



**Robotic  
Welding  
Solutions**



## Why Automation? Why Miller?

## Simple Solutions with Pre-Engineered Performance

### Workforce transitions

As the workforce shifts from manual labor to highly technological jobs, Miller offers a solution that addresses the shortage of skilled welders — robotic automation. Although the prospect of automation can be intimidating, companies large and small are turning to robotic welding because it:

- **Increases productivity**
- **Prevents over-welding**
- **Improves first-pass weld quality**
- **Produces less scrap and rework**
- **Complies with safety regulations**
- **Lowers the cost of doing business**

### Your one-stop resource

- Automate with just a single point of contact — a Miller welding professional can guide you through every step of the automation process.
- Work with partners you know and trust — your Miller representative and local welding distributor.
- Choose from among the industry's best automation system integrators and robot suppliers.
- Benefit from real system intelligence and partnership that delivers all the performance you need.

### Your trusted welding partner

Miller provides unparalleled customer support and partners with welding distributors to improve your business and provide solutions for the toughest welding challenges. As your guide every step of the way, we can evaluate all the automation options available to you, then recommend the robot system and integration partner that fits your needs. We can also provide upgrade options and explain their costs versus benefits.



Businesses of all sizes can benefit from automation. Companies with as few as two employees have purchased Miller robotic welding automation equipment — and experienced great success on many levels, including performance, payback and new technology applications.

We have developed a family of pre-engineered solutions integrating Panasonic robots, servo positioners and Miller welding technology to solve your fabrication challenges. This seamless integration makes learning the process easier, allowing you to concentrate on other areas of your business.





## Unlimited Applications

### TA and TB Series robots

The latest generation of robotic manipulators incorporates 3D design and finite element analysis (FEA) to optimize rigidity and speed in the TA and TB Series robotic lines. Larger motors and drives, together with high-end servo control algorithms, make the TA Series more than 50 percent faster than our previous generation of robots — while the TB Series features a through-arm design for tight-access applications. With unlimited flexibility, these robotic manipulators are ready to work in your toughest applications.

- **Advanced sensitivity** — When servo control algorithms detect undue load on the robot during motion, they drop servo power to a soft state to protect the robot from collisions.
- **Less interference** — A curved arm design, offset wrist and slim profile reduce robot self-interference, allowing for larger overall working ranges.
- **Safety compliance** — The most rigorous safety standards ensure your investment is not only productive, but safe for your employees (RIA, UL and c-UL compliant).



TEACH PENDANT

- **Easy to operate** — Each teach pendant runs Microsoft Windows® CE with a 7-inch color thin film transistor (TFT) display and uses common computer commands, which makes learning the process easier.
- **Adaptive fill** — When combined with Multi-Pass software and Root Pass Memorization, the robot can repeat a weld pattern while adapting to the changing part. The specialized programming menus on the robot are designed specifically for this process. The visual macros and graphical prompts make this software easy to understand and easy to use.

The robot can weld real-world parts with variation. Your quality goes up and your teaching time goes down.

Adaptive fill senses the edges of the weld joint as the robot weaves back and forth. The robot then adjusts the amplitude of the weave points based on the arc sensing at the weaving edges. The robot will adjust welding travel speed based upon the changing weaving amplitude and the feedback from the welding arc, giving a consistent fill, even though the joint dimensions are changing.



TA CONTROLLER

## Reach and Capacity for Any Application



### TA-1000G2/WG

Max reach: 1068 mm  
6 kg (13 lb.) payload



### TA-1400G2/WG

Max reach: 1374 mm  
6 kg (13 lb.) payload



### TA-1600G2/WG

Max reach: 1598 mm  
8 kg (17.6 lb.) payload



### TA-1800G2/WG

Max reach: 1796 mm  
8 kg (17.6 lb.) payload



### TA-1900G2/WG

Max reach: 1895 mm  
6 kg (13 lb.) payload



### TB-1400G2/WG

Max reach: 1437 mm  
4 kg (8.8 lb.) payload

### TB-1800G2/WG

Max reach: 1802 mm  
4 kg (8.8 lb.) payload



## Using Embedded Arc Control Technology (EAC)

### EAC technology creates new opportunities

TAWERS™ comes standard with EAC technology, which eliminates the need for three control systems by combining the robot, welder and servo wire feeder controls into a single unit. Contained inside the robot controller, this new system is monitored by the TAWERS 64-bit main CPU.

EAC technology controls the robot motion path, and synchronizes the welding power supply and servo wire feeder to adjust for dynamic changes in the welding process. TAWERS soars beyond conventional digital communication systems, delivering the first generation of fully software-controlled robotic welding solutions.

