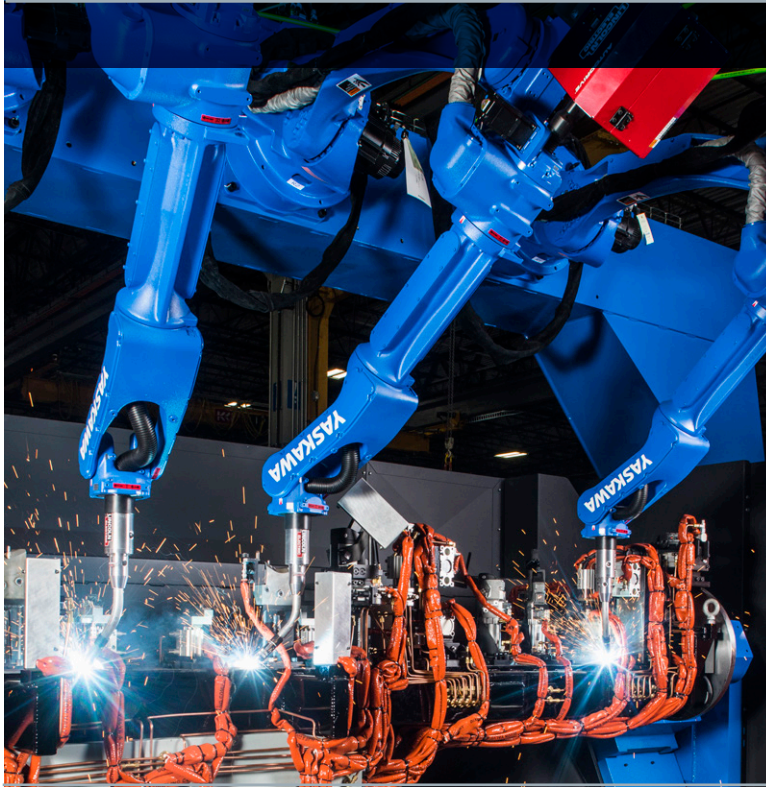


# YASKAWA

# ROBOTIC WELDING

SOLUTIONS FOR ALL INDUSTRIES



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*Proven. Flexible. Efficient.*



# A LEGACY OF EXCELLENCE

Over 100 Years of Innovation

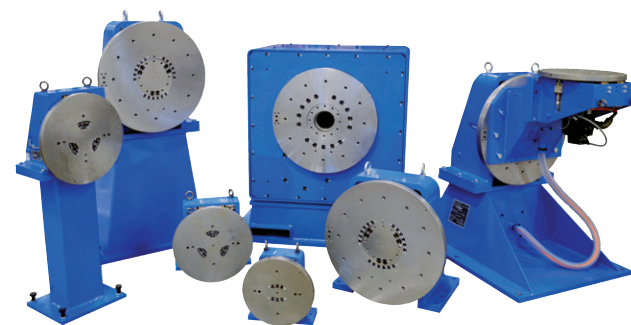
Yaskawa Motoman has created robotic arc welding solutions that seamlessly integrate robots, welding equipment, servo-controlled positioners, workcell safeguarding and software.

**The result:** turnkey and customized solutions that deliver unmatched speed, accuracy, reliability and versatility for customers spanning diverse industries.

## COMPONENTS FOR EVERY APPLICATION AND INDUSTRY

Our unique approach to arc welding solutions is founded on two core principles: exceptional design and optimal configuration. We start with an industry-leading range of workcells, robots and positioners, all engineered for maximum performance, and regularly enhanced and expanded based on real customer results. Our specialists then work with customers to determine the best combination of components for their specific needs, from analyzing parts and processes, to considering details such as inertia characteristics, motor torque curve and bearing loading parameters for positioners.

The combination of best-in-class offerings and expert consultation enables us to deliver outstanding solutions for companies of all sizes with remarkably diverse application needs. Whether you're producing small or large parts, prefer a process-to-part or part-to-process approach, or even need multiple robot control, Yaskawa Motoman has the solution.



## COMMITTED TO CUSTOMER SATISFACTION

All Yaskawa Motoman solutions are backed by our unwavering commitment to provide exceptional customer service and to ensure your complete satisfaction. You can depend on unmatched quality, integrity and timely service, including 24/7 technical phone support from associates with 100+ years of robotics experience. Coupled with regional service technicians throughout the Americas, and support services to maximize robot productivity and longevity, Yaskawa Motoman solutions deliver both world-class performance and true peace of mind.

## ROBOTIC WELDING SOLUTIONS

### PROVEN IMPACT

Robotic welding solutions from Yaskawa Motoman have delivered game-changing results for clients of all sizes. We've enabled Tier 1 automotive suppliers to produce high-volume parts with unprecedented speed and efficiency. We've helped construction machinery manufacturers create their heaviest-duty parts with ease. And, we've equipped job shops with flexible, cost-effective solutions that adapt easily to shifting market needs. Whatever your requirements or challenges, we can configure the ideal solution.

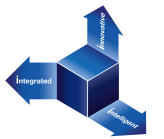
### ENGINEERED TO PERFECTION

Our experienced application engineers specialize in conceptualizing advanced robotic welding solutions in innovative, uniquely effective ways. By combining ISO 9001-2015 certified project processes, advanced 3D modeling software and offline proprietary simulation tools, we ensure well-executed projects. In addition, critical components such as system safeguarding, application equipment and programming are an integral part of the solution. In most cases, a pre-engineered ArcWorld® workcell is a perfect fit. If not, we can provide options such as modified workcells or custom solutions from our Automation Group, or we can refer you to an integration partner.

### BEST-IN-CLASS, ACROSS THE BOARD

Yaskawa Motoman positioners are designed for welding, built in the U.S. and life-tested for reliable performance. Our industry-leading high-speed robots include multiple payload, extended-reach and ultra-maneuverable seven-axis models for arc and spot welding. Innovative process features, such as a thru-arm torch and an integrated spot harness, provide improved cycle time and reduced downtime. Our advanced controller includes menu-driven welding software, digital weld interfaces and coordinated motion, as well as managing up to eight robots with a single controller and programming pendant.

Beyond our own components, we partner with leading companies to offer power sources, torches, spot guns and other key elements, creating solutions that are world-class from end to end.



## i³-Mechatronics

Amid the rapidly changing manufacturing industry, Yaskawa strives to create value-added products that foster growth for our customers. This has led to the development of new three-dimensional solutions that intertwine smart technologies with the human element to maximize productivity, enabling the next generation of factory automation.

i³-Mechatronics, Yaskawa's vision of Industry 4.0, is an integrated, intelligent and innovative approach that combines classical mechatronics, information and communications technology with new digital solutions.

### VISUALIZE YOUR OPERATIONS

A key component of i³-Mechatronics is Yaskawa Cockpit™, a state-of-the-art software platform that easily monitors, accumulates and visually delivers operational data in real time via an integrated approach, providing the ability to synchronize all factory and operational knowledge for data-driven optimized planning. Yaskawa Cockpit provides companies with the flexibility needed to oversee the health, status and performance of networked production environments.

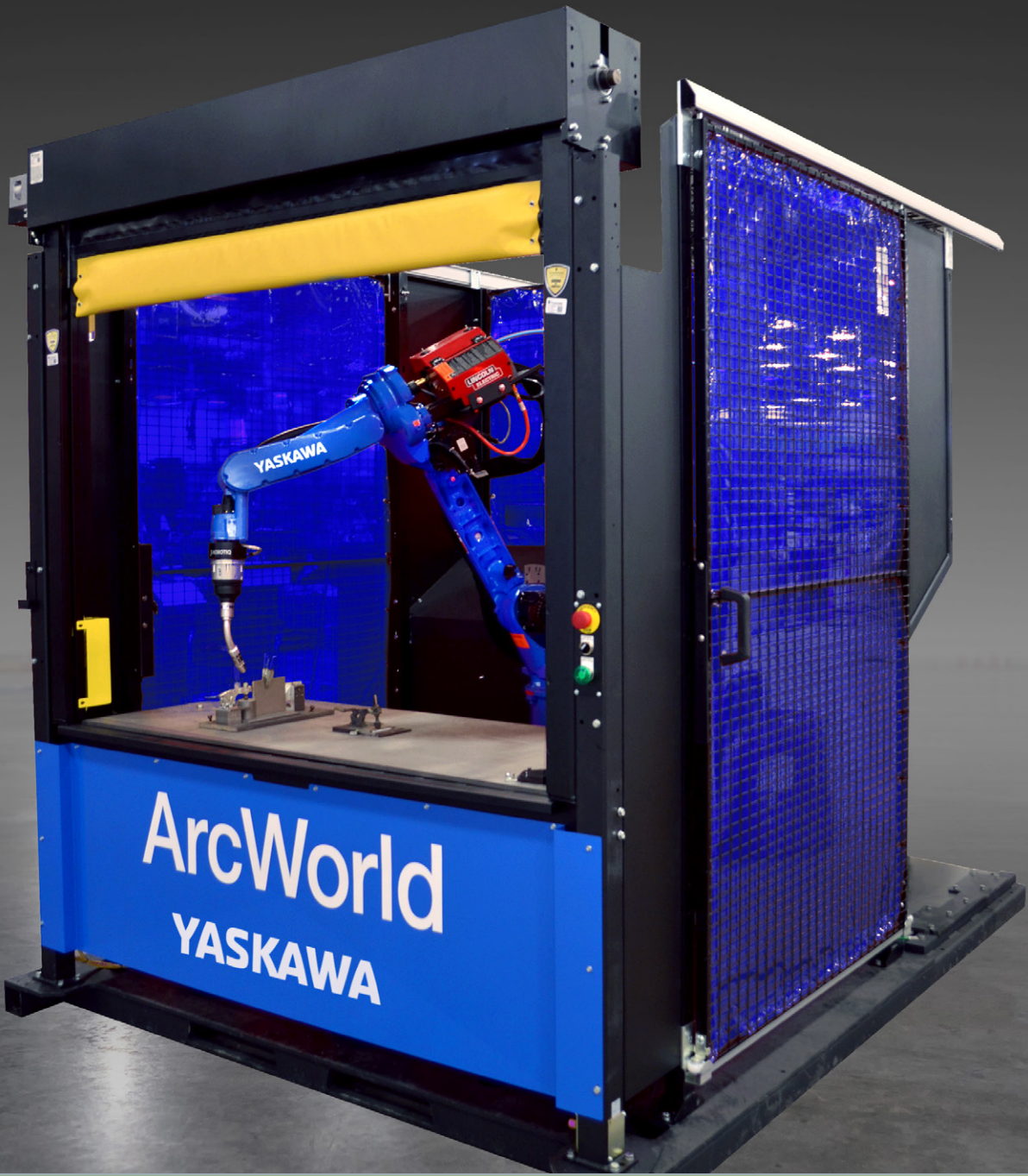
Yaskawa Cockpit is one of the first robot management systems that is extensible; non-robot devices throughout the factory can be incorporated with Add-on Functions. All processed data can be forwarded to external resources for utilization of AI-based Big Data analytics using its standard Open Platform Communication Unified Architecture (OPC UA) interface which allows data to be shared throughout the extended enterprise or external systems.

