



**B012/18 A,J
B012/18 B,K**

CNC Precision Automatic Lathes

INSTRUCTION MANUAL



PRECISION TSUGAMI

CONTENTS

CHAPTER 1 SAFETY	1 - 1
1.1 Precautions on Operation	1 - 1
1.2 Qualification of Operator	1 - 2
1.3 Precautions on Tooling	1 - 2
1.4 Precautions on Electric Equipment	1 - 2
1.5 Precautions on Unattended Operation	1 - 3
1.6 Warning and Caution Plates	1 - 4
1.7 Notice for Automatic Bar Feeder	1 - 6
1.8 Interlock with Automatic Bar Feeder	1 - 6
CHAPTER 2 SPECIFICATIONS	2 - 1
2.1 External View and Names of Parts	2 - 1
2.2 Machine Series (A, B, J, k)	2 - 6
2.3 Types of Peripheral Units	2 - 7
2.4 Standard Machine Specifications and Standard Accessories	2 - 8
2.5 Special Specification and Options	2 - 13
CHAPTER 3 TRANSPORTATION AND INSTALLATION	3 - 1
3.1 Transportation	3 - 1
3.2 Installation of Machine	3 - 2
3.3 Articles Required for a Trial Run of Machine (Power supply, air source, oil/grease)	3 - 4
3.4 Provision Against an Earthquake Disaster	3 - 5
CHAPTER 4 OPERATIONS	4 - 1
4.1 Operator's Panel	4 - 2
4.2 Operations	4 - 8
4.2.1 Basic Operations	4 - 8
4.2.2 Manual Operations	4 - 9
4.2.3 Automatic Operations	4 - 11
4.2.4 Setup of T-axis Offset	4 - 14
4.2.5 C-axis Offset Setup	4 - 15
4.3 Optional Functions	4 - 18

CONTENTS

CHAPTER 5 ADJUSTMENT, INSPECTION AND MAINTENANCE	5 - 1
5.1 Replacing the Spindle/Sub Spindle Collet Chuck	5 - 1
5.2 Adjusting the Spindle Collet Chuck Force and Replacing the Toggle	5 - 2
5.3 Adjusting the Guide Bush	5 - 3
5.4 Gripping Force Adjustment for Sub Spindle Collet Chuck	5 - 4
5.5 Rotation Bush Holder	5 - 5
5.6 Inspecting and Adjusting the Sub Spindle Belt Tension	5 - 6
5.7 Inspecting the Lubrication and Coolant	5 - 7
5.8 Pneumatic Unit	5 - 8
5.9 Lubricating Oil Level Adjustment and Filter Replacement	5 - 10
5.10 Machine Origin Position Setting	5 - 11
5.10.1 Procedure for setting the zero point of X ₁ Axis	5 - 12
5.10.2 Procedure for setting the zero point T ₁ Axis	5 - 13
5.10.3 Index position of each axis	5 - 14
5.11 Setting and Changing the Sub Spindle Speed, 2-spindle Cross Drill (Option) Speed	5 - 15
5.11.1 Display Status Transfer Diagram	5 - 15
5.11.2 Explanation of Parameters	5 - 16
5.12 Machine Maintenance Parts	5 - 19
 CHAPTER 6 TROUBLESHOOTING GUIDE	 6 - 1
6.1 Alarm Messages and Actions Taken	6 - 1
6.2 Alarm History	6 - 6
6.2.1 Procedure for Alarm History	6 - 6
6.2.2 Clear of Alarm History	6 - 6
6.2.3 Alarm Message display	6 - 7
 CHAPTER 7 PROGRAM	 7 - 1
7.1 Word, Address and Block	7 - 1
7.2 Coordinate System and Coordinate Values	7 - 3
7.3 M Codes	7 - 5
7.4 G Codes	7 - 7
7.5 S Codes	7 - 16
7.6 T Codes	7 - 17
7.7 Sub Spindle Commanding Method	7 - 18
7.7.1 How to Derive Tooling Zone and Command Values (standard sub spindle chuck)	7 - 18
7.7.2 Precaution on the Program Command	7 - 19

7.8 Programming Example	7-20
7.8.1 Programming Procedure	7-20
7.8.2 Beginning and End of Program	7-22
7.8.3 Front Face Machining	7-25
7.8.4 Outer Diameter (OD) and Threading	7-27
7.8.5 Cut-off and Eject	7-29
7.8.6 Bar Feeder Subprogram	7-31
7.8.7 Back Drilling	7-32
7.8.8 Back Tapping	7-34
7.8.9 Back Turning (Taper turning)	7-35
7.8.10 Simultaneous Machining of Both-side Center Holes	7-36
7.8.11 Back Turning	7-37
7.8.12 Programming Examples (1)	7-38
7.8.13 Programming Examples (2)	7-41
7.8.14 Two-axes Cross Drilling System (option)	7-50
7.9 Cutting Condition Data	7-53
7.9.1 Cutting Speed Selection Reference Table	7-53
7.9.2 Thread cutting count table	7-54
7.9.3 Incomplete screw thread length table at thread cutting	7-55
7.9.4 Feeding Conditions	7-56
7.9.5 Cutting condition	7-58

