Multi-axis high response CNC for General Industrial Machine

FANUC

Power Motion i-MODEL A
Multi-axis high response motion controller for general

**FANUC Power Motion i-MODEL A**
Max. number of paths : 4 paths
Max. total number of controlled axes : 32 axes
Max. number of simultaneous controlled axes : 4 axes

**Multi-axis high response motion control**
- Up to 24 programs can be executed at the same time
- Shortened cycle time by quick axis start/stop
- Improved accuracy for machines that require high speed operation by quick response to an external signal
- Shortened cycle time by high speed ladder execution cycle

**Functions for general industrial machines**
- Supports up to 32 axes by PMC axis control function that can be executed independently for each axis
- Flexible motion control of axes by position, speed, torque, or pressure
- Synchronous operation up to 32 axes
- Shortened cycle time by PMC axis control acceleration/deceleration specification feed
- Used for a wide range of general industrial machines and motion applications with multi-axis and multi-process functions
  Examples:
  - Press machines  · Die cushions  · Loaders
  - Wire saws  · Winding machines  · Filling machines
  - Packing/wrapping machines  · Stamping machines
  - Replace hydraulic cylinders with servo motor, etc.

**Functions for press machines**
- Easily control the link type servo press
- Improved forming quality by high accuracy pressure control
- Coordinated motion of transfer system with press machine can be performed easily by electric CAM function

**Ideal for large servo motor applications**
- Easily replace hydraulic mechanism by servo control for press machine etc.
- Up to 10 Large Servo Motors controlled by one controller
- Servo amplifiers for large servo motors achieve significant energy savings with power source regeneration and the latest low-loss power devices
State-of-the-Art Hardware
- Leading-edge hardware has enhanced the basic performance of the motion controller, servos and the PMC
  - Ultra high-speed digital servo processors
  - High-speed internal bus
  - Optical fiber cables for high-speed data transfer

Variety of customized functions
- Compact operator’s panel with touch panel
- Simplified custom screen development with FANUC PICTURE
- Advanced functionality with C language executor

Various types of field networks
- Various types of architectures can be constructed easily by using field networks with PLC and peripherals
- Communication with PC and robot can be performed easily via embedded Ethernet

High reliability and easy maintainability
- Hardware built for high reliability allows robust operation in harsh industrial environments
- Enhanced diagnostics improve maintainability so the cause of trouble can be identified quickly reducing MTTR
- USB port can be used to transfer files or upload/download data in the controller using easily obtainable USB flash drives

Superior safety functions
- Integrated safety functions facilitate safety of machine by Dual Check Safety (DCS)
- Integration of motion control and safety
State-of-the-Art High-Speed, High-Reliability Hardware
Ultra-Compact, Reduced wiring, High-Reliability

Enhanced basic performance
Leading-edge hardware has enhanced the basic performance of the control, servos and the PMC to support advanced control functionality such as multi-axis multi-path control.

Thin and compact
The LCD-mounted type control with all the functionality implemented behind the display greatly reduces control mounting space required on the machine. This contributes to downsizing. Intelligent communication functions are also embedded in the ultra-thin control unit of 60mm in depth, which helps design a compact operator’s panel.
A standalone type for panel mount is also available - making operation with or without a display possible. This allows selection of a controller suitable for your machine.

Leading-edge servo control with fast FSSB and high-speed DSP
Controls and amplifiers are connected with FSSB (FANUC Serial Servo Bus) using an optical fiber cable.
Leading-edge DSPs and newly-designed FSSB offer advanced servo control such as multi-axis control and fast current control.

FANUC I/O Link i
FANUC I/O Link i is a serial I/O interface between the PMC and various I/O units. The number of DI/DO points per channel is 2048/2048, doubled from conventional FANUC I/O Link. FANUC I/O Link i helps with quick recovery from trouble by making it easy to pinpoint the faulty part using various error detection capabilities such as bitwise DO ground fault detection, I/O power supply failure detection, etc.

iPendant
Portable display and operation unit can operate machines remotely from the main operator’s panel. May be connected full time for use as the primary or secondary remote operator panel, or connected temporarily for maintenance use. iPendants equipped with touch panel and manual pulse are also available.

Reduced wiring
The faster FSSB and FANUC I/O Link i achieve further reduction of wiring and lower wiring cost.

USB memory interface
A USB port is added on the front of the control display unit. USB memory is easily obtainable in the market and can be used to input and output various data in the control, so usability is enhanced.

High reliability achieved by ECC
Error correcting code (ECC) is a leading-edge high reliability technology. Should an error occur during data transfer, it can be detected and corrected. Although ECC is already being applied to various portions of the control, the range of applications are further expanded and the whole motion system is protected. ECC and original low power technologies contribute to high reliability.
Intelligent Servo System with High-Speed, Precision and Efficiency
Promoting High-Speed, Precision, Compact Size and
High Efficiency of Industrial Machines

FANUC AC SERVO MOTOR αi-B series, βi-B series
Ultra smooth rotation and quick acceleration AC SERVO MOTOR
● Wide range of sizes
  Motor ranges with continuous torque from 0.16Nm to 3000Nm.
● Compact size
  Downsizing of motor is achieved by optimum design, also contributing to machine tools downsizing.
● Intelligent Servo Motor
  Servo Motor has ID information of the motor and the Pulsecoder, contributing to quick maintenance.

