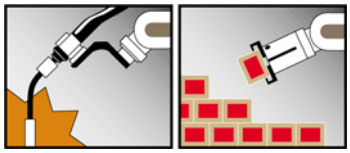
NACHI

NACHI ROBOTIC SYSTEMS INC.

MV SERIES

MV6 / MV6L / MV16



ARC WELDING AND HANDLING ROBOTS

Remarkable Enhancements in Motion Performance

MANIPULATORS

High Speed - Smooth Movement Shortens Production Time

- **Faster, yet smoother motion** - reduce cycle time by new servo control system with advanced acceleration method.
- **Independently articulated arm** - no link to impede articulation for a full range of motion.
- **Vibration restraining control** - virtually eliminates vibration when stopping at maximum speed.

Our Best Selling Arc Welding Robot

Offers a wide working range with an independently articulated arm.

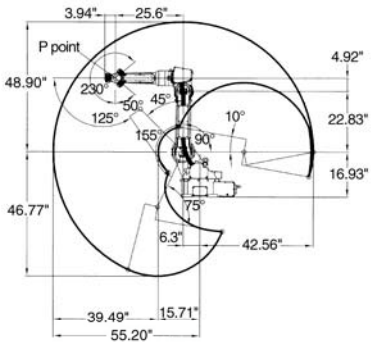
Long Arm Arc Welding Robot

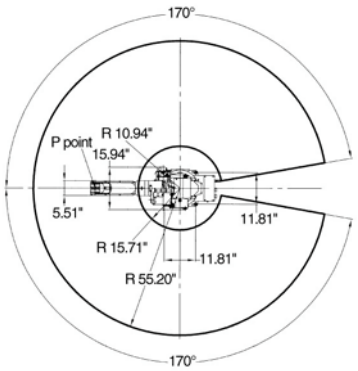
Extended reach up to 78.98" (2006mm). The optimum solution for welding large workpieces.

Multi-Purpose Handling Robot

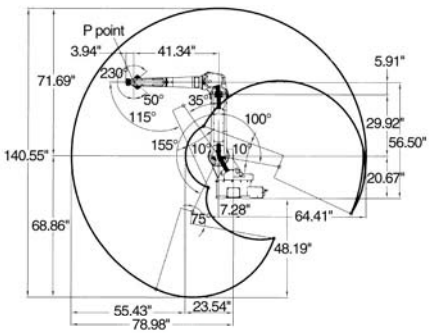
High performance, smooth handling of workpieces up to 35 lbs. (16kg).

