

MACHINE INSTALLATION GUIDE

Applicable Model

NH4000 DCG

Applicable NC Unit

MSX-501 MSX-501III
MSX-502 MSX-502III

Before starting operation, maintenance, or programming, carefully read the manuals supplied by Mori Seiki, the NC unit manufacturer, and equipment manufacturers so that you fully understand the information they contain. Keep the manuals carefully so that they will not be lost.

MORI SEIKI
THE MACHINE TOOL COMPANY

目次

CONTENTS

1 章 据付け

CHAPTER 1 INSTALLATION

1	据付けの概要	1-1
	INSTALLATION OVERVIEW	
2	据付けの条件	1-2
	INSTALLATION CONDITIONS	
2-1	据付け場所の環境	1-2
	Environmental Conditions	
2-2	据付け図	1-3
	Installation Diagrams	
2-2-1	2 面 APC, 3 面 APC 仕様	1-4
	2-, 3-Station APC Specifications	
2-2-2	5 面縦置 CPP 仕様	1-5
	5-Station CPP (Longitudinal Arrangement) Specifications	
2-2-3	6 面横置 CPP 仕様	1-6
	6-Station CPP (Transverse Arrangement) Specifications	
2-2-4	7 面縦置 CPP 仕様	1-7
	7-Station CPP (Longitudinal Arrangement) Specifications	
2-2-5	8 面横置 CPP 仕様	1-8
	8-Station CPP (Transverse Arrangement) Specifications	
2-2-6	9 面縦置 CPP 仕様	1-9
	9-Station CPP (Longitudinal Arrangement) Specifications	
2-2-7	10 面横置 CPP 仕様	1-10
	10-Station CPP (Transverse Arrangement) Specifications	
2-2-8	11 面縦置 CPP 仕様	1-11
	11-Station CPP (Longitudinal Arrangement) Specifications	
2-2-9	12 面横置 CPP 仕様	1-12
	12-Station CPP (Transverse Arrangement) Specifications	
2-2-10	LPP 仕様	1-13
	LPP Specifications	
3	基礎工事	1-21
	FOUNDATIONS	
3-1	防振基礎の概略	1-21
	Necessary Foundations for Vibration Absorption	
3-2	基礎図	1-22
	Foundation Diagrams	
3-2-1	ツール 40, 60 本仕様	1-23
	60-Tool Specifications	
3-2-2	ツール 120 本仕様	1-24
	120-Tool Specifications	
3-2-3	ツール 180, 240 本仕様	1-25
	180-, 240-Tool Specifications	
3-2-4	5 面横置 CPP 仕様	1-26
	5-Station CPP (Transverse Arrangement) Specifications	
3-2-5	6 面横置 CPP 仕様	1-27
	6-Station CPP (Transverse Arrangement) Specifications	
3-2-6	7 面横置 CPP 仕様	1-29
	7-Station CPP (Transverse Arrangement) Specifications	
3-2-7	8 面横置 CPP 仕様	1-30
	8-Station CPP (Transverse Arrangement) Specifications	
3-2-8	9 面横置 CPP 仕様	1-32
	9-Station CPP (Transverse Arrangement) Specifications	
3-2-9	10 面横置 CPP 仕様	1-34
	10-Station CPP (Transverse Arrangement) Specifications	

	3-2-10	11 面横置 CPP 仕様.....	1-36
		11-Station CPP (Transverse Arrangement) Specifications	
	3-2-11	12 面横置 CPP 仕様.....	1-38
		12-Station CPP (Transverse Arrangement) Specifications	
4		所要動力源.....	1-40
		REQUIRED POWER/AIR SOURCES	
4-1		入力電源.....	1-40
		Power Requirements	
4-2		入力電線サイズ（ブレーカサイズによる規定）.....	1-41
		Cable Size (Specified According to Breaker Capacity)	
4-3		工場側の機械電源（ブレーカ）.....	1-42
		Plant-Side Power Source (Breaker)	
4-4		アース線.....	1-42
		Grounding Cable	
4-5		空気圧源.....	1-43
		Compressed Air Supply	
4-6		圧縮空気用配管（ホース）.....	1-43
		Compressed Air Piping (Hoses)	
5		機械の吊上げ.....	1-44
		LIFTING MACHINE	
6		レベルの確認／調整.....	1-46
		ADJUSTING MACHINE LEVEL	
7		固定具の取外し／取付け.....	1-48
		REMOVING/MOUNTING TRANSIT CLAMP	
7-1		固定具の取外し.....	1-48
		Removing Transit Clamp	
7-2		固定具の取付け.....	1-53
		Mounting Transit Clamp	
8		マガジンの据付け.....	1-54
		MAGAZINE INSTALLATION	
8-1		ツール 120 本チェーンマガジン仕様.....	1-54
		120-Tool Chain Magazine Specifications	
8-1-1		吊上げ.....	1-54
		Lifting Magazine	
8-1-2		設置.....	1-55
		Placement	
8-1-3		固定具の取外し.....	1-60
		Removing Transit Clamp	
8-2		ツール 180, 240 本ラックマガジン仕様.....	1-61
		180- and 240-Tool Rack Magazine Specifications	
8-2-1		吊上げ.....	1-61
		Lifting Magazine	
8-2-2		設置.....	1-62
		Placement	
8-2-3		固定具の取外し.....	1-66
		Removing Transit Clamp	
9		付属機器の取付け.....	1-67
		UNITS INSTALLATION	
9-1		高圧クーラント装置の取付け（スルースピンドルクーラント仕様）.....	1-67
		High Pressure Coolant Unit Piping and Wiring	
		(Through-Spindle Coolant Specifications)	

