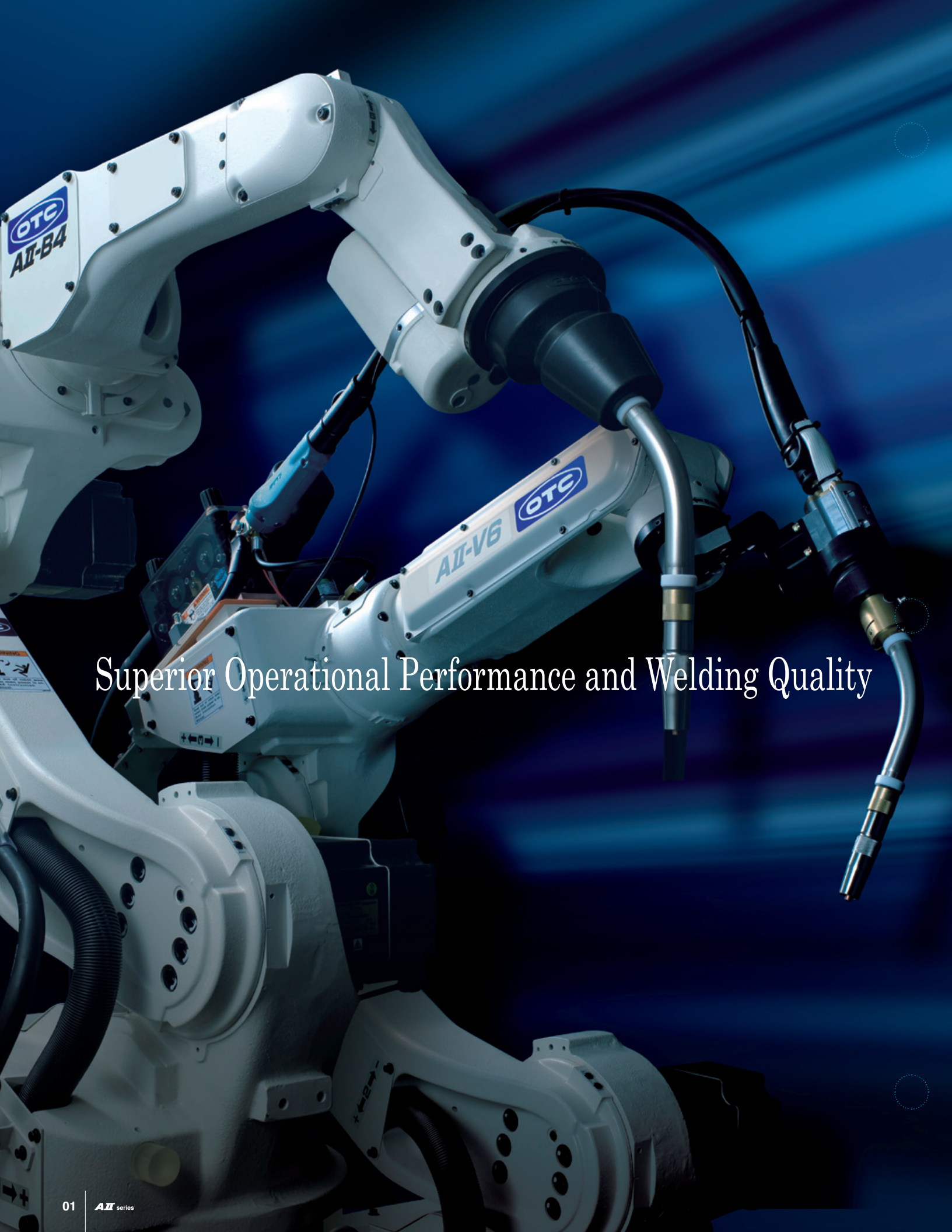
CAT. NO. R0001-1

DAIHEN Inc.

AII Series

AII-B4 • B4L • V6 • V6L • V20

ADVANCED ARC WELDING ROBOTS

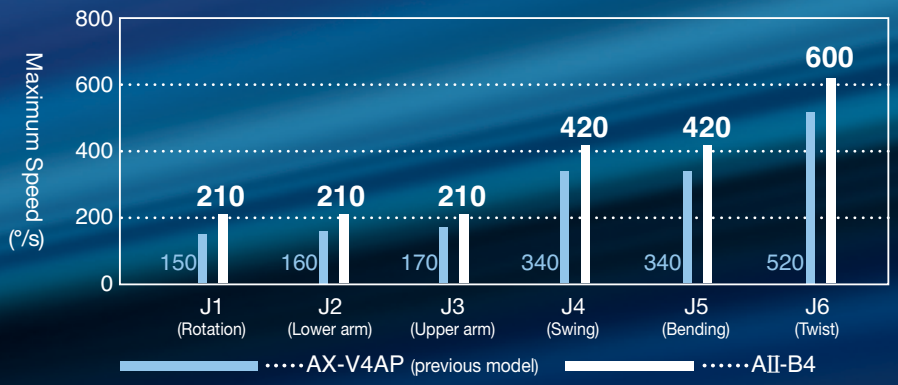


Superior Operational Performance and Welding Quality

Improved Manipulator Performance for Shorter Cycle Times

Significant increase to the maximum speeds for the individual manipulator axes allow for even higher productivity than previous models.

◎ Maximum Speed Comparison



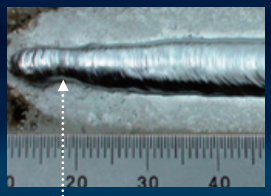
Reliable Arc Start Performance for Absolute Welding Quality

The All Series provides a smooth approach to the welding start point, resulting in improved welding quality.

◎ Combine with a Compact Servo Torch for the "Ultimate Arc Start", resulting in even higher welding performance.

