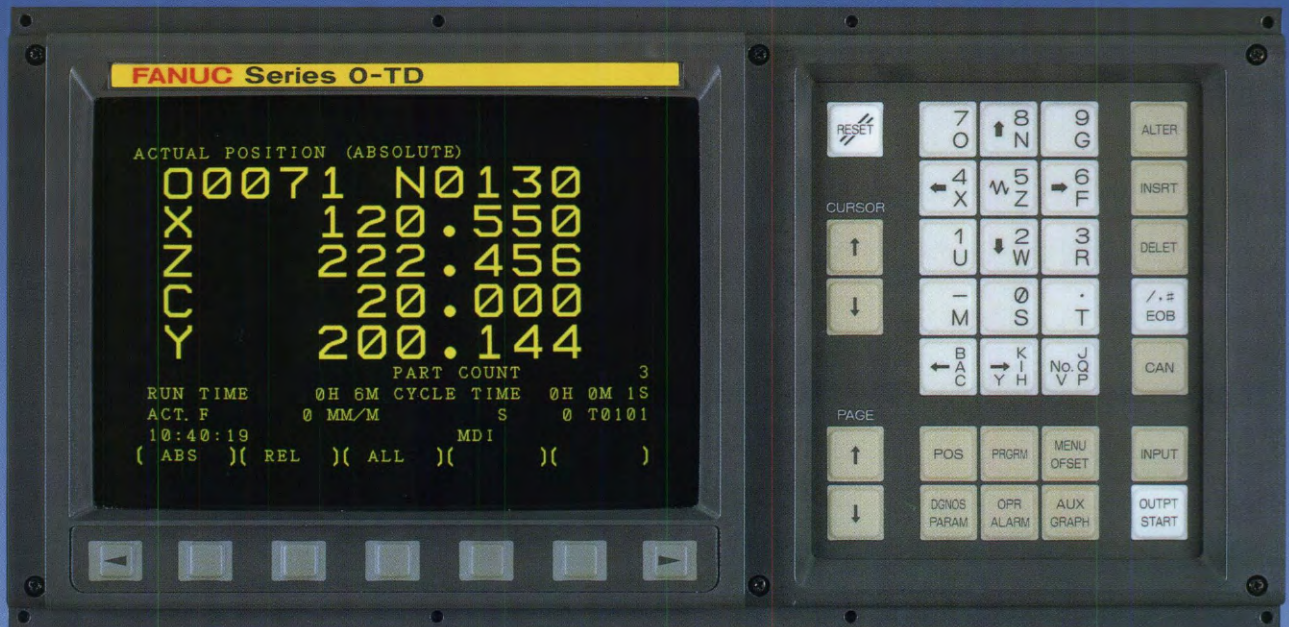


Best Selling CNC in the World

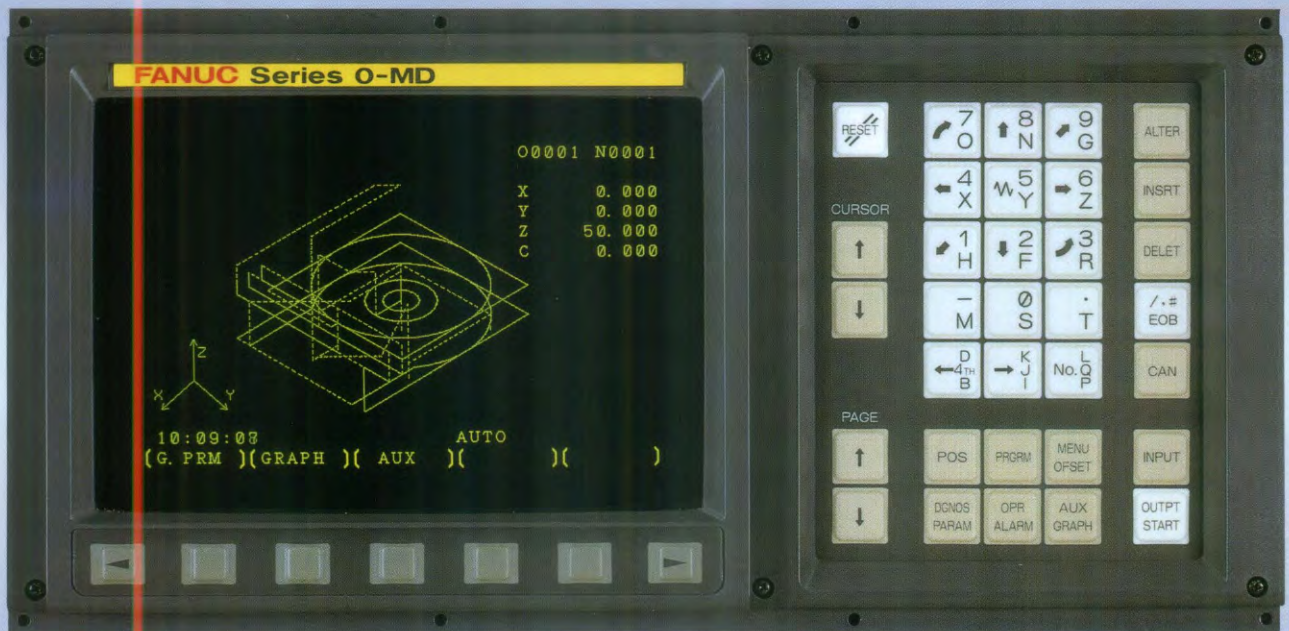
# FANUC Series 0-D





Best Selling CNC in the World

# FANUC Series 0-D



With over 300,000 units installed throughout the world, the FANUC Series 0 is the best selling CNC providing the best cost performance and the highest reliability for small machine.

The FANUC Series 0-D is a member of the Series 0 family and is available in two basic configurations :

## **FANUC Series 0-MD**

for small machining centers and small milling machines with up to 4 axes

## **FANUC Series 0-TD**

for small lathes with up to 4 axes



## Highest Reliability

The highest reliability has been achieved by using a unique design with a very few parts, engineered specifically for machining environments, a dedicated robotized production & testing facility and the highest level of quality control at the ISO 9000 certified factory.

The typical Series 0-D failure rate is under 0.008 per unit per month for the installed base.

