



# GE Fanuc Servo Motor $\alpha$ i Series

High Speed, High Precision and High Efficiency Nano Control



# High-Speed, High-Precision and High-Efficiency Nano Control

## GE Fanuc Servo Motor $\alpha$ i Series

GE Fanuc Servo Motor  $\alpha$  i series is a high-speed, high-precision and high-efficiency servo system designed for the new generation of high speed, precise and compact machines.

- GE Fanuc AC Servo Motor  $\alpha$  i Series
- GE Fanuc AC Spindle Motor  $\alpha$  i Series
- GE Fanuc Servo Amplifier  $\alpha$  i Series

### Nano Control

- Servo motor with extremely smooth rotation
- Super high-resolution Pulsecoder with 16,000,000/rev.
- Servo amplifier with high-precision current detector
- High speed and high precision with SERVO HRV Control

### Energy-Saving Servo System

- Advanced energy-saving servo system, succession to  $\alpha$  Series of products which won the 1999 MITI Award for Energy-Saving Equipment
- Features the latest Intelligent Power Device

### High Speed, High Efficiency

- High-speed and high-acceleration spindle motor (winding switching control)
- Quick acceleration and high response with SPINDLE HRV Control

### Conformance to Safety Standards (EN, UL/CSA)

- Conform to UL/CSA standard for North America, and Safety/EMC standards required to comply with CE Marking of machines shipped to the European market

### Compact and Reduced Wiring

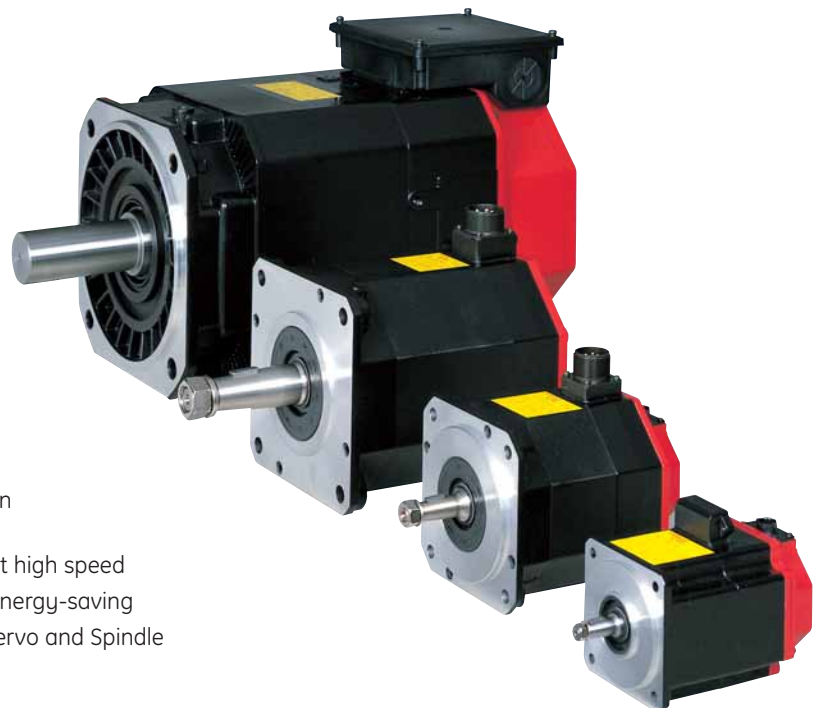
- Servo and spindle motor with shorter length
- Compact and space-saving servo amplifier
- 200V or 400V power input available

### Simplified Maintenance

- Simplified maintenance with electronic motor identification and precise thermal information
- Connector for amplifier power connection

### Large Selection of Products to Fit Many Applications

- GE Fanuc AC Servo Motor  $\alpha$  i Series - Smooth rotation and quick acceleration
- GE Fanuc AC Spindle Motor  $\alpha$  i Series - High power at high speed
- GE Fanuc Servo Amplifier  $\alpha$  i Series - Compact and energy-saving
- GE Fanuc Servo Guide - Quick and easy tuning for Servo and Spindle

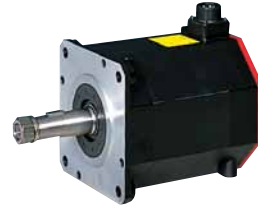


# Compact, Reduced Wiring and Easy Hardware Configuration Featuring Advanced Technology

## GE Fanuc AC Servo Motor $\alpha$ i Series

Very smooth rotation and quick acceleration AC SERVO MOTORS suitable for axis feed in machine tools

- **Compact size.** A new structure design makes the axial length of the motors shorter and contributes to downsizing the machines.
- **Compact and super high-resolution  $\alpha$  i series Pulsecoder.** High resolution (standard: 1,000,000/rev., option: 16,000,000/rev.) and compact size, contribute to compact and precise machine.
- **Intelligent Servo Motor.** The  $\alpha$  i Series Servo Motor features automatic identification of the motor and pulsecoder to greatly ease the maintenance operations.