Welding current: 150A
Welding voltage: 16.5V
Welding speed: 100cm/min
DL350, Compact Servo Torch
and RS Control (optional) used

Conventional Method



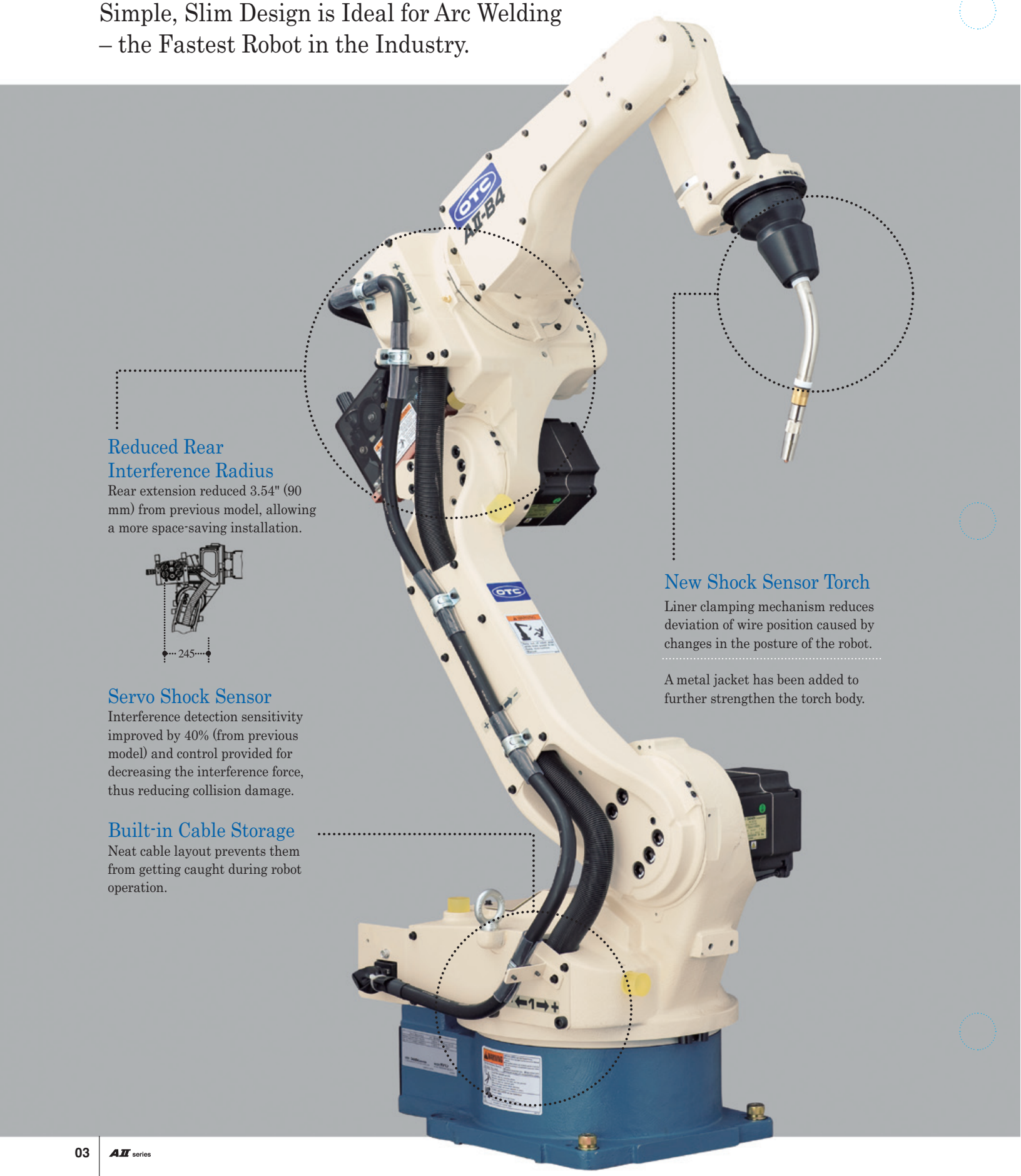
RS Control

Wire: A4043 / 1.6 mm (0.016")
Wire Feed Rate: 5 m/min (197 IPM)
Base Metal Thickness: A1050/ 3 mm (0.118")
Welding Speed: 50 cm/min (19.7 IPM)
Gas: 100% Ar
RS Control (optional) used

Short circuit immediately after arc start causes part of the wire tip to be flicked away, causing insufficient weld metal.

AII-B4

Simple, Slim Design is Ideal for Arc Welding
– the Fastest Robot in the Industry.



Reduced Rear Interference Radius

Rear extension reduced 3.54" (90 mm) from previous model, allowing a more space-saving installation.

Servo Shock Sensor

Interference detection sensitivity improved by 40% (from previous model) and control provided for decreasing the interference force, thus reducing collision damage.

Built-in Cable Storage

Neat cable layout prevents them from getting caught during robot operation.

New Shock Sensor Torch

Liner clamping mechanism reduces deviation of wire position caused by changes in the posture of the robot.

A metal jacket has been added to further strengthen the torch body.

Through-arm Cable Design Provides Incredible Welding Performance, Operability and Maintainability for the Ideal Arc Welding Solution.

Two Arm Lengths available: Standard and Long Reach

From small to large workpieces, our robots can meet your application needs.

Welding large workpieces

Long-Reach Arm Type
AII-B4L

AII-B4L

Cantilever Structure Provides Ease of Maintenance

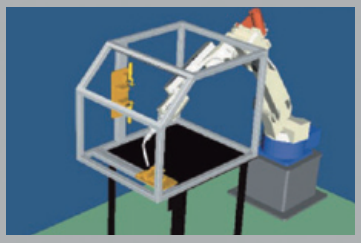
The cantilever structure of the upper arm allows complete access to the coaxial cable for easy maintenance and service.

Built-in Coaxial Cable Provides Stable Wire

Built-in power cable reduces wire bending, resulting in smooth, stable wire feeding and improved weld quality.

Ideal for Offline Teaching

Since coaxial cable is routed inside the arm, cable interference is no longer a factor to consider during offline teaching with a PC. This allows easier adoption of the offline program to the actual workpiece.

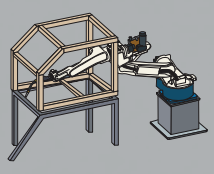


Easy Teaching with Built-in Power Cable

Interference of the coaxial cable is minimized even with complicated workpiece shapes or fixtures, allowing smoother approaches and teaching for natural welding positions.

