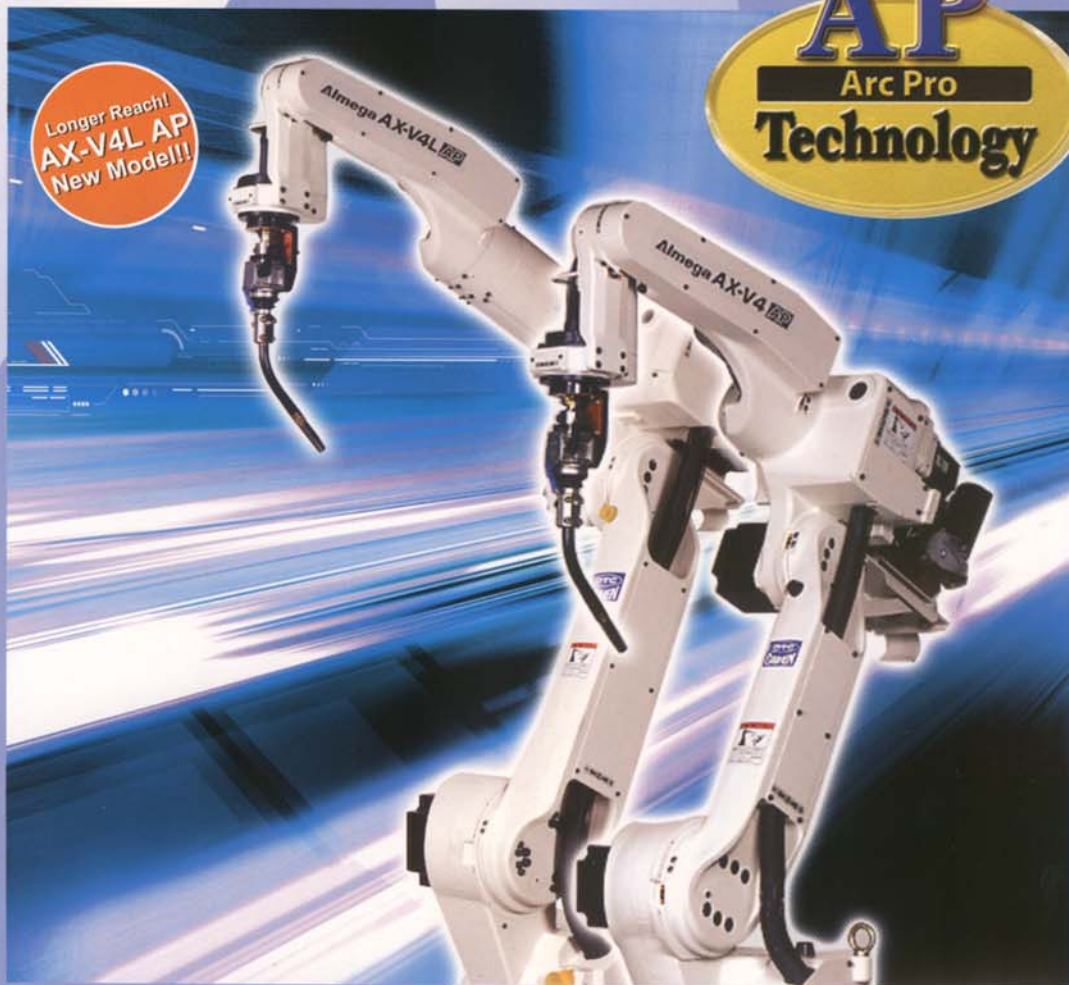


**Almega AX Series****Almega AX Series Highly Versatile Arc Welding Robots**

Almega AX-V4 AP

Almega AX-V4L AP



Longer Reach!
AX-V4L AP
New Model!!

**DAIHEN Provides Optimal Solutions Through
Arc Welding Robots and Welding Expertise**

Pursuing High Quality and High Efficiency Welding!

If you have problems like these •••

Problems in Quality

- Spatter at start and during welding



- Lack of knowledge for controlling welding conditions

Problems in Efficiency

- Tact time cannot be shortened.