FULLY INTEGRATED ARC WELDING SOLUTIONS

Yaskawa Motoman can work with you to select the optimal robotic welding solution for your specific needs. As a starting point, this chart can help you identify key attributes and requirements.

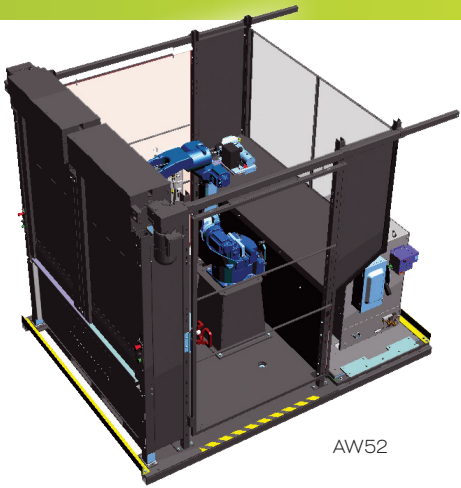
|                        | COMPACT WORKCELLS |      |      |         |      |         | MEDIUM PRODUCTION WORKCELLS |       |        |        | HIGH-VOLUME WORKCELLS |        |        | LARGE WORKCELLS |        | MODIFIED WORKCELLS |        |        |        |          |
|------------------------|-------------------|------|------|---------|------|---------|-----------------------------|-------|--------|--------|-----------------------|--------|--------|-----------------|--------|--------------------|--------|--------|--------|----------|
| CHARACTERISTICS        | AWHS              | AWRS | AW50 | AW50S   | AW52 | AW52S   | AW200                       | AW500 | AW1000 | AW1200 | AW6000                | AW6200 | AW6300 | AW2000          | AW2200 | AW4000             | AW4200 | AW4300 | AW6400 | AWV-6400 |
| Part Size              |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        |          |
| Less than 1 meter      | ■                 | ■    | ■    | ■       | ■    | ■       | ■                           | ■     | ■      | ■      | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      |        |          |
| 1 to 3 meters          |                   |      | ■    | ■       |      |         | ■                           |       |        |        | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      |        |          |
| Greater than 3 meters  |                   |      |      |         |      |         |                             |       |        |        |                       | ■      | ■      | ■               | ■      |                    |        |        | ■      | ■        |
| Part Weight            |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        |          |
| Up to 500 kg           | ■                 | ■    | ■    | ■       | ■    | ■       | ■                           | ■     | ■      | ■      | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      | ■      | ■        |
| 500 kg to 1,275 kg     |                   |      |      |         |      |         |                             |       | ■      | ■      | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      | ■      | ■        |
| 1,276 kg to 2,355 kg   |                   |      |      |         |      |         |                             |       |        |        | ■                     | ■      | ■      | ■               | ■      |                    |        |        | ■      | ■        |
| Greater than 2,355 kg  |                   |      |      |         |      |         |                             |       |        |        |                       |        |        | ■               | ■      |                    |        |        |        |          |
| Welding Stations       |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        |          |
| 1 Station              | ■                 |      | ■    | ■       |      |         |                             |       | ■      | ■      | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      | ■      | ■        |
| 2 Stations             |                   | ■    |      |         | ■    | ■       | ■                           | ■     |        |        |                       |        |        | ■               | ■      |                    |        |        |        |          |
| Part Positioning       |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        |          |
| Table                  | ■                 |      | ■    |         | ■    |         | ■                           |       |        |        |                       |        |        | ■               | ■      |                    |        |        |        |          |
| Turntable              |                   | ■    |      |         |      |         |                             |       | ■      | ■      |                       |        |        |                 |        |                    |        |        |        |          |
| H-Frame                |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        | ■                  | ■      | ■      |        |          |
| Ferris Wheel           |                   |      |      |         |      |         |                             |       |        |        | ■                     | ■      | ■      |                 |        |                    |        |        | ■      | ■        |
| Headstock/Tailstock    |                   |      |      | HS only |      | HS only |                             | ■     |        |        |                       |        |        | ■               | ■      |                    |        |        |        |          |
| Cell Loading           |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        |          |
| Overhead Robots        |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        | ■        |
| Forklift/Hoist         |                   |      |      |         |      |         | ■                           | ■     | ■      | ■      | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      | ■      | ■        |
| Track/Other Automation |                   |      |      |         |      |         |                             |       |        |        |                       |        |        | ■               | ■      |                    |        |        |        | ■        |
| Size of Robot          |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        |          |
| AR900                  | ■                 | ■    |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        |          |
| AR1440                 |                   |      | ■    | ■       | ■    | ■       | ■                           | ■     | ■      | ■      | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      | ■      | ■        |
| AR2010                 |                   |      |      |         |      |         |                             |       | ■      | ■      | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      | ■      | ■        |
| AR3120                 |                   |      |      |         |      |         |                             |       |        |        |                       |        |        | ■               | ■      |                    |        |        |        |          |
| AR1440E                |                   |      |      |         | ■    | ■       | ■                           | ■     |        |        | ■                     | ■      | ■      |                 |        |                    |        |        |        |          |
| Spot Welding Robots    |                   |      |      | ■       |      |         |                             |       | ■      | ■      | ■                     | ■      | ■      | ■               | ■      | ■                  | ■      | ■      |        |          |
| Number of Robots       |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        |        |          |
| 1 Robot                | ■                 | ■    | ■    | ■       | ■    | ■       | ■                           | ■     | ■      |        | ■                     |        |        | ■               | ■      | ■                  |        |        |        |          |
| 2 Robots               |                   |      |      |         |      |         |                             |       |        | ■      |                       | ■      |        |                 | ■      |                    | ■      |        |        |          |
| 3 Robots               |                   |      |      |         |      |         |                             |       |        |        |                       |        | ■      |                 |        |                    |        | ■      |        |          |
| Greater than 3 Robots  |                   |      |      |         |      |         |                             |       |        |        |                       |        |        |                 |        |                    |        |        | ■      | ■        |





# SMALL FOOTPRINT, BIG IMPACT

Delivering powerful performance in a compact package, these extremely efficient mid-range ArcWorlds feature reduced floorspace and are ideal for low- to medium-volume fabrication, such as job shop and automotive component applications.



AW52

## COMPACT ARCWORLD WORKCELLS

Low- to medium-volume fabrication, compact footprint

### OVERVIEW

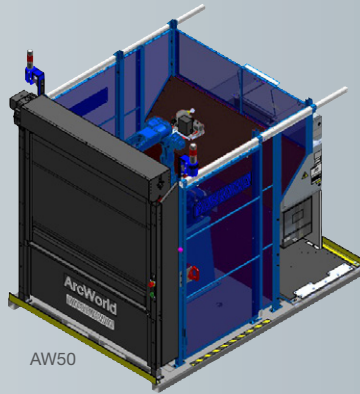
- Efficient, repetitive high-mix production
- Designed to handle small- to medium-sized parts
- Small footprint for efficient use of space
- Pre-assembled on a common base for quick setup and relocation
- Six- or seven-axis robots for maximum flexibility
- One part station for larger part size or two part stations for higher productivity
- Stationary table for lower cost or part positioner for greater flexibility
- Easy access to components for simplified maintenance and fast service

### AW50 | AW52 | AW50S | AW52S

Mid-range workcell, low- to medium-volume fabrication.

- Automotive-grade powered roll-up door for high-speed operation
- Power supplies and controller are mounted on sub-base which can be pulled out for servicing access
- “S” models feature one or two headstocks, allowing for part positioning during welding to increase efficiency and productivity
- High productivity without increased footprint or integration complexity

Part Positioning: Fixed or MH185



AW50

### AWHS | AWRS

Flexible, compact and cost-effective automation solution.

- Controller and most power supplies are contained within cell structure
- Two sizes of modular welding tables accommodate various small parts
- Built-in arc flash protection and fume hood

Part Positioning: Fixed



RS | HS

### WORKCELL SPECIFICATIONS

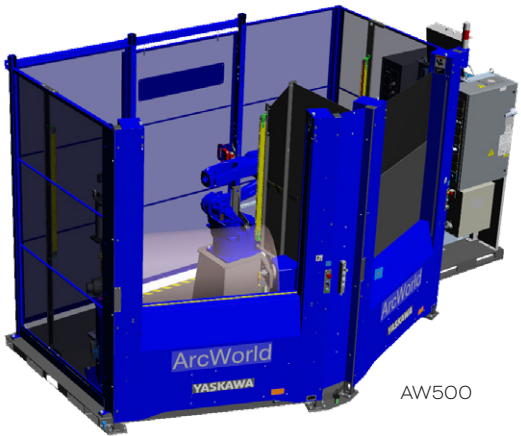
| CELL         | GUARDING      | COMMON BASE | NUMBER OF ROBOTS | WELDING STATIONS | POSITIONER TYPE | PAYLOAD CAPACITY (KG) | MAX PART SIZE (MM) |
|--------------|---------------|-------------|------------------|------------------|-----------------|-----------------------|--------------------|
| ArcWorld 50  | Roll-up Door  | Standard    | 1                | 1                | Flat Table      | 250                   | 1,650 x 685        |
| ArcWorld 52  | Roll-up Doors | Standard    | 1                | 2                | Flat Table      | 250                   | 775 x 685          |
| ArcWorld 50S | Roll-up Door  | Standard    | 1                | 1                | Headstock       | 185                   | 1,300 x 700        |
| ArcWorld 52S | Roll-up Doors | Standard    | 1                | 2                | Headstock       | 185                   | 550 x 700          |
| ArcWorld HS  | Hinged Door   | Standard    | 1                | 1                | Flat Table      | 100                   | 700 x 700          |
| ArcWorld RS  | Rotary Door   | Standard    | 1                | 2                | Flat Table      | 100                   | 400 x 800          |





# VERSATILITY THAT GETS THE JOB DONE

With more robust capabilities than our compact ArcWorld workcells, these models are designed to be versatile workhorses that can deliver whatever your application demands. Whether you need dependable production of small- to medium-sized parts, or affordable wire-to-weld solutions for medium-volume welding applications, these proven models are a perfect choice.



