

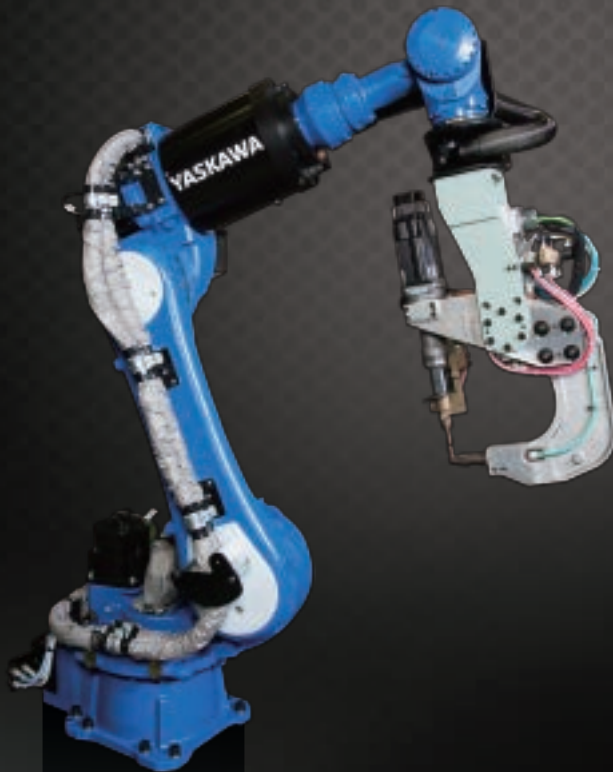
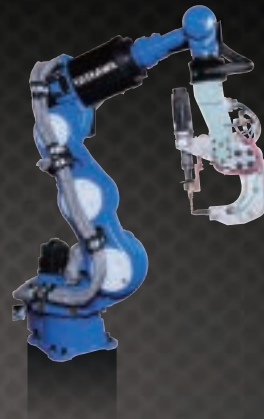
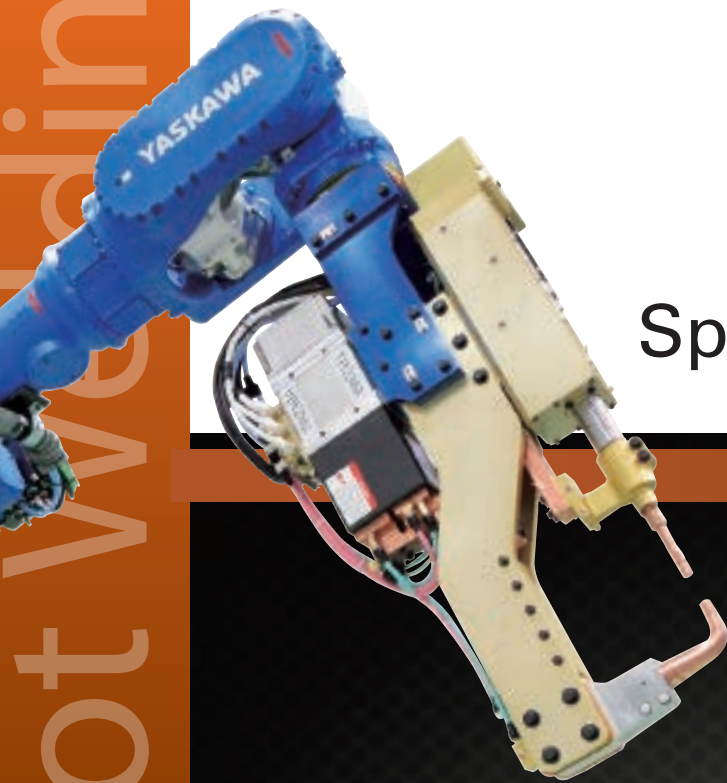
Spot Welding

YASKAWA

Spot Welding Application

| MOTOMAN-SP Series |

Compatible with YRC1000 Robot Controller



Robot System Solutions

MOTOMAN-SP Series

Find smart solutions for your production site with YASKAWA's cutting-edge robot systems.



YASKAWA has the answer

We can meet our customers' diverse needs with a wide range of functions and components.

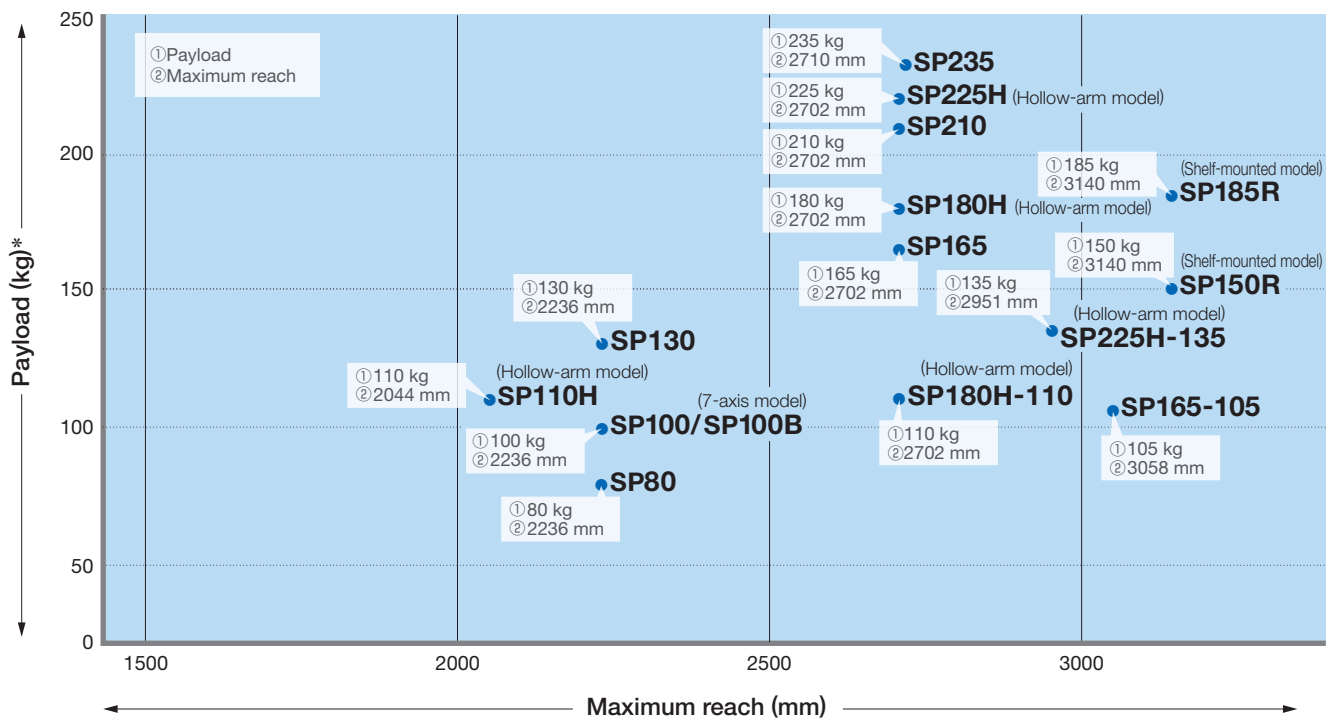


An extensive lineup to smartly solve problems at production sites

MOTOMAN-SP Series

Yaskawa has an extensive lineup of models in the MOTOMAN-SP series to support the diverse needs of customers.

Product Lineup



*: When a standard flange for cabling by Yaskawa is equipped to the tip of the wrist (excluding hollow-arm models)

6 axes



Floor-mounted models

MOTOMAN-SP80, -SP100, -SP130, -SP165, -SP165-105, -SP210, -SP235

Shelf-mounted models

MOTOMAN-SP150R, -SP185R

6 axes Hollow-arm

Reduces interference with surrounding equipment



Floor-mounted models

MOTOMAN-SP110H, -SP180H, -SP180H-110, -SP225H, -SP225H-135

A hollow-arm structure that can internally store cables for spot welding eliminates peripheral interference with cables and simplifies off-line simulation and teaching.

7 axes



E-axis added at the midpoint of the L arm

Floor-mounted model MOTOMAN-SP100B

In addition to the traditional six axes, an E-axis is added between the L-axis and U-axis, which can change the length of the L arm and expand the welding motion range.



Make equipment compact

SP100B robot with 7 axes



Offers additional value with its expanded effective motion range!

Within the extensive lineup of SP series, SP100B has a seventh E-axis at the midpoint of the L arm which expands the effective motion range and makes it suitable for actual applications.

Reduced system installation width

- Expanded effective motion range enables the construction of system layouts with shorter widths.

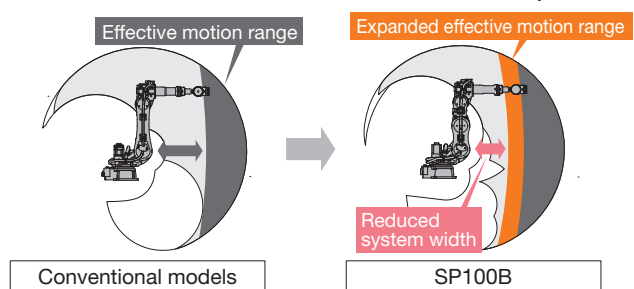
High-density installation layout

- Reduces the length of production lines, cycle times, and energy consumption.

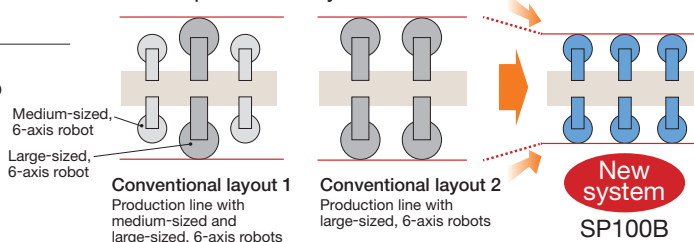
Higher flexibility in line layouts

- Reduces the number of man-hours required to design line layouts and better meets the requirements of high-mix production.