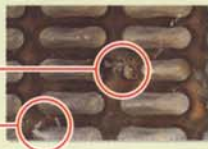
- Teaching takes too much time.

- Bad maintainability

"High-speed weld ability for sheet metal"
"reduced interference of cable, arm and torch with fixture"
"improved arc start performance", "spatter reduction"
and "reduction of unexpected stops"
In order to address these issues, DAIHEN combines its robots, welding machines and peripheral equipment into optimal welding packages.
This is what we call "Arc Pro(AP) Technology".

- Unstable arc start occurs.

Unstable arc start



AP Technology provides solutions to all these problems!

Merit **1**

Built-in cable provides higher weld ability, operability, and maintainability

Built-in Coaxial Power Cable
Simple & slim arm provides a variety of advantages

Easy maintenance with cantilever structure.

Adoption of cantilever structure makes the upper arm and wrist fully open, providing easy maintainability. Power cable can be exchanged with ease.

Easy teaching

Interference with power cable is minimized allowing for a smooth approach to complicated works or fixtures. This helps maintain optimal torch angles for best welding results.

- Circular welding (outside and inside)



- Welding in confined spaces



- Perfect for Offline Programming

When using a PC for offline programming, it is no longer necessary to consider power cable interference with the work and fixture, thereby allowing for easier adoption to the actual work place.

Standard and long arm types available.

Select the models most suitable for the size of the work.



Constant wire feed

Built-in cable design restrains bending of the power cable and helps keep constant wire feeding, as well as improved welding quality.



Quality Control

Arc Monitor Function

Monitor Welding Conditions Via the Teach Pendant

| CURRENT | V. ADJ. | SPEED | W. CHAR. | SPATTER |
|---------|---------|--------|----------|---------|
| 150 A | 0 | 100 cm | 0 | 0 |

| CURRENT | VOLTAGE | FEED LOAD | REDUCT. |
|---------|---------|-----------|---------|
| 150 A | 17.0 V | 20 % | 100 |
| Min/Max | 150/150 | 17.0/17.0 | 20/20 |

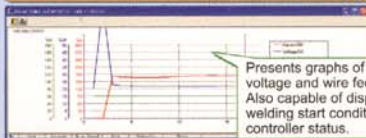
Spatter reduction effect can be checked.

Arc monitor window (when DL350 is connected)

Welding current, voltage and wire feed load can be monitored via the teach pendant. When the DL350 is connected, it is also possible to monitor the spatter control rate to determine whether spatter can be reduced.

PC Arc Monitor AX-AM (PC option)

Confirm Welding Conditions Through Visual Representation



Presents graphs of welding current, voltage and wire feed load, etc. Also capable of displaying detailed welding start conditions and controller status.

Weld Conditions Logging Feature

Executed welding steps, problematic areas, welding conditions per hour, and the time welding started and ended are displayed, as well as program numbers and average current, etc.

Easy Operation High Functionality

User-friendly operability

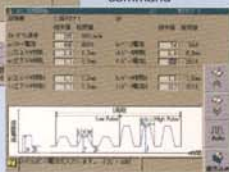
Advanced Functions With Easy Teaching

Teaching items such as welding and weaving conditions are visually presented for easy setting.



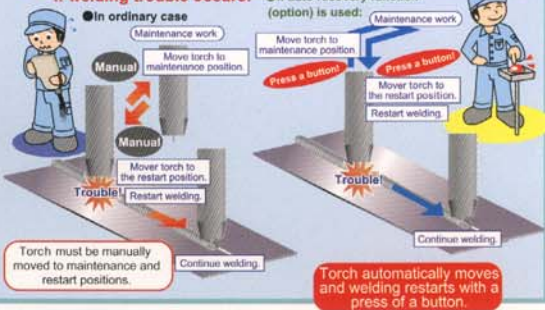
▼ Example of window for teaching the welding start command

▲ Example of window for teaching the weaving start command



Auto recovery function enables quick and easy recovery from welding troubles!

