

# AX20 Robot Controller

**NACHI**  
NACHI ROBOTIC SYSTEMS INC.

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) from Controller to Manipulator	Standard cable length 5m (for floor mounted or shelf-mounted type) (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 SC15: Approx. 2kVA Lift500 series approx. 9kVA (3 axes specification) SG Series: Approx. 5kVA SC Heavy Payload Series: Approx. 5kVA SC35/50 Series: Approx. 3kVA	
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 mode/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 TP Weight Cable Length Deadman Switch Touch Screen Language Support	6.5-inch color TFT LCD (256-color display of 640 x 480 with a back light) Approx. weight 1.3 kg (excluding connection cables) Standard TP cable length 8m (15m, 20m, 25m and 30m cables are optional) Single-hand three-position Deadman switch is standard (optional two handed) Digital Touch Screen (Optional) 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.)