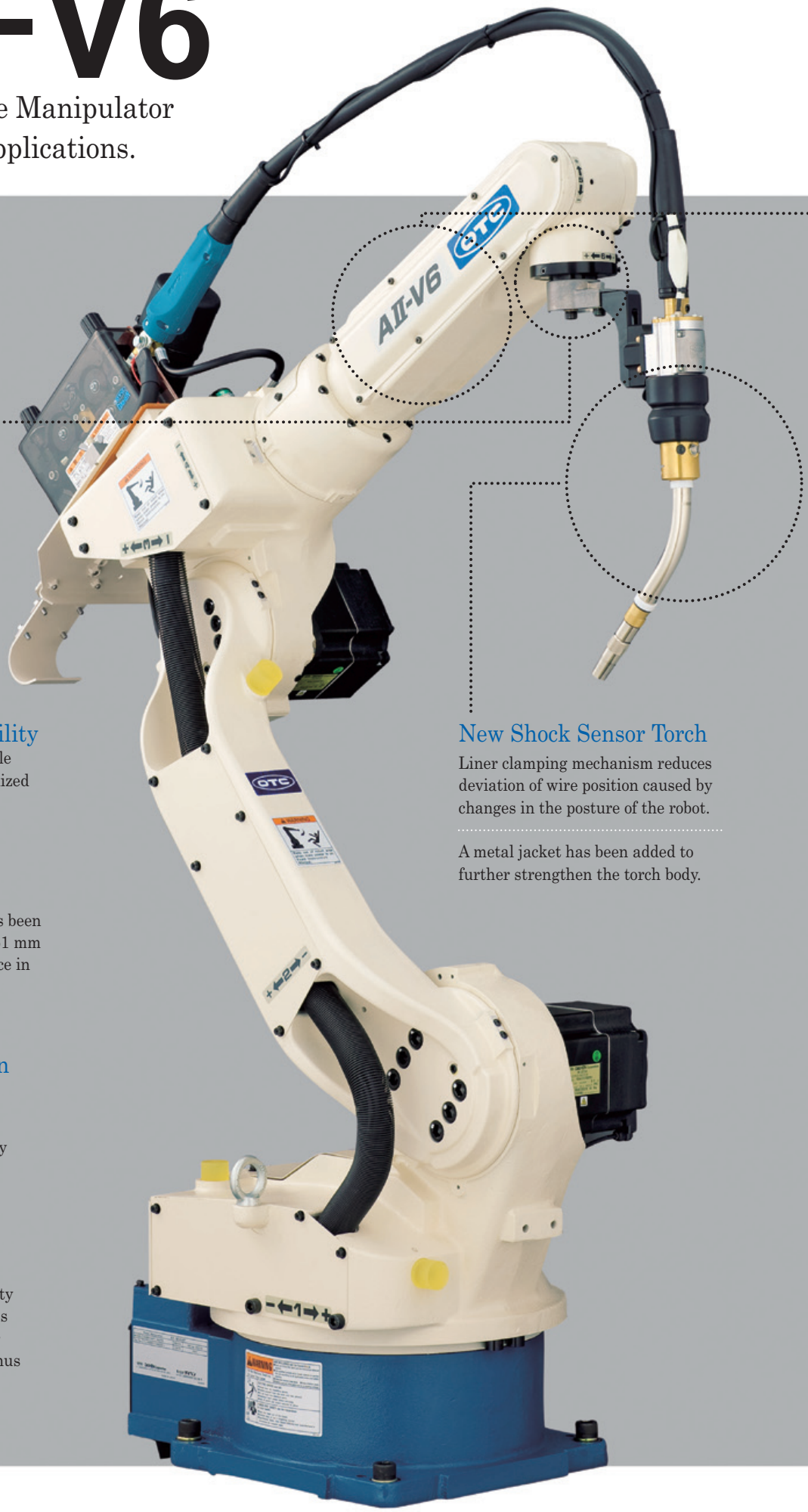
Circumference Welding (outer and inner)

Welding in Narrow Spaces



AII-V6

A Highly Versatile Manipulator
for All Welding Applications.



Improved Maintainability

Robots can now be greased while the torch is mounted. Standardized motors between different robot models reduces the number of service parts.

Slim Arm Width

The width of the upper arm has been reduced from 5.51" to 5.28" (5.51 mm to 134 mm) – easing interference in tight spaces.

Improved Dustproof and Waterproof Design Equivalent to IP54 (5/6 axes)

The AII-V6 utilizes a completely sealed structure, preventing droplets in any direction from causing adverse effects.

Servo Shock Sensor

Interference detection sensitivity improved by 40% (from previous model) and control provided for easing the interference force, thus reducing collision damage.

New Shock Sensor Torch

Liner clamping mechanism reduces deviation of wire position caused by changes in the posture of the robot.

A metal jacket has been added to further strengthen the torch body.

AII-V20

Adaptable to Various Applications.
Suitable for handling light articles
as well as arc welding applications.

Large Payload Capacity

13.2 lbs. (6 kg) payload capacity supports all welding applications including CO2/MAG, MIG and TIG.

For TIG Welding

Two Arm Lengths available: Standard and Long Reach

From small to large workpieces, our robots can meet your application needs.