- **Robot lift start** — When the robot senses current flow during the arc start process, it creates the arc using voltage — not current — to dramatically limit ignition spatter and increase first arc strike efficiency.

- **Robot lift end** — The robot lifts to end the weld cratering process, eliminating wire-stick detection and burnback times, while simultaneously sharpening the welding wire.
- **Optional embedded arc data monitoring** — By screening variables and data for quality control, you can find root causes to problems that could result in a suspect part reaching the end customer.



## Technical Innovation



### Continuous evolution with MIG

#### TAWERS™ aluminum MIG

- Aluminum package can be retrofitted to any existing TAWERS robot.
- Servo wire feed system is ultra-stable.
- Lift-start function improves arc starting.
- Low-pulse function allows for oscillation between two parameters (high-low) during welding, producing the Profile Pulse™ “stacked dime” weld bead appearance without back-stepping.
- Synchro-weave function provides true synchronous and instantaneous control of wire feed, parameter control and robot motion — while weaving between plates of unequal thicknesses.



### Continuous evolution with TIG

#### TAWERS™ high deposition TIG

- TIG package can be retrofitted to any existing TAWERS robot.
- Touch-start function eliminates high-frequency noise during arc starts.
- Unique filler wire arrangement reduces feeding-related issues.
- Wire can enter puddle from any position.
- Current shunt function preheats filler metal to improve wire deposition.
- Embedded arc control function provides true synchronous control of wire feed, parameter control and robot motion. Profile Pulse™ “stacked dime” weld bead appearance without back-stepping is easily achieved.
- Torch design is compact.
- Arc voltage height-control function is optional.



## External Welding Power Supplies

### Auto-Access® systems for robotic automation

Auto-Access offers seamless integration of digital control technology by combining an inverter welding power source with a robotic interface.

#### AA-40GB wire drive motor assembly with over current protection (OCP) to protect against current surges.

New design uses an improved sheet metal enclosure including printed circuit board. It features a threaded gas connection and a direct-panel-mounted, quarter-turn motor control cable connection that eliminates motion stress on the motor's power and tachometer feedback wires.

**72-pin HARTING connector** for quick, easy connection to common analog robot controllers. DeviceNet connector for quick, easy connection to common robot controllers with standard DeviceNet cables.

**Auto-CAL**, a patented automatic calibration feature that uses the Auto-Access internal digital technology to allow simple, automatic scaling and synchronization to analog robot controllers. This assures consistent and repeatable results with minimal downtime when installing Auto-Access power sources into existing robot cells.

**Auto-Line™ power management technology** for any input voltage hookup (208 – 575 V) with no manual linking. Assures rock-solid, consistent output on fluctuating primary lines.

### HMII-350/HMII-500

- **Flexible** — Three interactive Pulse control modes (soft, hard, hybrid) accommodate various applications and help cover gaps, reduce spatter and customize the arc to your specifications.
- **Quick and clean** — Two starting modes (MIG [CV] and Pulse) use a patented two-step high current impulse routine for virtually instantaneous spatter-free arc starts.
- **High quality** — Patented dip Pulse technology clears shorts caused by puddle interference, minimizing spatter adhesion in a real-time routine to provide higher travel speeds and improved welding quality.
- **Fully digital** — Digital communication is possible via a connection to any Panasonic Series robot controller with plug-and-play capability and full waveform control from the teach pendant.



## External Welding Power Supplies

### GBII-350

- **Spatter-controlled** — High-end waveform algorithms control welding spatter during the MIG (CV) process, minimizing the ball size and adhesion of the spatter and increasing the deposition efficiency, especially when welding with 100% CO<sub>2</sub>.
- **Fully digital** — Digital communication is possible via a connection to any Panasonic robot system PC tools (RSPCT) robot controller with plug-and-play capability and full waveform control from the teach pendant.
- **Capable of low-voltage and thin-gauge welding** — The optimized waveform control allows stable arc control at low voltages for excellent thin-gauge welding.



### Auto-Access® E with Insight™

- **Defect detection** — Auto-Access E with Insight weld data monitoring can detect when welding feedback is outside its predetermined limits. On a weld-by-weld basis, Insight can monitor current, voltage, wire feed speed, gas flow and duration to ensure that all welds are applied according to specifications — and it can shut down the system when critical faults occur.
- **Management information** — Insight Reporter™ drives welding process improvement using productivity, totalization and quality information, including robot cell state, arc time, parts produced, welds produced, wire used, gas used, downtime and overall equipment effectiveness (OEE).
- **Ethernet** — Using the Auto-Access E custom dashboard, you can monitor as many as 10 critical system attributes at one time from virtually anywhere in the world. You can even change system configuration settings and update firmware via Ethernet connection.



