 20 kg

With its unique arm form and seven controlled axes, the space-saving MOTOMAN-SIA20D/F has achieved flexibility of movement that was impossible for robots till now. This model is capable of handling heavy objects up to 20kg.

Features

- High degree of motion like a human arm with its 7-axis arm.
- The high flexibility of motion makes operation possible even in narrow spaces inaccessible to humans.
- Folds to compact size when not in use.
- Many installation options: on the floor, wall, ceiling, or slope
- Assembles and handles heavy objects up to 20 kg.
- Environmental resistance: model with drip-proofing is available.
  Protection level: IP65 for arm and IP54 for base.
  (Not acceptable to SIA20D/F flange at tip. A different model with a waterproof flange is available.)
  Notes : 1. Conduct a warming-up operation when the robot is to be used at low temperatures (10 degrees Celsius or lower).
  2. Contact your Yaskawa representative for details.
- By utilizing internal user I/O wiring harness and air lines integrated in the arm, layout can be planned offline without worrying about peripheral interference.
  (Internal user I/O wiring harness and air lines specifications: two air hoses and sixteen-core cables)
  Note : External axis specification for a hand can be accommodated. Contact your Yaskawa representative regarding your requirements.

Dimensions Units: mm



Manipulator Specifications

Model		MOTOMAN-SIA20D/F*3
Controlled Axis		7 (Vertically articulated)
Payload		20 kg
Repeatability*1		±0.1 mm
Range of Motion	S-axis (turning)	-180° - +180°
	L-axis (lower arm)	-110° - +110°
	E-axis (elbow twist)	-170° - +170°
	U-axis (upper arm)	-130° - +130°
	R-axis (wrist roll)	-180° - +180°
	B-axis (wrist pitch/yaw)	-110° - +110°
	T-axis (wrist twist)	-180° - +180°
Maximum Speed	S-axis (turning)	2.27 rad/s, 130°/s
	L-axis (lower arm)	2.27 rad/s, 130°/s
	E-axis (elbow twist)	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)	3.49 rad/s, 200°/s
	T-axis (wrist twist)	6.98 rad/s, 400°/s
Allowable Moment	R-axis (wrist roll)	58.8 N · m
	B-axis (wrist pitch/yaw)	58.8 N · m
	T-axis (wrist twist)	29.4 N · m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	4.0 kg · m^2
	B-axis (wrist pitch/yaw)	4.0 kg · m^2
	T-axis (wrist twist)	2.0 kg · m^2
Approx. Mass		120 kg
Power Requirements*2		2.0 kVA*4
Ambient Conditions	Temperature	0°C to +40°C
	Humidity	20% to 80%RH(non-condensing)
	Vibration	Less than 4.9 m/s^2
	Others	• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to water, oil or dust • Free from excessive electrical noise (plasma)

*1 : Conforms to ISO 9283.
*2 : Varies in accordance with applications and motion patterns.
*3 : The letter "F" at the end of the model number indicates that an FS100 controller is used to control the robot. When a DX100 controller is used, the model number will have the letter "D" at the end.
*4 : SIA20F requires 1.5 kVA.
Note : SI units are used for the specifications.