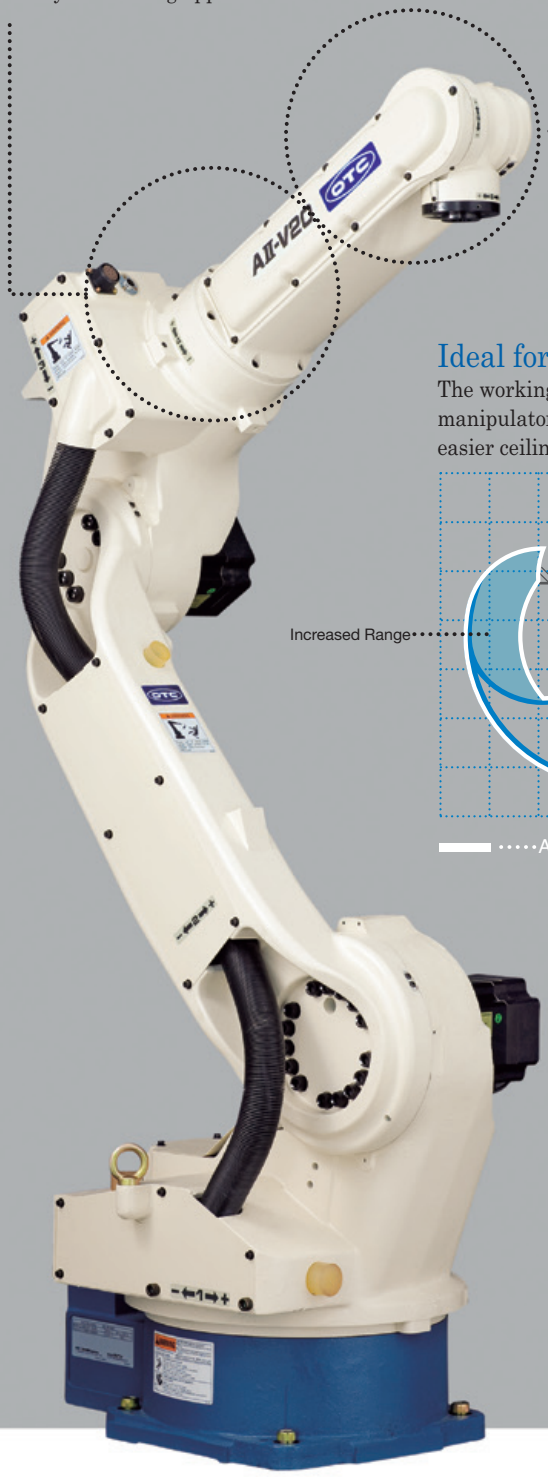
AII-V6L

Increased Payload Capacity

Payload capacity has been increased to 44.1 lbs. (20 kg), providing support for a wider variety of handling applications.

Advanced Operational Performance

Highly accurate positional repeatability is ±0.003" (0.07 mm). Wrist allowable moment has been improved by 20% over the previous model – provides high operational performance even when welding thick plates that require weaving.



Ideal for Ceiling Mounting

The working range at the back of the manipulator has been increased for easier ceiling mounting.

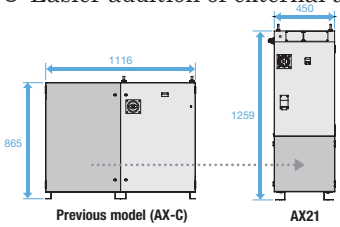
AX21

Cabinet features Improved Resistance to Heat and Dustproofing and Improved Reliability in Global Environments.

Controller with Higher Reliability and Maintainability

Improved cooling efficiency and dustproofing provides reliable use in severe environments, including production lines with high duty cycles and high-temperature and high-humidity areas.

◎ Easier addition of external axes than previous model.

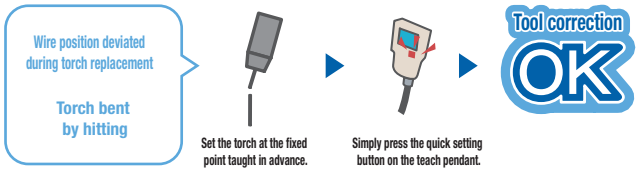


Size and weight of drive unit reduced and single-touch connection of control cable improves maintainability

Up to 16 axes controllable simply by adding an extension case

Two-point Tool Length Setting Function

◎ Simple one-button tool correction

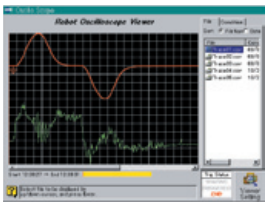


This process eliminates the need for adjustment with torch gauge, significantly reducing robot down time.

Simple and quick maintenance functions

Robot Diagnostic Tool — Option

AX21 features improved maintainability by modularization of parts and simplified cable wiring. Users can check preventive maintenance and abnormality diagnosis with the optional Robot Diagnostic Tool.



Right: Motor speed and actual current of each axis displayed on the teach pendant.

Robot Diagnostic Tool

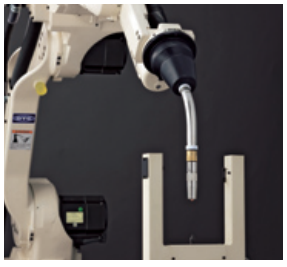
Automatic Calibration Function — Option

◎ Torch Deviation is Automatically Detected and Calibrated

A deviation detection program can be run at regular intervals to see if there is any error. If deviation is detected, the calibration program is automatically run for correction.

▼

This prevents weld failure due to deviation, thereby helping reduce weld failure rates.



PC-based management for compatibility with various applications

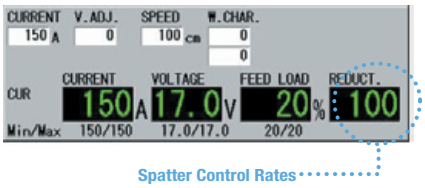
The AX21 controller can be used with a wide variety of applications, including arc welding, spot welding and material handling, addressing all kinds of needs in production processes.

Fully-equipped with Functions Ensuring Absolute Quality

Arc Data Monitor Function

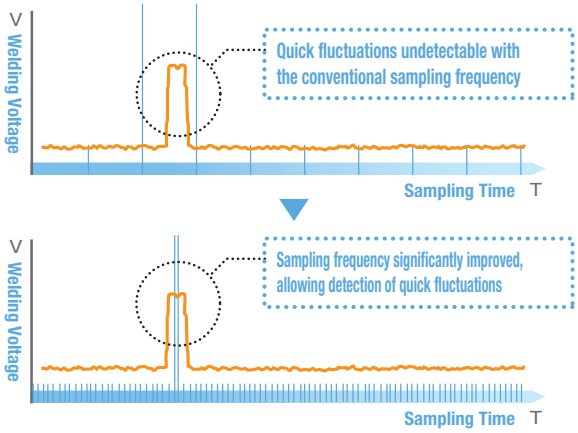
◎Welding conditions monitored via teach pendant

Monitor welding current, welding voltage, wire feed load, etc. on the teach pendant. Connecting a DL350 additionally shows spatter suppression rates.



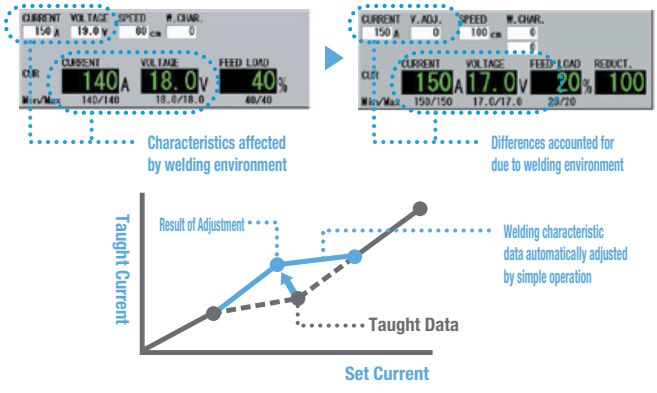
◎ Increased Sampling Frequency Provides Higher Detection Accuracy

The process is used to detect instantaneous arc outages, arc outages in short tack welding, etc.