## GE Fanuc AC Spindle Motor $\alpha$ i Series

High-performance AC SPINDLE MOTOR with high power at high speed suitable for spindles in machine tools

- **High power and high acceleration.** The motors have constant power up to high speed and can be accelerated quickly. They feature an optimum winding design and an effective cooling structure.
- **Coolant through Spindle Motor.** Center through coolant is possible through a direct connection with spindle of the machining center. Air-cooled  $\alpha$  Ti series and oil-cooled  $\alpha$  Li series are also available.
- **Built-in Spindle Motor.** When high speed, high accuracy, and low vibration need to be achieved with simple mechanical structure.



## GE Fanuc Servo Amplifier $\alpha$ i Series

Compact and energy-saving Servo Amplifier

- **Compact size.** Width is reduced by 20% (average) and depth is reduced by 11% compared to previous model.
- **Energy-saving.** Power loss is reduced by 10% using the latest IPM technology.
- **Smart maintenance.** Smart maintenance is possible using ID and motor thermal information.



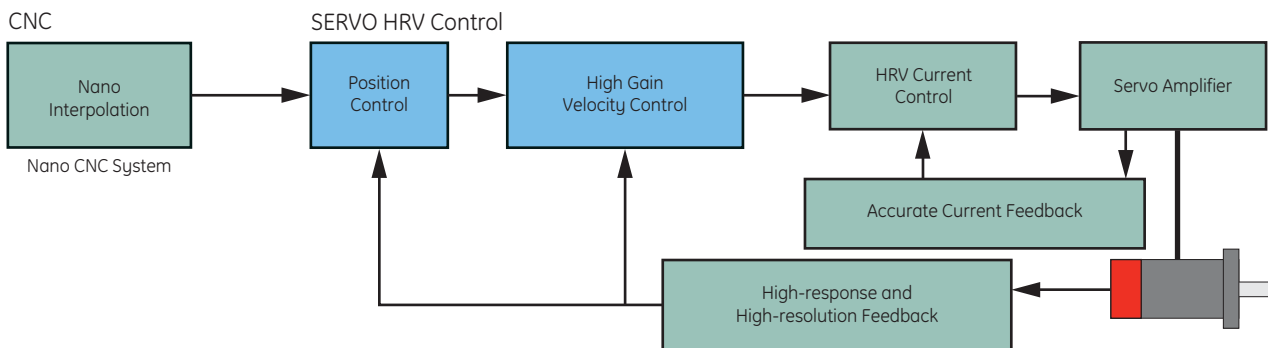
# Maintenance

## SERVO HRV Control

### High-speed and high-precision servo control

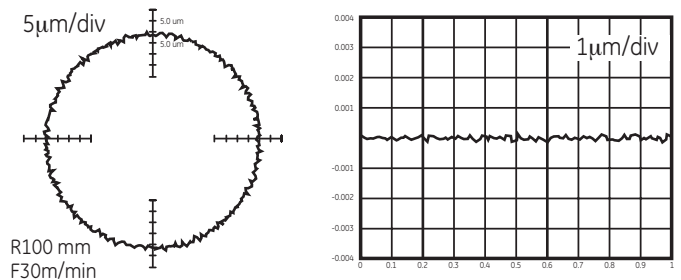
The combination of "Smooth command by Nano Interpolation" and "High gain servo system" (SERVO HRV Control), allows high-speed and high-precision control at the nano-meter level.

### Control Block Diagram



### Ultrasmooth rotation [diagram/chart]

Ultrasmooth servo feed is ensured by combining "Servo motor with ultrasmooth rotation", "Accurate current detection", "High-response and high-resolution Pulsecoder", and "High-speed and high-precision servo control".