AW500

## MEDIUM PRODUCTION WORKCELLS Space-saving cell designs with dual stations

### OVERVIEW

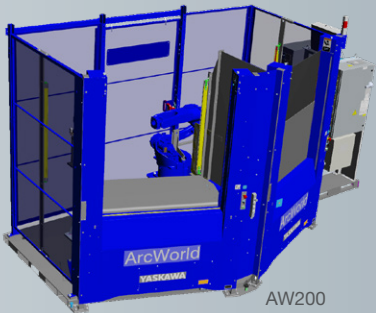
- Space efficient, two-station workcells for higher productivity
- Designed to handle small- to medium-sized parts
- Pre-assembled on a common base for quick setup and relocation
- Six- or seven-axis robots for maximum flexibility
- Robust positioning equipment for higher volume automotive production

### AW200 | AW500

Affordable wire-to-weld solutions for small- to medium-sized parts produced at medium to high volumes.

- Cost- and space-efficient workcell for contoured parts less than one meter long
- Electric door guard provides rapid operation with torque limiting for safety
- Two stationary workstations, a centrally located operator station and a large work area enable optimal flexibility and efficiency
- Workstations can be tooled for different parts or can be used for sequential operations
- High robot utilization and no positioner index time contribute to optimal productivity

**Part Positioning:** Fixed or MHT185



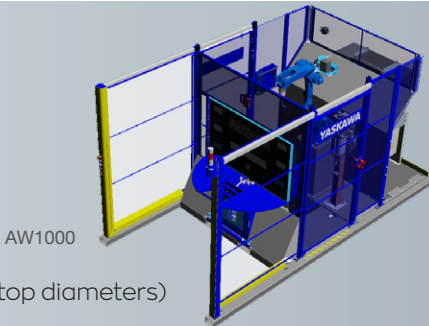
AW200

### AW1000 | AW1200

Designed for light- to medium-volume production.

- High-speed servo turntable with multiple payload and tabletop options
- Functional Safety Unit (FSU) with L-shaped light curtains for enhanced safety
- Available with one or two AR1440 robots for double productivity
- Optional fixture plates for quick change tooling

**Part Positioning:** MSR-series (355, 655, 1,055 kg payload capacities | 1,524, 1,828 mm tabletop diameters)



AW1000

### WORKCELL SPECIFICATIONS

| CELL   | GUARDING      | COMMON BASE | NUMBER OF ROBOTS | WELDING STATIONS | POSITIONER TYPE       | PAYLOAD CAPACITY (KG) | MAX PART SIZE (MM) |
|--------|---------------|-------------|------------------|------------------|-----------------------|-----------------------|--------------------|
| AW200  | Electric Door | Standard    | 1                | 2                | Flat Table            | 500                   | 1,300 x 600        |
| AW500  | Electric Door | Standard    | 1                | 2                | Headstock / Tailstock | 550                   | 1,072 x 750        |
| AW1000 | Light Curtain | Standard    | 1                | 1                | Turntable             | 355/655/1,055         | 1,000 x 650        |
| AW1200 | Light Curtain | Standard    | 2                | 1                | Turntable             | 355/655/1,055         | 1,000 x 650        |



### COMMON MOUNTING PLATFORM

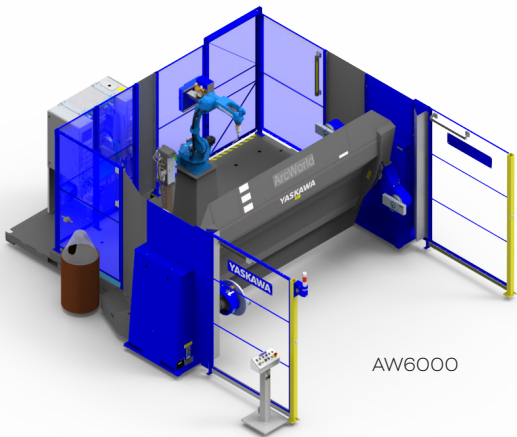
The common controller assembly, featured on each ArcWorld, keeps all components easily accessible for setup or maintenance, and maintains familiarity from one ArcWorld model to another. Designed with a compact footprint on a portable base, this assembly includes the robot controllers, power and controls enclosures, welding power supplies, transformer and other accessories.





# POWER TO PERFORM

When your application demands higher performance at peak volumes, the ArcWorld 6000 family steps up to the challenge. These popular solutions feature an industry-leading blend of flexible configurations, space efficiency and high-performance positioner technology.



AW6000

## HIGH-VOLUME WORKCELLS

Higher performance with best-in-class flexibility

### OVERVIEW

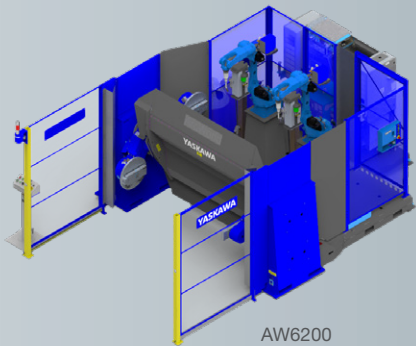
- A ferris wheel positioner is the most space-efficient method to index long parts
- Rapid station index times (3 to 5 seconds) for optimal throughput
- Various workcell configurations, including multiple robots and extended-reach options for maximum span width flexibility
- Multiple positioner payload capacities and spans with two profile configurations
- Common cell base provides elevated platform for safe programming environment and protection of routed cables
- Functional Safety Unit (FSU) prevents load station from moving when loading and allows axis jogging from operator station
- Manual jog capability for ergonomic part loading or part tacking
- Optional slip rings with air and Ethernet communication to automated fixturing for longer cable life on rotating tools
- Integrated weld grounds with high-amperage capacity for multiple robots

### AW6000 | AW6200 | AW6300

#### High capacity positioner for heavy parts.

- Locking pins on robot and load station arms to prevent motion of part being welded while heavy parts are hoisted onto second load station
- The RM2 positioners feature a sealed drive that eliminates most maintenance needs while expanding the life of the positioner
- Our standard ferris wheel positioners offer tooling diameters up to 1.3 meters and spans up to 3 meters for part flexibility and optimized cycle time
- Higher capacity positioners available for larger parts

**Part Positioning:** RM2-series (750, 1,275 kg payload capacities)



AW6200

### WORKCELL SPECIFICATIONS

| CELL          | GUARDING      | COMMON BASE | NUMBER OF ROBOTS | WELDING STATIONS | POSITIONER TYPE | PAYLOAD CAPACITY (KG) | MAX PART SIZE (M) LENGTH X DIA |
|---------------|---------------|-------------|------------------|------------------|-----------------|-----------------------|--------------------------------|
| ArcWorld 6000 | Light Curtain | Cell Base   | 1                | 1                | Ferris Wheel    | 750/1,275             | 3.0 x 1.3                      |
| ArcWorld 6200 | Light Curtain | Cell Base   | 2                | 1                | Ferris Wheel    | 750/1,275             | 3.0 x 1.3                      |
| ArcWorld 6300 | Light Curtain | Cell Base   | 3                | 1                | Ferris Wheel    | 750/1,275             | 3.0 x 1.3                      |

### MULTIPLE ROBOT CONTROL

The YRC1000, Yaskawa Motoman's patented multiple robot controller, allows coordination of up to eight robots (or 72 axes) using a single controller. This results in exceptional application flexibility, HyperProductivity® and lower integration costs. Controller modules reduce cost by eliminating processors and teach pendants for multiple robots. Integration cost is reduced due to a single control point for safety and PLC connections. FSU is included with single or multiple robot workcells.



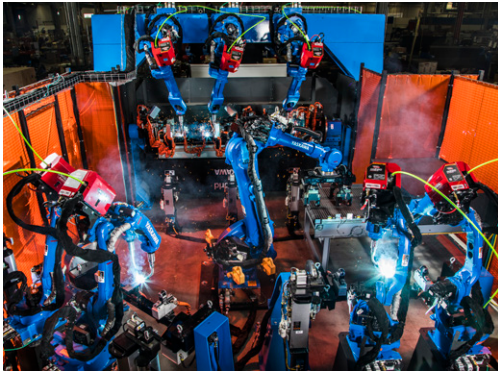


# LARGE WORKCELLS

Flexible workcell configurations for large parts

## Bigger and Better

When it comes to large parts (up to five meters and 6,300 kilograms) and heavy-deposition welding, only a truly heavy-duty solution will suffice. Our large ArcWorld workcells deliver maximum power for performance on a whole new scale, without sacrificing safety features and ease of integration that characterize our smaller workcells.



### OVERVIEW

- Multiple positioners and robot options combine to deliver a modular solution ideal for heavy transportation, agriculture and construction equipment
- Opposing workstations take full advantage of robot reach and allow continuous welding during part loading
- Supports a variety of part spans (2-, 3-, 4-, 5-meter) with extended reach or multiple robot configurations
- Single-station configuration or “blank” stations without positioner(s) for customer-supplied tool
- MotoMount™ fixture mounting system eliminates laser or transit alignment procedures for fast positioner setup and improved equipment life
- Common equipment base with wireways eases setup and provides cable management

### AW2000 | AW2200

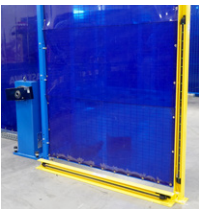
Designed for larger, heavier part production.