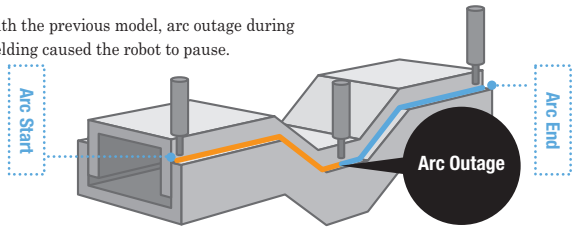
Welding Characteristic Data Automatic Adjustment Function

Adjustments are made so that the actual welding current/voltage will be output in the conditions as taught by accounting for differences in the welding environment such as changes in wire extension.



Reduction of Pauses During Welding

With the previous model, arc outage during welding caused the robot to pause.



AX21 allows automatic restoration of robot operation under predefined conditions, such as the restart position and number of restarts.

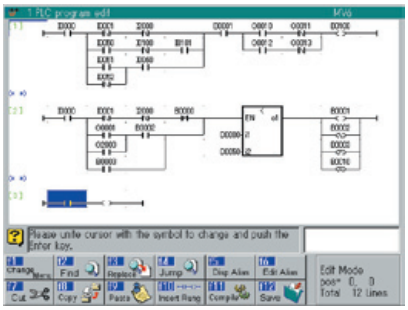
▶ Productivity of the robot is significantly improved

Helps reduce system construction costs

Software PLC Function

◎ Software PLC function for decrease of devices

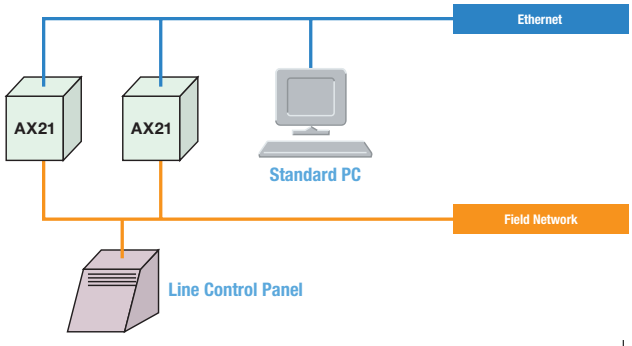
Interface PLC with line control panel, which is provided by user, can be significantly simplified – reducing your system cost.



Example of ladder diagram editing screen

Simplified wiring by field network compatibility

For I/O interface with line control panel, field networks such as DeviceNet and CC-Link can be used on top of relay contacts, allowing wiring cost reduction by simplified wiring and flexible system construction according to the user's needs.



TP Teach Pendant

User-Friendly Teach Pendant Provides Full Control for High Productivity and Optimal Welding Performance.

Multi-Window Display Function
Multi-window display function allows display information of up to four windows.

Function Keys for Simple Operation
Assign frequently used instructions from simple icon instructions.

Improved Operability via Dedicated Keys
Teaching time reduced by dedicated keys, including P, L, C, AS, WS, Input and Output.

High-resolution, large color display
640 x 480 dot VGA TFT LCD display

Visual Operation
Intuitive icon menu is easy to understand.

3-position Dead Man Switch

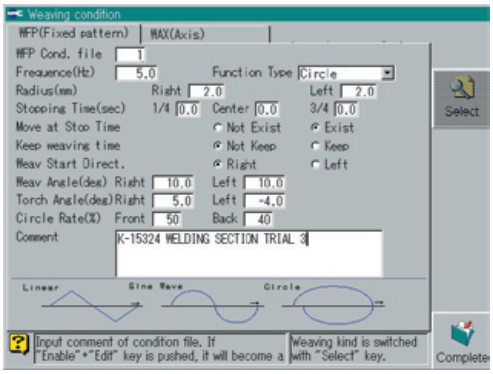
Reduced Number of Operations
Features like our Dedicated Keys, Seam Coordinate System, and Speed Collective Conversion reduce the overall number of key strokes required to program.

Further Simplified Teaching

Visual teaching input assistance

◎ Visualized teaching items

Teaching items such as welding and weaving conditions are visualized for ultimate ease of setting.



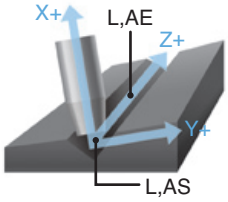
Weaving start instruction teaching screen

User-friendly Operation

Simple & speedy operation functions

◎ Seam coordinate system

Use of seam coordinate system allows movement in the direction of seam or wire extension simply by single-axis operation of the teach pendant.

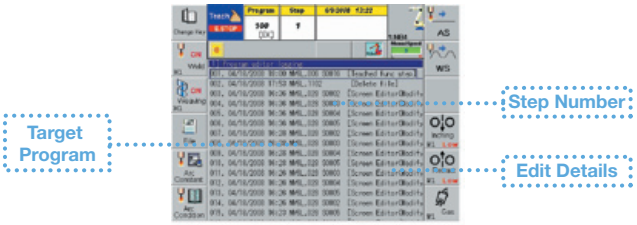


There's no need for multiple-axis key operation necessary with the previous model, simplifying teaching operation

Seam Coordinate System

◎ Editing History Display

Task programs and items of welding condition editing history can be sorted by date/time and program, allowing simple viewing of who edited what.



Management Functions

◎ Weld Failure Management Function

Search and sort functions allow quick, accurate identification of causes of pauses due to weld failure for improved productivity.

Rich functions including :

- Sort by Program
- Sort by Step

Arc Start Failure Occurrences

◎ User Inspection Function

Notifies operator of periodic robot inspections or part replacements via teach pendant message display or external output signal, which can be used for preventive maintenance of robot.

Advanced Interface

Touch Panel Teach Pendant

Option

◎ Operate Tooling Switches via the Teach Pendant

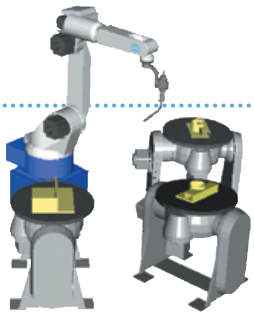
Indicators and switches, previously located on the operation panel, can also be assigned to the teaching pendant.