## Highest Performance

### Enhanced Machining Efficiency

Machine cycle time is shortened by reducing the non-machining time by using a high-speed machine interface.

### Distinguished Programming Capabilities

Machining program may be simplified by using versatile functions such as canned cycle, helical cutting and coordinate system rotation.

### Superb Machining Precision

Remarkably fine precision may be achieved through such features as stored pitch error compensation to correct feedscrew pitch error and other mechanical positioning errors, and automatic corner override to prevent over cutting at corners.

## Easier Communication

### Powerful Communication with PC

Uniquely developed DNC2 protocol on RS-232-C serial interface provides a simple network between the machine tool and a PC. NC programs and machining status may be easily communicated via this network.

## Advanced Technology

### Intelligent Digital Servo System

The FANUC Series 0-D is fully compatible with the compact, highly-reliable and superior cost-performance FANUC AC servo motors, the high power and better cost-performance FANUC AC spindle motors (even at high rotational speeds), and the energy-saving FANUC servo amplifiers. Moreover, the intelligent digital servo system provides unique features such as advanced preview control, backlash acceleration control and synchronization control of the spindle.

### New Powerful Hardware

- 32-bit high-speed micro-processor
- High-speed machine interface

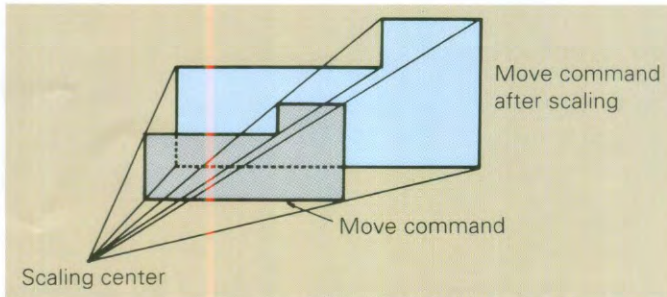


# Distinguished Programming Capabilities

## FANUC Series O-MD for Small Machining Centers

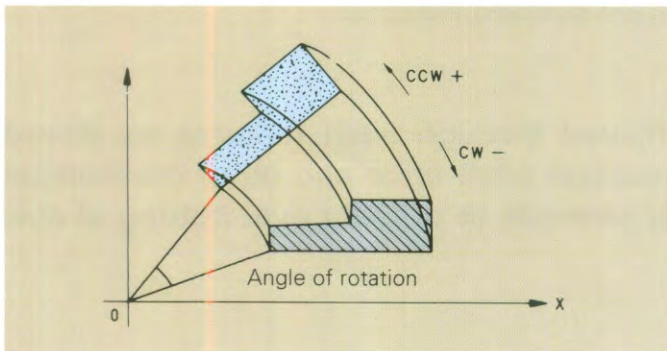
### Scaling

Program command may be scaled factor ranging from 0.001 through 999.999.



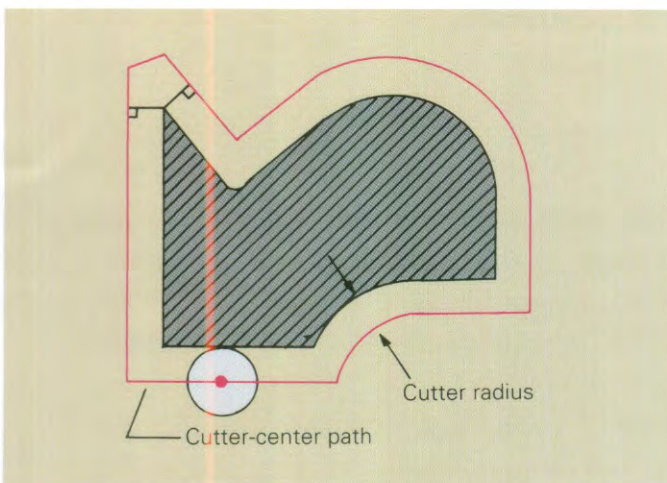
### Rotation of Programming coordinates

Angular deviation of workpiece location can be adjusted by rotating programming coordinate.



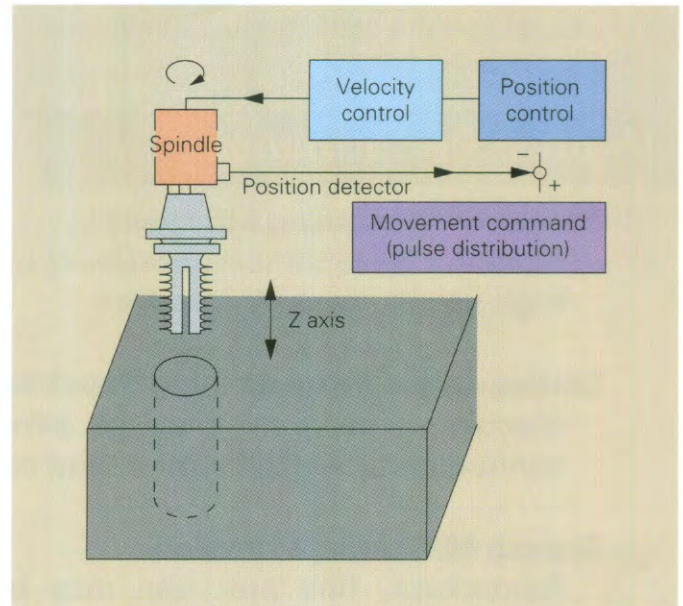
### Cutter Compensation

Cutter compensation provides automatic compensation of a tool diameter along programmed path.



### Rigid Tapping

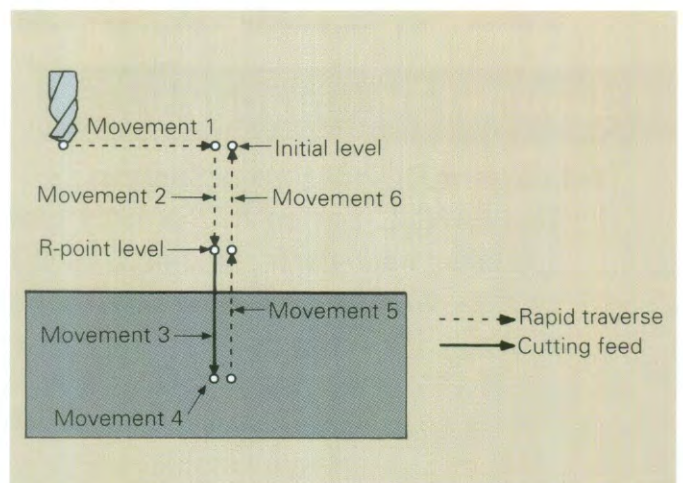
The FANUC spindle motor is synchronized with the Z-axis, eliminating the need for specialized tools such as a floating tap.