- Wire mesh safety fencing or solid panels for perimeter guarding
- Push-button operator station with manual job switch and 4-digit thumbwheel switch
- Coordinated motion software simplifies teaching of circumferential welds around contoured parts
- Optional light beacon, touchscreen operator HMI and inside light curtains

**Part Positioning:** MHT-series (1,075, 3,000, 6,300 kg maximum payload)

### WORKCELL SPECIFICATIONS

| CELL   | GUARDING      | COMMON BASE    | NUMBER OF ROBOTS | WELDING STATIONS | POSITIONER TYPE  | PAYLOAD CAPACITY (KG) | MAX PART SIZE (M) |
|--------|---------------|----------------|------------------|------------------|------------------|-----------------------|-------------------|
| AW2000 | Light Curtain | Cell Equipment | 1                | 1 or 2           | Blank, Fixed MHT | Up to 6,300           | Up to 4.0         |
| AW2200 | Light Curtain | Cell Equipment | 2                | 1 or 2           | Blank, Fixed MHT | Up to 6,300           | Up to 5.0         |



### TOTAL SAFETY ENVIRONMENT

ArcWorld solutions are designed to comply with the ANSI/RIA R15.06-2012 standard. Our total safety environment features complete barrier guarding, dual-channel E-Stop functionality, tamper-resistant interlocks, single-point operator control, control-reliable integrated Functional Safety Unit (FSU), interlocked access door(s), arc flash protection and dual-channel light curtains for optimal safeguarding and peace of mind.

# MODIFIED WORKCELLS

Variations of standard workcells to meet customer requirements

### OVERVIEW

- Innovative solutions designed for specific customer requirements at a cost-effective price
- Multiple robots can be positioned to minimize weld and cycle time, maximize output and reduce floorspace
- HyperProductivity includes the industry’s fastest multiple robot control, high-speed positioners and leading-edge process technology
- Ergonomic configurations combine optimum load and program heights, multi-station part positioning and menu-driven weld interfaces to make the best use of employee time and effort
- Material handling robots can be integrated into arc welding workcells for improved ergonomics and productivity

### AW4000 | AW4200 | AW4300 | AW6400

High-performance workcell with high-speed positioner.

- Double-ended headstock/tailstock positioners boost efficiency and productivity with part positioning on two stations simultaneously
- Coordinated motion provides the ability for the robot to weld contoured parts that are turning on the positioner

**Part Positioning:** MSR2S (500, 750 kg payload capacities), RM2-series

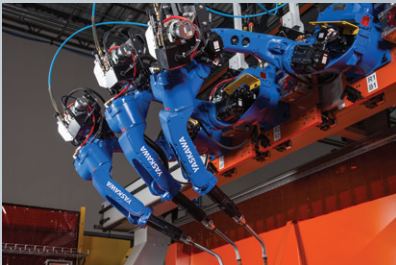


### AWV-6400

Space-saving integrated overhead robot mounting structure.

- Ideal ergonomics with a single load/unload point, open access for programming and open rear floorspace for automatic unloading
- Multiple robot control provides coordination of robots and positioner axes from single teach pendant

**Part Positioning:** RM2 (1,555, 2,355 kg payload capacities)



### WORKCELL SPECIFICATIONS

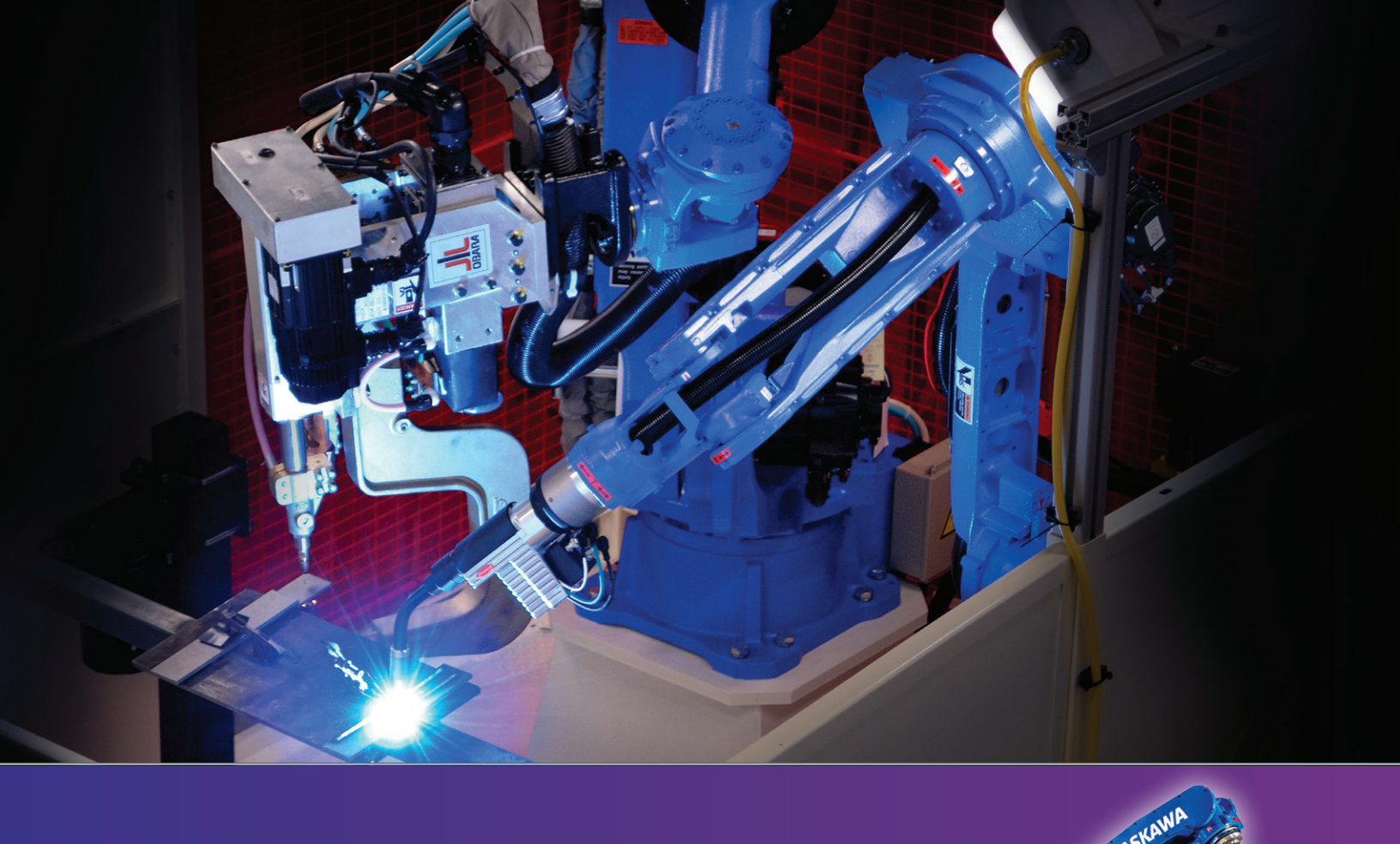
| CELL            | GUARDING      | COMMON BASE    | NUMBER OF ROBOTS | WELDING STATIONS | POSITIONER TYPE | PAYLOAD CAPACITY (KG)       | MAX PART SIZE (M)                       |
|-----------------|---------------|----------------|------------------|------------------|-----------------|-----------------------------|---|
| ArcWorld 4000   | Light Curtain | Cell Equipment | 1                | 1                | H-Frame         | 500<br>750                  | 2.0 x 1.3<br>3.0 x 1.3                  |
| ArcWorld 4200   | Light Curtain | Cell Equipment | 2                | 1                | H-Frame         | 500<br>750                  | 2.0 x 1.3<br>3.0 x 1.3                  |
| ArcWorld 4300   | Light Curtain | Cell Equipment | 3                | 1                | H-Frame         | 500<br>750                  | 2.0 x 1.3<br>3.0 x 1.3                  |
| ArcWorld 6400   | Light Curtain | Cell Equipment | 4                | 1                | Ferris Wheel    | 750/1,275<br>1,555<br>2,355 | 3.0 x 1.3<br>4.0 x 1.525<br>4.0 x 1.778 |
| ArcWorld V-6400 | Light Curtain | Cell Equipment | 4                | 1                | Ferris Wheel    | 1,555<br>2,355              | 4.0 x 1.525<br>4.0 x 1.778              |

### CUSTOMIZED SOLUTIONS FROM YASKAWA MOTOMAN'S AUTOMATION GROUP (AG)



Offering solutions for a wide range of budgets, AG is responsible for designing, building, testing and installing fully integrated, custom automation systems for arc, laser, plasma and spot welding applications. AG is your “one-stop-shop” for robots, fixtures, process expertise, controls, handling, safety, integration and installation.





# THE WORLD LEADER IN ROBOTIC WELDING

With over 500,000 robot units sold, Yaskawa is a world leader in robotic automation. There’s a reason that nearly a quarter of all robotic arc welding applications in the world feature Yaskawa robots. Building on more than a century of expertise, we continue to deliver groundbreaking innovations in automation and robotics, enabling exceptional results for our customers across all industries and applications.



