# AW
## ROBOT CONTROLLER

## AW Nachi Industrial Robot Controller

This high-performance, multi-tasking controller offers an open concept design, along with increased performance and improved menu-driven programming. Reliability and safety are also important features of the AW controller. With a smaller footprint than our previous controller the AW offers more options and improved programming efficiency.

## Control Features

- 50 mm short pitch move; 30% quicker
- High-speed interference detection
- Advanced 32-bit high-speed DSP motion control
- Improved maintenance access
- Protection for motor control circuit
- Amplifier power loss reduced by 40%

## Enhanced Software

- Path unaffected by speed change
- Customized pendant display function
- High-speed CPU produces smooth operation

## Teach Pendant

- User-friendly, ergonomic design, easy to use
- Color graphic Windows®-style display with pull-down menus
- Customized pendant display functions - you can configure

## Applications

Used on all Nachi robot products

## Open Concept

- Extends to industry standard bus (ISA/PCI)
- Supports Windows® applications (with extra printed circuit board)
- PC operation ease with industrial reliability

# NACHI
## NACHI ROBOTIC SYSTEMS INC.

# AW
## ROBOT CONTROLLER

## Features

| | |
|---|---|
| Controlled Axes | Simultaneous 6 axes (standard), additional 10 axes optional |
| Memory Capacity | 28,000 robot program points |
| CPU | 32-bit microprocessor |
| Memory | IC RAM with battery back-up |
| Positioning Device | Absolute encoder |
| Drive System | Fully digital with DSP control |
| | AC Servo motors |

## Control Cabinet

| | | |
|---|---|---|
| Unit | Free standing, NEMA 12 | |
| Dimensions | Height: | 1,180 mm |
| | Width: | 600 mm |
| | Depth: | 550 mm |
| Weight | 260 kg | |

## Programming Features

| | |
|---|---|
| Program Selection | 999 programs (BCD), 10 programs (discrete) |
| Programming | ICON and menu driven |
| Display Unit | Interactive teach pendant |
| | Windows®-style interface |
| | User programmable menu display |
| | Color graphic display with fine resolution |
| Language | SLIM (robot language) |
| System Software | Flash ROM |
| Application Software | Spot weld, seal, spray, arc, palletize, and more |
| | Integrated spot (Nachi or Medar) |
| | Integrated arc (Nachi) |
| Additional Features | User macros |
| | User coordinates |
| | Multi-robot control |

## Equipment Interface

| | | |
|---|---|---|
| Interface | | PCMCIA port/3.5" FDD/RS232C/RS422/Ethernet |
| Input/Output | (Standard) | 32 inputs VDC |
| | | 32 outputs VDC |
| | (Optional) | 56 inputs VDC |
| | | 48 outputs VDC |
| | | 120 VAC capabilities expandable up to 40 inputs/outputs |
| Input/Output | (Optional) | AB RIO Node adapter (full rack) |
| | | Device Net |
| Analog Signal | | Input: 2 channels |
| | | Output: 3 channels |
| Conveyor Pulse Counter | | 2 channels |
| Additional Features | | Extended bus, ISA, PCI, CPCI |

## Power Supply

| | |
|---|---|
| (Standard) | 480 VAC ±10%, 3 Phase, 50 or 60 Hz |
| (Optional) | 575 VAC ±10%, 3 Phase, 50 or 60 Hz (Canada) |
| | Others available |

## Environmental

| | |
|---|---|
| Ambient Temperature Rating | 0 to 45 degrees C |
| Ambient Humidity | 20 to 85 RH |
| Cooling Method | Heat exchanger |

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Rev 05/03*

# NACHI
## NACHI ROBOTIC SYSTEMS INC.

# AX
## ROBOT CONTROLLER

## Nachi AX PC-Based Robot Controller

Our latest high-performance, multi-tasking controller features hardware and software enhancements resulting in shorter cycle times. Programming is fast and flexible with additional options available through the teach pendant. With the internal manual/diagnostic function, maintenance can be done from a remote location. The AX also complies to international standard safety circuits for security you can count on.