Touch Panel Function

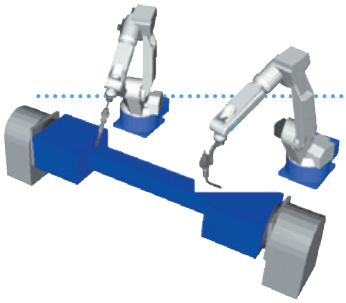
Synchromotion

Option

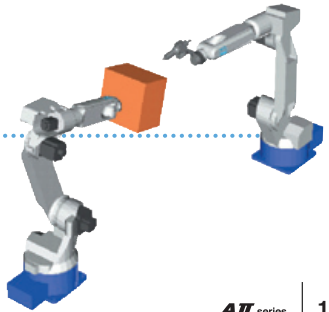
OTC's proprietary Synchromotion option is available for a variety of applications.



Multi-Synchromotion
Synchromotion on multiple stations



Twin Synchromotion
Simultaneous synchromotion of two welding robots



Jigless Synchromotion
Synchromotion between material handling and welding robots

Manipulator Working Range

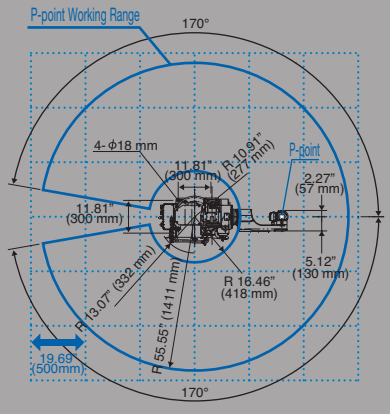
*The figures below show working ranges of P-point with no torch mounted.