Motoman®  
AR1440

| ARC WELDING Robots    | AR700      | AR900      | AR1440     | AR1730     | AR2010     | AR3120     | AR1440E | HC10DTP    | HC20DTP    |
|-----------------------|------------|------------|------------|------------|------------|------------|---------|------------|------------|
| Number of Axes        | 6          | 6          | 6          | 6          | 6          | 6          | 7       | 6          | 6          |
| Payload (kg)          | 8          | 7          | 12         | 25         | 12         | 20         | 6       | 10         | 20         |
| Horizontal Reach (mm) | 727        | 927        | 1,440      | 1,730      | 2,010      | 3,124      | 1,440   | 1,200      | 1,700      |
| Vertical Reach (mm)   | 1,312      | 1,693      | 2,511      | 3,089      | 3,649      | 5,622      | 2,487   | 1,200      | 1,700      |
| Repeatability (mm)    | 0.01       | 0.01       | 0.02       | 0.02       | 0.03       | 0.07       | 0.06    | 0.05       | 0.05       |
| Mounting              | F, W, C, T | F, W, C, T | F, W, C, T | F, W, C, T | F, W, C, T | F, W, C, T | F       | F, W, C, T | F, W, C, T |

F = Floor W = Wall C = Ceiling S = Shelf T = Tilt

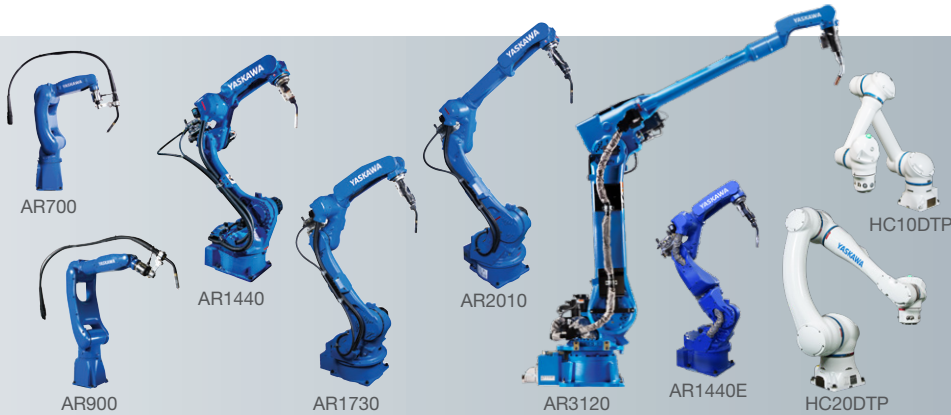
## WELDING ROBOTS

### OVERVIEW

- Yaskawa Motoman pioneered application-specific arc and spot welding robots to reduce process-related downtime
- Seven-axis robot models are available for maximum reach flexibility (including access under and around parts and within confined spaces), as well as reduced floorspace
- Variety of robot payloads and reach to support welding application flexibility
- Menu-driven welding software delivers maximum flexibility and optimal productivity, while ensuring high-quality output
- Slim robot profile allows several arms to work in close proximity for high-density applications
- Hollow arm models allow for thru-arm integration of weld cables for improved accessibility and protection

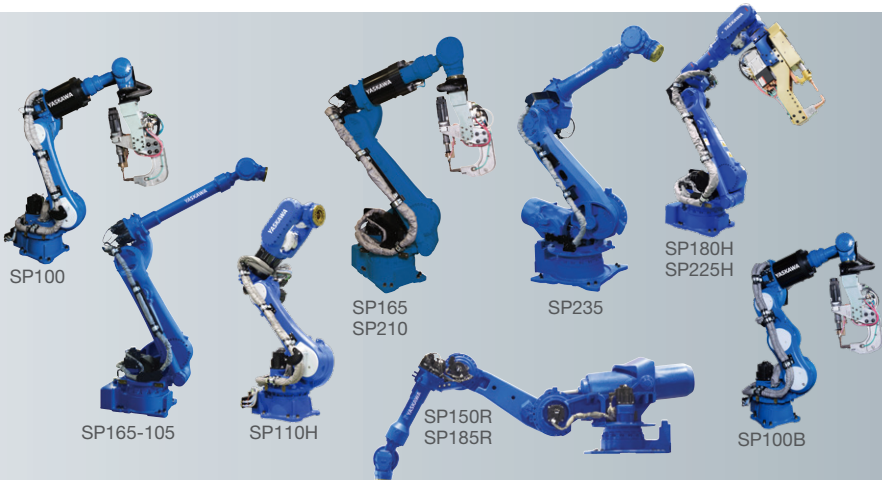
### ARC WELDING ROBOTS

- Versatile robots can be floor-, wall-, ceiling- or tilt-mounted, enhancing joint access
- Patented torch cable provides long life for high-flex, thru-arm robot design
- Double wrist support casting is strong, slim and allows symmetric access to weld joints
- AR-series robots have higher payload capacity and larger thru-hole wrists, along with higher speeds and improved uptime over previous models



### SPOT WELDING ROBOTS

- Medium payload robots provide faster speeds and reduced footprint for integration into SpotWorld® solutions for Tier 1 production
- Higher payload robots feature compact gas spring to reduce profile and allow higher-density robot spacing
- Integrated spot harness provides process utilities, including weld power, water and air hoses, servo gun cabling, spare I/O and DeviceNet connection
- Hollow arm (H) models include aluminum-compatible weld harness



| SPOT WELDING Robots   | SP80       | SP100 | SP110H | SP150R SP185R | SP165 SP210 | SP165-105 | SP180H SP180H-110 | SP225H | SP235 | SP100B |
|-----------------------|------------|-------|--------|---------------|-------------|-----------|-------------------|--------|-------|--------|
| Number of Axes        | 6          | 6     | 6      | 6             | 6           | 6         | 6                 | 6      | 6     | 7      |
| Payload (kg) *        | 80         | 100   | 110    | 150 185       | 165 210     | 105       | 180 110           | 225    | 235   | 100    |
| Horizontal Reach (mm) | 2,236      | 2,236 | 2,044  | 3,140         | 2,702       | 3,058     | 2,702             | 2,702  | 2,710 | 2,236  |
| Vertical Reach (mm)   | 3,751      | 3,751 | 3,367  | 4,782         | 3,393       | 4,105     | 3,393             | 3,393  | 3,490 | 3,792  |
| Repeatability (mm)    | 0.03       | 0.03  | 0.05   | 0.05          | 0.05        | 0.05      | 0.05              | 0.05   | 0.05  | 0.04   |
| Mounting              | F, W, C, T | F     | F      | S             | F           | F         | F                 | F      | F     | F      |

F = Floor W = Wall C = Ceiling S = Shelf T = Tilt

\* Payload limited by spot harness





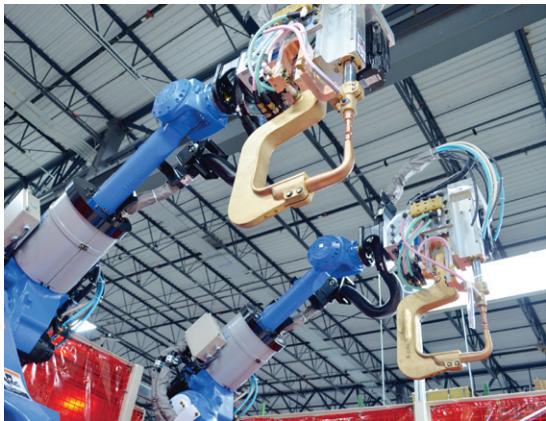
# OPTIONS FOR A PERFECT FIT

Application-specific robots maximize uptime with features to reduce application-related downtime. Yaskawa Motoman has optimized integration of welding equipment to leverage features from various suppliers in a simple-to-use format with robust performance. This allows the world's best welding technology to be tailored to your application.

## SPOT WELDING PACKAGES

Yaskawa Motoman has unique robot models to optimize high-density robot placement in automotive body shops. Superior Advanced Robot Motion (A.R.M.®) control software maximizes the performance of robot and servo gun motion. Digital interfaces to spot timers allow programming from robot teach pendant.

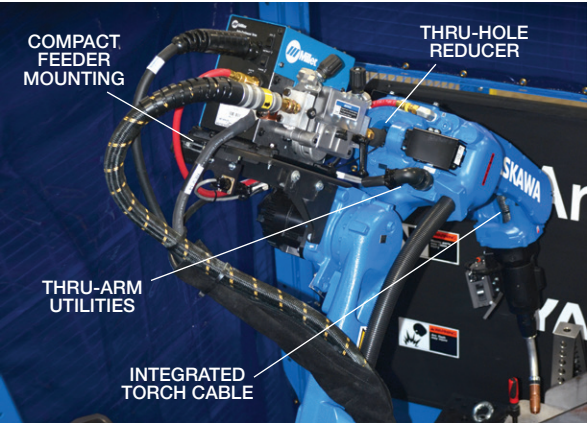
- Integrated spot harness improves wrist flexibility and reduces downtime, eliminating cable management issues and delivering maximum productivity with low cost of ownership
- Servo-controlled spot guns with DC spot timers are synchronized for reduced cycle time and optimized welding and part throughput
- Numerous spot welding functions to take advantage of servo gun control, including wire thickness detection, multi-step pressure file and tip wear compensation
- Options to enhance performance include tip dressers, tip changers, water flow sensors, utility service disconnects and tip wear tools



# WELDING SOLUTION COMPONENTS

## ARC WELDING PACKAGES

- Miller, Lincoln, Fronius, SKS and OTC power source models with full-feature digital interfaces
- Air-cooled torch with X-, Y-, Z-compliant torch shock sensor (water-cooled option)
- Collision detection software to minimize torch impact absorbed by shock sensor
- Arm-mounted 4-roll wire feeder
- Optimized robot dress to manage weld cabling for long life
- Weld-in-Teach function for improved safety
- Teach pendant overlay with arc welding specific keys
- Built-in Ethernet communication with options for DeviceNet or analog interfaces



## UNIVERSAL WELDCOM INTERFACE

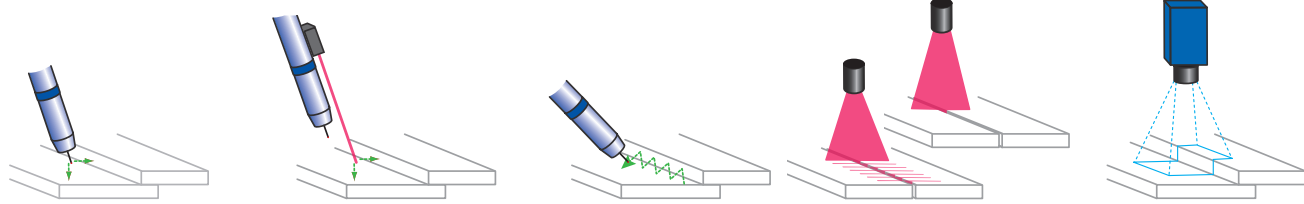
Yaskawa Motoman's exclusive Weldcom 2.0 and Universal Weldcom Interface (UWI) offer a common platform for major brands of welding power sources. This user-friendly pendant application offers:

- Full utilization of your power source processes and the ability to define multiple processes locally for quick recall
- Live weld status display and the ability to easily edit voltage, current and speed parameters in the user interface or inline
- Graphic representations and help screens of start and end weld sequences, including slope parameters
- Specialized functions like dual pulse, arc monitor data enable, weld line shift, arc retry, arc restart and password protection
- Quick filtering of weld modes based on process type, wire specs and gas type
- Terminology defined by the power source manufacturer for weld settings and programs



## SENSING TECHNOLOGY

Adding sensors to robotic arc welding operations can improve precision, productivity and quality. Yaskawa Motoman offers a wide range of sensing technologies, ranging from cost-effective thru-wire touch sensors to cutting-edge laser and vision systems.