## PERFORMARC™ ROBOTIC WELDING SYSTEM

PerformArc™ products are built on a core foundation of Panasonic robots, servo positioners and Miller welding technology. Designed specifically for your fabrication environment, each PerformArc product incorporates a fully welded steel frame and base structure with sheet-metal-skinned walls. PerformArc offers:

- **Flexibility** — PerformArc products are pre-wired and pre-assembled for fast installation and relocation.



PA 250 M

### PA 250 M

- Manually activated turntable
- Platen style
- 250 lb. per side
- 60 in. table diameter, equally divided
- Length 2870 mm (113 in.)  
Width 1676 mm (66 in.)  
Height 2286 mm (90 in.)

#### PRODUCT DETAILS

Typical part sizes (in inches): 12 x 53, 18 x 45, 24 x 30

- **Fast installation** — A fully welded frame, shipped to you pre-wired and pre-assembled, eliminates assembly time and is up and running in minutes.
- **Integrated controls** — An integrated interface and full-color teach pendant provide full system control, diagnostics and programming capability in one location, which makes learning the process easier for the operator.
- **Productivity and versatility** — The manually activated table allows for high output-to-investment ratio, which is ideal for first-time users and companies with a low volume of automation projects.

- **Central location** — Full system control, diagnostics, and programming capabilities in one easy-to-access location makes learning the process easier and increases cell uptime.
- **Safety features** — All models include a fully integrated safety environment with light curtains and door interlocks.
- **Support** — Your PerformArc system is pre-engineered and backed by Miller.



PA 350 S

### PA 350 S

- High-speed servo turntable
- Platen style
- 350 lb. per side
- 60 in. table diameter, equally divided
- Length 3988 mm (157 in.)  
Width 1727 mm (68 in.)  
Height 2286 mm (90 in.)

#### PRODUCT DETAILS

Typical part sizes (in inches): 12 x 53, 18 x 45, 24 x 30

- **Fast installation** — A fully welded frame, shipped to you pre-wired and pre-assembled, eliminates assembly time and is up and running in minutes.
- **Repeatability** — A standard platen design with bolt and dowel holes allows multiple fixtures to be exchanged on the same work cell.
- **Productivity** — The Panasonic AC servo positioner turns 180° in under 2.2 seconds, minimizing index time and maximizing productivity.

## PERFORMARC™ ROBOTIC WELDING SYSTEM



PA 750 S

### PA 750 S

- High-speed servo turntable
- Platen style
- 750 lb. per side
- 92 in. table diameter
- Length 4724 mm (186 in.)  
Width 2489 mm (98 in.)  
Height 2286 mm (90 in.)

#### PRODUCT DETAILS

Typical part sizes (in inches): 12 x 87, 24 x 76, 36 x 53

### PA 750 SW

- High-speed servo turntable
- Platen style
- 750 lb. per side
- 107 in. table diameter
- Length 5131 mm (202 in.)  
Width 2896 mm (114 in.)  
Height 2286 mm (90 in.)

#### PRODUCT DETAILS

Typical part sizes (in inches): 12 x 104.5, 24 x 95, 36 x 77, 48 x 43

- **Fast installation** — A fully welded frame, shipped to you pre-wired and pre-assembled, eliminates assembly time and is up and running in minutes.
- **Repeatability** — A standard platen design with bolt and dowel holes allows multiple fixtures to be exchanged on the same work cell.
- **Flexibility** — A large work area and 725 pound-per-side payload accepts larger parts, nest-type processing of smaller parts and progressive fixtures.



PA 550 H

### PA 550 H

- High-speed servo turntable
- H-frame style
- Two outboard servo positioners
- 550 lb. per side
- 48 in. between face plates, 34 in. turning diameter
- Length 4724 mm (186 in.)  
Width 2489 mm (98 in.)  
Height 2286 mm (90 in.)

#### PRODUCT DETAILS

Maximum part size (in inches): 34 x 48

### PA 550 HW

- High-speed servo turntable
- H-frame style
- Two outboard servo positioners
- 550 lb. per side
- 60 in. between face plates, 40 in. turning diameter
- Length 5131 mm (202 in.)  
Width 2896 mm (114 in.)  
Height 2286 mm (90 in.)