## Control Features

- 50mm short pitch move - 30% faster
- International standard safety circuit
- High-speed interference detection
- Fully digital drive with high-speed DSP motion control
- Simplified maintenance

## Enhanced Software

- Real time operating system (RTOS) plus embedded WindowsNT®
- Improved robot motion
- Easy tools to develop and validate robot programs
- Software PLC directly controls peripherals
- Offline programming
- Visual maintenance with online manual

## Teach Pendant

- Easy to operate - ergonomic design
- Enhanced color graphic Windows® display
- Pendant display functions can be customized
- Optional digital touch screen

## Applications

Used on all Nachi robot products

## Open Concept

- Extends to industry standard bus (ISA/PCI)
- Supports Windows® applications (with extra printed circuit board)

## NACHI
### NACHI ROBOTIC SYSTEMS INC.

# AX
## ROBOT CONTROLLER

| Features | |
|---|---|
| Controlled Axes | Simultaneous 6 axes (standard), additional 12 axes optional |
| Memory Capacity | 160,000 robot program points |
| Memory | Flash memory |
| External Storage Device I/F | Compact flash card I/F |
| Positioning Device | Absolute encoder |
| Drive System | Fully digital with DSP control |
| | AC Servo motors |
| **Control Cabinet** | |
| Unit | Free standing, NEMA 12 |
| Dimensions | Height: 1,180 mm |
| | Width: 600 mm |
| | Depth: 550 mm |
| Weight | 192 kg |
| **Programming Features** | |
| Program Selection | 9999 programs (BCD) |
| Programming | ICON and menu driven |
| Display Unit | Interactive teach pendant |
| | Windows®-style interface |
| | User programmable menu display |
| | Color graphic display with fine resolution (6.5" 640 x 480) |
| Language | SLIM (robot language) |
| System Software | Flash ROM |
| Application Software | Spot weld, seal, spray, arc, palletize, and more |
| | Integrated spot (Nachi or Medar) |
| | Integrated arc (Nachi) |
| Additional Features | User macros |
| | User coordinates |
| | Multi-robot control |
| | Internal electronic manual/diagnostic function |
| **Equipment Interface** | |
| Interface | RS232C/Ethernet (10 Base T) |
| Input/Output          (Standard) | 32 inputs DC24V |
| | 32 outputs DC24V |
| (Optional) | 64 inputs DC24V |
| | 64 outputs DC24V |
| | 120 VAC capabilities expandable up to 40 inputs/outputs |
| Input/Output          (Optional) | AB RIO Node adapter (full rack) |
| Field Bus (Max 4ch) | Device Net, profibus, and others supported |
| Analog Signal | Input: 2 channels |
| | Output: 3 channels |
| Conveyor Pulse Counter | 2 channels |
| Additional Features | ISA, PCI bus |
| **Power Supply** | |
| (Standard) | 480 VAC ±10%, 3 Phase, 50 or 60 Hz |
| (Optional) | 575 VAC ±10%, 3 Phase, 50 or 60 Hz (Canada) |
| | Others available |
| **Environmental** | |
| Ambient Temperature Rating | 0 to 45 degrees C |
| Ambient Humidity | 20 to 85% RH |
| Cooling Method | Heat exchanger |

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## NACHI
### NACHI ROBOTIC SYSTEMS INC.

# AX20 Robot Controller



Our latest high-performance, multi-tasking controller features hardware and software enhancements resulting in shorter cycle times. Programming is fast and flexible with additional options available through the teach pendant. With the internal manual/diagnostic function, maintenance can be done from a remote location. The AX20 also complies to international standard safety circuits for security you can count on.