10	給油	1-68
	LUBRICATION	
10-1	推奨油	1-68
	Recommended Oils	
10-2	各オイルメーカー対比表	1-69
	Equivalent Oils	
11	電源の接続	1-70
	CONNECTING POWER	
12	空圧源の接続	1-72
	CONNECTING AIR SOURCE	
13	X 軸調整	1-73
	X-AXIS ADJUSTMENT	
14	据付け後の確認	1-75
	POST-INSTALLATION CHECKS	
14-1	はじめての電源投入前の確認事項	1-75
	Checks before Turning ON Power for First Time	
14-2	はじめての電源投入後の確認事項	1-76
	Checks after Turning ON Power for First Time	
14-3	動作確認用サンプルプログラム	1-78
	Operation Confirmation Sample Program	

2 章 仕様

CHAPTER 2

SPECIFICATIONS

1	機械仕様	2-1
	MACHINE SPECIFICATIONS	
2	CPP 仕様	2-4
	CPP SPECIFICATIONS (OPTION)	
3	制御装置仕様	2-7
	NUMERICAL CONTROL UNIT SPECIFICATIONS	
4	電気容量一覧表	2-20
	POWER CAPACITY TABLE	
4-1	ツール 40, 60 本マガジン仕様 (標準)	2-20
	40-, 60-Tool Magazine Specifications (Standard)	
4-2	ツール 120 本マガジン仕様 (標準)	2-23
	120-Tool Magazine Specifications (Standard)	
4-3	ツール 40, 60 本マガジン仕様 (高加速度)	2-26
	40-, 60-Tool Magazine Specifications (High Acceleration)	
4-4	ツール 120 本マガジン仕様 (高加速度)	2-29
	120-Tool Magazine Specifications (High Acceleration)	

3 章 図面

CHAPTER 3

DRAWINGS

1	注意銘板.....	3-1
	SAFETY LABELS	
2	姿図.....	3-2
	GENERAL VIEWS	
2-1	2 面 APC 仕様.....	3-2
	2-Station APC Specifications	
2-2	3 面 APC 仕様.....	3-6
	3-Station APC Specifications	
2-3	縦置 CPP.....	3-10
	CPP (Longitudinal Arrangement)	
2-4	横置 CPP.....	3-12
	CPP (Transverse Arrangement)	
2-5	ツール 180, 240 本仕様.....	3-14
	180-, 240-Tool Magazine Specifications	
3	リミットスイッチ/ソレノイドバルブ配置図.....	3-18
	LIMIT SWITCH/SOLENOID VALVE INSTALLATION POSITIONS	
3-1	右側面.....	3-18
	Right Side	
3-2	左側面 (ツール 40, 60 本仕様).....	3-19
	Left Side (40- and 60-Tool) Specifications	
3-3	左側面 (ツール 120 本仕様).....	3-20
	Left Side (120-Tool Specifications)	
3-4	左側面 (ツール 180, 240 本仕様).....	3-21
	Left Side (180- and 240-Tool Specifications)	
4	機械移動量図.....	3-22
	AXIS TRAVEL DIAGRAMS	
4-1	タッチセンサ仕様 (メトロール製).....	3-22
	Touch Sensor Specifications (Product of Metrol)	
4-2	タッチセンサ仕様 (レニショー製).....	3-23
	Touch Sensor Specifications (Product of Renishaw)	
5	主軸回転速度出力特性線図.....	3-24
	SPINDLE SPEED OUTPUT CHARACTERISTICS DIAGRAMS	
5-1	14000 min ⁻¹	3-24
5-2	20000 min ⁻¹	3-25
6	ツールとワークの干渉図.....	3-26
	TOOL AND WORK INTERFERENCE	
6-1	標準仕様.....	3-26
	Standard Specifications	
6-2	油圧治具 I/F 仕様.....	3-27
	Hydraulic Fixture Interface Specifications	
7	主軸頭端面関係図.....	3-28
	SPINDLE HEAD MOUNTABLE ACCESSORIES	