### Canned Cycles

Various drilling cycles are available as a single block instruction.

- High-speed peck drilling cycle
- Reverse tapping
- Fine boring
- Spot boring
- Counter boring
- Peck drilling cycle
- Tapping
- Boring
- Back boring

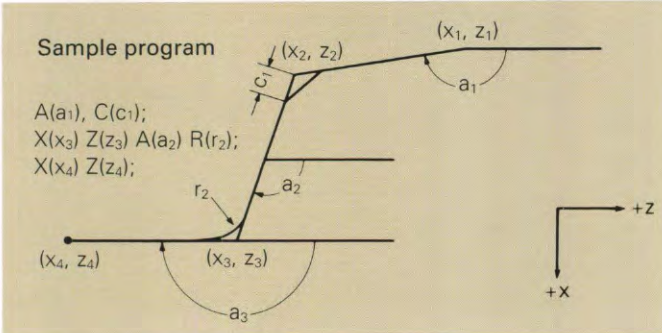




# FANUC Series O-TD for Small Lathes

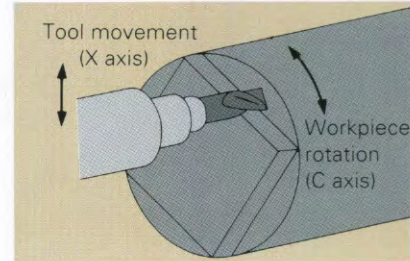
## Direct Programming

The orientation of a straight line, chamfering value, corner radius value, etc. in a blueprint can be specified as is. Direct command is also available.



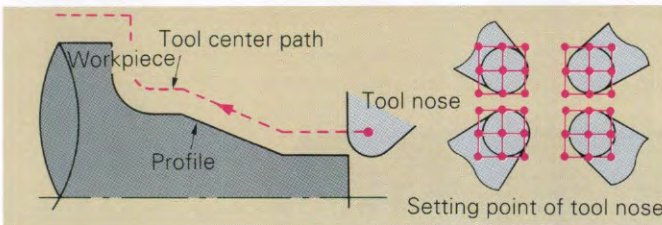
## Polar Coordinate Interpolation

Polar coordinate interpolation causes the movement of the linear axis (X axis) and rotary axis (C axis) to be automatically converted in the CNC. This feature is ideal for cam grinding and face milling (X, C axis) using a lathe. The profile can be programmed using an orthogonal coordinate system. Cutter radius compensation is also available.



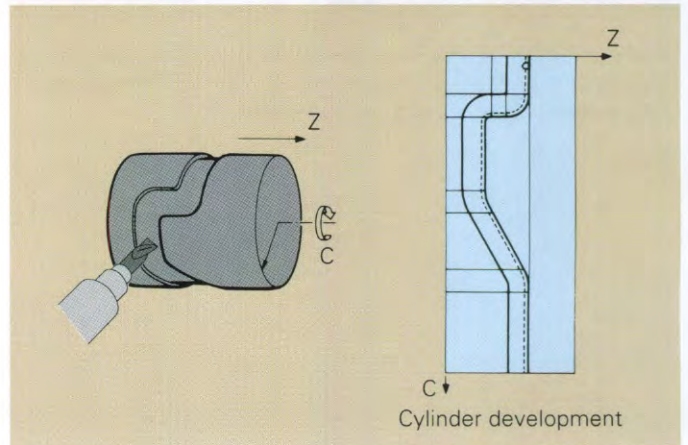
## Tool Nose Radius Compensation

Tool center path is automatically generated by offsetting the tool nose radius from the profile, so that higher accuracy and fine adjustment are possible without tedious calculations or use of a computer. Setting point of tool nose can be also specified.



## Cylindrical Interpolation

Cylindrical interpolation generates rotary axis movement based on the cylinder radius as instructed. This feature is ideally suited to cylindrical groove cutting. The cylinder is transformed to a flat surface to simplify programming. Cutter radius compensation is also available.



## Multiple Repetitive Cycles

The multiple repetitive cycles feature generates a series of cutting paths with simple commands. For instance, definition of final profile of workpiece generates tool path for rough cutting automatically.

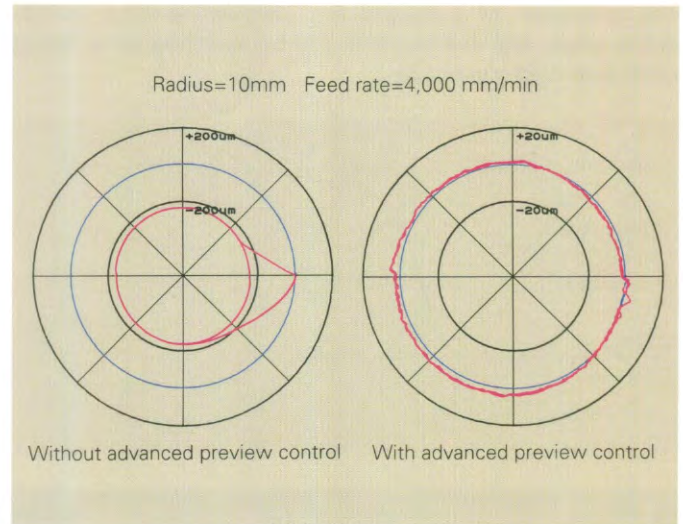
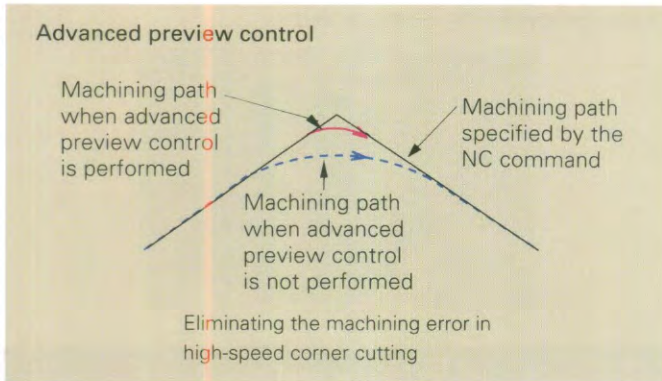
<b>G71 Stock removal in turning</b> 	<b>G72 Stock removal in facing</b> 	<b>G73 Pattern repeating</b> 	<b>G70 Finishing cycle</b> 
<b>G74 Peck drilling in Z axis</b> 	<b>G75 Grooving in X axis</b> 	<b>G76 Thread cutting</b> 	