Comparison of motion ranges



Comparison of layouts



Improve equipment installation, operation, and maintenance

Easy maintenance

- Zero position data can be saved without the need to connect to a battery when replacing wire harness.
- Number of cables and connectors have been reduced for better work efficiency.

Reduced wiring time

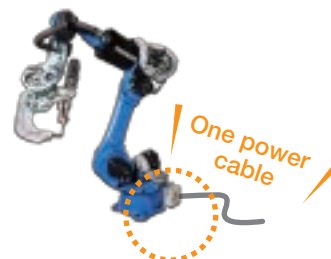
- Power cable is reduced to one cable, which reduces wiring time.



Significantly improves equipment installation, operation, and maintenance



Reduces the number of man-hours

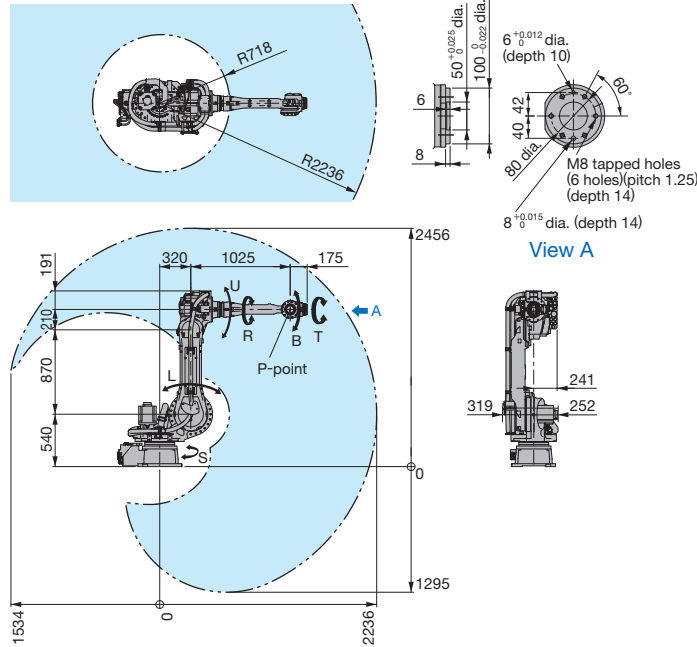


SP80



■ Dimensions Units: mm □: P-point Maximum Envelope

Note: Refer to individual dimension diagrams for detailed dimensions and specifications of the following models.



| | | | |
|--|---------------------------|--------------------------------------|------------------------|
| Model | | MOTOMAN-SP80 | |
| Flange for cabling | | Not-equipped | Equipped |
| Type | | YR-1-06VX88-A00 | |
| Controlled Axis | | 6 (vertically articulated) | |
| Payload | Wrist | 88 kg | 80 kg |
| | U -arm | 10 kg | |
| Maximum Reach | | 2236 mm | |
| Repeatability*1 | | 0.03 mm | |
| Range of Motion | S -axis (turning) | - 180° - +180° | |
| | L -axis (lower arm) | - 90° - +155° | |
| | U -axis (upper arm)*2 | - 80° - + 90° | |
| | R -axis (wrist roll) | - 360° - +360° | - 205° - +205° |
| | B -axis (wrist pitch/yaw) | - 125° - +125° | - 120° - +120° |
| | T -axis (wrist twist) | - 360° - +360° | - 180° - +180° |
| Maximum Speed | S -axis (turning) | 2.97 rad/s, 170°/s | |
| | L -axis (lower arm) | 2.44 rad/s, 140°/s | |
| | U -axis (upper arm) | 2.79 rad/s, 160°/s | |
| | R -axis (wrist roll) | 4.01 rad/s, 230°/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) | 408 N·m | 389 N·m |
| | B -axis (wrist pitch/yaw) | 408 N·m | 389 N·m |
| | T -axis (wrist twist) | 206 N·m | |
| Allowable Inertia (GD ² /4) | R -axis (wrist roll) | 30 kg·m ² | 28 kg·m ² |
| | B -axis (wrist pitch/yaw) | 30 kg·m ² | 28 kg·m ² |
| | T -axis (wrist twist) | 11 kg·m ² | 10.3 kg·m ² |
| Approx. Mass | | 630 kg | |
| IEC Protection Class | | Body: IP54, Wrist: IP67 | |
| Ambient Conditions | Temperature | 0 °C to +45 °C | |
| | Humidity | 20% to 80%RH (non-condensing) | |
| | Vibration | 4.9 m/s ² (0.5 G) or less | |
| | Altitude | 1000 m or less | |
| Power Requirements*3 | | 4.0 kVA | |
| Mounting*4 | | Floor, ceiling, wall, tilt | |

*1: Conforms to ISO 9283.

*2: The range of motion of the U-axis itself. Not with respect to the ground.

*3: Varies in accordance with applications and motion patterns.

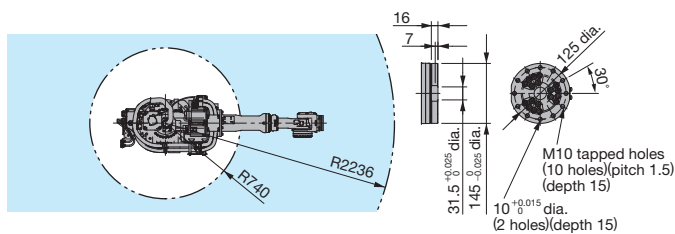
*4: There are motion limitations on S-axis for wall, tilt mounting type.

Note: SI units are used for the specifications.

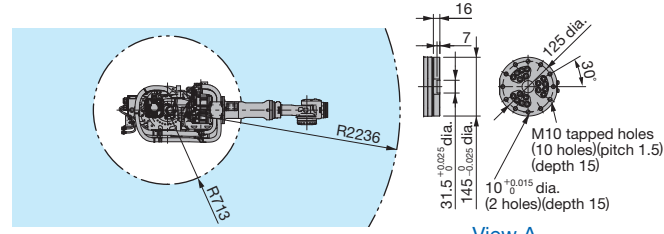
SP100



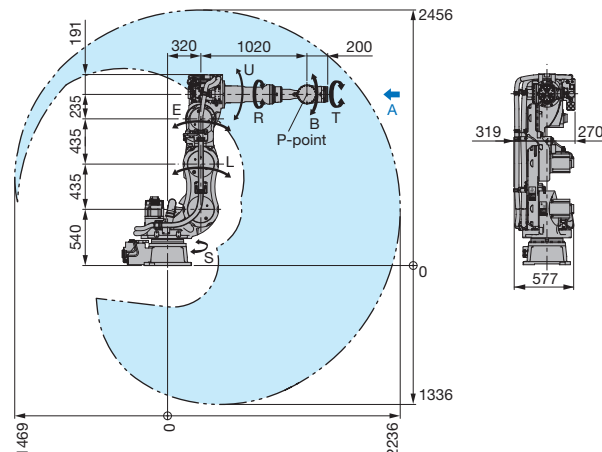
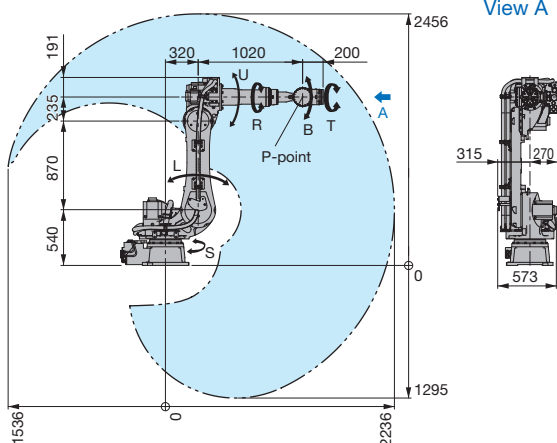
7-axis model SP100B



View A



View A



| Model | | MOTOMAN-SP100 | | MOTOMAN-SP100B | |
|--|---------------------------|--------------------------------------|----------------------|----------------------------|----------------------|
| Flange for cabling | | Not-equipped | Equipped | Not-equipped | Equipped |
| Type | | YR-1-06VX110-A00 | | YR-1-07VXB110-A00 | |
| Controlled Axis | | 6 (vertically articulated) | | 7 (vertically articulated) | |
| Payload | Wrist | 110 kg | 100 kg | 110 kg | 100 kg |
| | U -arm | 10 kg | | 10 kg | |
| Maximum Reach | | 2236 mm | | 2236 mm | |
| Repeatability*1 | | 0.03 mm | | 0.04 mm | |
| Range of Motion | S -axis (turning) | - 180° - +180° | | - 180° - +180° | |
| | L -axis (lower arm) | - 90° - +155° | | - 45° - +155° | |
| | E -axis (middle arm) | | | - 45° - +120° | |
| | U -axis (upper arm)*2 | - 80° - + 90° | | - 70° - + 90° | |
| | R -axis (wrist roll) | - 360° - +360° | - 205° - +205° | - 360° - +360° | - 205° - +205° |
| | B -axis (wrist pitch/yaw) | - 125° - +125° | - 120° - +120° | - 125° - +125° | - 120° - +120° |
| | T -axis (wrist twist) | - 360° - +360° | - 205° - +205° | - 360° - +360° | - 205° - +205° |
| Maximum Speed | S -axis (turning) | 2.45 rad/s, 140°/s | | 2.45 rad/s, 140°/s | |
| | L -axis (lower arm) | 1.92 rad/s, 110°/s | | 1.92 rad/s, 110°/s | |
| | E -axis (middle arm) | | | 1.92 rad/s, 110°/s | |
| | U -axis (upper arm) | 2.27 rad/s, 130°/s | | 2.27 rad/s, 130°/s | |
| | R -axis (wrist roll) | 3.05 rad/s, 175°/s | | 3.05 rad/s, 175°/s | |
| | B -axis (wrist pitch/yaw) | 3.05 rad/s, 175°/s | | 3.05 rad/s, 175°/s | |
| | T -axis (wrist twist) | 4.44 rad/s, 255°/s | | 4.45 rad/s, 255°/s | |
| Allowable Moment | R -axis (wrist roll) | 721 N·m | 696 N·m | 721 N·m | 696 N·m |
| | B -axis (wrist pitch/yaw) | 721 N·m | 696 N·m | 721 N·m | 696 N·m |
| | T -axis (wrist twist) | 294 N·m | | 294 N·m | |
| Allowable Inertia (GD ² /4) | R -axis (wrist roll) | 60 kg·m ² | 58 kg·m ² | 60 kg·m ² | 58 kg·m ² |
| | B -axis (wrist pitch/yaw) | 60 kg·m ² | 58 kg·m ² | 60 kg·m ² | 58 kg·m ² |
| | T -axis (wrist twist) | 33.7 kg·m ² | 33 kg·m ² | 33.7 kg·m ² | 33 kg·m ² |
| Approx. Mass | | 660 kg | | 790 kg | |
| IEC Protection Class | | Body: IP54, Wrist: IP67 | | | |
| Ambient Conditions | Temperature | 0 °C to +45 °C | | | |
| | Humidity | 20% to 80%RH (non-condensing) | | | |
| | Vibration | 4.9 m/s ² (0.5 G) or less | | | |
| | Altitude | 1000 m or less | | | |
| Power Requirements*3 | | 5.0 kVA | | | |
| Mounting | | Floor | | | |