#### PRODUCT DETAILS

Maximum part size (in inches): 39.37 x 60

- **Fast installation** — A fully welded frame, shipped to you pre-wired and pre-assembled, eliminates assembly time and is up and running in minutes.
- **Maximum accessibility** — Outboard servo positioners allow for easy loading or load-and-tack operations while maximizing torch accessibility.
- **Safety** — Outboard axis power is disconnected during fixture loading to prevent unexpected motion while the robot maintains production.



PA 1100 HW

### PA 1100 HW

- High-speed servo turntable
- H-frame style
- Two outboard servo positioners
- 1100 lb. per side
- 60 in. between faceplates  
40 in. turning diameter
- Length 5309 mm (209 in.)  
Width 3085 mm (121.5 in.)  
Height 2337 mm (92 in.)

#### PRODUCT DETAILS

Maximum part size (in inches): 40 x 60

- **Production flexibility** — A larger rotation diameter, increased length, heavier payload and open overhead construction accommodate larger parts and multiple or progressive fixturing.
- **Maximum accessibility** — Outboard servo positioners allow for easy loading or load-and-tack operations while maximizing torch accessibility.
- **Safety** — Outboard axis power is disconnected during fixture loading to prevent unexpected motion while the robot maintains production.



PA 2200 SS



PA 1100 SS

### PA 1100 SS\*

- Two opposing welding stations
- Independent style
- Two outboard servo positioners
- 1100 lb. per side
- 120 in. between faceplates, 44 in. turning diameter
- Width 4987 mm (196 in.)  
Depth 4254 mm (167.5 in.)  
Height 2286 mm (90 in.)

### PA 2200 SS\*

- Two opposing welding stations
- Independent style
- Two outboard servo positioners
- 2200 lb. per side
- 120 in. between faceplates, 60 in. turning diameter
- Width 5357 mm (211 in.)  
Depth 4991 mm (196.5 in.)  
Height 2286 mm (90 in.)

#### PRODUCT DETAILS

Maximum part size (in inches): 60 x 120

Optional sizes (in inches): 66 x 120, 66 x 44

- **Open design** — The sidewall design allows for heavier weldments to be crane-loaded, while standard load station jog allows unlimited positioning for multi-side part loading of final weldout.
- **Maximum accessibility** — Outboard servo positioners allow for easy loading or load-and-tack operations while maximizing torch accessibility.
- **Safety** — Outboard axis power is disconnected during fixture loading to prevent unexpected motion while the robot maintains production.



PA 1100 FW

### PA 1100 FW\*

- High-speed servo sweep
- “Ferris wheel” style
- Two outboard servo positioners
- 1100 lb. per side
- 120 in. between faceplates, 40 in. turning diameter
- Width 5618 mm (221 in.)  
Depth 4567 mm (180 in.)  
Height 2286 mm (90 in.)

#### PRODUCT DETAILS

Maximum part size (in inches): 43 x 118

- **High productivity** — A high-speed “Ferris wheel” positioner using three independent servo drives provides industry-leading indexing speed, minimizing cycle-time impact.
- **Maximum accessibility** — Outboard servo positioners allow for easy loading or load-and-tack operations while maximizing torch accessibility.
- **Safety** — Outboard axis power is disconnected during fixture loading to prevent unexpected motion while the robot maintains production.

\* Multi-robot configuration available

## Servo-Controlled Positioners

Our servo-controlled positioners are designed for precision welding on round tubes and pipes. Simply clamp each end of the material to a positioner for 360 degrees of access.

- **Built-in safety** — All Panasonic servo positioners come standard with servo disconnect technology and a host of software commands that allow flexibility while maintaining operator safety.
- **Versatility** — These positioners are applicable to MIG, Pulsed MIG, and TIG welding with built-in rotary ground (500 A capacity) and through-hole design to pass air and I/O cabling.
- **Efficiency and ease of use** — Optional harmonized external axes control software makes setting welding speeds and other system parameters easy, reducing the number of taught points and ensuring the optimum welding position.
- **Flexible positioning** — Panasonic 1000 kg servo positioners can be used as building blocks in system designs as main indexers, supplemental outboards, or in combination as skyhook-style positioners.