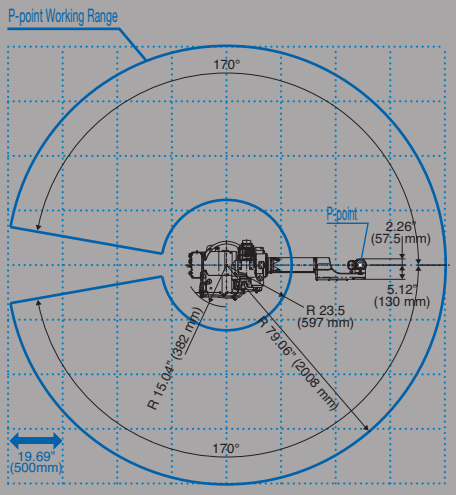
AII-B4

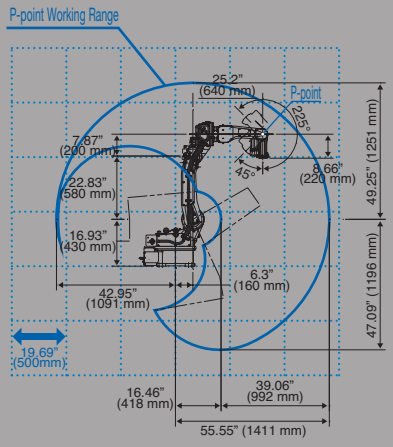
Standard

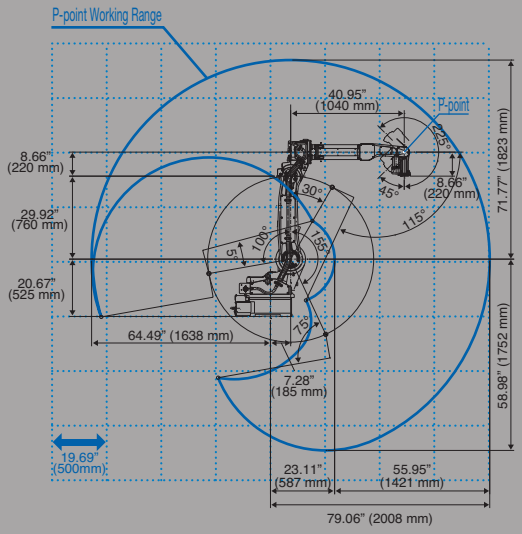
AII-B4L

Long Reach







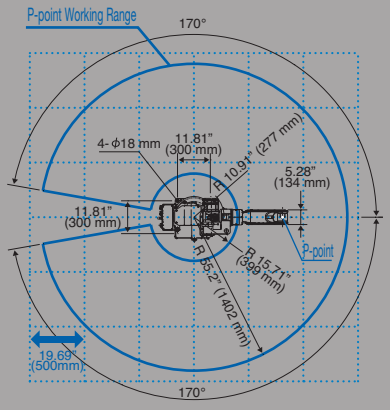


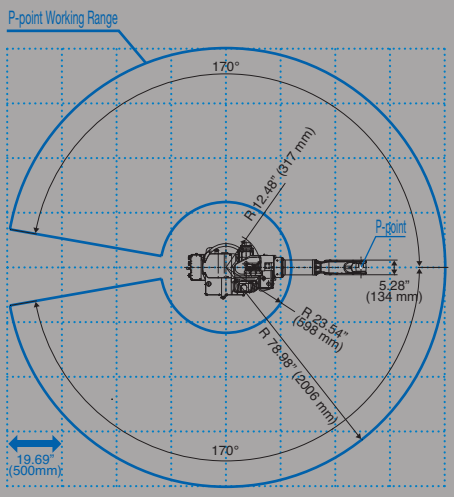
AII-V6

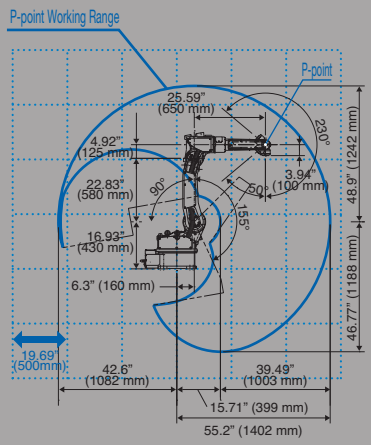
Standard

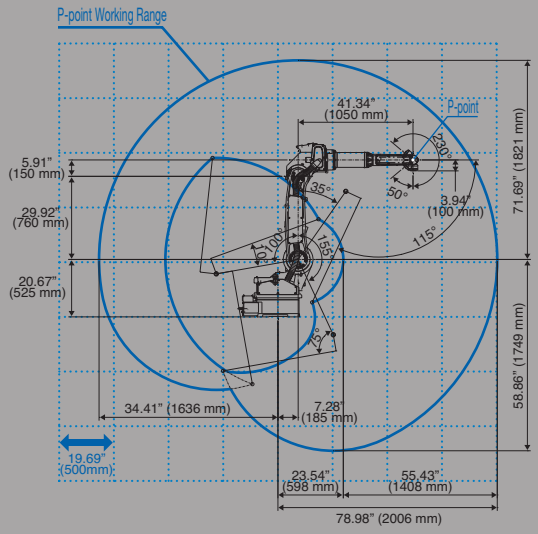
AII-V6L

Long Reach







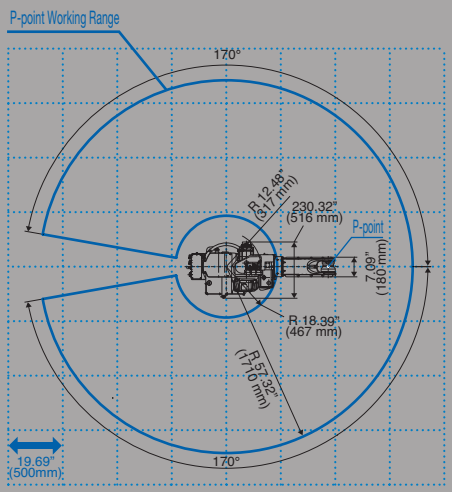


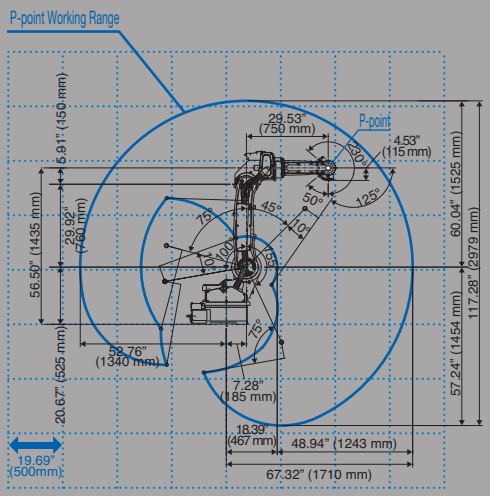
Manipulator Working Range/Specifications

*The figures below show working ranges of P-point with no torch mounted.

AII-V20

Standard





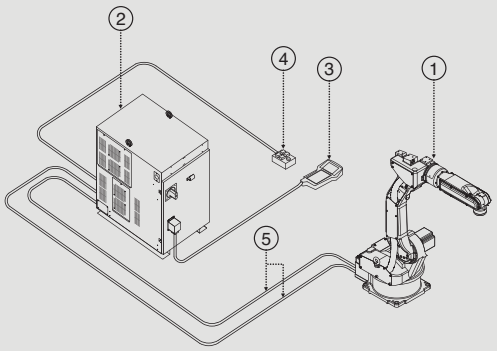
Item			
Model Number			AII-B4
Structure			Vertical articulated type
Number of Axes			6
Maximum Payload			8.82 lbs. (4 kg)
Capacity			±.003" (0.08 mm) (Note 1)
Positional Repeatability			AC Servo Motor
Driving Method			2550 W
Driving Capacity			Absolute Encoder
Working Range	Arm	J1 (Rotation)	±170° (±50°) (Note 2)
		J2 (Lower arm)	−155° ~ +90°
		J3 (Upper arm)	−170° ~ +180°
	Wrist	J4 (Swing)	±155°
		J5 (Bending)	−45° ~ +225°
		J6 (Twist)	±205° (Note 5)
Maximum Speed	Arm	J1 (Rotation)	3.66 rad/s {210°/s} (3.32 rad/s {190°/s}) (Note 2)
		J2 (Lower arm)	3.66 rad/s {210°/s}
		J3 (Upper arm)	3.66 rad/s {210°/s}
	Wrist	J4 (Swing)	7.33 rad/s {420°/s}
		J5 (Bending)	7.33 rad/s {420°/s}
		J6 (Twist)	10.50 rad/s {600°/s}
Wrist Allowable Load	Allowable Moment	J4 (Swing)	10.1 N・m
		J5 (Bending)	10.1 N・m
		J6 (Twist)	2.94 N・m
	Allowable Moment of Inertia	J4 (Swing)	0.38 kg・m^2
		J5 (Bending)	0.38 kg・m^2
		J6 (Twist)	0.03 kg・m^2
Arm Cross-sectional Area			2.94 m^2 × 340°
Ambient Temperature/Humidity			0 ~ 45°C, 20 ~ 80% RH (No Condensation)
Mass (weight)			375 lbs. (170 kg)
Upper Arm Maximum Carrying Capacity			22.05 lbs.(10 kg) (Note 3)
Installation Method			Floor-/Ceiling-/Wall-mounted
Origin Return			Not Necessary (Note 4)
Paint Color			Arm: white / Base: blue