7-axis Single-arm Robot

MOTOMAN-SIA30D

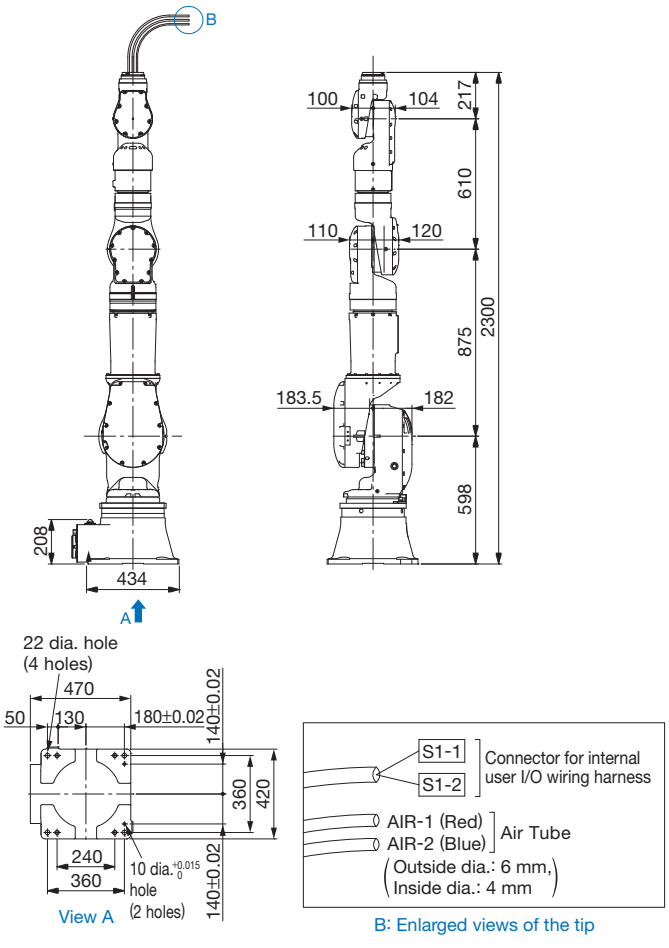
Single-arm | 7 axes | Payload: 30 kg

The MOTOMAN-SIA30D features seven controlled axes with a 30 kg payload. The wide range of motion and flexible movement expand the possible range of applications.

Features

- High degree of motion like a human arm with its 7-axis arm.
- High-speed and high-precision operation.
- Folds to compact size when not in use.
- Assembles and handles heavy objects up to 30 kg.
- Many installation options: on the floor, wall, ceiling, or slope
- Environmental resistance: model with drip-proofing is available.
  Protection level: IP65 for arm and IP54 for base.
  (Not acceptable to SIA30D flange at tip.)
  Notes : 1. Conduct a warming-up operation when the robot is to be used at low temperatures (10 degrees Celsius or lower).
  2. Contact your Yaskawa representative for details.
- By utilizing internal user I/O wiring harness and air lines integrated in the arm, layout can be planned offline without worrying about peripheral interference.
  (Internal user I/O wiring harness and air lines specifications: two air hoses and sixteen-core cables)
  Note : External axis specification for a hand can be accommodated. Contact your Yaskawa representative regarding your requirements.

Dimensions Units: mm



B: Enlarged views of the tip

Manipulator Specifications

Model		MOTOMAN-SIA30D
Controlled Axis		7 (Vertically articulated)
Payload		30 kg
Repeatability*1		±0.1 mm
Range of Motion	S-axis (turning)	-180° - +180°
	L-axis (lower arm)	-125° - +125°
	E-axis (elbow twist)	-170° - +170°
	U-axis (upper arm)	-110° - +110°
	R-axis (wrist roll)	-170° - +170°
	B-axis (wrist pitch/yaw)	-110° - +110°
	T-axis (wrist twist)	-180° - +180°
Maximum Speed	S-axis (turning)	2.27 rad/s, 130°/s
	L-axis (lower arm)	2.27 rad/s, 130°/s
	E-axis (elbow twist)	2.27 rad/s, 130°/s
	U-axis (upper arm)	2.27 rad/s, 130°/s
	R-axis (wrist roll)	2.97 rad/s, 170°/s
	B-axis (wrist pitch/yaw)	2.97 rad/s, 170°/s
	T-axis (wrist twist)	3.49 rad/s, 200°/s
Allowable Moment	R-axis (wrist roll)	117.6 N · m
	B-axis (wrist pitch/yaw)	117.6 N · m
	T-axis (wrist twist)	58.8 N · m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	6.0 kg · m^2
	B-axis (wrist pitch/yaw)	6.0 kg · m^2
	T-axis (wrist twist)	3.0 kg · m^2
Approx. Mass		345 kg
Power Requirements*2		3.0 kVA
Ambient Conditions	Temperature	0°C to +40°C
	Humidity	20% to 80%RH(non-condensing)
	Vibration	Less than 4.9 m/s^2
	Others	• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to water, oil or dust • Free from excessive electrical noise (plasma)

∗1 : Conforms to ISO 9283.
∗2 : Varies in accordance with applications and motion patterns.
Note : SI units are used for the specifications.