- **Thru-wire touch-sensing** enables cost-effective seam-finding and unrestricted joint access that is effective with all conductive metal.
- **AccuFast™** non-contact laser systems offer fast, accurate seam-finding that eliminates wire cutting and provides a cost-effective option between tactile and vision sensing solutions.
- **ComArc LV** thru-arc seam-tracking allows tracking while weaving and is compatible with multi-robot, multi-layer and jigless configurations.
- **MotoEye™** laser finding and tracking is ideal for varied materials and lighting conditions, as well as capturing joint gap data and adapting in real time based on joint gap feedback.
- **MotoSight™** vision sensors combine user-friendly software and pendant interface programming with powerful capabilities, including fixture identification and error proofing.





# BUILT TO PERFORM

Wide variety of servo positioners provide unmatched speed, accuracy, robustness and reliability. Using the same field-proven motor controls, they are manufactured to the same exacting standards as Yaskawa robots. We also lead in control technology with multi-tasking software that allows coordination between multiple robots, base axes and multi-axis positioners.

## ROTARY TURNTABLES

- Low inertia tabletop available in two diameters; positioner drive unit is available without tabletop for custom tooling or different diameters
- Metal arc screen divider creates a safety barrier, protecting the operator from arc flash
- MSR-655 and MSR-1055 models can be used with endless rotation software for continuous rotating applications with multiple programmable stop locations
- Positioner options include fixture plates to support quick change tools, DeviceNet signal slip ring with air for fixture utilities, ground brush and multi-station switch kits for continuous rotation, hard stops for reciprocating applications with heavy payloads



MSR-655

|                                | MSR-355       | MSR-655     | MSR-1055    |
|--------------------------------|---------------|-------------|-------------|
| Payload Capacity per Side (kg) | 355           | 655         | 1,055       |
| 180-deg Index Time (sec.)*     | 2.5           | 3.0         | 5.0         |
| Thru-hole (mm)                 | 75            | 120         | 120         |
| Rated Load Inertia (kg•m²)     | 461           | 1,040       | 3,000       |
| Table Diameter (mm)            | 1,524/1,829   | 1,524/1,829 | 1,524/1,829 |
| Rotation                       | Reciprocating | Continuous  | Continuous  |

\* Indexing time can be affected by application variables

## H-FRAME TURNTABLES



MSR2S-500

- Three servo-motor control
  - All axes can turn simultaneously while indexing
  - Operator can jog station axis while robot welds
- Ergonomic loading and programming heights
- MotoMount fixture mounting system for quick change and longer life
- Arc screen for flash protection and curved sides to block entry into workcell
- Long life carbon brushes provide high amperage (800 A) capacity required for multiple robots and pulsed welding

# POSITIONERS

Fast, accurate, reliable positioning solutions

|   | MSR2S-500 | MSR2S-750 |
|---|-----------|-----------|
| Payload Capacity per Side (kg)          | 500       | 750       |
| Fixture Length (m)                      | 2.0       | 3.0       |
| Max. Fixture Diameter (m)               | 1.3       | 1.3       |
| 180-deg Index Time (sec.)*              | 3.70      | 5.00      |
| Tooling Axis Speed (rpm)                | 19.6      | 20.7      |
| Tooling Axis Torque (N•m)               | 625       | 1,068     |
| Tailstock Thru-hole (mm)                | 41        | 41        |
| Load/Program Height (mm)                | 821/970   | 821/970   |
| Weld Ground Capacity (Amps @ 100% Duty) | 800       | 800       |

## FERRIS WHEEL POSITIONERS

- Most space-efficient, two-station positioner design for parts 3 to 5 meters long
- The RM2-750 and RM2-1275 positioners feature a sealed drive that eliminates most maintenance needs while expanding the life of the positioner
- Ergonomic load height and angle of fixture can be varied to ease part loading
- MotoMount fixture mounting system for quick change and longer life
- Z-beam center support provides maximum clearance for fixture turning and overhead clearance on operator side for hoist access
- Three servo-motor control
  - All axes can turn simultaneously while indexing
  - Operator can jog station axis while robot welds
- Integrated high amperage (800/1,600 A) weld ground brushes
- Hollow tailstocks and optional slip rings with DeviceNet or Ethernet cabling, weld sense leads and air for automated fixturing



RM2-2355

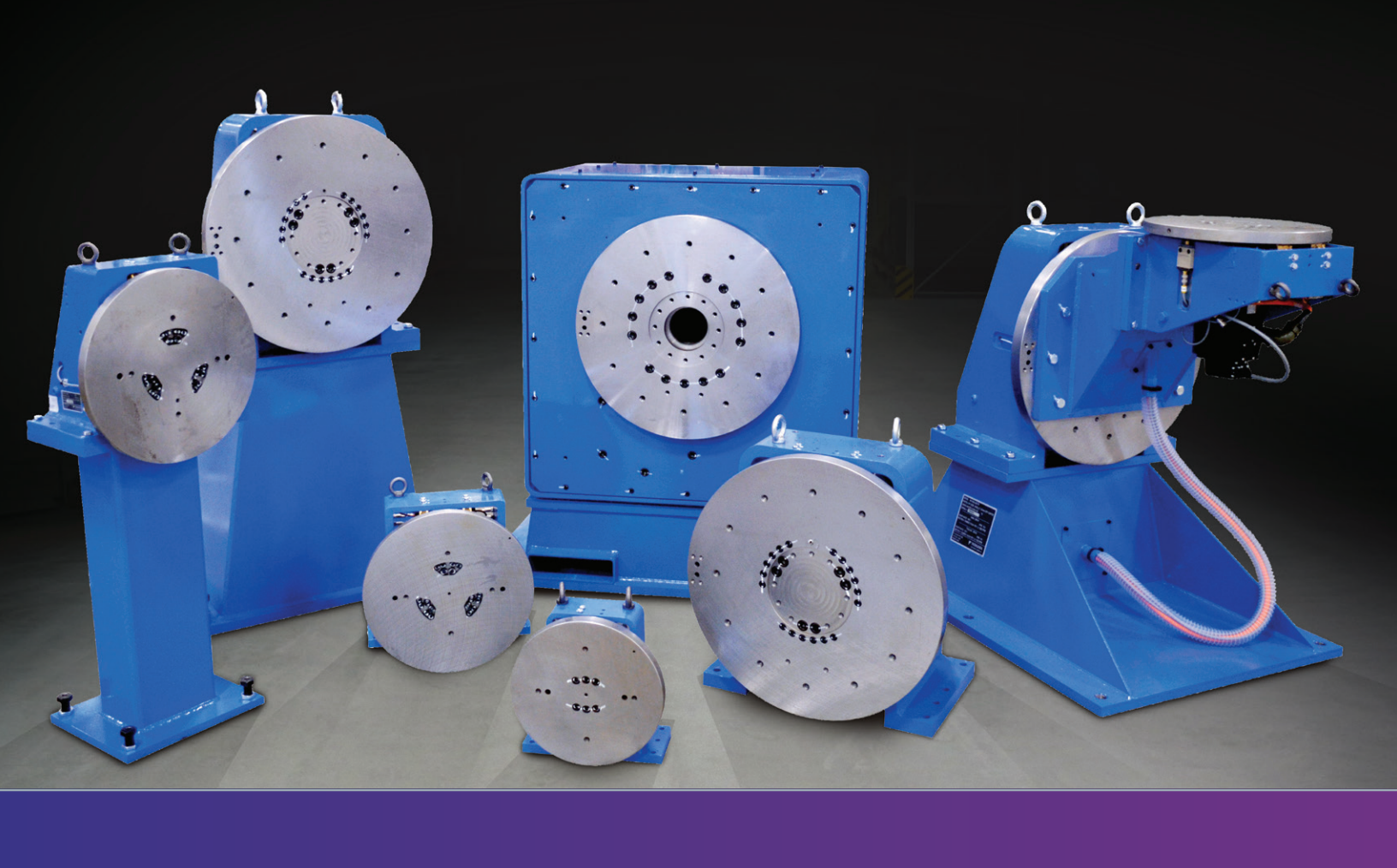
|   | RM2-750    | RM2-1275   | RM2-1555    | RM2-2355    |
|---|------------|------------|-------------|-------------|
| Payload Capacity per Side (kg)              | 750        | 1,275      | 1,555       | 2,355       |
| Fixture Length (m) (can be extended to 5 m) | 2.0/3.0    | 2.0/3.0    | 3.0/3.5/4.0 | 3.0/3.5/4.0 |
| Max. Fixture Diameter (m)                   | 1.3/1.6*   | 1.3/1.6*   | 1.524       | 1.778       |
| 180-deg Index Time (sec.)†                  | 2.95/3.27‡ | 3.51/4.13‡ | 5.1         | 7.0         |
| Tooling Axis Speed (rpm)                    | 32.7       | 21.6       | 21.6        | 21.6        |
| Tooling Axis Torque (N•m)                   | 957        | 3,260      | 3,260       | 3,260       |
| Tailstock Thru-hole (mm)                    | 41         | 41         | 41          | 41          |
| Load/Program Height (mm)                    | 911/1,441  | 947/1,592  | 1,075/1,765 | 1,018/1,823 |
| Max. Load Unbalance (kg)                    | 250        | 300        | 1,050       | 800         |
| Weld Ground Capacity (Amps @ 100% Duty)     | 800/1,600* | 800/1,600* | 1,600       | 1,600       |
| Locking Pins on Trunnion Arms (optional)    | No         | No         | Yes         | Yes         |