# High-Speed, High-Precision Machining

## Advanced Preview Control (0-MD only)

Advanced preview control realized reduction of machining error in high-speed cutting by looking ahead of the NC command. This effectively eliminates machining error in corner cutting and radius error in high-speed circle cutting.



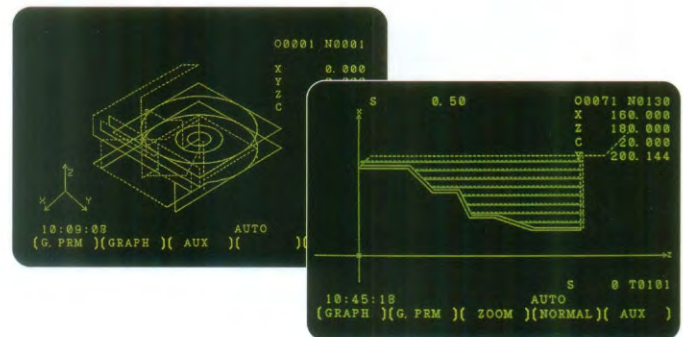
# Excellent Operability and Maintainability

## Background Editing

Program editing is available while the machine is operating. This feature enables effective use of the CNC for programming in background during machine operation.

## Tool Path Graphic Display

Tool path of machining programs is graphically displayed on the screen for visual confirmation prior to actual machining.

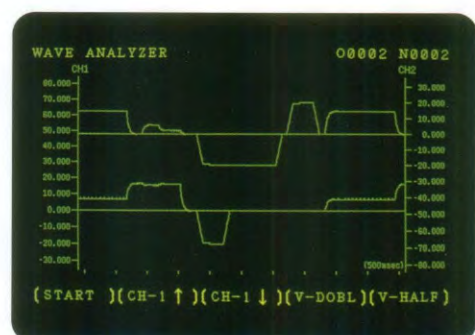
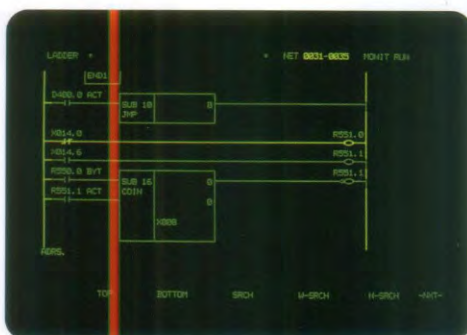


## Ladder Diagram Display

Dynamic display update of ladder diagram provides real time status of signals for troubleshooting. This ladder diagram display can be disabled.

## Waveform Display

Waveform display of servo data facilitates troubleshooting of servo problems and the adjustment of servos.

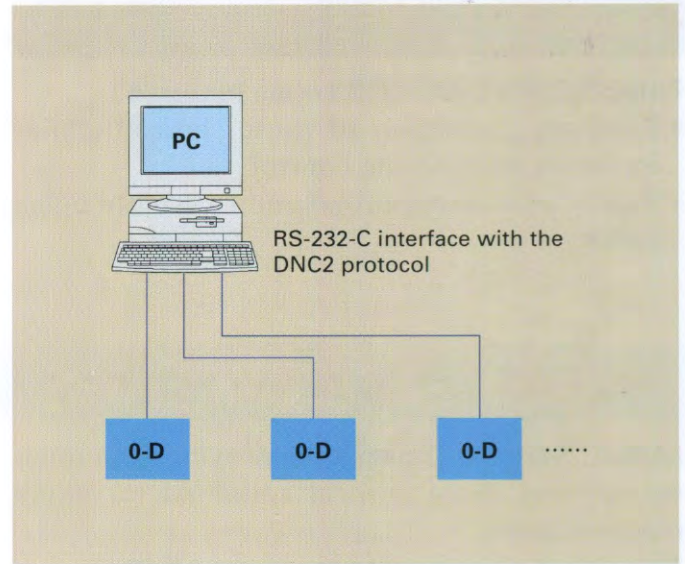




# Powerful Communication Function with PC

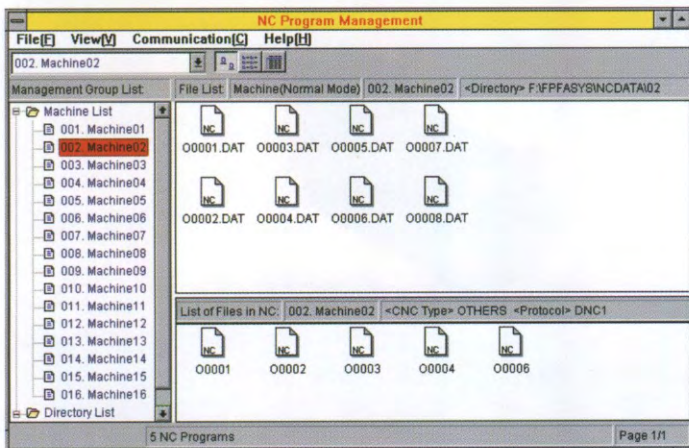
## Communication with PC

FANUC Series 0-D is able to communicate with a PC (Personal Computer) through the RS-232-C interface using the DNC2 protocol. The software packages "NC Program Management" and "NC Operation Management" are available for a PC running Windows™.



## NC Program Management

The NC Program Management software package standardizes your PC environment for flexible file management and upload/download of NC programs for the FANUC Series 0-D.



NC Program Management Screen

## NC Operation Management

The NC Operation Management software package provides functions to build customized shop-floor management applications on your PC.