MOTOMAN-SIA50D

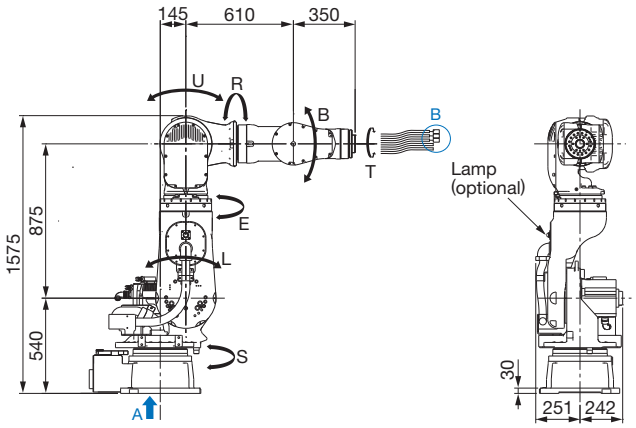
Single-arm | 7 axes | Payload: 50 kg

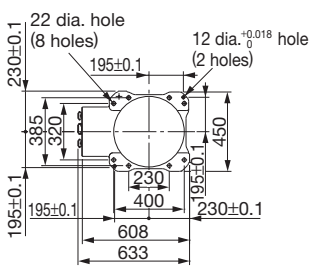
The MOTOMAN-SIA50D is a robot with seven controlled axes and is capable of handling heavy objects up to 50 kg.
Optimal for handling heavy objects in limited spaces.

Features

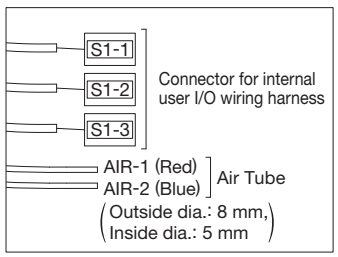
- High degree of motion like a human arm with its 7-axis arm.
- High-speed and high-precision operation.
- Folds to compact size when not in use.
- Assembles and handles heavy objects up to 50 kg.
- Environmental resistance: model with drip-proofing is available.
  Protection level: IP65 for arm and IP54 for base.
  (Not acceptable to SIA50D flange at tip. A different model with a waterproof flange is available.)
  Notes : 1. Conduct a warming-up operation when the robot is to be used at low temperatures (10 degrees Celsius or lower).
  2. Contact your Yaskawa representative for details.
- By utilizing internal user I/O wiring harness and air lines integrated in the arm, layout can be planned offline without worrying about peripheral interference.
  (Internal user I/O wiring harness and air lines specifications: two air hoses and twenty four-core cables)
  Note : External axis specification for a hand can be accommodated. Contact your Yaskawa representative regarding your requirements.

Dimensions Units: mm





View A



B: Enlarged views of the tip

Manipulator Specifications

Model		MOTOMAN-SIA50D
Controlled Axis		7 (Vertically articulated)
Payload		50 kg
Repeatability*1		±0.1 mm
Range of Motion	S-axis (turning)	-180° - +180°
	L-axis (lower arm)	-60° - +125°
	E-axis (elbow twist)	-170° - +170°
	U-axis (upper arm)	-35° - +215°
	R-axis (wrist roll)	-170° - +170°
	B-axis (wrist pitch/yaw)	-125° - +125°
	T-axis (wrist twist)	-180° - +180°
Maximum Speed	S-axis (turning)	2.97 rad/s, 170°/s
	L-axis (lower arm)	2.27 rad/s, 130°/s
	E-axis (elbow twist)	2.27 rad/s, 130°/s
	U-axis (upper arm)	2.27 rad/s, 130°/s
	R-axis (wrist roll)	2.27 rad/s, 130°/s
	B-axis (wrist pitch/yaw)	2.27 rad/s, 130°/s
	T-axis (wrist twist)	3.49 rad/s, 200°/s
Allowable Moment	R-axis (wrist roll)	377 N · m
	B-axis (wrist pitch/yaw)	377 N · m
	T-axis (wrist twist)	147 N · m
Allowable Inertia ($GD^2/4$)	R-axis (wrist roll)	29.6 kg · m^2
	B-axis (wrist pitch/yaw)	29.6 kg · m^2
	T-axis (wrist twist)	12.5 kg · m^2
Approx. Mass		640 kg
Power Requirements*2		5.0 kVA
Ambient Conditions	Temperature	0°C to +40°C
	Humidity	20% to 80%RH(non-condensing)
	Vibration	Less than 4.9 m/s^2
	Others	• Free from corrosive gas or liquid, or explosive gas or liquid • Free from exposure to water, oil or dust • Free from excessive electrical noise (plasma)

✻ 1 : Conforms to ISO 9283.
✻ 2 : Varies in accordance with applications and motion patterns.
Note : SI units are used for the specifications.