\* Optional

† Indexing time can be affected by application variables

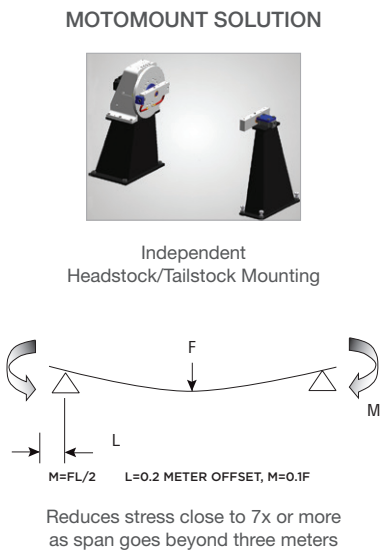
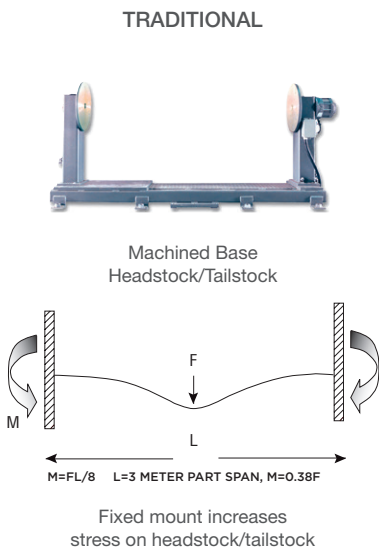
‡ Index time for 1,600 mm fixture diameter option





# BUILT TO WORK IN HARMONY

The YRC1000 controller allows multiple positioner stations to be easily programmed and coordinated with robot motion. Standard software functions include Parallel Start, Coordinated Motion, Twin Synchronous (multiple robots coordinated with station axis) and Master Tool Frame. Positioners are easily calibrated to the robot, and support software weaving and seam-tracking on rotating workpieces. Functional Safety Unit (FSU) provides integrated control-reliable safeguarding from positioner axes motion during part loading operations.



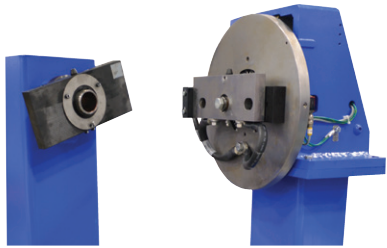
## MOTOMOUNT

The patented MotoMount fixture mounting system is designed to increase positioner life and improve weld repeatability while reducing implementation costs. MotoMount allows for simplified tooling using lower-precision mounting holes, while making fixture changeover faster and easier. By reducing stress and wear on positioner bearings, tooling repeatability is improved by up to 75%, and part warping from load stress is eliminated.

# POSITIONERS

Fast, accurate, reliable positioning solutions

## HEADSTOCKS / TAILSTOCKS



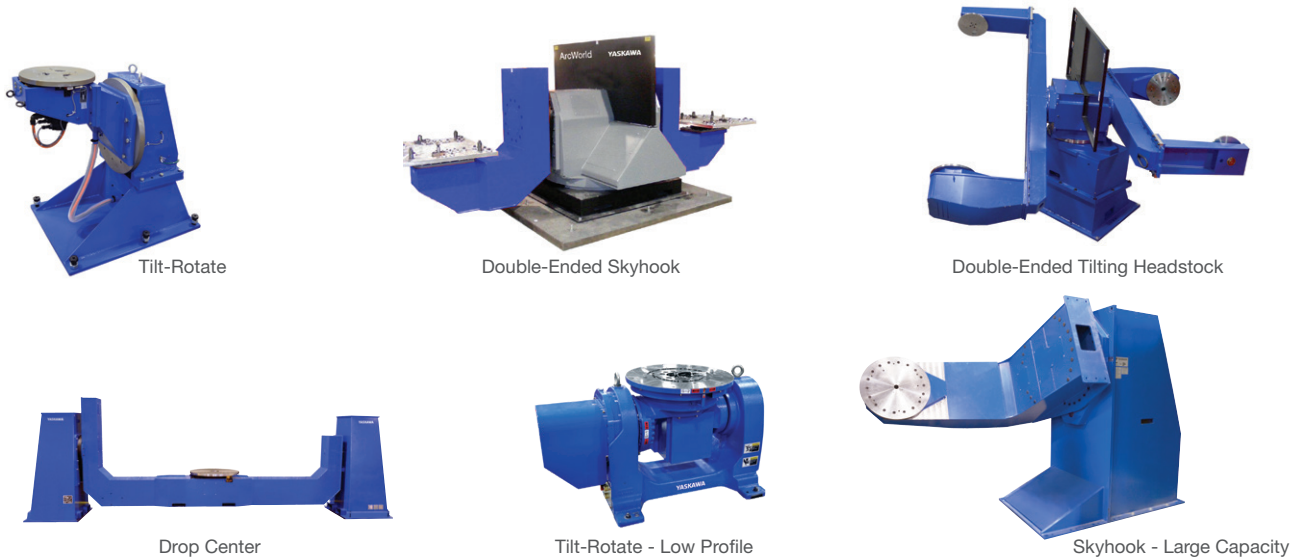
- Available as individual headstocks with rated payload, or combined with MotoMount for over twice the rated payload as headstock/tailstock
- MH units can be mounted at an angle or flat to create a rotary table
- Integrated high-amperage weld ground capacity for pulse welding and multiple robots
- Optional FSU is recommended to block motion on axes that are being loaded by operators
- Optional slip rings with communication and air are available for tailstock mounting

|   | MH185    | MH550       | MH1650      | MH3155     | MHTH605    | MHTH905    |
|---|----------|-------------|-------------|------------|------------|------------|
| Rated Load @ 152 mm Off-center (kg)       | 185      | 550         | 1,650       | 3,155      | 605        | 905        |
| Rated MHT Load @ CG Off-center (kgf @ mm) | 550 @ 50 | 1100 @ 80   | 3,300 @ 95  | 6,300 @ 90 | 1,717 @ 50 | 2,601 @ 50 |
| Headstock Speed (rpm)                     | 12.4     | 9.8         | 10.8        | 6.7        | 18.8       | 12.4       |
| Overhang @ Rated Load (mm)                | 250      | N/A         | N/A         | 58         | 1,375      | 925        |
| Load @ 500 mm Overhang (kgf)              | 75       | 175         | 500         | 1,344      | 1,578      | 1,578      |
| Rated Load Inertia (kg•m²)                | 47       | 113         | 687         | 3,036      | 208        | 477        |
| Rated Holding Torque (N•m)                | 268      | 957         | 3,260       | 4,622      | 842        | 1,276      |
| Allowable Thrust (kgf)                    | 400      | 800         | 2,000       | 3,000      | 800        | 800        |
| Tailstock Thru-hole (mm)                  | 45       | 40          | 40          | 45         | N/A        | N/A        |
| Headstock Thru-hole (mm)                  | N/A      | N/A         | N/A         | 120        | 110        | 110        |
| Rated Weld Current (Amps @ 100% Duty)     | 400      | 800/1,200 * | 800/1,600 * | 1,600      | 1,200      | 1,200      |

\* Optional

## MULTI-AXIS | TILT-ROTATE | SKYHOOK | DROP CENTER

Not all production parts fit nicely into a standard workcell. Heavy, long, boxy or tubular parts can be handled by matching the application need with the proper part positioner. And when the application calls for a unique welding setup, Yaskawa Motoman's wide range of positioners provide added flexibility that enables welding in the optimum position. Coordinated motion between the positioner and robot provides increased travel speeds while maintaining the highest weld standards. Representative designs are shown.







# MOVING DOWN THE LINE

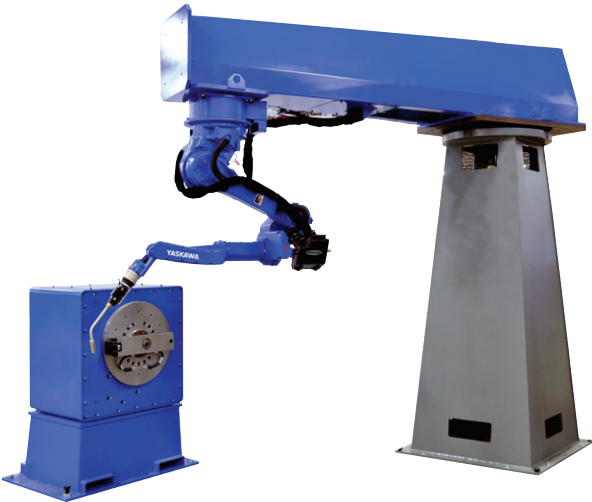
Moving the robot greatly increases the working range and application flexibility. Yaskawa Motoman delivers this advantage through a range of versatile transporter configurations. Our MotoSweep™ radial gantry is ideal for freeing up floorspace and allows the robot to be suspended directly over or on either side of a part. MotoRail™ linear transporters can be floor-mounted or suspended to reduce floorspace and can extend long distances. YRC1000 software can coordinate the motion of up to three base axes (X, Y, Z) for each robot with part positioners. It can also support multiple robots on transporter axes, along with part positioner(s), in a single workcell.