This software package contains versatile functions including :

- Operations
  - NC program selection
  - NC cycle start
  - NC reset
- Program and tool management
  - Tool offset data
  - Custom macro variables
  - Tool life data
  - PMC data
- Trouble shooting
  - NC alarm status



# FANUC SERVO MOTOR series

for Small Machine Tools

## Feature

FANUC SERVO MOTOR series features ;

- Compact packaging of motor and amplifier for servo and spindle control
- Highly reliable high-resolution absolute pulse coder
- Energy saving by returning electric energy through the regenerative power supply module
- Conformance for major international standards such as IEC and CE marking

## FANUC AC SERVO MOTOR $\alpha$ C series and $\beta$ series

FANUC Series 0-D packages provides the most economical servo control solutions for small machine tools.

Two series of compact servos are offered:

- $\alpha$ C series motor for axis-feed
  - $\beta$  series motor for positioning
- Both are equipped with the advanced  $\alpha$  pulse coder and  $\beta$  pulse coder. The  $\alpha$  pulse coder is a highly reliable high resolution absolute feedback system.



## FANUC AC SPINDLE MOTOR $\alpha$ C series

FANUC Series 0-D packages provides the most economical spindle control solutions for small machine tools with  $\alpha$ C series.



## FANUC SERVO AMPLIFIER $\alpha$ series and $\beta$ series

FANUC SERVO AMPLIFIER provides two kinds of series ;

- $\alpha$  series for servo motor and spindle motor
- $\beta$  series for  $\beta$  servo motor

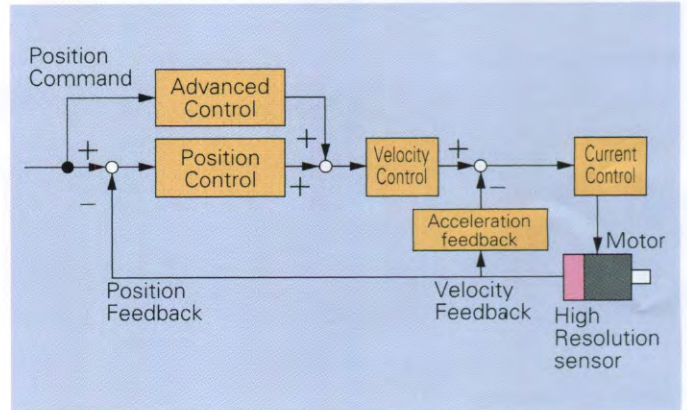




# High Performance and Advanced Function

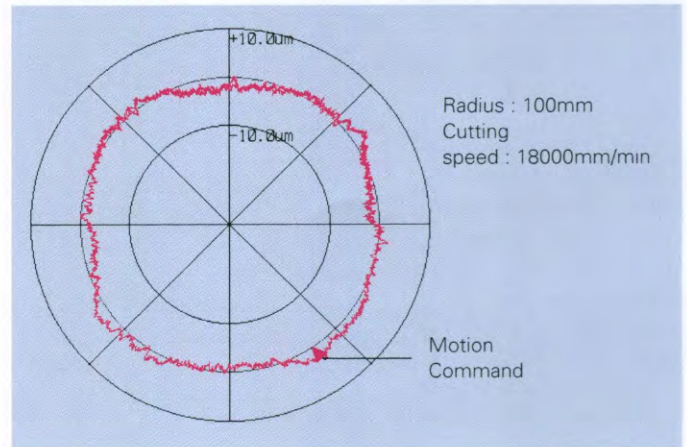
## Acceleration Feedback Control

Acceleration feedback enables rigid velocity control with effective stability.



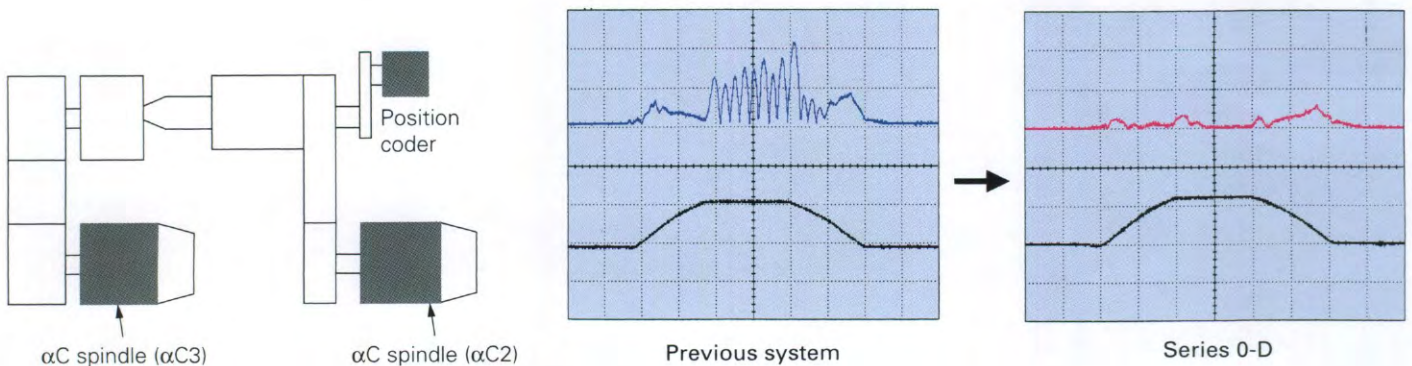
## Preview Control and Backlash Acceleration Control

Preview control minimizes servo error and shock at the corner through the automatic CNC velocity control. Backlash Acceleration Control reduces quadrant protrusion of the circle even at high speed.



## Spindle Synchronization Control

Spindle synchronization control has been significantly improved as shown in the figure (below right). The rotational angles of two spindles can be synchronized and a workpiece can be transferred between two spindle heads during rotation.