*1: Conforms to ISO 9283.

*2: The range of motion of the U-axis itself. Not with respect to the ground.

*3: Varies in accordance with applications and motion patterns.

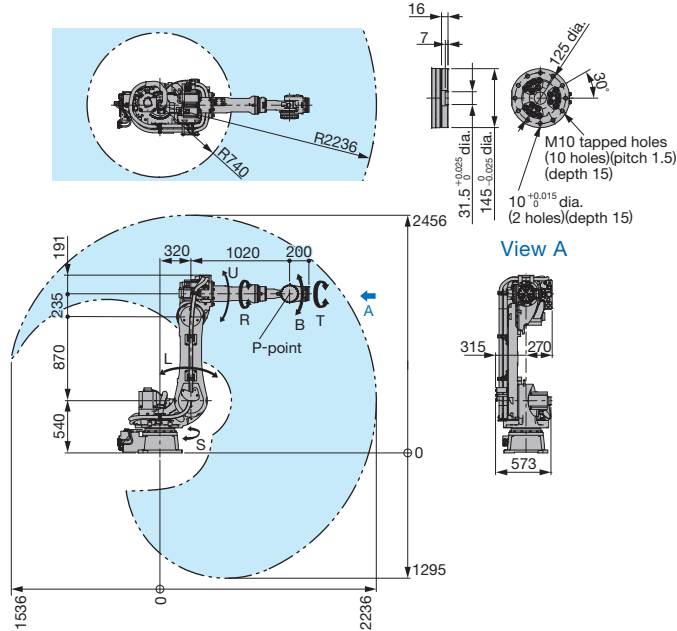
Note: SI units are used for the specifications.

SP130



■ Dimensions Units: mm □ P-point Maximum Envelope

Note: Refer to individual dimension diagrams for detailed dimensions and specifications of the following models.



| | | | |
|--|---------------------------|--------------------------------------|----------------------|
| Model | | MOTOMAN-SP130 | |
| Flange for cabling | | Not-equipped | Equipped |
| Type | | YR-1-06VX140-A00 | |
| Controlled Axis | | 6 (vertically articulated) | |
| Payload | Wrist | 140 kg | 130 kg |
| | U -arm | 10 kg | |
| Maximum Reach | | 2236 mm | |
| Repeatability*1 | | 0.03 mm | |
| Range of Motion | S -axis (turning) | - 180° - +180° | |
| | L -axis (lower arm) | - 90° - +155° | |
| | U -axis (upper arm)*2 | - 80° - + 90° | |
| | R -axis (wrist roll) | - 360° - +360° | - 205° - +205° |
| | B -axis (wrist pitch/yaw) | - 125° - +125° | - 120° - +120° |
| | T -axis (wrist twist) | - 360° - +360° | - 205° - +205° |
| Maximum Speed | S -axis (turning) | 2.45 rad/s, 140°/s | |
| | L -axis (lower arm) | 1.92 rad/s, 110°/s | |
| | U -axis (upper arm) | 2.27 rad/s, 130°/s | |
| | R -axis (wrist roll) | 3.05 rad/s, 175°/s | |
| | B -axis (wrist pitch/yaw) | 3.05 rad/s, 175°/s | |
| | T -axis (wrist twist) | 4.44 rad/s, 255°/s | |
| Allowable Moment | R -axis (wrist roll) | 845 N·m | 820 N·m |
| | B -axis (wrist pitch/yaw) | 845 N·m | 820 N·m |
| | T -axis (wrist twist) | 360 N·m | |
| Allowable Inertia (GD ² /4) | R -axis (wrist roll) | 73 kg·m ² | 71 kg·m ² |
| | B -axis (wrist pitch/yaw) | 73 kg·m ² | 71 kg·m ² |
| | T -axis (wrist twist) | 38.7 kg·m ² | 38 kg·m ² |
| Approx. Mass | | 660 kg | |
| IEC Protection Class | | Body: IP54, Wrist: IP67 | |
| Ambient Conditions | Temperature | 0 °C to +45 °C | |
| | Humidity | 20% to 80%RH (non-condensing) | |
| | Vibration | 4.9 m/s ² (0.5 G) or less | |
| | Altitude | 1000 m or less | |
| Power Requirements*3 | | 5.0 kVA | |
| Mounting | | Floor | |

*1: Conforms to ISO 9283.

*2: The range of motion of the U-axis itself. Not with respect to the ground.

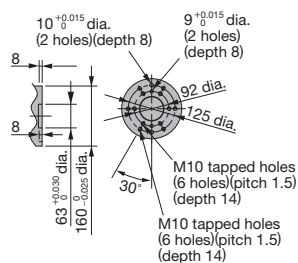
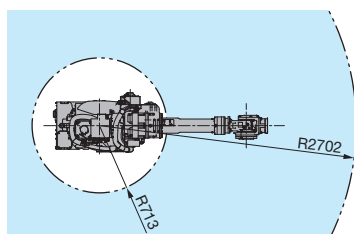
*3: Varies in accordance with applications and motion patterns.

Note: SI units are used for the specifications.

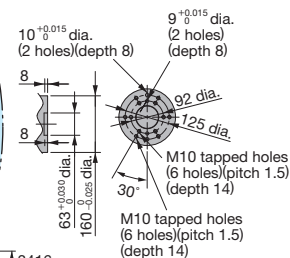
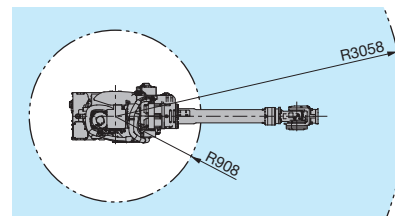
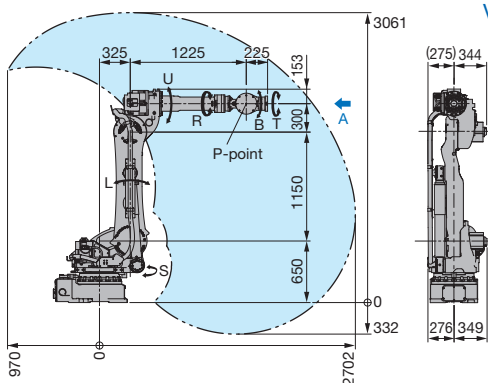
SP165