## Control Features

> 50mm short pitch move — 30% faster
> International standard safety circuit
> High-speed interference detection
> Fully digital drive with high-speed DSP motion control
> Simplified maintenance

## Enhanced Software

> Real Time Operating System (RTOS) plus embedded WindowsNT®
> Improved robot motion
> Easy tools to develop and validate robot programs
> Software PLC directly controls peripherals
> Offline programming
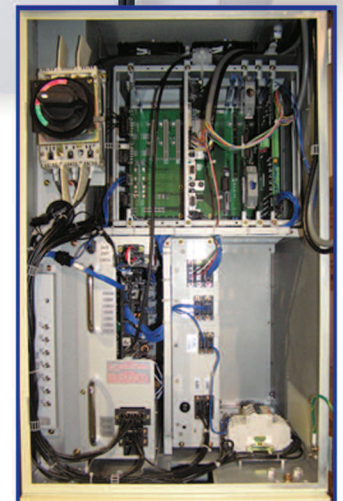> Visual maintenance with online manual

## Teach Mode

> Easy to operate — ergonomic design
> Enhanced color graphic Windows® display
> Pendant display functions can be customized
> Optional digital touch screen

## Applications

Used on all Nachi robot products

## Open Concept

> Extends to industry standard bus (ISA/PCI)
> Supports WindowsNT® applications (with extra printed circuit board)



AX20 Robot Controller Interior

# AX20 Robot Controller

## Basic Specifications

| | |
|---|---|
| Controlled Axis | Simultaneous 7 axes (maximum 9 axes optional) |
| | Total 18 axes (extended control cabinet) |
| Servo Motor / Positioning Device | AC servo motor / Absolute Encoder |
| Programming Language(s) | Teaching playback (Standard Step / Function Record method) |
| | JIS SLIM language (optional) |
| | IEC1131 software PLC (Nachi Soft-PLC) |
| Program Number / Memory Capacity | 9,999 programs / 16MB (160,000 steps equivalent) |
| Robot Cables (Wire Harness) | Standard cable length 5m (for floor mounted or shelf-mounted type) |
| from Controller to Manipulator | (10m, 15m 20m and 25m cables are optional) |
| Internal / External Memory | Flash memory / Compact Flash card Interface |
| User Interface | Interface PB panel on front of controller, additional mounting inside of door & side panel |
| Construction / IP Rating | Enclosed box with IP54 Rating |
| Cooling System | Direct cooling system |
| Input Supply Voltage(s) | Without transformer: AC200V - 220V ± 10% (3 phase, 50/60Hz) |
| | With transformer: AC380V ~ 480V ± 10% (3 phase, 50/60Hz) |
| Ambient Temperature / Humidity | 0-45°C / 20-85% (No Condensation) |
| Power Consumption | Peak power while in playback of operation program: |
| | ST Series: Approx. 5kVA          SG Series: Approx. 5kVA          SC35/50 Series: Approx. 3kVA |
| | SC15: Approx. 2kVA          SC Heavy Payload Series: Approx. 5kVA |
| | Lift500 series approx. 9kVA (3 axes specification) |
| Controller Cabinet Dimensions | W450 x H782 x D550mm (without controller casters); Height: 882 (with controller casters) |
| | W450 x H1195 x D550mm (without controller casters); Height: 1295 (with controller casters) |
| Weight | Approx. 85kg without transformer |
| | Approx. 165kg with transformer |
| Coated Color | Munsell 10GY9/1 |
| Operator Protective Function | Teach model/Playback mode interlock |
| | Deadman switch |
| | Emergency stop button (Operation panel / Teach pendant / External signal input) |
| | Guard fence door interlock signal (SFP – Safety Plug) |
| | Enable switch interface |
| Self-Diagnosis Function | Used to self-diagnose errors of the robot and controller (available for approx. 700 types of errors) |
| Error Detection Function | Used to monitor the status of the robot and controller at all times |
| | Used to make the robot an immediate stop when an error occurs |
| Teach Pendant — Screen | 6.5-inch color TFT LCD (256-color display of 640 x 480 with a back light) |
| TP Weight | Approx. weight 1.3 kg (excluding connection cables) |
| Cable Length | Standard TP cable length 8m (15m, 20m, 25m and 30m cables are optional) |
| Deadman Switch | Single-hand three-position Deadman switch is standard (optional two handed) |
| Touch Screen | Digital Touch Screen (Optional) |
| Language Support | Support for two concurrent languages are selectable from the languages shown (all languages except for English and Japanese are optional): Japanese, English, German, Korean, Taiwanese (traditional Chinese), Portuguese, Spanish, French, Chinese (simplified Chinese), Italian, and Dutch) |