MOTOMAN-SDA, SIA Series

Controller Specifications

Items	DX100 Controller	FS100 Controller
Configuration	Dust proof	IP20 (open structure)
Dimensions (W)×(D)×(H), Mass	MOTOMAN-SDA5D, SDA10D, SDA20D : 500×580×880 mm, 150 kg max.(Possible to control 1 external axis.)	MOTOMAN-SDA5F, SDA10F, SDA20F : 470×475×420 mm (includes projecting parts.) 40 kg, (Possible to control 1 external axis.)
	MOTOMAN-SIA5D, SIA10D, SIA20D : 500×580×580 mm, 100 kg max.(Possible to control 1 external axis.)	MOTOMAN-SIA5F, SIA10F, SIA20F : 470×475×210 mm (includes projecting parts.) 20 kg, (Possible to control 1 external axis.)
	MOTOMAN-SIA30D, SIA50D : 425×450×1200 mm, 100 kg max.(Possible to control 2 external axes.)	
Cooling System	Indirect cooling	Direct cooling
Ambient Temperature	During operation : 0°C to+45°C During storage : -10°C to+60°C	During operation : 0°C to+40°C During storage : -10°C to+60°C
Relative Humidity	90% max. (non-condensing)	90% max. (non-condensing)
Power Supply	Three-phase 200/220 VAC (+10% to -15%), 60 Hz (±2%)(Japan) Three-phase 200 VAC (+10% to -15%), 50 Hz (±2%)(Japan)	Three-phase 200/220 VAC (+10%, -15%), 50/60 Hz Single-phase 200/230 VAC (+10%, -15%), 50/60 Hz
Grounding	Grounding resistance : 100 Ω or less	Grounding resistance : 100 Ω or less
Digital I/Os	Specialized signals : 23 inputs and 5 outputs General signals : 40 inputs and 40 outputs Max. I/O (optional) : 2,048 inputs and 2,048 outputs	Specialized signals : 19 inputs and 2 outputs General signals : 28 inputs and 28 outputs Max. I/O (optional) : 1,024 inputs and 1,024 outputs
Positioning System	Serial communications (absolute encoder)	Serial communications (absolute encoder)
Programming Capacity	JOB : 200,000 steps, 10,000 instructions CIO ladder : 20,000 steps	JOB : 10,000 steps, 1,000 instructions CIO ladder : 1,500 steps
Expansion Slots	PCI : 2 slots for main CPUs and 1 slot for servo CPU 1 additional slot for sensor board	MP2000 bus×5 slots
LAN (Connection to Host)	1(10BASE-T/100BASE-TX)	1(10BASE-T/100BASE-TX)
Interface	RS-232C : 1ch	RS-232C : 1ch
Control Method	Software servo control	Software servo control
Drive Units	SERVOPACK for AC servomotors (can be controlled up to 8 axes)	Standard 6 axes and 1 additional single-axis amplifiers can be mounted.
Items	**Programming Pendant** *	
Dimensions	169(W)×50(D)×314.5(H) mm	
Mass	0.990 kg	
Material	Reinforced plastics	
Operation Device	Select keys, axis keys(8 axes),numerical/application keys, Mode switch with key (mode : teach, play, and remote), emergency stop button, enable switch, compact flash card interface device (compact flash is optional.),USB port (1 port)	
Display	640×480 pixels color LCD, touch panel (Alphanumeric characters, Chinese characters, Japanese letters, Others)	
IEC Protection Class	IP65	
Cable Length	Standard : 8 m, Max. : 36 m (optional)	Standard : 8 m, optional : 20 m max.

*: The programming pendant for the FS100 controller is optional. The model number of the programming pendant differs from that of the programming pendant for the DX100 controller.

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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.

Certified for ISO9001 and ISO14001

JAB QMS Accreditation R009 JQA-0813 JQA-EM0202

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