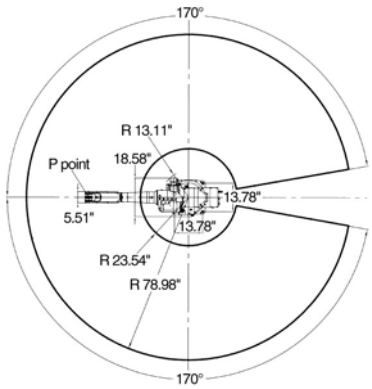
MV6



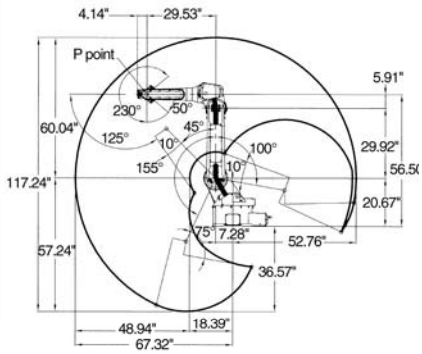


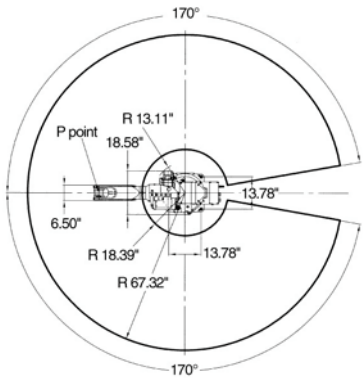
MV6L





MV16





Advancing the Science of GMAW Applications

HIGH QUALITY MAG / CO2 WELDING

- **Virtually Spatter Free - High Speed Welding**

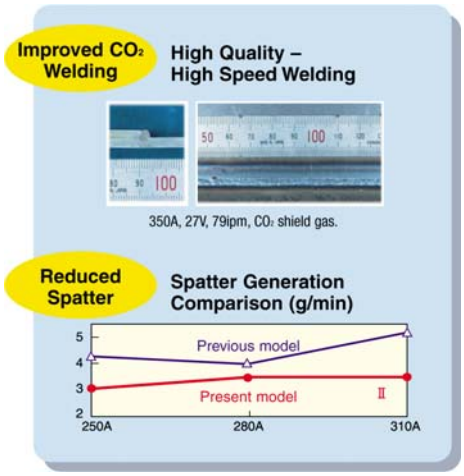
Arc voltage tolerance and arc stability are drastically improved when using mixed shielding gases or 100% CO^2

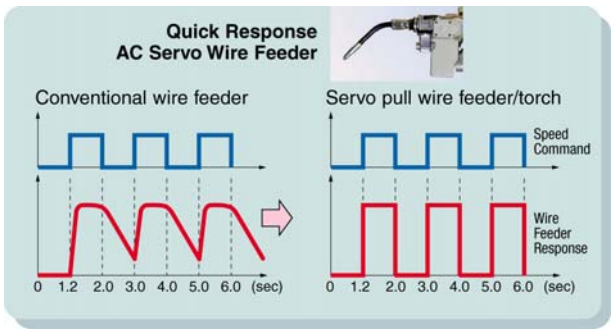
- **Optional AC Servo Wire Feed System**

By using an AC servo pull type wire feeder / torch, wire feedability is improved during high-speed welding

- **Optional RD (Retract Start) Control**

Improves instantaneous arc start ratio and bead profile at the arc start point





TANDEM PULSED MAG WELDING

- **High-Speed Tandem Pulsed MAG Welding**

Very fast travel speeds are easily attainable

- **Two Independent Electrodes**

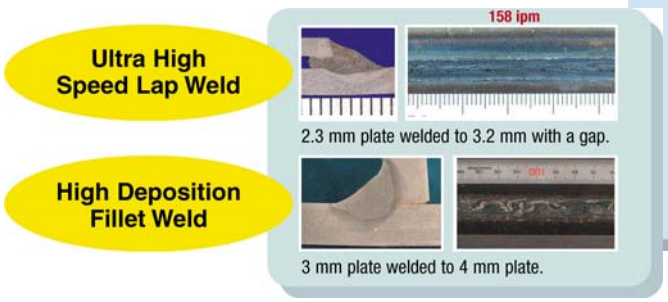
Each controlled separately and synchronously to maintain arc stability and reduce spatter

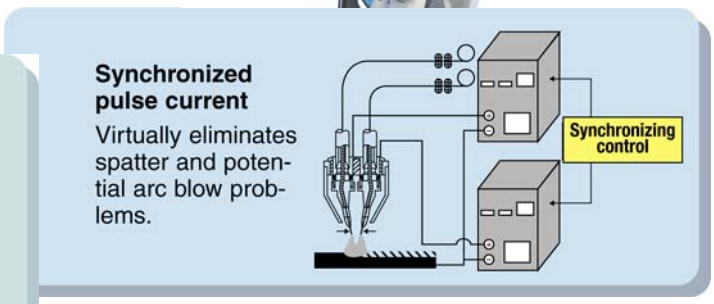
- **High Deposition Rate**

Achievable for thin and thick plate applications

- **Tandem MIG**

Available for high-speed aluminum applications





HIGH QUALITY ALUMINUM MIG WELDING

Optional Features

- **Retract Start Function-RS Control**

Arc start failures and spatter generation are dramatically reduced even when using soft aluminum wire

- **Synchro MIG and FC (Feed Control) MIG Functions**

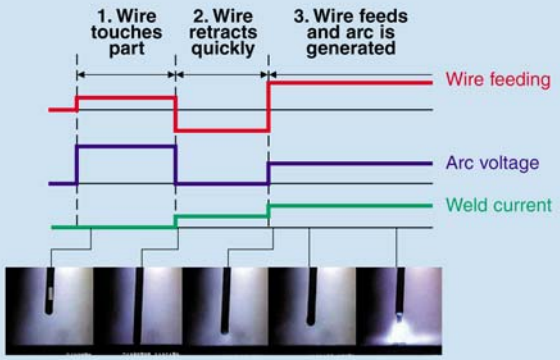
Beautiful TIG-like bead appearance is made easily and efficiently at higher travel speeds of MIG welding