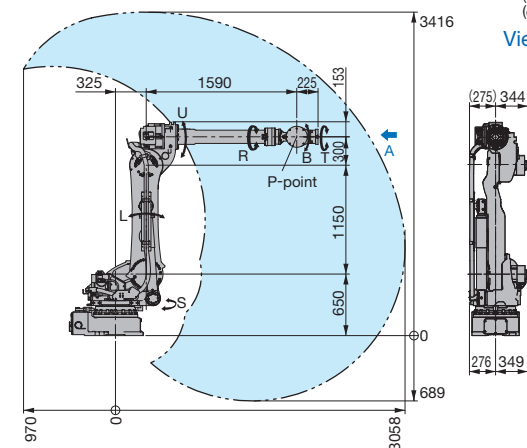
SP165-105



View A



View A



| Model | | MOTOMAN-SP165 | | MOTOMAN-SP165-105 | |
|--|---------------------------|--------------------------------------|----------------------|----------------------------|----------------------|
| Flange for cabling | | Not-equipped | Equipped | Not-equipped | Equipped |
| Type | | YR-1-06VX180-A00 | | YR-1-06VX180-120-A00 | |
| Controlled Axis | | 6 (vertically articulated) | | 6 (vertically articulated) | |
| Payload | Wrist | 180 kg | 165 kg | 120 kg | 105 kg |
| | U -arm | 30 kg | | 30 kg | |
| Maximum Reach | | 2702 mm | | 3058 mm | |
| Repeatability*1 | | 0.05 mm | | 0.05 mm | |
| Range of Motion | S -axis (turning) | - 180° - +180° | | - 180° - +180° | |
| | L -axis (lower arm) | - 60° - + 76° | | - 60° - + 76° | |
| | U -axis (upper arm)*2 | - 86° - + 90° | | - 86° - + 90° | |
| | R -axis (wrist roll) | - 360° - +360° | - 210° - +210° | - 360° - +360° | - 210° - +210° |
| | B -axis (wrist pitch/yaw) | - 130° - +130° | - 125° - +125° | - 130° - +130° | - 125° - +125° |
| | T -axis (wrist twist) | - 360° - +360° | - 210° - +210° | - 360° - +360° | - 210° - +210° |
| Maximum Speed | S -axis (turning) | 2.18 rad/s, 125°/s | | 2.18 rad/s, 125°/s | |
| | L -axis (lower arm) | 2.01 rad/s, 115°/s | | 2.01 rad/s, 115°/s | |
| | U -axis (upper arm) | 2.18 rad/s, 125°/s | | 2.18 rad/s, 125°/s | |
| | R -axis (wrist roll) | 3.18 rad/s, 182°/s | | 3.18 rad/s, 182°/s | |
| | B -axis (wrist pitch/yaw) | 3.05 rad/s, 175°/s | | 3.05 rad/s, 175°/s | |
| | T -axis (wrist twist) | 4.63 rad/s, 265°/s | | 4.63 rad/s, 265°/s | |
| Allowable Moment | R -axis (wrist roll) | 1000 N·m | 951 N·m | 883 N·m | 834 N·m |
| | B -axis (wrist pitch/yaw) | 1000 N·m | 951 N·m | 883 N·m | 834 N·m |
| | T -axis (wrist twist) | 618 N·m | | 520 N·m | |
| Allowable Inertia (GD ² /4) | R -axis (wrist roll) | 90 kg·m ² | 88 kg·m ² | 79 kg·m ² | 77 kg·m ² |
| | B -axis (wrist pitch/yaw) | 90 kg·m ² | 88 kg·m ² | 79 kg·m ² | 77 kg·m ² |
| | T -axis (wrist twist) | 46.3 kg·m ² | | 40 kg·m ² | |
| Approx. Mass | | 1020 kg | | 1090 kg | |
| IEC Protection Class | | Body: IP54, Wrist: IP67 | | | |
| Ambient Conditions | Temperature | 0 °C to +45 °C | | | |
| | Humidity | 20% to 80%RH (non-condensing) | | | |
| | Vibration | 4.9 m/s ² (0.5 G) or less | | | |
| | Altitude | 1000 m or less | | | |
| Power Requirements*3 | | 5.0 kVA | | | |
| Mounting | | Floor | | | |

*1: Conforms to ISO 9283.

*2: The range of motion of the U-axis itself. Not with respect to the ground.

*3: Varies in accordance with applications and motion patterns.

Note: SI units are used for the specifications.

SP210

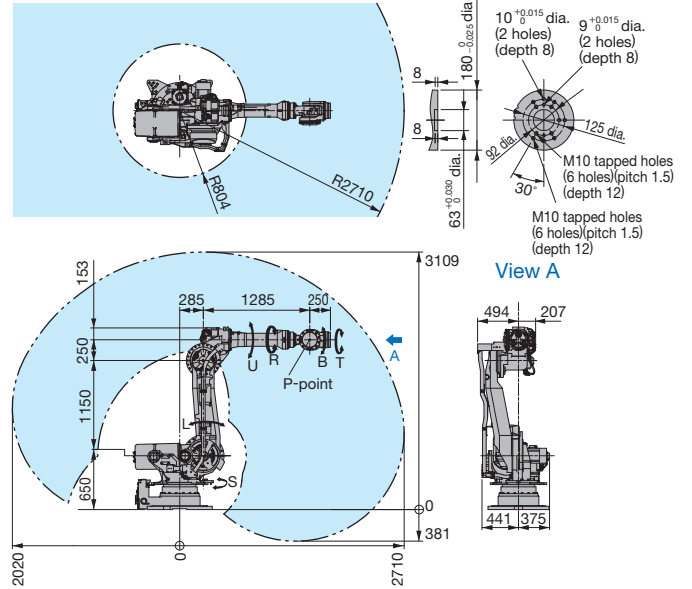
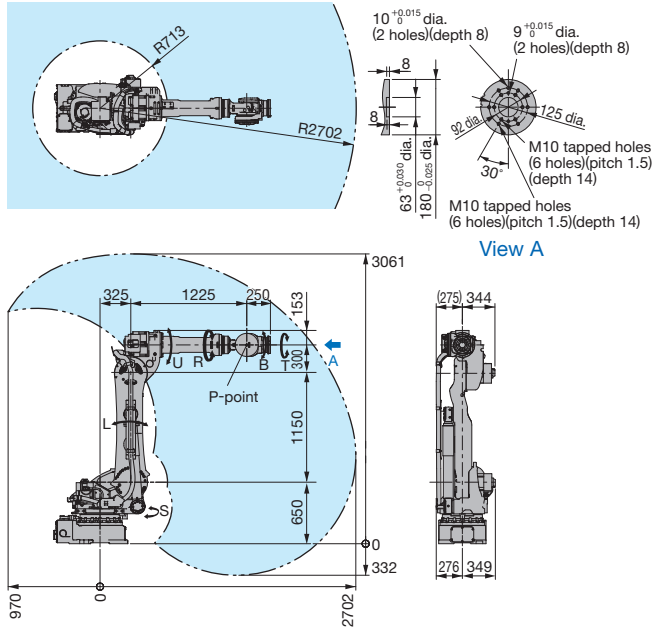


SP235



■ Dimensions Units: mm □: P-point Maximum Envelope

Note: Refer to individual dimension diagrams for detailed dimensions and specifications of the following models.



| Model | MOTOMAN-SP210 | | MOTOMAN-SP235 | | |
|--|----------------------------|--------------------------------------|----------------------------|-----------------------|-----------------------|
| Flange for cabling | Not-equipped | Equipped | Not-equipped | Equipped | |
| Type | YR-1-06VX225-A00 | | YR-1-06VX250-A00 | | |
| Controlled Axis | 6 (vertically articulated) | | 6 (vertically articulated) | | |
| Payload | Wrist | 225 kg | 210 kg | 250 kg | |
| | U -arm | 30 kg | | 235 kg | |
| Maximum Reach | 2702 mm | | 2710 mm | | |
| Repeatability*1 | 0.05 mm | | 0.05 mm | | |
| Range of Motion | S -axis (turning) | - 180° - +180° | | - 180° - +180° | |
| | L -axis (lower arm) | - 60° - + 76° | | - 60° - + 76° | |
| | U -axis (upper arm)*2 | - 86° - + 90° | | - 77.8° - +197° | |
| | R -axis (wrist roll) | - 360° - +360° | - 210° - +210° | - 360° - +360° | - 205° - +205° |
| | B -axis (wrist pitch/yaw) | - 125° - +125° | | - 125° - +125° | - 120° - +120° |
| | T -axis (wrist twist) | - 360° - +360° | - 210° - +210° | - 360° - +360° | - 180° - +180° |
| Maximum Speed | S -axis (turning) | 2.09 rad/s, 120°/s | | 1.75 rad/s, 100°/s | |
| | L -axis (lower arm) | 1.69 rad/s, 97°/s | | 1.57 rad/s, 90°/s | |
| | U -axis (upper arm) | 2.01 rad/s, 115°/s | | 1.69 rad/s, 97°/s | |
| | R -axis (wrist roll) | 2.53 rad/s, 145°/s | | 2.09 rad/s, 120°/s | |
| | B -axis (wrist pitch/yaw) | 2.53 rad/s, 145°/s | | 2.09 rad/s, 120°/s | |
| | T -axis (wrist twist) | 3.84 rad/s, 220°/s | | 3.32 rad/s, 190°/s | |
| Allowable Moment | R -axis (wrist roll) | 1372 N·m | 1323 N·m | 1385 N·m | 1333 N·m |
| | B -axis (wrist pitch/yaw) | 1372 N·m | 1323 N·m | 1385 N·m | 1333 N·m |
| | T -axis (wrist twist) | 735 N·m | | 735 N·m | |
| Allowable Inertia (GD ² /4) | R -axis (wrist roll) | 145 kg·m ² | 143 kg·m ² | 317 kg·m ² | 315 kg·m ² |
| | B -axis (wrist pitch/yaw) | 145 kg·m ² | 143 kg·m ² | 317 kg·m ² | 315 kg·m ² |
| | T -axis (wrist twist) | 84 kg·m ² | | 200 kg·m ² | |
| Approx. Mass | 1080 kg | | 1345 kg | | |
| IEC Protection Class | Body: IP54, Wrist: IP67 | | | | |
| Ambient Conditions | Temperature | 0°C to +45°C | | | |
| | Humidity | 20% to 80%RH (non-condensing) | | | |
| | Vibration | 4.9 m/s ² (0.5 G) or less | | | |
| | Altitude | 1000 m or less | | | |
| Power Requirements*3 | 5.0 kVA | | | | |
| Mounting | Floor | | | | |

*1: Conforms to ISO 9283.

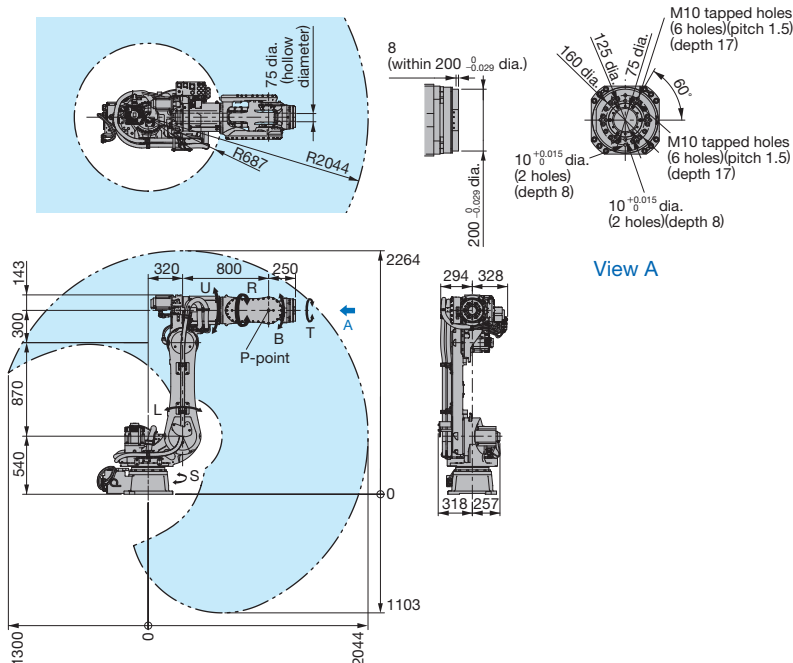
*2: The range of motion of the U-axis itself. Not with respect to the ground.