## TRANSPORTERS

Fast, accurate, reliable positioning solutions

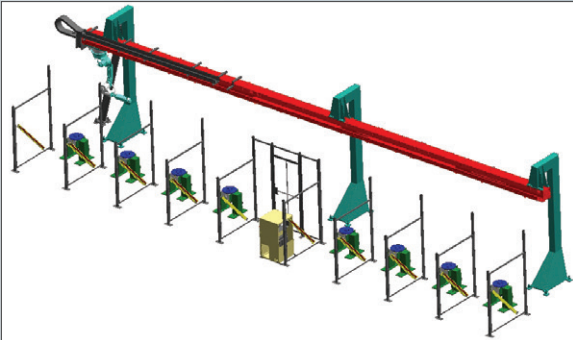
### MOTOSWEEP | MOTOSWEEP HD

- Supports ceiling- or wall-mounted robot to reach large parts or parts that require deep access into weld joints
- Rotating base is covered and not exposed to weld spatter like floor tracks
- Radial motion is coordinated with linear motion of robot and rotating motion of part positioner(s)
- Heavy-duty version can support a robot with 200-kg payload capacity or robot with 3-m reach on a long boom
- Optional bulk wire delivery packages for welding applications



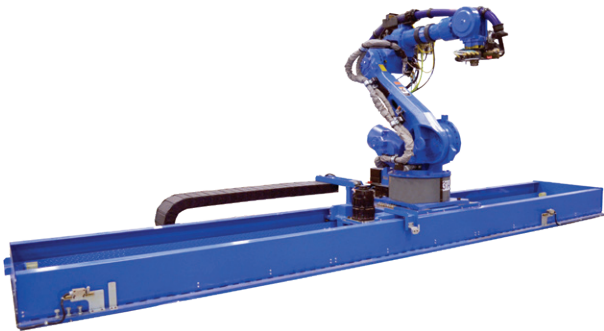
### MOTORAIL 7

- Suspended track with ceiling- or wall-mounted robot(s) provides open floorspace underneath to accommodate loading of large parts
- Six-axis robot mounted on seventh-axis rail provides additional range of motion and improves cycle time
- Available with wide range of robots including heavy-payload robots



### FLOOR TRACKS

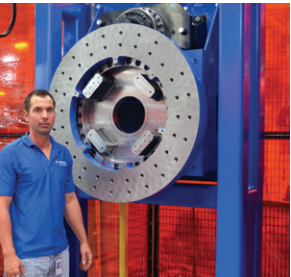
- Wide variety of payload capacities and travel speeds available
- Robot motion coordinated with linear travel and part positioner(s)
- Options include multiple carriages on a single track, or larger carriages to carry robot controller or process equipment



### GANTRY AND HD DRIVE MODULES

Heavy-duty turning unit used in the MotoSweep HD can be integrated with heavy-fixture positioning solutions, creating a low-profile solution with the torque and load capacity to move very large pieces.

A gantry solution features a robot mounted on a moving overhead track. This expands the robot's range to reach very large parts. Yaskawa Motoman's gantry solutions incorporate coordinated motion control across all axes, resulting in a uniquely flexible, variable length solution.







# MAKE THE MOST OF YOUR INVESTMENT

Yaskawa Motoman is committed to complete customer satisfaction at every stage of the project life cycle. Our Yaskawa Support Services team nurtures long-term customer relationships through a wide range of solutions that help maximize uptime, accelerate ROI and ensure long-term performance.

## YASKAWA SUPPORT SERVICES

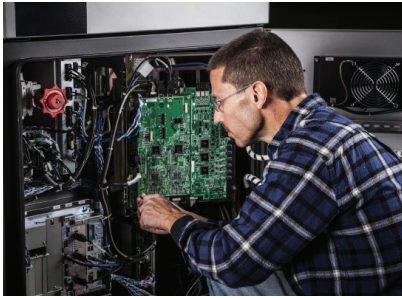
One robot or hundreds, Yaskawa Motoman is committed to every customer.



### TECHNICAL SUPPORT

- Just a call away
- 24/7 expert coverage
  - Highly skilled technicians; 100+ years combined experience
  - Online self-troubleshooting including FAQs and how-to videos

# YASKAWA SUPPORT SERVICES



### FIELD SERVICE

- Experience minimal downtime
- 24/7 dispatch
  - 99.2% first time fix rate
  - Grease analysis and torque sampling
  - Emergency, preventative and predictive maintenance



### PARTS

- Maintain operational success
- Over \$30m of inventory
  - 90% first pass fill rate
  - 24/7 emergency parts availability



### TRAINING

- Empower employees with the knowledge they need
- IACET accreditation
  - 13,400 square feet of classroom space with 65+ dedicated robots
  - 2:1 student-to-robot ratio
  - Remote and on-site training available



### REPAIR AND RETROFIT

- Dramatically increase productivity
- Certified pre-owned robots
  - Extend the life of your robot through rebuilds, upgrades and retrofits
  - Each option comes with a 1-year warranty



### LIFE CYCLE MANAGEMENT

- Optimize ROI and system throughput
- Regional Technical Managers strategically located throughout the country
  - Customized Robot Life Cycle Management solutions to maximize ROI
  - Complete line modernizations



Leaving a Legacy

In a time of rapid industry growth, enabling sustainable workforce development and providing competitive career pathways for students are both vital and challenging. Yaskawa Motoman is committed to addressing these critical needs with innovative products, curriculum, training certification and services for education and industry.



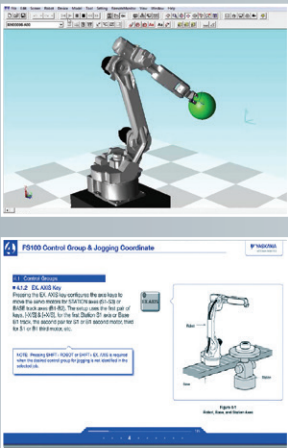
HARDWARE

STEM Robotics Platform

- Designed for education and training programs in advanced manufacturing and robotics
- Ideal for classrooms, labs and training centers
- Teach robotics with the same equipment used in factories

MotoSim® Touch

- PC-based offline programming environment and robotics simulation tool
- Designed specifically for K-16 schools, training organizations and educational research institutions
- Simulates a fully functional production environment



SOFTWARE

MotoSim EG-VRC

- Comprehensive software enables accurate 3D simulation of robot cells
- Optimize robot and equipment placement with virtual testing
- Collision detection, reach modeling and cycle calculations

Yaskawa Academy Learning Management System (LMS)

- Online training tool for skill-based robotics education
- Curriculum designed for classroom, lab, manufacturing training and industrial certification programs
- Accessible via standard browsers for secure, 24/7 access



CERTIFICATION

Yaskawa Academy offers two certification programs

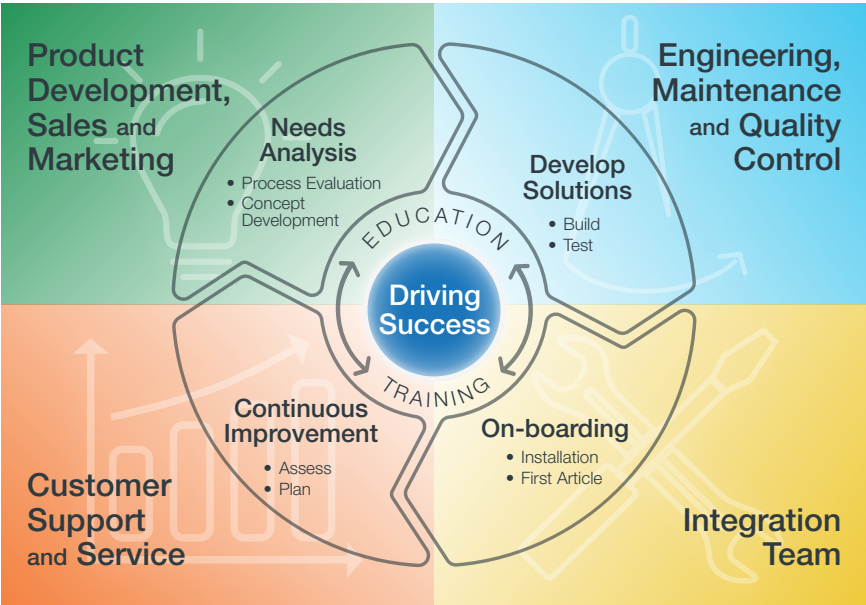
- **Train the Trainer Program** is designed specifically for educational institutions to provide students with a Yaskawa industrial robotics credential. It provides training, resources and tools for instructors to teach a robotics credentialing course.
- **MERIT (Motoman Endorsed Robotics Instructor Training)** is designed for instructors of educational institutions and to support workforce development certification with industry. This program enables instructors to deliver the same curriculum and instructional model as Yaskawa Academy to local manufacturers.



We Enable Real-World Success Stories

Yaskawa Motoman's commitment to excellence extends beyond simply delivering exceptional products, user education and customer support. Our passion for providing high-quality, innovative automation solutions is rooted in our desire to help our customers be competitive leaders in their industries and markets.

While we work with a number of Motoman Strategic Partners for individual application needs, our Automation Group (AG) is a single source for robots, application process expertise, controls, programming, handling systems and safety solutions that can be integrated with legacy systems. With a large staff of experienced engineers, the AG team can design, build, test and install fully integrated, custom automation solutions.



Driving customer success is at the core of every discipline within our company and spans the complete project life cycle. First, we thoroughly evaluate application needs to understand your unique requirements and challenges. This analysis drives the development of a configured solution specifically for your application. Next, we complete installation and training, with a strong focus on ensuring a positive on-boarding experience. Support doesn't end with installation – our goal is always total customer satisfaction, ensured by a dedicated AG Project Manager who oversees and coordinates all project details.

The life cycle continues with world-class support, post-installation review and continuous improvement recommendations to sustain your cycle of success.

With Yaskawa Motoman, you can count on a committed partner with a proven track record of industry-leading innovations. In addition to our arc welding solutions, we offer a comprehensive range of material handling solutions for applications including machine tending, assembly, part transfer, picking, packing, palletizing and more. Whether you need standard products or a fully customized solution, Yaskawa Motoman is the ideal partner to achieve your goals – and drive your long-term success.





Please visit our web site for the most up-to-date list of robot models.

[www.ErgonomicPartners.com](http://www.ErgonomicPartners.com)



Yaskawa is the leading global manufacturer of industrial robots, low and medium voltage variable frequency drives, servo systems and machine controllers. Our standard products, as well as tailor-made solutions, are well known and have a high reputation for outstanding quality and reliability.

# YASKAWA

**YASKAWA AMERICA, INC.**

100 Automation Way | Miamisburg, OH

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[www.ErgonomicPartners.com](http://www.ErgonomicPartners.com)

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YASKAWA ROBOTS CAN BE USED FOR A WIDE VARIETY OF APPLICATIONS INCLUDING ARC AND SPOT WELDING, ASSEMBLY AND KITTING, CUTTING (LASER, PLASMA, ULTRASONIC, WATERJET), DISPENSING, INSPECTION, MATERIAL REMOVAL, PAINTING AND STEM EDUCATION. THESE ROBOTS CAN ALSO BE USED FOR HANDLING APPLICATIONS SUCH AS PICKING, PACKING, PALLETIZING, INJECTION MOLDING, LOAD/UNLOAD, MACHINE TENDING, PART TRANSFER, PRESS TENDING AND SORTING. PLEASE CONSULT YASKAWA MOTOMAN TO CONVERT ROBOT MODEL FROM PRIMARY APPLICATION.