

INSTRUCTION MANUAL

VERTICAL MACHINING CENTER

FNC 74-A

FANUC SYSTEM OMB



MAKINO MILLING MACHINE CO., LTD.

No. FN1012-87

SPECIFICATIONS

6FS03A

CONTENTS

	Page
1. GENERAL	A- 1
1.1 External View	A- 1
1.2 Outline of Parts	A- 2
2. MAIN DIMENSIONS AND VALUES	A- 5
2.1 Main Body	A- 5
2.1.1 Motion Range	A- 5
2.1.2 Spindle	A- 5
2.1.3 Table	A- 5
2.1.4 Feedrate	A- 5
2.1.5 Machine reference point	A- 6
2.1.6 Automatic tool changer	A- 6
2.1.7 Fan cooler	A- 6
2.1.8 Hydraulic unit	A- 6
2.1.9 Coolant supply unit	A- 7
2.1.10 Pneumatic pressure supply	A- 7
2.1.11 Required electric power	A- 7
2.1.12 Power supply	A- 8
2.1.13 Machine weight	A- 8
2.1.14 Special accessories	A- 8
2.2 Numerical Control Unit (FANUC SYSTEM 11M)	A-14
3. EXTERNAL DIMENSIONS DIAGRAM	A-18
4. LAYOUT DRAWING	A-21

INSTALLATION
6FI03A

CONTENTS

	Page
1. SELECTING INSTALLATION PLACE	B- 1
2. LAYOUT	B- 1
3. POWER SUPPLY AND AIR SUPPLY	B- 1
4. FOUNDATION	B- 3
5. HOISTING	B- 5
6. INSTALLATION	B- 8
7. PIPING AND WIRING	B-10
7.1 Piping and Wiring to Coolant Supply Unit	B-10
7.2 Connecting Air Supply	B-10
7.3 Wiring to the Main Control Panel	B-10
7.4 Connecting the ATC Control Panel	B-11
7.5 Connecting Power Supply	B-11
8. SUPPLYING OIL	B-15
8.1 Lubricant	B-15
8.2 Hydraulic Oil	B-19
9. STAND-BY PROCEDURE	B-20
9.1 Wiping Anticorrosive Oil	B-20
9.2 Unclamping	B-20
10. TURNING ON POWER	B-23
11. LEVELING	B-25

OPERATION

MACHINE PROPER UNIT
6FT03A

CONTENTS

	Page
1. PARTS DESIGNATION	C- 1
2. SAFETY MEASURES	C- 2
3. FUNCTIONS OF MAIN CONTROL PARTS	C- 4
3.1 Main Power Switch	C- 4
3.2 Main Control Box	C- 5
3.2.1 NC unit control panel	C- 5
3.2.2 Main control panel	C- 5
3.2.3 Portable manual pulse generator	C-23
3.3 Diagnostic Function (DIAGNOSTIC)	C-26
4. EMERGENCY STOP AND ALARM	C-27
4.1 Emergency Stop	C-27
4.2 Alarm	C-27
5. PROCEDURE FOR START-UP	C-30
5.1 Turning On Power	C-30
5.2 Turning On Air Supply	C-30
6. RUNNING THE SYSTEM	C-31
6.1 Manual Operation	C-31
6.1.1 Manual continuous feed	C-31
6.1.2 HANDLE feed	C-32
6.1.3 Manual reference point return	C-33
6.2 Automatic Operation	C-34
6.2.1 Automatic operation mode	C-34
6.2.2 Set-up for automatic operation	C-36
6.2.3 Start-up of automatic operation	C-37
6.2.4 Temporary stop and restart of automatic operation	C-38
6.2.5 Shut-down of automatic operation	C-41
7. PROCEDURE FOR SHUT-DOWN	C-42
7.1 Turning Off Power Supply	C-42
7.2 Turning Off Air Supply	C-42
7.3 Cleaning the Surrounding Area	C-42

SPINDLE HEAD UNIT
6FT13A

CONTENTS

	Page
1. PARTS DESIGNATION	D- 1
2. HOW TO HANDLE THE MAIN PARTS	D- 2
2.1 Control Panel	D- 2
2.1.1 Main control panel	D- 2
2.1.2 Spindle head control panel	D- 6
2.1.3 Operating time integrator (special accessory)	D- 7
2.2 Turning the Spindle Manually	D- 8
2.3 Loading/Unloading a Tool On/From the Milling Chuck Holder	D- 8
3. HOW TO OPERATE THE SPINDLE	D- 9
3.1 Starting and Stopping the Spindle	D- 9
3.2 Changing the Spindle Speed	D- 9
3.3 Loading and Unloading a Tool	D-11
4. SPINDLE LOAD METER	D-12
5. LUBRICATION	D-13

LUBRICATION UNIT
6FT63A

CONTENTS

	Page
1. SPINDLE TEMPERATURE CONTROLLER	E-1
1.1 Parts Designation	E-1
1.2 Operation	E-2
1.3 Supplying Oil	E-3
1.4 Lubricant	E-3
2. AUTOMATIC LUBRICANT SUPPLY UNIT	E-4
2.1 Parts Designation	E-4
2.2 Lubrication Alarm Lamp	E-5
2.3 Operation	E-6
2.4 Lubricant	E-6

COOLANT UNIT
6FT73A

CONTENTS

	Page
1. PARTS DESIGNATION	F-1
2. HOW TO HANDLE THE MAIN PARTS	F-2
2.1 Coolant ON/OFF Switch	F-2
2.2 Nozzle	F-3
2.3 Flow Rate Adjusting Valve	F-3
3. APPLICABLE COOLANTS	F-3

A.T.C UNIT

6FT123A

CONTENTS

	Page
1. PARTS DESIGNATION	G- 1
2. HOW TO HANDLE THE MAIN PARTS	G- 2
2.1 Control Panel	G- 2
2.1.1 Main control panel	G- 2
2.1.2 Manual control panel for the ATC magazine	G- 6
2.2 Loading/Unloading a Tool On/From the Tool Magazine	G- 8
2.3 Limits of Weight and Size of Tools	G- 9
3. RUNNING THE SYSTEM	G-11
3.1 Stand-by of the Automatic Tool Changer	G-11
3.2 Registering Tool Number	G-11
3.2.1 Method to enter the tool numbers sequentially from pot 01 (reference pot)	G-12
3.2.2 Method to register only the tool number of a certain pot on CRT display	G-14
3.3 Calling a Tool	G-16
3.4 Automatic Tool Changing by MDI Procedure	G-16
3.5 Automatic Tool Changing by Tape Operation or Memory Operation	G-17
4. MAINTENANCE	G-18
4.1 Manual Maintenance Switch	G-18
4.2 Manual Operation of the ATC Arm	G-21

HYDRAULIC & PNEUMATIC UNITS
6FT133A

CONTENTS

	Page
1. HYDRAULIC UNIT	H-1
1.1 Parts Designation	H-1
1.2 Hydraulically-Operated Heating Switch	H-2
1.3 Operation	H-3
1.4 Hydraulic Oil	H-3
2. AIR SUPPLY UNIT	H-4
2.1 Parts Designation	H-4
2.2 Lubricant	H-5

APPENDIX

CONTENTS

	Page
APPENDIX 1 AUXILIARY FUNCTION LIST (FANUC SYSTEM 0MB)	I-1
APPENDIX 2 ERROR MESSAGE LIST	I-3