*3: Varies in accordance with applications and motion patterns.

Note: SI units are used for the specifications.

Hollow-arm model

SP110H



View A

| | | |
|--|---------------------------|--------------------------------------|
| Model | | MOTOMAN-SP110H |
| Flange for cabling | | Not-equipped |
| Type | | YR-1-06VXH110-A00 |
| Controlled Axis | | 6 (vertically articulated) |
| Payload | Wrist | 110 kg |
| | U -arm | 30 kg |
| Maximum Reach | | 2044 mm |
| Repeatability*1 | | 0.05 mm |
| Range of Motion | S -axis (turning) | - 180° - +180° |
| | L -axis (lower arm) | - 90° - +155° |
| | U -axis (upper arm)*2 | - 86° - + 90° |
| | R -axis (wrist roll) | - 210° - +210° |
| | B -axis (wrist pitch/yaw) | - 130° - +130° |
| | T -axis (wrist twist) | - 360° - +360° (- 210° - +210°)*4 |
| Maximum Speed | S -axis (turning) | 2.44 rad/s, 140°/s |
| | L -axis (lower arm) | 2.00 rad/s, 115°/s |
| | U -axis (upper arm) | 2.80 rad/s, 161°/s |
| | R -axis (wrist roll) | 3.92 rad/s, 225°/s |
| | B -axis (wrist pitch/yaw) | 3.49 rad/s, 200°/s |
| | T -axis (wrist twist) | 5.49 rad/s, 315°/s |
| Allowable Moment | R -axis (wrist roll) | 721 N·m |
| | B -axis (wrist pitch/yaw) | 721 N·m |
| | T -axis (wrist twist) | 315 N·m |
| Allowable Inertia (GD ² /4) | R -axis (wrist roll) | 85 kg·m ² |
| | B -axis (wrist pitch/yaw) | 85 kg·m ² |
| | T -axis (wrist twist) | 45 kg·m ² |
| Approx. Mass | | 730 kg |
| IEC Protection Class | | Body: IP54, Wrist: IP65 |
| Ambient Conditions | Temperature | 0 °C to +45 °C |
| | Humidity | 20% to 80%RH (non-condensing) |
| | Vibration | 4.9 m/s ² (0.5 G) or less |
| | Altitude | 1000 m or less |
| Power Requirements*3 | | 5.0 kVA |
| Mounting | | Floor |

*1: Conforms to ISO 9283.

*2: The range of motion of the U-axis itself. Not with respect to the ground.

*3: Varies in accordance with applications and motion patterns.

*4: The value in parenthesis is the motion range when standard external cabling by Yaskawa is mounted to the manipulator.
Note: SI units are used for the specifications.

Hollow-arm model

SP180H



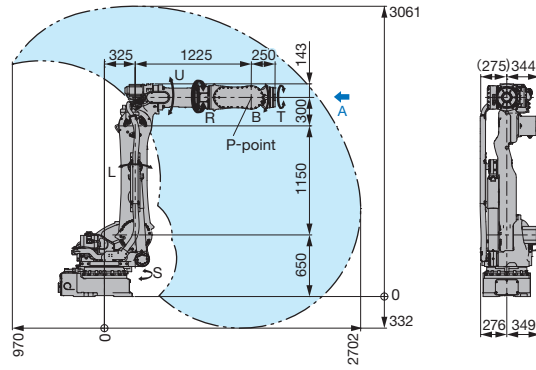
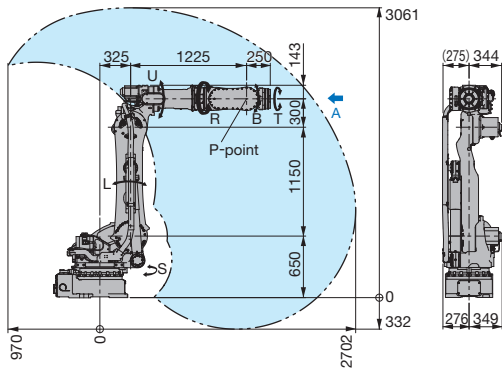
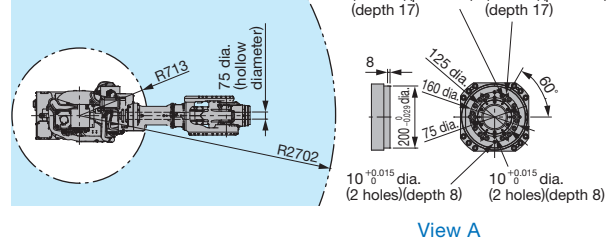
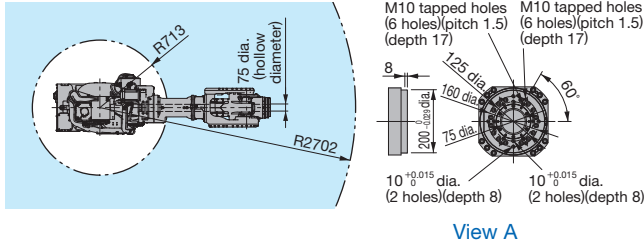
Hollow-arm model

SP180H-110



■ Dimensions Units: mm □: P-point Maximum Envelope

Note: Refer to individual dimension diagrams for detailed dimensions and specifications of the following models.



| Model | MOTOMAN-SP180H | MOTOMAN-SP180H-110 |
|--|--|--------------------------------------|
| Flange for cabling | Not-equipped | Not-equipped |
| Type | YR-1-06VXH180-A00 | YR-1-06VXH180-A10 |
| Controlled Axis | 6 (vertically articulated) | 6 (vertically articulated) |
| Payload | Wrist | 180 kg |
| | U -arm | 30 kg |
| Maximum Reach | 2702 mm | 2702 mm |
| Repeatability*1 | 0.05 mm | 0.05 mm |
| Range of Motion | S -axis (turning) | -180° - +180° |
| | L -axis (lower arm) | -60° - +76° |
| | U -axis (upper arm)*2 | -86° - +90° |
| | R -axis (wrist roll) | -210° - +210° |
| | B -axis (wrist pitch/yaw) | -130° - +130° |
| | T -axis (wrist twist) | -360° - +360° (-210° - +210°)*4 |
| Maximum Speed | S -axis (turning) | 2.09 rad/s, 120°/s |
| | L -axis (lower arm) | 1.69 rad/s, 97°/s |
| | U -axis (upper arm) | 2.01 rad/s, 115°/s |
| | R -axis (wrist roll) | 2.62 rad/s, 150°/s |
| | B -axis (wrist pitch/yaw) | 2.62 rad/s, 150°/s |
| | T -axis (wrist twist) | 4.01 rad/s, 230°/s |
| Allowable Moment | R -axis (wrist roll) | 1000 N·m |
| | B -axis (wrist pitch/yaw) | 1000 N·m |
| | T -axis (wrist twist) | 618 N·m |
| | Allowable Inertia (GD ² /4) | 104 kg·m ² |
| Allowable Inertia (GD ² /4) | B -axis (wrist pitch/yaw) | 104 kg·m ² |
| | T -axis (wrist twist) | 52 kg·m ² |
| | Approx. Mass | 1090 kg |
| IEC Protection Class | Body: IP54, Wrist: IP65 | |
| Ambient Conditions | Temperature | 0°C to +45°C |
| | Humidity | 20% to 80%RH (non-condensing) |
| | Vibration | 4.9 m/s ² (0.5 G) or less |
| | Altitude | 1000 m or less |
| Power Requirements*3 | 5.0 kVA | |
| Mounting | Floor | |

*1: Conforms to ISO 9283.

*2: The range of motion of the U-axis itself. Not with respect to the ground.

*3: Varies in accordance with applications and motion patterns.

*4: The value in parenthesis is the motion range when standard external cabling by Yaskawa is mounted to the manipulator.

Note: SI units are used for the specifications.