## Option Functions

| | |
|---|---|
| Primary Power Voltage | For out-of-the-standard primary power voltage (AC200-220V) |
| Compact Flash Card Interface | The compact flash card slot is installed |
| Servo Gun Auxiliary Axis | Spot welding gun is controlled — gun specification (gun quantity, gun change) and simultaneous usage with another auxiliary axes depends on the individual application (additional amplifier may be necessary) |
| Slide Positioner on other Auxiliary Axis | Slide positioner is servo controlled (additional amplifier may be necessary) |
| Positioner Axis | Positioner is servo controlled (additional amplifier may be necessary) |
| Field Bus | Device Net, Profibus-DP, Interlink, RIO, CC-LINK, maximum 2 communication channels per controller. (Ex. 1 Master and 1 Slave, 2 Master or 2 Slave) |
| Input / Output | Input 32 DC24V (input resistance 3k, input current 3mA or greater, sinking style input) |
| | Output 32 DC24V (Output voltage DC24V, +/- 3V at 100mA) |
| Extended DC I/O | Additional 32/32 or 64/64 for a total of 64/64 or 96/96 I/O) |
| XYZ Shift | Recorded point is played back with XYZ parallel shift amount |
| Palletizing | Palletizing & de-palletizing teaching programmed by integrated user friendly pattern definition |
| Robot Language | JIS SLIM language |
| Built-In PLC | Offline programming software tool (ICS Triplx ISaGRAF Workbench) |

## Standard Functions

| | |
|---|---|
| Accuracy | A selection from 8 (0-1000mm) of in-position accuracy can be designated on each step. In-position or path-through can also be designated |
| Tool Designation | 32 unique tools can be defined for use on taught positions. |
| Automatic Tool Length Calculator | Automated tool length calculation by selecting taught program |
| Automatic Tool Weight and COG Calculator | Automatic tool weight and COG is calculated by running designated program |
| Automatic Tool Moment of Inertia Calculator | Automated tool moment of inertia is calculated by running designated program |
| Self Checking Error Detection | Continuous real-time internal self checking of the robot and controller for fault or errors conditions, (700 types of errors). The robot stops immediately when error is detected. |
| Logical I/O | Maximum 2,048 logical I/O points for use with Soft-PLC |
| Programming Editor | 1. Screen Editor – addition, deletion and copy of every move step and function is available; recorded position can also be edited |
| | 2. Copy Utility – recorded program and step can be copied |
| | 3. Program Conversion – condition and speed, each axis angle, parallel shift, etc. |
| | 4. Program Certification – file directory, file verify |
| | 5. Undo function to delete last teach pendent programming operation |
| Power Save Function | Saves energy by locking brakes and removing motor power after a pre-determined times has elapsed with no motion. After extended non-motion time, the controller cooling fans will stop for further power savings. |
| Help Message (Built-in Manual) | Operation and function explanations are displayed on teach pendant screen along with a graphical display troubleshooting manual. |
| Home Positions & Outputs | Up to 32 unique positions can be defined with designated output when robot is at position. |
| Search / Interrupt | Function that allows for the detection of part position deviation, shifting the robots programmed positions) to compensate. (Sensing device is not included.) |