# FANUC Series O-MD

# FANUC Series O-TD

## Specifications

○ : Basic ● : Basic option ☆ : Option  
\* : Function included in another option

### Controlled axis

Item	Specification	MD	TD
Number of controlled axes	2 axes	—	○
	3 axes	—	☆
	4 axes	○	☆
Number of simultaneous controlled axes	2 axes	—	○
	3 axes	—	☆
	4 axes	○	☆
Additional axis control		○	—
Axis control by PMC	Max. 2 axes	○	○
Cs contouring control		○	○
Cf-axis control		—	○
Y-axis control		—	○
Simple synchronous control		○	○
Least input increment	0.001mm,0.001deg,0.0001inch	○	○
Increment system 1/10	0.0001mm,0.0001deg,0.00001inch	○	○
Inch/metric conversion		○	○
Interlock		○	○
Machine lock		○	○
Emergency stop		○	○
Over travel		○	○
Stored stroke check 1		○	—
Stroke limit external setting		○	○
Stored stroke check 2		○	—
Stored stroke check 3	G22,G24	—	○
Stored stroke check 3/4	G22/G23	○	○
Mirror image	each axis	○	○
Follow up		○	○
Servo off		○	○
Mechanical handle feed		—	○
Chamfering on/off		○	○
Backlash compensation		○	○
Stored pitch error compensation		○	○
Position switch		○	○

### Operation

Item	Specification	MD	TD
Automatic operation (Memory)		○	○
DNC operation	included in Reader/punch interface	○	○
MDI operation		○	○
MDI operation B		○	○
Scheduling function	Directory display of floppy cassette required	○	○
Program number search		○	○
Sequence number search		○	○
Sequence number compare and stop		○	○
Program restart		○	○
Buffer resister		○	○
Dry run		○	○
Single block		○	○
Jog feed (JOG)		○	○
Manual reference position return		○	○
Setting the reference position without DOGs		○	○
Reference position setting with mechanical stop		○	○
Manual handle feed	1 unit	○	○
M.P.G.	2/3 units (O-MD) 2 units (O-TD)	☆	☆

Item	Specification	MD	TD
Manual handle feed rate	x1, x10, xm, xn m:~127, n:~1000	○	○
Handle interruption		○	○
Incremental feed	x1, x10, x100, x1000	○	○
Jog and handle simultaneous mode		○	○

### Interpolation function

Item	Specification	MD	TD
Positioning	G00	○	○
Single direction positioning	G60	○	—
Exact stop mode	G61	○	—
Exact stop	G09	○	—
Linear interpolation		○	○
Circular interpolation	Multi-quadrant is possible	○	○
Dwell (per sec.)		—	○
Polar coordinate interpolation		○	○
Cylindrical interpolation		○	—
Helical interpolation		○	—
Helical interpolation axis extend		○	—
Threading / Synchronous cutting	Position coder required	○	○
Threading retract		—	○
Continuous threading		—	○
Variable lead thread cutting		—	○
Polygon turning		—	○
Skip function	G31	○	○
High-speed skip function		○	○
Torque limit skip		—	○
Reference position return	G28	○	○
Reference position return check	G27	○	○
2nd reference position return		○	○
3rd/4th reference position return		○	—
Normal direction control		○	—
Index table indexing function		○	○
Rapid traverse rate	Max. 100m/min	○	○
Rapid traverse override	Fo,25,50,100%	○	○
Feed per minute	mm/min.	○	○
Feed per revolution	mm/rev	○	○
Tangential speed constant control		○	○
Cutting feedrate clamp		○	○
Automatic acceleration / deceleration	Rapid traverse : linear Cuttingfeed : exponential	○	○
Bell-shaped acceleration / deceleration for rapid traverse		○	—
Linear acceleration / deceleration after cutting feed interpolation		○	○
Feedrate override	0~150%	○	○
One-digit F code feed		○	—
Jog feedrate override	0~150%	○	—
Override cancel		○	○
Manual continuous feed		—	○
External deceleration		○	○
Look-ahead control		○	—



## Programming

Item	Specification	MD	TD
Tape code	EIA/ISO automatic recognition	○	○
Label skip		○	○
Parity check	Parity H, Parity V	○	○
Control in / out		○	○
Optional block skip	9 units	○	○
Maximum command value	±8digits	○	○
Program number	04digits	○	○
Sequence number	N4 digits	○	○
Absolute / Incremental programming	It is possible to use in the same block.	○	○
Decimal point input / Pocket calculator type decimal point input		○	○
X-axis diameter / radius programming		—	○
Plane selection	G17,G18,G19	○	○
Rotary axis designation	Additiond axes only	○	○
Rotary axis roll-over function	Additiond axes only	○	○
Polar coordinate command		○	○
Coordinate system setting		○	○
Coordinate system shift		—	○
Direct input of coordinate system shift		—	○
Automatic coordinate system setting		○	○
Workpiece coordinate system	G52,G53,G54~G59	○	○
Workpiece coordinate pair addition	48 pairs	○	—
Manual absolute on / off		○	○
Direct drawing dimension programming		—	○
G code A		—	○
G code B/C		—	○
Optional angle chamfering / corner rounding		○	—
Programmable data input	G10 (Program input of offset data)	○	○
Subprogram call	Two levels	○	○
Custom macro A		○	○
Custom macro B	Editing is not available.	○	○
Addition of custom macro common variables	only with custom macro B	○	○
Pattern data input		○	○
Interruption type custom macro		○	○
Canned cycles		—	○
Multiple repetitive cycle		—	○
Multiple repetitive cycle 2	pocket figure	—	○
Canned cycles for drilling		○	○
Small-hole peck drilling cycle		○	—
Circular interpolation by radius programming		○	○
Automatic corner override		○	—
Block override		○	—
Automatic corner deceleration		○	—
Feedrate clamp by circular radius		○	—
Scaling		○	—
Coordinate system rotation		○	—
Programmable mirror image		○	—
Menu programming		○	○
Mirror image for double turret		—	○
Tape format for FS10/11		○	○

## Auxiliary function / Spindle function

Item	Specification	MD	TD
Auxiliary function	M3 digits	○	○
2nd auxiliary function	B8 digits	○	○
Auxiliary function lock		○	○
High speed M/S/T/B interface		○	○
Multiple command of auxiliary function	3 units (M code only)	○	○
Spindle function	S analog/ serial output	○	○
Constant surface speed control		○	○
Spindle speed override	0 ~120%	○	○
Actual spindle speed output		—	○
Spindle speed fluctuation detection		—	○
Analog voltage control by PMC		○	○
1st spindle orientation		○	○
1st spindle output switching function		○	○
2nd spindle orientation		○	○
2nd spindle output switching function		○	○
Spindle synchronous control		○	○
Simple spindle synchronous control		○	○
Spindle positioning		—	○
Multi spindle control		—	○
Rigid tapping	Position coder required.	○	○