- **4 Drive Roll AC Servo Pull Feeder / Torch**

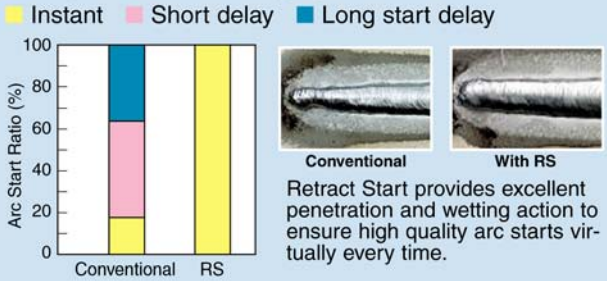
Stable wire feeding is accomplished with the highly responsive wire feed system

RS Arc Start Function (Retract Start)

With high wire feeding response of the AC servo pull torch, the following arc start function is executed. Here is how it works in three steps.

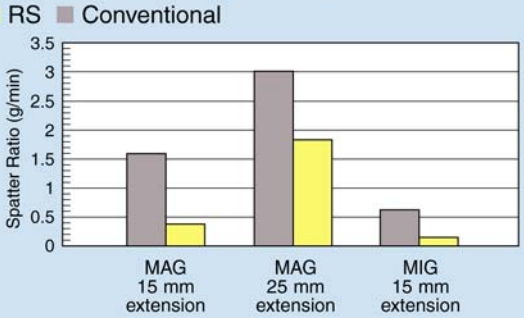


RS improves arc starting by 5 times on aluminum!



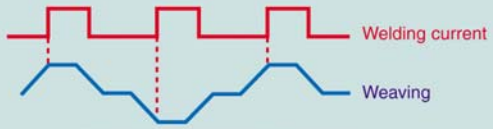
Retract Start provides excellent penetration and wetting action to ensure high quality arc starts virtually every time.

Spatter is reduced significantly



Synchro MIG

By synchronizing the welding current pulse cycle, heat input into the base metal can be precisely controlled. Excellent for welding dissimilar thicknesses.



2 pulse cycles within 1 weave cycle.

Lap joint welding using Synchro MIG

Synchro pulse: 2 Hz – 100A – 20V – 20 IPM.

FC MIG (feed control)

Wire feed speed is synchronized with low frequency pulsed current for high quality welding of even very thin aluminum.

Ideal for aluminum applications requiring Tig-like bead appearance with higher efficiency of MIG.

Significant Development in GTAW Applications

ULTRA PRECISION TIG WELDING

Standard Features

- **New Digitally Controlled Power Sources**

Pulse wave forms are programmed with the robot teach pendant improving repeatability and making parameter setting easy

- **Newly Designed TIG Torch**

Compact, rigid, and incorporates a built-in shock sensor that stops the robot instantly in the event of an accidental crash

- **Compact Wire Guide**

Simplifies teaching in narrow or confined spaces

Optional Features

- **Pulsed TIG and Synchro TIG Functions**

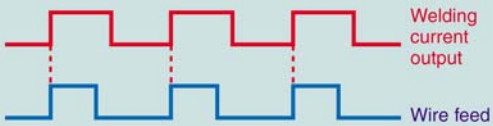
Ultra high quality with excellent bead appearance is easily attainable

- **AC Servo Wire Feed System**

Synchronizes wire feeding with pulsed current utilizing an AC servo wire feeder

Pulsed TIG Welding Function

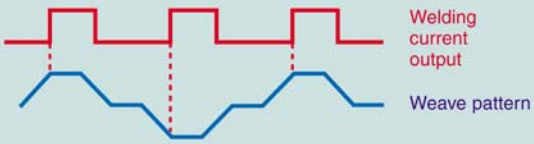
Synchronized pulsed welding current and pulsed wire feed.



Timing chart of current output and wire feeding

Synchro TIG Function

Pulsed welding current and pulsed wire feed is synchronized with weaving frequency.