If welding trouble occurs:



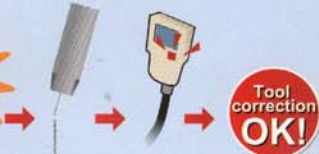
Greatly Improved Maintainability

2-point Tool Length Setting Function

If the torch is misaligned with wire after exchange, tool correction can be done with a press of button. A Torch gauge is no longer required.

Wire of exchanged torch is misaligned.

Torch deviates due to crash



Align the torch with the point set by pre-teaching

Simply press the Easy Setting button on the teach pendant

Tool correction OK!

Auto Calibration Function (Option)

Detects position deviation of torch and automatically performs calibration



Running the position deviation sensing program periodically provides preventive maintenance against misalignment.

If a position deviation occurs, the calibration program will automatically execute to correct the misalignment. Welding programs automatically corrects.

Position deviation

Auto-Calibrating...

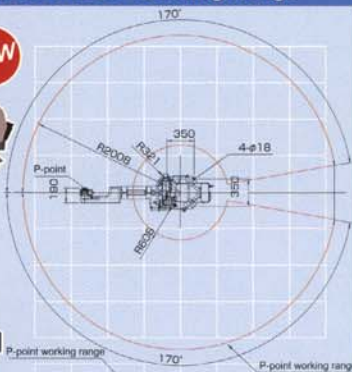
Almega AX-V4 AP Working Range



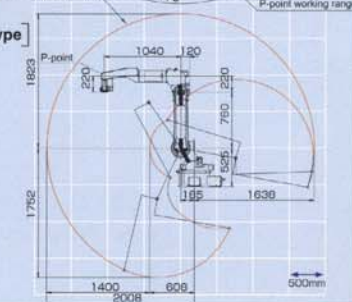
[Standard type]



Almega AX-V4L AP Working Range



[Long reach type]



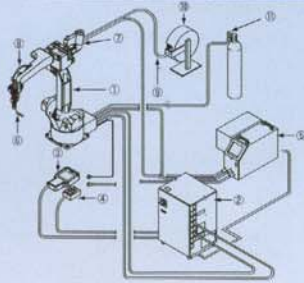
Specifications

| Item | AX-V4 AP | AX-V4L AP |
|---------------------------------|-------------------------------------|-------------------------------------|
| Name | AX-MV4AP | AX-MV4LAP |
| Structure | Vertical articulated | Vertical articulated |
| Number of Axes | 6 | 6 |
| Maximum weight capacity | 4kg | 4kg |
| Repeatability (*1) | ±0.08mm | ±0.1mm |
| Drive System | AC Servo Motor | AC Servo Motor |
| Drive Capacity | 2700W | 5150W |
| Position feedback | Absolute Encoder | Absolute Encoder |
| Cross section area of arm | 2.94m ² ×340° | 6.53m ² ×340° |
| Ambient Temperature | 0~45°C | 0~45°C |
| Ambient Humidity | 20~80%RH(No condensation) | 20~80%RH(No condensation) |
| Mass | 160Kg | 270Kg |
| Upper Arm Payload Capacity (*2) | 10Kg | 12Kg |
| Installation | Floor, ceiling or wall-hanging type | Floor, ceiling or wall-hanging type |
| Origin return (*3) | Not required | Not required |
| Paint Color | Arm: White, Base: Blue | Arm: White, Base: Blue |

(*1) Positional repeatability calculated after operating conditions stabilize from repeated automatic operations
 (*2) When an end effector of the maximum allowable weight is loaded.
 (*3) Positional date protected by a battery-backed storage inside the manipulator
 (*4) The value shown in () indicates wall-mounted conditions