RJC71



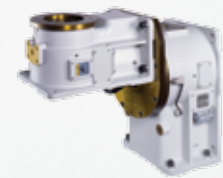
RJB31



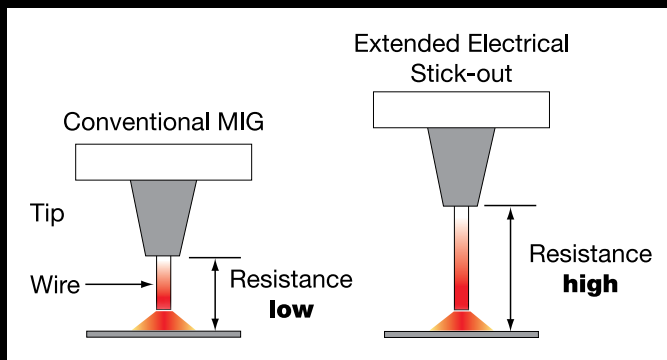
RJR41



RJB1121



RJR51



## Continuous Evolution with HEAT

## Welding Software

### HEAT (High-Efficiency Advanced Tip) benefits include:

- Up to 40% higher deposition than conventional welding processes.
- Less burn-through — ideal for thinner metals.
- Improved gap handling without sacrificing travel speed.
- Consistent tip-to-wire electrical contact for improved process control.



### Optimized for productivity

TAWERS™ arc welding robots combine TA Series manipulators with WG welders by fusing them together using embedded arc control (EAC) technology. With larger motors and drives, increased acceleration and a high rigidity FEA optimized design, TAWERS robots offer exceptional speed, maximizing your performance by minimizing cycle downtimes.

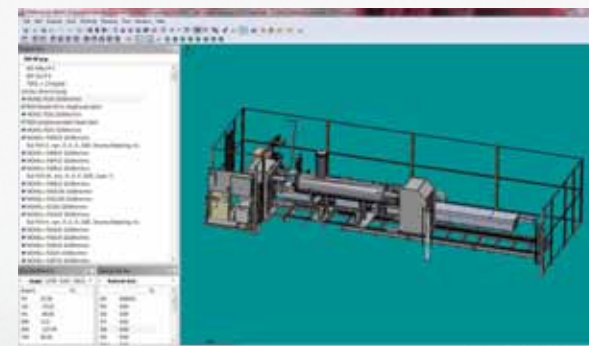
- **Bus communication** — This system helps reduce cycle times, advance quality and improve flexibility of the welding process.
- **Advanced sensitivity** — When servo control algorithms detect undue load on the robot during motion, they drop servo power to a soft state to protect the robot from collisions.
- **Ultra-low spatter** — Advanced arc physics analysis and control can save more than 100 lb. of wire per arc versus conventional MIG (CV) processes.
- **Better performance** — The robot controller and welder share a cabinet that does not exchange outside air with the welding environment, eliminating failure due to welding dust (WG only).

### Robot system PC tools

- **Accessibility** — Full access to system setup information and file management is available via removable PC card or Ethernet hookup.
- **Transferability** — The software allows for quick and easy file exchange between robot installations.
- **Time savings** — Programs can be edited offline, and program structure can be included in staff training.
- **Security** — Regular system backup is automatic, and access is password-protected.

### DTPS 3D simulation

- **Dedication** — A simulation package for Panasonic robot system PC tools (RSPCT), robots and external axes with full tooling and work cell support available.
- **Compatibility** — Simulation is merged with Panasonic RSPCT for complete program editing capability with no translation required.
- **Efficiency** — Offline program analysis and editing manage welding process programs over multiple robot systems.



### TECHNICAL SUPPORT

#### Applications engineering

The applications department within Miller uses the latest in robotic, arc welding, system and simulation capabilities to offer a comprehensive analysis of your potential welding projects. We can perform a thorough analysis by providing tangible results on the viability of your project.

#### Training

Within your organization, we can help you develop productivity specialists by sharing our unique experience and extensive knowledge. An investment in training is an investment in your organization that can offer tremendous operations expertise, productivity gains and ROI.

#### Maintenance services

Even the best, most reliable equipment and software need maintenance, care and upgrades over time. We provide a variety of services to maximize your productivity, extend the useful life of your production lines and reduce total operating costs. Our technical staff is available 24/7 through our technical assistance center.

#### Genuine parts

Ordering a replacement part for your robot is fast and easy. You can order through our customer care center, by phone or online. We'll fill your order and have it on its way to you immediately. And you'll have the confidence of knowing it is a quality part, meeting the specified need of your machine.



# Robotic Welding Automation

As the workforce transitions from manual labor to highly technological jobs, Miller offers robotic automation to address the shortage of skilled welders. Our regulation compliant robotic welding increases productivity and first-pass weld quality, reduces over-welding and rework, offers increased protection and safety for operators and lowers the cost of doing business. For more information, visit [MillerWelds.com/automation](http://MillerWelds.com/automation).



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