Timing chart of current output and weaving

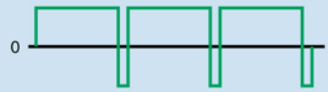
- Total control of process with incredible bead appearance.
- Insures high repeatability with accuracy.

AC Servo Wire Feeder

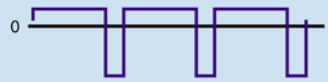
- Wire feeding is always stable and unaffected by robot movement
- Synchronizing wire feed with pulsed current improves the welding of thin aluminum, even with gaps

Current Waveform Function

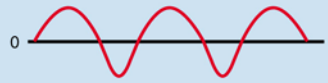
Sine wave, square wave, or combinations of the two can be taught directly from the teach pendant.



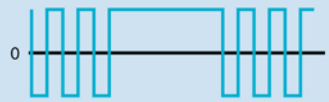
AC Standard Mode – wide application from thick to thin materials



AC Hard Arc Mode – focused arc for thin sheet, fillet joints and outside corner joints.



AC Soft Arc Mode – best suited for butt joint welding of sheet metal with low vibration of molten pool.



AC/DC Hybrid Mode – AC + DCEP drastically reduces consumption of electrode and provides deep penetration.

Flexibility in Plasma Cutting Applications

HIGH QUALITY PLASMA CUTTING

- **High Speed and Heavy-Duty Capacity**

Zips through thin and medium gauge material at incredible speeds
High quality cuts up to 2-inch thick material

- **Maximum Duty Cycle**

Plasma torch for the D-12000 is water cooled and offers 100% duty cycle

- **Long Life Consumables**

Water cooled electrodes and high durability cutting tips reduces down time for changing consumables

- **Built-in Torch Guard Function**

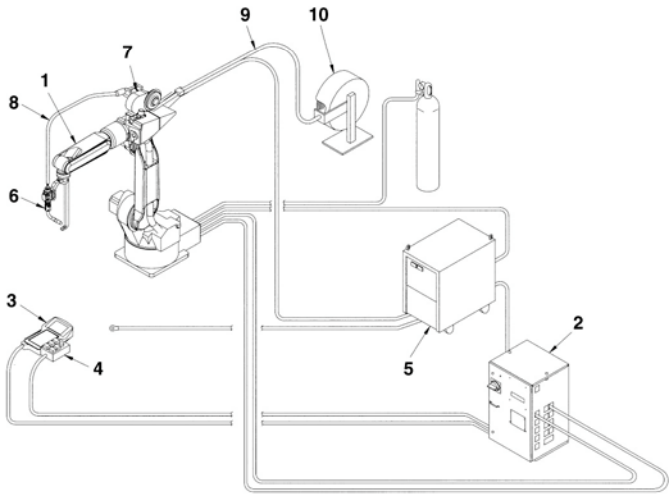
Alarm indicates replacement time of tip and electrode

D-12000 cutting chart

Cutting Thickness (in.)	1/2	3/4	1	1-1/2	2	2-1/2
Mild Steel	CLEAN CUT RANGE					
Stainless Steel						
Aluminum						

TYPICAL SYSTEM CONFIGURATION

1. Manipulator
2. Controller
3. Teach Pendant
4. Operation Box
5. Welding Power Source
6. Welding Torch
7. Wire Feeder
8. Coaxial Power Cable
9. Conduit
10. Wire Reel Stand



AX-C Open Architecture/PC-Based Robot Controller

CONTROLLER FEATURES

- **Open Architecture**

PC-based controller provides more flexibility to adapt to customized systems (Windows™ NT embedded)

- **Compatible to Abundant Applications**

Arc welding, cutting, spot welding, material handling, sealing ...