## Tool function

Item	Specification	MD	TD
Tool function		○	○
Tool offset memory	± 6 digits 32 pairs ± 6 digits 400 pieces	—	○
Tool offset memory B	Tool geometry / wear offset	○	—
Tool length compensation		○	—
Tool position compensation		○	—
Cutter compensation C		○	—
Tool offset		—	○
Y axis offset		—	○
Tool nose radius compensation		—	○
Tool geometry / wear compensation		—	○
Tool life management		○	○
Tool offset value counter input		—	○
Automatic tool offset		—	○
Direct input of offset value measured A		—	○
Direct input of offset value measured B		—	○
Tool length measurement		○	—
Automatic tool length measurement		○	—



## Editing operation

Item	Specification	MD	TD
Part program storage length	320m	○	○
Number of registerable programs	200 programs	○	○
Tape editing		○	○
Program protect		○	○
Background editing		○	○
Extended part program editing		○	○
Playback		○	○

## Setting / display

Item	Specification	MD	TD
Status display		○	○
Clock function		○	○
Current position display		○	○
Program display	Program name : 31 characters	○	○
Parameter setting display		○	○
Self-diagnosis function		○	○
Alarm display		○	○
Run hour and parts count display		○	○
Actual speed display		○	○
Display of spindle speed and T code in all screens	Position coder required.	○	○
Directory display of floppy cassette		○	○
Graphic display		☆	☆
Servo setting screen		○	○
Spindle setting screen		○	○
Servo waveform display		*	*
Software operator's panel		○	○
Software operator's panel general purpose switch		○	○
English display		○	○
Japanese (Chinese characters) display		○	○
German / French display		○	○
Italian display		○	○
Chinese display		○	○
Spanish display		○	○
Korean display		☆	☆
Data protect key		○	○

## Data input / output

Item	Specification	MD	TD
Reader / punch interface	Reader/punch (Ch.1) interface	○	○
	Reader/punch (Ch.2) interface	○	○
DNC2		☆	☆
External I/O device control		○	○
External data input		○	○
External key input		○	○
External workpiece number search	15 pieces	○	○
External program number search	1~9999	○	○

## Others

Item	Specification	MD	TD
Status output signals		○	○
9" monochrome CRT		○	○
PMC-L	Basic command: 6.0 μs Max.steps: 5000	●	●
PMC-M	Basic command: 2.0 μs Max.steps: 8000	●	●
Internal I/O card	DI/DO: 80/56 source/sink	—	●
	DI/DO: 104/72 source/sink	○	●
I/O Unit-MODEL A	DI/DO Max. : 1024/1024 points	☆	☆

○ : Basic ● : Basic option ☆ : Option  
\* : Function included in another option



## FANUC AC SERVO MOTOR series

Motor model	$\alpha$ C6/2000	$\alpha$ C12/2000	$\alpha$ C22/1500	$\beta$ 3/3000	$\beta$ 6/2000
Output (kW)	0.6	1.0	1.5	0.5	0.9
Stalling torque (Nm)	6	12	22	3	6
Maximum speed (min <sup>-1</sup> )	2000	2000	1500	3000	2000
Rotor inertia (kgm <sup>2</sup> )	0.0026	0.0062	0.012	0.002	0.04
Weight (kg)	13	18	29	5	8.5
Detector (Resolution)	ABS/INC 65536/rev			ABS/INC 32768/rev	

## FANUC AC SPINDLE MOTOR series

Motor model	$\alpha$ 3	$\alpha$ 6	$\alpha$ 8	$\alpha$ 12	$\alpha$ 15	$\alpha$ 18	$\alpha$ 22
Cont. rated output (kW)	3.7	5.5	7.5	11	15	18.5	22
30min. rated output (kW)	5.5	7.5	11	15	18.5	22	26
Base speed (min <sup>-1</sup> )	1500	1500	1500	1500	1500	1500	1500
Maximum speed (min <sup>-1</sup> )	8000	8000	6000	6000	6000	6000	6000
Rotor inertia (kgm <sup>2</sup> )	0.0148	0.0215	0.0275	0.09	0.09	0.128	0.128
Weight (kg)	46	60	80	110	110	143	143
Detector (Resolution)	2048/rev	4096/rev					

Motor model	$\alpha$ C3	$\alpha$ C6	$\alpha$ C8	$\alpha$ C12	$\alpha$ C15	$\alpha$ C18	$\alpha$ C22
Cont. rated output (kW)	3.7	5.5	7.5	11	15	18.5	22
30min. rated output (kW)	5.5	7.5	11	15	18.5	22	26
Base speed (min <sup>-1</sup> )	1500	1500	1500	1500	1500	1500	1500
Maximum speed (min <sup>-1</sup> )	6000	6000	6000	6000	6000	4500	4500
Rotor inertia (kgm <sup>2</sup> )	0.0148	0.0215	0.0275	0.09	0.09	0.128	0.128
Weight (kg)	46	60	80	110	110	143	143

## FANUC SERVO AMPLIFIER series

### SERVO AMPLIFIER MODULE

Amp. model		Motor model	$\alpha$ C6/2000	$\alpha$ C12/2000	$\alpha$ C22/1500	$\beta$ 3/3000	$\beta$ 6/2000
$\alpha$ series	1-axis	SVM1-20	○	○		○	○
		SVM1-40L			○		
	2-axes	SVM2-20/20	L/M	L/M		L/M	L/M
		SVM2-20/40	L	L	M	L	L
	3-axes	SVM2-40/40			L/M		
		SVM3-20/20/20	L/M/N	L/M/N		L/M/N	L/M/N
$\alpha$ series	1-axis	SVM3-20/20/40	L/M	L/M	N	L/M	L/M
		SVU1-20	○	○		○	○
	2-axes	SVU1-40			○		
		SVU2-20/20	L/M	L/M		L/M	L/M
	3-axes	SVU2-20/40	L	L	M	L	L
		SVU2-40/40			L/M		
$\beta$ series	SVU	SVU-20	○	○		○	○