FANUC LINEAR MOTOR LiS series
Linear Motor Achieving High-Speed and High Precision Feed
● Wide range of sizes
  Motor range with peak force from 300N to 17000N.
● High-speed and high acceleration
  Achieving maximum speed of 4m/s and maximum acceleration of over 30G, which is difficult to achieve using rotary motor.

FANUC SERVO AMPLIFIER αi-B series, βi-B series
Compact and Energy Saving Servo Amplifier
● Compact size
  Downsizing of amplifier is achieved by optimum cooling design, also contributing to cabinet downsizing.
● Energy saving
  Power consumption is largely reduced by full line regeneration back to power source. Reduction in power loss is achieved by using the latest high efficiency power devices.
● Technology for larger output
  Large servo motors are driven by grouping multiple standard servo amplifiers. Maintenance and support are simplified by use of standard components. High stability is achieved by Tandem Control in applications requiring multiple motors to drive one axis.
Multi-axis high response motion control

**Multi-axis high response function for quick axis start/stop**

Simultaneous execution of multiple programs.
- Independent motion for each axis can be achieved by ISO G-code program as max. 24 programs can be executed at the same time.
- Quick response is achieved for an external signal.
- Examples of machines where the accuracy can be improved are: notching machines, stamping machines, cutting machines, packaging/wrapping machines.
- Programs are specified in standard ISO G-code format and pre-processed on the control providing high response execution.
- High response and reduction of cycle time can be achieved by high-speed ladder execution cycle.
- The pressure control can be achieved with high accuracy by the pressure and position control.

Applicable functions for general industrial machines

**Flexible support for various machine configurations by multi-axis and multi-path functions**

One control can support up to 4 paths and 32 axes – this includes multi-axis machines.
- Up to 4 ISO G-code programs can be executed at the same time. Independent operation such as press operation and loader operation, etc. can be easily achieved. Synchronization between two or more executing programs can be easily achieved by the waiting M-codes function.
- Simple motion profiles can be achieved by using the ISO G-code programs and/or PMC axis control functions.

**Integrated functions for press machine**

Control function for link type press
- Link type servo press where deceleration ratio in slider part changes according to the main gear position angle can be controlled easily.

Electric CAM function
- Synchronized motion between transfer machine and press machine can be performed by electric CAM function.

**PMC Axis Control Acc/Dec Specification Feed**

Feed function of PMC axis control can separately specify acceleration and deceleration
- This function can specify the best acceleration and deceleration at each block, so that the cycle time can be reduced.
- Acceleration and deceleration can be specified separately.
- Acceleration and deceleration can change while accelerating.
Many Customizable Functions

FANUC PICTURE

FANUC PICTURE enables a machine operation screen to be created easily.

- Easy-to-use interface unique to FANUC.
- A screen usable on a display unit with or without a touch panel can be created.
- A created screen is executed by C language executor and can coexist with a C language executor application.

C Language Executor

Machine tool builders can create their own operation screens, which enables unique control display and operation.

- In addition to standard ANSI functions, many functions are available for controls and PMCs.
- High-level tasks to which high execution priority is assigned can monitor signal and position information.

Easy maintenance

Maintenance parts

Fans for cooling and the backup battery in snap-in cartridges can be replaced quite easily enhancing maintainability.

(LCD-mounted type control)

On the amplifier, fan motors are detachable from the front side for easy access.

Preventive maintenance

Unprecedented system downtime can be prevented by predictive trouble detection and warning indication.

Trouble Diagnosis Function

The cause of an alarm can be diagnosed by answering questions displayed on Trouble Diagnosis Guidance Screen when an alarm occurs on the control. As a result, downtime can be shortened.

Superior Safety Functions

Dual Check Safety + Servo STO

Dual Check Safety is a safety function that conforms to the international safety standard (ISO 13849-1). This function offers a high level of safety by redundant monitor by providing duplicate paths of breaking power for the servo amplifier. Safety functions built into the control make it easier to conform to the safety standards for machine tools.

- Cost can be reduced by significantly simplifying additional circuits for adherence to the safety standard.
- Two PMC functions have been incorporated into the control to duplicate sequence control for safety-related input/output signals.
- Safety-related input/output that is defined by a MTB allows redundant monitoring for controlling peripheral devices.
- By using FANUC I/O Link I, one single I/O Link cable can support dual safety signals.
- The safety machine operator’s panel provides redundant key signals for use in safety logic.
- STO (Safe Torque Off function) is equipped in the servo amplifier. Power lines for the motor can be shut off without using the electro-magnetic contactor.
Maintenance and Customer Support

Worldwide Customer Service and Support

FANUC operates customer service and support network worldwide through subsidiaries and affiliates. FANUC provides the highest quality service with the prompt response at any location nearest you.

World Wide Support Over 230 Offices

FANUC Training Center

FANUC Training Center operates versatile training courses to develop skilled engineers effectively in several days.

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