- **User Friendly Operation by Visual Display**

Friendly assistance and guidance by built-in tutorial function

- **Advanced PLC Functions**

Edit ladder diagram on the teach pendant - offline editing through commercial programming tool

- **Enhanced System Configuration Ability**

Up to 54 axes and 9 mechanisms (up to 6 manipulators) can be controlled by one controller

- **Large Memory Capacity and I/O Control Signals**

Standard memory capacity is 160,000 teach points - I/O control signal can be optionally enhanced up to 64 IN/OUT

- **Incredible New Functions for Arc Welding**

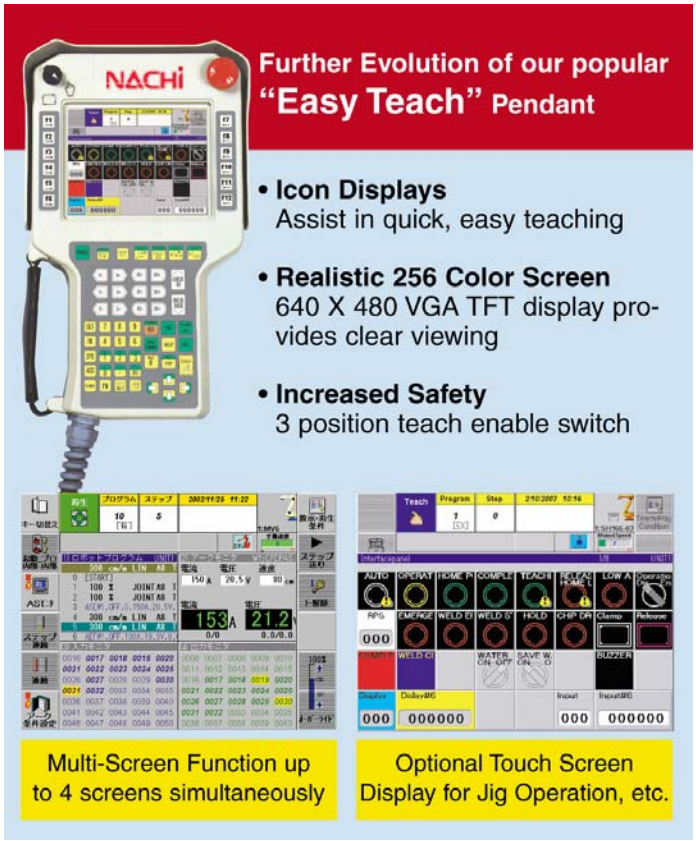
Optional “RS” Retract Start, Synchro MIG & TIG, FC-MEG, and more

- **Network Capability**

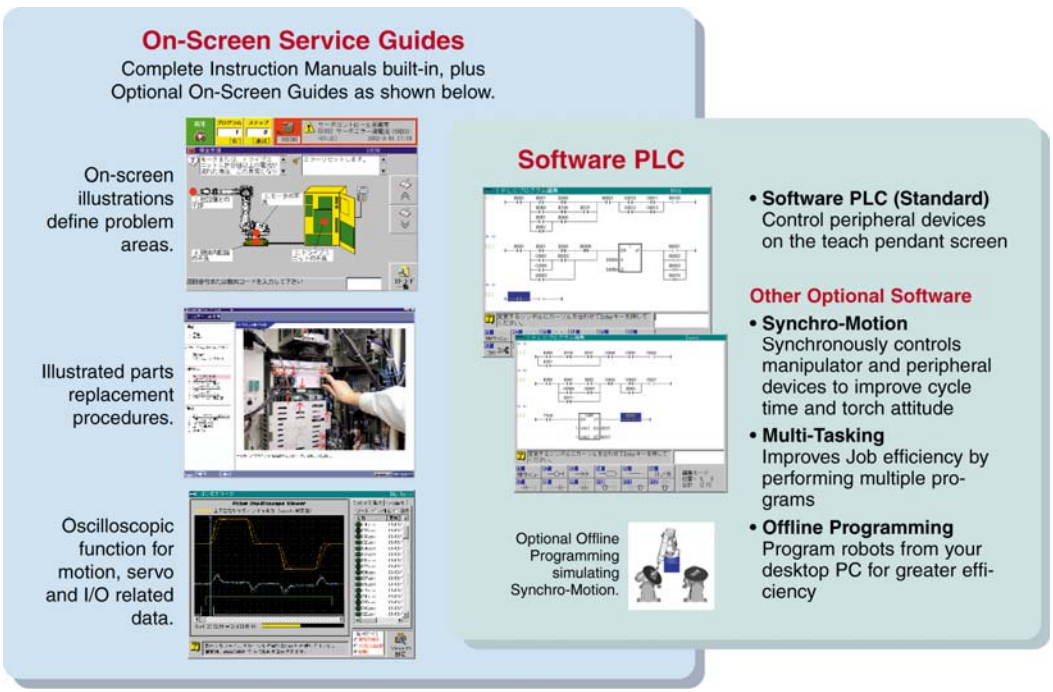
Optional Ethernet, Device-Net, and Profi-bus network connections