## SPINDLE HRV Control

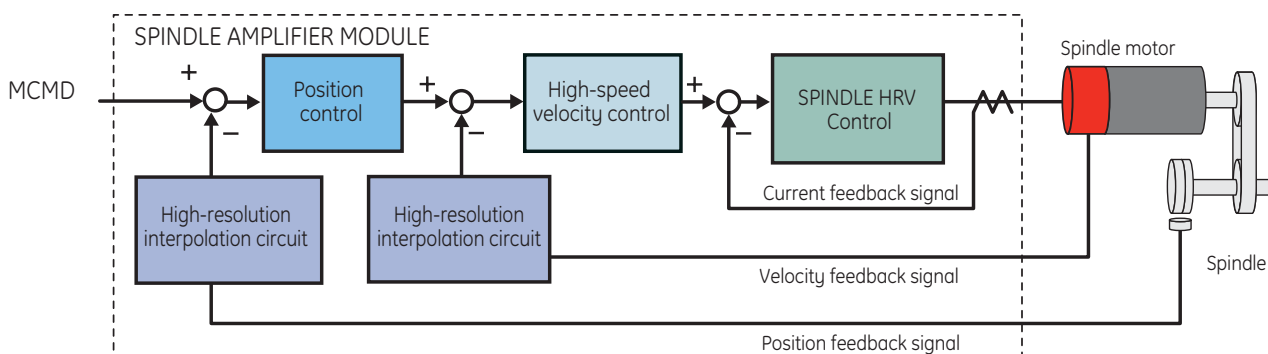
### Quick acceleration and high response (SPINDLE HRV Control)

Quick response and high stability of current control has been enhanced with high-speed DSP and advanced control algorithm (SPINDLE HRV Control).

High-response and high-precision spindle control is realized with faster velocity loop sampling time and a high-resolution detector circuit.

Control of C-axis contouring is now easier than ever.