Specification			
AII-B4L	AII-V6	AII-V6L	AII-V20
◄	◄	◄	◄
◄	◄	◄	◄
8.8 lbs. (4 kg)	13.2 lbs. (6 kg)	13.2 lbs. (6 kg)	44.1 (20 kg)
±.003" (0.08 mm) (Note 1)	±.003" (0.08 mm) (Note 1)	±.003" (0.08 mm) (Note 1)	±.003" (0.07 mm) (Note 1)
AC Servo Motor	AC Servo Motor	AC Servo Motor	AC Servo Motor
4650 W	2600 W	5000 W	5600 W
Absolute Encoder	Absolute Encoder	Absolute Encoder	Absolute Encoder
±170° (±50°) (Note 2, 6)	±170° (±50°) (Note 2)	±170° (±50°) (Note 2, 6)	±170° (±50°) (Note 2, 6)
−155° ~ +100°	−155° ~ +90°	−155° ~ +100°	−155° ~ +100°
−170° ~ +190°	−170° ~ +190°	−170° ~ +260° (Note 7)	−170° ~ +260° (Note 7)
±155°	±180°	±180°	±180°
−45° ~ +225°	−50° ~ +230°	−50° ~ +230°	−50° ~ +230°
±205° (Note 5)	±360°	±360°	±360°
3.40 rad/s {195°/s} (3.05 rad/s {175°/s}) (Note 2)	3.66 rad/s {210°/s} (3.32 rad/s {190°/s}) (Note 2)	3.40 rad/s {195°/s} (3.05 rad/s {175°/s}) (Note 2)	3.40 rad/s {195°/s} (3.05 rad/s {175°/s}) (Note 2)
3.49 rad/s {200°/s}	3.66 rad/s {210°/s}	3.49 rad/s {200°/s}	3.33 rad/s {190°/s}
3.49 rad/s {200°/s}	3.66 rad/s {210°/s}	3.49 rad/s {200°/s}	3.14 rad/s {180°/s}
7.33 rad/s {420°/s}	7.33 rad/s {420°/s}	7.33 rad/s {420°/s}	6.98 rad/s {400°/s}
7.33 rad/s {420°/s}	7.33 rad/s {420°/s}	7.33 rad/s {420°/s}	6.98 rad/s {400°/s}
10.5 rad/s {600°/s}	10.82 rad/s {620°/s}	10.82 rad/s {620°/s}	10.5 rad/s {600°/s}
10.1 N・m	11.8 N・m	11.8 N・m	43.7 N・m
10.1 N・m	9.8 N・m	9.8 N・m	43.7 N・m
2.94 N・m	5.9 N・m	5.9 N・m	19.6 N・m
0.38 kg・m^2	0.30 kg・m^2	0.30 kg・m^2	1.09 kg・m^2
0.38 kg・m^2	0.25 kg・m^2	0.25 kg・m^2	1.09 kg・m^2
0.03 kg・m^2	0.06 kg・m^2	0.06 kg・m^2	0.24 kg・m^2
6.37 m^2 × 340°	3.14 m^2 × 340°	7.57 m^2 × 340°	5.31 m^2 × 340°
◄	◄	◄	◄
617 lbs. (280 kg)	353 lbs. (160 kg)	617 lbs. (280 kg)	628 lbs. (285 kg)
44.09 lbs. (20 kg) (Note 3)	22.05 lbs.(10 kg) (Note 3)	44.09 lbs. (20 kg) (Note 3)	44.09 lbs. (20 kg) (Note 3)
◄	◄	◄	◄
◄	◄	◄	◄
◄	◄	◄	◄

Note 1. Measured value obtained after sufficient repetition of automatic operation for stabilizing conditions of manipulator operation with upper arm maximum carrying capacity.
2. The value shown in ( ) indicates wall-mounted conditions. 3. When the output flange of the wrist axis is loaded with maximum payload capacity.
4. Positional data is protected by battery-backed storage inside the manipulator. 5. Working range of J6 axis may be restricted by the position of J5 axis.
6. Working range of J2 axis may be restricted when wall-mounted. 7. Working range of J3 axis is restricted to -170°to +205° for floor-mounted welding applications.
*These specifications are subject to change without prior notice.

Configuration

Basic Configuration



Number and Part Name	Model	Specification
① Manipulator	AII-V6 (Model: NV61-[N][E][F][N])	[N] : Standard C : Welding cable equipment option [J] : Japanese E : Overseas (English) [F] : Floor-mounted C : Ceiling mounted W: Wall-mounted [N] : Standard U : UL-compliant
② Controller	AX21 (Model: AX21-[E][V][O]***)	[J] : Japanese E : English C: CE certified U: UL certified W: CE-/UL-certified [V] : NV6, NB4 (type of connected manipulator) [O] : No external axes1 : 1: 1 external axis 2: 2 external axes (external axis in main cabinet)
③ Teach pendant	A2TPDSNN-[E]C**	[J] : Japanese E : English U: UL certified **: 08 8m Model (standard) 15 15m Model
④ Operation Box	AXOP-[0]0**	[O] : Standard 1 : UL certified **: 05 5m Model (standard) 10 10m Model 15 15m Model
⑤ Control cable 1/2	A2RB-10**	** : 05 5m Model (standard) 10 10m Model 15 15m Model

CO2/MAG Welding Torches

Shock Sensor Torch

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

Shock Sensor Torch
for V-type manipulator:
RT3500

Photo: Shock sensor unit SSV mounted.

Model	Rated current (MAG rating shown in parentheses)	Duty cycle (MAG rating shown in parentheses)
RT3500	350A (350A)	80% (60%)
RT5000	500A (350A)	50% (70%)
RTW5000	500A (400A)	70% (60%)

Forced Pressurized Power Feeding Torch (TCC Torch)

Improved welding quality
due to stabilized power fed wire.

Forced Pressurized Power Feeding
Torch for V-type manipulator:
RZ3500

Photo: Shock sensor unit SSV mounted.

Model	Rated current (MAG rating shown in parentheses)	Duty cycle (MAG rating shown in parentheses)
RZ3500	350A (350A)	80% (60%)

Compact Servo Torch

AC servo motor provides stable wire
feeding for high accuracy and high quality.

Compact Servo Torch
MTXC-3541PS

Photo MTXC-3541PS mounted on pull feeder
*The Compact Servo Torch requires the Assist Feeder.

Model	Rated current (MAG rating shown in parentheses)	Duty cycle (MAG rating shown in parentheses)
MTXC-3541PS	350A (250A)	50% (50%)
MTXCW-5041PS	500A (350A)	70% (50%)

Inverter DSERIES

True digital welding machines designed meet all of your robotic arc welding needs

OTC DAIHEN INC.
(Headquarters)
1400 Blauser Dr.
Tipp City, OH 45371
Ph: 937-667-0800
Fax: 937-667-0885

OTC DAIHEN INC.
(Service Center)
5311 W. T. Harris Blvd., West
Charlotte, NC 28269

OTC DAIHEN INC.
(Atlanta Branch)
2964 Northeast Parkway NW
Atlanta, GA 30360

OTC DAIHEN INC.
(Detroit Branch)
22241 Roethel Drive,
Suite A
Novi, MI 48375

CAT. NO. R0001-1

●The information contained in this catalog is current as of August 2008 and is subject to revision without notice.
●This catalog was printed with environmentally-friendly soy oil ink.

PRINTED WITH SOY INK