### SPINDLE AMPLIFIER MODULE

Amp. model		Motor model	$\alpha$ 3	$\alpha$ 6 $\alpha$ 8	$\alpha$ 12	$\alpha$ 15 $\alpha$ 18	$\alpha$ 22	$\alpha$ C3	$\alpha$ C6 $\alpha$ C8	$\alpha$ C12	$\alpha$ C15 $\alpha$ C18	$\alpha$ C22
$\alpha$ series		SPM-5.5	○									
		SPM-11		○								
		SPM-15			○							
		SPM-22				○						
		SPM-26					○					
$\alpha$ C series		SPMC-5.5						○				
		SPMC-11						○				
		SPMC-15							○			
		SPMC-22								○		
		SPMC-26										○

### POWER SUPPLY MODULE

Amp. model	Item	Power supply	Power supply capacity (kVA)	Rated output capacity (kW)	Maximum output capacity (kW)
PSM-5.5	200/220/230VAC +10%, -15% 50/60Hz $\pm$ 1Hz		9	5.5	11
PSM-11			17	11	20
PSM-15			22	15	28
PSM-26			37	26	40



# FANUC LTD

	ADDRESS	PHONE	FAX
● Headquarters	Oshino-mura, Yamanashi Prefecture 401-0597, Japan	81-555-84-5555	81-555-84-5512
● Overseas Affiliated Companies			
GE Fanuc Automation Corporation	P.O. Box 8106, Charlottesville, VA 22906, U.S.A.	1-804-978-5000	1-804-978-5320
GE Fanuc Automation North America, Inc.	P.O. Box 8106, Charlottesville, VA 22906, U.S.A.	1-804-978-5000	1-804-978-5320
GE Fanuc Automation Europe S.A.	Zone Industrielle, L-6468 Echternach, Grand-Duché de Luxembourg	352-727979-1	352-727979-278
FANUC USA CORPORATION	1331 Greenleaf Avenue, Elk Grove Village, IL 60007, U.S.A.	1-847-427-5000	1-847-427-5001
FANUC KOREA CORPORATION	42, Ungnam-Dong, Changwon, Kyong-Nam, 641-290, Korea	82-551-82-0122	82-551-84-9826
FANUC TAIWAN LIMITED	No. 4 17th Rd. Taichung Industrial Park, Taichung, Taiwan, R.O.C.	886-04-359-0522	886-4-359-0771
BEIJING-FANUC Mechatronics CO., LTD.	No. 7 Xixi Zhong Road, Shangdi Information Industry Base Haidian District, Beijing 100085, China	86-10-62984726	86-10-62984741
FANUC HONG KONG LIMITED	Unit 1411, Sun Plaza, 28 Canton Road, Tsimshatsui, Kowloon, Hong Kong	852-2375-0026	852-2375-0015
Fanuc India Limited	41-A, Electronics City, KEONICS, Bangalore, 561 229, India	91-80-852-0057	91-80-852-0051
PT. Fanuc GE Automation Indonesia	Jl. Jend. Gatot Subroto, Kiaracandong, P.O. Box 2830-BDKC. Bandung, 40284A, Indonesia	62-22-31675	62-22-310966
Fanuc GE Automation Singapore Pte. Ltd.	No. 1 Teban Gardens Crescent, Singapore 608919, Singapore	65-567-9328	65-567-1856
FANUC THAI LIMITED	252/118, Unit D, E 23rd Fl., Muang Thai-Phatra Office Tower II Ratchadaphisek Road, Huay kwang, Bangkok 10320, Thailand	66-2-693-3343	66-2-693-3350
FANUC-MACHINEX LTD	29-37, Cristo Smirnenski Str. 1164, Sofia, Bulgaria	359-2-963-3319	359-2-963-2873
FANUC Europe GmbH	Bernhäuser Straße 22, 73765 Neuhausen, a.d.F. Germany	49-7158-187200	49-7158-187111
FANUC FRANCE S.A.	10 Rue de Valenton, 94470 Boissy-St-Léger, France	33-1-4569-6333	33-1-4569-0325
FANUC GERMANY GmbH	Bernhäuser Straße 22, 73765 Neuhausen, a.d.F. Germany	49-7158-187300	49-7158-187411
FANUC U.K. LIMITED	No. 1 Station Approach, Ruislip, Middlesex HA4 8LF, United Kingdom	44-1895-634182	44-1895-676140
FANUC ITALIA S.p.A.	Piazza Tirana, 24/4B, 20147 Milano, Italy	39-2-4830-3272	39-2-4830-1943
FANUC IBERIA, S.A.	C/Alfonso Gomez, 38 Planta 1-E 28037 Madrid, Spain	34-1-327-1938	34-1-327-0814
FANUC TURKEY LTD	Kusbakisi Sok. No:21, K-1-2, Altunizade-Uskudar, Istanbul, Turkey	90-216-3913548	90-216-3918133
FANUC SOUTH AFRICA (PROPRIETARY) LIMITED	17 Loper Ave. Airport Industrial Ests, Spartan Ext.2 P.O. Box 219, Isand 1600, Republic of South Africa	27-11-392-3610	27-11-392-3615
FANUC ASIA-PACIFIC OFFICE	No. 1 Teban Gardens Crescent, Singapore 608919, Singapore	65-567-8932	65-566-5937
FANUC SINGAPORE PTE. LTD.	No. 1 Teban Gardens Crescent, Singapore 608919, Singapore	65-567-8566	65-566-5937
FANUC MECHATRONICS (MALAYSIA) SDN. BHD.	Fujitsu Plaza, Suite 1, Level 2B, No. 1A Jalan Tandang 204, 46050 Petaling jaya, Selangor Darul Ehsan, Malaysia	60-3-794-4240	60-3-794-4250
FANUC OCEANIA PTY. LIMITED	21 Muriel Ave., Rydalmere, N.S.W., 2116, Australia	61-2-9638-4677	61-2-9638-4794
FANUC PHILIPPINES CORPORATION	2nd Fl., United Life Bldg., A. Arnaiz Ave. Legaspi Village, Makati, Metro Manila, Philippines	63-2-892-7809	63-2-812-1702

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