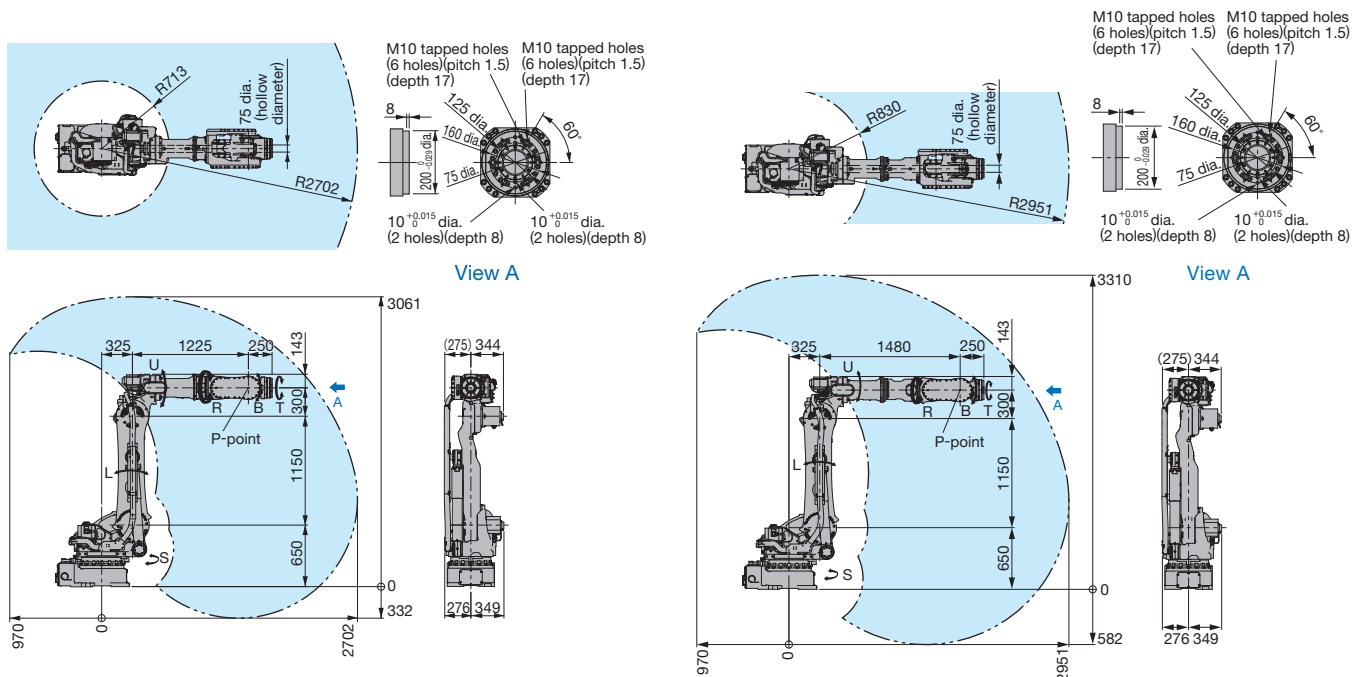
Hollow-arm model

SP225H



Hollow-arm model

SP225H-135



| Model | | MOTOMAN-SP225H | MOTOMAN-SP225H-135 |
|--|---------------------------|--------------------------------------|---------------------------------|
| Flange for cabling | | Not-equipped | Not-equipped |
| Type | | YR-1-06VXH225-A00 | YR-1-06VXH225-A10 |
| Controlled Axis | | 6 (vertically articulated) | 6 (vertically articulated) |
| Payload | Wrist | 225 kg | 135 kg |
| | U -arm | 30 kg | 30 kg |
| Maximum Reach | | 2702 mm | 2951 mm |
| Repeatability*1 | | 0.05 mm | 0.05 mm |
| Range of Motion | S -axis (turning) | -180° - +180° | -180° - +180° |
| | L -axis (lower arm) | -60° - +76° | -60° - +76° |
| | U -axis (upper arm)*2 | -86° - +90° | -86° - +90° |
| | R -axis (wrist roll) | -210° - +210° | -210° - +210° |
| | B -axis (wrist pitch/yaw) | -130° - +130° | -130° - +130° |
| | T -axis (wrist twist) | -360° - +360° (-210° - +210°)*4 | -360° - +360° (-210° - +210°)*4 |
| Maximum Speed | S -axis (turning) | 2.09 rad/s, 120°/s | 2.18 rad/s, 125°/s |
| | L -axis (lower arm) | 1.69 rad/s, 97°/s | 2.01 rad/s, 115°/s |
| | U -axis (upper arm) | 2.01 rad/s, 115°/s | 2.01 rad/s, 115°/s |
| | R -axis (wrist roll) | 2.62 rad/s, 150°/s | 3.18 rad/s, 182°/s |
| | B -axis (wrist pitch/yaw) | 2.62 rad/s, 150°/s | 3.05 rad/s, 175°/s |
| | T -axis (wrist twist) | 4.01 rad/s, 230°/s | 4.63 rad/s, 265°/s |
| Allowable Moment | R -axis (wrist roll) | 1372 N·m | 883 N·m |
| | B -axis (wrist pitch/yaw) | 1372 N·m | 883 N·m |
| | T -axis (wrist twist) | 735 N·m | 520 N·m |
| Allowable Inertia (GD ² /4) | R -axis (wrist roll) | 209.8 kg·m ² | 85 kg·m ² |
| | B -axis (wrist pitch/yaw) | 209.8 kg·m ² | 85 kg·m ² |
| | T -axis (wrist twist) | 162.1 kg·m ² | 40 kg·m ² |
| Approx. Mass | | 1090 kg | 1110 kg |
| IEC Protection Class | | Body: IP54, Wrist: IP65 | |
| Ambient Conditions | Temperature | 0 °C to +45 °C | |
| | Humidity | 20% to 80%RH (non-condensing) | |
| | Vibration | 4.9 m/s ² (0.5 G) or less | |
| | Altitude | 1000 m or less | |
| Power Requirements*3 | | 5.0 kVA | |
| Mounting | | Floor | |

*1: Conforms to ISO 9283.

*2: The range of motion of the U-axis itself. Not with respect to the ground.

*3: Varies in accordance with applications and motion patterns.

*4: The value in parenthesis is the motion range when standard external cabling by Yaskawa is mounted to the manipulator.

Note: SI units are used for the specifications.

Shelf-mounted model

SP150R

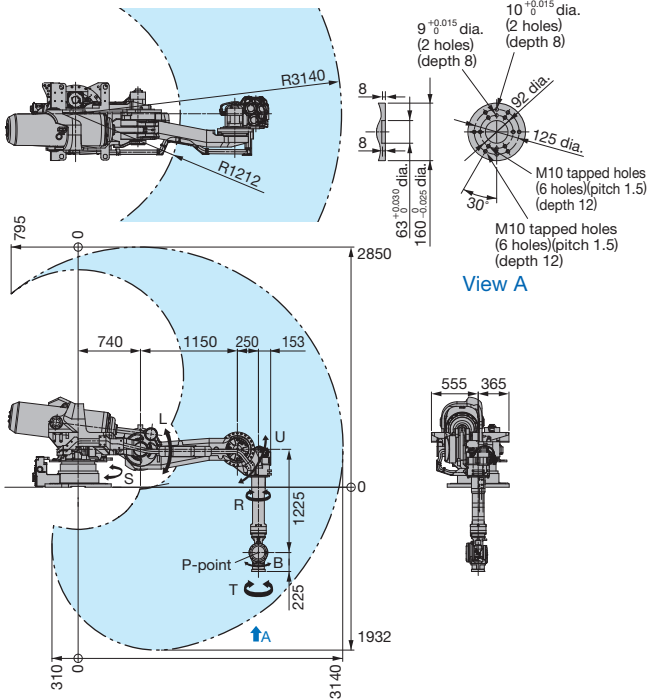


Shelf-mounted model

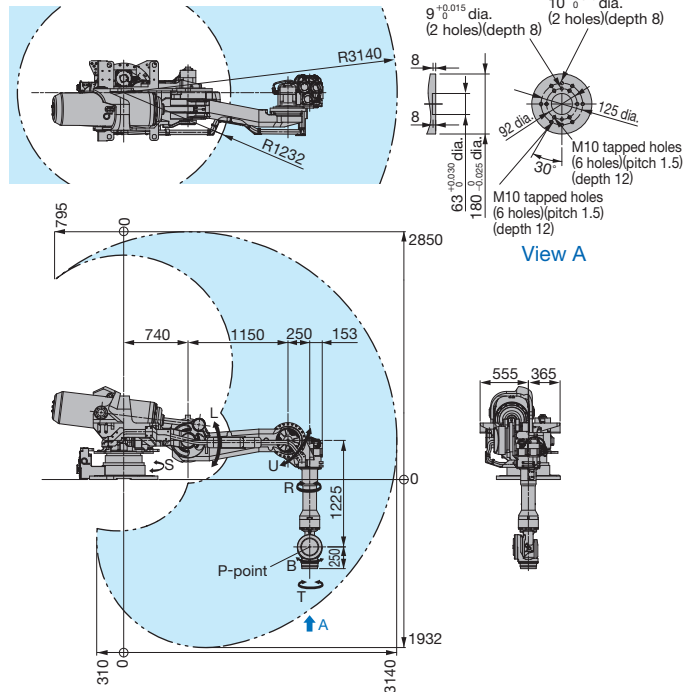
SP185R



■ Dimensions Units: mm □ : P-point Maximum Envelope



Note: Refer to individual dimension diagrams for detailed dimensions and specifications of the following models.



| Model | MOTOMAN-SP150R | | MOTOMAN-SP185R | |
|--|----------------------------|--------------------------------------|----------------------|-----------------------|
| Flange for cabling | Not-equipped | Equipped | Not-equipped | Equipped |
| Type | YR-1-06VR165-A00 | | YR-1-06VR200-A00 | |
| Controlled Axis | 6 (vertically articulated) | | | |
| Payload | Wrist | 165 kg | 150 kg | 200 kg |
| | U -arm | 30 kg | | 30 kg |
| Maximum Reach | 3140 mm | | 3140 mm | |
| Repeatability*1 | 0.05 mm | | | |
| Range of Motion | S -axis (turning) | - 180° - +180° | | - 180° - +180° |
| | L -axis (lower arm) | - 130° - + 80° | | - 130° - + 80° |
| | U -axis (upper arm)*2 | - 79.4° - + 78° | | - 78.4° - + 78° |
| | R -axis (wrist roll) | - 360° - +360° | - 205° - +205° | - 360° - +360° |
| | B -axis (wrist pitch/yaw) | - 130° - +130° | - 120° - +120° | - 125° - +125° |
| | T -axis (wrist twist) | - 360° - +360° | - 180° - +180° | - 360° - +360° |
| Maximum Speed | S -axis (turning) | 1.83 rad/s, 105°/s | | 1.57 rad/s, 90°/s |
| | L -axis (lower arm) | 1.83 rad/s, 105°/s | | 1.48 rad/s, 85°/s |
| | U -axis (upper arm) | 1.83 rad/s, 105°/s | | 1.48 rad/s, 85°/s |
| | R -axis (wrist roll) | 3.05 rad/s, 175°/s | | 2.09 rad/s, 120°/s |
| | B -axis (wrist pitch/yaw) | 2.62 rad/s, 150°/s | | 2.09 rad/s, 120°/s |
| | T -axis (wrist twist) | 4.19 rad/s, 240°/s | | 3.32 rad/s, 190°/s |
| Allowable Moment | R -axis (wrist roll) | 921 N·m | 868 N·m | 1344 N·m |
| | B -axis (wrist pitch/yaw) | 921 N·m | 868 N·m | 1344 N·m |
| | T -axis (wrist twist) | 490 N·m | | 715 N·m |
| Allowable Inertia (GD ² /4) | R -axis (wrist roll) | 85 kg·m ² | 83 kg·m ² | 143 kg·m ² |
| | B -axis (wrist pitch/yaw) | 85 kg·m ² | 83 kg·m ² | 141 kg·m ² |
| | T -axis (wrist twist) | 45 kg·m ² | | 80 kg·m ² |
| Approx. Mass | 1760 kg | | 1830 kg | |
| IEC Protection Class | Body: IP54, Wrist: IP67 | | | |
| Ambient Conditions | Temperature | 0°C to +45°C | | |
| | Humidity | 20% to 80%RH (non-condensing) | | |
| | Vibration | 4.9 m/s ² (0.5 G) or less | | |
| | Altitude | 1000 m or less | | |
| Power Requirements*3 | 5.0 kVA | | | |
| Mounting | Shelf | | | |

*1: Conforms to ISO 9283.