8	ツールシャンク寸法図.....	3-32
	TOOL SHANK DIMENSIONS	
8-1	MAS	3-33
8-2	DIN	3-34
8-3	CAT	3-35
9	サイドスルースピンドルクーラント用ツール穴位置図.....	3-36
	SIDE THROUGH-SPINDLE COOLANT HOLE	
10	プルスタッド寸法図.....	3-37
	RETENTION KNOB DIMENSIONS	
10-1	プルスタッド一覧表.....	3-37
	Retention Knob Tables	
10-2	MAS 森精機専用 90°	3-38
	MAS Mori 90°	
10-3	CAT 森精機専用 90°	3-38
	CAT Mori 90°	
10-4	プルスタッド使用上の注意	3-39
	Cautions When Using Retention Knob	
11	工具制限図.....	3-40
	TOOL RESTRICTIONS	
11-1	ツール 40, 60, 120 本仕様	3-40
	40-, 60-, 120-Tool Specifications	
11-2	ツール 180 本仕様	3-43
	180-Tool Specifications	
11-3	ツール 240 本仕様	3-46
	240-Tool Specifications	
12	パレット形状図	3-49
	PALLET SHAPES	
13	ワーク重心制限図	3-52
	WORKPIECE CENTER OF GRAVITY POSITION RESTRICTIONS	
14	四面イケール形状図.....	3-53
	STANDARD TOMBSTONE SHAPES	
14-1	ミリパレット用	3-53
	For Metric Specification Pallets	
14-2	インチパレット用.....	3-54
	For Inch Specification Pallets	
15	クーラント配管組立図.....	3-55
	COOLANT PIPING ASSEMBLY DIAGRAM	
16	油圧回路図.....	3-56
	HYDRAULIC CIRCUIT DIAGRAM	
17	空圧回路図.....	3-66
	AIR CIRCUIT DIAGRAM	

IN-MACHINE MEASURING SYSTEM MANUAL

Ver. 6.4

Applicable Function

- Automatic Tool Length Measurement
- Automatic Tool Breakage Detection

Applicable Model

Machining Centers

Applicable NC Unit

MSX-501	MSX-501III
MSX-502	MSX-502III
MSX-511	MSX-511III
MSX-701	MSX-701III
MSX-702	MSX-702III
MSX-711	MSX-711III

CONTENTS

SIGNAL WORD DEFINITION

A: CONFIGURATION OF IN-MACHINE MEASURING SYSTEM

B: PREPARATION BEFORE OPERATION

C: FUNCTIONS

APPENDIX

CHAPTER A

CONFIGURATION OF

IN-MACHINE MEASURING

SYSTEM

This chapter describes the configuration of the in-machine measuring system.

CONTENTS

A : CONFIGURATION OF IN-MACHINE MEASURING SYSTEM

1	PROGRAM	A-1
2	TABLE-MOUNT SENSORS	A-1

CHAPTER B

PREPARATION BEFORE

OPERATION

This chapter describes preparatory steps for the execution of automatic tool length measurement and automatic tool breakage detection.

CONTENTS

B : PREPARATION BEFORE OPERATION

1	PARAMETERS	B-1
2	CHECKING THE SENSOR	B-2
3	SETTING THE TABLE-MOUNT SENSOR DATA	B-4
3-1	Table Sensor Data Setting Screen	B-4
3-2	Measuring Table-mount Sensor Height	B-8

CHAPTER C

FUNCTIONS

This chapter describes details of the automatic tool length measurement and automatic tool breakage detection functions and the procedure how to use them.

CONTENTS

C : FUNCTIONS

1	AUTOMATIC TOOL LENGTH MEASUREMENT	C-1
1-1	Outline	C-1
1-2	Specifying the Automatic Tool Length Measurement	C-1
1-3	Flow Chart of Automatic Tool Length Measurement	C-3
1-4	Contents of Measurement Data Stored to Variables	C-5
1-5	Examples of Automatic Tool Length Measurement	C-7
1-6	Alarm Message List	C-10
2	AUTOMATIC TOOL BREAKAGE DETECTION FUNCTION	C-11
2-1	Outline	C-11
2-2	Specifying the Automatic Tool Breakage Detection	C-11
2-3	Flow Chart of Automatic Tool Breakage Detection	C-13
2-4	Contents of Measurement Data Stored to Variables	C-15
2-5	Examples of Automatic Tool Breakage Detection	C-17
2-6	Alarm Message List	C-20

APPENDIX

The Appendix describes G and M codes used in sensor macros and an example program for unmanned operation.

CONTENTS

APPENDIX

APPENDIX 1	G AND M CODES	APPENDIX-1
APPENDIX 2	UNMANNED OPERATION PROGRAM EXAMPLE.....	APPENDIX-2