| Item | | AX-V4 AP | AX-V4L AP |
|-------------------------|-----------------------------------|--------------------------------------|-----------------------|
| Working range | Arm | J1(Turn) (*4) ±170°(±50°) | ±170°(±50°) |
| | | J2(Lower arm) -155°~+90° | -155°~+100° |
| | | J3(Upper arm) -170°~+180° | -170°~+190° |
| Maximum speed | Wrist | J4(Revolution) ±155° | ±155° |
| | | J5(Bending) -45°~+225° | -45°~+225° |
| | | J6(Twist) ±205° | ±205° |
| | Arm | J1(Turn) 2.62rad/s (150°/s) | 2.97rad/s (170°/s) |
| | | J2(Lower arm) 2.79rad/s (160°/s) | 2.97rad/s (170°/s) |
| | | J3(Upper arm) 2.97rad/s (170°/s) | 3.05rad/s (175°/s) |
| Wrist | J4(Revolution) 5.93rad/s (340°/s) | 6.11rad/s (350°/s) | |
| | J5(Bending) 5.93rad/s (340°/s) | 5.93rad/s (340°/s) | |
| | J6(Twist) 9.08rad/s (520°/s) | 9.08rad/s (520°/s) | |
| Allowable load on wrist | Allowable moment | J4(Revolution) 10.1N·m | 10.1N·m |
| | | J5(Bending) 10.1N·m | 10.1N·m |
| | | J6(Twist) 2.94N·m | 2.94N·m |
| | Allowable inertia moment | J4(Revolution) 0.38kg·m ² | 0.38kg·m ² |
| | | J5(Bending) 0.38kg·m ² | 0.38kg·m ² |
| | | J6(Twist) 0.03kg·m ² | 0.03kg·m ² |

Standard Configuration Drawing



| | | CO/MAG specification | MAG specification |
|---|----------------------|---|---------------------|
| ① | Manipulator | AX-MV4 AP or AX-MV4L AP | |
| ② | Controller | AX-C | |
| ③ | Teach Pendant | AXTPDSON-EC08 | |
| ④ | Operating Box | AXOP-0005 | |
| ⑤ | Welding Power Source | Digital Auto DM350/500 | Digital Pulse DP400 |
| ⑥ | Welding Torch | MTXC-3531 (350A air-cooled) MTXCW-5031 (500A water-cooled) | |
| ⑦ | Wire Feeder | ● | |
| ⑧ | Power Cable | ● | |
| ⑨ | Conduit | ● | |
| ⑩ | Wire Reel Stand | ● | |
| ⑪ | Gas Flow Regulator | ● | |

AP

Variety of Merits Brought by AP Technology

Arc Pro Technology

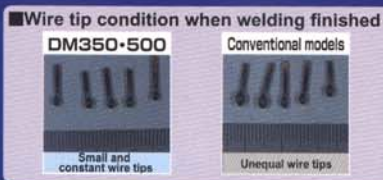


Merit 2

Stable arc start and low spatter welding

- Digital turbo start and digital antistatic factions significantly improve stability at arc start.

Constant wire tip diameter ensures stable arc start.
Unexpected momentary stop due to unstable arc start can be reduced.



+ Digital Inverter
DM350/500

- Reduce spatter
Precisely controlling current waveforms when in short-circuit reduces the number and size of spatters.
- Example of precise current waveform control



Merit 3

Improved welding efficiency at high speed and reduced cycle time

- High speed welding of sheet metal with high quality

Current: 350A, Voltage: 27V
Speed: 230cm/min, Gas: CO₂

Welding speed of 2.3 m/min ensures penetration and stable beads.



Current waveform control optimized for high speed welding provides further improved quality. It achieves faster cycle time as well as good welding quality.

+ Digital Pulse
DP400

- High quality welding thanks to stable arc (DACI control)
Highly precise current control for CO₂ and MAG welding modes enables stable arc. It also serves to control spatter.



Merit 4

Simplifying Difficult Welding (Galvanized, steel plate, etc.)

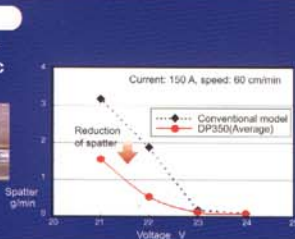
Pulsed MAG welding

- Intelligent filter provides stable weldability unsusceptible to zinc blow-up.



- T-joint fillet welding

Base metal: Galvanized sheet metal 2.0 mm
(Coating weight: 45 g/m²) method: MAG pulse welding
Current: 140 A, voltage: 22 V, speed 80 cm / min



Iron
Stainless steel
Galvanized sheet metal

+ Digital Pulse
DP400

- Increased voltage tolerance reduces spatter
Increased tolerance for lower voltage reduces spatter more than conventional models. Arc convergence is improved to stabilize the quality of fillet welding and high-speed welding.