*2: The range of motion of the U-axis itself. Not with respect to the ground.

*3: Varies in accordance with applications and motion patterns.

Note: SI units are used for the specifications.

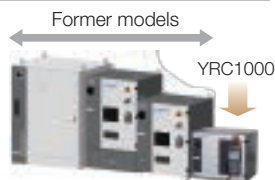
YRC1000 Robot Controller



Make equipment compact

Smallest size in the world reduces installation space

This 125 L compact size controller does not require a transformer and has built-in external axis amplifiers for three axes*.



Realized this size by building in three external axes* and eliminating the need for a transformer.



Standardization of equipment

Global standardization (Universal size)

- Common size for use in Japan and overseas.
- Overseas models do not require a transformer to adapt to the required power supply voltage.



Improve work efficiency

New motion control (high precision and high speed)

- Cycle time improved by max. 10% (compared with the former model) due to optimized acceleration/deceleration control (depends on conditions).
- Significantly reduces error in path accuracy caused by differences in motion speed (improved by 80% compared with the former model).

Lighter programming pendant with better operability

- Weighs only 730 g, the lightest programming pendant in its class, with improved cable installation.
- Can confirm robot positions and postures on the 3D robot model display.
- Touch screen allows intuitive operation to easily move the cursor and scroll.



Saves energy with the power regeneration function

Energy generated during motor deceleration (regenerative power) is returned to the power supply. This reduces electric power consumption by a maximum of 30% compared with the former model (depends on applications and motion patterns).

YRC1000 Robot Controller Specifications

| Items | Specifications |
|--------------------------|--|
| Configuration | Dust proof structure IP54 (area of backside duct fan: IP2X) |
| Dimensions | 598 (W)×427 (D)×490 (H) mm, 125 L |
| Approx. Mass | 85 kg max. (External axis amplifiers for up to three axes can be built in.)* |
| Cooling System | Indirect cooling |
| Ambient Temperature | During operation: 0°C to +45°C, During storage: -10°C to +60°C |
| Relative Humidity | 90% max. (non-condensing) |
| Altitude | 2000 m (with temperature derating) Derating condition of over 1000 m: max. ambient temperature decreases 1% per 100 m. |
| Power Supply | Japan: three-phase 200 VAC to 240 VAC (+10% to -15%), 50/60 Hz (±2%) Asia and Europe: three-phase 380 VAC to 440 VAC (+10% to -15%), 50/60 Hz (±2%) (neutral grounding) North America: three-phase 380 VAC to 480 VAC (+10% to -15%), 50/60 Hz (±2%) (neutral grounding) |
| Grounding | Grounding resistance: 100 Ω or less for 200-V class, 10 Ω or less for 400-V class |
| Digital I/Os | Specialized signals: 19 inputs and 6 outputs General signals: 40 inputs and 40 outputs (32 transistor outputs, 8 relay 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 express: 2 slots |
| LAN (Connection to Host) | 2 (10BASE-T/100BASE-TX) |
| Interface | RS-232C: 1ch |
| Control Method | Software servo control |
| Drive Units | SERVOPACK for AC servomotors |

Programming Pendant Specifications

| Items | Specifications |
|----------------------|--|
| Dimensions | 152 (W)×49.5 (D)×300 (H) mm |
| Approx. Mass | 0.730 kg |
| Material | Reinforced plastics |
| Operation Device | Select keys, axis keys, numerical/application keys, mode selector switch with keys (mode: teach, play, and remote), emergency stop button, enable switch, compact flash card interface device (compact flash is optional.), USB port (USB 2.0, 1 port) |
| Display | 5.7-inch TFT color LCD, touch panel VGA 640×480 pixels (alphanumeric characters, Chinese characters, Japanese letters, and others) |
| IEC Protection Class | IP54 |
| Cable Length | Standard: 8 m, max.: 36 m (with optional extension cable) |

*: External axis amplifiers for two axes can be built in for SP100B.
Note: The controller features and specifications on this page are for the manipulators described in this catalog.

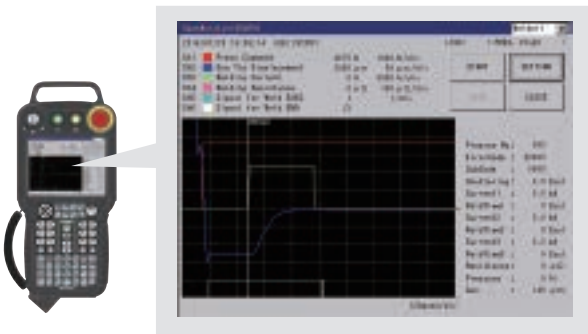
YRC1000's Optimized Functions for Spot Welding



Improve welding quality

Spot monitoring and graphing function (optional) **NEW**

Welding quality can be visualized because robot data and welding results from the welding timer can be displayed on the programming pendant in a wave form.



When to use

- Checking welding conditions when setting up a production line
- Checking welding status when a defect is detected
- Checking wave forms when correcting welding conditions

Display items

Robot data

- Gun pressure instruction
- Gun axis movement amount

Welding timer

- Welding current
- Welding resistance

IO signal

- Signal for welding starting conditions
- Signal for welding completion

· A welding timer from NADEX CO., LTD. must be used to confirm this function. Contact your Yaskawa representative for details on welding timers.

Spot welding conditions guiding function (optional) **NEW**

The YRC1000 allows the automatic calculation of recommended welding conditions just by entering the plate condition. This allows conditions for the pressure file and welding timer to be easily set. Calculation results can be saved to the robot and timer with a click of a button.

Enter plate condition
Setting items
Material, tension, plate thickness, number of plates

Press "calculate" to calculate recommended welding conditions

Recommended welding conditions

- Gun pressure
- Resistance welding time
- Welding current
- Hold time

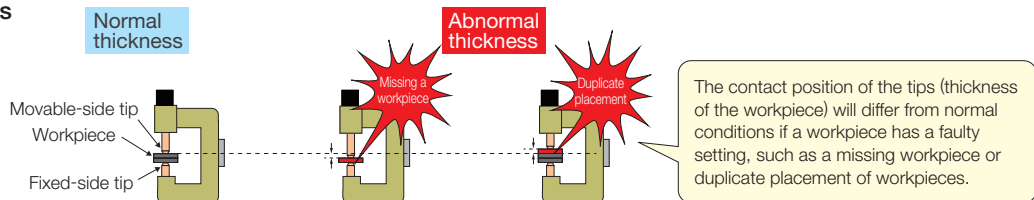
Press "write" to set the calculated recommended welding conditions

· A welding timer from NADEX CO., LTD. must be used to confirm this function. Contact your Yaskawa representative for details on welding timers.

Workpiece thickness detecting function

The workpiece thickness of each point is monitored when spot welding is performed. An alarm will sound if the YRC1000 detects a faulty setting for a workpiece. Faulty settings, such as a missing workpiece or duplicate placement of workpieces, can be detected without using a sensor.

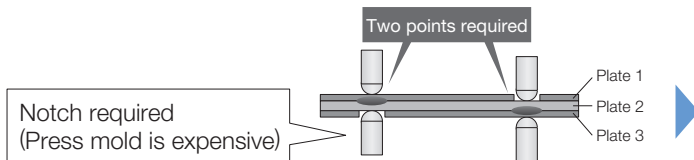
Detection of workpieces with faulty settings



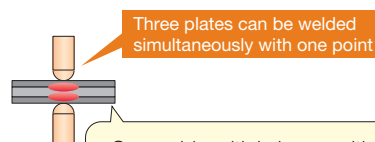
Multi-step pressure function (optional)

Welding conditions for low-spatter welding or welding of multiple layers can be easily set by combining the welding pressure and current.