- **Multilingual Feature**

Select two languages from 10 available languages



MAINTENANCE & SOFTWARE FEATURES



STANDARD SPECIFICATIONS

MANIPULATOR					
ITEM			**MV6**	**MV6L**	**MV16**
Structure			Vertical Articulated Type	Vertical Articulated Type	Vertical Articulated Type
Number of Axes			6	6	6
Maximum Allowed Load Weight			13.2lb (6kg)	13.2lb (6kg)	35.2lb (16kg)
Positional Repeatability			±.003 in. (±0.08mm)	±.004 in. (±0.1mm)	±.004 in. (±0.1mm)
Drive System			AC Servo Motor	AC Servo Motor	AC Servo Motor
Drive Capacity			2750W	5200W	5600W
Position Feedback			Absolute Encoder	Absolute Encoder	Absolute Encoder
Operating Range	Arm	1st axis rotation	±170° ±50° **	±170° ±50° **	±170° ±50° **
		2nd axis lower arm	-90°~ +155°	-100°~ +155°	-100°~ +155°
		3rd axis upper arm	-170°~ +190°	-170°~ +205°	-170°~ +205°
	Wrist	4th axis swing	±180°	±180°	±180°
		5th axis bending	-50°~ +230°	-50°~ +230°	-50°~ +230°
		6th axis twist	±360°	±360°	±360°
Maximum Speed	Arm	1st axis rotation	150°/sec	165°/sec (150°/sec**)	165°/sec (150°/sec**)
		2nd axis lower arm	160°/sec	165°/sec	165°/sec
		3rd axis upper arm	170°/sec	175°/sec	175°/sec
	Wrist	4th axis swing	340°/sec	350°/sec	350°/sec
		5th axis bending	340°/sec	340°/sec	335°/sec
		6th axis twist	520°/sec	520°/sec	520°/sec
Ambient Temperature			0° ~ 45°C 20 ~ 80%RH	0° ~ 45°C 20 ~ 80%RH	0° ~ 45°C 20 ~ 80%RH
Mass (weight)			341lb (155kg)	550lb (250kg)	550lb (250kg)
Installation Method			Floor, Hanging, Upside Down	Floor, Hanging, Upside Down	Floor, Hanging, Upside Down

Note: The positional repeatability shows the measured value in a status where automatic operation is repeated and the action conditions of the manipulator are stabilized.
*** Values are for wall or inverted installations.*

AX-C CONTROLLER					
	ITEM	**SPECIFICATION**		**ITEM**	**SPECIFICATION**
Control System	Teaching system	Teaching playback	**Sequence Control**	Program Capacity	32K Word
	Drive system	AC servo system		Sequence Command	Supports 5 languages in IEC1131-3
	No. of control axes	Max. 54 axes		Protective Function	Shock sensor, servo shock sensor (option), mechanical stopper, overrun limit switch
	Coordinates	Articulated, cartesian	**Input / Output Signal**	Special physical I/O	Out 4 / In 7 points
	Edit function	Copy, add, cut & paste		General physical I/O	Relay unit 32 points (option: extended relay 64)
	Shift function	Parallel, cylindrical, symetric, external axis shift (OP)		Input power	3 phase, AC200V*** +10%, -15%
	Program control	Call, jump, condition jump	**Physical**	Outside dimensions	22(W) x 19.8(D) x 34(H) inch 558 (W) x 503(D) x 865(H) mm
Memory	Memory element	Compact flash card		Mass	Approx. 176 lbs (80 kg)
	Memory capacity	160,000 instructions			
	No. of programs	9999			
	External memory	Compact flash card (OP)			
	Applications	Arc welding, spot welding, cutting, handling, sealing			
	Safety function	Door interlock, teach & auto mode interlock			

****Standard transformer supplied for AC230/460V input*

For more information visit the Nachi Robotic Systems Inc. website at www.nachirobotics.com, or e-mail to info@nachirobotics.com

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