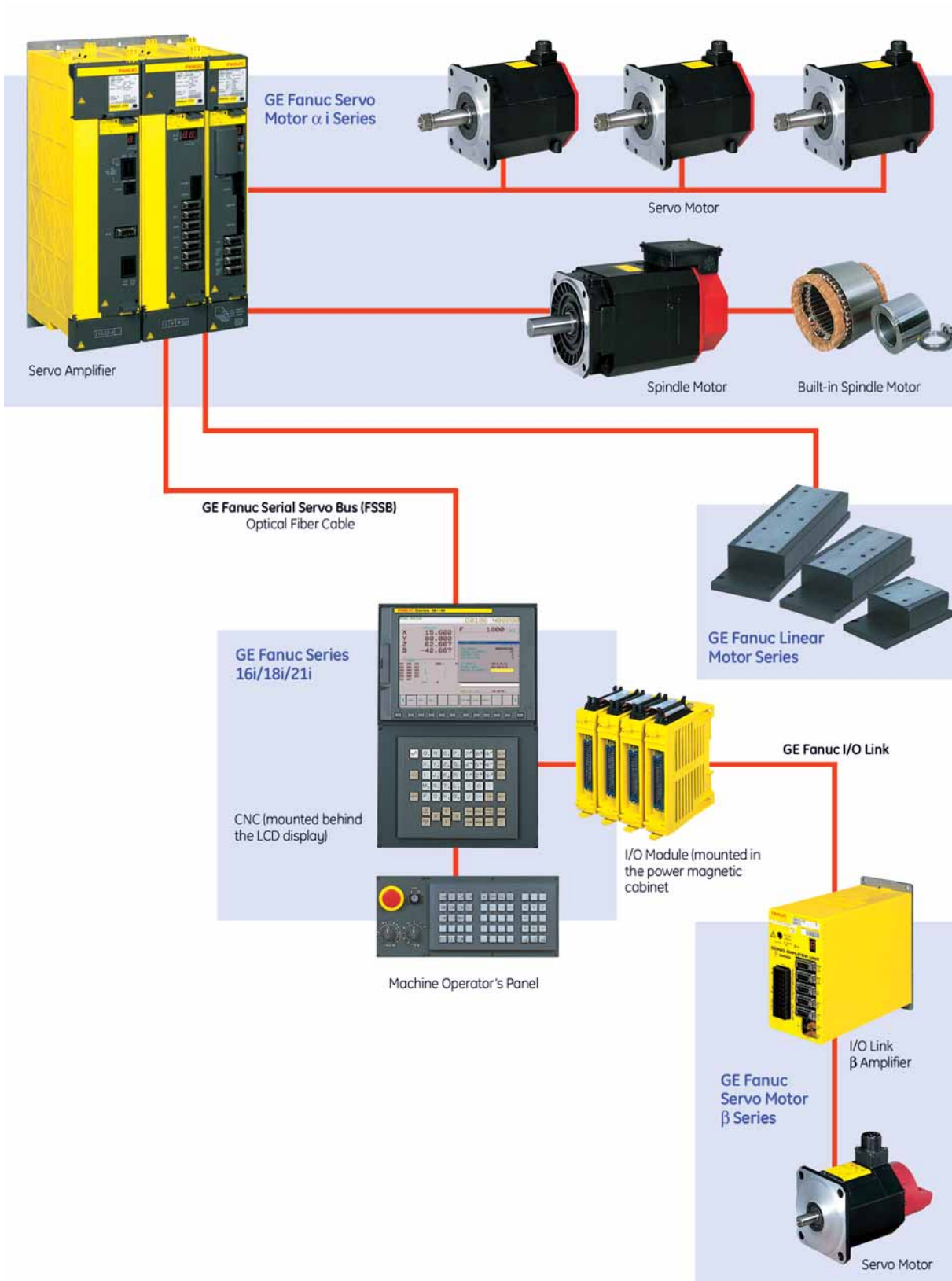
### Control Block Diagram



# GE Fanuc Servo Motor $\alpha$ i Series

## GE Fanuc Serial Servo Bus (FSSB)

The high-speed serial bus uses an optical fiber cable to connect several servo amplifiers to the CNC control unit.



# High Speed, High Precision and High Efficiency

## State-of-the-Art Servo Control Technology

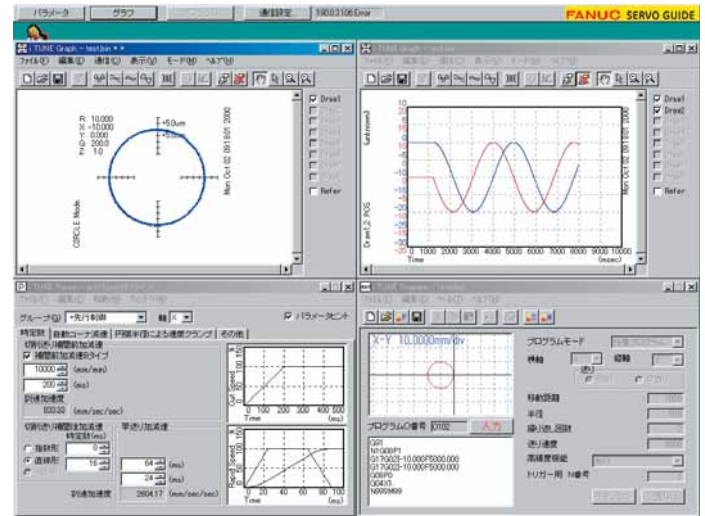
### Servo Tuning Servo Guide

#### Quick and easy tuning for Servo and Spindle

This software provides the integrated environment to test programs, set parameters and measure data, needed for servo and spindle tuning.

Direct connection is possible between the PC and the CNC through a PCMCIA-LAN card, attached on the CNC front panel.

Servo Guide allows a quick and easy optimization of servos and spindles.



### Energy-Saving

GE Fanuc has promoted energy-saving of the servo system with direct energy consumption reduction:

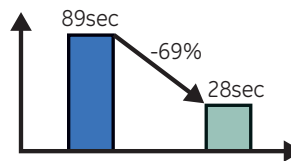
- Improving the efficiency of the servo system
- Indirect energy consumption reduction by shortening the cycle time with high speed and high-acceleration control.

$\alpha$  i series is a further advanced energy-saving servo system, successor of the  $\alpha$  series which won the 1999 MITI Award for Energy Saving Equipment.

### Conformity to Safety Standards (EN, UL/CSA)

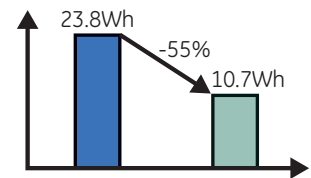
Motors and amplifier modules meet UL/CSA standard for North America, and Safety/EMC standards required to comply with CE Marking of machines shipped to the European market.

Cutting Time



Conventional servo system       $\alpha$  i servo system

Energy Consumption



Conventional servo system       $\alpha$  i servo system

Energy-saving example  
Work: Aluminum  
5 deep holes  
(dia.: 3mm, depth: 60mm)  
5 tapping (M6, depth: 15mm)

### GE Fanuc Automation Information Centers

Americas:  
1-800-GE FANUC or (434) 978-5100

Europe, Middle East and Africa:  
(352) 26722-1

Europe, Middle East and Africa (CNC):  
(352) 727979-1

Asia Pacific:  
86-21-3222-4555

### Additional Resources

For more information, please visit the GE Fanuc web site at:

[www.gefanuc.com/cnc](http://www.gefanuc.com/cnc)