Conventional method



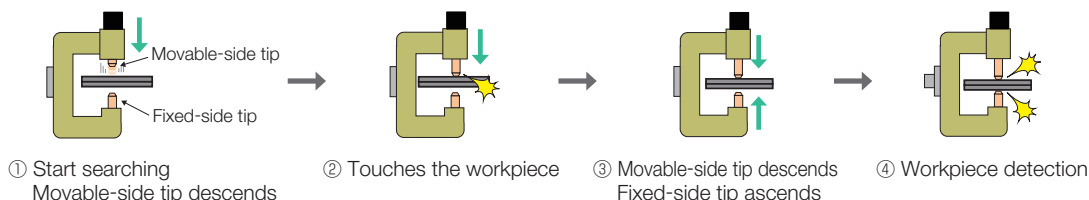
Multi-step pressure function



Reduce time for start-up and equipment maintenance

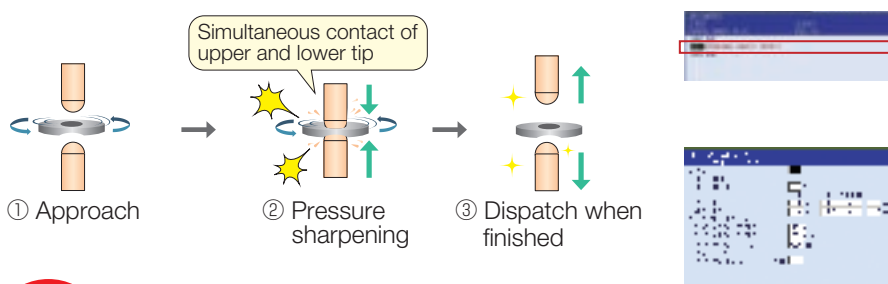
Work search function

Teaching can be performed without the need to manually check the position of the fixed-side tip and movable-side tip when using this function. Teaching time can be shortened because the fixed-side tip and the movable-side tip can start operating automatically from a position away from the workpiece and the position of the workpiece can be detected.



Tip dressing function

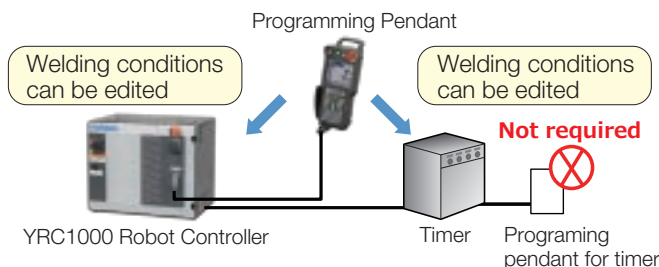
Customized instructions and designated files are available for tip dressing. Teaching time has been shortened using a one-point teaching method and the simultaneous contact of the upper and lower tip stabilizes the sharpening depth of both tips.



Improve equipment installation, operation, and maintenance

Integrated timer function (optional)

Welding conditions (welding current and welding time) that are usually managed in the programming pendant of the timer can be edited using the robot's programming pendant. The programming pendant of the robot can also show the welding results. A dedicated board is not required since the DeviceNet communications base supports this function.



This function may not work depending on the timer type. Contact your Yaskawa representative to check if your timer confirms this function.

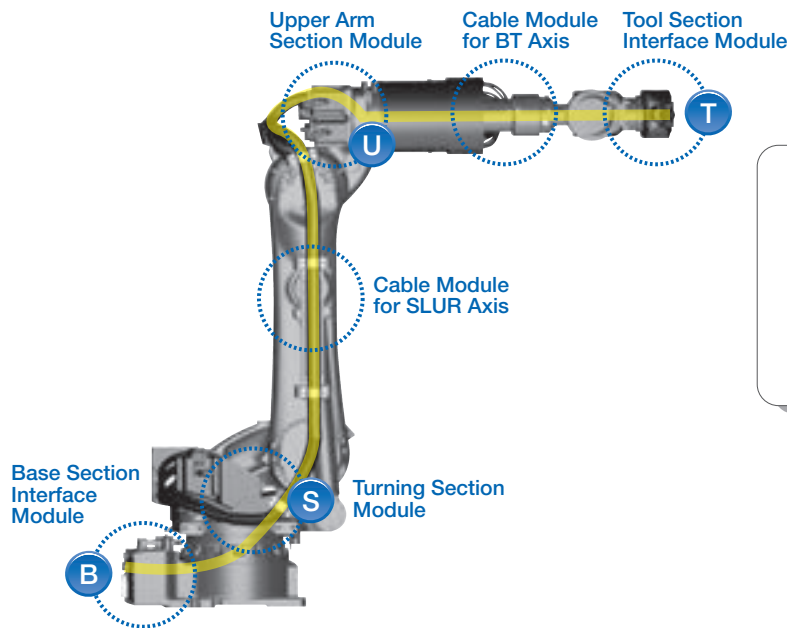
External Cables for Spot Welding



Improve equipment installation, operation, and maintenance

Offers simple modularized cablings (excluding some models*)

Yaskawa offers simple modularized cables and mounting devices that are easy to maintain to construct more functional and advanced cabling methods.



Components of modularized cablings
External cables consists of two cable modules for the SLUR axis and BT axis, two device modules (S and U), and two interface modules (B and T).

Steps for selecting external cables

Guidelines for selecting external cables for spot welding are available. Contact your Yaskawa representative for details.

STEP 1



Select a manipulator and application

Select a manipulator and specify the application.

Application

- ① Gun (standard servo gun)
- ② Servo gun + air-powered hand
- ③ Air-powered hand

STEP 2



If customization is required

STEP 3

Check standard modular components

Check the standard modular components according to the manipulator and the application.

Customize the modular components

Each module can be customized to suit your applications. Select a module from selectable modules that Yaskawa offers.

*Compatible models: MOTOMAN-SP100, SP100B, SP165, SP210
Contact your Yaskawa representative for information on other models.

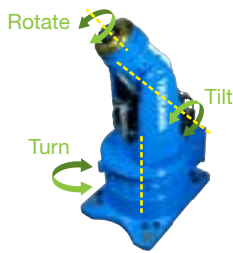
Positioner, Positioning Robot, Traverse Track



Increase productivity

Positioner

Collaboration with a spot welding robot delivers a high-speed spot welding performance and minimizes a robot's motion range. This helps shorten cycle times and save space.



MOTOMAN-MPOS225H

Positioner with three-axis motion

- 225-kg payload
- Composed of three axes (turn, tilt, and rotate)



Image of collaboration with a spot welding robot

Positioning robot

Diversified small-quantity production lines can be constructed using positioning robots that support a variety of workpieces.

This robot has three axes. One controller can operate up to 12 robots.



MOTOMAN-UH100Y

Positioning robot with three orthogonal axes

- Positioning robot with high rigidity
- 100-kg payload
- Composed of three axes (X, Y, and Z)

Traverse track

The use of a traverse track can expand the motion range of a single robot.

For example, one robot can transfer workpieces between separate processes or handle multiple processes.



MOTOBASE-TSA Series

Traverse track with high versatility

- The divided frame design makes it possible to select the travel stroke from 1 meter to 10 meters in 1-m increments.
- Capable of high-speed travelling at a maximum speed of 1.5 m/s *
- *: Maximum speed varies depending on the model to be mounted.

Handling robots to support spot welding lines

In addition to spot welding robots, we have a variety of medium- and large-sized handling robots to support production lines. Refer to the MOTOMAN-GP Series medium- and large-size models catalog (CHEP C941111 04) for details.



MOTOMAN-SP Series

YASKAWA ELECTRIC CORPORATION

2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu, 806-0004, Japan
Phone: +81-93-645-7703 Fax: +81-93-645-7802
www.yaskawa.co.jp

YASKAWA AMERICA, INC. (MOTOMAN ROBOTICS DIVISION)

100 Automation Way, Miamisburg, OH 45342, U.S.A.
Phone: +1-937-847-6200 Fax: +1-937-847-6277
www.motoman.com

YASKAWA EUROPE GmbH (ROBOTICS DIVISION)

Yaskawastrasse 1, 85391, Allershausen, Germany
Phone: +49-8166-90-100 Fax: +49-8166-90-103
www.yaskawa.eu.com

YASKAWA NORDIC AB

Verkstadsgatan 2, Box 504, SE-385 25 Torsas, Sweden
Phone: +46-480-417-800 Fax: +46-486-414-10
www.yaskawa.se

YASKAWA ELECTRIC (CHINA) CO., LTD.

22F, One Corporate Avenue, No.222 Hubin Road, Huangpu District, Shanghai 200021, China
Phone: +86-21-5385-2200 Fax: +86-21-5385-3299
www.yaskawa.com.cn

YASKAWA SHOUGANG ROBOT CO., LTD.

No.7 Yongchang North Road, Beijing E&T Development Area, Beijing 100076, China
Phone: +86-10-6788-2858 Fax: +86-10-6788-2878
www.yasr-motoman.cn

YASKAWA ELECTRIC KOREA CORPORATION

35F, Three IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, 07326, Korea
Phone: +82-2-784-7844 Fax: +82-2-784-8495
www.yaskawa.co.kr

YASKAWA ELECTRIC TAIWAN CORPORATION

12F, No.207, Sec. 3, Beishin Rd., Shindian District, New Taipei City 23143, Taiwan
Phone: +886-2-8913-1333 Fax: +886-2-8913-1513
www.yaskawa.com.tw

YASKAWA ASIA PACIFIC PTE. LTD.

30A Kallang Place, #06-01, 339213, Singapore
Phone: +65-6282-3003 Fax: +65-6289-3003
www.yaskawa.com.sg

YASKAWA ELECTRIC (THAILAND) CO., LTD.

59, 1st-5th Floor, Flourish Building, Soi Ratchadapisek 18, Ratchadapisek Road, Huaykwang, Bangkok 10310, Thailand
Phone: +66-2-017-0099 Fax: +66-2-017-0199
www.yaskawa.co.th

PT. YASKAWA ELECTRIC INDONESIA

Secure Building-Gedung B Lantai Dasar & Lantai 1 Jl. Raya Protokol Halim Perdanakusuma, Jakarta 13610, Indonesia
Phone: +62-21-2982-6470 Fax: +62-21-2982-6471
www.yaskawa.co.id

YASKAWA INDIA PRIVATE LIMITED (ROBOTICS DIVISION)

#426, Udyog Vihar Phase-IV, Gurugram, Haryana 122016, India
Phone: +91-124-475-8500 Fax: +91-124-475-8542
www.yaskawaindia.in



YASKAWA

YASKAWA ELECTRIC CORPORATION

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply. Specifications are subject to change without notice for ongoing product modifications and improvements.

© 2017 YASKAWA ELECTRIC CORPORATION

LITERATURE NO. CHEP C941111 05E <6>-0

Published in Japan January 2021
20-04-45