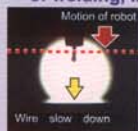


Merit 5

Robot Retract Start (RS) Control Drastically Improves Arc Start Performance

- RS control ensures beautiful bead appearance from the start of welding, improving total yield.

DaihenAfs unique RS control works with standard 4-roll feeders and robot software. It no longer requires an AC servo torch. This ensures reliable arc start and reduces spatter at the start of welding.



Robot performs wire touch while wire feed is slowed down



Wire touches base metal



Arc starts as soon as the robot retracts wire



Welding starts with stable arc start



Note) Robotic RS control is an optional feature and is limited to applicable welding power supplies, manipulators, and welding modes. Contact a DAIHEN sales representative for details.

Welding Power sources

CO₂ / MAG

Inverter-controlled
CO₂ / MAG welding power source
Digital
Auto **DM350/500**

**Standard type
Higher Versatility**



● **DM-350**
Rated Output :350A (31.5V)
Rated Duty Cycle :60%
Output Range :30~350A
Mass :30kg

● **DM-500**
Rated Output :500A (39V)
Rated Duty Cycle :100%
Output Range :30~500A
Mass :51kg

※ Interface board (option) is required for connection with AX robot.

Pulsed MAG / MIG · CO₂ / MAG

Inverter-controlled MAG/MIG · CO₂ / MAG
welding power source
Digital
Pulse **DP400**

**Handles from pulse welding to
DC welding with high quality**



● **DP-400**
Rated Output :400A (34V)
Rated Duty Cycle :Pulse 50% DC 60%
Range of Output Voltage :30~400A
Mass :45kg

※ Interface board (option) is required for connection with AX robot.
※ Aluminum AX-V4 AP, AX-V4L AP packages are currently not supported.

**Robotic Welding Power Sources can also
be used as general-purpose welding machines.**

CO₂ / MAG Welding Torch Variation

● Standard Torch (Curved)

Best-selling CO₂ / MAG
torch with built-in shock sensor unit



| Model | Rated current, I _{MAG} | Usage ratio, I _{MAG} |
|--|---------------------------------|-------------------------------|
| Air-cooled with shock sensor MTXC-3531 | 350A (250A) | 50% (50%) |
| Air-cooled with shock sensor MTXC-5031 | 500A (300A) | 50% (50%) |
| Inverter-cooled with shock sensor MTXCW-5031 | 500A (350A) | 70% (50%) |

● Air Purge Torch (Curved)

Removes spatter in the nozzle quickly by air to prevent unexpected momentary stop. Air-cools the nozzle to prolong its life span.



| Model | Rated current, I _{MAG} | Usage ratio, I _{MAG} |
|---|---------------------------------|-------------------------------|
| Air-cooled, air flow with shock sensor MTXCB-3531 | 350A (250A) | 50% (50%) |
| Air-cooled, air flow with shock sensor MTXCB-5031 | 500A (300A) | 50% (50%) |

● S-shaped Body Torch

S-shaped body corrects bend of wire to ensure stable alignment. Enables steady welding with good feeding characteristics.



| Model | Rated current, I _{MAG} | Usage ratio, I _{MAG} |
|--|---------------------------------|-------------------------------|
| Air-cooled with shock sensor MTXS-3531 | 350A (250A) | 50% (50%) |

Assist Feeder



**Strongly supports wire feed!
Easy-to-combine with your wire feeder.**

- Incorporating this assist feeder enhances wire feed capability and offers more stable feedability.
- Supports both packed wire and wire on reel.
- Constant torque control eliminates the necessity of synchronous control with the wire feeder. Can be combined with any wire feeder.
- AC motor requires no exchange of brush, offering easy maintenance.
- Max. feed speed 30 m/min.

PC-based

New Generation Robot Controller! **Almega AX-C**

Detailed catalog available upon request.
Please feel free to inquire.

In accordance with DAIHEN's policy to make continuing improvements, design and/or specifications are subject to change without notice and without any obligation on the part of manufacturer.

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